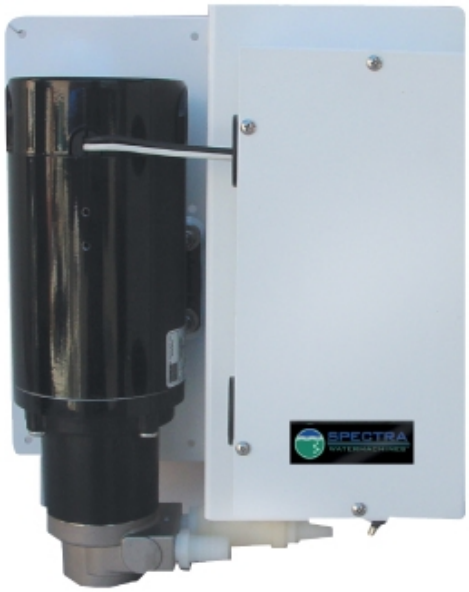
CATALINA CT-300
INSTALLATION MANUAL



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Rev 06-18-04

NON MPC VERSION

Thank you for your purchase of a Spectra Catalina system. Properly installed it will provide years of trouble free service. Please pay attention to the installation instructions and the system layout. Like any piece of mechanical equipment the system will require inspection and service from time to time. Do not place the components in inaccessible areas that will prevent proper maintenance. If you are having a dealer install the system for you, review the location of the components to make sure that the installation will meet your approval upon completion. . Prudent operation is required with any marine equipment. ***Always maintain enough reserve water to get safely into your next port.***

Catalina Installation Quick Start

Important Details for Installer

1. The system must have a dedicated sea water inlet to guarantee a solid flow of water to the system. The inlet should be as low in the boat as possible and with a scoop type forward facing thru-hull fitting installed.

2. Follow the wire gauge charts in the instructions! Using larger wire than specified is acceptable.

3. To achieve the full benefits of the fresh water flush system. The domestic fresh water pressure must be on and the fresh water tank level maintained. Calculate 3 gallons (12L) per flush for the Catalina 300.

4. If you are separating the Clark pump/membrane assembly, please review the high pressure tube assembly instructions. Improper assembly will cause failure!

5. Run test, then "sea trial" the complete system before assuming the system is operational. If the boat is in fresh or dirty water, see "Dry testing the system."

6. Spectra dealers are responsible for educating the vessel owners on the operation and maintenance of the system. We request that you "walk through" the installation with our customer.

7. Please have the owner fill out the warranty card. The warranty is void if it is not registered.

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Introduction to the Catalina 300

The Catalina represents the latest step forward in watermaking technology. Utilizing the Spectra intensifier (Clark Pump) and the Spectra-Mag feed pump it is the most efficient and quiet marine watermaker on the planet today.

The magnetic drive feed pump eliminates the direct couple between the motor and the pump eliminating seals and bearings. This allows for a quieter, more efficient and reliable pump assembly. The Spectra Mag pump assembly is coupled to a quality permanent magnet motor with field replaceable brushes. Understanding this pump is important in the operation of the system. The pump is a sealed unit with a set of magnets coupled to the pump rotor. There is a set of cup magnets attached to the motor that rotate around the pump assembly. The transfers the motor energy to the pump without needing to seal the rotating shaft. Without the shaft there is no requirement for a bearing that eventually will require lubrication or replacement. The Mag Driven pump has many advantages over its counterparts but does have some limitations. By understanding the issues you can avoid problems with the system.

The Mag drive pump will decouple if it is overloaded! When this happens the pump stops and the magnets on the motor continue to rotate. Shut the system down if this occurs. It will damage the system if run in this condition for extended periods.

Spectra Mag Pump

There are a few things that you can do to avoid problems with your Spectra Mag pump system.

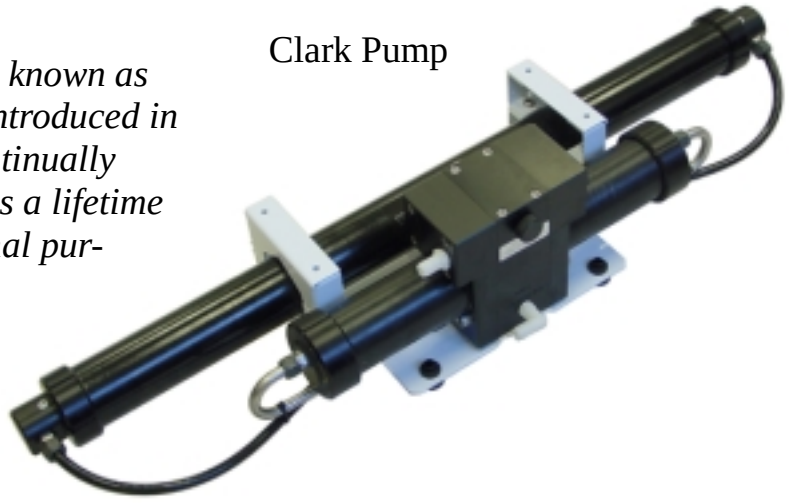
Make sure that the accumulator is properly installed and that it is charged to 60 PSI (4.2 BAR).

Keep your 20 and 5 micron filters clean to avoid restrictions.

Do not start the pump under load. After you shut the system down wait until the system pressure drops before restarting or going into a flush mode.

The Spectra Intensifier known as the Clark Pump was introduced in 1997 and has been continually improved since. It holds a lifetime warranty for the original purchaser!

Clark Pump



Getting Started

Unpack the system and inspect it to make sure that it has not been damaged in shipment.

Refer to the shipping list for your system to make sure you have received all of the components listed. Do not discard any packaging until you have found and identified all of the parts. The small installation parts are listed on the cellophane bags' pick list.

We will not be held responsible for shortages and or freight damage that are not reported within thirty days of the ship date.

Next, study the system layout diagram, component photos and descriptions before beginning your installation. This will assist you in understanding the function of each component.

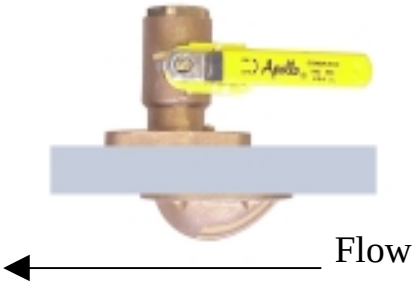
Layout the system. Before starting the installation identify the location where each module and component will be placed. Insure that there is proper clearance around the components for removal of filters and system service. Also check to make sure you have adequate tubing and hose before starting so additional parts may be ordered. Check to see that the control cable is long enough to reach from the display location to the main module.

Catalina 300 shipping list:

- Catalina Feed Pump Module.
- High Pressure Clark Pump and Reverse Osmosis Membrane Module
- Fresh Water Flush Module
- Duel filter assembly.
- Analog Monitor Panel With Control Switches and 25' (8.5M) control harness.
- Catalina Installation Kit
- Service Hose Kit
- 5/8" Hose (25')

Installation Basics

Thru hull
Not Supplied.



- **Read the directions!**
- Avoid tight hose bends and excessive runs.
- Use heavy gauge wire.
- Install feed pump as low as possible.
- Use a dedicated thru hull with scoop type strainer.

Thru-hulls

It is mandatory that a dedicated 3/4" forward facing scoop type intake thru-hull and seacock be installed. Install the intake for the system close to the middle and as far below the water line as possible. Thru-hulls in the bow area are susceptible to air intake in rough conditions. Sharing a thru-hull with another system is not acceptable and will void the warranty. Sharing a thru-hull can introduce unforeseen problems such as intermittent flow restriction, air bubbles, and contaminates. For racing boats and high speed power boats above 15 knots a retractable snorkel-type thru-hull fitting is preferred to be able to pick up water away from the hull.

Do not install the intake close to or downstream of a head discharge. Install as far below the waterline and as close to center line as possible to avoid contamination and air induction.

The brine discharge through-hull should be mounted above the waterline, in or just above the boot stripe to minimize water lift.

Double clamp all hose connections below the waterline.

Pipe Fitting Instruction

Plastic to plastic fittings should have 3 to 4 wraps of Teflon tape and will thread almost all the way in.

Avoid getting dirt or debris into the piping or hoses during assembly. A small bit of debris can stop the system! Avoid getting tape over the end of fittings that might get into the system. To insure this does not happen, leave the very first thread uncoated.

Avoid restrictions or long runs on the inlet side of the plumbing from the thru hull to the main feed pump module.

Prevent tight bends and excessive elbows. Any restrictions will hamper system performance. Secure the piping away from moving objects such as engine belts and hatches. Prevent chafe on the tubing as required. Test and inspect all piping and hose clamps after several hours of operation.

Wiring

- Pay attention to wire size or system performance will be impaired.
- Perform wiring to UL, ABYC, CE or applicable standards.

Component Placement

Refer to the Plumbing Diagrams

Strainer

Mount the strainer in an accessible area close to the intake through-hull that can handle water spillage during service. Extra care during assembly must be taken to avoid air leaks from the strainer. Use the supplied “Quick Block” and wire tie for mounting.

Fresh Water Flush Module

The fresh water flush module should be located between the intake strainer and the feed pump Module and as low as possible in the vessel. It should be mounted with the filter housings vertical and accessible for changing filters. Allow 2” below the filter housing for removal. Do not install over electrical equipment. Remove filter bowls for access to the screw holes in the mounting plate. The unit contains a 50 Micron prefilter, charcoal filter for the flush water, flush solenoid and three way intake service valve.

Optional Zeta Guard

The optional Zeta-Guard Water treatment system should be installed between the fresh water flush module and feed pump, to effectively treat all incoming water to the system. Consult your Zeta handbook for specific directions.

Feed Pump Control Module

Mount the Spectra Mag feed pump module on a horizontal or vertical surface up to 4’ above the waterline. It is <u>preferable</u> to mount as low as possible. If mounted on a vertical surface mount the pump head down.

This Module contains the control system that shuts the system down in the event of a clogged 50 micron prefilter or a blocked sea strainer. The control also has timer system for the fresh water flush cycle. The timed cycle is pulsed on and off to allow the fresh water system to keep pace and to slow the fresh water flow to allow the charcoal filter to do its job. There is an accumulator located on this module to store the fresh water during the off part of the pulsed cycle. It should be set between 0-5 PSI (0-.3 BAR)

The filter assembly is installed between the feed pump and the Clark pump membrane module. Mount vertically in a location with 2” below the filter bowls. Locate where water spillage during filter change will not be a problem. Plumb the water in on the left and water out on the right. The housing shown is equipped with pressure sensors for the optional MPC-3000 control.

There are two accumulator assemblies, one is located in the feed pump module to facilitate the fresh water flushing process and the other is located between the feed pump module and the Clark pump pressure vessel unit. Plumb the second as shown. The CT-300 has a remote analog gauge that is plumbed with small tube. The pressure is preset at the factory so no adjustment is necessary.

Remote Control Panel

The remote control and monitoring panel can be mounted anywhere that is dry and convenient. You will need to be able to route the product tubing the system pressure tube and the control cable to this location.

Clark Pump/Membrane Module

The Clark pump/membrane module comes complete with a mounting system. Be sure to use the supplied washers on the rubber feet. Use it as a template for drilling the mount holes. Mount in any position but leave access to the pressure relief valve on the Clark pump. Install in an area that maintains a temperature below 120F (50C). A cool location is preferable. Keep this unit within the 15' (4.5M) reach of the wires from main feed pump module. This unit may be placed as high in the boat as you desire. Make sure that the area around and under the pump does not have any water sensitive equipment. Water will be spilled during any repairs or if a leak occurs.

Membrane Pressure Vessel Mounting

The Clark pump and membrane assembly has been pre-assembled at the factory. If it is necessary to disassemble this module and mount the pressure vessel remotely use guidelines (High pressure tube assembly) in back of the manual. Use only approved Spectra tubing for assembly.

Plumbing

From the inlet thru hull to flush module and from flush module to feed pump module inlet use supplied clear 3/4” (19mm) spiral suction rated hose. Use the braided 5/8” hose on the discharge of the feed pump module to the filter assembly. From the outlet of the filter assembly to the Clark pump assembly use the supplied braided clear vinyl hose rated to 150 PSI (11 bar). Install the supplied accumulator and gauge between the filter and the Clark pump per photos. From Clark pump brine discharge connector use supplied 5/8” (15.9mm) clear braided vinyl hose.

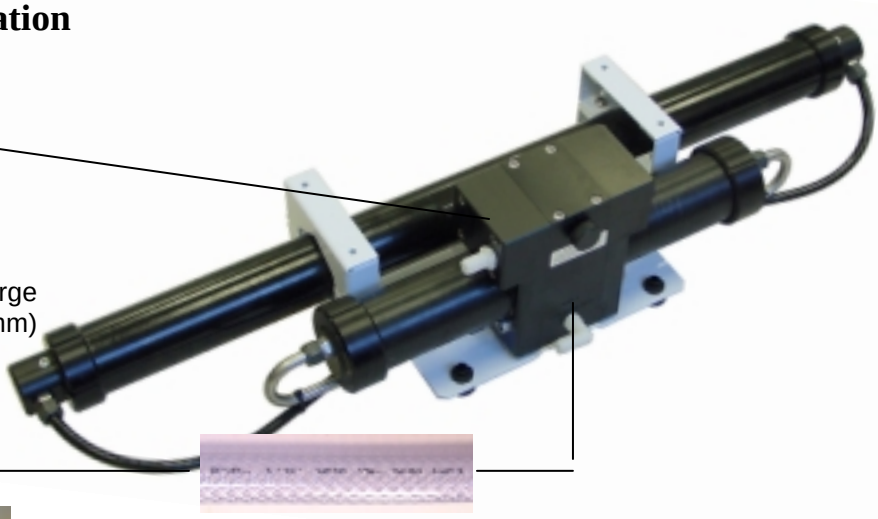
Route all hoses and tubes to prevent kinks and restrictions. Where possible, avoid right angle fittings if favor of straight. Secure piping away from moving objects such as engine belts and hatches. Prevent chafe on tubing as required. Test and inspect all piping and hose clamps after several hours of operation.

The install kit should have most all of the plumbing fittings that you require.

We supply quality hose rated for this application.

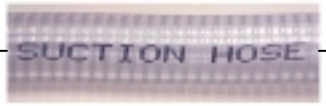
300 Systems Piping Specification

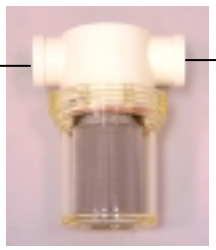
From the Clark pump brine discharge connector use the supplied 5/8 (15.9mm) clear braided vinyl hose.

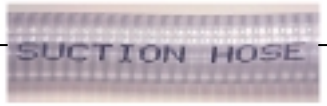


Install the supplied accumulator between the filter assembly and Clark pump.

The outlet of the feed pump module to the Spectra high pressure pump assembly is under pressure. Use the supplied braided clear vinyl hose rated to 150 PSI (11 bar).







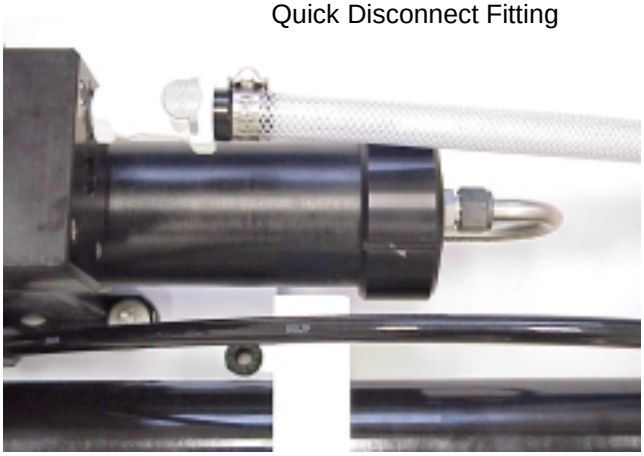
From the inlet thru hull to the flush module and from the flush module to the feed pump module inlet use the supplied clear 3/4” (19mm) spiral suction rated hose.

Fresh Water Flush Module

Run a feed line from the domestic cold pressure water system to the 1/2 hose barb on the fresh water flush assembly. This needs to be active when the boat is unattended for the fresh water flush system to function properly. The domestic fresh water pump must be able to deliver 2.5 gallons per minute at 25 PSI. Connect the wiring harness and heat shrink butt splices.

Brine Discharge

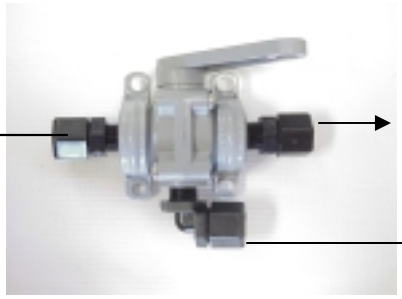
Route the Brine discharge from the quick disconnect fitting to location above the waterline using the supplied 5/8” (15.9MM) hose.



Catalina CT-300 Panel Plumbing and Wiring

Tap for sampling.

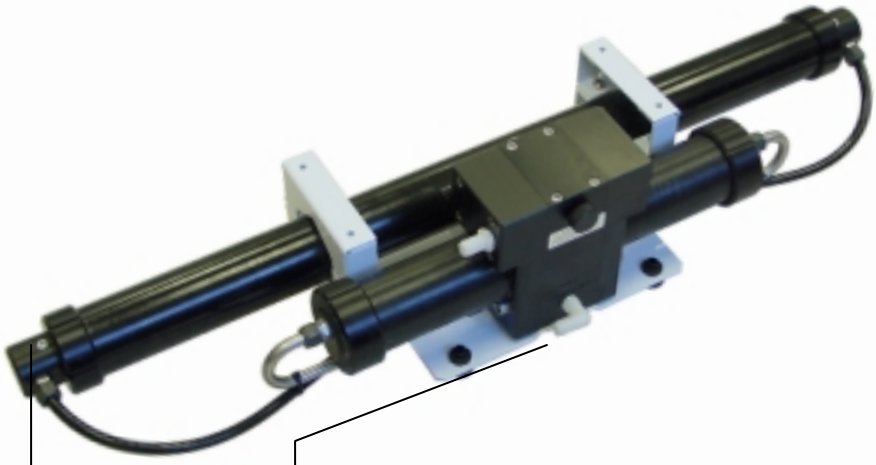
This is often led to a sink area for convenience.



Note: the handle is pointing to the direction of the flow.

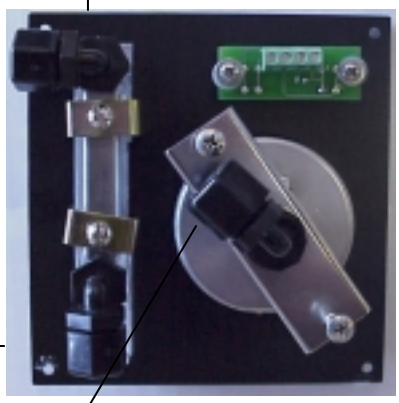
Product Water Sampling Valve

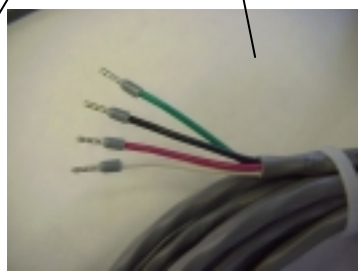
To Tank
You will need to route the product water from the valve into the top of the tank. Install a tee in the water fill or tap a pipe thread into an inspection port in the top of the tank. Do not feed the water into a manifold , Vent or the bottom of the tank. Make sure there is no restriction in this plumbing.



Product Water to Flow Meter

White
Black
Green
Red



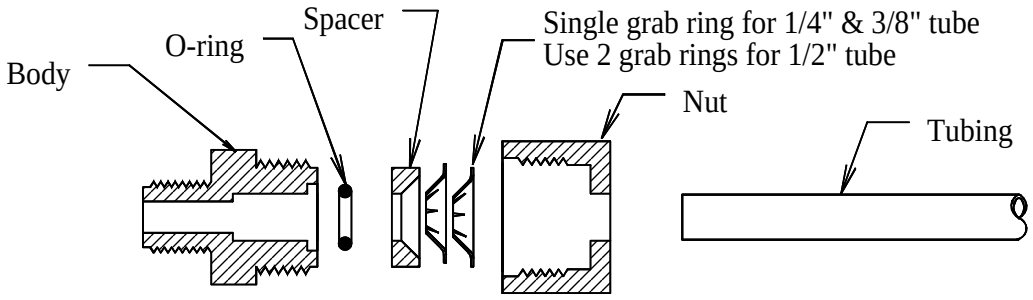


Harness From Spectra Mag Pump Control Module connects to remote control panel

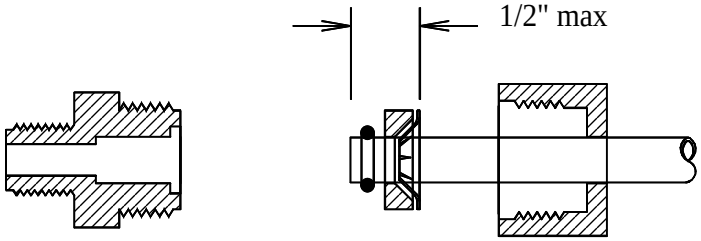
To Pressure Gauge

Feed From Spectra-Mag Pump

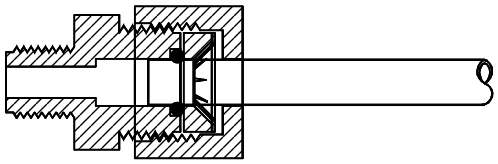
Parker Tube Fitting Assembly Procedure



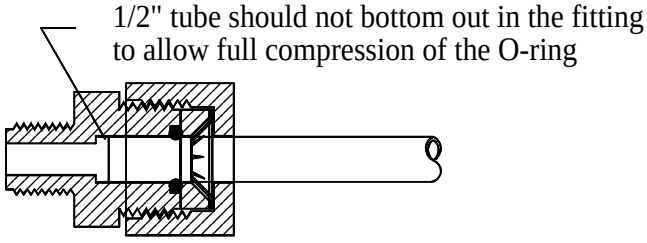
Step 1: Dissemble fitting components



Step 2: Install the Nut first then use the bevelled side of the Spacer to push the Grab Ring onto the tube no more than 1/2". Slip the O-ring over the tube to hold the Spacer in place. If the Grab Ring is pushed too far, trim back the tube so about 1/4" of tube extends past the O-ring.



Step 3: Gently fit the tube into the body and loosely thread on the nut. Be careful not to cross-thread the nut



Step 4: Hand tighten the nut. DO NOT OVER TIGHTEN! DO NOT USE A WRENCH! The tube should not come out if pulled by hand. If it does, tighten the grab ring tabs.

1/4", 3/8", 1/2" Parker Tube Fitting Assembly

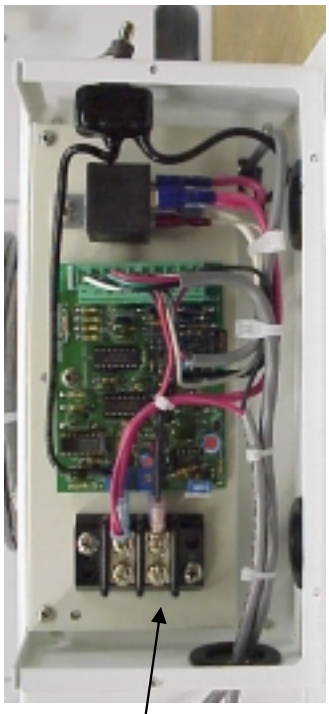
Electrical Installation

Catalina CT-300 Standard

The wiring of the standard version consists of routing the main power feed to the terminal block coming out of the control box on the Spectra– Mag pump module and connecting the two supplied harnesses to their respective locations. Use the wire chart to select wire gauge for the main power feed. The chart length is for a pair of wires. The supplied four conductor harness connects to the remote panel and the two conductor connects to the fresh water flush module. Do not connect any power to the control until you have finished all connections and are ready to test the system.

Catalina CT-300 Systems 12V Fuse or circuit breaker 25A
Use # 10 Gauge wire (6MM) to 10 Feet (3M)
Use #8 Gauge wire (10MM) to 15 Feet (4.5M)
Use #6 Gauge wire (16MM) to 20 Feet (6.1M)
Use #4 Gauge wire (25MM) to 35 Feet (10.6M)

For 24V you may double the length of the wire run. Use a 15A breaker.



Main power Connects
To Terminal Block
Red -POS.
Black- Ground

To Inlet Module
Crimp connectors and
heat to shrink.

To remote Panel

New System Start-Up and Testing Catalina Standard

Avoid running the system if the vessel is in contaminated water, such as in a harbor or canal. The system should be fully run tested before leaving port. It is preferable to sacrifice a filter by running the system in turbid water rather than waiting to get offshore to discover a problem or deficiency in the installation. If the location or weather prevents proper testing refer to the section “Dry Testing.”

Warning! Damage may occur if the purge sequence is bypassed and the membrane is pressurized with storage chemical in it.

1. First Check That:

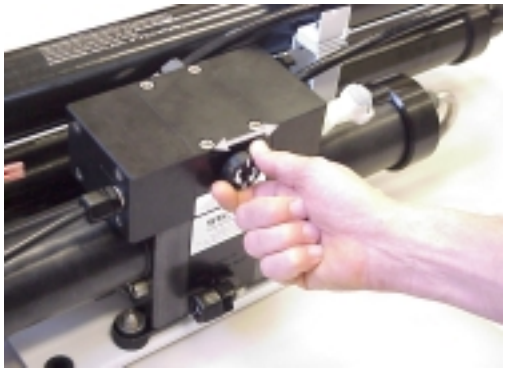
   Thru-hull valve is open

   Power is on.

   You have removed green tag and attached washer from the Pressure Intensifier.

   The inlet service valve on the inlet module is in the “Run” position

   The domestic water system is on.



2. Open pressure relief valve 1/2 turn !

Start the feed water pump with the start /stop switch on the remote panel. After a few seconds the pump should prime and get quiet. Check the overboard brine discharge for flow. Run with the pressure relief valve open for 20 minutes to purge the storage chemicals. Open the Product sampling valve and close the pressure relief valve. The pressure should rise to 60-90 PSI (4.2-6.4 BAR). The machine should start making water now.

After you have filled your tanks, stop the system. Wait several moments until the feed pressure drops to 40 PSI (3 BAR) before starting the Fresh Water flush cycle. The pump will cycle on and off for several minutes and then automatically shut down. You may flush the system again at any time. We recommend doing this on a five day cycle in moderate climates and three day cycle in tropical environments. If you need to leave the system for extended periods you will have to store the system with chemicals.

Never ! try to restart the system without letting the pressure drop or the pump may decouple. If this occurs stop the pump and allow it to stop before attempting to restart. If the pump sounds rough or is noisy stop the system and look for the cause.
If the pump stops check for a restriction in the strainer or the 50 micron filter system.

Daily Operation

Operation of the Catalina is quite simple. Before starting the system it is recommended that you check that

The inlet seacock is open.

The discharge seacock is open

The system is powered up

Product sampling valve is in sample position.

Next start the unit and check that the pressure is rising. The unit will operate between 70-100 PSI (5-7 BAR) depending on water temperature. The system should start making water after one to two minutes.

After 5 to 10 minutes the water quality should be good enough to fill your tanks and you can divert the sample valve into the tank fill position. You can test the water periodically with the supplied hand held tester. We consider water under 750 PPM quite acceptable for drinking.

Salinity Tester
Simply remove the protective cap at the bottom turn the unit on and dip the electrodes into the water sample.

Run the system until you have made the required water or your tanks are full. We recommend that it is better to run for several hours and to do a fresh water flush rather than to run and hour a day without a flush. Remember that it will take about 3 gallons (12L) per fresh water flush cycle.

When you are done making water shut the system down and push the FW flush button.
Wait for the pressure to drop to about 40 PSI (3 BAR) and then start the FW flush. If you do not wait the pump may decouple!

The timed cycle will start with the feed pump cycling on and off. At this time the FW Flush solenoid is open allowing the de-chlorinated water to flush the salt out of the pump and membrane. Run the machine or re-flush every 3 to five days.

Dry Testing With Artificial Ocean

If it is not possible to test run the system with the boat in the water testing may be accomplished with an artificial ocean. Purchase enough aquarium salts to make 5 gallons (20 liters) of salt water.

Make sure that the domestic water system is powered up and that there is water in the tank. Confirm that the Charcoal filter is installed in the Fresh water flush module and that the domestic water line had been installed and all valves are open.

1. **Open Pressure Relief Valve.**
2. Power up the control system.
3. Confirm that the domestic fresh water system is on.
4. Flush the system five or more times to purge the chemicals out of the membrane.
4. Hook up your service hoses per the photos. Route them into a 5 gallon (20 Liter) bucket. Route the product tube from the sampling valve or by using another short piece of tube route the product water feed into the test bucket.
6. Turn the valve on the fresh water flush module from "**Run"** to **"Service.**"
7. Press flush button one or two more times to get enough water into the bucket to properly mix your salt water. Mix the salt until it goes into solution. If you are using a hydrometer mix the water to be 34,000 PPM. Close the pressure relief valve ***(Make sure you have removed the green tag with the attached washer)*** and start the system using the "**Start/Run** Button.
8. Run and test the system for as long as possible. During the run test carefully inspect for leaks. Check all of the system parameters to make sure the system is operating correctly. Do not allow the water in the bucket to get above 120F (50C).
9. Store the system per the "Storage" instructions.

Inlet Module with service hose connected
Three way valve in service position.

Brine discharge quick disconnect
for access.

Long Term Storage Procedures

Watermakers are best run continuously. When not in use, biological growth in the membrane is the leading cause of membrane fouling. A warm environment will cause more growth than a cold environment. The fresh water flush system will greatly reduce biological growth but may not stop it completely in certain conditions. If an optional "Zeta Guard" water treatment system is installed in the system, the 5 day re-flush will maintain the system as long as unchlorinated pressurized fresh water is provided.

System Storage or "Pickling"

If the system is to be left unused for more than 2 weeks, perform the following storage procedure. The procedure introduces a chemical compound into the system that prevents biological growth. This procedure requires de-chlorinated water which can be made with the Spectra's charcoal filter. **Charcoal filters last a maximum of 6 months once wetted.**

Spectra SC-1 a special storage compound used by the US Navy. It is formulated to be compatible with the modern engineering plastics and composites in the Spectra pumps. Do not use any substitute except Propylene Glycol, SC-1 Storage Compound has to be mixed at a ratio of 1 Spectra container to 3 gallons (12L) of fresh water to have the proper solution. An average of 2 gallons (8L) of water is in a 300 system .

Caution! Avoid contact with skin, eyes, or lungs with the storage chemical.

Storage Procedure:

- Step 1: With the system running use your product sampling valve to divert five gallons (20 liters) into one or two containers.

- Step 2: Connect a hose, using the garden hose barb fitting from your service kit, to the service port of the fresh water flush module. Lead the hose into the bucket. Turn the service valve on the fresh water flush module 180°, so the intake is now coming from the bucket.

- Step3: Start the pump with the manual switch and flush the system with all but one gallon (4 L) of product water.

- Step 4: Remove the quick disconnect fitting from the brine discharge outlet of the Clark pump, and replace with a quick disconnect from your service kit, fitted to a hose, and lead the hose to a 5 gallon bucket.

- Step 5: Mix the storage chemical compound into the water in the bucket. Don't worry if it doesn't fully dissolve.

- **Step 6: Make sure the pressure relief valve on the Clark pump is <u>Open</u> (unpressurized).**

- Step 7: Use the "Feed Pump Manual" switch on the control box to turn on the feed pump. Circulate the storage chemical in the system for approximately 10-15 minutes. Turn off the switch when finished.

Clean Up:

- Remove the quick disconnect from the Clark pump brine discharge, and replace the original hose that leads to the thru-hull. You may at this point, if you choose to, pump the bucket dry by using the feed pump switch. Stop when the bucket is empty.

- Turn the service valve 180° back to its original position, and remove the service hose.

Alternative procedure:

If it is not possible to run the system you may use the fresh water flush system to get the required de-chlorinated fresh water.

First shut the intake thru hull. Confirm that the domestic fresh water system is on. Flush the system twice. Remove the brine discharge fitting and install the brine discharge service hose. Flush the system until you get one gallon (4L) in the bucket. Proceed with step 6 and 7 above.

Winterizing

Warning! Only use potable water antifreeze (Propylene Glycol).
Do not use automotive antifreeze (Ethylene Glycol).

- Step 1: With the system running use your product sampling valve to divert five gallons (20 liters) into one or two containers.

- Step 2: Connect a hose, using the garden hose barb fitting from your service kit, to the service port of the fresh water flush module. Lead the hose into the bucket. Turn the service valve on the fresh water flush module 180°, so the intake is now coming from the bucket.

- Step3: Start the pump with the manual switch and flush the system with almost all of the product water.

- Step 4: Remove the quick disconnect fitting from the brine discharge outlet of the Clark pump, and replace with a quick disconnect from your service kit, fitted to a hose, and lead the hose to a 5 gallon bucket.

- Step 5: Pour one gallon (4L) of Propylene Glycol into the bucket.

- **Step 6: Make sure the pressure relief valve on the Clark pump is <u>Open</u> (unpressurized).**

- Step 7: Use the "on manual" switch on the control box to turn on the feed pump. Circulate the chemical in the system for approximately 10-15 minutes. Turn off the switch when finished.

Clean Up:

- Remove the quick disconnect from the Clark pump brine discharge, and replace the original hose that leads to the thru-hull. You may at this point, if you choose to, pump the bucket dry by using the feed pump switch. Stop when the bucket is empty.

- Turn the service valve 180° back to its original position, and remove the service hose.

Alternative procedure:

If it is not possible to run the system you may use the fresh water flush system to get the required de-chlorinated fresh water.

First shut the intake thru hull. Confirm that the domestic fresh water system is on. Flush the system once. Remove the brine discharge fitting and install the brine discharge service hose. Flush the system until you get one gallon (4L) in the bucket. Proceed with step 6 and 7 above.

Note: The product tube, strainer, and all associated hoses that are not subject to the glycol antifreeze should be drained of fluid. This may require compressed air.

Maintenance

General

Periodically inspect the entire system for leakage and chafe on the tubing and hoses. Repair any leaks you find as soon as practical. Some crystal formation around the Clark pump blocks is normal. Wipe down any salt encrusted areas with a damp cloth.

The Seawater Strainer and 50 Micron Filter

- The sea water strainer's stainless steel element should be inspected, removed, and cleaned as needed. A clogged strainer or 50 Micron filter will cause the pump to stop without warning. Be careful to ensure that the thru-hull is closed before disassembly and the seal and element are in place before reassembly. Put the screen up to a light for inspection. When the system is put into storage, remove, rinse, and reassemble dry to impede corrosion. Check frequently during operation.

- The 50 micron filter needs to be properly maintained to protect the feed pump. Only use Spectra approved filters. These may be cleaned several times before discarding.

The Prefilters

- Service the prefilters on a regular basis. The pressure will drop on the remote gauge when the filters become dirty. Extremely dirty filters will harm system performance and may cause the feed pump to decouple.
- To service the filters shut off the thru-hull, open the housings, discard the old filters, Clean out the housing bowls, reassemble the housings with new 20 and 5 micron filter elements. The 5 micron filter goes downstream from the 20 micron. Leave dry until next startup.

- Use only Spectra approved filters or you may void your warranty. The filters may be cleaned several times with a soft brush and water in a bucket. Occasionally, lightly lube the O-rings with silicone grease.

Oil Water Separator (Optional)

To install Oil Water Separator capability remove the supplied 20 micron filter element in the duplex filter set and replace with the 20 micron oil water separator cartridge.

The Charcoal Fresh Water Flush Filter

- Replace the charcoal filter element at least every 6 months.

The Membranes

- The membranes need to be cleaned only when they have lost up to 15% of their capacity due to fouling or the product quality degrades. The leading cause of fouling is from biological growth that occurs when the system is left unused without flushing or pickling. Fouling from mineral scaling can happen during operation under certain sea water conditions, and from rust. Monitor the product salinity and feed pressure for higher than normal readings for the conditions. Other conditions can cause high pressure such as cold feed water or clogged filters. Low product flow is usually due to low voltage, damaged feed pump or Clark pump. Look for all other causes before cleaning the membrane. Membrane life can be shortened by excessive cleaning.

- There are two types of cleaners: acid and alkaline. The acid cleaner (SC-3) will remove mineral scaling. The alkaline cleaner (SC-2) is used to remove biological by-products, oil, and dirt particles that get past the prefilters. If membrane performance is reduced and they have not been pickled recently, cleaning with both chemicals is recommended. The acid cleaner should be used first. If the membrane fails to respond to both cleanings, this is an indication of another problem with the system, or that it is time to replace the membrane. Contact Spectra Watermakers before removing a membrane.

Membrane Cleaning

For normal cleaning, the SC-3 Acid Cleaning Compound is used first, then the SC-2 Alkaline Cleaning Compound. If known bio-fouling is present, the SC-2 may be used first. Using hot water if possible, up to 120° (45C) is recommended as it greatly enhances the ability of the cleaners to do their jobs.

If the history of the system is unknown or has been left “unpickled” for an extended length of time and biological growth is present, it is recommended that the system is cleaned with SC-2, using an alternate source of unchlorinated fresh water before the system is run under pressure. A simple test can be performed to see if biological growth has occurred. Before running the system, remove the prefilters and examine their condition If the housings are full of smelly discolored water, the system was not properly stored. Install clean prefilters if they were bad. Next check the membrane. Detach the brine discharge hose and lead to a bucket. Open the pressure relief valve one turn, and manually run the system for 30 seconds. Examine the brine water: if it’s discolored and smells bad, perform an SC-2 cleaning with an alternate source of unchlorinated water before running the system pressurized. If the brine is fairly clean, the system can be purged, run normally, and checked for performance. Clean the membranes only if performance is reduced.

Heating the water is preferable. One way to do this is to find a camp stove and use a large stainless steel pot to heat the solution in. The cleaning solution throughout the system will heat as it circulates in and out of the pot. An alternative is to heat the one or two gallons of initial water to 120° on the main stove before mixing in the cleaner and circulating it into the system. Periodically stop and reheat the solution.

Perform the cleaning procedures while the ship is in acceptable sea water for purging and testing.

Note: Procedures are the same for the SC-2 and SC-3 cleaners

Warning! The pressure relief valve on the Clark pump must be open for this procedure or membrane damage may result. Maximum pressure 50 PSI.

A Spectra Cleaning Compound (SC-2 or SC-3) must be mixed with fresh water at a ratio of 1 container of compound to 3 gallons (12L) of unchlorinated water to have the proper solution. An average of two gallons (8L) of water is already present inside a 300 system . This water has to be figured into the mixture. A 300 system will use 1 container of compound,

Cleaning Procedure:

- Step 1: With the system running use your product sampling valve to divert five gallons (20 liters) into one or two containers.

- Step 2: Connect the supplied service hose, to the service port of the fresh water flush module. Lead the hose into the bucket. Turn the service valve on the fresh water flush module 180°, so the intake is now coming from the bucket.

- Step3: Start the pump with the manual switch and flush the system with all but one gallon (4 L) of product water.

- Step 4: Remove the quick disconnect fitting from the brine discharge outlet of the Clark pump, and replace with a quick disconnect from your service kit, fitted to a hose, and lead the hose to a 5 gallon bucket.

- Step 5: Mix the cleaning chemical compound into the water in the bucket.

- **Step 6: Make sure the pressure relief valve on the Clark pump is <u>Open</u> (unpressurized).**

- Step 7: Use the " Pump Manual" switch on the control box to turn on the feed pump. Circulate the storage chemical in the system. Turn off the switch when finished.

Clean Up:

- Remove the quick disconnect from the Clark pump brine discharge, and replace the original hose that leads to the thru-hull. You may at this point, if you choose to, pump the bucket dry by using the feed pump switch. Stop when the bucket is empty.

- Turn the service valve 180° back to its original position, and remove the service hose.

Alternative procedure:

If it is not possible to run the system you may use the fresh water flush system to get the required de-chlorinated fresh water.

First shut the intake thru hull. Confirm that the domestic fresh water system is on. Flush the system once. Remove the brine discharge fitting and install the brine discharge service hose. Flush the system until you get one gallon (4L) in the bucket. Proceed with step 6 and 7 above.

Suggested Spares

Short term cruising, weekends etc.

We suggest a basic cruise kit. Kit consists of 3 ea, 50 micron ,20micron, and 5 micron filters and two SC-1 storage chemicals.

Cruising 2 to 6 months at a time.

Two basic cruise kits, One each replacement charcoal filter. One replacement feed pump head.

Longer than 6 months,

Additional filters, Offshore cruising kit consisting of Clark pump seals, O-rings, tools and membrane cleaning chemicals. One replacement strainer screen, O-ring for strainer screen,
O-rings for filter housing

Spectra Watermakers parts list:	**Part Number**
SC-1 STORAGE CHEMICAL	P/N FT-CHE-SC1
SC-2 CLEANER	FT-CHE-SC2
SC-3 CLEANER	FT-CHE-SC3
BASIC CRUISE KIT C	KIT-BCK-C
5 MIC FILTER	FT-FTC-5
20 MIC FILTER	FT-FTC-20
50 MIC FILTER	FT-FTC-50
CHARCOAL FILTER	FT-FTC-CC
2” STRAINER SCREEN	FT-STN-6S
OIL/WATER FILTER	FT-FTC-OW
FEED PUMP HEAD	***Contact Factory with Model and Voltage***
2” STRAINER O-RING	SO-STN-6SS
FILTER HOUSING O-RING	SO-FHS-10H
OFF SHORE KIT	KIT-OFFSH
20” MEMBRANE	FT-MB-20
40” MEMBRANE	FT-MB-40
ACCUMALTOR BLADDER	PL-ACC-BD

The Catalina system requires a properly charged accumulator tank. We suggest a simple bicycle tire pump be onboard so that the accumulator be recharged or adjusted if required.

Membrane Pressure Vessel Relocation

Use **ONLY** Dayco Imperial Nylo-Seal 88-NSR-1/2 tubing for high pressure connections. Pay attention to the direction and flow path of the tubing before disassembly. Make sure that you re-install the tubing in the same manner. Rotate the 90 degree high pressure tube fittings on the Clark pump for ideal tube runs. The high pressure fittings are typically pre-installed at the factory. These fitting seal with an O-ring and require no Teflon tape or pipe dope. Loosen the backing nut rotate the fitting and reseat the backing nut.

Follow the high pressure tube connection instructions on the next page. Connect the tubes to one of the components, secure the tube runs, and then trim and connect to the other component. A 90 degree bend in a tube is better than a 90 degree fitting. A tube, when mounted, should have at least ***one gentle bend*** to allow for expansion. **Do not connect a tube straight between hard mounted fittings.**

When connecting the tubes to their components, be sure to hold the fitting body with a wrench during the final tightening. Of special note are the stainless steel tube fittings on the membrane housing seal on an O-ring and should be seated all the way in. Hold the fitting with a wrench while installing the tube.

The fittings on the Clark pump have an O-ring seal and can be re-oriented by backing out the O-ring Stop nut. Rotate the fitting to align with the tube and tighten the nut **just past hand tight. Do Not over tighten!**

Spectra High Pressure Tube Fitting Assembly

Use **ONLY** Dayco Imperial Nylo-Seal 88-NSR-1/2 tubing for high pressure connections.

Carefully fit and measure the tubing before cutting with a sharp razor knife or hose cutter and remove any burrs. Minimum tubing bend radius is 6". Route tubing away from excessive heat sources and secure from vibration and chafe. Have at least one shallow bend in a tube assembly after it is installed.

Refer to figure 1. If a fitting has been dissembled, reassemble as illustrated. The notch on the ferrule must engage the inside of the nut properly for the nut to seat down fully. Once the tube is inserted the ferrule and nut will naturally align.

Refer to figure 2. Insert tube fully into the fitting, it should go in 0.9". Tighten the nut finger tight while moving the tube around to prevent binding. One thread should be showing under the nut. Secure the tube so it won't back out when tightening.

Refer to figure 3. Use 13/16" wrench to hold a straight body fitting or a 3/4" wrench for a 90º body, and a 7/8" wrench for the nut. Hold the body, recheck the tube insertion, then tighten the nut 1-1/4 turns. Use the index mark on the nut as a guide. The threads should be completely covered by the nut.

The tube connectors can be disconnected and re-tighten several times. To reconnect, insert the tube and ferrule into the body then hand tighten the nut. Hold the body and tighten the nut with a wrench a little past where resistance is encountered. When correct, the nut should be tightened a little past where it was before disassembly. Always check for leaks.

Figure 1.

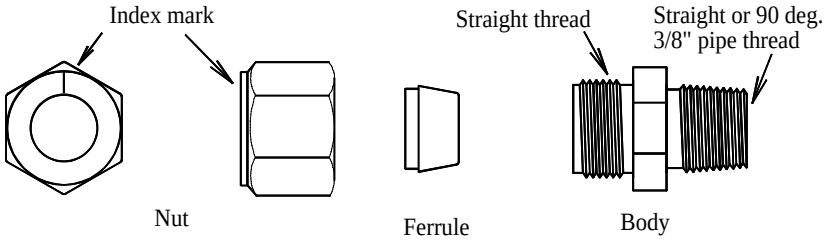


Figure 2.

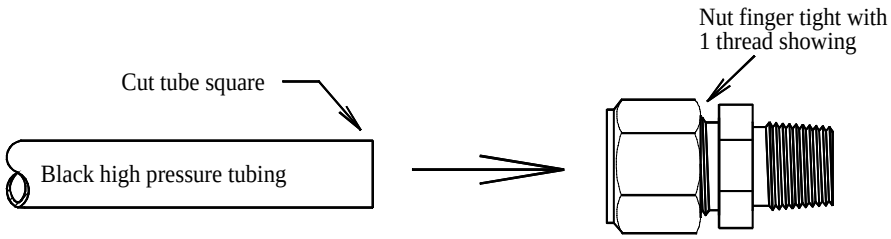
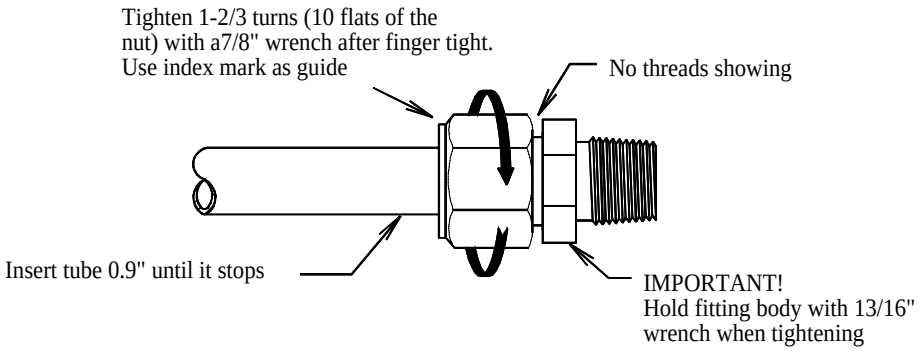


Figure 3.



Spectra Catalina Troubleshooting Procedures

SYMPTOMS	PROBABLE CAUSE	REMEDY
Feed pump runs constantly, will not turn off	Manual override switches in "on" position	Turn off manual switch on control box
Feed pump runs with loud noise	Intake blocked Air leakage in intake system **Pump De-Coupled**	Check thru-hull valve Check sea strainer for leaks Check FWF module for leaks **Check Accumulator for** correct charge
No lights or display, system does not operate	- Remote display not connected - No power to control box	Check panel cable connections at back and at control box - Check and reset main DC supply breaker - Check for voltage (12 or 24vDC) at control box power input studs - Try manual bypass switches; if pumps run, then control is defective
Pumps run intermittently, cycling on/off	System operating in flush mode (DC models)	- System will time out, or manually stop with the flush button.
Pump starts but stops immediately.	Closed Seacock, blocked strainer or plugged 50 micron inlet filter.	Inspect for blockages and clean strainer and filter.
Feed Pump Decoupling Product output low Feed pressure high	Clogged or dirty filters.	Clear or replace filters
Water production low	Voltage to feed pump low. Clogged or dirty filters	Charge batteries or check wire for voltage drop. Make sure pressure relief valve is fully closed