

388CC



388 Center Console OWNER ASSISTANCE MANUAL

Revised 2014



388CC SPECIFICATIONS

LENGTH:	37'10"	(11.5m)
BEAM:	11'	(3.4m)
DRAFT (boat only):	22"	(56cm)
BOAT WEIGHT:	9600lbs	(4354kg)
WEIGHT CAPACITY:	4300lbs	(1950kg)
PERSON CAPACITY:	12	
PERSON WEIGHT:	1980lbs	(900kg)
FUEL CAPACITY:	450gal	(1703.44L)
TRANSOM HEIGHT:	Twin-30" OR Trip 25"-30"-25"	
MAX POWER:	1050hp	(790kw)
COCKPIT DEPTH:	28"	(71cm)
COCKPIT AREA:	184sq/ft	(17m ²)
APPROX LENGTH ON TRAILER:	47'	(14.3m)
BRIDGE CLEARANCE:		
W/OUT TOP	10' 6"	(3.2m)
W/T-TOP	12'4"	(3.76m)
FLOTATION:	UNSINKABLE	
HULL DEADRISE:	22°	

CE

12 PERSONS OR 1547kg

790kw MAX POWER

B RATING

EdgeWater

Dear EdgeWater 388CC Owner:

Congratulations on purchasing one of the finest offshore boats ever built. It has been constructed with care from the finest available materials. At EdgeWater we take great pride in the quality and craftsmanship that goes into each boat. We believe you'll have many years of enjoyment from your new EdgeWater and thank you for entrusting your leisure time to one of our fine products.

This manual has been assembled to help you learn more about your new boat and increase your enjoyment of it. Your EdgeWater has been built for a "Lifetime on the Water".

Boat safe and boat smart, we wish you many years of boating pleasure.

Sincerely,

A handwritten signature in black ink, appearing to read "P. Truslow", with a stylized flourish at the end.

Peter Truslow
President
EdgeWater Power Boats LLC



Service Information

Please fill out the information below completely. It will help us in assisting you in the event your EdgeWater 3880C needs service.

Customer Name_____

Address_____

City_____State_____Zip_____

Phone_____Cell_____Business_____

E-mail Address_____

Dealer Name_____

Address_____

City_____State_____Zip_____

Phone_____Fax_____

Purchase Date_____Delivery Date_____

Engine Make/Model_____Engine Serial #_____

Engine Make/Model_____Engine Serial #_____

Engine Make/Model_____Engine Serial #_____

Hull Number_____DMA_____Ignition Key #_____

EdgeWater Power Boats LLC reserves the right to make alterations in the standard and optional equipment without incurring obligation to those boats already having been built. Every effort has been made to ensure that the information in this manual accurately describes vessels being built at the date of printing.

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1/General Information

1.1 General

Your EdgeWater 388CC is a semi-custom offshore fishing vessel that is designed to be powered by dual or triple outboard engines.

1.2 Owner / Operator Responsibilities

Registration

Registering your boat is important to you. Federal Law requires that all powered, undocumented vessels be registered in their state of principal use. Contact the appropriate agency in your local state to obtain specific registration information.

Reporting Boating Accidents

All boating accidents must be reported to the proper authorities in the state that the accident occurred. If someone dies or disappears as a result of the recreational boating accident, it must be reported immediately, with a formal report being made within 48 hours. If there is damage of more than \$500, or if the boat is completely lost, a formal report must be made within 10 days.

Questions regarding accidents may be directed to the Boating Safety Hotline, 800-368-5647.

Education

Whether or not you are an experienced boater, attending a Boating Education Course can be beneficial. If you are inexperienced, it is the best and safest way to begin your life on the water. If you are an experienced boater, it's always good to sharpen your skills.

Required Equipment

The U.S. Coast Guard requires certain equipment on each boat. In addition, they also set minimum equipment and safety standards. For more detailed requirement information, obtain "Federal Requirements And Safety Tips For Recreational Boats", by contacting the Boating Safety Hotline, 800-368-5647.



Some states and local agencies require equipment that is not required by the U.S. Coast Guard. Your local agency or dealer can provide specific information regarding these non-standard requirements.

2/Helm Control Systems

2.1 General

The helm station is the control center for the boat. The main control systems are the engine throttle and shift controls, the steering system, the trim tab controls, and the bow thruster control. These provide the operator the ability to control speed, direction, boat trim, and attitude. Each manufacturer provides manuals on the operation and use of their systems.

2.2 Steering System

General

The manual that comes with your steering system provides specific information on your steering system.

The SeaStar® helm pump is an axial piston pump. It has a built-in lock valve to prevent the steering load of the engines from feeding back to the boat operator. When the steering wheel is turned clockwise, hydraulic fluid is pumped out of the helm unit, into the starboard hydraulic line and then into the cylinder. As the fluid is pumped into one side of the steering cylinder, an equal volume of fluid is displaced from the opposite side, moving the steering cylinder body to port. The cylinder body is connected directly to the engine's stern arm, which moves the front of the engine to port and puts the boat into a starboard turn. The fluid displaced from the cylinder returns to the helm pump. Please see diagram in the manual's appendix for a visual representation of this system. In the event of a power assist failure, the steering system will still function normally but in a manual mode, which requires greater steering effort by the operator.

While running at slow speeds, most boats tend to wander slightly back and forth. Keeping the wheel in the center without overcompensating for the slight wandering will prevent over steering and reduce the tendency to wander.

Steering System Maintenance

Routine system inspection should occur regularly. Cables, hoses, linkage and helm assemblies should be inspected for wear, corrosion, cracking, or deterioration. Cleaning and light grease should be applied to all exposed metal parts and other damaged or deteriorated parts should be replaced as soon as possible. Cleaning fluids containing ammonia, acids or any other corrosive ingredients **MUST NOT** be used for cleaning any part of the steering system. Failure to comply will cause serious damage to the system, which could result in an accident or injury.

2.3 Engine Throttle and Shift Controls

Refer to the engine manual supplied with your engine for specific information on your controls. The ones depicted are those supplied by Yamaha®.

There are three major components of the engine throttle and shift controls: handles, throttle cable, and shift cable. Throttle and shift cables are push-pull and are connected to the fuel system (fuel injection throttle bodies) and to the shifting rod linkage. By moving the handles forward and back, the operator controls the amount of fuel and air being used and the gear selector for

forward, neutral and reverse. Careful use of the controls provides smooth, responsive and safe operation.



Do not bring the throttle back abruptly to stop the boat unless it is an emergency. Allow time for the engine RPM to come down to idle before shifting to reverse or severe gearbox damage could occur. PLEASE REFER TO YOUR ENGINE OWNER'S MANUAL FOR FURTHER OPERATIONAL PROCUDURES FOR YOUR OUTBOARD.

Engine Stop Switch

This device is designed to shut down the engine in the event that the operator is thrown away from the helm station. The operator should always wear the engine stop switch lanyard while the boat is in motion. Pulling the lanyard from the control will stop the engine. If the engine will not crank properly, the lanyard may not be properly attached to the engine stop switch.



Do not use the engine stop switch to stop the boat unless it is an emergency as it may impair your ability to quickly re-start the engine.
****NOTE** Each ignition key has a 3 digit number stamped on it. Please record this number for future reference on the service information page in the front of this manual.**

3/Propulsion System

3.1 General

Your new EdgeWater 388CC is designed to be powered by dual or triple outboard motors. Most 2-cycle outboards currently use an automatic system to mix the oil with the engine before the engine uses it. If equipped with 2-cycle engines, there will be oil tanks located inside the mechanical access space and the oil fills will be located on the motorwell side of the aft deck. Make sure the oil tanks always have a sufficient amount of the recommended 2-cycle oil for your cruise, plus some reserve. Most 4-cycle engines require oil be maintained in the crankcase. Always check the crankcase oil level before each day's run.



Always follow the manufacturer's recommendations and use only the recommended oil types.



Don't attempt to service your outboards or any of their components unless you are thoroughly familiar with its operation and dangers. Many of the moving part components are exposed and can pose an extreme danger to anyone unfamiliar with their operation. Always leave the servicing to a qualified technician.

Each manufacturer provides manuals designed to assist you in the proper operation and maintenance of your new engine(s). Follow their guidance and schedules for proper operation of your new engine(s). With a modern outboard there is little to do as long as proper maintenance is performed, in accordance with the manufacturer's recommendations. If the boat is to be kept in saltwater for an extended period, electrolysis and marine growth can become a problem. When leaving your boat in salt water overnight or for an extended period, tilt the engine(s) as high out of the water as possible. This will decrease the possibility of marine growth on the outside of the engine(s), as well as reduce the potential of marine growth compromising the cooling water inlets in the lower unit(s), which can cause overheating.



Do not paint your outboard's lower units with paints designed for boat hulls. Some can cause severe damage to your engine. Check with your engine manufacturer to get their recommendation.

Do not attempt control adjustments unless you are very familiar with their function, operation and adjustment. Failure to properly adjust the system components can adversely affect your boat's performance and safety. Mis-adjustment can also cause severe control, engine or lower unit damage.



Please return all warranty cards for boat, engines and other related items. This will assist you in the event you have a warranty problem.

3.2 Engine Cooling System

Most outboard engines are cooled by water taken in through ports in the lower part of the drive section. Make sure these ports are free of debris or other items that might cause the flow to be restricted. Maintain a routine vigilance to see that the visual inspection streams have a steady flow of water. If they do not, shut down the engine to see if they are clogged or if there is a more serious problem. Be especially watchful if you have gone through an area of vegetation or shallow water as the intake ports can become clogged with weeds, dirt or other debris.



Do not run your outboards without water coming into the lower unit. The water pump impellers can be damaged in only seconds of this type of operation.

3.3 Propellers

A turning propeller moves the boat through the water, forward or backward. They should always be clean and free from nicks or dings, which can adversely affect performance. Your dealer can assist you in the proper selection of a propeller for your boat. This selection is based on the horsepower of the engine and its relationship to the size and weight of the boat.

Propeller sizes are determined by two numbers, which appear on different propellers at various locations. They are listed in sequence, for example 13 x 17. The first number is the diameter of the propeller and the second is the pitch. Pitch is the theoretical distance the propeller moves through the water with each complete revolution, the larger the number the greater the theoretical movement. It also follows that the larger the number the greater horsepower is required to turn it. With a load which is "normal", or usual for your boating activities, the engine should be able to reach its maximum operating RPM range at wide open throttle (WOT) and full trim. With a light load on smooth water, the engine should reach its manufacturer's rated maximum operating RPM at wide-open throttle (WOT) and maximum trim. If it does not, you may have a propeller that has too much pitch. If it goes beyond the maximum recommended RPM range, you may have too little pitch. Neither condition is good for the engine. You will get shorter engine life and poorer performance than your boat and motor were designed to provide.



If your boat came from the factory with a propeller selected by EdgeWater Power Boats LLC and Yamaha® Engineering, it should already be optimized for the performance of your boat. Before changing the pitch or diameter of your propeller, always check with your dealer to determine how the changes will affect your boat and engine performance. Certain modifications such as bottom paint or options that affect weight balance and/or wind resistance may lower peak rpm. Always check with your dealer first if optimum rpm cannot be attained.

3.4 Engine Power Tilt and Trim

The power tilt and trim system on your outboard(s) provides the ability to optimize the running angle of your EdgeWater 388CC to allow for load and sea conditions. Moving the outboard lower unit toward the transom is generally referred to as trimming “in”, while moving the outboard lower unit away from the transom is referred to trimming “out”. It is generally best to have the engine(s) trimmed in for acceleration from displacement to planning mode. This brings the bow down and requires less fuel and effort on the engine’s part to plane off the hull. Once on plane, the engine should be trimmed “out” to optimize performance and minimize fuel consumption.

The first 20° of movement aft of the transom are referred to as trim and is the area generally used to operate the boat while on plane. The area beyond the first 20° is referred to as tilt and is usually reserved for operating in shallow water or at idle speeds only.

While running under normal conditions, the bow should be in a 3° to 5° up angle to maximize the hull’s ride and performance. When sea conditions are rougher than normal, bringing the bow slightly down may improve the ride and will also allow the boat to remain on plane at a lower speed.



Inspect hoses and cables at the engine before each use. Any worn or cracked components should be replaced immediately.

3.5 Engine Instrumentation

The following is presented to familiarize you with the instruments, which may be on your boat. Every boat is not equipped with full instrumentation.



All factory installed Yamaha® engines include Yamaha’s digital multifunction tachometer and speedometer. Refer to your engine operators’ manual for use details.

Tachometer

The tachometer displays the number of revolutions per minute (RPM) the engine is turning. There is a designed operation RPM range for the engine. Become familiar with the operating range of your engine and its operating characteristics. The tachometer is designed to aid the boater to assure the engine performs within that designed range. The tachometer can be used to better understand the performance of your engines and your EdgeWater 388CC. By monitoring your tachometer as you operate your EdgeWater 388CC, you will find RPM ranges that work better in certain sea and load conditions. Be alert the tachometer operation may provide an early indication of difficulty, before it becomes irreversible.

Speedometer

The speedometer indicates the boat speed in miles per hour. Some types work using a spinning wheel to determine the boat speed. Their accuracy can vary from the actual over the bottom speed due to many factors. Other boat speedometers calculate the speed by amount of pressure the moving water forces into a “pitot” tube. And some other speedometers use a GPS sensor. These gauges should only be used as indicators of approximate speed and not used as absolute speed indicators. NOTE: The Yamaha® F250 engines use a pitot tube built into the lower unit while the F300 and F350 engines require a GPS input for speed. In the event that erroneous speed-readings appear, it is likely caused by debris clogging the pitot tube. Consult with your dealer on methods to clean the tube and restore normal operation.

Temperature Gauge

This is designed to monitor the operating temperature of your engine's cooling system. A sudden rise from the normal should be investigated to determine if there is an obstruction in the cooling system.

Water Pressure Gauge

This gauge measures pressure in the engine cooling system. If the pressure changes from the norm it could indicate a complete or partial blockage in the system or a water pump problem. If this does not return to normal, your dealer should check it to make sure the cooling system is operating properly. Low water pressure may also be caused by engines mounted excessively high or low in misadjustments of the tie bar. NOTE: Factory rigged boats are not equipped with water pressure gauges.

Fuel Gauge

This gauge indicates the amount of fuel in the fuel tank. It is always prudent to follow the "rule of thirds", one-third of the tank to get the destination, one-third to return, and one-third in reserve. NOTE: It is important to "calibrate" your fuel gauge during your first initial boat trip. Record the fuel reading prior to fill up and how many gallons to top off the tank at each fill-up. Make sure the boat is floating in the same position. By subtracting the amount to top off from total fuel capacity you can calculate gallons remaining in the tank for 3/4, 1/2, and 1/4 gauge readings.



This gauge is a measure of relative fuel supply and is not a calibrated instrument!

Voltmeter

This meter displays the voltage for the battery and charging system. The voltmeter should read at least 12.1 volts when the engines are off and 13.4 volts when the engines are running.

Hour Meter

The hour meter keeps a record of operating time and is very useful for scheduling maintenance.

Engine Alarms

Most outboards are equipped with several audible engine alarms. Your engine owner's manual will familiarize you with these and their sometimes-distinctive sounds.



Warning: If an engine alarm sounds, shut down the engine until the source of the problem is determined.

Compass

The compass assists in determining your location by indicating your position relative to magnetic north. For accuracy, your compass may need to be adjusted to take into account specifics of your boat and geographic location. Please refer to the material provided with your compass for "compensation".

Instrument Maintenance

Your instrument faces should be periodically cleaned to keep them free of salt and atmospheric debris. The ignition switches should be periodically sprayed with a contact cleaner/lubricant to keep them free of corrosion and dirt. Cleaners with abrasives or harsh chemicals should not be used on your instruments.

4/Fuel System

4.1 General

Your EdgeWater 388CC is equipped with a 450-gallon “main” fuel tank. The inspection ports for the fuel tanks are located in the floor at the helm station for the main tank and between the aft fishbox lids for the auxiliary tank. If equipped with the auxiliary tank, electronic switching valves are located in the aft bilge compartment and are controlled by a dash-mounted switch. All engines draw from either the main or auxiliary tank simultaneously and the fuel level gauge will display the level of the tank selected. In the event of a malfunction of the valves, they may be switched manually. Follow the instructions on the fuel valve to perform this operation.

Your boat's fuel system has been designed to meet or exceed the requirements of the U.S. Coast Guard, the National Marine Manufacturers Association (NMMA), and the American Boat and Yacht Council (ABYC), which were in effect at the date of manufacture. All fuel system components on your EdgeWater 388CC have been tested at the factory for function and leaks, regular inspection and maintenance are the responsibility of the owner. Make periodic inspections to determine the system is still safe and free of leaks. Special care should be taken when inspecting joints and connections to ensure they have not loosened due to vibration.



If any odor of gasoline is detected, immediately shut off all engines and electrical devices until the source and condition of the odor has been determined and eliminated. Have a fire extinguisher at the ready until the condition has been resolved.

4.2 Fuel Fill

The fuel fill caps are located on the port side and are labeled “GAS”. If two fuel tanks are installed, the forward fill is the main tank and the aft fill is the auxiliary tank. Tighten the caps until snug, but not so tight they cannot be removed at the next fuel stop or so tight the rubber o-ring is damaged, as this will allow water to enter the system.

4.3 Fuel Vent

This vent is incorporated into the fuel fill cap. The vent allows air to escape from the tank as fuel is being added. Make sure the fill and vent area is kept free from debris. The vent also allows for expansion and contraction of the fuel in the tanks. **DO NOT SMOKE OR INTRODUCE AN OPEN FLAME NEAR THE FUEL CAPS!**

4.4 Fueling

Before fueling, you should follow these procedures:

- Make sure the boat is securely moored and engines are turned off.
- Make sure all switches are off and all cigarettes and open flames are extinguished.
- Know the location of all fire extinguishers.
- Remove the fuel fill cap.
- Place the nozzle firm against the side of the opening to prevent static discharge
- Begin fueling.
- DO NOT OVERFILL.
- Re-install the fuel cap.
- Check the bilge area for fuel odors.



Warning: If fuel odors are detected, do not start the engines! Check to make certain there are no leaks or system problems before starting the engines.



Warning: Do not fill the fuel tank while the engines are running. Do not allow smoking or open flames within 50 ft. of the fueling area. Fuel is very flammable. To prevent damage to the engines, use only fuels without harsh additives or alcohol. Refer to your engine owner's manual for specific fuel requirements.

4.5 Fuel System Maintenance

Regularly inspect the fuel system components. All lines, fittings, and bulbs should be flexible and not corroded. If fittings or other components are found to have cracks, they should be replaced at once. If you use your boat infrequently or do not use it for an extended period of time, a fuel conditioner should be added to a full tank of fuel to prevent fuel deterioration and damage to the fuel system.

4.6 Fuel Filters

Fuel filters are installed inside the mechanical access space on the starboard-side wall. These are fuel/water separator type of filters and are designed to prevent water from entering your engine. The fuel filter element is a spin-off type element. At a minimum, this element should be replaced at the beginning of every boating season. Always carry a filter wrench and spare filter of the type supplied on your boat.

5/Electrical Systems

5.1 General

Your EdgeWater 388CC operates on a 12volt DC system, similar to your automobile. The batteries, (2 standard plus 1 per engine), are typically lead acid type and require similar maintenance to your automobile's battery. A standard battery isolator and all batteries are located inside the console, behind the access door located on the aft wall of the console.

5.2 Panel Switches

Your EdgeWater 388CC is equipped with panel mounted breakers. Two panels are at the helm area and one is inside the console. On the 388CC helms' main switch panel, switches are provided for navigation lights, decklights, forward, aft, and sump bilge pumps, two for livewells, raw and freshwater pumps, fwd and aft fishwell pumpouts, fwd and aft spreader lights for t- or hard tops, helm, deck, & locker lights, waste discharge, and four accessory switches. A second panel mounted below the main switch panel includes two or three ignition switches, engine emergency stop switch, two 12V outlets, battery parallel switch, and windlass power and up/down switches.

Inside the console, the Master Distribution Panel houses the boats' battery switches along with breakers for the "switched" & "un-switched" component mains, electronics main, and anchor windlass main. Breakers are provided for the following "switched" components: waste & fishwell pump-outs, anchor windlass, forward, aft, and sump bilges, nav/helm/deck/locker lights, raw & freshwater pumps, livewells, 12V outlets, trim tabs, electric head, stereo, spreader lights, four accessories, and four spares. Breakers for "un-switched" components include: forward & aft auto bilge pumps, stereo memory, and two spares. Breakers for electronics include radar, GPS, sounder, VHF, autopilot, displays #1 & 2, one accessory, and eight spares.

A wiring diagram is included with this manual to assist you in troubleshooting the boat's electrical system. Please note that the accessory circuits are each protected by a circuit breaker. Check that the requirement of any device you install does not exceed the rating of the circuit breaker.

Your 388CC is equipped with two GRP29 batteries as standard, designated "HOUSE", along with "PORT ENGINE", "STBD ENGINE", and "CENTER ENGINE" if equipped. All batteries are connected to a battery isolator through their battery switches. The isolator serves to provide charging to all batteries simultaneously from the engines whenever they are running and to isolate each battery from the other when the engines are turned off. This allows the use of your electrical system at the dock or with the engines off without draining the engine cranking batteries. For normal operation, all battery switches should be placed in the "ON" position and returned to the "OFF" position when the boat is left unattended. Power is supplied to the automatic bilge pump float switches and the electronics memory circuits even when the switches are in the off position. In the event the battery level is too low to start an engine, the emergency parallel switch at the helm may be pressed, and held down, while starting the engines. This connects all the batteries together to provide increased starting power.

5.3 Electrical System Maintenance

At the beginning and end of each season the exposed electrical components of the switch panel should be sprayed with a non-conductive rust/corrosion inhibiting spray. Light bulb connections and running light connections should be covered with a non-water soluble lubricant. Care must be taken not to get grease on the glass portion of the light's as it will cause them to overheat and burn out. Inspect all wiring for breaks, loose terminals and sound insulation. Replace worn or deteriorated components. Check the electrolyte level in the batteries regularly and fill with distilled water, as necessary. **DO NOT OVERFILL.** Batteries under charge emit explosive hydrogen gas. DO NOT remove fill caps for inspection in the presence of sparks or an open flame.

6/Raw, Waste & Freshwater Systems

6.1 General

Your boat is equipped with fresh, waste, and raw water systems. The freshwater components include a freshwater tank, distribution lines, two sink/shower faucets, and a pump. The standard raw water system consists of a two high-speed pick-ups located on the transom, three pumps, two washdown outlets, distribution lines, and one or more livewells. The waste system consists of a toilet, waste management system, distribution lines, a deck plate, and an overboard discharge valve. A diagram of all the water systems is included with this manual.

6.2 Livewell Operation

Two low maintenance centrifugal pumps located in the mechanical access space fill the livewell(s). The main livewell is located at the center aft deck area, and an optional livewell may be added in place of the freshwater sink area at the port aft corner of the deck. The livewell & accessory livewell switches on the helm switch panel operate the pumps. In order to properly operate, the valves located inside the livewell(s) must be adjusted to provide an even flow in and out of the livewell(s). Too much flow and it will be more than the drains can handle, too little and the water will not get proper circulation. The valve should be turned counterclockwise to open and clockwise to close.

The livewell located at the aft center of the boat has 2 strainers attached to overboard drains in order to regulate the height of the water. The livewell drains through hoses connected to thru hull fittings on the sides of the boat. To completely drain the aft livewell(s) remove the bottom plug(s), which allows any water to drain overboard.

6.3 High Pressure Washdown

The washdown system is comprised of a pump mounted in the mechanical access space and two washdown outlets. The raw water switch on the helm switch panel controls the pump. A washdown hose bib is located amidships under the starboard gunnel and a washdown hose and nozzle assembly is located inside the forward anchor locker. These outlets can be used to wash debris from the boat. The raw water switch should be turned on immediately prior to use and turned off when not in use. When activated, the pump's pressure switch will automatically control the pump. It is normal for the pump to cycle on and off in response to flow rates and water demand.



Always turn off the high-pressure washdown pump switch when leaving the boat unattended.

6.4 Freshwater System

The freshwater system is comprised of a pump mounted beside the freshwater tank and two showerhead assemblies. The freshwater switch on the helm switch panel controls the pump. A thirty-one gallon freshwater tank is located forward of the console and is accessed by removing the console storage drawer unit located on the lower forward wall. The fill is located on the starboard side deck amidships. One showerhead assembly is located in the port aft sink on the deck; (unless an optional livewell is installed), and the other is inside the console at the sink. The freshwater switch should be turned on immediately prior to use and turned off when not in use.

When activated, the pump's pressure switch will automatically control the pump. It is normal for the pump to cycle on and off in response to flow rates and water demand.



Always turn off the freshwater pump switch when leaving the boat unattended.

Operating instructions for the freshwater system

1. Fill holding tank with drinkable water, using water fill located on the starboard side gunwale.
2. Turn on freshwater pump switch, located on the dash switch panel.
3. Utilize all freshwater equipment. (Transom shower STD)
4. If the system has not been used for a while please allow a few minutes for the pump to prime up. (In some cases it may take up to ten minutes to prime the system.)

Troubleshooting tips

1. You can hear the pump running, but no water is coming out of the spray head.
 - a. The holding tank is empty, fill with water.
 - b. The pump has not yet primed, hold hand over nozzle while squeezing the trigger. This will help to prime the pump.
2. The pump will not run at all.
 - a. Check the breaker on the dash switch panel.
 - b. Make sure the battery switches are in the "ON" position.
 - c. Check the connections at the switch and at the pump itself.

6.5 Waste System

The waste system is comprised of a toilet and a self-contained waste unit, which has the tank, pump and y-valve installed together and mounted in the space forward of the water tank, behind the console storage drawer unit located on the lower forward wall. A water solenoid is also installed above the water tank for toilet pressure regulation. The waste discharge switch on the helm switch panel controls the unit. The system can be emptied through a deck plate located on the starboard side deck amidships or by opening the overboard discharge valve located behind the access doors at the rear of the console interior. The waste discharge switch should be turned on immediately prior to use and turned off when not in use. When activated, the pump's pressure switch will automatically control the unit. Please refer to your toilet and waste systems owners' manuals for further operational procedures on the units.



Always turn off the waste discharge switch when leaving the boat unattended.

6.6 Raw Water System Maintenance

The following checks should be made periodically to assure your system operates properly:

- Periodically spray pumps with a protective silicone solvent to reduce corrosion.
- In-line filters should be cleaned periodically to remove any collected debris.
- Fishboxes and livewells should be drained and cleaned after each use.
- Hoses and connections should be checked periodically for signs of deterioration.

7/Drainage System

7.1 General

All non-bilge water drains from your EdgeWater 388CC by gravity. Your boat is self-bailing at rest and it is important to check all drains frequently to make sure they are clear and free flowing. Review the schematic in the Appendix and become familiar with the location of each thru-hull drain.

7.2 Cockpit Drains

Your EdgeWater 388CC drains through four cockpit drains located at the aft deck area. The deck is designed to take water and drain it overboard. When washing the boat down after use, use a hose nozzle with a high-pressure stream to make sure the drain troughs are clear of debris and free running.

7.3 Transom Bilge

Your EdgeWater 388CC's transom bilge is located in the mechanical access space. The aft bilge pump is designed with an electronic sensor that automatically turns the pump on if the water in the bilge rises, or the aft bilge switch on the helm switch panel may also activate it. This pump should be periodically checked to make sure it is working properly and that the drain screen is clear. To check the pump, squeeze the pump sides and lift it from the base, which is fastened to the hull. The screen will be easily seen and if there is debris, it may be cleaned and replaced. Replace the pump assembly and check its operation by turning on the momentary switch on the helm switch panel. When the boat is out of the water, unscrewing the garboard plugs located at the bottom of the transom and forward "step" areas drain any excess water that may intrude. The plugs may be removed with a ½" wrench. The plugs should be periodically checked for tightness.



Note: The bilge sump area should be checked for oil before operating the bilge pump. The discharge of oil from a bilge area is illegal and is subject to a fine. The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into or upon the navigable waters of the United States or the waters of the contiguous zone if such discharge causes a film or sheen upon, or a discoloration of the surface of the water, or causes a sludge or emulsion beneath the surface of the water. Violators are subject to a penalty of \$10,000.

7.4 Locker & Fishbox Drains

On the 388CC there is a forward anchor locker that drains directly through the hull. The forward and aft fishboxes are drained to diaphragm pumps that are controlled by the fishbox pumpout switches on the helm switch panel. An overboard discharge valve is located in the midship bilge, (interior console aft wall), for the forward fishbox. Access to the aft pumps is through the mechanical access hatch located on the aft deck floor, and access to the forward pump is behind the console storage drawer unit on the lower forward wall. A diagram of the raw water system is included in the Appendix.

7.5 Amidships Bilge & Console Sump

Your EdgeWater 388CC has a midship bilge where an automatic pump and two overboard discharge valves (holding tank and fishbox drain) are located, along with a console sump. The forward bilge switch on the helm switch panel also controls the sump. Access to the bilge and valves is through an access door located on the lower aft wall inside the console. This pump

should be periodically checked to make sure it is working properly and that the drain screen is clear. To check the pump, remove the top cover and lift it from the base, which is fastened to the hull. The screen will be easily seen and if there is debris, it may be cleaned and replaced. Replace the top cover and check its operation by pouring water into the console drain. Once the water level is high enough, the pump will automatically turn on and drain the sump.

8/Safety Equipment

8.1 Required Safety Equipment

Contact the U.S. Coast Guard Boating Safety Hotline at 1-800-368-5647, or 1-202-267-1070 to obtain a pamphlet on the latest required and suggested safety equipment. The Coast Guard Auxiliary also offers “Courtesy Examinations” to help ensure your boat is properly equipped.

The following is a list of required safety equipment to be aboard your boat. This may be modified from time to time and it is suggested that you contact the U.S. Coast Guard Boating Safety Hotline at 800-368-5647 or pick up a copy of the latest “Federal Requirements and Safety Tips of Recreational Boats” pamphlet.

Personal Floatation Devices (PFD’s)

These must bear a tag that they have been approved by the U.S. Coast Guard and must be in serviceable condition. They must also be of the appropriate size for the wearer, i.e. for children there must be children’s life vests on board. Many states now require children to wear PFD’s at all times. You should check with your state to determine the proper requirements. You should maintain at least one Type I, II, or III PFD for each person on board, plus one throwable device, a ring or boat cushion, Type IV.

Visual Distress Signals

These are now required in virtually all waters of the United States. If in doubt, please check with the U.S. Coast Guard Boating Safety Hotline at 1-800-368-5647 for a specific answer.

Pyrotechnic Visual Distress Signals

These must be U.S. Coast Guard approved, be in a serviceable condition, and be readily accessible. They each have a service life date and are not counted beyond this date. These types include both hand held flares and aerial flares.

Sound Signaling Device

You must have an efficient means of making a proper sound signal in the event of distress or poor visibility. Your 388CC is equipped with a horn as standard equipment, but a good back up such as a bell, whistle, or hand-held horn should also be carried.

Navigation Lights

These come with your EdgeWater 388CC and meet U.S. Coast Guard requirements. It is important that you periodically check to make sure they are in working order. It is very important these be checked prior to any cruise that will keep you on the water after dark.

Fire Extinguisher

Fire extinguishers are standard on all EdgeWater boats. These require regular inspection to make certain they are ready for use. Questions may be directed to the U.S. Coast Guard Boating Safety Hotline at 1-800-368-5647, or 1-202-267-1070. You should, as part of routine boat maintenance; check to make sure your extinguisher is still operable.



Never discharge your fire extinguisher to see if it still works. This will cause it to lose pressure. If it is accidentally discharged or if it is used on a fire, replace it immediately.

8.2 Suggested Safety Equipment - Inshore

Suggested safety equipment, over and above the required equipment is:

- First aid kit and manual
- Boat hook
- Tool kit
- An adequate number and size of line should be on the boat. Bowlines should be at least 1/3 longer than the boat's length and stern lines at least as long as the boat. When operating in areas with unusually high tidal range, this should be lengthened. The minimum size line for a small boat is 3/8" diameter 3-strand nylon. Refer to one of the listed references in the Appendix for a complete discussion on line size relative to boat length.
- Waterproof flashlight, with good batteries
- Spare batteries
- Binoculars
- Tow line. This should be a minimum of 50' long with at least one size increase over the boat's mooring lines.
- Day/Night visual distress signals
- Local charts and compass
- Properly sized anchor and line
- Fenders of the proper size



Always carry water, even for a 10-minute cruise.

8.3 Suggested Safety Equipment – Offshore

In addition to the required equipment, and the suggested inshore equipment, there is additional equipment that is prudent to have when venturing offshore. No matter what the conditions at the start of the trip, the situation can change rapidly and all your equipment and skill can be required to safely bring your crew home to safety.

- VHF radio
- A supplemental, portable VHF is also a good backup
- Sunscreen
- Spare propeller and the knowledge of how to properly change it, if required
- Extra clothing for changeable weather conditions
- Spare anchor with sufficient line for the water depth
- Mirror
- Charts

9/Safe Operation

9.1 Pre-Cruise Check List

- Check provisions. Make sure you have plenty of water in the event you have a problem and are delayed.
- Check the weather forecast. Avoid sea conditions that are beyond the experience of yourself and your crew.
- Do you have the correct safety gear aboard and is it in good working order?
- Make sure all fire extinguishers are in good working order.
- It is advisable to carry jackets or foul weather gear in the event of adverse weather conditions.

Your EdgeWater 388CC is equipped with a maximum capacity rating plate permanently affixed to the helm area of your boat. It will provide information regarding the maximum number of people you can safely have aboard, the maximum amount of weight the boat can safely carry, and the maximum horsepower your boat was designed to handle.



Do not overload your boat.

Before Starting the Engine

- Determine if the trip can be safely made by checking the weather.
- Are all the proper boat and personal documents on board?
- Check operational equipment, such as running lights and horns to make sure they are on board, and operable.
- Make sure there are enough provisions for the cruise.
- Leave a float plan with someone who can notify authorities in the event you do not return in the allotted time.
- Double check the fuel and engine oil levels.
- Set the battery switches to “ON”.
- Check the emergency stop lanyard to see if it is properly attached, and that the shift lever is in the neutral position.



Remember the rule of thirds: 1/3 out, 1/3 back, and 1/3 in reserve.

After Starting the Engine

Upon initial start-up, make sure to follow the manufacturer's recommendations for engine break-in:

- Check to be sure there is a telltale water stream exiting the engine.
- Check the gauges to determine if everything is nominal.
- Check to make sure everything is secured and properly stowed away; remember the boat's movement is dynamic and anything that is loose will become a hazard at the worst possible time.



Remember that the captain is responsible for the safety of the crew and passengers and for his/her boat's wake damage.



Never operate the boat while under the influence of alcohol!

Make sure someone else on-board knows how to operate the boat in the event you are injured and unable to operate the boat.



If you are operating the boat for the first time, make sure you follow the engine manufacturer's break-in recommendations. This will assure proper break-in and reduce the possibility of engine problems.

9.2 Basic Rules of the Road

The following is not intended to be a comprehensive course in seamanship and rules of the road, but instead an introduction. It is strongly recommended that a boating safety course be taken from your local Coast Guard Auxiliary or local Department of Natural Resources.



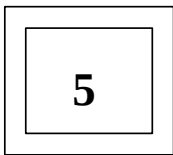
Remember, paddleboats, sailboats and other vessels (such as barges) that are unable to maneuver, always have the right of way over powerboats. Sail boats, when under power, are considered motorboats. However, always boat defensively.

Aids to Navigation

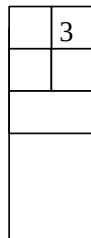
Along the coastlines and in navigable inland waters, the U.S. Coast Guard has placed aids to navigation. These have been placed for the boating public's safety. Please become familiar with them and learn to use them to make your boating safer and more fun.

Federal Waterways Marking System Aids

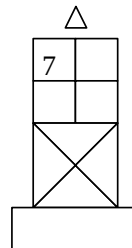
Lateral Aids as seen from Seaward (portside green)



Daymark

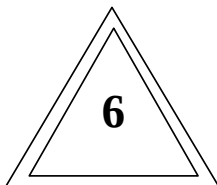


Can Buoy

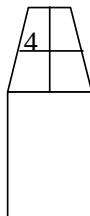


Lighted Buoy
(green light)

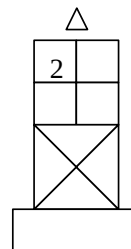
Lateral Aids as seen from Seaward (starboard side red)



Daymark



Nun Buoy



Lighted Buoy
(red light)

9.3 Safe Operation

Getting Underway

After clearing the dock, make sure the power trim (if so equipped) is trimmed down. (This will bring the boat up on plane more quickly and easily.) Give the engine sufficient throttle to bring it to plane briskly, then back down to the cruising speed of your choice, based on the sea conditions and your planned activity.

After coming on plane, raise the trim to a point where the engine is level with or slightly above the plane of the water. This is usually with the bow at about 3° to 5° above level. This will provide the smoothest, most economical operation.

Keep a constant vigil for other boats and watercraft and be prepared to give way, or slow down, if necessary. (We suggest you enroll in a boating safety course offered by the U.S. Power Squadron or the Coast Guard Auxiliary.)

When coming off plane, allow the engine to come back to an idle speed until the boat slows down. Shift to the neutral position.



Never allow anyone to sit on the gunwale while the boat is moving!

While underway keep a constant vigil for other craft that may be approaching, the gauges on your boat, location of passengers and the general sound and feel of your craft. Often, a change in the way the engine sounds or the boat feels will presage a problem. Your early attention may prevent a more serious problem.



If you should strike an underwater object, bring the throttle to neutral and stop the engine. Inspect the lower unit for damage. If none is apparent, proceed as before but heighten your awareness of the engine and its operation to make sure a problem has not gone undetected.

9.4 Towing or Being Towed

Sooner or later you will have the misfortune of having to be towed in or needing to tow someone back to a safe landing. It is important that this be done properly so that a difficult situation does not become worse. This comes under a longstanding, unwritten law of the sea that one boater will aid another in time of distress. The 1971 Boating Safety Act grants protection to those assisting others at sea as "Good Samaritans" and absolves them of civil liability rising from the aid being provided.

When being towed, it is best to have a line passed from the tow boat to the one being towed, assuming the towing boat has a line of adequate size and length. The towboat should also tow the disabled vessel from as close to amidships as possible. This reduces the tendency to yaw. If possible, the towing boat should use a bridle attached to the two stern ski tow eyes. The vessel being towed should attach the towline to the bow eye that holds the boat onto the trailer. This provides an optimal tow position and a strong tow point. Have the occupants of the boat being towed sit aft of amidships, but not all in the stern. Attention should be given so the boat remains balanced and on an even keel. Some boats tow better with the engine tilted out of the water, others need the engine to act as a rudder to be able to maintain a straight line. Start with the engine tilted. If that does not work well lower the engine until it is about perpendicular.



You should never attempt to plane off the boat being towed.

9.5 Stopping the Boat

Gradually bring the controls back to the low forward position and allow the boat to gradually slow down. After the boat has dropped into the displacement mode, shift to the neutral position. If you have been running the boat hard for some time, allow the engine to idle for several minutes to gradually cool down. After docking and securing the boat, raise the trim tabs to the fully upright position and turn off the ignition.

9.6 Docking

Safe docking keeps your boat from being damaged and is an indicator of a capable and knowledgeable captain. There are many docking maneuvers, which will be done while boating; only the basics will be discussed here. Several constants to always use as guides while docking:

Perform docking at idle or no wake speeds. Always try to come into wind or current, whichever is stronger. This allows you to use the natural forces on your boat to act as a natural brake. The skipper is free to use the boat's power to control speed and direction.

The approach to the dock should be at roughly a 45° angle, when possible. This approach angle allows the captain to bring the bow close to the dock, and then to use reverse, while turning the wheel toward the dock, to bring the boat to a safe, controlled stop.

Never approach a dock on plane. Even after reducing engine speed, the wake will push the boat uncontrollably into the dock.

9.7 After Operation

Refill the fuel tank and engine oil if it is a two-cycle engine. A full fuel tank is less subject to condensation and therefore, less fuel problems. If you will be leaving the boat for an extended period, use a good fuel stabilizer. Each engine manufacturer makes their own and proper use will avoid many fuel related and lay-up problems. Remember; always follow the manufacturer's recommendation.

If the boat is to be left in the water, make sure it is secure and free to properly accommodate any tide.

Turn off all electronics and leave the battery switches in the off position. Remember, the bilge pump will operate properly even with the battery switches turned off. On a comforting note, your EdgeWater 388CC is fully self-bailing and unsinkable. Proper precautions, however, are always prudent.

9.8 Trailering Your Boat



Note: If you have doubts or questions about your tow vehicle or towing, contact your dealer.



Before going on the highway, make sure your tow vehicle and trailer meet the local regulations for trailers and towing in your state.



Before leaving the driveway make sure the lights on the trailer are operating properly. If necessary, get a second person to make sure of the operation.

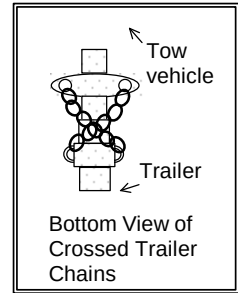


At least once a season, check and repair/replace the trailer wheel bearings.

The trailer should be adequately sized for your boat. Allow about 10% above the maximum boat weight for trailer capacity.

Make sure your vehicle is properly equipped to handle the load. This includes engine, hitch, frame, brakes, transmission cooler, and vehicle capacity.

Securely attached the boat trailer to the vehicle hitch, hook the safety chains and cross them under the hitch and check the lights to ensure they are hooked up and working.



If you are new to trailering your boat, it is best to practice before actually getting in a situation where you are not sure of your ability. If possible use a trailer without a boat to practice with as you can see the trailer's movement without the boat. Also, your vision will not be impaired by the boat's presence.

When going forward, remember that your trailer turns inside the tow vehicle, therefore the tow vehicle must start the turn slightly later than without the trailer. This allows the trailer to turn inside the tow vehicle radius without leaving the roadway.

When backing, remember, the bottom of the steering wheel will move in the direction the trailer will ultimately go. Backing consists of two parts, breaking the trailer by turning the vehicle's backward motion in the opposite direction from the ultimate trailer direction, then following the trailer toward the correct direction with the tow vehicle. It is prudent to go to a large paved area with little traffic to practice these maneuvers before attempting them on the boat ramp.



Remember to check to see if the tow ball is the same size as the trailer coupler. Never use a different size.

9.9 Launching Your Boat

When you arrive at the ramp, prepare your boat before getting in the ramp line.

Make sure the hull plug is in place.

Place a line on the bow and stern cleats to be at the dock ready.

Have fenders out and on the proper side.

Raise the engine so it will not be damaged during launching.

Make sure the engine battery switches are in the "on" positions, and the boat key is in the ignition.

Remove any tie-down straps.

If someone is with you, hand him or her the free end of the bowline and have him or her follow the trailer as you enter the ramp.

Back the boat into the water until it barely floats. Remove the winch line. The boat should now come free with a gentle tug on the bowline.

Lower the engine, pump the fuel bulb until firm and crank the engine.

Let it idle for a few minutes to warm up before getting under way.

9.10 Retrieving Your Boat

There are several ways to retrieve your boat. The method described herein requires two persons.

Drop someone off to back the trailer into the water, or do it yourself. If doing it yourself, make sure you make it easy and safe to exit the boat after it is loaded onto the trailer.

Back the trailer into the water until the bunks are completely submerged, or until the middle roller is just touching the water. (This depth should provide enough to float the boat until the last minute and yet provide enough resistance from the trailer to stop the boat short of the winch stand.) Drive the boat onto the middle of the trailer. This is assuming it is a trailer designed for drive on. Speed should not be over one or two knots. Fast enough to maintain steerage but slow enough to be easily controlled.

Once the boat has touched the trailer, a little forward throttle should secure the boat on the trailer and allow you to put the engine in neutral and have the winch line attached to the bow eye. The boat should now be easily winched onto the last several feet of the trailer.



When properly done, this method is easy, safe and will not harm boat ramps by powering away the soil from the base of the ramp.

10/Routine Maintenance

10.1 Exterior Hull and Deck

Fiberglass

When you remove the boat from the water, clean it as soon as possible. Dirt, debris and grime will come off easier while it is still wet. Use a brush and biodegradable boat cleanser. Stubborn areas may be cleaned with a non-abrasive cleaner. Harsh abrasives and chemical cleaners are not recommended as they can damage the gelcoat, shorten its life, and make it more susceptible to stains. When used in saltwater, the boat should be washed after each use. NOTE** Do not use any cleaners containing ammonia or with extremely high or low PH levels as this will effect condition of gelcoat.

The hull should be waxed periodically, at least once a year, with a high quality wax. This will keep it shiny looking and help prevent chalking and aging. The wax will also make it easier to keep clean by closing the pores that trap the grime.



If the boat is to be kept in freshwater or saltwater for an extended period, proper barrier coat and bottom paint must be applied to prevent possible Gel Coat blistering.



Do not wax non-skid areas. It could make them slippery and increase the possibility of injury.

Stainless Steel Hardware

The stainless steel hardware of your boat should be cleaned and washed after each boat use, especially in salt or polluted water. While it is “stainless” it is not “stain-proof”. If it is not cleaned, it can develop surface rust stains. It can be protected with a high quality automotive or boat wax. It can also be protected with a commercial metal cleaner and protectant such as Flitz®.

Anodized Aluminum

The aluminum can be maintained with a regular washing with soap and water and wiped with a rag containing a petroleum-based lubricant such as WD-40®. Otherwise it can develop a surface corrosion, which can penetrate the anodizing and attack the aluminum underneath. If badly scratched, it can be repaired with an aluminum or silver paint.

Chrome Hardware

Use a good metal polish and protect with wax. This should be done every couple of months or as soon as you notice any finish deterioration. Dupont® No.7 Chrome Polish works well.

Plexiglas®

Do not use products with ammonia on your Plexiglas® windscreen. It can mar the surface and reduce its transparency. A mild soap and water or non-ammonia cleaner will work well. In addition to ammonia, cleaners should not be used which contain solvents, acetone, or alcohol. Plexus® is recommended for proper treatment and protection of Plexiglas®.

Upholstery

Soap and water should be periodically used to clean the vinyl. Vinyl protector products can make the seats slippery, which may not be desirable. When cleaning the vinyl, be gentle. Do not use cleaners that contain ammonia, acetone, strong solvents, or powdered abrasive cleaners. They can damage and shorten the vinyl's life.

Sump Area

Your EdgeWater has a bilge area in the after part of the boat. This can be maintained well by periodically using a boat bilge cleaner. Follow the directions carefully.

Powder Coated Parts

Powder coating can be a very effective option to minimize corrosion to aluminum or stainless steel parts. Keep in mind however that powder coating requires waxing, applications of water dispersant aerosols on fasteners and touchups to maintain its luster and protective qualities.

10.2 Engine

If you have a new engine with a built-in flushing device, the engine may be flushed without cranking. If the engine does not have a built-in flush device, one may be purchased to fit.

To flush the engine, after connecting a water hose to the proper connection, turn on the water. Put the engine control in the idle position and crank the engine. Only let it run for a couple of minutes. The gear case is water-cooled and is not designed to run out of the water for extended periods.



Do not crank the engine without water running. Water acts as a coolant and also a lubricant for the water pump.



Do not rev the engine when flushing; idle speed is sufficient!

The exterior of the engines will respond well to a good quality wax. This should be re-applied every several months as the marine environment is a very harsh one and the constant sun exposure will deteriorate your motor's finish. Consult the engine manufacturer's owner's manual for specific instructions. In areas where there is a conflict between this manual and the engine manufacturer's manual, the engine owner's manual will take precedence.

11/Exterior Equipment

11.1 Anchor Locker/Windlass

The EdgeWater 388CC has a windlass anchor roller, chafe plate, tie-off cleat, 200' rode and an anchor strap as standard equipment. The windlass switch, located below the helm switch panel, provides power to the unit and the "Up/Down" switch controls direction. Consult the windlass manufacturer's owner's manual for specific instructions. The anchor locker has been designed for a Danforth, plough, or claw-style anchor. Before using the anchor for an extended period or overnight, make sure the free end of the anchor line is attached to the boat's anchor tie-off cleat, which is located inside of the locker.



Remember, your anchor line should be a minimum of 7 times the depth in which you routinely operate.



Your EdgeWater 388CC should have a minimum of 150 to 200 feet of ½" three strand nylon line. If you routinely venture offshore, remember the 7 times depth rule. This may sound like a lot but if your engine fails in 100 feet of water, maintaining your position will be very important to being recovered.

11.2 Boarding Ladder

Your EdgeWater 388CC is equipped with a removable boarding ladder mounted in the motorwell area of the boat and there are important steps to remember for safe use of this useful feature. Always shut down the engine if persons will be using the ladder. Do not just settle for the engine being in neutral. Make sure the ladder has been properly stowed before getting underway.

11.3 Trim Tabs

The trim tabs on your EdgeWater 388CC can assist the captain in maintaining trim and level running attitude. When used in conjunction with the engine trim, a great deal of flexibility is available to the operator. On the EdgeWater hull, the tabs are most useful to affect lateral trim. The best results for lateral trim are usually achieved by using only one tab. For example, if the boat is loaded heavier to the port side, lowering the port trim tab will elevate that side and assist the boat in running trim and level. This is important for seaworthiness and fuel consumption. A hull is usually more efficient when running level and with the bow 3° to 5° above level. Tabs can also be useful when running into a heavy wind that is blowing from the side. If the boat tends to turn into the side blowing wind, elevating the tab on the windward side will elevate that side and assist the boat in running level.

11.4 Bow Thruster

The bow thruster on your EdgeWater 388CC can assist the captain in maneuvering in and around the docks. When used in conjunction with alternating engine throttle directions, the boat can easily be directed into its' intended mooring. A joystick is mounted on the console face to the port side of the steering wheel for ease of use and control. Refer to the manufacturers owner's manuals for specific information. Access to the thruster motor is through the hatch located in the bottom of the forward fishbox.

12/Seasonal Maintenance

12.1 Engine

Refer to your engine manual for any specific information pertaining to your engine. For the fuel system, add a fuel stabilizer to a full fuel tank as per the stabilizer's instructions. Run the engine for a minimum of 10 minutes to allow the fuel stabilizer to reach the engine.

- Remove the engine cowl and spray the engine's powerhead with a non-conductive lubricant spray. Do not spray directly on joints that are lubricated with grease as some lubricant sprays may dissolve grease.
- Grease all external zert fittings on the engine and steering system. Use grease that is consistent with engine manufacturer's recommendations.
- Change the engine lower unit lubricant. This will remove contaminants that may have built up throughout the boating season. This is also a good time to check for lower unit seal problems. If there is a leak, have it repaired by your dealer.
- Remove the propeller and grease the propeller shaft. Inspect the shaft and propeller for unusual wear or signs of deterioration.

12.2 Hull

Wax the entire boat. The hull will maintain its factory delivered luster much longer if waxed at least once a season. The inside of the boat, which is subject to the sun's direct rays, will also respond well to a good coat of marine wax.



DO NOT wax the non-skid surfaces.

- Remove the hull plug so the sump area can breathe.

12.3 Storage

It is best to store the boat inside, however if inside storage is not available, use the following guidelines in order of preference

Under awning with no boat cover

Outside under cover: Boat cover should allow ample ventilation and be removed periodically to allow moisture to dissipate avoiding mildew growth and staining.

12.4 Trailer

Check the wheel bearings for water. Clean and re-pack or replace as necessary.

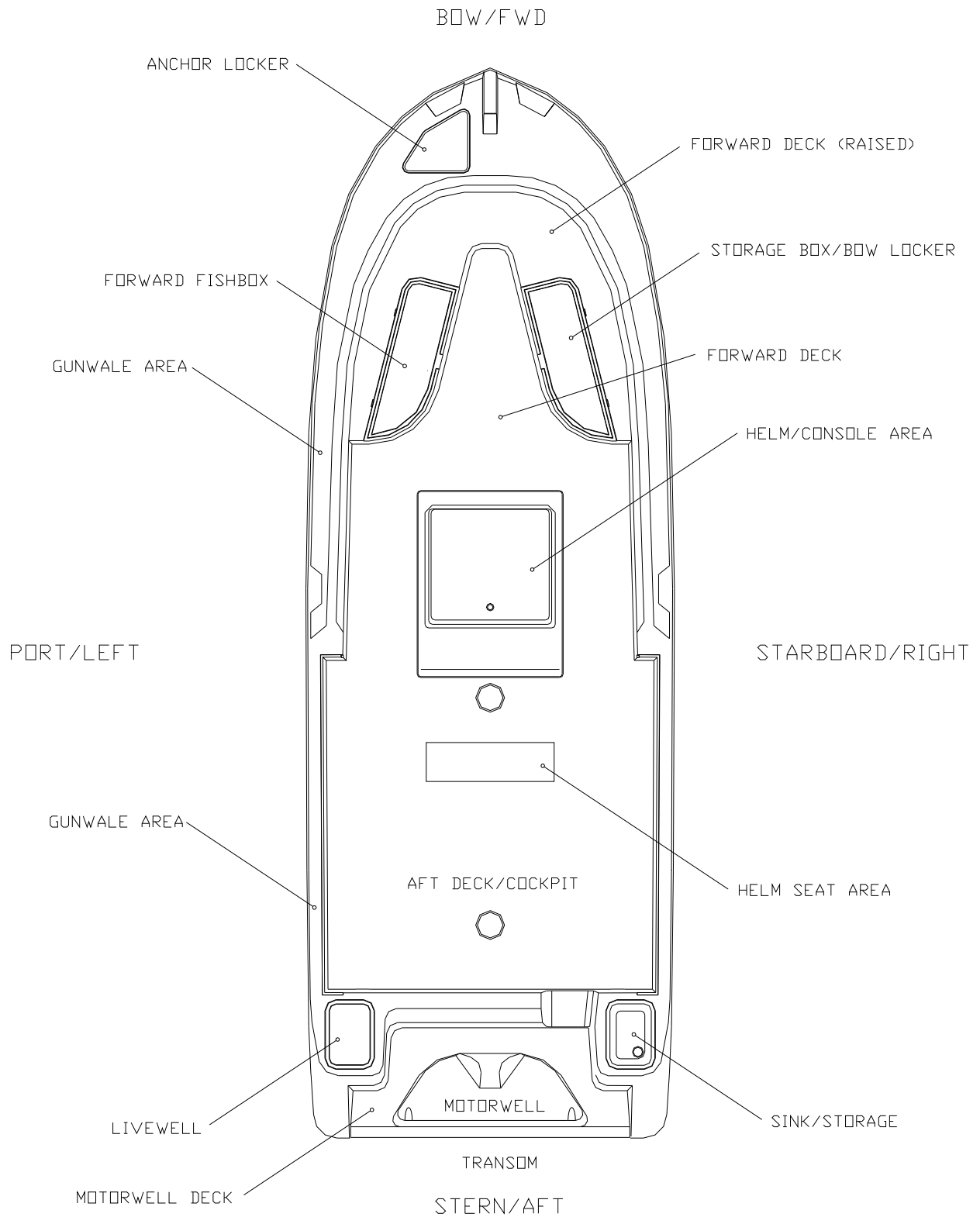
Check the tires for proper inflation.

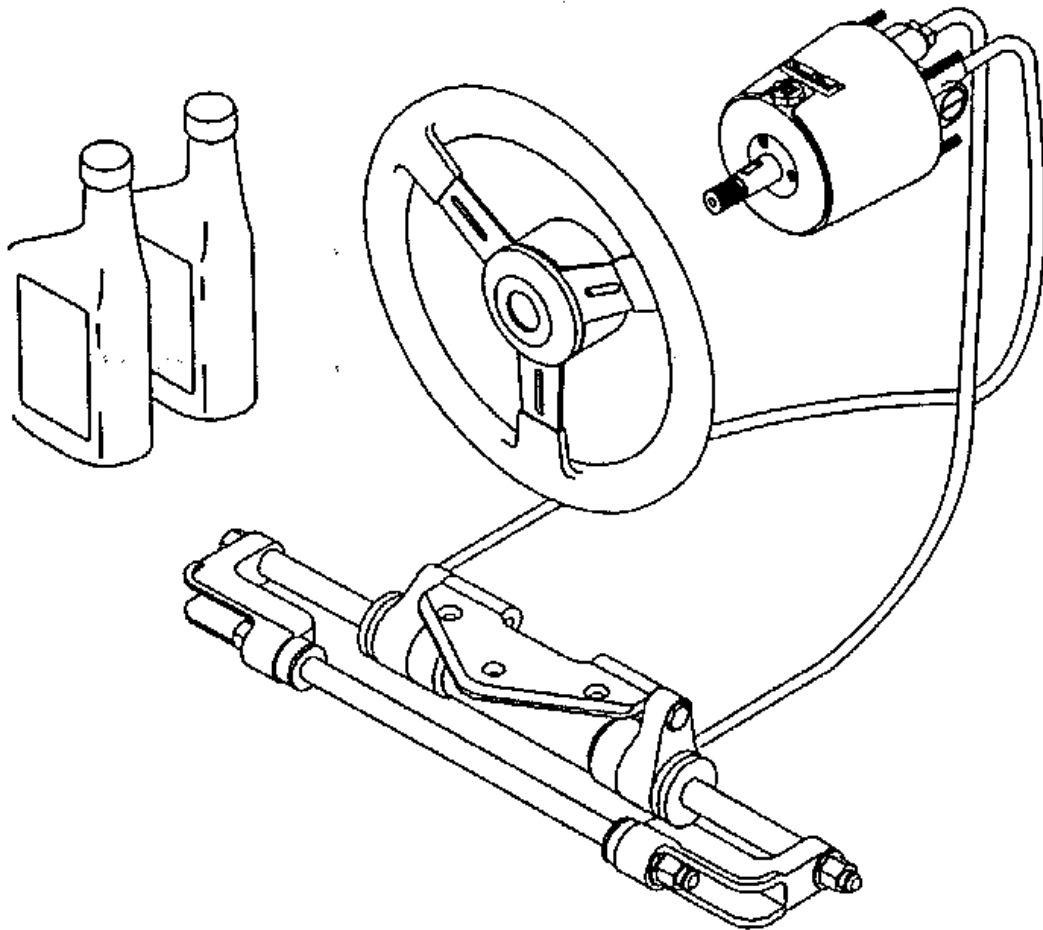
Try to store the boat and trailer with the bow slightly elevated so it will drain.

If possible, cover the boat so that the sun will not deteriorate and tree sap and other environmental hazards will not damage the deck or upholstery. If covered, make sure to let air circulate so mildew will not build up. If in a high snow or rain area, make sure to properly support the cover to sustain and shed the load.

Appendix 388CC

CHART OF BOAT TERMS





Hydraulic Steering System

A/C HU
120/240 VA

SHORE PWR INLET BREAK

10 BLACK
10 GREEN
10 WHITE

OUTLET

14 WHITE
14 GREEN
14 BLACK

14 WHITE
14 GREEN
14 BLACK

10 GREEN
"SHORE PWR"

10 GREEN
"GALV ISO"

5/15%
GALVANIC ISOLATOR

BATTERY CHARGER

14 GREEN "14C GRND BUSS"
10 GREEN "GALV ISO"
14 GREEN "BATT CHGR"
14 GREEN "OUTLET"
14 GREEN "14C GRND BUSS"

A/C GRND BUSS #10R

10 WHITE "SHR PWR IN"
10 BLACK "SHR PWR IN"

A/C MAIN #10R

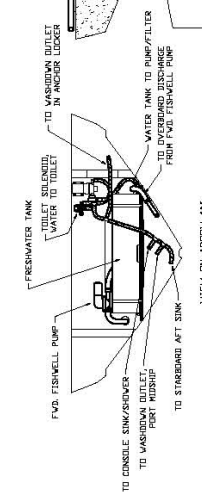
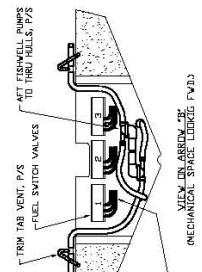
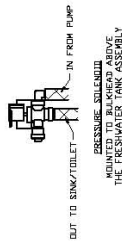
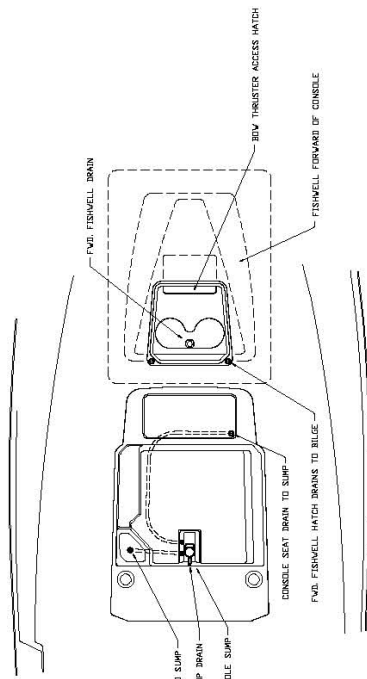
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14 BLACK "BATT CHGR"

A/C BREAKS #10R

14 WHITE "OUTLET"
14 WHITE "BATT CHGR"

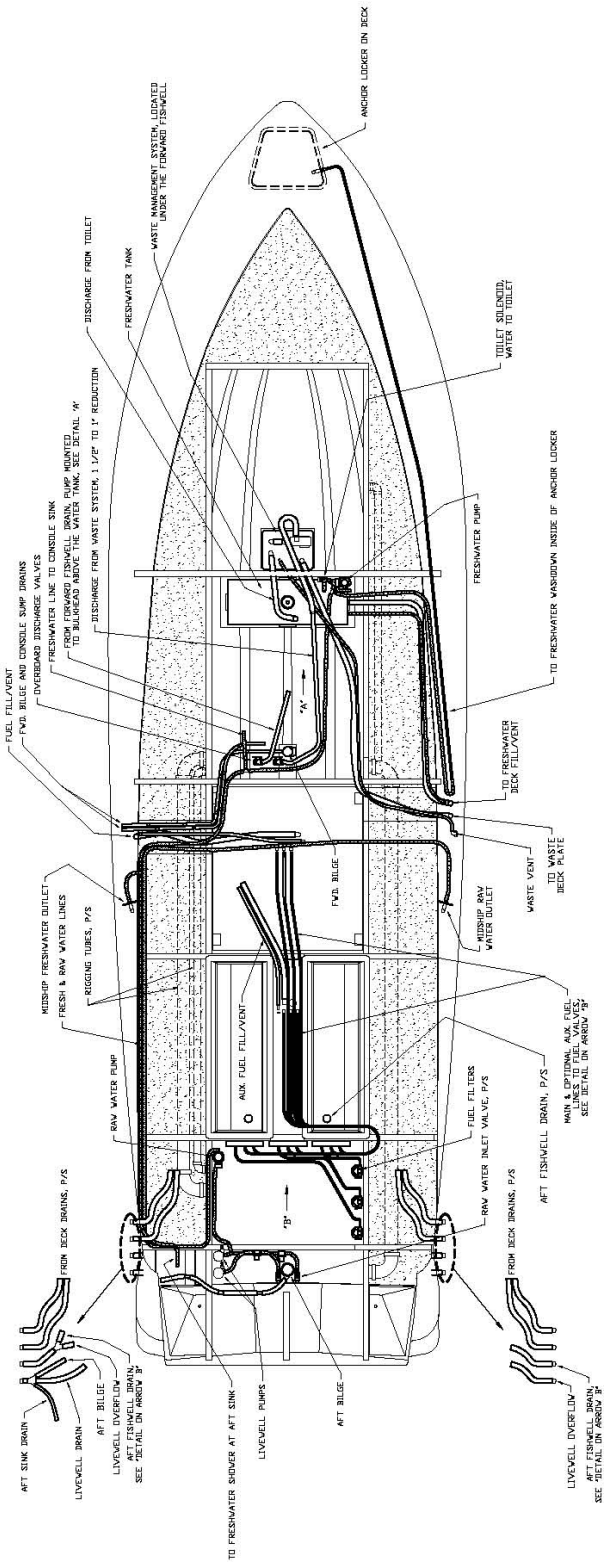
COMMON BUSS #10R

[illegible]



VALVES IDENTIFIED BY TANK DRAWS AND AT FUEL SWITCH VALVES AS SHOWN. NUMBER OF VALVES AND LINES ARE DETERMINED BY ENGINE PACKAGE.

IN FROM MAIN TANK
IN FROM AFT TANK
OUT TO FUEL FILTER



Installation, Compensation, and Maintenance Instructions

For all

RITCHIE® NAVIGATOR™

Compass Models

Made in U.S.A.

CAUTION:

All Magnetic Compasses are vulnerable to magnetic interference, which will produce errors, called deviation. It is the Owner/Operator and/or Helmsman's responsibility to make sure the compass is properly installed and compensated. Compensation is the act of correcting for deviation. Magnets (speakers, microphones etc.), ferrous metals (steel, iron, etc.) and current carrying devices are common causes of deviation. It is important to understand that magnetic compasses point toward Magnetic North. There is a difference between Magnetic North and True North, and that difference is called variation. Variation differs depending on your geographical location and can be determined by referring to a local chart.

Please read the Instructions completely before beginning installation.

Selecting the Proper Location

The compass should be close enough to the helmsman and positioned below the helmsman's line of sight so it is easily read during normal operation. Direct Read Dial or CombiDamp Dial models will allow the compass to be mounted higher, near or at eye level.

You will need a flat and level surface (when the boat is on a level keel). Many boats have a curved mounting surface and if this is the case, a fairing block should be utilized to bring the compass to a level position.

Select a location that has no more than 20 degrees deviation on any of the four cardinal points (N S E and W). Most compasses have a built in compensation system that will correct for fixed deviation up to 20 degrees. It is important to realize that proper compensation is not possible when a compass is subjected to a magnetic field that is variable. Some shipboard devices can cause varying magnetic fields. Devices such as windshield wipers, high current carrying wire and even some steering wheels must be considered when selecting a location for your compass.

Testing Your Chosen Location

Use your compass to test a location. There are two brass rods near the bottom of the compass which rotate 360 degrees, the slotted ends may be all that is visible. These compensation rods are used to correct your compass for deviation. When testing a location, you do not want pre-set corrections in your compass, so neutralize the compensation rods by setting the slots in a horizontal position.

Begin your test by holding the compass away from any possible interference and observing the compass reading. Then move the compass into position carefully; keeping it pointed in the same direction. If the compass reading is different without a change in direction you are observing deviation. You need to find a location that has less than 20 degrees of deviation on the 4 cardinal points if you intend to adjust your compass using the compensator rods.

After finding a location you should test for intermittent changes in the magnetic field. With the compass mounted temporarily in its intended position try moving the steering wheel, throttle controls or anything else that might cause deviation. It is also advised to turn electrical devices off and on. Please be advised that a changing magnetic field can not be corrected with compensation and you will need to find another location for your compass.

Installation (all Models)

Mounting the Compass

Great care must be taken to mount the compass so that it is aligned with the keel of the boat. An alignment error is a constant error on all headings caused by the compass not being pointed in the same direction as the boat. One recommendation is to temporarily mount the compass using one fastener so if an alignment error is detected it is easily corrected. Masking tape can be used as a reference or to keep the compass steady during installation.

If you are mounting to a bulkhead that is not perpendicular to the centerline of the boat, a fairing block must be used.

Due to variations in bulkhead and deck materials, mounting screws are not supplied. Use hardware that is suitable for your specific installation. SELECT MOUNTING HARDWARE THAT IS NON-MAGNETIC. Most quality stainless steel and solid brass fasteners can be used. If you are unsure test them with a magnet.

Most models have built-in lights which will require routing the wire or wires to your power source. To assure a clean installation you may want to wait and drill the routing holes after you are satisfied with the compass alignment.

Specific model installation instructions are as follows:

Note for all flush and bulkhead mount compasses:

It is important that you use the mounting gasket included with each model. We do NOT recommend the use of bedding compound since some brands contain chemicals that could damage the plastic dome.

FN-201, FNW-201, SS-2000, SS-2000W, FN-203 & FNW-203 Flush Mount

Using the mounting template supplied with the compass, make the cutout in your chosen location and mount as instructed above (Mounting the Compass). Note: If you cannot access the compensation rods from below you need to allow for easy removal of the compass during compensation. (See Compensation instructions below).

BN-202 Bulkhead Mount

Before making the cut, make sure the bulkhead surface at the mounting location is at a ninety-degree (90°) angle to the centerline of the boat and is in a vertical position. If such is not the case, a fairing block must be used between the compass and the bulkhead. Use the mounting template supplied with the compass for cutting the necessary opening in the vertical bulkhead. If the compass is not mounted in a vertical position, serious errors can develop when the boat heels over and pitching occurs simultaneously. There is also potential error from the built-in compensator magnets if the compass is not mounted vertically.

DNP-200, DNB-200, DNW-200, DNP-203, DNB-203, DNW-203, SS-2100B, SS-2100W SS-2100P & DNW-203 Deck Mount

When you have selected and prepared the area for mounting, place the compass in position and remove the three large Phillips head screws holding the capsule unit to the binnacle. These three screws are located near the outer edge of the top bezel. NOTE: Do not remove any of the smaller Phillips head screws also located on the top bezel. The compass capsule can now be lifted out of the binnacle. Please note, the binnacle mounting flange is supplied with two sets of mounting holes. The slotted mounting holes will be used when the compass is to be mounted on a pedestal. If the compass is to be mounted directly to the deck, the round mounting holes should be used.

Night Light Wiring (all Models)

All models are supplied with a 12-volt night lighting system. To connect lights to a 24 or 32-volt system, dropping resistors are available.

Lights should be wired to an appropriately fused 12-volt circuit in your electrical system (i.e. running light circuit). Connect the red wire to positive and black to ground.

Compensation

A built-in correcting magnet system consists of two sets of magnets fixed to two adjusting rods with slotted ends. The slots should be horizontal before starting the adjusting procedure. A small non-magnetic screwdriver is provided for this purpose.

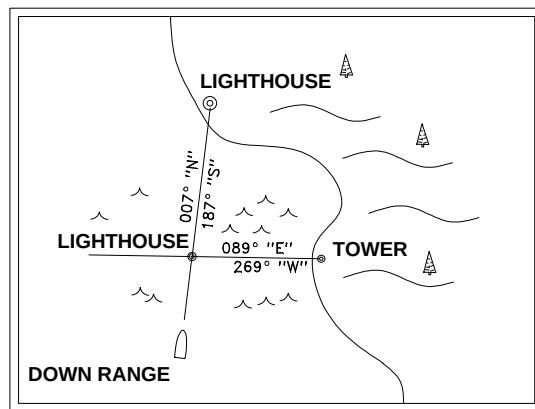
Before starting compensation, make sure you have a suitable location (see Testing Your Chosen Location).

Method 1. (Preferred)

Step One. With the compass in its intended position, but not finally secured, (see Mounting the Compass) select a course on your chart using two fixed aids that are within ten degrees (10°) of the North/South line. Try to select this course so that you can maneuver your boat "down range" of the marks selected (See example).

Step Two. From a position down range of the North/South marks, and keeping the marks lined up, run the boat visually along the Northerly course selected. Turn the port/starboard compensator (slot is facing starboard) until the compass reads correctly.

Step Three. Simply repeat steps 1 & 2, except this time, using an East/West course and the fore/aft compensator



EXAMPLE

(slot is facing aft).

Step Four. Check compass alignment by running the boat in a Southerly direction, again keeping the mark lined up. If the compass is not correct at this time, there is an alignment error. To correct, rotate the compass itself to remove one half of this error. Repeat steps 1, 2 & 4 until your North/South line is correct then repeat step 3.

Step Five. Install fastener (s), taking care not to disturb alignment.

Method 2. (Requires the use of GPS or Loran)

In this method you will be using a GPS or Loran as your reference.

1. Your GPS or Loran must be set to provide you with Magnetic, not True headings. Check your Manual.
2. GPS and Loran provide headings based on COG (course over ground). Compasses provide heading based on the direction the boat is actually pointed. Because of Tides, Currents and Winds, the boat may not always point in the same direction as COG. Pick a time and location that will minimize these effects.
3. Because the GPS and Loran calculate COG based on current and past positions you will see greater heading accuracy while traveling at higher speeds. We recommend at least 10 knots.

Step One. While at sea, with the compass in its intended position, but not finally secured, (see Mounting the Compass), obtain the Loran/GPS bearing to a fixed aid or landmark that is within 10° of a North/South line.

Step Two. Position your boat along that line and steer directly at that mark. Turn the port/starboard compensator (slot is facing starboard) until the compass heading matches the Loran/GPS bearing.

Step Three. Simply repeat steps 1 & 2, except this time, using an East/West course and the fore/aft compensator (slot is facing aft).

Step Four. Check compass alignment by running the boat 180 degrees from the heading used in step 2. If the compass is not correct at this time, there is an alignment error. To correct, rotate the compass itself to remove one half of this error. Repeat steps 1, 2 & 4 until your North/South line is correct then repeat step 3.

Step Five. Upon completing the procedure, secure the compass in its final position.

If you feel that the deviation on your boat is of an unusual nature, the services of a professional compass adjuster will be a wise investment.

To assure accuracy on all headings, check for deviation every thirty degrees and record any deviation on a deviation card. We recommend checking at the start of each boating season, and any time new equipment is added near the compass, for deviation.

Maintenance

Protect your compass from the sun when not using your boat. Strong sunlight may decrease the life of your compass. Custom fit covers are available from Ritchie.

Ritchie compasses require very little care. To remove salt spray deposits or dirt, rinse the entire compass with clean, fresh water and wipe carefully with a damp cloth. **Important Note: Never Use Chemical or Abrasive Cleaners.**

Night Lighting Systems

Ritchie's night-lights are designed to last for years of use. If you need to replace one, contact the factory with your model and serial number for a part number and price. Tel. 781-826-5131 Fax. 781-826-7336 E-mail. service@ritchienavigation.com

Warranty:

We warrant all Ritchie Magnetic Marine Compasses to be free of defects in workmanship or materials. If within three years of purchase date, a compass fails to give satisfactory service, it will be repaired or replaced without charge. This warranty does not cover breakage through accident or misuse. Replacement or repair will be made if the instrument is returned prepaid to a Ritchie Service Station or directly to E.S. Ritchie & Sons, Inc., 243 Oak Street, Pembroke, MA 02359.

RITCHIE NAVIGATION

E.S. RITCHIE & SONS, INC., P.O. BOX 548, 243 OAK ST., PEMBROKE, MASSACHUSETTS 02359 U.S.A.

Tel. (781) 826-5131 Fax (781) 826-7336 www.ritchienavigation.com

WE MAKE
THE BEST BOATS
BETTER!™



The world leader in
trim tab, trolling motor and hatch lift innovation.



OWNER'S MANUAL

Featuring NEW waterproof Deutsch connectors!

Lenco power explained...

The entire Lenco Actuator is fully submersible, maintenance-free and sealed for life

Corrosion proof, water tight Vandar top cap and mounts stand up to severe loads

Buna-N SBR O-ring ensures absolute water-tight seal

Tough, high-torque motor easily transfers 750 lbs (340.18 kg)
Available in 12- or 24-volt motor.

Precision molded, powdered metal, high alloy gears provide high accuracy, high wear resistance, and high strength for long life

Buna-N SBR O-ring ensures absolute water-tight seal

Ballscrew rotates freely on 12 ball bearings at both ends of its stroke so there's no need for complicated limit switches and clutches

Dual Nitrile Buna SBR O-ring sealed for maximum protection

Stainless steel ram will not flex, even under extreme loads

6 foot leads with Deutsch connectors

Top cap gland seal sheaths the actuator cable outer jacket as well as both internal conductors for maximum waterproofing

High-impact, ultraviolet resistant Nylon 66, 50% glass fiber reinforced thermoplastic housing

Self-locking stainless steel ball screw locks into position and will not drift

CE All Lenco products are CE certified

Electro-polished solid 316 stainless steel billet end for Extreme Duty, Heavy Duty, and High Performance applications

Corrosion proof Vandar mounts always look great



Lenco Marine

CONGRATULATIONS!

You have just purchased the finest, performance trim tab system in the world! Welcome to the future.

Lenco Trim Tabs make the single most important difference in the way your boat rides and performs. Lenco Trim Tabs make your boat ride smoother, drier, faster, and safer with increased fuel efficiency whether on a small skiff or a mega-yacht. Lenco's ball screw design is more reliable, twice as powerful and features an instant response, making them very user friendly compared to typical hydraulic trim tabs. Lenco Trim Tabs are oil free and are environmentally friendly. Our goal is to manufacture products that simply make boating more enjoyable.



Electro-polished Blades



Electro-polished Blades

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Trim Tab Operation

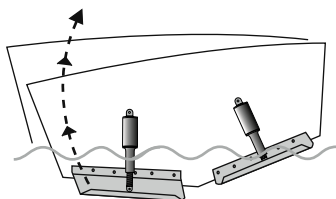
The Lenco Tactile Switch is based on the position of the bow.



Without Trim Tabs



With Trim Tabs



When the tabs are lowered, the water flow is redirected creating an upward force at the stern of the boat.

Lenco Trim Tab kits include two stainless steel planes, two electromechanical actuators and all mounting hardware for installation. (See available switch options on page 16.) The trim tabs operate independently of one another to provide optimal performance by redirecting water flow at the transom of the boat. Lenco Trim Tabs have been designed to improve the overall attitude of a boat. If used properly, Lenco Trim Tabs improve the ride, reduce drag, increase speed and improve the fuel efficiency of your boat.

The operation of Lenco Trim Tabs is basic. The two stainless steel planes are mounted with the actuators on the transom of the boat. When the tabs are lowered, the water flow is redirected creating an upward force at the stern of the boat. When the stern rises, the bow will lower.

Since Lenco actuators are electromechanical, they provide an immediate response at the touch of the switch. The Lenco switch is based on the position of the bow. The left side of the switch controls the starboard tab. The right side of the switch controls the port tab. The system is set up this way to minimize the guesswork while underway. To lower the starboard bow, press the right (starboard) switch where it reads DOWN. To lower the port bow, press the left (port) switch where it reads DOWN.

Since all boats are different in weight, length, speed and performance, it takes practice to understand how your boat reacts with trim tabs installed. Lenco Trim Tabs allow your boat to get on plane faster and continue planing at lower speeds. This improves visibility and the overall safety of your boat. When making adjustments with the trim tabs, use short momentary taps of the switch.

To become knowledgeable on how your boat performs with Lenco Trim Tabs, remember, practice makes perfect.

Lenco electromechanical actuators provide an instant response. When making adjustments, use short momentary taps of the switch.

SPECIAL CONDITIONS

HEAD SEA

Head Sea — Lower both tabs slightly by pressing BOW DOWN on both sides. This brings bow down while maintaining speed. This adjustment allows the hull of the boat to absorb the impact of the waves, resulting in a more efficient and smoother ride.

FOLLOWING SEA

Following Sea — Make sure the tabs are fully retracted by pressing BOW UP on both sides. This brings both tabs to a fully retracted position decreasing lift in the stern, allowing the bow to rise. If tabs are deployed, the bow may dig.

WINDY CHOP

Windy Chop — To raise the windward side of the boat press BOW UP on that side. If this is not sufficient, press BOW DOWN on the leeward side of the boat. Do not over trim when attempting this. This allows the windward side of the boat to rise and minimizes spray.

SHALLOW WATER HOLE SHOT

Shallow Water/Hole Shot — Lower both tabs completely down by pressing BOW DOWN on both sides. This provides lift in the stern of the boat and keeps the bow down. As you throttle up and speed increases, raise tabs by pressing BOW UP on both sides.

UNEVEN LOAD

Uneven Load — If one side of the boat is higher than the other while running, press BOW DOWN on the switch on that side. This lowers the tab on the listing side (low side) to bring the boat level.

PORPOISING

Porpoising — To stop porpoising, press BOW DOWN on both sides of the switch. The tabs need only to be deployed slightly to correct this adverse situation.

SAFETY

While the boat is underway, do not move one tab up or down significantly; this may cause listing.

While at higher speeds, do not over trim. This causes the bow to lower quickly, resulting in a reduction of speed and may cause the boat to veer.

When in following seas or when running an inlet, the tabs should be fully retracted. This allows for optimal performance.

While operating trim tabs, use caution. Improper use of trim tabs may cause accidents and/or injury.

1	Stainless steel blade with hinge	#20141-001 (B-9x12 dimensions of tab)
2	Electromechanical Actuator	#101, #101 XD, #101 XDS, #102 XD
3	Upper mounting bracket	#15085-001 (116)
4	Space saver upper mounting bracket (optional)	#50225-001 (117)
5	Lower mounting bracket	#50014-001 (119)
6	RetroFit Kit bracket	#15085-001 (116)
7	(Qty. 2) 5/16 #18 X 1-3/4" large hex head bolt and 5/16	#10250-001
8	#123 L.E.D. Indicator Switch w/Retractor (optional)	#15070-001 (123SC)
9	124SSR Standard solid state Tactile Switch w/ Retractor (optional)	#15069-001 (124SSR)
10	#123 DR Dual Actuator L.E.D. Indicator Switch w/Retractor (optional)	#15071-001 (123DRSC)
11	Shim kit (optional)	#50015-002 (118S)
12	(Qty. 26) 1-1/4" (3.17 cm) stainless steel sheet metal screw kit	#10002-001 (Kit #1)
13	(Qty. 6) 20 X 7/8" (2.22 x .63 cm) stainless steel screws, (Qty 6) flat washers and (Qty. 6) 1/4" (.63 cm) lock nuts	Kit #4

Troubleshooting Guide for Trim Tabs

Trim tabs do not work together, independently or intermittently.

Solution Sequence:

- 1) Inspect fuse at fuse panel.
Replace if necessary.
- 2) Verify that all connections at switch control box are tight and in place.
- 3) Make sure that switch assembly has a solid ground.
- 4) If the actuator cables were spliced inside the transom, inspect joint for positive connection.
- 5) If, after following steps stated above, the actuators still do not operate properly — STOP and call the factory for further assistance at 772-288-2662.

Additional Information

- Check electrical connections behind switch and make sure ground wire is in place.
- The addition of a zinc anode will deter electrolysis. It is important that the zinc is in contact with the trim tab blade.
- To discourage any marine growth on tab or actuator, antifouling paint can be applied. When applying paint to the actuator, make sure it is fully retracted. Do not paint the stainless ram above the area that is exposed when retracted.
- If tabs malfunction or tabs become stuck in the down position while underway, remove pin or bolt at the lower mounting bracket.
- To reposition the actuator turn stainless steel ram clockwise and reattach.

Trim Tab Installation Instructions

Warning: The following instructions contain important safety information and should be followed carefully. Failure to do so may result in injury and will void warranty.

Please read through the instructions in their entirety prior to beginning installation!

TOOLS AND MATERIALS LIST

- Electric drill
 - Wire crimper/cutter
 - Tape measure
 - 3/16" & 3/8" drill bits (.48 & .95 cm)
 - 7/16" (1.11 cm) wrench
 - Small hammer
 - 4' (1.22 m) level
 - Straight edge
 - 3M 5200 adhesive caulking
 - 2" (5.08 cm) hole saw
 - #2 & #3 Phillips screwdrivers
 - 3M 5200 adhesive caulking
1. To begin, determine where the Lenco Trim Tab Kit will be installed.
Note: When laying out the desired tab location, hold the tab against the transom with the bottom of the hinge knuckle 3/8" (.95 cm) from the bottom of the transom, approximately 1" to 4" (2.54 to 10.56 cm) in from the chine, and in line with the hull. When mounting the hinge to the hull make sure that the inside corner of the hinge knuckle is no closer than 2" (5.08 cm) to the left or right of any strake edge. The hinge may overlap a strake edge as long as any corner of the hinge knuckle is no closer than 2" (5.08 cm) to the left or right of the strake edge. (see Fig.1). Transfer (trace) the screw hole pattern onto the transom for drilling, see step 2.
 2. Using the 3/16" (.48 cm) drill bit, drill the previously marked hole locations to a depth of 1-1/4" (3.17 cm).

Note: When drilling out the screw hole pattern for the trim tab hinge you may drill through the transom, however the screws when installed with 3M 5200 adhesive caulking will seal the holes. All supplied screws and fasteners are stainless steel. Do not use any other type of alloy.

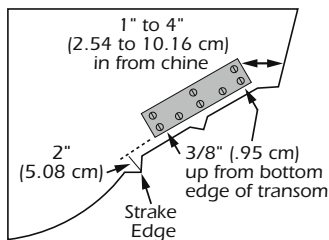
Mount the trim tab hinge to the transom using provided #14 x 1-1/4" (3.17 cm) stainless steel metal screws. We recommend using 3M 5200 adhesive caulking to bed the hinge and screws. **DO NOT OVERTIGHTEN.**

3. Attach the lower mounting bracket to the tab with the bolts, washers, and nylon lock nuts provided., Attach the upper bracket to the actuator using the 5/16-18 X 1-3/4" (4.45 cm) large hex head bolt and 5/16-18 hex nut provided. Attach the actuator to the lower bracket using the 5/16-18 X 1-3/4" (4.45 cm) large hex head bolt and 5/16-18 hex (.79) nut provided.

In order to properly position the upper bracket against the transom, you must lift the trim tab so that the trailing edge is approximately

Note: Performance tabs should be mounted with the tapered end facing toward the center of the boat.

Fig. 1



5/8" (1.59 cm) (for a 9" trim tab) and 3/4" (1.9) (for a 12" trim tab) above the straight edge when held to the hull (see Fig. 2). When the trim tab is at the appropriate level, transfer (trace) the outer shape of the upper bracket onto the transom. The upper bracket should be marked where it lays naturally against the transom to prevent binding during travel. (Do not adjust the upper bracket to the right or left, as this will cause binding, instead just allow the bracket to come to rest in it's natural position).

Remove the actuator from the lower bracket. Remove the upper bracket from the actuator and align to the previously marked location to mark the upper screw hole locations and cable hole location. Using the 3/16" (.48 cm) drill bit, drill the previously marked screw hole locations to a depth of 1-1/4" (3.17 cm).

Note: When drilling out the screw hole pattern for the trim tab hinge you may drill through the transom, however the screws when installed with 3M 5200 adhesive caulking will seal the holes when installed. All supplied screws and fasteners are stainless steel. Do not use any other type of alloy.

4. **Warning:** With some installations, fuel, water tanks and/or other systems may prevent the actuator cable from entering the hull through the upper mounting bracket. Be sure to check inside the hull before drilling the 3/8" (.95 cm) cable hole.

If all is clear, Using the 3/8" (.95 cm) drill bit., drill the previously marked cable hole completely through the transom. Insert the actuator cable through the appropriate hole in the upper bracket until it reaches the actuator. Insert the actuator cable through the gland seal until it

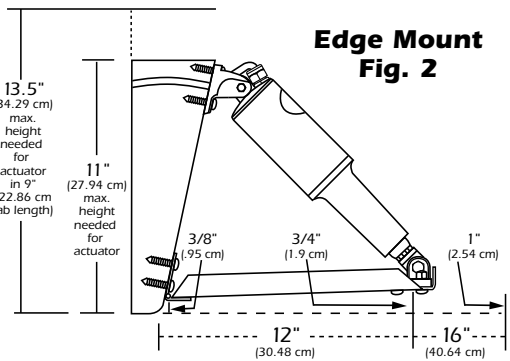
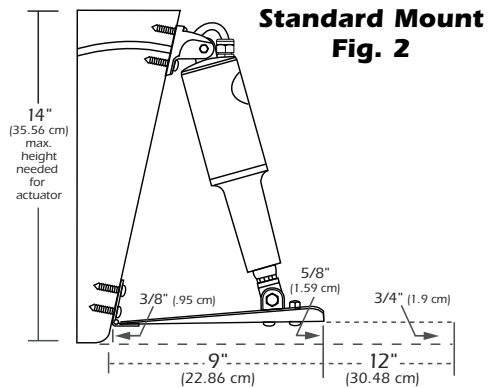
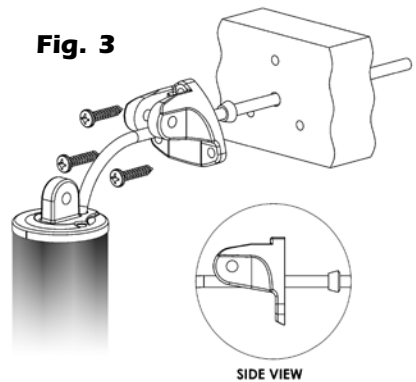


Fig. 3



reaches the upper bracket.

Note: For appropriate orientation of upper bracket and gland seal, (see Fig 3).

Continued on page 10.

Installation Instructions continued from page 9.

Insert the actuator cable through the transom. With the actuator loosely supported, start the provided #14 x 1-1/4" (3.17 cm) stainless steel metal screws through the upper bracket and into the transom. **MAKING SURE TO LEAVE THE SCREWS ONLY PARTIALLY INSTALLED.**

Insert the actuator clevis (mounting ear) into the top bracket and hold in the approximate installed location. Pass the actuator cable through the transom removing slack on the cable until it is snug. Remove the actuator from the upper bracket and finish installing the previously started #14 x 1-1/4" (3.17 cm) stainless steel metal screws through the upper bracket and into the transom. We recommend using 3M 5200 adhesive caulking to bed the upper bracket and screws. **DO NOT OVERTIGHTEN.**

Attach the actuator to the upper bracket using the 5/16-18 X 1 3/4" (4.45 cm) large hex head bolt and 5/16-18 (.79 cm) hex nut provided. If, however, you are prevented from drilling a hole through the transom at the bracket location, using the 3/8" (.95 cm) drill bit, simply drill a 3/8" (.95 cm) hole 4" to 5" (10.16 to 12.7 cm) above the waterline and insert the cable. Cover the hole and cable with a clamshell vent sealed with 3M 5200 for a waterproof and finished effect.

Assemble actuator connector ends as instructed in Actuator Deutsch Connector Instructions insert card provided.

5. At the helm, determine where the tactile switch will be installed, locate the template on page 27 and secure to helm, cut a circular opening using a 2" (5.08 cm) hole saw. Before cutting, make sure the area inside

the helm is clear of wires and other equipment that could be damaged. Using the template on page 35, drill four 3/16" (.48 cm) holes through the helm.

Secure the switch with the nylon nuts provided. When mounting the black control box, keep in mind that there is a 30" (76.2cm) lead that attaches to the back of the tactile switch. Make sure control box is mounted on a vertical surface with wires facing down toward the deck.

6. Following the trim tab switch wiring diagram, connect the actuators or the actuator extension cables to the switch control box. Be very careful of sharp edges that may damage the cable. Remember the left switch controls the right starboard tab and the right switch controls the left port tab.

**Please follow the instructions and drawings carefully.
Call the Lenco Service Department at 772-288-2662 for technical assistance.**





Lenco Trim Tabs, Switches and Bennett RetroFit Kits carry a 3-year limited warranty from the date of original purchase.

When possible, please refer to our troubleshooting guide on our website, <http://www.lencomarine.com> prior to processing your claim with the Lenco factory.

1. Call Lenco Marine at 772-288-2662, and ask for customer service. Give the technician a brief description of the product and the problem. Once the tech determines that the product is eligible for repair or replacement, they will issue you an RMA number (Return Merchandise Authorization). **Claims will not be processed without an RMA number.**
2. Return product and paperwork to Lenco Marine with the following information: name, telephone number, description of problem, proof of purchase to verify warranty. Proof of purchase and warranty info can consist of the following:
 - A. Bill of sale from place of purchase
 - B. Retail boat purchase bill of sale
3. Mark the outside of the package with the RMA number and return it to Lenco Marine Customer Service Department at 4700 SE Municipal Court, Stuart, FL 34997 for processing. Once received, our Customer Service Department will make every effort to process your return quickly. Should time restraints prohibit you from sending in the merchandise first, or you need an immediate

replacement, you will be required to secure the replacement part with a credit card prior to shipment (Visa, MasterCard, American Express, Discover). Lenco Marine ships all warranty items UPS ground. Costs for upgrades in shipping are the responsibility of the customer. Lenco Marine warranties all trim tabs, switches or Bennett RetroFit Kits for a period of 3 years from the date of original purchase. If any part of a Lenco Trim Tab, switch or Bennett RetroFit Kit fails due to manufacturing defects or workmanship within a period of 3 years from the date of original purchase, Lenco Marine will repair or replace the part(s) without charge at our discretion. No haul out, labor or miscellaneous charges are covered under this warranty. Warranty is not transferable.

The foregoing is in lieu of any and all other warranties, expressed or implied, including any warranty of merchantability or fitness for a particular purpose. There are no other warranties which extend beyond that set forth above. Lenco Marine reserves the right to void any warranty claim if the part is opened or repair was attempted, without prior authorization from Lenco Marine.

Lenco Marine, Inc.
Phone: 772-288-2662
Fax: 772-288-2566
www.lencomarine.com
4700 SE Municipal Court
Stuart, FL 34997



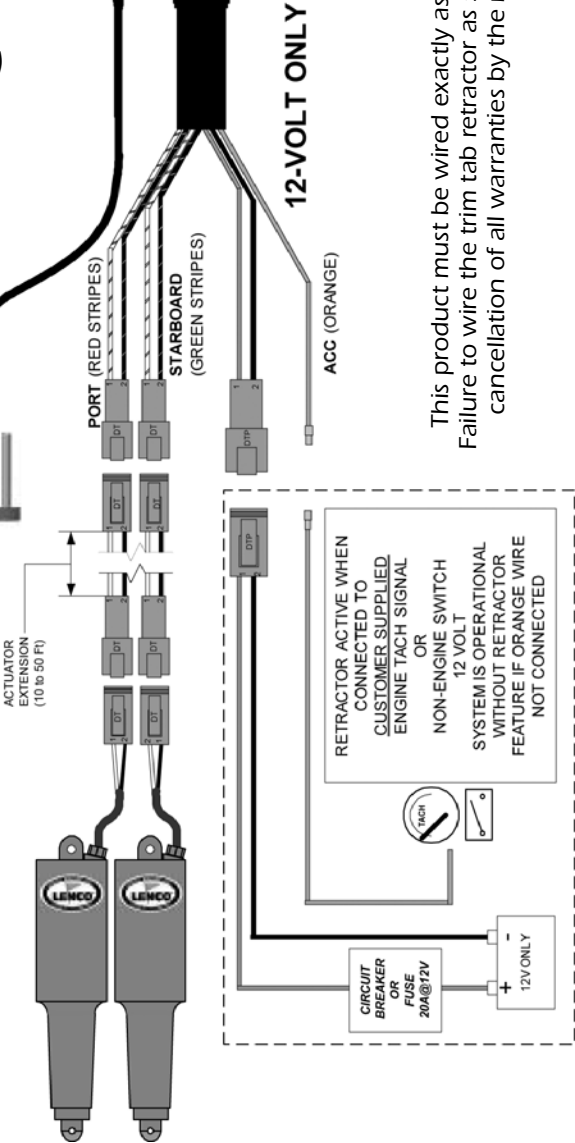
15069-001 (124SSR)

Standard Trim Tab Switch w/ Retractor
Wiring Diagram - Part # 15069-001(124SSR)

This product must be wired exactly as shown above.
Failure to wire the trim tab retractor as shown will cause
cancellation of all warranties by the manufacturer.



Note: In all cases,
make sure control box
is mounted with wires
facing down
toward deck.

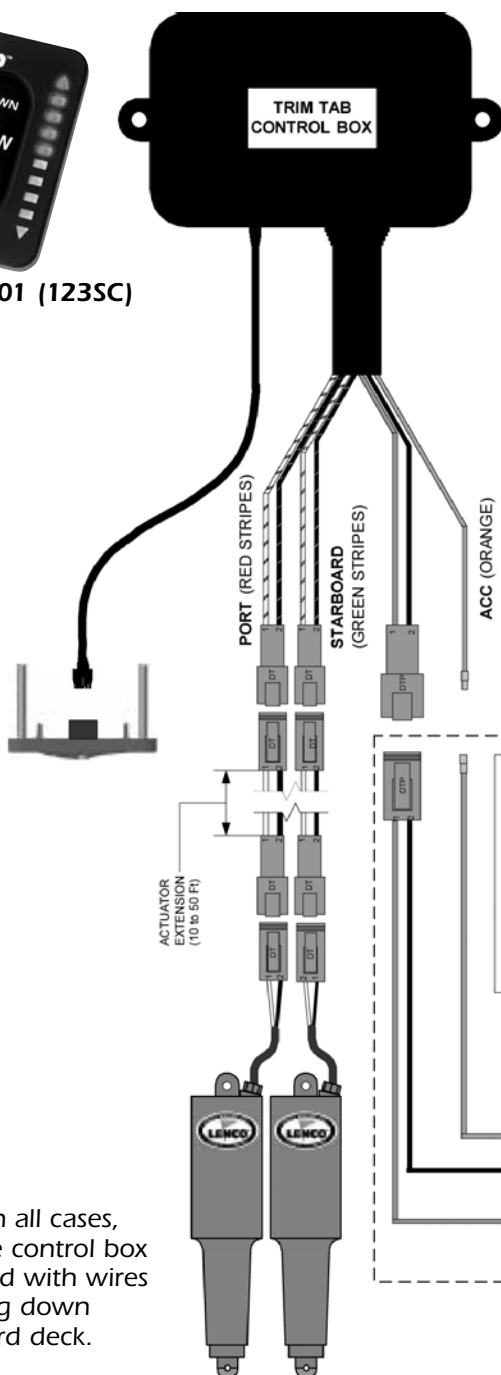




15070-001 (123SC)

L.E.D. Trim Tab Indicator Switch w/ Retractor and Self Test Wiring Diagram - Part # 15070-001 (123SC)

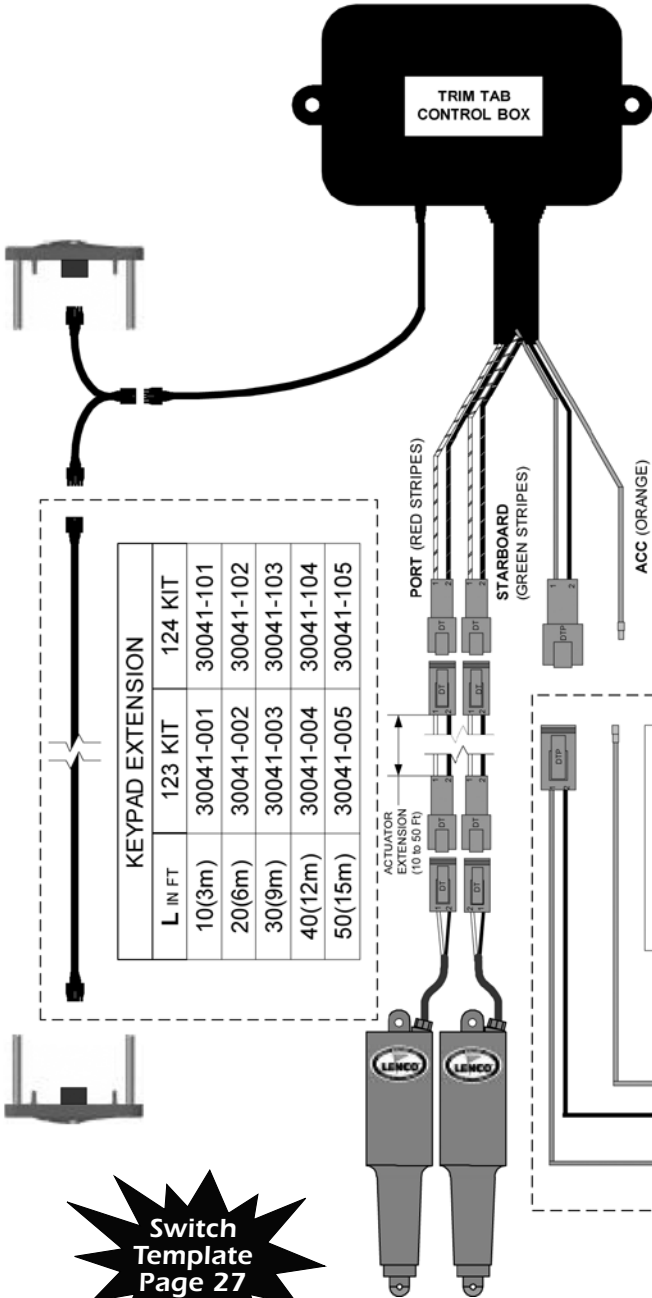
Note: In all cases,
make sure control box
is mounted with wires
facing down
toward deck.



This product must be wired exactly as shown above.
Failure to wire the trim tab retractor as shown will cause
cancellation of all warranties by the manufacturer.

Dual Station Flybridge Wiring Diagram

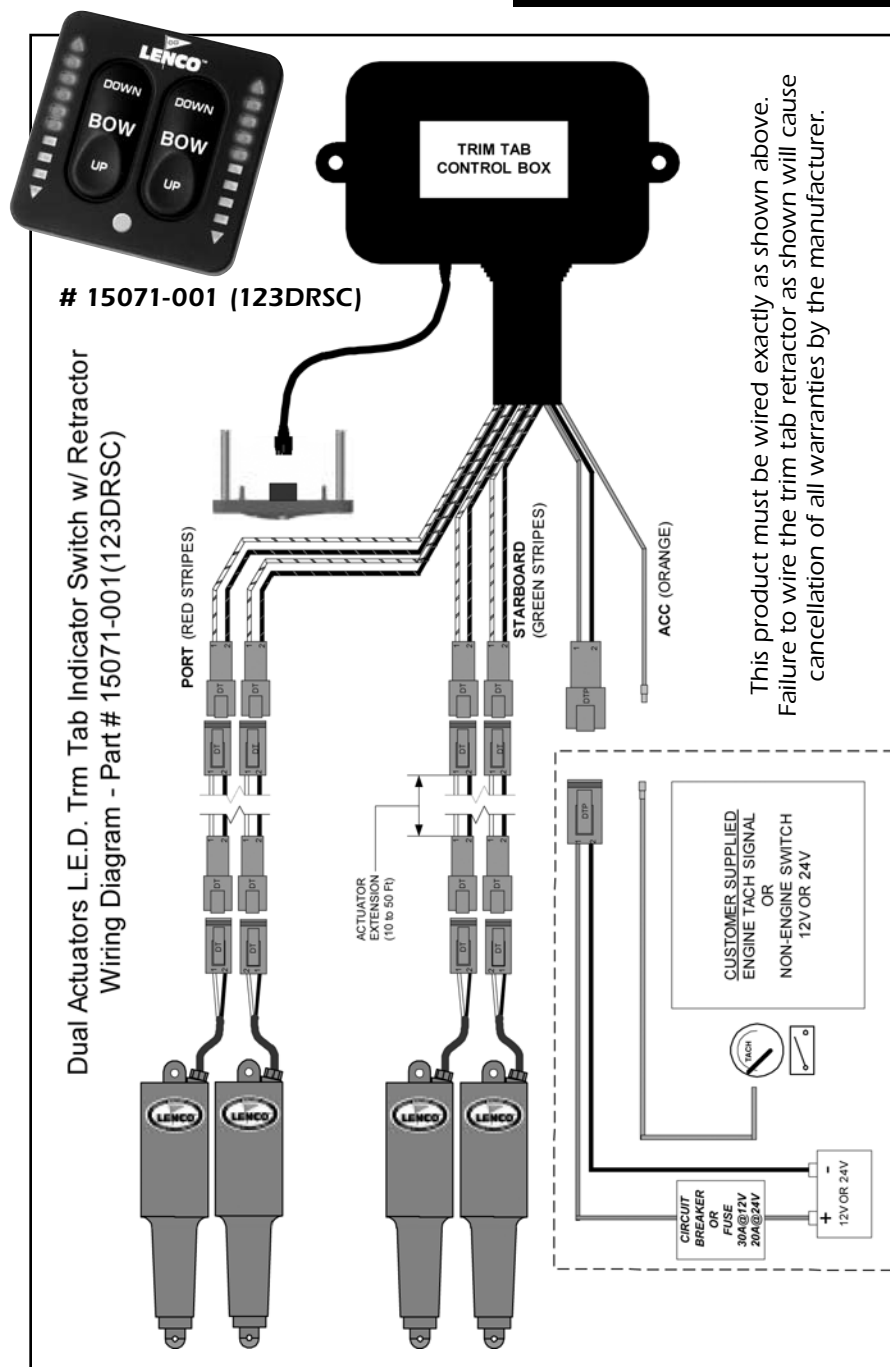
For Switches #15070-001(123SC), #15069-001(124SSR), and #15071-001(123DRSC)



This product must be wired exactly as shown above. Failure to wire the trim tab retractor as shown will cause cancellation of all warranties by the manufacturer.

Switch
Template
Page 27

Note: In all cases, make sure control box is mounted with wires facing down toward deck.



Note: In all cases, make
sure control box is
mounted with wires facing
down toward deck.

Complete your trim tab system with the latest switch technology — totally waterproof, maintenance-free, easy-to-install tactile switches.

Lenco Switch Options

- #15069-001 (124SSR) – Standard Tactile Switch w/Retractor for all single actuator 12-volt trim tab systems
- #15070-001 (123SC) - L.E.D. Indicator Tactile Switch w/Retractor and Self-Check for all single actuator 12- or 24-volt trim tab systems
- #15071-001 (123 DRSC) - Dual Actuators L.E.D. Indicator Tactile Switch w/ Retractor and Self-Check
- #10225-001 (125)- For Air Boats and Hatch Lifts.

Lenco switches feature:	124 SSR	123 SC	123 DRSC
1) Self-Check feature at power-up			
2) Self-contained, sealed keypad			
3) Self-contained, sealed control box			
4) Fade/smudge-proof, laser engraved graphics			
5) Plug & play switch wiring harness connectors			
6) Built-in Retract feature returns tabs to a fully retracted position when power or tach signal is removed			
7) 2 high-intensity L.E.D. indicator displays show the exact position of your trim tabs at all times			
8) Photo eye reads ambient light and adjusts the L.E.D. indicator display intensity for optimum viewing in all light conditions			
9) Backlit keypad graphics for optimum night viewing			
10) 24-volt compatibility			



NEW! Waterproof Plug & Play Deutsch Connections

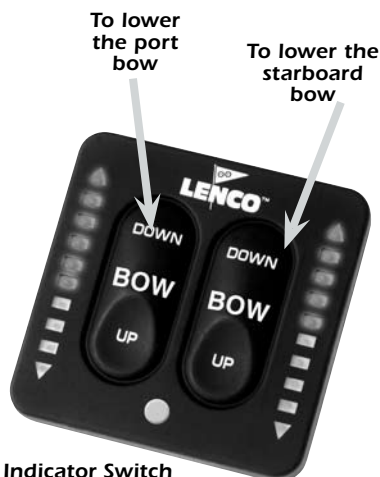


SWITCH OPERATION

The operation of the indicator switch is based on the position of the bow. To lower the starboard bow, press the right (starboard) side of the switch where it reads Down. This lowers the port tab. To lower the port bow, press the left (port) side of the switch where it reads Down. This lowers the starboard tab. The L.E.D. displays on the sides of the display show how far that tab has moved.

When the on/off switch is turned on at the helm or the engine's tachometer circuit becomes active, the L.E.D. displays on the indicator switch light from top to bottom and immediately extinguish from

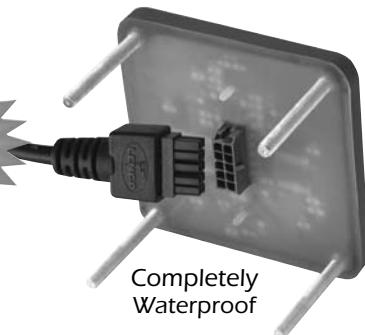
bottom to top to indicate self test at power up. If there is a problem with an actuator connection the L.E.D. displays show every other light red "ON" at the side that has the problem. After self test is complete (1 to 2 seconds) the L.E.D. displays show one up arrow on each side of the switch. This shows that both tabs are fully retracted. While functioning the tabs, the L.E.D. displays indicate the position of the tabs by lighting up the further they are pressed down. As the switch is pressed up, the lights go out. When power is removed from the switch or the engine stops (if accessory wired to tach), the tabs retract from any position before powering down.



Indicator Switch
with Retractor
#15070-001 (123SC)



Standard Switch
#15069-001
(124SSR)



Electric RetroFit Kit for Bennett Trim Tabs Installation Instructions

Lenco Marine's RetroFit Kit is designed as a direct replacement for the Bennett 4-ring standard trim tab actuator.

Note: Bennett Joystick Control can not be retrofitted to the Lenco Actuators.

These instructions should be followed completely. If you experience any problems not covered, please call the Lenco Marine customer service line at 772-288-2662.

- 1) Disconnect the Bennett hydraulic pump unit (HPU) and drain as much of the hydraulic fluid as possible into a container for proper disposal later. Remember that automatic transmission fluid (ATF) is to be disposed of only at an approved collection site in your area; do not discard in the regular trash.
- 2) Remove the Bennett trim tab cylinder from the boat transom and remove the hydraulic line at the connection. It helps to have several rags handy to soak up the oil. Remove and discard old hydraulic lines.
- 3) Disconnect the Bennett cylinder from the trim tab plane by tapping out the small black pin at the base of the cylinder where it attaches to the plane. You will first have to remove one screw from the lower bracket as this holds the pin in place. Do not remove the lower bracket, as you will need it later.
- 4) Insert the actuator cable through the appropriate hole in the upper bracket until it reaches the actuator. Insert the actuator cable through the gland seal until it reaches the upper bracket.

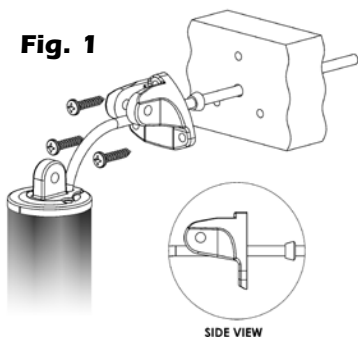
Note: For appropriate orientation of upper bracket and gland seal, (see Fig 1).

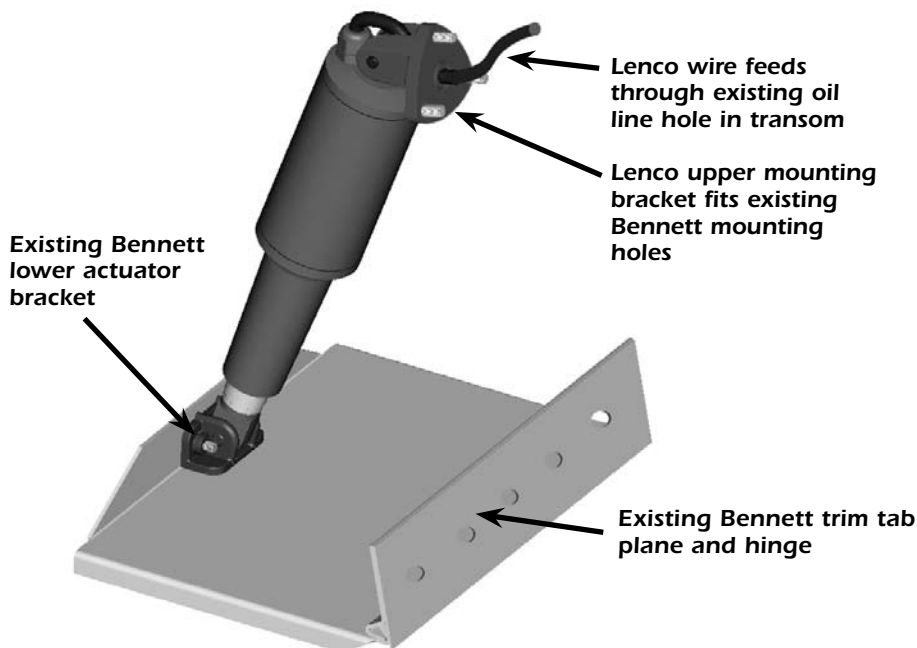
You will need to clean mounting surfaces on the transom with a cleaning solvent such as mineral spirits or alcohol to remove all oils and dirt before final mounting.

Insert the actuator cable through the transom. With the actuator loosely supported, bed the upper bracket and screws with 3M 5200 adhesive caulking. Start the provided #14 x 1-1/4" (3.17 cm) stainless steel metal screws through the upper bracket and into the transom. **MAKE SURE TO LEAVE THE SCREWS ONLY PARTIALLY INSTALLED.**

Insert the actuator clevis (mounting ear) into the top bracket and hold in the approximate installed location. Pass the actuator cable through the transom removing slack on the cable until it is snug. Remove the actuator from the upper bracket and finish installing the previously started #14 x 1-1/4" (3.17 cm) stainless steel metal screws through the upper bracket and into the transom. We

Fig. 1





recommend using 3M 5200 adhesive caulking to bed the upper bracket and screws.

DO NOT OVERTIGHTEN.

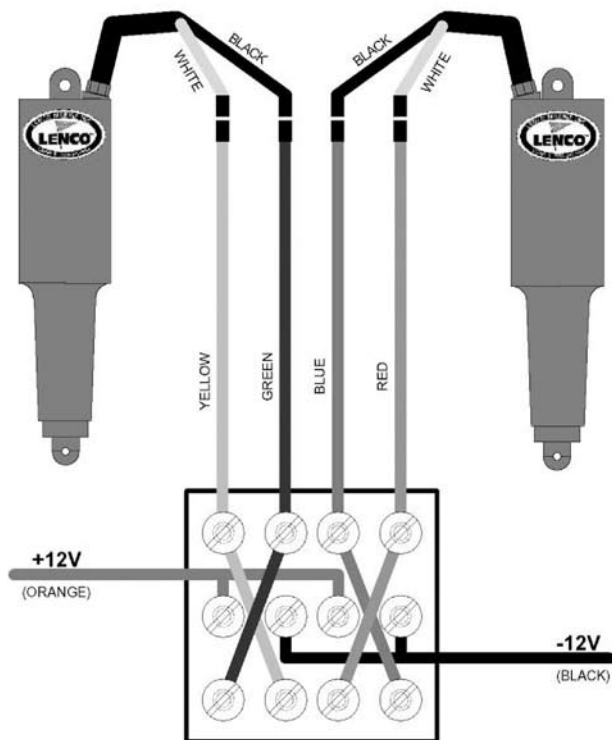
Attach the actuator to the upper bracket using the 5/16-18 X 1-3/4" (4.45 cm) large hex head bolt and 5/16-18 (.79 cm) hex nut provided.

- 6) You are now ready to attach the Lenco Actuator to the blade. First insert the pin part way through the hole in the Bennett lower bracket and insert through one of the four black washers provided in the kit. Place the actuator into the bracket and tap the pin through. Continue through the second washer and other side of the bracket. Replace the bracket screw removed in step 3. This will lock the pin in place and prevent it from falling out.

- 7) Now you will need to hook up the Lenco Actuator wires inside the bilge/rigging area. First cut the wire connector from the Bennett wire harness where the pump used to be. Strip the four harness wires and connect to the four Lenco wires using the heat shrink butt splices provided in the kit. Make sure to use the proper crimping tool and then heat all connections for a tight waterproof seal. Tie-wrap or secure in some fashion to a dry location to help prevent the connectors from getting too wet. For further wiring information, see wiring instructions and diagram on next page.

Please follow the instructions and drawings carefully. Call the Lenco Service Department at 772-288-2662 for technical assistance.

Wiring Instructions for Electric RetroFit Kit for Bennett Trim Tabs



- 1) Remove all wires and all jumpers (brass strips) on Bennett factory switch and discard.
- 2) Now find the 12-volt negative at the helm/console. Connect the black wire from the switch to this source. The Lenco system requires that a negative (-) wire be attached at the switch as per the wiring diagram. The 12-volt positive (+) should already be at the switch from the previous system. Simply reconnect it as per the wiring diagram.
- 3) Test the trim tabs for proper operation. Remember that the right switch controls the left trim tab and the left controls the right.

BOW DOWN should extend the tabs while BOW UP should retract them. If for some reason this does not work as described in the above text, recheck all the wiring for a misplaced wire. If still not fully operational, refer to the trim tab troubleshooting guide on page 7 for further instructions.

Use caution when using Lenco Trim Tabs for the first time. The response time is faster than the Bennett system.

Try small taps of the switch until you become accustomed to the new trim tabs.

Upgrading and Retrofitting

Standard Tab to Troll'n Tab

A 9x12 trim tab can be upgraded to 9x12 Troll'n Tab.

Standard Tab Blade Upgrade

For a larger trim tab blade a 9x12 blade can be retrofitted with a 12x12 blade.

Edge Mount Kit Upgrade

Since the placement of the upper bracket is lower then a standard mount, an edge mount can be retrofitted only with another edge mount trim tab.

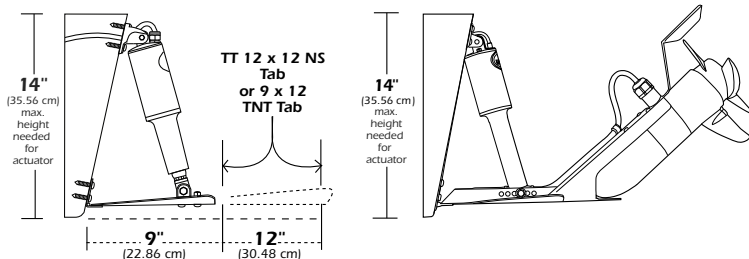
Edge Mount Tab to Troll'n Tab

A 12x12E trim tab can be upgraded to a 12x12 Troll'n Tab.

Note: In order to utilize the same mounting holes when upgrading from trim tabs to Troll'n Tabs, the trim tabs have to have been mounted with the hinges at least 3/8" (.95 cm) from transom bottom as recommended in Lenco installation instructions.

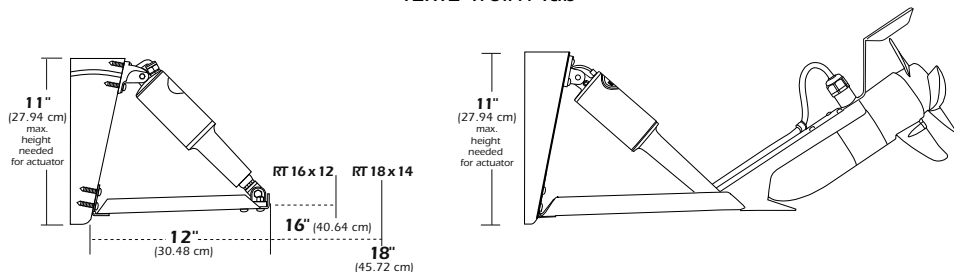
Standard Mount Kit # 15001-101 (TT 9x12 NS)

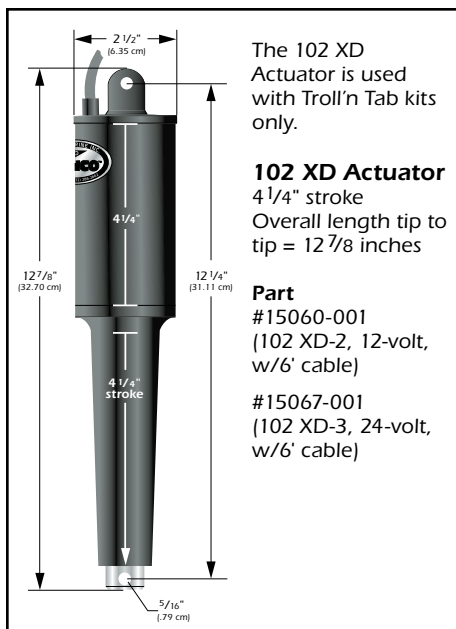
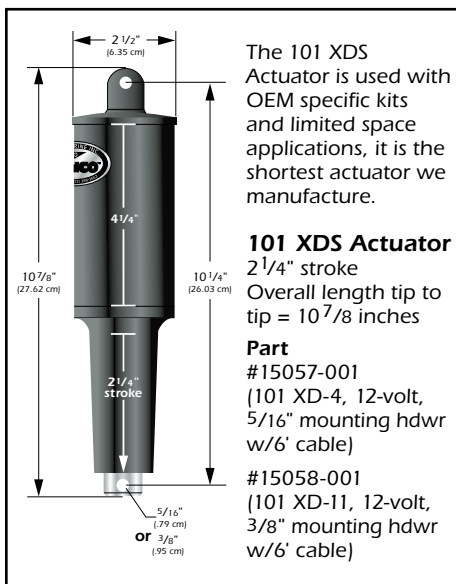
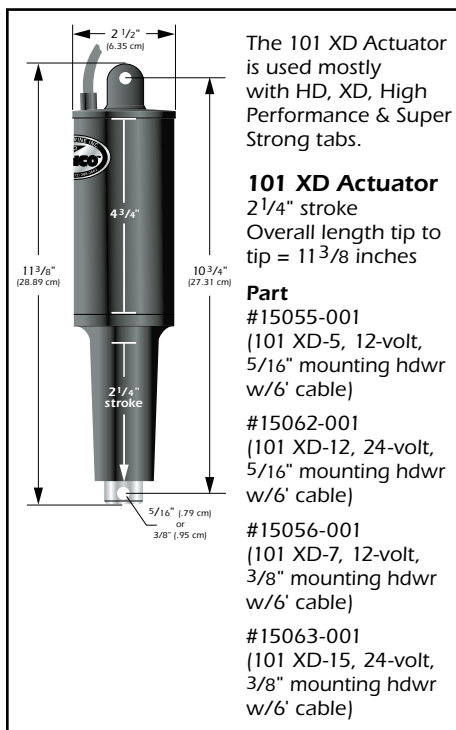
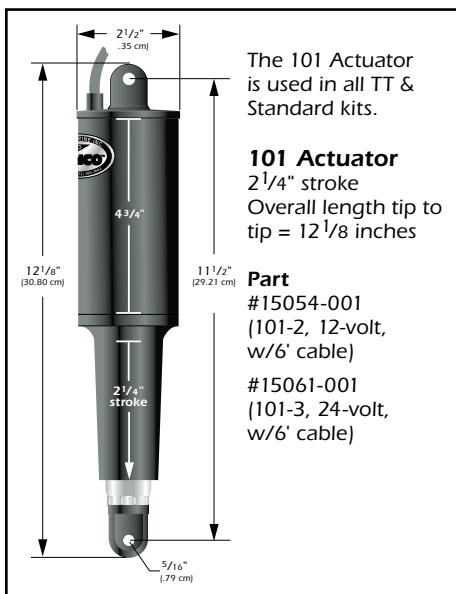
Can be upgraded to a 12" tab or a 9x12 Troll'n Tab



Edge Mount Kit #15016-101 (TT 12x12 ENS)

Can be upgraded to a 16" or 18" tab or a 12x12 Troll'n Tab





The entire Lenco Actuator is fully submersible, maintenance-free and sealed for life.



Lenco Hatch Lifts carry a 2-year limited warranty from the date of original purchase.

When possible, please refer to our troubleshooting guide on our website, <http://www.lencomarine.com> prior to processing your claim with the Lenco factory.

1. Call Lenco Marine at 772-288-2662, and ask for customer service. Give the technician a brief description of the product and the problem. Once the tech determines that the product is eligible for repair or replacement, they will issue you an RMA number (Return Merchandise Authorization).

Claims will not be processed without an RMA number.

2. Return product and paperwork to Lenco Marine with the following information: name, telephone number, description of problem, proof of purchase to verify warranty. Proof of purchase and warranty info can consist of the following:
 - A. Bill of sale from place of purchase
 - B. Retail boat purchase bill of sale
3. Mark the outside of the package with the RMA number and return it to Lenco Marine Customer Service Department at 4700 SE Municipal Court, Stuart, FL 34997 for processing. Once received, our Customer Service Department will make every effort to process your return quickly. Should time restraints prohibit you from sending in the merchandise first, or you need

an immediate replacement, you will be required to secure the replacement part with a credit card prior to shipment (Visa, MasterCard, American Express, Discover). Lenco Marine ships all warranty items UPS ground. Costs for upgrades in shipping are the responsibility of the customer. Lenco Marine warrants all Hatch Lifts for a period of 2 years from the date of original purchase. If any part of a Lenco Hatch Lift fails due to manufacturing defects or workmanship within a period of 2 years from the date of original purchase, Lenco Marine will repair or replace the part(s) without charge at our discretion. No haul out, labor or miscellaneous charges are covered under this warranty. Warranty is not transferable.

Trim Tab customers please see separate warranty policy. The foregoing is in lieu of any and all other warranties, expressed or implied, including any warranty of merchantability or fitness for a particular purpose. There are no other warranties which extend beyond that set forth above. Lenco Marine reserves the right to void any warranty claim if the part is opened or repair was attempted without prior authorization from Lenco Marine.

Lenco Marine Inc.
Phone: 772-288-2662
Fax: 772-288-2566
www.lencomarine.com
4700 SE Municipal Court
Stuart, FL 34997

Lenco Hatch Lift Installation/Operation

Due to the many different variables involved with the numerous applications for Lenco hatch lifts, installation is never the same. Here are some general guidelines that can be of assistance:

- The actuator is most powerful when it is installed vertically at 90 degrees.
- Lifting capabilities decrease the closer the upper or lower mount is located to the hinge.
- The further from a vertical position the less lifting capability. When retracted, **Do Not position hatch lift at an angle less than 45 degrees.**
- Dual actuator systems are recommended for hatches over 500 pounds (226.79 kg) of force.
- Lenco hatch lifts are designed around a ball screw that spins freely when hatch is fully open or closed.
- For installation, it is important that the hatch lift is able to disengage itself at the fully retracted position.
- The ram must be allowed to free spin at both ends of its stroke or it will continue to push or pull against any resistance potentially damaging the hatch lift or the hatch itself.
- Failure to make accurate measure could cause damage to hatch lift or the hatch itself.
- Lenco hatch lifts are fully submersible and will not drift.
- Lenco hatch lifts are offered in both 12 and 24 volts.

S = Short. All part numbers ending in S have the same stroke but in a 4" (10.16 cm) shorter length.

Part Number	L. O. A. Retracted	Approx. Stroke	L. O. A. Extended
HL-400	15"	4"	19"
HL-800S	21"	8"	29"
HL-800	25"	8"	33"
HL-1200S	25"	12"	37"
HL-1200	29"	12"	41"
HL-1600S	29"	16"	45"
HL-1600	33"	16"	49"
HL-2000S	33"	20"	53"
HL-2000	37"	20"	57"
HL-2400S	37"	24"	61"
HL-2400	41"	24"	65"

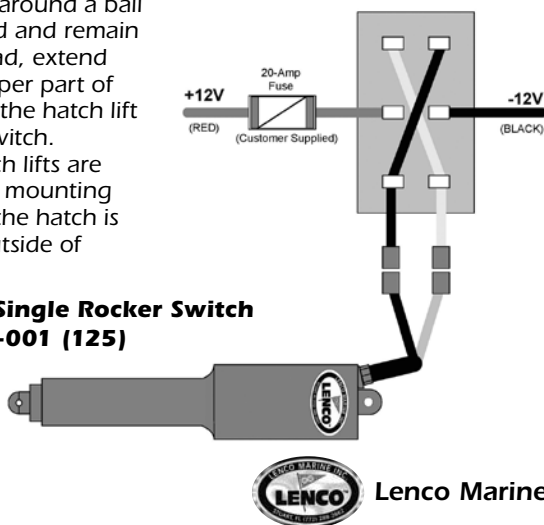


OPERATION

The function of the Lenco Hatch Lift system is simple. Since the hatch lift is based around a ball screw it is able to push a heavy load and remain at a constant position. To raise a load, extend the hatch lift by pressing on the upper part of the switch. To lower a load, retract the hatch lift by pressing the lower part of the switch. In case of power failure, Lenco hatch lifts are supplied with two clevis pins at the mounting brackets. To pull this pin out while the hatch is closed, you must rig it to a point outside of the hatch.

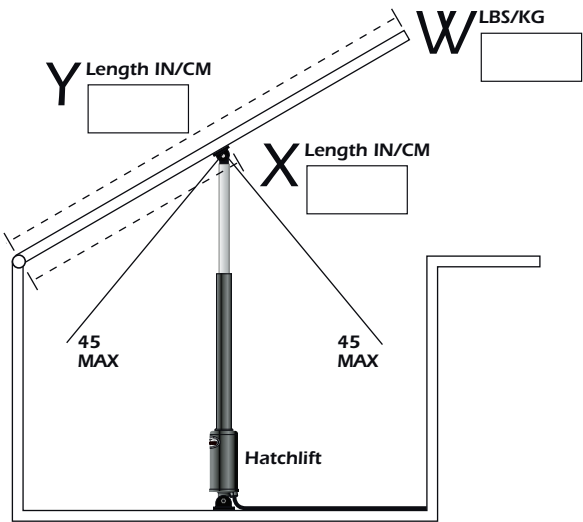


Wiring Single Rocker Switch #10225-001 (125)

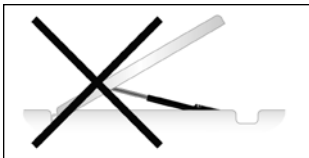
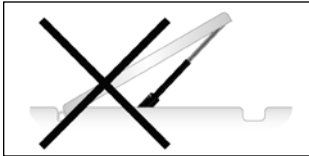


Lenco Marine

Lenco Hatch Lift Mounting



$$Y \times W \div X = \text{Force}$$



1. Follow the chart above to figure out load on the hatch lift. Maximum load is 500 lbs. (226.79 kg)

Y = Total length of hatch

X = Length from the hinge to the hatch lift mounting point

W = Weight of the hatch to be lifted

2. Determine the angle of the hatch lift mount. Do not exceed 45 degrees from center.
3. Mount the hatch lift on the desired location as per the above instructions.
Important: It may be necessary to shim the upper or lower mounting bracket up or down so the hatch does

not bind when fully closed. The hatch lift does not stop pulling until it has reached its fully closed position. If the hatch fully closes before the hatch lift is fully retracted, it will cause damage to the lift or the mounting hardware. Shim the hatch lift with stainless washers for small amounts of length. Use Lenco part #118S for lengths greater than 1/8" (3 mm).

4. Wire to switch according to the hatch lift wiring diagram in the owners manual supplied with the hatch lift.

SYSTEM PARTS

1	Hatch Lift (electromechanical actuator)	#s HL-400, HL-800, HL-800s, HL-1200, HL-1200S, HL-1600, HL-1600S, HL-2000, HL-2000S, HL-2400, HL-2400S
2	Mounting brackets	#50014-001 (119), #50015-001 (118)
3	Clevis pins	#60101-001 (121SS)
4	Single rocker switch	#10225-101 (125) (optional)
5	Slide bracket	#70381-001 (HLSB) (optional)

Standard Trim Tab Kits

- Standard trim tab kits include: two #101 actuators with extension harnesses and Deutsch connectors, two stainless steel blades, and all mounting hardware. See switch selections on page 16 for available options
- Available in standard mount and edge mount (space saver mount)
- Sizes range from 9" x 9" to 12" x 40". Measurements taken L x W



TT 9x12 NS



TT 12x9 ENS



TT 12x12 ENS

**Switches sold separately.
See available options on page 16**

Performance Tab Kits

Standard Performance

- Standard performance tab kit includes: two #101 actuators with extension harnesses and Deutsch connectors, two 12-gauge electro-polished stainless steel blades and all mounting hardware
- Available in sizes: RT 9x9 NS, RT 9x12 NS, RT 12x9 NS, RT 12x12 NS, RT 14x12 NS, RT 16x12 NS and RT 18x14 NS

Heavy Duty Performance

- Heavy duty performance tab kit includes: two #101 XD actuators with extension harnesses and Deutsch connectors, two 12-gauge electro-polished stainless steel blades w/transom back plates and heavy duty hinge with 1/4" (.64 cm) hinge pin
- Available in sizes: RT 12x12 HDNS, RT 16x12 HDNS, RT 18x14 HDNS
- Customer supplied mounting hardware

Extreme Duty Performance

- Extreme duty performance tab kit includes: two #101 XD actuators (RT 17x12 XDNS), four #101 XD actuators (RT 19x14 XDNS & RT 24 x 14 XDNS) on two 10-gauge electro-polished stainless steel blades w/transom back plates and super duty hinge with 3/8" (.95 cm) hinge pin
- Actuator extension harnesses sold separately in choice of 5 lengths
- Customer supplied mounting hardware
- Available in sizes: RT 17x12 XDNS, RT 19x14 XDNS, and RT 24x14 XDNS

Switches: See selections on page 16 for available options

RT 12x12 NS



RT 16x12 HDNS



RT 19x14 XDNS



Electro-polished Blades

High Performance Tabs - Single & Dual Actuator

- High performance tab kit includes: two 12-volt Extreme Duty Actuators with 316 SS billet ram with 3/8" (.95 cm) SS bolts, two 7-gauge flat-304 electro-polished stainless blades.
- Full transom back plate with adjustable C-channel, 3/8" (.95 cm) bolts and super duty hinge with 3/8" (.95 cm) hinge pin
- Actuator extension harnesses sold separately in choice of 5 lengths
- Customer supplied mounting hardware
- Available in sizes: Single Actuator System: #15048-101 (14" x 12"), #15049-101 (18" x 12")
Dual Actuator System : #15050-101 (21" x 14"), #15051-101 (25" x 14")

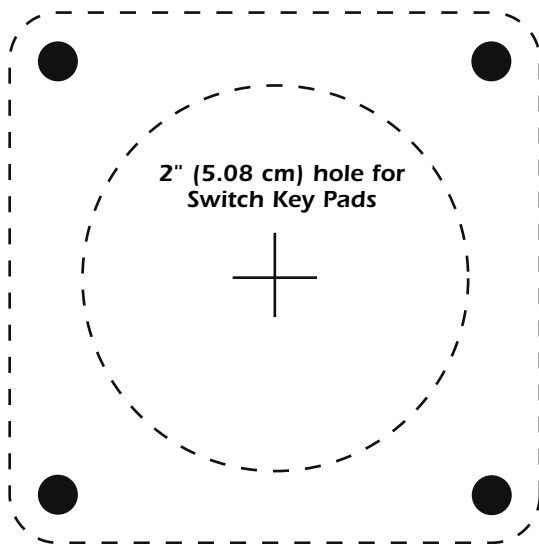
High Performance Tabs - Single & Dual Actuator



Electro-polished Blades



Switches sold separately. See available options on page 16



Tactile Switch Connection

Mount control box within 30" (76.2) of keypad.
Control box wire harness is 30" (76.2) length



Switch Template

Remove the template from the owner's manual by cutting around the dashed rectangular perimeter line.

Align the 3/16" (.48 cm) drill bit with each of the four black circles and drill straight down through the helm, providing

clearance for the mounting hardware provided with the switch.

Align the centering bit of a 2" (5.08 cm) hole saw with the cross hairs in the center of the 2" (5.08 cm) dashed circular perimeter and drill straight down through the helm, providing additional clearance for switch and electrical connection.

DON'T WORRY...



we've got your back.



Lenco Marine Inc., 4700 Municipal Court ■ Stuart, Florida 34997
772-288-2662 ■ 772-288-2566 fax ■ www.lencomarine.com

JABSCO®

31295 / 31395 - SERIES AUTOMATIC WATER SYSTEM PUMP

FEATURES

- Smooth Flow
- Self-Priming up to 10 feet (3m)
- Dry running capability
- Soft noise absorbing mounts
- Snap-fit port fittings
- Built-in bypass — less pulsation
- Reduces need for accumulator tank
- Corrosion resistant materials
- Thermal overload protection
- Motor rating: IP 54
- CSA listed
- ISO 8846 MARINE (ignition protection)
- **CE**

SPECIFICATIONS

Motor: Permanent Magnet, Ball Bearing Totally Enclosed.
Not for Continuous Duty. Intermittent Duty Only.

Pump: Body - Polypropylene
Diaphragm - Santoprene
Valves - EPDM



Fittings: (2) 1/2" - 14 Male pipe
(2) 1/2" (13 mm) Hose Barbs



31295 / 31395 - Series

Pump Series	Dimensions - Inches (mm)			Weight lb. (kg)
	Height	Width	Length	
31X95-XXXX	4-3/4" (121)	6" (152)	9" (229)	3.5 (1.6 kg)

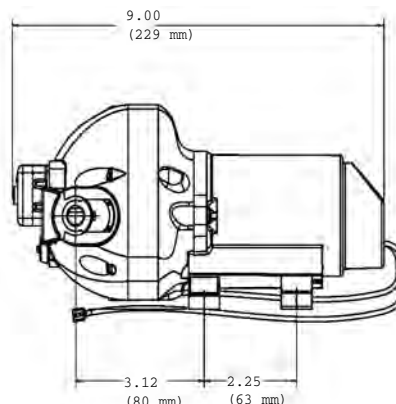
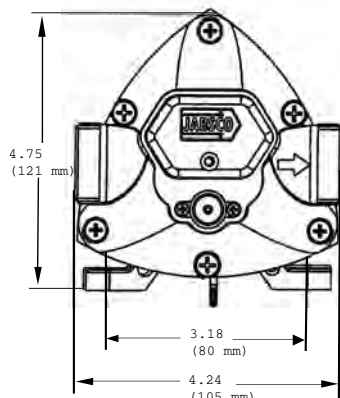
MODEL	VOLTS	AMP DRAW (A) @ 10 psi (0.7 bar)	FUSE SIZE (A)	OPEN FLOW GPM (l/min)	MAX PSI (bar)
31395-0092	12V dc	4.4	10	2.9 (11)	50 (3.4)
31395-0094	24V dc	2.2	5	2.9 (11)	50 (3.4)
31395-0392	12V dc	4.4	10	2.9 (11)	40 (2.7)
31395-0394	24V dc	2.2	5	2.9 (11)	40 (2.7)
31395-0292	12V dc	4.4	10	2.9 (11)	25 (1.7)
31395-0294	24V dc	2.2	5	2.9 (11)	25 (1.7)
31295-0092	12V dc	3.5	10	1.9 (7)	25 (1.7)
31295-0094	24V dc	1.7	5	1.9 (7)	25 (1.7)

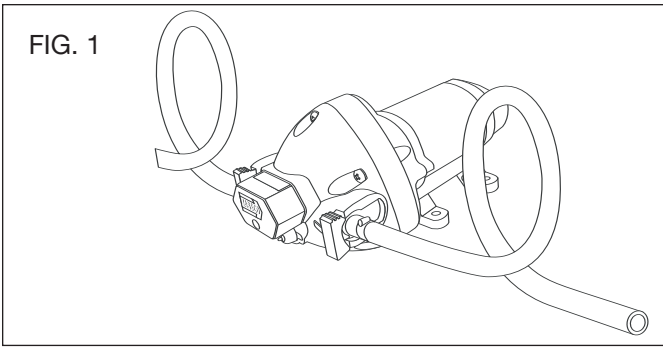
OPERATION

With pump switch off and battery fully charged, fill water tank, open all faucets, then turn pump switch on. Water will begin to flow. When the water is free of air, turn faucets off. Remember,

you are filling the water heater and the toilet and shower lines. When all valves are shut-off, pump will stop. Should pump fail to stop, turn switch off and see the trouble shooting guide.

DIMENSIONAL DRAWING





INSTALLATION

STEP 1

Remove shipping plugs from pump ports. There may be slight amount of water that drains out of the pump as all pumps are tested at the factory before shipment.

STEP 2

A direction arrow can be found on the pump head to indicate direction of flow. Connect the appropriate sized hose to one of the supplied fittings and then connect the hose to the water supply tank outlet. To reduce vibration use 1/2" (13 mm) braided or reinforced flexible hose on the inlet and outlet of the pump as shown on Fig.1. Use hose clamps on the slip-on barb connectors.

WIRING (Fig. 3)

IF YOU ARE NOT FAMILIAR WITH APPLICABLE ELECTRICAL STANDARDS, HAVE THE UNIT INSTALLED BY A QUALIFIED ELECTRICIAN.

Suggested wiring information is given as a reference. For proper information, please reference USCG regulations for marine applications and wiring gauges, connectors and fuse protection.

STEP 1

Determine the distance from the power source to the pump and then double the measurement. Wire gauge installation is determined on the entire run length, to the pump and back.

STEP 2

Connect to power supply lead (red)(+) to the positive (+) terminal on the battery or through a properly installed fuse / circuit breaker panel. Then run the length of wire to the pump, connecting the red wire through a switch appropriately rated to the pump's current requirements.

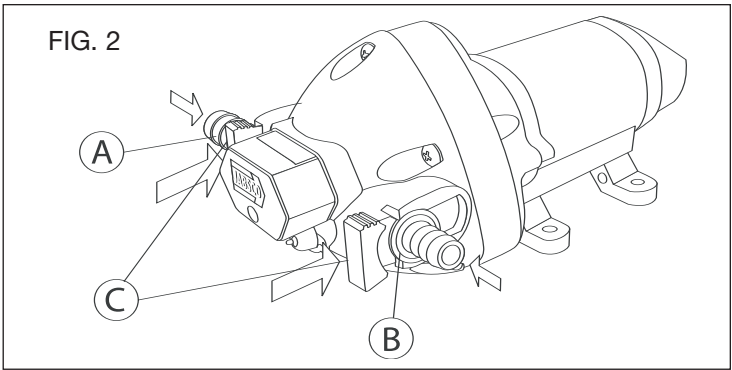
STEP 3

Route the wire so as not to create hazards in operation of the engine, movement of steering components or human traffic.

WIRE SIZE

Pump Voltage	Total Wire Length - feet (meters)		
	0 - 20 ft (0 - 6 m)	20 - 35 ft (6 - 9 m)	35 - 55 ft (9 - 12 m)
12 VDC	#14 AWG (2.5 mm ²)	#12 AWG (4 mm ²)	#10 AWG (6 mm ²)
24 VDC	#16 AWG (1.5 mm ²)	#14 AWG (2.5 mm ²)	#12 AWG (4 mm ²)

CAUTION Motor case could get hot during extended operation. Prolonged contact with skin may cause a burn.



STEP 3

Slide rubber mounts fully into 4 mounting tracks.

STEP 4

Mount pump horizontally in an accessible location or vertically with pumphead down. Support weight of the pump and attach pumphead mounts first then motor mounts second.

STEP 5 (Fig. 2)

Install inlet A and discharge B port connectors. Firmly push slide clips C forward to lock port connectors in place.

STEP 6 (Fig. 4)

Install a Pumpgard™ strainer in an accessible location (for inspection and cleaning) between the tank and pump inlet in order to protect valves from debris.

STEP 4

Connect the red lead to the red lead on the pump housing located pressure switch.

STEP 5

Connect the black lead from the pump to the ground or negative power side (-) of the vessel.

STEP 6

Turn the system off when not in use for extended periods of time or when the water supply tank is empty.

STEP 7

After installation, check voltage at the pump motor. Voltage should be checked when pump is operating. Full voltage must be available at the pump motor at all times for proper pump operation and pump motor life.

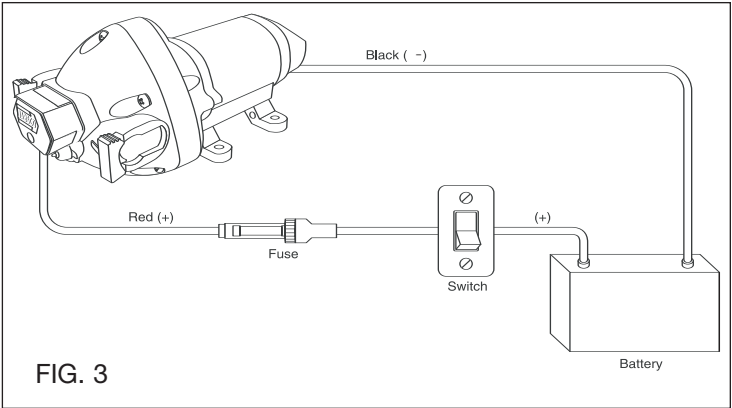


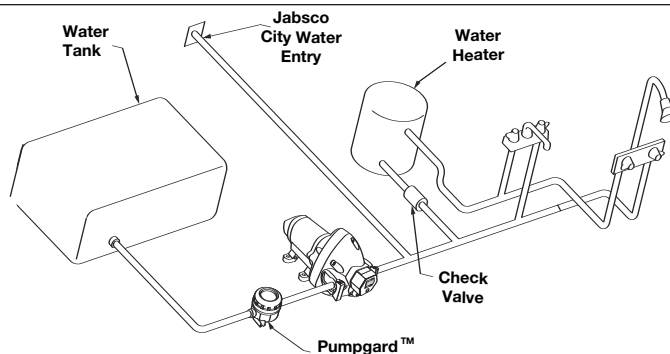
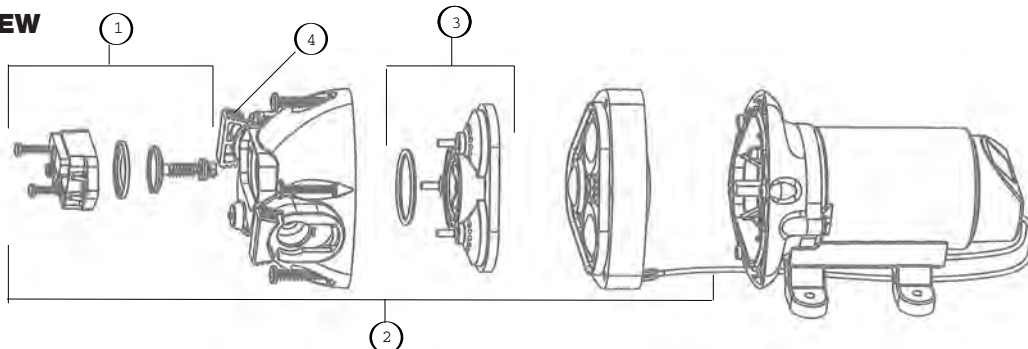
FIG. 3

WARNING

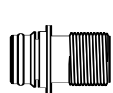


Fire hazard. Wiring must comply with applicable electrical standards and include a properly sized fuse or circuit breaker. Improper wiring can cause a fire resulting in injury or death.

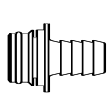
FIG. 4

**EXPLODED VIEW****AUTOMATIC WATER SYSTEM PUMP SERVICE PARTS**

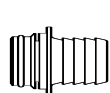
KEY#	DESCRIPTION		SERIES 31395 - XXXX	SERIES 31295 - XXXX
1	Pressure Switch	(25 psi)	18916-1025	18916-1025
		(40 psi)	18916-1040	
		(50 psi)	18916-1050	
2	Pumphead Assembly	(25 psi)	18914-1025	18914-0025
		(40 psi)	18914-1040	
		(50 psi)	18914-1050	
3	Check Valve Assembly		18911-1030	18911-1030
4	Slide Clips (Pair)		30647-1000	30647-1000

**ACCESSORIES
SNAP-IN PORT SYSTEM**

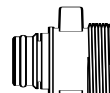
30649-1000
(1 PAIR)
SNAP-IN PORT X
1/2" - 14 MALE PIPE
STRAIGHT



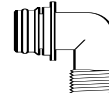
30654-1000
(1 PAIR)
SNAP-IN PORT X
1/2" (13 mm)
HOSE BARB
STRAIGHT



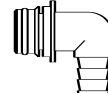
30653-1000
(1 PAIR)
SNAP-IN PORT X
3/4" (19 mm)
HOSE BARB
STRAIGHT



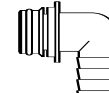
30650-1000
(1 PAIR)
SNAP-IN PORT X
GARDEN HOSE
STRAIGHT



30655-1000
(1 PAIR)
SNAP-IN PORT X
1/2" - 14 MALE PIPE
90° ELBOW



30651-1000
(1 PAIR)
SNAP-IN PORT X
1/2" (13 mm)
HOSE BARB
90° ELBOW



30642-1000
(1 PAIR)
SNAP-IN PORT X
3/4" (19 mm)
HOSE BARB
90° ELBOW

Winterizing

Allowing water to freeze in the system may result in damage to the pump and plumbing system. Non-Toxic antifreeze for potable water may be used with Jabsco pumps. Follow manufacturer's recommendations. Refer to boat or equipment manufacturer's instructions for their specific winterizing and drainage procedures. **Do not use automotive antifreeze** to winterize potable water systems. These solutions are highly toxic and may cause serious injury or death if ingested.

1. Drain the water tank. Open tank drain valve. You may use the pump to drain the tank by opening all the faucets in the system. Allow the pump to operate until the tank is empty. Do not operate the pump more than 15 minutes continuously.

2. Open all faucets and purge the water from the plumbing system. Turn off power to the pump. Be sure that all the water from the drain lines is drained.
3. Remove quick-connect inlet and outlet fittings from the pump and turn the pump on to pump out remaining water from the pump head. Be sure to have a catch pan or a rag under the pump to prevent water from spilling onto the boat. Turn the pump off once the plumbing is empty. Leave the fittings disconnected from the pump until the system is ready to be used again. Make a note on your tank filler that the plumbing is not connected.
4. Be sure that all faucets are left open to protect against damage to the plumbing.

Sanitizing

Potable water systems require periodic maintenance to deliver a consistent flow of fresh water. Depending on use and the environment the system is subjected to, sanitizing is recommended prior to storing and before using the water system after a period of storage. Systems with new components, or ones that have been subjected to contamination, should also be disinfected as follows:

(NOTE: The sanitizing procedure is in conformance with the approved procedures of the US Public Health Service.)

1. Use the following methods to determine the amount of common household bleach needed to sanitize the tank:
 - A. Multiply "gallons of tank capacity" by 0.13; the result is the ounces of bleach needed to sanitize the tank (30 gallons X .13 = 3.9 oz bleach).
 - B. Use the number of liters of tank capacity to determine the number of milliliters of bleach needed to sanitize the tank (120 liters of tank capacity = 120 milliliters of bleach).
2. Mix into solution the proper amount of bleach within a container of water
3. Pour the solution (water/bleach) into the tank and fill the tank with potable water.
4. Open all faucets (hot and cold) allowing the water to run until the distinct odor of chlorine is detected.
5. The standard solution must have four (4) hours of contact time to disinfect completely. Doubling the solution concentration allows for contact time of one (1) hour.
6. When the contact time is completed, drain the tank. Refill with potable water and purge the plumbing of all sanitizing solution.

TROUBLESHOOTING

WARNING: BEFORE SERVICING PUMP, TURN OFF PUMP AND DRAIN WATER FROM SYSTEM!!

PROBLEM	SOLUTION
Pulsation Flow - Pump cycles on and off	Restricted pump delivery. Check discharge lines, fittings and valves for undersizing or clogging. Clean screens in faucets. Some filters or purifiers are highly restrictive. Filters/purifiers with high pressure drop may require a separate line and/or the installation of an accumulator tank in the system.
Failure to Prime - Motor operates, but no pump discharge	Restricted intake or discharge line Air leak in intake line Punctured pump diaphragm Debris under flapper valves Crack in pump housing
Pump fails to turn off after all fixtures are closed	Empty water tank Punctured pump diaphragm Discharge line leak Defective pressure switch Insufficient voltage to pump Debris under flapper valves
Low flow and pressure	Air leak at pump intake Accumulation of debris inside pump and plumbing Worn pump bearing (excessive noise) Punctured pump diaphragm Defective motor
Motor fails to turn on	Loose wiring connection Pump circuit has no power Blown fuse/thermal protector tripped Pressure switch failure Defective motor

Jabsco



ITT Industries
Engineered for life

www.jabsco.com

THE PRODUCTS DESCRIBED HEREIN ARE SUBJECT TO THE JABSCO THREE-YEAR LIMITED WARRANTY, WHICH IS AVAILABLE FOR YOUR INSPECTION UPON REQUEST.

U.S.A. Jabsco Cape Ann Industrial Park Gloucester, MA 01930 Tel: +1 978 281 0440 Fax: +1 978 283 2619	UK Jabsco Bingley Road, Hoddesdon Hertfordshire EN11 0BU Tel: +44 (0) 1992 450145 Fax: +44 (0) 1992 467132	CANADA Fluid Products Canada 55 Royal Road Guelph, Ontario N1H 1T1 Tel: 519 821 1900 Fax: 519 821 2569	JAPAN NHK Jabsco Company Ltd. 3-21-10, Shin-Yokohama Kohoku-Ku, Yokohama, 222 Tel: +45 475 8906 Fax: +45 475 8908	GERMANY Jabsco GmbH Oststrasse 28 22840 Norderstedt Tel: +49 (40) 53 53 730 Fax: +49 (40) 53 53 7311	ITALY Jabsco Marine Italia Via Tommaseo, 6 20059 Vimercate, Milano Tel: +39 039 685 2323 Fax: +39 039 666 307
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WATER SYSTEM PUMPS

- 31595-SERIES
- 31600-SERIES
- 31620-SERIES
- 31630-SERIES

PAR-MAX 2+ – 2.8 GPM (10.6 LPM)

PAR-MAX 3 – 3.5 GPM (13.2 LPM)

PAR-MAX 4 – 4.3 GPM (16.3 LPM)

FEATURES

- Self-Priming to 10 ft. (3 m)
- Runs Dry Without Damage
- Smooth Flow
- Four Piston, Diaphragm Pump
- Powerful Motor with Thermal Overload Protection
- Snap-in Ports
- Waterproof Coating (31630-Series)
- Pressure Switch with Rubber Boot
- Meets USCG Regulation 183.410 and EN ISO 8846 MARINE (Ignition Protection)
- Meets EN 50081-1 Electro-magnetic Compatibility



APPLICATIONS

The PAR-MAX Automatic Water System Pump is designed for self-contained boats and RV's with multiple fixture water systems. The system operates automatically. When a fixture is opened, the pump instantly begins operation to provide a smooth constant flow from tank to faucet. Closing the faucet automatically discontinues pump operation.

The Deluxe model 31630-Series has a corrosion resistant coated motor for extra protection in harsh environment applications.

SPECIFICATIONS

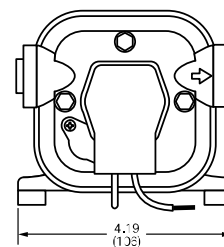
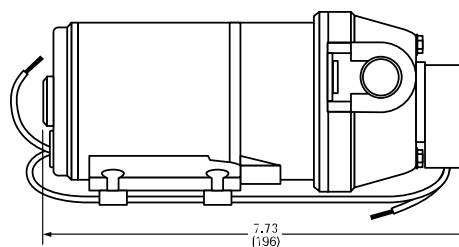
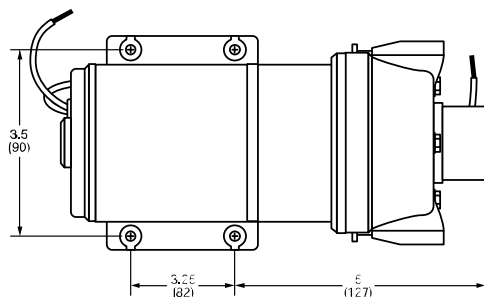
- Pump Body – Glass Filled Polypropylene
- Pump Design – Multi-Chamber Diaphragm
- Suction Lift – Self Priming to 10 ft. (3 m)
- Ports – 1/2" (13 mm) Hose & 1/2" (13 mm) Threaded (QEST Type)
- Motor – Permanent Magnet
- Shipping Weight – 3.9 lb (1.8 kg) 31595-Series
4.5 lb (2.1 kg) 31600-Series
6.0 lb (2.8 kg) 31620-Series
31630-Series

Models 31595, 31600, 31620, 31630-Series

MODEL	GPM/LPM	VOLTS	NOMINAL psi (bar)		AMP DRAW @ 10 psi	FUSE/ BREAKER*
			CUT-IN	CUT-OUT		
31595-0092	2.8/10.6	12 Vdc	20 (1.4)	40 (2.8)	4	10
31595-0094	2.8/10.6	24 Vdc	20 (1.4)	40 (2.8)	2	7
31595-0292	2.8/10.6	12 Vdc	10 (0.7)	25 (1.8)	4	10
31595-0294	2.8/10.6	24 Vdc	10 (0.7)	25 (1.8)	2	7
31600-0092	3.5/13.2	12 Vdc	20 (1.4)	40 (2.8)	5	10
31600-0094	3.5/13.2	24 Vdc	20 (1.4)	40 (2.8)	3	7
31600-0292	3.5/13.2	12 Vdc	10 (0.7)	25 (1.8)	5	10
31600-0294	3.5/13.2	24 Vdc	10 (0.7)	25 (1.8)	3	7
31620-0092	4.3/16.3	12 Vdc	20 (1.4)	40 (2.8)	6	10
31620-0094	4.3/16.3	24 Vdc	20 (1.4)	40 (2.8)	3	7
31620-0292	4.3/16.3	12 Vdc	10 (0.7)	25 (1.8)	6	10
31620-0294	4.3/16.3	24 Vdc	10 (0.7)	25 (1.8)	3	7
31630-0092	4.3/16.3	12 Vdc	20 (1.4)	40 (2.8)	6	15

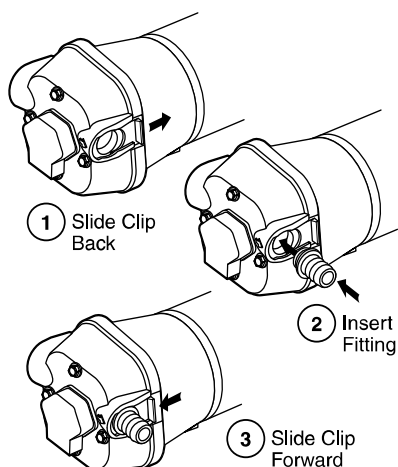
* Customer supplied, not included with pump.

DIMENSIONAL DRAWINGS — INCHES (MILLIMETRES)



INSTALLATION

QUICK EASY INSTALLATION VERSATILE SNAP-IN PORTS



MOUNTING

The PAR-MAX pumps are self-priming and may be located above or below the fresh water tank in a dry location. To vertically mount these units, it is best to do so with the motor on top. This will prevent water dripping on motor in the event of a leak. **Place pump on a solid surface and secure with four mounting screws (not included) being careful not to compress the rubber grommets which act as shock absorbers.**

PLUMBING

Select two of the port adaptors supplied to match your plumbing system. **Flexible potable water hose or PEX tubing is recommended instead of rigid piping at pump.** If you choose to use rigid piping, provide a short length of hose between pipe and the pump to avoid noise and vibration. Use clamps at both ends of hose to prevent air leaks into the water line. NOTE: Intake hose must be minimum 1/2" (13 mm) ID reinforced hose. Main distribution line from pump outlet should also be 1/2" (13 mm) ID with branch and individual supply lines to outlets no smaller than 3/8" (10 mm). A Jabsco "Pumpgard" in line strainer should be installed between pump and tank to keep debris out of pump and system. Fresh water tank must be vented. Avoid any kinks or fittings which could cause excessive restrictions. Remember to periodically clean faucet and "Pumpgard" screens.

WARNING!

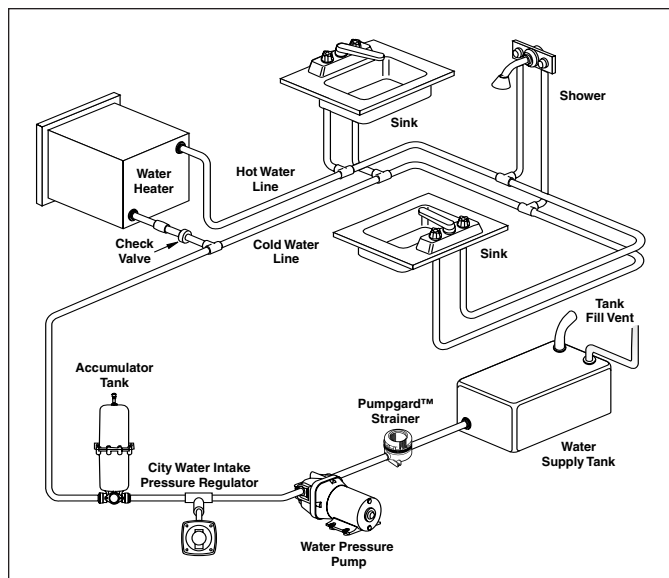


Explosion hazard. Do not pump gasoline, solvents, thinners or other flammable liquids. To do so can cause an explosion resulting in injury or death.

WIRING

In an easily accessible location, install a switch (Jabsco 44960-Series) to control electricity to the pump. Turn the pump off when not used for extended periods or when the tank is empty.

The electrical circuit should be protected with an over-current protection device in the positive lead. See chart for proper size. The pump circuit should not include any other electrical loads. The free lead at the pressure



switch is positive. Black wire from the motor is negative.

Select wire size from chart below. Use total length of wire from the battery to pump and return. Chart allows for 3% voltage drop. If in doubt, use next larger wire size.

Total length in feet	0-20 (0-6 m)	20-35 (6-11 m)	35-55 (11-17 m)
12 Volt	#14 AWG (2.5 mm ²)	#12 AWG (4 mm ²)	#10 AWG (6 mm ²)
24 Volt	#16 AWG (1.5 mm ²)	#14 AWG (2.5 mm ²)	#12 AWG (4 mm ²)

WARNING

Fire hazard. Wiring must comply with applicable electrical standards and include a properly sized fuse or circuit breaker. Improper wiring can cause a fire resulting in injury or death.

If you are not familiar with applicable electrical standards, have the unit installed by a qualified electrician.

After installation, check the voltage at the pump motor. Voltage should be checked when pump is operating. Full voltage must be available at the pump motor at all times.

OPERATION

1. Check level of water in tank.
2. Open all faucets hot and cold.
3. Switch on power to pump and wait for hot water tank and water lines to fill.
4. Close each faucet as flow becomes steady and free of air (close cold water faucet first). Pump should shut off soon after closing last faucet.
5. Pump is now ready for automatic operations. It will start when faucet is opened and stop when faucet is closed.
6. If pump will be inoperative for a considerable length of time, turn off circuit to pump and bleed system by opening faucet.

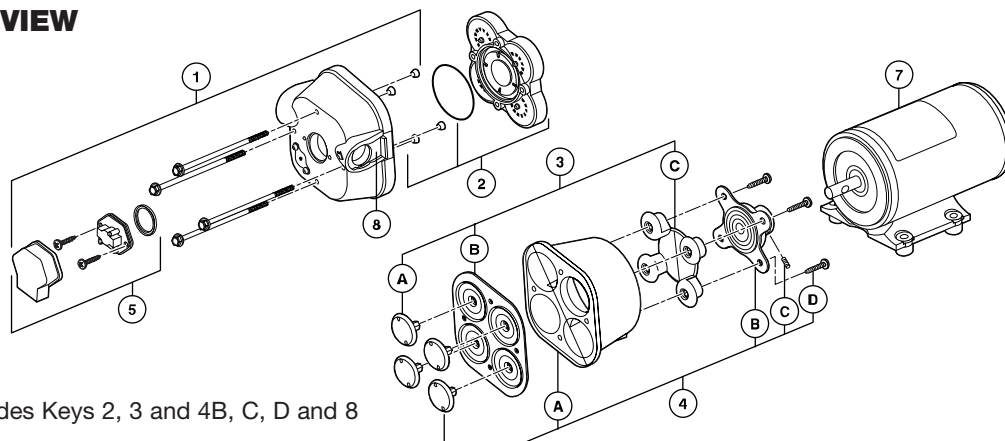
CAUTION

Motor case will get hot. Prolonged contact during operation may cause a burn.



WARNING: DISCONNECT POWER TO PUMP AND OPEN VALVE TO RELIEVE WATER PRESSURE PRIOR TO SERVICING PUMP

EXPLODED VIEW



* Service kit includes Keys 2, 3 and 4B, C, D and 8

KEY	DESCRIPTION	QTY	31595-SERIES	31600-SERIES	31620-SERIES	31630-SERIES
1	Upper Housing	XXXXX-0092	1	18910-4040	18910-4040	18910-4040
		XXXXX-0094	1	18910-4040	18910-4040	18910-4040
		XXXXX-0292	1	18910-4025	18910-4025	18910-4025
		XXXXX-0294	1	18910-4025	18910-4025	18910-4025
		XXXXX-0294	1	18910-4025	18910-4025	18910-4025
2	Valve Kit		1	18911-7030	18911-7030	18911-7030
3	Diaphragm Kit		1	18912-3040	18912-3040	18912-3040
4	Lower Housing Kit		1	18915-9000	18915-9002	18915-9002
5	Pressure Switch	XXXXX-0092	1	18916-0040	18916-0040	18916-0040
		XXXXX-0094	1	18916-0040	18916-0040	18916-0040
		XXXXX-0292	1	18916-0025	18916-0025	18916-0025
		XXXXX-0294	1	18916-0025	18916-0025	18916-0025
		XXXXX-0294	1	18916-0025	18916-0025	18916-0025
*6	Service Kit		1	18920-9042	18920-9043	18920-9043
7	Motor Kit – 12V EMC COMP		1	18919-0134	18919-0131	18919-0133
		24V EMC COMP	1	18919-1055	18919-1052	N/A
8	Slide Clips		1	30648-1000	30648-1000	30648-1000
9	Pumphead Assy.	XXXXX-0092	1	18914-6240	18914-6340	18914-6340
		XXXXX-0094	1	18914-6240	18914-6340	18914-6340
		XXXXX-0292	1	18914-6225	18914-6325	18914-6325
		XXXXX-0294	1	18914-6225	18914-6325	18914-6325
		XXXXX-0294	1	18914-6225	18914-6325	18914-6325

DISASSEMBLE

Pressure Switch (5)

1. Disconnect power to pump and open a faucet or valve to relieve system pressure.
2. Remove Rubber Boot, then remove the two visible Pressure Switch Screws located on each side of the Pressure Switch (5).

Upper Housing (1)

3. Slide Port Clip (8) back and unplug from Tank Plumbing.
4. Loosen but DO NOT remove the four Pump Head Screws and carefully remove Upper Housing Assembly (1).
5. Remove Check Valve (2) and inspect for debris.

Check Valve Assembly (2) Follow Steps 1, 3 & 4

6. Inspect Check Valve (2) and O-Ring

Lower Housing (4) Follow Step 1, 3 & 4

7. Remove Rubber Plugs on housing (4-A) to access Allen Screw.
8. Rotate Lower Housing (4), so access notch is aligned with Cam Bearing Set Screw (4-C), loosen set screw with a 1/8" Allen Wrench and slide pump head off motor shaft.

Diaphragm (3-B)

9. Loosen four cam piston screws with Phillips head screw driver and pull apart cam (4-B) from Inner Pistons (3-A). (Both pistons (3-A & C) should be replaced when a new Diaphragm (3-B) is installed.)

Motor (7) Follow steps 1, 3, 4, 7, & 8

REASSEMBLE

Diaphragm (3-B)

1. Insert Outer Pistons (3-C) into Lower Housing (4-A) by bending pistons at center fold.
2. Placing the Diaphragm (3-B) (flatter side of Diaphragm facing the motor) on the Lower housing (4-A). Press each Inner Piston (3-A) through the Diaphragm and Lower Housing (4A) into Outer Piston (3-C). Hex stem of Inner Pistons (3-A) must be aligned into hex holes in Outer Pistons (3-C). Tighten cam piston screws partially, center piston in diaphragm, and tighten screws securely (18 in. lbs. torque). Also, the Outer Pistons (3-C) must be aligned with alignment slots on Cam Assembly (4-B) making sure screw holes align in cam assembly, otherwise diaphragm will leak.

Cam Bearing (4-B)

3. Place Cam Bearing (4-B) over Inner Pistons (3-C) and tighten down with four Phillips Head Screws. (18 in. lbs. torque)

Lower Housing (4) to Motor (7)

- Coat motor shaft with grease prior to installing Cam Bearing (4-B).
4. When installing the Lower Housing (4), rotate access notch to align with Cam Bearing Set Screw (4-C).
5. Attach Cam Bearing (4-B) to motor shaft indentation with Cam Bearing Set Screw (4-C). (35 in. lbs. torque)
6. Reinsert new Notch Plugs.

Check Valve (2)

7. Place Ferrules (Rubber Cones) in the Upper Housing (1) coned side first.
8. Properly seat O-Ring in Check Valve (2) and insert Check Valve (2) into the Upper Housing (1).

Upper Housing (1)

9. Place Upper Housing (1) on top of the Lower Housing (4-A) and tighten Hex Bolts (30 in. lbs. torque) through the Upper Housing (1) to the Motor.

TROUBLESHOOTING

PULSATING FLOW – PUMP CYCLES ON AND OFF

- Restricted pump delivery. Check discharge lines, fittings and valves for undersizing or clogging. Clean screens in faucets. Some filters or purifiers are highly restrictive. Filters/purifiers with high pressure drop may require a separate line and the installation of an accumulator tank in the system.

FAILURE TO PRIME – MOTOR OPERATES, BUT NO PUMP DISCHARGE

- Restricted intake or discharge line.
- Air leak in intake in line.
- Punctured pump diaphragm (water leak).
- Debris under flapper valves.
- Crack in pump housing.

MOTOR FAILS TO TURN ON

- Loose wiring connection.
- Pump circuit has no power.
- Blown fuse/Thermal Protector tripped (wait 30 min.).
- Pressure switch failed.
- Defective motor.

⚠ CAUTION PAR-MAX pumps have thermal overload protected motors. The motor will automatically shut off as temperature rises due to an overload condition. If the motor shuts off in this manner, close all nozzles, faucets or valves. After a cooling off period, the pump will automatically re-start.

WINTERIZING YOUR WATER SYSTEM

To winterize, it is not necessary to drain the water from the entire water system. Blowing into the lines to remove the water from your water system is not satisfactory due to the check valve mechanism built into the pump.

Follow these steps to remove all water from your water system:

1. Drain water by opening tank drain, or open a fixture to allow pump to operate until tank is dry.

⚠ DANGER DO NOT USE AUTOMOTIVE TYPE ANTI-FREEZE. IT IS POISONOUS. USE OF THIS TYPE ANTI-FREEZE WILL CAUSE SERIOUS INTERNAL INJURY OR DEATH.

PUMP FAILS TO TURN OFF AFTER ALL FIXTURES ARE CLOSED

- Empty water tank.
- Punctured pump diaphragm (water leak).
- Discharge line leak.
- Defective pressure switch.
- Insufficient voltage to pump.
- Debris under flapper valves.

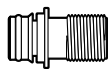
LOW FLOW AND PRESSURE

- Air leak at pump intake.
- Accumulation of debris inside pump and plumbing.
- Worn pump bearing (excessive noise).
- Punctured pump diaphragm (water leak).
- Defective motor.

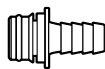
2. Open the lowest outlet in water system to drain lines.
3. To remove any remaining water (about a cup), remove outlet hose on pump and activate pump. To blow out lines, attach air nozzle where outlet hose was removed. Make sure all fixtures are open before starting.
4. Your water system is now winterized. Don't forget to reattach the outlet hose to pump and close all fixtures.

ACCESSORIES

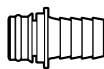
SNAP-IN PORT SYSTEM



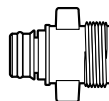
30649-1000
30649-1001
SNAP-IN PORT x
1/2" MALE QEST.
STRAIGHT



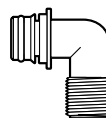
30654-1000
30654-1001
SNAP-IN PORT x
1/2" HOSE BARB
STRAIGHT



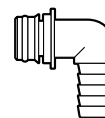
30653-1000
30653-1001
SNAP-IN PORT x
3/4" HOSE BARB
STRAIGHT



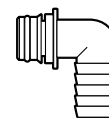
30650-1000
30650-1001
SNAP-IN PORT x
GARDEN HOSE
STRAIGHT



30655-1000
30655-1001
SNAP-IN PORT x
1/2" MALE QEST.
90° ELBOW



30651-1000
30651-1001
SNAP-IN PORT x
1/2" HOSE BARB
90° ELBOW



30642-1000
30642-1001
SNAP-IN PORT x
3/4" HOSE BARB
90° ELBOW

Jabsco



ITT Industries
Engineered for life

THE PRODUCTS DESCRIBED HEREIN ARE SUBJECT TO THE JABSCO ONE YEAR LIMITED WARRANTY, WHICH IS AVAILABLE FOR YOUR INSPECTION UPON REQUEST.

U.S.A.
Jabsco
20 Icon
Foothill Ranch, CA 92610-3000
Tel: 949.609.5106
Fax: 949.859.1254

UNITED KINGDOM
Jabsco
Bingley Road, Hoddesdon
Hertfordshire EN11 0BU
Tel: +44 (0) 1992 450145
Fax: +44 (0) 1992 467132

CANADA
Fluid Products Canada
55 Royal Road
Guelph, Ontario N1H 1T1
Tel: (519) 821.1900
Fax: (519) 821.2569

JAPAN
NHK Jabsco Company Ltd.
3-21-10, Shin-Yokohama
Kohoku-Ku, Yokohama, 222
Tel: 045.475.8906
Fax: 045.475.8908

GERMANY
Jabsco GmbH
Oststrasse 28
22840 Norderstedt
Tel: +49-40-53 53 73 -0
Fax: +49-40-53 53 73 -11



JOHNSON PUMP
AN SPX BRAND

Instruction Manual

Ultima Bilge

600GPH, 800GPH, 1000GPH, 1250GPH



Read and understand this manual prior to
operating or servicing this product.

IB-123/01 (0912)

SPX®

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Electromagnetic Compatibility Directive 89/336/EEC
EN55014-1: 1993/A:1997 /Radio disturbance
Recreational Craft Directive 94/25/EEC
ISO 8846: 1990/Electrical devices - Protection against ignition of surrounding flammable gases
ISO 8849: 1990/Electrically operated bilge pumps
ISO 10133: 1994/Electrical systems - Extra low-voltage DC installations

Warranty Information

Johnson Pumps of America of 10509 United Parkway, Schiller Park, Illinois 60176 warrants to the original consumer purchaser that this product will be free from defects in material and workmanship, providing that the case is not opened or the pump otherwise abused for a period of three (3) years from the date originally purchased.

The exclusive remedy of the consumer purchaser in the event the product does not meet this express Limited Warranty is to return the pump to Johnson Pump at the above address, freight prepaid with your sales receipt. IMPORTANT: FOR THIS WARRANTY TO BE EFFECTIVE, JOHNSON PUMP MUST BE SUPPLIED WITH THE ORIGINAL PURCHASE DATE OF THE PRODUCT. THE ACCEPTANCE BY JOHNSON PUMP OF ANY PRODUCT RETURNED SHALL NOT BE DEEMED AN ADMISSION THAT SUCH PRODUCT IS DEFECTIVE OR IN VIOLATION OF ANY WARRANTY. THE COMPANY RESERVES THE RIGHT TO REPAIR OR REPLACE THE PRODUCT.

NO REPRESENTATIVE OR OTHER PERSON IS AUTHORIZED TO ASSUME FOR JOHNSON PUMP ANY ADDITIONAL LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS OR TO ALTER THIS WARRANTY IN ANY WAY.

IN NO EVENT WILL JOHNSON PUMPS OF AMERICA BE LIABLE FOR MORE THAN THE SALES PRICE OF THE PRODUCT. UNDER NO CIRCUMSTANCES WILL JOHNSON BE LIABLE FOR ANY LOST PROFITS, INCIDENTAL OR

CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES. THE LIMITATION ON LIABILITY FOR LOST PROFITS, INCIDENTAL OR CONSEQUENTIAL COST EXPENSES OR DAMAGES SHALL SURVIVE ANY FAILURE OF ESSENTIAL PURPOSE OF THIS LIMITED WARRANTY. Some states do not allow the exclusive or limitation of incidental or consequential damages, so the above limitation may not apply to you.

NO EXPRESS OR LIMITED WARRANTY, INCLUDING WARRANTY OF MERCHANTABILITY AND FITNESS SHALL EXTEND FOR ANY PERIOD OF TIME GREATER THAN THREE YEARS FROM THE DATE OF ORIGINAL PURCHASE OF THIS PRODUCT. Some states do not allow limitation on how long an implied warranty lasts so the above limitation may not apply to you. CAUTION - Warranty void if seal on product is broken, if any electric cord is cut back more than 3 inches, if electric splices become submerged, or if product is installed contrary to instructions or warnings.

Johnson Pumps of America
10509 United Parkway
Schiller Park, Illinois 60176
Fax (847)671-7909

www.johnson-pump.com

E-Mail: CUSTOMERSERVICE@

Ultima Bilge länspump

Varning: Vänligen läs igenom och följ samtliga anvisningar innan installation och användning av denna produkt.

Koppla alltid bort spänningskällan vid installation, service eller underhåll av denna produkt. Ultima Bilge är omsorgsfullt konstruerad för att enbart pumpa ut stående vatten. Dessa pumpar är inte avsedda för skadekontroll. Länspumparnas kapacitet torde inte vara tillräcklig för att förhindra översvämning från hastig ansamling av vatten på grund av storm, hårt väder och/eller hastigt uppkomna läckage skapade av skador i skrov och/eller riskabla navigationsförhållanden.

Lite om Ultima Bilge

Ultima bilge är en automatisk länspump som använder avancerad elektronisk avkänningsteknologi för att upptäcka förekomsten av vatten i slaget på en båt och följaktligen tömma ut det vattnet. Den är byggd på den utprovade UltimaSwitch teknologin som använder mikroelektroniska fält för att upptäcka förekomsten av vatten. Ultima Bilge är en tätad undervattenspump med elektronisk flottörströmställare som gör en enkel installation möjlig för slutanvändaren.

Varningar:

För att undvika personskador eller skador på egendom under installation, service och underhåll, säkerställ att elektriciteten är fränkopplad.

Denna pump konstruerades enbart för att avlägsna stående slagvatten och skall inte användas för att pumpa petroleumprodukter som bensin, olja, eller lättantändliga vätskor.

Säkerställ att använda rätt säkringsstorlek som rekommenderas för din pumpmodell. Användning av en felaktig säkring kan leda till personskador, egendomsskador och

brandfara.

Installation av Ultima Bilge:

Varning: Vid installation av Ultima Bilge, säkerställ att pumpen är fri från alla hinder, speciellt nära avkänningsområdet. Om avkännarna är blockerade kommer pumpen kontinuerligt att vara påslagen!

- 1) Placera en 3/4" tjock bit av marinywood som monteringsblock för din pumps fästpunkt. Monteringsblocket skall vara tillräckligt stort för att täcka filterområdet. Använd ett vattentåligt bindemedel för att fästa monteringsblocket mot båtens skrov. Säkerställ att monteringsblocket är så plant som möjligt. Placera pumpen i slagets lägsta område. Säkerställ även att utloppsmunstycket är i plan.
- 2) Avlägsna pumpen från filtret genom att trycka ned de två sidostiften och dra filtret från pumphuset. Använd filtret för att märka ut tre monteringshål. För att undvika att borra igenom båtens skrov, ställ in borren på lämpligt djup för styrhålen. Borra styrhålen.
- 3) Dra fast tre #8 x 5/8" rostfria skruvar (inte medlevererade) i filterhålen för att montera filtret. Dra inte åt för hårt.
- 4) Efter att filtret är monterat, placera pumphuset på filtret och säkerställ att sidostiften låser fast i pumphuset.

För 3/4" utloppsmodeller, fäst slangen över Duraport. Använd slangklämmor av rostfritt stål för att fästa slangen. Om tillvalet backventil monteras, säkerställ att backventilen monteras i Duraport innan slangen installeras. För 1 1/8" modeller, fäst slangen över den gängade anslutningsöppningen [1 1/8" eller 1 1/4"]. Använd slangklämmor av rostfritt stål för att fästa slangen på anslutningsöppningarna. Om tillvalet backventil

monteras, säkerställ att backventilen monteras i Duraport innan slangen och anslutningsöppningarna installeras. Backventilen för [1 1/8" eller 1 1/4"] modellen innefattar en rostfri bricka och en klaff. För att installera backventilen, placera den rostfria brickan i pumpens utloppsområde. Placera därefter Nitrile klaffen över brickan. Gånga därefter på anslutningsöppningen på pumpens utlopp. Dra åt anslutningsöppningen tills den bottnar i pumphuset.

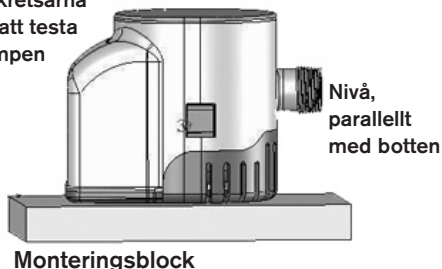
För modell 3/4" installerar du kontrollventilerna så att den avsmalnande änden är i riktning mot flödet. För att installera kontrollventilerna, tar du av packningen i Duraport och byter ut packningen mot kontrollventilerna som även fungerar som packning. Spara den gamla packningen ifall du inte vill använda kontrollventilerna vid ett senare tillfälle.

Undvik veck eller öglor på slangen. Stöd slangen om nödvändigt. Det är viktigt att slangen stadigt är upphöjd och inte tillåts sänkas ned under utloppet eftersom detta kan orsaka luftblåsor i slangen. För maximal prestanda, använd slätborrad, förstärkt slang.

OBS!

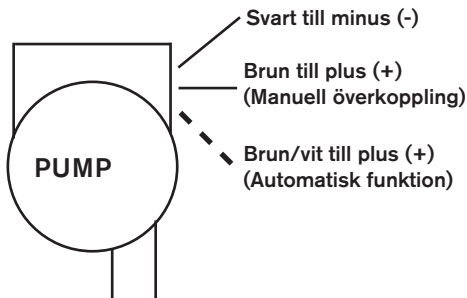
Backventilen som levereras med din Ultima Bilge används för att förhindra backströmning av vatten. Nyttan av backventilen kräver att du är uppmärksam på dess funktion. Backventilen är tillverkad av Nitrilematerial som endast är avsett för tillämpning med vatten. Backventilen minskar även pumpens strömhastighet. Om strömningen är avgörande för pumpens tillämpning rekommenderas det att inte använda backventilen. Dessutom, vid vinterrustning av din båt, ta bort backventilen för att undvika isbildning och/eller försämring av backventilen.

Placera fingrarna på kretsarna för att testa pumpen



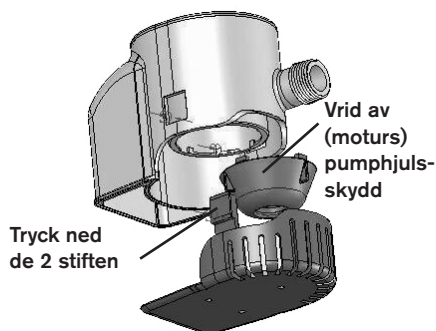
Anvisningar för elinstallation: Hänvisning till kopplingsschema nedan. Använd lämplig storlek av anslutningsdon för dimension 16 ledning. Ledningsanslutningarna skall utföras med vattenskyddade permanenta anslutningsklämmor. Vattenfast el-tejp skall användas för att täcka anslutningsklämmorna. Monteringsanslutningarna skall vara ovanför den högsta vattennivån. Garantin blir ogiltig för denna produkt om någon elektrisk ledare kapas mer än 3 tum, om elektriska skarvar sänks ned i vatten, användning av felaktig säkring eller om pumpen installeras i strid mot instruktioner och varningar.

Man kan installera en trevägs kopplingspanel som gör det möjligt för pumpen att befinna sig i manuellt eller automatiskt läge. Säkerställ att pumpen avsäkras. Säkringshållaren skall placeras mellan batteriets positiva pol och trevägs kopplingspanelen. Säkerställ att lämplig säkringsstorlek används för modellerna. För att kontrollera pumpens funktion, placera två fingrar på det upphöjda cirkelrunda området på pumpens baksida. Efter en kort stund [5 sekunder], skall pumpen starta. Om du tar bort ett finger från det cirkelrunda området skall pumpen fortsätta att gå. Om du tar bort båda fingrarna skall pumpen stanna.



Säkerställ att du har minst 25mm fritt utrymme från avkännarna på Ultima Bilge till väggar eller omgivning. Om det inte finns tillräckligt med fritt utrymme kan avkännarna upptäcka föremålet och låta pumpen gå kontinuerligt.

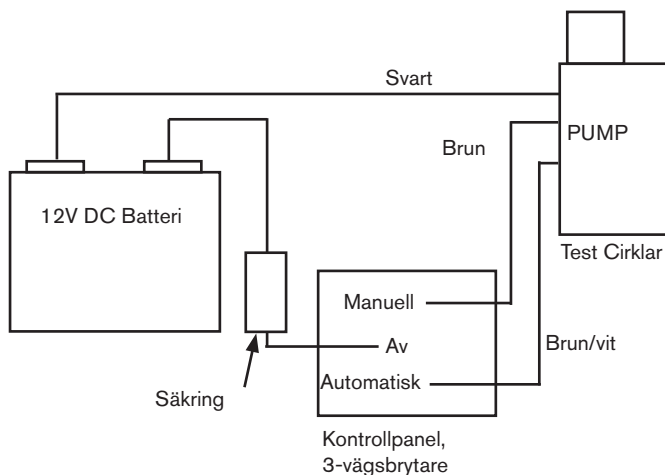
Underhåll: Ultima Bilge är konstruerad för att vara bekymmersfri och underhållsfri. Dock skall uppmärksamhet riktas mot att pumphjulet är fritt från skräp för optimal funktion. Säkerställ att spänningen är frånslagen vid underhåll av pumpen. För att komma åt pumphjulet, avlägsna pumpen från filtret genom att trycka ned de två sidostiften och dra pumpen från filtret. För rengöring av pumphjulet, ta tag i pumphjulets skyddsfläns och vrid pumphjulets skydd medurs och dra rakt ut. Avlägsna och rengör pumphjulet och pumpen från allt skräp som har samlats. Säkerställ att även rengöra eventuellt skräp som samlats på filtret. Efter att pumphjulet är rengjort, sätt tillbaka skyddet genom att rikta in stiften med spåren och vrida moturs, dra inte åt för hårt. Skyddet skall vridas tills det är stadigt. Placera pumphuset på filtret och säkerställ att båda låsstiften låser fast i pumphuset.



Garantiinformation

Johnson Pumps of America, 10509 United Parkway, Schiller Park, Illinois 60176, beviljar garanti åt den ursprungliga konsumenten/inköparen att denna produkt är fri från defekter i material och arbete, under förutsättning att enheten inte har öppnats eller att pumpen på annat sätt har missbrukats under en period av tre (3) år från och med det ursprungliga inköpsdatumet.

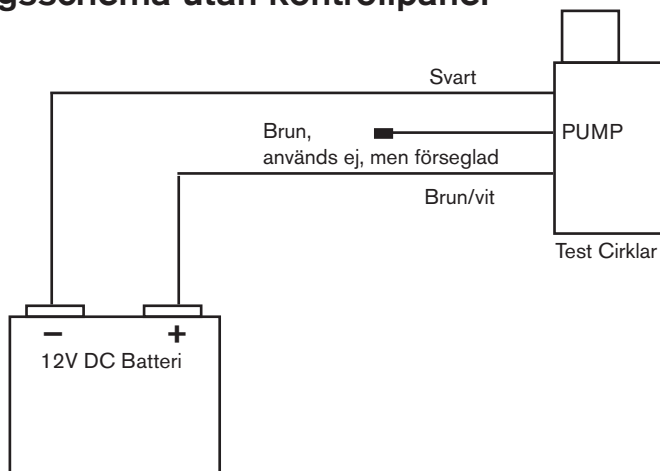
Kopplingsschema



Om du använder en 3-vägsbrytare, kan du koppla din pump så att den fungerar i den manuella vidarekopplings- eller automatiska driften.

Som visas på diagrammet, anslut den svarta (-) jordade ledningen till den negativa batteriterminalen. För att vidarekoppla driften manuellt, anslut den bruna ledningen från pumpen till panelomkopplaren. För automatdrift, anslut den bruna ledningen med den vita spårningsledningen till panelomkopplaren. Se till att du använder korrekt säkring, som kommer från den positiva batteriterminalen till panelomkopplaren, se diagrammet.

Kopplingsschema utan kontrollpanel



Ultima Bilge - Automatic Bilge Pump

Caution: Please read and follow all instructions before installing and using this product.

Always disconnect power sources during installation, servicing or maintenance of this product. The Ultima Bilge pump has been carefully designed to exhaust standing water only. These pumps are not intended for damage control. Bilge pump capacities may not be sufficient to prevent flooding from rapid accumulation of water due to storms, rough weather and/or rapid leaks created by hull damages and/or unsafe navigational conditions.

About the Ultima Bilge Pump

The Ultima Bilge pump is a state of the art automatic bilge pump that uses advanced electronic sensing technology to detect the presence of water in the bilge area of a boat and consequently discharge of that water. It is built upon the proven UltimaSwitch technology which uses micro electrical fields to detect the presence of water. The Ultima Bilge pump is a sealed, submersible pump and electronic float switch that allows for a simple installation for the end user.

Warnings:

To eliminate personal injury or damage to property during installation, servicing and maintenance, make sure to disconnect electrical power. This pump was designed to remove standing bilge water only and should not be used to pump petroleum products such as gasoline, oil, or flammable liquids.

Make sure to use the appropriate fuse size recommended by your pump model. Using the wrong fuse can lead to personal injury, property damage and fire hazard.

Installing the Ultima Bilge Pump:

Caution: *When installing the Ultima Bilge Pump, make sure that pump is clear of all obstacles, especially near the detector area. If detectors are blocked, the pump will remain continuously on!*

- 1) Place a 3/4" thick block of marine plywood as a mounting block for your pump base. Mounting block should be large enough to cover the strainer area. Use a waterproof adhesive to attach mounting block to the hull of the vessel. Make sure that mounting block is as flat as possible. Place pump in the lowest area of the bilge. Also, make sure discharge nozzle is level.
- 2) Remove the pump from the strainer by depressing the two side tabs and pulling the strainer from pump body. Use the strainer to mark three mounting holes. In order to avoid drilling through the hull of the vessel, set your drill to the appropriate depth for the pilot holes. Drill your pilot hole.
- 3) Drive three #8 x 5/8" (not supplied) Stainless screws into the strainer holes to mount the strainer. Do not over tighten.
- 4) After the strainer is mounted down, place pump body onto strainer making sure that the side tabs lock onto pump body.

For 3/4" discharge models attach your hose over the Duraport. Use Stainless steel hose clamps to secure the hose. If installing the optional check valve, make sure to install the check valve into the Duraport before installing the hose. For 1 1/8" models attach your hose over threaded port [1 1/8" or 1 1/4"]. Use Stainless Steel hose clamps to secure the hose to the ports. If installing the optional check valve,

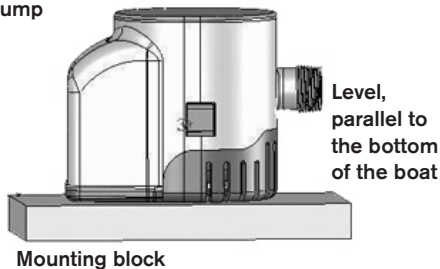
> English

make sure to install the check valve before installing the hose and ports. The check valve for the [1 1/8" or 1 1/4"] model will include a stainless steel washer and a flapper. To install the check valve, place stainless steel washer into the discharge area of pump. Next place the Nitrile flapper over the washer. Then thread on the port on to pump's discharge. Tighten port until port is bottomed out with pump body.

For 3/4" model install check valve such that the tapered end is towards the direction of flow. To install check valve, remove gasket in Duraport and replace the gasket with the check valve which also acts as the gasket. Save the old gasket in case you intend to not use the check valve at a later time. Make sure to avoid loops or bends in the hose. Support hose if necessary. It is important that the hose be constantly rising and not be allowed to dip below the outlet port as this may cause an airlock situation. For maximum performance use smooth bore, reinforced hose.

NOTE: The check valve supplied with your Ultima Bilge pump is used to prevent the backflow of water. The utilization of the check valve requires you to be mindful of its functionality. The check valve material is made of Nitrile material to be used for water applications only. Also, the check valve will reduce the flow of the pump. If flow is critical to the application of the pump, it is recommended that the check valve not be used. Also, when winterizing your boat, remove the check valve to avoid ice formation and/or degradation of the check valve.

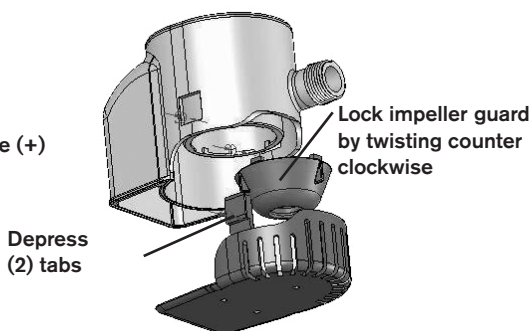
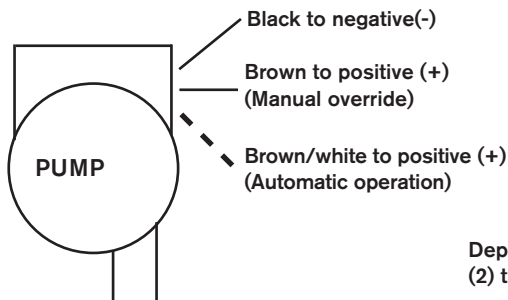
Place fingers on circles to test the pump



Wiring Instructions:

Refer to wiring diagram below. Use appropriate sized connectors for 16 Gauge wire. The wiring connections should be made with water resistant permanent terminals. Liquid electrical tape should be used to coat terminals. The mount connections should be above the highest water level. The warranty will become void on this product if any electrical cord is cut back more than 3 inches, if electrical splices become submerged, failure to properly fuse or if pump is installed contrary to instructions or warnings.

You may install a three way switch panel that will allow the pump to be in manual or automatic mode. Make sure to fuse the pump. The fuse holder should be between positive battery terminal and three way panel switch. Make sure to use the appropriate fuse size for the models. To check the operation of the pump, place two fingers over the raised circular areas in the back of the pump. After a short delay [5 seconds], the pump should turn on. If you remove your finger from the top circle, the pump should remain on. If you remove both fingers, the pump should turn off.



Make sure to have at least 1 inch [25MM] of clearance from the sensors on the Ultima Bilge pump to any wall or surroundings. If there is not enough clearance, the sensors may detect the object and leave the pump running continuously.

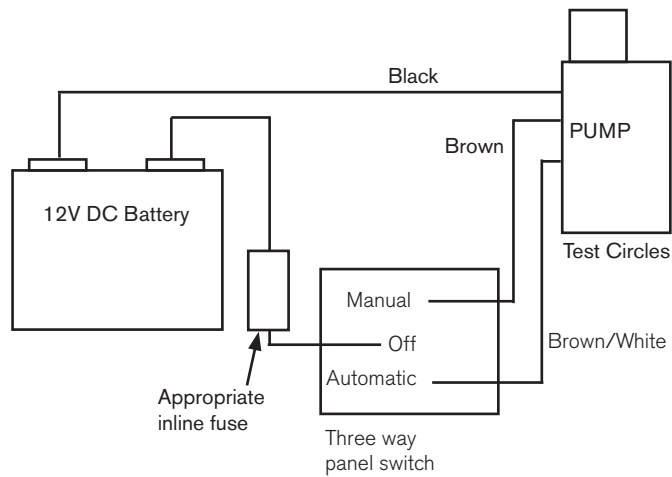
Maintenance:

The Ultima bilge pump is designed to be worry free and maintenance free. However, care should be taken to make sure that the impeller is clear of debris for optimum pump functionality. Make sure power is disconnected during maintenance of the pump. To access the impeller, remove pump from strainer by depressing the side lock tabs on pump body and pulling pump from strainer. To clean the impeller, grab on to impeller guards fins and rotate impeller guard clockwise and pull straight out. Remove and clean the impeller and pump from all debris that has accumulated. Make sure to clean any debris that has accumulated on the strainer as well. After the impeller is clean, replace impeller guard by aligning tabs with slots and turning counter-clockwise, making sure not to over tighten. The guard should be rotated until it is firm. Place pump body on to strainer making sure that both locking tabs snap onto pump body.

Warranty Information

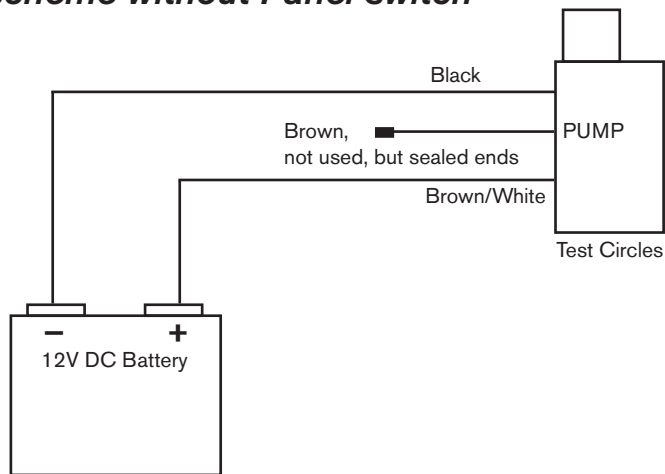
Johnson Pumps of America of 10509 United Parkway, Schiller Park, Illinois 60176 warrants to the original consumer purchaser that this product will be free from defects in material and workmanship, providing that the case is not opened or the pump otherwise abused for a period of three (3) years from the date originally purchased.

Wiring Scheme



If you are using a 3-way switch, you can wire your pump to operate in the manual over-ride or automatic operation.
As shown in the diagram, connect the black (-) ground wire to the negative terminal of the battery. For manual over-ride operation, connect the brown wire from the pump to the switch panel. For automatic operation, connect the brown wire with white tracer to the switch panel. Make sure to connect an appropriate in line fuse coming from the positive terminal of the battery to the switch panel as shown.

Wiring scheme without Panel switch



Ultima Bilge -Lenzpumpe

Vorsicht: Bitte lesen und befolgen Sie vor der Installation und Einsetzung dieses Produktes alle Anweisungen.

Trennen Sie das Produkt während der Installation, Instandhaltung oder Wartung immer von den Stromquellen. Die Ultima-Lenzpumpe ist ausschließlich zum Auspumpen stehenden Wassers sorgfältig entwickelt worden. Diese Pumpen sind nicht für die Schadenskontrolle vorgesehen. Es ist möglich, dass das Volumen der Lenzpumpe nicht ausreicht, um Überflutungen bei einem schnellen Eindringen von Wasser bei Stürmen, schlechtem Wetter und/oder plötzlich auftretenden Lecks, im Falle von Rumpfschädigungen und/oder unsicheren Navigationsbedingungen, zu verhindern.

Über die Ultima-Lenzpumpe

Die Ultima-Lenzpumpe ist eine hochmoderne automatische Lenzpumpe, die eine elektronische Spitzenabtastungstechnologie verwendet, um das Vorhandensein von Wasser im Bilgenbereich eines Schiffes zu entdecken und dieses Wasser danach auszupumpen. Die Pumpe ist nach der bewährten UltimaSwitch-Technologie gebaut, die mikroelektrische Felder zum Aufspüren von Wasser benutzt. Die Ultima-Lenzpumpe ist eine abgedichtete Tauchpumpe und hat einen elektronischen Schwimmerschalter, der eine leichte Installation für den Endverbraucher ermöglicht.

Warnungen:

Um bei der Installation Personen- oder Materialschäden zu vermeiden, stellen Sie sicher, dass Sie die Stromverbindung trennen. Diese Pumpe ist nur für die Entfernung des Bilgenwassers entwickelt worden und sollte nicht zum Pumpen von Erdölprodukten, z. B. für Benzin, Öl oder feuergefährliche Flüssigkeiten verwendet werden.

Stellen Sie sicher, dass Sie eine Sicherung mit der Größe benutzen, die für Ihr Pumpenmodell empfohlen wird. Die Verwendung von falschen Sicherungen kann zu Personenschäden, Materialschäden und Brandgefahr führen.

Installation der Ultima-Lenzpumpe:

Vorsicht: Stellen Sie bei der Installation der Ultima-Lenzpumpe sicher, dass es keine Hindernisse für die Pumpe gibt, insbesondere in der Nähe des Detektorbereichs. Falls die Detektoren blockiert werden, bleibt die Pumpe dennoch eingeschaltet!

- 1) Legen Sie ein Stück Bootsbausperrholz mit einer Dicke von 3/4" als Montageblock für die Pumpe auf den Boden. Der Montageblock sollte eine ausreichende Größe haben, damit sie den Filterbereich bedeckt. Zur Befestigung des Montageblocks an den Schiffsrumpf verwenden Sie wasserfesten Kleber. Stellen Sie sicher, dass der Montageblock so flach wie möglich ist. Stellen Sie die Pumpe in den niedrigsten Bereich der Bilge auf. Stellen Sie ebenfalls sicher, dass der Ablaufstutzen ausgerichtet ist.
- 2) Entfernen Sie die Pumpe vom Filter, indem Sie die zwei seitlichen Verschlussnasen drücken und den Filter aus dem Pumpengehäuse ziehen. Verwenden Sie den Filter zum Markieren der drei Montagebohrungen. Um Bohren durch den Schiffsrumpf zu vermeiden, stellen Sie den Bohrer für die Löcher auf eine richtige Tiefe ein. Machen Sie ein Loch.
- 3) Zur Montage des Filters führen Sie drei #8 x 5/8" (nicht im Lieferumfang) rostfreie Schrauben in die Bohrungen des Filters. Ziehen Sie nicht zu stark an.
- 4) Nach der Montage des Filters stellen Sie das Pumpengehäuse auf den Filter und stellen Sie sicher, dass die seitlichen Verschlussnasen am Pumpengehäuse verriegeln.

Bei 3/4"-Ablaufmodellen befestigen Sie Ihren Schlauch über den Duraport. Verwenden Sie zur Befestigung des Schlauchs Schlauchschellen aus rostfreiem Stahl. Falls Sie ein optionales Rückschlagventil installieren, stellen Sie sicher, dass Sie das Ventil im Duraport prüfen, bevor Sie den Schlauch in-

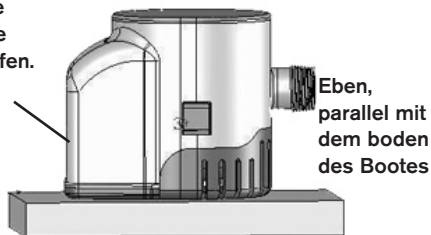
stallieren. Für 1 1/8"-Modelle befestigen Sie Ihren Schlauch über dem Gewindeanschluss [1 1/8" oder 1 1/4"]. Verwenden Sie einen Schlauch aus rostfreiem Stahl. Falls Sie ein optionales Rückschlagventil installieren, stellen Sie sicher, dass Sie das Ventil am Dura-port prüfen, bevor Sie den Schlauch und die Anschlüsse installieren. Das Rückschlagventil für das Modell [1 1/8" oder 1 1/4"] enthält eine Unterlegscheibe aus rostfreiem Stahl und eine Klappe. Zum Installieren des Rückschlagventils stellen Sie die Unterlegscheibe aus rostfreiem Stahl in den Ablaufbereich der Pumpe. Danach stellen Sie die Nitril-Klappe auf die Unterleg-Scheibe. Danach drehen Sie den Anschluss auf den Pumpenablauf. Ziehen Sie den Anschluss an, bis der Anschluss am Boden des Pumpengehäuses ist.

Beim Modell 3/4" installieren Sie das Rückschlagventil so, dass das konische Ende in Flussrichtung zeigt. Zum Installieren des Rückschlagventils entfernen Sie den Dichtring aus dem Duraport und ersetzen Sie den Dichtring mit dem Rückschlagventil, dass auch als Dichtring fungiert. Bewahren Sie den alten Dichtring auf für den Fall, dass Sie das Rückschlagventil in der Zukunft nicht mehr verwenden wollen.

Stellen Sie sicher, dass der Schlauch weder Schleifen hat, noch geknickt ist. Unterstützen Sie den Schlauch bei Bedarf. Es ist wichtig, dass der Schlauch immer steigt und nicht unter das Niveau der Abflussöffnung fällt, da dies einen Lufteinschluss mit sich bringen kann. Für eine maximale Leistung verwenden Sie einen innen glatten, verstärkten Schlauch.

HINWEIS: Das mit der Ultima-Lenzpumpe mitgelieferte Rückschlagventil wird zur Vorbeugung des Rückflusses von Wasser benutzt. Die Verwendung des Rückschlagventils verlangt Aufmerksamkeit gegenüber dessen Funktionalität. Das Material des Rückflussventils ist aus Nitril, das ausschließlich für Wasseranwendungen eingesetzt werden soll. Außerdem verkleinert das Rückschlagventil den Pumpendurchfluss. Falls der Durchfluss bei der Einsetzung der Pumpe wichtig ist, wird empfohlen, das Rückschlagventil nicht zu benutzen. Falls Sie ihr Boot winterfest machen, sollten Sie das Rückschlagventil entfernen, um Eisbildung und/oder Erosion des Rückschlagventils zu vermeiden.

Setzen Sie ihre Finger auf die Kreise, um die Pumpe zu prüfen.

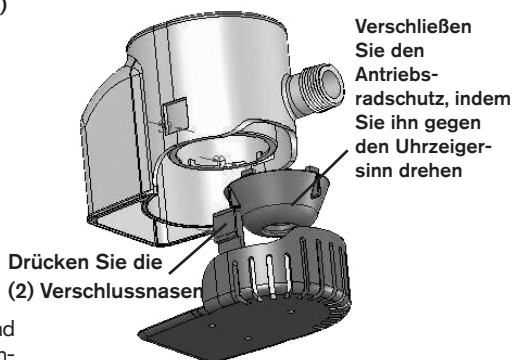
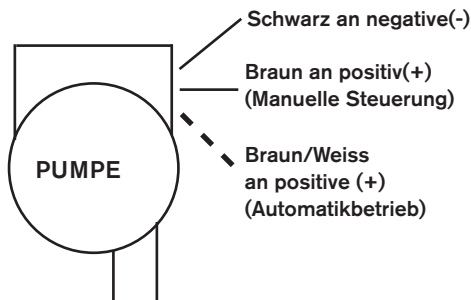


Montageblock

Verdrahtungsanweisungen:

Sehen Sie sich den Schaltplan unten an. Verwenden Sie die richtigen Anschlüsse für den Drahtquerschnitt 16. Die Drahtanschlüsse sollten mit wasserfesten Dauerklemmen gemacht werden. Zum Bedecken der Klemmen sollte flüssiges Isolierband verwendet werden. Die Montageanschlüsse sollten über den höchsten Wasserstand sein. Der Garantieanspruch wird ungültig, wenn ein elektrischer Draht auf mehr als 3 Zoll zurückgeschnitten ist, falls elektrische Verbindungen ins Wasser getaucht werden, eine inkorrekte Sicherung verwendet wird oder bei der Installation der Pumpe Anweisungen oder Warnungen nicht beachtet wurden.

Sie können ein Dreizeige-Bedienungsfeld installieren, das es ermöglicht, die Pumpe im Hand- oder Automatikbetrieb zu betreiben. Stellen Sie sicher, dass die Pumpe gesichert wird. Der Sicherungsträger sollte sich zwischen der positiven Batterieklemme und dem Dreizeige-Bedienungsschalter befinden. Stellen Sie sicher, dass Sie eine Sicherung mit der richtigen Größe für Ihr Modell verwenden. Zur Überprüfung des Pumpenbetriebs stellen Sie zwei Fingern über die erhobenen, kreisförmigen Bereiche auf der Rückseite der Pumpe. Nach einer kurzen Verzögerung [5 Sekunden] sollte sich die Pumpe einschalten. Falls Sie Ihren Finger vom oberen Kreis entfernen, sollte die Pumpe eingeschaltet bleiben. Falls Sie beide Fingern entfernen, sollte sich die Pumpe ausschalten.



*** Stellen Sie sicher, dass Sie einen Abstand von mindestens 1 Zoll [25 mm] von den Sensoren der Ultima Lenzpumpe zu jeglichen Wänden oder der Umgebung haben. Falls es keinen genügenden Abstand gibt, können die Sensoren ein Objekt entdecken und die Pumpe kontinuierlich laufen lassen. ***

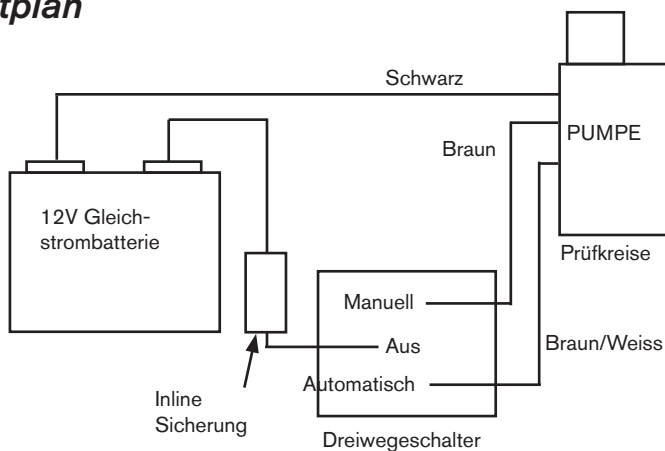
Wartung:

Die Ultima-Lenzpumpe ist störungs- und wartungsfrei konzipiert. Allerdings sollte zur Sicherung eines optimalen Pumpenbetriebs dafür gesorgt werden, dass das Antriebsrad frei von Fremdkörpern ist. Stellen Sie sicher, dass die Stromverbindung während der Wartungsarbeiten getrennt ist. Um den Zugang zum Antriebsrad zu sichern, entfernen Sie die Pumpe vom Antriebsrad, indem Sie die seitlichen Verschlussnasen auf dem Pumpengehäuse drücken und die Pumpe vom Antriebsrad herausziehen. Zur Reinigung des Antriebsrades nehmen Sie die Schutzrippen des Antriebsrades, rotieren Sie das Antriebsrad im Uhrzeigersinn, und ziehen Sie es aufrecht heraus. Entfernen und reinigen Sie das Antriebsrad und die Pumpe von allen angesammelten Fremdkörpern. Entfernen Sie alle angesammelten Fremdkörper auch vom Antriebsrad. Nach der Reinigung des Antriebsrades ersetzen Sie den Schutz des Antriebsrads, indem Sie die Verschlussnasen mit den Schlitten ausrichten und gegen Uhrzeigersinn drehen, wobei Sie darauf achten, dass sie nicht zu stark anziehen. Der Schutz sollte so lange gedreht werden, bis er fest ist. Stellen Sie das Pumpengehäuse auf das Antriebsrad, indem Sie sicher stellen, dass die beiden Verschlussnasen auf dem Pumpengehäuse einrasten.

Garantieinformationen

Die Firma Johnson Pumps of America of 10509 United Parkway, Schiller Park, Illinois 60176 garantiert dem Erstkäufer, dass dieses Produkt für einen Zeitraum von drei (3) Jahren ab Kaufdatum frei von Material- und Bearbeitungsschäden ist, unter Voraussetzung, dass das Gehäuse nicht geöffnet oder die Pumpe auf jegliche andere Weise missbraucht wird.

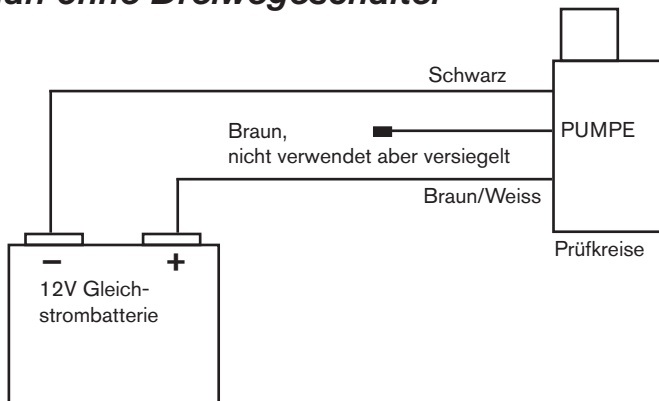
Schaltplan



Mit einem Dreiwegeschalter kann die Pumpe sowohl manuell als auch automatisch betätigt werden.

Wie aus der Abbildung hervorgeht, wird der schwarze (-) Masseleiter an den Minuspol der Batterie angeschlossen. Für manuellen Betrieb wird der braune Leiter von der Pumpe an die Schalttafel angeschlossen. Für automatischen Betrieb wird der braune Leiter mit weißer Kennzeichnung an die Schalttafel angeschlossen. Zwischen dem Pluspol der Batterie und der Schalttafel muss eine passende Inline-Sicherung eingesetzt werden (s. Abb.).

Schaltplan ohne Dreiwegeschalter



Ultima Bilge - Pompe de Fond de cale Ultima Bilge

Attention: Veuillez SVP lire et suivre toutes les instructions avant l'installation et l'usage de ce produit. Toujours déconnecter l'alimentation électrique durant les travaux d'installation, d'entretien ou de maintenance de ce produit. La pompe de fond de cale Ultima Bilge n'a été soigneusement conçue que pour évacuer les eaux stagnantes. Ces pompes ne sont pas prévues pour l'organisation sécurisée. Les capacités de la pompe Bilge peuvent ne pas être suffisantes pour empêcher une inondation par une rapide accumulation d'eau par une tempête, une météorologie difficile et/ou une brèche soudaine à la suite de dégâts à la coque et/ou des conditions de navigation hasardeuses.

Concernant la pompe Ultima Bilge

La pompe de fond de cale Ultima Bilge est une pompe à la pointe du progrès qui utilise une technologie de captage électronique avancée pour détecter la présence d'eau dans la zone du fond de cale d'un navire et donc pour l'évacuation de cette eau. Elle est équipée de la technologie éprouvée UltimaSwitch qui utilise les micros champs électriques pour détecter la présence d'eau. La pompe de fond de cale Ultima Bilge est une pompe étanche, submersible et elle est équipée d'un commutateur électronique à flotteur pour une installation simple par l'utilisateur.

Avertissements:

Pour éviter des blessures ou de dégâts matériels durant les travaux d'installation, d'entretien ou de maintenance, assurez-vous de déconnecter l'alimentation électrique. Cette pompe n'a été conçue que pour l'évacuation de l'eau stagnante en fond de cale et ne doit pas être utilisée pour pomper des produits pétroliers tels que de l'essence, de l'huile ou des liquides inflammables. Assurez-vous d'utiliser le fusible du calibre recommandé pour le modèle de votre pompe. L'utilisation d'un fusible erroné peut provoquer des blessures, des dégâts matériels ou un risque d'incendie.

Installation de la pompe de fond de cale Ultima Bilge:

Attention: Lors de l'installation de la pompe de fond de cale Ultima Bilge, assurez-vous que la pompe est libre de tout obstacle, spécialement à proximité de la zone de détecteurs. Si les détecteurs sont bloqués, la pompe restera continuellement en marche!

- 1) Placez un bloc de contre-plaqué marine de 3/4" d'épaisseur comme bloc de montage pour votre base de pompe. Le bloc de montage doit être suffisamment grand pour couvrir la zone de la crépine. Utilisez un adhésif hydro résistant pour fixer le bloc de montage à la coque du navire. Assurez-vous que le bloc de montage soit aussi plat que possible. Placez la pompe dans la partie la plus basse de la cale. Assurez-vous également que la buse d'évacuation est de niveau.
- 2) Enlevez la pompe de la crépine en appuyant sur les deux tirettes latérales et en retirant la crépine du corps de pompe. Utilisez la crépine pour marquer l'emplacement de trois trous de montage. Pour éviter de percer à travers la coque du navire, réglez votre perceuse à la profondeur appropriée des avant-trous. Percez votre avant-trou.
- 3) Vissez trois vis inoxydables de #8 x 5/8" (pas livrées) dans les trous de la crépine pour l'installer. Ne serrez pas trop fort.
- 4) Après que la crépine est installée, placez le corps de pompe au-dessus de la crépine en vous assurant que les tirettes latérales se verrouillent sur le corps de pompe.

Pour les modèles avec refoulement de 3/4" fixez votre tuyau sur le Duraport. Utilisez des brides pour tuyaux en acier inoxydable pour maintenir le tuyau. Si vous installez un clapet de anti-retour optionnel, assurez-vous d'installer le clapet de anti-retour dans le Duraport avant d'installer le tuyau. Pour les modèles de 1 1/8" fixez votre tuyau sur le raccord fileté [1

> Français

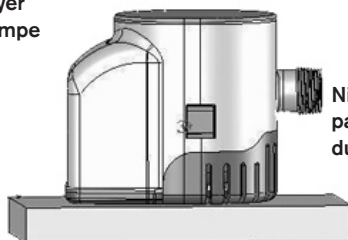
1/8" ou 1 1/4"]. Utilisez des brides pour tuyaux en acier inoxydable pour maintenir le tuyau sur les raccords. Si vous installez un clapet de anti-retour optionnel, assurez-vous d'installer le clapet de anti-retour avant d'installer le tuyau et les raccords. Le clapet de anti-retour pour le modèle [1 1/8" ou 1 1/4"] comprend une rondelle en acier inoxydable et un battant. Pour installer le clapet de anti-retour, mettez la rondelle en acier inoxydable dans l'orifice de refoulement de la pompe. Ensuite mettez le clapet en Nitrile sur la rondelle. Puis vissez le raccord sur l'orifice de refoulement de la pompe. Serrez le raccord jusqu'à ce qu'il soit à niveau avec le corps de pompe.

Pour le modèle 3/4", installez le clapet anti-retour de manière à ce que le pan conique se trouve dans la direction du flux. Pour installer le clapet anti-retour enlevez le joint d'étanchéité dans le Duraport et remplacez-le par le clapet anti-retour qui va également faire office de joint. Conservez l'ancien joint au cas où vous souhaiteriez ne plus utiliser le clapet anti-retour plus tard.

Assurez-vous d'éviter des boucles ou des coudes dans le tuyau. Soutenez le tuyau si nécessaire. Il est important que le tuyau ait une pente constante et il ne doit jamais passer en dessous de l'orifice de refoulement car ceci peut créer une poche d'air. Pour une performance maximale, utilisez un tuyau métallique à alésage lisse.

NOTE: Le clapet de anti-retour livré avec votre pompe de fond de cale Ultima Bilge est utilisé pour éviter le retour d'eau. L'utilisation du clapet de anti-retour vous demande d'être conscient de son fonctionnement. Le matériel du clapet de anti-retour est fabriqué en Nitrile, matériau à n'utiliser que pour l'eau seulement. De même, le clapet de anti-retour diminuera le flux de la pompe. Si le flux est critère critique dans l'application de la pompe, il est recommandé de ne pas utiliser le clapet de anti-retour. Egalement lors de l'hivernage de votre bateau, enlevez le clapet de anti-retour pour éviter la formation de glace et/ou une dégradation du clapet de anti-retour.

Mettez les doigts sur les cercles pour essayer la pompe



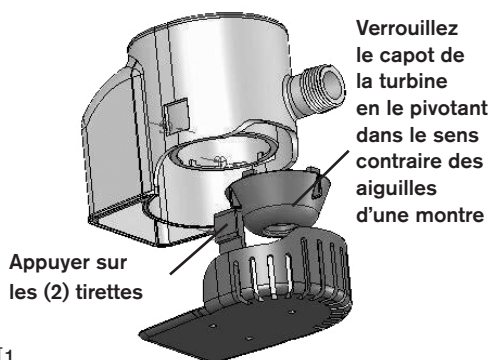
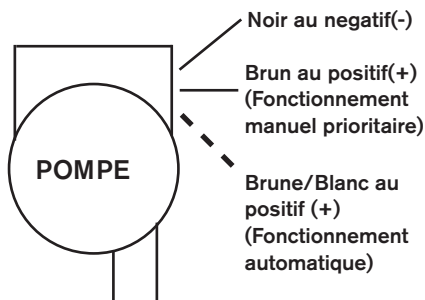
Niveau, parallèle au fond du bateau

Bloc de montage

Instructions de câblage:

Veuillez vous référer au schéma de câblage ci-dessous. Utilisez des connecteurs appropriés pour des fils de calibre 16. Les raccordements doivent être exécutés avec des bornes hydro résistantes permanentes. Un bain d'isolant liquide doit être utilisé pour recouvrir les bornes. L'installation des bornes de raccordement doit se trouver au-dessus du plus haut niveau d'eau. La garantie devient caduque pour ce produit si un quelconque cordon électrique est dénudé sur plus de 3 pouces, si une épissure de câble est submergée, en cas de défaut de fusible de protection ou si la pompe est installée de manière contraire aux instructions ou avertissements.

Vous pouvez installer un sélecteur Panel va-et-vient, ce qui permet à la pompe de fonctionner aussi bien en mode manuel qu'automatique. Assurez-vous de protéger la pompe par un fusible. Le fusible doit être installé entre la borne positive de la batterie et le sélecteur Panel va-et-vient. Assurez-vous d'utiliser le bon calibre de fusible pour les différents modèles. Pour vérifier le fonctionnement de la pompe, mettez deux doigts sur les zones circulaires en relief au dos de la pompe. Après un petit délai [5 secondes], la pompe doit se mettre en marche. Si vous enlevez votre doigt du cercle supérieur, la pompe doit continuer à fonctionner. Si vous enlevez les deux doigts, la pompe doit s'arrêter.



Assurez-vous d'avoir au moins 1 pouce [1 inch = 25MM] de distance entre les capteurs de la pompe de fond de cale Ultima Bilge et une quelconque paroi ou un objet environnant. S'il n'y a pas assez de jeu, les capteurs peuvent détecter l'objet et laisser la pompe continuellement en marche.

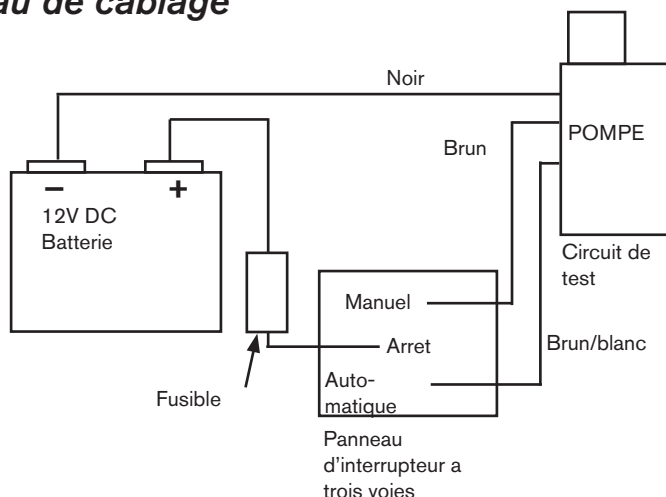
Maintenance:

La pompe de fond de cale Ultima Bilge est conçue pour être sans souci et sans maintenance. Cependant, il faut prendre le soin de s'assurer que la roue de la turbine est libre de débris pour un fonctionnement optimum de la pompe. Assurez-vous que l'alimentation électrique est déconnectée durant les travaux de maintenance de la pompe. Pour accéder à la turbine, retirez la pompe de la crépine en appuyant sur les deux tirettes latérales situées sur le corps de pompe et en levant la pompe de la crépine. Pour nettoyer la turbine, tenez les ailettes du capot de la turbine et faites tourner le capot dans le sens des aiguilles d'une montre et tirez directement vers vous. Enlevez tous les débris accumulés et nettoyez la turbine. Assurez-vous de nettoyer absolument tous les débris qui se sont accumulés sur la crépine également. Une fois que la turbine est propre, remplacez le capot de la turbine en alignant les griffes avec les fentes et en tournant le capot dans le sens contraire des aiguilles d'une montre, tout en vous gardant de serrer exagérément. Le capot doit être tourné jusqu'à ce qu'il soit bloqué fermement. Installez le corps de pompe sur la crépine en vous assurant que les deux tirettes s'accrochent au corps de pompe.

Information concernant la garantie

Johnson Pumps of America situé à 10509 United Parkway, Schiller Park, Illinois 60176 garanti au premier acheteur que le produit n'a pas de défaut aussi bien en ce qui concerne le matériel que la construction, pour autant que l'emballage n'a pas été ouvert⁰, ou que la pompe n'a pas été endommagée autrement pour une période de trois (3) ans à partir de la date d'achat.

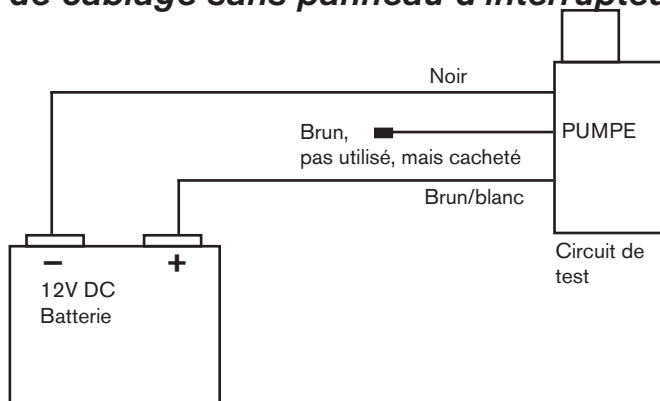
Tableau de câblage



Si vous utilisez un interrupteur à trois voies, vous pouvez câbler votre pompe de manière à la faire fonctionner manuellement ou automatiquement.

Comme montré dans le diagramme, raccordez le fil de terre noir (-) à la borne négative de la batterie. Pour un fonctionnement manuel, raccordez le fil brun de la pompe sur le panneau d'interrupteur. Pour un fonctionnement automatique, raccordez le fil brun avec une ligne blanche au panneau d'interrupteur. Assurez-vous de placer un fusible approprié sur la ligne venant de la borne positive de la batterie vers le panneau d'interrupteur comme indiqué.

Tableau de câblage sans panneau d'interrupteur



Ultima Bilge - Bomba de Desfonde Ultima

Cuidado: Por favor, lea y siga todas las instrucciones antes de instalar y usar este producto.

Desconecte siempre las fuentes de energía durante la instalación, el servicio o el mantenimiento de este producto. La Bomba de Desfonde Ultima ha sido cuidadosamente diseñada para evacuar agua estancada únicamente. Estas bombas no se pretende que sirvan para el control de daños. La capacidad de la bomba de desfonde puede que no sea suficiente para prevenir una inundación por acumulación rápida de agua debido a tormentas, tiempo severo y/o fugas rápidas creadas por daños en el casco y/o condiciones de navegación no seguras.

A Cerca de la Bomba de Desfonde Ultima

La bomba de desfonde Ultima es una bomba de desfonde muy moderna que usa tecnología sensorial electrónica avanzada para detectar la presencia de agua en el área de desfonde de un barco y consecuentemente para librarse de ese agua. Está construida sobre la tecnología probada UltimaSwitch que usa campos micro-eléctricos para detectar la presencia de agua. La bomba de desfonde Ultima es una bomba sumergible, sellada y con un interruptor de flote electrónico que le permite una instalación simple para el usuario final.

Avisos:

Para evitar el daño personal o el daño a la propiedad durante la instalación, servicio y mantenimiento, asegúrese de desconectar la fuente de energía.

Esta bomba fue diseñada para sacar agua estancada solo y no debería usarse para bombear productos derivados del petróleo tales como la gasolina, el gasoil o líquidos inflamables.

Asegúrese de usar el tamaño de fusible apropiado recomendado por el modelo de su bomba. Usar el fusible equivocado puede provocar daños personales, daños a la propiedad y riesgo de fuego.

Instalar la Bomba de Desfonde Ultima:

Cuidado: *Cuando esté instalando la Bomba de Desfonde Ultima, asegúrese de que la bomba está limpia de obstáculos especialmente en el área del detector. Si los detectors está bloqueados, la bomba permanecerá constantemente encendida.*

- 1) Ponga un bloque de madera laminada marina de 3/4" de espesor como bloque de montaje para la base de su bomba. El bloque de montaje debería ser lo suficientemente grande como para cubrir el área de filtrado. Use un pegamento a prueba de agua para pegar el bloque de montaje al casco de la embarcación. Asegúrese de que el bloque de montaje está tan plano como sea posible. Coloque la bomba en el lugar más bajo del desfonde. Asegúrese también de que la boquilla de vaciado está nivelada.
- 2) Quite la bomba del filtro presionando las dos lengüetas laterales y sacando el filtro del cuerpo de la bomba. Use el filtro para marcar los agujeros de montaje. Para evitar la perforación del casco de la embarcación, configure su taladro a la profundidad apropiada para los agujeros piloto. Taladre su agujero piloto.
- 3) Ponga tres tornillos de acero inoxidable de #8 x 5/8" (no suministrados) en los agujeros del filtro para montar el filtro. No los apriete demasiado.
- 4) Una vez que el filtro esté montado, ponga el cuerpo de la bomba en el filtro asegurándose de que las lengüetas laterales se cierran en el cuerpo de la bomba.

Para los modelos de descarga de $\frac{3}{4}$ " ponga su tubería flexible sobre el Duraport. Use abrazaderas de acero inoxidable para asegurar la tubería flexible. Si se instala la válvula de control opcional, asegúrese de instalar la válvula en el puerto Duraport antes de instalar la tubería flexible. Para los modelos de 1 $\frac{1}{8}$ " ponga la tubería flexible sobre el puerto engarzado [1 $\frac{1}{8}$ " o 1 $\frac{1}{4}$ "] Use abrazaderas de acero inoxidable para asegurar la tubería flexible a los puertos. Si se instala la válvula de control opcional, asegúrese de instalar la válvula antes de instalar la tubería flexible y los puertos. La válvula de control para el modelo [1 $\frac{1}{8}$ " o 1 $\frac{1}{4}$ "] incluirá una arandela de acero inoxidable y una charnela. Para instalar la válvula de control, ponga la arandela de acero inoxidable en el área de filtrado de la bomba. A continuación coloque la charnela Nitrile sobre la arandela. Después engarce el puerto en la descarga de la bomba. Apriete el puerto hasta que el puerto llegue al fondo del cuerpo de la bomba.

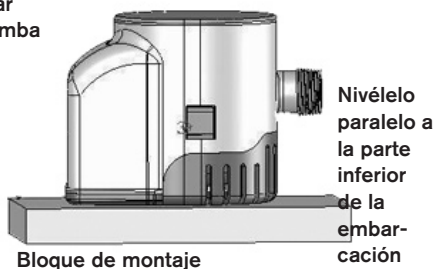
Para el modelo $\frac{3}{4}$ ", instale la válvula de control de manera que el extremo afilado esté situado hacia la dirección del flujo. Para instalar la válvula de control, retire la junta en Duraport y reemplácela por la válvula de control, que tiene la misma función que la junta. Guarde la junta antigua en caso de que decida no utilizar la válvula de control en un futuro

Asegúrese de que evita lazos o dobleces en la tubería flexible. Tubería flexible de soporte si es necesaria. Es importante que la tubería flexible esté hacia arriba siempre y que no se le permita bajar más debajo de la salida del puerto ya que esto causaría una situación de burbuja de aire. Para un rendimiento máximo use una tubería flexible reforzada con una pared interior suave.

NOTA: La válvula de control suministrada con su bomba de desfonde Última se usa para evitar que el agua fluya hacia atrás. La utilización de la válvula de control requiere que usted sea consciente de su funcionalidad. El material de la válvula de control

está hecho de Nitrilo que solo se usa para aplicaciones de agua. La válvula de control también reducirá el flujo de la bomba. El flujo es muy importante para la aplicación de la bomba y se recomienda que no se use la válvula de control. También, cuando esté preparando su embarcación para el invierno, quite la válvula de control para evitar que se forme hielo y/o la degradación de la válvula de control.

Ponga los dedos en los cirulos para probar la bomba

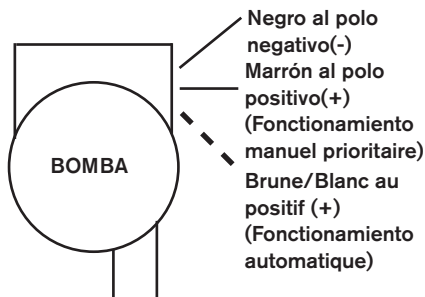


Instrucciones para la instalación eléctrica:

Refiérase al diagrama de cableado de abajo. Use los conectores de tamaño apropiado para un cable de calibre 16. Los conectores eléctricos deberían ser resistentes al agua en las terminales permanentes. Se debería usar una cinta líquida eléctrica para forrar las terminales. Los soportes de las conexiones deberían estar por encima del máximo nivel de agua. La garantía será nula en este producto si se corta cualquier cable electrónico más de 3 pulgadas/7.62 cm, si los empalmes eléctricos se sumergen o si no se usa correctamente o si la bomba se instala sin seguir las instrucciones.

Puede instalar un panel de interruptores de tres vías que permitirá a la bomba funcionar en modo manual o automático. Asegúrese de instalar los fusibles en la bomba. El recipiente de los fusibles debería estar entre la terminal positiva de la batería y el panel del interruptor de tres vías. Asegúrese de usar el tamaño de fusible apropiado recomendado para los modelos. Para revisar el funcio-

namiento de la bomba ponga dos dedos sobre las áreas circulares levantadas en la parte trasera de la bomba. Después de un corto espacio (5 segundos), la bomba debería encenderse. Si quita el dedo del círculo superior, la bomba debería permanecer encendida. Si quita los dos dedos, la bomba debería apagarse.

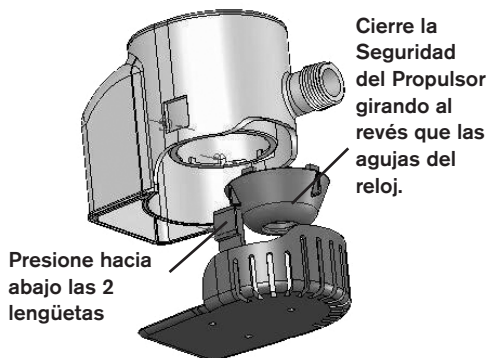


Asegúrese de tener al menos una pulgada [25 MM] de espacio libre entre los sensores en la bomba de desfonde Ultima a cualquier pared o alrededores. Si no hay suficiente espacio libre, los sensores pueden detectar el objeto y dejar que la bomba funcione de manera continua.

Mantenimiento:

La bomba de desfonde Ultima está diseñada para estar libre de preocupaciones y no tener problemas de mantenimiento. Sin embargo, se debería tener cuidado para asegurarse de que el propulsor está libre de basura para un funcionamiento óptimo de la bomba. Asegúrese de que la bomba está desconectada durante las operaciones de mantenimiento. Para acceder al propulsor, quite la bomba del filtro presionando hacia abajo las lengüetas de cierre laterales en el cuerpo de la bomba y saque la bomba del filtro. Para limpiar el propulsor, agarre las aletas de defensa del propulsor y gire la seguridad del propulsor como las agujas del reloj y sáquelo. Quite y limpie el propulsor y la bomba de toda la basura que haya acumulado. Asegúrese de limpiar toda la basura que se haya

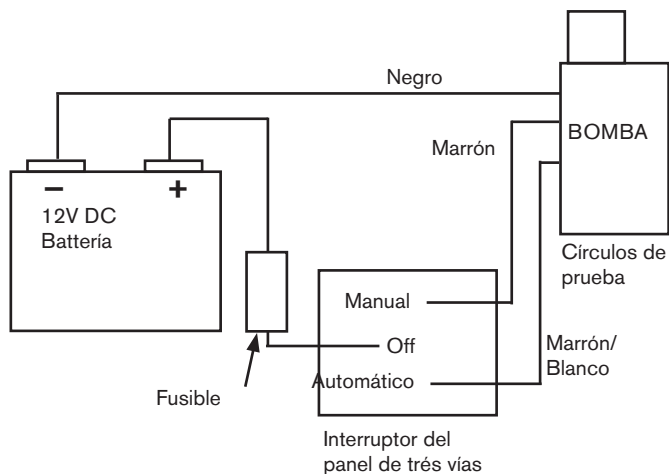
acumulado en el filtro también. Después de que el propulsor esté limpio, vuelva a poner la seguridad del propulsor alineando las lengüetas con las ranuras y girando al revés que las agujas de reloj, asegurándose de que no están demasiado ajustadas. La seguridad debería girar hasta que esté firme. Ponga el cuerpo de la bomba en el filtro asegurándose de que las dos lengüetas de cierre se ajustan en el cuerpo de la bomba.



Información acerca de la Garantía

Johnson Pumps of America, con sede central en 10509 United Parkway, Schiller Park, Illinois 60176, garantiza al comprador original que este producto estará exento de defectos de material y fabricación por un período de tres (3) años a partir de la fecha de compra inicial, a condición que la carcasa no se abra ni la bomba sea objeto de algún otro uso indebido.

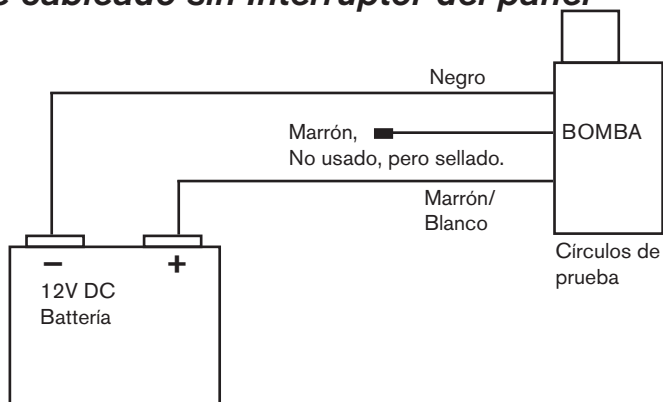
Tabla de cableado



Si está usando un interruptor de 3-vías, puede cablear su bomba para funcionar de forma manual o automática.

Como se muestra en el diagrama, conecte el cable de tierra negro (-) a la terminal negativa de la batería. Para su funcionamiento manual, conecte el cable marrón desde la bomba hasta el panel de interruptores. Para funcionamiento automático, conecte el cable marrón con rastreador blanco al panel de interruptores. Asegúrese de conectar un fusible en línea apropiado que venga del terminal positivo de la batería al panel de interruptores como se muestra.

Tabla de cableado sin Interruptor del panel



Ultima Bilge - Pompa di sentina Ultima

Attenzione: prima dell'installazione e dell'uso di questo prodotto vi preghiamo di leggere e seguire attentamente tutte le istruzioni.

Interrompete sempre la corrente elettrica durante l'installazione o la manutenzione di questo prodotto. La pompa di sentina Ultima è stata accuratamente progettata per l'esclusiva aspirazione di acqua stagnante. Questo tipo di pompa non può essere utilizzato per il controllo di avarie. La capacità di queste pompe di sentina può non essere sufficiente per prevenire allagamenti causati da un rapido accumulo di acqua dovuto a temporali, cattivo tempo e/o falle improvvise create da danni allo scafo e/o da condizioni di navigazione pericolose.

Informazioni sulla pompa di sentina Ultima

Ultima è una pompa di sentina automatica d'avanguardia che utilizza una avanzata tecnologia elettronica per rilevare la presenza di acqua nell'area di sentina di una nave e di conseguenza per operarne il deflusso. Essa si basa sulla ben sperimentata tecnologia UltimaSwitch, che si serve di campi microelettrici per rilevare la presenza di acqua. La pompa di sentina Ultima è una pompa sommersa impermeabile ed un interruttore di flusso elettronico di semplice installazione per l'utilizzatore finale.

Avvertenze:

Al fine di evitare danni a persone o cose durante l'installazione e la manutenzione della pompa, assicuratevi di aver interrotto la corrente elettrica. Questa pompa è stata progettata per l'aspirazione esclusiva di acqua stagnante di sentina e non deve essere utilizzata per pompare derivati del petrolio quali benzina, olio o liquidi infiammabili.

Assicuratevi di utilizzare fusibili di dimensioni appropriate, indicate per ciascun modello di pompa. L'uso di un fusibile non appropriato può causare danni a persone o cose e pericolo di incendio.

Installazione della pompa di sentina Ultima:

Attenzione: Durante l'installazione della pompa di sentina Ultima, assicuratevi che la pompa sia libera da ogni tipo di ostacolo, in particolare vicino alla zona di rilevazione. Se i rilevatori sono ostruiti, la pompa resterà continuamente attivata!

- 1) Posizionate un pannello di compensato per uso marittimo delle dimensioni di 3/4" come supporto per la base della pompa. Il pannello dovrebbe essere abbastanza grande da coprire l'area del filtro. Utilizzate un adesivo impermeabile per applicare il pannello di supporto allo scafo dell'imbarcazione. Assicuratevi che il pannello di supporto sia il più possibile uniforme. Collocate la pompa nella zona inferiore della sentina. Assicuratevi quindi che l'ugello di scarico sia a livello.
- 2) Rimuovete la pompa dal filtro premendo le due linguette laterali ed estraendo il filtro dal corpo della pompa. Utilizzate il filtro per demarcare tre fori di montaggio. Al fine di evitare fori allo scafo dell'imbarcazione, tarate il trapano alla giusta profondità per i fori pilota. Eseguite quindi i fori guida.
- 3) Inserite tre viti inossidabili #8 x 5/8" (non fornite) nei fori per il montaggio del filtro. Non serrate le viti eccessivamente.
- 4) Dopo aver montato il filtro, collocate il corpo della pompa sul filtro assicurandovi che le linguette laterali si chiudano bene sul corpo della pompa.

Per i modelli di scarico 3/4" collegate il flessibile sul Duraport ed utilizzate delle apposite grappe in acciaio inossidabile per fissare il flessibile. Se desiderate installare la valvola di controllo opzionale, assicuratevi di inserirla nel Duraport prima di installare il flessibile. Per i modelli 1 1/8" applicate il flessibile sui fori filettati [1 1/8" o 1 1/4"] ed utilizzate apposite grappe in acciaio inossidabile per fissare

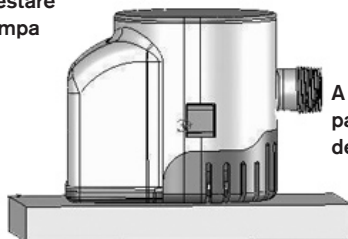
il flessibile ai fori. Se desiderate montare la valvola di sicurezza opzionale, assicuratevi di installarla prima di fissare il flessibile ai fori. La valvola di controllo per il modello [1 1/8" o 1 1/4"] include una rondella in acciaio inossidabile ed una valvola di gomma a ciabatta. Per l'installazione della valvola di controllo, collocate la rondella in acciaio inossidabile nell'area di scarico della pompa. Quindi posizionate la ciabatta di Nitrile sulla rondella, infilate il foro sullo scarico della pompa e serratelo fino a fissarne il fondo al corpo della pompa.

Sul modello 3/4" installate le valvole di controllo in modo che l'estremità conica sia rivolta in direzione del flusso. Per installare le valvole di controllo rimuovete la guarnizione nel Duraport e sostituitela con le valvole di controllo, che fungono anche da guarnizione. Conservate la vecchia guarnizione per il caso in cui decidiate successivamente di non utilizzare le valvole di controllo.

Assicuratevi che non si formino occhielli o pieghe nel flessibile. Se necessario, utilizzate dei sostegni per il flessibile: è importante che essa sia sempre in posizione elevata e non possa essere immersa al di sotto della porta di scarico, perché ciò potrebbe causare una situazione di interruzione del flusso a causa di una sacca d'aria. Per ottenere il massimo delle prestazioni, utilizzate un flessibile rinforzato e con anima liscia.

NOTA: La valvola di controllo in dotazione alla pompa di sentina Ultima serve a prevenire il riflusso dell'acqua. L'utilizzo della valvola di controllo richiede attenzione per la sua funzionalità. Il materiale della valvola di controllo è fatto di Nitrile e può essere impiegato solo per uso con acqua. La valvola di controllo riduce il flusso della pompa. Pertanto, se il flusso è cruciale per l'utilizzo della pompa, si raccomanda di non impiegare la valvola di controllo. Inoltre, durante la predisposizione dell'imbarcazione per il funzionamento a basse temperature, la valvola di controllo va rimossa per evitare la formazione di ghiaccio e/o la sua degradazione.

Mettete le dita sui cerchi per testare la pompa

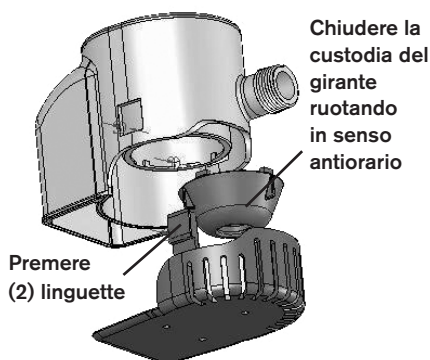
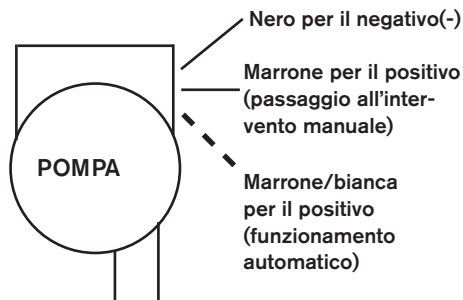


Pannello di montaggio

Istruzioni di cablaggio:

Fate riferimento allo schema elettrico sottostante. Utilizzate dei connettori di dimensioni appropriate per il filo calibro 16. I collegamenti dei fili dovrebbero essere fatti con morsetti permanenti resistenti all'acqua. Per rivestire i morsetti bisognerebbe utilizzare del nastro elettrico liquido. I collegamenti di supporto dovrebbero essere al di sopra del livello più alto dell'acqua. La garanzia sul prodotto perde validità nei seguenti casi: se qualsiasi filo elettrico è stato accorciato di più di 3 pollici, se i giunti elettrici vengono a trovarsi sotto il livello dell'acqua, se non vengono impiegati i fusibili corretti ed in modo appropriato, o se la pompa non è installata conformemente alle istruzioni o alle avvertenze.

E' possibile installare un pannello con commutatore deviatore che consenta alla pompa di funzionare in modo automatico o manuale. Assicuratevi di munire la pompa di fusibili. Il portafusibili dovrebbe essere collocato tra i morsetti positivi della batteria e il commutatore deviatore. Accertatevi di utilizzare fusibili di dimensioni appropriate per ciascun modello. Per controllare il funzionamento della pompa, mettete due dita sulle aree circolari in rilievo sul retro della pompa. Dopo poco [5 secondi], la pompa dovrebbe azionarsi. Rimuovendo un dito dal cerchio, la pompa dovrebbe rimanere in attività. Rimuovendo invece entrambe le dita, la pompa dovrebbe disattivarsi.



Assicuratevi che ci sia almeno 1 pollice [25 mm] di spazio libero tra i sensori della pompa di sentina Ultima e qualsiasi parete o punto circostante. Se non c'è abbastanza spazio, i sensori potrebbero rilevare l'oggetto e far funzionare la pompa continuamente.

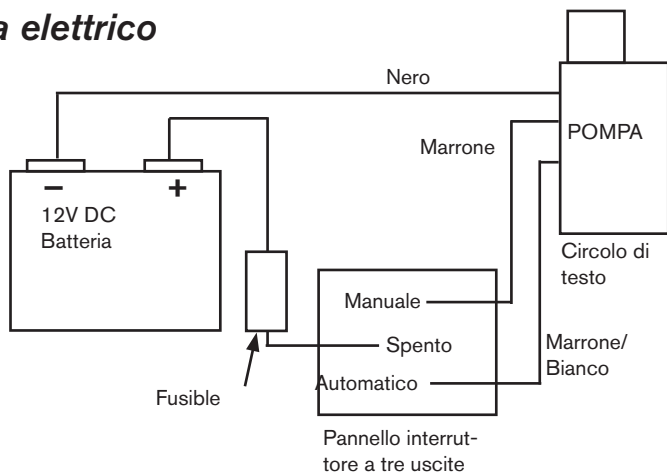
Manutenzione:

La pompa di sentina Ultima è progettata per non richiedere cure e manutenzione. Tuttavia, per il funzionamento ottimale della pompa bisognerebbe controllare periodicamente che il girante sia libero da detriti. Durante la manutenzione, assicuratevi sempre che l'alimentazione elettrica sia interrotta. Per accedere al girante, rimuovete la pompa dal filtro premendo le linguette di chiusura laterali sul corpo della pompa ed estraendo la pompa dal filtro. Per pulire il girante, afferrate le alette della custodia, ruotate la custodia in senso orario e tirate forte. Quindi rimuovete il girante e pulite girante e pompa da tutti i detriti che si sono accumulati. Assicuratevi di rimuovere anche i detriti che si sono accumulati sul filtro. Dopo aver pulito il girante, riposizionate la custodia allineando le linguette alle apposite fessure e ruotando in senso antiorario, assicurandovi di non stringere eccessivamente. La custodia dovrebbe essere fatta ruotare finché non è ben fissa. Collocate il corpo della pompa sul filtro accertandovi che entrambe le linguette di chiusura scatinino sul corpo della pompa.

Garanzia

Tutti i prodotti della Johnson Pumps of America of 10509 United Parkway, Schiller Park, Illinois 60176 sono coperti da 3 anni di garanzia a partire dalla data di acquisto per difetti di materiale e vizi di lavorazione e purché il prodotto non risulti aperto o manomesso in alcun modo.

Schema elettrico



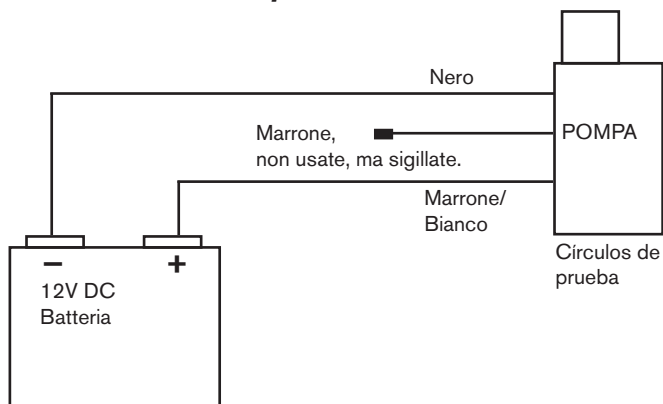
Se si usa un interruttore a 3 uscite, collegare la pompa per funzionare in modo manuale o automatico.

Come mostra il diagramma, connettere il cavo nero di terra (-) al terminale negativo o della batteria.

Per operazioni manuali override, connettere il cavo marrone dalla pompa al pannello interruttore.

Per operazioni automatiche, connettere il cavo marrone con il conduttore bianco al pannello interruttore. Assicurarsi di connettere un fusibile in linea appropriato dal terminale positivo della batteria al pannello interruttore come mostrato.

Schema elettrico senza pannello con Interruttore



Technical Specifications:

Dimensions: L=5.60" [142 MM]
W=3.25" [82 MM]
H=4.15" [105 MM]
Weight: 1.45 LBS [0.66 KG]
Material of construction: ABS
Seal: Lip Seal
Fuse Size: 5A @ 12 VDC
16 Ga caulked Wire

Part No.

Part Number	Description
32-47258	Ultima Bilge 600
32-47259	Ultima Bilge 800
32-47260	Ultima Bilge 1000
32-47261	Ultima Bilge 1250

Avfallshantering/materialåtervinning

Vid avfallshantering ska produkten lämnas för destruktion/återvinning enligt gällande lagstiftning. Vid tillämpliga fall demonteras och sorteras produkten i ingående materialfraktioner.

Waste handling & material recycling

At the products end of life, please dispose of the product according to applicable law. Where applicable, please disassemble the product and recycle the parts material.

Entsorgung/Recycling

Nach Lebensdauerende entsorgen Sie die Pumpe nach den örtlichen Vorschriften. Nach Möglichkeit demontieren Sie Teile der Pumpe um sie dem Recycling-Process zuzuführen.

Gestion des déchets/recyclage des matériaux

Lorsque le matériel arrivera en fin de vie, veuillez le mettre au rebut en fonction des lois applicables. Lorsque c'est possible, veuillez démonter le matériel et recycler les pièces pouvant l'être

Desguace/Reciclado

Al final de la vida del equipo disponga de este de acuerdo a la ley. Donde sea de aplicación desmonte el equipo y recicle los diferentes materiales.

Gestione dei rifiuti/riciclaggio dei materiali

Al termine della vita del prodotto si prega di smaltire il prodotto secondo le leggi in vigore per queste operazioni. Quando possibile, si raccomanda di smontare il prodotto e riciclare i materiali dei componenti.

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Johnson Pumps of America Inc.
1625 Hunter Road, Suite B, Hanover Park, Illinois, 60133, USA
Tel. +1 847 671 7867. Fax +1 847 671 7909.
E-mail: johnson-pump.usa@processequipment.spx.com



SPX Johnson Pump Marine AB
Nastagatan 19, P.O. Box 1436
SE-701 14 Örebro, Sweden
Phone: +46 (0)19 21 83 00 Fax: +46 (0)19 27 23 72
E-mail: johnson-pump.marine@processequipment.spx.com

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JOHNSON PUMP
AN SPX BRAND

Instruction Manual

Submersible Bilge Pump

L1600, L2200, L4000



Read and understand this manual prior to operating or servicing this product.

IB-106/03 (0911)

SPX®

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Recreational Craft Directive 94/25/EEC

Electromagnetic Compatibility Directive 89/336/EEC

L1600 & L2200

Garanti 3 år
Warranty 3 years
Garantie 3 Jahren
Garantie 3 ans
Garantía 3 años
Garanzia 3 anni

L4000

Garanti 18 månader
Warranty 18 months
Garantie 18 Monaten
Garantie 18 mois
Garantía 18 meses
Garanzia 18 mesi

Dränkbar länsdpump L1600, L2200 och L4000, 12/24 V

Dränkbar länsdpump för pumpning av länsdpatten i marin miljö. Installeras i kölsvinet.

Säkerhetsföreskrifter

- Pumpen får inte användas till annan vätska än vatten/länsdpatten.
- Installera alltid pumpen enligt kopplings-schemat, se sid 16-17.
- Använd den säkring som anges, se "Teknisk beskrivning" nedan.
- Kabelanslutningarna ska avtätas med ett marint tättningsmedel.
- Alla elektriska anslutningar måste placeras ovanför högsta slagvattennivå.
- Pumpen får inte köras torr.

Typbeteckning

Pumptyp	Art nr
L1600 12 V	32-1600-01
L1600 24 V	32-1600-02
L2200 12 V	32-2200-01
L2200 24 V	32-2200-02
L4000 12 V	32-4000-01
L4000 24 V	32-4000-02

Teknisk beskrivning

	L1600	L2200	L4000
Slanganslutning:	1 1/8"	1 1/8" alt 1 1/2"	1 1/2" alt 2"
Kapacitet, fritt utlopp (13,6V/27V):	100 l/min/(1 600 GPH)	130 l/min/(2 060 GPH)	258 l/min/(4 100 GPH)
(12V/24V):	92 l/min/(1 450 GPH)	120 l/min/(1 900 GPH)	252 l/min/(4 000 GPH)
Kapacitet, lyfthöjd 1 m (13,6V/27V):	98 l/min/(1 550 GPH)	120 l/min/(1 900 GPH)	196 l/min/(3 100 GPH)
(12V/24V):	88 l/min/(1 400 GPH)	110 l/min/(1 750 GPH)	164 l/min/(2 600 GPH)
Spänning:	12/24 V DC	12/24 V DC	12/24 V DC
Strömförbrukning:	12V – 7A 24V – 3,5A	12V – 7,5A 24V – 4,5A	12V – 19,5A 24V – 10A
Säkring:	12V – 10A 24V – 6A	12V – 12A 24V – 6A	12V – 25A 24V – 15A
Pumphus:	Termoplast	Termoplast	Termoplast
Axel:	SS2343	SS2343	SS2343
Axeltätning:	Läpp	Mekanisk, kol/keramik	Mekanisk, kol/keramik
Ledningsarea:	1,5 mm ²	1,5 mm ²	1,5 mm ²
Max höjd:	149 mm	177 mm	216 mm
Max dia:	108 mm	108 mm	121 mm
Vikt:	1,3 kg	2,25 kg	2.45 kg

Installation

Följ anvisningarna noggrant för att uppnå maximal effekt.

1. Ta bort filtret från pumpens nederdel genom att trycka in låstapparna på båda sidor om pumpen.
2. Bestäm monteringsplats för pumpen, vilken vanligtvis placeras i kölens lägsta punkt.
3. Placera filtret så att pumpens utlopp riktas åt rätt håll när pumpen monteras fast på filtret.

4. Montera filtret. Använd rostfria skruvar vid montering på trä. Ska pumpen monteras på metall eller glasfiber, skruva först fast en träplatta att fästa filtret på.
5. Placera pumpen på filtret och se till att båda låstapparna "snäpper" fast.
6. Välj en plats där vattnet ska pumpas överbord – så högt som möjligt över vattenlinjen och så nära pumpen som möjligt. Installera en 28 mm (1 1/8") [L1600/L2200] alt 38 mm (1 1/2") [L2200/L4000] alt 50 mm (2") [L4000] bordgenomföring. OBS! L4000 pumpen levereras med en avtagbar backventil för att minimera återflöde av vatten. Om vattnet står en längre tid i slang kommer lite vatten att sippra tillbaka. Backventilen minskar även flödet till en viss del.
7. Anslut en 28 mm (1 1/8") [L1600/L2200] alt 38 mm (1 1/2") [L2200/L4000] alt 50 mm (2") [L4000] bränslesäker slang från pumpens utlopp till bordgenomföringen. Undvik skarpa veck och öglor. Om nödvändigt, fäst slangen. Obs! För att förhindra luftfickor är det viktigt att slangen inte riktas nedåt vid pumpens utlopp. Slangen ska hela tiden riktas uppåt.
8. Anslut den bruna kabeln till batteriets pluspol (+) och den svarta till batteriets minuspol (-) eller jord. Se kopplingsschema sid 16-18.
9. Viktigt! Alla elledningar måste klammas med kabelskarvarna så högt över länsvattnet som möjligt. Ta inte bort mer än nödvändigt av kabelisoleringen. Samtliga kabelskarvar ska tätas med ett marint tätningsmedel för att förhindra oxidation.

Rengöring

Kontrollera regelbundet om filtret och impellern blivit igensatta av smuts. För att kunna göra rent, tryck in låstapparna och lyft pumphuset. Obs! Utloppsslangen behöver inte tas bort vid rengöring.

Tillbehör

Strömbrytarpanel 12 eller 24 V

Art nr: 12 V – 34-1224
24 V – 34-1225

Elektrisk installation med Johnson Pump strömbrytarpanel

Installera enligt kopplingsschemat på sid 16-17.

UltimaSwitch™

Art nr: 34-36303

BilgeAlert™

Art nr: 34-72303

Elektronisk Nivåströmbrytare

Art nr: 34-1900B-12V
34-1900B-24V

Automatisk nivåströmbrytare

Art nr: 34-888

Avfallshantering/materialåtervinning

Vid avfallshantering ska produkten lämnas för destruktion/återvinning enligt gällande lagstiftning. Vid tillämpliga fall demonteras och sorteras produkten i ingående materialfraktioner.

Submersible bilge pump L1600, L2200 and L4000, 12/24 V

Submersible bilge pump for pumping bilge water in marine environment. To be installed in the keelson.

Security

- The pump may not be used for other liquids than water/bilge water.
- Always install the pump according to the wiring diagram, see page 16-18.
- Always use the fuse required, see "Design features" below.
- The wire connections must be sealed with a marine sealant.
- Insulation or cable sheathings must be placed above the highest bilge water level.
- Do not run dry.

Type designation

Pumptype	Part nr
L1600 12 V	32-1600-01
L1600 24 V	32-1600-02
L2200 12 V	32-2200-01
L2200 24 V	32-2200-02
L4000 12 V	32-4000-01
L4000 24 V	32-4000-02

Design features

	L1600	L2200	L4000
Hose size:	1 1/8"	1 1/8" or 1 1/2"	1 1/2" or 2"
Capacity, straight (13,6V/27V):	100 l/min/(1 600 GPH)	130 l/min/(2 060 GPH)	258 l/min/(4 100 GPH)
(12V/24V):	92 l/min/(1 450 GPH)	120 l/min/(1 900 GPH)	252 l/min/(4 000 GPH)
Capacity, 1 m head (13,6V/27V):	98 l/min/(1 550 GPH)	120 l/min/(1 900 GPH)	196 l/min/(3 100 GPH)
(12V/24V):	88 l/min/(1 400 GPH)	110 l/min/(1 750 GPH)	164 l/min/(2 600 GPH)
Voltage:	12/24 V DC	12/24 V DC	12/24 V DC
Amperage:	12V – 7A 24V – 3,5A	12V – 7,5A 24V – 4,5A	12V – 19,5A 24V – 10A
Fuse size:	12V – 10A 24V – 6A	12V – 12A 24V – 6A	12V – 25A 24V – 15A
Body:	Thermoplastic	Thermoplastic	Thermoplastic
Shaft:	SS2343	SS2343	SS2343
Shaft seal:	Lip seal	Mechanical seal, carbon/ceramic	Mechanical seal, carbon/ceramic
Wire size:	1,5mm ²	1,5mm ²	14 Gage
Max height:	149mm	177mm	216mm
Max dia:	108mm	108mm	121mm
Weight:	1,3 kg	2,25 kg	2,45kg

Installation

Please follow the installation instructions carefully to assure maximum efficiency in your bilge pump operation.

1. Remove the strainer from the bottom of the pump by depressing the lock tabs on both sides of the pump.
2. Determine the desired location for the pump. Usually it is placed in the lowest point of the bilge.

3. Position the strainer so that the pump nozzle is in the proper position to connect to the discharge hose.
4. Mount the strainer. If attaching the strainer to wood, fasten with stainless steel screws. If attaching the strainer to metal or fiberglass, first mount a wooden block and then fasten the strainer to the wooden block.
5. Mount the pump on the strainer so that both locktabs "snaps" into place.
6. Select a point where the bilge water is to be pumped overboard as high as possible above the water line and at the shortest distance from the pump. Install a 1½"[L2200/L4000] or 1⅝" [L1600/L2200] or 2"[L4000] thru-hull fitting. Note: The L4000 pump comes equipped with an integrated check valve to minimize back flow of water, however, over time water will seep back into the hull when the pump is not running. The use of flapper check valve will reduce maximum flow performance.
7. Fasten a 1½"[L2200/L4000] or 1⅝" [L1600/L2200] or 2"[L4000] fuel resistant hose from the pump outlet to the thru-hull fitting. Avoid sharp bends or loops. Support the hose if necessary. Note: In order to prevent air locks it is important that the hose not be allowed to dip below the pump outlet. The hose should be constantly rising.
8. Connect the brown wire to the positive (+) terminal of the battery, and the black wire to the negative (-) terminal of the battery. See wiring diagram, page 16-17.
9. Important: All electrical wiring must be clamped with the connections well above the bilge water level. Do not remove the insulation more than necessary. All wiring connections should be sealed with a marine sealant to avoid oxidation

Maintenance

Regularly check the pump to be sure that the filter base and impeller are not clogged with debris. To clean, push in the tabs and lift up the pump housing. Note! The discharge hose need not be removed.

Accessories

Panel 12 or 24 V

Part No: 12 V – 34-1224
24 V – 34-1225

Electrical installation with the Johnson Pump panel

Always install according to the wiring diagram on page 16-18.

UltimaSwitch™

Part No: 34-36303

BilgeAlert™

Part No: 34-72303

Electronic Float Switch

Part No: 34-1900B-12V
34-1900B-24V

Automatic Float Switch

Part No: 34-888

Waste handling & material recycling

At the products end of life, please dispose of the product according to applicable law. Where applicable, please disassemble the product and recycle the parts material.

Bilge-Tauchpumpe L1600, L2200 und L4000, 12/24 V

Marine-Tauchpumpe zum Abpumpen von Bilgenwasser. Zur Installation im Kiel- oder Bilgenbereich.

Sicherheitsvorschriften

- Die Pumpe darf nur zum Abpumpen von Bilge- und Seewasser verwendet werden.
- Die Pumpe muß gemäß dem Schaltplan auf Seite 16-18 installiert werden.
- Immer die angegebene Sicherung verwenden. "Technische Daten" siehe unten.
- Die elektrischen Verbindungen müssen mit seewasserbeständigem Dichtmittel abgedichtet werden.
- Alle elektrischen Verbindungen müssen in sicherem Abstand über dem Höchst-Wasserstand gelegt werden.
- Die Pumpe darf nicht trockenlaufen.

Modellvarianten

Pumpentyp	Artikel Nr
L1600 12 V	32-1600-01
L1600 24 V	32-1600-02
L2200 12 V	32-2200-01
L2200 24 V	32-2200-02
L4000 12 V	32-4000-01
L4000 24 V	32-4000-02

Technische Daten

	L1600	L2200	L4000
Schlauchdurchmesser:	1 1/8"	1 1/8" oder 1 1/2"	1 1/2" oder 2"
Leistung, bei geradem Auslauf (13,6V/27V):	100 l/min/(1 600 GPH)	130 l/min/(2 060 GPH)	258 l/min/(4 100 GPH)
(12V/24V):	92 l/min/(1 450 GPH)	120 l/min/(1 900 GPH)	252 l/min/(4 000 GPH)
Leistung bei 1 m Förderhöhe (13,6V/27V):	98 l/min/(1 550 GPH)	120 l/min/(1 900 GPH)	196 l/min/(3 100 GPH)
(12V/24V):	88 l/min/(1 400 GPH)	110 l/min/(1 750 GPH)	164 l/min/(2 600 GPH)
Spannung:	12/24 V DC	12/24 V DC	12/24 V DC
Stromaufnahme:	12 V – 7 A 24 V – 3,5 A	12 V – 7,5 A 24 V – 4,5 A	12 V – 19,5 A 24 V – 10 A
Sicherung:	12 V – 10 A 24 V – 6 A	12 V – 12 A 24 V – 6 A	12 V – 15 A 24 V – 7,5 A
Gehäuse:	Thermoplastik	Thermoplastik	Thermoplastik
Welle:	SS2343	SS2343	SS2343
Wellenabdichtung:	Lippendichtung	Gleitringdichtung, Kohlenstoff/Keramik	Gleitringdichtung
Kabelquerschnitt:	1,5 mm ²	1,5 mm ²	1,5 mm ²
Max. Höhe:	149 mm	177 mm	216 mm
Durchmesser:	108 mm	108 mm	121 mm
Gewicht:	1,3 kg	2,25 kg	2,45 kg

Einbau

Bitte befolgen Sie diese Anweisungen sorgfältig. Nur so kann dafür garantiert werden, daß die Pumpe einwandfrei und mit voller Leistung arbeitet.

- Saugkorb durch Drücken auf die beidseitigen Verriegelungen vom Pumpen-unterteil demontieren.
- Den günstigsten Platz für die Montage der Pumpe bestimmen. Dies sollte möglichst der tiefste Punkt in der Bilge sein.

3. Den Saugkorb so platzieren, daß der Pumpenauslauf bei der Montage der Pumpe in die richtige Richtung zeigt.
4. Saugkorb montieren. Bei Montage auf Holz Schrauben aus Niro verwenden. Bei Anbringung auf Metall oder GFK zunächst eine Platte aus seewasserbeständigem Sperrholz montieren. Auf diese wird der Saugkorb befestigt.
5. Pumpenkörper auf den Saugkorb aufsetzen und dafür sorgen, daß die beiden Verriegelungszapfen fest einrast.
6. Suchen Sie eine günstige Stelle für den Borddurchlaß aus. Dieser sollte möglichst hochüber der Wasserlinie und dennoch im kürzesten Abstand zur Pumpe installiert werden. Der Borddurchlaß sollte eine Größe von 1 1/8" [L1600/L2200] oder 1 1/2" [L2200/L4000] oder 2" [L4000] haben.
Hinweis: Die L4000-Pumpe ist zwar mit einem eingebauten Rückschlagventil ausgestattet um den Wasserrückfluss so gering wie möglich zu halten, aber über die Zeit wird doch Wasser in den Rumpf gelangen, wenn die Pumpe nicht läuft. Durch den Einsatz eines Klappenrückschlagventils wird die maximale Förderleistung verringert.
7. Installieren Sie einen ölbeständigen Schlauch von 1 1/8" [L1600/L2200] oder 1 1/2" [L2200/L4000] oder 2" [L4000] Durchmesser zwischen dem Pumpen-Schlauchstutzen und dem Borddurchlaß. Dieser sollte ohne enge Radien im direkten Weg von der Pumpe zum Borddurchlaß mit konstanter Steigung verlegt werden.
8. Das braune Kabel muß an den Pluspol(+), das schwarze Kabel an den Minus pol (-) der Batterie geklemmt werden. Siehe Schaltplan Seite 16-17.
9. Wichtig! Alle elektrischen Verbindungen müssen so installiert werden, daß sie sich in ausreichender Höhe über dem max. Bilge-Wasserstand befinden. Die Kabel so kurz wie möglich abisolieren. Sämtliche Kabelanschlüsse mit seewasserbeständiger Dichtmasse schützen, um Korrosionen zu vermeiden.

Wartung

Regelmäßig prüfen, ob Saugkorb und Flügelrad nicht durch Schmutz verstopft sind. Zwecks Durchführung der Reinigung: Verriegelungszapfen drücken und Pumpengehäuse herausheben.
VERMERK: Der Auslaufschlauch muß bei der Reinigung nicht entfernt werden.

Zubehör

Schalttafel 12 oder 24 V

Artikel Nr: 12 V – 34-1224
24 V – 34-1225

Elektrischer Anschluss mit Johnson Pump Schalttafel

Siehe Schaltplan Seite 16-18.

UltimaSwitch™

Artikel Nr: 34-36303

BilgeAlert™

Artikel Nr: 34-72303

Elektronik-Schwimmerschalter

Artikel Nr: 34-1900B-12V
34-1900B-24V

Automatischer Niveauschalter

Art. Nr. 34-888

Entsorgung/Recycling

Nach Lebensdauerende entsorgen Sie die Pumpe nach den örtlichen Vorschriften.
Nach Möglichkeit demonstrieren Sie Teile der Pumpe um sie dem Recycling-Process zuzuführen.

Pompe de cale submersible L1600 et L2200, 12/24 V

Pompe de cale submersible pour eaux de cale en milieu marin. Pour installation en fond de cale.

Instructions de sécurité

- La pompe ne peut être utilisée que pour de l'eau ou pour les eaux de cale.
- Brancher toujours la pompe selon le schéma électrique, page 16-18.
- Utiliser le fusible indiqué, voir "caractéristiques techniques" ci-dessous.
- Les points de jonction du cablage doivent être étanchés à l'aide d'un produit hydrofuge.
- Tous les points de jonction électriques doivent être placés au-dessus du niveau le plus haut des eaux de cale.
- La pompe ne doit en aucun cas tourner à vide.

Spécifications du modèle

Modèle	Référence
L1600 12 V	32-1600-01
L1600 24 V	32-1600-02
L2200 12 V	32-2200-01
L2200 24 V	32-2200-02
L4000 12 V	32-4000-01
L4000 24 V	32-4000-02

Caractéristiques techniques

	L1600	L2200	L4000
Diam. de tuyau:	28mm	28mm ou 38mm	38mm ou 50mm
Débit, refoulement libre (13,6V/27V):	100 l/min/(1 600 GPH)	130 l/min/(2 060 GPH)	258 l/min/(4 100 GPH)
(12V/24V):	92 l/min/(1 450 GPH)	120 l/min/(1 900 GPH)	252 l/min/(4 000 GPH)
Débit, refoulement à 1 m (13,6V/27V):	98 l/min/(1 550 GPH)	120 l/min/(1 900 GPH)	196 l/min/(3 100 GPH)
(12V/24V):	88 l/min/(1 400 GPH)	110 l/min/(1 750 GPH)	164 l/min/(2 600 GPH)
Voltage:	12/24 V DC	12/24 V DC	12/24 V DC
Intensité:	12V – 7A 24V – 3,5A	12V – 7,5A 24V – 4,5A	12V – 19,5 24V – 10A
Fusible:	12V – 10A 24V – 6A	12V – 12A 24V – 6A	12V – 25A 24V – 15A
Corps:	Thermoplastique	Thermoplastique	Thermoplastique
Arbre:	SS2343	SS2343	SS2343
Etanchéité arbre:	Joint à lèvres	Garniture mécanique, carbone/céramique	Garniture mécanique,
Section de câbles:	1,5mm ²	1,5mm ²	1,5mm ²
Hauteur maxi:	149mm	177mm	216mm
Diam. maxi:	108mm	108mm	121mm
Poids:	1,3 kg	2,25 kg	2,45kg

Installation

Suivre méticuleusement les instructions ci-dessous afin d'obtenir un rendement optimum.

- Enlever le filtre de la partie inférieure de la pompe en enfonçant les verrous des deux côtés de la pompe.
- Déterminer l'emplacement de montage de la pompe, en général au point le plus bas de la cale.

3. Placer le filtre pour que la sortie de la pompe soit dirigée dans le bon sens lorsque la pompe est fixée sur le filtre.
4. Monter le filtre. Utiliser les vis inoxydables pour le montage sur du bois. Si la pompe doit être montée sur du métal ou des fibres de verre, commencer par visser une plaque en bois où sera fixé le filtre.
5. Placer la pompe sur le filtre et s'assurer que les deux verrous sont bien enclenchés.
6. Choisir un endroit par lequel les eaux de cale seront pompées et évacuées aussi haut que possible au-dessus de la ligne d'eau et le plus près possible de la pompe. Installer un raccord fileté de 28 mm [L1600/L2200] ou 38 mm [L2200/L4000] ou 50 mm [L4000] à travers la coque. Remarque: La pompe L4000 est équipée d'origine d'un clapet anti-retour pour réduire au minimum le reflux, cependant, après une longue période d'utilisation, l'eau contenue dans le circuit de refoulement peut refluer lentement. L'utilisation d'un clapet anti-retour réduit le débit de la pompe.
7. Monter un tuyau résistant à l'essence de 28 mm [L1600/L2200] ou 38 mm [L2200/L4000] ou 50 mm [L4000] entre la sortie de la pompe et le raccord fileté traversant la coque. Eviter les plis et les boucles. Fixer le tuyau si nécessaire. Important: Afin d'éviter les poches d'air, il est important de s'assurer que la sortie du tuyau ne soit pas dirigée vers le bas, mais toujours vers le haut.
8. Relier le fil marron à la borne positive (+) de la batterie et relier le fil noir à la borne négative (-) de la batterie.
9. Attention: Le câblage électrique doit être fixé de manière à ce que tous les raccords se trouvent au-dessus du niveau le plus haut des eaux de cale. N'enlever qu'un minimum d'isolant du bout des câbles. Tous les raccords doivent être bien protégés contre la corrosion à l'aide d'un produit résistant à l'eau.

Nettoyage

Vérifier régulièrement si le filtre et la turbine sont encrassés. Pour nettoyer, enfoncer les verrous et soulever le corps de pompe. Note! Le flexible de sortie n'a pas besoin d'être enlevé pour le nettoyage.

Accessoires

Tableau de commande 12 ou 24 V

Référence: 12 V – 34-1224
24 V – 34-1225

Installation électrique avec tableau de commande Johnson Pump

Installer selon le schéma électrique à la page 16-18.

UltimaSwitch™

Référence: 34-36303

BilgeAlert™

Référence: 34-72303

Interrupteur de commande électronique

Référence: 34-1900B-12V
34-1900B-24V

Interrupteur automatique à flotteur

Ref. No. 34-888

Gestion des déchets/recyclage des matériaux

Lorsque le matériel arrivera en fin de vie, veuillez le mettre au rebut en fonction des lois applicables. Lorsque c'est possible, veuillez démonter le matériel et recycler les pièces pouvant l'être.

Bomba de achique sumergible L1600, L2200 y L4000, 12/24 V

Bomba de achique sumergible para achicar agua en ambientes marinos. Para instalación en la contra-quilla.

Instrucciones de seguridad

- La bomba sólo debe utilizarse para agua.
- Instalar la bomba según el esquema eléctrico de las páginas 16-18.
- Poner el fusible indicado en "Características técnicas".
- Todas las conexiones eléctricas deben sellarse con silicona marina.
- Todas las conexiones eléctricas deben quedar por encima del nivel más alto de la sentina.
- No debe funcionar en seco.

Modelo

Tipo	Ref. No
L1600 12 V	32-1600-01
L1600 24 V	32-1600-02
L2200 12 V	32-2200-01
L2200 24 V	32-2200-02
L4000 12 V	32-4000-01
L4000 24 V	32-4000-02

Características técnicas

	L1600	L2200	L4000
Conexión:	1 1/8"	1 1/8" alt 1 1/2"	1 1/2" alt 2"
Caudal salida libre (13,6V/27V):	100 l/min/(1 600 GPH)	130 l/min/(2 060 GPH)	258 l/min/(4 100 GPH)
(12V/24V):	92 l/min/(1 450 GPH)	120 l/min/(1 900 GPH)	252 l/min/(4 000 GPH)
Caudal a 1 m altura (13,6V/27V):	98 l/min/(1 550 GPH)	120 l/min/(1 900 GPH)	196 l/min/(3 100 GPH)
(12V/24V):	88 l/min/(1 400 GPH)	110 l/min/(1 750 GPH)	164 l/min/(2 600 GPH)
Tensión:	12/24 V DC	12/24 V DC	12/24 V DC
Amperaje:	12V – 7A 24V – 3,5A	12V – 7,5A 24V – 4,5A	12V – 19,5A 24V – 10A
Fusible:	12V – 10A 24V – 6A	12V – 12A 24V – 6A	12V – 25A 24V – 15A
Cuerpo:	Termoplástico	Termoplástico	Termoplástico
Eje:	SS2343	SS2343	SS2343
Retén eje:	Retén labial	Retén mecánico carbón/cerámico	Retén mecánico,
Conductor:	1,5mm ²	1,5mm ²	1,5mm ²
Alto total:	149mm	177mm	216mm
Ø total:	108mm	108mm	121mm
Peso:	1,3 kg	2,25 kg	2,45kg

Instalación

Se recomienda observar estrictamente estas instrucciones para asegurar la máxima eficacia de la bomba.

1. Quitar el filtro de la parte inferior de la bomba presionando los ejes de cierre a ambos lados de la bomba.
2. Determinar el lugar de montaje de la bomba. Generalmente se coloca en el punto más bajo de la sentina.

3. Colocar el filtro de manera que la salida de la bomba quede orientada para conectar la manguera.
4. Montar el filtro. Utilizar tornillos de acero inoxidable si se hace el montaje sobre madera. Si la bomba se ha de montar sobre metal o fibra de vidrio, deberá colocarse una chapa de madera a la que se fijará el filtro.
5. Colocar la bomba en el filtro y asegurarse que los dos pernos de cierre quedan bien encajados.
6. Elegir un punto en que la salida del agua esté a la mayor distancia posible por encima de la línea de flotación y lo más cerca de la bomba. Nota: La bomba del L4000 viene provista de una válvula de control integrada que merma el caudal de retorno del agua, sin embargo, con el tiempo el agua vuelve a filtrarse en el casco cuando la bomba no trabaja. El uso de la válvula de retención reducirá al máximo la acción del flujo.
7. Fijar la manguera de 1½"[L2200/L4000] ó 1⅞"[L1600/L2200] ó 2"[L4000] resistente a hidrocarburos, entre la bomba y el pasacascos. Evitar coca y lazos. Si fuese necesario, fijar la manguera.
Observación: Para evitar la entrada de aire, es importante que la manguera no quede por debajo de la salida de la bomba. La manguera debe tener una elevación constante.
8. Conectar el cable marrón al positivo (+) y el cable negro al negativo (-).
9. Importante: Todo el cableado debe fijarse de manera que las conexiones queden lo más alto posible por encima del nivel de agua de la sentina. Pelar los cables justo lo imprescindible. Todas las conexiones deben aislarse con silicona marina para evitar la corrosión.

Mantenimiento

Comprobar regularmente si el filtro y el impulsor están obturados por suciedad. Para limpiarlos, presionar los pernos de cierre y quitar la bomba. Nota: No es necesario quitar la manguera.

Accesorios

Panel 12 ó 24 V

Ref. No: 12 V – 34-1224

24 V – 34-1225

Instalación eléctrica con el panel de Johnson Pump

Instalar según el esquema eléctrico de la página 16-18.

UltimaSwitch™

Ref. No: 34-36303

BilgeAlert™

Ref. No: 34-72303

Interruptor de nivel electrónico

Ref. No: 34-1900B-12V

34-1900B-24V

Interruptor flotante automático

Ref. No: 34-888

Desguace/Reciclado

Al final de la vida del equipo disponga de este de acuerdo a la ley. Donde sea de aplicación desmonte el equipo y recicle los diferentes materiales.

Pompa di sentina sommersa L1600, L2200 a L4000, 12/24 V

Pompa di sentina sommersa per pompare l'acqua di sentina in ambiente marino. Per installazione in stiva.

Istruzioni di sicurezza

- La pompa non si può usare per altri liquidi dell'acqua o dell'acqua di sentina.
- Installare sempre la pompa secondo il schema elettrico nella pagina 16-18.
- Usare il fusibile indicato, vedere le caratteristiche tecniche in basso.
- I collegamenti elettrici dovrebbero essere sigillati con un sigillante marino.
- Tutti i collegamenti elettrici devono essere posti al di sopra del livello più alto dell'acqua.
- La pompa non può girare a vuoto.

Specifiche del tipo

Tipo	Art No
L1600 12 V	32-1600-01
L1600 24 V	32-1600-02
L2200 12 V	32-2200-01
L2200 24 V	32-2200-02
L4000 12 V	32-4000-01
L4000 24 V	32-4000-02

Caratteristiche tecniche

	L1600	L2200	L4000
Sezione tubo:	1 1/8"	1 1/8" o 1 1/2"	1 1/2" o 2"
Portata massima (13,6V/27V):	100 l/min/(1 600 GPH)	130 l/min/(2 060 GPH)	258 l/min/(4 100 GPH)
(12V/24V):	92 l/min/(1 450 GPH)	120 l/min/(1 900 GPH)	252 l/min/(4 000 GPH)
Portata a 1 mt di prevalenza (13,6V/27V):	98 l/min/(1 550 GPH)	120 l/min/(1 900 GPH)	196 l/min/(3 100 GPH)
(12V/24V):	88 l/min/(1 400 GPH)	110 l/min/(1 750 GPH)	164 l/min/(2 600 GPH)
Voltaggio:	12/24 V DC	12/24 V DC	12/24 V DC
Amperaggio:	12V – 7A 24V – 3,5A	12V – 7,5A 24V – 4,5A	12V – 19,5A 24V – 10A
Capacità fusibile:	12V – 10A 24V – 6A	12V – 12A 24V – 6A	12V – 25A 24V – 15A
Corpo:	Termoplastico	Termoplastico	Termoplastico
Albero:	SS2343	SS2343	SS2343
Guarnizione dell'albero:	Guarnizioni a labbro	Tenuta meccanica, carbonio/ceramica	Tenuta meccanica,
Area cavo:	1,5mm ²	1,5mm ²	1,5mm ²
Altezza:	149mm	177mm	216mm
Dimensione:	108mm	108mm	121mm
Peso:	1,3 kg	2,25 kg	2,45 kg

Installazione

Si prega di seguire con attenzione le istruzioni di montaggio per garantire la massima efficacia di funzionamento alla vostra pompa di sentina.

1. Rimuovere il filtro dalla parte inferiore della pompa, premendo all'interno entrambi i perni di bloccaggio posti ai lati della pompa stessa.
2. Individuare il punto in cui installare la pompa, solitamente quello più basso della sentina.

3. Sistemare il filtro in modo che la mandata della pompa, una volta che questa sia stata montata sul filtro, sia orientata nella direzione corretta.
4. Installare il filtro, usando le viti in acciaio inossidabile nel caso il fissaggio avvenga direttamente su legno. Se avviene invece su fibra di vetro o metallo, andrà prima apposto un basamento in legno, e su questo fissato il filtro.
5. Montare la pompa sul filtro, accertandosi che entrambi i perni "scattino" in posizione di bloccaggio.
6. Scegliere il punto da cui l'acqua di sentina deve essere pompata fuori bordo, il più alto possibile rispetto alla linea d'acqua ed alla minima distanza dalla pompa. Installare un attacco di 1 1/2" o 1 5/8" attraverso la carena. Nota: l'L400 viene fornito dotato di una valvola di controllo integrata per minimizzare il ritorno di acqua, comunque, nel tempo l'acqua si infiltrerà nello scafo quando la pompa non è in funzione. L'uso della valvola di controllo a pinna ridurrà le prestazioni con il flusso massimo.
7. Collegare un tubo di 1 1/2"[L2200/L4000] o 1 5/8"[L1600/L2200] o 2"[L4000] resistente ai carburanti dalla mandata della pompa all'attacco a carena. Evitare curve brusche o occhielli. Se necessario, supportare il tubo. Nota: per prevenire bolle d'aria è importante che il tubo non si immerga al di sotto della mandata della pompa. Il tubo dovrebbe essere costantemente sollevato.
8. Collegare il cavo marrone al terminale + della batteria e il cavo nero al - della batteria – vedi schema a pagina 16-17.
9. N.B. Tutti i collegamenti elettrici devono essere posti al di sopra del livello più alto dell'acqua di sentina. Non rimuovere più di necessario dall'isolamento dei cavi. I collegamenti dei cavi dovrebbero essere sigilati con un sigillante marino per prevenire la corrosione.

Pulizia

Controllare regolarmente che filtro e girante non sia intasati dalle impurità. Per eseguire la pulizia, premere verso l'interno i perni di bloccaggio e sollevare il corpo pompa. Nota! Per effettuare la pulizia della pompa non è necessario estrarre il tubo di scarico.

Accessori

Pannello 12 o 24 V

Art No: 12 V – 34-1224
24 V – 34-1225

Installazione elettrica con il pannello Johnson Pump

Installare secondo il schema elettrico nella pagina 16-18.

UltimaSwitch™

Art No: 34-36303

BilgeAlert™

Art No: 34-72303

Interruttore elettronico

Art No: 34-1900B-12V
34-1900B-24V

Interruttore Automatico

Art No: 34-888

Gestione dei rifiuti/riciclaggio dei materiali

Al termine della vita del prodotto si prega di smaltire il prodotto secondo le leggi in vigore per queste operazioni. Quando possibile, si raccomanda di smontare il prodotto e riciclare i materiali dei componenti.

UltimaSwitch

Elektrisk installation utan strömbrytarpanel.

Electrical installation without panel.

Elektrische Installation ohne Schalttafel.

Installation électrique sans panneau

Instalación eléctrica sin panel

Installazione elettrica senza pannello

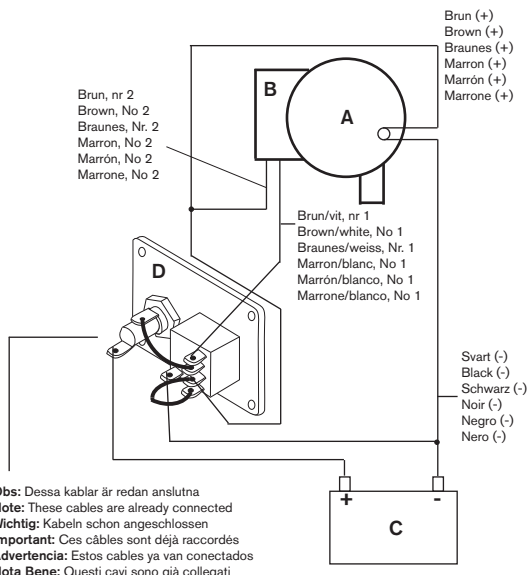
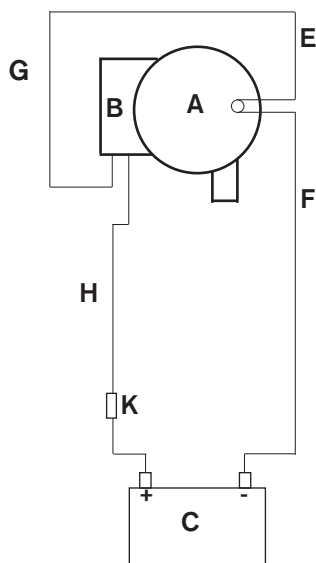
Elektrisk installation med strömbrytarpanel. Electrical installation with panel.

Elektrische Installation mit Schalttafel.

Installation électrique avec panneau.

Instalación eléctrica con panel.

Installazione elettrica con pannello.



A Länspump Bilge pump Bilgepumpe Pompe de cale Bomba achique Pompa di sentina	B Elektronisk UltimaSwitch Electronic UltimaSwitch Elektronik UltimaSwitch Interrupteur UltimaSwitch Interrupitor UltimaSwitch Interruttore UltimaSwitch	C Batteri DC supply Batterie Batterie Bateria Batteria	D Panel Panel Schalttafel Panneau Panel Pannello	E Brun(pump) Brown(pump) Braun(Pumpe) Marron(pompe) Marrón((bomba) Marrone(pompa)
F Svart(pump) Black(pump) Schwarz(Pumpe) Noir(pompe) Negro(bomba) Nero(pompa)	G Brun(#1) Brown(#1) Braun(#1) Marron(#1) Marrón(#1) Marrone(#1)	H Brun/vit(#2) Brown/white(#2) Braun/weiss(#2) Marron/blanc(#2) Marrón/blanco(#2) Marrone/bianco(#2)	J Switch Switch Schalter Interrupteur Interrupitor Interruttore	K Säkring Fuse Sicherung Fusible Fusible Fusibile

AS888

Elektrisk installation utan strömbrytarpanel.

Electrical installation without panel.

Elektrische Installation ohne Schalttafel.

Installation électrique sans panneau

Instalación eléctrica sin panel

Installazione elettrica senza pannello

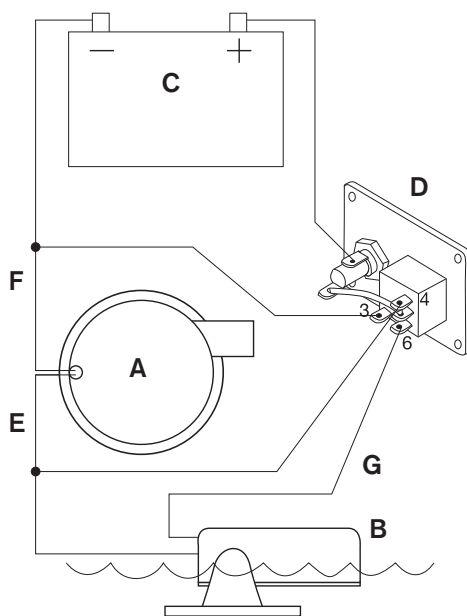
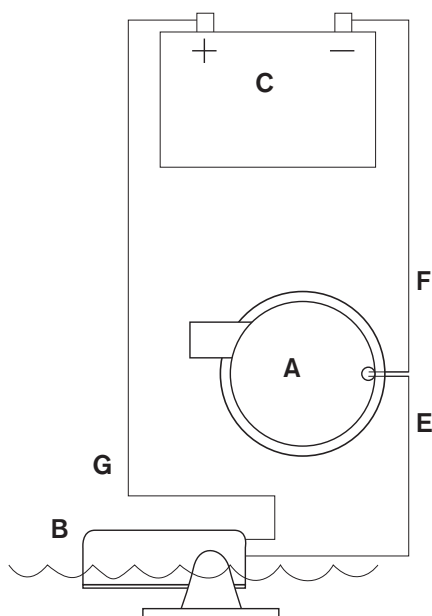
Elektrisk installation med strömbrytarpanel. Electrical installation with panel.

Elektrische Installation mit Schalttafel.

Installation électrique avec panneau.

Instalación eléctrica con panel.

Installazione elettrica con pannello.



- | | | | | |
|---|--|--|--|---|
| A Länspump
Bilge pump
Bilgepumpe
Pompe de cale
Bomba achique
Pompa di sentina | B Automatisk nivåströmbrytare
Automatic float switch
Automatischer Niveauschalter
Interruteur automatique à flotteur
Interruptor flotante automático
Interruttore automatico | C Batteri
DC supply
Batterie
Batterie
Bateria
Batteria | D Panel
Panel
Schalttafel
Panneau
Panel
Pannello | E Brun(pump)
Brown(pump)
Braun(Pumpe)
Marron(pompe)
Marrón((bomba)
Marrone(pompa) |
| F Svart(pump)
Black(pump)
Schwarz(Pumpe)
Noir(pompe)
Negro(bomba)
Nero(pompa) | G Brun
Brown
Braun
Marron
Marrón
Marrone | H Brun (Ultima)
Brown (Ultima)
Braun (Ultima)
Marron (Ultima)
Marrón (Ultima)
Marrone (Ultima) | | |

Elektrisk installation utan strömbrytarpanel, med elektronisk nivåströmbrytare

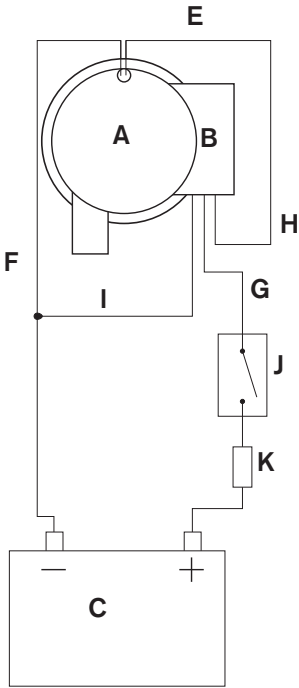
Electrical installation without panel, with electronic float switch

Elektrische Installation ohne Schalttafel, mit elektronischem Schwimmerschalter

Installation électrique sans panneau, avec contacteur de niveau

Instalación eléctrica con interruptor de nivel electrónico y sin panel

Installazione elettrica senza pannello con interruttore elettronico



- | | |
|---|---|
| A Länspump
Bilge pump
Bilgepumpe
Pompe de cale
Bomba achique
Pompa di sentina | B Elektronisk nivåströmbrytare
Electronic float switch
Elektronik-Schwimmerschalter
Interrupteur de commande électronique
Interruptor de nivel electrónico
Interruttore elettronico |
|---|---|

- | | | |
|---|---|--|
| F Svart(pump)
Black(pump)
Schwarz(Pumpe)
Noir(pompe)
Negro(bomba)
Nero(pompa) | G Brun/röd(#1)
Brown/red(#1)
Braun/rot(#1)
Marron/rouge(#1)
Marrón/rojo(#1)
Marrone/rosso(#1) | H Brun(#2)
Brown(#2)
Braun(#2)
Marron(#2)
Marrón(#2)
Marrone(#2) |
|---|---|--|

Elektrisk installation med strömbrytarpanel och elektronisk nivåströmbrytare

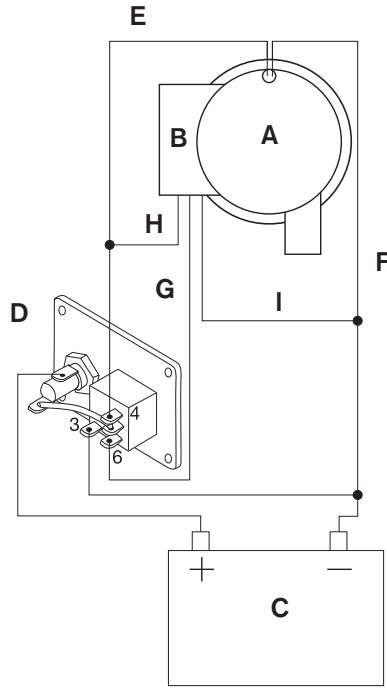
Electrical installation with panel and electronic float switch

Elektrische Installation mit Schalttafel und elektronischem Schwimmerschalter

Installation électrique avec panneau et contacteur de niveau

Instalación eléctrica con interruptor de nivel electrónico y panel

Installazione elettrica con pannello e interruttore elettronico



- | | | |
|--|--|---|
| C Batteri
DC supply
Batterie
Batterie
Bateria
Batteria | D Panel
Panel
Schalttafel
Panneau
Panel
Pannello | E Brun(pump)
Brown(pump)
Braun(Pumpe)
Marron(pompe)
Marrón((bomba)
Marrone(pompa) |
|--|--|---|

- | | | |
|---|--|---|
| I Svart(#3)
Black(#3)
Schwarz(#3)
Noir(#3)
Negro(#3)
Nero(#3) | J Switch
Switch
Schalter
Interrupteur
Interruptor
Interruttore | K Säkring
Fuse
Sicherung
Fusible
Fusible
Fusibile |
|---|--|---|



SPX Johnson Pump Marine AB
Nastagatan 19, P.O. Box 1436
SE-701 14 Örebro, Sweden
Phone: +46 (0)19 21 83 00 Fax: +46 (0)19 27 23 72
E-mail: johnson-pump.marine@processequipment.spx.com

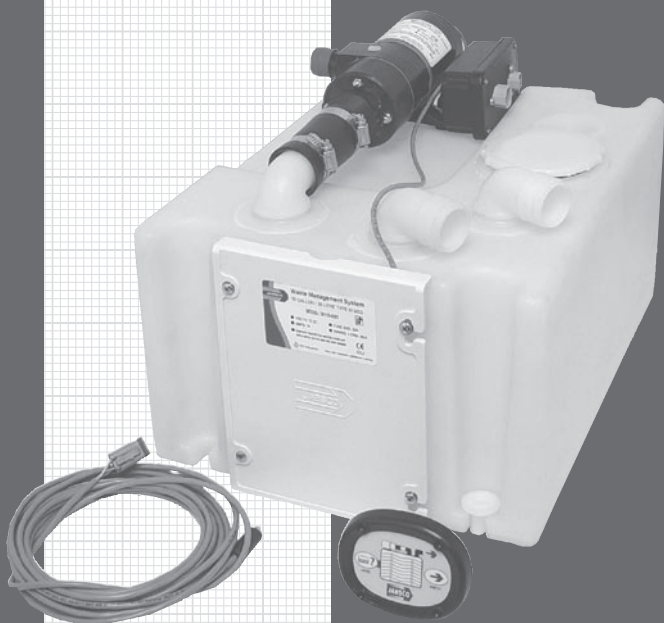


For more information about our worldwide locations, approvals, certifications, and local representatives, please visit www.johnson-pump.com.

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JABSCO®



38110

Type III MSD Waste Management System

- FR** Système pour traitement des déchets MSD de type III
- DE** Fäkalien-Entsorgungssystem Typ III MSD
- IT** Sistema di gestione dei rifiuti MSD Tipo III
- NL** Vuilwatersysteem type III MSD
- SE** Typ III MSD-avfallshanteringssystem
- ES** Sistema de gestión de residuos MSD Tipo III

CE



ITT

Engineered for life

Type III MSD Waste Management System

- Rugged Polyethylene holding tank
- Barbed fittings for all hose connections
- Heavy Duty Macerator
- Evacuation pump
- Three run-dry and accidental activation safety features
- Touch-pad waste management control panel
- Additional dock side evacuation pick up

PUMP FEATURES

Pump:	Self-Priming Flexible Impeller with Stainless Steel Wearplate
Impeller:	Jabsco Nitrile compound
Macerator:	Stainless Steel Cutter reduces particle size to 1/8" (3mm) maximum
Seal:	Lip Type
Ports:	Inlet - 1 -1/2" (38mm) Hose Barb and 1-1/2" N.P.T. (Male) Outlet - 1" (19mm) Hose Barb
Motor:	Permanent Magnet Type, Fully Enclosed, with Stainless Steel Shaft Includes Run-Dry Protection Device that shuts-off pump. Powder coated housing with sealed end-bells and bearings

System Features

Level Indication: When pressed, the level indicator will illuminate for 1 minute. When the tank level reaches full, the indicator will flash automatically to alert the user to empty the tank.

Sleep Mode: If the flashing LED is a disturbance the unit can be put into sleep mode. The unit will emerge from sleep if the system is turned off or the tank level is increased. NOTE: the unit is unable to be put into sleep mode if the tank is 7/8 full or greater.

Empty Button: This button needs to be pressed and held for 3 seconds to activate the pump. This eliminates the possibility of accidental operation.

Averaging: Two different level averaging methods have been used - one when filling and one when emptying. This compensates for the the boats movement when the tank is filling, and still allows an accurate reading when emptying.

Fail Safe Feature: If no fluid movement is sensed 20 seconds after the pump is set to run, the pump will shut down and the fault LED on the indicator panel will flash. This protects the pump from failure. NOTE: To re set the unit simply press the level button, If unit continues to shut down and indicate a fault check pump and plumbing for a blockage.

Installation:

- 1: The holding tank should be located close to the toilet.
- 2: A proper seacock is required if the discharge thru-hull is positioned below the waterline.
- 3: Both the discharge thru-hull and the holding tank are installed to prevent a potential siphon. Contact a marine plumber or Jabsco technical support specialist for installation assistance.
- 4: Mount on a strong flat surface. Note: the area of installation needs to support the weight of the unit and its contents. The total weight for this unit when full can equal 90lbs (40.8kg).
- 5: Four mounting feet (included) need to be attached to the platform with four machine or lag screws and four flat washers.

Plumbing:

Each tank contains:

- 1 x 1½" deck pump out - evacuation pickup tube (install to dockside pump-out deck plate)
- 1 x 1½" inlet port - from toilet system
- 1 x 3" O-ring sealed inspiration hatch
- 1x1" vent* - connect to vent outlet usually sited high on a vessel's hull near the gunwale

- 1x1" Overboard discharge port macerator pump out. Discharge: connect to the overboard discharge thru-hull fitting.
- *See plumbing diagram for recommended installation.

Electrical:

Wire the unit in an Independent Circuit.
Consult the wiring table for fuse and wire size.
Consult the wiring diagram for connections.

Wiring Table

VOLTAGE	AMP FUSE		WIRE SIZE PER FEET OF RUN*				
	DRAW	SIZE	0"-10"	10"-15"	15"-25"	25"-40"	40"-60"
12 Vdc	16	20	#16(1.5)	#14(2.5)	#14(2.5)	#12(4)	#6(16)
24Vdc	8	15	#18(1)	#16(1.5)	#16(1.5)	#14(2.5)	#10(6)

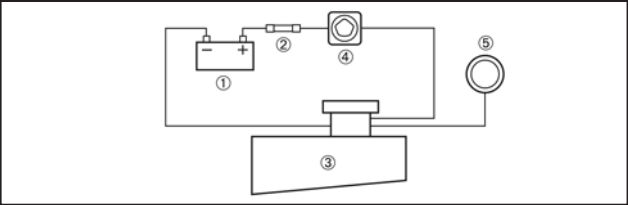
* Length of run is total length of the circuit from the power source to product and back to ground. Wire sizes listed are AWG gauge and metric millimeters.

Maintenance:

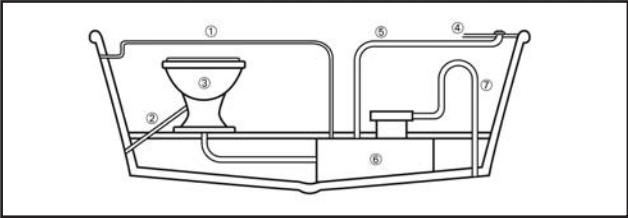
Flush system with clean water to remove any build up of sludge or debris. It is recommended that this process be completed at least once a year. Please reference 18590 Series Macerator datasheet servicing section for details.

Winter storage:

Empty the complete system of all water making sure pipe work and pump are completely free of waste.



KEY	DESCRIPTION
1	Battery
2	Fuse
3	Waste Management System
4	Master Switch
5	Controller for Waste Management System



KEY	DESCRIPTION
1	Vent
2	Inlet
3	Toilet
4	Deck
5	Pumpout
6	Waste Holding Tank
7	Vertical Loop Outlet

KEY	DESCRIPTION	KIT PART NUMBER
1	1-1/2" Barbed Pick-Up tube	38111-0000
2	1-1/2" Barbed Inlet Port	38111-0010
3	Vent 3/4"	38112-0000
	Vent 5/8"	38112-0010
4	Cap and O-Ring	38115-0000
5	Tank	38113-0000
6	Kick Panel	38114-0000
7	Control Box on Tank	38116-0000
8	Sensor Array (Sensors under Kick Panel)	38117-0000
9	Macerator 12v	18590-2092
	Macerator 24v	18590-2094
	15 Foot Control Cable	47010-0000
	20 Foot Control Cable	47020-0000
	30 Foot Control Cable	47030-0000
10	Control Panel 12v	38111-0012
10	Control Panel 24v	38111-0024

Système pour traitement des déchets MSD de type III

- Réservoir en polyéthylène renforcé
- Embouts cannelés pour tous les raccords de tuyauterie
- Pompe de macération robuste
- Pompe d'évacuation
- Trois fonctions de sécurité contre le fonctionnement à sec et l'activation accidentelle
- Tableau de contrôle des déchets, à pavé tactile
- Poste de décharge à quai supplémentaire

FONCTIONS DE POMPE

Pompe :	Turbine flexible auto-amorçante avec plaque d'usure en acier inoxydable
Turbine :	Composant Jabsco en nitrile
Macérateur :	Le broyeur en acier inoxydable réduit les déchets en particules de 3 mm maximum
Joint d'étanchéité :	Type capuchon
Ports :	Orifice d'entrée - Embout cannelé 38 mm et Orifice de sortie (mâle) norme N.P.T. 38 mm - Embout cannelé 19 mm
Moteur :	Type à aimant permanent, entièrement scellé, avec arbre en acier inoxydable, comprenant un dispositif de protection contre le fonctionnement à sec qui éteint la pompe. Boîtier peint par poudrage avec flasques et roulements

Fonctions du système

Indication de niveau : Lorsque enfoncé, l'indicateur de niveau s'illuminera pendant 1 seconde. Si le réservoir est entièrement rempli, l'indicateur clignote automatiquement pour avertir l'utilisateur qu'il faut vider le réservoir.

Mode veille : Si la DEL clignotante vous dérange, l'unité peut être mise en veille et en sortira si le système est éteint ou le niveau du réservoir monte.

N.B. : l'unité ne peut pas être mise en veille si le réservoir est plein au 7/8 ou plus.

Bouton de dévidage : Ce bouton doit être enfoncé pendant 3 secondes pour activer la pompe, ce qui évite toute possibilité de fonctionnement accidentel.

Calcul de moyenne : Il existe deux méthodes de calcul de moyenne du niveau : l'une en cas de remplissage et l'autre en cas de dévidage. Cela permet de compenser le mouvement du bateau pendant le remplissage du réservoir et permet tout de même une lecture exacte au moment du dévidage.

Fonction de sécurité intégrée : Si aucun mouvement de liquide n'est détecté 20 secondes après l'amorçage de la pompe, celle-ci s'éteint et la DEL d'erreur sur le panneau d'indicateurs clignote. La pompe est ainsi protégée contre les pannes. **N.B. :** Pour réinitialiser l'unité, appuyer sur le bouton de niveau. Si l'unité continue de s'éteindre et d'indiquer une erreur, vérifier qu'il n'existe aucune obstruction de la pompe ou des canalisations.

Installation :

1 : Le réservoir devrait se trouver aussi près des W.C. que possible.

2 : Une vanne de ballast adéquate est nécessaire si le passe coque de dévidage se trouve au-dessous de la ligne d'eau.

3 : Si le passe coque de dévidage et le réservoir se trouvent au-dessous de la ligne d'eau, un coude anti-siphons doit être installé pour éviter tout siphon potentiel. Si vous ignorez comment installer un coude anti-siphons, consulter un plombier spécialisé en plomberie marine ou contacter Jabsco pour de plus amples détails.

4 : Installer sur une surface plane solide. À noter que la surface d'installation doit être capable de supporter le poids de l'unité et de son contenu. Le poids total de cette unité lorsqu'elle est pleine est près de 41 kg.

5 : Quatre pieds de fixation sont fournis et doivent être fixés à la plate-forme avec 4 vis décolletées ou tire-fond et rondelles plates.

Plomberie :

Chaque réservoir est équipé comme suit :

Décharge de pont 25 mm x 38 mm - Tube de prise d'évacuation - Plaque de pont de décharge pour fixation sur pont.

Orifice d'entrée 25 mm x 38 mm - Depuis les W.C.

Clapet d'inspection scellé par joint torique 25 mm x 76 mm

Évent* 25 mm x 15 mm - Raccord à l'orifice de ventilation généralement situé sur la partie supérieure de la coque d'un bateau près du plat bord.

Orifice de décharge à la mer - Pompe de macération. Décharge - Raccord à l'embout du passe coque de dévidage à la mer.
Consulter le diagramme de plomberie pour la méthode d'installation suggérée.

Données électriques :

Connecter l'unité à un circuit indépendant.
Consulter le tableau de données électriques pour connaître la taille de fusible et de fil.
Consulter le diagramme électrique pour les connexions.



Tableau de données électriques

TENSION	AMP	FUSIBLE	TAILLE DE FIL POUR LONGUEUR DE CONDUCTEUR EN MÈTRES*				
	TIRAGE	TAILLE	0"-10"	10"-15"	15"-25"	25"-40"	40"-60"
12 Vdc	16	20	#16(1,5)	#14(2,5)	#14(2,5)	#12(4)	#6(16)
24Vdc	8	15	#18(1)	#16(1,5)	#16(1,5)	#14(2,5)	#10(6)

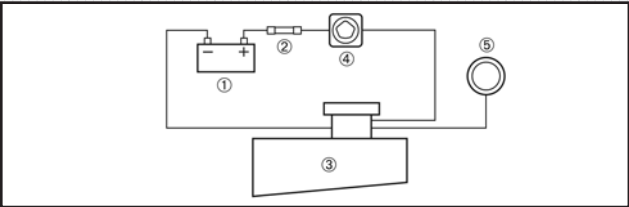
* La longueur de conducteur est la longueur totale du circuit depuis la source d'alimentation jusqu'au produit, avec retour à la terre. Les tailles de fil listées figurent en millimètres.

Entretien :

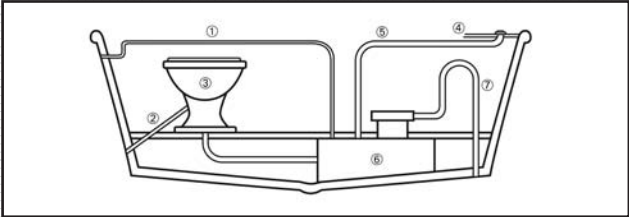
Pour maintenir le bon fonctionnement du système, il est conseiller de le rincer à l'eau propre pour évacuer tout dépôt ou débris au moins une fois par an. Pour l'entretien de la pompe de macération, consulter la section d'entretien de la fiche technique de la pompe de macération 18590 Series.

Entreposage en hiver :

Évacuer toute l'eau du système en veillant à ce qu'aucun déchet ne reste dans la tuyauterie ni dans la pompe.



LÉGENDE	DESCRIPTION
1	Batterie
2	Fusible
3	Système d'évacuation des déchets
4	Interrupteur général
5	Contrôleur du système d'évacuation des déchets



LÉGENDE	DESCRIPTION
1	Évent
2	Orifice d'entrée
3	W.C.
4	Pont
5	Décharge
6	Réservoir de collecte des déchets
7	Orifice de sortie de coude anti-siphons vertical

LÉGENDE	DESCRIPTION	N° DE PIÈCE DE KIT
1	Tube de prise d'évacuation cannelé 38 mm	38111-0000
2	Orifice d'entrée cannelé 38 mm	38111-0010
3	Évent 19 mm	38112-0000
	Évent 16 mm	38112-0010
4	Capuchon et joint torique	38115-0000
5	Réservoir	38113-0000
6	Plaque protectrice	38114-0000
7	Boîte de contrôle du réservoir	38116-0000
8	Capteur à barrettes (DéTECTEURS sous la plaque protectrice)	38117-0000
9	Macérateur 12 v	18590-2092
	Macérateur 24 v	18590-2094
	Câble de contrôle de 4,5 m	47010-0000
	Câble de contrôle de 6 m	47020-0000
	Câble de contrôle de 9 m	47030-0000
10	Tableau de contrôle 12 v	38111-0012
10	Tableau de contrôle 24 v	38111-0024

Fäkalien-Entsorgungs-System Typ III MSD

- Robuster Sammel-tank aus Polyethylen
- Schlauchstutzen für alle Schlauchanschlüsse
- Leistungsfähiger Zerkacker
- Absaugpumpe
- Dreifacher Trockenlauf- und Einschalt-schutz
- Kontrolleinheit mit Folientastatur
- Zusatzanschluss für landseitige Entleerung

PUMPENAUSFÜHRUNG

Pumpe:	trocken selbstansaugend mit flexiblem Impeller und Edelstahlverschleißplatte
Impellerwerkstoff:	Jabsco Nitril
Zerkacker:	Edelstahlmesser zerkleinert Feststoffe auf $\leq 3\text{mm}$
Dichtung:	Wellendichtring (Simmerring)
Anschluß:	Einlass 38mm Ø / 1 ½" NPT, Auslass 25mm Ø
Motor:	Permanentmagnet, gekapselt, Edelstahlwelle, mit Trockenlaufschutzvorrichtung zum Abschalten der Pumpe bei Flüssigkeitsmangel, pulverbeschichtetes Gehäuse, Endkappen und Lager abgedichtet

Systemmerkmale

Füllstandsanzeige: Bei Betätigung leuchtet die Füllstandsanzeige 1 Minute lang auf. Wenn der Tank voll ist, meldet die Anzeige dem Benutzer durch automatisches Blinken, dass der Tank zu leeren ist.

Standbymodus: Sollte die blinkende LED stören, lässt sich das System in den Standbymodus versetzen. Diesen verlässt es, wenn das System abgeschaltet oder der Füllstand im Tank erhöht wird. HINWEIS: Ab 7/8 vollem Tank ist kein Standbymodus möglich.

Entleerungsschalter: Zum Einschalten der Pumpe ist dieser Schalter 3 Sekunden lang zu drücken. Das verhindert unbeabsichtigten Betrieb.

Nivellierung: Das Nivellieren kann beim Füllen und beim Entleeren erfolgen. Hierdurch werden Bewegungen des Bootes beim Füllen des Tanks ausgeglichen; es gestattet aber auch genaues Ablesen beim Entleeren.

Trockenlaufschutz: wird innerhalb von 20 Sekunden nach dem Einschalten der Pumpe keine Flüssigkeit bewegt, schaltet sich die Pumpe ab und die Störanzeige-LED blinkt. Das schützt die Pumpe vor Beschädigung. HINWEIS: Zur Rückstellung wird einfach auf den Füllstandsknopf gedrückt. Bleibt sie abgeschaltet, weist dies auf eine Störung hin und erfordert Überprüfung der Pumpe und Schläuche auf Blockierung.

Einbau:

- 1: Der Sammel-tank ist so dicht wie möglich an der Toilette zu installieren.
- 2: Liegt die Auslassöffnung der Bordwand unter der Wasserlinie, ist ein geeignetes Seeventil zu verwenden.
- 3: Bei unter der Wasserlinie liegendem Auslass-Seeventil und Sammel-tank ist zur Vermeidung eines möglichen Saughebereffektes ein belüftetes Schwanenhalsventil vorzusehen. Bei Unsicherheit im Umgang mit einem belüfteten Schwanenhalsventil bitte einen geeigneten Servicetechniker heranziehen oder einen Partner von Jabsco fragen.
- 4: Das System auf einer soliden, ebenen Fläche montieren. Der Montage-Ort muss für das Gewicht des Systems einschl. Inhalt ausgelegt sein. Das Gesamtgewicht des Systems in befülltem Zustand kann bis über 40 kg betragen.
- 5: Die 4 mitgelieferten Montagefüße sind mit 4 geeigneten Schrauben und Scheiben zu befestigen.

Leitungen:

Jeder Tank ist wie folgt ausgestattet:

- 1 x 38mm Pumpenausgang – zum Anschluss an landseitige Entsorgungsanlage.
 - 1 x 38mm Einlass – von der Toilette
 - 1 x 76mm Inspektionsdeckel
 - 1 x 25,4mm Be-/Entlüftungsöffnung
 - 1 x 25,4mm Ablauf Zerkackerpumpe zum Seeventilaustritt oberhalb der Wasserlinie
- Einbauempfehlung: siehe Rohrleitungsplan

Elektroanschluss:

Für das System einen separaten Stromkreis verwenden.
Siehe Tabelle bezüglich Sicherung und Kabelquerschnitt.
Siehe Schaltplan bezüglich der Anschlüsse.

Kabeltabelle

Spannung	Amp	Sicherung	Kabel-Ø/m Kabel *				
			0"-10"	10"-15"	15"-25"	25"-40"	40"-60"
12 V	16	20	#16(1,5)	#14(2,5)	#14(2,5)	#12(4)	#6(16)
24V	8	15	#18(1)	#16(1,5)	#16(1,5)	#14(2,5)	#10(6)

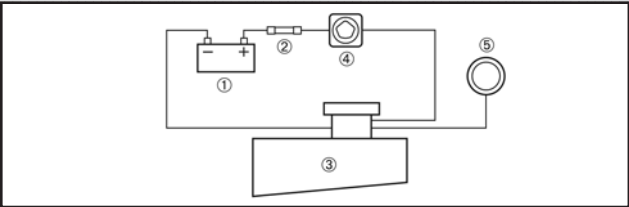
* Strecke ist die Gesamtlänge von der Stromquelle zum System und zurück zur Erdung. Die Kabelquerschnitte sind in AWG und Millimeter angegeben.

Wartung:

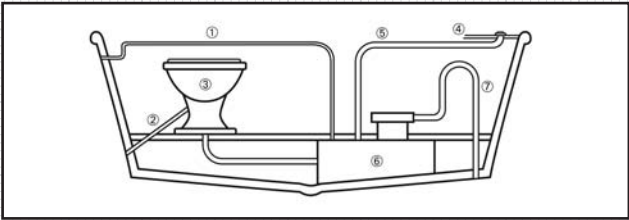
Das System sollte von Zeit zu Zeit mit klarem Wasser durchgespült werden um Schlamm und Schmutzrückstände zu entfernen. Dies sollte mindestens einmal jährlich erfolgen. Die Pflegeanweisungen für die Zershackerpumpe sind dem Datenblatt der Baureihe 18590 unter Wartung zu entnehmen.

Überwinterung:

Das gesamte System ist zu entleeren, die Leitungen und die Pumpe zu reinigen.



Pos.	Bezeichnung
1	Batterie
2	Sicherung
3	Fäkalien-Entsorgungssystem
4	Hauptschalter
5	Steuergerät für Entsorgungssystem



Pos.	Bezeichnung
1	Be-/Entlüftung
2	Einlass
3	Toilette
4	Deck
5	Pumpenausgang
6	Sammeltank
7	Vertikaler Auslass

Pos.	Bezeichnung	Art.-Nr.
1	1-1/2" (38mm) Schlauch	38111-0000
2	1-1/2" (38mm) Einlasstutzen	38111-0010
3	Be-/Entlüfter 3/4" (19mm)	38112-0000
	Be-/Entlüfter 5/8" (16mm)	38112-0010
4	Verschluss und O-Ringdichtung	38115-0000
5	Tank	38113-0000
6	Abdeckplatte	38114-0000
7	Steuerungskasten am Tank	38116-0000
8	Sensorfeld (Sensor unter der Abdeckplatte)	38117-0000
9	Zershackerpumpe 12v	18590-2092
	Zershackerpumpe 24v	18590-2094
	5,0 m Steuerkabel	47010-0000
	6,5 m Steuerkabel	47020-0000
	10 m Steuerkabel	47030-0000
10	Bedienpanel 12V	38111-0012
10	Bedienpanel 24V	38111-0024

Sistema di gestione dei rifiuti MSD Tipo III

- Robusta tanica di raccolta in polietilene
- Attacchi dentati per tutti i collegamenti dei tubi
- Maceratore per servizio gravoso
- Pompa di evacuazione
- Tre funzioni di sicurezza per funzionamento a secco e contro l'attivazione accidentale
- Pannello di comando con sistema touchpad
- Ulteriore presa di evacuazione in banchina

CARATTERISTICHE DELLA POMPA

Pompa:	girante flessibile autoadescente con piatto d'usura in acciaio inossidabile
Girante:	composto in nitrole Jabsco
Maceratore:	tritatore in acciaio inossidabile, riduce particelle massimo 3mm (1/8")
Tenuta:	a becco
Bocche:	entrata - 38mm (1,5") dentata per tubi e uscita (maschio) 1-1/2" N.P.T. - dentata per tubo 19mm (1")
Motore:	a magnete permanente, completamente racchiuso, con albero in acciaio inossidabile, comprende dispositivo di protezione in caso di funzionamento a secco che spegne la pompa. Carcassa verniciata a polvere con flange e cuscinetti sigillati

Caratteristiche del sistema

Indicazione del livello: quando viene premuto, l'indicatore del livello si illumina per 1 minuto. Quando la cassa è piena, l'indicatore lampeggia automaticamente avvisando l'utente di vuotare la cassa.

Modo "a riposo": se il LED lampeggiante disturba, l'unità può essere messa "in riposo notturno", dal quale apparirà se il sistema viene spento o il livello nella cassa aumenta. **NOTA:** l'unità non può essere messa in modo "a riposo" se la cassa è piena almeno per 7/8.

Pulsante di svuotamento: questo pulsante deve essere tenuto premuto per 3 secondi per attivare la pompa. Questo accorgimento evita la possibilità di funzionamento accidentale.

Media: vengono usati due diversi metodi di determinazione della media: uno in sede di riempimento e uno in sede di svuotamento. In tal modo viene compensato il movimento della barca quando la cassa si riempie, consentendo altresì una lettura precisa quando la cassa si vuota.

Funzione di sicurezza in caso di guasto: se non viene rilevato alcun movimento di liquido 20 secondi dopo che la pompa è stata messa in moto, la pompa si arresta e il LED di guasto lampeggia sul pannello degli indicatori. Questa funzione protegge la pompa da un guasto. **NOTA:** per reimpostare l'unità, premere il pulsante del livello. Se l'unità continua ad arrestarsi e indica un guasto, controllare la pompa e i tubi per eventuali intasamenti.

Installazione:

- 1: Collocare la cassa di raccolta il più vicino possibile alla toilet.
- 2: Se lo scarico a mare si trova sotto la linea di galleggiamento, è necessario usare una corretta presa a mare.
- 3: Se lo scarico a mare e cassa di raccolta sono poste sotto la linea di galleggiamento, deve essere installato un vented loop per evitare un possibile effetto sifone. Se non si è sicuri di come installare un vented loop, rivolgersi per assistenza a un idraulico marino o alla Jabsco per avere ulteriori dettagli.
- 4: Montare l'unità su una superficie piatta e stabile. Tenere presente che la superficie dove verrà fatta l'installazione deve sorreggere il peso dell'unità più il suo contenuto. Il peso dell'unità quando è piena può arrivare a 40 kg.
- 5: L'unità viene consegnata con 4 piedi di montaggio, che devono essere fissati alla piattaforma con 4 viti a ferro o a testa quadra per legno e 4 rondelle piatte.

Idraulica:

Ogni cassa di raccolta è dotata di:

1 x 1 1/2" scarico sul ponte - tubo di raccolta per evacuazione - collegare alla piastra sul ponte per lo scarico in banchina.

1 x 1 1/2" apertura d'entrata - dalla toilet

1 x 3" sportello d'ispezione sigillato con anello di tenuta ad "O".

1x1" Sfiato* - Collegare all'uscita dello sfiato, di solito situata in alto sullo scafo della barca vicino al parapetto superiore.

1x1" apertura di scarico in mare - pompa maceratrice. Scarico - collegare all'attacco attraverso lo scafo per lo scarico in mare.

Vedere il diagramma idraulico per l'installazione.

Parte elettrica:

Cablare l'unità in un circuito indipendente.

Per le dimensioni dei fusibili e dei fili, vedere la tabella del cablaggio.

Per le connessioni, vedere il diagramma del cablaggio.

Tabella del cablaggio

VOLT.	AMP.	DIMENSIONE		DIMENSIONE FILI IN METRI*				
		FUSIBILE	0"-10"	10"-15"	15"-25"	25"-40"	40"-60"	
12 V CC	16	20	#16(1,5)	#14(2,5)	#14(2,5)	#12(4)	#6(16)	
24V CC	8	15	#18(1)	#16(1,5)	#16(1,5)	#14(2,5)	#10(6)	

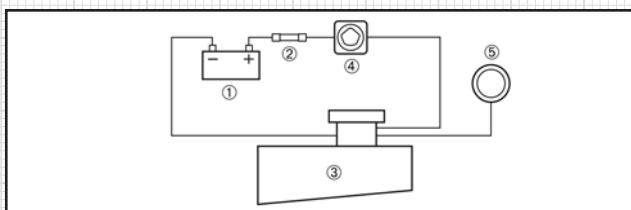
* La lunghezza del percorso è la lunghezza totale del circuito dalla fonte di energia al prodotto e di nuovo alla messa a terra. Dimensioni dei fili elencate sono in calibro AWG e in millimetri metrici.

Manutenzione:

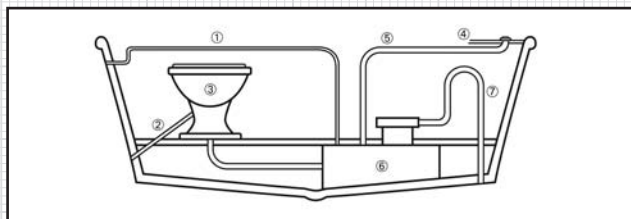
Per mantenere l'unità in buone condizioni d'esercizio, lavare con acqua pulita per rimuovere ogni accumulo di sporco e detriti. Si consiglia di fare questo lavaggio almeno una volta all'anno. Per la manutenzione della pompa del maceratore, vedere il foglio informativo Maceratore Serie 18590, Sezione Manutenzione.

Rimessa per l'inverno:

Vuotare tutta l'acqua dall'intero sistema, verificando che i tubi e la pompa siano completamente privi di rifiuti.



RIFERIMENTO	DESCRIZIONE
1	Batteria
2	Fusibile
3	Sistema di gestione dei rifiuti
4	Interruttore principale
5	Unità di controllo del sistema di gestione dei rifiuti



RIFERIMENTO	DESCRIZIONE
1	Sfiato
2	Entrata
3	Toilet
4	Ponte
5	Scarico pompa
6	Tazza di raccolta dei rifiuti
7	Uscita verticale loop

RIFERIMENTO	DESCRIZIONE	CODICE KIT
1	1-1/2" Tubo di raccolta dentato	38111-0000
2	1-1/2" Porta d'entrata dentata	38111-0010
3	Sfiato 3/4"	38112-0000
	Sfiato 5/8"	38112-0010
4	Tappo e anello di tenuta a "O"	38115-0000
5	Serbatoio	38113-0000
6	Pannello kick	38114-0000
7	Scatola di controllo sul serbatoio	38116-0000
8	Gruppo di sensori (Sensori sotto il pannello kick)	38117-0000
9	Maceratore 12v	18590-2092
	Maceratore 24v	18590-2094
	Cavo di controllo, 4,5 metri	47010-0000
	Cavo di controllo, 6 metri	47020-0000
	Cavo di controllo, 9 metri	47030-0000
10	Pannello di controllo 12v	38111-0012
10	Pannello di controllo 24v	38111-0024

Vuilwatersysteem type III MSD

- Robuuste polyethyleen opvangbak
- Alle slangkoppelingen voorzien van draad fittingen
- Zware versnijderpomp
- Afvoerpomp
- Drie beveiligingen tegen drooglopen en ongewilde activering
- Touchpad bedieningspaneel
- Extra afvoerbuis aan walkant

KENMERKEN VAN DE POMP

Pomp:	zelfaanzuigende buigzame impeller met roestvrijstalen slijtplaat
Impeller:	Jabsco nitril compound
Versnijderpomp:	roestvrijstalen hakker reduceert tot deeltjes van max. 3 mm (1/8")
Afsluiting:	liptype
Aansluitingen:	inlaat: 38 mm (1-1/2") draadfitting – uitlaat: 38 mm (1-1/2") N.P.T. (mannetje) 19 mm (1") draadfitting
Motor:	permanente magneetmotor, volledig ingesloten, roestvrijstalen as, voorzien van droogloop beveiliging die de pomp uitschakelt. Gepoedercoate behuizing met afgedichte eindafdekplaten en lagers.

Kenmerken van het systeem:

Vulindicator: na indrukken blijft de vulindicator gedurende 1 minuut branden. Als de tank vol raakt, begint de indicator automatisch te knipperen om de gebruiker te waarschuwen dat de tank moet worden leeggemaakt

Slaapmodus: als het knipperende ledje stopt, kan de eenheid in slaapmodus worden gezet. Als het systeem wordt afgezet of het tankniveau wordt verhoogd, komt de eenheid uit de slaapmodus. **OPMERKING:** de eenheid kan niet in slaapmodus worden gezet als de tank 7/8 of meer gevuld is.

Doortrekknop: om de pomp in te schakelen, houd u deze knop 3 seconden ingedrukt. Deze beveiliging voorkomt ongewilde inwerkingstelling.

Middeling: er zijn twee verschillende methoden voor niveaumiddeling gebruikt - een voor vullen en een voor legen. Hiermee worden de bewegingen van de boot gecompenseerd als de tank wordt gevuld en is een nauwkeurige aflezing toch nog mogelijk bij legen.

Veilig bij defect: als er gedurende 20 seconden nadat de pomp is ingeschakeld geen vloeistofbeweging wordt gemeten, wordt de pomp uitgeschakeld en springt het storingsledje aan op het indicatorpaneel. Dit beschermt de pomp tegen storingen. **OPMERKING:** Om de eenheid te resetten, drukt u gewoon op de niveaunknop; als de eenheid buiten werking blijft en een storingsmelding blijft geven, moet u controleren of de pomp en het afvoersysteem niet verstopt zijn.

Installatie:

- 1: De vultank moet zo dicht mogelijk bij het toilet worden gemonteerd.
- 2: Als de afvoer door de scheepsrump onder de waterlijn ligt, is een goede buitenboordafsluiter nodig.
- 3: Indien zowel de afvoer door de scheepsrump als de vultank onder de waterlijn worden gemonteerd, moet een ontluhtingspijp worden aangebracht om te vermijden dat er een hevelwerking ontstaat. Raadpleeg een specialist of neem contact op met Jabsco voor verdere details als u niet vertrouwd bent met het installeren van een ontluhtingspijp.
- 4: Op een stevig, vlak oppervlak monteren. Denk eraan dat het installatieoppervlak het gewicht van de eenheid en de inhoud moet kunnen ondersteunen. Bij een volle tank kan het totaalgewicht van deze eenheid oplopen tot ca. 41 kg.
- 5: 4 montagepoten worden meegeleverd. Deze moeten met 4 zware schroeven en platte sluitringen op het platform worden gemonteerd..

Installatie:

Elke tank is voorzien van het volgende:

- 1 x 1½" dekpomp uit - afvoeropnamebuis – te monteren op uitpompdekplaat aan walkant
 - 1 x 1½" inlaataansluiting - van toilet
 - 1 x 3" inspectieluik met O-ring afdichting
 - 1 x 1" afvoer* - aan te sluiten op afvoeropening die doorgaans bovenaan de scheepsrump zit bij het dolboord.
 - 1 x 1" overboord afvoeraansluiting - versnijderpomp. Afvoer - aan te sluiten op de huiddoorvoer in de scheepsrump.
- Zie Loodgietersschema voor voorgestelde Installatie.

Elektrisch:

Sluit de eenheid aan op een onafhankelijk stroomcircuit.
Raadpleeg de bedradingstabel voor informatie over de zekering en de kabels.
Raadpleeg het bedradingsschema voor aansluitingen.

Bedradingstabel

SPANNING	MAX.		KABEL PER VOET SERIELENGTE**				
	STROOM	ZEKERING	0"-10"	10"-15"	15"-25"	25"-40"	40"-60"
12 V gelijkstroom	16	20	#16(1,5)	#14(2,5)	#14(2,5)	#12(4)	#6(16)
24 V gelijkstroom	8	15	#18(1)	#16(1,5)	#16(1,5)	#14(2,5)	#10(6)

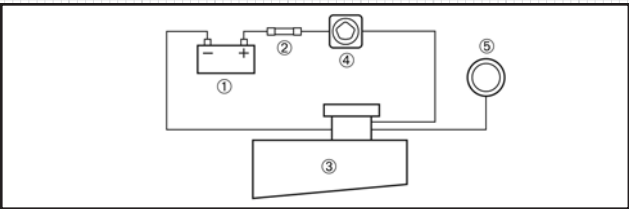
* De serielengte is de totale lengte van het circuit vanaf de stroombron tot aan het product en terug naar het aardpunt. De kabeldiktes zijn aangegeven in AWG-dikte en in millimeter.

Onderhoud:

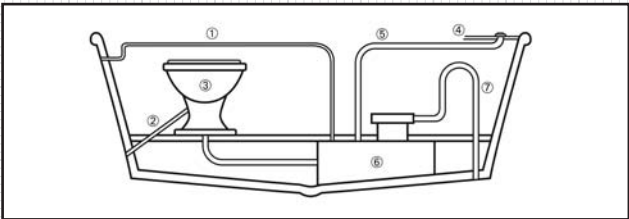
Spoel het systeem met schoon water om het in goede werking te houden en eventuele vervuiling van bezinsel of afzetting te verwijderen. Aanbevolen wordt dit minstens een keer per jaar te doen. Voor onderhoud van versnijderpomp: zie onder Onderhoud op het gegevensblad van de 18590 serie versnijderpomp.

Winterberging:

Verwijder al het water uit het volledige systeem en zorg ervoor dat het leidingwerk en de pomp inwendig helemaal schoon zijn.



LEGENDE	BESCHRIJVING
1	Batterij
2	Zekering
3	Vuilwatersysteem
4	Hoofdschakelaar
5	Regelaar voor afvalverwerkingssysteem



LEGENDE	BESCHRIJVING
1	Afvoer
2	Inlaat
3	Toilet
4	Dekplaat
5	Wegpompen
6	Vuilwater tank
7	Verticale uitloop

LEGENDE	BESCHRIJVING	ARTIKELNUMMER KIT
1	1-1/2" draad afvoertule	38111-0000
2	1-1/2" draad inlaattule	38111-0010
3	Afvoer 3/4"	38112-0000
	Afvoer 5/8"	38112-0010
4	Kap- en O-ring	38115-0000
5	Tank	38113-0000
6	Stootpaneel	38114-0000
7	Bedieningspaneel op tank	38116-0000
8	Sensoren	38117-0000
	(sensoren onder stootpaneel)	
9	Versnijder 12 V	18590-2092
	Versnijder 24 V	18590-2094
	Bedieningskabel - 15 voet	47010-0000
	Bedieningskabel - 20 voet	47020-0000
	Bedieningskabel - 30 voet	47030-0000
10	Bedieningspaneel 12 V	38111-0012
10	Bedieningspaneel 24 V	38111-0024

Typ III MSD- avfallshanteringssystem

- Stark septiktank av polyetylen
- Hullingförsedda kopplingar för alla slanganslutningar
- Kraftfull maceratorpump
- Evakueringspump
- Tre säkerhetsfunktioner för torrkörning och oavsiktlig aktivering
- Kontrollpanel för avfallshantering med tryckkänslig knappsats
- Ytterligare evakueringsutsug vid kajen

PUMPFUNKTIONER

Pump:	Självsugande flexibel impeller med slitplåt av rostfritt stål
Impeller:	Jabsco-nitrilblandning
Macerator:	Kniv av rostfritt stål reducerar partikelstorleken till max. 3 mm (1/8 tum)
Packning:	Läpptätning
Portar:	Intag – 38 mm (1,5 tum) slanghulling och 38 mm (1,5 tum) N.P.T. (hane) Uttag – 19 mm (1 tum) slanghulling
Motor:	Permanentmagnet, helt innesluten, axel av rostfritt stål, inkluderar skyddsanordning mot torrkörning som slår av pumpen. Pulverbelagt hus med förseglade slutbälgar och lager

Systemfunktioner

Nivåindikator: När du trycker på nivåindikatorn tänds den 1 minut. När tanknivån är full blinkar indikatorn automatiskt för att varna användaren om att tanken bör tömmas.

Viloläge: Om den blinkande lysdioden är störande kan enheten sättas i viloläge. Enheten lämnar viloläge om systemet slås av eller om nivån i tanken stiger. OBS! Enheten kan inte gå i viloläge om tanken är mer än 7/8 full.

Tömningsknapp: Du måste hålla denna knapp nedtryckt i 3 sekunder för att aktivera pumpen. Detta eliminerar risken för oavsiktlig drift.

Medelvärdesberäkning: Två olika metoder för beräkning av medelvärden används – en vid påfyllning och en vid tömning. Detta kompenserar för båtens rörelser när tanken fylls och tillåter en noggrann avläsning vid tömning.

Felsäkerhetsfunktion: Om ingen vätskerörelse registreras 20 sekunder efter det att pumpen har slagits på, slås den av och dioden för felindikering på indikatorpanelen börjar blinka. Detta skyddar mot skador på pumpen. OBS! Enheten återställs helt enkelt genom att du trycker på nivåknappen. Om enheten fortsätter att slås av och anger feltillstånd, ska du kontrollera att pumpen och rören inte är tilltäppta.

Installation:

- 1: Septiktanken bör vara så nära toaletten som möjligt.
- 2: En bottenförskruvning krävs om evakueringsöppningen genom skrovet är under vattenlinjen.
- 3: Om både evakueringen genom skrovet och septiktanken är under vattenlinjen, måste ett ventilerat kretslopp (med ventilerad böj) installeras för att förhindra att en potentiell hävert skapas. Om du inte vet hur ett ventilerat kretslopp installeras, konsultera en båtrörläggare eller kontakta Jabsco för ytterligare detaljer.
- 4: Montera på en stark flat yta. Notera att installationsområdet måste kunna bära upp vikten av enheten och dess innehåll. När enheten är full kan dess totalvikt uppgå till 41 kg.
- 5: 4 monteringsfötter medföljer. Dessa måste fästas vid plattformen med 4 maskin- eller rundhuvudsskruvar med flata brickor.

Rörläggning:

Varje har följande tillbehör:

1 x 1½ tums uttag för däckpump - Evakueringsslang – Anpassad till pumpdäcksplåt på kajen.

1 x 1½ tums intagsport – Från toalettssystem

1 x 3 tums O-ring förseglad med inspektionslucka

1 x 1 tums ventil* - Anslut till ventiluttaget som sitter högt på båtskrovet nära relingen.

1 x 1 tums port för utpumpning överbord - Maceratorpump. Utpumpning – anslut till skruvförbindningen för pumpning överbord genom skrovet.

Se rörläggningsschemat för installationsförlägg.

El:

Dra ledningar i enheten som en fristående strömkrets.
Konsultera ledningstabellen för säkrings- och ledningsstorlek.
Konsultera ledningsdiagrammet för anslutningar. .

Ledningstabell

SPÄNNING	AMPERE- SÄKRINGS-		LEDNINGSSTORLEK PER LEDNINGSLÄNGD*				
	FÖRBRUKNING	STORLEK	0"-10"	10"-15"	15"-25"	25"-40"	40"-60"
12 V likström	16	20	#16(1,5)	#14(2,5)	#14(2,5)	#12(4)	#6(16)
24 V likström	8	15	#18(1)	#16(1,5)	#16(1,5)	#14(2,5)	#10(6)

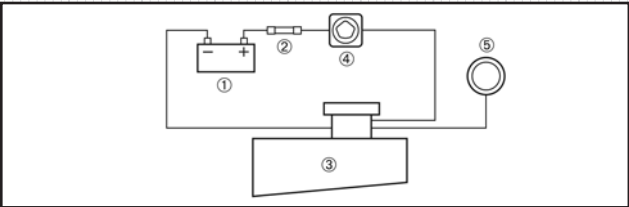
* Med ledningslängd avses kretsens totala längd från kraftkällan till produkten och tillbaka till jord. Ledningsstorlekarna listas som AWG-mått och i millimeter.

Underhåll:

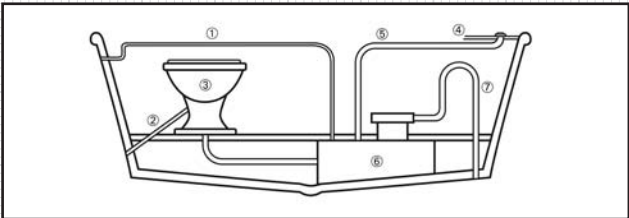
För att hålla systemet i gott skick ska det spolas rent med vatten för att avlägsna slam- och smutsavlagringar. Vi rekommenderar att denna process utförs minst en gång om året. För maceratorpumpunderhåll se underhållsavsnittet på databladet för maceratorn i serien 18590.

Vinterförvaring:

Töm allt vatten från systemet och se till att rör och pump inte innehåller avfallsprodukter.



POS.	BESKRIVNING
1	Batteri
2	Säkring
3	Avfallshanteringssystem
4	Huvudströmbrytare
5	Styrenhet för avfallshanteringssystem



POS.	BESKRIVNING
1	Ventil
2	Intag
3	Toalett
4	Däck
5	Utpumpning
6	Avfallshålltank
7	Vertikalt kretsloppsuttag

POS.	BESKRIVNING	ARTIKELNUMMER
1	1-1/2 tums hullingförsedd pickup-rör	38111-0000
2	1-1/2 tums hullingförsedd intagsport	38111-0010
3	Ventil 3/4 tum	38112-0000
	Ventil 5/8 tum	38112-0010
4	Lock och o-ring	38115-0000
5	Tank	38113-0000
6	Sparkplåt	38114-0000
7	Styrenhet på tanken	38116-0000
8	Sensorer (sensorer under sparkplåten)	38117-0000
9	Macerator 12 V	18590-2092
	Macerator 24 V	18590-2094
	15-fots styrkabel	47010-0000
	20-fots styrkabel	47020-0000
	30-fots styrkabel	47030-0000
10	Kontrollpanel 12 V	38111-0012
10	Kontrollpanel 24 V	38111-0024



Sistema de gestión de residuos MSD Tipo III

- Tanque de retención de polietileno resistente
- Conexiones acanaladas para todas las mangueras
- Macerador para servicio pesado
- Bomba de evacuación
- Tres funciones de seguridad contra funcionamiento en seco y activación accidental
- Panel de control táctil de gestión de residuos
- Recolector de evacuación adicional para muelle

CARACTERÍSTICAS DE LA BOMBA

Bomba:	Impulsor flexible autocebante y placa de desgaste de acero inoxidable
Rotor:	Compuesto de nitrilo Jabsco
Macerador:	Cuchilla de acero inoxidable que reduce el tamaño de las partículas a un máximo de 3 mm
Retén/Sello:	Tipo de labio
Lumbreras:	Entrada – Acanalada para manguera de 38 mm y NPT de 1-1/2" (macho) salida – Acanalada para manguera de 19 mm
Motor:	Tipo de imán permanente, hermético, con eje de acero inoxidable. Incluye dispositivo contra funcionamiento en seco que apaga la bomba. Carcasa con recubrimiento pulvimetalúrgico, campanas de extremo y cojinetes sellados

Características del sistema

Indicación de nivel: El indicador de nivel se ilumina durante 1 minuto cuando se pulsa. Cuando el tanque está lleno, el indicador destella automáticamente a fin de alertar al usuario para que lo vacíe.

Modo de sueño: Si el destello del LED es molesto, la unidad se puede poner en modo de sueño. La unidad sale de este modo si se apaga el sistema o aumenta el nivel en el tanque. NOTA: no es posible poner la unidad en modo de sueño si el tanque está lleno a 7/8 de su capacidad o más.

Botón de vaciado: Debe pulsarse y mantenerse oprimido este botón durante 3 segundos para activar la bomba. De esta forma se elimina la posibilidad de operación accidental.

Promediación: Se usan dos métodos de promediación de nivel diferentes —uno durante el llenado y otro durante el vaciado. De esta forma se compensa el movimiento de la embarcación cuando el tanque se está llenando y se permite al mismo tiempo una lectura exacta durante el vaciado.

Función de seguridad a prueba de fallas: Si no se detecta movimiento de fluido 20 segundos después de ponerse en marcha la bomba, ésta se apaga y destella el LED de falla del panel de indicadores. De esta forma se protege la bomba contra fallas. NOTA: Para restablecer la unidad, pulse simplemente el botón de nivel. Si la unidad continúa apagada y con indicación de falla, revise la bomba y las tuberías para detectar posibles obstrucciones.

Instalación:

- 1: El tanque de retención se debe colocar tan cerca del inodoro como sea posible.
- 2: Si la descarga a través del casco está ubicada debajo de la línea de flotación, se requiere un grifo de fondo apropiado.
- 3: Si tanto la descarga a través del casco como el tanque de retención están instalados debajo de la línea de flotación, se debe instalar un bucle venteado (curva antisifón) para evitar que se cree potencialmente un sifón. Si no está familiarizado con la instalación del bucle venteado, consulte a un plomero marino o a Jabsco para obtener más detalles.
- 4: Móntelo sobre una superficie plana resistente. Tenga en cuenta que el área de instalación debe soportar el peso de la unidad más el de su contenido. El peso total de esta unidad cuando está llena puede llegar a 41 kg.
- 5: Se proveen 4 patas de montaje. Las mismas deben fijarse a la plataforma con 4 tornillos para metal o tirafondos y arandelas planas.

Tuberías y accesorios:

Cada tanque está equipado con lo siguiente:

Salida de bomba de cubierta de 25 x 28 mm – Tubo recolector de evacuación – para fijar a la placa de cubierta de salida de la bomba de muelle.

Lumbrera de entrada de 25 x 38 mm – proveniente del sistema del inodoro

Escotilla de inspección de 25 x 76 mm sellada con junta tórica

Venteo de 25 x 25 mm* - para conectar a la salida de venteo ubicada generalmente en un lugar alto del casco de la embarcación cerca de la borda.

Lumbrera de descarga al mar de 25 x 25 mm – bomba del macerador.

Descarga – para conectar a la conexión de descarga al mar a través del casco.

Vea la instalación sugerida en el diagrama de tuberías.

Sistemas eléctricos:

Cablee la unidad en un circuito independiente.

Consulte las especificaciones de tamaño de fusibles y cables en la tabla de cableado.

Para conocer las conexiones, consulte el diagrama de cableado.

Tabla de cableado

VOLTAGE	AMPERAJE	TAMAÑO DEL FUSIBLE	TAMAÑO DEL CABLE SEGÚN LOS PIES DE RECORRIDO*				
			0"-10"	10"-15"	15"-25"	25"-40"	40"-60"
12 VCC	16	20	#16(1,5)	#14(2,5)	#14(2,5)	#12(4)	#6(16)
24 VCC	8	15	#18(1)	#16(1,5)	#16(1,5)	#14(2,5)	#10(6)

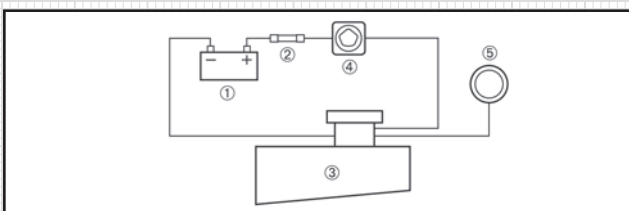
* La longitud del recorrido es la longitud total del circuito desde la fuente de alimentación hasta el producto y de retorno a tierra. Los tamaños de cable indicados están en calibres AWG y milímetros.

Mantenimiento:

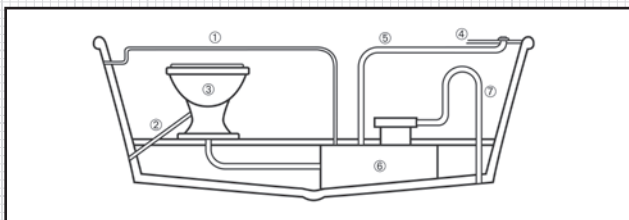
Para mantener el sistema en buen estado de funcionamiento, lávelo con agua limpia para eliminar toda acumulación de lodo o desechos. Se recomienda realizar este proceso al menos una vez al año. En relación con el servicio de la bomba del macerador, consulte la sección Servicio de la hoja de datos del Macerador Serie 18590.

Almacenamiento durante el invierno:

Vacíe el agua de todo el sistema asegurándose de que las tuberías y la bomba queden totalmente libres de residuos.

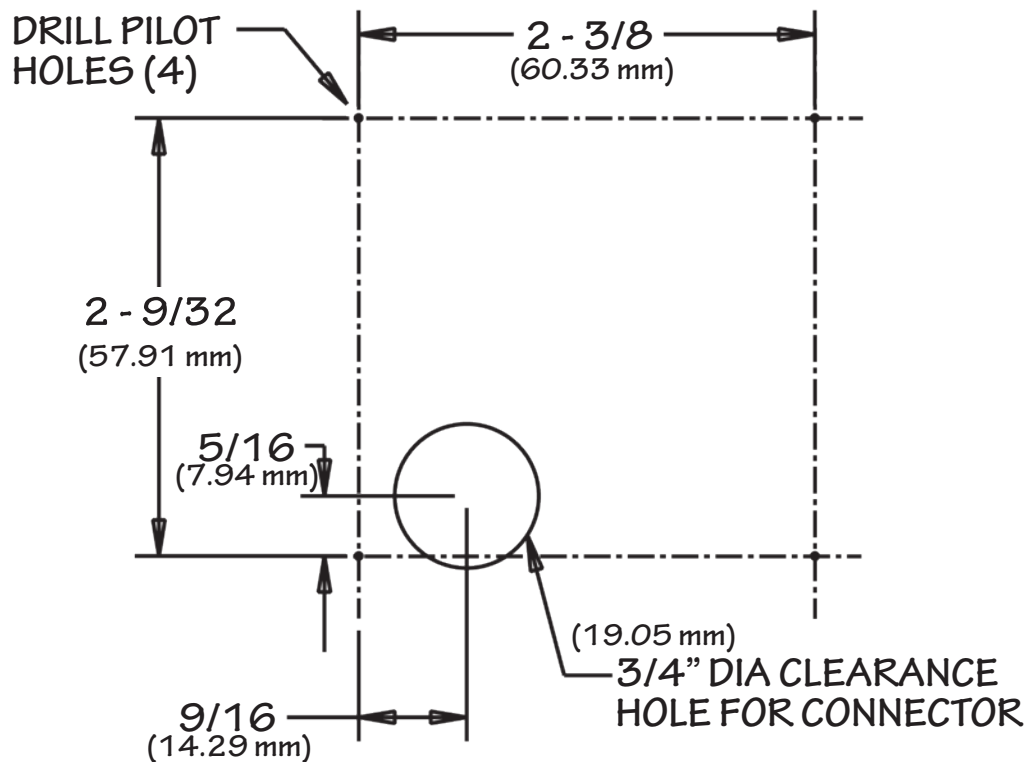
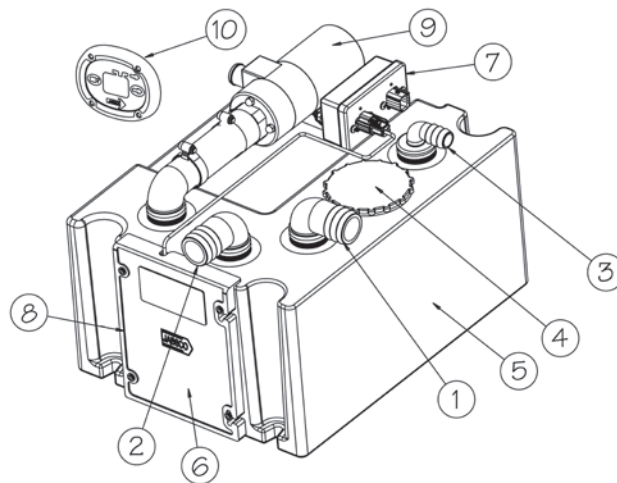
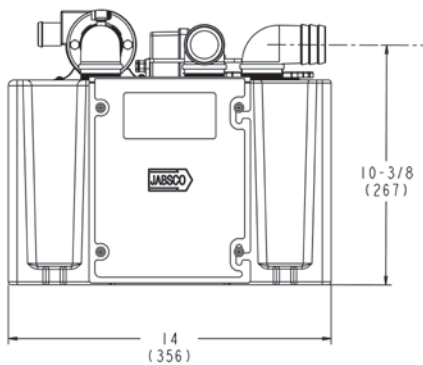
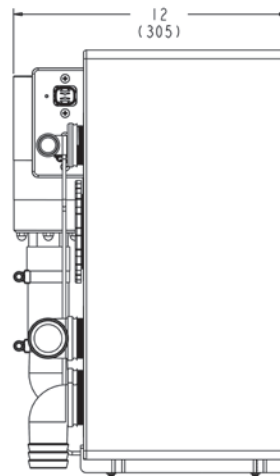
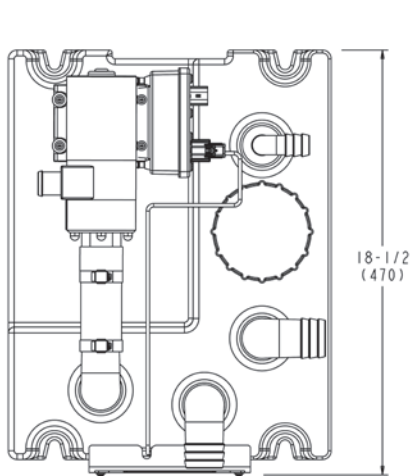


REF.	DESCRIPCIÓN
1	Batería
2	Fusible
3	Sistema de gestión de residuos
4	Interruptor maestro
5	Controlador del sistema de gestión de residuos



REF.	DESCRIPCIÓN
1	Ventoe
2	Entrada
3	Inodoro
4	Cubierta
5	Salida de la bomba
6	Tanque de retención de residuos
7	Salida del bucle vertical

REF.	DESCRIPCIÓN	Nº DE PIEZA DEL JUEGO
1	Tubo recolector acanalado de 1-1/2" (38 mm)	38111-0000
2	Lumbrera de entrada acanalada de 1-1/2" (38 mm)	38111-0010
3	Ventoe de 3/4" (19 mm)	38112-0000
	Ventoe de 5/8" (16 mm)	38112-0010
4	Tapa y junta tórica	38115-0000
5	Tanque	38113-0000
6	Zócalo	38114-0000
7	Caja de control del tanque	38116-0000
8	Arreglo de sensores (sensores debajo del zócalo)	38117-0000
9	Macerador para 12 V	18590-2092
	Macerador para 24 V	18590-2094
	Cable de control de 4,5 m	47010-0000
	Cable de control de 6 m	47020-0000
	Cable de control de 9 m	47030-0000
10	Panel de control para 12 V	38111-0012
10	Panel de control para 24 V	38111-0024



CONTROL PANEL MOUNTING TEMPLATE

DISCOVER JABSCO'S COMPLETE RANGE OF WASTE SYSTEM PRODUCTS

DELUXE FLUSH ELECTRIC TOILETS

Designed to rival the comforts at home, the Jabsco Deluxe Flush combines sleek elegance along with the features required of a luxury marine toilet.

50840/50820 Series



TWIST 'N' LOCK™ MANUAL TOILET



NEW!

Twist 'N' Lock™ action safety handle provides a quick and easy lock that ensures a solid seal during your voyage.

29090-3000

NEW! DIAPHRAGM WASTE PUMPS

Heavy Duty Diaphragm Pump passes solids easily and quietly for maximum efficiency in emptying holding tanks.

50890 Series



RUN DRY MACERATOR PUMP

Now with a fully sealed motor and a more powerful chopping blade.

The four bladed chopper prevents clogging.

18590 Series



QUIET FLUSH ELECTRIC TOILETS

Designed to dramatically reduce noise levels, Quiet Flush Electric Toilets make life on board more comfortable for all crew members, even those sleeping!

37045/37245 Series



NEW! Y- VALVE



Robust Y-Valve allows waste to be pumped overboard or into a holding tank.

45490 Series



Engineered for life

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The products described herein are subject to the Jabsco one year limited warranty, which is available for your inspection upon request.

Les produits décrits ci-dessous bénéficient de la garantie limitée d'un an de Jabsco, que vous pouvez consulter sur simple demande.

Die nachstehend beschriebenen Produkte unterliegen einer einjährigen Gewährleistung. Die Gewährleistungsbedingungen können bei Jabsco angefordert werden.

I prodotti qui descritti sono coperti dalla garanzia Jabsco limitata di un anno, disponibile per la visione su richiesta.

De hierin beschreven producten worden aangeboden met de beperkte Jabsco garantie van één jaar. Deze is op aanvraag verkrijgbaar ter inzage.

För produkterna som beskrivs nedan utfärdar Jabsco ett års begränsad garanti, som vi kan skicka till dig på begäran.

Los productos descritos en este folleto están respaldados por la garantía limitada de Jabsco por un año, que está disponible para su lectura a pedido.

JABSCO®



50890



- GB** Waste Pump
- FR** Pompe d'eaux usées
- DE** Fäkalienpumpe
- IT** Pompa di scarico
- NL** Afvoerpomp
- SE** Tömningspump
- ES** Bomba para desechos



Jabsco



ITT Industries
Engineered for life

JABSCO®

Waste Pump

Robust Single Diaphragm Design

GB

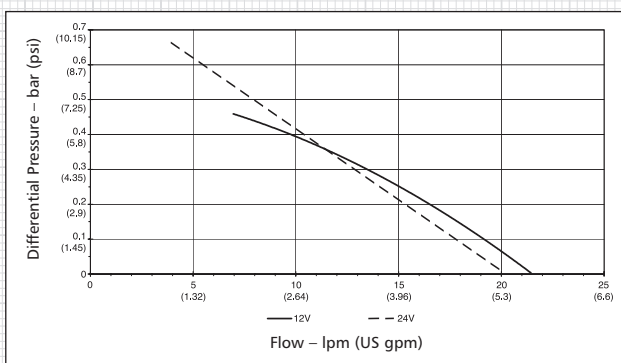
Features

- Flexible installation
- No filter required
- Compact and simple design
- Self-priming to 3m (10ft)
- 12v and 24v variants
- Dry running capability
- Connections for 38mm (1½") ports
- Up to 19 lpm (5 US gpm) flow

Specifications

- Suction Lift: 3 meters (10ft)
- Relevant Standards:
 - ISO 8846 MARINE and USCG Regulations for Ignition Protection
 - ISO 8849 MARINE Bilge Pump Standard
- Built to ISO 15083 Specification
- Meets BSEN 50081 (Electro Magnetic Compatibility)

Performance Curve



Installation

- The Jabsco Waste Pump is self priming up to 3m (10ft).
- Uses multi positional ports for easy mounting of the pump.
- If mounted vertically the motor should be above the pump head.
- Use rubber grommets provided to absorb vibration.
- Plumbing Connections: Use 38mm (1½") ID, non-collapsible waste type suction hose.
- Connect the hose to inlet and outlet of pump using two stainless steel hose clamps at both ends.
- All suction connections must be airtight and free of sharp bends or restrictions.



WARNING: The Discharge thru-hull may be positioned below the waterline only if the discharge hose has a vented loop at least 20cm (8") above the waterline at all angles of heel or trim.



WARNING: Do not use any Jabsco pump for petrol, petroleum products or any products with a flash point below 37°C (98°F), explosion or death may occur.

Operation

The dc motor is suitable for intermittent duty and should not be run for more than 30 minutes continuously.

Maintenance

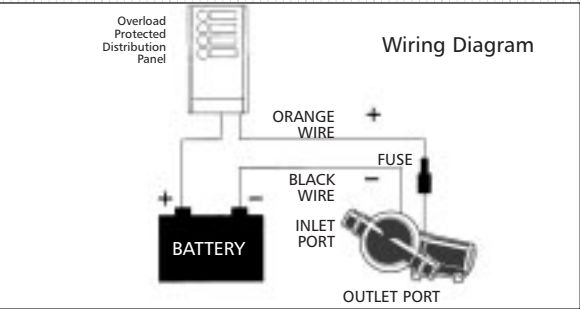


WARNING: Always disconnect pump from power supply.

Check all electrical connections periodically, particularly in salt water areas. Corrosion can cause loss of performance or non-operation in extreme cases. The motor should be protected with a corrosion inhibiting spray and any rust should be removed and the motor repainted.

Wiring Instructions

- Make all electrical connections in dry locations; connections in humid environments should be sealed to prevent corrosion.
- Protect the circuit with a rated fuse or circuit breaker in the red positive (+) lead as close as possible to the power source.
- Connect the black motor wire to the negative (-) battery terminal.
- Inadequate voltage at the motor terminals when the pump is running (not less than 10% below rated voltage at full load) due to partially discharged batteries or insufficient cable size may result in blowing fuses, failure to start or poor pump performance.



Model No	Voltage	Max Current	Max Fuse Size	Wiring size*		
				AWG	mm ²	Max. Length
50890-1000	12V	8A	10A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)
50890-1100	24V	2.5A	5A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)

*for longer installations, fit thicker cables



WARNING: If the fuse fails repeatedly do not fit a heavier fuse or bridge the fuse terminals with silver paper or metal wire. Failure to observe this instruction may result in a fire hazard due to overheating of cables.

Ensure sterilization of wet end before disassembly.

Rotation of Pump Head

(See diagrams on inside back cover)

1. Push down on clip and remove end cover
2. Internal bolt heads now exposed
3. Undo all four mounting bolts
4. Remove bolts and grasp motor unit firmly
5. Rotate pump head to desired position
6. Example of pumps rotational capabilities
7. Replace all 4 internal bolts and secure tightly
8. Replace end cover

Rotation of Ports

(See diagrams on inside back cover)

1. Undo clamp using allen key
2. Remove clamp
3. Rotate port unit to desired location
4. Example of pumps rotational capabilities
5. Replace clamp and tighten until firmly secure

Pompe d'eaux usées

Modèle résistant à diaphragme unique

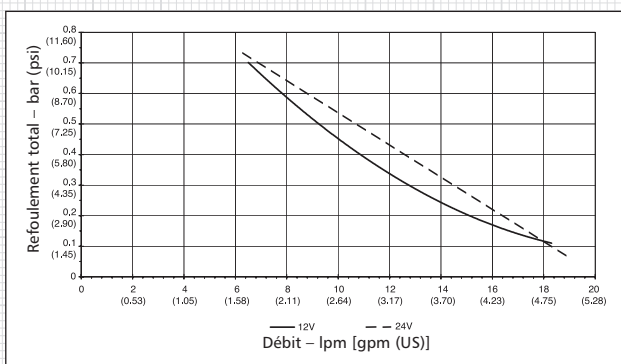
Caractéristiques

- Flexibilité d'installation
- Ne nécessite pas l'emploi de filtre
- Modèle compact et simple
- Auto-amorçante jusqu'à 3 mètres
- Disponibles à 12 v et 24 v
- Capacité de fonctionnement à vide
- Raccords pour tuyaux de 38 mm
- Débit maximum de 19 l/minute

Spécifications

- Hauteur d'aspiration : 3 mètres
- Normes applicables :
 - ISO 8846 MARINE et réglementation de l'USCG (antidéflagrante)
 - ISO 8849 MARINE - Normes pour les pompes de cale
- Spécification de la fabrication conforme à l'ISO 15083
- Conformité BSEN 50081 (compatibilité électromagnétique)

Courbe de performances



Installation

- La pompe d'eaux usées Jabsco s'amorce automatiquement jusqu'à 3 mètres.
- Les orifices à positions variables facilitent le montage de la pompe.
- Si la pompe est montée verticalement, le moteur doit se trouver au-dessus de la tête de pompe.
- Utiliser les silent-blocs pour absorber les vibrations.
- Raccordement : utiliser un tuyau armé pour eaux usées, de 38 mm Ø int.
- Raccorder le tuyau à l'entrée et à la sortie de la pompe en installant deux colliers en acier inoxydable sur les deux raccords.
- Tous les raccords d'aspiration doivent être étanches et ne présenter aucun coude ou obstruction.



AVERTISSEMENT : ne pas placer le passe coque de sortie au-dessous de la ligne de flottaison (sauf si le tuyau de refoulement est équipé d'un col de cygne avec Air Vent qui culmine à 20 cm minimum au-dessus de la ligne de flottaison).



AVERTISSEMENT : on ne doit pas utiliser une pompe Jabsco avec de l'essence, des produits pétroliers ou tout produit ayant un point d'éclair inférieur à 37°C, faute de quoi on s'expose à des risques d'explosion ou d'accident mortel.

Utilisation

Le moteur c.c. est étudié pour des applications intermittentes : on ne doit pas l'utiliser en continu pendant des période de plus de 30 minutes.

Maintenance



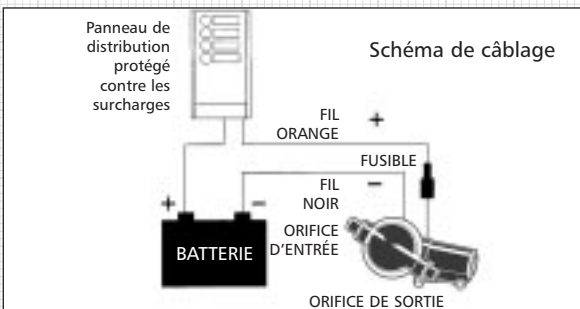
AVERTISSEMENT : on doit toujours couper l'alimentation électrique de la pompe.

Vérifier périodiquement tous les raccordements électriques, en particulier en milieux salins. Dans des cas extrêmes, la corrosion risque d'affecter le rendement ou la mise hors service. Il est nécessaire de protéger le moteur avec un inhibiteur de corrosion et d'enlever les moindres traces de rouille avant de repeindre le moteur.

FR

Instructions pour le câblage

- Effectuer tous les raccordements électriques dans un lieu sec ; les raccordements effectués dans un environnement humide doivent être scellés afin d'empêcher la corrosion.
- Protéger le circuit en plaçant un fusible à courant nominal approprié ou un coupe-circuit dans le fil positif (+) le plus près possible de la source d'alimentation.
- Raccorder le fil noir du moteur sur le pôle négatif (-) de la batterie.
- La présence d'une tension insuffisante aux bornes du moteur, lorsque la pompe est en marche (avec une tension non inférieure à 10% de la tension nominale à pleine charge), produit par l'épuisement partiel des batteries ou de la taille insuffisante du câble, risque de faire sauter les fusibles, d'empêcher le démarrage ou d'entraîner le mauvais fonctionnement de la pompe.



Model No	Tension	Puissance consommée maxi	Taille maxi du fusible	Taille des conducteurs*		
				AWG	mm ²	Longueur maxi
50890-1000	12V	8A	10A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)
50890-1100	24V	2.5A	5A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)

Pour des installations plus longues, utiliser des câbles de section plus important



AVERTISSEMENT : si le fusible saute à plusieurs reprises, on ne doit pas installer un fusible à courant supérieur ni monter en pont les bornes de fusible avec du papier métallique ou un fil métallique. L'observation de cette instruction comporte un risque d'incendie à cause de la surchauffe des câbles.

Vérifier la stérilisation de la partie humide avant le démontage.

Rotation de la tête de la pompe

(cf. schémas sur l'intérieur du revers)

1. Appuyer sur la pince et enlever le couvercle
2. Les têtes de boulon internes sont maintenant exposées
3. Défaire les quatre boulons de montage
4. Enlever les boulons et tenir fermement l'ensemble du moteur
5. Tourner la tête de la pompe sur la position désirée
6. Exemple de capacités rotatives des pompes
7. Remonter les 4 boulons internes, en les serrant à fond
8. Remonter le couvercle

Rotation des orifices

(cf. schémas sur l'intérieur du revers)

1. Défaire la fixation avec la clé mâle
2. Enlever la fixation
3. Tourner l'orifice de la pompe sur la position désirée
4. Exemple de capacités rotatives des pompes
5. Remonter la fixation puis serrer à fond

Fäkalienpumpe

Robustes Design mit Einfachmembran

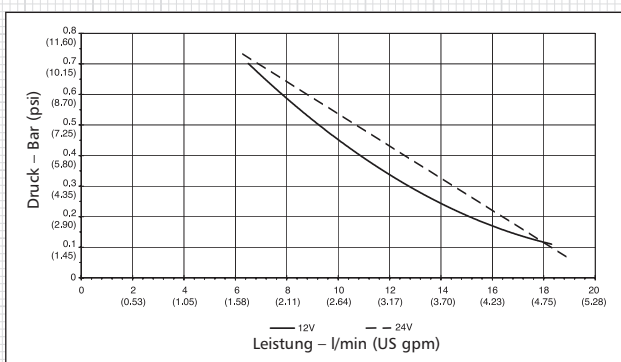
Hauptmerkmale

- Flexible Installation
- Kein Filter erforderlich
- Kompakte und einfache Konstruktion
- Trocken Selbstansaugend bis zu 3m
- Erhältlich für 12 Volt und 24 Volt
- Trockenlaufsicher
- Anschlüsse 38mm
- Leistung bis zu 19 l/min

Spezifikation

- Saughöhe: 3 Meter
- Normen:
 - ISO 8846 MARINE und USCG Regulations for Ignition Protection
 - ISO 8849 MARINE Bilge Pump Standard
- Konstruktion entsprechend ISO 15083 Spezifikation
- Entspricht BSEN 50081 (EMV)

Leistungskurve



Einbauder Pumpe

- Die Fäkalienpumpe von Jabsco ist bis zu 3 Metern trocken selbstansaugend.
- Leichtere Installation der Pumpe durch verstellbare Anschlüsse.
- Wenn die Pumpe vertikal montiert wird, muss sich der Motor über dem Pumpenkopf befinden.
- Zur Schwingungsdämpfung die mitgelieferten Gummifüße verwenden.
- Spiralverstärkten, für Fäkalien geeigneten festen Saugschlauch mit einem Innendurchmesser von 38mm verwenden.
- Den Schlauch am Pumpeneinlass und – auslass befestigen und jeweils mit zwei Edelstahl-Schlauchklammern an beiden Enden sichern.
- Alle Sauganschlüsse müssen luftdicht sein und dürfen keine Knicke oder Blockierungen aufweisen.



ACHTUNG: Das Abpumpen durch den Rumpf darf nur dann unterhalb der Wasserlinie erfolgen, wenn der Schlauch über ein belüftbares Schwanenhalsventil verfügt, das bei jedem Krängungs- oder Trimmwinkel mindestens 20 cm über der Wasserlinie liegt.



ACHTUNG: Jabsco-Pumpen nicht für Benzin, Erdölprodukte oder andere Produkte mit einem Flammpunkt unter 37°C benutzen, da sonst Explosions- oder Lebensgefahr besteht.

Betrieb

Der Gleichstrommotor ist für den Kurzzeitbetrieb geeignet und sollte nicht länger als 30 Minuten im Dauerbetrieb laufen.

Wartung



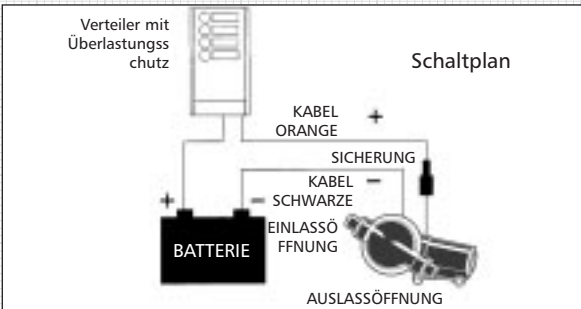
ACHTUNG: Immer die Pumpe vom Stromnetz trennen!

Alle elektrischen Anschlüsse in regelmäßigen Abständen überprüfen, dies gilt vor allem in Salzwasserbereichen. Korrosion kann zu Leistungsverlust oder in extremen Fällen zu einem Ausfall der Pumpe führen. Der Motor sollte mit einem korrosionshemmenden Spray geschützt werden; rostige Stellen müssen entfernt und der Motor neu gestrichen werden.

DE

Verdrahtungsanleitungen

- Alle elektrischen Anschlüsse müssen in einer trockenen Umgebung vorgenommen werden; Anschlüsse in nassen Umgebungen müssen abgedichtet werden, um Korrosion zu verhindern.
- Die Schaltung muss mit einer ausreichend dimensionierten Sicherung oder einem Überlastschalter in der roten positiven (+) Leitung so nahe wie möglich an der Stromquelle geschützt werden.
- Das schwarze Kabel an den negativen (-) Batteriepol anschließen.
- Eine unzureichende Spannung an den Motorklemmen bei laufender Pumpe (nicht weniger als 10% unter Nennspannung bei voller Belastung) aufgrund teilweise entladener Batterien oder einer unzureichenden Kabelgröße kann zu einem Durchbrennen der Sicherungen, zu Anlaufproblemen oder zu mangelnder Pumpleistung führen.



Modell Nr.	Spannung	Max Amp Stromentnahme	Max Sicherungsgsgröße	Kabelquerschnitt*		
				AWG	mm ²	Max. Länge
50890-1000	12V	8A	10A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)
50890-1100	24V	2.5A	5A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)

* Bei längeren Installationen dickere Kabel benutzen



ACHTUNG: Wenn die Sicherung immer wieder durchschlägt, keine stärkere Sicherung montieren oder die Sicherungsklemmen mit Silberpapier oder Metaldraht überbrücken. Ein Missachten dieser Anweisung kann zu Brandgefahr aufgrund überhitzter Kabel führen.

Sicherstellen, dass das die produktberührten Teile vor dem Auseinanderbau sterilisiert werden.

Drehung des Pumpenkopfs

(Siehe Abbildungen hinten auf der Innenklappe)

1. Die Klammer herunterdrücken und die Endabdeckung abnehmen
2. Die inneren Schraubenköpfe sind jetzt zugänglich
3. Alle vier Befestigungsschrauben lösen
4. Die Schrauben entfernen und die Motoreinheit fest in den Griff nehmen
5. Den Pumpenkopf in die gewünschte Position drehen
6. Beispiel für die Drehkapazität der Pumpe
7. Alle 4 Schrauben wieder anbringen und fest anziehen
8. Die Endabdeckung wieder anbringen

Drehung der Öffnungen

(Siehe Abbildungen hinten auf der Innenklappe)

1. Die Klammer mit einem Innensechskantschlüssel lösen
2. Die Klammer entfernen
3. Die Anschlüsse in die gewünschte Position drehen
4. Beispiel für Drehkapazität der Pumpe
5. Klammer wieder anbringen und fest anziehen

Afvoerpomp

Robuust Eénmembraan Ontwerp

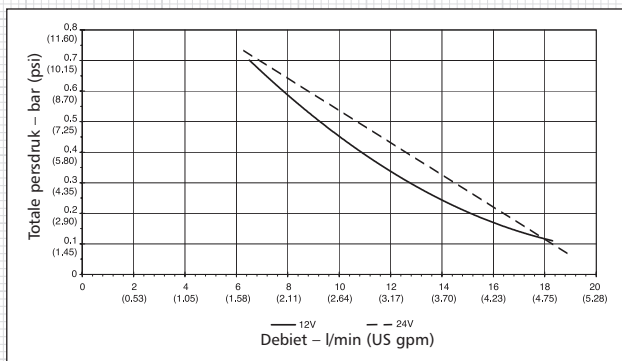
Kenmerken

- Flexibele installatie
- Geen filter vereist
- Compacte en eenvoudige vormgeving
- Zelfaanzuigend tot 3m
- 12V en 24V modellen
- Droogloopvermogen
- Aansluitingen voor 38mm poorten
- Debiet maximaal 19 l/min

Specificaties

- Aanzuighoogte: 3 meter
- Van toepassing zijnde normen:
 - ISO 8846 MARINE en USCG voorschriften voor explosieveiligheid
 - ISO 8849 MARINE Lenspompnorm
- Gebouwd conform ISO 15083 Specificatie
- Voldoet aan BSEN 50081 (electromagnetische compatibiliteit)

Prestatiekromme



Installatie

- De Jabsco afvoerpomp is zelfaanzuigend tot 3m.
- Gebruik van de meerstandenpoorten vereenvoudigt de montage van de pomp.
- Bij verticale montage moet motor boven pompkop staan.
- Gebruik meegeleverde rubber ringen voor het absorberen van trilling.
- Pijpaansluitingen: Gebruik 38mm ID voor afvalwater geschikte niet-inknijsbare zuigslang.
- Slang m.b.v. een RVS slangklemmen op elke in-en uitlaat van pomp aansluiten.
- Alle zuigaansluitingen moeten luchtdicht en vrij van scherpe bochten of vernauwingen zijn.



WAARSCHUWING: De door de huid lopende uitlaat mag alleen onder de waterlijn aangebracht worden mits de uitlaatslang, onder alle ligging- of helling-hoeken, te allen tijde een bocht met ontluchting tenminste 20cm boven de waterlijn heeft.



WAARSCHUWING: Nooit een Jabsco pomp gebruiken voor benzine, aardolieproducten of enig product met een vlampunt onder 37°C daar dit explosie met de dood tot gevolg kan hebben.

Bedrijf

De gelijkstroommotor is bedoeld voor onderbroken gebruik en mag nooit langer dan 30 minuten continu draaien.

Onderhoud



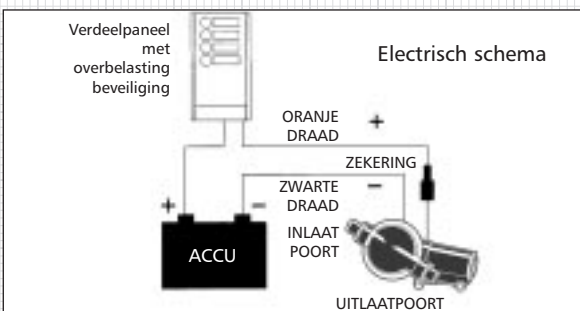
WAARSCHUWING: Pomp altijd van de stroombron losmaken.

Alle elektrische aansluitingen periodiek controleren, speciaal in de nabijheid van zeewater. Corrosie kan lager rendement en in extreme gevallen, uitvallen van de pomp tot gevolg hebben. De motor is met een speciaal corrosiewerend middel behandeld. Mocht er onverhoopt toch roestvorming opkomen, deze verwijderen en de motor opnieuw verven.

NL

Electrische aansluitingen

- Alle elektrische werkzaamheden onder droge omstandigheden uitvoeren; aansluitingen in vochtige ruimten moeten verzegeld worden om corrosie te voorkomen.
- Circuit beveiligen met een zekering of automaat van de juiste waarde aan de rode positieve (+) kabel en zo dicht mogelijk bij de stroombron.
- De zwarte motorkabel aansluiten aan de negatieve (-) accuklem.
- Onvoldoende spanning op de motorklemmen tijdens draaien van de pomp (niet lager dan 10% onder nominale spanning onder volle belasting) als gevolg van gedeeltelijk ontladen accu's of kabels van te kleine doorsnede, kan doorbranden van zekeringen, startweigering of laag pomprendement tot gevolg hebben.



Model Nr	Spanning	Max stroom-verbruik	Max zekering-waarde	Draaddoorsnede*		
				AWG	mm ²	Max. Lengte
50890-1000	12V	8A	10A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)
50890-1100	24V	2.5A	5A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)

* Bij overschrijding van de max. lengte, dikkere kabels monteren.



WAARSCHUWING: Als de zekering herhaaldelijk doorbrandt, nooit een sterkere zekering aanbrengen of de zekering overbruggen met zilverpapier of metaaldraad. Niet opvolgen van deze aanwijzing kan brandgevaar als gevolg van oververhitting van labels tot gevolg hebben.

Vóór demontage verzekeren dat natte einde gesteriliseerd wordt.

Draaien van pompkop

(Zie afbeeldingen aan binnenzijde van achteromslag)

1. Clip induwen en einddeksel afnemen
2. Inwendige boutkoppen nu zichtbaar
3. Alle vier montagebouten losmaken
4. Bouten uitnemen en motordeel stevig vastgrijpen
5. Pompkop in gewenste stand draaien
6. Voorbeeld van verschillende pompstanden
7. Alle 4 inwendige bouten weer monteren en stevig aandraaien.
8. Einddeksel terugzetten

Draaien van poorten

(Zie afbeelding aan binnenzijde van achteromslag)

1. Klem met inbussleutel loszetten
2. Klem afnemen
3. Poort in gewenste stand draaien
4. Voorbeeld van verschillende poortstanden
5. Klem terugzetten en stevig aandraaien.

Pompa di scarico

Robusto design a singola membrana

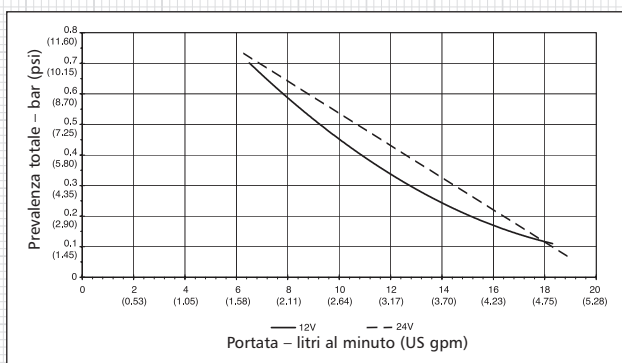
Caratteristiche

- Flessibilità di installazione
- Nessuna necessità di filtro
- Design semplice e compatto
- Autoadescante fino a 3m
- Modelli da 12 e da 24volt
- Capacità di funzionamento a secco
- Raccordi per sbocchi da 38mm
- Portata fino a 19 litri al minuto

Specifiche tecniche

- Altezza di aspirazione: 3 metri
- Normativa applicabile:
 - ISO 8846 MARINE e Norme USCG per la protezione contro l'accensione
 - ISO 8849 MARINE per pompe di sentina
- Realizzate ai sensi della ISO 15083
- Conforme alla BSEN 50081 (compatibilità elettromagnetica)

Curva delle prestazioni



Installazione

- La pompa di scarico Jabsco è autoadescante fino a un'altezza di 3m.
- Utilizzare gli sbocchi multi-posizionali per un facile montaggio della pompa.
- Se la pompa viene montata in posizione verticale, il motore dovrà essere disposto al di sopra della testa della stessa.
- Usare gli appositi gommini per assorbire le vibrazioni.
- Collegamenti idraulici: usare 1 manichetta di aspirazione non pieghevole con diametro interno di 38mm.
- Collegare la manichetta agli attacchi di entrata e di uscita della pompa usando due collari di acciaio inossidabile su entrambe le estremità.
- Tutti i collegamenti situati sul lato di aspirazione dovranno essere a tenuta stagna e privi di curve brusche o restringimenti.



AVVERTENZA: Lo scarico a mare potrà essere posizionato sotto la linea di galleggiamento soltanto se il tubo di scarico è corredato di sifone situato almeno 20cm sopra la linea di galleggiamento in tutti gli angoli di assetto e di inclinazione trasversale.



AVVERTENZA: NON usare le pompe Jabsco con benzina, petrolio o altri prodotti con punto di infiammabilità inferiore ai 37°C in quanto ciò potrebbe provocare esplosioni o morte

Funzionamento

Il motore a corrente continua è idoneo al regime intermittente e non dovrà essere azionato per più di 30 minuti alla volta.

Manutenzione

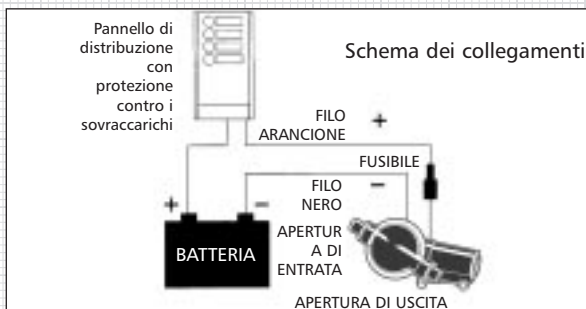


AVVERTENZA: *Staccare sempre la pompa dall'alimentazione elettrica.*

Controllare periodicamente tutti i collegamenti elettrici, soprattutto nelle zone affette da acqua di mare. La corrosione può infatti provocare perdite di rendimento o, in casi estremi, il mancato funzionamento. Il motore dovrà essere protetto con uno spray anticorrosione, avendo cura di eliminare tutte le eventuali tracce di ruggine e di riverniciare il motore.

Istruzioni di cablaggio

- Effettuare tutti i collegamenti elettrici in luoghi asciutti. I collegamenti realizzati negli ambienti umidi dovranno essere opportunamente sigillati per evitare la corrosione.
- Proteggere il circuito con fusibile nominale o con un interruttore di circuito nel filo rosso positivo (+) il più vicino possibile alla fonte di alimentazione.
- Collegare il filo nero del motore al terminale negativo (-) della batteria.
- L'insufficienza di tensione in corrispondenza dei terminali del motore con la pompa in funzione (a non meno del 10% sotto la tensione nominale a pieno carico) dovuta alle batterie parzialmente scariche o a dimensioni insufficienti dei cavi potrebbe provocare lo scatto dei fusibili, il mancato avviamento o lo scarso rendimento della pompa.



N° modello	Tensione	Consumo massimo	Dimensioni Massime fusibile	Dimensioni fili*		
				AWG	mm ²	Lunghezza massima
50890-1000	12V	8A	10A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)
50890-1100	24V	2.5A	5A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)

* Per le installazioni più lunghe impiegare cavi di dimensioni più grosse



AVVERTENZA: *Se il fusibile continua a guastarsi, non montarne uno più grande o collegare i terminali a carta argentata o filo metallico. La mancata osservazione di questo requisito potrebbe costituire pericolo d'incendio per via del surriscaldamento dei cavi.*

Prima di procedere allo smontaggio, verificare che l'estremità bagnata sia stata sterilizzata.

Rotazione della testa della pompa

(Vedere i diagrammi riportati nella ribalta interna)

1. Spingere in giù il fermaglio e smontare il coperchio posteriore
2. A questo punto saranno esposte le teste dei bulloni interni
3. Allentare tutti e quattro i bulloni di fissaggio
4. Smontare i bulloni e afferrare fermente l'unità motore
5. Far ruotare la testa della pompa fino a raggiungere la posizione desiderata
6. Esempio delle capacità rotatorie della pompa
7. Rimontare tutti e 4 i bulloni interni e stringerli a fondo
8. Rimontare il coperchio posteriore

Rotazione delle aperture

(Vedere i diagrammi riportati nella ribalta interna)

1. Allentare il collare usando una chiave a brugola
2. Togliere il collare
3. Far ruotare l'apertura fino a raggiungere la posizione desiderata
4. Esempio delle capacità rotatorie della pompa
5. Rimontare il collare e stringerlo a fondo

JABSCO®**SE**

Tömning- spump

**Robust membranpump
för tömning av
septiktank.**

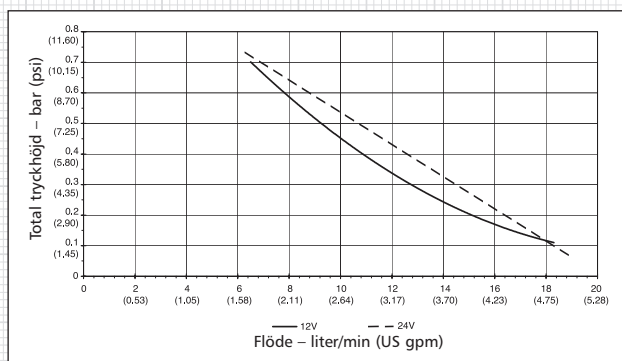
Särdrag

- Flexibel installation
- Inget behov av filter
- Kompakt och enkel design
- 12V och 24V utförande
- Torrkörningssäker
- 38mm anslutningar
- Flöde 19 liter/min

Specificationer

- Sughöjd 3 m
- Gällande normer
 - ISO 8846 MARIN och USCG förordningar för antändningsskydd
 - ISO 8849 MARIN länpumpstandard
- Byggt enligt ISO 15083 specifikation
- Stämmer med BSEN 50081 (elektromagnetisk lämplighet)

Prestationskurva



Installation

- Justerbart pumphus för att underlätta pumpens placering.
- Vid vertikal montering ska motorn vara ovanför pumphuvudet.
- Använd medföljande gummigenomföringar för att dämpa vibrationer.
- Spiralarmerad slang rekommenderas med 38 mm innerdiameter.
- Slangen ansluts till in- och utlopp på pumpen med två rostfria slangklämmor i varje ände.
- Alla anslutningar måste vara lufttäta och fria från vassa krökar eller hinder.



WARNING! Utloppet genom skrovet får bara placeras nedanför vattenlinjen om utloppsslangen har en ventilerad slinga minst 20 cm ovanför vattenlinjen i alla vinklar vid slagsida eller på rätt köl.



WARNING! Använd inte någon Jabsco pump till bensin, petroleumprodukter eller produkter med en flampunkt under 37°C, då det kan medföra explosionsrisk och livsfara.

Användning

Motorn är konstruerad för intermittent drift, kontinuerligt drift 30 minuter.

Underhåll

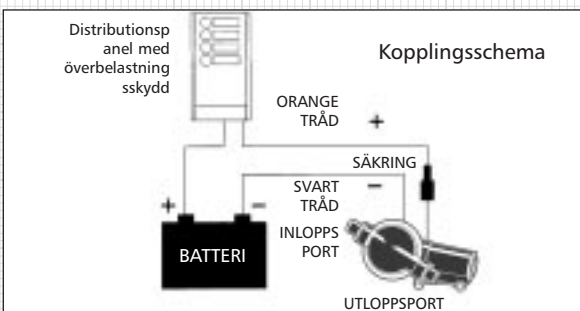


VARNING! Koppla alltid loss ifrån strömförsörjningen innan demontering.

Kontrollera alla elektriska anslutningar regelbundet, i synnerhet i saltvattenområden. Korrosion kan leda till försämrad funktion eller ingen funktion alls i extrema fall. Motorn bör skyddas med korrosionsskyddande spray, eventuell rost ska avlägsnas och motorn målas om.

El - anslutning

- Gör alla elektriska anslutningar på torra platser. Anslutningar i fuktig miljö måste förseglas för att förhindra korrosion.
- Skydda kretsen med en lämplig säkring eller kretsbrytare i den röda pluskabeln (+) så nära strömkällan som möjligt.
- Anslut den svarta motorkabeln till batteriets minuspol (-).
- För låg spänning vid motorklämmorna (minst 10% under märkspänningen vid full belastning) på grund av att batterierna är urladdade eller fel kabel area kan leda till att säkringar smälter, pumpen inte vill starta eller att den fungerar dåligt. Montera kraftigare kablar vid längre kabelinstallationer.



Modell nr	Volttal	Max. strömförbrukning	Max. säkringsstorlek	Kabelstorlek*		
				AWG	mm ²	Max. längd
50890-1000	12V	8A	10A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)
50890-1100	24V	2.5A	5A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)

* Montera tjockare kablar vid längre installationer



VARNING! Om säkringen går gång på gång, montera då inte in en kraftigare säkring eller överbrygga säkringspolerna med silverpapper eller metalltråd. Om denna instruktion inte följs kan det medföra brandrisk på grund av överhettade kablar.

In och utlopp måste steriliseras före demontering.

Pumphuvudets rotation

(Se scheman på omslagets insida)

1. Tryck ned klämman och tag bort ändplattan
2. De inre bulthuvudena friläggs då
3. Lossa alla fyra monteringsbultarna
4. Tag bort bultarna och grip stadigt tag i motorn
5. Vrid pumphuvudet till önskad position
6. Exempel på pumprotation
7. Sätt tillbaka de 4 inre bultarna och drag åt ordentligt
8. Sätt tillbaka ändplattan

Portarnas rotation

(Se scheman på omslagets insida)

1. Lossa klammern med insexnyckel
2. Tag bort klammern
3. Vrid porten till önskat läge
4. Exempel på pumprotation
5. Sätt tillbaka klammern och drag fast den ordentligt

JABSCO®**ES**

Bomba para desechos

De diafragma único de diseño sólido

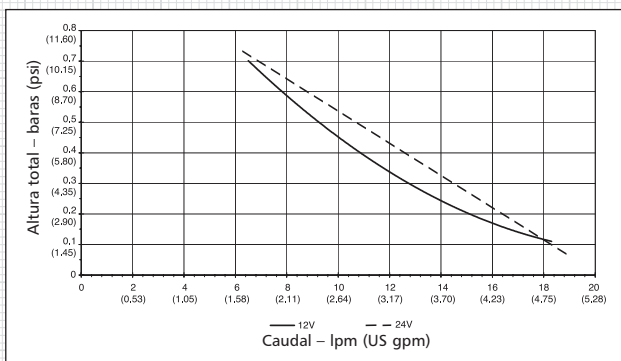
Características

- Instalación flexible
- No requiere filtro
- Diseño compacto y simple
- Autocebadora hasta 3m
- Variantes de 12v y 24v
- Capacidad para funcionar en seco
- Conexiones para puertos de 38mm
- Caudal de hasta 19 lpm

Especificaciones

- Altura de aspiración: 3 metros
- Estándares pertinentes:
 - ISO 8846 MARINO y Reglamentos USCG para Protección contra Incendio
 - ISO 8849 MARINO Norma sobre bombas de sentina
- Construida de conformidad con la especificación ISO 15083
- Cumple la norma BSEN 50081 (Compatibilidad Electromagnética)

Curva de prestaciones



Instalación

- La bomba de Jabsco para desechos es autocebadora hasta 3 m.
- Utilice puertos con posiciones múltiples para la instalación fácil de la bomba.
- Si el montaje es vertical, el motor debería estar por encima de la cabeza de la bomba.
- Utilice las arandelas aislantes de caucho provistas para absorber la vibración.
- Conexiones de tuberías: Utilice una manguera no aplastable para aspiración de desechos con un diámetro interno de 38 mm.
- Conecte la manguera a la entrada y a la salida de la bomba utilizando dos grapas de acero inoxidable en ambos extremos.
- Todas las conexiones de aspiración deben ser estancas al aire y no deberán tener codos agudos ni restricciones.



ADVERTENCIA: La descarga por el casco se podrá colocar por debajo de la línea de flotación sólo si la manguera de descarga cuenta con un bucle venteado al menos a 20 cm por encima de la línea de flotación en todos los ángulos de escoraje o asiento.



ADVERTENCIA: No utilice ninguna bomba Jabsco para gasolina, productos de petróleo ni para ningún producto con un punto de inflamación por debajo de 37°C ya que ello podría causar explosiones o muerte.

Funcionamiento:

El motor CC es para funcionamiento intermitente y no se deberá hacer funcionar continuamente durante más de 30 minutos.

Mantenimiento



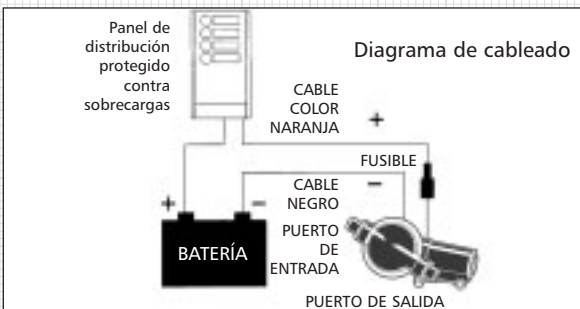
ADVERTENCIA: Siempre desconecte la bomba del suministro eléctrico.

Controle todas las conexiones eléctricas periódicamente, en particular en las zonas de agua salada. La corrosión puede causar pérdida de prestaciones de la bomba y en casos extremos interrupción total del funcionamiento. Se deberá proteger el motor con un rocío inhibidor de corrosión y se deberá retirar cualquier oxidación y volver a pintar el motor.

ES

Instrucciones para el cableado

- Todas las conexiones eléctricas se deberán hacer en un lugar seco. Las conexiones en entornos húmedos se deberán sellar para impedir la corrosión.
- Proteja el circuito con un fusible de intensidad nominal o disyuntor en el cable rojo positivo (+) tan cerca de la fuente de potencia como sea posible.
- Conecte el cable negro del motor al terminal negativo (-) de la batería.
- La tensión inadecuada en los terminales del motor cuando la bomba está funcionando (no inferior a 10% por debajo de la tensión nominal durante plena carga) debido a baterías parcialmente descargadas o tamaño insuficiente del cable podrían resultar en fusibles quemados, fallos del arranque o prestaciones inadecuadas de la bomba.



Modelo No.	Tensión	Toma máx. (amp)	Tamaño máx. del fusible	Tamaño de cableado*		
				AWG	mm ²	Longitud máx.
50890-1000	12V	8A	10A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)
50890-1100	24V	2.5A	5A	14	2.5	4.5m (15ft)
				14	2.5	9.0m (30ft)

** Para instalaciones más largas, utilice cables de mayor gros.



ADVERTENCIA: Si el fusible falla varias veces no coloque un fusible de mayor potencia ni pantee los terminales del fusible con papel de plata o cable de metal. En caso de no acatarse esta instrucción podría haber un peligro de incendio debido a recalentamiento de los cables.

Asegure la esterilización del extremo húmedo antes del desarmado.

Giro de la cabeza de la bomba

(Vea los diagramas en el interior de la cubierta trasera)

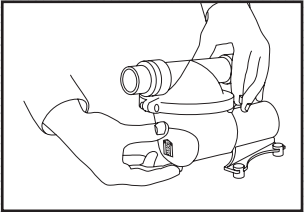
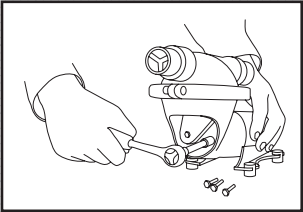
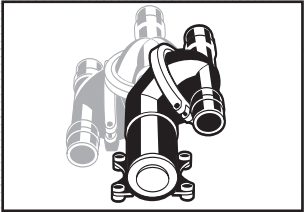
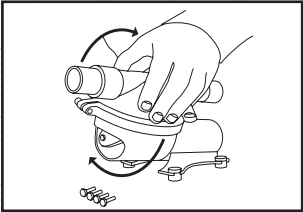
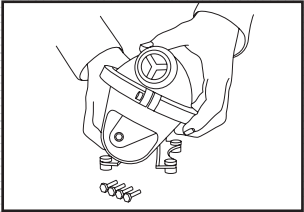
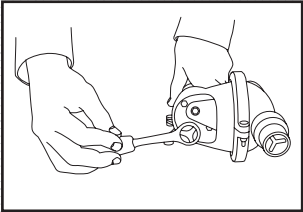
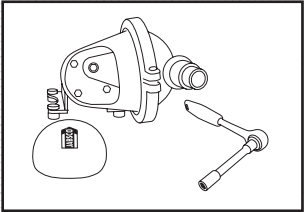
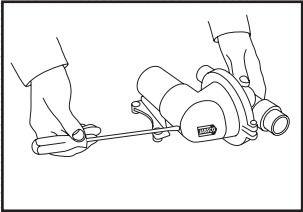
1. Empuje la abrazadera hacia abajo y retire la tapa en el extremo.
2. Las cabezas de los pernos internos quedarán expuestas ahora.
3. Afloje los cuatro pernos de montaje.
4. Retire los pernos y sostenga la unidad del motor firmemente.
5. Gire la cabeza de la bomba a la posición deseada.
6. Ejemplos de la capacidad de rotación de las bombas.
7. Vuelva a colocar los 4 pernos internos y apriételos firmemente.
8. Vuelva a colocar la tapa.

Rotación de los puertos

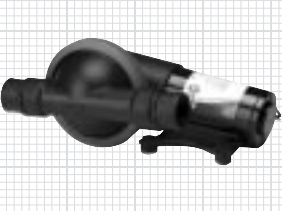
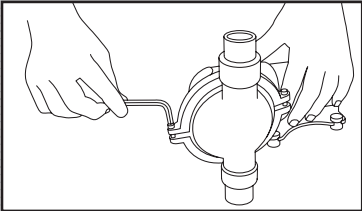
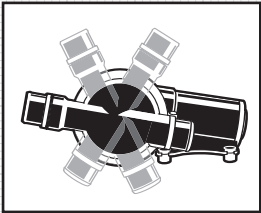
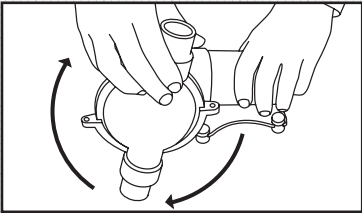
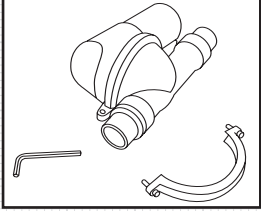
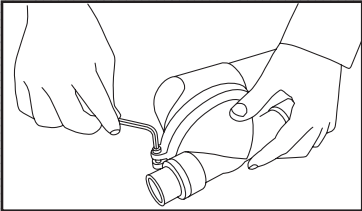
(Vea los diagramas en el interior de la cubierta trasera)

1. Afloje la abrazadera utilizando la llave Allen.
2. Retire la abrazadera.
3. Gire la unidad de los puertos a la posición deseada.
4. Ejemplos de la capacidad de rotación de las bombas.
5. Vuelva a colocar la abrazadera y apriétela hasta que esté firmemente asegurada.

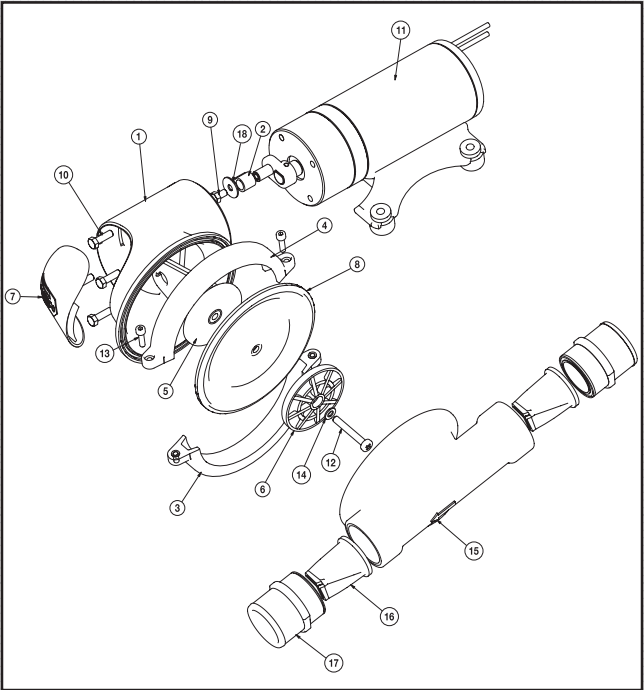
Rotation of Pump Head



Rotation of Ports



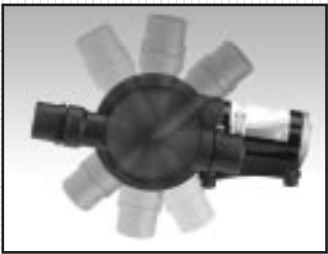
EXPLODED VIEW



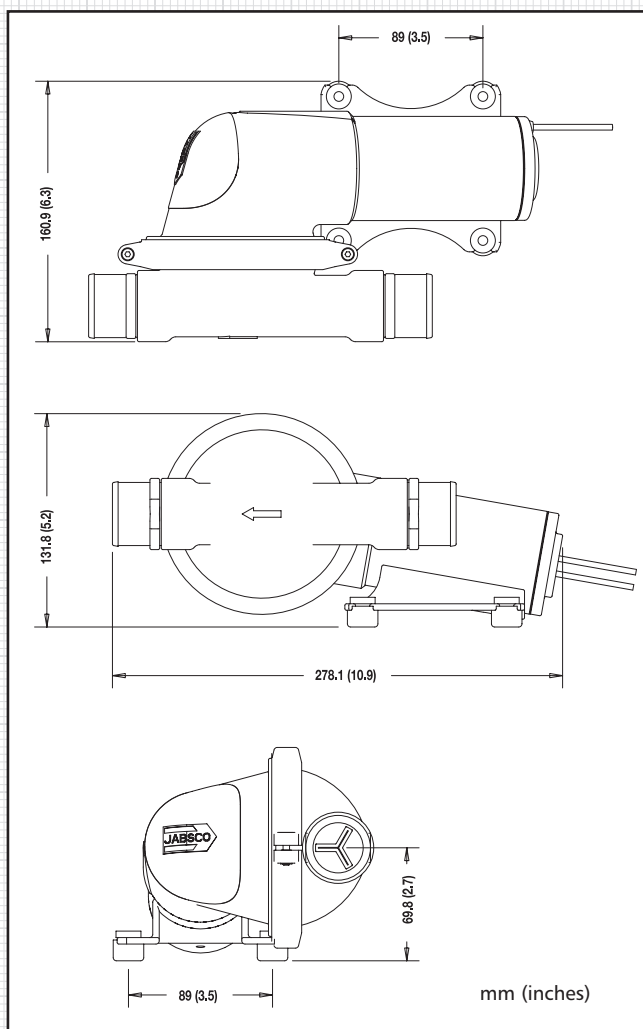
Part Numbers		
Model	Voltage	Fuse Sizes
50890-1000	12V	10A
50890-1100	24V	5A

Service Kit (Includes*)	
SK890	Service Kit - Waste Pump

Key	Description	*Quantity in Kit
1	Bracket	
2	Bush	
3	Clamp Bottom	
4	Clamp Top	
5	Con Rod	
6	Con Rod Plate	
7	Cover	1
8	Diaphragm	1
9	Hex Head Screw	
10	Hex Head Screw	4
11	Motor Assembly	
12	Screw Recessed Pan Head	1
13	Socket Head Screw	
14	Washer	1
15	Waste Pump Chamber	
16	Waste Pump Joker Valve	2
17	Waste Pump Port	2
18	Washer	



DIMENSIONAL DRAWING



Jabsco



ITT Industries
Engineered for life

Jabsco,

1 Kondelin Road, Cape Ann Industrial Park, Gloucester, MA 01930
Tel: +1 978 281 0440 Fax: +1 978 283 2619

USA

Jabsco,

Bingley Road, Hoddesdon, Hertfordshire EN11 0BU
Tel: +44 (0) 1992 450 145 Fax: +44 (0) 1992 467 132

UK

Fluid Products Canada,

55 Royal Road, Guelph, Ontario N1H 1T1
Tel: +1 519 821 1900 Fax: +1 519 821 2569

CANADA

NHK Jabsco Co Ltd,

3-21-10, Shin-Yokohama, Kohoku-ku, Yokohama 222
Tel: +81 (0) 45 475 8906 Fax: +81 (0) 45 475 8908

JAPAN

Jabsco GmbH,

Oststraße 28, 22844 Norderstedt
Tel: +49 (0) 40 53 53 73 0 Fax: +49 (0) 40 53 53 73 11

GERMANY

Jabsco Marine Italia S.r.l.,

Via Tommaseo, 6, 20059 Vimercate, Milano
Tel: +39 039 6852323 Fax: +39 039 666307

ITALY

Discover Jabsco at www.jabsco.com

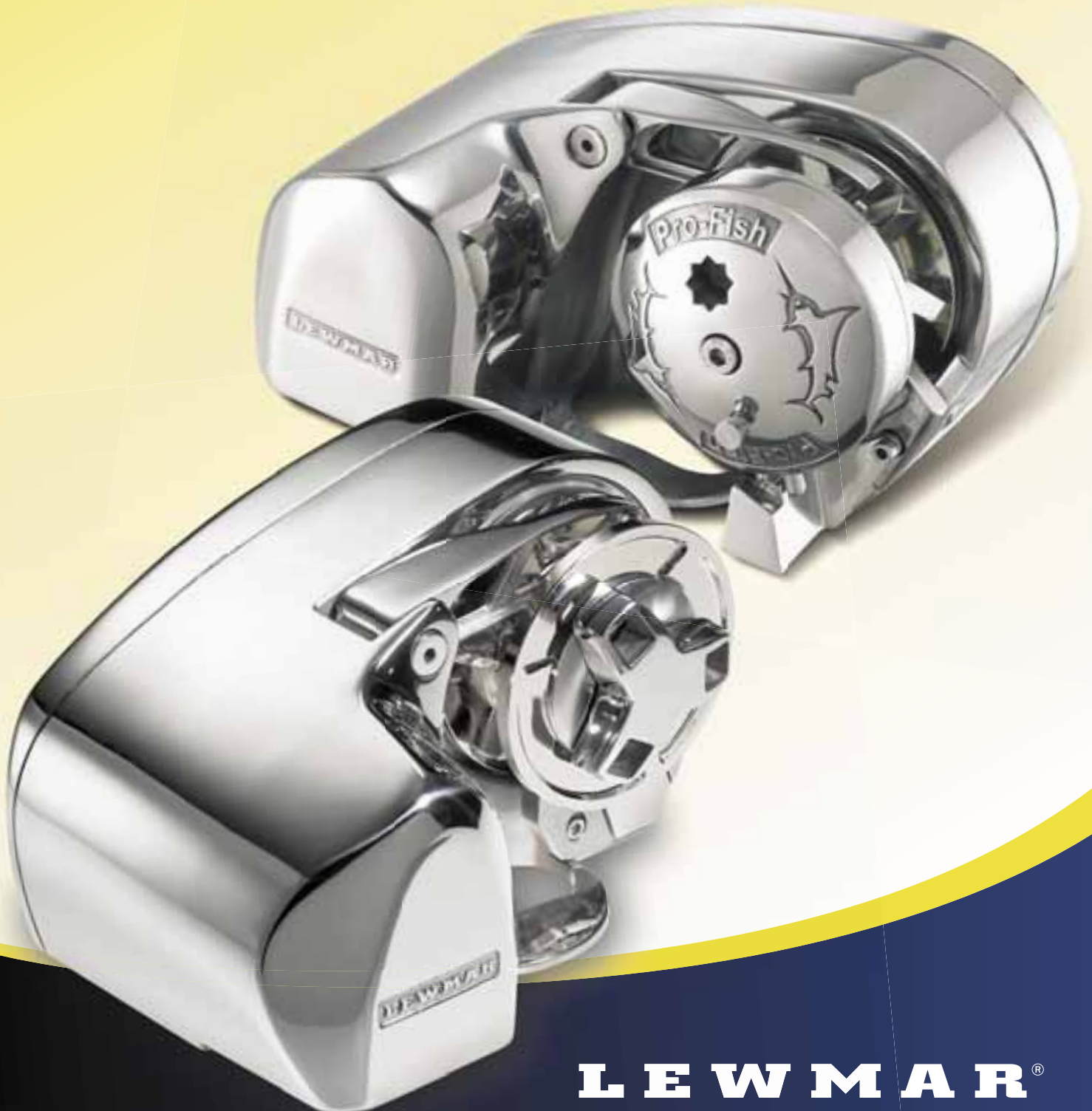
Warranty: All products of the company are sold and all services of the company are offered subject to the company's warranty and terms and conditions of sale, copies of which will be furnished upon request

B10490 Issue 2

GB

Pro-Series & Pro-Fish Windlass

Owner's Installation, Operation &
Basic Servicing Manual



LEWMAR®

www.lewmar.com

B10490 Issue 2. Pro-Series & Pro-Fish Windlass.

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To the best of our knowledge, the information in this manual was correct when it went to press. However, Lewmar cannot accept liability for any inaccuracies or omissions it may contain. In addition, our policy of continuous product improvement may change specifications without notice. As a result, Lewmar cannot accept liability for any differences between the product and the manual.

 This manual forms part of the product and **MUST BE RETAINED** along with, OR incorporated into, the Owner's Manual for the vessel to which the windlass is fitted.

Dear Customer,

Thank you for choosing Lewmar windlass. Lewmar products are world renowned for their quality, technical innovation and proven performance. With a Lewmar windlass you will be provided with many years of outstanding service.

Product support

Lewmar products are supported by a worldwide network of distributors and Authorised Service Representatives. If you encounter any difficulties with this product, please contact your national distributor, or your local Lewmar dealer. Details are available at:

www.lewmar.com

CE Approvals

For CE approval certificates contact Lewmar.

Safety notices

General

Please read before installing and operating your Windlass.

Classification Societies and Lewmar require that a vessel at anchor must have its rode held by a chain stopper or equivalent strong point at all times!

At all times it is the responsibility of the boat user to ensure that the anchor and rode are properly stowed for the prevailing sea conditions. This is particularly important with high-speed powerboats, because an anchor accidentally deploying while under way can cause considerable damage. An anchor windlass is mounted in the most exposed position on a vessel and is thus subject to severe atmospheric attack resulting in a possibility of corrosion in excess of that experienced with most other items of deck equipment. As the windlass may only be used infrequently, the risk of corrosion is further increased. It is essential that the windlass is regularly examined, operated and given any necessary maintenance.

Please ensure that you thoroughly understand the operation and safety requirements of the windlass before commencing the installation. Only persons who are completely familiar with the controls and those who have been fully made aware of the correct use of the windlass should be allowed to use it. If there is any doubt of how to install or operate this unit please seek advice from a suitably qualified engineer.

- Windlasses used incorrectly could cause harm to equipment or crew.
- Windlasses should be used with care and treated with respect.
- Sailing, like many other sports can be hazardous. Even the correct selection, maintenance and use of proper equipment cannot eliminate the potential for danger, serious injury or death.
- Lewmar windlasses are designed and supplied for anchor control in marine applications and are to be used in conjunction with any other use.
- It is the unavoidable responsibility of the owner or master or other responsible party to assess the risk of any operation on the vessel.

Important information about this manual

Throughout this manual, you will see safety and product damage warnings. You must follow these warnings carefully to avoid possible injury or damage.

The type of warnings, what they look like, and how they are used in this manual are explained as follows:

**Warning!**
This is a warning against anything which may cause injury to people if the warning is ignored. You are informed about what you must or must not do in order to reduce the risk of injury to yourself and others.

**Safety Symbol**
When you see the safety symbol it means: “Do not...”; “Do not do this”; or “Do not let this happen”.

- Lewmar recommends the use of appropriate Personal Protective Equipment and hands free communication equipment by any person going aloft, and only then where the person going aloft is properly trained in the use of that equipment and where there remain sufficient trained and experienced personnel on deck to ensure constant observation and the continued safe conduct both of the vessel and the hoisting operation.

Fitting

- This equipment must be installed and operated in accordance with the instructions contained in this manual. Failure to do so could result in poor product performance, personal injury and/or damage to your boat.
- Consult the boat manufacturer if you have any doubt about the strength or suitability of the mounting location.

Electrical

- Make sure you have switched off the power before you start installing this product.
- If in doubt about installing electrical equipment please seek advice from a suitably qualified electrical engineer.

Electromagnetic compatibility

- It is essential that this product does not cause any electromagnetic disturbance to any other electrical or electronic equipment installed in the vessel. This will be achieved if the windlass is connected to the same battery as the vessel's starter motor and not to the service battery to which other equipment is connected. In addition, the run of the wiring, from the battery to the windlass, should be kept as far apart from the other wiring on the vessel as possible. For instance, if the main wiring loom is to starboard, fit the windlass wiring to port.

It should be noted that there is no evidence to indicate that windlass installations do cause magnetic interference but the installer is advised to carry out checks when the installation is complete.

1. Installation

- **Pro-Series & Pro-Fish Manual**

All references regarding installation and wiring etc. of Pro-Series apply to the equivalent Pro-Fish model (700 or 1000).

1.1 Gypsy suitability

Gypsies fitted to the Pro-Series range of windlasses are ideally suited to handling our factory made Rope/Chain combination rodes, which consist of rope spliced to a chain tail.

Model	Gypsy	Chain	Rope
700	RC0762	7 mm (1/4") High Test G-4 ISO	12 mm or 1/2" 3 strand medium lay or 8 plait nylon
700	RC0670	6 mm (NON USA)	12 mm (NON USA)
1000	RC0850	8 mm (5/16") High Test G-4 ISO	14-16 mm or 9/16" - 5/8" 3 strand medium lay or 8 plait nylon

Ropes used must be windlass grade, medium lay nylon. Ropes from different manufacturers have wide variations in stretch and consistency in diameter. Therefore, rope and chain from other manufacturers may require some experimentation to determine the optimum size.

Should you have difficulty in matching a gypsy to your chain please consult your local agent or our international network of Lewmar distributors worldwide.

1.2 Package contents

- Windlass
- Intelligent Mounting Studs, Washers and Nuts
- All-in-one Installation Wrench & Clutch Lever
- Base Gasket Seal
- Safety Instructions
- Mounting Template
- Instruction Booklet
- Warranty Registration Card
- Breaker/Isolator
- Control Switch (Pro-Series 700 only)
- Guarded Rocker Switch (Pro-Series 1000 only)
- Contactor (Pro-Series 1000 only)

1.3 Additional requirements

Each installation requires:

Windlass installation

The following tools:

- 10 mm (3/8") Drill.
- 75 mm (3") Hole saw.
- An appropriate marine sealant.

Wiring installation

The following tools:

- Crimping pliers/wire stripper.
- Suitable electrical cable and crimp terminals.

1.4 Accessories

Use only Lewmar parts and accessories to ensure top performance and eliminate the risk of voiding your warranty. For replacement parts, please see the Parts section or visit your nearest dealer or the Lewmar website.

1.5 Specifications

Model 700	
Maximum pull	320 kg (700 lb)
Maximum line speed	32 m/min (105 ft/min)
Typical working load	80 kg (175 lb)
Normal line speed	27 m/min (88 ft/min)
Boat size	up to 10.7 m (35 ft)

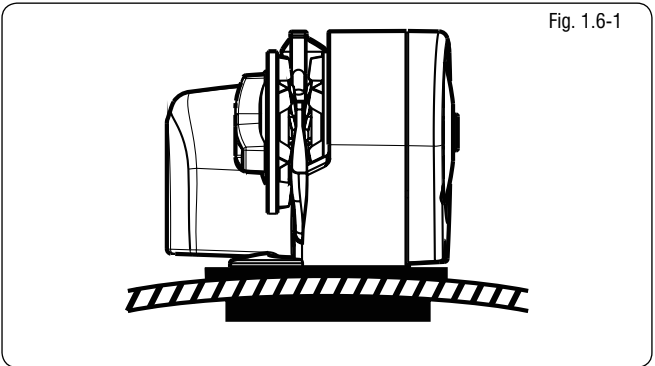
Model 1000	
Maximum pull	454 kg (1000 lb)
Maximum line speed	32 m/min (105 ft/min) 12 V
Typical working load	114 kg (250 lb)
Normal line speed	27 m/min (88 ft/min) 12 V
Boat size	up to 13.7 m (45 ft)

1.6 Fitting the windlass to the deck

- If the deck is not flat, a suitable mounting pad may be required to take up camber or sheer.

Decks that are thin, or of foam or balsa laminate construction, will require reinforcement in order to spread the loads that will be applied to the deck while the windlass is in use.

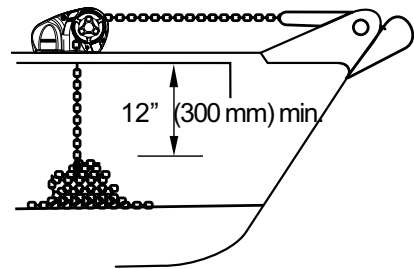
The standard 8 mm (5/16") threaded mounting studs supplied suit deck and packing thickness of up to 76 mm (3"). These are adequate for most installations.



- Place the windlass on the deck and decide upon a position for it with reference to the vessel's bow roller (Fig. 1.6-2) and the chain locker below. Rode lead from the roller should ideally be fed horizontally back to the top of the gypsy and along its centerline (Fig. 1.6-3).

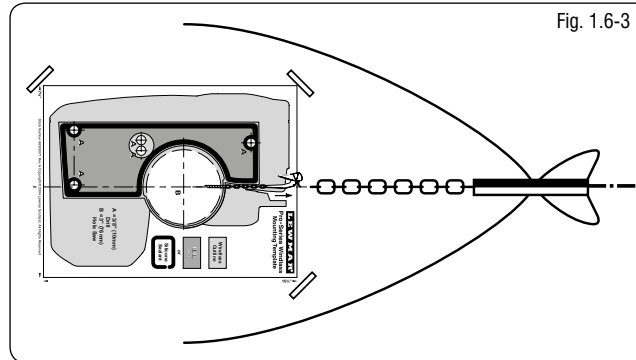
There must be sufficient vertical fall for the chain or rope, even with a full locker, to draw the rode from the gypsy when hauling in.

Fig. 1.6-2



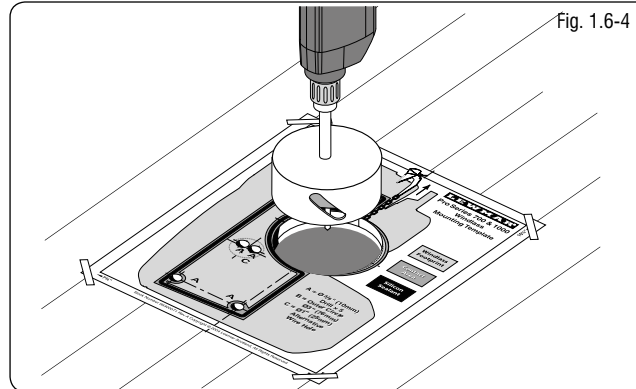
- Place the mounting template on the deck or mounting pad in the desired position for the windlass and hold it in place using adhesive tape.
- NOTE: Check the scale of the template matches the winch.**

Fig. 1.6-3



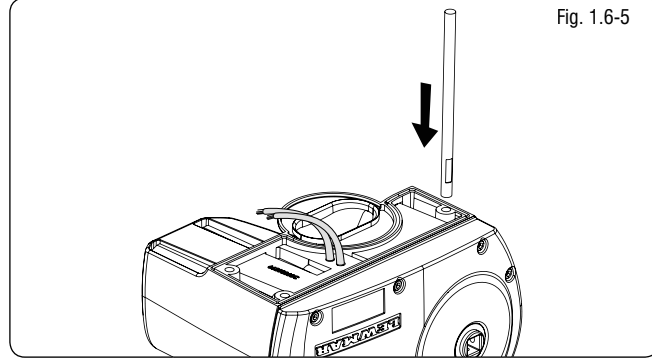
- Using a 10 mm ($\frac{3}{8}$ ") diameter drill, make the three holes for the mounting studs and two for the motor wires. With a 76 mm (3") diameter hole saw, make the hole for the rode to pass through. When all the holes have been made, remove the template. To help avoid water absorption by the deck, apply an appropriate marine sealant to the freshly cut hole edges.

Fig. 1.6-4



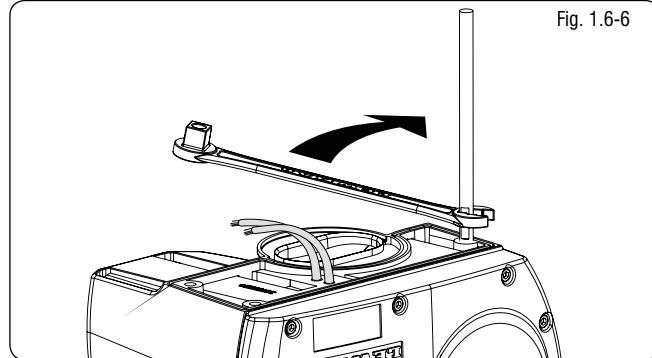
- Fully screw the three mounting studs into the base of the windlass. This can be done, quite simply, using the multi-tool wrench supplied. Screw the studs into the base finger tight, with the flats towards the base (Fig 1.6-5).

Fig. 1.6-5



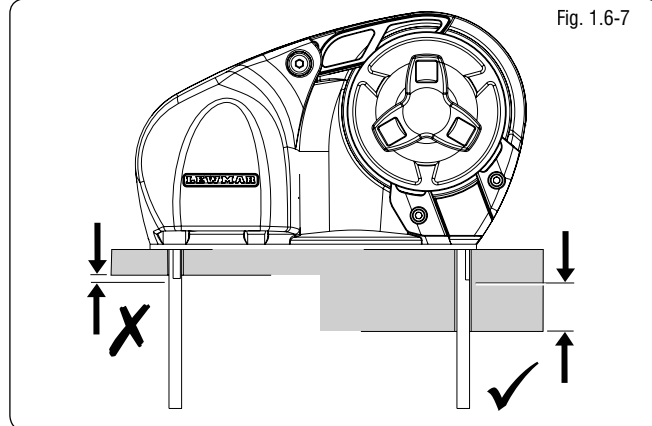
- Next, using the wrench on the flats, tighten the studs until they bottom out in their holes. Do this to each of the studs in turn.

Fig. 1.6-6



- Place the base mat in position on the deck, optionally, apply a suitable sealant.

Fig. 1.6-7



DO NOT use a permanent adhesive/sealant, e.g., 5200 to the base of the windlass, any mounting pad or around the studs.

DO NOT get CAULK or SEALANT under the GEAR TRAIN COVER (17) as it makes it difficult to remove. Secure the windlass firmly to the deck from below, using the nuts and washers supplied.

- As a rule of thumb, if the flats on the studs are visible below deck, the deck and/or any packing is likely to be too thin to offer adequate support when the windlass is under load.
- NOTE: If using silicone or other rubbery type sealant, it is advisable to allow curing of the sealant before final tightening of the mounting nuts. Trim the studs back to 6 mm ($\frac{1}{4}$ ") below the fully tightened nuts.**

2. Electrical wiring installation

2.1 Electric cable selection

To achieve the best performance and to safeguard your electrical system it is essential that any electrical windlass be fitted with sufficiently large diameter cable to cope with the current draw imposed upon it and to keep the voltage drop within acceptable limits. In any circumstance voltage drop due entirely to cable resistance should not exceed 10%.

The following table gives recommended cable sizes. The recommendations are based on total length of cable required, from the battery, following the route of the cables.

- Total length of cable run is from the battery to the windlass, and from the windlass back to the battery.**

DO NOT confuse cable Length with the length of the vessel!

Model 700 cable selection													
Cable Length Up To	Feet	7	13	20	26	33	40	46	53	60	66	73	80
	Metres	2	4	6	8	10	12	14	16	18	20	22	24
Cable Size	AWG	8					6			4			
	mm ²	10						16			25		

Model 1000 cable selection													
Cable Length Up To	Feet	7	13	20	26	33	40	46	53	60	66	73	80
	Metres	2	4	6	8	10	12	14	16	18	20	22	24
Cable Size	AWG	6					4			2			
	mm²	16						25			35		

- In Multi Station installations 14 AWG wire (1.5 mm² cross sectional area, 21/0.30 PVC covered) is used to connect the switches to the reversing control box.

2.2 Wiring

Plan the installation to suit the controls and give the operator a full view of the windlass. The wiring system should be of the two cable fully insulated return type, which avoids possible electrolytic corrosion problems. We recommend the use of type III stranded, tinned copper wire with copper crimp terminals. Most modern installations are negative return (negative ground) but polarity should be checked. If necessary add a grounding strap between the mounting studs and an earthing point.

In a Model 1000 installation, the contactor must be sited in a dry location.

DO NOT install the contactor in the anchor locker.

If a contactor is installed in an anchor locker it is exposed to harsh conditions it is not designed to withstand. Further more this type of installation will void your warranty.

Overload protection, in the form of the circuit breaker/isolator supplied, must be built into the windlass wiring circuit. This protects the wiring and prevents undue damage to the windlass motor, in the event of its being stalled by an excessive load in service.

It is advisable to site the circuit breaker/isolator in a dry, readily accessible place. The breaker/isolator supplied must be manually reset should an overload occur that causes it to trip to the off position.

- NOTE: Crimp terminals should be used on all wire ends wherever possible for good electrical contacts.**

If you are not sure you understand these guidelines, seek professional help.

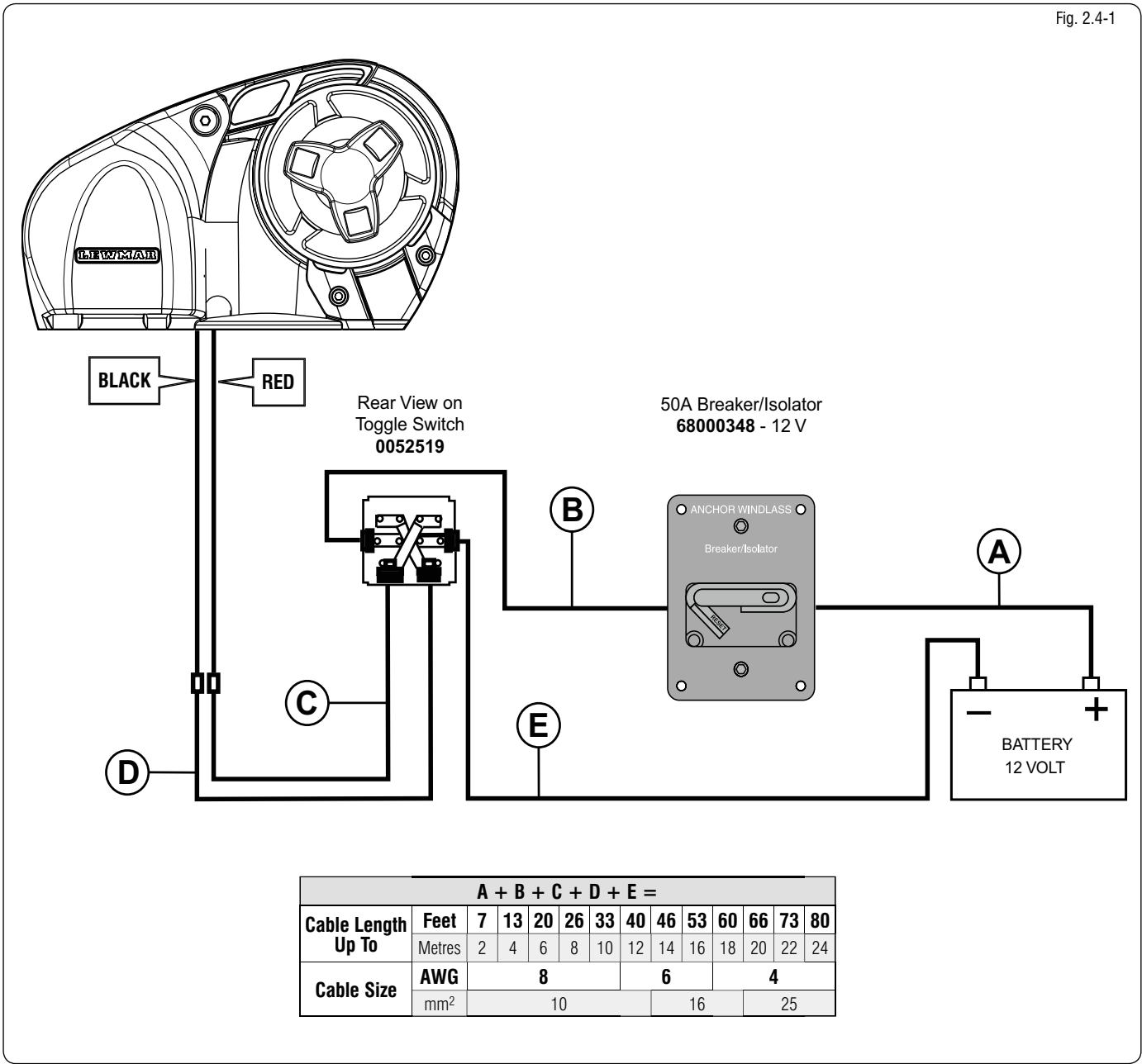
2.3 Control Switch Installation

Follow the mounting instructions supplied with the switch. Remember, in a Multi Station installation all switches must be wired in a parallel circuit.

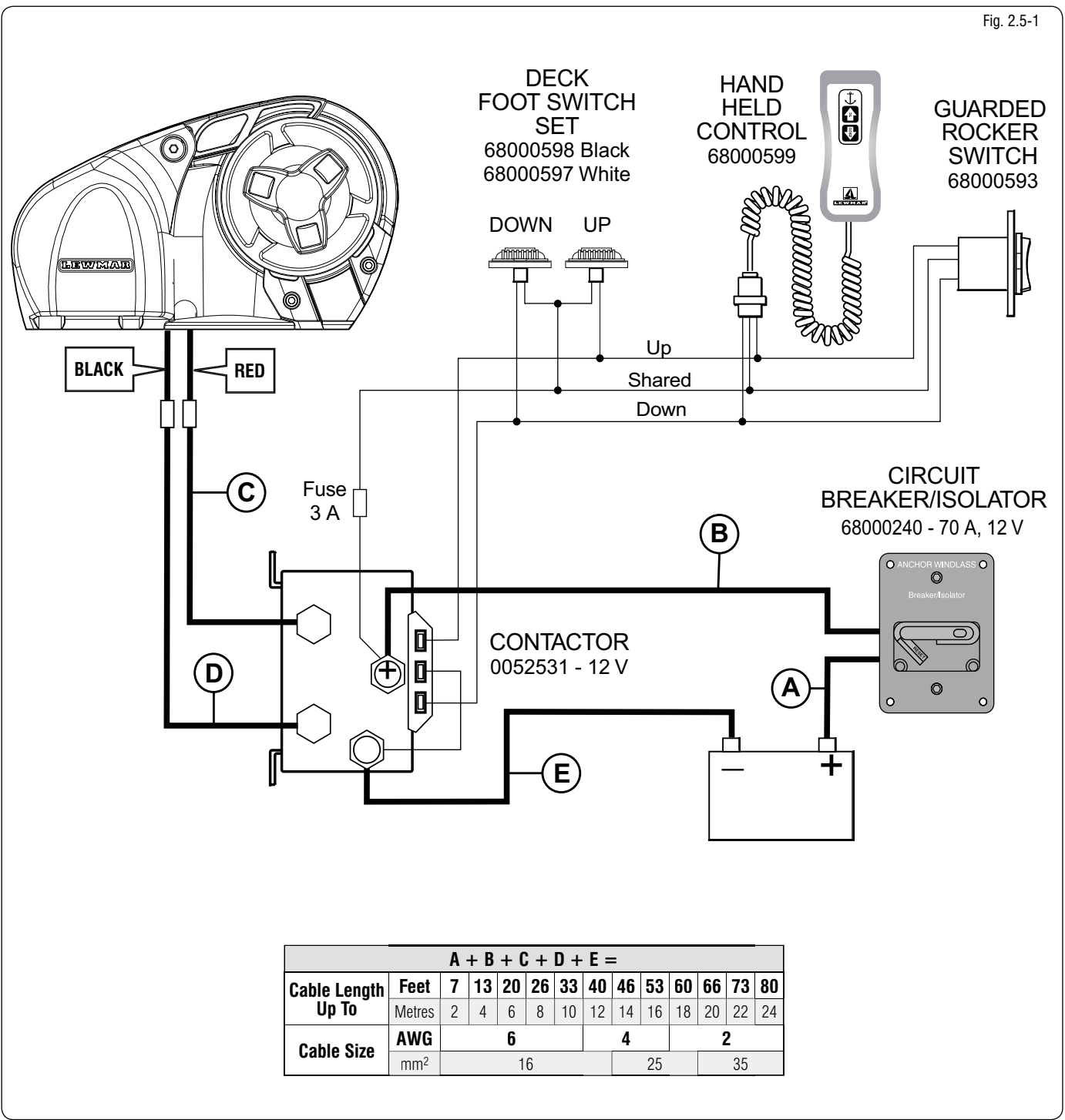
2.4 Model 700 - 12 V

Choice of cable thickness depends on total cable length:
A + B + C + D + E =
Battery to windlass, windlass to battery.

Model	Motor	Breaker / Isolator	Contactor
700	12 V	50 A (68000348)	-
1000	12 V	70 A (68000240)	0052531



2.5 Model 1000 - 12 V



- **NOTE:** Wireless remote also available.
- **NOTE:** Wireless remote can only be used if a contactor is fitted. See wireless remote instructions for wiring details.

Model	Item	Description
Wireless Remotes	68000844	3 Button Windlass only
	68000845	5 Button Windlass & Thruster

3. Operating your windlass

As a prudent act of seamanship, anchor recovery operations require the undivided attention of skipper and crew to prevent personal injury or damage to the vessel.

In a typical anchor recovery situation, the windlass will pass through a number of operational phases.

3.1 Safety first

To avoid personal injuries ensure that limbs, fingers and clothing are kept clear of the anchor rode and windlass during operation. Always ensure that there are no swimmers or divers nearby when dropping your anchor.

3.2 Use of clutch on Pro-Series

To tighten the clutch - using the Installation Tool & Clutch Lever supplied, rotate the clutch nut (1) clockwise, this will grip the gypsy, effectively locking it to the windlass gear train.

To slacken the clutch - turn the nut anticlockwise, this will free the gypsy allowing it to turn independently of the windlass gear train. Always remove the handle after use.

3.3 Use of clutch on Pro-Fish freefall

Press DOWN button for 2 seconds until the anchor is under freefall. (Note: Pressing the DOWN button for 5+ seconds will result in a longer clutch re-engagement time during the next UP command). If using a rope/chain rode, motor astern to create the desired scope.

Once scope has been created press the UP button continuously until freefall stops. It normally takes several seconds to fully re-engage the internal clutch mechanism, locking the windlass. Failure to do this could result in rope/chain creeping out. Press the UP button continuously to recover the anchor.

⚠ To ensure continuous freefall operation using rope/chain rode, it is important that the rope is FREE from knots or hockles. To avoid this problem we recommend periodically paying out the rode whilst motoring astern (in deep water) to unwind and knots or hockles that may be present.

3.4 Letting go under gravity

Insert the clutch lever into the clutch nut (1) and turn it clockwise to ensure that the clutch is tight. Release any independent anchor locks. If it is safe to do so, pull back on the clutch lever until the anchor and rode begin to pay out. Control the rate of descent of the anchor by pushing the clutch lever forwards. When sufficient rode has been paid out, fully tighten the clutch nut once again.

3.5 Letting go under power

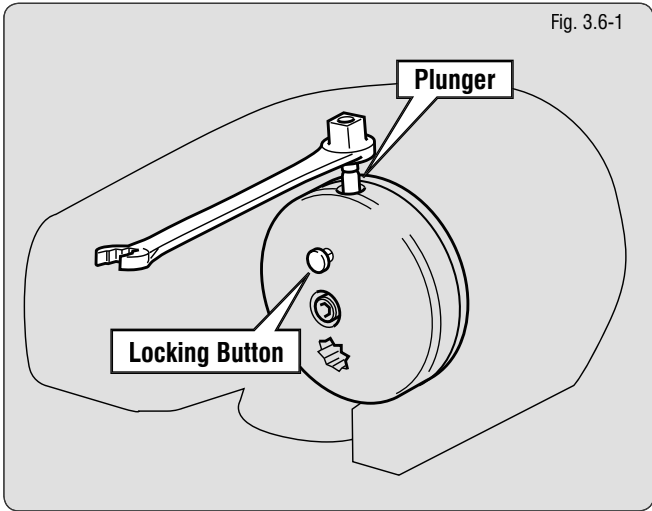
Release any independent anchor locks. If it is safe to do so, let go under power by operating a down control. Release the control when sufficient rode has been paid out.

⚠ Isolate the windlass electrically and tie rode off to a secure fixing point prior to carrying out operation 3.6.

3.6 Change Pro-Fish to power down mode

To engage, simply pull out the locking button, press in the plunger on the rim of the gypsy cap with the installation wrench and push in the locking button.

To disengage, pull out the locking button.



3.7 Lying to anchor safely

Vessels at anchor will snub on the rode and this can cause slippage or apply excessive loads to the windlass.

For maximum safety and to prevent damage, the windlass must not be left to take the entire force from the anchor rode while at anchor. The rode should be made fast directly to a bollard, sampson post or cleat.

3.8 Hauling in

Untie the bridle or replace the rode in the gypsy. If it is safe to do so, operate an 'Up' control. Having retrieved the anchor, ensure it is independently secured to prevent its accidental release.

3.9 Manual recovery

Insert a standard 12 mm (1/2") drive ratchet into the socket on the end of the Driveshaft (30). Using the ratchet, turn the driveshaft clockwise.

3.10 Operating tips

When anchoring, it is best to power the rode out, allowing the vessel to take up stern way before full scope is let out. This helps prevent the rode from becoming tangled on top of your anchor on the seabed.

To aid anchor recovery, we recommend that the vessel's engine be used to assist by moving the vessel towards the anchor. We do not recommend that the vessel be motored over and beyond the anchor, as this can cause the rode to damage your topsides. As the anchor approaches the stemhead, the last few feet of rode should be inched in by judicious use of controls to avoid damage to the vessel. Having retrieved the anchor, ensure it is independently secured to prevent accidental release. It is strongly advised to use an anchor safety strap (Part No. 66840011), or a chain stopper (Part No. 2417301).

When mooring stern to, at a suitable distance from the jetty, deploy the anchor to prevent the bow from swinging. Gently pay out the rode under the influence of the stern way of the vessel as it approaches the jetty. Make fast your vessel with warps from the stern.

3.11 Joining rope to chain

When splicing rope to chain, select a length of chain that will avoid having the splice positioned in the gypsy when the anchor comes over the stemhead. Furthermore, ensure that the splice is no tighter than the rope. A hard splice is not desired.

With whipping twine or similar, seize your rope 200 mm (8") from the rope's end and unlay the strands.

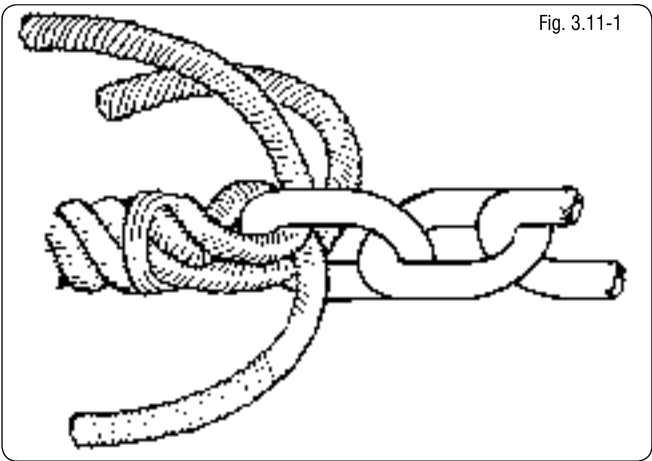
Pass one strand through the chain link from one side and the other two strands from the opposite side. Remove seizing and complete a back splice in the normal manner for four full tucks.

With a hot knife pare down the three strands by one half of their diameter and continue with two further tucks.

With a hot knife, carefully melt the ends back into the line. Because of wide variations in rope type and construction some experimentation may be required.

Whip the line with permanent whipping at the beginning of the taper.

The above method of joining is designed to minimize chafe between the rope and chain but as a matter of prudent seamanship the splice should be checked regularly and remade if there is any evidence of wear.



4. Maintenance

4.1 General recommendations

⚠ Isolate the windlass electrically, before carrying out any maintenance work.

- After the first two or three anchor recoveries, check the mounting nuts to ensure that the windlass is still fastened tightly to your deck, as it should now be bedded-in.

- Regularly wash down the exterior of your windlass with fresh water.
- Examine all electrical connections for possible corrosion, clean and lightly grease as necessary.
- Anchor rode splice should be checked regularly and remade if there is any evidence of wear.
- The Gypsy should be examined on a regular basis, because it is a high wear item. The Gypsy is designed for short scopes of chain and will last longer if properly used.

5. Dismantling procedures

5.1 Gypsy replacement (Pro-Series)

Remove the Clutch Nut (1), anti-clockwise using the clutch operating lever. Withdraw the Gypsy Cone (2), carefully set aside the two Stainless Steel Drive Pins (28). Pull the Control Arm (8) into the upright position. Remove the Screws (31) that retain the Stripper (4) using a 4 mm (5/32") Allen Wrench. Remove the Gypsy assembly. Remove the stripper from the Gypsy. To replace the Gypsy, reverse the above procedure.

5.2 Gypsy replacement (Pro-Fish)

Remove the Shoulder Screw (45) anticlockwise using a 8 mm (5/16") Allen wrench. Remove the Washer (46) from the centre of the Pro-Fish Drive Cap (36). Lock the Pro-Fish Plunger (38) in, using the Stopper (41). Remove the Pro-Fish Drive Cap (36) anticlockwise. Remove Socket Head Cap Screws (10) anticlockwise, using a 4 mm (5/32") Allen wrench. Remove the Pro-Fish Stopper Cam (37). Remove the Gypsy assembly (3) and Stripper (4) from the unit. Remove the Stripper (4) from the Gypsy (3).

To replace the Gypsy, reverse the above procedure. Clean thread of Shoulder Screw (45) and use Loctite® 638 (66200160) (Loctite® 2701 or 262 may also be used) on thread during re-assembly. Tighten bolt to 21 Nm (15.4 lb/ft) and allow at least 15 minutes for the Loctite® to cure before use.

5.3 Control arm replacement

To remove the Control Arm (8) rotate it to the vertical position. Unscrew the Grub Screw (33) using a 2 mm (5/64") Allen Wrench by 3 mm (1/8"). Allow the Control Arm to return to its normal position. Withdraw the Control Arm Pivot (6) using a 4 mm (5/32") Allen wrench. The Allen wrench should be used initially

to push the Control Arm Pivot in towards the centerline of the windlass. On doing this the Torsion Spring (7) will tend to turn the Control Arm Pivot and Allen wrench clockwise. Allow it to travel clockwise as far as it can and, using some side force on the wrench, withdraw the Pivot. Remove the Control Arm, Pivot Pin Washer (34) and Torsion Spring from the maincase. Reverse this procedure to replace the Control Arm. Place the Torsion Spring in the hole, ensuring that the outer tang is aligned parallel to the ridge on the maincase and the dog leg is parallel to the deck. Place the Pivot Pin Washer in board of the flange and offer up the Control Arm such that it is pointing at the two o'clock position. Pick up the Pivot Pin, align the groove on its head also to the two o'clock position. Insert it through the hole on the maincase and engage the spring with its slot. Holding the Control Arm in position, use the Allen wrench to push the Pivot Pin in. Then turn it anti-clockwise as far as it will go. Using side force again, pull the wrench out until the head of the Pivot Pin sits slightly proud of the case. Rotate the control arm to the vertical and, applying a spot of Loctite® 2701 threadlock, fully re tighten the Grub Screw.

5.4 Gypsy drive shaft replacement & lubrication service

- NOTE: Lubrication and internal parts will not fall out when the windlass is disassembled.**

The gear train and its bearings have been lubricated for you with SFG 100 grease and should not require regular attention. SFG is a white synthetic grease containing PTFE. Use grease of a similar specification throughout. It is recommended that the external Drive Shaft components be stripped, cleaned and re-greased at least annually. To do this, the Gypsy (3) and Stripper (4) should be removed as detailed above. To inspect the Maincase Wiper

Seal (29) for signs of wear the Mainshaft must be removed as detailed below. If the seal is found to be unserviceable, the Gypsy Drive Shaft (30) will have to be withdrawn and the seal replaced. Remove the Gear train Cover (17) using a 4 mm (⁵/₃₂”) Allen Wrench.

DO NOT use a screwdriver or sharp edged tool to pry the Gear train Cover open.

If there is sealant present, use a razor blade to cut through it. Withdraw the 1st Compound Gear Assembly (16), taking care not to lose the Teflon™ Flat Washers (14). Remove the 2nd Compound Gear Assembly (22).

- NOTE: Rotate this gear assembly as you pull on it, eventually this action will orientate a flat on its washer and allow the assembly to pass the Drive Shaft Gear (25).**

Remove the External Circlip (23) and withdraw the Drive Shaft Gear (25). Gently tap the Drive Roller (27) through the Drive Shaft.

The Drive Shaft can now be withdrawn with or without the Gypsy Assembly attached, provided the Stripper is no longer attached to the Case. Remove the Seal and replace it with a new one. Clean the stripped down components in kerosene, dry them and inspect them for wear.

6. Parts list

6.1 Parts list key Pro-Series & Pro-Fish models 700 & 1000

Item	Description	Qty.	Part No.
1	Clutch Nut	1	66000098
2	Gypsy Cone	1	66000098
3	Gypsy RC 7 mm (¹ / ₄ ”)	1	66000110
3a	Gypsy RC 8 mm (⁵ / ₁₆ ”)	1	66000101
3b	Gypsy RC ⁵ / ₁₆ ” G4	1	66000102
3c	Gypsy RC 6 mm	1	66000112
4	Stripper Arm	1	66000096
5	Maincase	1	N/A
6	Control Arm Pivot	1	66000097
7	Torsion Spring	1	66000097
8	Control Arm	1	66000097
9	Dowel ¹ / ₄ ” x 1 ¹ / ₄ ”	3	66000104
10	Socket HD Cap Screw 10-24UNC x ³ / ₄ ”	5	66000616 or 66000617 or 66000096 or 66000104 or 66000107
11	Motor Pinion	1	66000107
12	Dowel, 6 x 30 mm	1	66000104 or 66000107
13	Spirol Pin, 3 x 20 mm	1	66000104 or 66000105 or 66000107
14	Teflon Flat Washer	2	66000635
15	Needle Roller Bearing	2	66000103
16	1st Compound Gear	1	66000635
17	Gear Train Cover	1	66000637
18	Socket HD Cap Screw, 10-24UNC x 1 ¹ / ₄ ”	6	66000104 or 66000637
19	Wiper Seal	1	66000104 or 66000637
20	Needle Roller Bearing	1	66000103 or 66000637
21	Needle Roller Bearing	1	66000103 or 66000637
22	2nd Compound Gear Assembly	1	66000635 or 66000636
23	External Clip	1	66000103 or 66000104 or 66000105

To reassemble, reverse the above procedure. Rebuild the windlass applying generous amounts of grease.

5.5 Electric motor replacement

Isolate the windlass electrically!

Disconnect the Motor Cables from the vessel’s wiring loom. Remove the Gear Train Cover (17) using a 4 mm (⁵/₃₂”) Allen Wrench as detailed above. Remove the 1st Compound Gear Assembly (16) and Teflon™ Flat Washers (14).

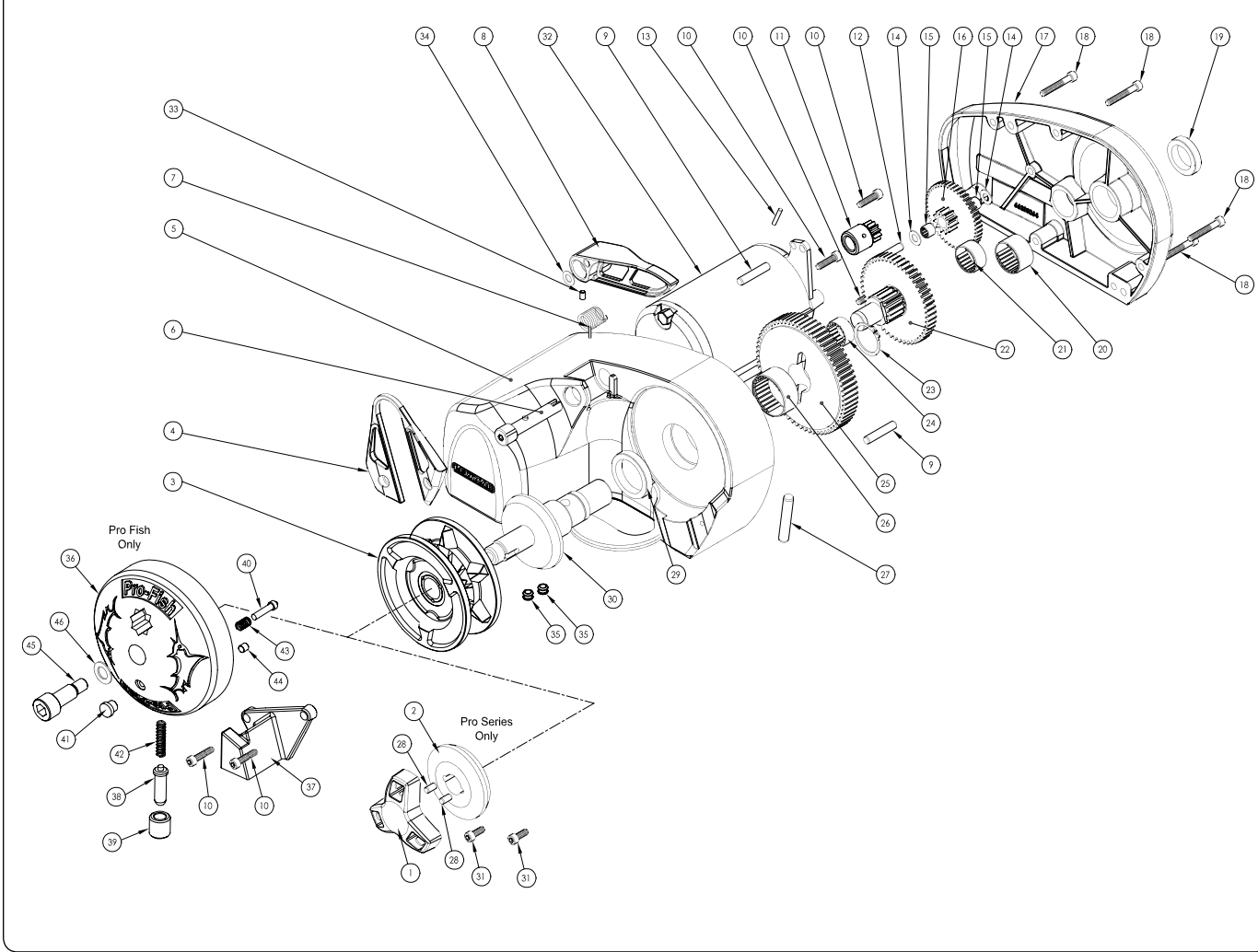
Using a 4 mm (⁵/₃₂”) Allen Wrench remove the Motor Screws (10). Withdraw the motor from the Main Case. Note that silicone is used to seal the holes in the case where the motor wires pass through. Be careful not to strip the insulation from the Motor Wires when pulling them through the Main Case.

Replace the Motor by reversing the above procedure, using fresh silicone to seal the wire holes in the case. Use Loctite® 2701 threadlock on the Motor Screws.

5.6 Pro-Fish conversion

Pro-Series units with Serial Number 561*** or 571*** can easily be converted to Pro-Fish units by removing the Clutch nut (1), Gypsy Cone (2), Drive Pins (28) & Screws (31) and fitting the Pro-fish conversion kit (66000616). Fully fitting instructions, tools & loctite are included in the kit.

6.1-1 Parts list



6.2 Pro-Series & Pro-Fish models 700 & 1000 service kits

Service Kit	Description	Items Included (Qty)
66000096	Pro-Series Stripper Arm Kit	4(1), 10(2), 31(2)
66000097	Control Arm Kit	6(1), 7(1), 8(1), 33(1), 34(1)
66000098	Pro-Series Clutch Nut & Cone Kit	1(1), 2(1), 28(2)
66000099	Clutch Lever	Clutch Lever (1)
66000100	Fastening Kit (Imperial)	47(1), 48a(1)
66000101	Gypsy RC 8 mm (⁵ / ₁₆ ”)	3a(1)
66000102	Gypsy RC ⁵ / ₁₆ ” G4	3b(1)
66000103	Bearings Kit	15(20, 20(1), 21(1), 23(1), 24(1), 26(1)
66000104	Pro-Series Seals and Screw Kit	10(5), 12(1), 13(1), 18(6), 19(1), 23(1), 9(3), 27(1), 28(2), 29(1), 31(2)
66000635*	Gears and Shaft Kit	11(1), 13(1), 14(2), 15(2), 16(1), 22(1), 23(1), 25(1), 27(1), 30(1)
66000636*	Compound Gear Kit	22(1)
66000107	Motor 12 V	11(1), 32(1), 10(3), 12(1), 13(1), 35(2)
66000108	Fastening Kit (Metric)	47(1), 48b(1)
66000637*	Gear Train Cover Kit	17(1), 18(6), 19(1), 20(1), 21(1)
66000110	Gypsy RC 7 mm (¹ / ₄ ”)	3(1)
66000112	Gypsy RC 6 mm	3c(1)
66000616	Pro-Fish Conversion Kit	36(1), 37(1), 38(1), 39(1), 40(1), 41(1), 42(1), 43(1), 44(1), 45(1), 46(1), 10(2)
66000617	Pro-Fish Stopper Kit	37(1), 10(2)
66000620	Pro-Fish Drive Cap Assembly Kit	36(1), 38(1), 39(1), 40(1), 41(1), 42(1), 43(1), 44(1), 45(1), 46(1)

*** Kits are for use on Pro-Series/Fish with Serial Nos starting 561***, 563***, 565***, 571***, for earlier kits please check the manual supplied with your windlass or contact a Lewmar distributor.**

7. Troubleshooting

7.1 Anchor rode pays out independently while windlass is not in use

This problem is a result of not securing the anchor rode combined with the Clutch Nut (1) being slack. Tighten the clutch nut using the tool provided and always secure the anchor rode independently of the windlass whenever it is not being deployed or recovered.

7.2 Anchor rode pays out independently while windlass not in use (Pro-Fish)

This problem is a result of not securing the anchor rode combined with the internal Clutch mechanism not being fully engaged. Operate the UP button briefly to fully re-engage the internal

clutch mechanism. Always secure the anchor rode independently of the windlass whenever it is not being deployed or recovered.

7.3 Electrical troubleshooting

As with most electrical marine equipment the majority of problems that arise are electrical in nature. Therefore it is essential that the proper voltage be maintained. The proper voltage on a 12 volt system is 13.5 volts. (Constant low voltage will destroy the motor). Ensure that electrical cable size is large enough to handle the current draw imposed upon it and to keep the voltage drop within acceptable limits. In any circumstance voltage drop due entirely to cable resistance should not exceed 10%.

Follow the charts to troubleshoot the problem.

Failure to Operate (Pro-Series 700 Only) Troubleshoot Chart: Reversing Toggle Control Switch (Part No. 0052519)	
Is there voltage at the input terminal (positive) to the control switch?	If no voltage is present, the battery isolation switch is OFF, the breaker is tripped or a fuse has blown. The battery may also have been dead or disconnected.
YES ↓ NO →	
Check voltage at the output terminals of the control switch with the switch on forward then reverse. Is there voltage at either output terminal for forward then reverse.?	Control switch is defective.
YES ↓ NO →	
Replace motor.	

Sluggish Operation Troubleshoot Chart	
Is windlass overloaded?	Ease the load and ensure the battery is well charged.
YES ↓ NO →	
Check the voltage across the motor leads with the windlass on. (Proper voltage is 13.5 V. Constant low voltage will destroy the motor). Is the voltage low? (Below 11.0 V on a 12 V system).	There is a severe voltage drop in the circuit. Check for undersized cables, poor connections or corroded connections. Also check for resistance across the battery isolation switch or solenoid. (Feel them to see if they are heating up).
YES ↓ NO →	
Is the voltage correct? (Above 11.0 V and anchor is not fouled).	The motor is defective. Replace the motor.
YES →	

Failure to Operate Troubleshoot Chart	
Is there voltage at the input terminals to the contactor and switch(es)?	Check the circuit breaker/isolator switch and any fuses.
YES ↓ NO →	
Operate the switch. Is there voltage at the positive switch terminal on the solenoid?	The switch (or its wiring), is defective.
YES ↓ NO →	
Keep the switch activated. Is there voltage at the main output terminal on the contactor?	Check the contactor coil ground circuit. If okay, replace the contactor.
YES ↓ NO →	
Check the voltage at the motor. If voltage is present, the motor is defective. If you have any questions call your nearest Lewmar representative.	

8. Lewmar limited warranty

LIMITED WARRANTY and KEY TERMS OF SUPPLY BY LEWMAR

Lewmar warrants that in normal usage and with proper maintenance its products will conform with their specification for a period of five years from the date of purchase by the end user, subject to the conditions, limitations and exceptions listed below. Any product, which proves to be defective in normal usage during that five-year period, will be repaired or, at Lewmar's option, replaced by Lewmar.

A CONDITIONS AND LIMITATIONS

- i Lewmar's liability shall be limited to the repair or replacement of any parts of the product which are defective in materials or workmanship.
- ii Responsibility for the selection of products appropriate for the use intended by the Buyer shall rest solely with the Buyer and Lewmar accepts no responsibility for any such selection.
- iii Lewmar shall not be liable in any way for Product failure, or any resulting loss or damage which arises from:
 - a use of a product in an application for which it was not designed or intended;
 - b. corrosion, ultra violet degradation or wear and tear;
 - c. a failure to service or maintain the product in accordance with Lewmar's recommendations;
 - d. faulty or deficient installation of the product (unless conducted by Lewmar);
 - e. any modification or alteration of the product;
 - f. conditions that exceed the product's performance specifications or safe working loads.
- iv Product subject to a warranty claim must be returned to the Lewmar outlet which supplied the product for examination unless otherwise agreed by Lewmar in writing.
- v This warranty does not cover any incidental costs incurred for the investigation, removal, carriage, transport or installation of product.
- vi Service by anyone other than authorised Lewmar representatives shall void this warranty unless it accords with Lewmar guidelines and standards of workmanship.
- vii Lewmar's products are intended for use only in the marine environment. Buyers intending to use them for any other purpose should seek independent professional advice as to their suitability. Lewmar accepts no liability arising from such other use.

B EXCEPTIONS

Cover under this Warranty is limited to a period of one year from the date of purchase by the end user in the case of any of the following products or parts of products:

- Electric motors and associated electrical equipment
- Electronic controls
- Hydraulic pumps, valves and actuators
- Weather seals
- Products used in “Grand Prix” racing applications

C LIABILITY

- i Lewmar's liability under this warranty shall be to the exclusion of all other warranties or liabilities (to the extent permitted by law). In particular (but without limitation):
 - a Lewmar shall not be liable for:
 - Any loss of anticipated turnover or profit or indirect, consequential or economic loss ;
 - Damages, costs or expenses payable to any third party;
 - Any damage to yachts or equipment;
 - Death or personal Injury (unless caused by Lewmar's negligence).

Some states and countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

- b Lewmar grants no other warranties regarding the fitness for purpose, use, nature or satisfactory quality of the products.
- ii Where applicable law does not permit a statutory or implied warranty to be excluded, then such warranty, if permitted by that state or country's law, shall be limited to a period of one year from the date of purchase by the end user. Some states and countries do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you.

D PROCEDURE

Notice of a claim for service under this warranty shall be made promptly and in writing by the end user to the Lewmar outlet which supplied the product or to Lewmar at Southmoor Lane, Havant, Hampshire, England PO9 1JJ.

E SEVERANCE CLAUSE

If any clause of this warranty is held by any court or other competent authority to be invalid or unenforceable in whole or in part, the validity of the remaining clauses of this warranty and the remainder of the clause in question shall not be affected.

F OTHER RIGHTS

This warranty gives you specific legal rights, and you may also have other legal rights, which vary, from state to state and country to country. In the case of European States a Consumer customer (as defined nationally) has legal rights under the applicable national law governing the sale of Consumer Goods; this Warranty does not affect those rights.

G LAW

This warranty shall be governed by and read in accordance with the laws of England or the state or country in which the first end user is domiciled at the time of purchase of the product.

H DISPUTES

Any dispute arising under this warranty may, at the option of the end-user, be referred to alternative dispute resolution under the rules of the British Marine Federation or to the Courts of the State whose law shall govern the warranty or to the Courts of England and Wales.

The British Marine Federation may be contacted at Marine House, Thorpe Lea Road, Egham, England, TW20 8BF



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B10490

“CYCLONE PUMP”

Stainless Steel DC Motor / Pump Unit

A range of Stainless Steel General Purpose Centrifugal pumps designed specifically for the marine and industrial markets. Typical applications would be for circulation applications such as hot water systems, livewell or bait tank installations.

Features & Benefits

- Heavy duty robust design
- Stainless steel construction
- Long life DC motor
- Silent running
- Anti-clog impeller design
- Long life mechanical seal
- Single tool servicing

Specification

- Continuously rated
- Motor life 3500 hours
- 2m suction lift when wet

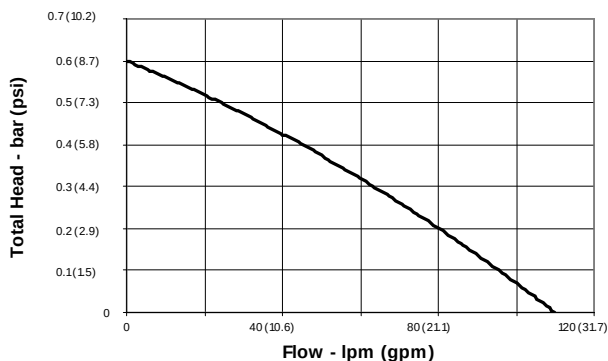
Relevant Standards

- ISO 8846 MARINE and USCG Regulations for Ignition Protection
- ISO 8849 MARINE Bilge Pump Standard

Performance Curve

50840-Series Cyclone Performance

Typical performance based on pumps running at 12.8V and 25.6V DC



Part Numbers

Model	Voltage	Port Fitting
50840-0012	12Vdc	NPTF
50840-2012	12Vdc	BSP
50840-0024	24Vdc	NPTF
50840-2024	24Vdc	BSP



WARNING: Do not pump petrol or fluids with a flash point below 37°C (98°F). Explosion and death may occur.

Installation Instructions

- The Cyclone can be mounted on any flat surface.
- The pump must be installed below the lowest fluid level to maintain flooded suction.
- Fit pump in a dry, well ventilated position.
- Use rubber grommets provided to minimise vibration.
- If mounted vertically, ensure the motor is above the pump head.
- Use 3/4" pipe fittings with PTFE pipe joint tape or compound.
- Plastic fittings should not be used if pump is installed below the waterline.



WARNING: All marine pumps discharging overboard must be installed with the overboard discharge well above both static and heeled waterlines. Flooding and death may occur.

Operation

- Pump may be run dry for short periods of time.
- Pump may be run against a closed discharge.

Maintenance

- Check all electrical connections periodically.
- Check seal area for signs of leaking.

Spare Parts List

See Exploded View (Page 4) for explanation of parts key

(A) Pump Head Kit (NPT)	50844-0000
Pump Head Kit (BSP)	50844-2000
(B) Seal Kit	50835-0000
(C) Motor Kit (12V)	50836-0012
Motor Kit (24V)	50836-0024

KEY	DESCRIPTION	KIT KEY			QTY PER KIT
		A	B	C	
1	Housing	1			1
2	End Cover	1			1
3	O-Ring	1	1		1
4	Screws	5	5		5
5	Impeller	1			1
6	Seal		1		1
7	Motor			1	1
8	Locking Nut	1	1		1
9	Slinger		1		1

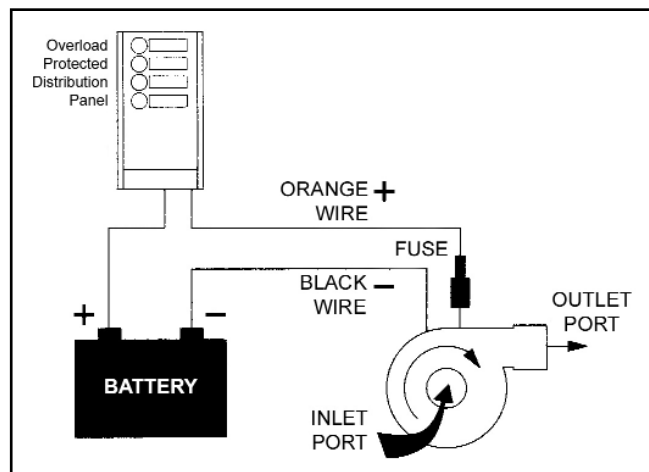


WARNING: Motor may get hot after prolonged use, do not touch. Burns may occur.

Wiring Instructions

- Make all electrical connections in dry locations.
- In humid/wet environments, connections must be sealed to prevent corrosion.
- Protect the circuit with a correctly fitted fuse or circuit breaker in the red/orange positive (+ve) lead, as close as possible to the power source.
- Connect the black negative (-ve) lead to the negative battery terminal.
- Inadequate voltage at the pump (not more than 3% below rated voltage) may result in poor pump performance. See table for wire sizing.

Wiring Diagram

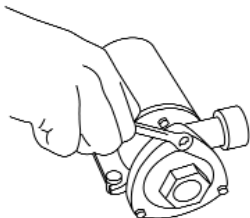
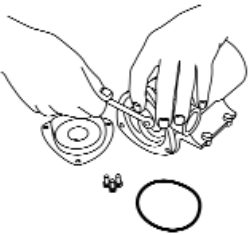
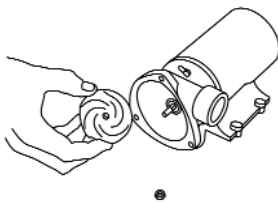
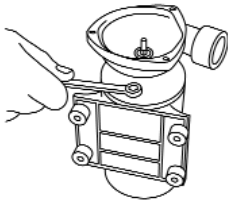
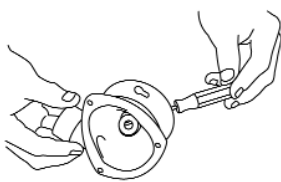


WARNING: If the fuse fails repeatedly, do not fit a heavier fuse or bridge the terminals. Fire and death may occur.

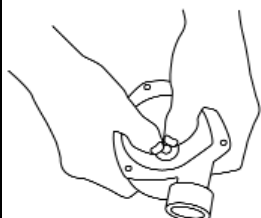
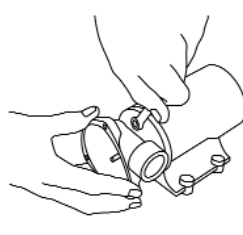
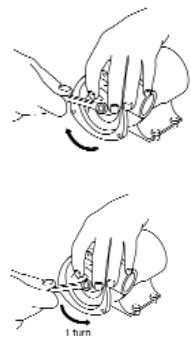
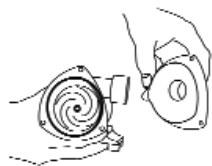
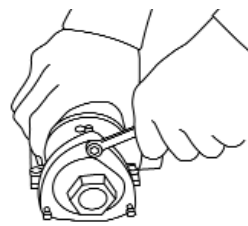
Model Number	Voltage	Maximum Current	Fuse Size	Wiring Size*		
				AWG	mm ²	Max. Length
50840-XX12	12V	9.0A	10A	14	2.5	4.5m (15 ft)
				10	6.0	9.0m (30 ft)
50840-XX24	24V	4.5A	7A	18	1.0	4.5m (15 ft)
				16	1.5	9.0m (30 ft)

* wire length from battery to pump and back to battery, maximum voltage drop 3%

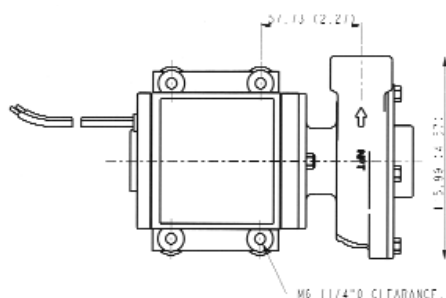
Dis - Assembly

1	Disconnect pump from power supply. Remove 3 end cover bolts, end cover & o-ring.	
2	Carefully holding impeller, remove impeller nut.	
3	Remove impeller.	
4	Loosen 2 head fixing bolts, rotate pump head and pull to remove.	
5	Remove seals from pump body.	

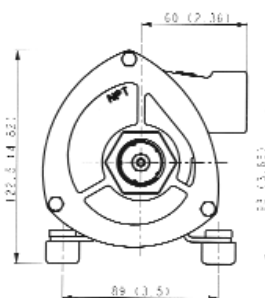
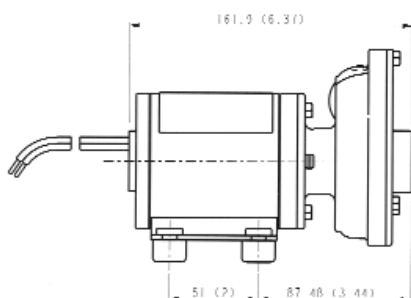
Re - Assembly

6	Wet the flat seal part and cup rubber and push into head.	
7	Fit head to motor locking into position and tighten head fixing bolts.	
8	Lubricate inside of mechanical seal and push onto shaft.	
9	Fit and carefully hold impeller and tighten nyloc nut. Once tight, carefully hold impeller and undo nut 1 revolution to set impeller clearance.	
10	Fit o-ring to the body, then place on the head.	
11	Tighten 3 end cover bolts.	

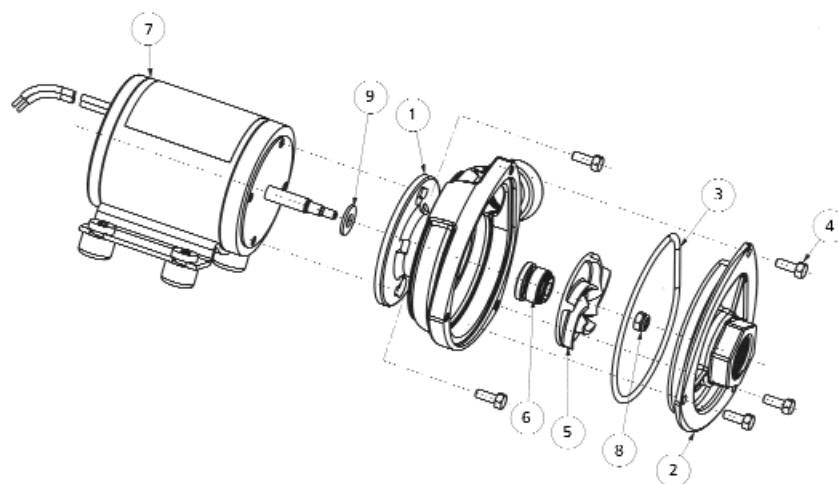
Dimensional Drawing



Dimensions in mm (inches)
Weight 2.88kg (6.3lbs)



Exploded View



ITT

Engineered for life

Jabsco, 1 Kondelin Road, Cape Ann Industrial Park, Gloucester, MA 01930

Tel : +1 978 281 0440 Fax : +1 978 283 2619

Jabsco, Bingley Road, Hoddesdon, Hertfordshire, EN11 0BU

Tel : +44 (0)1992 450145 Fax : +44 (0)1992 467132

Fluid Products Canada, 55 Royal Road, Guelph, Ontario N1H 1T1

Tel : +1 519 821 1900 Fax : +1 519 821 5316

NHK Jabsco Co Ltd, 3-21-10, Shin - Yokohama, Kohoku-ku, Yokohama 222

Tel : +81 (0) 45 475 8906 Fax : +81 (0) 45 475 8908

Jabsco GmbH, Oststraße 28, 22844 Norderstedt

Tel : +49 (0) 40 53 53 73 0 Fax : +49 (0) 40 53 53 73 11

Jabsco Italia, s.r.l., Via Tommaseo, 6, 20059 Vimercate, Milano

Tel : +39 039 685 2323 Fax : +39 039 666 307

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ITALY



Instruction Manual

UltimaSwitch™

12/24 V



Read and understand this manual prior to operating or servicing this product.

IB-116/02 (0911)

SPX®

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A single switch is in conformity with:
Recreational Craft Directive 94/25/EEC
ISO 8846: 1990/Electrical devices - Protection against ignition of
surrounding flammable gases



Made in the USA

Garanti 3 år
Warranty 3 year
Garantie 3 Jahren

Garantie 3 ans
Garantía 3 años
Garanzia 3 anni

UltimaSwitch™

UltimaSwitch är en mycket driftsäker halvledarbrytare som inte använder några mekaniska delar eller giftigt kvicksilver för att känna av vattennivån och som kan automatiskt styra en 12V DC eller 24V DC länsypump. Brytaren aktiverar pumpen när vattennivån når 2" eller högre och slår ifrån pumpen när vattennivån når under $\frac{3}{4}$ ". Ultimaswitch ställer automatiskt in sig mellan 12 V DC länsypump eller en 24V DC pump utan att några ingrepp krävs.

Varning!

1. Anslut en radsäkring med rätt amperetal (anges på pumpen).
2. UltimaSwitch är konstruerad endast för 12 VDC och 24 VDC drift. Använd inga andra spänningar, använd inte AC eller AC-DC omvandlade spänningskällor.
3. Underlåtenhet att använda lämplig säkring eller koppla ledningar i enlighet med medlevererade anvisningar upphäver all Johnson Pump Garanti och kan orsaka allvarliga skador eller personskador.

Installation

Placering:

1. Montera UltimaSwitch i vertikalt läge (Monteringshålen mot båtens nedre del) och nära pumpen så att vattennivån är lika för både pumpen och UltimaSwitch.

> Svenska

2. Montera inte UltimaSwitch direkt i båtens skrov. Använd ett monteringsblock av minst $\frac{3}{4}$ " tjock marin plywood epoxy-limmad mot skrovet på båten för att fästa Ultimaswitch.
3. Nederdelen på UltimaSwitch kan monteras högre men aldrig lägre än pumpbasen.

Obs! Om du monterar din UltimaSwitch på båtens sida, säkerställ att du fäster UltimaSwitch med användning av sidopelarna och beakta samma monteringsanvisningar som när du monterar UltimaSwitch i ett vertikalt läge.

Montering:

1. Märk ut styrhålen i UltimaSwitch-sockeln genom att använda UltimaSwitch-hålen.
2. För att undvika att borra igenom båtens skrov, ställ in borren på lämpligt djup för styrhålen.
3. Fäst UltimaSwitch direkt mot blocket med användning av #8 x 5/8" långa skruvar av rostfritt stål (inte medlevererat).

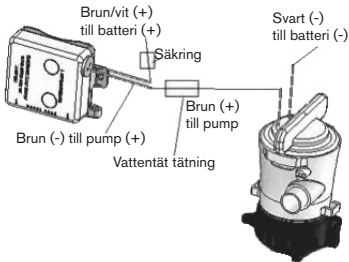


Ledningsdragnings:

1. Anslut den manuella fjärrbrytaren och radsäkringen mellan batteriet och UltimaSwitch.
2. Ledningsanslutningarna skall utföras med vattenskyddade permanenta anslutningsklämmor. Vattenfast el-tejp skall användas för att täcka anslutningsklämmorna. Monteringsanslutningarna skall vara ovanför den högsta vattennivån.
3. Den bruna UltimaSwitch ledningen med vit färgmarkering (+) skall fästas till den avsäkrade ledningen från plus--klämman.
4. Den bruna vidarekopplade UltimaSwitch ledningen till den bruna (+) pumpledningen.
5. Den svarta (-) pumpledningen till minus-batteriklämman.
6. 2 vägsomkopplare på instrumentbrädan Auto/On Funktion. Anslut brun brytarledning och brun plus (+) pumpledning till plus (+ ON läge) för instrumentbrädesomkopplaren. Anslut brun brytarledning med vit färgmarkering till plus (+) batteriklämman (radsäkring krävs).
7. 2 vägsomkopplare på instrumentbrädan OFF/ON Funktion. Anslut brun brytarledning till brun plus (+) pumpledning. Anslut brun brytarledning med vit färgmarkering till plus (+ On läge) för instrumentbrädesomkopplaren (radsäkring krävs).
8. 3 vägsomkopplare på instrumentbrädan ON/OFF/Auto

Funktion

Anslut brun brytarledning och brun plus (+) pumpledning till plus (+ ON läge) för instrumentbrädesomkopplaren. Anslut brun brytarledning med vit färgmarkering till plus (+ Auto läge) för instrumentbrädesomkopplare (radsäkring krävs). Svart minus (-) ledning från pumpen leds alltid till jord.



Drift av UltimaSwitch

1. Efter att installationen av UltimaSwitch är avslutad, håll två fingrar över de upphöjda cirkelrunda områdena på UltimaSwitch under ungefär 10 sekunder. Om ledningsdragningen är korrekt kommer länspumpen att aktiveras.

Om du tar bort ett finger från det cirkelrunda området, skall pumpen fortsätta att gå. Efter att båda fingrarna avlägsnas kommer länspumpen att slås av efter en kortare fördröjning.

2. Säkerställ att UltimaSwitch provas med vatten i båtens kölsvin för att på nytt bekräfta att pumpen kopplas till och från på rätt sätt. Om länspumpen inte aktiveras som det krävs, kan det bli nödvändigt att placera UltimaSwitch på ett annat ställe.

Felsökning:

Pumpen aktiveras inte:

- Kontrollera ledningarnas anslutningar
- Kontrollera säkringen
- Kontrollera pumpen genom att direktkoppla den till batteriet

Pumpen går oavbrutet:

- Kontrollera för ev. omkastad ledningsanslutning
- Brytaren monterad nedanför pumpen

Underhåll:

Din UltimaSwitch kommer att ge dig år av underhållsfri funktion. I händelse av funktionsfel, säkerställ att UltimaSwitch är fri från flytande skräp. Ha alltid alla säkringar och ledningsanslutningar högt och torrt.

> Svenska

Garanti:

Din UltimaSwitch täcks av en treårig begränsad garanti.

VARNING - Garantin blir ogiltig om tätningar på produkten förstörs, om någon elektrisk ledare kapas mer än 3 tum, om elektriska skarvar sänks ned i vatten, eller om produkten installeras i strid mot instruktioner och varningar.

UltimaSwitch™

The UltimaSwitch is a highly reliable solid state switch which uses no mechanical parts or toxic mercury to sense water level and automatically controls a 12V DC or 24V DC bilge pump. The switch activates the pump when the water level reaches 2" or more and turns off the pump when the water level reaches below $\frac{3}{4}$ ". The Ultimaswitch automatically adjusts between 12 V DC bilge pump or a 24V DC pump without any adjustments necessary.

Caution!

1. Connect an inline fuse of the appropriate amperage (specified on the pump).
2. The UltimaSwitch is designed for 12 VDC and 24 VDC operation only. Do not use any other voltages, do not use AC or AC-DC converted power sources.
3. Failure to use the appropriate fuse and connecting wires according to the instructions provided will void any Johnson Pump Warranty and may cause serious damage or personal injury.

Installation

Location:

1. Mount the UltimaSwitch in a vertical position (Mount holes towards the bottom of vessel) and close to the pump such that the water level is equal on both pump and the UltimaSwitch.

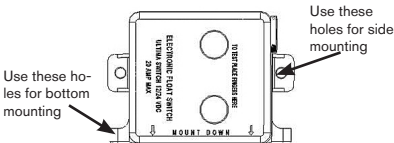
> English

2. Do not mount the UltimaSwitch directly to the hull of the boat. Use a mounting block of at least $\frac{3}{4}$ " thick marine plywood epoxied to the hull of the boat to fasten the Ultimaswitch.
3. The bottom of the UltimaSwitch can be mounted higher but never lower than the base of the pump.

Note: If your mounting the UltimaSwitch on the side of the boat, make sure you fasten the UltimaSwitch using the side posts and observing the same mounting instructions as you would installing the UltimaSwitch in a vertical position.

Mounting:

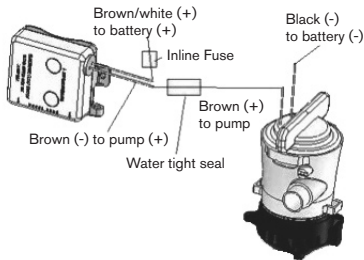
1. Mark pilot holes in the base of the UltimaSwitch by using the UltimaSwitch holes.
2. In order to avoid drilling through the hull of the vessel, set your drill to the appropriate depth for the pilot holes.
3. Fasten the UltimaSwitch directly to the block using #8 x 5/8" long stainless steel screws (not supplied).



Wiring:

1. Connect the remote manual switch and inline fuse between the battery and the UltimaSwitch.
2. The wiring connections should be made with water resistant permanent terminals. Liquid electrical tape should be used to coat the terminals. The mount connections should be above the highest water level.
3. The Brown with White Tracer (+) UltimaSwitch wire should be attached to the fused wire from the positive terminal.
4. The Brown relay UltimaSwitch wire to the Brown (+) pump wire.
5. The Black (-) pump wire to the negative battery terminal.
6. 2 Way Dash Panel Switch Auto/On Operation. Connect brown switch wire lead and brown positive (+) pump wire lead to positive (+ ON position) of dash panel switch. Connect brown with White Tracer switch wire lead to positive (+) battery terminal (in line fuse required).
7. 2 Way Dash Panel Switch OFF/ON Operation. Connect brown switch wire lead to brown positive (+) pump wire lead. Connect brown with white tracer switch wire lead to positive (+ On Position) of panel switch (Inline fuse required)
8. 3 Way Dash Panel Switch ON/OFF/Auto Operation. Connect brown switch wire lead and brown positive (+) pump wire lead to positive (+ ON Position) of dash panel switch. Connect Brown with white tracer switch wire lead to positive (+ Auto Position) of panel switch (Inline fuse required). Black negative (-) wire lead from pump always to ground.

> English



Operation of the UltimaSwitch

1. After installation of the UltimaSwitch is complete is complete, hold two fingers over the raised circular areas of the UltimaSwitch for approximately 10 seconds. If the wiring is correct the bilge pump will activate. If you remove a finger from the top circle, the pump should continue to be on. After removal of both fingers, the bilge pump will no longer run after a short delay.
2. Make sure to test the UltimaSwitch with water in the bilge of the vessel to re-affirm that the pump will turn on and off properly. If the bilge pump does not activate as required, a repositioning of the UltimaSwitch may be necessary.

Trouble Shooting:

Does not activate pump:

- Check Wiring
- Check Fuse
- Check pump by connecting directly to battery

Pump Runs Continuously:

- Check for reversed wiring
- Switch mounted below pump

Maintenance:

Your UltimaSwitch will provide years of maintenance free operation. In case of malfunction, make sure that the UltimaSwitch is clear of floating debris. At all times keep all fuse and wire connections high and dry.

Warranty:

Your UltimaSwitch is covered by a three year Limited Warranty.

CAUTION - Warranty void if seal on product is broken, if any electric cord is cut back more than 3 inches, if electric splices become sub-merged, or if product is installed contrary to instructions or warnings.

UltimaSwitch™

Der UltimaSwitch-Schalter ist ein höchst zuverlässiger kontaktloser Schalter, der keine mechanischen Teile oder toxisches Quecksilber zum Antasten des Wasserstands verwendet und automatisch eine 12V DC oder 24V DC Bilgenpumpe steuert. Der Schalter aktiviert die Pumpe, wenn der Wasserstand 2" oder mehr erreicht und schaltet die Pumpe aus, wenn der Wasserstand unter $\frac{3}{4}$ " liegt. Der UltimaSwitch stellt sich ohne jegliche zusätzliche Einstellungen automatisch auf 12 V DC oder 24V DC Bilgenpumpe ein.

Vorsicht!

1. Schließen Sie eine Inline-Sicherung mit angemessener Stromstärke (siehe Pumpe) an.
2. Der UltimaSwitch ist geeignet nur für den 12 VDC und 24 VDC Betrieb. Verwenden Sie keine anderen Spannungen oder AC- oder AC-DC-Stromquellen.
3. Falls keine angemessene Sicherung und Anschlussdrahte in Übereinstimmung mit den gegebenen Anweisungen verwendet werden, wird jeglicher Garantieanspruch der Firma Johnson Pump ungültig. Außerdem können ernsthafte Schäden und Verletzungen entstehen.

Installation

Einbauort:

1. Montieren Sie den UltimaSwitch-Schalter in senkrechter Stellung (Bohrungen in Richtung Boden des Boots) und

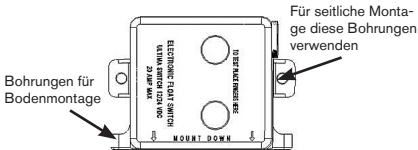
schließen Sie die Pumpe so an, dass der Wasserstand gleich mit der Pumpe und dem UltimaSwitch ist.

2. Den UltimaSwitch nicht direkt an den Rumpf anbauen.
Verwenden Sie zur Befestigung des UltimaSwitch-Schalters einen Montageblock aus Bootsbausperrholz mit einer Dicke von wenigstens $\frac{3}{4}$ ", der an den Rumpf geklebt wird.
3. Der Boden des UltimaSwitch-Schalters kann höher montiert werden, aber nie niedriger als der Boden der Pumpe.

Hinweis: Falls Sie den UltimaSwitch-Schalter an die Seite des Boots montieren, stellen Sie sicher, dass Sie den UltimaSwitch-Schalter mittels Seitenpfosten befestigen und dieselben Montageanweisungen befolgen wie beim Anbau des UltimaSwitch-Schalters in senkrechte Stellung.

Montage:

1. Markieren Sie auf dem Boden des UltimaSwitch-Schalters mit Hilfe der UltimaSwitch-Bohrungen die Montagebohrungen.
2. Um Bohren durch den Rumpf zu vermeiden, stellen Sie Ihren Bohrer auf eine angemessene Tiefe für die Bohrungen ein.
3. Befestigen Sie den UltimaSwitch-Schalter mittels 8 x 5/8" langen Edelstahlschrauben (nicht im Lieferumfang) direkt an den Block.

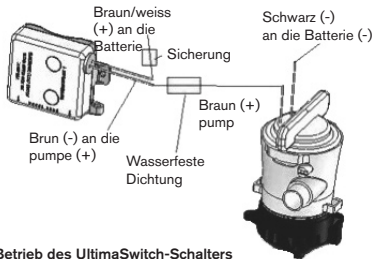


Verdrahtung:

1. Schließen Sie den manuellen Fernschalter und die Inline-Sicherung zwischen der Batterie und dem UltimaSwitch an.
2. Die Verdrahtungsanschlüsse sollten mit wasserfesten permanenten Klemmen gemacht werden. Zum Bedecken der Klemmen sollte flüssiges Isolierband verwendet werden. Die Montageanschlüsse sollten sich über dem höchsten Wasserstand befinden.
3. Der braune Draht mit weißem Zeichner (+) des Ultima-Switch-Schalters sollte an den gesicherten Draht von der positiven Klemme angeschlossen werden.
4. Der braune Relaisdraht des UltimaSwitch-Schalters sollte an den braunen Pumpendraht (+) angeschlossen werden.
5. Der schwarze (-) Pumpendraht sollte an die negative Batterieklemme angeschlossen werden.

6. Zweiwege-Bedienungsfeld Schalter Auto/Ein Betrieb
Schließen Sie den schwarzen Draht und den braunen positiven (+) Draht der Pumpe an den positiven (+ ON (EIN)-Stellung) Draht des Bedienungsfeldschalters. Schließen Sie den braunen Draht mit dem weißen Zeichner des Schalters an die positive (+) Batterieklemme (Inline-Sicherung nötig).
7. Zweiwege-Bedienungsfeld Schalter AUS/EIN Betrieb
Schließen Sie den braunen Schalterdraht an den braunen positiven (+) Pumpendraht an. Schließen Sie den braunen Draht mit weißen Zeichner des Schalters an den positiven (+ On-Stellung) Draht des Bedienungsfeldschalters (Inline--Sicherung nötig)
8. Dreiwege-Bedienungsfeld Schalter EIN/AUS/Automatikbetrieb. Schließen Sie den braunen Draht des Schalters und den braunen positiven (+) Draht der Pumpe an den positiven (+ ON-Stellung) Draht des Bedienungsfeldschalters an. Schließen Sie den braunen Draht mit weißem Zeichner an den positiven (+ Auto-Stellung) Draht des Bedienungsfeldschalters (Inline-Sicherung nötig) an. Der schwarze negative (-) Draht von der Pumpe sollte immer an die Erde angeschlossen werden.

> Deutsch



Betrieb des UltimaSwitch-Schalters

1. Nach der Installation des UltimaSwitch-Schalters halten Sie zwei Fingern für etwa 10 Sekunden über die erhobene kreisförmige Bereiche des UltimaSwitch-Schalters. Falls die Verdrahtung korrekt ist, schaltet die Bilgenpumpe ein. Wenn Sie Ihren Finger vom oberen Kreis entfernen, sollte die Pumpe weiter eingeschaltet bleiben. Nach dem Entfernen beider Finger schaltet die Pumpe nach einer kurzen Verzögerung aus.
2. Prüfen Sie den UltimaSwitch-Schalter auch in der Bilge des Boots, um nochmals sicher zu stellen, dass die Pumpe ordnungsgemäß ein- und ausschaltet. Falls die Bilgenpumpe nicht einschaltet, wie nötig, muss der UltimaSwitch-Schalter neu positioniert werden.

Fehlersuche:

Pumpe schaltet nicht ein:

- Verdrahtung überprüfen
- Sicherung überprüfen
- Pumpe überprüfen, indem sie direkt an die Batterie angeschlossen wird

Pumpe läuft ständig:

- Überprüfen, ob die Verdrahtung nicht umgekehrt ist
- Schalter ist unter der Pumpe installiert

Wartung:

Ihr UltimaSwitch-Schalter garantiert Ihnen einen jahrelangen wartungsfreien Betrieb. Im Falle von Störungen stellen Sie sicher, dass der UltimaSwitch frei von Fremdkörpern ist. Halten Sie die Sicherung und die Drahtanschlüsse hoch und trocken.

Garantie:

Ihrem UltimaSwitch-Schalter gilt eine dreijährige beschränkte Garantie.

VORSICHT – Der Garantieanspruch wird ungültig, falls das Siegel des Produkts gebrochen ist, eine elektrische Leitung mehr als 3" zurückgeschnitten ist, elektrische Verbindungen in Wasser getaucht werden oder das Produkt nicht in Übereinstimmung mit den Warnungen installiert wird.

UltimaSwitch™

L'UltimaSwitch est un commutateur à état solide très fiable qui n'utilise aucune pièce mécanique ni mercure toxique pour détecter le niveau de l'eau et contrôler automatiquement une pompe de cale en 12V DC or 24V DC. Le commutateur active la pompe quand le niveau d'eau atteint 2" ou plus et éteint la pompe quand le niveau d'eau arrive au-dessous de ¾". L'Ultimaswitch se règle automatiquement pour une pompe de cale en 12 V DC ou une pompe de cale en 24V DC sans autre réglage nécessaire.

Attention!

1. Raccordez en ligne un fusible d'un ampérage adéquat (spécifié sur la pompe).
2. L'UltimaSwitch est conçu pour ne fonctionner qu'en 12 VDC et 24 VDC. N'utilisez aucune autre tension, ne pas utiliser de courant alternatif CA ni de convertisseur CA-DC comme source d'alimentation électrique.
3. Ne pas utiliser de fusible ou de fils de raccordement conformément aux instructions jointes annule toute garantie de Johnson Pump et peut provoquer de sérieux dégâts ou des blessures corporelles.

Installation

Emplacement:

1. Installez l'UltimaSwitch en position verticale (les trous de montage sur le fond du bateau) et à proximité de la pompe de

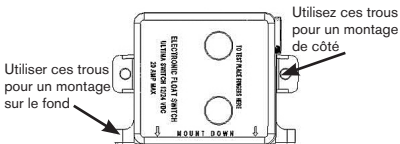
manière à ce que le niveau d'eau soit égal pour les deux, pompe et UltimaSwitch.

2. Ne pas installer l'UltimaSwitch directement sur la coque du bateau. Pour fixer l'Ultimaswitch, utilisez un bloc de montage d'au moins $\frac{3}{4}$ " d'épaisseur de contre-plaqué marine maintenu par un époxy sur la coque du bateau.
3. Le bas de l'UltimaSwitch peut être installé plus haut mais jamais plus bas que la base de la pompe.

Remarque: Si vous installez l'UltimaSwitch sur le côté du bateau assurez-vous d'installer l'UltimaSwitch en utilisant les montants latéraux et en observant les même instructions de montage comme si vous installiez l'UltimaSwitch en position verticale.

Montage:

1. Marquez les avant-trous dans la base de l'UltimaSwitch en utilisant les trous de l'UltimaSwitch.
2. Pour éviter de percer au travers de la coque du bateau, réglez votre perceuse à la profondeur appropriée pour les avant-trous.
3. Fixez l'UltimaSwitch directement au bloc en utilisant des vis inoxydables #8 x 5/8" de long (pas comprises dans la livraison).



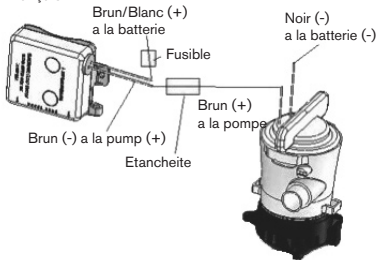
Câblage:

1. Raccordez le commutateur manuel à distance et le fusible en ligne entre la batterie et l'UltimaSwitch.
2. Les raccordements du câblage doivent être exécutés avec des bornes à étanchéité permanente. Une isolation liquide doit être utilisé pour recouvrir les bornes. Le montage des raccordements doit être au-dessus du niveau d'eau le plus haut.
3. Le fil Brun avec le Marquage Blanc (+) de l'UltimaSwitch doit être relié au fil protégé par le fusible de la borne positive.
4. Le fil Brun du relais de l'UltimaSwitch doit être relié au fil Brun (+) de la pompe.
5. Le fil Noir (-) de la pompe est raccordé à la borne négative de la batterie.
6. Interrupteur à deux voies du tableau de commande avec fonctionnement Auto/Marche (Auto/On). Connectez le fil conducteur brun de l'interrupteur et le conducteur brun (+) de

la pompe à la borne positive (+ position Marche (ON)) du tableau de commande. Raccordez le fil brun avec le Marquage Blanc à la borne positive (+) de la batterie (fusible en ligne nécessaire).

7. Interrupteur à deux voies du tableau de commande avec fonctionnement Arrêt/Marche (OFF/ON). Raccordez le conducteur brun du commutateur au conducteur positif (+) brun de la pompe. Raccordez le fil brun avec le marquage blanc du commutateur à la borne positive (+ position Marche (On)) du tableau de commande (fusible en ligne nécessaire)
- 8) Interrupteur à trois voies du tableau de commande avec fonctionnement Marche/Arrêt/Auto (ON/OFF/Auto Operation). Raccordez le conducteur brun du commutateur et le conducteur positif (+) brun de la pompe à la borne positive (+ position Marche (ON)) du tableau de commande. Raccordez le conducteur Brun avec le Marquage Blanc à la borne positive (+ position Auto) du tableau de commande (fusible en ligne nécessaire). Le conducteur négatif Noir (-) de la pompe est toujours mis à la terre.

> Français



Fonctionnement de l'UltimaSwitch

1. Après que l'installation de l'UltimaSwitch est terminée, tenir deux doigts sur les zones circulaires marquées de l'UltimaSwitch pendant environ 10 secondes. Si le câblage est correct, la pompe de cale va être activée. Si vous retirez un doigt du cercle du haut, la pompe devrait continuer à fonctionner. Après avoir retiré les deux doigts, la pompe ne doit pas continuer à fonctionner après un court temps de retard.
2. Assurez-vous de réessayer l'UltimaSwitch avec de l'eau dans la cale du bateau pour re-confirmer que la pompe va se mettre en marche et s'arrêter correctement. Si la pompe de cale ne se met pas en marche comme requis, un repositionnement de l'UltimaSwitch peut être nécessaire.

Dépannage:

La pompe ne s'active pas:

- Contrôlez le câblage
- Contrôlez le fusible
- **Contrôlez la pompe en la raccordant directement à la batterie**

La pompe fonctionne continuellement:

- Croisez le câblage
- Le commutateur est monté au-dessous de la pompe

Maintenance:

Votre UltimaSwitch vous procurera des années de fonctionnement sans aucun entretien. En cas de mauvais fonctionnement, assurez-vous que l'UltimaSwitch est libre de débris flottants. En tout temps maintenez les câbles et fusibles hors d'eau et secs.

Garantie:

Votre UltimaSwitch est couvert par une Garantie Limitée de trois ans.

ATTENTION – La garantie est annulée si l'étanchéité du produit est endommagée, si un quelconque fil est coupé (ou dénudé) de plus de 3 pouces, si les raccordements électriques sont submergés ou si le produit est installé de manière contraire aux instructions et avertissements.

UltimaSwitch™

El UltimaSwitch es un interruptor sólido altamente fiable que no usa partes mecánicas ni mercurio tóxico para detectar el nivel del agua y controlar automáticamente una bomba de sentina de 12V DC o 24V DC. El interruptor activa la bomba cuando el nivel del agua alcanza 2" o más y apaga la bomba cuando en nivel del agua baja por debajo de $\frac{3}{4}$ ". El UltimaSwitch ajusta automáticamente entre una bomba de sentina de 12V DC o una bomba de 24V DC sin que sea necesario ningún ajuste.

¡Peligro!

1. Conecte un fusible de línea entrante del voltaje apropiado (especificado en la bomba).
2. El UltimaSwitch está diseñado para su operación con 12V DC y 24V DC solo. No use otros voltajes, no use fuentes de energía de AC o AC-DC convertidas.
- 3) Si no usa el fusible y los cables de conexión apropiados de acuerdo a las instrucciones proporcionadas esto anulará la Garantía de Johnson Pump y puede causar serios daños o daños personales.

Instalación

Localización:

1. Monte el UltimaSwitch en posición vertical (Monte los agujeros hacia la parte inferior del barco) y cerca de la bomba

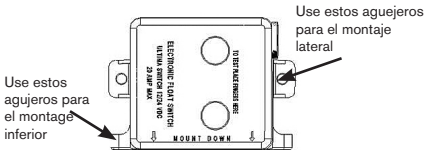
de manera que el nivel del agua sea igual en la bomba y en el UltimaSwitch.

2. No monte el UltimaSwitch directamente en el casco de la embarcación. Use un bloque de montaje de al menos $\frac{3}{4}$ " de espesor de madera contrachapada cubierta de resina al casco de la embarcación para asegurar el UltimaSwitch.
3. La parte inferior del UltimaSwitch puede ser montada más alta pero nunca más baja que la base de la bomba.

Nota: Si está montando el UltimaSwitch a un lado de la embarcación, asegúrese de que sujete el UltimaSwitch usando los postes laterales y observando las mismas instrucciones de montaje que si montara el UltimaSwitch en posición vertical.

Montaje:

1. Marque los agujeros piloto en la base del UltimaSwitch usando los agujeros del UltimaSwitch.
2. Para evitar atravesar el casco de la embarcación, ponga su taladro a la profundidad adecuada para los agujeros piloto.
3. Sujete el UltimaSwitch directamente al bloque usando tornillos largos de acero inoxidable de #8 x $\frac{5}{8}$ " (no suministrados).



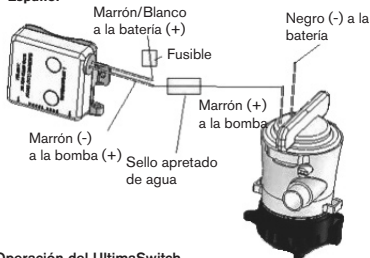
Cableado:

1. Conecte el interruptor manual remoto y el fusible de línea entrante entre la batería y el UltimaSwitch.
2. Las conexiones de los cables deberían hacerse con terminales permanentes resistentes al agua. Se debería usar cinta adhesiva eléctrica líquida para revestir los terminales. Las conexiones de montaje deberían estar por encima del nivel más alto del agua.
3. El cable Trazador Marrón con Blanco (+) UltimaSwitch se debería fijar al cable del fusible desde el terminal positivo.
4. El cable de relé Marrón UltimaSwitch al cable de la bomba Marrón (+).
5. El cable de la bomba Negro (-) al terminal negativo de la batería.
6. Interruptor de Panel de 2 Vías de Arranque de Operación Auto/Encendido. Conecte el cable de plomo marrón del interruptor y el cable de plomo positivo (+) marrón de la bomba al positivo (+ posición de ENCENDIDO) del interruptor del

panel de arranque. Conecte el cable de plomo marrón del interruptor con Rastreador Blanco al terminal positivo (+) de la batería (se necesita un fusible con línea de entrada).

7. Interruptor de Panel de 2 Vías de Arranque de Operación Apagado/Encendido. Conecte el cable de plomo marrón del interruptor al cable de plomo marrón positivo (+) de la bomba. Conecte el cable de plomo marrón del interruptor con rastreador blanco al positivo (+ Posición de Encendido) del interruptor del panel (se necesita un fusible con línea de entrada).
8. Interruptor de Panel de 3 Vías de Arranque de Operación Apagado/Encendido/ Auto. Conecte el cable de plomo marrón del interruptor y el cable de plomo positivo (+) marrón de la bomba al positivo (+ posición de ENCENDIDO) del interruptor del panel de arranque. Conecte el cable de plomo Marrón del interruptor con rastreador blanco al positivo (+ Posición Auto) del interruptor del panel (se necesita un fusible con línea de entrada). El cable de plomo negro negativo (-) desde la bomba siempre va a la tierra.

> Español



Operación del UltimaSwitch

1. Después de que la instalación del UltimaSwitch esté completa, mantenga dos dedos sobre las áreas circulares levanta das del UltimaSwitch durante aproximadamente 10 segundos. Si el cableado es correcto la bomba de sentina se activará. Si quita un dedo del círculo superior, la bomba debería seguir encendida. Después de quitar los dos dedos, la bomba de sentina dejará de funcionar después de un corto espacio de tiempo.
2. Asegúrese de probar el UltimaSwitch con agua en la sentina de la embarcación para reafirmar que la bomba se enciende y se apaga correctamente. Si la bomba de sentina no se activa correctamente, puede que se necesite un reposicionamiento del UltimaSwitch.

Descubrimiento de Problemas:

La bomba no se activa:

- Revise el Cableado
- Revise el Fusible
- Revise la bomba conectándola directamente a la batería

La Bomba Funciona Continuamente:

- Revise si hay cables invertidos
- Interruptor montado por debajo de la bomba

Mantenimiento:

Su UltimaSwitch le proporcionará años de funcionamiento libres de mantenimiento. En caso de mal funcionamiento, asegúrese de que el UltimaSwitch está limpio de basura flotante. Mantenga siempre todas las conexiones de cables y fusibles en alto y secos.

Garantía:

Su UltimaSwitch está cubierto por una Garantía Limitada de tres años.

PRECAUCIÓN – La garantía se anula si se rompe el sello del producto, si cualquier cordón eléctrico se corta más de 3 pulgadas, si se sumergen los empalmes eléctricos o si el producto no se instala de acuerdo con las instrucciones y los avisos.

UltimaSwitch™

UltimaSwitch è un interruttore a stato solido altamente affidabile che non utilizza parti meccaniche o mercurio tossico, in grado di rilevare il livello dell'acqua e di controllare in automatico una pompa di sentina a corrente continua da 12V o 24V. L'interruttore attiva la pompa quando il livello dell'acqua raggiunge 2" o più e spegne la pompa quando il livello dell'acqua torna sotto ¾". L'interruttore Ultimaswitch si regola in automatico a seconda della presenza di una pompa a corrente continua da 12 V o di una pompa a corrente continua da 24 V, senza necessità di una ulteriore regolazione.

Attenzione!

1. Collegate un fusibile in linea con amperaggio appropriato (specificato sulla pompa).
2. L'interruttore UltimaSwitch è progettato per il funzionamento esclusivo con corrente continua a 12 V o a 24V. Non utilizzate alcun altro tipo di voltaggio e non utilizzate alimentatori a corrente alternata o a corrente di conversione alternata - continua.
3. Nel caso in cui non venga utilizzato un fusibile appropriato ovvero in cui i cavi non vengano collegati come da istruzioni fornite, la Garanzia perde validità per qualsiasi Pompa Johnson; ciò può inoltre causare gravi danni a cose e/o persone.

Installazione

Collocazione:

1. Montate l'interruttore UltimaSwitch in posizione verticale (posizionate i fori verso il fondo dell'imbarcazione) e vicino alla pompa in modo che il livello dell'acqua sia identico sulla pompa e sull'interruttore UltimaSwitch.
2. Non montate l'interruttore UltimaSwitch direttamente sullo scafo della barca: utilizzate un supporto, ossia un pannello di legno compensato per uso marittimo di almeno $\frac{3}{4}$ " di spessore e protetto da resina epossidica, da applicare allo scafo della barca per fissare l'interruttore.
3. La parte inferiore dell'interruttore UltimaSwitch può essere posizionata al di sopra della base della pompa, ma mai al di sotto.

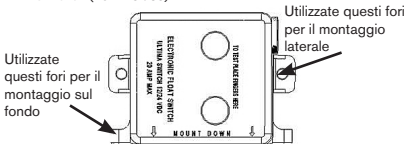
NB: Nel caso in cui montiate l'interruttore UltimaSwitch sul lato della barca, assicuratevi di fissare bene UltimaSwitch utilizzando i puntelli laterali ed attenendovi quindi alle stesse istruzioni di montaggio come per l'installazione di UltimaSwitch in posizione verticale.

Montaggio:

1. Contrassegnate i fori pilota sulla base dell'interruttore UltimaSwitch con l'aiuto dei fori di UltimaSwitch
2. Per evitare di forare lo scafo dell'imbarcazione, tarate accuratamente la profondità della punta del trapano prima di effettuare i fori pilota.

> Italiano

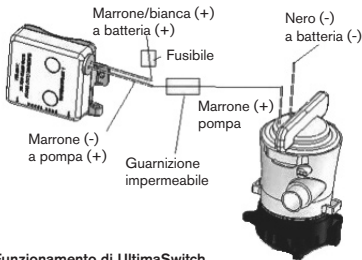
3. Fissate l'interruttore UltimaSwitch direttamente sul pannello utilizzando delle viti in acciaio inossidabile di dimensioni #8 x 5/8" (non incluse).



Cablaggio:

1. Collegate l'interruttore manuale a distanza ed il fusibile in linea tra la batteria e l'interruttore UltimaSwitch.
2. I collegamenti dei cavi devono essere dotati di morsetti permanenti resistenti all'acqua. I morsetti devono essere rivestiti con adesivo liquido per materiale elettrico. I collegamenti di supporto devono essere al di sopra del livello più alto dell'acqua.
3. Il cavo Marrone con Tracciatura Bianca (+) dell'interruttore UltimaSwitch deve essere collegato al cavo sotto fusibile dal morsetto positivo.
4. Il relè Marrone del cavo UltimaSwitch al cavo Marrone (+) della pompa.

5. Il cavo Nero (-) della pompa al morsetto negativo della batteria.
6. Interruttore bipolare del pannello di controllo Funzionamento Auto/On (automatico /acceso). Collegate il conduttore isolato del cavo marrone dell'interruttore ed il conduttore isolato del cavo marrone positivo (+) della pompa al positivo (+ posizione ON – acceso) dell'interruttore del pannello di controllo. Collegate il conduttore isolato del cavo Marrone con Tracciatura Bianca dell'interruttore al morsetto positivo (+) della batteria (è necessario un fusibile in linea).
7. Interruttore bipolare del pannello di controllo Funzionamento OFF/ON (spento /acceso). Collegate il conduttore isolato del cavo marrone dell'interruttore al conduttore del cavo marrone positivo (+) della pompa. Collegate il conduttore isolato del cavo marrone con tracciatura bianca dell'interruttore al positivo (+ posizione ON – acceso) dell'interruttore del pannello di controllo (è necessario un fusibile in linea).
8. Interruttore tripolare del pannello di controllo Funzionamento ON/OFF/Auto (spento /acceso/ automatico). Collegate il conduttore isolato del cavo marrone dell'interruttore ed il conduttore isolato del cavo marrone positivo (+) della pompa al positivo (+ posizione ON – acceso) dell'interruttore del pannello di controllo. Collegate il conduttore isolato del cavo marrone con tracciatura bianca al positivo (+ posizione Auto - automatico) dell'interruttore del pannello di controllo (è necessario un fusibile in linea). Il conduttore isolato del cavo nero negativo (-) dalla pompa va sempre messo a terra.



Funzionamento di UltimaSwitch

1. Dopo aver completato l'installazione dell'interruttore UltimaSwitch, tenete due dita sulle aree circolari in rilievo di UltimaSwitch per circa 10 secondi. Se il cablaggio è corretto, la pompa di sentina si attiva. Togliendo il dito dal cerchio superiore, la pompa dovrebbe continuare a funzionare. Togliendo entrambe le dita, la pompa smette di funzionare dopo breve tempo.
2. Assicuratevi di testare l'interruttore UltimaSwitch in presenza di acqua nella sentina dell'imbarcazione per accertarvi che la pompa si accenda e si spenga correttamente. Se la pompa di sentina non si attiva come dovrebbe, potrebbe essere necessario riposizionare l'interruttore UltimaSwitch.

Eliminazione di guasti /errori:

La pompa non si attiva:

- Controllate il Cablaggio
- Controllate il Fusibile
- Controllate la pompa collegandola direttamente alla batteria

La pompa funziona in continuo:

- Controllate eventuali inversioni di cavi
- L'interruttore è montato sotto la pompa

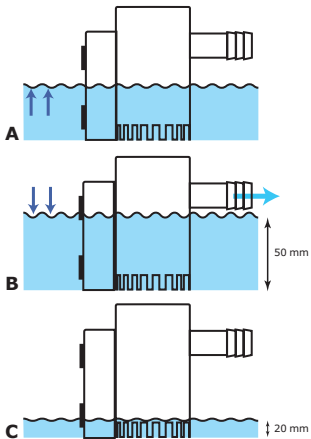
Manutenzione:

Il vostro interruttore UltimaSwitch consente un funzionamento di diversi anni senza necessità di manutenzione. In caso di mal-funzionamento, assicuratevi che l'interruttore sia libero da detriti galleggianti. I fusibili ed i collegamenti elettrici devono sempre essere mantenuti asciutti ed in posizione elevata.

Garanzia:

Il vostro interruttore UltimaSwitch è coperto da una Garanzia Limitata di tre anni.

ATTENZIONE – La garanzia perde validità nei seguenti casi: se il sigillo sul prodotto è rotto, se qualsiasi cavo è stato accorciato di più di 3 pollici, se i giunti elettrici vengono a trovarsi sotto il livello dell'acqua, o se il prodotto non è stato installato conformemente alle istruzioni o alle avvertenze.

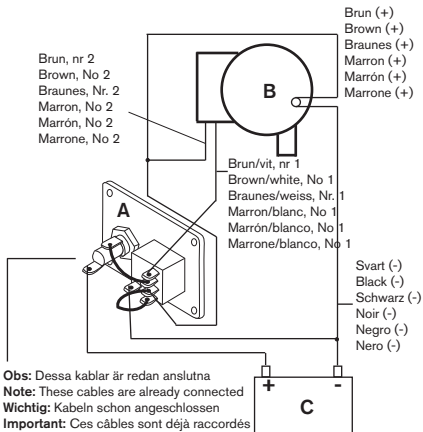


Elektrisk installation med Johnson Pump panel
Electrical installation with Johnson Pump Panel
Elektrischer Anschluss mit Johnson Pump Schalttafel
Schéma de raccordement avec le tableau de
commande Johnson Pump
Instalación eléctrica con panel Johnson Pump
Schema collegamento elettrico con pannello
di controllo Johnson Pump

A Panel
Panel
Schalttafel
Tableau de commande
Panel
Pannello

B Länspump
Bilge pump
Bilgenpumpe
Pompe de cale
Bomba de sentina
Pompa di sentina

C Batteri
DC supply
DC-Versorgung
Batterie
Bateria
Batteria



Obs: Dessa kablar är redan anslutna

Note: These cables are already connected

Wichtig: Kabeln schon angeschlossen

Important: Ces câbles sont déjà raccordés

Advertencia: Estos cables ya van conectados

Nota Bene: Questi cavi sono già collegati

Elektrisk intsallation utan panel

Electrical installation without panel

Elektrischer Anschluss ohne Schalttafel

Schéma de raccordement sans tableau de commande

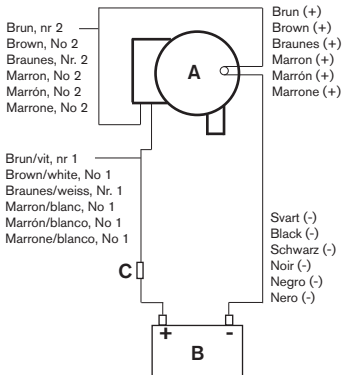
Instalación eléctrica sin panel

**Schema collegamento elettrico senza pannello
di controllo**

A Länspump
 Bilge pump
 Bilgenpumpe
 Pompe de cale
 Bomba de sentina
 Pompa di sentina

B Batteri
 DC supply
 DC-Versorgung
 Batterie
 Bateria
 Batteria

C Säkring
 Fuse
 Sicherung
 Fusible
 Fusible
 Fusibile



Warranty Information

Johnson Pumps of America of 10509 United Parkway, Schiller Park, Illinois 60176 warrants to the original consumer purchaser that this product will be free from defects in material and workmanship, providing that the case is not opened or the pump otherwise abused for a period of three (3) years from the date originally purchased.

The exclusive remedy of the consumer purchaser in the event the product does not meet this express Limited Warranty is to return the pump to Johnson Pump at the above address, freight prepaid with your sales receipt. **IMPORTANT: FOR THIS WARRANTY TO BE EFFECTIVE, JOHNSON PUMP MUST BE SUPPLIED WITH THE ORIGINAL PURCHASE DATE OF THE PRODUCT. THE ACCEPTANCE BY JOHNSON PUMP OF ANY PRODUCT RETURNED SHALL NOT BE DEEMED AN ADMISSION THAT SUCH PRODUCT IS DEFECTIVE OR IN VIOLATION OF ANY WARRANTY. THE COMPANY RESERVES THE RIGHT TO REPAIR OR REPLACE THE PRODUCT.**

NO REPRESENTATIVE OR OTHER PERSON IS AUTHORIZED TO ASSUME FOR JOHNSON PUMP ANY ADDITIONAL LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS OR TO ALTER THIS WARRANTY IN ANY WAY.

IN NO EVENT WILL JOHNSON PUMPS OF AMERICA BE LIABLE FOR MORE THAN THE SALES PRICE OF THE PRODUCT. UNDER NO CIRCUMSTANCES WILL JOHNSON BE LIABLE FOR ANY LOST PROFITS, INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES. THE LIMITATION ON LIABILITY FOR LOST PROFITS, INCIDENTAL OR CONSEQUENTIAL COST EXPENSES OR DAMAGES SHALL SURVIVE ANY FAILURE OF ESSENTIAL PURPOSE OF THIS LIMITED WARRANTY. Some states do not allow the exclusive or limitation of incidental or consequential damages, so the above limitation may not apply to you.

NO EXPRESS OR LIMITED WARRANTY, INCLUDING WARRANTY OF MERCHANTABILITY AND FITNESS SHALL EXTEND FOR ANY PERIOD OF TIME GREATER THAN THREE YEARS FROM THE DATE OF ORIGINAL PURCHASE OF THIS PRODUCT. Some states do not allow limitation on how long an implied warranty lasts so the above limitation may not apply to you. **CAUTION - Warranty void if seal on product is broken, if any electric cord is cut back more than 3 inches, if electric splices become submerged, or if product is installed contrary to instructions or warnings.**

Johnson Pumps of America

10509 United Parkway

Schiller Park, Illinois 60176

Fax (847)671-7909

www.johnson-pump.com

E-Mail: CUSTOMERSERVICE@JOHNSONPUMPCHI.COM



Johnson Pumps of America Inc.
1625 Hunter Road, Suite B, Hanover Park, Illinois, 60133, USA
Tel. +1 847 671 7867. Fax +1 847 671 7909.
E-mail: johnson-pump.usa@processequipment.spx.com

SPX Johnson Pump Marine AB
Nastagatan 19, P.O. Box 1436
SE-701 14 Örebro, Sweden
Phone: +46 (0)19 21 83 00 Fax: +46 (0)19 27 23 72
E-mail: johnson-pump.marine@processequipment.spx.com

For more information about our worldwide locations, approvals, certifications, and local representatives, please visit www.johnson-pump.com

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*Before you do it your way,
please try it our way*

Notice to Boat Manufacturer or Installer

Throughout this publication, Warnings and Cautions (accompanied by the International Hazard Symbol ) are used to alert the manufacturer or installer to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly.

Observe Them Carefully!

These safety alerts alone, cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the installation and maintenance plus common sense operation are major accident prevention measures.

DANGER

Immediate hazards which **WILL** result in severe personal injury or death.

WARNING

Hazards or unsafe practices which **COULD** result in severe personal injury or death.

CAUTION

Hazards or unsafe practices which **COULD** result in minor injury or product or property damage.

NOTICE

Information which is important to proper installation or maintenance, but is not hazard-related.

WARNING

Cleaning fluids containing ammonia, acids or any other corrosive ingredients MUST NOT be used for cleaning any part of this Hydraulic Steering System. Failure to comply will cause serious damage to the steering system, resulting in possible loss of steering, causing property damage, personal injury and/or death.

NOTICE

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

Don't compromise performance... use genuine SeaStar parts only!

- SeaStar Helms
- SeaStar Hoses
- SeaStar Cylinders
- SeaStar Oil

Substituting non SeaStar parts in any part of the SeaStar hydraulic steering system, may seriously compromise system performance.

Please ensure this manual is left on board the boat for future reference.

INTRODUCTION

Before proceeding with the installation, read these instructions thoroughly. Teleflex cannot accept responsibility for installations where instructions have not been followed, where substitute parts have been used, or modifications have been made to our products. Warranty may be void if products other than Teleflex products are used with this system.

NOTICE

Due to a small amount of internal hydraulic slip, a "master spoke: or "centered" steering wheel cannot be maintained with a Hydraulic Steering System. For best results, use an equal distance spoke steering wheel.



WARNING

DO NOT use a wire coil type trim switch with a hydraulic steering system. Wire coil can wind up tight around the steering wheel shaft and prevent further steering!

PRO Trim offers fingertip trim or jackplate control with a column-mounted switch, enabling you to keep both hands on the steering wheel and concentrate on your driving. PRO Trim PT1000 controls trim or jackplate only. PRO Trim Dual PT2000 controls both functions.



WARNING

SeaStar PRO Power Assist units are to be used with SeaStar PRO Helms ONLY!

NOTICE

This installation manual covers the entire, SeaStar and SeaStar PRO PA Series. Notes are made, when required, to cover any differences between the part numbers.

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The following Power Assist Units are covered in this installation manual. PA1200-2, PA1225-2 and PA1315-2.

BEFORE OPERATING YOUR BOAT

WARNING

The SeaStar P/A unit has been designed and tested for use with Marine Hydraulic Steering ONLY. It is not recommended for any other use. Not complying with this warning may result in property damage and/or personal injury or death.

Ensure that the following check list is carried out

- 1 With the P/A unit "OFF" (ignition off) perform a system pressure test by turning the helm all the way to hard over and then forcing the helm another one quarter to one half turn past the stop point.

Inspect the following areas for leaks.

- Inspect helm fittings
- Inspect P/A fittings
- Inspect cylinder fittings

Look for evidence of a leak. This test is to be done in BOTH directions. Any leak that is noticed will need to be repaired before operating the boat.

- 2 **Confirm that extruded nylon tubing has NOT been substituted for SeaStar/SeaStar PRO Hydraulic Steering hose.**
- 3 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 simple steps:
 - If installed on an outboard engine, with the engine fully titled, 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 restrictors. Contact Jack plate manufacturer 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.
 - Confirm that the hydraulic hose/tube are not subjected to chafing, rubbing or stretching. Stretched, kinked or chafed hose/tube will fail over a period of time leading to loss of steering control.

WARNING

Failure to comply with the above may result in loss of steering control, leading to collision with obstacle(s), ejection from vessel resulting in property damage and/or personal injury or death.

WARNING

Stretched, kinked or chafed hose will fail over a period of time.

CAUTION

If power to the unit is lost, the SeaStar Power Assist and SeaStar Power Assist PRO will revert to manual steering, requiring substantially more effort to turn the wheel.

WARNING

When working in an area where fumes from fuel are present, allow the fumes to disperse completely **BEFORE** doing any electrical connection to the battery. Failure to do so may result in an explosion and or fire.

SeaStar P/A Compatibility Chart

The P/A and P/A PRO are designed for use in recreational marine applications in conjunction with SeaStar and SeaStar PRO steering systems. Optimal performance will be obtained when used with SeaStar, or SeaStar PRO 1.4, 1.7 and 2.0 Helm pumps.

CAUTION

SeaStar nylon tube may **ONLY** be used for the compensating line. **DO NOT** use SeaStar Nylon tube to plumb any other portion of the steering system.

SeaStar P/A PRO is NOT to be used with SeaStar Hydraulic Steering, performance will be compromised. ONLY use P/A PRO with a SeaStar PRO Hydraulic steering system and ensure that SeaStar PRO (1500 psi) hose is used to plumb the entire system. (Nylon tubing may be used for the compensating/return line ONLY.

Tools

NOTICE

Use **ONLY** Teleflex products with the P/A unit as with ALL Teleflex systems. Failure to do so may void your warranty.

You will need the following tools to complete your installation.

- 1/2", 5/8", and 3/4" open end wrench.
- Electrical cut and crimp pliers.
- All other tools noted with your Helm Pump and Steering Cylinder Installation Instructions.

Specifications

NOTICE

The SeaStar Power Assist will automatically recognize the voltage level once it is connected to an on board power source (refer to page 12 for electrical connections).

WARNING

ONLY use SeaStar PRO Power Assist with a SeaStar PRO helm.

DO NOT exceed peak operating pressure. 1000psi – Standard, 1500psi – Pro.

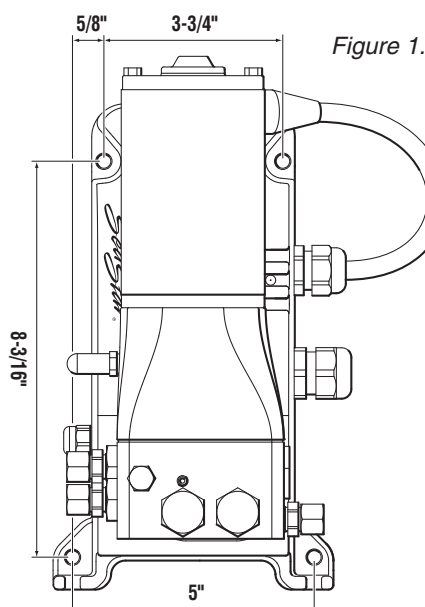


Figure 1.

SEASTAR POWER ASSIST 12/24V (PA1200-2 AND PA1225-2)

- 12/24 Volts (automatically recognized)
- 1000psi MAX system peak pressure (500psi working load)
- PEAK Current Draw = 60 amps
- MAX Current Draw = 40 amps
- Typical current draw:
 - Single outboard ~ 3 amps, average
 - Twin rudder inboard ~ 8 amps, average
- Purple ignition wire MAX current draw = 1 amp

SEASTAR PRO POWER ASSIST, 12/24V (PA1315-2)

- 12/24 Volts (automatically recognized)
- 1500psi MAX System peak pressure (500psi working load)
- PEAK Current Draw = 60 amps
- MAX Current Draw = 40 amps
- Typical current draw:
 - Single outboard ~ 3 amps, average
 - Twin rudder inboard ~ 8 amps, average
- Purple ignition wire MAX current draw = 1 amp

Part No.	Harness Length	Voltage (auto recognized)	Relief Pressure Setting
PA1200-2	15'	12/24 Volt	1000psi
PA1225-2	25'	12/24 Volt	1000psi
PA1315-2	15'	12/24 Volt	1500psi

HOW THE SYSTEM WORKS

SeaStar P/A (Power Assist) steering uses an electronically controlled hydraulic pump to provide "Power" for your SeaStar Hydraulic Steering system.

The SeaStar P/A system is comprised of two circuits: a hand operated manual system, which is the control element, and a hydraulic power pump, which is the working element.

The manual system consists of a helm pump with internal relief and check valves, as well as a built in reservoir. Two steering lines and a compensating line which provide a routing for fluid to transmit through the system, and a steering cylinder which moves the steering device on the boat from side to side.

The power system, is an electronically controlled hydraulic pump that boosts the fluid being sent from the helm pump to the steering cylinder (this will result in much easier effort at the wheel—even when under heavy loads). A compensating line connects the P/A unit to the helm pump, allowing the P/A unit to share fluid with the helm reservoir.

The SeaStar P/A is compatible with multiple steering stations, and with the use of an autopilot. In the event of a P/A power loss or failure the hydraulic system will automatically revert to a manual hydraulic system.

Typical installations shown (please refer to you cylinder installation manual for proper hose installation diagrams).

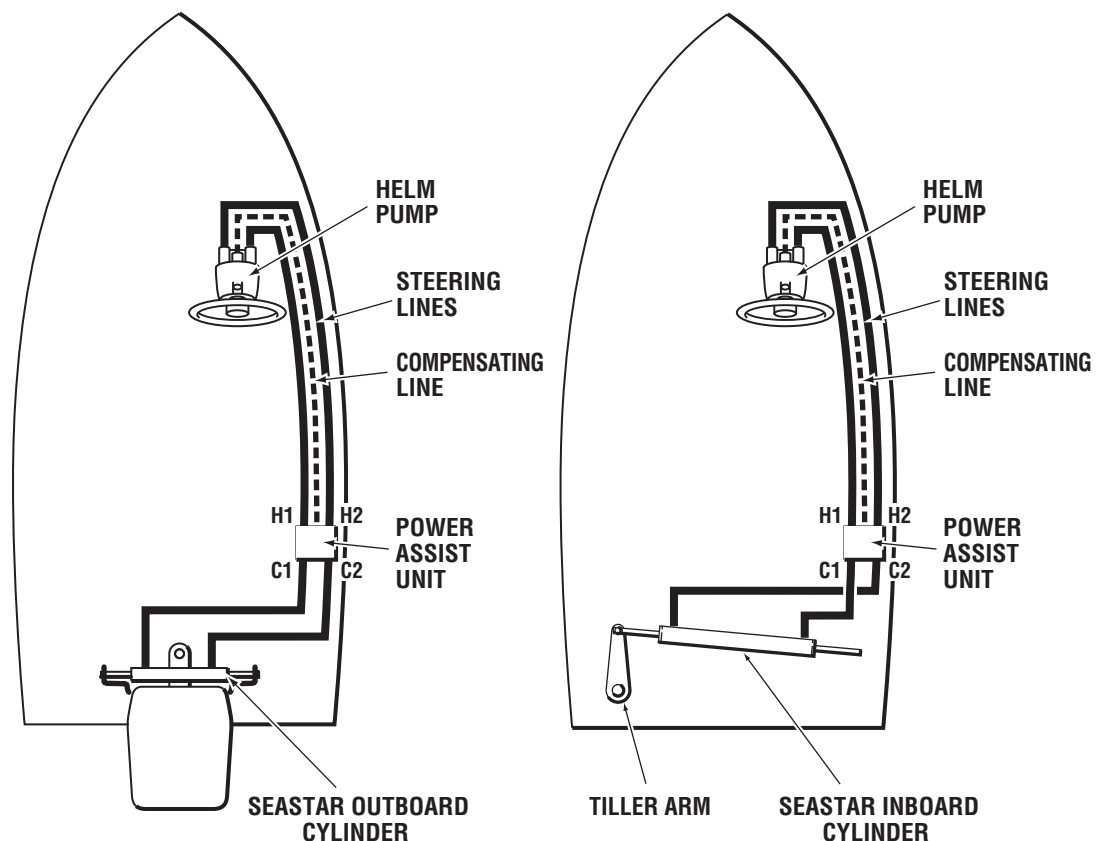


Figure 2.

THINGS YOU NEED TO KNOW

WARNING

SeaStar/SeaStar PRO Steering hoses **CANNOT** be cut. Cutting these hoses will render them useless. Failing to comply may result in possible loss of steering causing property damage, personal injury and/or death.

CAUTION

DO NOT use SeaStar Nylon tube with P/A unit, other than to plumb the compensating line. Use of SeaStar or SeaStar PRO steering hose is the **ONLY** hose recommended for use with the P/A unit.

CAUTION

Confirm that all components needed to complete the installation are purchased, including: helm pump, steering cylinder, hoses, fluid, fittings and pipe sealant such as Loctite PST, **NEVER USE TEFLON TAPE.**

CAUTION

Take **EXTREME** care not to allow any foreign material or contamination to enter the hydraulic system. Contamination is the main cause for a hydraulic system to wear and or fail. Keep protective caps on hose ends until ready to install onto the fitting.

NOTICE

*The SeaStar and SeaStar PRO Power Assist pump will automatically recognize the power source output (12/24Volt). If connecting SeaStar, or SeaStar PRO Power Assist directly to the battery, the connection **MUST** be fused in compliance with ABYC specifications.*

BEFORE STARTING

Study this manual and the other manuals provided with your SeaStar Steering system carefully, and thoroughly to familiarize yourself with all of the components and their intended or required mounting locations. Ensure there is adequate space available for installation of all components, hydraulic lines, and easy access for service. It is good practice to mount all components first, before running hoses. This allows port to port connection with less chance of an error. If you must run hoses first, a system of marking the various lines must be used. ALL hose ends must be closed with tape or similar material to prevent contamination.

Contamination is the most common cause of system failure.

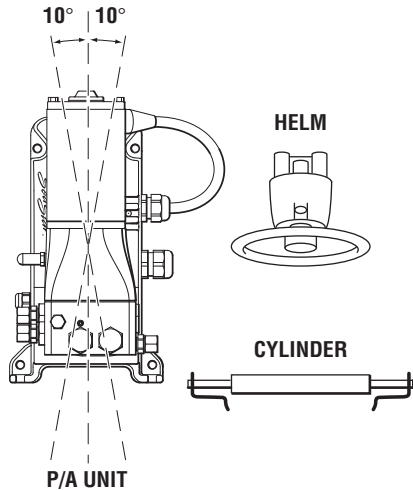
Read ALL bold print text, notes and cautions. Reading them now will help prevent unexpected surprises during the installation.

These instructions have been made as complete as possible, but as brief as practical. If you have any questions, contact your Distributor or Teleflex Canada.

SYSTEM INSTALLATION OVERVIEW

STEP 1

System Installation



- Install SeaStar Helm pump onto the dash using installation instructions provided with your helm pump.
- Install Steering Cylinder into boat using the installation instructions provided with your steering cylinder.
- The P/A unit will make a noise similar to that of an autopilot; this should be taken into consideration if installing the P/A unit into a center consul and/or in an area where noise is preferred to be limited. Install the P/A unit in a vertical position (see diagram) as close the steering cylinder as possible.
DO NOT mount the P/A unit in a horizontal position.

⚠ WARNING The P/A motor may be **HOT to the touch**, **DO NOT** mount P/A in an area where fabrics and/or any other flammable material may come in contact with the P/A motor.

- Install steering hoses using diagrams noted on page 6 through page 10, using your specific application.

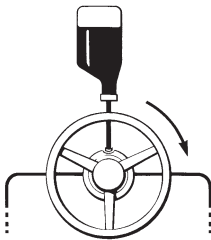
⚠ WARNING The SeaStar PRO system must use SeaStar PRO steering hoses.

NOTICE Due to the different cylinders options available with SeaStar Steering, be sure that you choose the correct installation diagram noted in this book.

NOTICE Hoses **MUST** be at least 6' in length from the power assist to the helm pump, or, from the power assist to the cylinder(s).

STEP 2

Filling and Purging Procedure

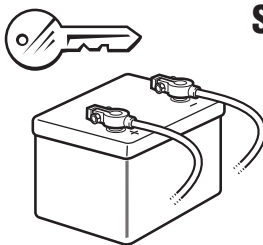


- Refer to steps 1 through 5, located on page 15 of this manual.

⚠ CAUTION **DO NOT** run the P/A unit until the SeaStar Steering System has been bled free of air. Failure to do so may result in non-repairable damage to the P/A unit.

STEP 3

Electrical Installation



- Refer to page 12 of this manual for electrical connection.

STEP 4

Final Purge and System Check

- Turn ignition ON and continue with the filling and purging instructions step 6 on page 18 of this manual

SeaStar Outboard Front Mount Cylinders and I/O Cylinder

Outboard Front Mount Cylinders:

HC5345 HC5347
 HC5358 HC5348
 HC6751 HC6750
 HC6753 HC6752
 HC6755 HC6754

I/O Cylinder:

HC5332

CAUTION

ALL hose connections **MUST** be torqued to 15 ft-lb (20.34Nm).

NOTICE

Hoses **MUST** be at least 6' in length from the power assist to the helm pump, or, from the power assist to the cylinder(s).

HELM PUMP MODEL & DISPLACEMENT	WHEEL TURNS
1.7 cu.in. per revolution	5
2.0 cu.in. per revolution	4
2.4 cu.in. per revolution	3.5

WARNING

DO NOT run the wires or hoses in areas where they may come in contact with battery acid or excessive heat, i.e. engine exhaust, manifolds or any other area that may damage the wires or hoses.

Hose connection is as follows.

- Helm to P/A = S (helm) to H1 (P/A), P (helm) to H2 (P/A), lower R port (helm) to R (P/A).
- P/A to cylinder = C2 (P/A) to starboard side (cylinder), C1 (P/A) to port side (cylinder).

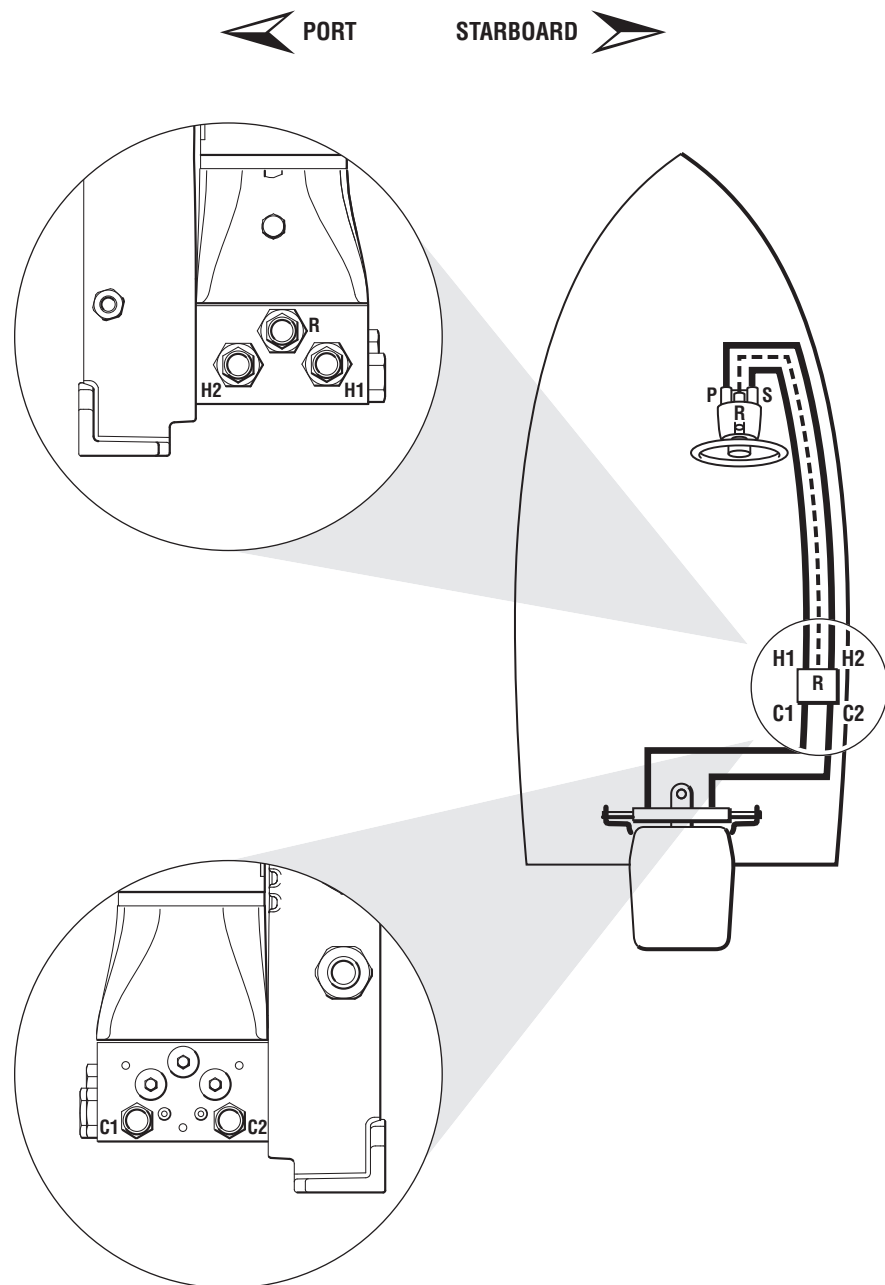


Figure 3.

NOTICE

Hoses **MUST** be at least 6' in length from the power assist to the helm pump, or, from the power assist to the cylinder(s).

HELM PUMP MODEL & DISPLACEMENT**WHEEL TURNS
CONFIG. A
'PARALLEL'****WHEEL TURNS
CONFIG. B
'SERIES'**

1.7 cu.in. per revolution

10

5

2.0 cu.in. per revolution

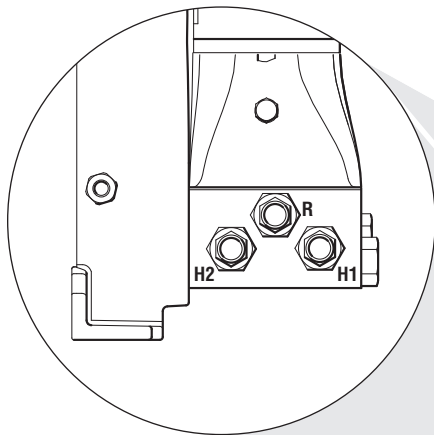
8

4

2.4 cu.in. per revolution

6

3.5

**CAUTION**

ALL hose connections **MUST** be torqued to 15 ft-lb (20.34Nm).

WARNING

DO NOT run the wires or hoses in areas where they may come in contact with battery acid or excessive heat, i.e. engine exhaust, manifolds or any other area that may damage the wires or hoses.

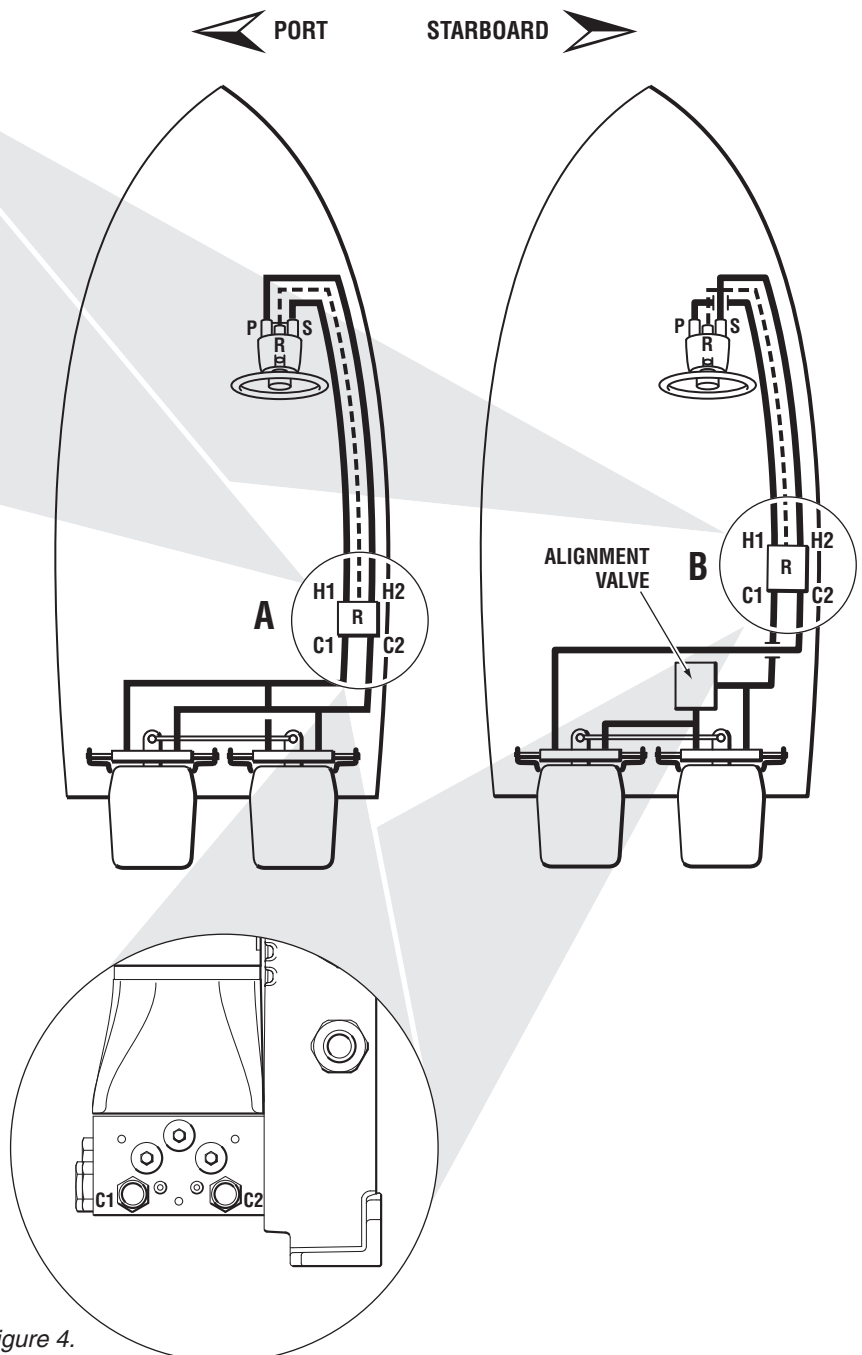


Figure 4.

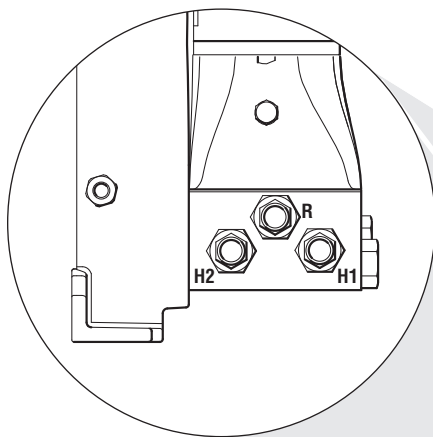
SEASTAR POWER ASSIST

SYSTEM INSTALLATION

NOTICE

Hoses **MUST** be at least 6' in length from the power assist to the helm pump, or, from the power assist to the cylinder(s).

HELM PUMP MODEL & DISPLACEMENT	WHEEL TURNS CONFIG. C 'PARALLEL'	WHEEL TURNS CONFIG. D 'SERIES'
1.7 cu.in. per revolution	14.5	10
2.0 cu.in. per revolution	12.5	8
2.4 cu.in. per revolution	10.3	6



CAUTION

ALL hose connections **MUST** be torqued to 15 ft-lb (20.34Nm).

WARNING

DO NOT run the wires or hoses in areas where they may come in contact with battery acid or excessive heat, i.e. engine exhaust, manifolds or any other area that may damage the wires or hoses.

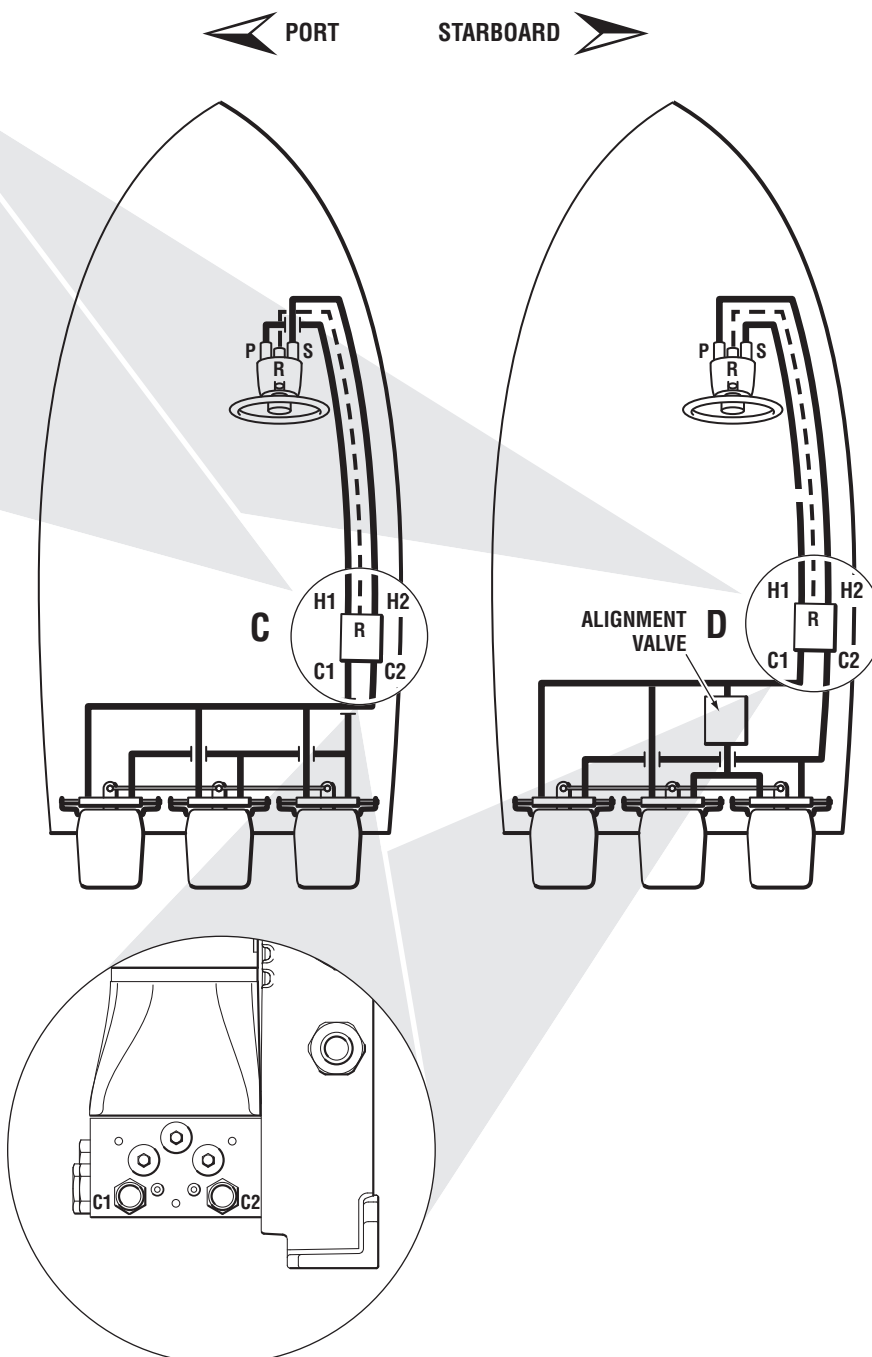


Figure 5.

SeaStar Outboard Side Mount and Splashwell Mount Cylinders

Side Mount Cylinder:
HC5370

Splashwell Cylinder:
HC5380

NOTICE

Unbalanced cylinder will result in unequal wheel turns.

Hose connection is as follows.

- Helm to P/A = S (helm) to H1 (P/A), P (helm) to H2 (P/A), lower R port (helm) to R (P/A).
- P/A to cylinder = C1 (P/A) to starboard side (cylinder). C2 (P/A) to port side (cylinder).

HELM PUMP MODEL & DISPLACEMENT	WHEEL TURNS HC5370	WHEEL TURNS HC5380
1.7 cu.in. per revolution	4.8/5.7	5.5/6.5
2.0 cu.in. per revolution	4.0/4.8	4.6/5.5
2.4 cu.in. per revolution	3.5/4.0	3.9/4.6

⚠ WARNING

DO NOT use SeaStar PRO systems with HC5370 side mount and/or HC5380 Splashwell mount cylinders as SeaStar PRO systems are not compatible with any unbalanced cylinder.

NOTICE

Hoses MUST be at least 6' in length from the power assist to the helm pump, or, from the power assist to the cylinder(s).

⚠ CAUTION

ALL hose connections **MUST** be torqued to 15 ft-lb (20.34Nm).

⚠ WARNING

DO NOT run the wires or hoses in areas where they may come in contact with battery acid or excessive heat, i.e. engine exhaust, manifolds or any other area that may damage the wires or hoses.

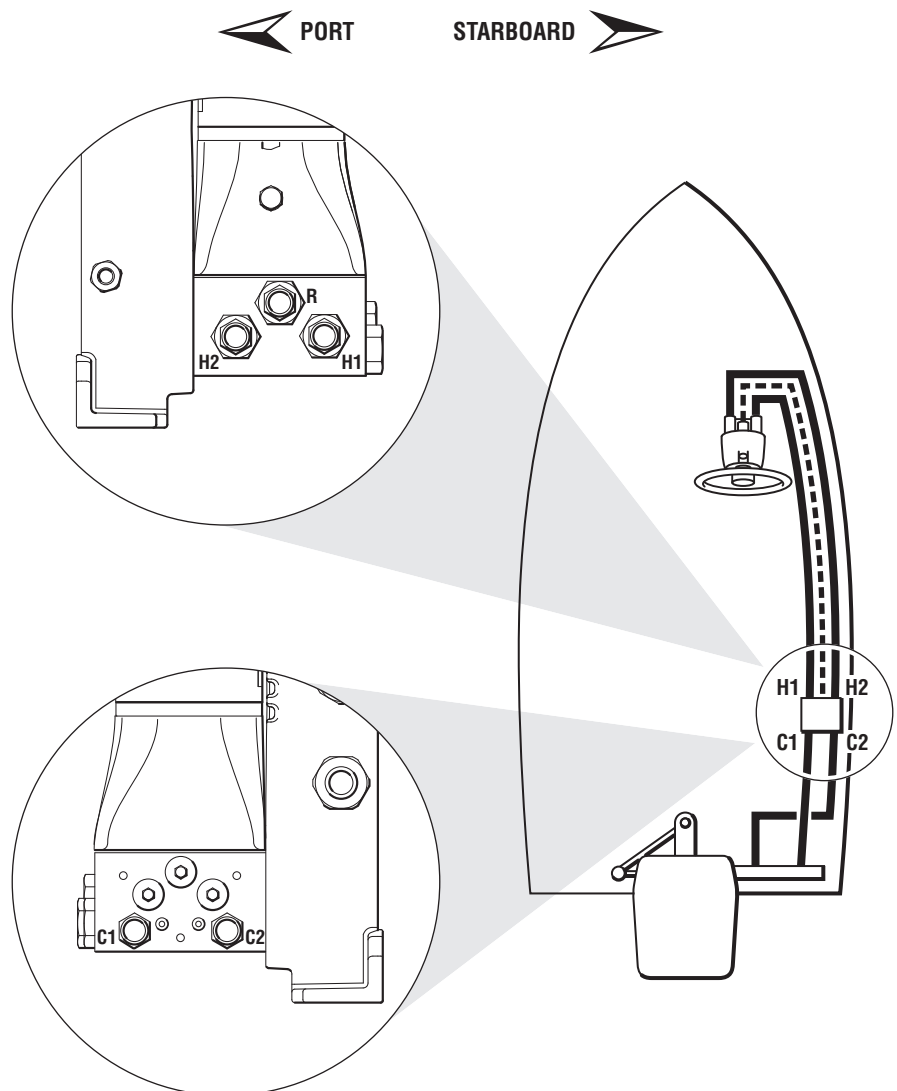


Figure 6.

SeaStar Inboard and Sterndrive Cylinders ALL

All Inboard & Sterndrive Except: HC5332

NOTICE

Hoses **MUST** be at least 6' in length from the power assist to the helm pump, or, from the power assist to the cylinder(s).

CAUTION

ALL hose connections **MUST** be torqued to 15 ft-lb (20.34Nm).

WARNING

DO NOT run the wires or hoses in areas where they may come in contact with battery acid or excessive heat, i.e. engine exhaust, manifolds or any other area that may damage the wires or hoses.

Hose connection is as follows.

- Helm pump to P/A = S (helm) to H1 (P/A), P (helm) to H2 (P/A), lower R port (helm) to R (P/A).
- P/A to cylinder = C1 (P/A) to starboard side (cylinder), C2 (P/A) to port side (cylinder).

HELM PUMP MODEL & DISPLACEMENT	WHEEL TURNS				
	HC5312-2	HC5313	HC5314	HC5318	HC5319
1.7 cu.in. per revolution	4.2	5	6	6	8
2.0 cu.in. per revolution	3.6	4	5	5	6.8
2.4 cu.in. per revolution	3	3.5	4.2	4.2	5.7

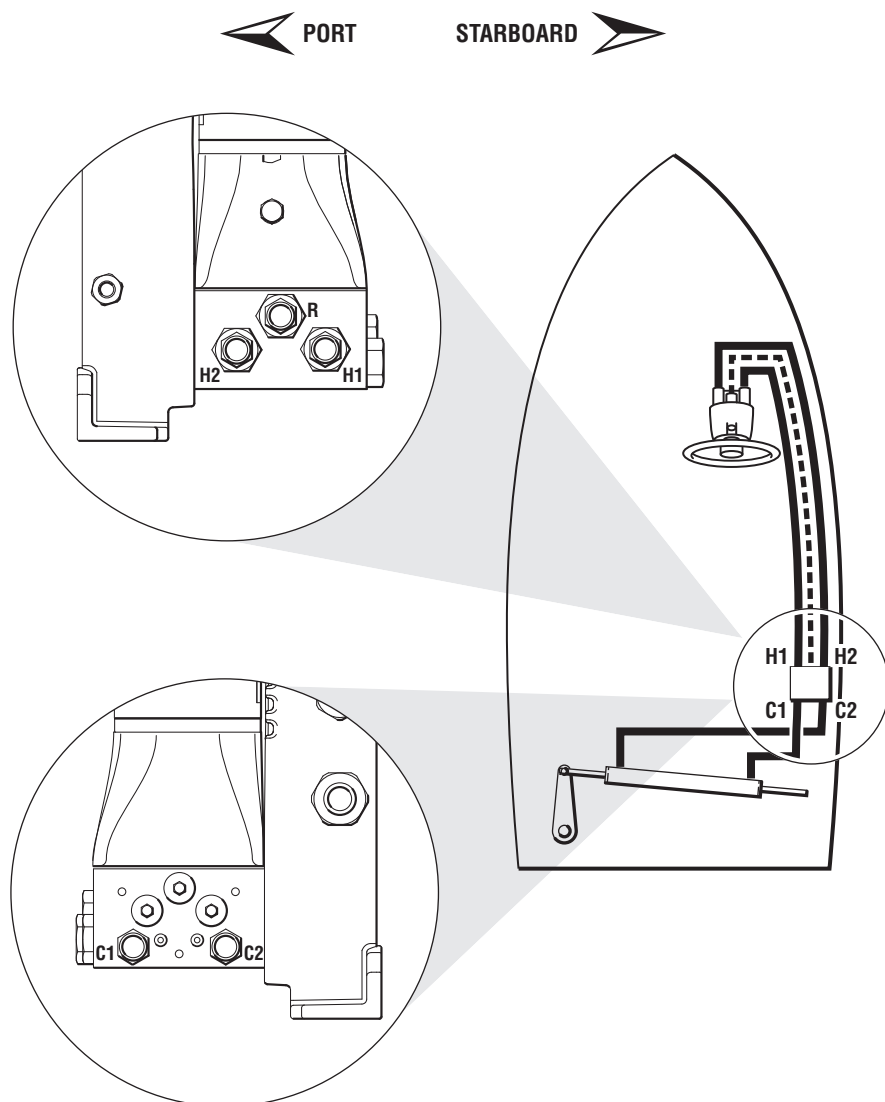


Figure 7.

Autopilot Connection Detail

NOTICE

Installation and operation can be simplified with the purchase of a SeaStar AutoPilot Pump. Contact Teleflex Marine for details.

Hose connection is as follows.

- Autopilot pump **MUST** be connected to the steering lines **AFTER** the P/A (see diagram below). The return R line **MUST** be tee'd into the system in front of the P/A unit (see diagram below).
- Refer to page 6 through page 10 for you cylinder application.
- When bleeding, ensure that the autopilot Reservoir line is bled free of air at the same time the Power Assist Reservoir line is bled free of air. Autopilot pump must be run in both directions during the bleeding procedure, refer to page 18 for details.

NOTICE

Hoses **MUST** be at least 6' in length from the power assist to the helm pump, or, from the power assist to the cylinder(s).

⚠ WARNING

DO NOT run the wires or hoses in areas where they may come in contact with battery acid or excessive heat, i.e. engine exhaust, manifolds or any other area that may damage the wires or hoses.

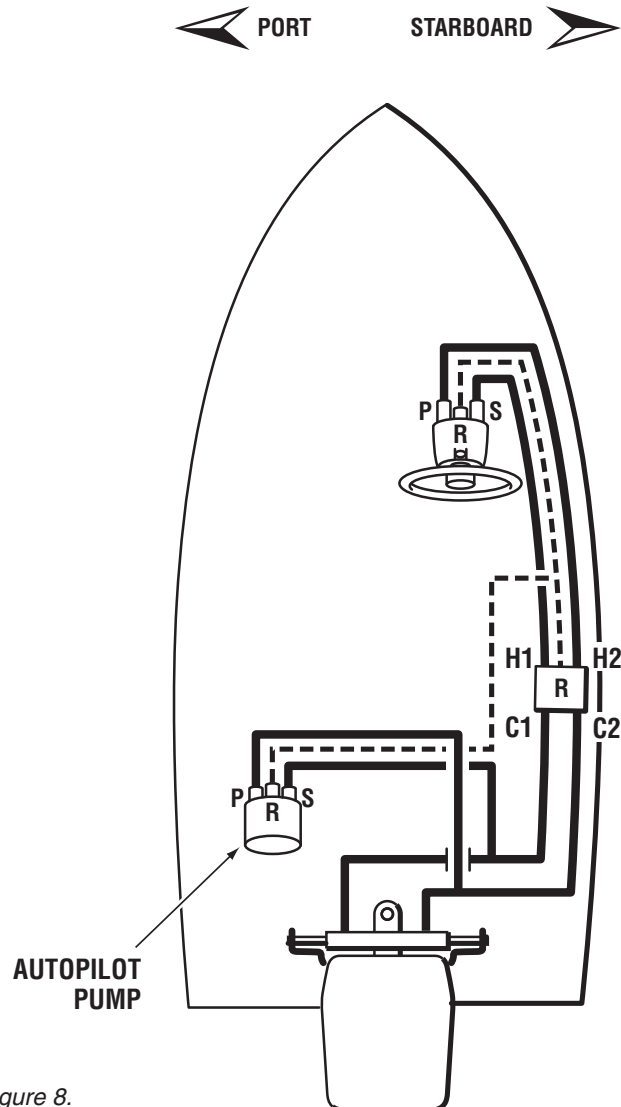


Figure 8.

Electrical Installation

! WARNING

ALWAYS use ABYC compliant components in electrical installations of the Power Assist and any other electrical device being installed on board the vessel. Failure to do so may result in a fire and/or explosion leading to property damage, personal injury and/or death.

! WARNING

If connecting directly to a battery there MUST be an overcurrent protection as per ABYC E11.12 OVERCURRENT PROTECTION. Failure to do so may result in a fire and/or explosion leading to property damage, personal injury and/or death.

- Refer to wiring diagram on page 13 of this manual.
- Connect Red wire (+ positive) to the positive (+) supply
- Connect Black wire (– negative) to the negative (–) supply
- Connect purple wire (Power) to the ignition of the boat. Use of a two-position ON/OFF switch is recommended, use a fuse protected switch **ONLY**. Use of this switch will allow the helmsman to turn the Power Assist OFF in the case of power supply being limited.

NOTICE

The Power Assist wiring may be cut to length as per your installation.

NOTICE

Always use appropriate wiring terminals as per ABYC requirements.

! WARNING

Overcurrent protection MUST be used to connect the SeaStar Power Assist in a distribution panel or to a battery. The overcurrent may be:

- **An ABYC compliant, 50AMP rated circuit breaker, or**
- **An in-line MAXI fuse, Teleflex part # HA1206**
- **If the location of the SeaStar Power Assist unit is within 72" of the battery, the main over-current protection (fuses) within the Power Assist unit itself will meet ABYC requirements.**

NOTICE

If applicable, complete the wiring from the distribution panel to the boat battery in accordance to ABYC E-11.10 Load Calculation and E-11.16 System wiring.

Wiring Diagram

NOTICE

For multiple engine applications it is advisable to install a Dual Ignition Control Kit (part# HA1201). This kit will enable the Power Assist to work in the event an engine(s) may not be running.

⚠ WARNING

DO NOT run the wires or hoses in areas where they may come in contact with battery acid or excessive heat, i.e. engine exhaust, manifolds or any other area that may damage the wires or hoses.

NOTICE

If the location of the SeaStar Power Assist unit is within 72" of the battery, the main overcurrent protection (fuses) within the unit itself will meet ABYC requirements.

NOTICE

2 x 40 amp ATO/ATC fuses are located inside the rear panel of the SeaStar Power Assist Pump.

NOTICE

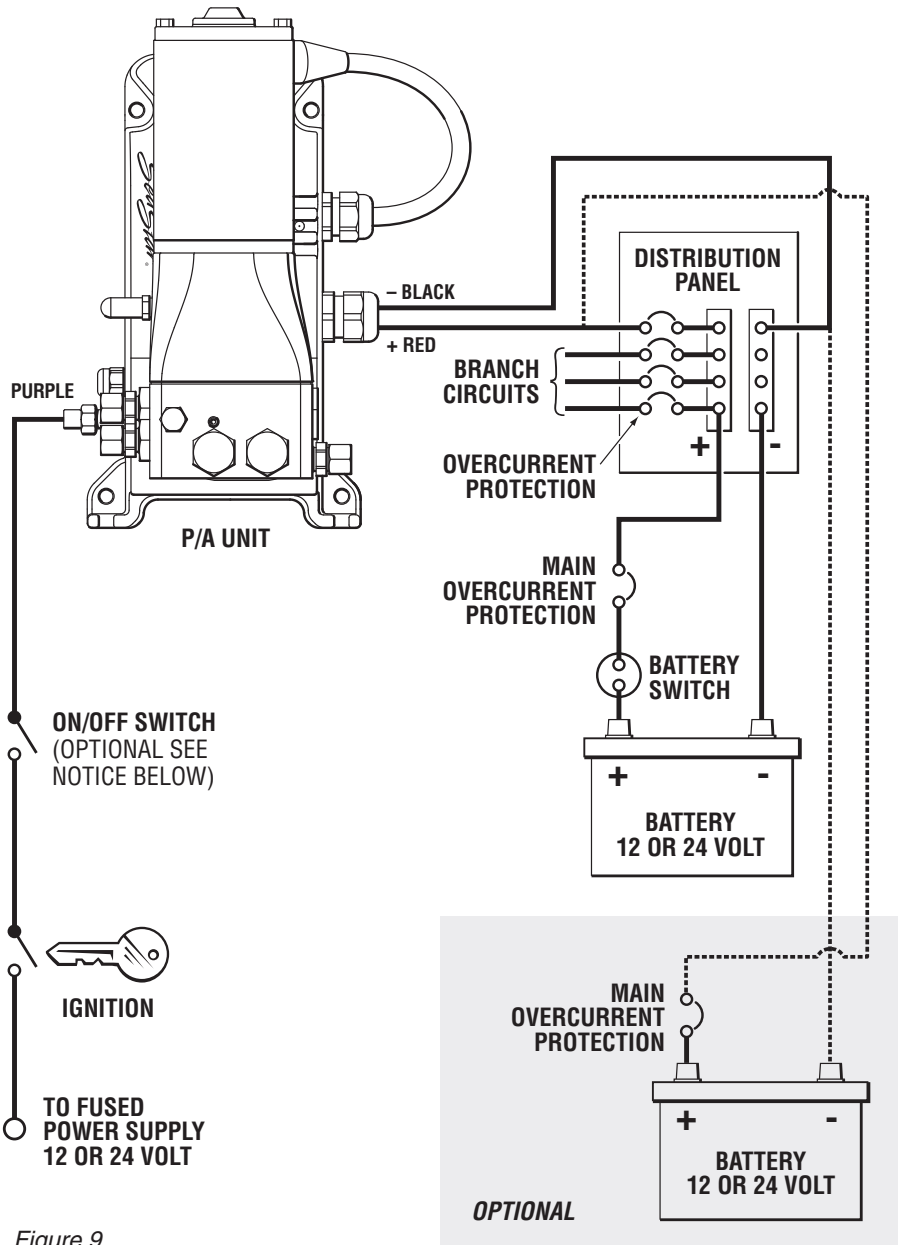


Figure 9.

It is recommended that a two position switch is purchased to allow the P/A unit to be turned off to help conserve battery power in a situation where battery power is limited. In order to prevent accidental P/A shut down, Teleflex recommends the use of a 12-Volt, 15 amp, ON/OFF, rocker style or push button style switch. ON/OFF switches are not available from Teleflex.

POWER PURGE FILLING AND PURGING THE SYSTEM

NOTICE

If system is plumbed as shown in Config. B (page 7), C (page 8) or D (page 8), please contact Teleflex Marine for specific bleeding details.

NOTICE

BEFORE bleeding the main steering system (helm, hoses and cylinders), the RETURN line will need to be purged.

Step 1

CAUTION

Refer to your Power Purge installation manual for important Warnings and Notices while using the Power Purge Units.

Removing Air from Return Line

- Install the helm adapter into the helm pump and attach the helm hose from the power purge unit.
- Connect one of the fluid return hoses (cylinder lines) from the Power Purge unit to the Reservoir bleed fitting on the P/A unit. (see figure 10 on page 16 for bleed fitting location).
- Open reservoir bleed fitting 1 turn.

NOTICE

DO NOT OPEN MANUAL BLEED VALVE WHEN USING A POWER PURGER

- Turn ON the Power Purge unit and continue to run until NO air is visible leaving the P/A unit.
- Turn OFF Power Purge unit.
- Close reservoir bleed fitting and continue on with the following steps.

Step 2

- Ensure the reservoir bleed fitting is closed then remove the hose from the reservoir bleed fitting and connect to the steering cylinder bleeder fittings. Ensure the quick connect is locked onto the fitting.
- Open ALL Cylinder bleed fittings 1-1/2 turn.

NOTICE

DO NOT OPEN MANUAL BLEED VALVE WHEN USING POWER PURGE UNITS.

- Turn Power Purge unit ON.
- Oil should flow into and out of the helm pump. Wait twenty seconds for the helm to fill with oil.
- Turn the steering wheel clockwise until the cylinder rod is fully extended (you may have to manually push the cylinder rod). SLOWLY continue to turn the wheel to hold the cylinder in this position for approximately 30 seconds. Ensure there are NO air bubbles escaping through the cylinder hoses.
- Turn the steering wheel counter-clockwise until the cylinder rod is fully extended (you may have to manually push the cylinder rod). SLOWLY continue to turn the wheel to hold the cylinder in this position for approximately 30 seconds. Ensure there are NO air bubbles escaping through the cylinder hoses.
- Turn OFF Power Purge unit
- Tighten ALL bleed fittings on the steering cylinder(s)
- Repeat above steps with the Power Assist unit ON.

Step 3

Continue on with Oil Level and System Check on page 20.

MANUAL FILLING AND PURGING THE SYSTEM

Read First

These instructions show how to fill and purge a SeaStar Steering System with the P/A unit installed. The same steps apply to ALL cylinders with the exception of which bleed fitting to open and close and the direction the cylinder rod moves. These variations are shown in inset diagrams at each step. For multiple steering stations, start with the lowest station while going through Steps 1 – 7, repeat at each higher station until complete.

CAUTION

DO NOT turn ON P/A unit until manual portion is completed.

This procedure requires two people. One person may not be able to remove all the air from the system, which will result in spongy, unresponsive steering.

During the entire filling procedure, oil **MUST** be visible in the filler tube. **DO NOT** allow oil level to disappear into the helm pump, as this may introduce air into the system and increase your filling time.

Hydraulic Oil Requirements

2 bottles (2 quarts or liters) for single station and single cylinder systems. One additional bottle for each cylinder, helm, and or autopilot added to the system.

NOTICE

Oil can be re-used if filtered through a fine mesh screen such as that used for gasoline. If unable to filter oil, an additional bottle of fluid is required.

NOTICE

"Bleeder" refers to cylinder or P/A unit fitted with bleed fittings. Bleed fittings can be opened by unscrewing bleed nipple nut two turns.

NOTICE

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

Single Station One Cylinder

NOTICE

BEFORE bleeding the main steering system (helm, hoses and cylinders), the RETURN line will need to be purged.

Step 1

Removing Air From Return Line

- Install the fill tube and fluid fill bottle into the helm pump.

NOTICE

Filling the helm full of fluid prior to connecting the filler tube and oil bottle will decrease purge time.

- Open the manual bleed valve (see Figure 10) and reservoir bleed fitting (see Figure 10) on the power assist unit. The manual bleed valve should be opened two full turns.

SEASTAR POWER ASSIST

FILLING AND PURGING

- Fill helm with fluid, then, turn steering wheel to the starboard side until a steady stream of "air-free" oil comes out of the reservoir bleed fitting on the Power Assist Unit.
- Close reservoir bleed fitting.
- Continue to turn the wheel to starboard another 15 turns after closing the reservoir bleed fitting and prior to closing the manual bleed valve.
- Close manual bleed valve and continue with Steps 2 – 5.

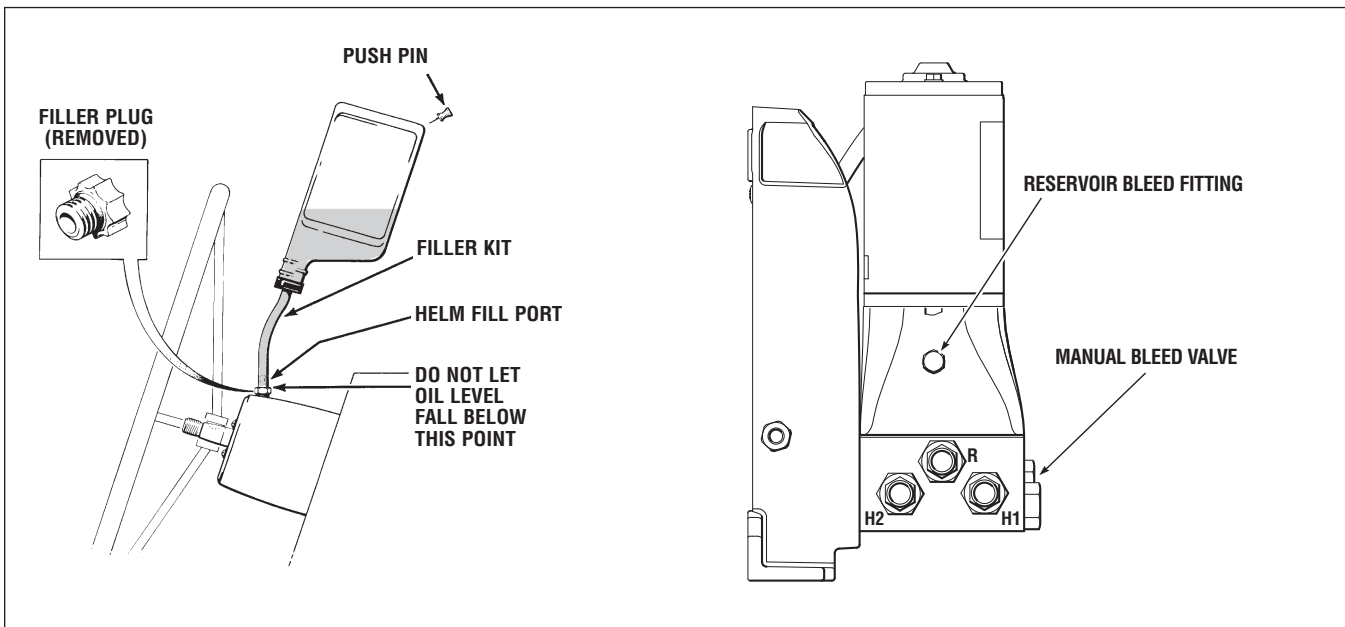
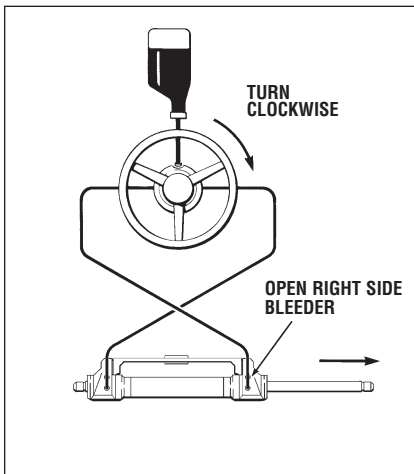


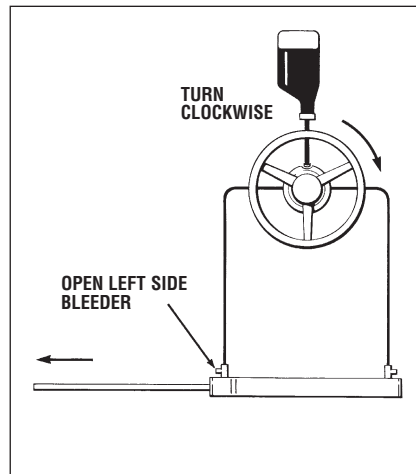
Figure 10.

Step 2

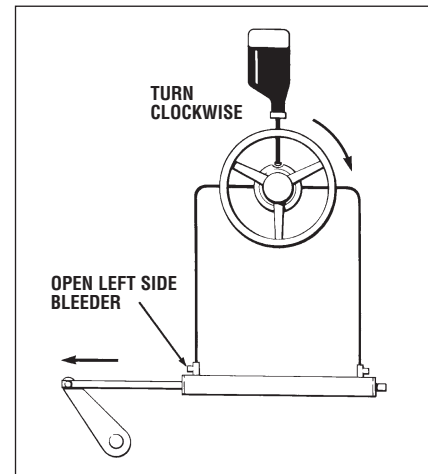
- Turn the steering wheel clockwise until the cylinder rod is fully extended on the right side of the cylinder.
- Open bleed fitting as per your installation.



Outboard Front Mount & HC5332 Cylinder



Side Mount / Splashwell Mount Cylinder



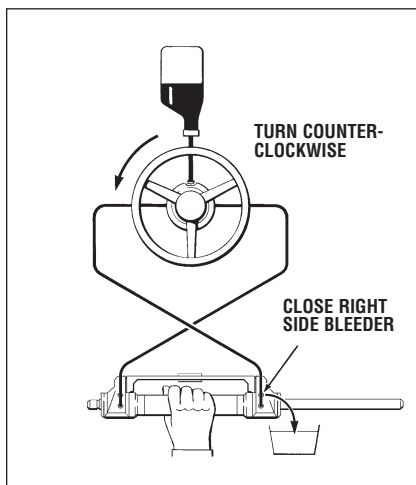
All Balanced Cylinder: Inboard & Sterndrive Cylinders

Step 3

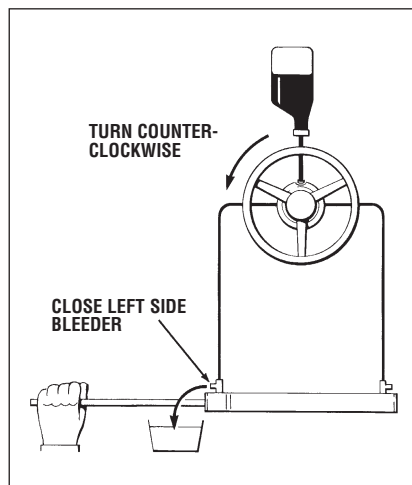
- Holding the cylinder body (Front Mount cylinder) or rod (Side Mount cylinder) to prevent the body/rod from moving, turn the steering wheel counter-clockwise until a steady stream of air free oil comes out of the bleeder. (Drain approx. 1/2 bottle of oil or as required).

Do not use anything other than your hands to restrain the cylinder body/rod.

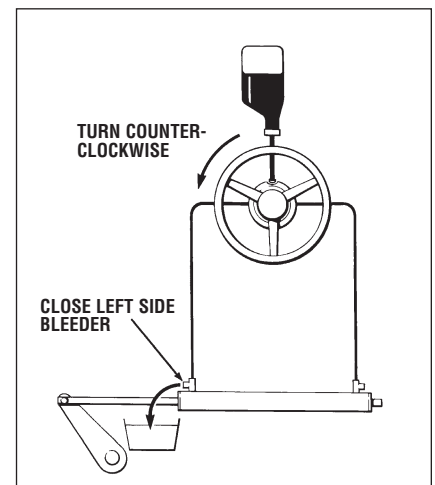
- While continuing to turn the wheel close the bleed fitting for your application and let go of the cylinder body/rod.



Outboard Front Mount & HC5332 Cylinder



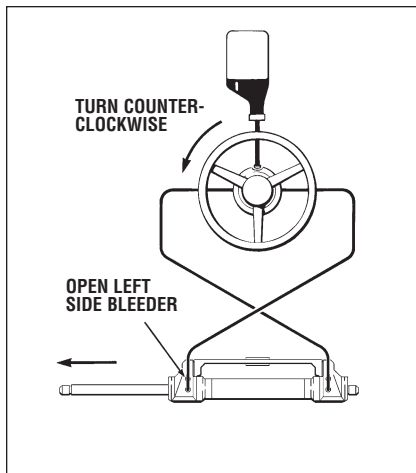
Side Mount / Splashwell Mount Cylinder



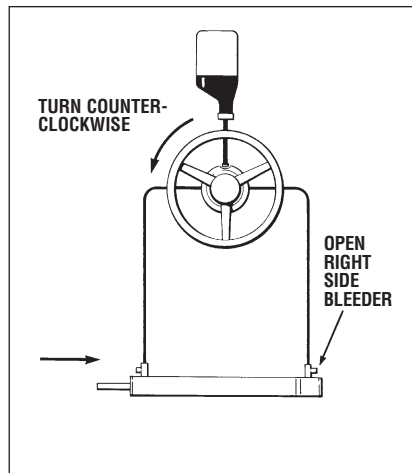
All Balanced Cylinder. Inboard & Sterndrive Cylinders

Step 4

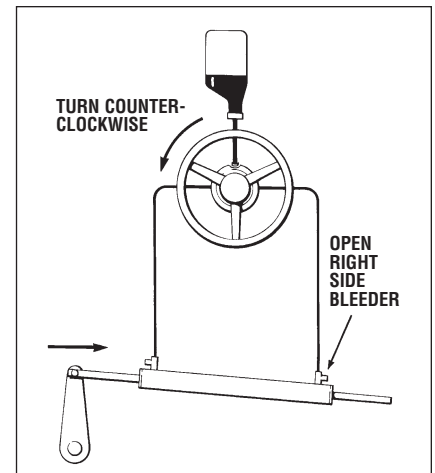
- Continue turning the steering wheel counter-clockwise until the cylinder rod is fully extended to the left. (Steering wheel will come to a stop).
- Open bleed fitting as per your installation.



Outboard Front Mount & HC5332 Cylinder



Side Mount / Splashwell Mount Cylinder



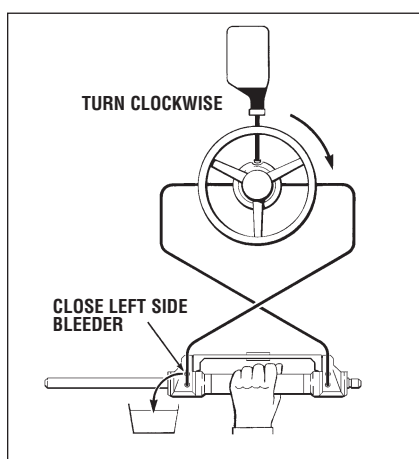
All Balanced Cylinder. Inboard & Sterndrive Cylinders

Step 5

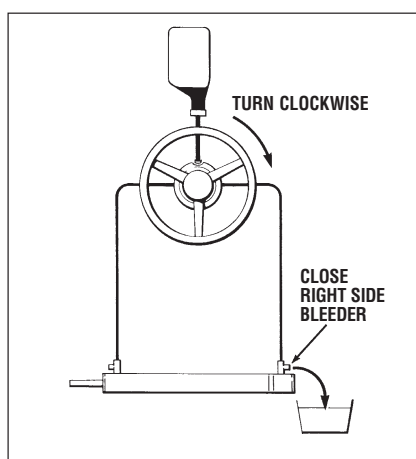
- Holding the cylinder body (Front Mount cylinder) or rod (Side Mount cylinder) to prevent the body/rod from moving, turn the steering wheel clockwise until a steady stream of air free oil comes out of the bleeder.
- While continuing to turn the wheel close the bleed fitting for your application and let go of the cylinder body/rod.

⚠ CAUTION

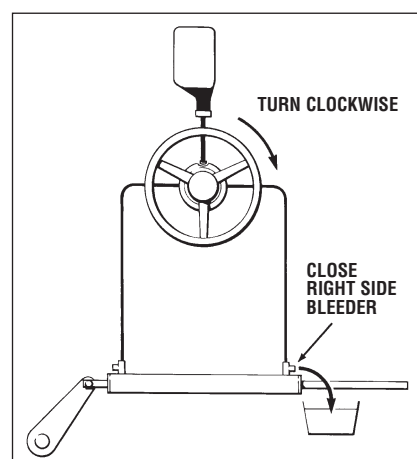
Prior to operating system, perform Oil Level System Check, refer to page 20.



Outboard Front Mount & HC5332 Cylinder



Side Mount / Splashwell Mount Cylinder



All Balanced Cylinder. Inboard & Stern Drive Cylinders

Step 6

- Complete electrical connections as outlined in your Installation Owner's Manual.
- Repeat Steps 2 – 5 of purging instructions with the P/A unit "ON"

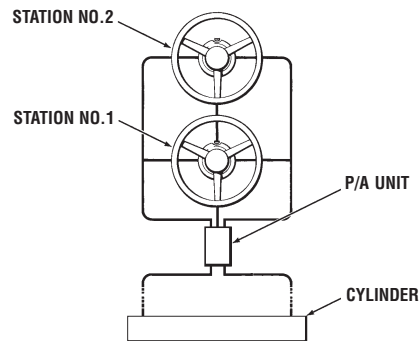
NOTICE

*Be sure to remove ALL air from the autopilot reservoir line.
If the system has an autopilot installed, ensure that the autopilot pump is run for at least 10 seconds in both directions during Step 3 and Step 5.*

Twin Station Single Cylinder

Perform Steps 1 – 6 at station no. 1. Then repeat Steps 2 – 5 at station no. 2.

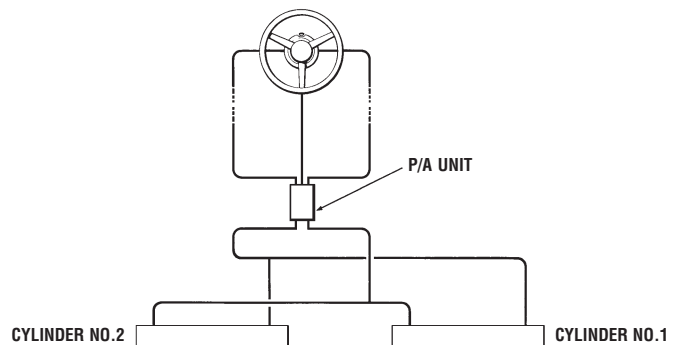
Note: Refer to Oil Level & System Check on page 20.



Single Station Twin Cylinder

When performing Steps 2 – 5, perform instructions in each step first on cylinder no. 1 and then on cylinder no. 2, before proceeding to the next step. ie: Perform instructions referring to right side of cylinder first on cylinder no. 1 and then on cylinder no. 2.

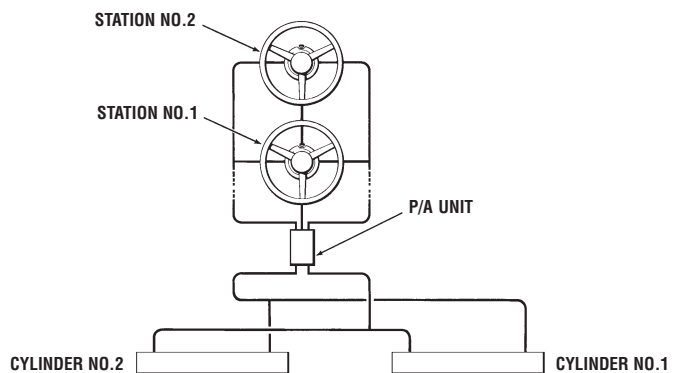
Note: Refer to Oil Level & System Check on page 20.



Twin Station Twin Cylinder

Follow same procedure as instructed for single station-twin cylinders, beginning at station no. 1, and repeat entire procedure at station no. 2.

Note: Refer to Oil Level & System Check on page 20.



Oil Level and System Check

At this time the steering system must be checked for proper connections hose and fittings, possible leaks, and air removal. Please complete the following steps with the P/A Unit OFF.

- Turn steering wheel to hard over, then force the wheel another one quarter to one half turn past the stop point. Check the following areas for evidence of a leak.
 - Helm fitting connections.
 - P/A fitting connections
 - Cylinder fitting connections
- Repeat above steps to the other steering direction.
- Any sign of a leak **MUST** be repaired prior to operating the boat.
- While turning steering wheel observe fluid level in the helm pump. If fluid level drops and rises as the wheel is being turned there is still air in the system. Complete bleeding instructions again until no obvious fluid level change is noticed.

NOTICE

Helms mounted with the wheel shaft completely horizontal must be filled to the bottom of the filler hole at all times. Do NOT allow the fluid level to drop more than one-quarter inch below the filler hole.

NOTICE

*Helms mounted on a 20 degree angle or with the wheel shaft vertical **MUST** have the fluid level within 1/2" of the filler hole, refer to the diagram below.*

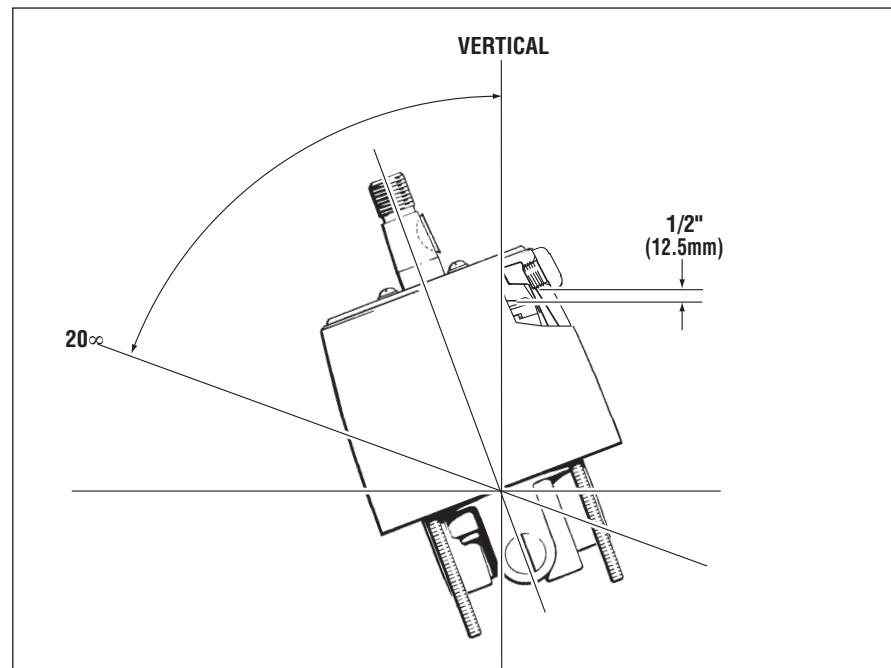


Figure 11.

TROUBLESHOOTING GUIDE

FAULT	CAUSE	SOLUTION
1. P/A unit does not turn on.	Blown Fuse/Breaker	Replace 'external' fuse if blown first. Replace 'internal' fuse if blown second. Or, reset breaker. NOTICE 2 x 40 amp ATO/ATC fuses are located inside the rear panel of the SeaStar Power Assist Pump. ⚠ WARNING If it is necessary to replace the fuse(s) in the Power Assist Unit, ensure the Power Assist Unit is turned OFF.
	Wrong electrical connections	Refer to wiring diagram and location of fuse on page 13.
2. Turns the wrong way	Lines reversed	Review the plumbing diagrams for your system noted on page 6 through page 10, confirm that your hoses are hooked up correctly.
3. Wheel is bumpy	Air in system	Re-Bleed. Concentrate on remaining air in the P/A unit. Autopilot has not been bled as per instructions.
4. Helm locks up in both directions	Hoses installed in the wrong ports.	Review the plumbing diagrams for your system noted on page 6 through page 10, confirm that your hoses are hooked up correctly.
	Kinked or collapsed line	Check ALL lines for sign of a collapsed or kinked line.
5. Helm only turns in one direction and free wheels in the other	Port or Starboard line is connected to the reservoir R port on the P/A unit.	Review the plumbing diagrams for your system noted on page 6 through page 10, confirm that your hoses are hooked up correctly.
6. Steering is very hard (stiff)	P/A unit is not turned on. Partially kinked or collapsed line. H1, H2 or R port screen filters are plugged with contamination.	See fault #1 Check ALL lines for a sign of a collapsed or kinked line Remove H1, H2 and R hose and fittings. Clean screens located in the adapter fittings.
7. No Power Assist, Lights are blinking.	Note sequence of blinking lights	See page 22 for details
8. After hitting hard over and/or running at high loads with the SeaStar PRO Power Assist, the effort at the wheel increasing dramatically.	Helm is super charging	Super charging is a normal occurrence with ALL PRO systems, while running at higher loads and/or hitting the hard over point. This should not be taken as a fault in the system.

FAULT	CAUSE	SOLUTION
9. The power assist unit is really hot to the touch.	Motor operating	This is a normal occurrence with the Power Assist unit; mount the P/A in an area where it can not easily be handled and away from flammable materials.
10. Lock to lock wheel turns are different with the power assist "off" than with the power assist "on".	Hitting hard-over causing hose expansion. Power assist is pressurizing system.	This is a normal occurrence when using the power assist system. This is a normal occurrence when using a power assist.

WARNING

Whenever a solution calls for the removal from vessel and/or dismantling of steering system components, such work must **ONLY** be carried out by a qualified marine hydraulic mechanic. Teleflex offers this information as a guide **ONLY** and is not responsible for any consequences resulting from incorrect repairs. When in doubt, contact your parts distributor or Teleflex for assistance.

NOTICE

The Green and Red lights are used to show the status of the SeaStar Power Assist Units. Below is a quick list as to what the lights refer to. Any fault within the Power Assist Unit will be acknowledged via the RED light flashing in the sequences noted below.

- **GREEN. Steady (no flash)**
Normal operation.
- **RED. Two flashes, long pause**
Standby mode, lack of calibration.
SOLUTION: Contact Teleflex Marine.
- **RED. Three flashes, long pause**
Calibration mode.
SOLUTION: Turn OFF ignition, after one minute, turn ignition ON.
If problem persists, contact Teleflex Marine
- **RED. Four flashes, long pause**
Overvoltage mode.
SOLUTION: check ignition and battery voltage. MUST be less than 32Volts, correct as required.

ACCESSORIES

SeaStar P/A Dual Ignition Control Kit

Part# HA1201

NOTICE

For each and every engine fitted after two (triples, quads... etc.), you will require one more HA1201 kit per engine being added.

The Dual Ignition Control Kit is designed to connect the P/A unit's ignition wire to two engines allowing one engine to be turned off and retain power assist control.

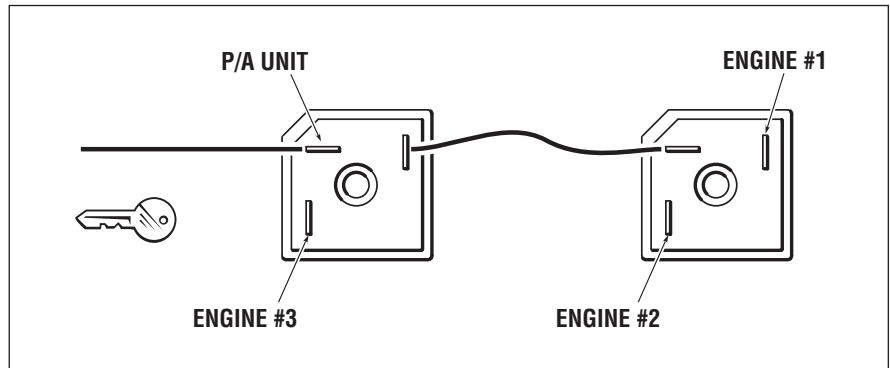


Figure 12.

SeaStar Power Purge JR.

Part# HA5445-2

SeaStar®/BayStar™ Power Purge Jr. is the quickest way to bleed a SeaStar®/ BayStar™ system in the field and assure a rock-solid steering feel every time!

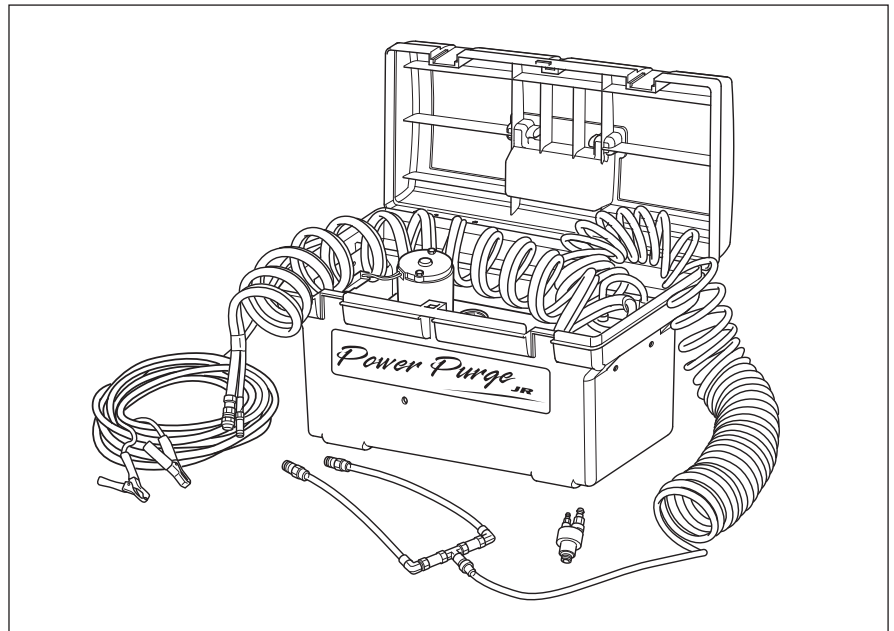
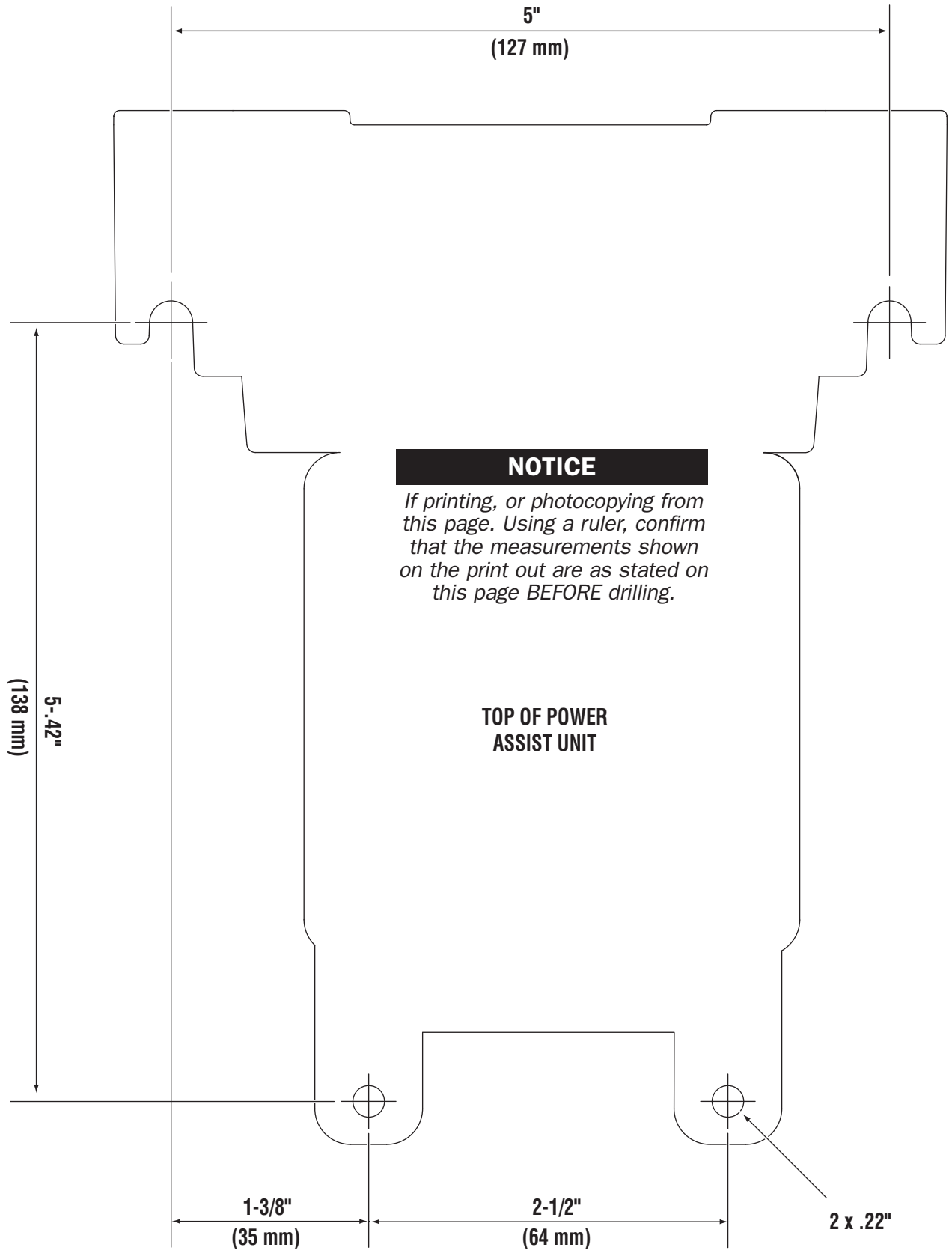


Figure 13.

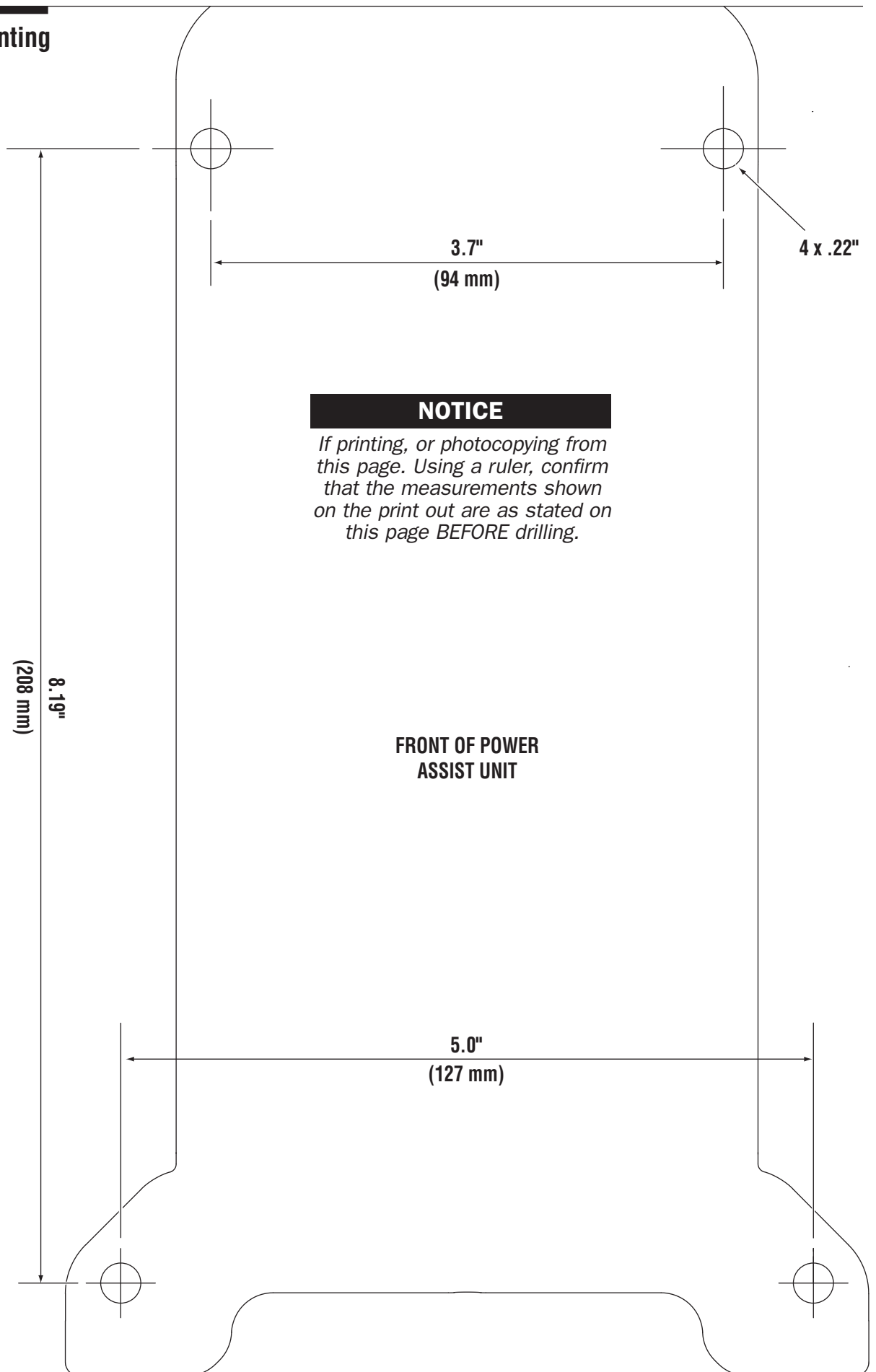
Advantages:

- Steering feel is solid every time
- Complete Fill & Purge in 10 minutes or less
- Fast and efficient
- Easy to operate
- Screens contaminants from oil
- Quick connect fittings
- Convenient portable size
- Convenient electrical hook-up utilizing 12 volt boat battery
- Optional Dual Cylinder Purging Kit HA5461 available
- Optional 50' Hose Extension Kit HA5462, for longer runs

Floor Mounting Template



Wall Mounting Template



NOTICE

If printing, or photocopying from this page. Using a ruler, confirm that the measurements shown on the print out are as stated on this page BEFORE drilling.

Statement of Limited Warranty

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

We will provide replacement product without charge, for any **Teleflex Canada Limited Partnership** product meeting this warranty, which is returned (freight prepaid) within the warranty period to the dealer from whom such product were purchased, or to us at the appropriate address. In such a case **Teleflex Canada Limited Partnership** products found to be defective and covered by this warranty, will be replaced at **Teleflex's** option, and returned to the customer.

The above quoted statement is an extract from the complete **Teleflex Canada Limited Partnership** products warranty statement. A complete warranty policy is available in our **Teleflex Canada Limited Partnership** products catalogue.

Return Goods Procedure

Prior to returning product to **Teleflex Canada Limited Partnership** under warranty, please obtain a *Return Goods Authorization number* (claim number).

Be sure to label the goods with:

- a) the name and address of the sender, and
- b) the return goods authorization number (claim number)

Please address the returned goods as follows:

From U.S.A.

RGA # ?
Teleflex Canada
c/o UPS-SCS Warehouse
1927 Boblett Street
Blaine, WA 98230

From Canada

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

teleflex®

MARINE

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

FAX 604-270-7172

www.seastarsteering.com

ISO 10592



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HYDRAULIC STEERING SELECTION GUIDE 2008



Boating safety is everyone's responsibility.

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

1. Wear an approved Personal Flotation Device (PFD)
2. **Read your owner's manual.**
3. Attach engine stop switch securely to your body or PFD.
4. Respect the speed limits and other boating restrictions.
5. Be cautious and courteous.
6. Navigate with care.
7. Understand the behaviour characteristics of your vessel that might result from unexpected manoeuvres, such as sudden deceleration, high-speed obstacle avoidance, and other speed related issues.
8. It is good boating practice to rinse down your boat and exposed steering equipment with clean, fresh water after each use.
DO NOT use corrosive materials on SeaStar products.

Become informed and stay informed!

"Take an accredited boating safety course"

Notice to Boat Manufacturer or Installer

Throughout this publication, Warnings and Cautions (accompanied by the International Hazard Symbol ) are used to alert the manufacturer or installer to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly.

Observe Them Carefully!

These "safety alerts" alone, cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the installation and maintenance plus "common sense" operation are major accident prevention measures.

 DANGER	 WARNING	 CAUTION	NOTICE
Immediate hazards which WILL result in severe personal injury or death.	Hazards or unsafe practices which COULD result in severe personal injury or death.	Hazards or unsafe practices which COULD result in minor injury or product or property damage.	Information which is important to proper installation or maintenance, but is not hazard-related.

NOTICE

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

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BayStar and SeaStar Hydraulic Steering Systems

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

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

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

BayStar & SeaStar, the hydraulic steering systems that are;

Easy to install...

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

Easy to fill and purge...

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

Easy to turn...

- Anti-friction piston points

Designed to provide many years of service...

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

BayStar and SeaStar! Simply the best!

Teleflex Hydraulic Steering

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

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

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

1. The Helm Unit.

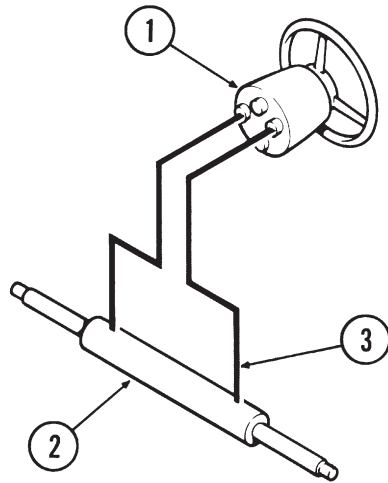
The helm pump is an axial piston pump specifically designed for manual steering. It has a built-in lock valve to prevent the steering load from feeding back to the driver. The lock valve will not allow the rudder or drive unit to move until you move it with the steering wheel. The lock valve section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

2. The Cylinder.

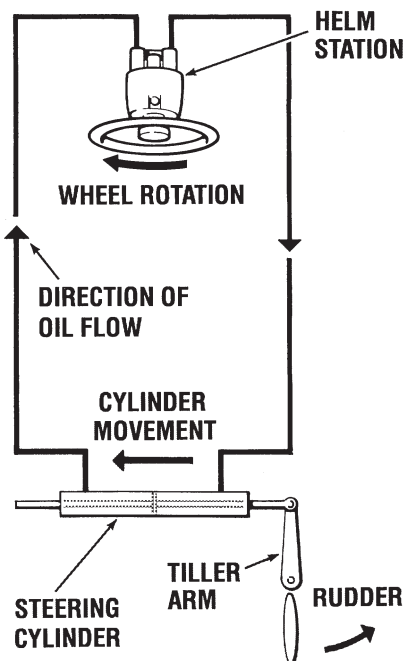
The most important differences between the variety of steering systems available is the cylinder selection. Both BayStar and SeaStar systems have a cylinder for most steering applications.

3. Hoses and Tubes.

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



The System: How it works



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

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

Selecting the System

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

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

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

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

Notes on Steering Response versus Steering effort

Steering wheel effort is directly proportional to the number of wheel turns lock to lock.

The number of wheel turns lock to lock is dependent on three things;

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

Less wheel turns lock to lock results in more steering effort. More wheel turns lock to lock results in less steering effort. However, additional factors that can influence steering effort are;

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

System Selection Worksheet

How can we help?

We have provided the following check list to assist you in choosing your Hydraulic Steering System. We invite you to make notes on this page as required.

☒ as appropriate.

- ☐ **OUTBOARD—Single up to 150HP UNDER 55mph**
 - ☐ Most economical system to meet my steering needsPage 1-1
 - ☐ Economical to meet my needs, PLUS less effort at the steering wheel than above.....Page 3-1, 3-9
 - ☐ Power Assist – 'Automotive' Style, Feel and ComfortPage 2-1, 3-1, 3-9
- ☐ **OUTBOARD—Multiple up to 150HP combined total**
 - ☐ Most economical system to meet my steering needsPage 1-1
 - ☐ Economical to meet my needs, PLUS less effort at the steering wheel than above.....Page 3-1, 3-9
 - ☐ Power Assist – 'Automotive' Style, Feel and ComfortPage 2-1, 3-1, 3-9
- ☐ **OUTBOARD—Single 150HP – 350HP UNDER 65mph**
 - ☐ Most economical system to meet my steering needsPage 3-1, 3-2
 - ☐ Power Assist – 'Automotive' Style, Feel and ComfortPage 2-1, 3-1, 3-2
- ☐ **OUTBOARD—Single 150HP – 350HP OVER 65mph**
 - ☐ Most economical system to meet basic steering needsPage 3-1, 3-9
 - ☐ Recommended for Steering Comfort and 'Automotive' Style and Feel.....Page 2-1, 3-1, 3-9
- ☐ **OUTBOARD—Multiple over 150HP
(including Catamaran and Liquid Tiebars)**
 - ☐ Most economical system to meet basic steering needsPage 3-1, 3-2
 - ☐ Recommended for Steering Comfort and 'Automotive' Style and Feel.....Page 2-1, 3-1, 3-2
- ☐ **STERNDRIVE—Single and Twin**
 - ☐ Most economical system to meet my steering needsPage 4-1
 - ☐ Power Assist – 'Automotive' Style, Feel and ComfortPage 2-1, 4-1
- ☐ **INBOARD—Single and Twin**
 - ☐ Most economical system to meet my steering needsPage 5-1
 - ☐ Power Assist – 'Automotive' Style, Feel and ComfortPage 2-1, 5-1
 - ☐ Power Steering SystemPage 7-1

My Steering Components

Helm Model #..... Cylinder Model #.....

Hose/Tube Other

Autopilot Equipped ☐ Yes ☐ No Date Purchased.....

Boat: Make..... Model Length

Engine: Make..... H.P. Quantity

OUTBOARD STEERING

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

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

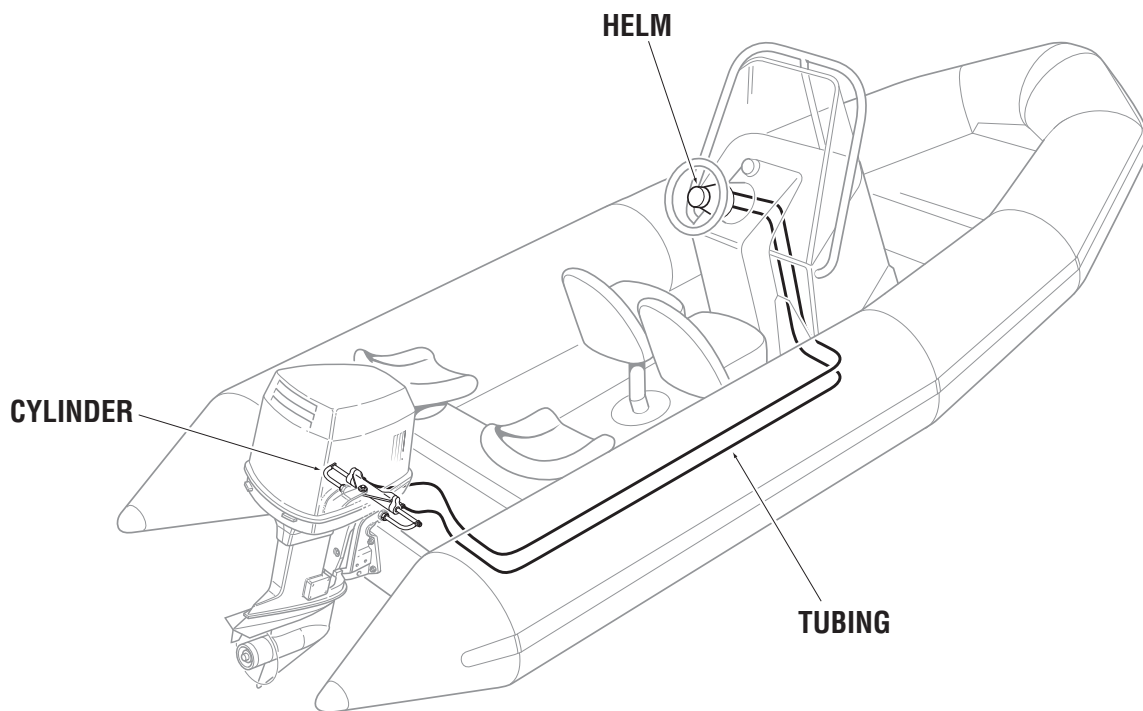
⚠ CAUTION

BayStar is **ONLY** applicable for single station steering.

DO NOT use BayStar on smaller HP outboard engines that use wing nut type transom mount clamping screws.

NOTICE

Tilt Helm HH4315 is available separately. Currently not available in kit form.

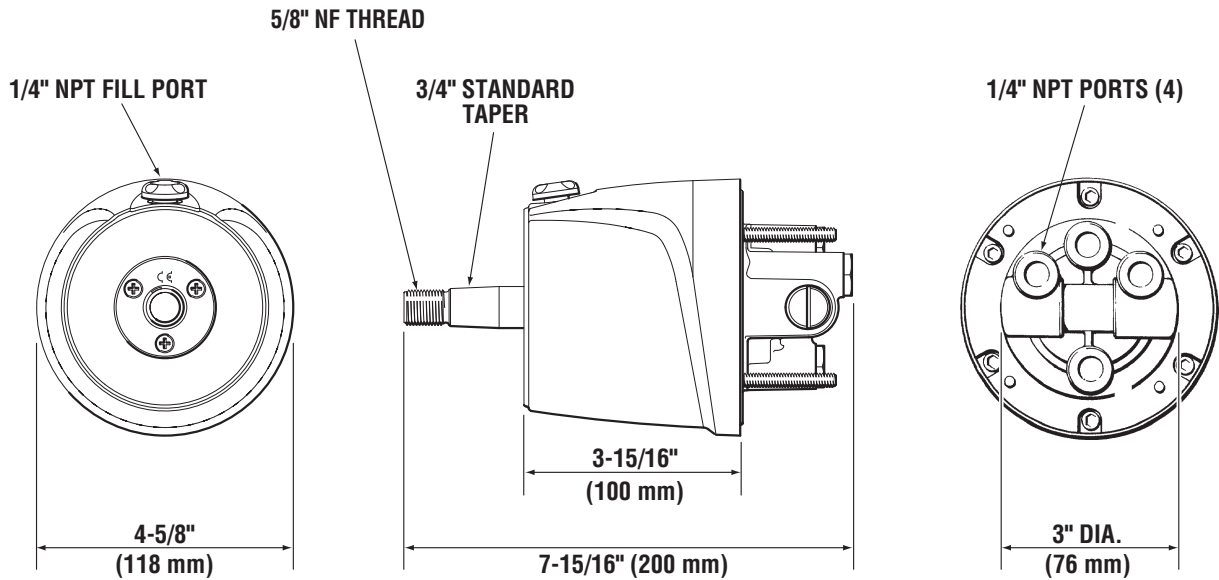


Typical BayStar Installation

Three easy steps to select your BayStar System:

- 1) Check helm dimension. Both the Standard and Tilt helms require a 3" (76mm) cut-out hole in the dash.

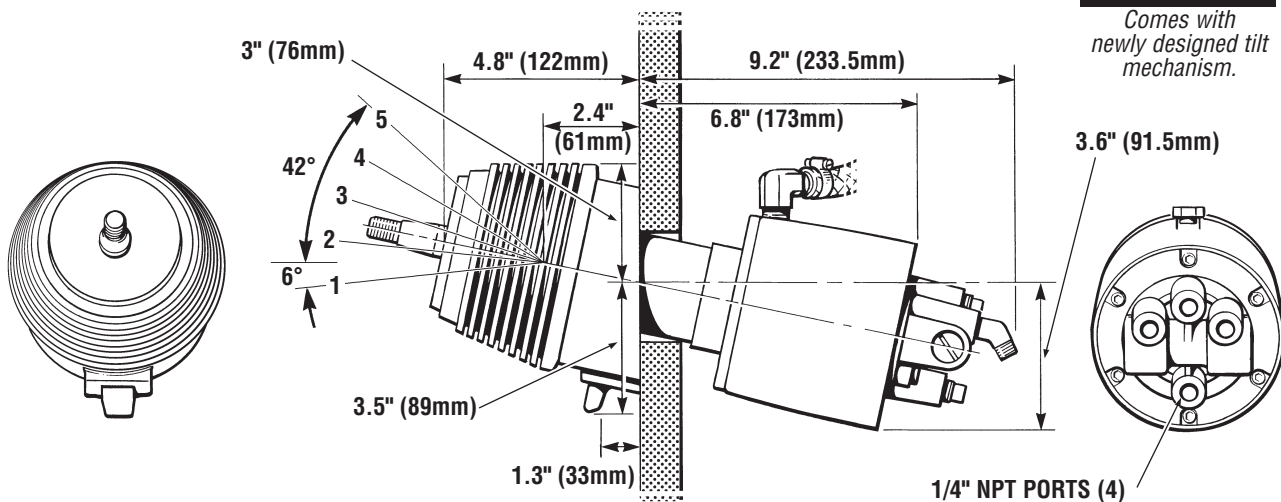
STANDARD HELM PART# HH4314



TILT HELM PART# HH4315

NOTICE

Comes with newly designed tilt mechanism.

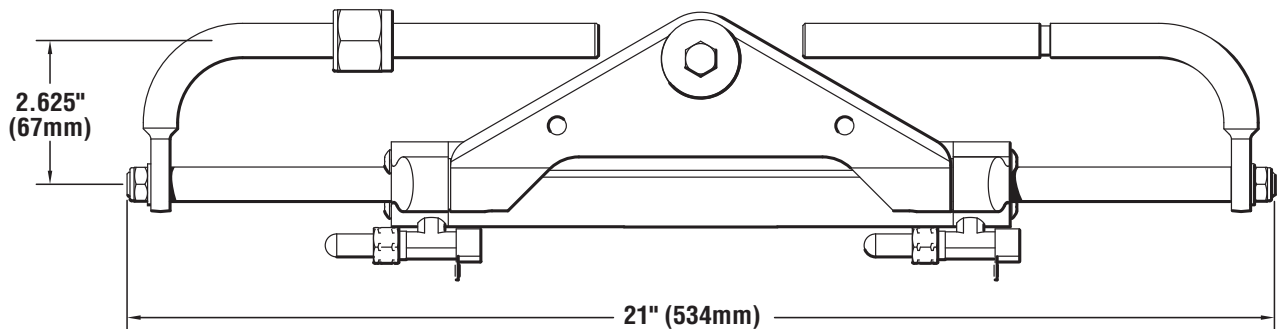


- 2) Check the BayStar cylinder dimensions through the full trim/tilt range of the engine.

IS THE SPLASHWELL WIDE ENOUGH?

The HC4645H/47H/48H /58H require a 21" (534mm) Splashwell width.

BAYSTAR CYLINDER PART# HC4645H/47H/48/H58H



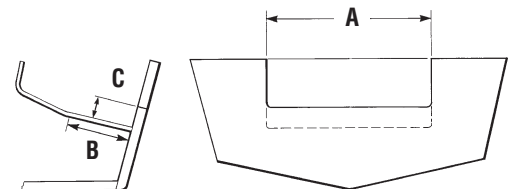
- 3) Is there enough room in the splashwell for full engine tilt?
Find the dimensions (A, B & C) of your splashwell. Check them against the minimum splashwell dimensions for full engine tilt for your engine and cylinder.

MOTOR WELL DIMENSIONS required for BayStar front mount outboard steering systems

CYLINDER MODEL NO.	# OF ENGINES	A	B	C	MIN. ENGINE CENTER DISTANCE
HC4645H/47H/48H/58H	1	21" (534mm)	6" (153mm)	5" (127mm)	N/A
	2	Twin engine applications not available at this time			

NOTES:

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



BayStar Steering Kits PID# HK4200A, HK4230A



NOTICE

HC4645H compact cylinder is included in both BayStar Steering Kits. If your engine requires the use of a cylinder other than HC4645H or HC4658H (refer to application guide on page 1-5) then purchase of a replacement Pivot Plate (noted on page 1-5) will be required.

BayStar Steering kits come complete with everything needed for an install, (some engines require spacer kits and/or cylinder plate change, see application chart on *page 1-5*) the compact cylinder does not require the engine manufacturer drag link for connection. For your convenience two lengths of 20' cut to fit tubing are supplied with the HK4200A and two lengths of 30' cut to fit tubing are supplied with the HK4230A kit.

BayStar Steering Kit (HK4200A)

Includes:

- 1 x BayStar helm pump (HH4314)
- 1 x BayStar Cylinder (HC4645H)
- 1 x BayStar Tubing kit (HT4420H, comes with two 20' hoses)
- 2 x Hydraulic Steering Fluid (HA5430)
- 1 x Filler Kit (HA5438)

BayStar Steering Kit (HK4230A)

includes:

- 1 x BayStar helm pump (HH4314)
- 1 x BayStar Cylinder (HC4645H)
- 1 x BayStar Tubing kit (HT4430H, comes with two 30' hoses)
- 2 x Hydraulic Steering Fluid (HA5430)
- 1 x Filler Kit (HA5438)

NOTICE

HC4600 and HC4600H are no longer being made by Teleflex Canada, all seal kits and spare parts will be made available. If purchase of a new HC4600 or HC4600H is required, please purchase BayStar Compact Cylinder part# HC4645H/47H/48H/58H as per the application chart on page 1-5. If the cylinder that you are replacing does not include the letter H after the part number, you will need to reuse the fittings out of your old cylinder and/or purchase fitting kit # HF4201 (includes 2 of the old style bleed fittings).

BayStar Outboard Compact Application Guide

(BayStar Compact Cylinders HC4645/47/48/58)

BayStar

OUTBOARD—FRONT MOUNT

MFG	YEAR	MODEL	CYLINDER	NOTES
FORCE	1985–DATE	90–150 HP	HC4645H	
HONDA	1992–DATE	30–90 HP	HC4645H	
	1998–DATE	115–130 HP	HC4647H	
	2001–DATE	150 HP	HC4645H	
	2003–DATE	BF135 HP	HC4645H	
JOHNSON/ EVINRUDE	1977–1989	65–150 HP	HC4648H	
	1991–DATE	40–150 HP	HC4645H	
	1997–DATE	115 HP FICHT	HC4658H	4
	1997–DATE	75–150 HP FICHT	HC4645H	
	1998–DATE	40–140 HP 4-Stroke	HC4658H	1, 4
MERCURY/ MARINER	1984–DATE	75–150 HP	HC4645H	
NISSAN	1990–DATE	120–140 HP	HC4645H	
SUZUKI	1986–DATE	150 HP	HC4645H	
	1996 ONLY	115–140 HP	N/A	
	1987–2002	115–140 HP	HC4645H	1
	1990–2000	90–100 HP	HC4645H	
	1998–DATE	40–70 4-Stroke	HC4645H	1
	2001–DATE	115–140 HP 4-Stroke	HC4658H	1, 4
TOHATSU	1990–DATE	140–140 HP	HC4645H	
YAMAHA	1998–DATE	40–50 HP	HC4645H	2
	1998–DATE	60 HP	HC4645H	3
	1986–DATE	70–90 HP	HC4645H	1
	1997–DATE	80–150 HP 4-Stroke	HC4645H	
	2000–DATE	25–60 HP 4-Stroke	HC4648H	1
YANMAR	1990–DATE	27–36 HP	HC4645H	

1. Requires Spacer kit part # HO5090

2. 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.

3. Steering hook Yamaha Part # 63D-48511-00-4D must be installed

4. Cylinder HC4645 may be used in these applications. The pivot plate will need to be flipped before installation. Instructions provided with Owner's Manual.

The above engine applications are current through the revision date shown. For up-to-date engine applications go to: www.seastarsteering.com

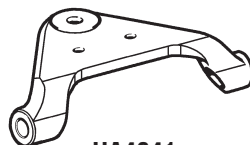
REVISION DATE: MAR. 10TH 2006

NOTICE

HC4645H compact cylinder is included in the BayStar Steering kits. If your engine requires the use of a cylinder other than HC4645H or HC4658H then please refer to the figure below for additional replacement pivot plate.



HA4640
Use with cylinder HC4645H



HA4641
Use with cylinder HC4647H



HA4642
Use with cylinder HC4648H



HA4643
Use with cylinder HC4658H

SeaStar^{PA}TM

POWER ASSIST



SeaStar Power Assist Pilot shown, available Summer, 2008.

The Marine Industry is continually introducing heavier outboard engines, higher horse power engines, more aggressive propellers, bigger/faster boats...

Boat operators are asking for increased comfort and lighter steering loads... These were the driving forces behind the design of SeaStar and SeaStar PRO Power Assist.

This new and innovative product is highly recommended on any 200HP and above outboard application to give your boat the same, easy steering you are accustomed to in your car. Power Assist is also recommended for the following;

- Twin and Triple engine applications
- Bass Boats
- Power Catamarans
- Inboard powered cruisers without engine driven power assist.

How the System Works

SeaStar P/A (Power Assist) steering uses an electronically controlled hydraulic pump to provide "Power" for your SeaStar Hydraulic Steering system.

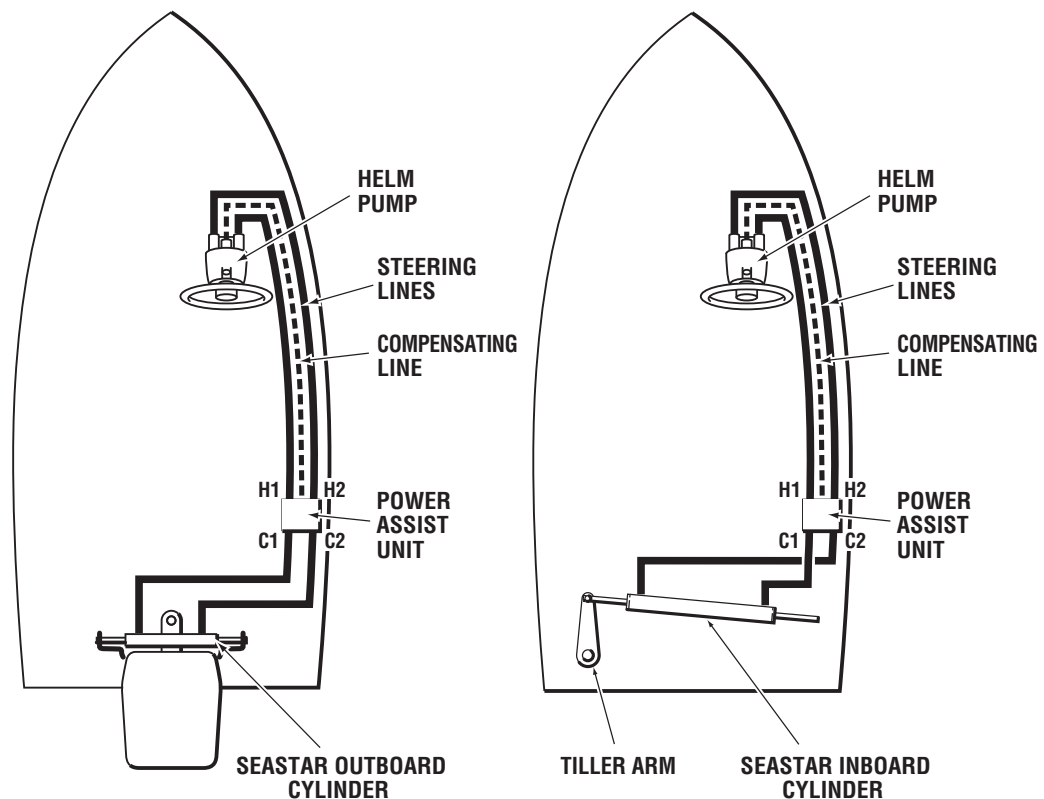
The SeaStar P/A system is comprised of two circuits: a hand operated manual system, which is the control element, and a hydraulic power pump, which is the working element.

The manual system consists of a helm pump with internal relief and check valves, as well as a built in reservoir. Two steering lines and a compensating line which provide a routing for fluid to transmit through the system, and a steering cylinder which moves the steering device on the boat from side to side.

The power system, is an electronically controlled hydraulic pump that boosts the fluid being sent from the helm pump to the steering cylinder (this will result in much easier effort at the wheel—even when under heavy loads). A compensating line connects the P/A unit to the helm pump, allowing the P/A unit to share fluid with the helm reservoir.

The SeaStar P/A is compatible with multiple steering stations, and with the use of an autopilot. In the event of a P/A power loss or failure the hydraulic system will automatically revert to a manual hydraulic system.

Typical installations shown (please refer to your cylinder installation manual for proper hose installation diagrams).



SeaStar P/A Compatibility Chart

The P/A is designed for use in recreational marine applications in conjunction with SeaStar Hydraulic Steering. Optimal performance will be obtained when used with SeaStar 1.4, 1.7 and 2.0 cu in (1000psi) helm pumps, or, 2.0 cu in (1500 psi) SeaStar P/A PRO Hydraulic Steering.

NOTICE

SeaStar nylon tube may ONLY be used for the compensating line. DO NOT use SeaStar Nylon tube to plumb any other portion of the steering system.

NOTICE

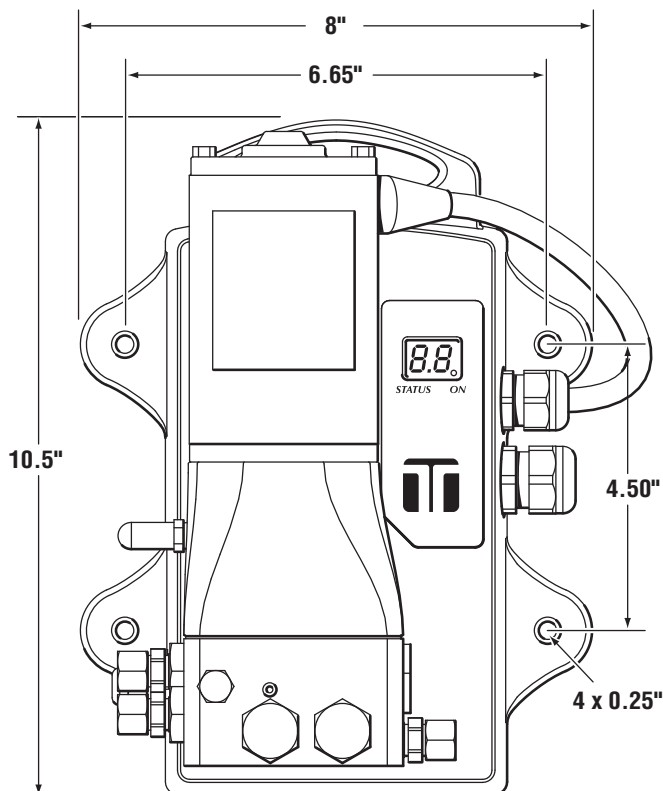
Plan ahead. There MUST be at least 4' (feet) of hose between the helm pump and power assist, or the power assist and the steering cylinder.

NOTICE

Use ONLY Teleflex products with the P/A unit as with ALL Teleflex systems. Failure to do so may void your warranty.

SeaStar P/A PRO is NOT to be used with SeaStar Hydraulic Steering, performance will be compromised. ONLY use P/A PRO with a SeaStar PRO Hydraulic steering system and ensure that SeaStar PRO (1500 psi) hose is used to plumb the entire system. (Nylon tubing may be used for the compensating/return line ONLY.

Specifications



SEASTAR P/A 12VOLT, SEASTAR PRO P/A, 12 VOLT

- 12 Volts
- 1000 psi MAX System peak pressure (500 psi working load) SeaStar Standard
- 1500 psi MAX System peak pressure (500 psi working load) SeaStar Pro
- MAX Current Draw (at 1000psi) 55 amps
- Purple ignition wire MAX. current draw = 1 amp
- Typical current draw:
Single outboard ~ 3 amps, average
Twin Rudder inboard ~ 8 amps, average

SEASTAR P/A 24 VOLT. (SEASTAR PRO P/A IS NOT AVAILABLE IN 24 VOLT POWER).

- 24 Volts
- 1000 psi MAX., System peak pressure (500psi working load)
- MAX Current Draw (at 1000psi) 25 amps
- Purple ignition wire MAX. current draw = 1 amp
- Typical current draw:
Single outboard ~ 1.5 amps, average
Twin Rudder inboard ~ 4 amps, average

WARNING

DO NOT exceed peak operating pressure.
1000psi – Standard,
1500psi – Pro.

OUTBOARD STEERING

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 HC5345/47/48/58. The Side Mount Cylinder HC5370 and the Splashwell Mount Cylinder HC5380. 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. Teleflex encourages you to use the tables noted below and select your system accordingly.

Selecting the outboard steering system best suited for your boat:

- 1) Using the table below, select your design of boat as per speed, hull design and horsepower.
- 2) Using the Application chart on page 3-5 choose the proper cylinder and tiebar equipment as per your outboard engine. If your engine is not noted, contact Teleflex or your Distributor for details.
- 3) Proceed to page 10-1 for details on fitting kits and particular equipment that will be needed to add a second station and/or and autopilot.

TYPICAL BOAT DESIGNS

- 1 INFLATABLE:** Boats manufacture 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 be single and/or dual engine, and is generally slower than 40 mp/h
- 2 CRUISER:** Cuddy/express/bridge cruiser primarily designed for cruising. It has overnight accommodations. Typically rigged with two steering stations. Boats may be single and/or dual engine, and is generally slower than 45 mp/h
- 3 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 are generally slower than 60 mp/h
- 4 FISH "N" SKI:** Single engine boat designed for day fishing or skiing in protected waters. Boats speeds are generally slower than 40 mp/h
- 5 FISH BOAT:** Boat primarily designed and equipped for offshore fishing. May be rigged with a second station and may have single and/or dual outboards. Speeds are generally slower than 50 mp/h
- 6 CENTER CONSOLE:** Boats with the control station located on the center line of the boat. Designed specifically for fishing, may be single and/or dual engine(s). Boat speeds are generally slower than 65 mp/h.
- 7 BASS BOAT:** Single engine designed specifically for fishing in protected waters and has a flat bottomed hull. Generally performance orientated and speeds in excess of 60 mp/h.
- 8 PONTOON:** Twin or triple hull boats. Single and dual engine capable. Generally speeds to not exceed 60 mp/h. Note: High steering loads when equipped with engines over 115 HP.
- 9 CATAMARAN:** Twin hull vessels. Typically twin engine boats where the use of a mechanical tiebar is not possible. Speeds to not exceed 60 mp/h
- 10 COMMERCIAL/WORK/RESCUE/RACE/:** Any of the above noted boats but used in a more severe environment. Take special care when selecting a system for these boats to ensure that you have both comfortable and safe steering.

SEASTAR FRONT MOUNT OUTBOARD STEERING SYSTEM

Part# HC5345, HC5347, HC5348, HC5358

Features

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

Applications

- General purpose system.
- Single and multiple engine capability.
- Total power to 700 HP.
- Typical applications include center console fishboats and cruisers.

How to select a front mount outboard steering system

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

CAUTION

Not recommended for use in installations where;

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

HC5345



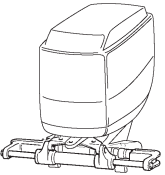
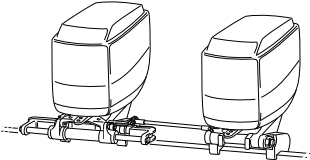
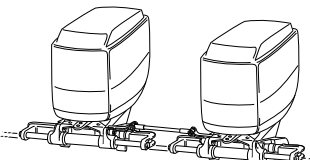
Order Guide

SeaStar®

OUTBOARD-FRONT MOUNT

NOTICE

Front Mount Cylinder part# HC5345 is included in the SeaStar Outboard Steering Kits HK6400/63XX and HK7400/73XX. If your engine requires the use of a cylinder other than the HC5345 (see application guides on pages 3-5 through 3-6) you will need to purchase the individual components (helm, cylinder, hoses, etc.) separately.

ENGINE/ CYLINDER CONFIGURATION	DESCRIPTION	QTY REQ	MODEL	PART NUMBER	REF. PAGE #
SINGLE ENGINE (SINGLE CYLINDER) APPLICATIONS UP TO 350 HP MAX NUMBER OF TURNS 5 	CYLINDER	1	FRONT MOUNT	† HC5345	
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	HOSE KIT	1	OUTBOARD HOSE	‡ HO51__	10-2
	OIL	3	SEASTAR OIL	HA5430	11-1
	FOR EXTRA STEERING STATION ADD:				
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	FITTING KIT	1	ADD A STATION	HF5501	10-10
	HOSE KIT	1	OUTBOARD HOSE	‡ HO51__	10-2
	OIL	1	SEASTAR OIL	HA5430	11-1
	† Refer to Application Guides on page 3-5 to page 3-7 for correct cylinder ‡ Refer to on page 10-2 for measuring hose distance				
DUAL ENGINE (SINGLE CYLINDER) NON-COUNTER ROTATING APPLICATIONS UP TO 450 HP MAX COUNTER ROTATING ENGINE APPLICATIONS UP TO 600 HP MAX NUMBER OF TURNS 5 	CYLINDER	1	FRONT MOUNT	† HC5345	
	TIE BAR KIT	1		HO60__	
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	HOSE KIT	1	OUTBOARD HOSE	‡ HO51__	10-2
	OIL	3	SEASTAR OIL	HA5430	11-1
	FOR EXTRA STEERING STATION ADD:				
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	FITTING KIT	1	ADD A STATION	HF5501	10-10
	HOSE KIT	1	OUTBOARD HOSE	‡ HO51__	10-2
	OIL	1	SEASTAR OIL	HA5430	11-1
	† Refer to Application Guides on page 3-5 to page 3-7 for correct cylinder ‡ Refer to on page 10-2 for measuring hose distance				
DUAL ENGINE (DUAL CYLINDERS) NON-COUNTER ROTATING APPLICATIONS UP TO 600 HP MAX ALL COUNTER ROTATING ENGINE APPLICATIONS UP TO 700 HP MAX NUMBER OF TURNS 6.5 	CYLINDER	2	FRONT MOUNT	† HC5345	
	TIE BAR KIT	1		HO60__	
	HELM	1	** SEASTAR II- STANDARD	HH5272	9-6
	HOSE KIT	1	OUTBOARD HOSE	‡ HO51__	10-2
	HOSE KIT	1	OUTBOARD HOSE	‡ HO51__	10-2
	HOSE KIT	1	OUTBOARD HOSE	‡ HO51__	10-2
	FITTING KIT	1	TEE FITTINGS	HF5530	10-1
	OIL	3	SEASTAR OIL	HA5430	11-1
	FOR EXTRA STEERING STATION ADD:				
	HELM	1	** SEASTAR II- STANDARD	HH5272	9-6
	FITTING KIT	1	ADD A STATION	HF5501	10-10
	HOSE KIT	1	OUTBOARD HOSE	‡ HO51__	10-2
	OIL	1	SEASTAR OIL	HA5430	11-1
	† Refer to Application Guides on page 3-5 to page 3-7 for correct cylinder ‡ Refer to on page 10-2 for measuring hose distance				
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FOR STANDARD HELMS)	HA5418	9-3
	20 DEGREE WEDGE		(FOR STANDARD HELMS)	HA5419	9-3
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5501	10-10
	* TILT HELM- SEASTAR I			HH5741	9-7
	REAR MOUNT HELM- SEASTAR I			HH5261	9-7
	** TILT HELM- SEASTAR II			HH5742	9-7
	REAR MOUNT HELM- SEASTAR II			HH5262	9-7
	POWER ASSIST STEERING			PA1200	2-1

300HP + Outboard Installation Recommendations

With the introduction of heavier, higher horsepower engines producing more torque, Teleflex Marine has updated its recommendations across various applications (single and multiple engines, different hull types, etc.) Please read carefully to ensure that your current steering system provides the best comfort versus performance available.

ENGINE	SEASTAR FRONT MOUNT (Normal Use)	SEASTAR FRONT MOUNT (Aggressive Use - See Note 1)	HYNAUTIC K-6 (Normal Use ONLY)
SINGLE ENGINE	SINGLE CYLINDER 350 HP Max 75 MPH Max HC53xx Cylinder (See Note 2)	SINGLE CYLINDER 350 HP Max HC63xx Pro Cylinder (See Notes 2 & 3)	SINGLE CYLINDER 300 HP Max 55 MPH Max
DUAL ENGINE NON COUNTER ROTATING	SINGLE CYLINDER 450 HP Max 55 MPH Max HC53xx Cylinder HO60xx Tie Bar	SINGLE CYLINDER Not Recommended	SINGLE CYLINDER 400 HP Max 55 MPH Max
	DUAL CYLINDER 600 HP Max 55 MPH Max HC53xx Cylinders HO60xx Tie Bar	DUAL CYLINDER 700 HP Max HC67xx Cylinders (See Notes 2 & 4) HO67xx Tie Bar	DUAL CYLINDER 500 HP Max 55 MPH Max
DUAL ENGINE COUNTER ROTATING	SINGLE CYLINDER 600 HP Max 55 MPH Max HC53xx Cylinder HO60xx Tie Bar	SINGLE CYLINDER Not Recommended	SINGLE CYLINDER 500 HP Max 55 MPH Max
	DUAL CYLINDER 600 HP Max 55 MPH Max HC53xx Cylinders HO60XX Tie Bar	DUAL CYLINDER 700 HP Max HC67xx Cylinders (See Notes 2 & 4) HO67xx Tie Bar	DUAL CYLINDER 500 HP Max 55 MPH Max
TRIPLE ENGINE ONE WITH COUNTER ROTATING	DUAL CYLINDER 900 HP Max 55 MPH Max HC53xx Cylinders HO60xx Tie Bar	DUAL CYLINDER 1050 HP Max HC67xx Cylinders (See Notes 2 & 4) HO67xx Tie Bars HA67xx Center Engine (See Note 2) Bracket Kit	NOT RECOMMENDED
	TRIPLE CYLINDER 900 HP Max 55 MPH Max HC53xx Cylinders HO60xx Tie Bar	TRIPLE CYLINDER 1050 HP Max HC67xx Cylinders (See Notes 2 & 4) HO67xx Tie Bars	NOT RECOMMENDED
1 Teleflex has specific steering equipment for boats that are driven aggressively, used in severe conditions or with more than 300 HP per engine. 2 ALL ENGINES over 300 HP and all boats that are driven aggressively must use a high strength tiller bolt, kit part # HA5822. 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 "TFX -ARP" on the head of the bolt (refer to NOTICE page 3-5). 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 Kevlar Steering Hoses is recommended. 4 HC67xx Tournament cylinders are designed for use with high powered fishing/sport boats. If your application calls for dual or triple outboard engines, is capable of speeds exceeding 55 mp/h and runs in open water, Tournament Cylinders should be used.			

Single Engine Application Guide

SeaStar

OUTBOARD-FRONT MOUNT

Prior to selecting a cylinder from this application guide, please refer to page 3-4 to ensure that you are selecting the correct cylinder for your engine/boat.

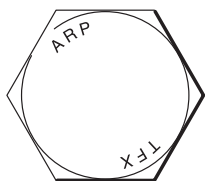
NOTICE

NOTICE

Front Mount Cylinder part# HC5345 is included in the SeaStar Outboard Steering Kits HK6400/63XX and HK7400/73XX. If your engine requires the use of a cylinder other than the HC5345 (see application guides on this page through 3-6) you will need to purchase the individual components (helm, cylinder, hoses, etc.) separately.

NOTICE

High Strength Tiller bolt, part# HA5822. ALL cylinders shipped after June 15th, 2007 will have this bolt included in the cylinder package.



CAUTION

SeaStar PRO Helms require the use of SeaStar PRO (1500 psi) Kevlar steering hoses.

Is your Splashwell wide enough? Check page 3-11 for space requirements.

MFG	YEAR	MODEL	CYL	NOTES
FORCE	1985-DATE	90-150 HP	HC5345	
HONDA	1996-DATE	75-90HP	HC5345	See Note 1
	1998-DATE	115-130HP	HC5347	
	1998-DATE	30-50HP	HC5345	
	2001-DATE	135-225HP 4-Stroke	HC5345	
	2003-DATE	BF135HP	HC5345	
JOHNSON/ EVINRUDE	1977-1990	65-300HP	HC5348	Inc. ETech See Note 1 See Note 1
	1988-1997	250-300HP V8	HC5342	
	1991-DATE	40-250HP	HC5345	
	1996-DATE	75-250HP Ficht	HC5345	
	1998-DATE	40-140HP 4-Stroke	HC5358	
	2000-DATE	115HP Ficht	HC5358	
	2002-DATE	200-225HP 4-Stroke	HC5345	
	2005-DATE	E250 DPX Vindicator	HC5348	
MERCURY	1984-1994	2.4/2.5HP EFI	HC5345	See Note 2
	1989-DATE	75-300HP	HC5345	
	1996-DATE	75-225HP 4-Stroke	HC5345	See Note 1 See Note 3
	1998-DATE	30-60HP	HC5345	
	2003-DATE	250-300HP XS	HC6345	
NISSAN	1990-DATE	90-140HP	HC5345	
SUZUKI	1986-DATE	100HP	HC5345	NOT 1996 See Note 1 See Note 1
	1986-2002	115-140HP	HC5345	
	1986-DATE	150-300HP 2 & 4-Stroke	HC5345	
	1996 ONLY	115-140HP	HC5348	
	1998-DATE	40-140HP 4-Stroke	HC5358	
	2003-DATE	90HP 4-Stroke	HC5358	
US MARINE	1996-DATE	90-120HP	HC5345	
YAMAHA	1990-2003	40-90HP	HC5345	See Note 5 See Note 5 See Note 1 See Note 4
	1986-DATE	100-250HP 2-Stroke	HC5345	
	1997-DATE	80-225HP 4-Stroke	HC5345	
	2000-DATE	150-250 HPDI	HC5345	
	2002-DATE	300 HPDI	HC5358	
	2003-DATE	25-60 HP 4-Stroke	HC5348	
	2007-DATE	350 HP	HC5345	
YANMAR	1994-DATE	90-120HP	HC5345	

1. Requires Spacer Kit# HO5090.
2. May Require Extensive Cowling Modifications.
3. **MUST** use High Strength Tiller bolt, part # HA5822. Refer to the NOTICE on this page identifying the high strength bolt.

4. Optional cylinder part # HC5358, with the engine in the full tilt position.
5. Cylinder part # HC5358 may also be used in these single engine applications.

The above engine applications are current through the revision date shown. For up-to-date engine applications go to: www.seastarsteerng.com

REVISION DATE: MAR. 24th 2008

Twin Engine Application Guide

Prior to selecting a cylinder from this application guide, please refer to page 3-4 to ensure that you are selecting the correct cylinder for your engine/boat.

NOTICE

Is your Splashwell wide enough? Check page 3-11 for space requirements.

MFG	YEAR	MODEL	CYL	TIE BAR KITS		NOTES
				TWIN x 1	TWIN x 2	
FORCE	1985-DATE	90-150 HP	HC5345	HO5008A	HO5008A	
HONDA	1996-DATE	75-90HP	HC5345	HO6001	HO6002	See Note 3
	1998-DATE	115-130HP	HC5347	HO5063	HO5064	See Note 5
	1998-DATE	30-50HP	HC5345	HO6001	HO6002	See Note 2
	2001-DATE	150HP 4-Stroke	HC5345	N/A	HO6002	See Note 7
	2001-DATE	225HP 4-Stroke	HC5345	HO6001	HO6002	
	2003-DATE	BF135HP	HC5345	HO6003	HO6002	
JOHNSON/ EVINRUDE	1977-1990	65-300HP	HC5348	HO6003	HO6002	
	1988-1997	250-300HP V8	HC5342	HO5001A	HO5030	See Note 5
	1991-DATE	40-250HP	HC5345	HO6003	HO6002	<i>Inc. ETech Engines.</i>
	1996-DATE	75-250HP Ficht	HC5345	HO6003	HO6002	
	1998-DATE	40-140HP 4-Stroke	HC5358	HO6003	HO6002	See Note 2
	2000-DATE	115HP FICHT	HC5358	HO6003	HO6002	See Note 2
	2002-DATE	200-225HP 4-Stroke	HC5345	HO6003	HO6002	
	2005-DATE	E250 DPX Vindicator	HC5348	HO6003	HO6002	
MERCURY	1984-1994	2.4/2.5HP EFI	HC5345	HO6001	HO6002	See Note 4
	1989-DATE	75-300HP	HC5345	HO6001	HO6002	See Note 3
	1996-DATE	75-200HP 2 & 4-Stroke	HC5345	HO6001	HO6002	
	1998-DATE	30-60HP	HC5345	HO6001	HO6002	See Note 2
	2002-DATE	225HP 4-Stroke	HC5358	HO6001	HO6002	See Note 1
	2003-DATE	250-300HP XS	HC5345	N/A	HO6002	See Note 6
NISSAN	1990-DATE	90-140HP	HC5345	HO6001	HO6002	
SUZUKI	1986-DATE	100HP	HC5345	HO6003	HO6002	
	1986-2002	115-140HP	HC5345	HO6001	HO6002	NOT 1996
	1986-DATE	150-300HP 2 & 4-Stroke	HC5345	HO6003	HO6002	
	1996 ONLY	115-140HP	HC5348	HO6001	HO6002	
	1998-DATE	40-140HP 4-Stroke	HC5358	HO6003	HO6002	See Note 2
	2003-DATE	90HP 4-Stroke	HC5358	HO6003	HO6002	See Note 2
US MARINE	1996-DATE	90-120HP	HC5345	HO6001	HO6002	
YAMAHA	1990-DATE	40-90HP	HC5345	HO6003	HO6002	
	1986-DATE	100-250HP 2-Stroke	HC5345	HO6001	HO6002	
	1997-DATE	80-225HP 4-Stroke	HC5358	HO6001	HO6002	See Note 1
	2000-DATE	150-250 HPDI	HC5358	HO6001	HO6002	See Note 1
	2002-DATE	300 HPDI	HC5358	HO6001	HO6002	
	2003-DATE	25-60HP 4-Stroke	HC5348	HO6003	HO6002	See Note 2
	2006-DATE	350HP	<i>MUST Use Tournament Cylinders. Refer to Page 3-8</i>			
YANMAR	1994-DATE	90-120HP	HC5345	HO6001	HO6002	

1. HC5345 is optional for **SINGLE ENGINE ONLY** applications. **DO NOT** use HC5345 for twin engine applications as operational interference may occur.

2. Requires Kit HO5090

3. Minimum Engine Center = 27"

4. May Require Extensive Cowling Modifications

5. HO5030 and HO5064 comes without Tie Bar

6. One cylinder per engine. Must use Mercury supplied tiller bolt for installation.

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

The above engine applications are current through the revision date shown. For up-to-date engine applications go to: www.seastarsteering.com

REVISION DATE: NOV. 23rd 2007

Triple Engine Application Guide

SeaStar

OUTBOARD-FRONT MOUNT

Prior to selecting a cylinder from this application guide, please refer to page 3-4 to ensure that you are selecting the correct cylinder for your engine/boat.

⚠ WARNING

Use of incorrect components on a high speed/performance boat, may lead to bending and breaking of components resulting in steering failure causing property damage and/or personal injury.

NOTICE

Tournament Tiebar Cylinder should be used on ALL Tournament/High Speed (60 Mph and above) multi-engine boats. Please refer to page 3-8.

MFG	YEAR	MODEL	CYL	PORT TO DRIVE CYL	STARBOARD TO DRIVE CYL	NOTES
FORCE	1995-DATE	90-120HP	HC5345	HO6001	HO6002	See Note 4
HONDA	1996-DATE	75-90HP	HC5345	HO6001	HO6002	See Note 2, 4
	2001-DATE	135-225HP 4-Stroke	HC5345	HO6003	HO6002	See Note 4
MERCURY	1989-DATE	75-275HP	HC5345	HO5081		See Note 4
	2003-DATE	250-300HP XS	HC5345	HO6002	HO6002	See Note 3, 4
JOHNSON/ EVINRUDE	1991-DATE	90-175HP	HC5345	HO5080		See Note 4
	1991-DATE	250-300HP	HC5345	HO6001	HO6002	See Note 4
	1991-DATE	200-225HP	HC5345	HO6003	HO6002	See Note 4
	1991-DATE	90-225HP Ficht	HC5345	HO5080		See Note 2, 4
	1998-DATE	65-70HP 4-Stroke	HC5345	HO6003	HO6002	See Note 1, 4
	2005-DATE	E250 DPX Vindicator	HC5348	HO6003	HO6002	See Note 4
SUZUKI	1986-DATE	150-200HP 2 & 4-Stroke	HC5345	HO6003	HO6002	See Note 4
	1986-DATE	115-140HP	HC5345	HO6003	HO6002	See Note 4
	1998-DATE	65-70HP 4-Stroke	HC5345	HO6001	HO6002	See Note 1, 4
	2001-DATE	250-300HP	HC5345	HO6001	HO6002	See Note 4
YAMAHA	1990-DATE	100-200HP	HC5345	HO6001	HO6002	See Note 4
	1990-DATE	225-250HP 4-Stroke	HC5358	HO5080		See Note 4
	1998-DATE	80-100HP 4-Stroke	HC5358	HO6001	HO6002	See Note 4
	2001-DATE	150-300HP HPDI	HC5358	HO6001	HO6002	See Note 4
	2006-DATE	350HP	<i>MUST Use Tournament Cylinders. Refer to Page 3-8</i>			See Note 3

1. Requires Kit HO5090

2. Minimum Engine Center = 29"

3. One cylinder required per engine. MUST use high strength tiller bolt part # HA5822.

4. For high performance/speed applications, please refer to the Caution noted at the bottom of this page.

The above engine applications are current through the revision date shown. For up-to-date engine applications go to: www.seastarsteerng.com

REVISION DATE: SEPT. 4th 2007

NOTICE

A minimum of two cylinders will be required to operate a triple engine installation with the exception of Mercury XS engines which MUST use one cylinder per engine.

NOTICE

Is your Splashwell wide enough? Check page 3-11 for space requirements.

Tournament Series Tiebar Cylinders

NOTICE

Maximum engine centers for:
Single cylinder = 41"
Twin cylinders = 32-1/8"

With the power and speed increasing for performance orientated fishing boats, Teleflex Marine felt it prudent to set up a dedicated application for these types of boats. If your application calls for a dual or triple Outboard Engine configuration, is capable of speeds exceeding 55mph and runs in open water, please refer to the Tournament Tiebar Cylinders to achieve performance, durability and safety.



MAKE	YEAR	TWIN ENGINE CYLINDERS	TRIPLE ENGINE CYLINDERS *Note
HONDA All models	200–250HP	HC6750 (s) x 1 HC6751 (p) x 1 Tiebar HO6700 x 1	HC6750 (s) x 1 HC6751 (p) x 1 HC6752 (c) x 1 2 x HO6700 tiebar kits required for triples.
EVINRUDE Salt/Fresh/DI engines	200–300HP	HC6753 (s) x 1 HC6754 (p) x 1 Tiebar HO6700 x 1	HC6753 (s) x 1 HC6754 (p) x 1 HC6755 (c) x 1 2 x HO6700 tiebar kits required for triples.
MERCURY Verado N/A	200–300HP	HC6750 (s) x 1 HC6751 (p) x 1 Tiebar HO6700 x 1	HC6750 (s) x 1 HC6751 (p) x 1 HC6752 (c) x 1 2 x HO6700 tie bar kits required for triples.
	250–300HP XS (One cylinder per engine required.)	HC6750 (s) x 1 HC6751 (p) x 1 Tiebar HO6700 x 1	HC6750 (s) x 1 HC6751 (p) x 1 HC6752 (c) x 1 2 x HO6700 tiebar kits required for triples.
SUZUKI All models	200–300HP 2 and 4 stroke	HC6750 (s) x 1 HC6751 (p) x 1 Tiebar HO6700 x 1	HC6750 (s) x 1 HC6751 (p) x 1 HC6752 (c) x 1 2 x HO6700 tiebar kits required for triples.
YAMAHA All models	200–300HP	HC6753 (s) x 1 HC6754 (p) x 1 Tiebar HO6700 x 1	HC6753 (s) x 1 HC6754 (p) x 1 HC6755 (c) x 1 2 x HO6700 tiebar kits required for triples.
	350HP	HC6750 (s) x 1 HC6751 (p) x 1 Tiebar HO6700 x 1	HC6750 (s) x 1 HC6751 (p) x 1 HC6752 (c) x 1 2 x HO6700 tiebar kits required for triples.

REVISION DATE: NOV. 22nd 2007

NOTICE

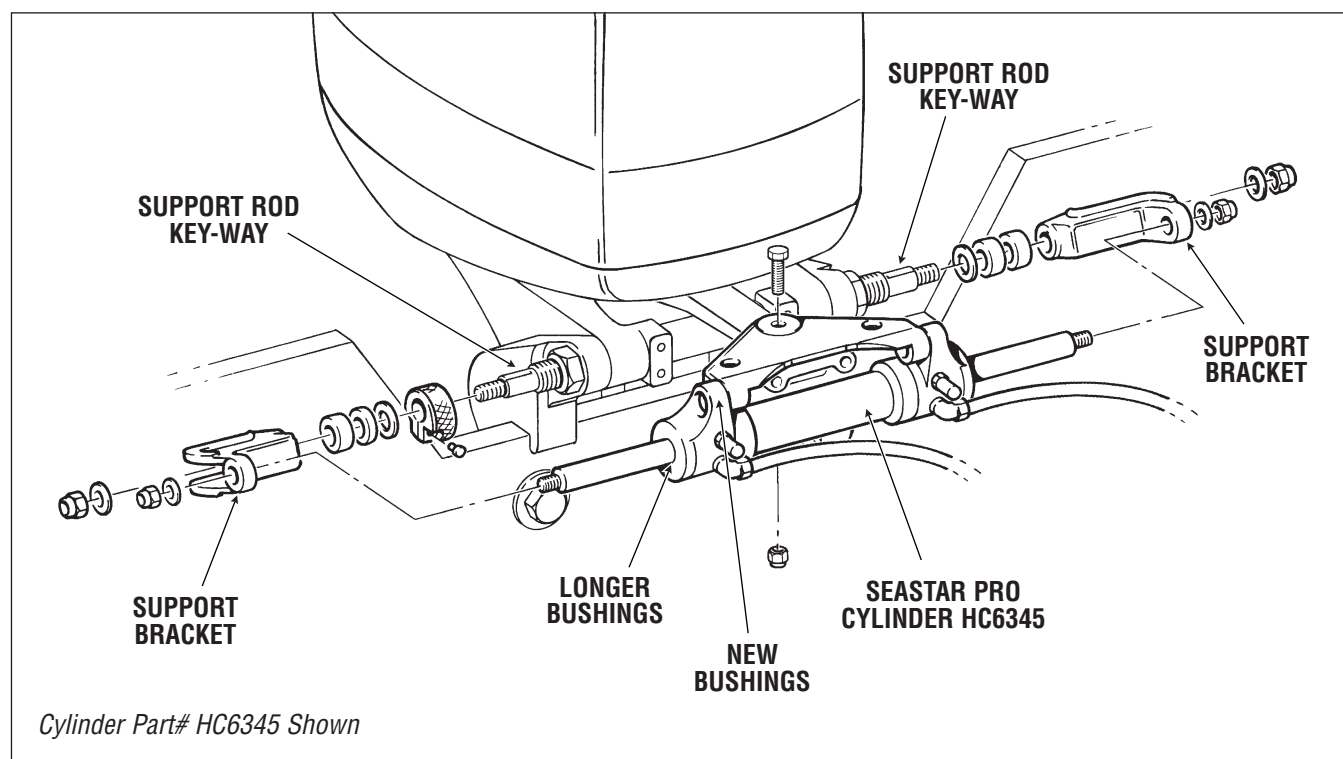
* All triple engine applications, excluding the Mercury XS line, may use a twin cylinder set up with the additional purchase of a "center engine bracket kit, part # HA6701.

SeaStar Pro Steering Systems

SeaStar®

OUTBOARD-FRONT MOUNT

SeaStar PRO Outboard Steering systems 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. Before ordering it is necessary to determine the proper cylinder and helm pump for your application. Using the table on page 3-10, choose the correct cylinder as per your outboard engine. All SeaStar PRO systems require the use of a SeaStar PRO helm and SeaStar PRO (1500psi) reinforced Kevlar hoses ONLY!



⚠ WARNING

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

Helm Pumps

SeaStar PRO Steering systems have the option to install a standard front mounting helm, both traditional and sport tilt as well as rear mount helm pumps. Please refer to page 9-1 for style and page 9-5 for PRO Helm part numbers.

⚠ CAUTION

SeaStar PRO Helms require the use of SeaStar PRO (1500 psi) Kevlar steering hoses

SeaStar Pro Application Guide

NOTICE

Is your Splashwell wide enough? Check page 3-11 for space requirements.

MFG	YEAR	MODEL	CYL	NOTES
FORCE	1985-DATE	90-150HP	HC6345	
HONDA	1996-DATE	150-300HP	HC6345	
JOHNSON/ EVINRUDE	1977-1990 2002-DATE 2003-DATE 2005-DATE	150-300HP 150-250HP 4-Stroke 150-300HP ETech E250HP Vindicator	N/A HC6345 HC6345 N/A	Contact Teleflex Contact Teleflex
MERCURY	1989-DATE	150-300 2-Stroke, 4-Stroke and XS Engines	HC6345	XS engine requires mercury supplied tiller bolt on install
SUZUKI	1986-DATE	150-250 HP 2 and 4-Stroke	HC6345	
YAMAHA	1986-DATE 2002-DATE	150-250HP 2 and 4-Stroke 300 HPDI	HC6345 HC6358	

REVISION DATE: FEB. 10TH 2006

NOTICE

SeaStar PRO Steering Systems can not be used with an unbalanced steering cylinder.

Cylinder Installation and General Dimensions

⚠ WARNING

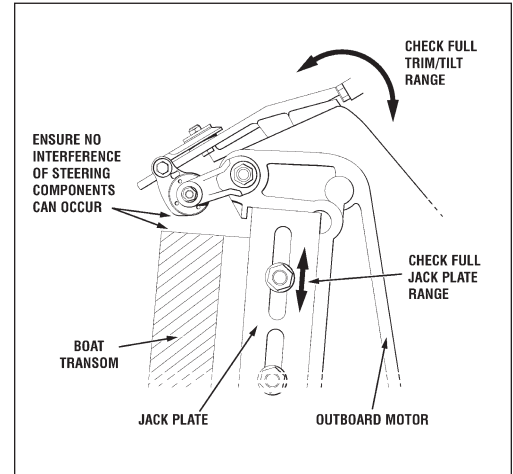
Operational interference of the steering cylinder/cylinder fittings and jackplates/transom/splashwell can occur under certain conditions. Check installation thoroughly throughout the full range of Motor Tilt, Jack Height and Trim before making final installation.

If interference does occur, contact:

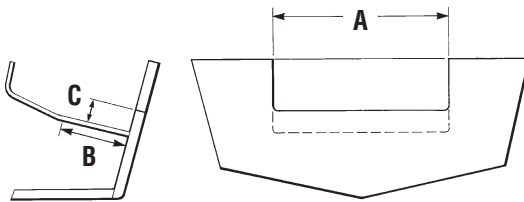
Teleflex Canada Limited Partnership for additional information/options.

Telephone: **604-270-6899** Fax: **604-279-2202**

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



Motor Well dimensions required for front mount outboard steering systems

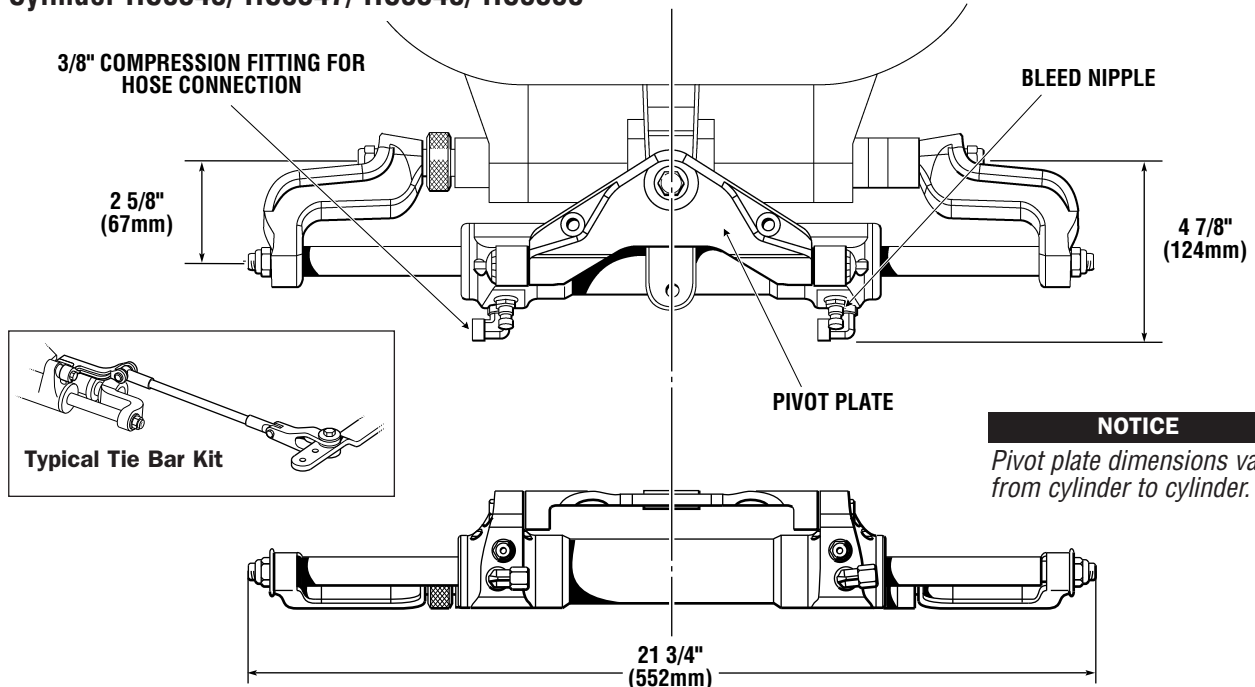


# OF ENGINES	A	B	C	MIN. ENGINE CENTER DISTANCE
1	22" (559mm)	6" (152mm)	5" (127mm)	N/A
2	49" (1244mm)	6" (152mm)	5" (127mm)	26" (660mm)

NOTES

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

Cylinder HC5345/ HC5347/ HC5348/ HC5358



NOTICE

Pivot plate dimensions vary from cylinder to cylinder.

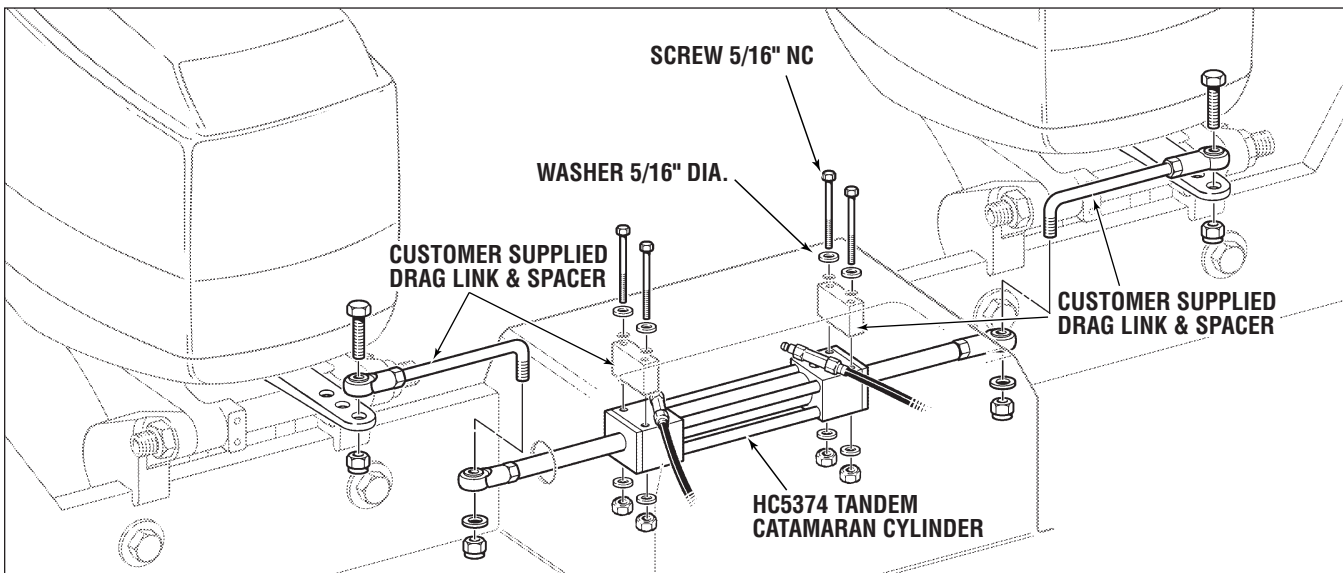
Outboard-Catamaran

Horsepower Limitations

ENGINE CONFIGURATIONS	MAXIMUM HORSEPOWER	CYLINDER	RECOMMENDED HELM PUMP	NO. OF STEERING WHEEL TURNS
NON COUNTER-ROTATING	UP TO 450HP	HC5343 HC5374	HH5271 HH5272	5 5.5
COUNTER-ROTATING	UP TO 600HP	HC5343 HC5374	HH5271 HH5272	5 5.5

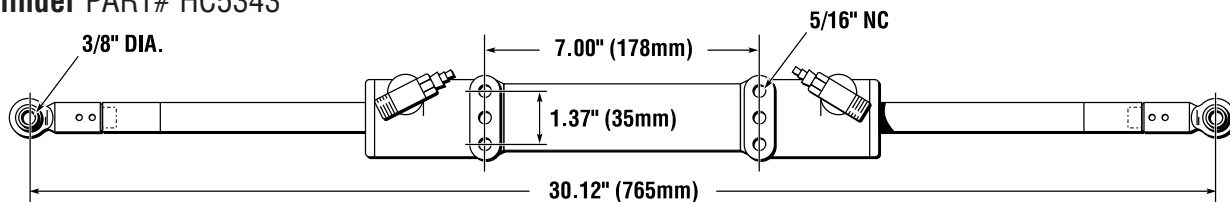
To establish whether or not this cylinder is suitable for your application, the following points should be considered:

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

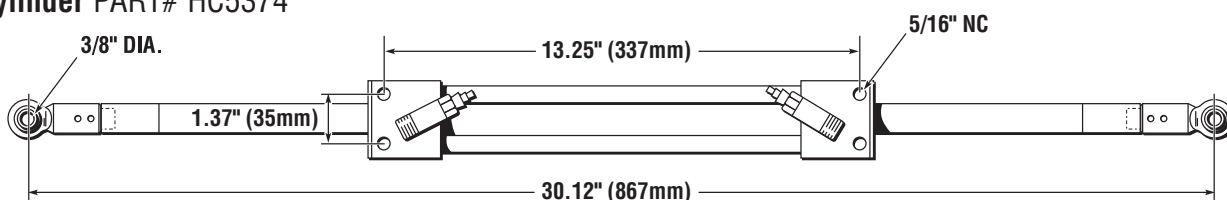


Cylinder Part# HC5374 Shown

Cylinder PART# HC5343



Cylinder PART# HC5374



SEASTAR SIDE MOUNT OUTBOARD STEERING SYSTEM

Part# HC5370

Features

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

Applications

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

How to select a side mount outboard steering system

WARNING

**Not for use with SeaStar-Pro
Helm Pumps.**

- 1) From the order guide on page 3-14 select the system configuration based on;
 - a) the number of engines, and
 - b) the total power of engine(s) to be installed.
- 2) From the order guide select the cylinder(s) and tie bar kits required.
- 3) From the order guide select the appropriate helms and accessory hardware for each steering station.
- 4) From the order guide select the fitting and hose kits required for the installation.
- 5) Confirm that there is sufficient space available in the splashwell and dash areas for the steering components.

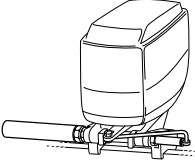
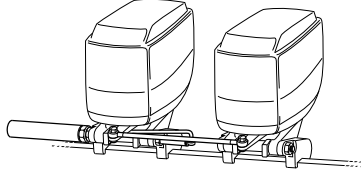
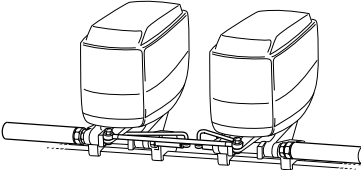
NOTICE

*Not recommended for use in
installations where;*

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



Order Guide

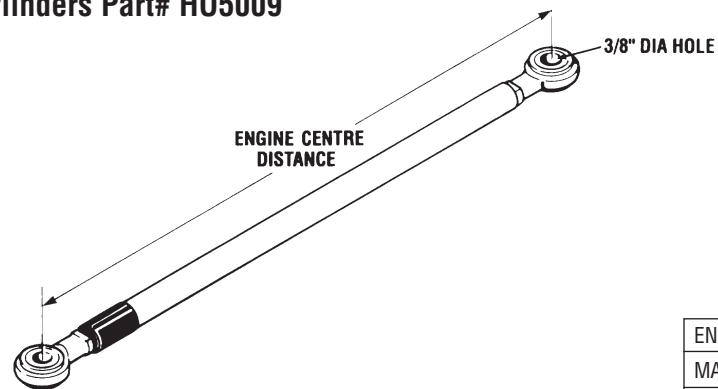
ENGINE/ CYLINDER CONFIGURATION	DESCRIPTION	QTY REQ	MODEL	PART NUMBER	REF. PAGE #
SINGLE ENGINE (SINGLE CYLINDER) APPLICATIONS UP TO 300 HP MAX NUMBER OF TURNS 4.8/5.7 	CYLINDER	1	SIDE MOUNT	HC5370	
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	HOSE KIT	1	OUTBOARD HOSE	HO51__	10-2
	OIL	3	SEASTAR OIL	HA5430	11-1
	FOR EXTRA STEERING STATIONS ADD:				
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	FITTING KIT	1	ADD A STATION	HF5501	10-10
	HOSE KIT	1	OUTBOARD HOSE	HO51__	10-2
	OIL	1	SEASTAR OIL	HA5430	11-1
DUAL ENGINE (SINGLE CYLINDER) NON-COUNTER ROTATING APPLICATIONS UP TO 300 HP MAX COUNTER ROTATING ENGINE APPLICATIONS UP TO 600 HP MAX NUMBER OF TURNS 4.8/5.7 	CYLINDER	1	SIDE MOUNT	HC5370	
	TIE BAR KIT	1	TIE BAR ONLY	HO5009	
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	HOSE KIT	1	OUTBOARD HOSE	HO51__	10-2
	OIL	3	SEASTAR OIL	HA5430	11-1
	FOR EXTRA STEERING STATIONS ADD:				
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	FITTING KIT	1	ADD A STATION	HF5501	10-10
	HOSE KIT	1	OUTBOARD HOSE	HO51__	10-2
	OIL	1	SEASTAR OIL	HA5430	11-1
DUAL ENGINE (DUAL CYLINDERS) NON-COUNTER ROTATING APPLICATIONS UP TO 600 HP MAX ALL COUNTER ROTATING ENGINE APPLICATIONS NUMBER OF TURNS 7.5 	CYLINDER	2	SIDE MOUNT	HC5370	
	TIE BAR KIT	1	TIE BAR ONLY	HO5009	
	HELM	1	** SEASTAR II- STANDARD	HH5272	9-6
	HOSE KIT	1	OUTBOARD HOSE	HO51__	10-2
	HOSE KIT	1	OUTBOARD HOSE	HO51__	10-2
	HOSE KIT	1	OUTBOARD HOSE	HO51__	10-2
	FITTING KIT	1	TEE FITTINGS	HF5530	10-1
	OIL	3	SEASTAR OIL	HA5430	11-1
	FOR EXTRA STEERING STATIONS ADD:				
	HELM	1	** SEASTAR II- STANDARD	HH5272	9-6
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FOR STANDARD HELMS)	HA5418	9-3
	20 DEGREE WEDGE		(FOR STANDARD HELMS)	HA5419	9-3
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5501	10-10
	* TILT HELM- SEASTAR I			HH5741	9-7
	REAR MOUNT HELM- SEASTAR I			HH5261	9-7
	** TILT HELM- SEASTAR II			HH5742	9-7
	REAR MOUNT HELM- SEASTAR II			HH5262	9-7
	POWER ASSIST STEERING			PA1200	2-1

General Dimensions

SeaStar

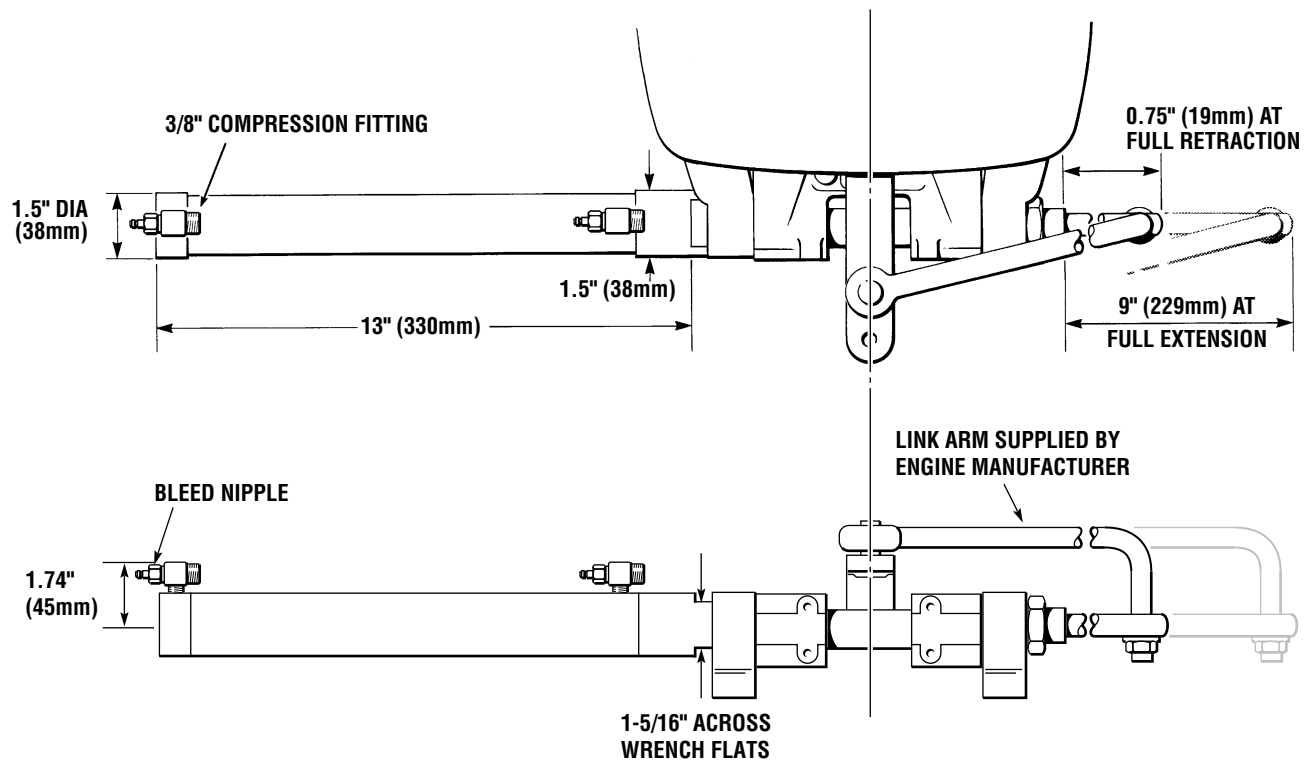
OUTBOARD-SIDE MOUNT

Tie Bar for Side Mount Cylinders Part# H05009



ENGINE CENTRE DISTANCE	
MAXIMUM:	36" (914mm)
MINIMUM:	26" (660mm)

PART# HC5370



SEASTAR SPLASHWELL MOUNT OUTBOARD STEERING SYSTEM

Part# HC5380

NOTICE

Not for use with SeaStar Pro Helms.

Features

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

Applications

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

How to select a splashwell mount outboard steering system

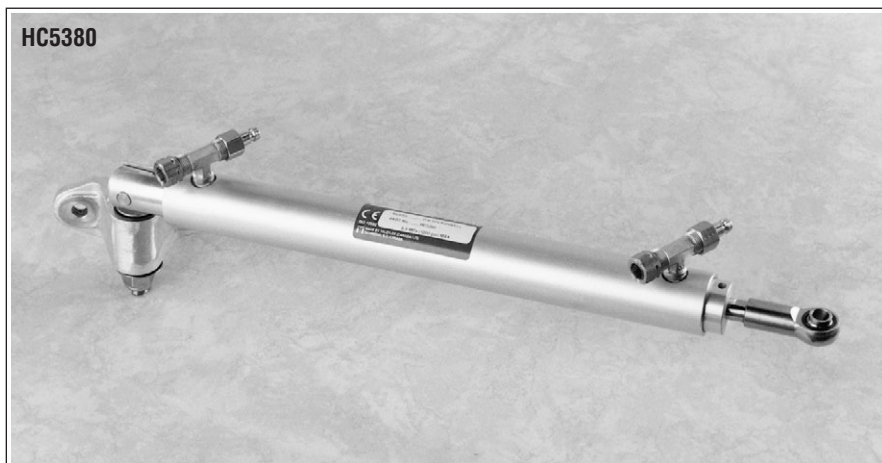
- 1) From the order guide on page 3-17 select the system configuration based on;
 - a) the number of engines, and
 - b) the total power of engine(s) to be installed.
- 2) Select the cylinder and tie bar kit required.
- 3) From the order guide select the appropriate helms and accessory hardware for each steering station.
- 4) From the order guide select the fitting and hose kits required. You will have to determine the configuration, length, number of hose and fitting kits required for the installation (refer to page 10-2).
- 5) Confirm that there is sufficient space available in the splashwell and dash areas for the steering components.

NOTICE

Not recommended for use in installations where;

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

HC5380

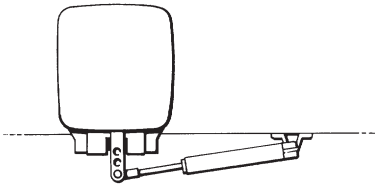
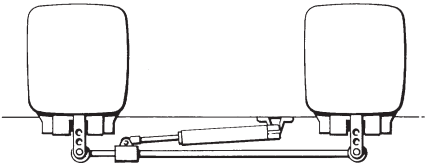


Order Guide

SeaStar

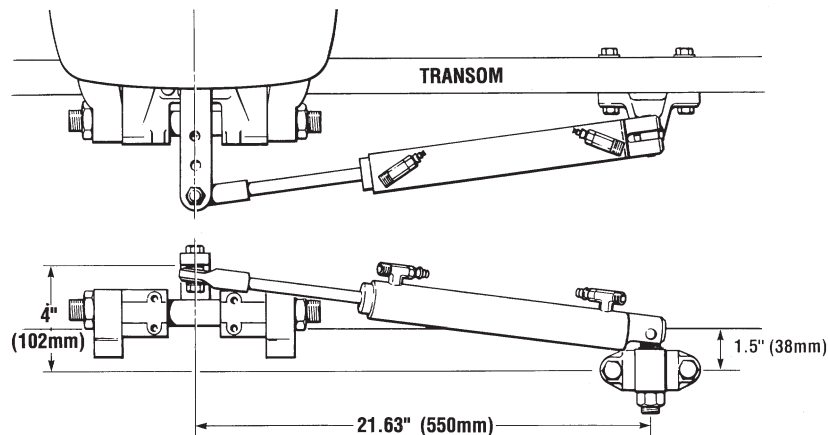
OUTBOARD-SPLASHWELL MOUNT

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

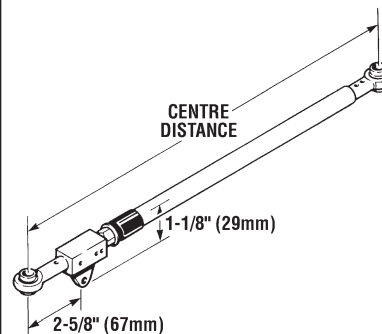
ENGINE/ CYLINDER CONFIGURATION	DESCRIPTION	QTY REQ	MODEL	PART NUMBER	REF. PAGE #
SINGLE ENGINE (SINGLE CYLINDER) APPLICATIONS UP TO 300 HP MAX NUMBER OF TURNS 5.5/6.5 	CYLINDER	1	SPLASHWELL	HC5380	
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	HOSE KIT	1	OUTBOARD HOSE	H051_ _	10-2
	OIL	3	SEASTAR OIL	HA5430	11-1
	FOR EXTRA STEERING STATIONS ADD:				
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	FITTING KIT	1	ADD A STATION	HF5501	10-10
	HOSE KIT	1	OUTBOARD HOSE	H051_ _	10-2
	OIL	1	SEASTAR OIL	HA5430	11-1
DUAL ENGINE (SINGLE CYLINDER) NON-COUNTER ROTATING APPLICATIONS UP TO 300 HP MAX COUNTER ROTATING ENGINE APPLICATIONS UP TO 600 HP MAX NUMBER OF TURNS 5.6/6.5 	CYLINDER	1	SPLASHWELL	HC5380	
	TIE BAR KIT	1	SPLASHWELL		
				MOUNT TIE BAR H05010	
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	HOSE KIT	1	OUTBOARD HOSE	H051_ _	10-2
	OIL	3	SEASTAR OIL	HA5430	11-1
	FOR EXTRA STEERING STATIONS ADD:				
	HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
	FITTING KIT	1	ADD A STATION	HF5501	10-10
	HOSE KIT	1	OUTBOARD HOSE	H051_ _	10-2
	OIL	1	SEASTAR OIL	HA5430	11-1
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FOR STANDARD HELMS)	HA5418	9-3
	20 DEGREE WEDGE		(FOR STANDARD HELMS)	HA5419	9-3
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5501	10-10
	* TILT HELM- SEASTAR I			HH5741	9-7
	REAR MOUNT HELM- SEASTAR I			HH5261	9-7
	POWER ASSIST STEERING			PA1200	2-1

General Dimensions

Mounting Configuration



Tie Bar Kit# H05010

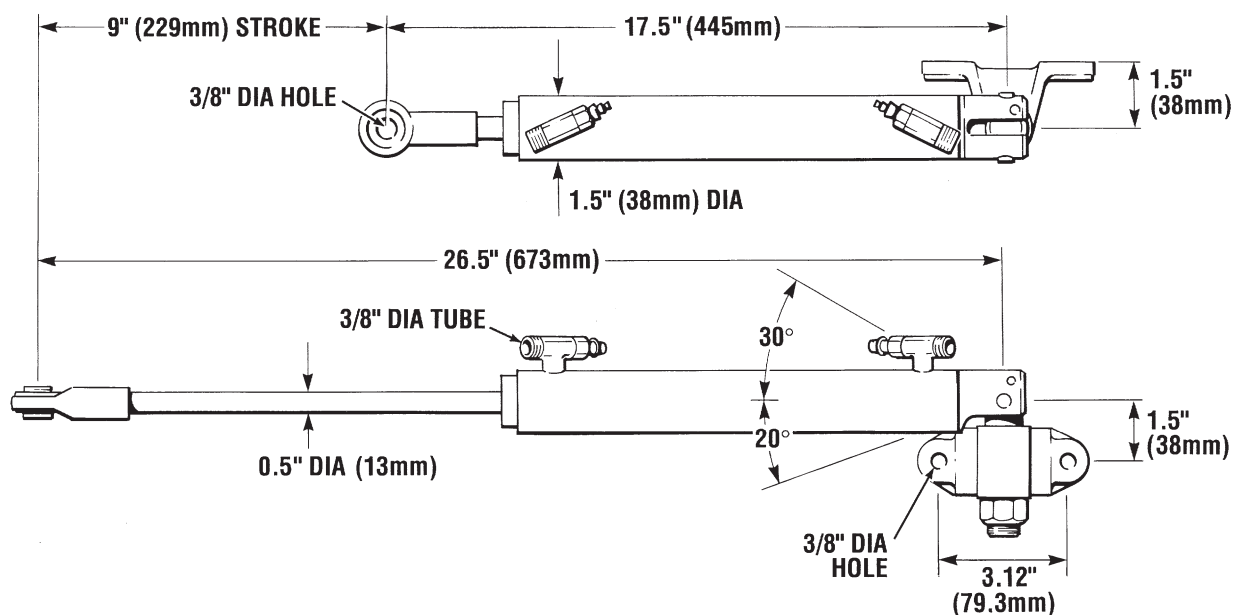


36" (914mm)	MAXIMUM ENGINE CENTRE DISTANCE
26" (660mm)	MINIMUM ENGINE CENTRE DISTANCE

PART# HC5380

NOTICE

DO NOT use a PRO Helm pump with this, or any other unbalanced steering cylinder.



Features

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

Applications

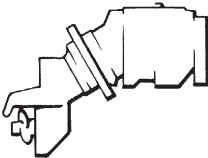
- Fits most power and non-power assist sterndrives.
- Single and multiple drives.

How to select a steering system for a stern drive

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



Order Guide

SYSTEM CONFIGURATION	COMPONENT DESCRIPTION	QTY REQ	MODEL	PART #	PAGE REF #
SINGLE & DUAL STERNDRIVE (For dual sterndrive applications use engine manufactures supplied tie bar.) 	CYLINDER	1	SEE APPLICATION GUIDE		
	HELM	1	* SEASTAR I STANDARD (SEE NOTE 1) ** SEASTAR II-STANDARD (SEE NOTE 2)	HH5271 HH5272	9-6 9-6
	OIL	3	SEASTAR OIL	HA5430	11-1
	TUBE/HOSE		SEE NOTE 3		10-6
	FOR EXTRA STEERING STATION ADD:				
	HELM	1	* SEASTAR I STANDARD (SEE NOTE 1) ** SEASTAR II-STANDARD (SEE NOTE 2)	HH5271 HH5272	9-6 9-6
	FITTING KIT	1	ADD A STATION - FOR SEASTAR I HELMS - FOR SEASTAR II HELMS	HF5502 HF5501	10-11 10-10
	OIL	1	SEASTAR OIL		11-1
	EXTRA TUBE/HOSE		SEE NOTE 3		10-6
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FOR STANDARD HELMS)	HA5418	9-3
	20 DEGREE WEDGE KIT		(FOR STANDARD HELMS)	HA5419	9-3
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5502	10-11
	* TILT HELM-SEASTAR I			HH5741	9-7
	REAR MOUNT HELM-SEASTAR I			HH5261	9-7
	** TILT HELM-SEASTAR II			HH5742	9-7
	REAR MOUNT HELM-SEASTAR I			HH5262	9-7
	POWER ASSIST STEERING			PA1200	2-1

1. Seastar I helms are the standard recommendation for both non-power and power steered applications.
2. Seastar II helms can be specified for power steered applications where faster steering response is desired. Review the application chart on page 4-3 for recommendations.
3. * **For Seastar I systems:** use 3/8" dia nylon tubing ref part No. HT5_ _ (Refer to page 10-6)

- * **For Seastar II systems:** Use the following option **A** or **B**
- A)** Outboard hose:
Hoses must be ordered in standard lengths. They cannot be cut to length. (Refer to page 10-2)
- B)** Copper tube:
3/8" diameter copper tube and hose kit part No. HF5508 (Refer to page 10-6)
4. For dual stern drives – use the tie bar supplied by the engine manufacturer.

NOTICE

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

Application Guide



STERNDRIVE STEERING

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

1. Balanced system – ie: the number of turns lock to lock is equal port to starboard or vice-versa.
2. Unbalanced system – ie: the number of turns lock to lock is not equal port to starboard or vice-versa.
3. Requires additional clevis supplied by engine manufacturer. Reference Quicksilver part No. B98735A1. Refer to diagram on page 4-4.

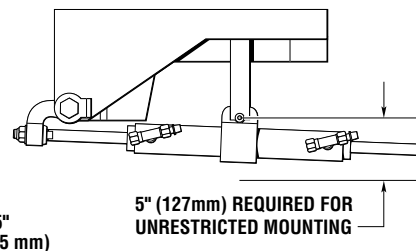
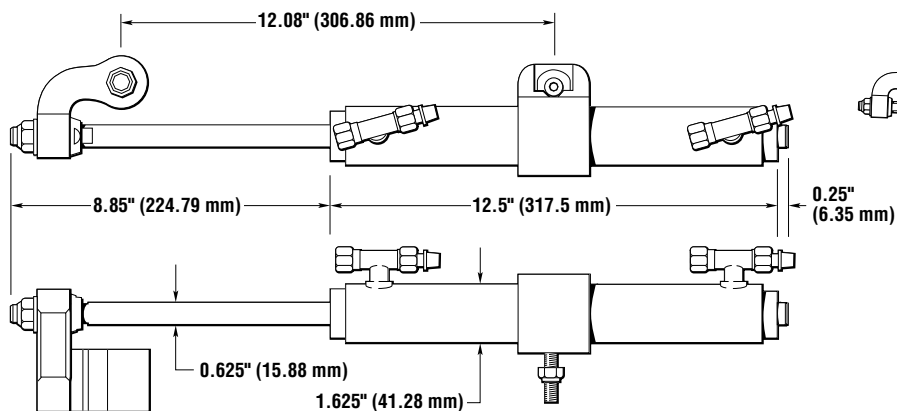
4. Requires cylinder rod end adapter HA5424 supplied by Teleflex Canada Limited Partnership. Refer to diagram on page 4-4.
5. **HC5332 replaces HC5326 as of January 2000.** If installing HC5326 additional clevis supplied by engine manufacturer required (part number B98735A1).

6. **The installation of the HC5332 sterndrive cylinder requires the use of SeaStar Outboard hose only. DO NOT use 3/8" copper or nylon tube.**
7. If engine outdrive is NOT equipped with a torque tab on the underside of the lower leg one must be installed to reduce prop torque.
8. Yanmar Engines using the Bravo III drives require the use of cylinder HC5326.

REVISION DATE: JANUARY 12TH 2004

General Dimensions

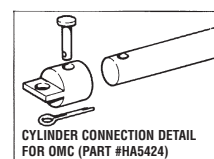
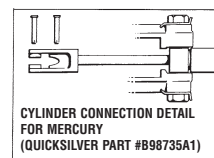
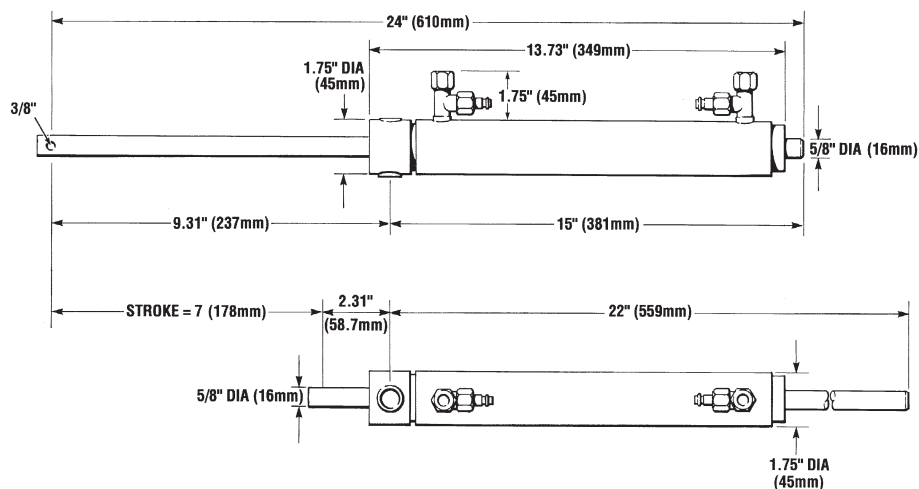
HC5332 135-7EM



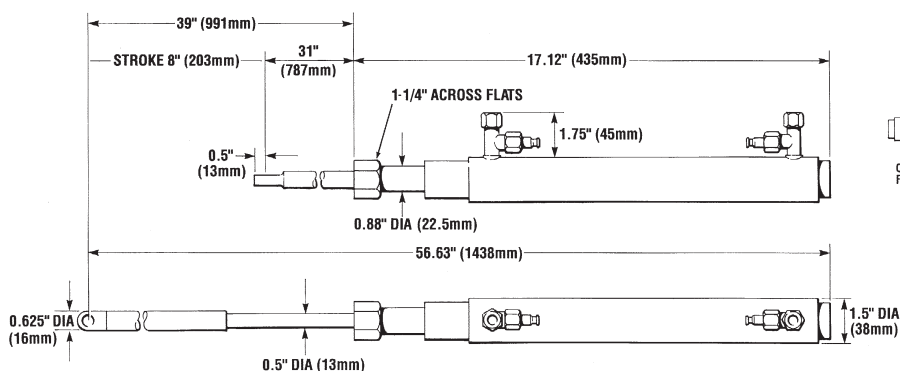
NOTICE

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

HC5326 BA150-7EM

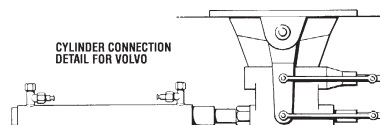
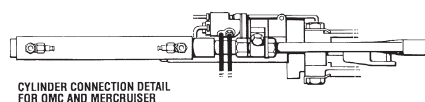


HC5328 125-8EM



NOTICE

DO NOT use a PRO Helm pump with this, or any other unbalanced steering cylinder.

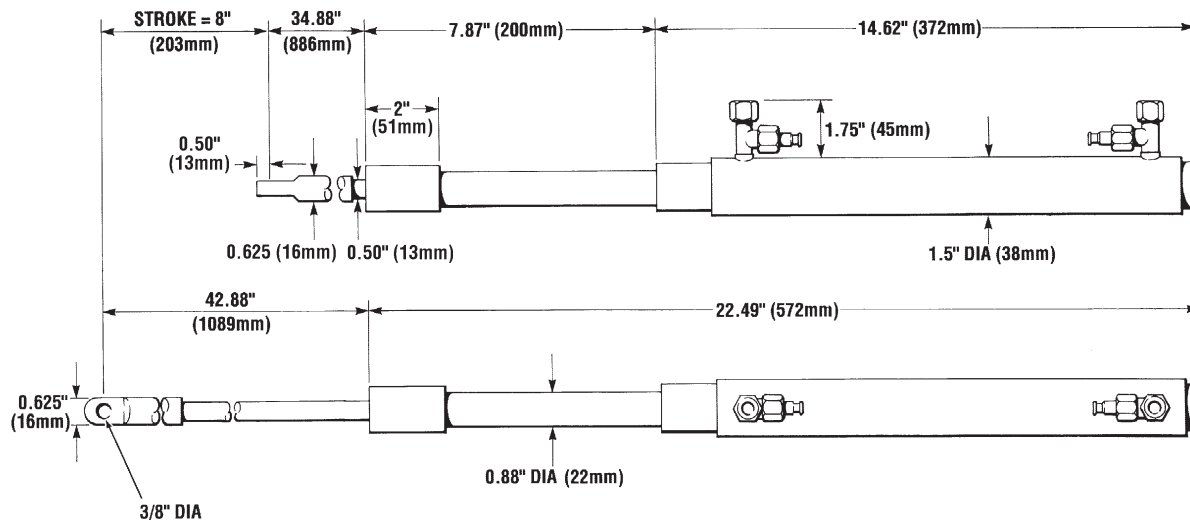


General Dimensions

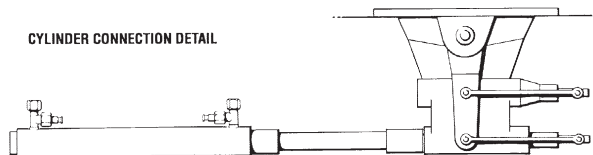
SeaStar®

STERNDRIIVE STEERING

HC5329 125-8VEM



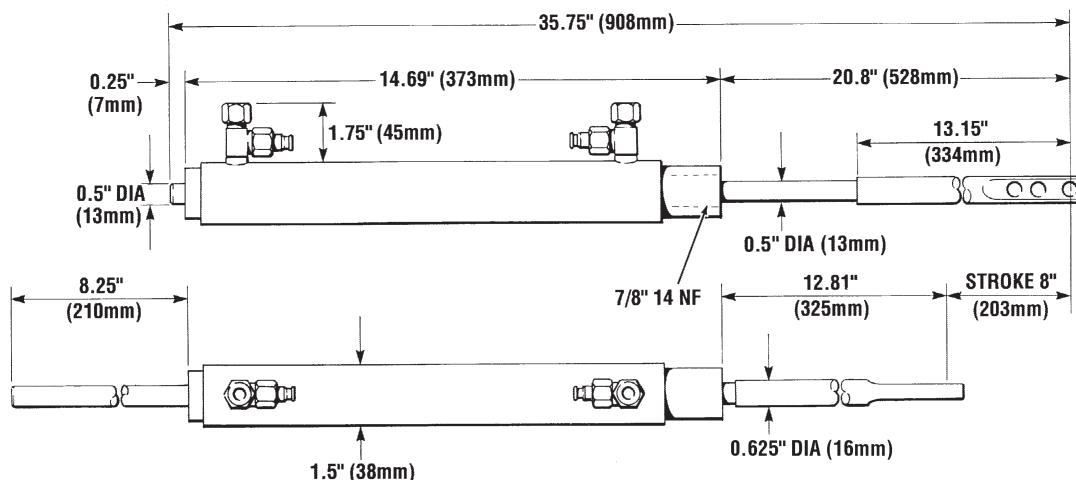
CYLINDER CONNECTION DETAIL



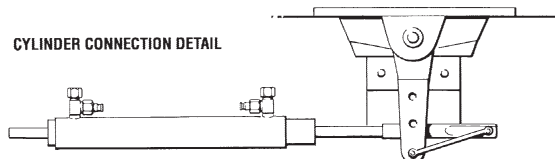
NOTICE

DO NOT use a PRO Helm pump with this, or any other unbalanced steering cylinder.

HC5330 BA125-8EMV

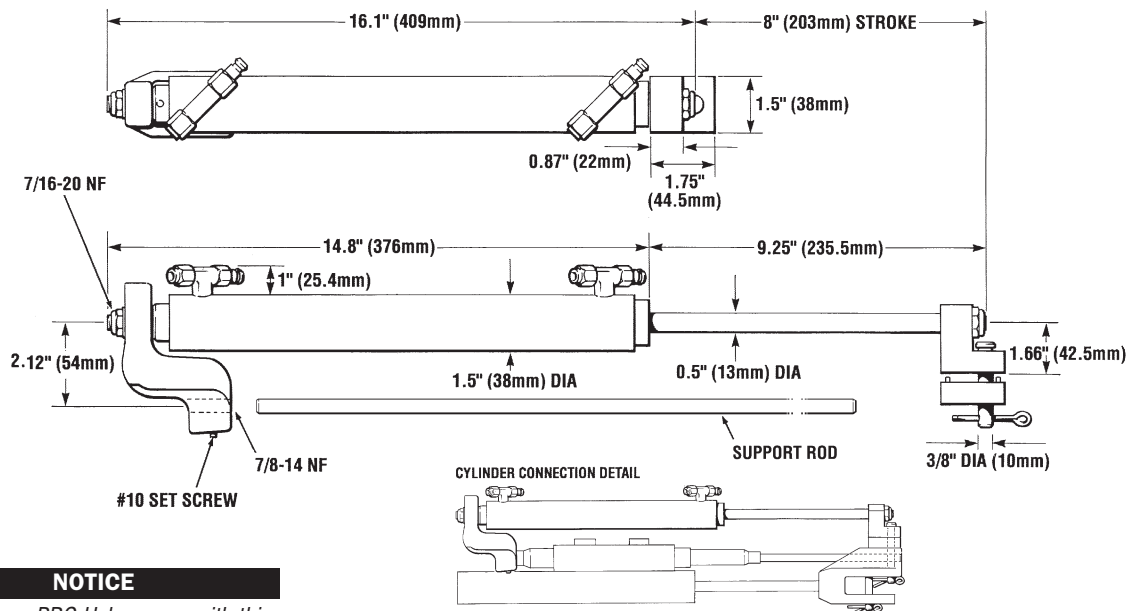


CYLINDER CONNECTION DETAIL



General Dimensions

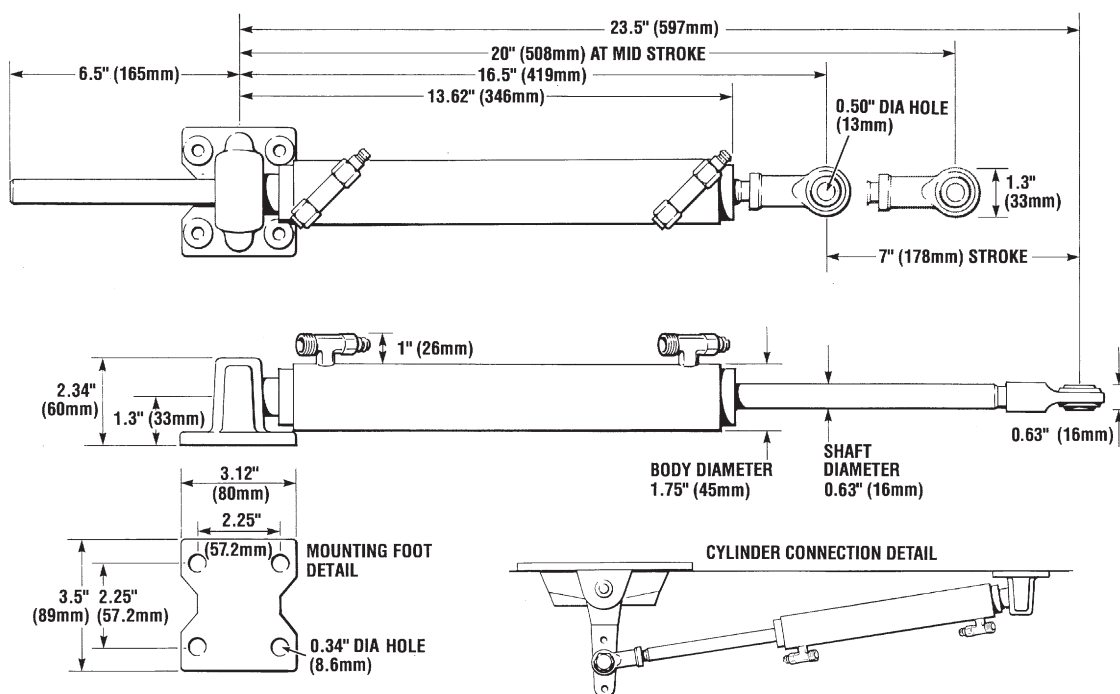
HC5331 92-VPS



NOTICE

DO NOT use a PRO Helm pump with this, or any other unbalanced steering cylinder.

HC5314 BA150-7ATM



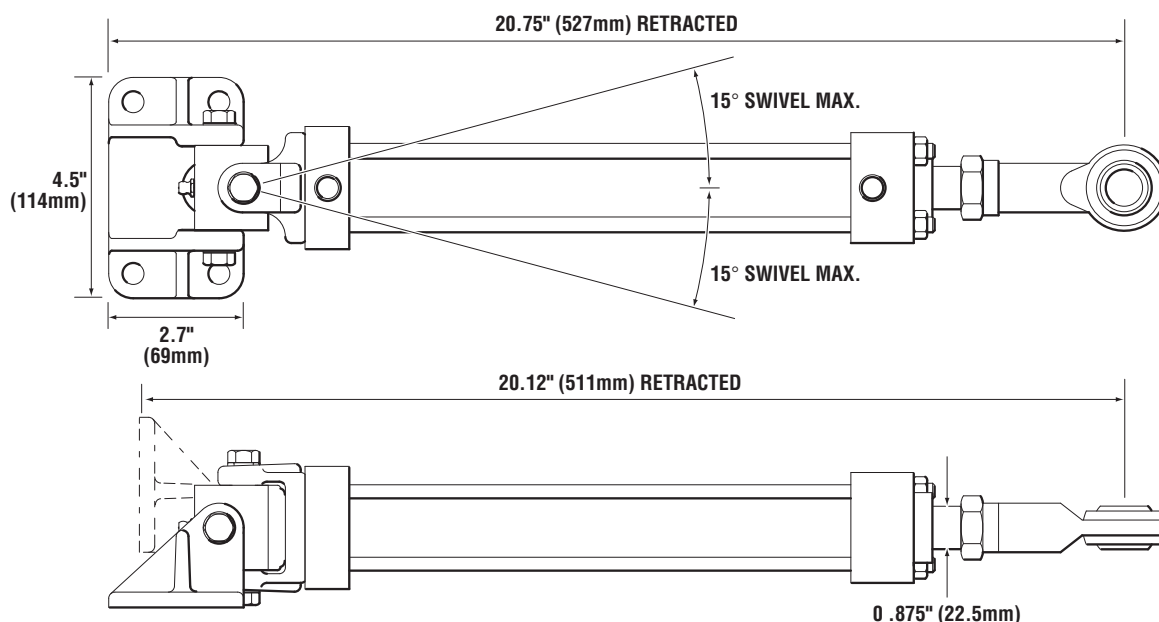
Performance I/O and Outboard Cylinders

The K-5-B cylinder was designed for inboard/outboard boats requiring external cylinders of substantial size and strength. The K-5 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-transom 1/4" NPT ports located at the mounting end of the cylinder.

NOTICE

Due to the large volume of the K-5-B Cylinders, it is suggested that only Capilano and/or Hynautic H-40 series helms be used to retain a comfortable yet reasonable amount of wheel turns from hard over to hard over.

K-5-B



BORE	STROKE	DISP EXT.	DISP RET.
1.5" (38mm)	9" (229mm)	15.9cu in	10.5cu in

NOTICE

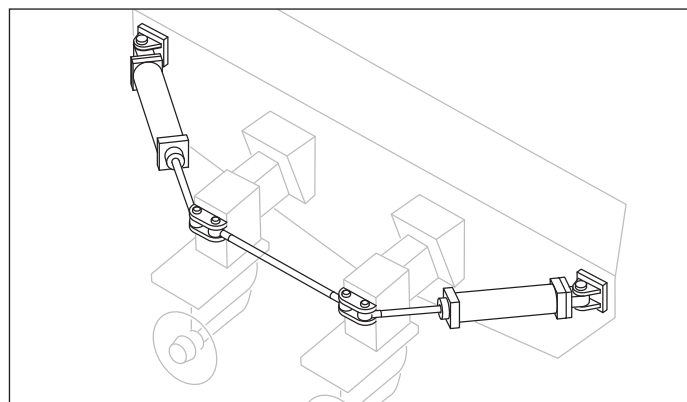
K-5 Cylinders are UN-balanced Cylinders, unequal amount of fluid on either side of the piston.

NOTICE

DO NOT use a PRO Helm pump with this, or any other unbalanced steering cylinder.

NOTICE

Teleflex does NOT make connecting hardware to attach this cylinder to the out drive.

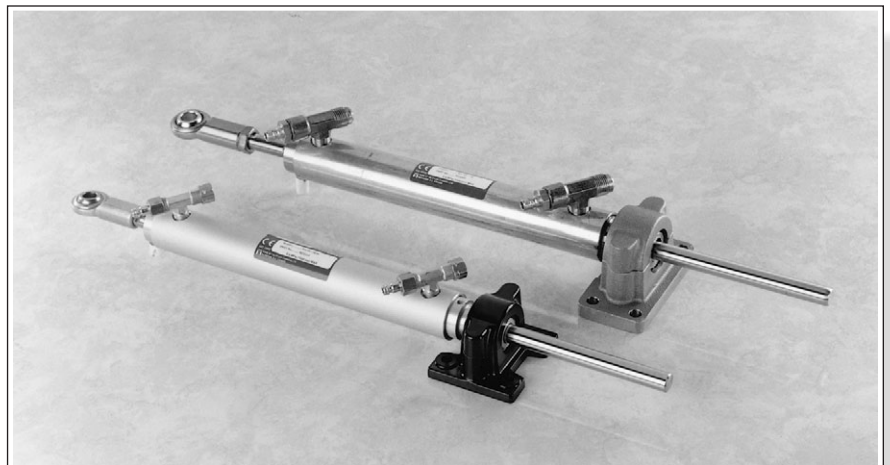


Features

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

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

- 1) From the Application Guide on page 5-2 select the System Number appropriate for the vessel based on;
 - a) hull type - displacement or planing,
 - b) length of vessel,
 - c) number of rudders, and
 - d) usage of vessel.
- 2) From the Order Guide on page 5-2 select the appropriate helms and accessory hardware for each steering station.
- 3) From the Order Guide select the fitting and hose kits required for the installation.
- 4) Confirm that you have sufficient space available in;
 - a) the area the cylinder is to be mounted, and
 - b) the dash area for the steering components.



Application Guide

NOTICE

Want automotive type steering? Refer to page 2-1 for Power Assist Details.

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

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

ORDER GUIDE

COMPONENT DESCRIPTION	QTY REQ	MODEL	PART #	PAGE REF
1 4 TURNS LOCK TO LOCK				
HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
CYLINDER	1	BA125 - 7ATM	HC5312-2	
OIL	3	SEASTAR OIL	HA5430	11-1
TUBE	1	3/8" DIA NYLON (NOTE 1 & 3)	HT5_ _	10-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
FITTING KIT	1	ADD A STATION	HF5502	10-11
OIL	1	SEASTAR	HA5430	11-1
EXTRA TUBE		3/8" DIA NYLON (NOTE 1 & 3)		10-6

COMPONENT DESCRIPTION	QTY REQ	MODEL	PART #	PAGE REF
4 4-1/4 TURNS LOCK TO LOCK				
HELM	1	** SEASTAR II- STANDARD	HH5272	9-6
CYLINDER	1	BA150 - 7TM	HC5318	
OIL	3	SEASTAR OIL	HA5430	11-1
HOSE KIT	1	HOSE KIT	HF5508	10-12
COPPER TUBE		3/8" DIA.(NOTE 2 & 3)		10-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	** SEASTAR II- STANDARD	HH5272	9-6
FITTING KIT	1	ADD A STATION	HF5502	10-11
OIL	1	SEASTAR	HA5430	11-1
EXTRA TUBE		AS ABOVE (NOTE 2 & 3)		10-6

2 5 TURNS LOCK TO LOCK				
HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
CYLINDER	1	BA135 - 7ATM	HC5313	
OIL	3	SEASTAR OIL	HA5430	11-1
TUBE	1	3/8" DIA NYLON (NOTE 1 & 3)	HT5_ _	10-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
FITTING KIT	1	ADD A STATION	HF5502	10-11
OIL	1	SEASTAR	HA5430	11-1
EXTRA TUBE		3/8" DIA NYLON (NOTE 1 & 3)		10-6

5 5-1/2 TURNS LOCK TO LOCK				
HELM	1	** SEASTAR II- STANDARD	HH5272	9-6
CYLINDER	1	BA175 - 7TM	HC5319	
OIL	3	SEASTAR OIL	HA5430	11-1
HOSE KIT	1	HOSE KIT	HF5508	10-12
COPPER TUBE		3/8" DIA.(NOTE 2 & 3)		10-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	** SEASTAR II- STANDARD	HH5272	9-6
10-11 OIL	1	SEASTAR	HA5430	11-1
EXTRA TUBE		AS ABOVE (NOTE 2 & 3)		10-6

3 6 TURNS LOCK TO LOCK				
HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
CYLINDER	1	BA150 - 7ATM	HC5314	
OIL	3	SEASTAR OIL	HA5430	11-1
TUBE	1	3/8" DIA NYLON (NOTE 1 & 3)	HT5_ _	10-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	* SEASTAR I- STANDARD	HH5271	9-6
FITTING KIT	1	ADD A STATION	HF5502	10-11
OIL	1	SEASTAR	HA5430	11-1
EXTRA TUBE		3/8" DIA NYLON (NOTE 1 & 3)		10-6

OPTIONAL EQUIPMENT			
BACK PLATE KIT (FOR STANDARD HELMS)	HA5418	9-3	
20 DEGREE WEDGE KIT (FOR STANDARD HELMS)	HA5419	9-3	
AUTOPILOT FITTING KIT (FOR ALL HELMS)	HF5502	10-11	
* TILT HELM-SEASTAR I	HH5741	9-7	
REAR MOUNT HELM-SEASTAR I	HH5261	9-7	
** TILT HELM-SEASTAR I	HH5742	9-7	
REAR MOUNT HELM-SEASTAR I	HH5262	9-7	
POWER ASSIST STEERING	PA1200	2-1	

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. (Refer to page 10-12).

2. For systems 4 & 5 - copper tubing (3/8" dia.) is the standard requirement for plumbing the system. Fitting Kit HF5508 is required. (Refer to page 10-12).

3. For systems 1, 2, 3, 4, & 5 Seastar outboard hose can be substituted for nylon or copper tube. These hoses must be ordered in standard lengths. They cannot be cut to length. (Refer to page 10-2).

NOTICE

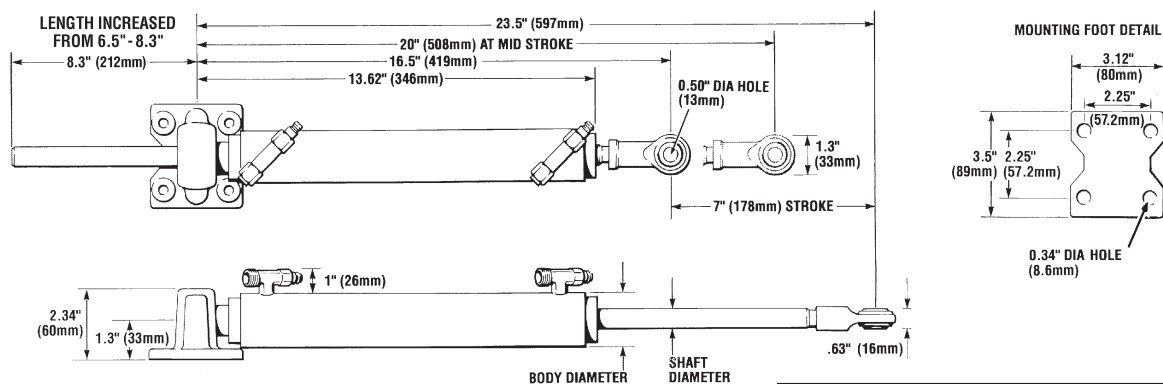
If your vessel is beyond system 1 to 5, please go to page 7-1 for SeaStar Power Steering Systems.

General Dimensions–SeaStar

SeaStar®

INBOARD STEERING

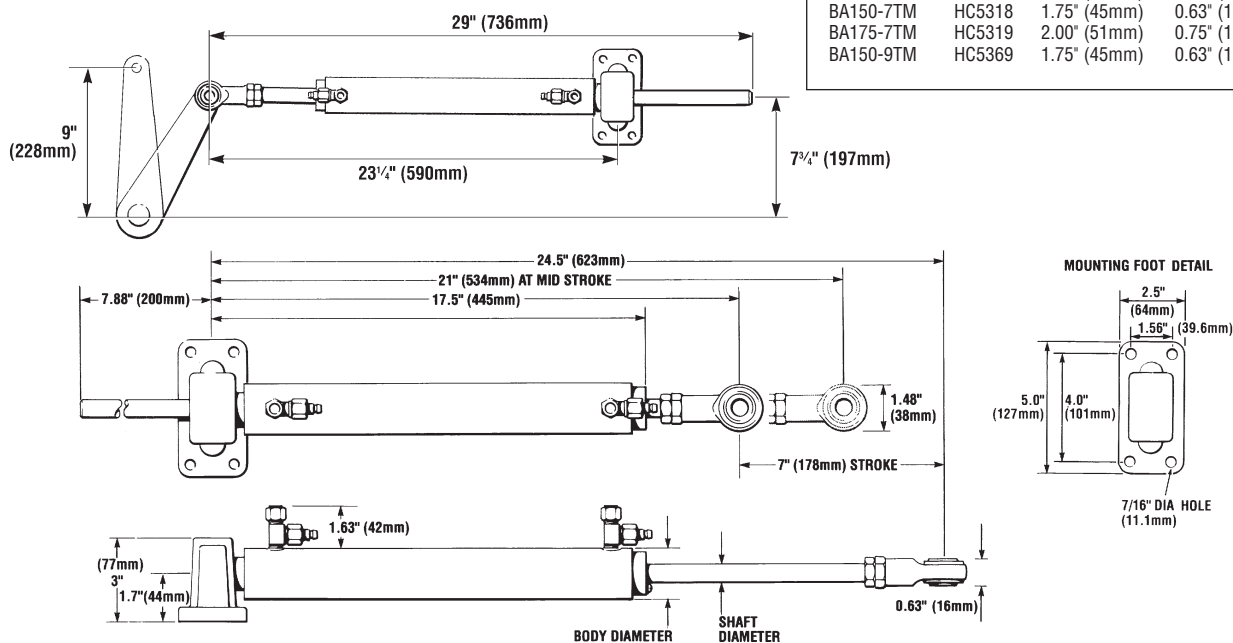
ATM CYLINDERS (ALUMINUM): HC5312-2/ HC5313/ HC5314



CYLINDER DIMENSIONS SPECIFIC TO MODEL

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

TM CYLINDERS (BRASS): HC5318/ HC5319/HC5369

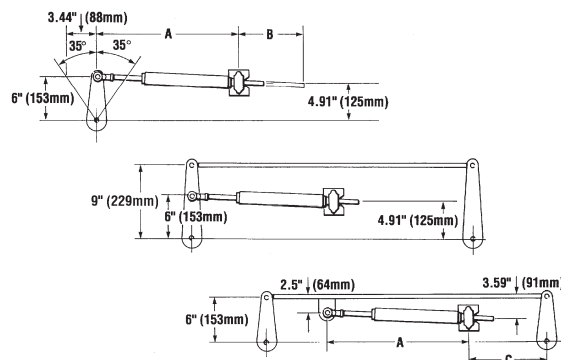


CYLINDER MOUNTING CONFIGURATIONS

MOUNTING CONFIGURATION DIMENSIONS

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

Figures in parenthesis are in millimetres

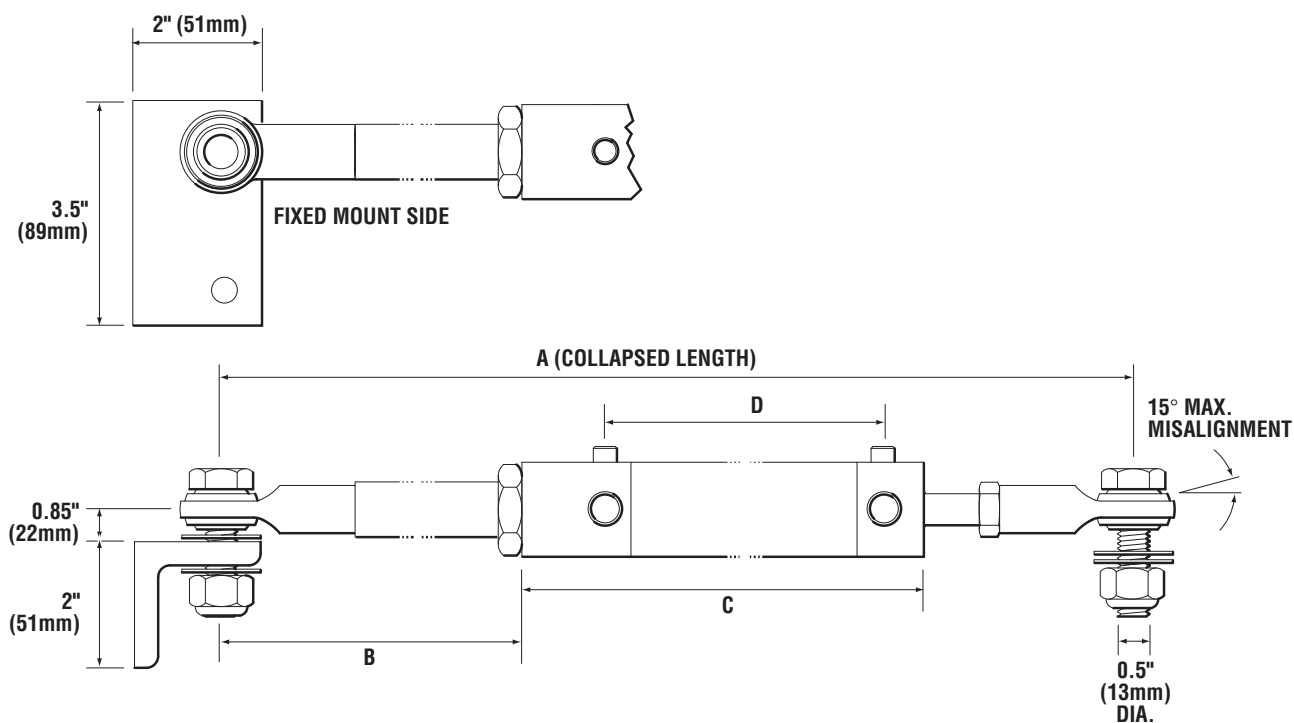


General Dimensions–Hynautic

Universal Mount Cylinders K-18/K-19

The K-18 and K-19 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.

K-18 & K-19



CYL MODEL	A	B	C	DIMENSIONS D	BORE	STROKE	DISP
K-18	24.5" (662mm)	9.31" (237mm)	11.75" (299mm)	9.875" (251mm)	1.25" (32mm)	7" (178mm)	7cu in
K-19	28.5" (724mm)	11.31" (287mm)	13.75" (350mm)	11.875" (302mm)	1.25" (32mm)	9" (229mm)	9cu in

Above cylinders can be used on the following boats:

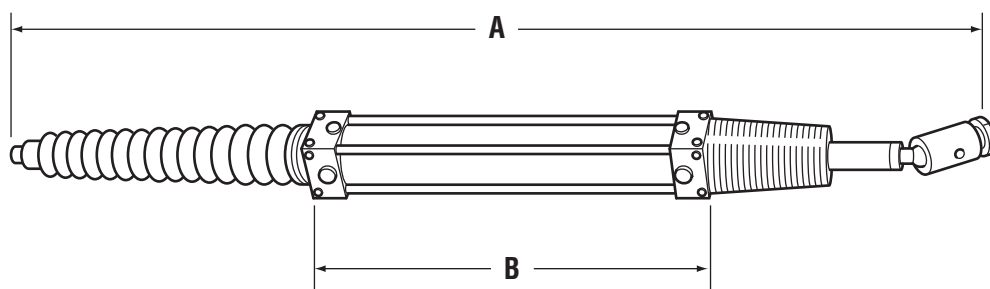
K-18 = ALL System #1 as noted on page 5-2.

K-19 = ALL Systems #1 through #3 as noted on page 5-2.

Fixed Mount and Pivot Mount models: K-22, K-27 and K-31

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.

K-22 & K-27

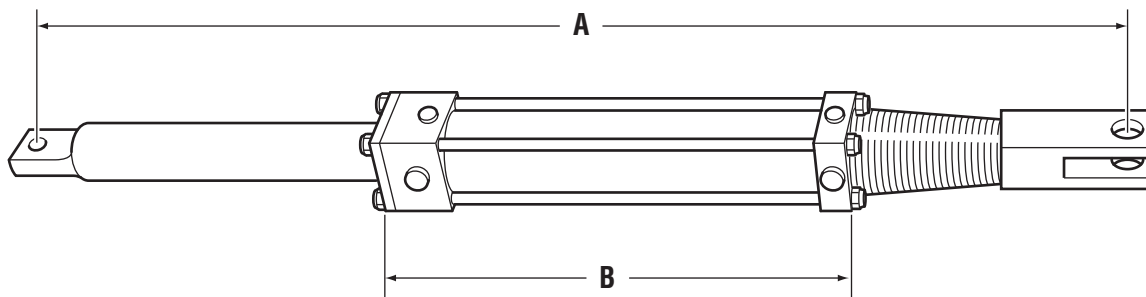


CYL MODEL	DIMENSIONS		BORE	STROKE	DISP
	A	B			
K-22	*34.12" (867mm)	13.25" (337mm)	1.5" (38mm)	10" (254mm)	13.20cu in
K-27	*36.75" (934mm)	13.25" (337mm)	1.5" (38mm)	10" (254mm)	13.20cu in

**Dimensions are with the cylinder rod centered.*

For use in Systems #3 through #4 as noted on page 5-2.

K-31



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

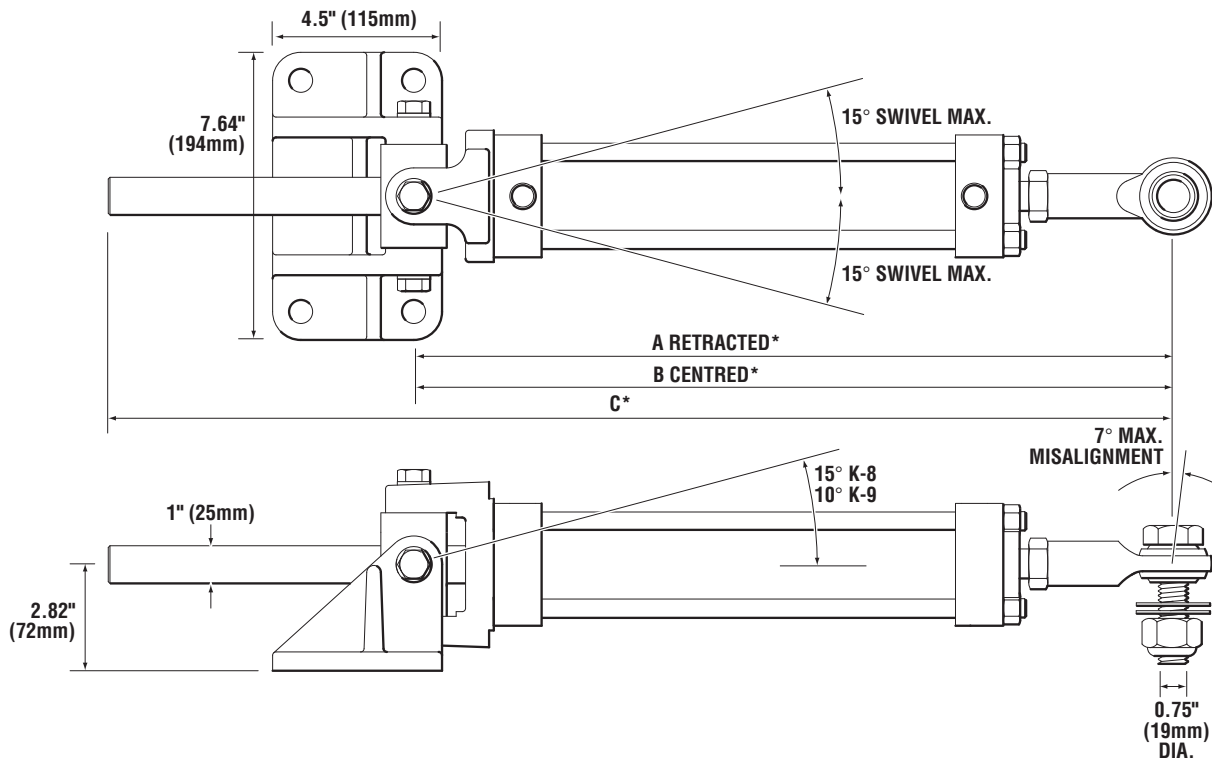
**Dimensions are with the cylinder rod centered.*

For use in System #5 as noted on page 5-2.

Large I/B Cylinders K-8/K-9

The K-8 and K-9 cylinders are double rod end, tie rod constructed hydraulic cylinders. Each has a universal mount, which allows two planes of pivot freedom. Each cylinder is equipped with a stainless steel ball joint. Porting is through two 1/4" NPT ports at each end of the cylinder.

K-8 & K-9



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

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



HYNAUTIC 3-LINE INBOARD STEERING

Introduction

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.

How to Spec a System

- 1 From the application guide select components appropriate for the vessel based on:
 - a) hull type—displacement or planing
 - b) length of vessel, and
 - d) number of steering wheel turns desired
- 2 Select the fitting and hose kits required, based on type of plumbing (1/2" or 5/8" tubing or hose) and based on number of steering stations.
- 3 Confirm that there is sufficient space available in the dash and engine compartment(s) for the steering components. Refer to helm and cylinder dimensions on page 9-8 and page 5-4.

Components

H-21	Hynautic 2.75 cu. in. helm (1" straight shaft) or
H-25	Hynautic 2.75 cu. in. helm (3/4" tapered shaft) or
H-42	Hynautic 4.0 cu. in. helm (1" straight shaft) or
H-42-02	Hynautic 4.0 cu. in. helm (3/4" tapered shaft) or
H-41	Hynautic 5.5 cu. in. helm (1" straight shaft) or
H-41-02	Hynautic 5.5 cu. in. helm (3/4" tapered shaft) or (See application guide page 6-3.)
HF-10	H-20 Fittings Kit for Main Station
HF-21	H-40 Fittings Kit for Main Station
HC53__ or K-__	Inboard Cylinder (See application guide page 6-3. 1 or 2 required.)
R06	Reservoir - Standard (2 quart)
MSV-21	Relief Valve (950 PSI)
MSVF-07	Relief Fittings (1150 & 1175-21-1)
MSVF-13	Relief Fittings (1175-42-1 & up)
1/2" or 5/8" OD Copper Tubing	(See application guide page 6-3.)
HF5590	Fitting Kit (for 1/2" Copper Tubing) or
HF5592	Fitting Kit (for 5/8" Copper Tubing) (See application guide page 6-3. These fitting kits are for one steering station, purchase add-a-station kit for 2nd station.)
HA5731	Hose Kit for Copper Tubing (2 hoses) Contains two 18" (.45m) hoses for single-cylinder installations.
HA5440	SeaStar Oil (1 Gallon) (Other fittings may be required. Contact Teleflex Canada.)

Options

K-31	Pivot Mount Inboard Cylinder (K-31 can be used in place of HC5378 or HC5379, see application chart page 6-3 for details.)
HA5732	Dual Cylinder Hose 2' (.6m)
HA5733	Dual Cylinder Hose 3' (.9m)
HA5734	Dual Cylinder Hose 4' (1.2m)
HA5735	Dual Cylinder Hose 5' (1.5m)
HA5736	Dual Cylinder Hose 6' (1.8m) These hoses are sold individually (four are required for dual cylinder installations).
R07	Reservoir (2 quart, with hand pump)
R11	Reservoir (1 quart, with hand pump)
R12	Reservoir (2 quart)
MSV-19	Relief Valve (500 PSI)
RV-55	Reservelvalve (500 PSI, top read, 3/8)
RV-55P	Reservelvalve (500 PSI, top read, 3/8, w/pump)
RV-57	Reservelvalve (500 PSI, top read, 5/16, w/pump)
RV-60	Reservelvalve (950 PSI, top read, 5/16)
RV-67	Reservelvalve (950 PSI, frt.read, 5/16, w/pump)
HF-11	H-20 Fittings Kit for Second Station
HF-22	H-40 Fittings Kit for Second Station

Hynautic 3-Line Inboard Steering Application Guide

VESSEL SIZE	HELM PUMP	WHEEL TURNS	CYLINDER MODEL	TUBING DIAMETER		MAX HP or AREA
				CYL. TO FARTHEST HELM		
				<40'	>40'	
Planing Hulls:						
35–50' (11–15m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	450 HP
40–50' (12–15m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	750 HP
40–50' (12–15m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	750 HP
45–60' (14–18m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	950 HP
45–60' (14–18m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	950 HP
55–65' (17–20m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	1200 HP
To 70' (To 21m)	H-41	10.8	2 x HC5378 or HC5379	1/2"	5/8"	1500 HP
To 70' (To 21m)	H-41	14.2	2 x K-8	1/2"	5/8"	1500 HP
Displacement Hulls—Tug Boats, Net Haulers:						
To 30' (To 9m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	200 HP
30–35' (9–11m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	250 HP
30–35' (9–11m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	250 HP
26–40' (8–12m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	400 HP
26–40' (8–12m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	400 HP
30–45' (9–14m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	150 HP
To 50' (To 15m)	H-41	10.8	2 x HC5378 or HC5379	1/2"	5/8"	500 HP
To 50' (To 15m)	H-41	14.2	2 x K-8	1/2"	5/8"	500 HP
To 50' (To 15m)	H-41	20.0	2 x K-9	1/2"	5/8"	500 HP
Displacement Hulls—Work and Pleasure Boats:						
To 40' (To 12m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	300 HP
40–45' (12–14m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	350 HP
40–45' (12–14m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	350 HP
40–55' (12–17m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	500 HP
40–55' (12–17m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	500 HP
45–65' (14–20m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	650 HP
To 75' (To 32m)	H-41	10.8	2 x HC5378 or HC5379	1/2"	5/8"	750 HP
To 75' (To 32m)	H-41	14.2	2 x K-8	1/2"	5/8"	750 HP
Sail Boats—Skeg Rudder:						
To 40' (To 12m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	9' (.9m)
40–45' (12–14m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	10' (1m)
40–45' (12–14m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	10' (1m)
40–52' (12–16m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	17' (1.6m)
40–52' (12–16m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	17' (1.6m)
50–60' (15–18m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	18' (1.7m)
To 65' (To 20m)	H-41	10.8	2 x HC5378 or HC5379	1/2"	5/8"	20' (1.9m)
To 65' (To 20m)	H-41	14.2	2 x K-8	1/2"	5/8"	20' (1.9m)
Sail Boats—Spade Rudder:						
To 40' (To 12m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	7' (.6m)
40–45' (12–14m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	8' (.7m)
40–45' (12–14m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	8' (.7m)
35–46' (11–14m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	15' (1.4m)
35–46' (11–14m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	15' (1.4m)
40–50' (12–15m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	15.5' (1.4m)
To 60' (To 18m)	H-41	10.8	2 x HC5378 or HC5379	1/2"	5/8"	16.5' (1.5m)
To 60' (To 18m)	H-41	14.2	2 x K-8	1/2"	5/8"	16.5' (1.5m)

Helm Options

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

HELM PART#	DISPLACEMENT RANGE	RELIEF VALVE SETTING
H-21	2.75 cu.in.	950 psi (66Bar)
H-25	2.75 cu.in.	950 psi (66Bar)
H-42	4.00 cu.in.	950 psi (66Bar)
H-41	5.50 cu.in.	950 psi (66Bar)

Tubing/Hose Options

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

HELM TYPE	DISTANCE—CYLINDER TO FURTHEST HELM	
	40 FEET OR LESS	MORE THAN 40 FEET
All	1/2" O.D. Copper Tubing	5/8" O.D. Copper Tubing

Cylinder Options

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

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

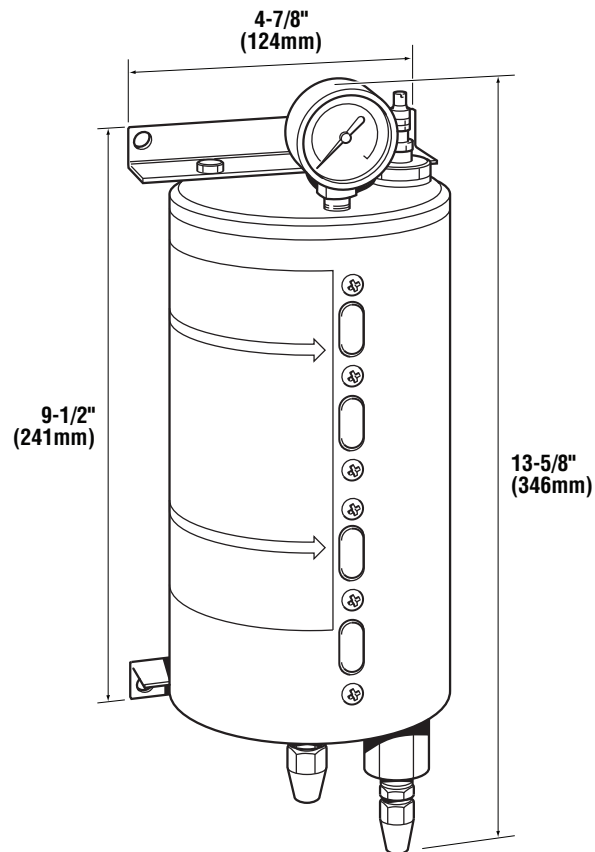
MODEL	PART#	DESCRIPTION / MODEL / ROD END CONFIG
7" Stroke:	HC5350	Cylinder BA175-7TMB (Rod End Ball Joint)
	HC5356	Cylinder BA175-7TMC (Rod End Clevis)
	HC5351	Cylinder BA200-7TMB (Rod End Ball Joint)
	HC5357	Cylinder BA200-7TMC (Rod End Clevis)
9.5" Stroke:	K-8	Hynautic Cylinder, 2.5" (Rod End Ball Joint)
11" Stroke:	HC5378	Cylinder BA200-11TMB (Rod End Ball Joint)
	HC5379	Cylinder BA200-11TMC (Rod End Ball Clevis)

NOTICE

The application guide on page 6-3 should be used with discretion. The chart is only a guide to selecting a steering system. A steering system manufacturer cannot anticipate all the variables in boat-rudder design that affect the steering loads. It is the final responsibility of the boat builder/designer to specify maximum expected steering loads. If the required information is not available, please see the Displacement and Planning Hull data sheets on page 10-21 and page 10-22. These sheets after being completely filled out can be faxed to Teleflex Technical Support at 604-279-2202.

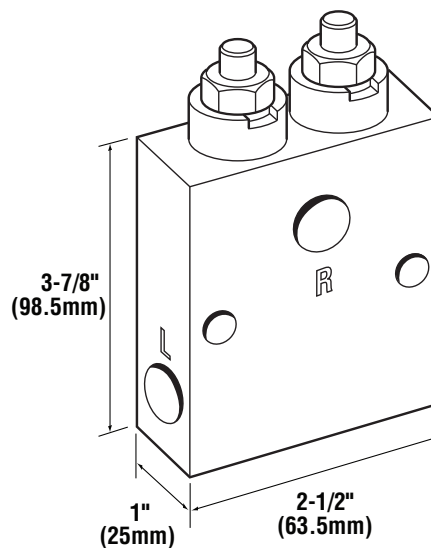
Reservoir Part# R-06

Capacity = 2 quarts.



Relief Valve Part# MSV-21

Relief Pressure factory set to 950psi.



Hynautic Seal Kits

Helms

SEAL KIT#	DESCRIPTION
HS-01	H-20 Series Helms, 1978 and earlier
HS-02	H-20 and H-30 Series Helms, 1979 and later
HS-03	H-40 Series Helms, 1978 and earlier
HS-04	H-40 Series Helms, 1979 and later
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 and H-200 Series Helm Pumps

Cylinders

SEAL KIT#	DESCRIPTION
KS-01	K-11 thru K-17
KS-02	K-18 thru K-20
KS-03	K-02, H1010 (old style)
KS-04	K-21 thru K-29 (prior to Aug. 1983)
KS-05	K-31 thru K-33
KS-06	K-21 thru K-29 (after Aug. 1983)
KS-07	K-10
KS-08	K-07
KS-09	K-08, K-09 (prior to April 15, 1994)
KS-11	K-01, PSK-10
KS-12	K-02
KS-13	K-03, K-04, PSK-11, PSK-12 (prior to April 15, 1994)
KS-14	K-51
KS-15	K-05
KS-17	K-03, K-04, PSK-11, PSK-12 (after April 15, 1994)
KS-18	K-08, K-09 (after April 15, 1994)
KS-19	K-06 Models

Reservoirs

SEAL KIT#	DESCRIPTION
RS-01	R-04, R-10, R-13, R-14

Crossover Hynautic to SeaStar Steering

To review Advisory Notices, please view on line at www.seastarsteering.com or contact Teleflex Canada Limited Partnership directly at 604-270-6899.

Cylinders	HYNAUTIC CYLINDER	REPLACED WITH SEASTAR PART#	ADVISORY NOTICE#
	K-51	HC5314HY	764626
	K-1-B/C	HC5369HY/HYC	764624
	K-2-B/C	HC5373HY/HYC	764625
	K-3-B/C	HC5802HY/HYC	764615
	K-4-B/C	HC5378HY/HYC	764616
	K-10	HC5345HY	764612
	K-11, K-11S, K-12	HC5380HY	764613
	K-13, K-14	HC5370HY	764614

Helm Cross Over H-800 Series	HYNAUTIC#	SEASTAR#	ADVISORY NOTICE#
	H-816	HH5271	764622
	H-820	HH5273	764622
	H-824	HH5272	764622

BH-800 Series	HYNAUTIC#	SEASTAR#	ADVISORY NOTICE#
	BH-816	HH5779	764617 Hose MUST be replaced
	BH-820	HH5770	764617 Hose MUST be replaced
	BH-824	HH5772	764617 Hose MUST be replaced

H-100 Series	HYNAUTIC#	SEASTAR#	ADVISORY NOTICE#
	H-116	HH5260	764618
	H-120	HH5261	764618
	H-124	HH5262	764618

H-200 Series	HYNAUTIC#	SEASTAR#	ADVISORY NOTICE#
	BH-216	HH5741	764619
	BH-220	HH5743	764619
	BH-224	HH5742	764619

H-300 Series	HYNAUTIC#	SEASTAR#	ADVISORY NOTICE#
	H-316	HH5271	764621
	H-320	HH5273	764621
	H-324	HH5272	764621

H-50 Series	HYNAUTIC#	SEASTAR#	ADVISORY NOTICE#
	BH-50	HH5273	764623
	BH-51	HH5272	764623
	BH-52	HH5271	764623

Hydraulic Kits	HYNAUTIC#	SEASTAR#	ADVISORY NOTICE#
	KF-100	H05035 Single H05038A Single	764633
	All Hynautic Hose/Tube	H051XX Hose HT5XXX Tube	764632
	All Hynautic Steering Kits	Misc. SeaStar Items	764631
	All Hynautic Hose/Tube	SeaStar Power Steering System	764630

Syten Hydraulic Steering
(Obsolete).

NOTICE

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

NOTICE

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

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

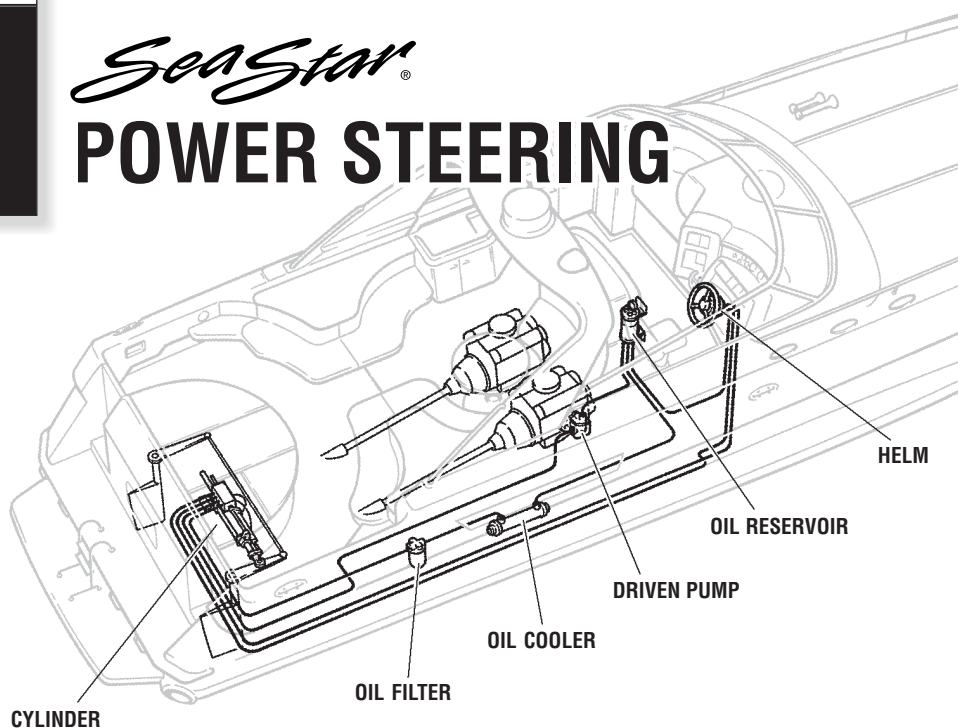
Tube: The 5/16 nylon tube and fittings are obsolete and must be replaced with SeaStar 3/8" nylon extruded tube for all inboard applications.

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

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

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

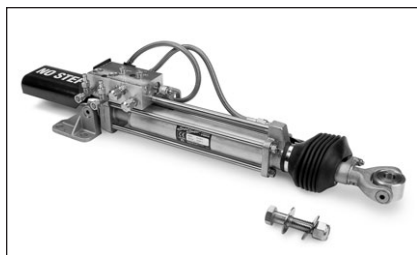
SeaStar® POWER STEERING



Features:

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

How it works:



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

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

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

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

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

Hose, Tube and Hydraulic Fluid:

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

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

Cylinder Selection Guide:

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

CYLINDER PART NUMBER	DISPLACEMENT HULLS (standard)	DISPLACEMENT HULLS (heavy duty)	PLANING HULLS
SINGLE 9" x 1 CYLINDER (HC5801-2)	UP TO50' (15m)	UP TO40' (12m)	UP TO65' (20m)
TWIN 9" x 2 CYLINDER (HC5802)	UP TO75' (22m)	UP TO55' (17m)	UP TO85' (26m)
SINGLE 11" x 1 CYLINDER (HC5803-2)	UP TO60' (18m)	UP TO50' (15m)	UP TO75' (23m)
TWIN 11" x 2 CYLINDER (HC5804)	UP TO85' (26m)	UP TO60' (18m)	UP TO100' (31m)
*SINGLE 9" x 2.5 CYLINDER (HC5805)	UP TO100' (31m)	UP TO70' (22m)	UP TO110' (34m)
*TWIN 9" x 2.5 CYLINDER (HC5806)	UP TO110' (34m)	UP TO80' (25m)	UP TO120' (37m)

* Larger 2.5" cylinder bore than HC5801-2 and HC5802.

Technical Data:

CYLINDER PART NUMBER	DISPLACEMENT	BORE	STROKE	OUTPUT FORCE	MAX. TORQUE (35° from centre)
SINGLE 9" CYLINDER (HC5801-2)	21.25 in ³ (348cc)	2.0" (51mm)	9" (229mm)	2946 lbs _f (13,090 N)	18,900 in-lbs (2130 Nm)
SINGLE 11" CYLINDER (HC5803-2)	26.00 in ³ (426cc)	2.0" (51mm)	11" (280mm)	2946 lbs _f (13,090 N)	23,140 in-lbs (2610 Nm)
TWIN 9" CYLINDER (HC5802)	42.50 in ³ (697cc)	2.0" (51mm)	9" (229mm)	5892 lbs _f (26,190 N)	37,800 in-lbs (4260 Nm)
TWIN 11" CYLINDER (HC5804)	52.00 in ³ (853cc)	2.0" (51mm)	11" (280mm)	5892 lbs _f (26,190 N)	46,280 in-lbs (5220 Nm)
SINGLE 9" CYLINDER (HC5805)	37.11 in ³ (608cc)	2.5" (64mm)	9" (229mm)	5154 lbs _f (22,926 N)	33,065 in-lbs (3736 Nm)
TWIN 9" CYLINDER (HC5806)	74.33 in ³ (1216cc)	2.5" (64mm)	9" (229mm)	10,308 lbs _f (45,852 N)	66,130 in-lbs (7472 Nm)

Basic System Selection Guide:

Power Steering Cylinders

Part #

9" (228mm) strokeHC5801-2

See table above for correct cylinder selection

11" (279mm) strokeHC5803-2

See table above for correct cylinder selection

9" (228mm) strokeHC5805

See table above for correct cylinder selection

Add-On Cylinders

9" (228mm) strokeHC5802

See table above for correct cylinder selection

11" (279mm) strokeHC5804

See table above for correct cylinder selection

9" (228mm) strokeHC5806

See table above for correct cylinder selection

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

Part #

SSI Helm, Standard Mount.....HH5271

SSI Helm, Rear MountHH5261

SSI Helm, TiltHH5741

SSI Helm, Rear Mount, 1" ShaftHH5281

Power Steering Pumps

Outlet Check Power Pump.....HP5820

Press Relief Twin Pump.....HP5822

R.H. Rotation, Belt Drive.....HP5830

L.H. Rotation, Belt Drive.....HP5831

R.H. Rotation, Keyed Shaft, Direct DriveHP5832

R.H. Rotation, Keyed Shaft, Direct DriveHP5833

R.H. Rotation, Direct Drive, Heavy Duty.....HP5835

R.H. Rotation, 9 Tooth

Splined Shaft, Direct DriveHP5837

R.H. Rotation, 11 Tooth

Splined Shaft, Direct DriveHP5838

R.H. Rotation, Direct Drive,

No Flow Control.....HP5836

R.H. Rotation, 9 Tooth

Splined Shaft, Direct DriveHP5839

L.H. Rotation, 11 Tooth

Splined Shaft, Direct DriveHP5840

L.H. Rotation, Direct Drive.....HP5841

L.H. Rotation, 11 Tooth

Splined Shaft, Direct DriveHP5842

L.H. Rotation, 9 Tooth

Splined Shaft, Direct DriveHP5843

R.H. Rotation, 6 Tooth

B Flange, Direct DriveHP5844

L.H. Direct Drive, 9 Tooth

Splined ShaftHP5845

R.H. Direct Drive, 9 Tooth

Splined ShaftHP5846

R.H. Direct Drive, 11 Tooth

Splined ShaftHP5847

R.H. Keyed ShaftHP5848

L.H. Direct Drive, 11 Tooth

Splined ShaftHP5849

L.H. Keyed Shaft.....HP5850

L.H. direct drive, 13 Tooth

Splined ShaftHP5852

Oil Reservoir, Cooler & Filter

Oil Reservoir.....HP5810

Oil Cooler, 2.25 Kw, 1" water lines.....HP5825

Oil Cooler, 6.25 Kw, 2" water lines.....HP5826

Oil FilterHP5815

Miscellaneous

Outlet Check Valve (Power Pump).....HP5820

Auto Flow Control (Twin Pump)HP5821

Crossover Pressure ReliefHP5822

System Pressure Gauge KitHA5821

Adapter Kit, Twin Disk #5050HA5823

Adapter Kit, Twin Disk #5061HA5824

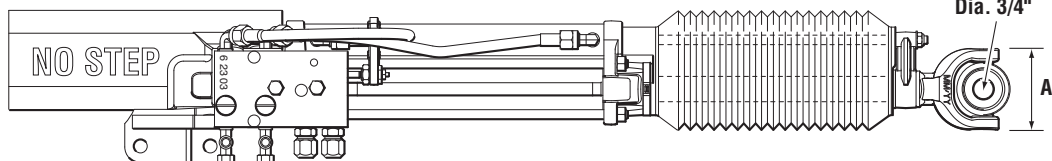
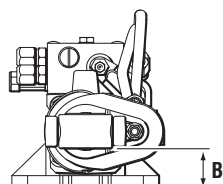
Adapter Kit, MAN to V10 PumpHA5827

SeaStar Oil, 1 liter.....HA5430

SeaStar Oil, 4 liter.....HA5440

Pressure Relief Valve, (1250psi setting).....*HP5818

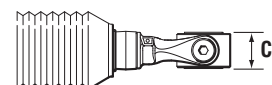
* Required in a system where the Power pump does NOT have a built in pressure relief valve. ALL SeaStar Power Pumps have built in Pressure Relief Valves.



A = 3.20"

B = 1.43"

C = 1.41"



HYNAUTIC TRIM TABS

Introduction

The effort required to keep large pleasure yachts and commercial boats trim and level is usually too great for most fiberglass nylon trim cylinders, even when used in multiple combinations. This is especially true when backing down hard.

Based on an understanding of these forces, Hynautic offers a heavy duty brass trim cylinder powerful enough to move and maintain the position of even the largest trim planes.

And, this patented product is more durable because it resists corrosion by eliminating all external hoses, isolating dissimilar metals, and protecting vital seals.

Coupled with a Hynautic 12 volt or 24 volt pump the cylinder will extend quickly enough to make an immediate difference in the trim of your yacht or work boat.

Applications

The Hynautic cruiser trim system is designed for yachts and commercial vessels. One brass trim cylinder provides a force equal to approximately 2.5 times that of the typical nylon cylinders.

Therefore, a Hynautic TCS-1-02 trim system, which includes separate port and starboard cylinder/pump assemblies is effective for most yachts to 65 feet using properly reinforced stainless planes. When more hydraulic muscle is needed, two cylinders per tab may be pressurized from a single pump as in the TCS-2-01 system.

Similarly, Hynautic can supply a system as complex as four cylinders moving a single trim plane from a single power pump source.

Because of the diversity of tab shapes and materials, the design is left to the builder and not included in the basic system.

Features

Double acting brass cylinder with a patented porting design:

All plumbing is left inside the transom. No external plumbing fittings to be damaged or corroded. The patented, double wall cylinders are pressurized in each direction which means they work equally as well at either holding the plane down against a force from below or preventing it from being pushed down from a force from above.

Simple, effective marine power pumps:

Available in 12 or 24 volt, and easy to install and purge. The use of marine rated relays and switches adds to the product's durability.

A design mechanics can appreciate:

The cylinder is designed to be disassembled from outside the boat without removing the complete assembly from the transom. Where dissimilar metals might come in contact, they are separated by a neutral material to reduce the effects of electrolytic corrosion.

Designed to be filled with Dextron III Automatic Transmission Fluid or equivalent.

Order Guide

NOTICE

Pressure and plate dimensional requirements are to be calculated by your Naval Architect.

TCS-1-01 TAB CYLINDER SYS, 24 VOLT:

Control switch	1 ea	TC-03
Tab cyl. - cruiser	2 ea	TK-01
Power pump	2 ea	TP-01
Manual	1 ea	182037
Hose - 2ft.	4 ea	207402

TCS-1-02 TAB CYLINDER SYS, 12 VOLT:

Control switch	1 ea	TC-03
Tab cyl. - cruiser	2 ea	TK-01
Power pump	2 ea	TP-02
Manual	1 ea	182038
Hose - 2ft.	4 ea	207402

TCS-2-02 TAB CYLINDER SYS, 12 VOLT:

Control switch	1 ea	TC-03
Tab cyl. - cruiser	4 ea	TK-01
Power pump	2 ea	TP-02
Manual	1 ea	182038
Hose - 2ft.	4 ea	207402

OPTIONAL PUMP:

Pump 24V DC (110cu. in./minute)	TP-03
---------------------------------	-------

Cylinder Specification

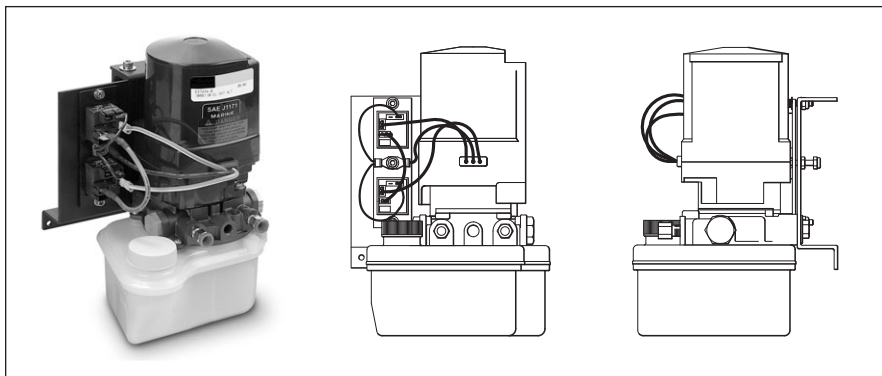
Stroke = 4"

Displacement = 5.94 cu in.

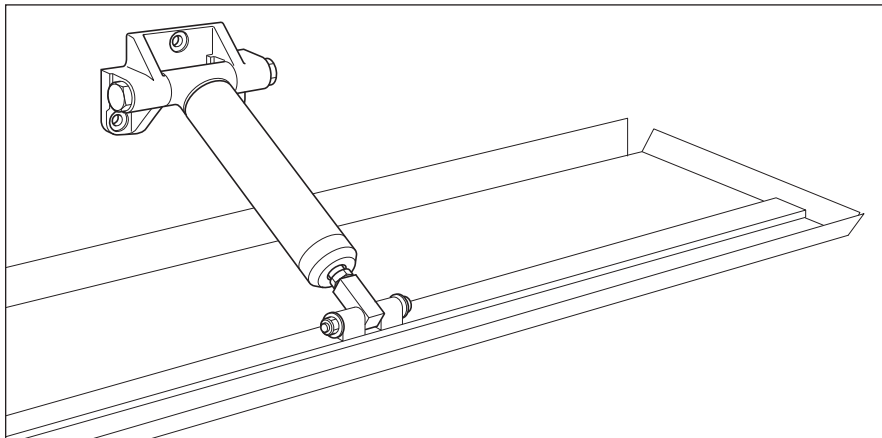
Force = 2230 ft lb @ rated pressure

Model	Displacement (in. 3/min)	Motor
TP-02	57	12V
TP-01	80	24V
TP-03	110	24V

Optional Pump Part# TP-03



Tab Cylinder Part# TK-01



SeaStar® HELMS

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



Standard helm features

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

Rear mount helm features (CONTACT YOUR LOCAL DISTRIBUTOR FOR AVAILABILITY)

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

Sport Tilt helm features

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

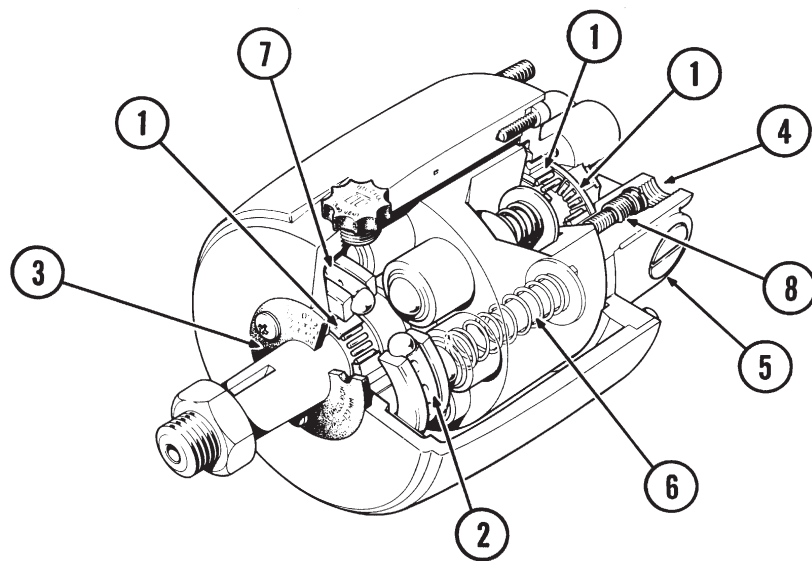
Traditional Tilt helm features

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

Features of SeaStar Helm Pumps

Features

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

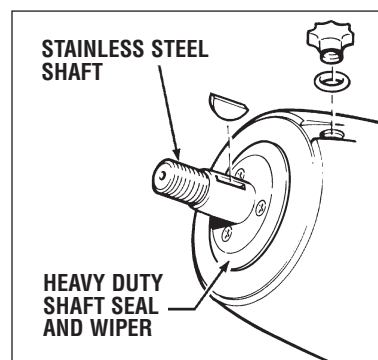


Commercial Helms

Part# HH5217, HH5224

NOTICE

For Commercial Use ONLY.



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

Accessories

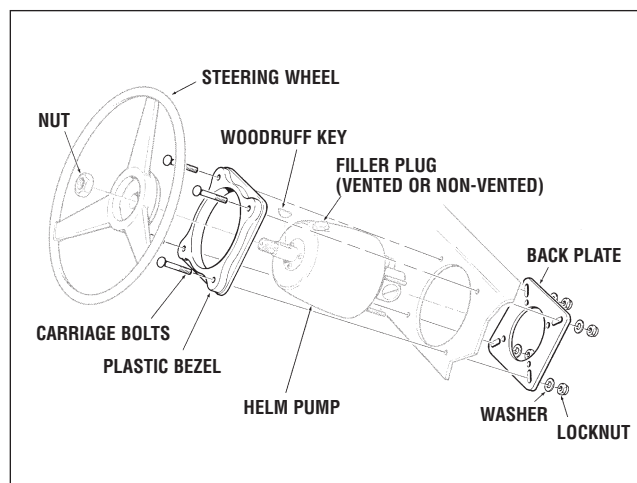
SeaStar®

HELMS

Backplate Kit (part # HA5418)

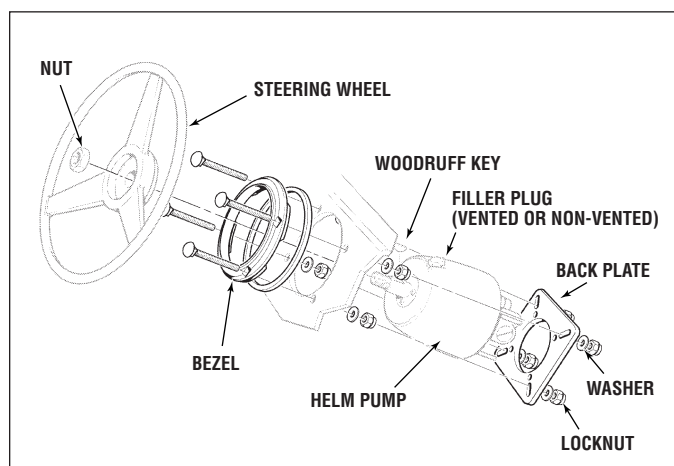
- a) Used to retrofit a new SeaStar standard helm in the old 4.5" (115mm) diameter hole, or
- b) reduce the helm protrusion from the dash by the thickness of the dash, or
- c) retrofit new SEASTAR standard helm into hole cutouts for mechanical and hydraulic steering as per chart.

STEERING MANUFACTURER	HELM MODEL TYPE	SYSTEM	BACKPLATE KIT REQ
TELEFLEX	SAFE-T	MECHANICAL	YES
	BIG-T	MECHANICAL	YES
	ROTARY	MECHANICAL	NO
	RACK AND PINION	MECHANICAL	NO
	SYTEN	HYDRAULIC	YES
MORSE	ROTARY	MECHANICAL	NO
	RACK AND PINION	MECHANICAL	NO
HYNAUTIC	H-50 SERIES	HYDRAULIC	YES
	H-60 SERIES	HYDRAULIC	YES
	H-80 SERIES	HYDRAULIC	YES
	H-300 SERIES	HYDRAULIC	YES



Round Bezel (part # HA5417)

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

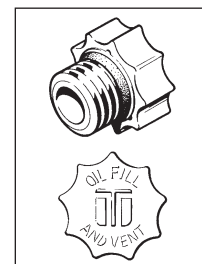


Vent Plug (part # HA5431)

Supplied with SeaStar Helm Pump

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

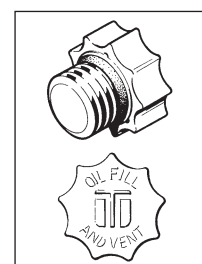
Must be used on uppermost Helm Pump on multi steering station systems.



Non-Vent Plug (part # HA5432)

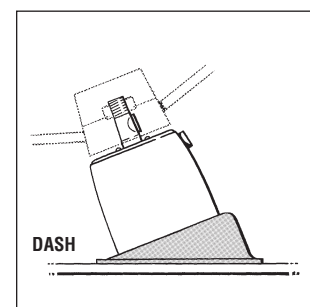
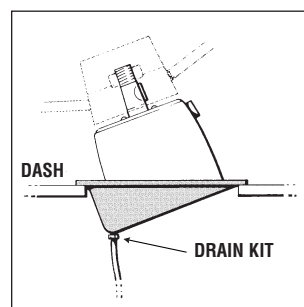
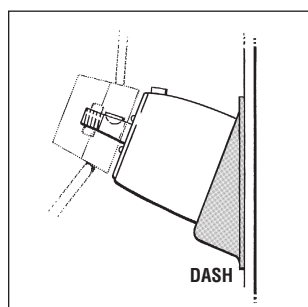
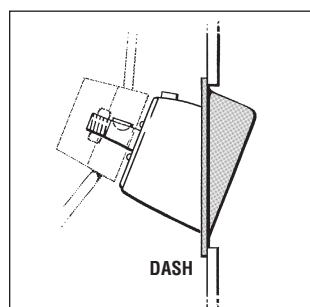
Must be used on all Helm Pumps other than uppermost Helm Pump on multi steering station systems.

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



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

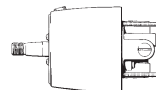
This kit is designed to mount the helm at a 20° angle to the mounting surface. 4 possible mounting configurations are available.



▲ For this configuration use HA5408

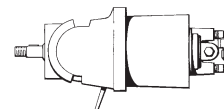
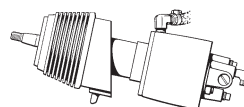
SeaStar Helm – Order Guide

SeaStar Standard Mount



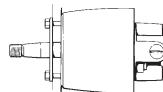
PART NUMBER	HELM DESCRIPTION	DISPLACEMENT CU. IN./REV (CC/REV)		RELIEF VALVE SETTING PSI (BAR)		NOTES
HH5269	STANDARD MOUNT	1.4	(23.0)	1000	(70)	
HH5271	STANDARD MOUNT	1.7	(27.8)	1000	(70)	
HH5761	STANDARD MOUNT FULL FEEDBACK	1.7	(27.8)	1000	(70)	2
HH5217	STD. MOUNT, COMMERCIAL	1.7	(27.8)	1000	(70)	3
HH5273	STANDARD MOUNT	2.0	(33.0)	1000	(70)	
HH5760	STANDARD MOUNT FULL FEEDBACK	2.0	(33.0)	1000	(70)	2
HH5272	STANDARD MOUNT	2.4	(39.3)	1000	(70)	
HH5762	STANDARD MOUNT FULL FEEDBACK	2.4	(39.3)	1000	(70)	2
HH5224	STD. MOUNT, COMMERCIAL	2.4	(39.3)	1000	(70)	3

SeaStar Tilt Mount



HH5744	TRADITIONAL TILT	1.4	(23.0)	1000	(70)	
HH6193	SPORT TILT	1.4	(23.0)	1000	(70)	
HH5741	TRADITIONAL TILT	1.7	(27.8)	1000	(70)	
HH6191	SPORT TILT	1.7	(27.8)	1000	(70)	
HH6291	SPORT TILT (Spline Shaft)	1.7	(27.8)	1000	(70)	
HH5743	TRADITIONAL TILT	2.0	(33.0)	1000	(70)	
HH6145	SPORT TILT	2.0	(33.0)	1000	(70)	
HH5742	TRADITIONAL TILT	2.4	(39.3)	1000	(70)	
HH6192	SPORT TILT	2.4	(39.3)	1000	(70)	
HH6292	SPORT TILT (Spline Shaft)	2.4	(39.3)	1000	(70)	

SeaStar Rear Mount



HH5260	REAR MOUNT	1.4	(23.0)	1000	(70)	
HH5279	REAR MOUNT 1" STRAIGHT SHAFT	1.4	(23.0)	1000	(70)	
HH5280	REAR MOUNT 1" TAPERED SHAFT	1.4	(23.0)	1000	(70)	
HH5231	REAR MOUNT FULL FEEDBACK	1.4	(23.0)	1000	(70)	
HH5261	REAR MOUNT	1.7	(27.8)	1000	(70)	
HH5281	REAR MOUNT 1" TAPERED SHAFT	1.7	(27.8)	1000	(70)	
HH5262	REAR MOUNT	2.4	(39.3)	1000	(70)	
HH5282	REAR MOUNT 1" TAPERED SHAFT	2.4	(39.3)	1000	(70)	

NOTES

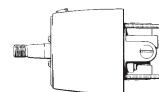
1. SeaStar PRO helms cannot be used with an unbalanced cylinder. SeaStar reinforced Kevlar Outboard style hoses MUST be used with ALL SeaStar PRO helms.
2. No "Check Valves" are installed into these helm pumps. These are intended for use in a single steering station application ONLY. Not for use in multiple steering stations and/or in conjunction with autopilot.
3. Commercial helms use a stainless steel shaft and a better sealing top plate for use in extreme conditions and or commercial type applications.

SeaStar PRO Helm – Order Guide

SeaStar

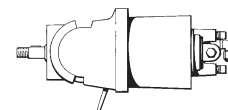
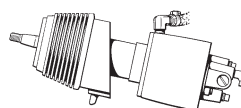
HELMS

SeaStar PRO Standard Mount



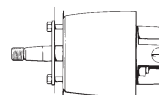
PART NUMBER	HELM DESCRIPTION	DISPLACEMENT CU. IN./REV (CC/REV)		RELIEF VALVE SETTING PSI (BAR)		NOTES
HH5779	STANDARD MOUNT	1.7	(27.8)	1500	(103)	1
HH5218	STD. MOUNT, COMMERCIAL	1.7	(27.8)	1500	(103)	1, 3
HH5770	STANDARD MOUNT	2.0	(33.0)	1500	(103)	1
HH5772	STANDARD MOUNT	2.4	(39.3)	1500	(103)	1

SeaStar PRO Traditional and Sport Tilt Mount



HH5775	TRADITIONAL TILT	1.4	(23.0)	1500	(103)	1
HH5773	TRADITIONAL TILT	1.7	(27.8)	1500	(103)	1
HH6189	SPORT TILT	1.7	(27.8)	1500	(103)	1
HH5774	TRADITIONAL TILT	2.0	(33.0)	1500	(103)	1
HH6190	SPORT TILT	2.0	(33.0)	1500	(103)	1
HH6188	SPORT TILT	2.4	(39.3)	1500	(103)	1

SeaStar PRO Rear Mount



HH5778	REAR MOUNT	1.7	(27.8)	1500	(103)	1
HH5771	REAR MOUNT	2.0	(33.0)	1500	(103)	1

NOTES

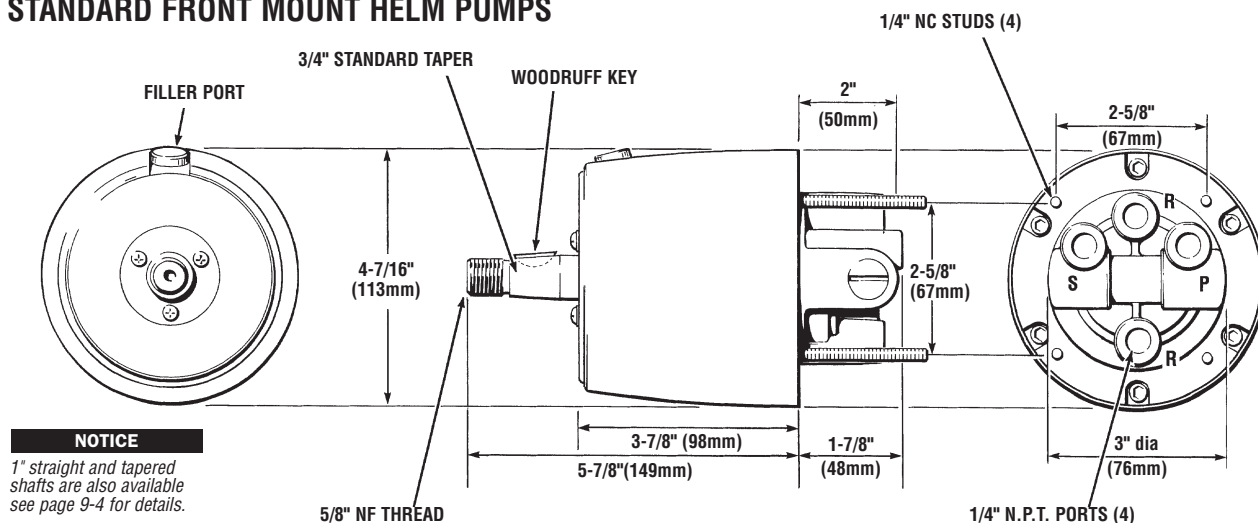
1. SeaStar PRO helms cannot be used with an unbalanced cylinder. SeaStar reinforced Kevlar Outboard style hoses MUST be used with ALL SeaStar PRO helms.
2. No "Check Valves" are installed into these helm pumps. These are intended for use in a single steering station application ONLY. Not for use in multiple steering stations and/or in conjunction with autopilot.
3. Commercial helms use a stainless steel shaft and a better sealing top plate for use in extreme conditions and or commercial type applications.

Standard/Rear Mount Helm Dimensions

NOTICE

ALL SeaStar helm pumps can be mounted horizontally to vertically and anywhere in between. In ALL cases the filler port must be in the uppermost position.

STANDARD FRONT MOUNT HELM PUMPS



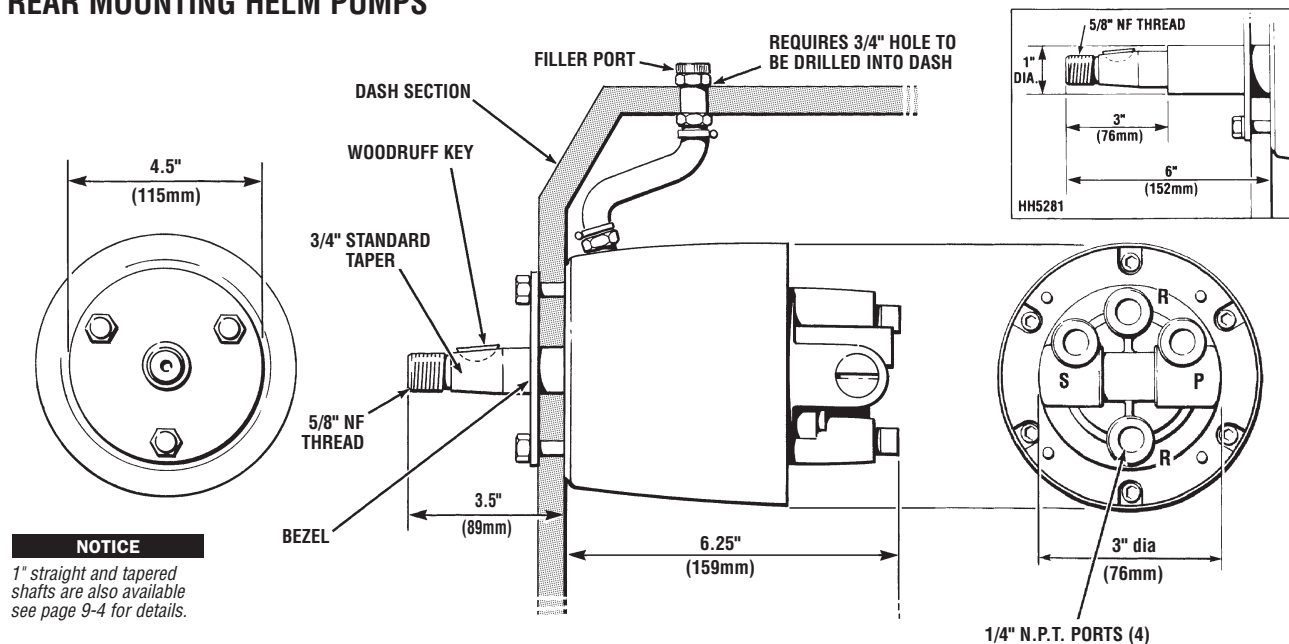
NOTICE

1" straight and tapered shafts are also available see page 9-4 for details.

NOTICE

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

REAR MOUNTING HELM PUMPS



NOTICE

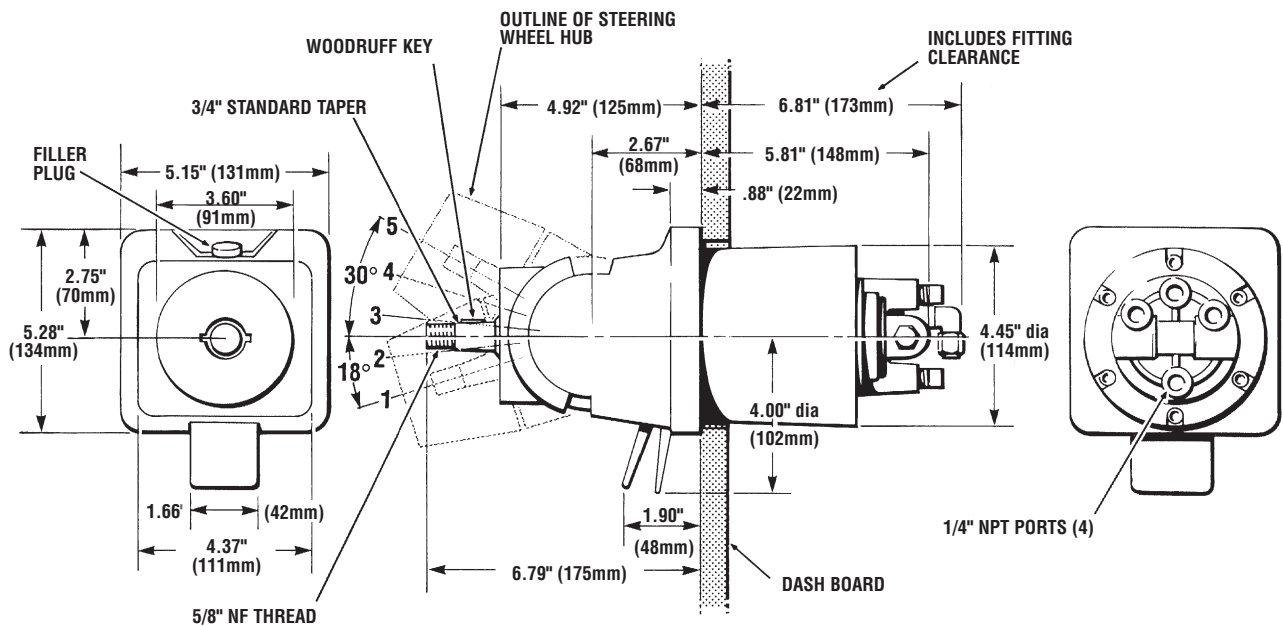
1" straight and tapered shafts are also available see page 9-4 for details.

NOTICE

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

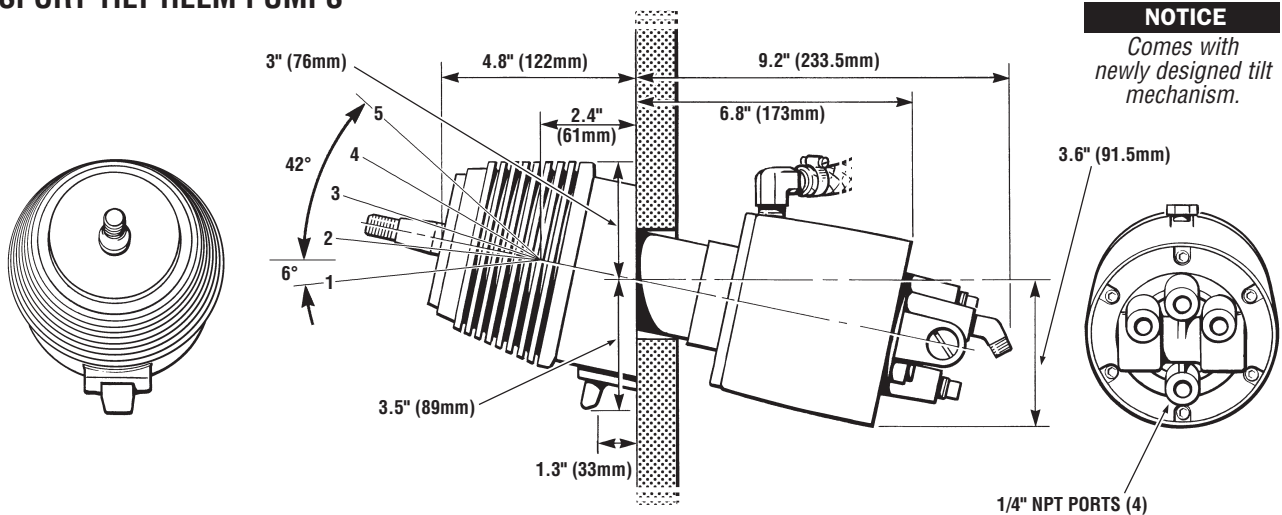
Tilt/Sport Tilt Helm Dimensions

TRADITIONAL STYLE TILT HELM PUMPS



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

SPORT TILT HELM PUMPS



NOTICE

Comes with newly designed tilt mechanism.

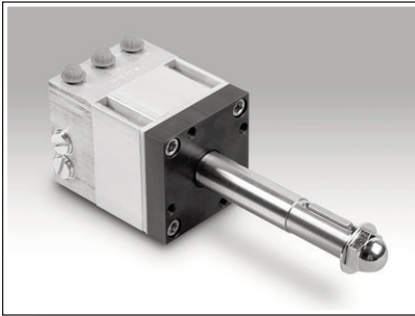
NOTICE Max. steering wheel diameter 20" (508mm)

NOTICE

Remote fill and vent kit (included with helm pump) requires a 3/4" hole to be drilled into the dash board and above the helm pump. Please refer to page 10-19, HA5450 for details.

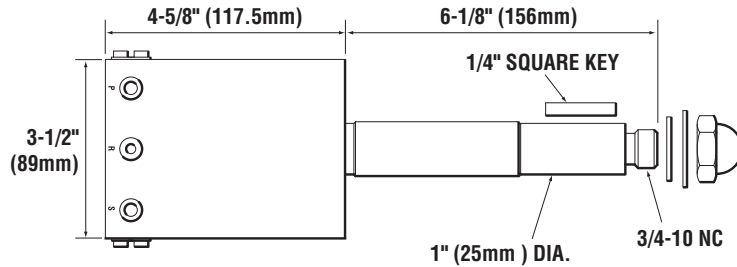
Hynautic Helm Pumps

Heavy Duty Helm Pump H-20 Series

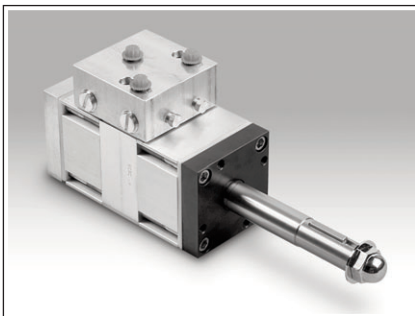


HELM		DISPL	SHAFT STYLE DIA. & TYPE	KEYWAY	INTEGRAL VALVING
20 Series	H-21	2.75cu in	1 Straight	1/4" Square	Yes
	H-25	2.75cu in	3/4", 1"/ft Tapered	#9 Woodruff	Yes
	H-26	2.00cu in	3/4", 1"/ft Tapered	#9 Woodruff	Yes

H-21

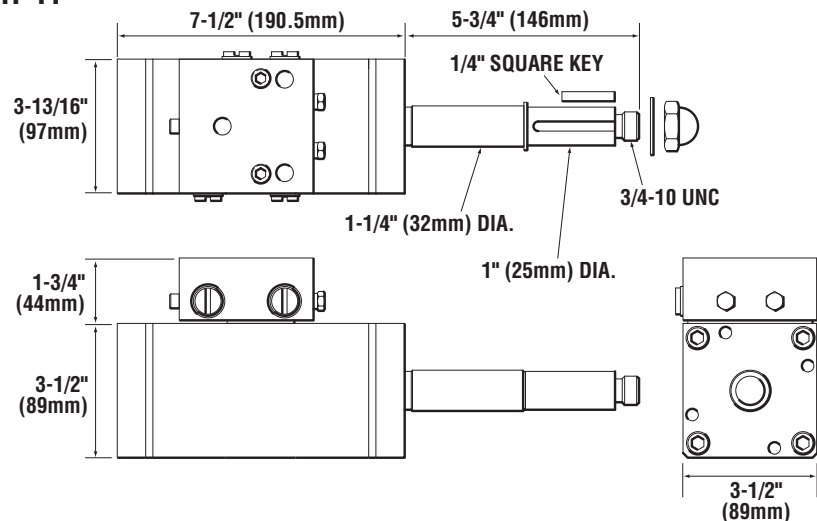


Heavy Duty Helm Pump H-40 Series



HELM		DISPL	SHAFT STYLE DIA. & TYPE	KEYWAY	INTEGRAL VALVING
40 Series	H-41	5.50cu in	1 Straight	1/4" Square	Yes
	H-41-2	5.50cu in	3/4", 1"/ft Tapered	#9 Woodruff	Yes
	H-42	4.00cu in	1 Straight	1/4" Square	Yes
	H-42-02	4.00cu in	3/4", 1"/ft Tapered	#9 Woodruff	Yes

H-41



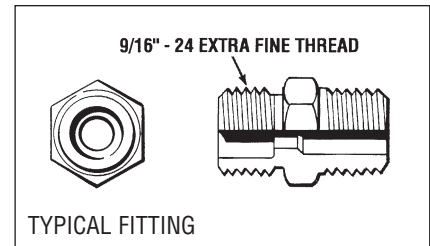
NOTICE

If using a Hynautic H-20 or H-40 series helm pump, use of a Hynautic Reservoir and Relief Valve, see page 6-4 for details. Fitting kits sold separately for both H-20 and H-40 series, please see page 6-2 for which fitting kit is to be used."

HOSE, TUBING, FITTINGS, ACCESSORIES AND TOOLS

Fittings

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



Tubing/Hose

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

⚠ WARNING
DO NOT CUT OUTBOARD HYDRAULIC HOSE.

APPLICATION	TUBING/HOSE REQUIREMENTS	PAGE #
OUTBOARDS, INBOARDS, SEASTAR POWER ASSIST, or STERNDRIVE CYLINDER# HC5332	OUTBOARD HOSE	10-2– 10-4
STERNDRIVES, SEADRIVES, INBOARDS, SSI	3/8" DIA. NYLON or COPPER TUBE	10-6– 10-8
CAUTION: DO NOT USE NYLON TUBING IN OUTBOARD AND/OR POWER ASSIST STEERING APPLICATIONS.		

General Considerations

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

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

SEASTAR OUTBOARD HOSE

⚠ WARNING

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

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

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

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

Measuring Hose Lengths

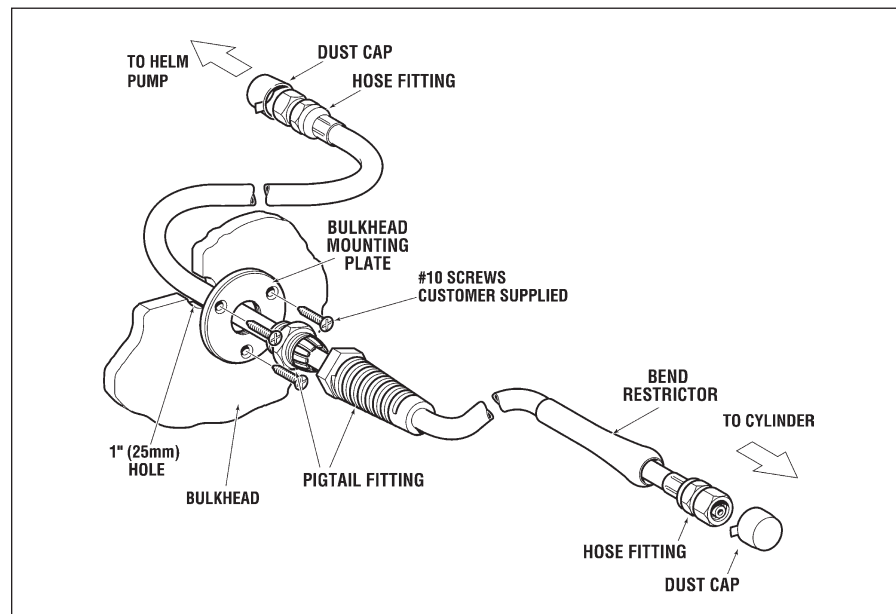
NOTICE

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

- 1 Measure from the center of the steering wheel to the Starboard side wall.
- 2 Measure from the Starboard side wall to the transom.
- 3 Measure from the transom into the center of the engines (if this is a twin engine twin cylinder application please measure to the center of the Port side engine.)
- 4 Add up the above three measurements, round up to the nearest even number, then add two feet. This is the length of hose required for your application.

Bulkhead Hose Kit

For the cleanest Installation.



Available SeaStar Hose Kits: How to order

NOTICE

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

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

Each part number contains two hoses of equal length.

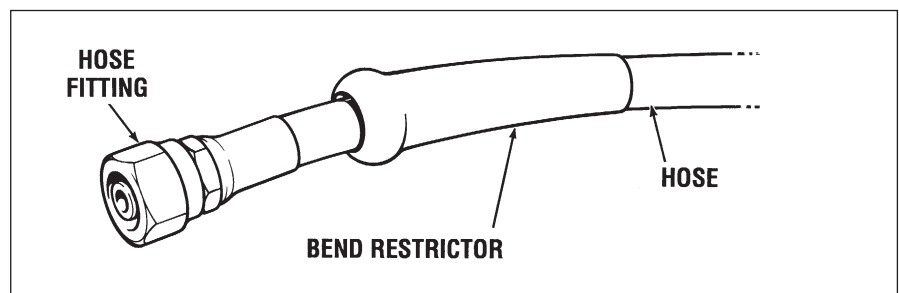
PART NUMBER	KIT DESCRIPTION
* H051XX	SeaStar Standard Outboard Hose Kit (2 hoses)
* H057XX	SeaStar Pro Hose Kit (2 hoses)
** H081XX	SeaStar Bulkhead Hose Kit, Standard (2 hoses)
** H082XX	SeaStar Bulkhead Hose Kit, Pro (2 hoses)

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

40' Hose Kits are available by special order only.

** SeaStar Standard and Pro Bulkhead Hose Kits are available in lengths from 12' – 30'.

40' Hose Kits are available by special order only.



Standard Hose Kit

To determine the required hose lengths for outboard steering installations.

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

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

Single Station System

- From the illustration that suits your application note the number of hose and fitting kits required.
- Measure along the intended path of the hose routing for each of the required hose kits.
- Round up the measurement to the next even digit and add 2 feet (0.6m). This is the length of hose kit required.
- Order hose kit(s) part no. H051_ _ . The last two digits correspond to the length of hose kit.

NOTICE

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

⚠ CAUTION

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

Single Station

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

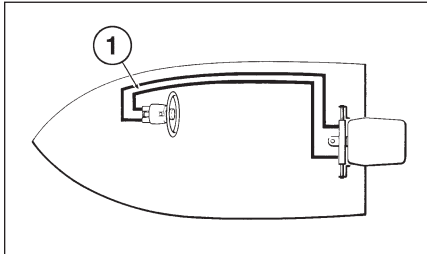


Figure B: HC5370
Single Side Mount Cylinder
Note: cylinder body stationary

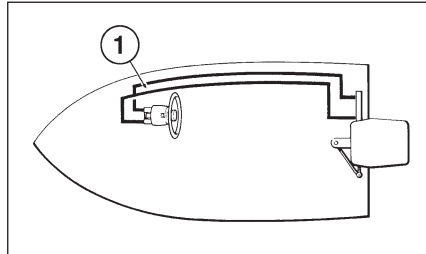


Figure C: HC5380
Single Splashwell Mount Cylinder
Note: cylinder body stationary

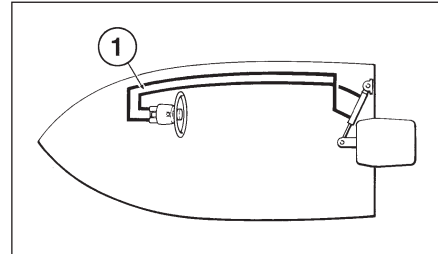


Figure D: HC5345
Dual Front Mount Cylinders
Note: cylinder body moves

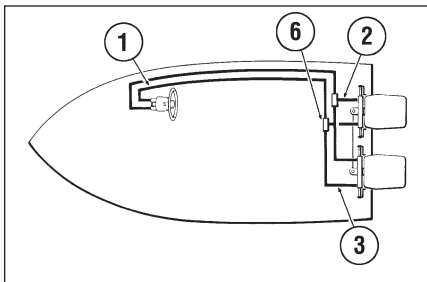


Figure E: HC5370
Dual Side Mount Cylinders
Note: cylinder body stationary

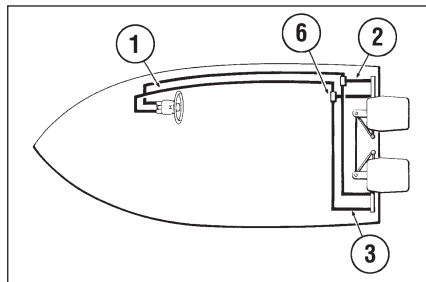


Figure F: HC535
Single Front Mount Cylinder
c/w bulkhead fittings
Note: cylinder body moves

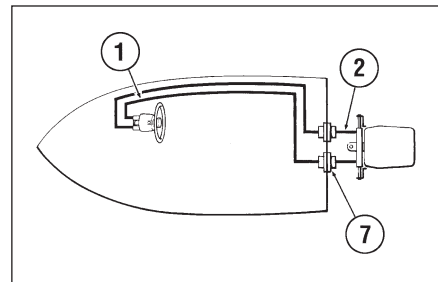


Figure G: HC5370
Single Side Mount Cylinder
c/w bulkhead fittings
Note: cylinder body stationary

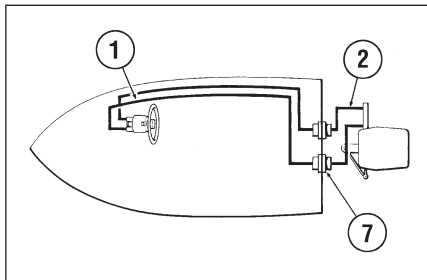


Figure H: HC5345
Dual Front Mount Cylinders
c/w bulkhead fittings

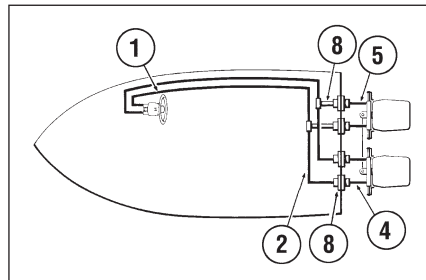
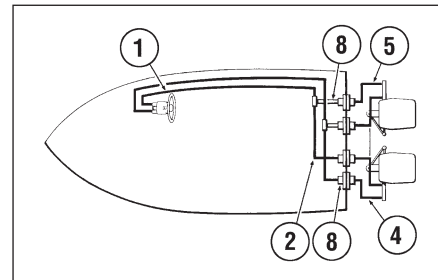


Figure I: HC5370
Dual Side Mount Cylinders
c/w bulkhead fittings



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

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

Additional Stations or Autopilot Integration

Additional Steering Station or Autopilot Power pack

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

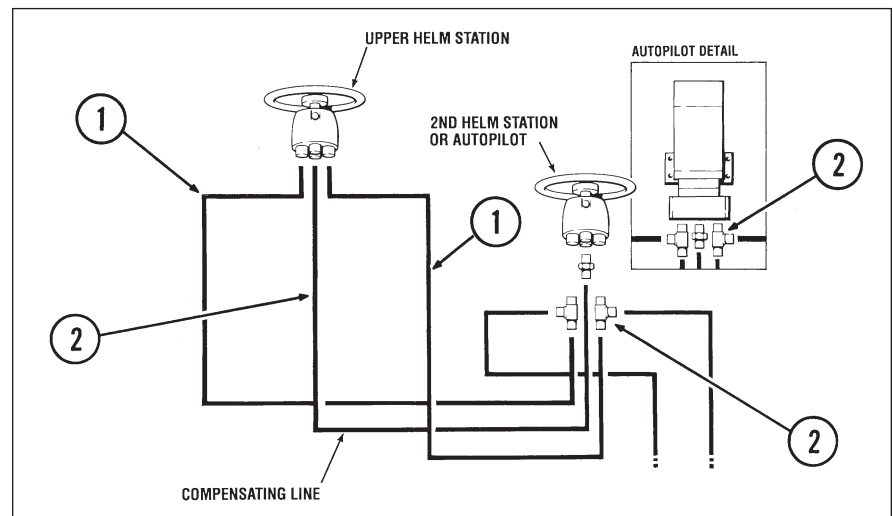
Note:

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

Figure J

2nd Steering Station or
Autopilot Power Pack
Installation

⚠ WARNING
DO NOT CUT HYDRAULIC HOSE.



Parts list

For Figure J

ITEM #	DESCRIPTION	PART NUMBER	QUANTITY REQUIRED	REF PAGE #
1	HOSE KIT	H051_ _	1	
2	FITTING KIT*	HF5501	1	10-10

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

SEASTAR INBOARD/STERNDRIVE TUBING

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

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

Nylon Tubing

NOTICE

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

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

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

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

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

⚠ WARNING

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

Copper Tubing

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

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

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

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

Specification for copper tubing:

Soft annealed copper tubing, Type 'L' produced under ASTM D-280.

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

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

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

Single Station

SeaStar®

TUBING

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

Figure A

Single Inboard Cylinder

- fittings required supplied with helm and cylinder

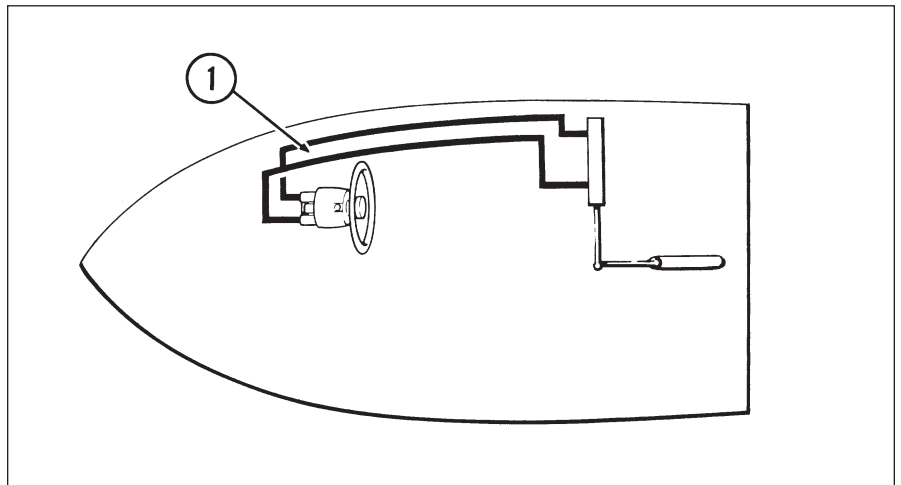
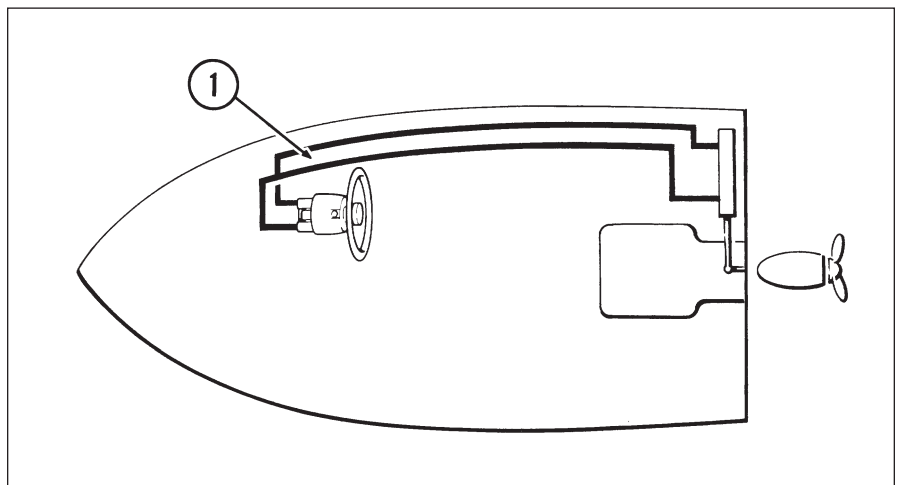


Figure B

Single Sterndrive Cylinder

- fittings required supplied with helm and cylinder



Parts list

For Figures A, B

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

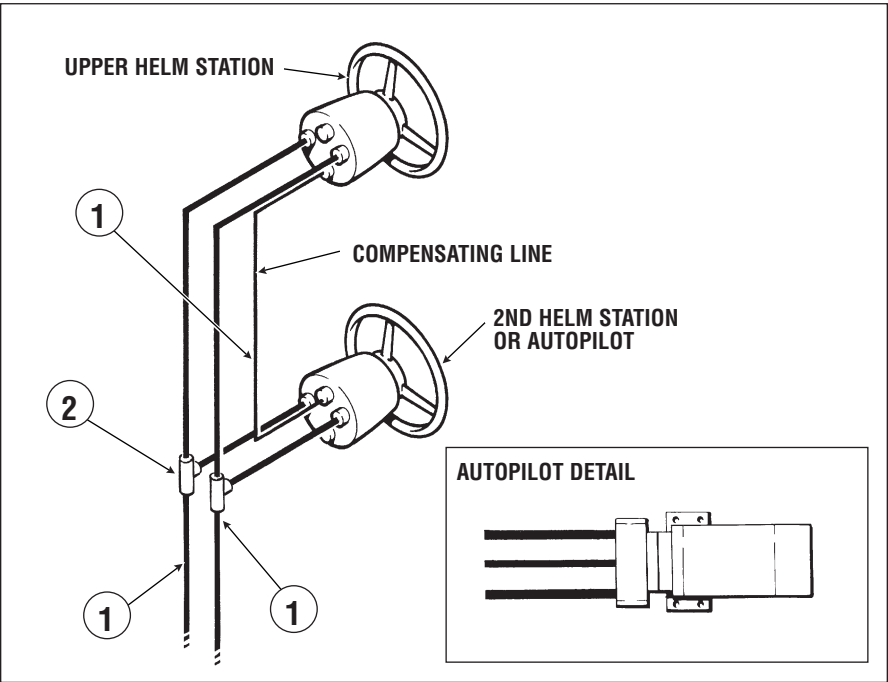
ADDITIONAL SEASTAR STEERING STATION OR AUTOPILOT KIT

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

Figure E
2nd Steering Station or Autopilot

NOTICE

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



ITEM #	DESCRIPTION	PART NUMBER	QUANTITY REQUIRED	REF PAGE #
1	3/8" DIA NYLON OR COPPER TUBE	HT5_ _ _	AS MEASURED	10-11
2	FITTING KIT	HF5502	1	

Required details for the addition of an autopilot.

- 1) Most SeaStar Helm pumps have a built in check valve. Full feedback helm pumps do not have a built in check valve and one will be required for the installation of an autopilot, refer to page 9-4 of this guide to determine whether your helm pump has check valves built in.
- 2) Autopilot mfg. requires the volume of your steering cylinder(s) to provide an adequate autopilot pump, refer to page 12-2 for volumes of your cylinder.requirement.

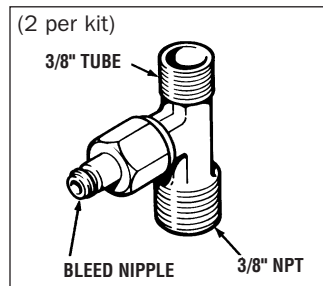
FITTINGS

SeaStar®

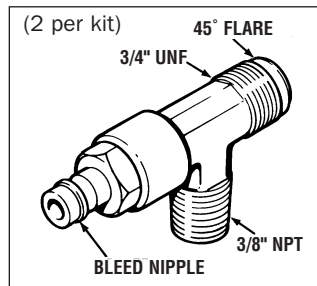
FITTINGS

All SeaStar Manual Hydraulic steering systems utilize the same style of fittings for all applications. These are 3/8" compression fittings which utilize a 9/16"-24 extra fine thread. Refer to page 10-1.

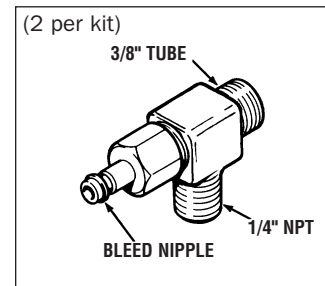
HF5518 Vertical Bleeder Tee



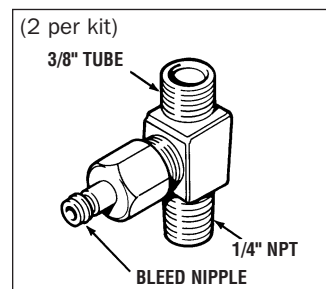
HF5519 Bleed Tee (TM Cylinders)



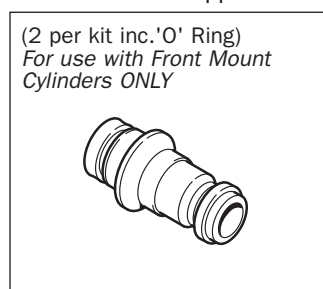
HF5520 Horiz. Bleeder Tee



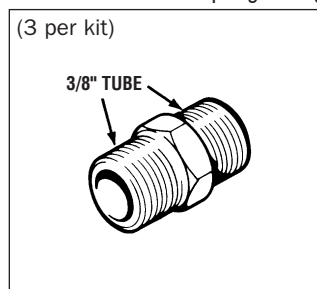
HF5521 Vertical Bleeder Tee



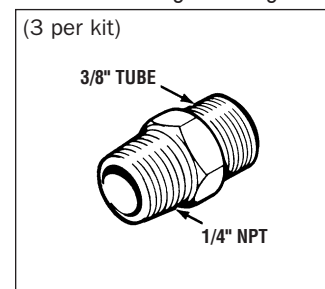
HF5548 Bleed Nipple



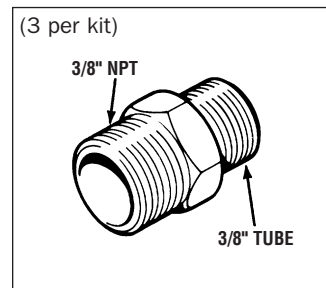
HF5527 Union Coupling Fitting



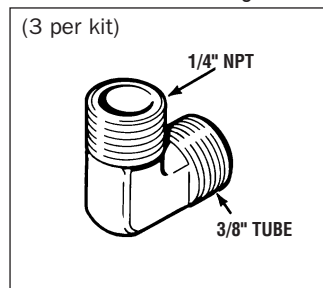
HF5528 Straight Fitting



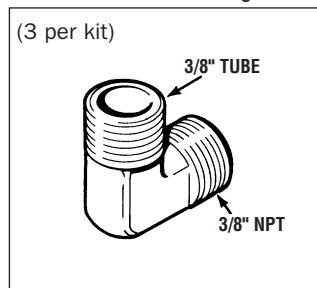
HF5532 Connector Fitting



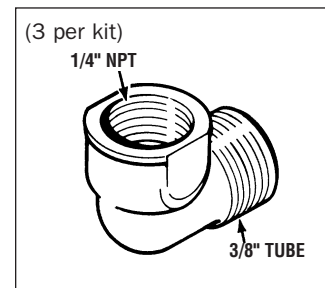
HF5529 Elbow Fitting



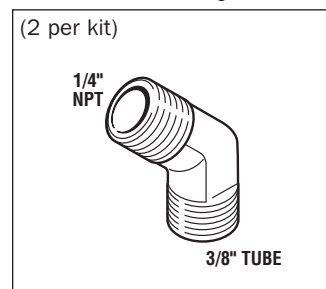
HF5534 Elbow Fitting



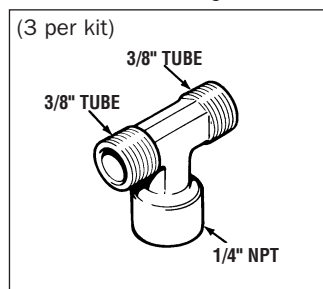
HF5538 Street Elbow



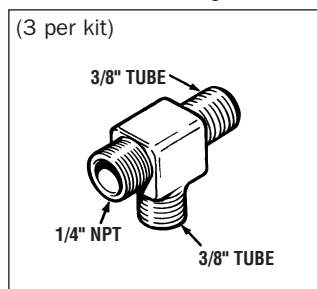
HF5540 45° Fitting



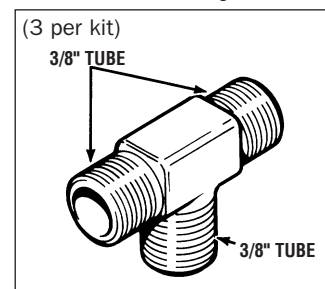
HF5533 Tee Fitting



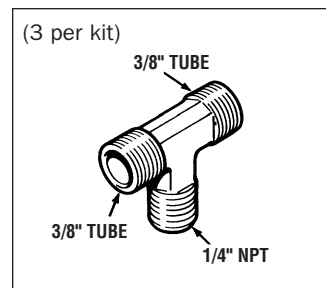
HF5531 Tee Fitting



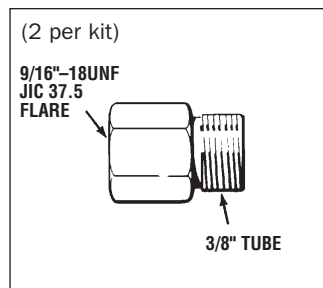
HF5530 Tee Fitting



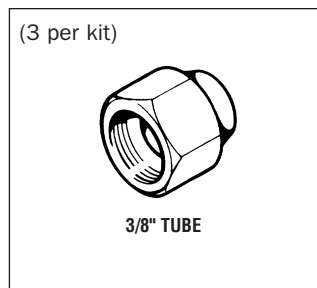
HF5536 Tee Fitting



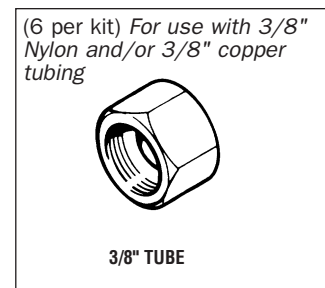
HF5566 Adapter Fitting



HF5524 Cap Plug Nut



HF5526 Tube Nut



HF5501

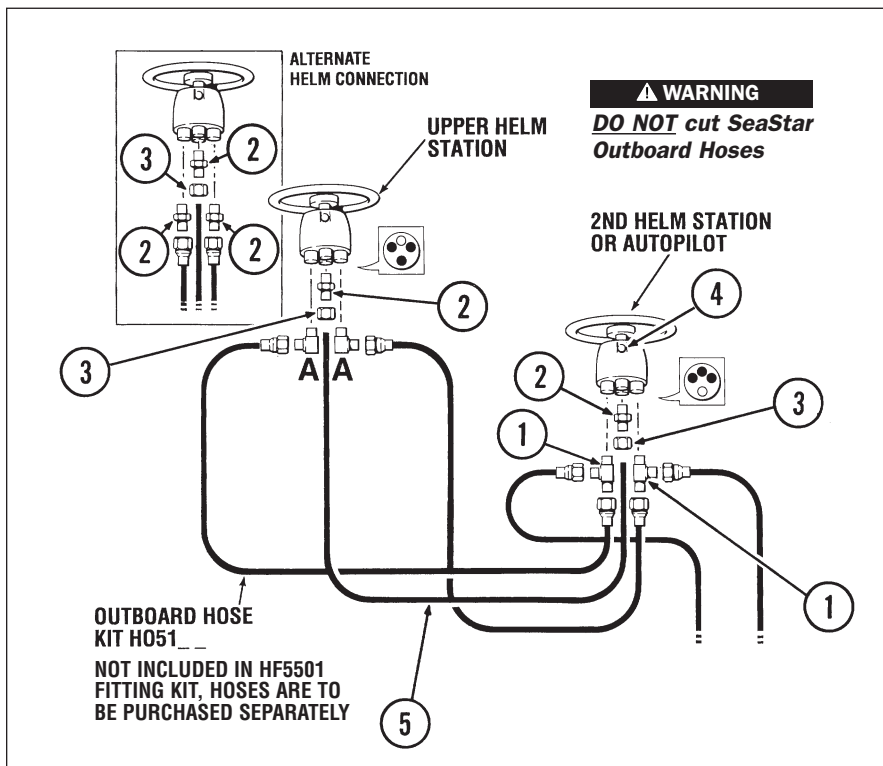
Application

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

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

* SUPPLIED WITH HELM PUMP.

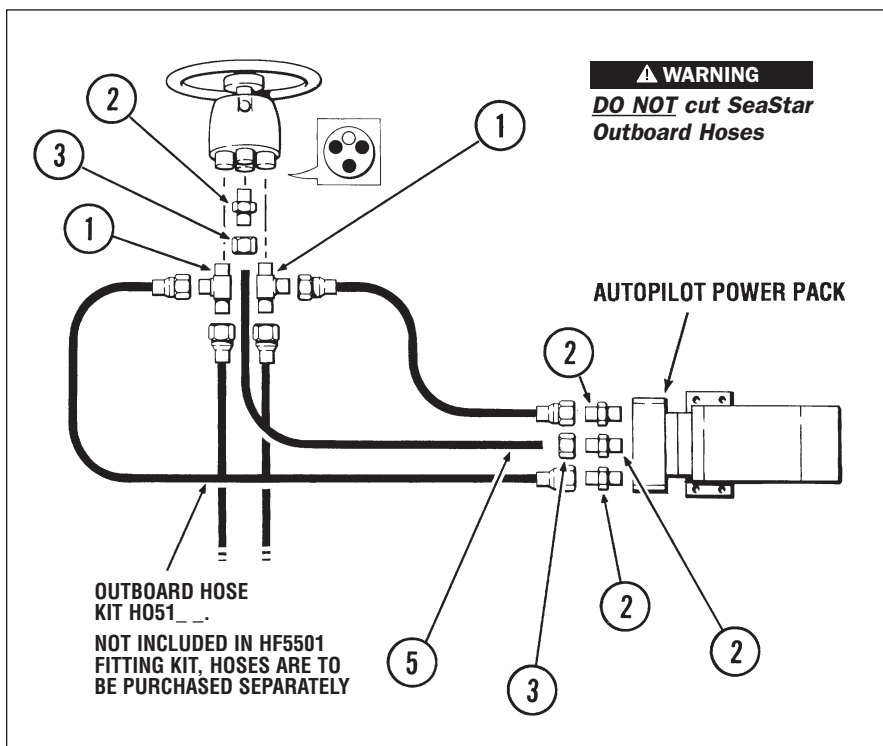
NOTE: HF5501 FITTING KIT IS TO BE USED WHEN THE SYSTEM HAS BEEN PLUMBED WITH SEASTAR OUTBOARD STEERING HOSE ONLY.



Autopilot powerpack connection

CAUTION

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



HF5502

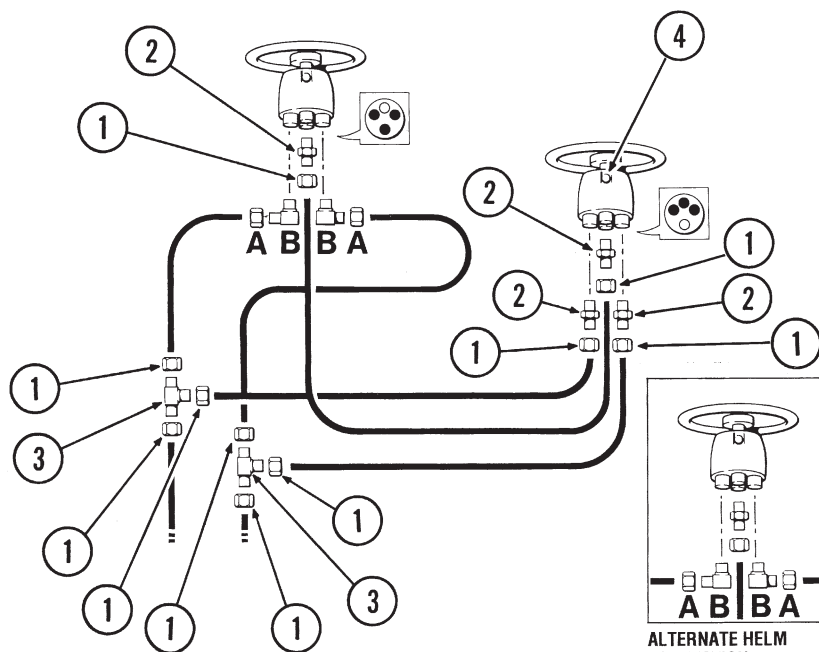
Application

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

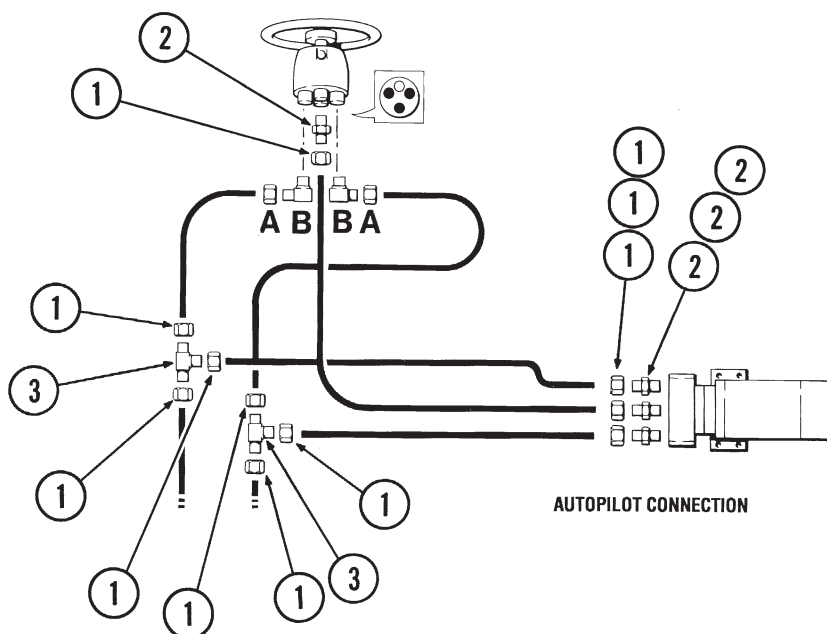
ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Tube Nut – 3/8" Dia.	10	280327
2	Connector Fitting 3/8" Tube (M) – 1/4" NPT (M)	4	600602
3	Tee Fitting 3 Ends – 3/8" Tube	2	600605
4	Non-Vented Filler Plug	1	HA5432
A*	Tube Nut – 3/8" +Dia.	2	
B*	3/8" Elbow 1/4" NPT (M)	2	

* SUPPLIED WITH HELM

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



Autopilot powerpack connection



HF5507

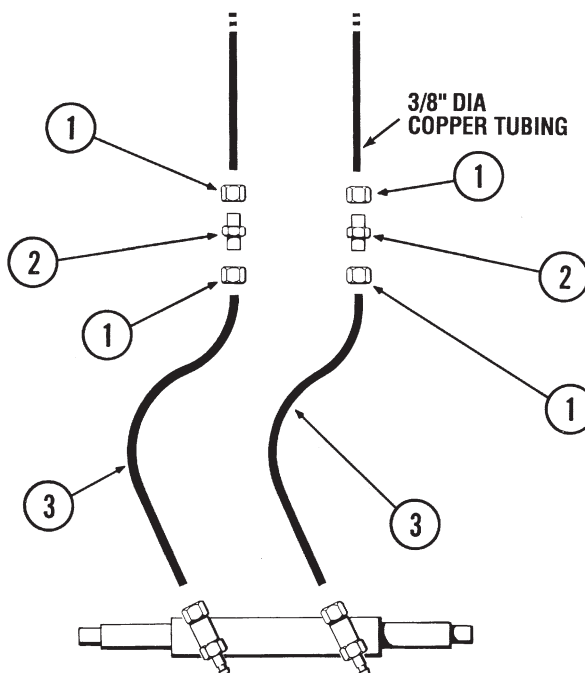
Application

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

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Tube Nut – 3/8" Dia.	4	280327
2	Connector Fitting 3/8" Tube (M) – 3/8" Tube (M)	2	280929
3	Nylon Tubing 3/8" Dia.	6ft	795628

NOTICE

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



HF5508

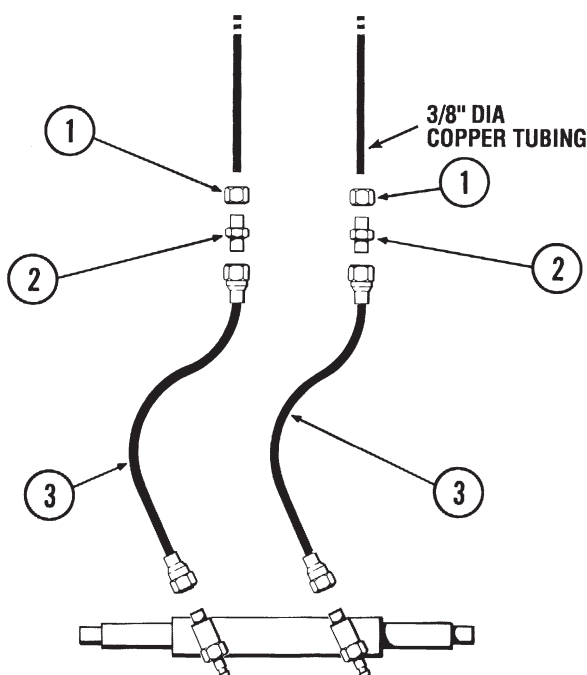
Application

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

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

CAUTION

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



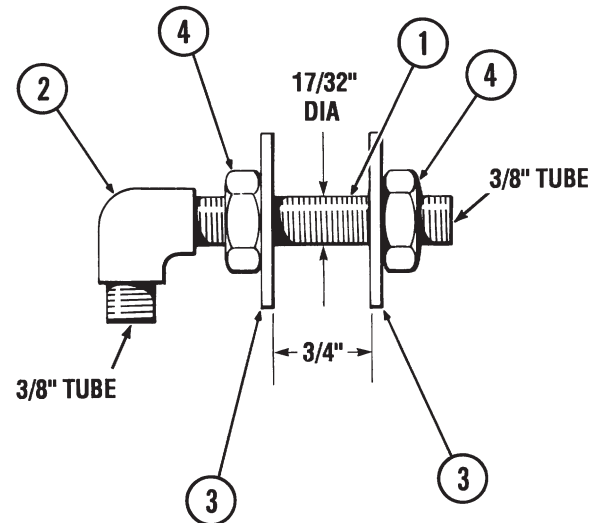
HF5512

3/4" bulkhead fitting kit

Application: Single cylinder installations

2 Assemblies per kit

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



2 OF EACH ILLUSTRATED INCLUDED IN KIT

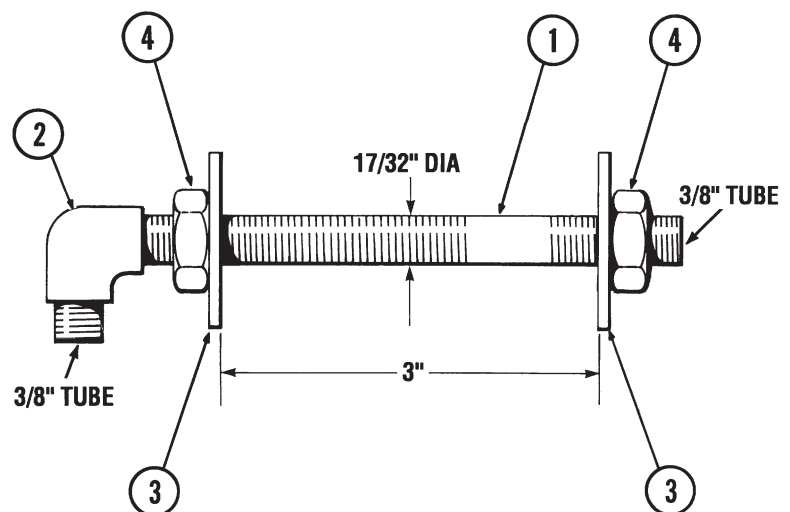
HF5513

3" bulkhead fitting kit

Application: Single cylinder installations

2 Assemblies per kit

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



2 OF EACH ILLUSTRATED INCLUDED IN KIT

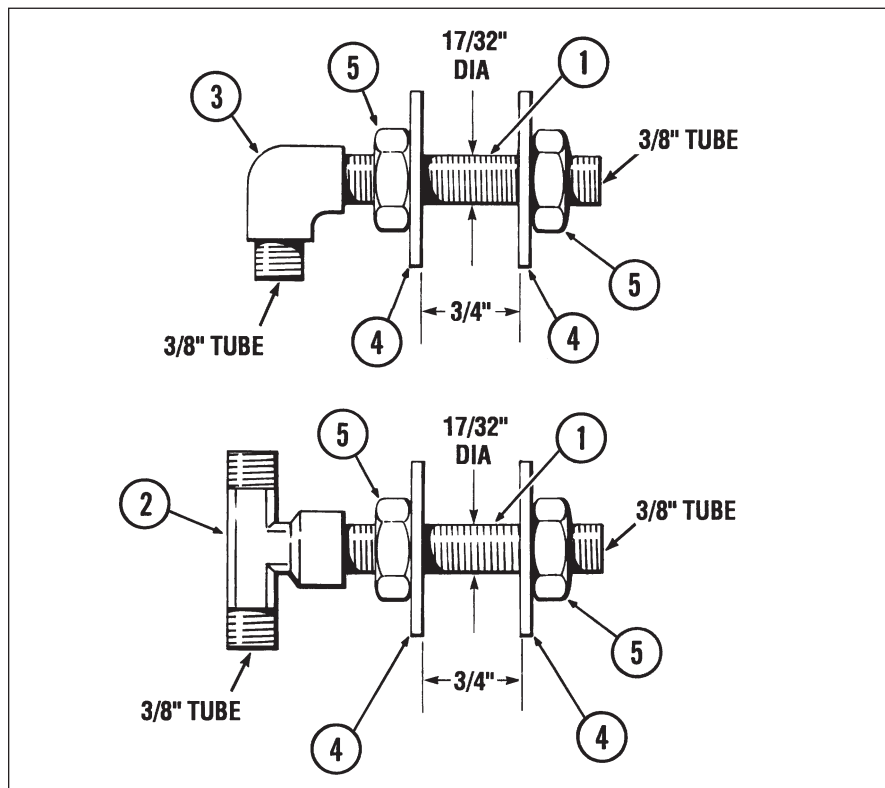
HF5514

3/4" bulkhead fitting kit

Application: Dual cylinder installations

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

2 OF EACH ILLUSTRATED INCLUDED IN KIT



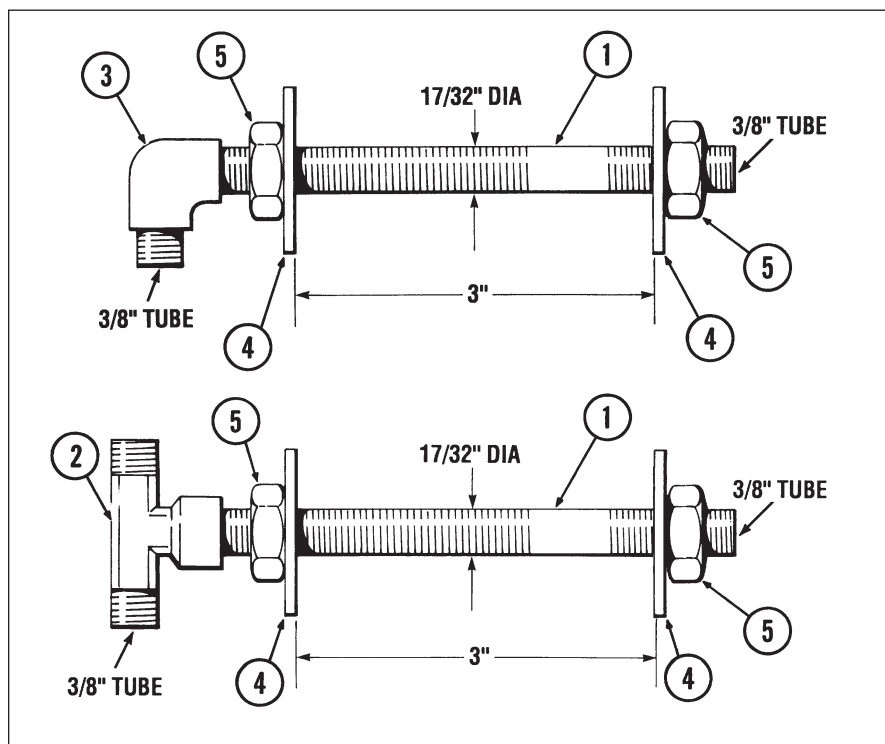
HF5515

3" bulkhead fitting kit

Application: Dual cylinder installations

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

2 OF EACH ILLUSTRATED INCLUDED IN KIT

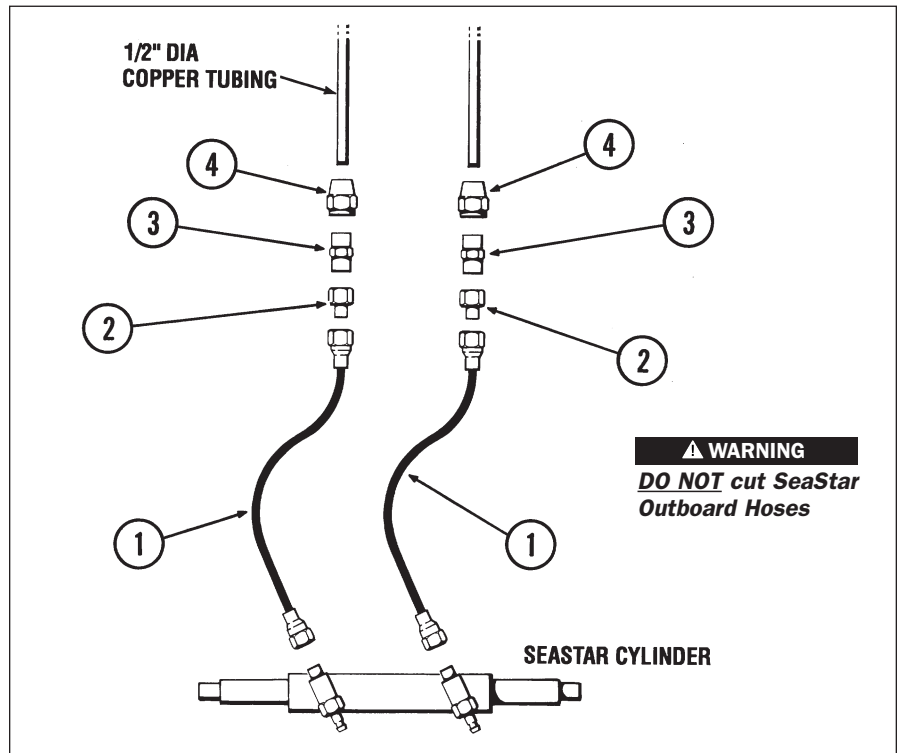


HF5568

Application

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

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

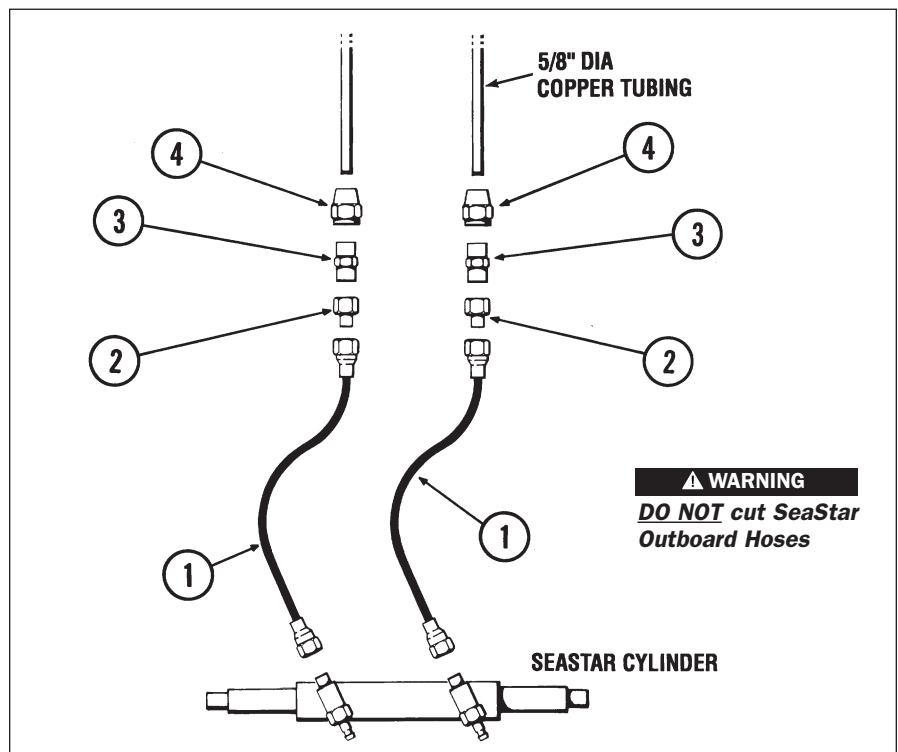


HF5569

Application

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

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



⚠ CAUTION

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

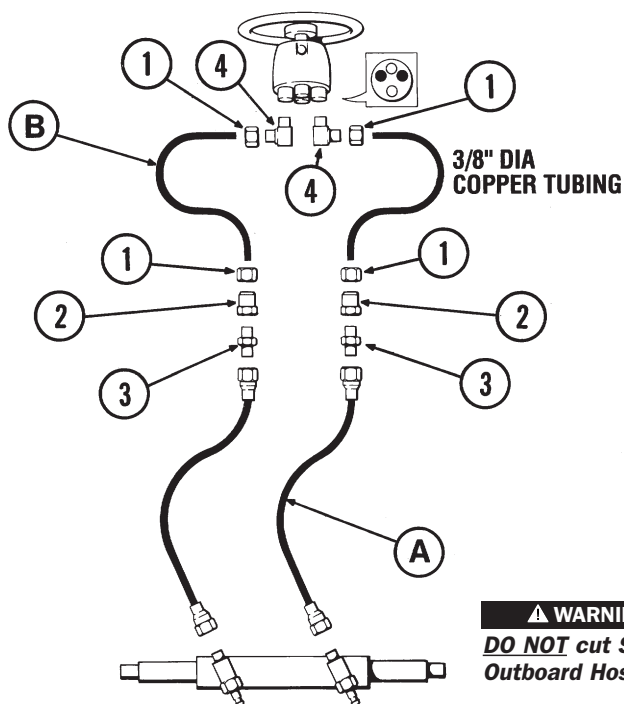
HF5581

Application

45° flare fitting connection kit
for SeaStar systems

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

* NOT SUPPLIED WITH FITTING KIT



HF5582

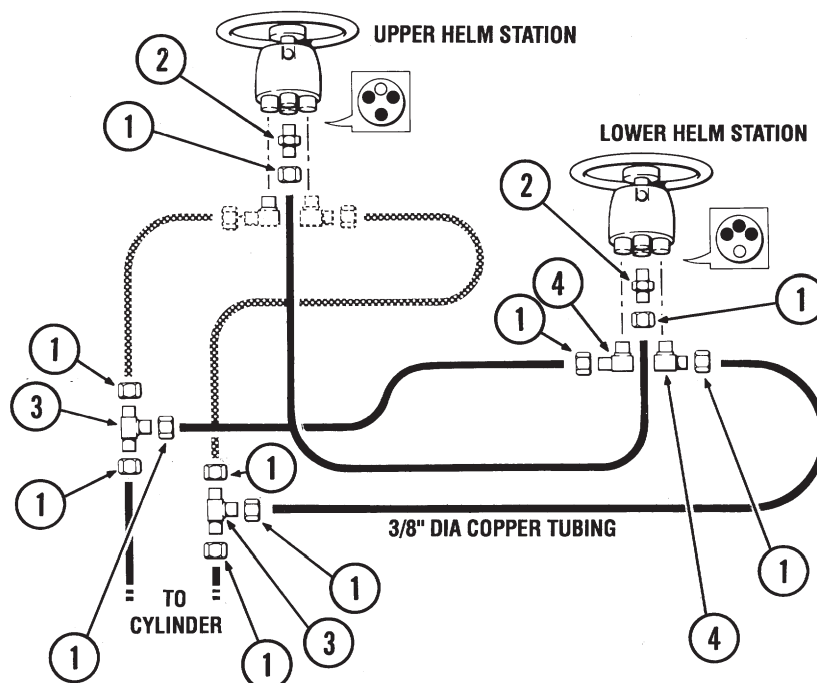
Application

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

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

NOTICE

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



SEASTAR LIQUID TIE BAR ALIGNMENT VALVE Part# HA5471-2

NOTICE

If a mechanical tiebar can be used, it is advisable that one is fitted. There is no substitute for a mechanical tiebar

CAUTION

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

WARNING

The use of a standard helm at high speed (55 mph +) or a high load, eg: full throttle forward/reverse, may cause a vacuum in the liquid tie bar and cause engine/rudders to misalign, resulting in momentary loss of steering control. This will not occur if a SeaStar Pro Helm Pump (part # HH5770) is used.

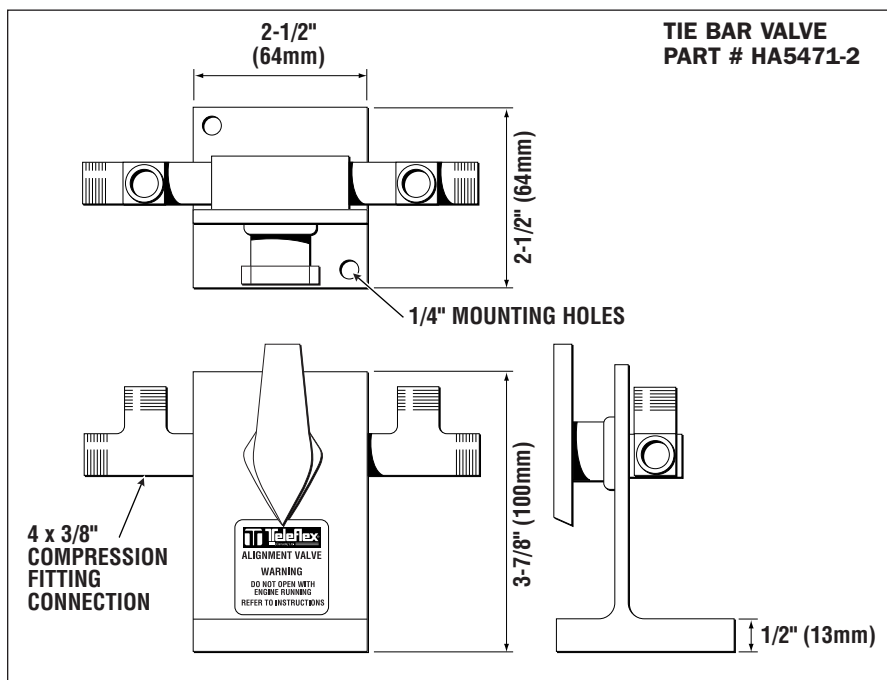
CAUTION

DO NOT allow cylinder body to move (HC5345), or shaft to move back into cylinder (HC5370).
DO NOT use a wrench to hold cylinder.

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.

Due to the potential for leakage across the piston seals, it is possible for the engines to get out of synchronization. We are unable to predict, due to circumstances beyond our control, the frequency that misalignment may occur, therefore Engine alignment should be checked and corrected as required before leaving the dock.



Cylinder Alignment Valve Bleeding Instructions

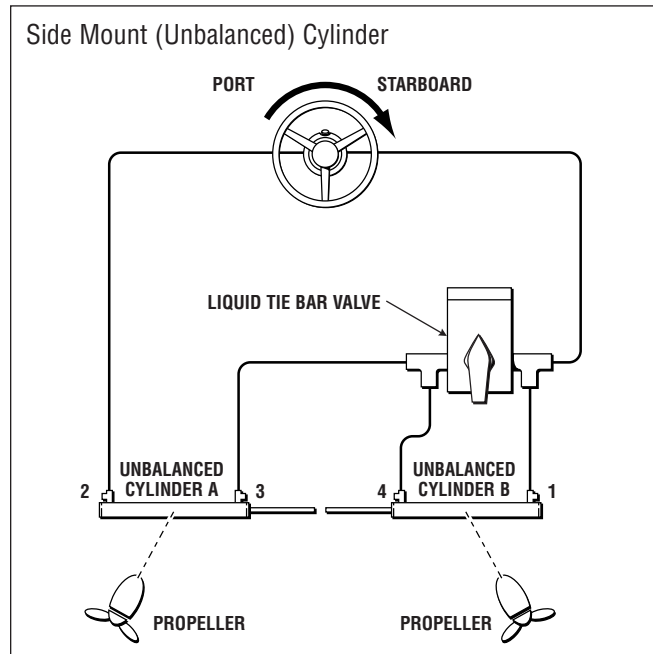
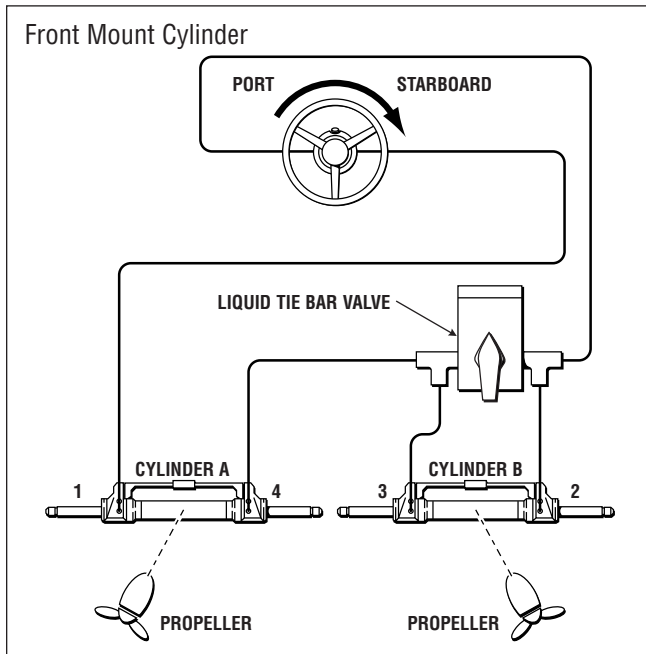
Referencing the cylinder alignment valve installation schematic.

- Fill helm with oil and attach filler device / container to helm
- Open valve
- Open bleed fitting no. 1 and pull cylinder shaft all the way out on fitting no. 1 side of cylinder
- Turn steering wheel clockwise until an air free stream of oil comes forth from bleed fitting no. 1
- Close bleed fitting no. 1
- Open bleed fitting no. 2 and pull cylinder shaft all the way out on fitting no. 2 side of cylinder
- Turn steering wheel counter-clockwise until an air free stream of oil comes forth from bleed fitting no. 2, then close bleed fitting no. 2
- Open bleed fitting no. 3 and pull cylinder shaft all the way out on fitting no. 3 side of cylinder
- Turn steering wheel counter-clockwise until an air free stream of oil comes forth from bleed fitting no. 3, then close bleed fitting no. 3
- Open bleed fitting no. 4 and pull cylinder shaft all the way out on fitting no. 4 side of cylinder
- Turn steering wheel counter-clockwise until an air free stream of oil comes forth from bleed fitting no. 4, then close bleed fitting no. 4
- Turn steering wheel back and forth from hardover to hardover a couple of times. Align cylinders by pulling cylinder rod all the way out on the same side of each cylinder and close valve

Realignment Instructions

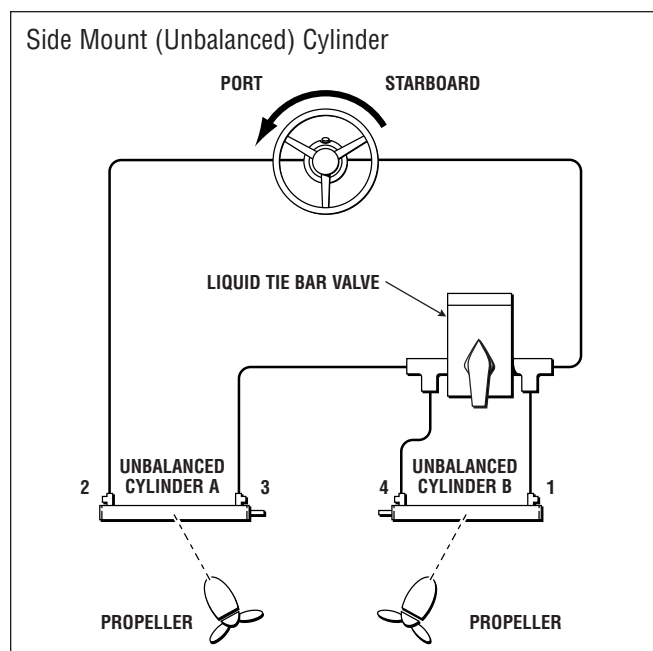
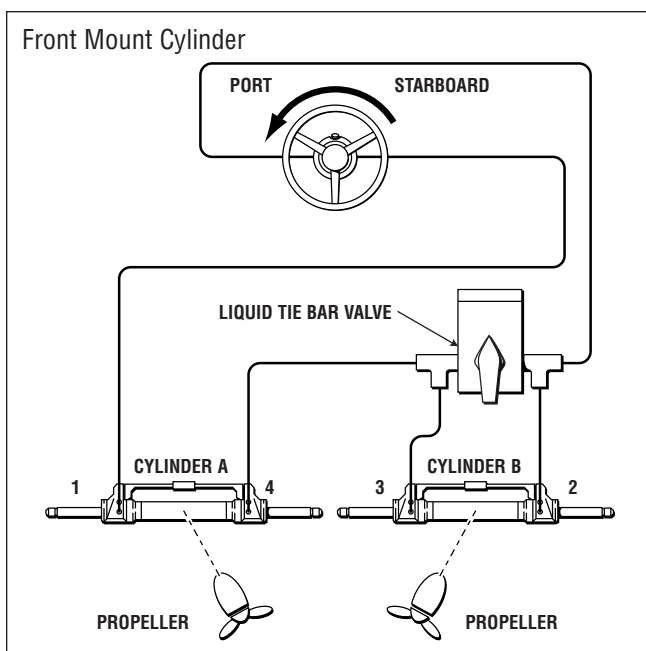
Engines Toe'd Outwards; Props too far apart

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



Engines Toe'd Inwards; Props too close together

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



TOOLS AND TORQUE DATA SHEETS

SeaStar Power Purge JR.

Part# HA5445-2



SeaStar®/BayStar™ Power Purge Jr. is the quickest way to bleed a SeaStar®/BayStar™ system in the field and assure a rock-solid steering feel every time!

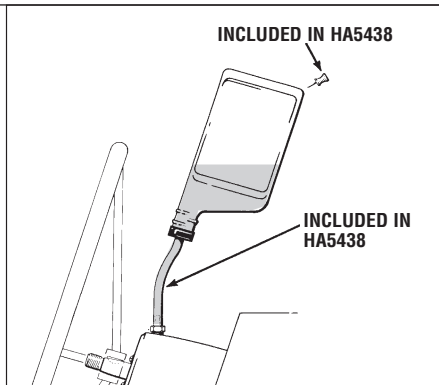
The Power Purge Jr. reduces installation and warranty costs while enhancing the quality of the boat to the end user. A typical manual fill and purge takes the average experienced installer or service technician about 30 minutes per boat — by using the Power Purge Jr. this can be reduced to 10 minutes or less.

Advantages:

- Steering feel is solid every time
- Complete Fill & Purge in 10 minutes or less
- Fast and efficient
- Easy to operate
- Screens contaminants from oil
- Quick connect fittings
- Convenient portable size
- Convenient electrical hook-up utilizing 12 volt boat battery
- Optional Dual Cylinder Purging Kit HA5461 available
- Optional 50' Hose Extension Kit HA5462, for those longer runs

SeaStar Bleed Hose

Part# HA5438



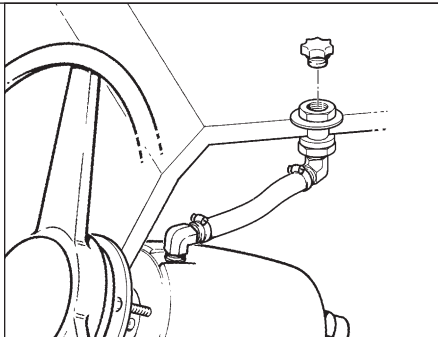
- This kit is needed to properly bleed the SeaStar Outboard steering kit
- Screws onto the SeaStar and equivalent fluid to bleed the SeaStar system
- Makes for a clean bleed when used properly

SeaStar Remote Fill

Part# HA6450

NOTICE

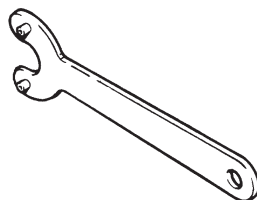
requires 3/4" hole to be drilled onto dash above helm pump.



- Can be used with ALL SeaStar Helm pumps
- Relocate your fill plug to a more convenient or hidden place

SeaStar Front Mount Gland Removal Tool

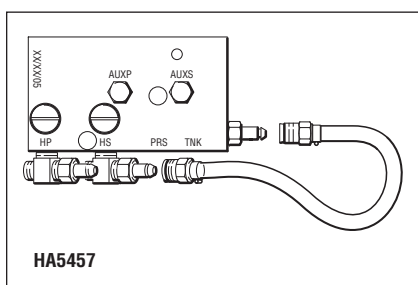
Part# 745225



- Makes changing the end glands on the front mount cylinder easy.
- Avoid damage to the gland by using the proper tool.
- Lightweight and durable.

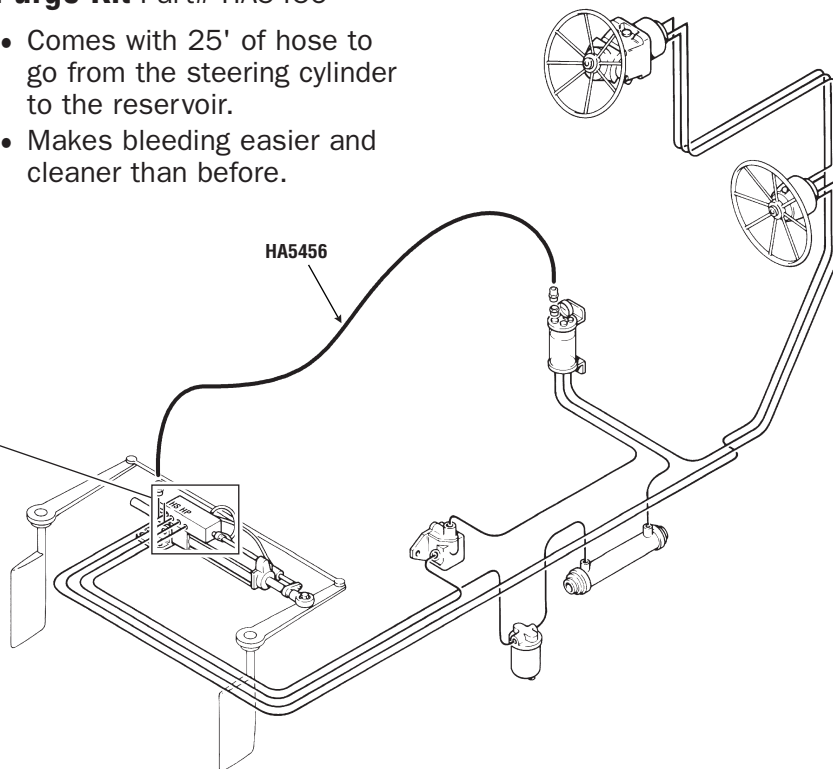
SeaStar Power Steering Purge Kit Part# HA5457

- Makes bleeding even easier than before.
- Central bleeding location—no need to run hoses to reservoir.
- Can only be used with Power Steering Cylinders made after October 2005.



SeaStar Power Steering Purge Kit Part# HA5456

- Comes with 25' of hose to go from the steering cylinder to the reservoir.
- Makes bleeding easier and cleaner than before.



SeaStar Helm Pump Drill Jigs

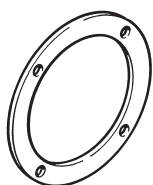
HA5405 Mounting washer for SeaStar helm studs for applications where the dashboard hole is 3-1/4 inches in diameter.

HA5465 Pilot Drill Jig for enlarging a 2 inch diameter dashboard hole to a 3 inch diameter hole. As required for all standard SeaStar and SeaStar Pro helms when using a standard 3 inch diameter hole saw.

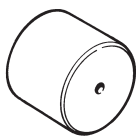
HA5466 Drill Jig for drilling mounting holes for standard SeaStar and SeaStar Pro helms. A 3 inch dashboard hole is required.

HA5467 Drill Jig for drilling mounting holes for standard SeaStar and SeaStar Pro helms where dashboard has a 3-1/4 inch hole from a previously mounted mechanical helm.

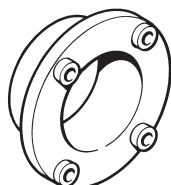
HA5468 Drill Jig for drilling mounting holes for SeaStar and SeaStar Pro traditional tilt helms (HH5741, HH5742, HH5743). Also back Mount Kit (HA5418). A 4-1/2 inch dashboard hole is required.



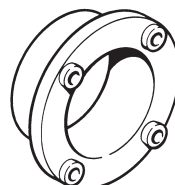
HA5405



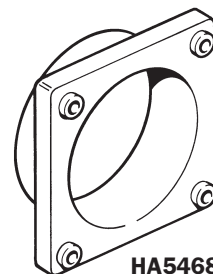
HA5465



HA5466



HA5467



HA5468

Steering Torque Data Sheet

SeaStar®

TORQUE DATA SHEETS

DISPLACEMENT HULLS ONLY

NAME: _____

CONTACT: _____

HULL DATA

HULL DIMENSIONS:

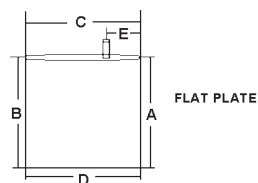
LOA _____ SAIL _____
 BEAM _____ OTHER _____
 DISPLACEMENT _____ TOP SPEED _____ Knots
 DRAFT _____ USE: _____
 NO. STEERING STATIONS _____

POWER DATA

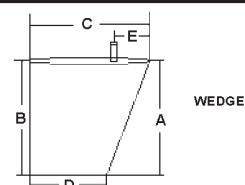
EACH SHAFT HORSEPOWER _____
 PROP DIAMETER: _____
 SINGLE ENGINE ☐
 TWIN ENGINE ☐

RUDDER DATA

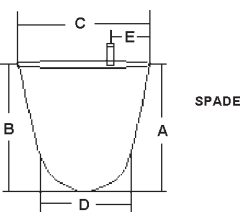
(CIRCLE TYPE OF RUDDER)



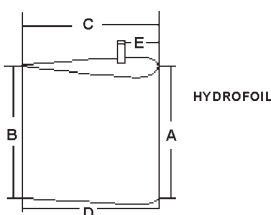
FLAT PLATE



WEDGE



SPADE



HYDROFOIL

RUDDER ARC (Midship to Hardover): _____ Degrees

RUDDER AREA: _____ Square Ft.

NO. RUDDERS ☐ One ☐ Two

RUDDER DIMENSIONS:

(A) Height _____ In.
 (B) Height _____ In.
 (C) Width _____ In.
 (D) Width _____ In.
 (E) Counter-balance _____ In.

NOTICE

Please include a detailed drawing of your rudder to assist with rudder load calculations.

Rudder Torque Data Sheet

To: _____

Phone Number: _____

Fax Number: _____

From: _____

Date: _____

PLANING HULLS ONLY

NAME: _____
ADDRESS: _____

BUILDER: _____
DESIGNER: _____
BOAT NAME: _____
NO. STEERING STATIONS: _____

HULL DATA

HULL DIMENSIONS:

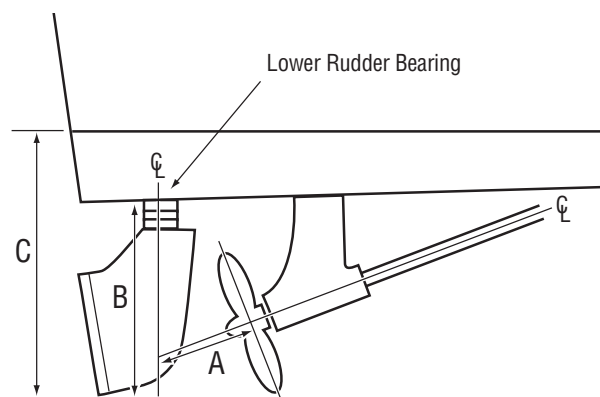
LOA _____ SAIL _____
BEAM _____ OTHER _____
DISPLACEMENT _____ TOP SPEED _____ Knots
DRAFT _____ USE: _____

POWER DATA

EACH SHAFT HORSEPOWER _____
PROP DIAMETER: _____
SINGLE ENGINE ☐
TWIN ENGINE ☐

DATA

FORMULA

Projected area of rudder = $(H+W) - (C+B)$


A = Perpendicular distance from the rudder shaft to the propeller.

B = Distance parallel to rudder shaft from rudder base to center of lower rudder bearing.

C = Perpendicular distance from waterline to rudder base.

Note: Formula presumes 23-27% counterbalance

Boat speed: _____ knots
Number of rudders: _____
Rudder area (projected area): _____ square feet
Propeller diameter: _____ feet
Perpendicular distance from the rudder shaft to the propeller: _____ feet
Distance measured parallel to the rudder shaft from the base of the rudder to the center of the lower bearings: _____ feet
Average rudder chord length: _____ feet
Perpendicular distance from the waterline to the rudder base: _____ feet
Rudder shaft diameter: _____ inches
Shaft power: _____ horsepower

NOTICE

Please include a detailed drawing of your rudder to assist with rudder load calculations.

**PLEASE TAKE A MOMENT TO COMPLETE
THIS FORM AND
RETURN IT VIA FAX TO: 604-279-2202**

BayStar™ SeaStar® Hynautic HYDRAULIC FLUID

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

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

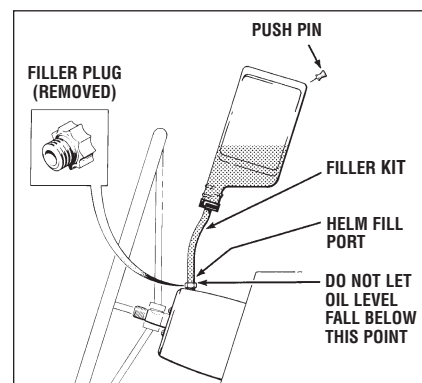


Alternate recommended hydraulic fluids for SeaStar steering systems.

Oil Manuf.	Brand Name
SeaStar	SeaStar oil part# HA5430
Shell	Aero Shell Fluid #41
Esso	Univis N15 or J13
Texaco	H015
Chevron	Aviation Hydraulic Fluid A
Mobil	Aero HFA
Petro Canada	Harmony HV115 (In Canada Only)

Optional Filler Kit

Part# HA5438



CAUTION

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

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.

SeaStar[®] Hynautic[®]

VOLUMES & CAPACITIES

NOTICE

Contact your nearest dealer or distributor to order replacement parts.

SeaStar Helm Pump Shaft Details:

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

Table A: SeaStar/Hynautic Helm Pumps

HELM DESCRIPTION	PART NUMBER	DISPLACEMENT CU. IN./REV (cc)	RELIEF VALVE SETTING PSI (BAR)	MAXIMUM WHEEL DIA. INCHES (mm)	SEAL KIT	SHAFT SEAL
SEASTAR 1.4 – STANDARD MOUNT	HH5269	1.4 (23.0)	1000 (70)	26 (660)	HS5176	225226
SEASTAR 1.4 – REAR MOUNT	HH5260	1.4 (22.9)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR 1.4 – REAR MOUNT FULL FEEDBACK	HH5231	1.4 (23.0)	1000 (70)	26 (660)	HS5176	225226
SEASTAR 1.4 – REAR MOUNT 1" STRAIGHT SHAFT	HH5279	1.4 (23.0)	1000 (70)	26 (660)	HS5151	225320
SEASTAR 1.4 – REAR MOUNT 1" TAPERED SHAFT	HH5280	1.4 (23.0)	1000 (70)	26 (660)	HS5151	225320
SEASTAR 1.4 – TILT	HH5744	1.4 (23.0)	1000 (70)		HS5176	225226
SEASTAR 1.7 – STANDARD FRONT MOUNT	HH5271	1.7 (27.8)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR 1.7 – STANDARD MOUNT FULL FEEDBACK	HH5761	1.7 (27.8)	1000 (70)	26 (660)	HS5176	225226
SEASTAR 1.7 – REAR MOUNT	HH5261	1.7 (27.8)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR 1.7 – REAR MOUNT 1" TAPERED SHAFT	HH5281	1.7 (27.8)	1000 (70)	26 (660)	HS5151	225320
SEASTAR 1.7 – TRADITIONAL TILT	HH5741	1.7 (27.8)	1000 (70)	20 (508)	HS5176*	225226*
SEASTAR 1.7 – SPORT TILT	HH5291	1.7 (27.8)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR PRO 1.7 – STANDARD MOUNT	HH5779	1.7 (27.8)	1500 (103)	26 (660)	HS5176	225226
SEASTAR PRO 1.7 – REAR MOUNT	HH5778	1.7 (27.8)	1500 (103)	26 (660)	HS5176	225226
SEASTAR PRO 1.7 – TILT	HH5773	1.7 (27.8)	1500 (103)		HS5176	225226
SEASTAR – 2.0 STANDARD FRONT MOUNT	HH5273	2.0 (33.0)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR – 2.0 STANDARD MOUNT FULL FEEDBACK	HH5760	2.0 (33.0)	1000 (70)	26 (660)	HS5176	225226
SEASTAR PRO 2.0 – STANDARD FRONT MOUNT	HH5770	2.0 (33.0)	1500 (103)	26 (660)	HS5176*	225226*
SEASTAR PRO 2.0 – REAR MOUNT	HH5771	2.0 (33.0)	1500 (103)	26 (660)	HS5176	225226
SEASTAR PRO 2.0 – TRADITIONAL TILT	HH5774	2.0 (33.0)	1500 (103)	20 (508)	HS5176*	225226*
SEASTAR PRO 2.0 – SPORT TILT	HH5290	2.0 (33.0)	1500 (103)	20 (508)	HS5176*	225226*
SEASTAR 2.4 – STANDARD FRONT MOUNT	HH5272	2.4 (39.3)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR 2.4 – STANDARD MOUNT FULL FEEDBACK	HH5762	2.4 (39.3)	100 (70)	26 (660)	HS5176	225226
SEASTAR 2.4 – REAR MOUNT	HH5262	2.4 (39.3)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR 2.4 – REAR MOUNT 1" TAPERED SHAFT	HH5282	2.4 (39.3)	1000 (70)	26 (660)	HS5151	225320
SEASTAR 2.4 – TRADITIONAL TILT	HH5742	2.4 (39.3)	1000 (70)	20 (508)	HS5176*	225226*
SEASTAR 2.4 – SPORT TILT	HH5292	2.4 (39.3)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR PRO 2.4 – STANDARD MOUNT	HH5772	2.4 (39.3)	1500 (103)	26 (660)	HS5176*	225226*

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

HELM DESCRIPTION	PART NUMBER	DISPLACEMENT CU. IN./REV (cc)	SHAFT STYLE	KEY WAY	SEAL KIT
HYNAUTIC	H-21	2.75 (45.1)	1" STRAIGHT	1/4" SQUARE	HS-02
HYNAUTIC	H-25	2.75 (45.1)	3/4" TAPERED	#9 WOODRUFF	HS-02
HYNAUTIC	H-26	2.00 (32.8)	3/4" TAPERED	#9 WOODRUFF	HS-02
HYNAUTIC	H-41	5.50 (90.1)	1" STRAIGHT	1/4" SQUARE	HS-04
HYNAUTIC	H-42	4.00 (65.5)	1" STRAIGHT	1/4" SQUARE	HS-04
HYNAUTIC	H-42-2	4.00 (65.5)	3/4" TAPERED	#9 WOODRUFF	HS-04

NOTICE

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

Table B: SeaStar/Hynautic Cylinders

CYLINDER MODEL	PART NUMBER	BORE DIAMETER IN (mm)	NOMINAL SHAFT DIA IN (mm)	STROKE IN (mm)	SEAL KIT	VOLUME CUBIC IN (cc)	TORQUE (See Notice) IN-LB (KG-M)
BAYSTAR COMPACT	HC4645H	1.25 (31.7)	0.63 (16.0)	8 (203)	N/A	7.24 (118.6)	N/A
BAYSTAR COMPACT	HC4658H	1.25 (31.7)	0.63 (16.0)	8 (203)	N/A	7.24 (118.6)	N/A
BAYSTAR COMPACT	HC4647H	1.25 (31.7)	0.63 (16.0)	8 (203)	N/A	7.24 (118.6)	N/A
BAYSTAR COMPACT	HC4648H	1.25 (31.7)	0.63 (16.0)	8 (203)	N/A	7.24 (118.6)	N/A
BA125-3ATM	HC5303	1.25 (31.7)	0.63 (16.0)	3 (76)	HS5154	2.72 (44.5)	N/A
BA125-6.25ATM	HC5311	1.25 (31.7)	0.63 (16.0)	6.25 (159)	N/A	5.66 (92.7)	N/A
BA135-7	HC5332	1.37 (34.9)	0.625 (15.9)	7 (178)	HS5155	8.3 (135.2)	5741 (66.1)
BA125-7ATM	HC5312	1.25 (31.7)	0.50 (12.7)	7 (178)	HS5154	7.2 (118.2)	5025 (57.9)
BA135-7ATM	HC5313	1.375 (34.9)	0.625 (15.9)	7 (178)	HS5155	8.3 (135.2)	5741 (66.1)
BA135-8EM	HC5327	1.35 (34.2)	0.63 (16.0)	8 (203)	HS5155	9.5 (155.4)	6557 (75.5)
BA150-7ATM	HC5314	1.50 (38.1)	0.625 (15.9)	7 (178)	HS5156	10.2 (167.5)	7117 (82.0)
BA150-7TM	HC5318	1.50 (38.1)	0.625 (15.9)	7 (178)	HS5182	10.2 (167.5)	7117 (82.0)
BA175-7TM	HC5319	1.75 (44.4)	0.75 (19.0)	7 (178)	HS5183	13.7 (225.4)	9569 (110.2)
BA135-7EM	HC5332	1.375 (34.9)	0.625 (15.9)	7 (178)	HS5155	8.3 (135.2)	5741 (66.1)
BA150-7EM	HC5326	1.50 (38.1)	0.625 (15.9)	7 (178)	HS5156	10.2 (167.5)	8853 (102.0)
BA150-9TM	HC5369	1.50 (38.1)	0.625 (15.9)	9 (229)	HS5182	13.1 (214.7)	9375 (107.7)
BA175-9TM	HC5373	1.75 (44.4)	0.75 (19.0)	9 (229)	HS5183	17.7 (290.0)	12600 (145.5)
BA200-11TM	HC5378	2.00 (50.8)	0.75 (19.0)	11 (279)	HS5185	26.0 (426)	23140 (267.2)
BA200-11TMC	HC5379	2.00 (50.8)	0.75 (19.0)	11 (279)	HS5185	26.0 (426)	23140 (267.2)
BA200-9	HC5802	2.00 (50.8)	0.75 (19.0)	9 (229)	HS5198	21.25 (348.2)	18900 (218.3)
BA200-11	HC5804	2.00 (50.8)	0.75 (19.0)	11 (279)	HS5198	26.0 (426)	23140 (267.2)
125-8EM	HC5328	1.25 (31.7)	0.50 (12.7)	8 (203)	HS5154	8.3 (135.2)	7142 (82.3)
92VPS	HC5331	1.25 (31.7)	0.50 (12.7)	8 (203)	HS5153	8.3 (135.2)	N/A
BA125-8EMV	HC5330	1.25 (31.7)	0.50 (12.7)	8 (203)	HS5154	8.3 (135.2)	7142 (82.3)
PIVOT MOUNT	HC5345	1.375 (35)	0.75 (19.0)	8 (203)	HS5157	8.34 (136.6)	N/A
PIVOT MOUNT	HC5347	1.375 (35)	0.75 (19.0)	8 (203)	HS5157	8.34 (136.6)	N/A
PIVOT MOUNT	HC5348	1.375 (35)	0.75 (19.0)	8 (203)	HS5157	8.34 (136.6)	N/A
PIVOT MOUNT	HC5358	1.375 (35)	0.75 (19.0)	8 (203)	HS5157	8.34 (136.6)	N/A
FRONT MOUNT	HC5342	1.262 (32.56)	0.75 (19.0)	10 (254)	HS5157	8.13 (133.2)	N/A
SIDE MOUNT	HC5370	1.25 (31.7)	0.50 (12.7)	8 (203)	HS5153	8.3 (135.2)	N/A
SPLASHWELL MOUNT	HC5380	1.25 (31.7)	0.50 (12.7)	9 (228)	HS5155	9.3 (152.1)	N/A
CATAMARAN O/B	HC5343	1.262 (32.0)	0.75 (19.0)	10 (254)	HS5157	8.13 (133.2)	N/A
CATAMARAN O/B	HC5374	1.50 (38.1)	0.75 (19.0)	10 (254)	KS-06	13.3 (217.95)	8990 (103.8)
HYNAUTIC	K-5	1.50 (38.1)	0.875 (22.2)	9.0 (229)	KS-15	15.9 (260.5)	10790 (124.6)
HYNAUTIC	K-8	2.50 (63.5)	1.000 (25.4)	9.5 (241)	KS-18	39.2 (642.4)	26575 (306.9)
HYNAUTIC	K-9	2.50 (63.5)	1.000 (25.4)	14.5 (368)	KS-18	55.0 (901.3)	39850 (460.2)
HYNAUTIC	K-18	1.25 (31.7)	0.625 (15.9)	7.0 (178)	KS-02	7.0 (114.7)	5972 (68.8)
HYNAUTIC	K-19	1.25 (31.7)	0.625 (15.9)	9.0 (229)	KS-02	9.0 (147.5)	7685 (88.54)
HYNAUTIC	K-22	1.50 (38.1)	0.750 (19.0)	10.0 (254)	KS-04	13.3 (217.9)	8990 (103.8)
HYNAUTIC	K-27	1.50 (38.1)	0.750 (19.0)	10.0 (254)	KS-04	13.3 (217.9)	8990 (103.8)
HYNAUTIC	K-31	2.00 (50.8)	0.875 (22.2)	10.0 (254)	KS-05	25.5 (417.9)	17320 (200.0)
TOURNAMENT SERIES	HC6750	1.375	0.75 (19.0)	8 (203)	HS5157	8.3 (135.2)	N/A
TOURNAMENT SERIES	HC6751	1.375	0.75 (19.0)	8 (203)	HS5157	8.3 (135.2)	N/A
TOURNAMENT SERIES	HC6752	1.375	0.75 (19.0)	8 (203)	HS5157	8.3 (135.2)	N/A
TOURNAMENT SERIES	HC6753	1.375	0.75 (19.0)	8 (203)	HS5157	8.3 (135.2)	N/A
TOURNAMENT SERIES	HC6754	1.375	0.75 (19.0)	8 (203)	HS5157	8.3 (135.2)	N/A
TOURNAMENT SERIES	HC6755	1.375	0.75 (19.0)	8 (203)	HS5157	8.3 (135.2)	N/A

NOTICE

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

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Benrock Inc. (Wholesale)
15233 E. Skelly Drive
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Oklahoma
74116
USA
Tel: (918) 437-2371 Fax: 800-544-5697
Toll Free: 800-643-9762
www.benrock.com

OREGON

Coast Distribution (Wholesale)
7914 S.E. 82nd Street
Portland
Oregon
97266
USA
Tel: (503) 777-3991 Fax: (503) 775-4989

Englund Marine Supply (Retail)
Foot of 15th Street, Box 296
Astoria
Oregon
97103
USA
Tel: (503) 325-4341 Fax: (503) 325-6421
Toll Free: 800-228-7051
e-mail: englund@pacifier.com
www.englundmarine.com

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

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

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

U.S. Distributing Inc. (Wholesale)
7911 N.E. 33rd Drive, Unit 140
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USA
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Toll Free: 800-621-3454

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1200 Lake Shore Road
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Pennsylvania
115541
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Tel: 814-267-3075 Fax: 814-267-3670
Toll Free: 800-726-3075
e-mail: blackburn@wpia.net

Coast Distribution (Wholesale)
175 Greenfield Road
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Pennsylvania
17601
USA
Tel: (717) 299-2501 Fax: (717) 295-7490

Keller Marine Service Routes 11 & 15
Port Trevorton
Pennsylvania
17864
USA
Tel: (717) 374-8169 Fax: (717) 374-5356

SOUTH CAROLINA

Donovan Marine
7289 Spa Road, Unit B
North Charleston
South Carolina
29418
USA
Tel: 904-786-3008 Fax: 800-582-9749
Toll Free: 800-865-5299
www.donovanmarine.com

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29405
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Lewis Marine Supply of Charleston
624 Marina Dr.
Charleston
South Carolina
29492
USA
Fax: 800-823-0311

McGill Distributing
1903 Longstreet Street
Kingstree
South Carolina
29556
USA
Tel: (803) 354-7404 Fax: (803) 354-3263

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Donovan Marine
603 Davidson Street
Nashville
Tennessee
37213
USA
Tel: (615) 834-8262 Fax: (615) 726-3696
www.donovanmarine.com

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76118
USA
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Donovan Marine Inc. (Wholesale)
3130 Pawnee
Houston
Texas
77054
USA
Tel: 713- 734-4171 Fax: (713) 734-1674
Toll Free: 800-669-8392
www.donovanmarine.com

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Corpus Christi
Texas
78469
USA
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Houston Marine Supply Co.(Wholesale)
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Houston
Texas
77003
USA
Tel: (713) 236-8190 Fax: (713) 236-0831

V & V Marine Products
6642 Baker Blvd.
Fort Worth
Texas
76118
USA
Tel: (817) 284-1125 Fax: (817) 284-1219

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Coast Distribution (Wholesale)
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Salt Lake City
Utah
84120
USA
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Land 'N' Sea Distributors (Wholesale)
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Norfolk
Virginia
23503
USA
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Toll Free: 800-446-8142
www.landnsea.net

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Virginia
23502
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Toll Free: 800-234-7290
www.paxtonco.com

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Coast Distribution Seattle (Wholesale)
5301 Shilshole Avenue, N.W.
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Washington
98107
USA
Tel: (206) 789-1500 Fax: (206) 784-6393

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

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

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Tel: (206) 632-4462 Fax: (206) 634-4600
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e-mail: mail@fisheriessupply.com
www.fisheriessupply.com

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Washington
98110
USA
Tel: 877-780-5670 Fax: 877-780-5673
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Everett
Washington
98201
USA
Fax: 425-259-7248
Toll Free: 800-824-0882

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Washington
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USA
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e-mail: kolstrand@msn.com
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e-mail: bellingham@lfsinc.com
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Bellingham
Washington
98225
USA
Tel: (360) 733-0250 Fax: (360) 733-7180
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e-mail: kevinp@reddeinc.com
e-mail: jima@reddeinc.com
www.reddeinc.com

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www.bellrpg.com

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Austria

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Fax: 00 43 5574 8990010

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Nijmegen - NL

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Fax: +31 (0) 24 3777770

e-mail: info@allpa.nl
www.allpamarine.com

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Gadstrup
Denmark

Tel: 00-45-4619-1166

Fax: 00-45-4619-1353

e-mail: columbus@columbus-marine.dk
www.columbus-marine.dk

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Hypro Marine
Mount Pleasant Lane
Lymington
Hampshire
SO41 8LS
England

Tel: 0044 590 681445

Fax: 0044 590 681446

e-mail: info.@hypromarine.co.uk
www.hypromarine.com

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Finland

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Fax: 00-358-9-251-31881

e-mail: marine@usparts.fi
www.usparts.fi

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France

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Fax: 00-33-491-460400

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Nijmegen - NL

Tel: +31 (0) 24 3777773

Fax: +31 (0) 24 3777770

e-mail: info@allpa.nl
www.allpamarine.com

GIBRALTAR

See Brunger Exports, Florida

GREECE

Motocraft SA
48 Alimou Ave
17455
Athens
Greece

Tel: +3010 98.88.288

Fax: +3010 98.50.102

e-mail: alexzeis@motocraft.gr
www.motocraft.gr

INTERNATIONAL

GUATEMALA

See Brunger Exports, Florida

HOLLAND

Allpa Marine Equipment
P.O. Box 6630 6503 GC Nijmegen- NL
Kerkenbos 10-15 6546 BB
Nijmegen
Holland
Tel: +31 (0) 24 3777773
Fax: +31 (0) 24 3777770
e-mail: info@allpa.nl
www.allpa.nl

HONG KONG

Holylight (HK) Trading Co.
Flat C., 11/F. Sing Teck Factory Building
44 Wong Chuk Hang Road
Aberdeen
Hong Kong
Tel: 00 852 2543 7048
Fax: 00 852 2543 6156
e-mail: coha@holylight.biz.com.hk

To Kee Marine Ltd.
NO. 8 B On Kui Street
On Lok Tsuen
Fanling, NT
Hong Kong
Tel: 00 852 2947 2921
Fax: 00 852 2947 2076
e-mail: tokeer@netvigater.com

Teleflex Morse Pte Ltd.
30 Pioneer Road
Singapore
628502

Tel: 65 6869 6439
Fax: 65 6869 3662
e-mail:
lkt.tfxmorse@pacific.net.sg

INDIA

Teleflex Morse Pte Ltd. Singapore
30 Pioneer Road
Singapore
628502
Tel: 65 6869 6439
Fax: 65 6869 3662
e-mail:
lkt.tfxmorse@pacific.net.sg

INDONESIA

Jasa Marine
Jl Malaka 2, No. 35
Jakarta 11230
Indonesia
Tel: 00 62 21 690 3130
Fax: 00 62 21 690 5615
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PD Sumber Marine
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Jakarta, 11110
Indonesia
Tel: 00 62 21 692 5436
Fax: 00 62 21 692 9234
e-mail: smmarine@centrin.net.id

Teleflex Morse Pte Ltd. Singapore
30 Pioneer Road
Singapore
628502
Tel: 00 65 686 13644
Fax: 00 65 686 13662
e-mail: lkt.tfxmorse@pacific.net.sg

IRELAND

Western Marine
Bulloch Harbour
Dalkey
County Dublin
Ireland
Tel: 00-353-128-00321
Fax: 00-353-128-00327
e-mail: marine@iol.ie

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Italy
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Fax: 00-390-39-6064371
e-mail: giuseppe.scarpino@yamaha-motor.it
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Via Beneficio 2, Tronco
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Italy
Tel: 00-390-544-965689
Fax: 00-390-544-965734
e-mail: svama-nautica@svama-nautica.com
www.svama-nautica.com

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JAPAN

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591-16, Janghang-Dong
Ilsan-Gu, Goyang-Si
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Korea
Tel: 82-31-907-6363
Fax: 82-31-903-1951
e-mail: saehan36@hanmir.com

Saehan Marine Co.
591-26, Janghang-Dong
Ilsan-Gu, Goyang-City
Gyungki-Do
Korea
Tel: 00 82 31 907 6363
Fax: 00 82 31 903 1951
e-mail: saehan36@paran.com

Saehan Marine
P.O. Box 232
Young Dong
Seoul
Korea
Tel: 00-822-542-6363
Fax 00-822-546-1951

Hwa Chang Trading Co.
726-420 Hannam-Dong, Yongsan-Gu
Seou
Korea
Tel: 00 822 7946-133
Fax: 00 822 7946-155
e-mail: hwachang@hwachang.com

Teleflex Morse Pte Ltd. Singapore
30 Pioneer Road
Singapore
628502
Tel: 65 6869 6439
Fax: 65 6869 3662
e-mail:
lkt.tfxmorse@pacific.net.sg

KUWAIT

See Brunger Exports, Florida

MALAYSIA

Teleflex Morse Pte Ltd. Singapore
30 Pioneer Road
Singapore
628502
Tel: 65 6869 6439
Fax: 65 6869 3662
e-mail:
lkt.tfxmorse@pacific.net.sg

MALTA

RGC Marine
1 Marine Louise Building
Garden Street
Tax'Biex
Malta
Tel: 00-356-319-338
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Lusty & Blundell
38 Tawa Drive
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1001
New Zealand
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Fax: 00-649-415-8304
e-mail: sales@lusty-blundell.co.nz
www.lusty-blundell.co.nz

NORWAY

Telma Control - A/P
P.O. Box 2906, Toyen
Rolph, hofmosgatan 18
Oslo
NO-0608
Norway
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628502
Tel: 65 6869 6439
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INTERNATIONAL

DISTRIBUTOR LIST

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e-mail: j.pires@krautli.pt
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Blk 3019 Ubit Road 1, 03-103
Singapore
408715
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Fax: 00 65 6745 5618
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Teleflex Morse Pte Ltd. Singapore
30 Pioneer Road
Singapore
628502
Tel: 65 6869 6439
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e-mail:
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Spain
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SRI LANKA

Teleflex Morse Pte Ltd. Singapore
30 Pioneer Road
Singapore
628502
Tel: 65 6869 6439
Fax: 65 6869 3662
e-mail:
lkt.tfxmorse@pacific.net.sg

SWEDEN

Jan Comstedt Ab
Box 12022
SE 402
41
Gothenburg
Sweden
Tel: 00-46-31-775-6530
Fax: 00-46-31-24-53-17
e-mail: info@comstedt.se
www.comstedt.se

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Switzerland
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e-mail: marineparts@pilatusnet.ch

TAIWAN

Matsu Shiyon Trading Co.
No. 19 Lane 100 Ho Pien Street
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Taiwan
Tel: 00 886 2 2975 4178
Fax: 00 886 2 2975 4238
e-mail: ms78.ms4628@msa.hinet.net

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No. 15 Chongshan Street
Siaogang District
81245 Kaohsiung
Taiwan
Fax: 00 886 7 813 32533-5
Toll Free: 00 886 7 813 3236
e-mail: mms46654@ms16.hinet.net

Teleflex Morse Pte Ltd. Singapore
30 Pioneer Road
Singapore
628502
Tel: 65 6869 6439
Fax: 65 6869 3662
e-mail:
lkt.tfxmorse@pacific.net.sg

THAILAND

Seat Pattaya Co. Ltd.
308/4 M. 12 Thappraya Road
Nongprue
Banglamung
Cholburi
20150
Thailand
Tel: 00 66 38 251637
Fax: 00 66 38 251 782
e-mail: seatboat@loxinfo.co.th

Teleflex Morse Pte Ltd. Singapore
30 Pioneer Road
Singapore
628502
Tel: 65 6869 6439
Fax: 65 6869 3662
e-mail:
lkt.tfxmorse@pacific.net.sg

TUNISIA

Majimpex
26 Av
Chedly
Zouiten
1082
Tunisia
Tel: 00-216-1-802617
Fax: 00-216-1-802617
e-mail: info@majimpex.com

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Vietnam
Tel: 00-84-8844-4297
Fax: 00-84-8843-9666

Teleflex Morse Pte Ltd. Singapore
30 Pioneer Road
Singapore
628502
Tel: 65 6869 6439
Fax: 65 6869 3662
e-mail:
lkt.tfxmorse@pacific.net.sg

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Ft. Lauderdale, FL 33312
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Ft. Myers, FL 33919
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Beltsville, MD 20705
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Boat America - Towson
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Towson, MD 21204
Tel (301) 296-0451

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OHIO

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TEXAS

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Tel (713) 880-2160

VIRGINIA

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Alexandria, VA 22304
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Norfolk, VA 23502
Tel (757) 461-3601

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

We will provide replacement product without charge, for any Teleflex Canada Limited Partnership product meeting this warranty, which is returned (freight prepaid) within the warranty period to the dealer from whom such products were purchased, or to us at the appropriate address. In any such case Teleflex Canada Limited Partnership products found to be defective and covered by this warranty, will be replaced or repaired at Teleflex Canada Limited Partnership's option, and returned to the customer.

Teleflex Canada Limited Partnership's sole responsibility under this warranty is limited to the repair or replacement of product which is, in Teleflex Canada Limited Partnership's opinion, defective. Teleflex Canada Limited Partnership is not responsible for charges connected with the removal of such product or re-installation of replacement or repaired parts.

We will have no obligations under this warranty for any product:

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- which has been used in an installation other than as recommended in our installation or operation instructions or specifications.
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- Which has been used on an engine/boat combination where the engine horsepower exceeds the boat horsepower rating established by the boat manufacturer.
- Which has been used with other products which, in Teleflex Canada Limited Partnership's opinion, are incompatible with the Teleflex Canada Limited Partnership product.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, OBLIGATIONS OR LIABILITIES ON THE PART OF TELEFLEX CANADA LIMITED PARTNERSHIP AND WILL BE THE CUSTOMER'S EXCLUSIVE REMEDY EXCEPT FOR ANY APPLICABLE IMPLIED WARRANTIES UNDER STATE LAW WHICH ARE HEREBY LIMITED IN DURATION TO TWO YEARS FROM THE DATE OF ORIGINAL PURCHASE. IN NO EVENT WILL TELEFLEX CANADA LIMITED PARTNERSHIP BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY RELATING TO THE PRODUCTS. Some states do not allow limitations on an implied warranty, or the exclusion of incidental or consequential damages, so the above exclusions may not apply to you. You may have other rights which vary from state to state.

If Teleflex Canada Limited Partnership products are to be returned to Teleflex Canada Limited Partnership under warranty, you must obtain a Return Goods authorization number (claim number) prior to shipping. Be sure to label the goods with:

- a) the name and address of the sender, and
- b) the return goods authorization number (claim number).

Please address the returned goods as follows:

From U.S.A.

RG# ?
Teleflex Canada
c/o UPS-SCS Warehouse
1927 Boblett Street
Blaine, WA 98230

From CANADA and Overseas:

RG# ?
Teleflex Canada
3831 No.6 Road
Richmond, B.C.
Canada V6V 1P6

Teleflex®

MARINE

TELEFLEX CANADA
3831 NO.6 ROAD
RICHMOND, B.C.
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500100 Issue 3

Electric/Hydraulic TT Thruster 140-300

GB

Owner's Installation, Operation &
Basic Servicing Manual



LEWMAR®

www.lewmar.com

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Introduction

Dear Customer,

Thank you for choosing Lewmar TT Thrusters. Lewmar products are world renowned for their quality, technical innovation and proven performance. With a Lewmar thruster you will be provided with many years of outstanding service.

Product support

Lewmar products are supported by a worldwide network of distributors and Authorised Service Representatives. If you encounter any difficulties with this product, please contact your national distributor, or your local Lewmar dealer. Details are available at:

www.lewmar.com

Important information about this manual

Throughout this manual, you will see safety and product damage warnings. You must follow these warnings carefully to avoid possible injury or damage.

The type of warnings, what they look like, and how they are used in this manual are explained as follows:

Warning!
This is a warning against anything which may cause injury to people if the warning is ignored. You are informed about what you must or must not do in order to reduce the risk of injury to yourself and others.

Safety Symbol
When you see the safety symbol it means: "Do not..."; "Do not do this"; or "Do not let this happen".

CE Approvals

For CE approval certificates contact Lewmar.

To the best of our knowledge, the information in this manual was correct when it went to press. However, Lewmar cannot accept liability for any inaccuracies or omissions it may contain. In addition, our policy of continuous product improvement may change specifications without notice. As a result, Lewmar cannot accept liability for any differences between the product and the manual.

Warning! This manual forms part of the product and **MUST BE RETAINED** along with, OR incorporated into, the Owner's Manual for the vessel to which the thruster is fitted.

Safety notices

General

Please ensure that you thoroughly understand the operation and safety requirements of the thruster before commencing the installation. Only persons who are completely familiar with the controls and those who have been fully made aware of the correct use of the thruster should be allowed to use it. If there is any doubt of how to install or operate this unit please seek advice from a suitably qualified engineer.

- Please ensure that you thoroughly understand the operation and safety requirements of the thruster.
- Your thruster should not be operated close to swimmers, as a powerful suction of water is generated when in use.
- The tunnel installation and any hull modifications should only be carried out by a specialist. This manual is based on a GRP tunnel installation.
- We recommend that a qualified person install the thruster. Faulty installation will place the boat and crew in danger and make the warranty invalid.
- It is the unavoidable responsibility of the owner or master or other responsible party to assess the risk of any operation on the vessel.

Thruster supply

- The thruster is securely packed for transit. However all parts should be inspected for signs of damage before installation. If any parts are found to be damaged please contact Lewmar.

Fitting

- This equipment must be installed and operated in accordance with the instructions contained in this manual. Failure to do so could result in poor product performance, personal injury and/or damage to your boat.
- Electric thrusters must be located in a dry environment. Should there be a need to install in a damp /wet location then the IP (Ignition Protected) version must be used.
- Electric bow thrusters use powerful electric motors, it is very important that there is sufficient battery capacity and large enough cables for safe operation. Using smaller than recommended battery and cables will cause loss of performance and may cause dangerous overheating.
- Electric motors spark and run hot. Do not place near flammable or sealed areas.
- Main battery must not be connected and power must not be switched on until all covers and terminal protectors are correctly fitted.
- It is very dangerous to run the thruster out of the water, even for a few seconds, the motor will over speed by 300%, causing damage to the motor seals etc. and the propeller will cause serious damage to whatever comes into contact with it. This action will invalidate the warranty.
- Consult the boat manufacturer if you have any doubt about the strength or suitability of the mounting location.

Electrical

- Make sure you have switched off the power before you start installing this product.
- If in doubt about installing electrical equipment please seek advice from a suitably qualified electrical engineer.

1. Installation

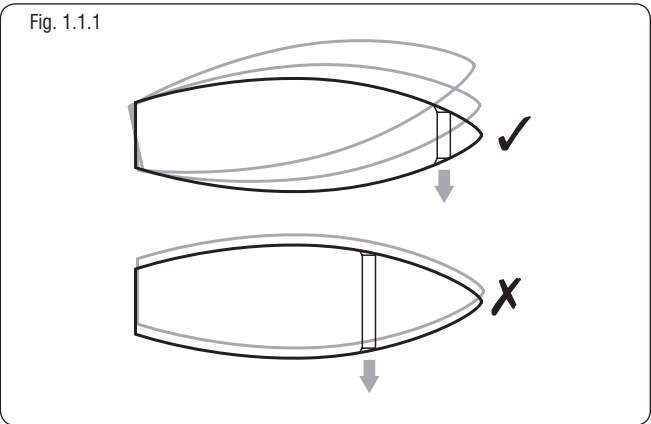
1.1 Choosing location

The actual position of the Thruster will depend on the internal & external construction of the Motor Boat or Sailing Yacht.

$\varnothing$ = Tunnel Diameter.

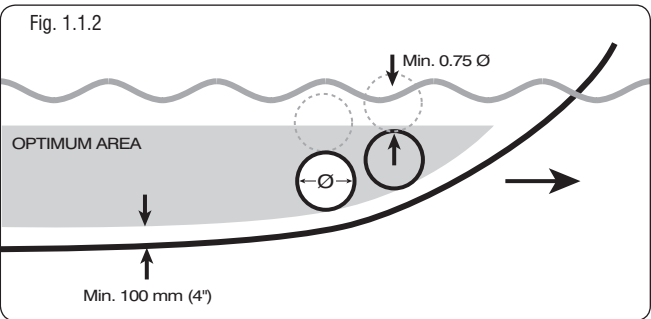
For optimal performance the Thruster should be mounted within the following:

- As far forward as possible (Fig 1.1.1 lever effect).



- 1 x $\varnothing$ below the waterline to prevent air being sucked into the tunnel. (Fig. 1.1.2 0.75 x $\varnothing$ minimum.).
- Minimum suggested tunnel length 2 x $\varnothing$.

NOTE: Ensure there is sufficient space for the Thruster assembly complete with motor and controls in the boat.



- TT Thruster can be fitted new or as a replacement for an existing thruster (see Fig 1.1.3).

NOTE: Check mounting holes on the saw template.

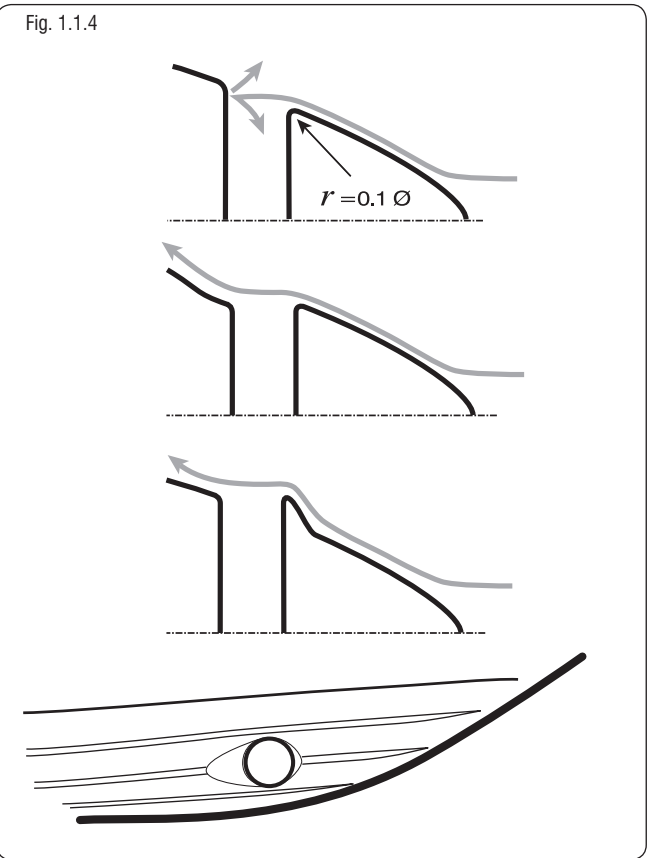
Fig. 1.1.3

Thruster Model (kW)	Thruster I.D. mm (inch)	Wall mm (inch)
140	140 (5 ¹ / ₂)	4.0 (5 ⁵ / ₃₂) - 5.0 (3 ³ / ₁₆)
185 (3.0 & 4.0)	185 (7 ⁹ / ₃₂)	4.0 (5 ⁵ / ₃₂) - 6.0 (1 ¹ / ₄)
185 (5.0 & 6.0)	185 (7 ⁹ / ₃₂)	6.0 (1 ¹ / ₄)
250	250 (9 ²⁷ / ₃₂)	7.5 (9 ⁹ / ₃₂)
300	300 (11 ¹³ / ₁₆)	9.0 (1 ¹¹ / ₃₂)

⚠ A competent, marine engineer must carry out any work on the hull of your boat.

⊘ The boat MUST be out of the water, levelled and secure in its cradle.

- The recommended tunnel is designed to fit a Lewmar saddle, take the weight of the Thruster and the torque of the motor.
- Fig 1.1.4 - To reduce any potential loss of performance or damage to the propeller the entrance of the tunnel can be altered to improve thrust as well as reduce noise.



1.2 Preparing the hole for the tube

⚠ This section is for general guidance for GRP boats only. Problems caused by faulty installation of the tunnel are the installers full responsibility. A competent, marine engineer must carry out any work on the hull of your boat.

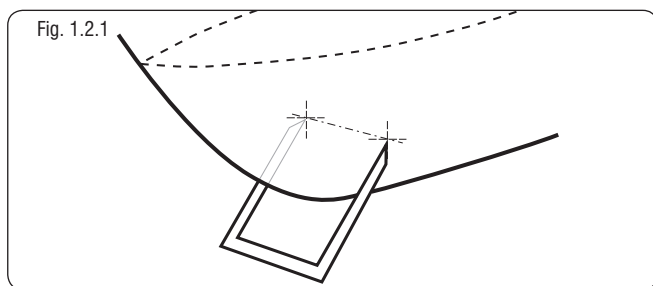
When you are satisfied the best location for the Thruster unit has been found within the parameters available proceed as follows.

- Fig 1.2.1 - Make a jig to precisely align the drill holes either side of the hull.

NOTE: Double check everything before drilling.

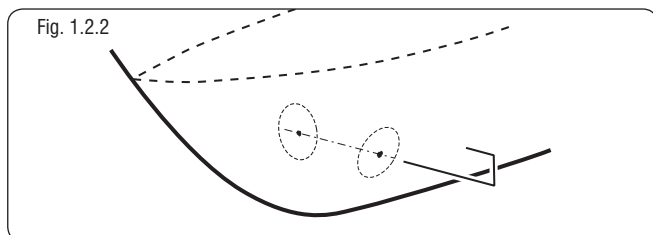
- Drill a pilot hole in both sides of the hull.

Fig. 1.2.1



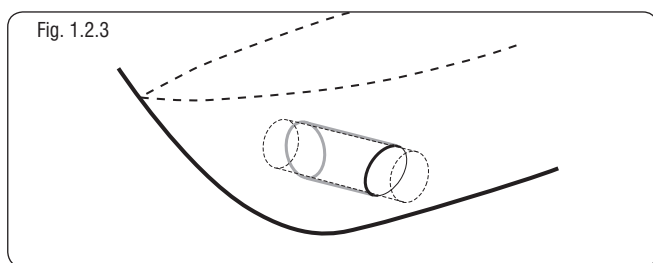
- Drill a pilot hole in both sides of the hull.

Fig. 1.2.2



- Form a wire guide to diameter of the tunnel hole, mark, check and cut.
- Insert tube in the hole, mark and remove excess.

Fig. 1.2.3

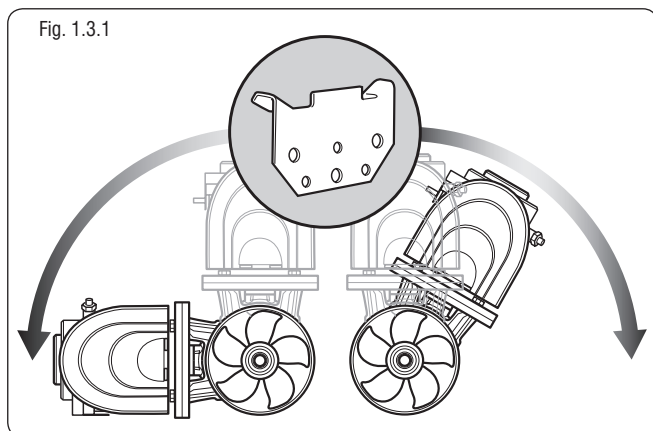


- Grind off gel coat etc. Insert tunnel and fix allowing enough room inside for saddle location on the tunnel.
Gel coat finished installation and antifoul.

1.3 Preparing for fitting the thruster

- The Thruster can be installed at any angle within 90° from vertical.

Fig. 1.3.1

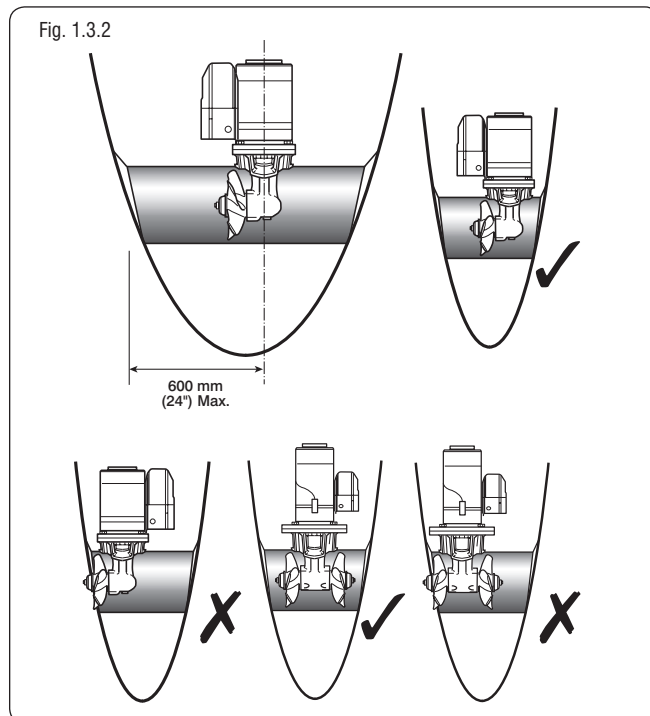


⚠ Electric motors must be supported if installed more than 30° from vertical (Fig 1.8.1).

- Choose position of thruster, ensuring internal room for motor and controls and that the propeller is easily reached from outside.

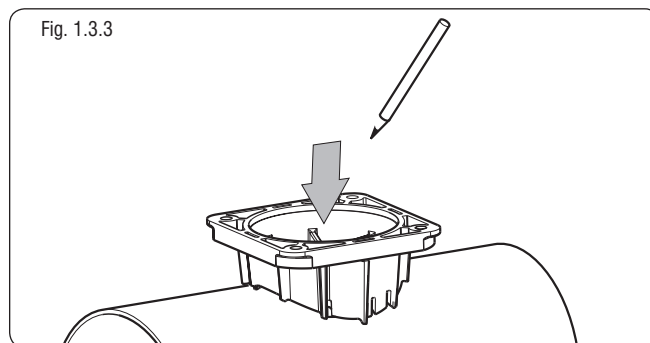
NOTE: Fig 1.3.2. - Normal install is to Port (single propeller unit)

Fig. 1.3.2



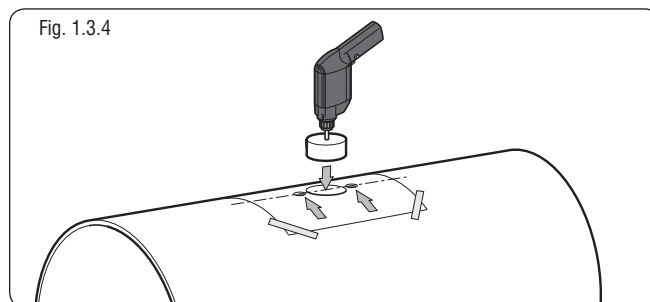
- Place the thruster saddle in the desired position, ensure the fit is firm and free from movement then mark centre.
- To aid installation a kit is available. See Sec 6.6 Accessories.

Fig. 1.3.3



- Position template on centre line, double check everything and drill. Remove all burrs. All the holes must be on the centre line. Poor alignment may affect hub positioning.

Fig. 1.3.4

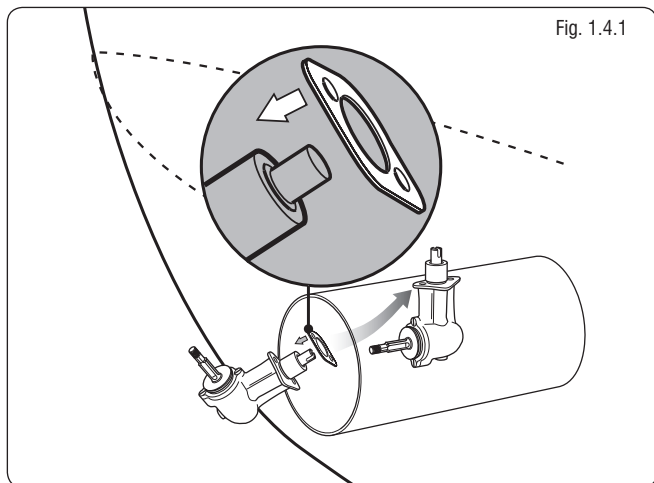


1.4 Installing hub unit and saddle models 140TT & 185TT

NOTE: Illustrations based on 140TT saddle.

- To suit the wiring configuration supplied fit the thruster propeller on the port side.
- Place gasket on hub and locate through centre hole. Sealant can be applied to gasket and flange to aid sealing.

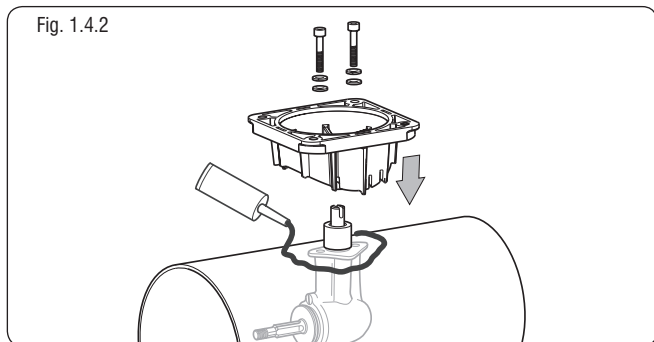
NOTE: To achieve the correct position of the propeller in the tunnel the gasket must be in place.



NOTE: Poor exterior tunnel surface could cause leakage and noise. Apply sealant to this area as required (Fig. 1.4.2).

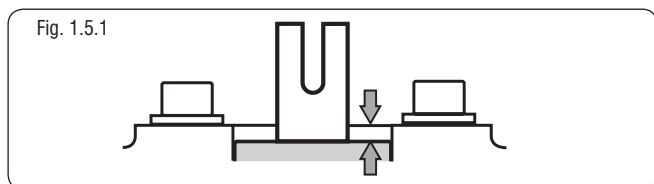
- Apply zinc chromate paste or marine grease to location bore and assemble saddle onto hub (SikaFlex® or similar maybe used to seal saddle in place). Apply Blue Loctite® 243 to bolts and hand tighten along with supplied washers (Fig. 1.4.2).

NOTE: Tighten to full torque within 10 minutes.



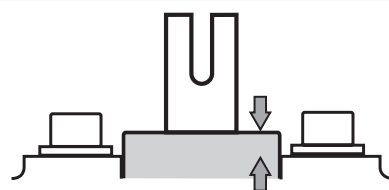
1.5 Gearbox position - 185TT only

- On installation check the position of the gearbox (leg) brass stem in the saddle.



- If it is below 2 mm ($\frac{1}{16}$ "), material must be removed from the tunnel (Fig 1.5.1).

Fig. 1.5.2

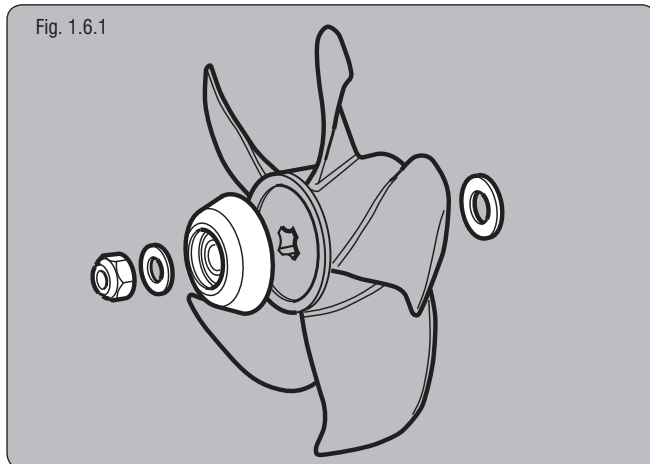


- If it is above 3.5 mm ($\frac{1}{8}$ "), the tunnel should be packed under the saddle (Fig 1.5.2).

1.6 Propeller assembly - all models

- Check the hub gasket is in place.
- Fig 1.6.1 - Assemble anode kit and propeller in this order:- large washer, propeller, anode, small washer and nyloc nut onto propeller shaft.

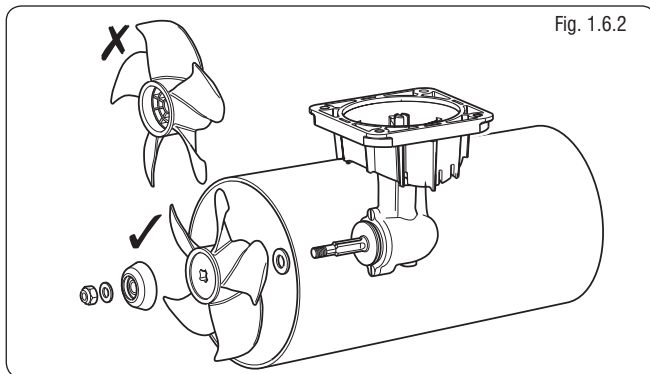
Fig. 1.6.1



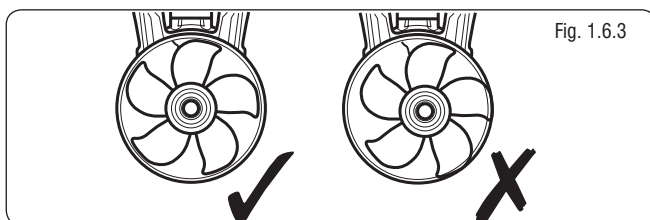
⚠ Check the propeller has been assembled in the correct order.

NOTE: Tighten each bolt alternately a number of times to full torque.

- Fig 1.6.2 - Tighten hub/saddle bolts to 9 Nm (6.6 lbs.ft) for 140 or 21 Nm (15.5 lbs.ft) for 185. Check that propeller is centred and free turning (within 10 minutes of applying Blue Loctite® 243).



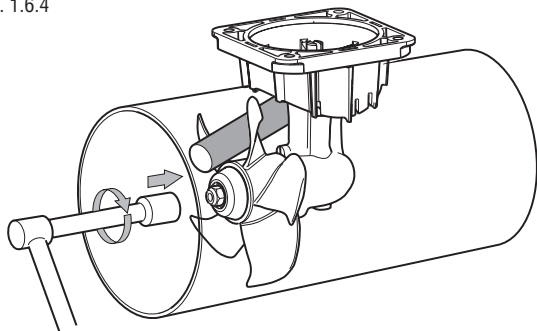
⚠ DO NOT allow propeller to touch tunnel.



⊘ **DO NOT** antifoul zinc anode.

- Antifoul bronze hub and propeller if desired.

Fig. 1.6.4



- Tighten propeller nut to 10 Nm (7.4 lbs.ft) for 140 or 15 Nm (11 lbs.ft) for 185, a length of wood placed between propeller blade and tunnel will stop movement.

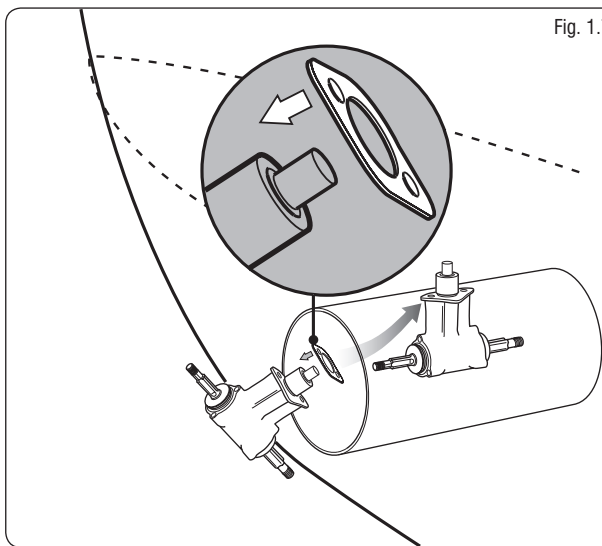
⊘ **DO NOT** overtighten propeller nuts.

1.7 Installing hub unit and saddle models 250TT & 300TT

- Place gasket on hub and locate through centre hole. Sealant can be applied to gasket and flange to aid sealing.

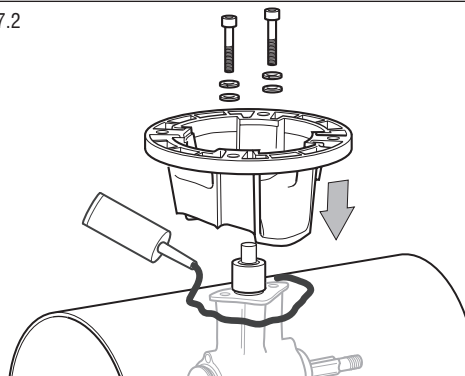
NOTE: To achieve the correct position of the propeller in the tunnel the gasket must be in place.

Fig. 1.7.1



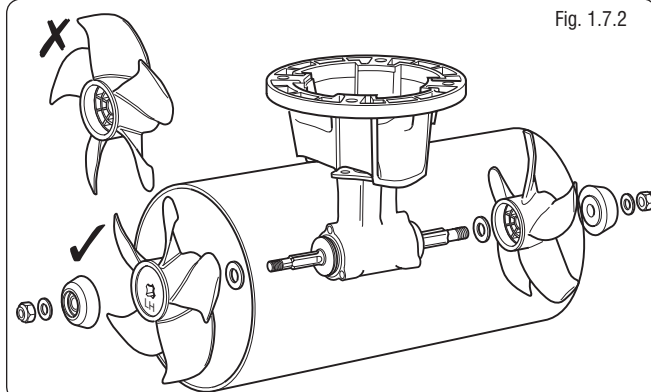
- **NOTE:** Poor exterior tunnel surface could cause leakage and noise. Apply sealant to this area as required (Fig 1.7.2).
- Apply zinc chromate paste or marine grease to location bore and assemble saddle onto hub (SikaFlex® or similar maybe used to seal saddle in place). Apply Blue Loctite® 243 to bolts and hand tighten along with supplied washers (Fig 1.7.2).
- **NOTE:** Tighten to full torque within 10 minutes.
- **NOTE:** Tighten each bolt alternately a number of times to full torque.
- Tighten hub/saddle bolts to 33 Nm (24 lbs.ft) for 250 or 82 Nm (60.5 lbs.ft) for 300. Check that propeller is centred and free turning (within 10 minutes of applying Blue Loctite® 243).

Fig. 1.7.2



- Assemble anode kit and propeller in this order:- large washer, propeller, anode, small washer and nyloc nut onto propeller shaft. To suit the wiring configuration supplied fit the thruster LH propeller on the port side.

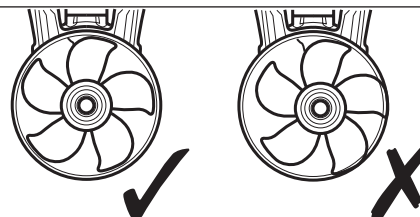
Fig. 1.7.2



⚠ Check the propeller has been assembled correctly (Fig 1.6.1).

⊘ **DO NOT** allow propeller to touch tunnel.

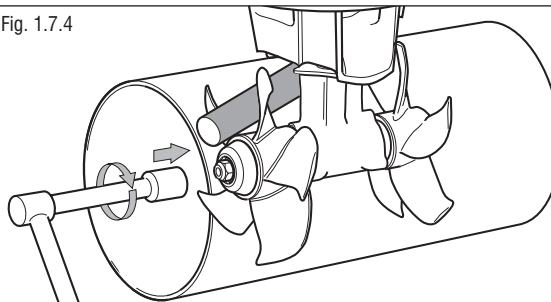
Fig. 1.7.3



⊘ **DO NOT** antifoul zinc anode.

- Antifoul bronze hub and propeller if desired.

Fig. 1.7.4

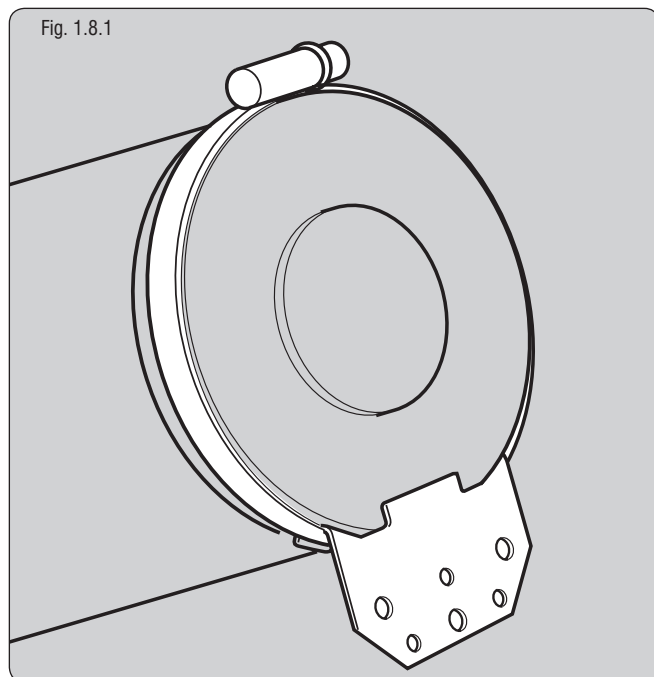


- Tighten propeller nut to 35 Nm (26 lbs.ft), a length of wood placed between propeller blade and tunnel will stop movement.

⊘ **DO NOT** overtighten propeller nuts.

1.8 Electric motor unit support

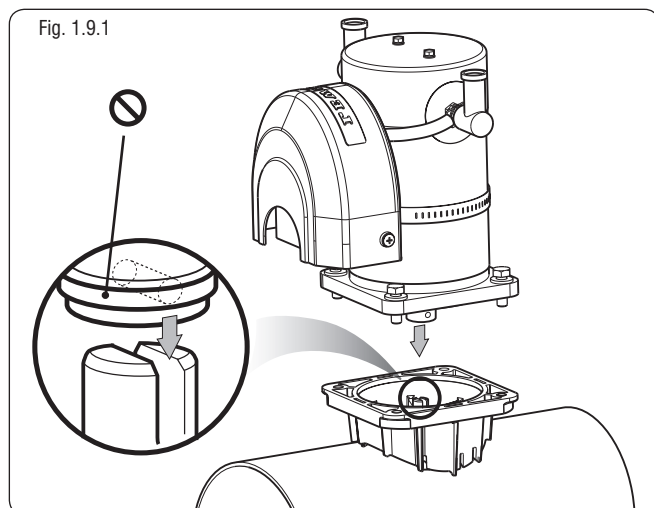
- If the electric motor is installed more than 30° from the vertical it **MUST** be supported and secured to the support with a strap (not supplied) around the main motor unit.



1.9 Installing electric motor unit model 140TT & 185TT

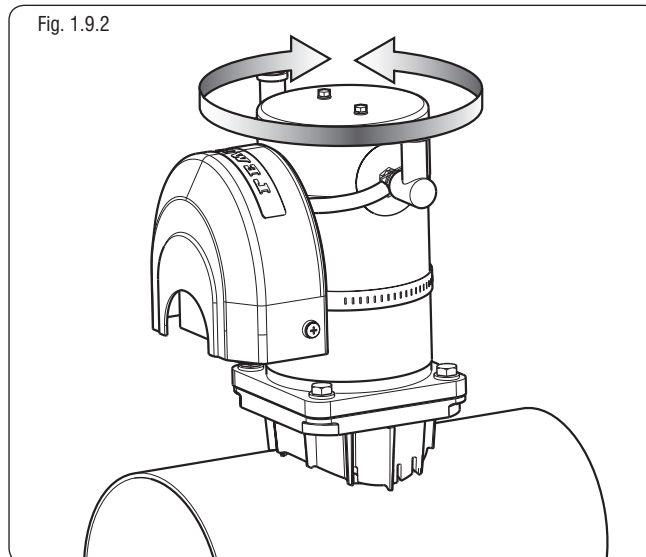
- **NOTE: Illustrations based on 140TT saddle.**
- Align motor drive pin inline with slot in shaft. Apply grease to hub shaft.

⊘ **DO NOT REMOVE** the drive pin plastic retainer tie on the motor drive shaft.



- Slide motor into position and align holes for most suitable installation.
- Bolt motor assembly to saddle and tighten bolts to 20 Nm (15 lbs.ft) for 140 or 35 Nm (25.8 lbs.ft) for 185. Apply Blue Loctite® 243 to all bolts.

Fig. 1.9.2

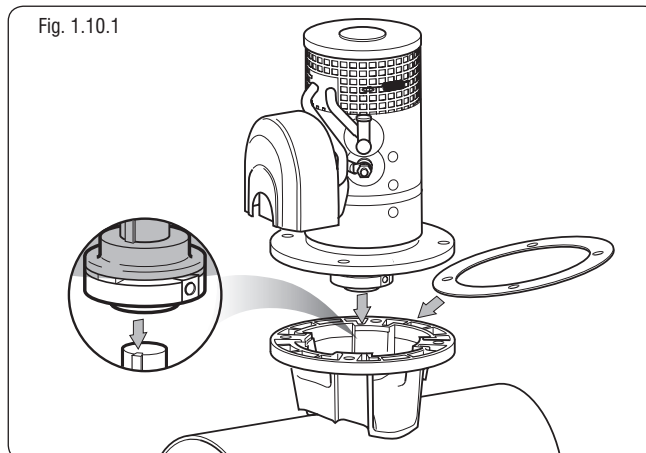


1.10 Installing electric motor unit model 250TT & 300TT

⊘ **Coupling is factory fitted. DO NOT remove.**

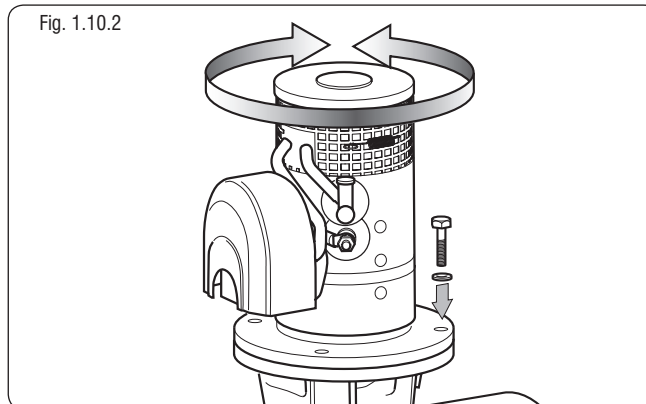
- Place insulator in between saddle and motor flange. Line up key to coupling keyway.

Fig. 1.10.1



- Remove drive shaft key retaining tie, grease shaft, slide motor into position and align holes for most suitable installation and bolt motor assembly to saddle applying Blue Loctite® 243 to bolts.

Fig. 1.10.2

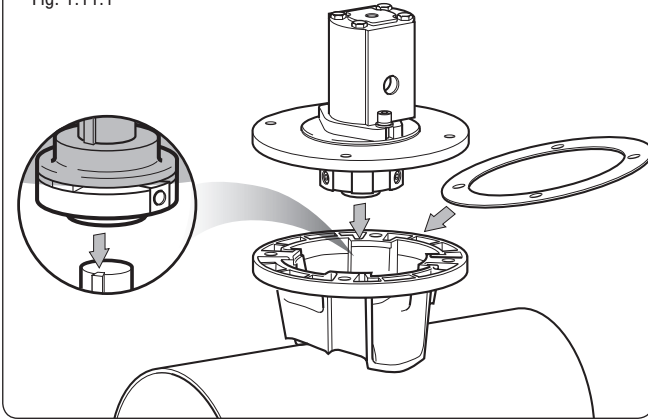


1.11 Installing hydraulic motor unit model 185TTH to 300TTH

⊘ Coupling is factory fitted. DO NOT remove.

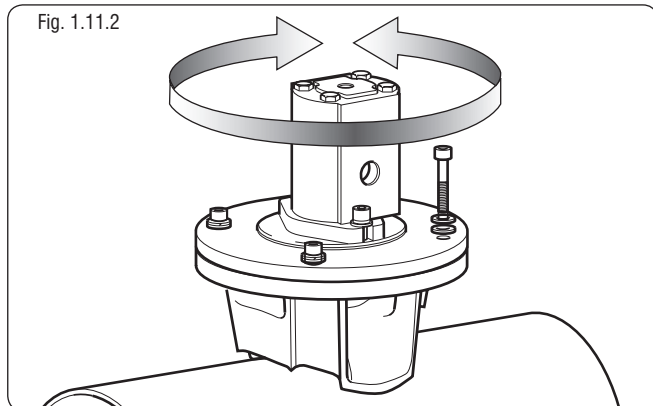
- Place insulator in between saddle and motor flange. Line up key to coupling keyway.

Fig. 1.11.1



- Remove drive shaft key retaining tie, grease shaft, slide motor into position and align holes for most suitable installation and bolt motor assembly to saddle and tighten.

Fig. 1.11.2



- Motor ports require male/female connectors with correct size hydraulic sealing washers.
185TT Main ports = $\frac{3}{8}$ " BSPP.
Main ports = $\frac{3}{4}$ " BSPP.
Drain ports = $\frac{1}{4}$ " BSPP.

NOTE: It is advisable to fit insulated pipe sections to prevent thruster corrosion.

Fig. 1.11.3

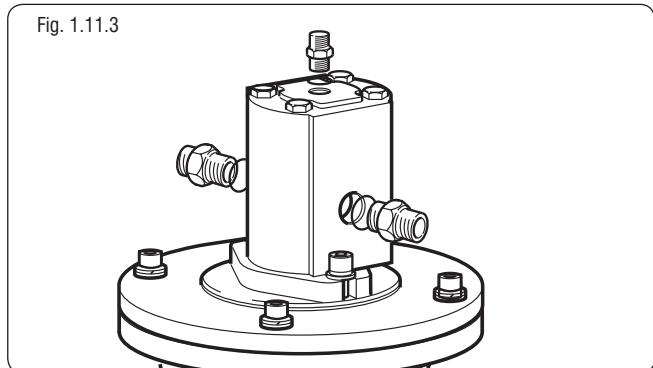


Fig. 1.11.4

Model	Part No.	Max. Output	Motor Disp.	DELTA	Flow	Max. Thrust
185TTH	591820	7 kW	6 cc/rev	210 bar	26 l/min	100 kgf
250TTH	592520	15 kW	26 cc/rev	122 bar	81.5 l/min	200 kgf
250TTH	592521	15 kW	17 cc/rev	190 bar	52.3 l/min	200 kgf
300TTH	593020	22.5 kW	30 cc/rev	182 bar	82.1 l/min	300 kgf
300TTH	593021	22.5 kW	26 cc/rev	210 bar	71.7 l/min	300 kgf

1.12 Final checks - All models

Check list hydraulic

- Check drain line fitted.
- All fittings are tight with seals in place.
- Hydraulic system has been checked and adjusted to correct pressures and flows.

Operation of Hydraulic unit

- Refer to system suppliers instructions.

Check list mechanical

- Check all bolts and nuts are tight.
- Check the propeller/s are correctly installed and the nuts tightened.
- Check the motor control box cover is in place.
- Check the propeller/s can be turned - before working on unit check battery switch is off or remove the fuse.

NOTE: Saddle and motor are firmly seated on the tube.

2. Electrical wiring installation

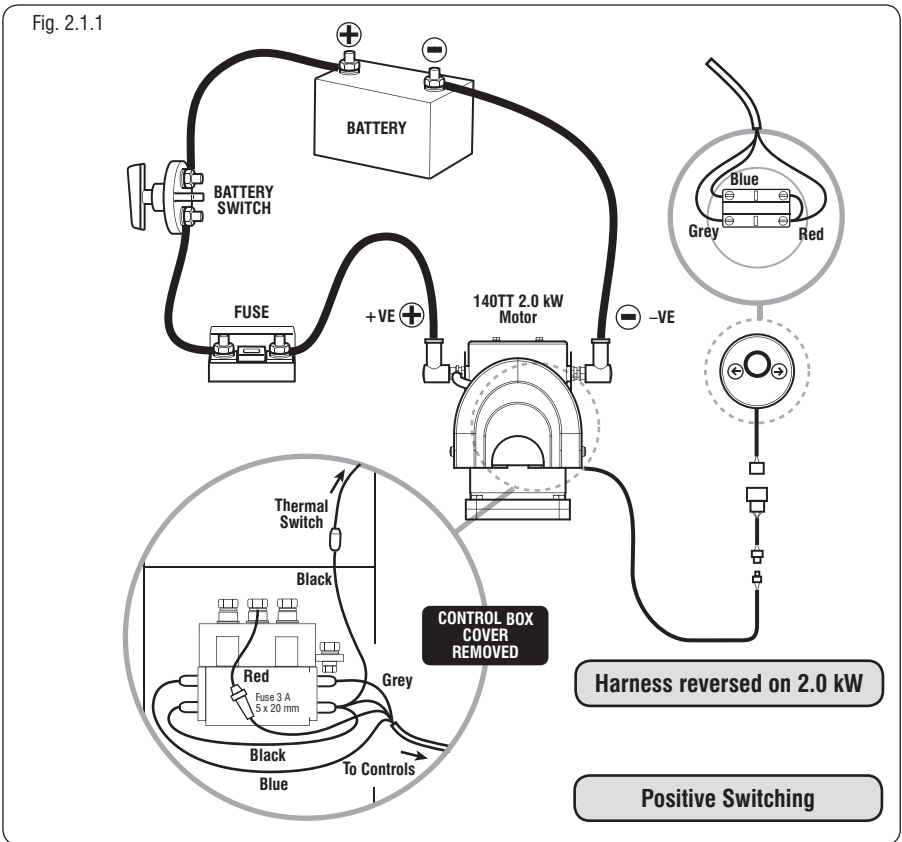
2.1 Typical electrical layout model 140TT 2.0 kW only

- If the thruster operates in an opposite direction to the control panel, swap the grey and blue wire connections on the contactor coils.

NOTE: Automatic battery switch can not be used with this product.

⚠ To satisfy International standards, a suitably sized battery switch should be fitted to the thruster +VE supply. Lewmar recommend this as best practice for safe installations.

Loom Wiring	
Red	+VE
Blue	Thrust port switch
Grey	Thrust starboard switch
Black	Not Used



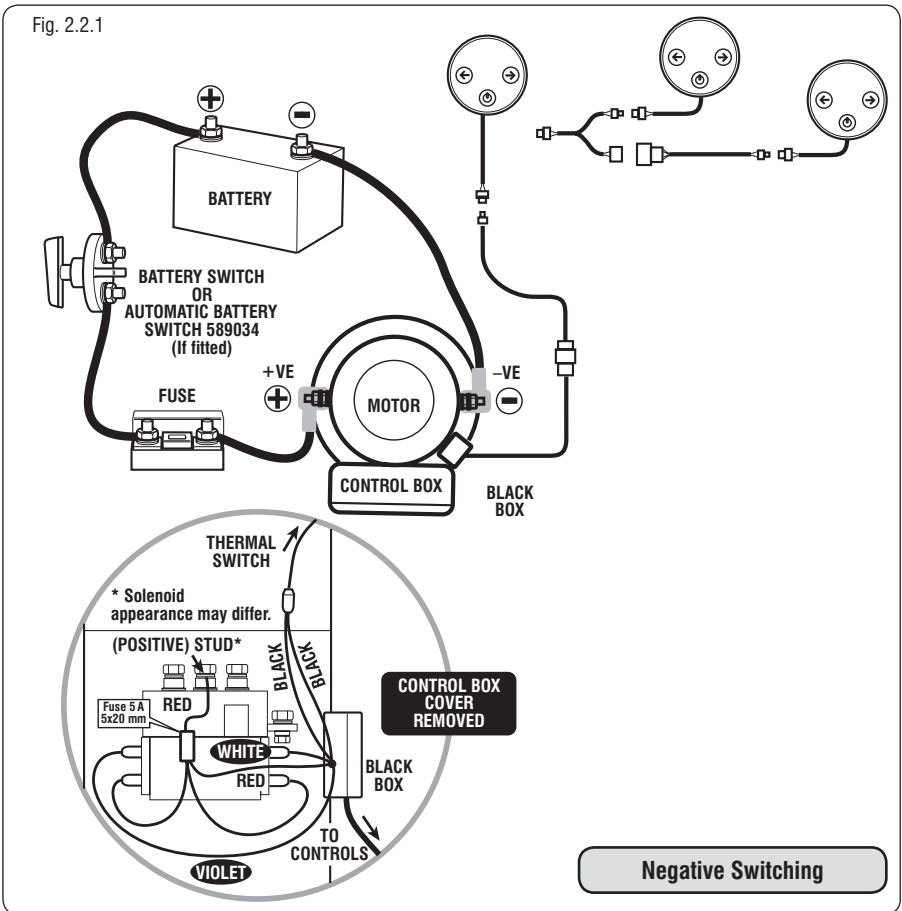
2.2 Typical electrical layout models 140TT 2.2 kW and 185TT

- If the thruster operates in an opposite direction to the control panel, swap the white and violet wire connections on the contactor coils.

NOTE: Automatic switch (if fitted). Main power is switched on when panel is switched on.

⚠ It is vital that the positive battery lead is connected to the positive motor terminal or damage to the electronics will occur.

Loom Wiring	
Red	+VE
Blue	Thrust port switch
Grey	Thrust starboard switch
Black	-VE



2.3 Typical electrical layout models 250TT & 300TT

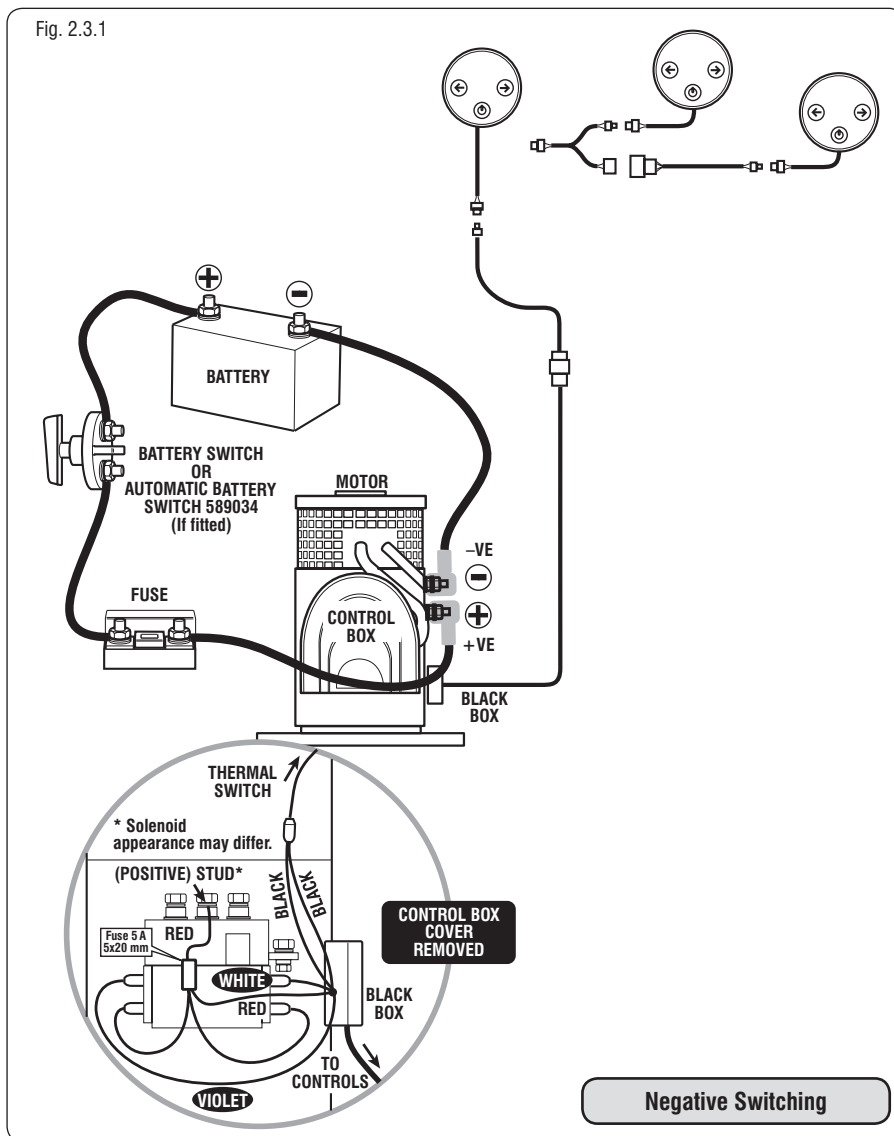
- If the thruster operates in an opposite direction to the control panel, swap the white and violet wire connections on the contactor coils.

NOTE: Automatic switch (if fitted). Main power is switched on when panel is switched on.

⚠ It is vital that the positive battery lead is connected to the positive motor terminal or damage to the electronics will occur.

Loom Wiring	
Red	+VE
Blue	Thrust port switch
Grey	Thrust starboard switch
Black	-VE

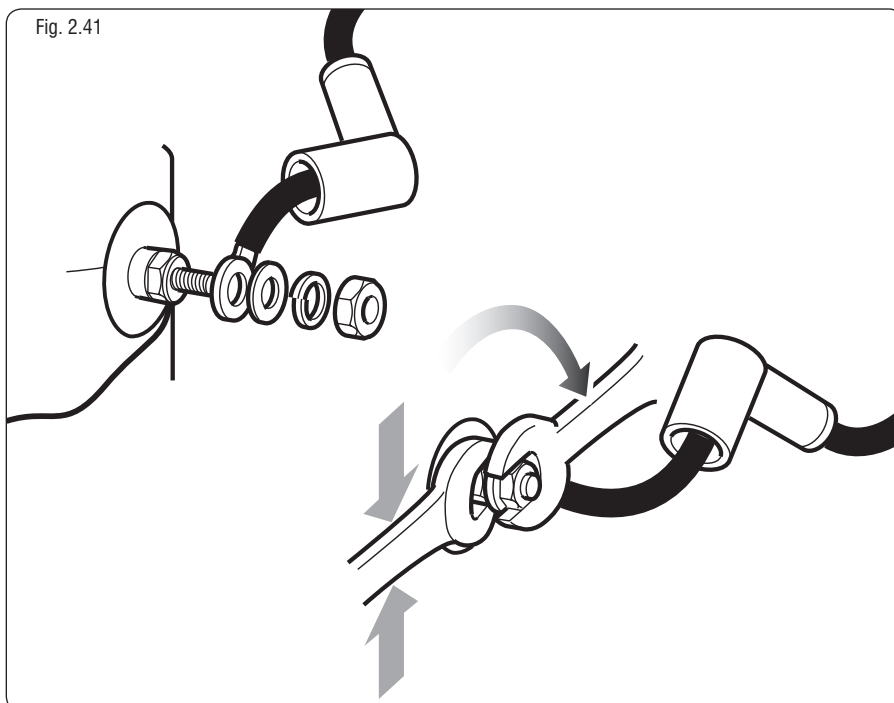
NOTE: For dual thruster controls see stern thruster manual included in sternkit or on www.lewmar.com



2.4 Electric motor terminal connections

- Terminals must be correctly clamped to motor studs. Use a pair of spanners - the one nearest motor to stop rotation of the stud.
- Spanner sizes are 13 mm for 140TT and 17 mm for 185TT - 300TT. Tighten the bolts to 20 Nm (15 lbs.ft).

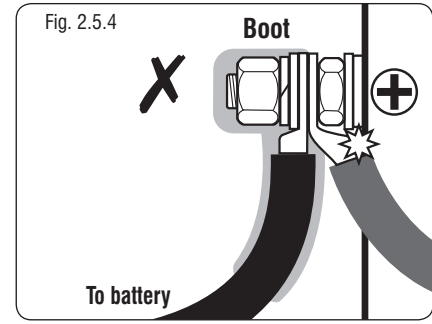
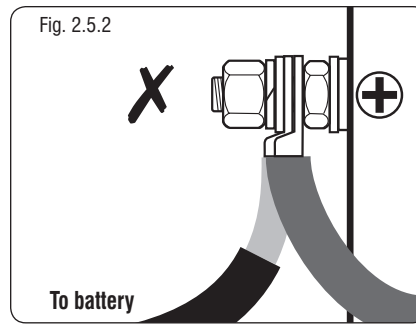
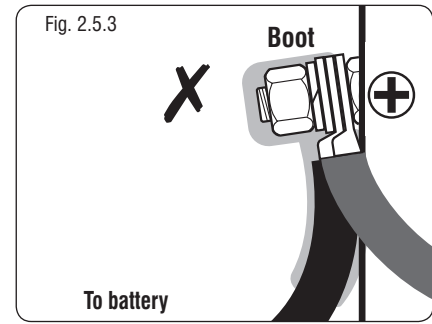
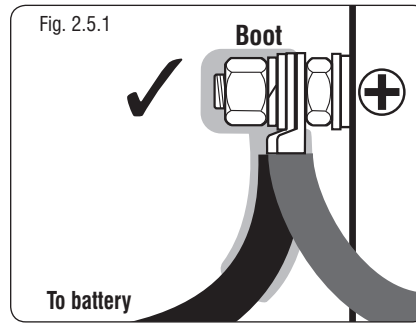
⚠ DO NOT overtighten electric motor terminal nuts.



2.5 Battery cable connections

⚠ Incorrect installation of battery cables or damage to connection studs may result in a short to the thruster body. Use the examples above to check for a correct installation on both +V and -V battery connections.

- Correct installation. Supplied cable boots are used and no bare wires exposed (Fig 2.6.1).
- Live wire exposed! (Fig. 2.6.2). Correct the cable installation to match (Fig 2.6.1).
- Terminal or motor is damaged. Contact Lewmar Limited (Fig 2.6.3).
- Crimp inverted and is touching motor! (Fig 2.6.4). Correct the cable installation to match as (Fig 2.6.1).



2.6 Correct cable sizes

NOTE: Cable length is total from battery to thruster and back.

- Example: Measure the total cable run from the battery to thruster and back in metres. Grey area on the table shows a total of 28 m (92 ft) of cable with a model 250 8.0 kW thruster would need 95 mm CSA (000 AWG) cable.
- Battery crank capacity should be at least equal to the thruster current.
- Main power cables should be run from the batteries and must have an inline fuse fitted.

⚠ The installation MUST have a battery switch that is switched off whilst the thruster is not in use or the boat is unoccupied.

- The cables should be terminated with a ring terminal corresponding to the motor studs, 8 mm ($\frac{5}{16}$ "") for 140TT and 10 mm ($\frac{3}{8}$ "") for 185TT, 250TT and 300TT. It is important that this termination is secure so that the high current is transferred to the motor efficiently. The minimum voltage at motor when running should be 10 V for 12 V and 21 V for 24 V units.
- Ensure the insulating boots, supplied with the unit, are correctly fitted.

NOTE: If very large cables are used discard supplied boots and fit appropriate sized ones.

CABLE CSA mm - Cable length in metres									
TT Model	Current (A)	25	35	50	70	95	120	150	175
140 2.0 kW-12 V	270	6	10	16	22	-	-	-	-
140 2.2 kW-12 V	280	6	10	15	21	-	-	-	-
185 3.0 kW-12 V	330	6	8	10	15	21	-	-	-
185 3.0 kW-24 V	160	18	22	-	-	-	-	-	-
185 4.0 kW-12 V	470	4	6	8	12	16	21	26	30
185 4.0 kW-24 V	235	12	16	25	33	-	-	-	-
185 5.0 kW-12 V	480	4	6	8	12	16	20	25	29
185 5.0 kW-24 V	240	12	16	24	32	-	-	-	-
185 6.0 kW-12 V	700	-	-	6	8	12	15	21	28
185 6.0 kW-24 V	370	9	12	16	24	32	-	-	-
250 8.0 kW-24 V	500	7	10	12	21	28	36	45	-
250 9.6 kW-48 V	330	-	26	37	50	64	-	-	-
300 10.8 kW-24 V	650	4	6	9	12	16	21	25	30
300 15.0 kW-48 V	420	-	24	35	48	62	-	-	-

CABLE AWG - Cable length in feet									
TT Model	Current (A)	3	2	1	0	00	000	0000	2x0000
140 2.0 kW-12 V	270	20	31	42	53	64	-	-	-
140 2.2 kW-12 V	280	20	30	40	50	60	-	-	-
185 3.0 kW-12 V	330	19	24	30	37	49	62	-	-
185 3.0 kW-24 V	160	63	80	-	-	-	-	-	-
185 4.0 kW-12 V	470	14	18	23	30	38	48	60	-
185 4.0 kW-24 V	235	42	50	68	80	100	-	-	-
185 5.0 kW-12 V	480	14	18	23	29	37	47	59	-
185 5.0 kW-24 V	240	42	50	68	80	100	-	-	-
185 6.0 kW-12 V	700	-	13	16	21	28	35	50	100
185 6.0 kW-24 V	370	-	37	45	60	74	97	-	-
250 8.0 kW-24 V	500	-	32	41	52	66	84	105	-
250 9.6 kW-48 V	330	-	80	98	118	154	-	-	-
300 10.8 kW-24 V	650	-	19	24	31	39	49	65	130
300 15.0 kW-48 V	420	-	74	92	112	148	-	-	-

2.7 Electrolytic test

- ⚠ To prevent electrolytic corrosion or faults, the thruster motor body and assembly **MUST** remain isolated from any power supply or grounds. The installer can check for this using a multimeter in the following ways.

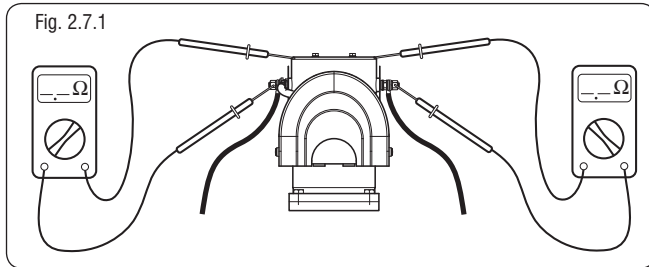
• Test 1. Fig.2.7.1

With the negative not connected and the positive cable connected but with battery switch off or fuse removed. Use a continuity tester to check for a connection between the -VE stud and motor body and also between +VE stud and motor body. In both cases the meter should give no indication of an electrical connection.

If a connection is measured between the +VE stud and the motor body, check installation for cables or wires touching the assembly or for damage to assembly.

If a connection is measured between the -VE stud and the motor body, remove any bonding straps attached to the assembly and check as before.

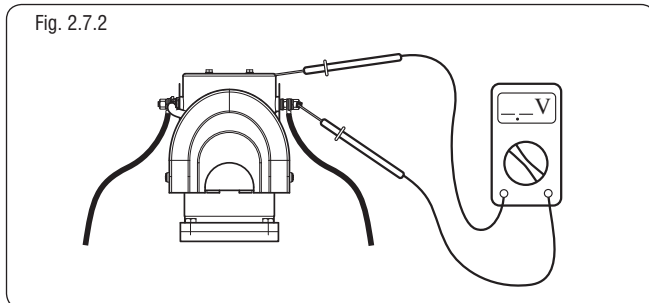
Fig. 2.7.1



• Test 2. Fig 2.7.2

With the battery applied: Use a voltmeter to test the voltage between the -VE motor stud and the thruster motor body. If the supply voltage (12 V/24 V) is measured, disconnect power immediately and inspect the assembly for faulty installation or damage.

Fig. 2.7.2



2.8 Installing control panel - all models

- A 63.5 mm (2 1/2") hole saw is required. Ensure there is sufficient depth for the control panel and access for the switch leads and plug (see saw template).

Fig. 2.8.1

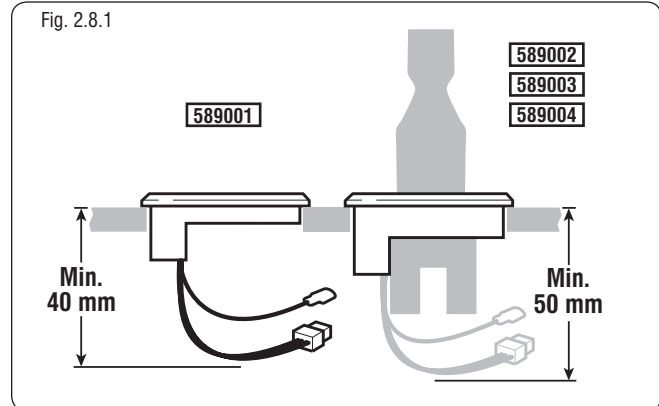
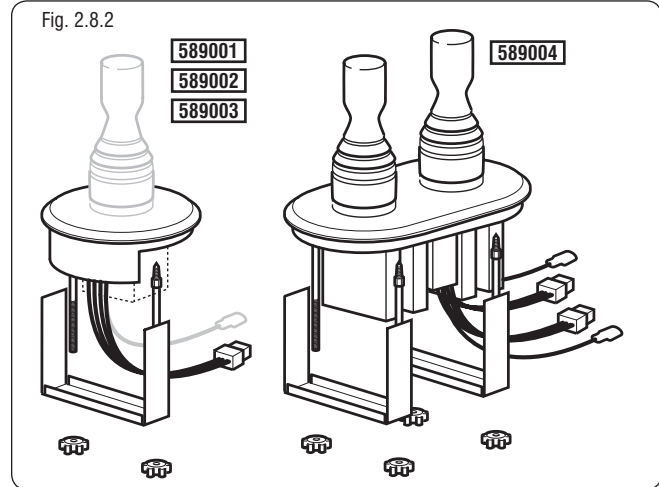
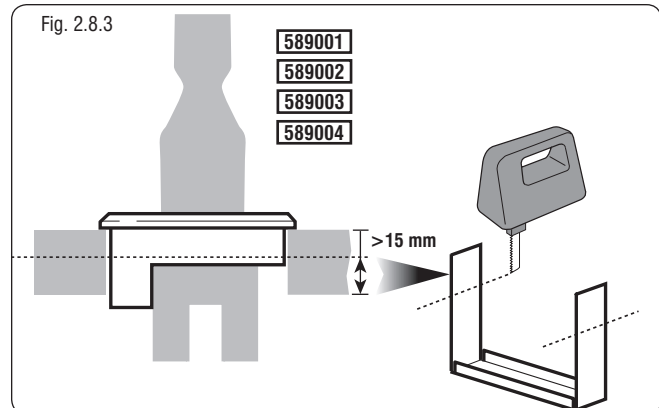


Fig. 2.8.2

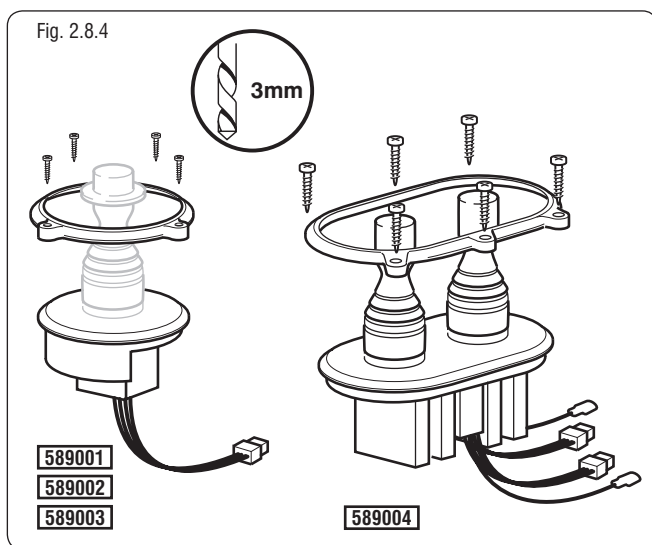


- The panel has an integral seal and can be clamped from the rear or with the bezel from the top. Trim clamp depending on panel thickness.

Fig. 2.8.3



- The small plug connects at the panel. If two or more panels are installed use the optional Y connectors (Sec 6.6).
- The auxiliary wire is used to connect an automatic battery switch. Please refer to the units instructions. If automatic battery switch not fitted, disregard auxiliary wire.



2.9 Final checks

Check list electrical

⚡ Check the power is OFF.

- Check motor connections are tight with rubber boots in place.
 - The correct fuse is in place.
 - Check all switch wires are connected to correct motor terminal.
- Now the cables can be connected to the battery.
- Perform electrical check , Section 2.8.

Operation of electrical unit

⚠ The thruster must not be operated unless it is in water.

- Ensure batteries are fully charged before switching on the main power.
- When first operating the thruster, make sure you are not close to other vessels.

3. Operating your thruster

3.1 140TT 2.0 kW

The thruster can be operated using the Lewmar locking joystick (Part No. 589003) or any water proof momentary two direction switch with a 5 amp rating.

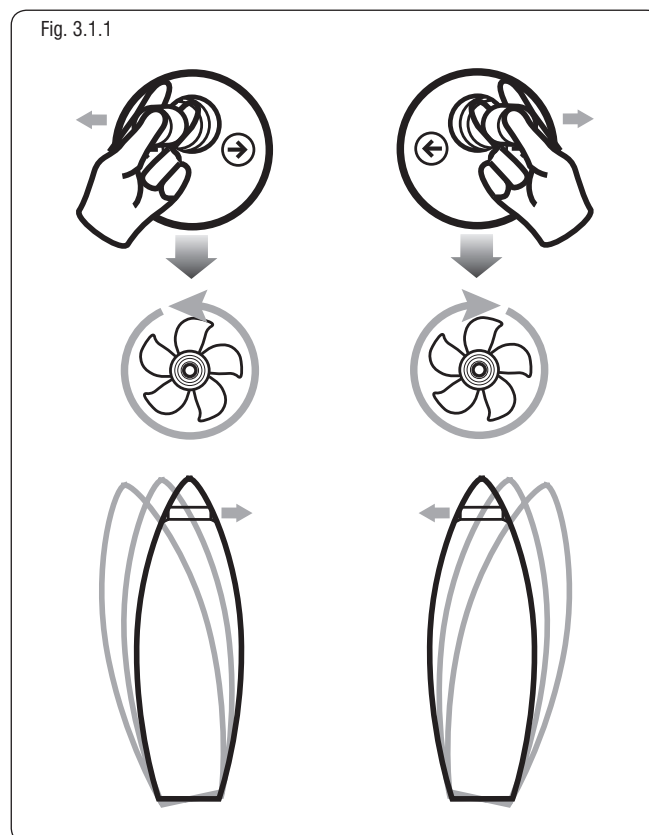
- Switch ON the battery switch.
- Lift the 'top hat' and move the joystick in the desired direction. When the boat movement has been achieved return the joystick to the central position (spring return).

⚡ DO NOT frequently move port to starboard on the joystick in quick succession as this could damage the electric motor.

⚠ Please ensure that you thoroughly understand the operation and safety requirements of the thruster.

⚠ Your thruster should not be operated close to swimmers, as a powerful suction of water is generated when in use.

Fig. 3.1.1

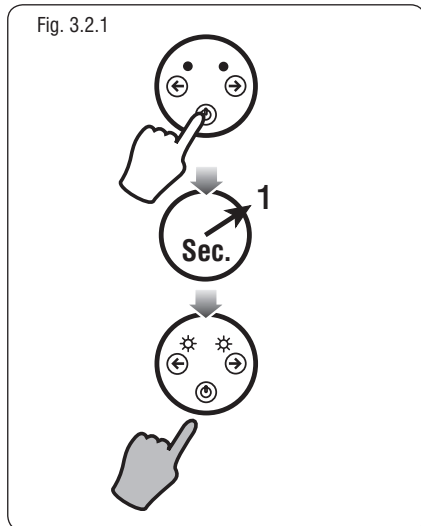


3.2 140TT 2.2 kW to 300TT 15.0 kW operation and safety features

Safety Features

- Lewmar control panel 589001 and 589002.
- NOTE: If Thruster is operated constantly for 3 minutes it will power down. Panels will deactivate.**
- NOTE: Dual Thruster panel has same functions as single.**
- NOTE: The system is designed to automatically power down after no operation for 20 minutes.**
- To activate the control panel press  and hold for 1 second (Fig 3.2.1).

Fig. 3.2.1

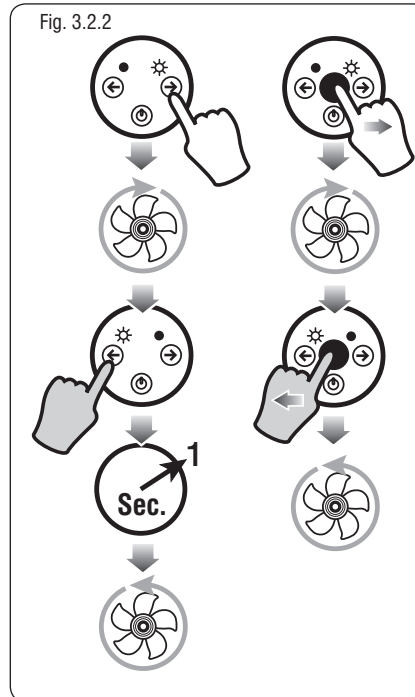


Changing direction.

Press the button or move the joystick for the direction you wish to thrust. Press the opposite button or move the joystick to change direction (Fig 3.2.2). After 1 second thruster activates.

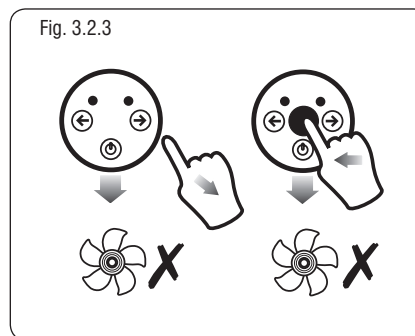
NOTE: If thermal cut-out is activated all power to the controls is disabled. Wait for unit to cool down.

Fig. 3.2.2



- To cancel either thruster direction stop pressing button or return joystick to central position (Fig 3.2.3).

Fig. 3.2.3

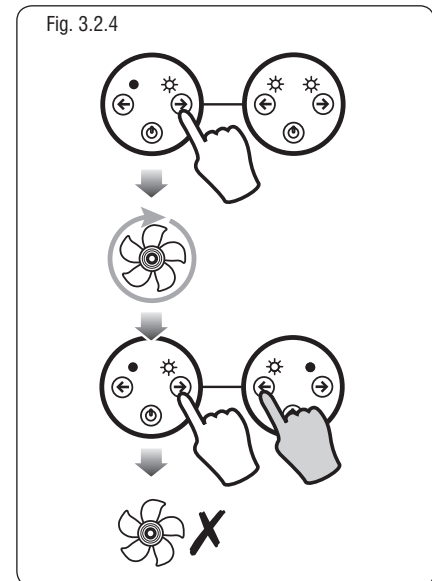


 **DO NOT** press both buttons at the same time.

Additional controller

Pressing opposite button on a second control panel when thruster is operating will cancel operation of thruster (Fig 3.2.4).

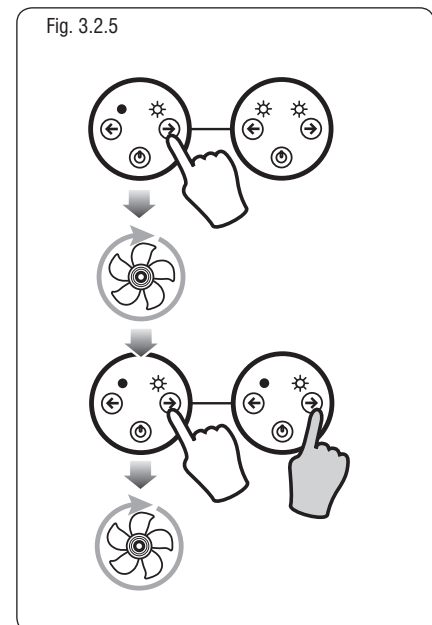
Fig. 3.2.4



Additional controller

Operating same direction button when still in operation on other control panel will have no effect (Fig 3.2.5).

Fig. 3.2.5



4. Servicing your thruster

4.1 Service schedule

NOTE: Thrusters are more likely to attract 'debris', so it is necessary to regularly check the tunnel.

⚠ Before working on unit check battery switch is off or remove the fuse.

New install:

- The anode should be checked after approximately 3 - 4 months to gauge an appropriate replacement schedule. .

At the annual boat service:

- Remove any debris from tunnel, propeller and hub.
- Replace the anode.
- If the propeller is damaged or heavily contaminated, replace it, best to be safe.
- Apply grease to exposed thruster seal and shaft.
- If hub is removed the tunnel gasket must be replaced.
- Inspect motor, ensure all leads are still tight.
- Check all bolts and nuts are to correct torque.
- Check the motor assembly is dry and that the compartment is water tight.
- Check and clean out thruster compartment.

Electric:

- Inspect electric motor, ensure all leads are still tight.
- Brush out carbon dust from top of electric motor especially on aluminium boats. Recommend qualified electrician.

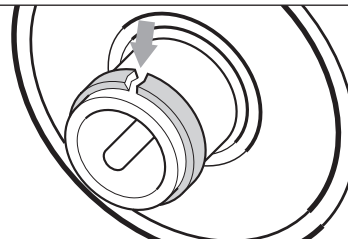
Hydraulic:

NOTE: Refer to hydraulic system supplier for service requirements.

4.2 Changing drive pin 140TT or 185TT

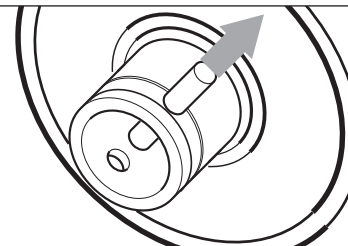
- Cut cable tie on shaft - (If Fitted)

Fig. 4.2.1



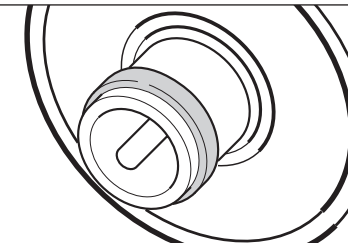
- Punch out pin parts.

Fig. 4.2.2



- Tap in new pin and secure with new plastic cable tie.

Fig. 4.2.3



5. Weight & specifications

5.1 Electric

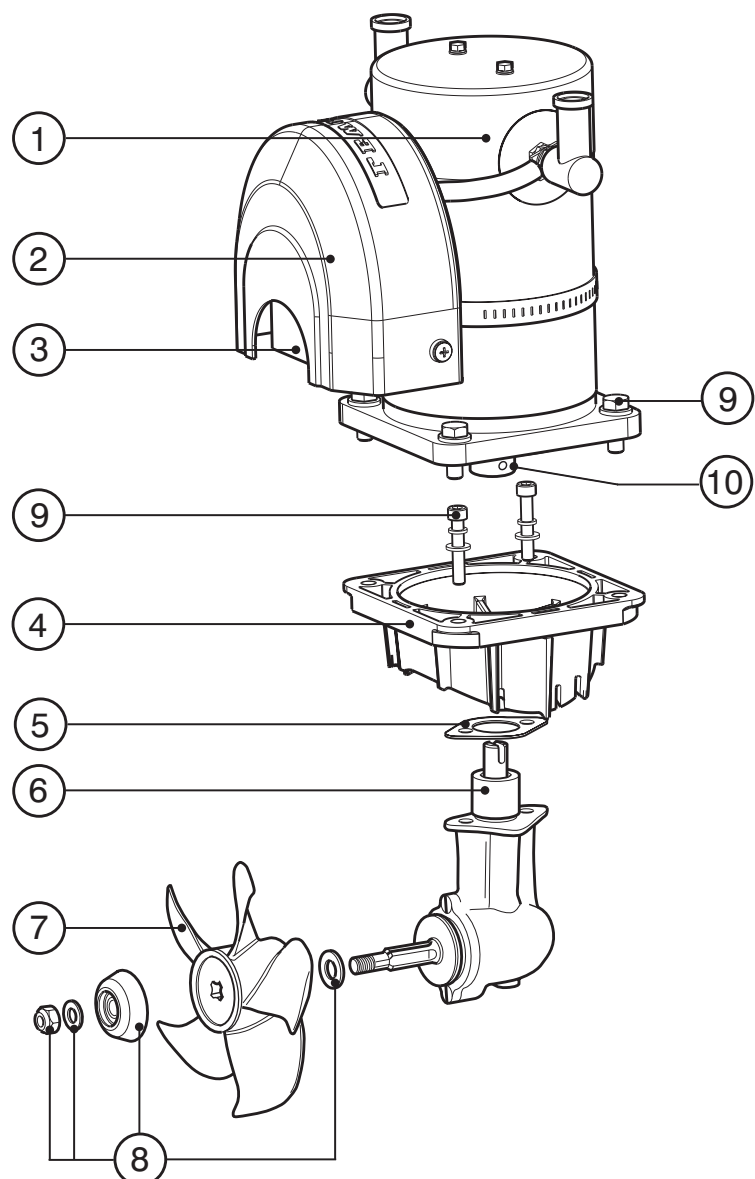
Part Number	Model	Voltage V	Power		Gearbox Mtl	Tunnel (mm)	Propeller	Thrust		Weight	
			kW	hp				kgf	lbs	kg	lbs
591402	140TT 2.0	12	2.0	2.7	Bronze	140	Single 5 Blade	37	81	13	29
591401	140TT 2.2	12	2.2	3.0	Bronze	140	Single 5 Blade	42	92	13	29
591801	185TT 3.0	12	3.0	4.0	Bronze	185	Single 5 Blade	58	128	20	43
591802	185TT 3.0	24	3.0	4.0	Bronze	185	Single 5 Blade	58	128	20	43
591807	185TT 4.0	12	4.0	5.4	Bronze	185	Single 5 Blade	65	143	20	43
591808	185TT 4.0	24	4.0	5.4	Bronze	185	Single 5 Blade	65	143	20	43
591803	185TT 5.0	12	5.0	6.7	Bronze	185	Single 5 Blade	82	180	27	59
591804	185TT 5.0	24	5.0	6.7	Bronze	185	Single 5 Blade	82	180	27	59
591805	185TT 6.0	12	6.0	8.0	Bronze	185	Single 5 Blade	97	213	27	59
591806	185TT 6.0	24	6.0	8.0	Bronze	185	Single 5 Blade	97	213	27	59
591833	185TT 5.0	12 IP	5.0	6.7	Bronze	185	Single 5 Blade	82	180	27	59
591834	185TT 5.0	24 IP	5.0	6.7	Bronze	185	Single 5 Blade	82	180	27	59
591836	185TT 6.0	24 IP	6.0	8.0	Bronze	185	Single 5 Blade	97	213	27	59
592501	250TT 8.0	24	8.0	10.8	Bronze	250	Twin CR 5 Blade	140	308	46	102
592502	250TT 9.6	48	9.6	13.0	Bronze	250	Twin CR 5 Blade	170	374	50	110
592503	250TT 8.0	24	8.0	10.8	Aluminium	250	Twin CR 5 Blade	140	308	46	102
593001	300TT 10.8	24	10.8	14.5	Bronze	300	Twin CR 5 Blade	250	550	65	143
593002	300TT 15.0	48	15.0	20.0	Bronze	300	Twin CR 5 Blade	280	616	68	150
593003	300TT 10.8	24	10.8	14.5	Aluminium	300	Twin CR 5 Blade	250	550	65	143

Part Number	Model	Voltage V	Fuse (A)	Fuse Part Number	Fuse Holder	
					Std - 589006	T2 - 589013
591402	140TT 2.0	12	200	589012	●	●
591401	140TT 2.2	12	200	589012	●	●
591801	185TT 3.0	12	250	589008	●	●
591802	185TT 3.0	24	130	589007	●	●
591807	185TT 4.0	12	400	589010		●
591808	185TT 4.0	24	130	589007	●	●
591803	185TT 5.0	12	400	589010		●
591804	185TT 5.0	24	130	589007	●	●
591805	185TT 6.0	12	500	589011		●
591806	185TT 6.0	24	325	589009	●	●
591833	185TT 5.0	12 IP	400	589010		●
591834	185TT 5.0	24 IP	130	589007	●	●
591836	185TT 6.0	24 IP	325	589009	●	●
592501	250TT 8.0	24	400	589010		●
592502	250TT 9.6	48	250	589008	●	●
592503	250TT 8.0	24	400	589010		●
593001	300TT 10.8	24	500	589011		●
593002	300TT 15.0	48	400	589010		●
593003	300TT 10.8	24	400	589010		●

5.2 Hydraulic

Model	kW	hp	Tunnel (mm)	Propeller/s	Thrust		Weight	
					kgf	lbs	kg	lbs
185TTH	7	10	185	Single 5 Blade	100	220	8	17.5
250TTH	15	20	250	Twin CR 5 Blade	200	240	13	28.5
300TTH	22.5	30	300	Twin CR 5 Blade	300	660	17	37.5

6. Parts list

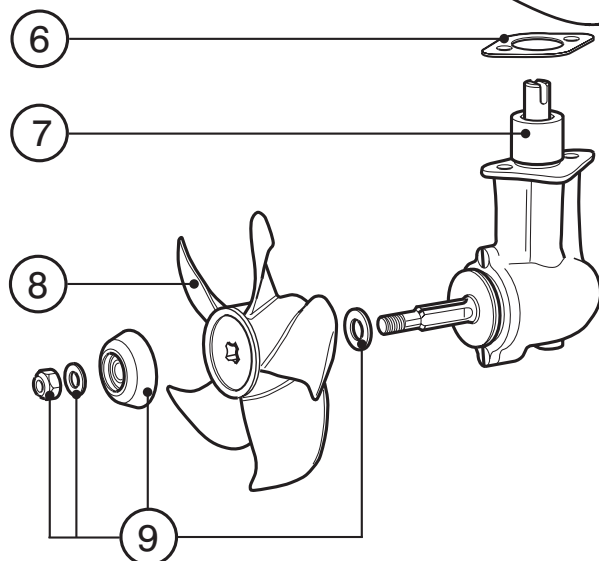
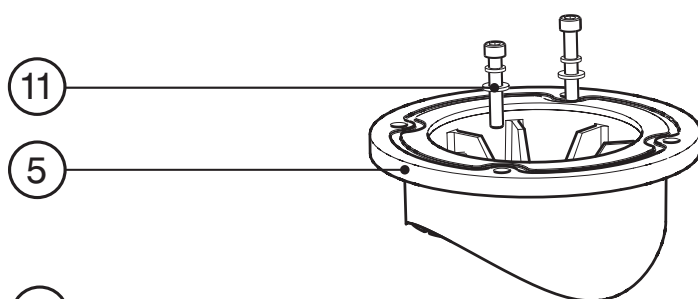
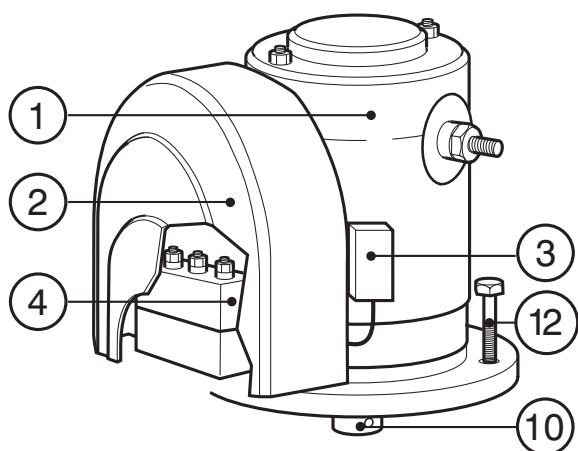


6.1 Model 140TT 2.0 kW 12 V

Item	Part No.	Description
1	581027	Motor Assembly
2	553034	Cover
3	B11126	Solenoid
	559039	Solenoid Loom
4	551052	Mounting Saddle
5	551035	Tunnel gasket
6	581001	Hub assembly
7	589151	Propeller
8	589150	Propeller anode kit
9	589152	Installation fixing kit
10	559018	Drive pin

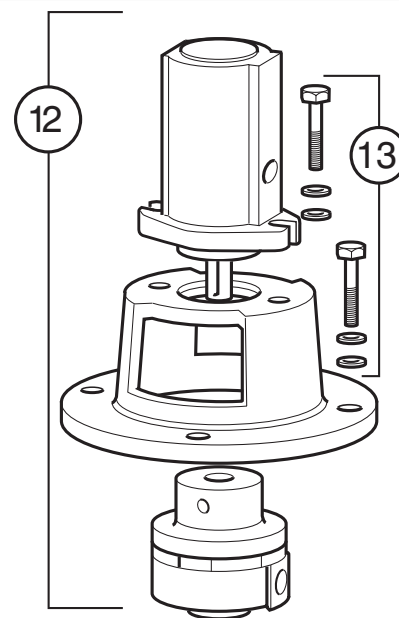
6.2 Model 140TT 2.2 kW 12 V

Item	Part No.	Description
1	581026	Motor Assembly
2	553034	Cover
3	B11126	Solenoid
	559003	Black Box
4	551052	Mounting Saddle
5	551035	Tunnel Gasket
6	581001	Hub Assembly
7	589151	Propeller
8	589150	Propeller Anode Kit
9	589152	Installation Fixings Kit
10	559018	Drive pin

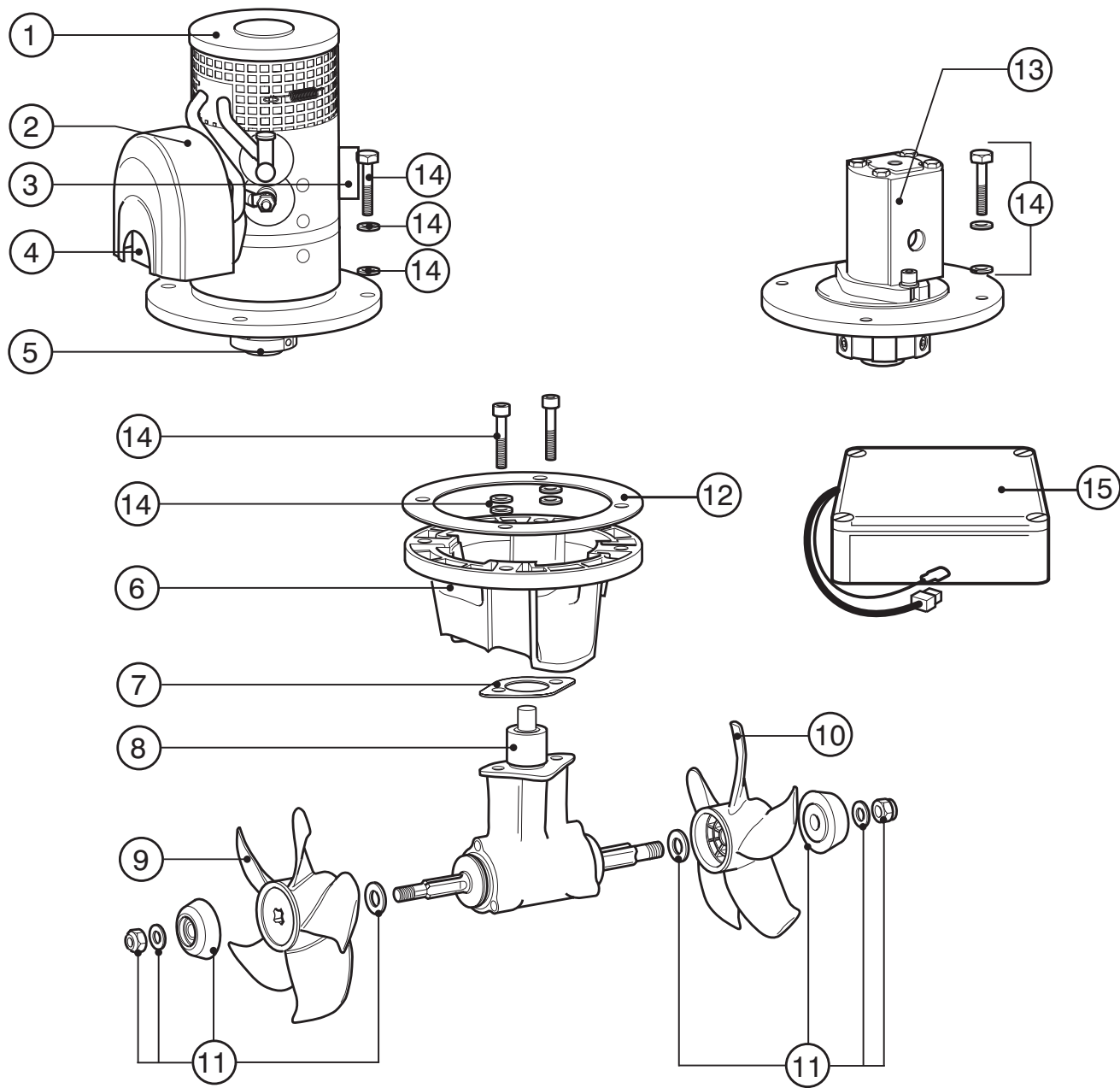


6.3 Model 185TT/H 3.0 to 6.0 kW 12 & 24 V

Item	Part No.	Description	kW	Volts
1	583026	Motor Assembly	3.0	12
	583027	Motor Assembly	3.0	24
	583032	Motor Assembly	4.0	12
	583033	Motor Assembly	4.0	24
	583028	Motor Assembly	5.0	12
	583029	Motor Assembly	5.0	24
	583030	Motor Assembly	6.0	12
	583031	Motor Assembly	6.0	24



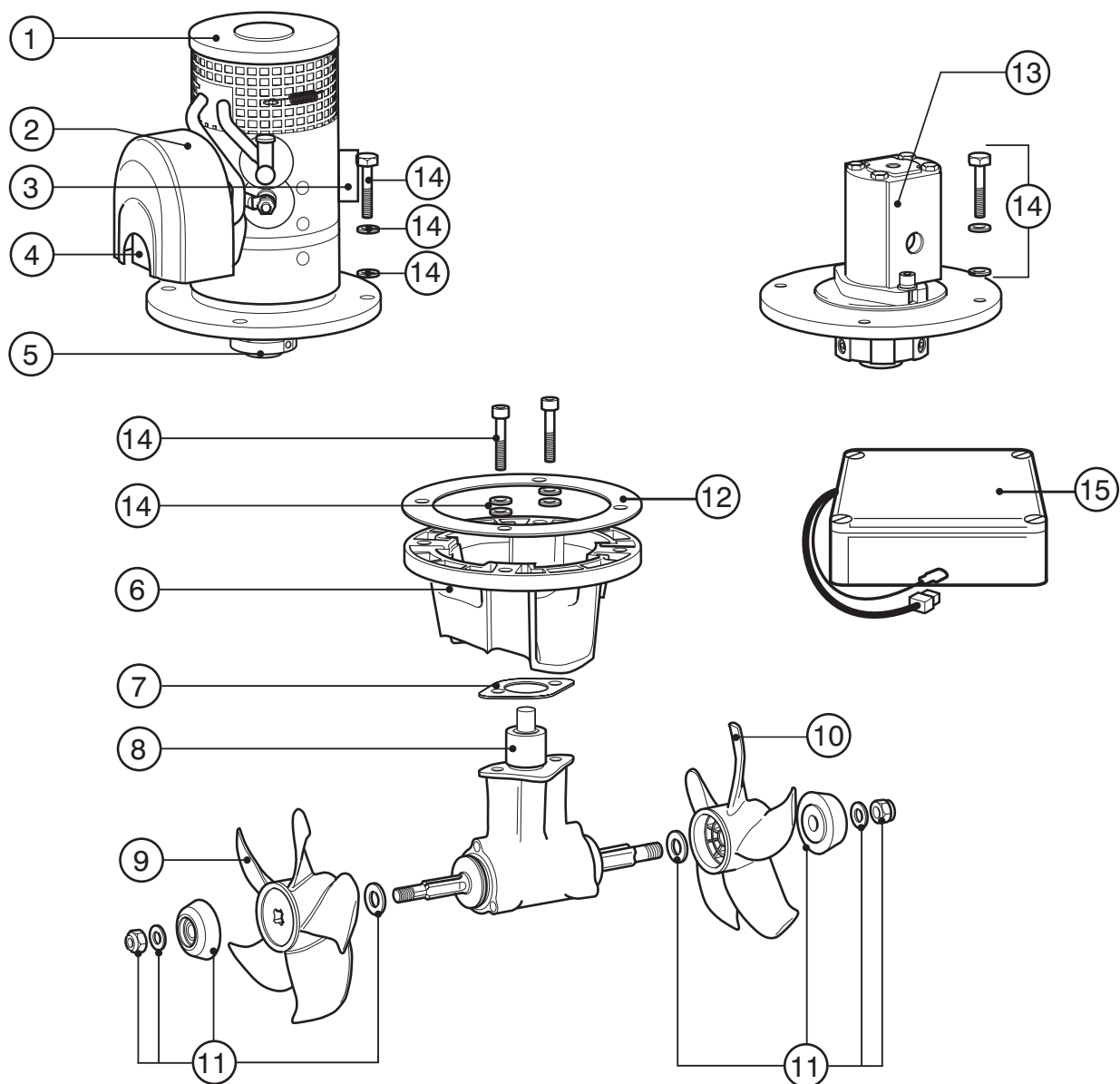
Item	Part No.	Description	kW	Volts
2	553034	Cover	3.0	12-24
	553036	Cover	4.0/5.0	12-24
	555034	Cover	6.0	12
3	559003	Black Box	All	All
	559020	Black Box	6.0	12
4	B11126	Solenoid	3.0	12
	B11127	Solenoid	3.0	24
	B11128	Solenoid	4.0/5.0	12
	B11129	Solenoid	4.0/5.0/6.0	24
	B11130	Solenoid	6.0	12
5	553071	Mounting Saddle	All	All
6	553035	Tunnel Gasket	All	All
7	583001	Hub - 2.2 Ratio	3.0	12-24
	583003	Hub - 1.5 Ratio	4.0-6.0	12-24
8	589351	Propeller	All	All
9	589350	Anode Kit	All	All
10	559017	Drive pin	All	All
11	589352	Installation Fixings Kit	3.0	12.24
	589355	Installation Fixings Kit	4.0-6.0	12-24
Hydraulic Only				
12	583040	Hydraulic Motor Assembly	5.0 cc/rev	
	583041	Hydraulic Motor Assembly	6.0 cc/rev	
13	589352	Installation Fixings Kit	All	All



6.4 Model 250TT/H 8.0 kW 24 V

Item	Part No.	Description
1	585026	Motor Assembly 8.0 kW 24 V
	585029	Motor Assembly 9.6 kW 48 V
2	553036	Cover
3	559003	Black Box
4	B11129	Solenoid
5	585014	Coupling
6	555025	Mounting Saddle
7	555035	Tunnel Gasket
8	585002	Hub
9	589551	Right Hand Propeller

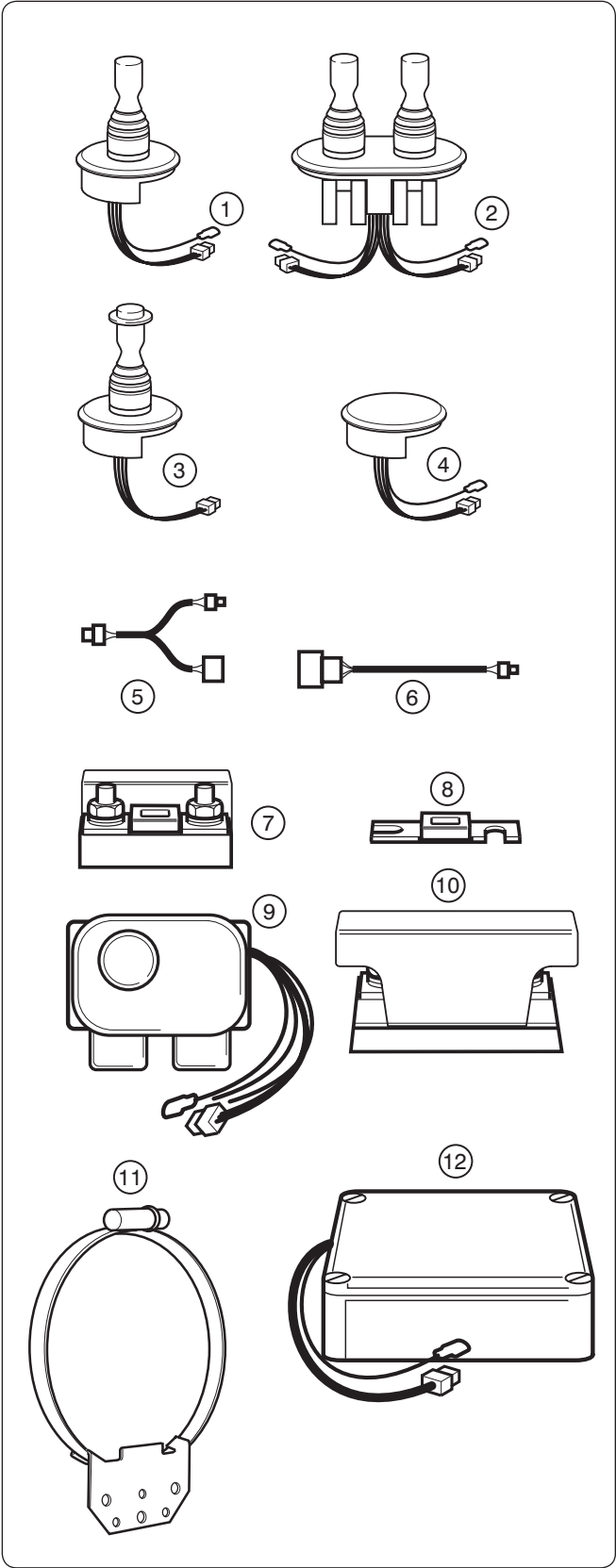
Item	Part No.	Description
10	589552	Left Hand Propeller
11	589550	Anode Kit
12	555038	Plastic Washer
14	589554	Installation Fixings Kit
15	589029	Parallel Switch Box 12/24 V (24 V ONLY)
	589030	Parallel Switch Box 24/48 V (48 V ONLY)
Hydraulic Only		
13	585040	Hydraulic Motor Assy. 26 cc/rev
	585041	Hydraulic Motor Assy. 16.8 cc/rev



6.5 Model 300TT/H 10.8 to 15.0 kW

Item	Part No.	Description	kW	Volts
1	587026	Motor Assembly	10.8	24
	587027	Motor Assembly	15.0	48
2	555034	Cover	All	All
3	559020	Black Box	All	All
4	B8429	Solenoid	10.8	24
5	585014	Coupling	All	All
6	557025	Mounting Saddle	All	All
7	557035	Tunnel Gasket	All	All
8	587001	Hub	All	All
9	589750	Right Hand Propeller	All	All
10	589751	Left Hand Propeller	All	All

Item	Part No.	Description	kW	Volts
11	589550	Anode Kit	All	All
12	555038	Plastic Washer	All	All
14	589752	Installation Fixing Kit	All	All
15	589031	300TT 10.8 kW ONLY Heavy Duty Parallel Switch Box 12/24 V	10.8	12-24
	589030	300TT 15.0 kW ONLY Heavy Duty Parallel Switch Box 24/48 V	15.0	24-48
Hydraulic Only				
13	587040	Hydraulic Motor Assembly	30.0 cc/rev	
	587041	Hydraulic Motor Assembly	26.0 cc/rev	
14	589752	Installation Fixings Kit	All	

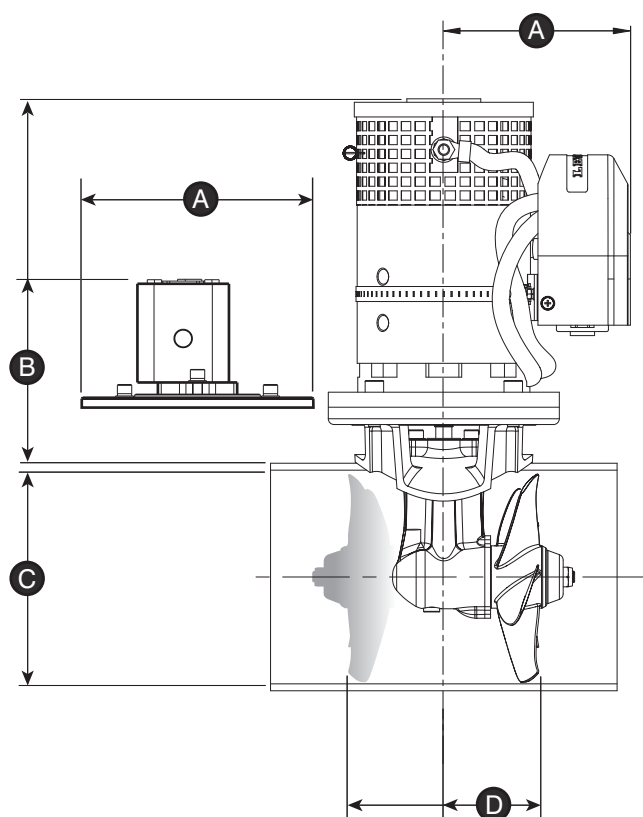


6.6 Accessories

Item	Part No.	Description
1	589002	Single Joystick Panel Controller (NOT 2.0 kW)
2	589004	Double Joystick Controller (NOT 2.0 kW)
3	589003	Locking Single Joystick Controller
4	589001	Touch Panel Controller (NOT 2.0 kW)
5	589025	Y Connector for Dual Controls
6	589016	7 m Control Cable & Connectors
	589017	10 m Control Cable & Connectors
	589018	14 m Control Cable & Connectors
	589019	18 m Control Cable & Connectors
	589020	22 m Control Cable & Connectors
7	589006	Fuse Holder
8	589007	130 A ANL Type Fuse
	589008	250 A ANL Type Fuse
	589009	325 A ANL Type Fuse
	589010	400 A ANL Type Fuse
	589011	500 A ANL Type Fuse
	589012	200 A ANL Type Fuse
9	589034	Automatic Battery Switch (NOT 140TT 2.0 kW)
10	589013	T2 Fuse Holder
11	589064	Motor Support Bracket Kit 185TT
	589065	Motor Support Bracket Kit 300TT
	589066	Motor Support Bracket Kit 250TT
12	589030	Parallel Switch Box 24 - 48 V
	589029	Parallel Switch Box 12 - 24 V
	589031	300TT Only Heavy Duty Parallel Switch Box 12 - 24 V

7. Dimensions

Fig. 7.1.1



7.1 Electric

Model	Voltage	Power	A		B		C		D	
			mm	in	mm	in	mm	in	mm	in
140TT 2.0	12 V	2.0 kW (2.7 hp)	123	4 ⁵ / ₁₆	235	9 ¹ / ₄	140	5 ¹ / ₂	73	2 ⁷ / ₈
140TT 2.2	12 V	2.2 kW (3.0 hp)	123	4 ⁵ / ₁₆	211	8 ⁵ / ₁₆	140	5 ¹ / ₂	73	2 ⁷ / ₈
185TT 3.0	12 V	3.0 kW (4.0 hp)	130	5 ¹ / ₈	271	10 ²¹ / ₃₂	185	7 ⁹ / ₃₂	85	3 ¹¹ / ₃₂
185TT 3.0	24 V	3.0 kW (4.0 hp)	130	5 ¹ / ₈	271	10 ²¹ / ₃₂	185	7 ⁹ / ₃₂	85	3 ¹¹ / ₃₂
185TT 4.0	12 V	4.0 kW (5.4 hp)	148	5 ¹³ / ₁₆	294	11 ⁹ / ₁₆	185	7 ⁹ / ₃₂	85	3 ¹¹ / ₃₂
185TT 4.0	24 V	4.0 kW (5.4 hp)	148	5 ¹³ / ₁₆	294	11 ⁹ / ₁₆	185	7 ⁹ / ₃₂	85	3 ¹¹ / ₃₂
185TT 5.0	12 V	5.0 kW (6.7 hp)	162	6 ³ / ₈	316	12 ⁷ / ₁₆	185	7 ⁹ / ₃₂	85	3 ¹¹ / ₃₂
185TT 5.0	24 V	5.0 kW (6.7 hp)	162	6 ³ / ₈	316	12 ⁷ / ₁₆	185	7 ⁹ / ₃₂	85	3 ¹¹ / ₃₂
185TT 6.0	12 V	6.0 kW (8.0 hp)	173	6 ¹³ / ₁₆	316	12 ⁷ / ₁₆	185	7 ⁹ / ₃₂	85	3 ¹¹ / ₃₂
185TT 6.0	24 V	6.0 kW (8.0 hp)	173	6 ¹³ / ₁₆	316	12 ⁷ / ₁₆	185	7 ⁹ / ₃₂	85	3 ¹¹ / ₃₂
250TT 8.0	24 V	8.0 kW (10.8 hp)	165	6 ¹ / ₂	405	15 ¹⁵ / ₁₆	250	9 ²⁷ / ₃₂	238	9 ³ / ₈
250TT 9.6	48 V	9.6 kW (13.0 hp)	165	6 ¹ / ₂	405	15 ¹⁵ / ₁₆	250	9 ²⁷ / ₃₂	238	9 ³ / ₈
300TT 10.8	24 V	10.8 kW (14.5 hp)	203	8	450	17 ²³ / ₃₂	300	11 ¹³ / ₁₆	320	12 ¹⁹ / ₃₂
300TT 15.0	48 V	15.0 kW (20 hp)	203	8	450	17 ²³ / ₃₂	300	11 ¹³ / ₁₆	320	12 ¹⁹ / ₃₂

7.2 Hydraulic

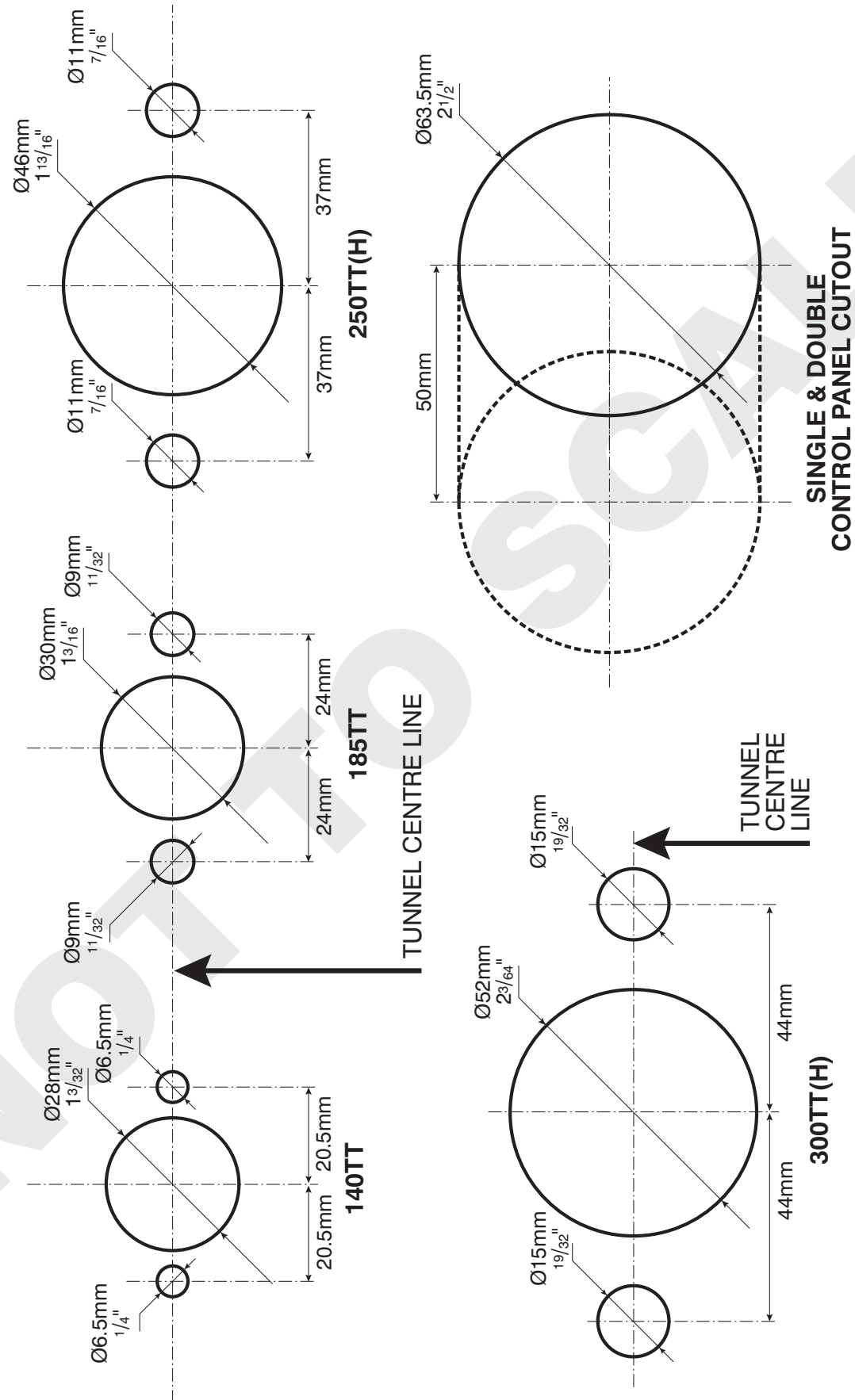
Model	kW	hp	A		B		C		D	
			mm	in	mm	in	mm	in	mm	in
185TTH	7	10	200	7 ⁷ / ₈	202	7 ¹⁵ / ₁₆	185	7 ⁹ / ₃₂	83	3 ⁹ / ₃₂
250TTH	15	20	258	10 ⁵ / ₃₂	234	9 ⁷ / ₃₂	250	9 ²⁷ / ₃₂	238	9 ³ / ₈
300TTH	22.5	30	258	10 ⁵ / ₃₂	256	10 ¹ / ₁₆	300	11 ¹³ / ₁₆	320	12 ¹⁹ / ₃₂

8. Fault finding

Fault • Thrust in wrong direction?	Action • Change contactor wires on motor solenoid (See section 2.1).
Fault • Fuse keeps blowing?	Action • Wrong fuse fitted - check rating and replace. • Propeller restricted or jammed causing excessive load on motor - check and clear. Check that propeller washer is fitted see Section 6.
Fault • Control Panel does not illuminate?	Check • Power - Hold  for 1 second. • Battery is connected. • Main switch ON, check fuse. • Control loom connections. • Long operation has tripped thermal switch. Wait 20 minutes for motor to cool and reset. DO NOT attempt to cool motor by any other means.
Fault • Control panel illuminates but no thrust?	Action • Are batteries charged? • Check main motor connections are tight.
Fault • Poor thrust or thrust in one direction only??	Action • Batteries not large enough or charged, cables not recommended size. Voltage at motor when running should be a minimum 10 V for 12 V and 21 V for 24 V units. • Blockage in tunnel/propeller jammed with debris, switch off main power, inspect and clear. • Propeller washers fitted wrong. See Sec.1.6 • Check motor brush springs are located properly, brushes should have good contact with the commutator.
Fault • 140TT and 185TT ONLY - Motor turns but no drive?	Action • DO NOT continue to run thruster. • Shear pin broken, remove 4 motor bolts, see Sec. 4.2, drive out old pin and replace with new pin. • Propeller blades broken. Replace with new.
Fault • Thruster noisy and vibrating?	Action • Check propeller is not touching the tunnel wall. • 140 - 185 models: Check hub height is correct, see section 7.

 If in doubt contact Lewmar.com

9. Cutting templates



10. Lewmar limited warranty

LIMITED WARRANTY and KEY TERMS OF SUPPLY BY LEWMAR

Lewmar warrants that in normal usage and with proper maintenance its products will conform with their specification for a period of three years from the date of purchase by the end user, subject to the conditions, limitations and exceptions listed below. Any product, which proves to be defective in normal usage during that three-year period, will be repaired or, at Lewmar's option, replaced by Lewmar.

A CONDITIONS AND LIMITATIONS

- i Lewmar's liability shall be limited to the repair or replacement of any parts of the product which are defective in materials or workmanship.
- ii Responsibility for the selection of products appropriate for the use intended by the Buyer shall rest solely with the Buyer and Lewmar accepts no responsibility for any such selection.
- iii Lewmar shall not be liable in any way for Product failure, or any resulting loss or damage which arises from:
 - a use of a product in an application for which it was not designed or intended;
 - b corrosion, ultra violet degradation or wear and tear;
 - c a failure to service or maintain the product in accordance with Lewmar's recommendations;
 - d faulty or deficient installation of the product (unless conducted by Lewmar);
 - e any modification or alteration of the product;
 - f conditions that exceed the product's performance specifications or safe working loads.
- iv Product subject to a warranty claim must be returned to the Lewmar outlet which supplied the product for examination unless otherwise agreed by Lewmar in writing.
- v This warranty does not cover any incidental costs incurred for the investigation, removal, carriage, transport or installation of product.
- vi Service by anyone other than authorised Lewmar representatives shall void this warranty unless it accords with Lewmar guidelines and standards of workmanship.
- vii Lewmar's products are intended for use only in the marine environment. Buyers intending to use them for any other purpose should seek independent professional advice as to their suitability. Lewmar accepts no liability arising from such other use.

B EXCEPTIONS

Cover under this Warranty is limited to a period of one year from the date of purchase by the end user in the case of any of the following products or parts of products:

- Electric motors and associated electrical equipment
- Electronic controls
- Hydraulic pumps, valves and actuators
- Weather seals
- Products used in "Grand Prix" racing applications

C LIABILITY

- i Lewmar's liability under this warranty shall be to the exclusion of all other warranties or liabilities (to the extent permitted by law). In particular (but without limitation):
 - a Lewmar shall not be liable for:
 - Any loss of anticipated turnover or profit or indirect, consequential or economic loss ;
 - Damages, costs or expenses payable to any third party;
 - Any damage to yachts or equipment;
 - Death or personal Injury (unless caused by Lewmar's negligence).

Some states and countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

- b Lewmar grants no other warranties regarding the fitness for purpose, use, nature or satisfactory quality of the products.
- ii Where applicable law does not permit a statutory or implied warranty to be excluded, then such warranty, if permitted by that state or country's law, shall be limited to a period of one year from the date of purchase by the end user. Some states and countries do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you.

D PROCEDURE

Notice of a claim for service under this warranty shall be made promptly and in writing by the end user to the Lewmar outlet which supplied the product or to Lewmar at Southmoor Lane, Havant, Hampshire, England PO9 1JJ.

E SEVERANCE CLAUSE

If any clause of this warranty is held by any court or other competent authority to be invalid or unenforceable in whole or in part, the validity of the remaining clauses of this warranty and the remainder of the clause in question shall not be affected.

F OTHER RIGHTS

This warranty gives you specific legal rights, and you may also have other legal rights, which vary, from state to state and country to country.

In the case of European States a Consumer customer (as defined nationally) has legal rights under the applicable national law governing the sale of Consumer Goods; this Warranty does not affect those rights.

G LAW

This warranty shall be governed by and read in accordance with the laws of England or the state or country in which the first end user is domiciled at the time of purchase of the product.

H DISPUTES

Any dispute arising under this warranty may, at the option of the end-user, be referred to alternative dispute resolution under the rules of the British Marine Federation or to the Courts of the State whose law shall govern the warranty or to the Courts of England and Wales.

The British Marine Federation may be contacted at Marine House, Thorpe Lea Road, Egham, England, TW20 8BF



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500100

Produced by T. Connell UK (+44) 023 9263 9265 Ref: T11873/04/2007

Deluxe Flush Electric Toilets

FEATURES

- Space saving stylish design
- Regular household size seat
- Virtually silent operation for undisturbed sleep
- User selectable choice of "one touch" flush cycles for minimal water usage - a 'Quick Flush' uses less than 1 quart (1 litre)
- Owner selectable choice of leaving bowl wet or dry after use
- Fresh or raw water rinse models
- Non-clogging large bore flush pump macerates waste
- Uses less than 1.0 amp/hour per day
- ISO 8846 MARINE - Ignition Protection
- Crevice free contours for added cleanliness and hygiene
- All plumbing and wiring easily concealed
- Angled or Vertical back vitreous china bowl



Angled



Vertical

The two bowls differ only in the shape of the back of the toilet. The angled back version gives minimal footprint and makes it easy to mount against a sloping surface or in a corner. The vertical back version allows snug fitting against a vertical bulkhead.

* * * * *

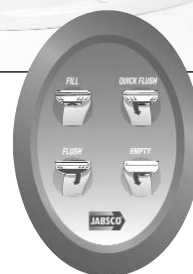
MODEL RANGE

Description		Model	Rinse Water Variant	DC Voltage	Fuse / Breaker
	Angled Back, Gross Weight 48lb (22kg)	58020-1012	Fresh	12 Vdc	25 amp
		58020-1024	Fresh	24 Vdc	15 amp
		58220-1012	Raw	12 Vdc	25 amp
		58220-1024	Raw	24 Vdc	15 amp
	Vertical Back, Gross Weight 57lb (26kg)	58040-1012	Fresh	12 Vdc	25 amp
		58040-1024	Fresh	24 Vdc	15 amp
		58240-1012	Raw	12 Vdc	25 amp
		58240-1024	Raw	24 Vdc	15 amp



Models 58XX0 - Series

NEW!
Touch Pad
Controller

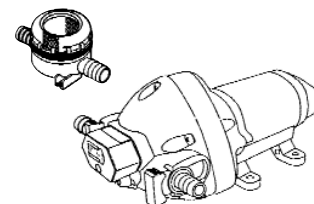
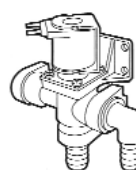


* * * * *

RINSE OPTIONS

(1) Fresh Water

(2) Raw Water



(1) **58020 & 58040 Series** are supplied with a combined solenoid valve and siphon breaker assembly for connection to any existing pressurized water system capable of delivering 2.9 US gpm (11 lpm) or more. The siphon breaker ensures there is no backflow from the toilet into the water system.

(2) **58220 & 58240 Series** are supplied with a remote mounted self-priming pump to bring in sea, river or lake rinse water. Complete with Pumpgard™ strainer.

* * * * *

TOUCH PAD CONTROLLER



The Deluxe Flush toilet range features a multi-function 'one touch' control pad offering four options - 'Fill', 'Quick Flush', 'Flush' or 'Empty'.

In addition, the owner can set the control at any time so that the bowl is left either 'Dry' or 'Wet' after flushing. The recommended 'Dry' setting minimises total water usage. If water usage is not a concern, the 'Wet' setting automatically adds 1 quart (1 litre) of water after flushing, ready for the next user.

Simultaneously holding down both 'Quick Flush' and 'Flush' buttons for 5 seconds switches between bowl always left 'Dry' and bowl always left 'Wet' modes.

- 'Fill' may be touched when the bowl is 'Dry' to add 1 quart (1 litre) of water before use, if thought necessary.
- 'Quick Flush' first rinses and then empties the bowl after light use. On 'Dry' setting, this uses less than 1 quart (1 litre) of water.
- 'Flush' rinses and empties the bowl twice after heavy use. If the bowl is 'Dry', touching 'Fill' first is recommended. This uses just 2.5 quarts (2.5 litres) of water.
- 'Empty' does exactly what it says without adding any water, whenever desired.

Even when the bowl is apparently 'dry', there is an anti-odour water lock in the pump housing.

* * * * *

APPLICATIONS

You may install JABSCO Deluxe Flush electrically operated marine toilets in both power and sailing craft, either above or below the waterline, for use on sea, river, lake or canal.



Caution! JABSCO manual toilets are designed specifically for marine use. Consult ITT Industries Jabsco for advice about possible non-marine applications.

Your installation may discharge the waste either overboard (provided that your national and local regulations allow this), or into a treatment system or into an on-board holding tank (U.S.C.G. Marine Sanitation Devices Type I, II and III).

* * * * *

SPECIFICATIONS

Bowl, seat and cover

- Hygienic white glazed vitreous china bowl for ease of cleaning.
- Luxury wooden seat and cover with tough baked enamel coating.

Flush pump

- Internally mounted, high speed, non-clogging, centrifugal, waste macerating pump driven by powerful 240 watt, 12 or 24 Vdc, permanent magnet motor with ball bearings and robust ceramic seal, discharges up to 6ft (2m) above the base of the toilet.

Either Solenoid Valve

- Jabsco solenoid valve and syphon breaker assembly for connection to any existing pressurised water system capable of delivering 2.9gpm (11 lpm) or more. The syphon breaker ensures that there is no backflow from the toilet into the water system.

Or Rinse pump

- Jabsco, self-priming up to 3m (10ft), dry running, diaphragm water pump driven by 12 or 24 Vdc, permanent magnet, ball bearing motor.

Control Panel

- One Touch 'Press and Release' switch pad, sealed for life, with 10ft (3m) link cable, fitted quick connector, and heat shrink seal.

Control Box

- Sealed for life, with external leads to ship's 12 or 24 Vdc Positive and Negative power supply, to Flush pump and to either Solenoid Valve or Rinse Pump, plus 6 way quick connector input from Control Panel. Reverse polarity protected, computer controlled circuitry with heavy duty mechanical relays for ultra reliability.

Standards

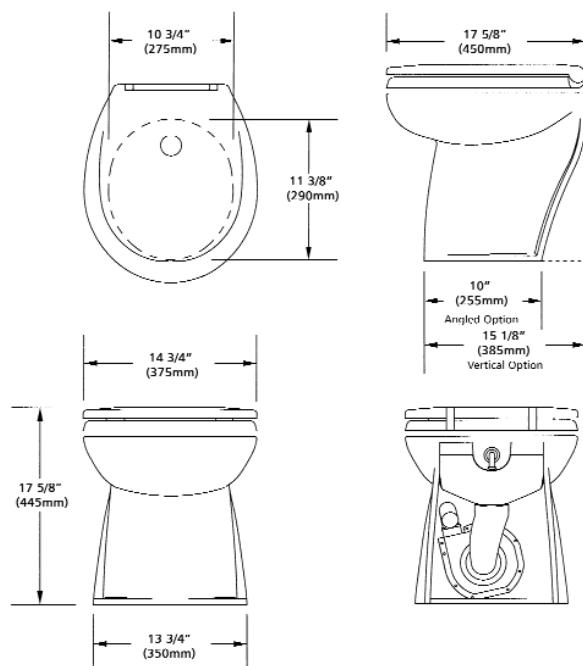
- Complies with ISO8846 MARINE [Ignition protection].



Ports

- Raw Water Rinse pump inlet & outlet, and Toilet Rinse inlet - $\frac{3}{4}$ " (19mm) hose tails.
- Fresh Water Rinse solenoid valve inlet - choice of $\frac{1}{2}$ " (13mm) hose tail or $\frac{1}{2}$ " (13mm) male thread. Outlet - $\frac{3}{4}$ " (19mm) hose tail.
- Flush pump discharge - $1\frac{1}{2}$ " (38mm) hose tail.

Dimensions - inches (mm)



* * * * *

INSTALLATION INSTRUCTIONS

YOUR TOILET is just one part of a system. Correct installation of the whole system is essential if you want the toilet to perform properly, operate reliably and safely, and give satisfactory length of life.

- The seat and lid is delivered boxed and unfitted for its protection.
- Key numbers, e.g. ('Key 31') are references to the exploded view diagram on the back page.

* * *

Location

- Select a location that will give sufficient clearance all round and above the bowl.
- The mounting surface must be flat, rigid and strong enough to support a man's weight and should be at least 2" (50mm) wider and 2" (50mm) deeper than the base of the toilet.
- You will need sufficient clearance below the mounting surface to be able to secure the mounting bolts, and to be able to remove them for maintenance.
- Offer up the seat and lid to the bowl. They should be able to swing up and over, so that they will not fall forward when the craft heels or pitches. When they are swung over they must be supported so that the hinges are not strained. Remove the seat and lid and put them aside until the installation is complete.

* * *

Mounting

YOU WILL need:

- 4 x 1 1/4" (6mm) diameter stainless steel bolts of length to suit the thickness of the mounting surface.
- 4 stainless steel nuts, preferably self-locking. If you do not use self-locking nuts you will need some nut-locking compound.
- 4 plastic and 4 stainless steel 1 1/4" (6mm) washers
- A tube of white silicone sealant.
- Offer up the toilet in the selected position and, using the holes in the base as a guide, mark the positions for the 4 bolt holes on the mounting surface. Remove the toilet and drill 4 vertical holes of 5/16" (8mm) diameter through the mounting surface.

Now complete all of the rest of the installation before you secure the bowl.

* * *

Through Hull Fittings

YOU MAY need:

- 3/4" 19mm bore seacock for the Rinse pump and, if you are discharging the waste over board, a 1 1/2" 38mm bore seacock for the waste outlet.
- Follow the seacock manufacturer's own instructions concerning materials and methods of installation.
- Ensure the inlet seacock is positioned where it will be below the waterline at all times when the craft is underway, and also ensure that any other outlet seacock is both aft of, and higher than, the inlet seacock.



HAZARD RISK: Through Hull fittings.

FOLLOW THESE INSTRUCTIONS!

If the installation of the toilet results in it being connected to ANY through-hull fitting that may possibly be below the waterline at ANY time, whether when the craft is at rest, underway and heeling or rolling or pitching, you must install the toilet in accordance with these Installation Instructions. If you do not, water may flood in, causing the craft to sink, which may result in loss of life.



HAZARD RISK: Accidental Damage.

USE SEACOCKS!

If the toilet is connected to ANY through-hull fittings and if the toilet or pipework is damaged, water may flood in causing the craft to sink, which may result in loss of life. Therefore, if you are making connections between the toilet and ANY through-hull fittings that may possibly be below the waterline at ANY time, full bore seacocks must be fitted to those hull

fittings, to allow them to be shut off.

The seacocks **MUST** also be positioned where they are easily accessible to all users of the toilet. If, for any reason, it is not possible to do this, then secondary bore marine quality valves **MUST** be fitted to the hoses where they are easily accessible.



CAUTION! Use lever operated, full bore marine seacocks and valves. The use of screw-down gate valves is not recommended.

* * *

Pipework - selection of correct method

YOU MUST select the correct method for the inlet pipework from 2 options and for the outlet pipework from 4 options, according to whether the toilet is above or below the waterline, and to whether it discharges the waste overboard or into an on-board holding tank.

WARNING



HAZARD RISK: Bowl Rim Below Waterline.

USE VENTED LOOPS!

If the toilet is connected to ANY through-hull fittings, and if the rim of the bowl falls below the waterline, water may flood in causing the craft to sink, which may result in loss of life.

Therefore, if the rim of the toilet is less than 8" (20cm) above the waterline when the craft is at rest, or if there is ANY possibility that the rim of the bowl may be below the waterline at ANY time, a ventilated anti-syphon loop **MUST** be fitted in any pipework connected to a through-hull fitting, irrespective of whether inlet or outlet.

SPECIAL NOTE 1: The smaller bore inlet pipework is more hazardous than the larger outlet pipework. Unless there is a ventilated anti-syphon loop in the inlet pipework, water will flow into the bowl whenever both the inlet seacock is open and the rim of the bowl is below the actual waterline.

SPECIAL NOTE 2: Making a loop in the hose without fitting a vent may be just as hazardous as no loop at all, because water may syphon over a loop. It is the vent that actually prevents the syphon.

WARNING



HAZARD RISK: Pipework Becomes Loose.

USE HOSE CLIPS!

If the toilet is connected to ANY through-hull fittings and if the pipework becomes disconnected, either from a through-hull fitting or seacock, or from the toilet or any secondary valve, water may flood in and cause the craft to sink, which may result in loss of life.

Therefore the ends of ALL flexible hoses fitted directly or indirectly between the toilet and ANY through-hull fitting that may possibly be below the waterline at ANY time, **MUST** be secured to the hose tails to which they are connected, using two stainless steel worm-drive hose clips.

Pipework - General instructions for all options

YOU WILL need:

- *Spiral reinforced smooth bore flexible hoses for both the ¾" 19mm inlet and the 1½" (38mm) outlet pipework.*
- *Two stainless steel worm-drive hose clips for every hose tail connection.*
- Secure the hose runs so that the hoses cannot move and chafe, and so that they do not exert any leverage on the hose tail fittings to which they are connected, as this may cause adjacent joints to leak.
- Avoid sharp bends in the hoses as this may cause them to become kinked.
- Keep all pipework runs as straight and as short as possible, avoiding rising and falling over obstructions which creates airlocks.
- If it is difficult to fit the hose onto the hose tails of the toilet or seacocks, lubricate it with water, or soften the hose by dipping the end in hot water.



CAUTION: Do not apply flame to the hose. Do not apply flame or heat to the plastic hose tails on the toilet, rinse pump or solenoid valve. Do not use oils, greases or synthetic lubricants. Do not apply sealing compounds to any hose connections. Do not over tighten hose clips. Any of these actions may result in cracking or breakage of the plastic parts.

- Secure the ends of all hoses to the hose tails with two stainless steel worm-drive hose clips, ensuring that all inlet connections are airtight and that all the outlet connections are water tight.

* * *

Fresh Water Rinse Pipework

YOU WILL need:

- *A 'T' piece that fits your boat's pressurised water system pipework.*



CAUTION: Turn off power to the water pressure system pump, and open cold water taps to de-pressurise the system.

- Install a 'T' fitting in the pressurised cold water pipework near to the toilet to provide a ½" (13mm) feed to the Solenoid Valve.



CAUTION: If you ever connect your water system to unregulated USA City Water supplies, you **MUST** fit or use a Pressure Regulator to prevent risk of flooding.

- Mount the Solenoid Valve and Syphon Valve assembly (key 29) in a dry position, on a vertical surface, with the outlet port facing **DOWN**, as close to the Rinse Intake Elbow (key 3) as possible **AND** at least 8" (20cm) **ABOVE** the Rinse Intake Elbow.
- Install suitable pipework between the 'T' fitting and the ½" (13mm) inlet port on the Solenoid Valve.
- Run ¾" (19mm) hose by the most direct route from the ¾" (19mm) outlet port on the Solenoid Valve to the Rinse Intake Elbow.

* * *

Raw Water Rinse Pipework - 2 options

- Install the Raw Water Rinse pump (key 30) in a dry position close to the toilet where it will not be more than 6ft (2m) above the heeled waterline at any time.
- Fit the Pumpguard™ (key 31) supplied to the inlet of the Rinse pump.
- For more detail refer to the separate Data Sheet supplied with the Rinse pump.

Option 1: Toilet below the heeled waterline

YOU MUST fit a ¾" (19mm) Vented Loop fitting, Jabsco part number 29015-0000.

- Run ¾" (19mm) hose by the most direct route from the inlet seacock to the inlet of the Pumpguard™ fitted to the Rinse pump.



CAUTION: Do not position the ventilated anti-syphon loop between the inlet seacock and the rinse pump, because it may prevent the rinse pump from priming.

- Arrange a length of ¾" (19mm) hose between the Rinse pump outlet and the Rinse Intake Elbow (key 3), to form an anti-syphon loop whose highest point is at least 20cm (8") above the highest possible waterline, and fit the ¾" (19mm) Vented Loop at the highest point.

Option 2: Toilet always above the heeled waterline

- Run ¾" (19mm) hose by the most direct route from the inlet seacock to the inlet of the Pumpguard™ fitted to the Rinse pump.
- Run ¾" (19mm) hose by the most direct route from the outlet of the Rinse pump to the Rinse Intake Elbow.

* * *

Discharge Pipework - 4 options

Option 1: Toilet below the waterline and discharging overboard.

YOU MUST fit a 1½" (38mm) Vented Loop fitting, Jabsco part number 29015-0010.

- Run 1½" (38mm) outlet hose from the non-return valve (key 23) to form a loop which is at least 8" (20cm) above the highest possible waterline, and fit the 1½" (38mm) Vented Loop at the highest point.

Option 2: Toilet always above the heeled waterline and discharging overboard.

- Run 1½" (38mm) outlet hose from the non-return valve down to the outlet seacock by the most direct route.

Option 3: Toilet discharging into holding tank AND top of holding tank above non-return valve at any time.

YOU MUST FIT a 1½" (38mm) Vented Loop fitting, Jabsco part number 29015-0010.

- If there is ANY possibility that the discharge non-return valve may be below the top of the tank at ANY time, a ventilated anti-syphon loop must be fitted in the outlet pipework to ensure that the contents of the tank do not syphon out through the bowl.
- Arrange the outlet hose to form a loop which is at least 8" (20cm) above the highest possible level that the top of the tank may reach, and fit the Vented Loop at that highest point.

Option 4: Toilet discharging into holding tank, AND non-return valve always above the top of holding tank.

- Run the outlet hose by the most direct route from the non-return valve down to the holding tank inlet.

* * *

Controls and Electrics

YOU MUST:

- *Connect the Control Box either directly to the battery or to a primary distribution board with sufficient spare amperage capacity.*
- *Keep the total length of both the positive and negative wires to a minimum, selecting your wire size from the Electrical Specifications table below.*



CAUTION: Inadequate wire size will result in voltage drop, and will reduce performance.

- *Make all joints with appropriately rated marine grade terminal blocks and crimp connectors.*
- *Use marine grade multi-strand copper wire.*
- *Support all wires approximately every 18" (45cm) with plastic cable clips.*

YOU MUST FIT the correct size of fuseholder or circuit breaker, selected from the Electrical Specifications table. If you connect the Control Box directly to the battery, fit your fuseholder or circuit breaker within 7" (17cm) of the battery.

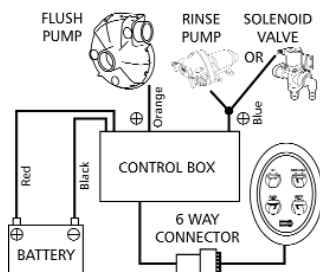


CAUTION: Remove fuse, or turn circuit breaker off, whilst installing Controls and Electrics.

- Fix the Control Box (key 24) in a dry but accessible position close to the Flush pump.
- Select a position for the Control Panel (key 28) that is convenient for both standing and seated users, and which allows you to run the 10ft (3m) control cable out of sight to the Control Box.
- Use the Mounting Plate as a template and drill a 5/8" (16mm) hole for the 6 way control cable

connector. Place the Glove (key 26) under the Mounting Plate, and fix the Mounting Plate. Feed the control cable through the Mounting Plate and insert the Control Panel into the Glove.

- Slide the Heat Shrink Sleeve (key 25) over the control cable. Plug in the 6 way control cable to the Control Box, and carefully use a hot air gun or hairdryer to seal the Heat Shrink Sleeve over the 6 way connector.
- Note that the Control Box has 4 other leads - Red and Black, Orange and Blue.



- Connect your boat's Positive (+) feed to the Red (+) input lead of the Control Box, and your boat's Negative (-) return to the Black (-) output lead of the Control Box.
- Connect the Orange (+) output lead of the Control Box to the Red (+) input lead of the Flush pump motor (key 18).
- **Either** connect the Blue (+) output lead of the Control Box to any terminal of the Solenoid Valve (key 29) **or** to the Red (+) input lead of the Raw Water Rinse pump (key 30).
- **Either** connect the remaining terminal of the Solenoid Valve **or** the Black (-) output lead of the Rinse pump to your boat's Negative (-) return.

ELECTRICAL SPECIFICATIONS							
Voltage	Amp Draw	Fuse/Breaker	Wire size mm ² (AWG) per metre (foot) of length*				
			0-4m (0-13ft)	4-6m (13-20ft)	6-12m (20-40ft)	12-18m (40-60ft)	
12 Vdc	20	25 amp	4 mm ² (#10)	6 mm ² (#8)	8 mm ² (#6)	19mm ² (#4)	
24 Vdc	10	15 amp	2.5mm ² (#16)	4 mm ² (#14)	6 mm ² (#10)	8mm ² (#10)	

* Wire length is the total distance from the battery to the Flush pump and back to the battery

Securing the bowl and fitting the seat and lid

- Apply a bead of white silicone sealant to the base of the toilet.
- Bolt down the toilet, using plastic washers next to the china, with stainless steel washers between the plastic washers and the bolt heads. Tighten the fastenings securely. If you are not using self-locking nuts, use nut-locking compound.
- Fit the seat and lid using the adjustable fastenings supplied with it.

Testing

- Ensure that the battery is fully charged, and that the circuits are live.
- Open both seacocks.
- Refer to the next section - OPERATING INSTRUCTIONS.
- To prime the Solenoid Valve or Rinse pump on first installation, operate the 'Quick Flush' function several times until water flows into the toilet bowl. Thereafter they are automatically switched by the Control Panel.

Safety

Ensure that this INSTRUCTION MANUAL reaches the owner, skipper or operator of the craft as it contains essential safety information.

ON COMPLETION - CLOSE BOTH SEACOCKS

* * * * *

OPERATING INSTRUCTIONS

The toilet is one of the most used pieces of equipment on your boat.

Correct operation of the toilet is essential for the safety and comfort of your crew and craft.

- Open inlet and outlet seacock (and secondary valves if fitted)
- Use Touch Pad Controller as described on Page 2.
- Use good quality hard or soft household toilet paper, but do not use more than necessary.
- Do not put anything in the toilet unless you have eaten it first, except toilet paper.



HAZARD RISK: Accidental Damage.

SHUT SEACOCKS!

If the toilet is connected to ANY through-hull fittings that are below the waterline at any time, and if the toilet or pipework is damaged, water may flood in, causing the craft to sink, which may result in loss of life.

Therefore after every usage, both seacocks (or secondary valves) **MUST** be shut.

Whenever your craft is unattended, even if for only a short period of time, both seacocks (even if secondary valves are fitted) **MUST** be shut.

- Ensure that ALL users understand how to operate the toilet systems correctly and safely, including seacocks and secondary valves.
- Take special care to instruct children, the elderly and visitors.

* * *

Cleaning

- To clean the bowl, use any liquid or cream ceramic cleaner.



CAUTION: Do NOT use aggressive chemical agents such as Acetone or Bleach because the plastic parts may crack and the enamel coating on the seat and lid may blister.

- To clean the rest of the toilet, including the seat and lid, use a non-abrasive liquid cleaner. Polish with a dry cloth only.



CAUTION: Do not use abrasive pads on any part of the toilet and do not use cream cleaners except for the bowl.

- To disinfect the toilet, use a liquid disinfectant diluted in accordance with the manufacturers instructions. You may apply it to all parts of the toilet using a sponge or soft brush as necessary.



CAUTION: Do not use thick liquid toilet cleansers or neat bleach. They may damage the valves, gaskets, seals and the enamel coating of the seat and lid.

* * * * *

SERVICING INSTRUCTIONS

Jabsco Deluxe Flush electric toilets do not normally require maintenance during the season, provided that they are winterised in the autumn.

- Regularly check all fastenings for tightness and leaks.

WARNING



HAZARD RISK: Leaks.

REPAIR LEAKS IMMEDIATELY!

If the toilet is connected to ANY through-hull fittings and, if the toilet or the pipework develops a minor leak, it can suddenly become a major leak that allows water to flood in, causing the craft to sink, which may result in loss of life. Therefore, if ANY leak develops you must repair it immediately.

Control Panel and Control Box

- These 'sealed for life' units are maintenance free.

Solenoid Valve

- The Solenoid Valve is maintenance free.

Rinse pump

- Please refer to the Data Sheet provided for the 31331-Series Rinse pump.

Ceramic shaft seal

- In the unlikely event that water begins to drip from the shaft of the Flush pump motor (key 18), the ceramic seal is worn and must be replaced.

Electrical connections

- Carefully inspect all electrical connections, even if they are protected. Remove any corrosion on the terminals or in the cables, and remake any loose or weak connections, because these cause voltage drop when under load, which directly reduces both Rinse and Flush pump performance. Protect all electrical connections against moisture.

Servicing & Winterisation - preparation

Jabsco Deluxe Flush electric toilets are designed to be user serviceable and no special skills are required.

- Flush the toilet in accordance with the OPERATING INSTRUCTIONS and ensure that all waste has left the discharge pipework and that the bowl is empty.
- CLOSE BOTH SEACOCKS (even if secondary

valves are fitted)

- SWITCH OFF POWER OR REMOVE FUSE.
- Be ready to mop up any water that may come out of the system.

Servicing - Winterisation

Drain the complete system, both as protection against frost damage and to discourage the growth in the pipework of bacteria that cause unpleasant smells.

- Loosen hose clips and disconnect the hose ends from both the seacock hose tails. Ensure that all water is drained from the toilet system.



CAUTION: The use of anti-freeze is NOT RECOMMENDED, as it is impossible to ensure that it penetrates the complete toilet system. If, for any reason, anti-freeze is used it MUST be glycol based.

WARNING



HAZARD RISK: Seacocks opened by mistake.

ATTACH WARNING NOTICE!

If you leave the toilet disassembled and, if the seacocks are opened when the craft is afloat, water will flood in and may cause the craft to sink, which may result in the loss of life. Therefore, you MUST attach a warning notice to the seacocks and, if possible wire the seacocks shut.

If you are not leaving the toilet disassembled:

- Reconnect all hose ends and secure them with their hose clips.
- Replace the non-return valve.
- Fasten down the seat and lid to prevent use and attach a warning notice.

* * *

Servicing - Flush pump

YOU WILL need a pair of long nose locking grips and a Service kit 58100-1000 - refer to the PARTS LIST for details.

Remove complete pump assembly

- Unfasten and separate the 2 halves of the non-return valve (key 23). Keep its fastenings and its rubber flap valve. Remove any debris or scale from the flap valve, and inspect it. Replace the flap valve if it is damaged or age hardened.
- Remove the hose clip (key 9) where the inlet hose (key 8) is fastened to the bowl outlet.
- Cut the support strap (key 4) that fastens the motor to the support block (key 5).
- Remove the complete pump and hoses assembly from the bowl. Disconnect the Flush pump positive and negative motor leads.

Check pump chamber

- Remove the 9 screws (key 20) that fasten the upper pump body (key 10) to the lower pump body (key 14).

- Separate the 2 pump bodies. Remove the joint ring (key 11), and inspect it. Replace the joint ring if it is damaged or age hardened.
- Thoroughly clean and de-scale all parts.

Remove shaft seal (only if leaking)

- Grip the motor shaft between the motor (key 18) and the adaptor plate (key 19), and turn the impeller CLOCKWISE and remove it.
- Remove the 4 nuts and washers (key 15 & 16) from the motor studs, and keep them. Separate the adaptor plate, together with the lower pump body, from the motor.
- Remove the 3 screws (key 19) that fasten the adaptor plate to the lower pump body, and keep them. Separate the adaptor plate from the lower pump body.
- Using a blunt instrument, carefully push out the ceramic seal assembly (key 13) from the lower pump body (key 14).

Fit new shaft seal

YOU MUST:

- *Have perfectly clean and dry fingers when you handle the ceramic seal, or wear surgical gloves.*



CAUTION: Do NOT allow anything at all to touch or fall onto the mating faces of the new ceramic seal!

- Take the stationary half of the new seal (white ceramic face in rubber cup) and, with rubber cup at the bottom, press it into the seal housing in the lower pump body (Key 14) using your clean, dry fingers only, leaving white ceramic face exposed.
- Re-fasten the adaptor plate (key 17) to the lower pump body (Key 14).
- Re-fasten the adaptor plate, together with the lower pump body, to the motor (key 18).
- Carefully slide the rotating half of the ceramic seal (black carbon face) down the motor shaft to cover the white ceramic face.
- Grip the motor shaft between the motor and the adaptor plate, and re-place the impeller by turning it ANTI-CLOCKWISE. Fasten the impeller by hand only - do NOT use any tools or leverage.

Re-assemble pump

- Place joint ring (key 11) in position.
- Re-fasten the upper pump body (key 10) to the lower pump body (key 14), using the 9 screws (key 20).

Refit pump assembly

- Reconnect the Flush pump positive and negative motor leads. Offer up the complete pump and hoses assembly to the bowl and to the bowl outlet.
- Re-fasten the motor to the support block (key 5), using a new support strap (key 4).
- Re-fasten the inlet hose (key 8) to the bowl outlet, with the hose clip (Key 9).
- Re-fasten the 2 halves of the non-return valve (key 23).

Hoses

- Examine all hoses throughout their length for chafe, kinks and splits under hose clips. Check all hose clips for corrosion and replace worn or damaged parts.



CAUTION: Do not apply flame to the hose. Do not apply flame or heat to the plastic hose tails on the toilet, rinse pump or solenoid valve. Do not use oils, greases or synthetic lubricants. Do not apply sealing compounds to any hose connections. Do not over tighten hose clips. Any of these actions may result in cracking or breakage of the plastic parts.

- Reconnect all loose hose ends and secure them with their hose clips.

Servicing - Testing

- Open inlet and outlet seacocks (and secondary valves if fitted).
- Switch on power or replace fuse.
- Use Touch Pad Controller as described on page 2, to check all functions, and then inspect for leaks.

ON COMPLETION - CLOSE BOTH SEACOCKS!

* * * * *

TROUBLE SHOOTING

Bowl fills when not in use

- Shut seacocks
- Fit Vented Loops

Waste water re-appears in bowl

- Check non-return valve (key 23)

Bowl does not empty

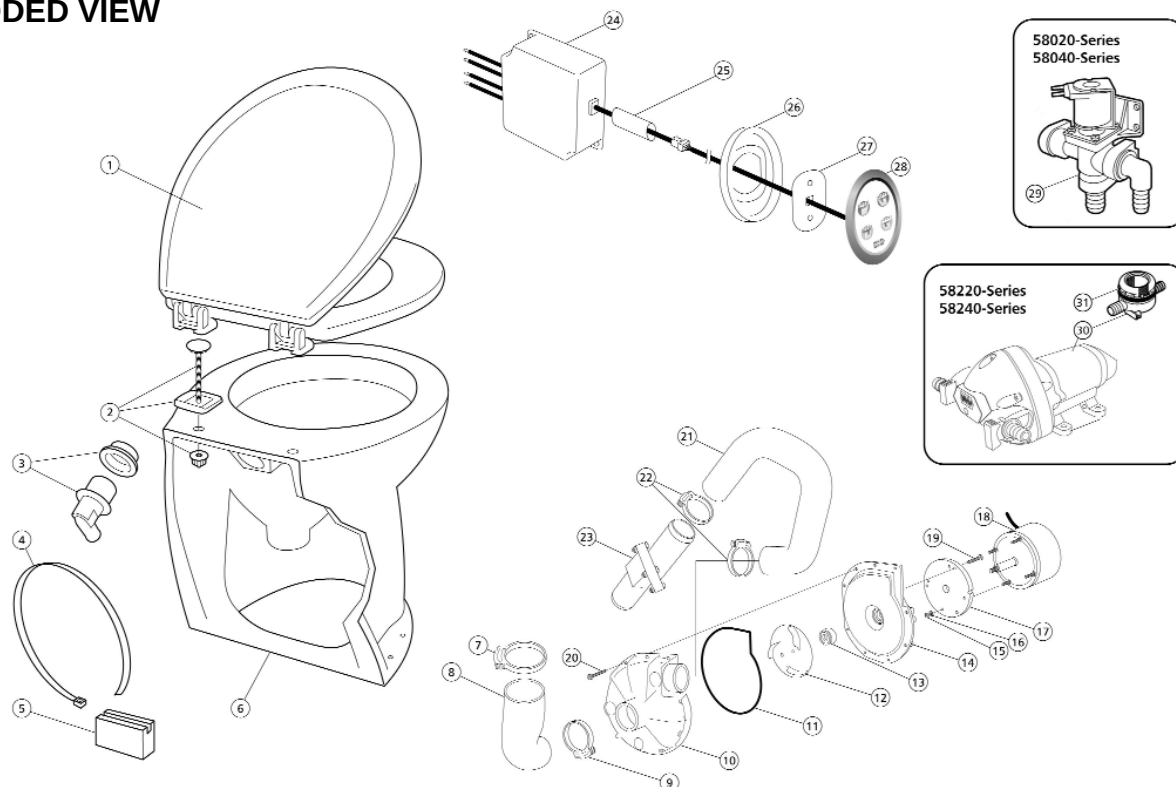
- Open Outlet Seacock
- Check non-return valve (key 23), Discharge Hose or Outlet Seacock for blockage.
- Remove pump and check for blockage

Water does not come in

- Open Inlet seacock
- Check Inlet hose connections are airtight
- Check electrical connections to Solenoid Valve or Rinse pump

* * * * *

EXPLODED VIEW



SPARE PARTS

Service Kits Available		
Kit	Part No	Description
A	58100-1000	Major Service kit
B	58101-1000	Ceramic Seal kit
C	58102-1000	Hose kit
D	58103-1012	Pump Assembly, 12v
	58103-1024	Pump Assembly, 24v
E	58029-1000	Control kit

Key	Description	Qty per Toilet	Part No	Qty per Service Kit				
				A	B	C	D	E
1	Seat & Lid, set	1	58104-1000					
2	Hinge Kit, pair	1	58105-1000					
3	Rinse Intake Seal & Elbow	1	29048-0000					
4	Support Strap, motor	1	see kits	1	1	1	1	
5	Support Block, motor	1	58034-1000	1				
6	Bowl, Angled back	1	58028-1000					
	Bowl, Vertical back	1	58038-1000					
7	Hose Clip, large	1	see kits	1	1	1	1	
8	Inlet Hose, flush pump	1	see kits	1		1	1	
9	Hose Clip, medium	1	see kits	1	1	1	1	
10	Pump Body, upper	1	see kits					1
11	Ring Seal, pump	1	see kits	1	1			1

Key	Description	Qty per Toilet	Part No	Qty per Service Kit				
				A	B	C	D	E
12	Impeller	1	see kits				1	
13	Ceramic Seal, set	1	see kits	1	1		1	
14	Pump Body, lower	1	see kits				1	
15	Nut, motor stud	4	see kits	1	1		4	
16	Washer, motor stud	4	see kits	1	1		4	
17	Adaptor Plate	1	see kits				1	
18	Motor, 12v	1	see kits				1	
	Motor, 24v	1	see kits				1	
19	Screw, adaptor plate	3	see kits	1	1		3	
20	Screw, pump	9	see kits	2	2		9	
21	Outlet Hose, pump	1	see kits	1			1	1
22	Hose Clip, small	2	see kits	2	2		2	
23	Non-return Valve	1	29295-1010					
24	Control Box, electronics	1	see kits					1
25	Heat Shrink Sleeve, control cable	1	see kits					1
26	Glove, control panel	1	see kits					1
27	Mounting Plate, glove	1	see kits					1
28	Control Panel	1	see kits					1
29	Solenoid Valve, 12v	1	37038-1012					
	Solenoid Valve, 24v	1	37038-1024					
30	Rinse Pump, 12v, c/w Pumpgard	1	31331-0092					
	Rinse Pump, 24v, c/w Pumpgard	1	31331-0094					
31	Pumpgard only	1	46400-9500					

Jabsco



ITT Industries

Jabsco, 1 Kondelin Road, Cape Ann Industrial Park, Gloucester, MA 01930

Tel : +1 978 281 0440 Fax : +1 978 283 2619

Jabsco, Bingley Road, Hoddesdon, Hertfordshire, EN11 0BU

Tel : +44 (0) 1992 450 145 Fax : +44 (0) 1992 467 132

Fluid Products Canada, 55 Royal Road, Guelph, Ontario N1H 1T1

Tel : +1 519 821 1900 Fax : +1 519 821 5316

NHK Jabsco Co Ltd, 3-21-10, Shin - Yokohama, Kohoku-ku, Yokohama 222

Tel : +81 (0) 45 475 8906 Fax : +81 (0) 45 475 8908

Jabsco GmbH, Oststraße 28, 22844 Norderstedt

Tel : +49 (0) 40 53 53 73 0 Fax : +49 (0) 40 53 53 73 11

Jabsco Italia, S.r.l., Via Tommaseo, 6, 20059 Vimercate, Milano

Tel : +39 039 685 2323 Fax : +39 039 666 307

USA

UK

CANADA

JAPAN

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