SPECTRA
WATERMAKERS

NEWPORT
700 - 1000 Mk II
INSTALLATION & OWNER'S MANUAL

Part 1.....Installation, Operation, Maintenance

Part 2..... Programming and Controls

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2-2012 MPC-5000

Thank you for your purchase of a Spectra Newport system. Properly installed it will provide years of trouble free service. 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.

Newport Installation

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. Both the Newport Mk II Feed Pump Module and the Clark Pump/Membrane Module must be installed in a well ventilated compartment where **temperatures will not exceed 120F (48C).** Many engine compartments exceed this temperature when underway. Warranty will be void if the installation does not meet this requirement.

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

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

5. Test and "sea trial" the system before assuming it is operational. If the boat is in fresh or dirty water, see "Artificial Dry Testing the system." After testing make sure the flush cycle operates properly. The water going overboard at the end of the flush should not taste salty (<1000ppm)

6. The watermaker must have power continuously to achieve the full benefits of the Auto Store Fresh Water Flush Mode. The domestic fresh water pressure must be on and the fresh water tank level maintained. Calculate 9 - 12 gallons (34 - 45L) per flush..

7. The MPC 5000 control must be de -powered (DC power off) after the system is put in storage, where a storage chemical or antifreeze is run through the system.

8. Please fill out the warranty card. The warranty is void if it is not registered.

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Section 2: Programming & Controls

Getting Started

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

Refer to the shipping list for your system to make sure you have received all of the components. 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. Ensure 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, additional parts may be ordered. Check to see that the MPC cable is long enough to reach from the display location to the Feed Pump Module.

Newport 700 –1000 MkII shipping list:

- Newport Feed Pump Module
- MPC 5,000 MAG
- High Pressure Pump and Membrane Module
  - 20 % Clark Pump
- NP 700 / 1K Boost Pump Module
- NP MKII Flush Module
- Newport Install Kit
- Newport SVC Kit
- SUB– NP– MK2– ILHA
- 5/8 Hose, 25 Inches
- 3/4 Suction Hose, 25 Inches
- 3/4 Hose, 10 Inches
- 1/2 Hose, 10 Inches
- 38 Low Pressure Tube Blue, 25 Inches
- 3/8 Low Pressure Tube Black, 25 Inches.

Suggested Spares

Short term cruising, weekends etc.

We suggest a basic cruise kit. Kit consists of 3 ea, 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.

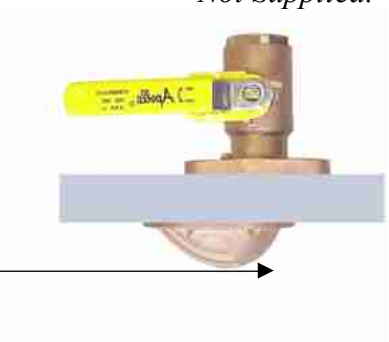
Longer than 6 months,

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, salinity probe and cable.

Spectra Watermakers spare parts list:	**Part Number**
SC-1 STORAGE COMPOUND	KIT-CHEM-SC1
SC-2 ORGANIC CONTAMINATION CLEANER	KIT-CHEM-SC2
SC-3 MINERAL SCALE CLEANER	KIT-CHEM-SC3
BASIC CRUISE KIT B NEWPORT:	KIT-BCK-C
5 MIC FILTERS	FT-FTC-5
20 MIC FILTERS	FT-FTC-20
SC-1 STORAGE CHEMICAL	KIT-CHEM-SC1
CHARCOAL FILTER	FT-FTC-CC
6” STRAINER SCREEN	FT-STN-6S
OIL/WATER FILTER	FT-FTC-OW
FEED PUMP HEAD (MAGNETIC DRIVE)	PL-PMP-240MAG5
6” STRAINER O-RING	SO-STN-6SS
FILTER HOUSING O-RING	SO-FHS-3PCS10
SALINITY PROBE	EL-MPC-SP3
ROTO FLOW METER	EL-SSR-IFM
OFFSHORE REPAIR KIT	KIT-OFFSH

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" to 1" forward facing scoop type intake thru -hull and seacock be installed. Thru-hulls in the bow area are susceptible to air intake in rough conditions and should be avoided. **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 since it picks 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 clockwise wraps of Teflon tape and will thread almost all the way in. When wrapping fitting threads avoid taping the bottom thread. It will allow for smoother instillation and help to avoid covering the fitting opening inadvertantly.

Avoid getting dirt or debris into the piping or hoses during assembly. A small bit of debris can stop the system! Avoid getting Teflon tape over the end of fittings.

Avoid restrictions or long runs on the entire inlet side of the plumbing from the thru hull to the 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 will not be damaged by 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 may be located in any convenient location near the Feed Pump Module. It should be mounted with the filter housing vertical and accessible for changing filters. Allow 2" below the filter housing for removal. Do not install over electrical equipment. The unit contains a charcoal filter, shut off valve, and flush water pressure regulator.

Boost Pump Module

The Boost Pump Module should be mounted vertically with the service hose connection at the top. The boost pump MUST be installed below the water line to ensure that it will prime.

Feed Pump Module

Mount the feed pump module on a horizontal or vertical surface that can be up to 3' (1.0M) above the waterline. It is <u>preferable</u> to mount as low as possible. Keep future maintenance in mind when choosing a location Locate in an area that allows easy access to the filters and left hand side. Make sure water spills during filter changes will not be a problem. . The feed pump has overheat protection and will not operate properly at ambient temperatures over 120F (48C).

Remove front cover to access mounting holes in the enclosure.

Newport 700/1000 Component Placement
-Continued-

Clark Pump/Membrane Module

Note: If your machine is equipped with the optional Z -brane, see the Z-brane Installation and Operation section of this manual for instructions on installing the Z -brane anodes into the membrane end plugs. This should be done **before** installing the 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 Feed Pump Module wires. 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.

Clark Pump/ Membrane Module Mounting

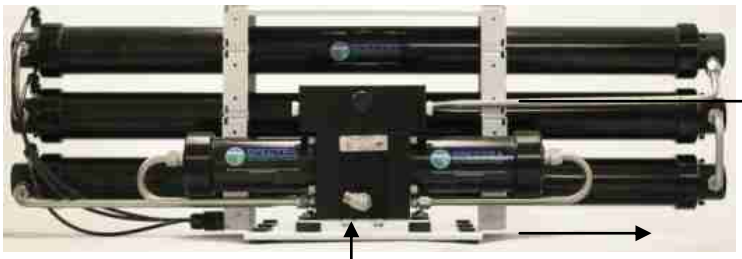
The Clark Pump and Membrane Module has been pre -assembled at the factory. If it is necessary to disassemble this module and mount the membrane housing pressure vessels remotely, refer to "Membrane Pressure Vessel Relocation" in the back of this manual. Use only approved tubing for assembly.

Remote Control Panel

The remote control panel can be mounted anywhere that is dry and convenient. Cut a 4 -9/16" (116 mm) wide by 2-7/8" (68mm) high opening for the panel. Control panel should be easily visible and easy to manipulate the buttons. **Use only Spectra approved remote cable. Do not connect power to the alarm buzzer terminals on the back!**

The cable is NOT standard LAN cable or phone cord.

System Plumbing



From the Clark pump Brine Discharge quick connector to the overboard thru hull use the supplied 5/8" (15.9mm) clear braided vinyl hose.

Flush Module

Use the 1/2inch braided hose between the Flush Module and the Feed Pump Module

Use the supplied 3/4" pressure hose with compression fitting adaptors between the Feed Pump Module and the Clark Pump inlet fitting.

Flush water from ship's pressure water system 25 psi (2bar) minimum

Feed Pump Module

From the Boost Pump to the 20 micron filter inlet us the 3/4" braided hose.

Boost Pump Module

Service Hose Port

From a dedicated thru hull inlet to the Boost Pump Module use the supplied clear 3/4" (19mm) spiral suction rated hose.

Strainer

System Plumbing

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 pressurized when the boat is unattended for the Auto Store Fresh Water Flush Mode to function properly. **The domestic fresh water pump must be able to deliver 1.5 gallons per minute (6lpm) at 25 PSI**.

Charcoal Filter

5 and 20 Micron Filters

Product Water Tubing

Product water tubing is 3/8“ Parker tubing. ***See the Parker tube fitting assembly diagram next page***. Product water goes from the membrane into the Feed Pump Module where it passes through the **Intake Manifold.**

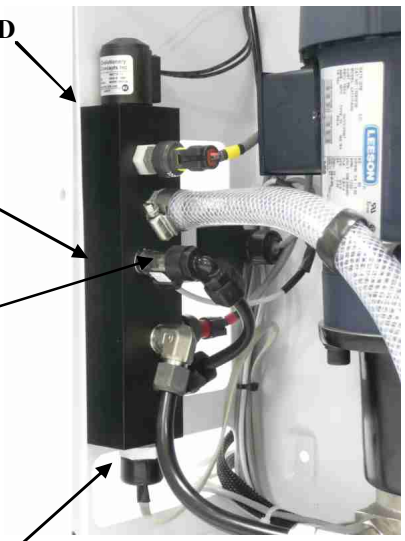
The water flows through the flow meter, then the salinity probe reads the product salinity, in parts per million (PPM). If the salinity is below the programmed limit, then MPC board opens the diversion valve and water flows to tank. If the salinity is too high, the diversion valve is not energized the product goes back into the feed water.

Connect the product outlet on the membrane housing to the **black** Product Inlet fitting on the Feed Pump Module manifold the with supplied 3/8 **black** nylon tubing.
Route the product water from the **blue** product outlet fitting on the Feed Pump Module manifold into the top of the tank using the **blue** 3/8 inch nylon tubing. Install a tee in the water tank fill or tap a pipe thread into an inspection port in the top of the tank. Do not feed the water into a manifold or bottom of the tank. Make sure there is no restriction in this plumbing.
If the lengths of product water tubing supplied with the watermaker is insufficient, use a larger size hose. **Product water flow restriction will result in reduced product and a power consumption increase.**

INTAKE MANIFOLD
On Feed Pump Module

Product Water Enters the manifold from the membranes.

Flowmeter: Measures the volume of water produced by the system



Salinity Probe reads the salinity of the product water in PPM.

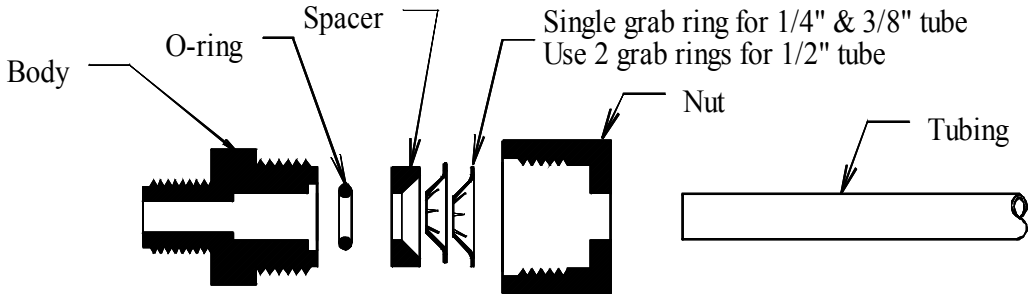
Salinity Probe PPM Reading < 748 **Diversion Valve Opens**, product water flows into tank,

Salinity Probe PPM Reading > 748 **Diversion Valve stays Closed**, product water goes back into feed water.

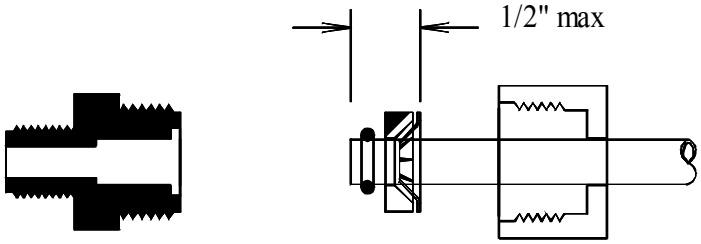
Blue Product Tube
To Fresh Water Tank

Black Product tube from membrane end cap to feed pump manifold

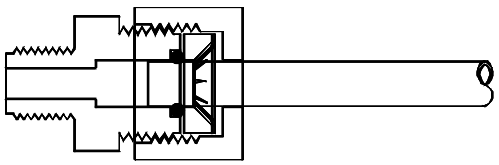
Parker Tube Fitting Assembly Procedure



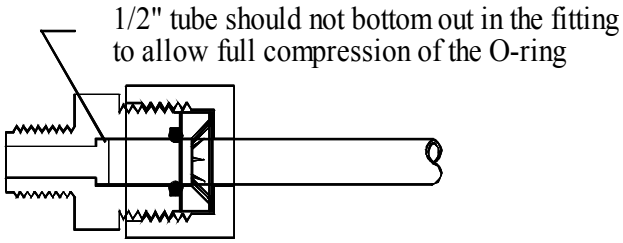
Step 1: Dissemble fitting components



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.

John Guest Super Speedfit

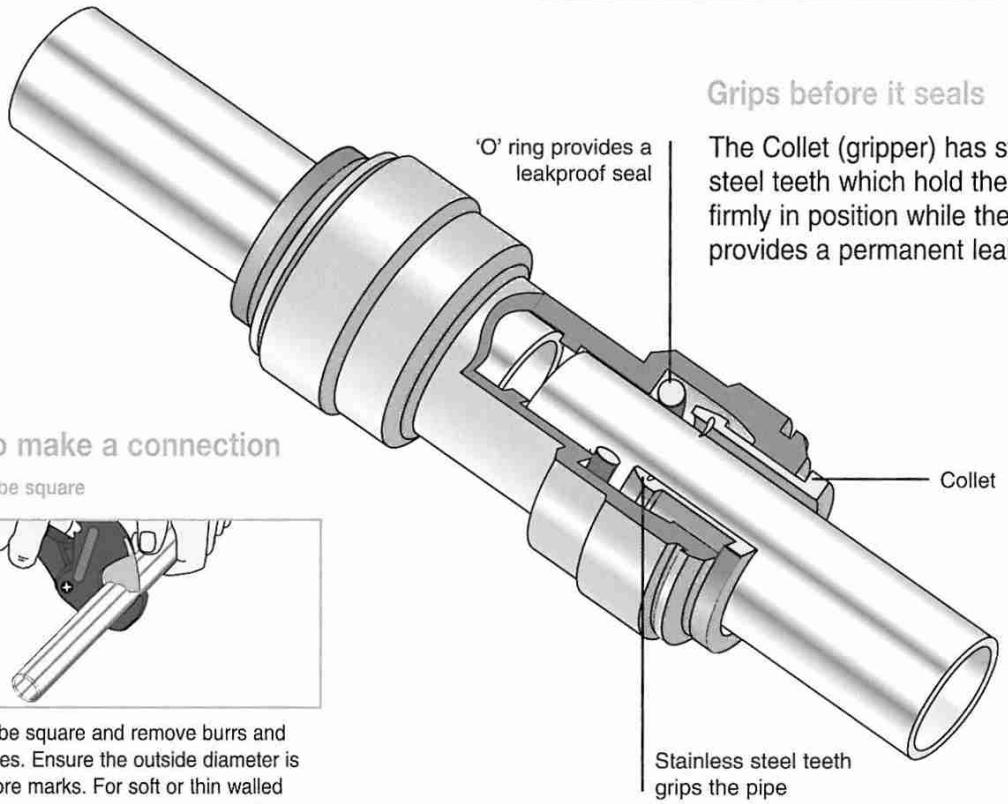
How Super Speedfit Works

To make a connection, the tube is simply pushed in by hand; the unique patented John Guest collet locking system then holds the tube firmly in place without deforming it or restricting flow.

Materials of construction

Super Speedfit fittings are made up of three components:

Bodies are produced in an acetal copolymer or polypropylene.
'O' rings are Nitrile rubber or EPDM.
Collets are produced in acetal copolymer or polypropylene with stainless steel teeth.

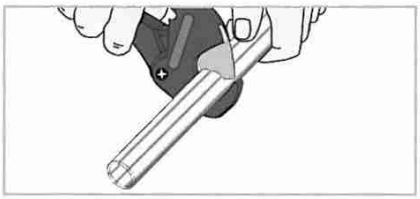


Grips before it seals

The Collet (gripper) has stainless steel teeth which hold the tube firmly in position while the 'O' ring provides a permanent leakproof seal.

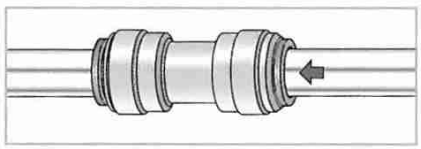
How to make a connection

Cut the tube square



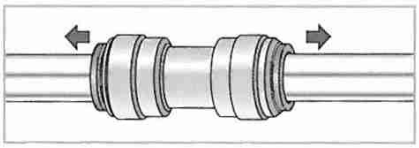
Cut the tube square and remove burrs and sharp edges. Ensure the outside diameter is free of score marks. For soft or thin walled tube we recommend the use of a tube insert

Push up to tube stop



Push the tube into the fitting, to the tube stop.

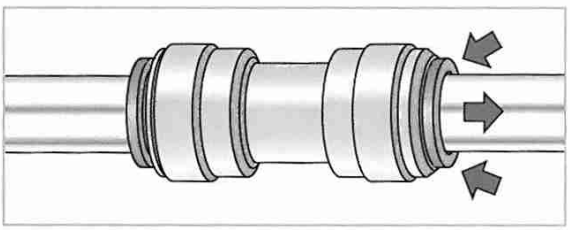
Pull to check secure



Pull on the tube to check it is secure. Test the system before use.

To disconnect

Push in collet and remove tube



To disconnect, ensure the system is depressurized, push the collet square against the fitting. With the collet held in this position the tube can be removed.

24 Volt DC Wiring

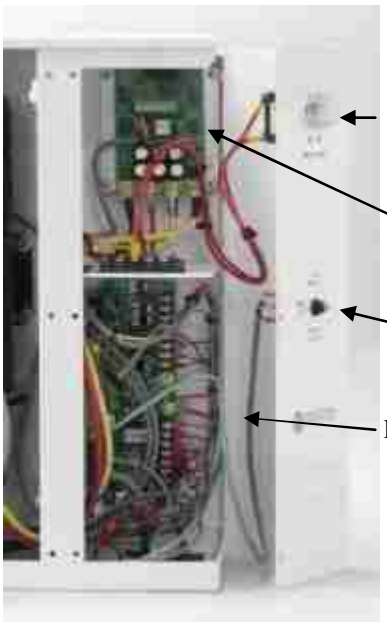
Identify cables that are connected to the Newport Control System.

Newport MkII 24 volt DC Systems have a Power Inlet harness with a terminal block, a 2 conductor boost pump cable, and a 75' (23M) cable for the MPC -5000 display. A motor speed control sets the run speed and also slows the motor to the flush and service speeds. **Do not install the feed pump module in hot or poorly ventilated locations. Allow for access to the Motor Speed Control**.

Boost Pump Cable

MPC Display Cable: 75' (26M) cable with connectors

Power Inlet harness with terminal block



Motor Power Supply Breaker

Motor Speed Control

Manual Control Switch

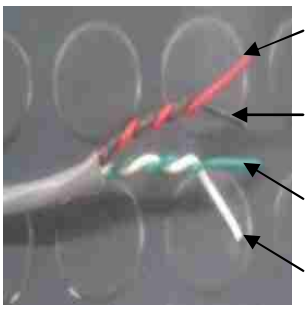
MPC-5000 Board

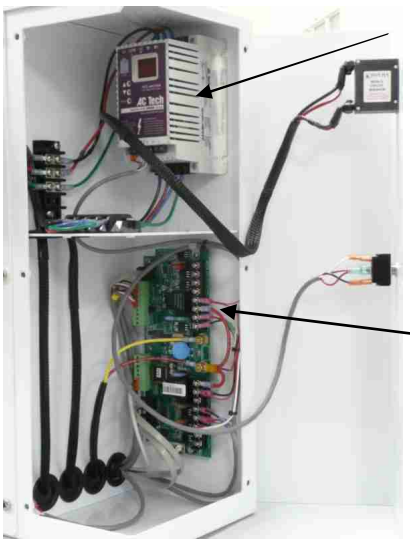
Wiring 110 & 220 Volt AC Versions

The MPC-5000 Control Box is located on the Feed Pump Module. There are two blue filter housings on top of the metal box.
The MPC-5000 control box houses the **V**ariable **F**requency Motor **D**rive and the MPC-5000 control board.
The **VFD** serves several functions. First it allows the machine to run with almost any AC frequency. Regardless of the input conditions the drive will hold a constant motor speed. The motor controller output is three phase AC to the motor. The control "soft starts" the motor. This allows the watermaker to be run on a very small generator if desired. The motor control also slows the motor to the flush and service speeds. The VFD has over-temperature shut-down protection. **Do not install it in hot or poorly ventilated locations,** and **allow for access to the VFD**.

NOTE:

Systems with 12VDC controls will have a 4 conductor wire for the boost pump. Match the wires according to the pairs below





Wiring (continued)

Mount the main power terminal block in a junction box or on a bulkhead adjacent to the Feed Pump Module. Make sure that this is a dry location well above bilge level and not subject to water spray.

Route the control cable through the boat to the MPC display location. Be careful not to damage the connector or get it wet. Plug this into the back of the remote display.

Connect the boost pump wires to the corresponding red and black conductors on the boost pump using the supplied butt connectors. Heat the connectors to waterproof them.

Check the wire size chart to select the proper size power feed to the main power harness. DC power feeds should be uninterruptible to insure proper operation of the auto store feature. Avoid house breaker panels that could be accidentally tripped.

Component Sizing:

- 24V use a 35 Amp breaker and size the wire for 30 Amperes.
- Provide circuit protection at the source! Inadequate wiring will cause a loss of system performance. DC power should be uninterruptible.

Note: If the specified circuit breaker sizes are unavailable use the next higher rating but do not exceed the specification by more then 10%. All wiring to be done to applicable ABYC, Marine UL or CE standards.

24 Volt DC Wiring Chart

Wire length is measured from source circuit breaker or fuse to control terminal block (one direction).

MkII 24V

Wire Length	Meters	AWG.	SQ MM
10	3	10	6
15	4.5	8	10
20	6.1	8	10
25	7.6	6	16
30	9.4	6	16
35	10.6	4	25
40	12	4	25
45	14	4	25
50	15	4	25

Distances are shown one-way, from the DC Supply to the Feed Pump Module.

Wire gauge should be determined by the sum of the Positive and Negative wires.

Example: 7 feet of wire is needed to connect the DC electrical panel to the Feed Pump Module on a 24 volt system. In order to determine what type of wire you need, add the positive and negative wire lengths: 7 + 7 = 14.

14 > 10

Since 14 is greater than 10, size the wire for 15': 8 AWG / 10SQ MM wire.

110 Volt AC System Motor Wiring

Use a 15 amp circuit breaker

Wire Length	AWG wire size	Square MM wire size
To 25 feet (7.5M)	12 awg	3 sq mm
25 feet to 50 feet (7.5M to 15M)	10 awg	5 sq mm
50 feet to 75 feet (15M to 23M)	8 awg	8 sq mm

220 Volt AC System Motor Wiring

Use a 10 Amp circuit breaker

Wire Length	AWG wire size	Square MM wire size
To 25 feet (7.5M)	14 awg	2 sq mm
25 feet to 50 feet (7.5M to 15M)	12 awg	3 sq mm
50 feet to 75 feet (15M to 23)	10 awg	5 sq mm

Wire length is measured from source circuit breaker or fuse to control terminal block (one direction).

CHECKING THE AUTO STORE WATER FLUSH CYCLE

The factory presets the timing of the Flush Cycle, and the on / off time for the feed pump.

After the installation is complete the Auto Store Fresh Water Flush cycle must be checked to ensure that no salt or brackish water remains in the system after the Flush Cycle has finished. Salt left in the feed pump rapidly deteriorates the pump's internal components, and the nutrients in sea water allow rapid microbial growth in the membrane.

If the ship's water system is unable to provide flush water at the required flow rate, or the feed pump is running too fast during the Flush Cycle, sea water will be drawn in to make up the difference.

At initial startup test the Fresh Water Flush Cycle by taking a sample of the brine discharge water as the flush cycle is ending. This water should not taste salty, and should read less than 1000 ppm on a digital TDS Meter, (Total Dissolved Solids).

The Fresh Water Flush Cycle can also be tested by closing the sea cock during the flush cycle. If the MPC -5000 display gives a "SERVICE PREFILTERS" alarm, then salt water was drawn in. In this case the water supply should be increased by opening up the pressure regulator (see next page for instructions).

Adjusting pressure regulator

Turn the center screw.

Place the output hose from the charcoal filter into a bucket and open the service valve.

In 1 minute you should get no more than 1.5 gallons of water, and no less than 1 gallon.

Adjust the pressure regulator until flow rates match those stated above.

Flush Cycle Adjustment
All Systems

Before shipping from the factory the Newport watermaker flush cycle is set to factory default settings. After initial start up, and annually thereafter, the flush cycle should be checked. The water going overboard at the end of the flush cycle should not taste salty (l<1000ppm). **If the water at the end of the flush is still salty follow these instructions to optimize the cycle.**

Adjusting the flush water pressure regulator: Remove the 1/2 inch vinyl flush water hose from the Flush Water Inlet on the Feed Pump Module. Push the **Auto Store** button on your MPC Display. Water will begin to flow out of the flush water tube, catch water in a container and allow the water to flow into the container for exactly thirty seconds. Push the **Stop** button. If more than 3 quarts (3 liters) of water went into the bucket the pressure regulator is set too high, if less the 2 quarts flow into the bucket the pressure is too low.
Adjust the black plastic regulator on the Charcoal Filter Housing by loosening the black lock nut and turning the adjusting screw of the Pressure Regulator. Test again until the correct flow is achieved. Reconnect the flush water tube.

Check the flush speed as follows: Push the **Auto Store** button. Push the **Alarm Display** button until the display reads "PREFILTER: GOOD—REPLACE". The flush valve opens, the water flows backwards through the filters and strainers. After 30 seconds the back flush ends and the feed pump starts, and the Clark Pump and membranes are flushed with fresh water. After the feed pump starts, turn the yellow service valve on the Boost Pump Module to OFF. If the bar graph on the display begins to move toward REPLACE on the gauge the feed pump is trying to pump more water than the Flush Module is supplying. The feed pump should be slowed down according to the instructions on the next page.

Service Valve
Shown in Off position

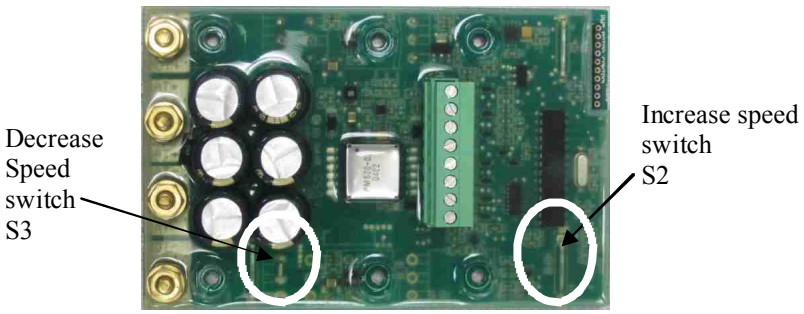
Boost Pump Module

Flush Cycle Adjustment
All Systems –Cont'd

Turn the yellow service valve on the Boost Pump Module to Service. Water should flow very slowly out of the service hose fitting. If flow is more than a trickle, speed up the pump.
Goal: Optimum flush = slightly more water coming from the Flush Module than the feed pump is pumping. This setting will ensure that no seawater is sucked in during the fresh water flush, but fresh water is not being wasted overboard.

Flush Cycle Adjustment
DC Systems

Next adjust the feed pump's flush speed. Mounted on the right hand side of the Feed Pump Module, behind the Manual Run toggle switch, is a pump speed controller. The speed controller is a green board, covered in a thick clear rubber plastic. On the board are two magnetic strips that adjusting the pump motor rpm. The switches are narrow silver colored bars about 1/2" (1.5cm) long. The Increase Speed switch is labeled S2 and is located near the corner of the board opposite the battery terminal screws. The Decrease Speed switch is labeled S3 and is located next to the six cylindrical capacitors. Each time a small magnet is placed near the switch while the pump is running, a signal will be sent to the controller and the feed pump will slightly speed up or slow down.



Adjusting the Pump Off time and Pump On time. The flush begins and ends with the Pump off. Pump off time should be set so that the feed pump comes on just as fresh water reaches the sea cock.
Pump On time should be adjusted so that the pump runs just long enough for fresh water to reach the brine overboard fitting, then stops. Pump On and Pump Off times can be adjusted from the laptop computer or the display. See the instructions in Section 2.

Flush duration must be set the same as or higher than the total flush time. Total flush time = Pump off + Pump on + Pump off times. Ex: 6 + 3 + 6.

Flush Cycle Adjustment
AC Systems

Adjust the pressure regulator on the Fresh Water Flush Module before adjusting the pump speed!! See instructions on p. 20 for more detail.

After checking the pressure regulator and checking the flush speed as per the instructions on p.20, if the pump speed requires adjustment, follow the instructions below:

Mounted under the top of the Feed Pump Module, under the MPC box, is a VFD feed pump motor control.

VFD motor speed control

WARNING ELECTRICAL HAZARD: 120 v OR 220v AC POWER WILL BE PRESENT ON THE TERMINAL BLOCKS WHILE ADJUSTMENTS ARE BEING MADE!

The SCM & SCL speed controls are used to set the feed pump motor speed by changing ships AC 50 or 60 HZ power to different desired frequency. This allows the pump to provide the desired output pressure and flow in the three different modes. **Do not change any setting except parameter 32: flush speed.**

Enter PROGRAM MODE by pushing the **Mode** button. This will activate the password prompt. The password is 25. Enter the password with the up and down buttons. When the display reads 25, press **Mode**.

The display will read P01 to indicate that you have entered program mode. Using the up button select Parameter 32 (P32). Press **Mode** to display the current setting. The speed settings are displayed in Hertz (cycles per second, AC output power frequency.) Use the up and down buttons to change the setting. *Do not change the setting more than 3 Hertz at a time*. Press **Mode** to enter the new setting.

The pump speed will change, and the controller will enter parameter select mode. To continue changing the same parameter until the desired pressure or flow rate is achieved, press the **Mode** button two more times. This will bring you back to Program mode in the same parameter.

If no buttons are pushed for two minutes the controller will require the password to be entered again.

Adjusting the Pump Off time and Pump On time. The flush begins and ends with the Pump off. Pump off time should be set so that the feed pump comes on just as fresh water reaches the sea cock. Pump On time should be adjusted so that the pump runs just long enough for fresh water to reach the brine overboard fitting, then stops. Pump On and Pump Off times can be adjusted from the laptop computer or the display. See the instructions in Section 2.

Flush duration must be set the same as or higher than the total flush time.
Total flush time = Pump off + Pump on + Pump off times. Ex: 6 + 3 + 6.

Salinity Probe

Salinity is a measurement of dissolved solids in liquid: these solids will conduct electricity to varying degrees. A special probe is used, with two electrical contacts in it, to determine the resistance to the flow of electricity in the liquid.

The salinity probe is located just before the diversion valve, at the output of the membrane. This way we can look at the salinity level of the product water before deciding to either reject the water or accept it and divert it into the holding tank.

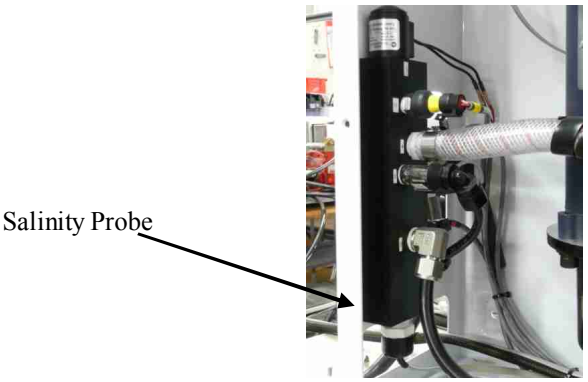
The salinity level in parts-per-million can be seen either through the salinity meter in the software, or on the display.

In order to calibrate the salinity probe, a hand -held salinity meter is required. You can simply take a reading of your product water while the unit is running, then calibrate our MPC board to match that reading. As long as you trust the accuracy of your hand -held meter, this is all that is necessary.

The microprocessor calculates salinity from the signals sent back to it from the probe. The salinity circuit can be adjusted from the Spectra software by adjusting the "Salinity Calibration" parameter, or from the display in the Salinity Cal window. Increase the calibration parameter to increase the salinity reading.

Conductivity calibration solutions are available from Spectra Watermakers to confirm/calibrate a hand held tester. These solutions are pre -made potassium chloride solutions with known salinity levels. Calibrate the hand held tester according to the instructions supplied with the device.

To remove the salinity probe:
Use a wrench to unscrew the probe from the feed pump module manifold. Use care when removing the probe so that you do not damage the hard wired cable in the bottom of the probe. Upon re-installation, use Teflon tape on the salinity probe threads before re -installing to prevent leaks.



Connection of Optional Accessories

Use of external devices not approved by the factory may cause permanent damage to the controller and is not covered by the Spectra warranty. Accessory outputs are limited to 2 amps maximum load! Do not connect motors, pumps, etc to accessory outputs.

Optional Z-brane System: Detailed instructions are included in the Z-Brane section. Connect to an uninterruptible 12 / 24Volt DC power source.

Ultraviolet Sterilizer: Detailed instructions are included with the sterilizer kit. The UV sterilizer lamp module and ballast unit should mount vertically, with the product water inlet at the bottom, outlet at the top. The ballast wires plug into the end of the bulb in the lamp module. The ballast RED wire connects to "STER" terminal on the MPC board, and the ballast BLACK wire connects to the "GND" terminal. If the wires must be extended, use minimum 16AWG wire.

External Buzzer(s): In addition to the external buzzer(s) installed at each remote control display panel, a buzzer unit may be installed at the control box. The buzzer RED wire connects to the "BUZZ" terminal on the MPC board, and the buzzer BLACK wire connects to "GND."

Float Switches: The Newport 700-1000 MKII can have optional tank float switches installed for complete automated operation. See detailed instruction on pg 25 for operation and installation guidelines.

Tank Switch Installation and Operation:

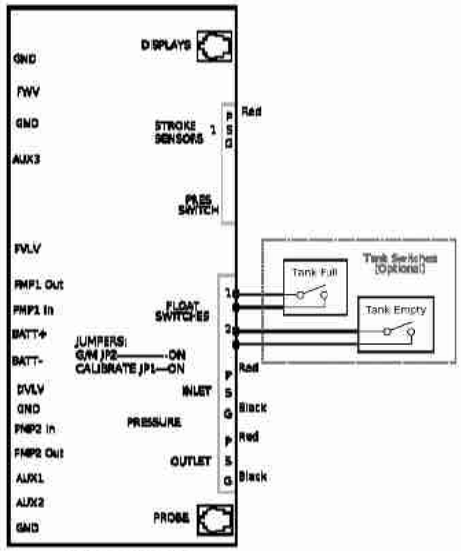
There are two sets of terminals on the MPC -5000 PCB that can be used in four different configurations to automatically start and stop the watermaker or to automatically stop the watermaker when the tank(s) are full without using the auto start feature. These terminals are on the green 10 pin connector and are labeled **"Float Switch 1"** and **"Float Switch 2."** Float Switch 1 is the tank full switch and Float Switch 2 is the tank empty switch.

If the unit is wired for both Autostart and Autostop, it can be put into AutoFill Mode by pushing and holding the **Auto Run** button on the MPC-5000 display. In this mode the watermaker will start whenever the water level drops below the tank empty switch, so that it is open (not conducting electricity). When the tank fills up and both the tank full switch and the tank empty switch have remained closed for two minutes, the watermaker will shut down and flush itself. The watermaker will start back up when the water level drops below the tank empty switch, it remains open for 2 minutes. This configuration allows for completely automatic operation. If the watermaker does not need to start up within five days it will automatically do a fresh water flush. AutoFill Mode can be ended by pushing the **Stop** button or the **Auto Flush** button. If the watermaker is in Autorun Mode it can be put into Autofill Mode without stopping it by holding down the **Auto Run** button.

If the owner prefers to install the automatic shutoff feature without the automatic start up option, only the tank full switch is used. A jumper must be placed between the tank empty terminals (Float Switch 2) in place of the tank empty switch, because the watermaker will only shut down if both sets of terminals are closed. To use this mode the watermaker must be started up with the **Stop/Start** button or the **Auto Run** button. ***DO NOT press and hold the 'Auto Run' button, as this will enter the 'Auto Fill Mode' and the watermaker will not function properly***. The watermaker will then fill the tank and automatically enter the Autoflush Mode, fresh water flushing itself every 5 days until another command is given.

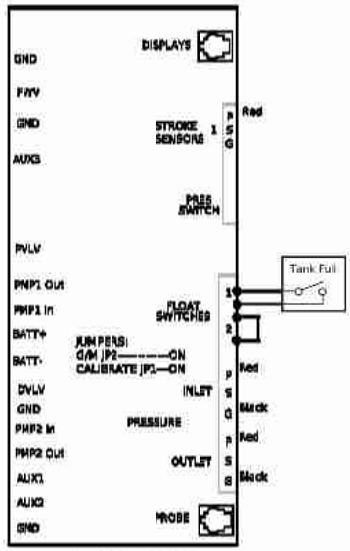
It is possible to use the Autofill Feature with 2 tanks. A double throw electrical switch must be installed in a convenient location. If only the single tank full switch is installed in each tank connect the wire from the **Float Switch 1 terminal "1**" to the common on the switch and run separate wires from the switch to each tank switch. The second wires can both be run to the **Float Switch 1 terminal 2**. If you are using two switches in each tank you will need a double pole double throw switch.

Option 1:
Tank Empty and Tank Full Switches Installed



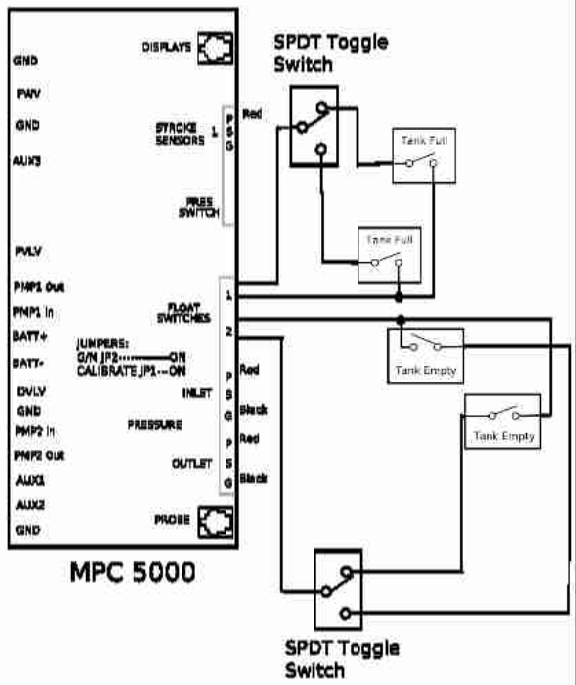
MPC 5000

Option 2:
Tank Full Switch Installed, Tank Empty Terminals Connected



MPC 5000

Option 3:
Multiple Tanks Connected to MPC



MPC 5000

New System Start-Up and Testing

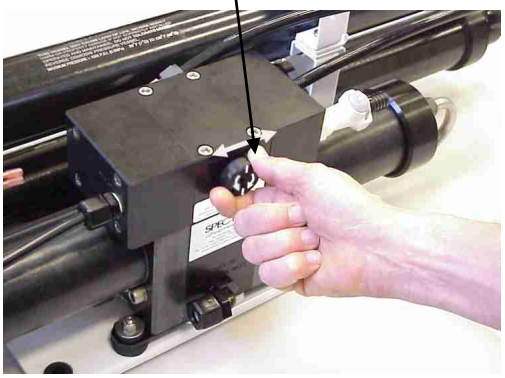
Use this procedure when starting a new watermaker for the first time and **whenever the system contains Preservative or cleaning compounds.**

Avoid running the system if the vessel is in contaminated water, such as in a dirty 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
   - Run Manual/ Run Auto/ Flush Manual Switch in "Run Auto" Position
   - Domestic fresh water pressure system **must be on**

2. Open pressure relief valve 1/2 turn !



3. Power up the system to enter "Purge Mode". Note: The watermaker will not run with the pressure relief valve open unless it is in "Purge Mode". Instead it will restart twice and alarm "System Stalled".

   - Alarm will sound
   - Display will read "Open Pressure Relief Now" In-sure that it is open. -

   - Push the Alarm /Display button to silence alarm

4. Press **Auto Run** Button ⟶

The system will go into a start mode and the feed pump will start shortly after. The system should prime within 60-90 seconds. Check the strainer and the brine discharge for water flow. There should be no bubbles anywhere in the intake hoses and the feed pump should sound smooth after priming. **If the feed pump continues to sound rough, find the reason before continuing!** Inspect the system for leaks.

Note: If you must stop the purge sequence for any reason, the control will default back to the beginning of the purging mode to protect your system. If you wish **you can bypass the purge sequence** and initiate a normal start. Pressing both " **Auto Run"** and "**Stop"** simultaneously anytime during the purge sequence will bypass the purge sequence and enable a normal start.

5. After the purge sequence. The control will alarm with the message "Close pressure relief valve" - **Close the valve** and proceed by pressing " **Auto Run.**"

6. The system is now running under pressure and making water. The display will read **"purging product water."** This mode diverts the product water overboard for ten minutes in case there is any residual chemicals in the membrane. **Carefully inspect for leaks over the entire system!** Shut down the system and repair any leaks you find.

7. After the ten minute product purge the system will go into operational mode. You may now start and run your system as you desire. You will not have to go through the purging mode again unless you "de -power" the system. If you do, you can bypass the purging mode by pushing **"Stop"** and **"Auto run"** buttons at the same time. It is best to use the **Auto-Run** button to run the machine, which defaults to the automatic fresh water cycle. If you shut down the system from the **Stop** button then use the **Auto Store** button to begin the fresh water flush cycle.

8. Check that the system is operating within its normal parameters. Compare with the chart on the next page

Product Flow

700 will produce 29-30 GPH
(115-120 LPH)

1000 will produce 39-41 GPH
(147-155 LPH)

Salinity

Salinity reads in parts per million. System rejects water higher than 750 PPM. Anything below 500 is excellent.

Feedwater Pressure

Pressure range 180-215 PSI
(13-16 BAR)
Pressure will be higher with cold or high salinity feed water, and lower with warm water or low salinity.

Filter Condition

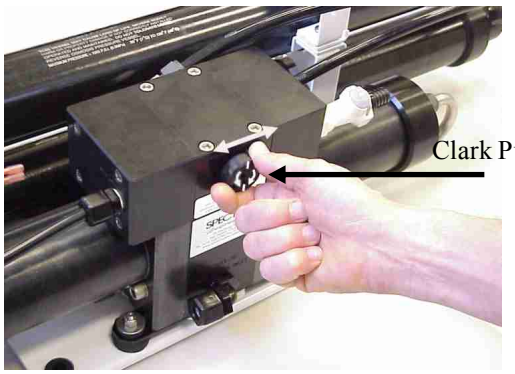
PREFILTER warns that filters are getting dirty. Clean filters as soon as convenient. If the graph reaches full scale the machine will automatically slow down to low speed. If it reaches full scale again it will alarm 'Service Prefilters' and shut off the watermaker.

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 salt to make 5 gallons (20 liters) of salt water at 32mg of salt per Liter of fresh water.

Make sure that the domestic water system is powered up and that there is water at least 35 gallons (132L) of water in the boat's tank. Confirm that the charcoal filter is installed in the Fresh Water Flush Module, the domestic water line had been installed, and all valves are open.

1. Open pressure relief valve.
2. Power up the control system.
3. Press "**Auto Run**" and "**Stop**" simultaneously to bypass the purge sequence. If the pump starts, press **"Stop"** and then try " **Auto Run"** and "**Stop**" buttons again, until the message "PURGE MODE BYPASSED" is displayed.
4. Press the "**Auto Store**" button and allow the Fresh Water Flush to cycle through its timed operation. Hit **Auto Store** after Fresh Water Flush completes to instantly initiate another flush. Fresh Water Flush the system **5 or more times** to purge all of the storage chemical.
5. Attach your service hoses to the quick disconnect Brine Discharge fitting on the Clark Pump and to the Service Intake on the Boost Pump Module. Route them into a 5 gallon (20 liter) bucket. Disconnect the product tube from the diversion valve and using another short piece of tube, route the product water feed into the test bucket.



6. Turn the yellow service valve on the Boost Pump Module from "Run **"** to **"Service."**
7. Press **Auto Store** one or two more times to get enough water into the bucket to properly mix your saltwater. Mix the salt until it goes into solution. If a hydrometer is available mix the water a specific gravity of 1.025. *Close the pressure relief valve* and start the system using the " **Auto 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 120 ^{o}F (50^{o}C).
9. If you are not going to use the system in five days, press the 'Auto Store' button.

Normal Start Up Using the Auto Run Button

- Press **Auto Run** button once and the system will prime and run for 1 hour. The display reads "RUN AUTO MODE" then "STARTING" with a 30 second priming countdown timer. After priming, the display reads "RUN AUTO MODE" with a countdown timer. An hour of run time is added, up to 12 hours, with each successive momentary press of the **Auto Run** button. An hour can be added at any time.
- Successive presses of the **Alarm/Display** button will scroll through the displays starting with "GPH PRODUCT." Upon auto shut down by the timer or by the optional tank full float switches, the system will automatically fresh water flush then re-flush every 5 days.
- Pressing the **Stop** button stops the sequence, at any time, with no flushes.

Normal Operation

- For best efficiency, Auto Run the system as long as possible each time: The more product water you make each time, the lower the proportion of product consumed by the flush cycle. **Never let the system sit with salt water in it.** Never allow continuous air leaks in the intake, as air is damaging to the pumps.

Normal Shut Down

- If the system was started using the **Auto Run** button, the system will shut off on its own when the selected run time is expired, and will auto flush every 5 days.

- Pressing the **Stop** button at any time will shut off the system, but it will not flush itself, and the 5 day Auto Flush will not be activated.

- The optional tank float switches will shut off the system from any mode. If the system was started by the **Auto Run** button the system will flush and then re-flush every 5 days.

  - The display will read "TANK/S FULL." Once one of the tank float switches opens, the alarm and "TANK/S FULL" display will cease on its own. Note that if "TANK/S FULL" is displayed, the system cannot be restarted. The system should perform a fresh water flush and then go back into Auto Flush every five days.

Auto Store Fresh Water Flush Cycle

Warning! Proper understanding of Spectra's flush system and the vessel's fresh water system configuration is mandatory for the extended Auto Store Cycle (Fresh Water Flush Cycle). The flush cycle must not be allowed to drain all the fresh water from the vessel or damage to the watermaker and/or vessel's systems may occur.

- **Make sure there is enough water in the fresh water supply system** to supply the watermaker for more than the expected time of operation in the Auto Store Flush. The Newport MkII units require about 9 gallons (34 Liters) every 5 days.

- **Make sure that the pressure water supply is on and will stay on during the Auto Store Flush** (If this is not possible contact your certified dealer.).

- **Make sure that the pressure relief valve on the Clark Pump is closed.** It should be closed if the system was just used to make water. The Auto Store Flush will not function properly if the valve is open.

- **The power for the system must remain on during the Auto Store (5 day Fresh Water Flush Mode).** Turning off the power will disable the Auto Store Flush and damage may occur.

- **Pressing the Auto Store button will start a flush and then activate the 5 day Fresh Water Flush.** The display will read "FRESH WATER FLUSH" with a countdown timer. After 30 seconds the feed pump will run for 6—7 minutes then remain off for the final 30 seconds of the flush. Then the display will read "FLUSH TIMER INTERVAL," and the countdown timer will reflect the number of hours until the next flush, (every five days).

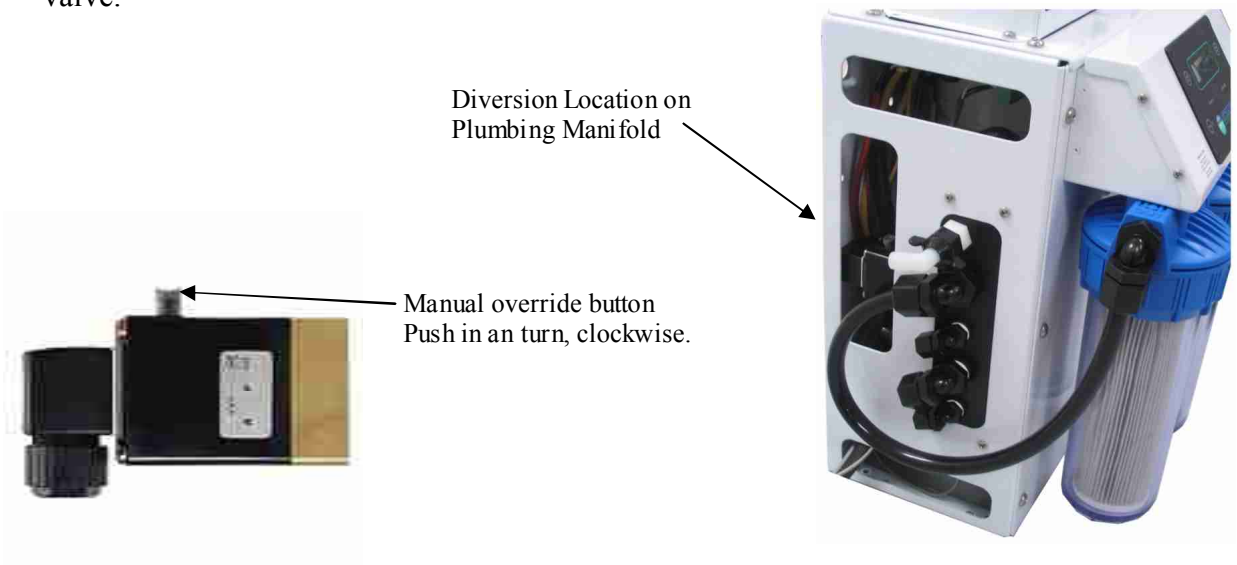
- **Pressing and holding the Auto Store button for 3 seconds will engage a 1 time flush.** The system flushes as described above but will not re-flush every 5 days. Display will read "FRESH WATER FLUSH" with a countdown timer, then the default display will appear when finished.

- Pressing the **Stop** button will cancel the Auto Store Fresh Water Flush and put the watermaker in Standby Mode.

Manual Operation

In the event of a component failure resulting in a shut down due to a false alarm, the failed component can be overridden using the Programming Function on the display. High Pressure, Service Prefilter, System Stalled (airlock), and Salinity Probe Failed alarms can all be defeated individually, leaving the other safety shutdowns will still be activated.
The pressure sensors and salinity probe can also be calibrated from the display. Complete instructions are found in Part 2 of this manual under "Programming from the Display".
Be absolutely certain that the alarm is in error before defeating the automatic controls.

- **In the event of complete MPC control failure**, the system may be operated manually by using RUN MAN switch on the Feed Pump Module and manually opening the diversion valve.
- For manual start up, switch on the feed pump by setting the toggle switch on the feed pump module to "RUN MAN". Shut the unit down if the Clark pump does not cycle, if air is continuously present in the intake line, or if the feed pump is excessively noisy. **The automatic safety controls are disabled in manual mode.**
- Always discard the product water for the first 5 minutes of operation. The initial product water from the system may not be potable. Taste the product water before sending to a tank. To get a water sample loosen the 1/4 inch black product tube fitting at the membrane outlet and collect a sample. Check it with a handheld salinity meter or taste it, if it is under 750 PPM divert product water to tanks.
- The diversion valve is electrically energized by the MPC controls to send water to the tank. The diversion valve will not open automatically in manual mode, you must open it with the mechanical override button on the valve. The valve is located behind an access opening on the left side of the Feed Pump Module. Push and turn the manual override button clockwise. It should push into the valve and stay pushed in, this will manually open the diversion valve.



DIVERSION VALVE

Long Term Storage

Watermakers are best when 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 Auto Store 5 day Fresh Water Flush will greatly reduce biological growth but may not stop it completely in certain conditions. The Auto Store 5 day Fresh Water Flush Cycle allows the system to "shut down" for extended periods of time but it doesn't replace performing a storage procedure for long periods of non-use.

If an optional "Z-Brane" water treatment system is installed in the system, the 5 day Fresh Water Flush Cycle will maintain the system as long as un-chlorinated pressurized fresh water is provided.

System Storage or "Pickling"

If the system is to be left unused for more than a week, pickle your Membrane. The storage chemical prevents biological growth. This procedure requires de-chlorinated water. If you run water through your charcoal filter it will remove chlorine from the water. **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 4 gallons (16L) of water is in a Newport system. This water has to be figured in to the mixture. A 700/1000 system uses two containers. Do not be concerned if the powder does not go completely into solution.

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

Storage Procedure: Pickling your Membrane
Newport 700-1000 Storage Procedure

The watermaker has 4 gallons of water in the system at all times. This water needs to be accounted for when mixing the storage chemical with water in a bucket. Use two cans of Spectra Storage Compound.

- Step 1: Fresh Water Flush the system twice. Push the **Auto Store** button on the MPC -5000 display, when the first flush has been completed, press **Stop** to cancel the 5 day interval timer. Then press **Auto Store** again.

- Step 2: Remove the quick disconnect fitting from the brine discharge outlet of the Clark Pump, and replace with the quick disconnect hose from your Service Kit. Run the hose into a 5 gallon bucket.

Boost Pump Module

- Step 3: Push the **Auto Store** button to fill the bucket with 2 gallons of fresh unchlorinated water. When the bucket has reached the desired level push the **Stop** button.

- Step 4: Connect the inlet hose, using the garden hose bib fitting from your Service Kit, to the service port of the Boost Pump Module. Run the hose into the bucket. Turn the yellow service valve on the Boost Pump Module to SERVICE.

- Step 5: Mix two storage containers chemical compound into the water in the bucket. *Some storage compound may not dissolve in the bucket, this is normal.*

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

- Step 7: Set the metal toggle on the Feed Pump Module to **"RUN MAN" to start the feed pump**. Circulate the storage chemical in the system for approximately 20 minutes. Set the switch to **"RUN AUTO" 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. If you want pump the bucket dry by momentarily running the feed pump as in Step 7 above. Stop when the bucket is empty.
- Turn the yellow service valve on the Boost Pump Module back to RUN and close your thru - hull. If you don't want to close the thru - hull turn the yellow handle to OFF.
- Turn off power to the system and the MPC control.
- **LEAVE THE PRESSURE RELIEF VALVE OPEN**

Winterizing

Warning! Use only potable water antifreeze (Propylene Glycol).
<u>DO NOT USE AUTOMOTIVE ANTIFREEZE</u> (Ethylene Glycol).

Propylene Glycol is an effective biocide and antifreeze only at concentrations above 25%. Commercially available products range from 25 to 60 percent. They are usually labeled with a temperature rating. "Minus 50" antifreeze is already diluted to 25%. "Minus 100" is a 60% solution. **Purchase the strongest antifreeze available**. Use enough to ensure that the system contains at least a 25% solution even after it is diluted with the residual water inside the water-maker.

Boost Pump Module

- Step 1: Fresh Water Flush the system twice.
  Push the **Auto Store** button on the MPC -5000 display. When the 1st flush finishes, press **Stop** to cancel the 5 day countdown. Then press **Auto Store** again.
- Step 2: **<u>Open pressure relief valve on the Clark Pump.</u>**
- Step 3: Pour at least 3 gallons of the propylene glycol into a bucket. Follow instructions on the container.
- Step 4: Connect the hose, using the garden hose barb fitting from your Service Kit, to the service port of the Boost Pump Module. Run the hose into the bucket. Turn the yellow service valve on the Boost Pump Module to SERVICE.
- Step 5: Flip metal switch on Feed Pump Module to "RUN MAN." Pump as much of the water remaining inside the watermaker overboard as possible. **Run the feed pump until you see antifreeze begin to appear in the brine overboard hose.** Flip the switch to "RUN AUTO" to stop the feed pump.
- Step 6: Remove the quick disconnect fitting from the **brine discharge outlet of the Clark Pump,** and replace with the quick disconnect hose from your Service Kit. Lead the hose to the bucket.

- Step 7: Switch the toggle switch on the Feed Pump Module to "RUN MAN" and circulate the antifreeze for 20 minutes.

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, pump the bucket dry by running the Feed Pump as in step 5 above. Stop when the bucket is empty.
- Turn the yellow service valve back to RUN and close the thu -hull, or turn the yellow service valve to OFF.
- Turn off power to the system and the MPC control.
- **LEAVE THE PRESSURE RELIEF VALVE ON THE CLARK PUMP OPEN.**

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.

CLEANERS: Cleaning can be detrimental to the membrane and shorten its life. Avoid unnecessary cleaning. Avoid cleaning as a diagnostic tool.

SC-3 is an acid cleaner used to remove mineral and scale deposits. **In most cases this is used first**, and if no results are achieved, proceed with the SC-2. This is used in the same way as the SC-2. SC-3 will in most cases lower the product PPM and over all pressures. Scaling is a slow process that may take several months or years. SC -3 is less harmful to the membrane and will almost always improve the performance of an older membrane.

SC-2 is an alkaline cleaner used to remove light oil, grime and biological growth. It is most effective if heated to 120 ^{o}F. On a boat, this is not easy to do. If not heated, circulate for 2 hours and let set for several hours and circulate for one hour and discard. *In most cases the water quality will increase in PPM after an SC-2 cleaning*. After a few hours it should recover to near the PPM it produced before the cleaning .

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 4 gallons (8L) of water is already present inside a Newport system . This water has to be figured into the mixture. Use 1 container of compound. SC-2 and SC-3 are never mixed together. Do not use them for storage pickling solution.

Cleaning Procedure:

- Step 1: Close the seacock. Flush the system twice. Use the "Auto Flush" button on the MPC-5000 display, once the first flush has been completed, press "Stop" to cancel the 5 day interval timer, then press "Auto Flush" again.

- Step 2: 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 bucket.

- Step 3: Press "Auto Flush" again to fill the bucket with 1 gallon (4L) of fresh unchlorinated water. Press "Stop" when the bucket has reached the desired level.

- Step 4: Connect a hose, using the garden hose barb fitting from your service kit, to the service port of the boost pump module. Lead the hose into the bucket. Turn the service valve on the boost pump module 180°, so the intake is now coming from the 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: Set the toggle switch on the MPC control box to 'Service' to turn on the feed pump. Circulate the storage chemical in the system for approximately 25 minutes. Circulate the chemical in the system for approximately 25 minutes. Allow to soak for several hours or overnight if the solution is cold. Run the pump occasionally to agitate the solution. **Set the toggle switch to Auto** when finished.

- Step 8: **Turn off the control system (DC) power. Replace the brine overboard hose. Remove the Inlet Service hose and turn the Service valve to the Run position.**

- Step 9: To avoid damaging the membranes, **Follow the "New System Startup" Instructions to Purge the chemicals out of the System**.

Maintenance

General

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

The Seawater Strainer

The sea water strainer's stainless steel element should be inspected, removed, and cleaned as needed. A clogged strainer will cause the MPC control to alarm **"Service Prefilters"** Be careful to ensure that the thru -hull is closed before disassembly. Make sure the **seal** and **element** are in place before reassembly. Put the strainer's screen up to a light for inspection. When the system is put into storage, remove, rinse, and reassemble sweater strainer dry to impede corrosion. Check frequently during operation.

The Prefilter

- Service the prefilter as soon as possible after the prefilter condition graph begins to rise. If the filter condition graph gets all the way to "Replace" an alarm sounds and the system will shut down to prevent damage.

- To service the filter close the thru-hull, open the housing using the supplied filter housing wrench, and discard old filter. Clean out the housing bowls, and reassemble the housings with a new 5 micron filter element. Leave dry until next startup.

- Only use Spectra approved filters or you may void your warranty. The filters may be carefully cleaned up to 3 times with a soft brush and water in a bucket, before they must be replaced. Occasionally lightly silicone grease the filter housing O-rings.

The Charcoal Fresh Water Flush Filter

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

The Membranes

- Chlorine destroys membranes.

- If your product salinity increases, perform a flow test. If your flow test results appear to be normal, and the salinity has increased drastically then consider cleaning your membrane. The membranes need to be cleaned only when the feed pressures have risen beyond normal levels or when product salinity increases. Cleaning shortens the life of your membrane and should not be performed causally. Biological growth is the leading cause of membrane fouling, it 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 bar graphs 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 a damaged 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.

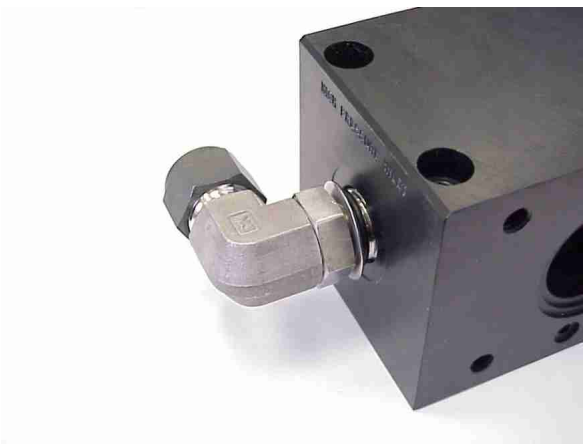
Membrane Pressure Vessel Relocation

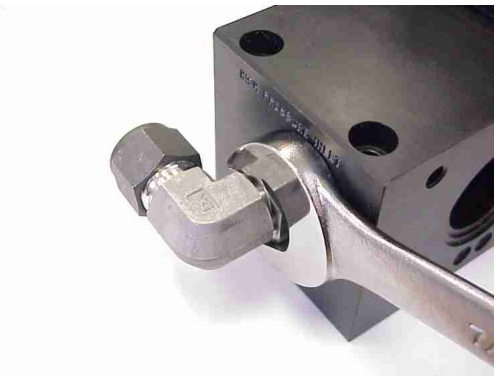
Use **ONLY** Dayco Imperial Nylo-Seal 88-NSR-1/2 tubing for high pressure connections. Pay attention to the direction and flow path of the tubing before disassembly. Make sure that you reinstall the tubing in the same manner. Rotate the 90 degree high pressure tube fittings on the Clark pump for ideal 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. 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.

Make Sure these fittings are tight on initial assembly or they will fail!

The correct Torque is specification is 85 foot pounds

Figure 1.

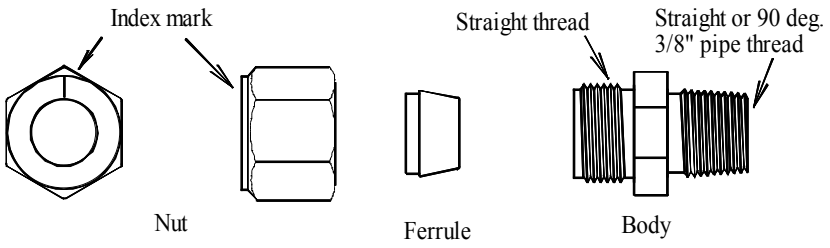


Figure 2.

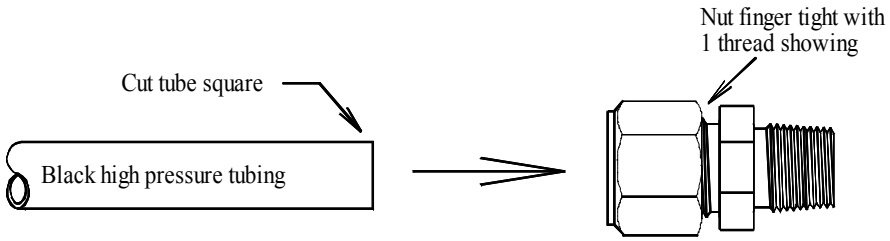
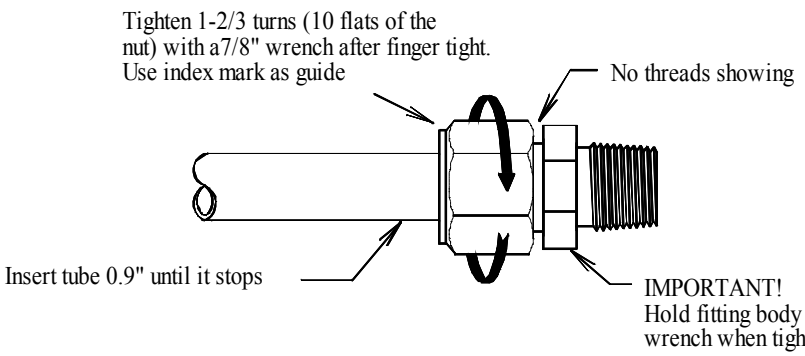


Figure 3.



Spectra Watermakers Newport Troubleshooting Procedures

SYMPTOMS	PROBABLE CAUSE	REMEDY
Feed pump runs constantly, will not turn off	Manual override switch in "on" position	Turn off manual switch on control box
Feed pump runs with loud noise	- Intake blocked - Air in system	- Check thru-hull valve - Check sea strainer for leaks - Check FWF module for leaks - Re-prime system (restart)
No lights or display, system does not operate	- Remote display not connected - No power to control box	- Check display cable connections at back of display 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 or display is defective
Display activates, but pump will not run	- loose or broken pump wire connection - speed control board problem - tanks are full	- Check wiring at terminal block inside MPC - Check speed control operation - Replace fuse (mini automotive type ATM) - Check tanks– system cannot be started if tanks are full.
System runs, no product water delivered to water tanks, GHP bar graph shows OK, "Good" LED activated	- diversion valve inoperative wiring fault. - disconnected or broken product tubing - diversion valve FAILED-	- Check wiring at diversion valve and inside control box - Check product tubing - Use manual override or replace valve (contact factory)
System runs, no product water delivered to water tanks, GPH bar graph shows OK, "reject" LED activated	- high salinity of product water, causing system to reject water - salinity probe out of calibration or defective, bad cable - chlorine damage to membranes - pressure relief valve open	- Check for low feed pressure, close pressure relief valve - Check for leaks at high pressure hoses - Test product water with hand-held tester– if over 500ppm for 1 hour, contact factory - Close Pressure Relief Valve

Spectra Watermakers Newport Troubleshooting Procedures

Error Messages

SYMPTOMS	PROBABLE CAUSE	REMEDY
"System stalled" ("system stalled" may alarm when using the control panel to run system for servicing with the pressure relief valve open– use manual override switch instead)	- pressure relief valve open - intake thru-hull closed - air-locked system - no signal from rotoflow meter - feed pump overheating	- Close pressure relief valve - Check thru-hull - Check for air leaks - Check flow meter wiring at control box - Improve pump module cooling
"High Pressure"	- blocked brine discharge - fouled membrane	- Check brine discharge - Clean membrane
"Voltage Too Low"	- battery voltage too low - loose wires or poor connections	- Charge batteries - Check charging voltage - Check power connections
"Re-starting"	- no signal from stroke sensor at startup. System Air-locked	- See remedy above for "system stalled"
"Check Fuse" (followed by fuse number)	- blown fuse at circuit board	- Replace fuse (mini automotive type ATM) - Look for cause
"Service Prefilter"	- clogged filters - loose or defective pressure sensor wires	- Install new filters - Check sensor wiring
"Salinity High"	- high product water salinity - chlorine damage to membranes - defective salinity probe or cable, cable disconnected	- Check for low feed pressure - Check for leaks at high pressure hoses - Remove and clean probe contacts check calibration. - Check cable connections - Clean membrane

Operation and Repair Bulletins

The following documents are sections of our complete service bulletin set. These are available on our website Spectratermakers.com

MB-2 MEMBRANE CARE

Membrane life is affected by a large number of factors and is somewhat unpredictable. A big commercial plant running 24/7 will get 10 to 12 years out of a set of membranes. But they do all kinds of fancy chemical injections and never shut the thing off. Most cruisers are lucky to get five or six years out of one. You hear of the eight or ten year old membrane now and then. The biggest killers of membranes are lack of use, chlorine damage, and improper storage.

Don't let membranes sit around with sea water or stale fresh water in them. Biological growth will occur in the membrane. Here at the factory we frequently get back membranes for inspection that reek of hydrogen sulfide (rotten eggs). This odor is produce by anaerobic bacteria that live in an unused membrane, feeding on whatever animal or vegetable matter is trapped in it from the plankton that gets through the system. Membranes badly fouled in this way can seldom be saved. These bacteria are always present but are inhibited by the oxygen in sea water while the unit is in frequent use, by scheduled fresh water flushes, or by pickling. Keeping the prefilters clean is also important in preventing bio-fouling. If your prefilters are allowed to become a breeding ground for bacteria (get smelly), the contamination will spread throughout the system. When we cut open a failed membrane we also find mildew, another form of bio fouling, probably due to long term storage with no biocide or stale biocide.

After many hours of water making mineral deposits will form and must be dissolved away with an acid cleaner. Alkaline cleaners are used for bio-fouling. Cleaning chemicals, especially the alkaline, are not good for the membrane. Every time you clean the membrane it shortens its life. Clean only when necessary, and avoid cleaning as a "diagnostic tool".

Chlorine will destroy a membrane in minutes. It attacks the material that the membrane is made from. Always use product water or water filtered slowly through a charcoal filter for flushing and chemical treatments.

Oil simply plugs up the matrix of the membrane and clogs it up. We have brought back oil fouled membranes with Joy soap (MB -5 Cleaning with Detergent, in Manual)

For storage we recommend using propylene glycol potable water system antifreeze if available. It can safely be left in the system for one year and will keep things from freezing in cold conditions. It is hard to find in warm climates, and takes up a lot of room on a small boat, so our SC-1 is best for tropical cruising.

MB-5 MEMBRANE CLEANING WITH DETERGENT

If the membrane has been fouled with oil it may be possible to save it by cleaning it with dish soap such as Joy. Don't use anything that may contain bleach. You will need quite a lot of chlorine free fresh water. If using shore water run it through a charcoal filter at a rate of not more than 1.5 gallons (6 liters) per minute.

Fill a bucket with fresh water and mix in a couple squirts of the detergent. Run the system de-pressurized with the watermaker drawing water from the bucket and discharging overboard. When about half the water is gone from the bucket stop the unit and let the membrane soak for a few minutes. Restart and pump the remaining solution overboard. Repeat until the discharge appears clean.

After most of the oil is cleaned out you can put the brine discharge into the bucket and run the system with the soapy water circulating as you would for the other cleaning chemicals. Rinse the system with a bucket of fresh water or the fresh water flush cycle, then flush for twenty minutes using sea water. Pressurize and test.

MPC-5 PURGE MODE BYPASS

Whenever the control power (12 or 24 volt DC) has been shut off the system will prompt you through the purge mode when it is turned back on. This is because the only time the MPC-5000 should be turned off is after the system has been pickled. Purge Mode prompts the operator to open the pressure relief and then runs seawater through the system for 20 minutes to clear away the chemicals. Normally, during periods of disuse the MPC -5000 will remain powered up so that it can do the five day flush cycles, and no storage solution will be present. If the control power has been interrupted but the system is not filled with storage solution, Purge Mode can be bypassed by tapping the two left hand buttons at the same time until the display reads PURGE MODE BYPASSED. The buttons must be pushed at exactly the same time. You can't hold one down and then push the other. From Purge Mode By-passed you can run the system in any mode.

OP-1 WINTERIZING OR PICKLING W/ ANTIFREEZE

WARNING: Use only propylene glycol based drinking water system antifreeze. Do not use ethylene glycol based automotive antifreeze, which is toxic.

Propylene glycol can be used instead of Spectra SC-1 storage chemical for storage in any climate up to one year following this procedure.

1. Replace the prefilters with clean ones.
2 Flush the system with fresh water until the brine discharge water is below 1000 ppm or until the brine discharge does not taste salty.
3. Set up the system for pickling according to the directions for your model.
4. Place enough antifreeze in a bucket to fill your system. This will be about two gallons for a 150 or 200 model, three gallons for a 380 or 400, and larger systems will take more.
5. Run the system DEPRESSURIZED with the feed pump drawing from the bucket and the brine discharging overboard until the colored antifreeze solution begins to appear at the brine discharge then switch the brine discharge into the bucket and recycle the remaining solution until the glycol and water are completely mixed, (about ten minutes). On some models you will have to shut down the unit to switch the brine discharge into the bucket.
6. The product water side of the system will not contain antifreeze and should be protected from freezing by blowing or draining it dry if necessary.
7. Turn off power to the system, leaving the pressure relief valve open ½ turn.

OP-4 FRESH WATER FLUSH

The purpose of the fresh water flush is to replace the sea water in the watermaker with fresh water whenever the system is not operating. The Auto Flush Mode changes the fresh water every five days if the system has been idle that long. The watermaker will last longer and operate better if it is always kept filled with fresh water between uses.

Most spectra watermakers are equipped with a fresh water flush module. This module includes a charcoal filter to remove any chlorine in the fresh water that might damage the membrane. The electrically operated solenoid valve opens during the fresh water flush allowing the boats pressurized water system to supply water to the system. The charcoal filter has a maximum flow rate of 1.5 gallons per minute (6lpm) so the feed pump is operated at a reduced speed to avoid exceeding this flow rate.

If the ship's water system is unable to provide flush water at the required flow rate, sea water will be drawn in to make up the difference. This will cause the flush water to be brackish, and ineffective in preserving the watermaker. At initial startup the fresh water flush system should be tested by taking a sample of the brine discharge water just as the flush cycle is ending. This water should not taste salty, and should read less than 1000 ppm on a digital tds meter. The flush cycle can also be tested by closing the sea cock during the flush cycle. If the MPC -5000 display gives a SERVICE PREFILTER alarm this means that the fresh water supply is insufficient. In this case it is very important to either increase the water supply or adjust the feed pump flush speed as shown in the System Startup instructions.

Because the pre-filters trap the plankton in the feed water they can be subject to "going anaerobic" or starting to smell like rotten eggs, as the trapped plankton decay. For this reason it is advisable to always put in clean elements if the unit is going to be left on Auto Flush Mode. In daily or regular use the fresh water flush after each shutdown will help prevent this problem, but in excessively warm or fertile waters the pre-filters will need regular attention.

PF-4 PREFILTERS – Mark 2 SYSTEMS

Four different filters are used on these Spectra Watermakers to make sure that no damaging foreign materials enter the system. There are three filters in the system to clean the feed water of abrasive materials while the system is in operation, and a fourth filter that prevents the entrance of chlorine during fresh water flushing.

During normal operation the feed water is filtered in two stages. First it enters a fine mesh metal sea strainer then passes through a fifty micron pleated cellulose filter. This protects the boost pump from damage. After passing through the boost pump the feed water enters the filter housings containing 20 and 5 micron elements. These filters remove very fine particles which could damage the Feed Pump or Clark pump, and which would shorten membrane life.

Cleaning schedules will vary widely depending on how and where the system is used. If large amounts of feed water are run through the system in a relatively short period in biologically fertile near shore waters, the prefilters will plug up, the pressure drop across the filters will rise, product production and quality will drop, and the system will sense plugged filters and give a service prefilters or check strainer alarm.

When operated only an hour or two a day in inland or near shore waters, the trapped plankton will begin to decay in the filters long before the elements plug up, and the bacteria involved in the decay will cause a "rotten egg" smell in the product water. This decay will set in overnight in tropical waters, or after a week or two in high latitudes. If handled gently and changed regularly before they get too smelly, filters in this service can be cleaned a limited number of times.

In crystal clear blue water conditions the filters may need to be cleaned much less frequently.

The charcoal filter used in the fresh water flush system will not plug up unless you have some incredibly dirty domestic water in your boat. About six months after installation the charcoal filter element will lose its effectiveness at removing any membrane damaging chlorine which may be present in domestic water. Charcoal filter elements must be replaced every six months if there is ANY chance that chorine could be introduced into the flush water. Charcoal filter elements cannot be cleaned.

To ensure that filter elements fit properly and remove chlorine effectively, they should be purchased at factory authorized dealers. Our element part number is FT -FTC-XX. The last two digits indicate the micron rating, e.g. FT-FTC-05 is for a 5 micron element. Charcoal elements are FT-FTC-CC.

06/03/04

PF-2 CHARCOAL FILTERS

The function of the charcoal filter element, p/n FT -FTC-CC, is to remove any chlorine in the fresh water flush water supply. It also removes any particulate matter. The charcoal filter we use removes 99.7% of the chlorine. Beware when buying other charcoal filters. If they don't specify the percentage of chlorine removed, don't use them. The cheap ones in most cases will only remove 60 or 70%. Also, there are aftermarket filters which are very close to, but not exactly, the same dimensions that will not seal properly in the housing. The membrane can only handle small amounts of chlorine for short periods without damage. The chlorine will damage the bonding agent in the membrane in a very short time. So if you skimp on the charcoal filter you will toast a $600 membrane on the first flush. The other factor is the flow rate that the filter can handle. Because the chlorine is deactivated by a chemical reaction with the charcoal, it must remain in contact with the charcoal for sufficient period of time for the reaction to be complete. The filter we use can handle 1.5 gallons (6 litres) per minute flow, and are good for 3000 gallons (12,000 litres) at 1.5 GPM, or six months, whichever comes first. Regardless of the flow the charcoal loses its effectiveness after six months.

7/26/04

VP-2 ADJUSTING THE AC SPEED CONTROL

WARNING ELECTRICAL HAZARD: 120v OR 220v AC POWER WILL BE PRESENT ON THE TERMINAL BLOCKS WHILE ADJUSTMENTS ARE BEING MADE!

The SCM & SCL speed controls are used to set the feed pump motor speed by changing ships AC 50 or 60 HZ power to another desired frequency. This allows the pump to be operated to provide precisely the desired output pressure and flow in the three different modes. The speed control is Spectra factory preset and should only be adjusted after contacting the factory. Do not change any setting except parameter 31: run speed, parameter 32: flush speed, or parameter 33: service speed.

If you have the AC Tech Installation and Operation Manual that ships with replacement speed controllers the parameter menu section will be marked with the Spectra Watermakers factory presets for your unit. The manual is also available on the website at www.Spectrawatermakers.com . Instructions for changing the settings are found in the Programming the SCL/SCM Drive section.

To change a speed setting run the watermaker in the mode in which you want to change the speed. For example: If you want to change the speed the pump runs at while making water, have the unit actually making water.

Enter PROGRAM MODE by pushing the Mode button. This will activate the password prompt. The password is 25. Enter the password with the up and down buttons. When the display reads 25, press Mode. The display will read P01 to indicate that you have entered program mode. Using the up and down buttons select the desired Parameter (e.g. P31 for setting run speed.) Press Mode to display the current setting. The speed settings are displayed in Hertz (cycles per second AC output power frequency.) Use the up and down buttons to change the setting. Do not change the setting more than 3 Hertz at a time. Press Mode to enter the new setting. The pump speed will change, and the controller will enter parameter select mode. To continue changing the same parameter until the desired pressure or flow rate is achieved, Press the Mode button two more times. This will bring you back to Program mode in the same parameter.

If no buttons are pushed for two minutes the controller will require the password to be entered again.

VP-8 DC SPECTRA™ SPEED CONTROL

DC powered Newport model watermakers shipped after January 1, 2007 are equipped with a Spectra™ feed pump speed controller. (See Note) The 12 and 24 Volt DC models use the same speed controller. Three preset, and one variable speed are available. Changes in Run Speed change the feed water flow rate during "Auto Run" and "Run" modes, and when the manual switch is in the Manual Run position. Changes to the Run speed setting will affect the Product flow rate, system power consumption, and feed pressure. The Flush Speed setting regulates the flush water flow rate during "Auto Store" mode and when the manual switch is set to "Flush Manual". Some models have a third "Service speed".

On the speed control circuit board are two magnetic switches for adjusting the pump motor rpm. The switches are narrow silver colored bars about 1/2" (1.5cm) long. The Increase Speed switch is labeled S2 and is located near the upper right corner of the board. The Decrease Speed switch is labeled S3 and is located to the right of the six cylindrical capacitors. Each time a small magnet is placed near the switch while the pump is running, a signal will be sent to the controller, changing the selected speed setting, and the pump will speed up or slow down slightly.

SETTING FLUSH SPEED: Flush speed should be set to run the pump slowly enough that the vessels fresh water system can supply a sufficient flow of water through the charcoal filter, so that no sea water is drawn in during the flush cycle. The maximum flow through the Charcoal filter is 1.5 gpm (6lpm), so at flush speed the pump must discharge less than this amount. Flush speed can be checked by closing the sea cock during the flush cycle. If the system shuts down on the Check Sea Strainer alarm the feed pump is running too fast and drawing sea water into the system to make up the difference.

SETTING RUN HIGH SPEED: Run High Speed should be adjusted so that the Watermaker produces the specified amount of product flow at the specified power consumption and nominal feed pressure. Since feed pressure and power consumption vary with sea temperature and salinity, it may be desirable to adjust the Run Speed to optimize the pressure or power consumption in very cold or high salinity waters.

SETTING RUN LOW SPEED: Run low speed can be adjusted to minimize energy consumption by comparing product flow to amperage to achieve the lowest possible amp hours per gallon.

SERVICE SPEED: Limits the feed flow through the membranes during cleaning procedures and pickling to maintain feed pressure below 50psi.

MAXIMUM CURRENT LIMIT: The current limit is adjusted at the factory and can not be adjusted in the field.

SPECTRA WATERMAKERS

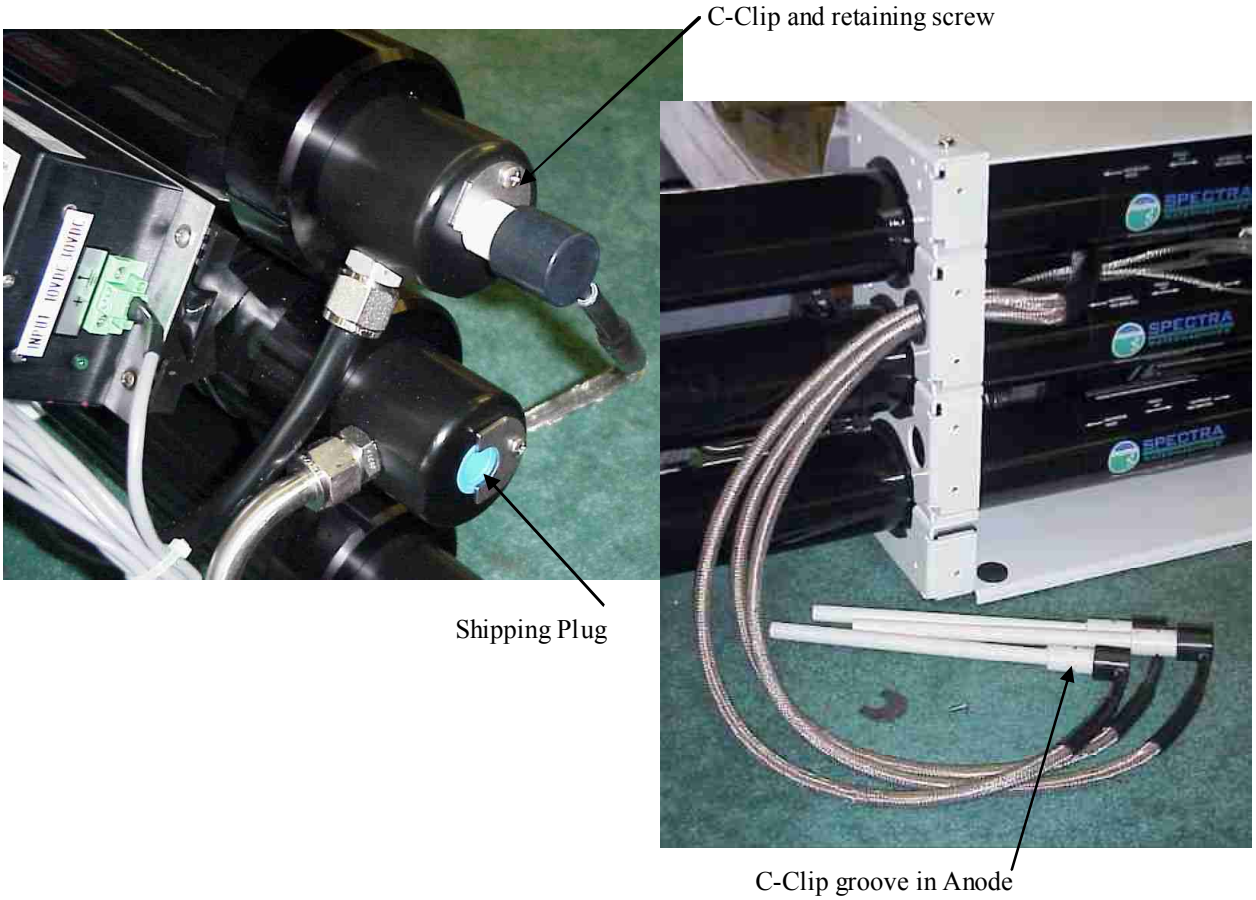
Z-BRANE INSTALLATION & OPERATION MANUAL

The **Z-brane** is a revolutionary product which incorporates the Z-Guard High Voltage Capacitive technology into the membrane pressure vessel. Always active, the Z-Brane creates an environment that is unfriendly to bio-film and bacteria. The Z technology also assists in the prevention of scale formation on the membrane surfaces. The Z-Brane allows the system to be shut down or decommissioned for extended periods of time without chemicals or preservatives. The Z-Brane will not prevent freezing so that in cold climates Propylene Glycol is still required.

ANODE INSTALLATION

Spectra Watermakers ship the High Pressure Module with the White Z-brane Anode(s) removed from their socket(s) to prevent shipping damage. Before the High Pressure Module is mounted the anodes should be installed.

The socket(s) have been plugged with plastic plugs to keep the membranes clean and moist during shipping and storage. Remove the "C-clips" that secure the plugs, and remove the plugs. Insert an anode into each socket. It doesn't matter which anode goes in which socket. Insert the anode until the groove is flush with the membrane end plug, so the C-clip will slip into the groove. Install the C-clip screw to secure the clip.



WIRING

The Z-Brane system is integral with the watermaker unit and only requires continuous 12Vor 24V DC power to be operative.

Note: There is no reason to open the transformer enclosure. Do not service this unit without disconnecting the power source! There may be high voltage present.

It is recommended that the Z -Brane be connected to a discreet continuous power source. The power must be on during the time that the system is operation and during the time the Z -Brane is used for membrane storage. If the power is obtained from the MPC then the MPC must be powered up at all times during storage. This may not be desirable.

Fuse the power at the source with a 5 amp fuse or circuit breaker.
Red is Positive (+) , Black is Ground (-)

Z-Brane Power Harness

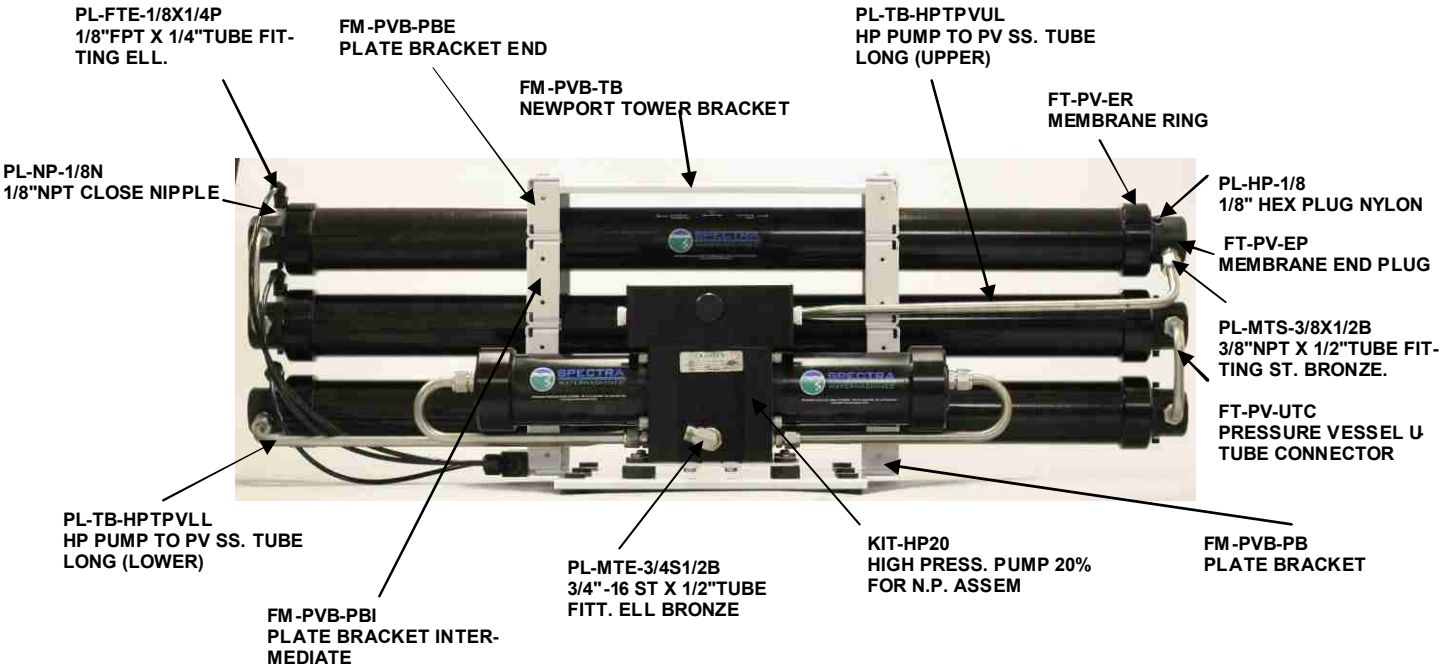
Operation

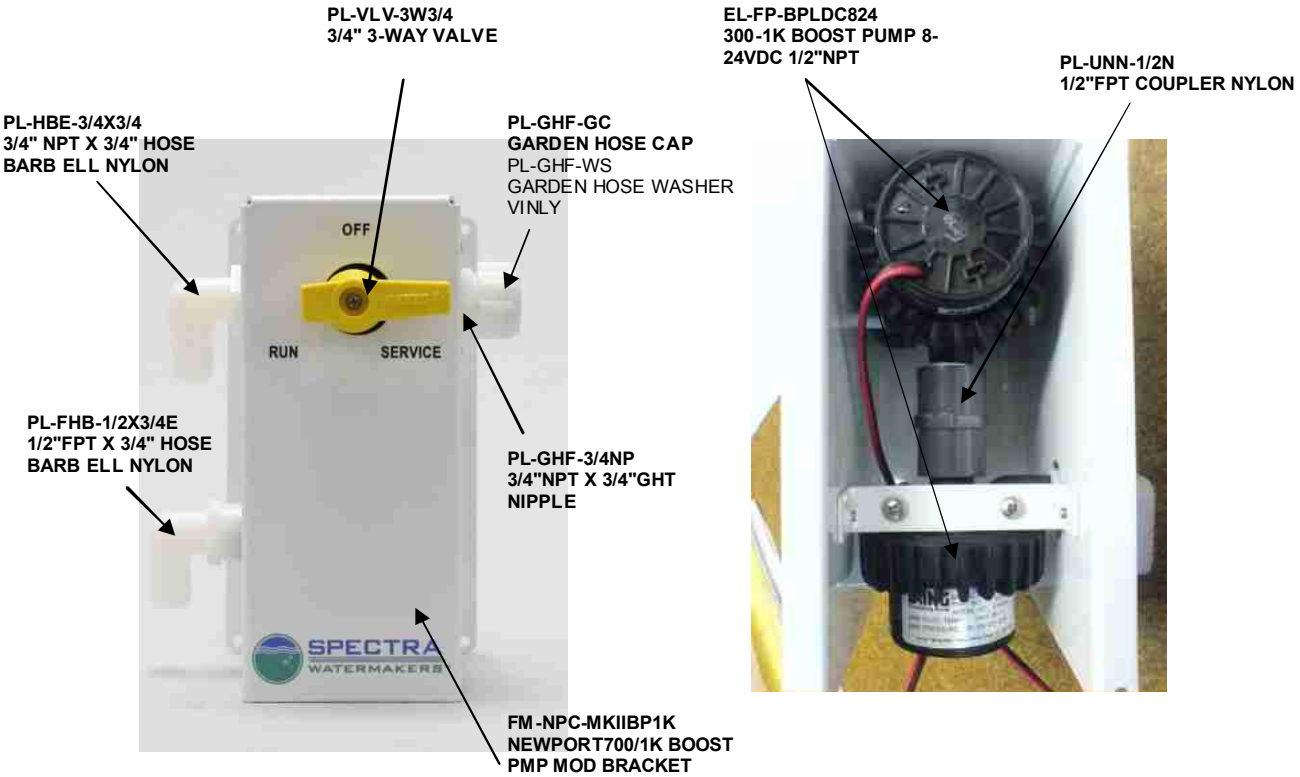
During normal operation the Red LED should be on . Power needs to be supplied to the Z - Brane unit at all times that you wish to have the biofouling and scale protection. We recommend that your watermaker be flushed after each use not only to protect the membrane but to prevent corrosion in the feed water system. To achieve full effectiveness thoroughly fresh water flush the watermaker several times before leaving the vessel.

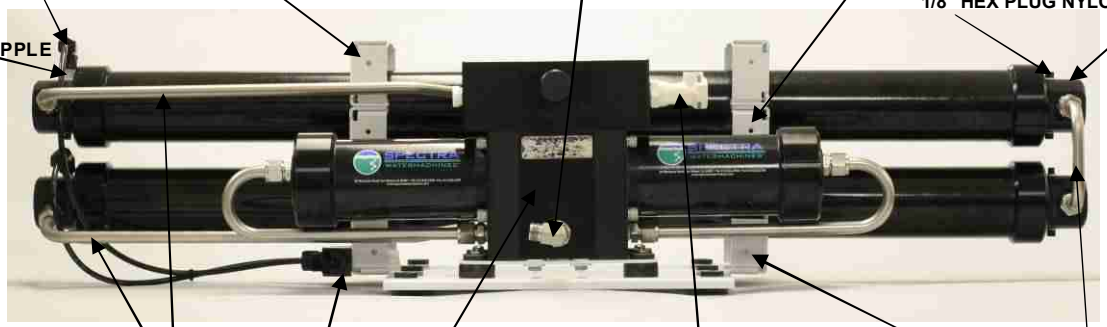
The Z-Brane may be de -powered if the system is stored with chemicals or winterized with Glycol.

DO NOT DISCONNECT OR SPLICE ANY OF THE HIGH VOLTAGE WIRING!

Contact the factory if modifications are required.


PL-FTE-1/8X1/4P
1/8"FPT X 1/4"TUBE FIT-
TING ELL.
FM-PVB-PBE
PLATE BRACKET END
FM-PVB-TB
NEWPORT TOWER BRACKET
PL-TB-HPTPVUL
HP PUMP TO PV SS. TUBE
LONG (UPPER)
FT-PV-ER
MEMBRANE RING
PL-NP-1/8N
1/8"NPT CLOSE NIPPLE
PL-HP-1/8
1/8" HEX PLUG NYLON
FT-PV-EP
MEMBRANE END PLUG
PL-MTS-3/8X1/2B
3/8"NPT X 1/2"TUBE FIT-
TING ST. BRONZE.
FT-PV-UTC
PRESSURE VESSEL U-
TUBE CONNECTOR
PL-TB-HPTPVLL
HP PUMP TO PV SS. TUBE
LONG (LOWER)
FM-PVB-PBI
PLATE BRACKET INTER-
MEDIATE
PL-MTE-3/4S1/2B
3/4"-16 ST X 1/2"TUBE
FITT. ELL BRONZE
KIT-HP20
HIGH PRESS. PUMP 20%
FOR N.P. ASSEM
FM-PVB-PB
PLATE BRACKET

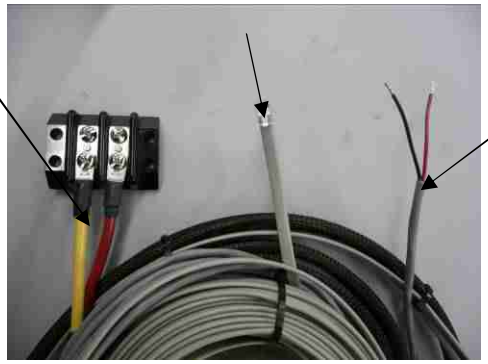

PL-VLV-3W3/4
3/4" 3-WAY VALVE
EL-FP-BPLDC824
300-1K BOOST PUMP 8-
24VDC 1/2"NPT
PL-UNN-1/2N
1/2"FPT COUPLER NYLON
PL-HBE-3/4X3/4
3/4" NPT X 3/4" HOSE
BARB ELL NYLON
PL-GHF-GC
GARDEN HOSE CAP
PL-GHF-WS
GARDEN HOSE WASHER
VINLY
OFF
RUN
SERVICE
PL-FHB-1/2X3/4E
1/2"FPT X 3/4" HOSE
BARB ELL NYLON
PL-GHF-3/4NP
3/4"NPT X 3/4"GHT
NIPPLE
SPECTRA
WATERMAKERS
FM-NPC-MKIIBP1K
NEWPORT700/1K BOOST
PMP MOD BRACKET


PL-FTE-1/8X1/4P
1/8"FPT X 1/4"TUBE FIT-
TING ELL.
FM-PVB-PBE
PLATE BRACKET END
PL-MTE-3/4S1/2B
3/4"-16 ST X 1/2"TUBE
FITT. ELL BRONZE
FM-PVB-PBI
PLATE BRACKET INTERMEDI-
ATE
PL-HP-1/8
1/8" HEX PLUG NYLON
PL-NP-1/8N
1/8"NPT CLOSE NIPPLE
FT-PV-EP
MEMBRANE END PLUG
FM-PVB-PB
PLATE BRACKET
PL-TB-HPTPVLL
HP PUMP TO PV SS. TUBE
KIT-HP20
HIGH PRESS. PUMP 20%
FOR N.P. ASSEM
PL-QDC-BD3/8
3/8"NPT QUICK DISCNT.
COUP. BODY
FT-PV-UTC
PRESSURE VESSEL U-
TUBE CONNECTOR
PL-MNF-PD
PRODUCT MANIFOLD 700/1000


PL-MTE-3/4X5/8P
3/4"NPT X 5/8" TUBE FITT. ELL
FM-NPC-MKII1K
NEWPORT 700/1K MK-II
CHASSIS ASSY
EL-MPC-RMCD
MPC REMOTE CONTROL (LCD)
PL-NP-1/2X3/8N
1/2"NPT X 3/8"NPT CLOSE
NIPPLE NYL
EL-BRK-BRKB2P
BREAKER BOOT PANEL
MOUNTED 2 POLES
PL-HBE-SFPA
SHURFLO PORT ADAP-
TOR
PL-MTE-1/2X5/8P
1/2"NPT X 5/8" TUBE ELL
FITTING
PL-HBE-3/4X3/4
3/4" NPT X 3/4" HOSE
BARB ELL NYLON
PL-MTE-3/8X3/8J
3/8"NPT X 3/8" TUBE FIT-
TING ELL JG
EL-SWT-TG-DPDT
TOGGLE SWITCH DP/DT
PL-BSH-1/2X3/8N
1/2" x 3/8" HEX BUSHING
REDUCER NYL
EL-SWT-TSBHC
TOGGLE SWITCH BOOT
SEAL
PL-MTE-3/4S1/2B
3/4"-16 ST X 1/2"TUBE
FITT. ELL BRONZE
PL-NP-3/4N
3/4" NPT CLOSE NIPPLE
NYLON
PL-MTE-3/8X3/8P
3/8"NPT X 3/8"TUBE FIT-
TING ELL.NYL
PL-NLT-5/8
5/8" NYLON TUBE LOW
PRESSURE
FT-FTH-10L3PCS
10" LOW PRESS. FILTER
HOUSING 3 PCS
FT-FTC-5
5 MICRON FILTER ELE-
MENT
FT-FTC-20
20 MICRON FILTER ELE-
MENT

EL-MPC-CBL50
50' MPC REMOTE CON-
TROLLER CABLE

EL-TM-65A2 T
ERMINAL BLOCK 65A



EL-CBL-18-2
18 AWG X 2 CABLE

PL-BSH-3/4X1/4N
3/4" X 1/4" HEX BUSHING REDUCER
NYL

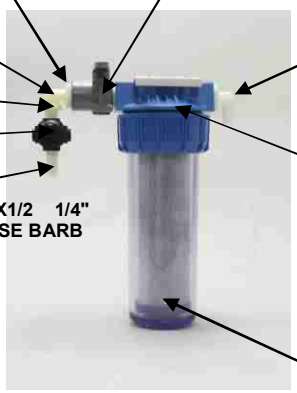
PL-VLV-3/4PVC
3/4"NPT X 3/4"FPT 1-WAY
PVC VALVE

PL-MFF-1/4X1/4
1/4"NPT X 1/4"FPT ELBOW FIT-
TING NYL

PL-HBE-3/4X1/2
3/4 NPT X 1/2"HOSE BARB
ELL. NYLON

PL-NP-1/4N
1/4" NPT CLOSE NIPPLE NYLON

PL-PRG-1/4P
1/4" WATER PRESSURE
REGULATOR

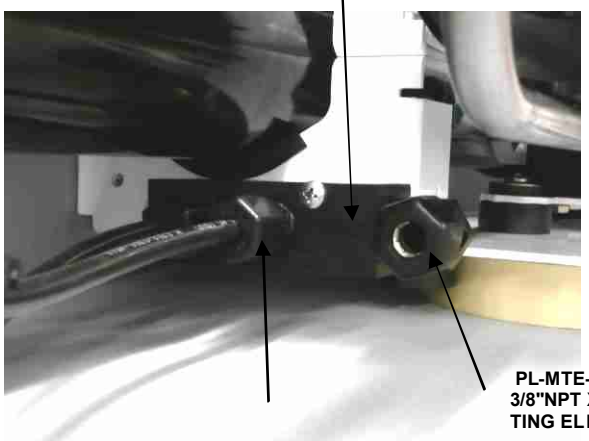


FT-FTH-10L3PCS
10" LOW PRESS. FILTER
HOUSING 3 PCS

PL-HBS-1/4X1/2 1/4"
NPT X 1/2" HOSE BARB
ST. NYLON

FT-FTC-CC
CHARCOAL FILTER

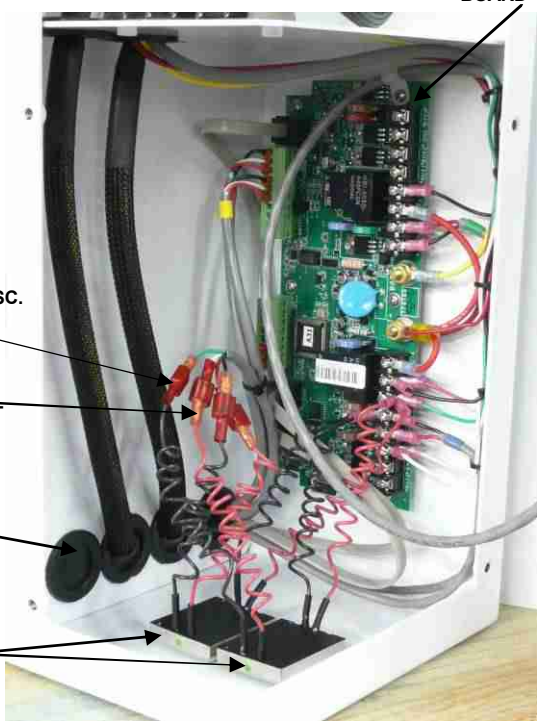
PL-MNF-PD
PRODUCT MANIFOLD 700/1000



PL-MTE-3/8X3/8P
3/8"NPT X 3/8"TUBE FIT-
TING ELL.NYL

PL-MTS-1/4X1/4P
1/4"NPT X 1/4"TUBE FITTING ST.

NOTE: NP700/1000
DC SYSTEMS ONLY



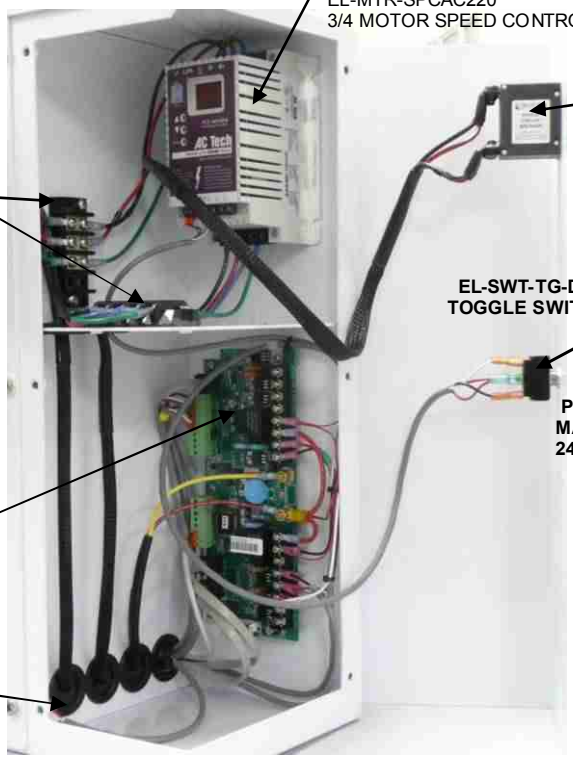
For 110 AC
EL-MTR-SPCAC110
3/4 MOTOR SPEED CONTROLLER AC 110
For 220 AC
EL-MTR-SPCAC220
3/4 MOTOR SPEED CONTROLLER AC 220

For 110AC & 24 DC
EL-BRK-30ADP
AC/DC BREAKER DP TOG-GLE 30A
For 220AC
EL-BRK-15ADP AC/DC BREAKER DP TOGGLE 15A

EL-TM-30A4
TERMINAL BLOCK
30A 4 POS.

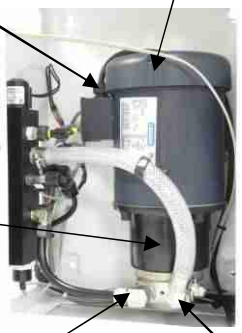
EL-MCD-1/2NCG
1/2" NYLON LIQUID-TIGHT CORD GRIP

EL-MTR-3/4AC220
3/4 HP, 240 VAC, 3 PHASE, 56C MOTOR



EL-SWT-TG-DPDT
TOGGLE SWITCH DP/DT

PL-PMP-240MAG5
MAG5. DRIVE VANE PUMP 240 GPH C250



EL-MPC-PCBDP
MPC-5000 CIRCUIT BOARD

PL-MTE-7/8SX1/2
7/8"-14S X 1/2" TUBE FIT-TING EL SS.

PL-HBE-7/8SX3/4
7/8"-14S X 3/4" HOSE BARB EL SS.

EL-HWR-DPG
DIAPHRAM
GROMMET PVC
BLACK

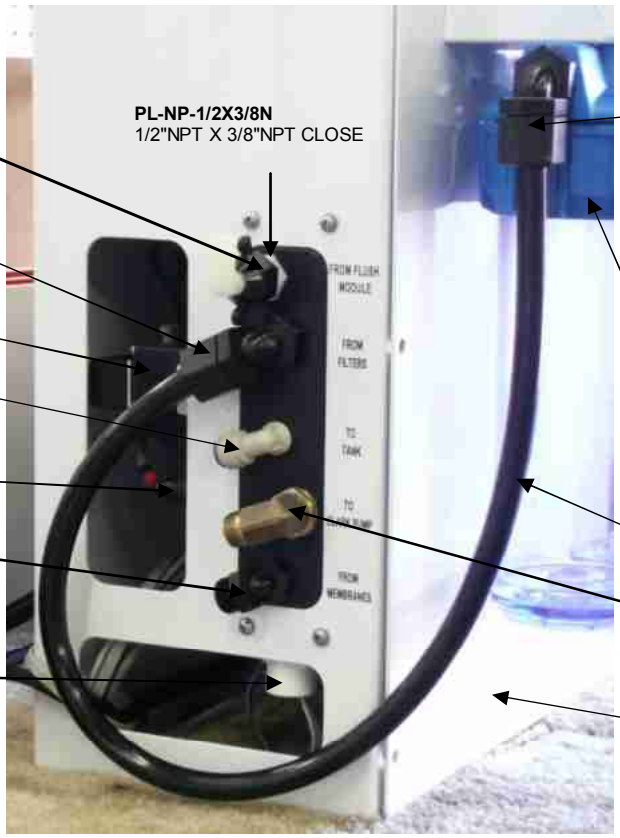
EL-TM-30A3
TERMINAL BLOCK 30A 3 CIRCUIT

EL-TM-30A2
TERMINAL BLOCK 30A 2

EL-MPC-CBL50
50' MPC REMOTE CONTROLLER CABLE

EL-BC-22-18HS 22-18 AWG BUTT CONN. W/HEAT SHRINK

EL-CBL-18-2
18 AWG X 2 CABLE



PL-HBE-SFPA
SHURFLO PORT ADAPTOR

PL-NP-1/2X3/8N
1/2"NPT X 3/8"NPT CLOSE

PL-MTE-3/4X5/8P
3/4"NPT X 5/8" TUBE FITT. ELL.

PL-MTE-1/2X5/8P
1/2"NPT X 5/8" TUBE ELL

PL-SLN-1/4D12M
1/4" DIVERSION VALVE 12 V (MNF)

FT-FTH-10L3PCS
10" LOW PRESS. FILTER HOUSING 3 PCS

PL-MTE-3/8X3/8J
3/8"NPT X 3/8" TUBE FITTING ELL JG

EL-SSR-250
PRESSURE TRANSDUCER (250 PSI)

PL-NLT-5/8
5/8" NYLON TUBE LOW PRESSURE

PL-MTE-3/8X3/8P
3/8"NPT X 3/8"TUBE FITTING ELL.NYL

PL-MTE-3/4S1/2B
3/4"-16S X 1/2"TUBE 90DEG. AL-BRZ

EL-MPC-SP3
SALINITY PROBE 3RD GENERATION

FM-NPC-MKII1K
NEWPORT 700/1K MK-II CHASSIS ASSY

FM-NPC-MKII1K
NEWPORT 700/1K MK-II CHASSIS ASSY

PL-HBS-1/2X3/4
1/2" NPT X 3/4" HOSE BARB ST NYLON

EL-MTR-1.5HP3P2
1.5HP 1750 RPM 3 PHASE MOTOR 56C

PL-SLN-1/4O12VB
1/4"1-WAY SOLENOID VALVE 12V W/O VB

PL-CLP-10SS
#10 HOSE CLAMP

EL-SSR-ABS
ABSOLUTE PRESSURE SENSOR

PL-HS-3/4VN
3/4" VINYL HOSE

SUB-NP-MK2-INT
NEWPORT MK-II INTAKE MANIFOLD

PL-PMP-240MAG5
MAG5. DRIVE VANE PUMP 240 GPH C250

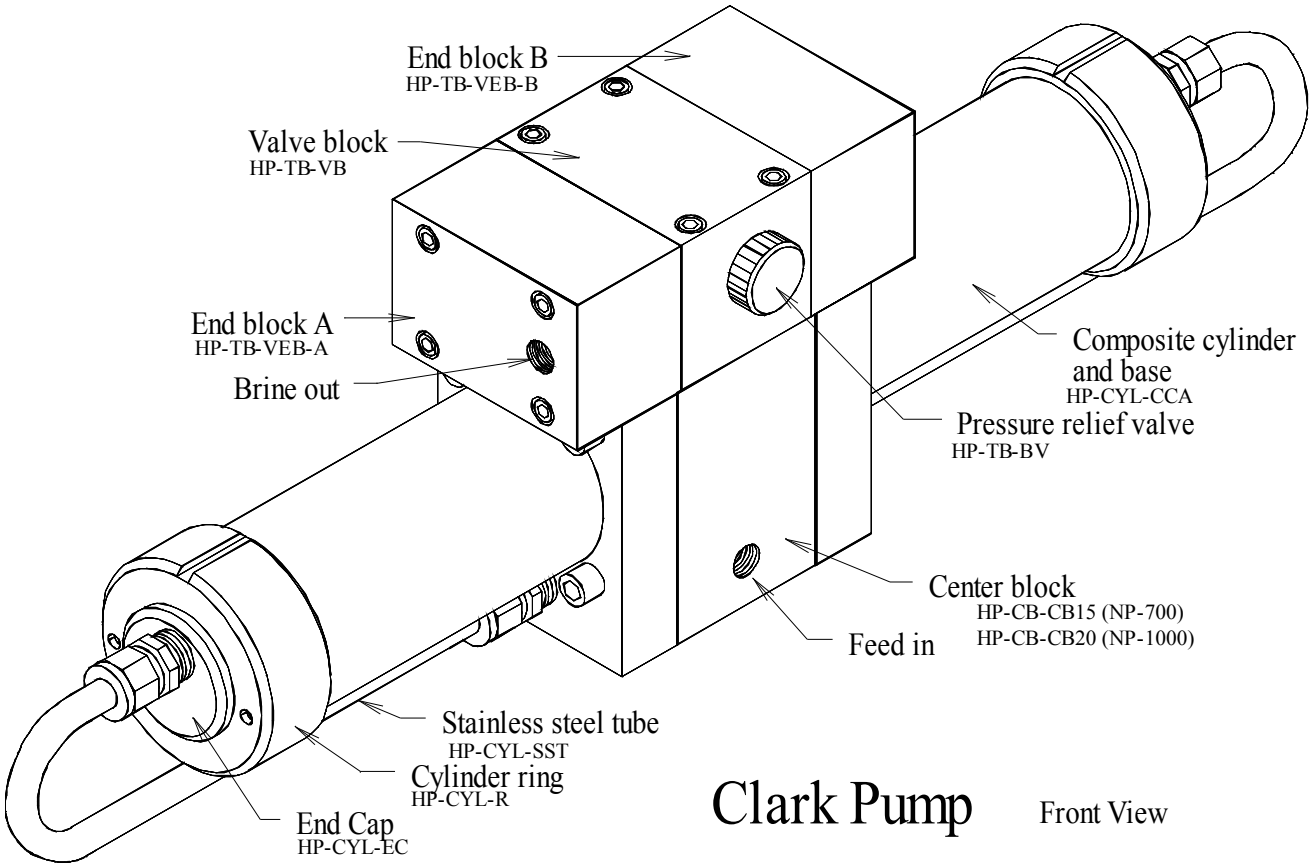
EL-SSR-IFM
INLINE FLOW SENSOR

PL-CLP-10SS
#10 HOSE CLAMP

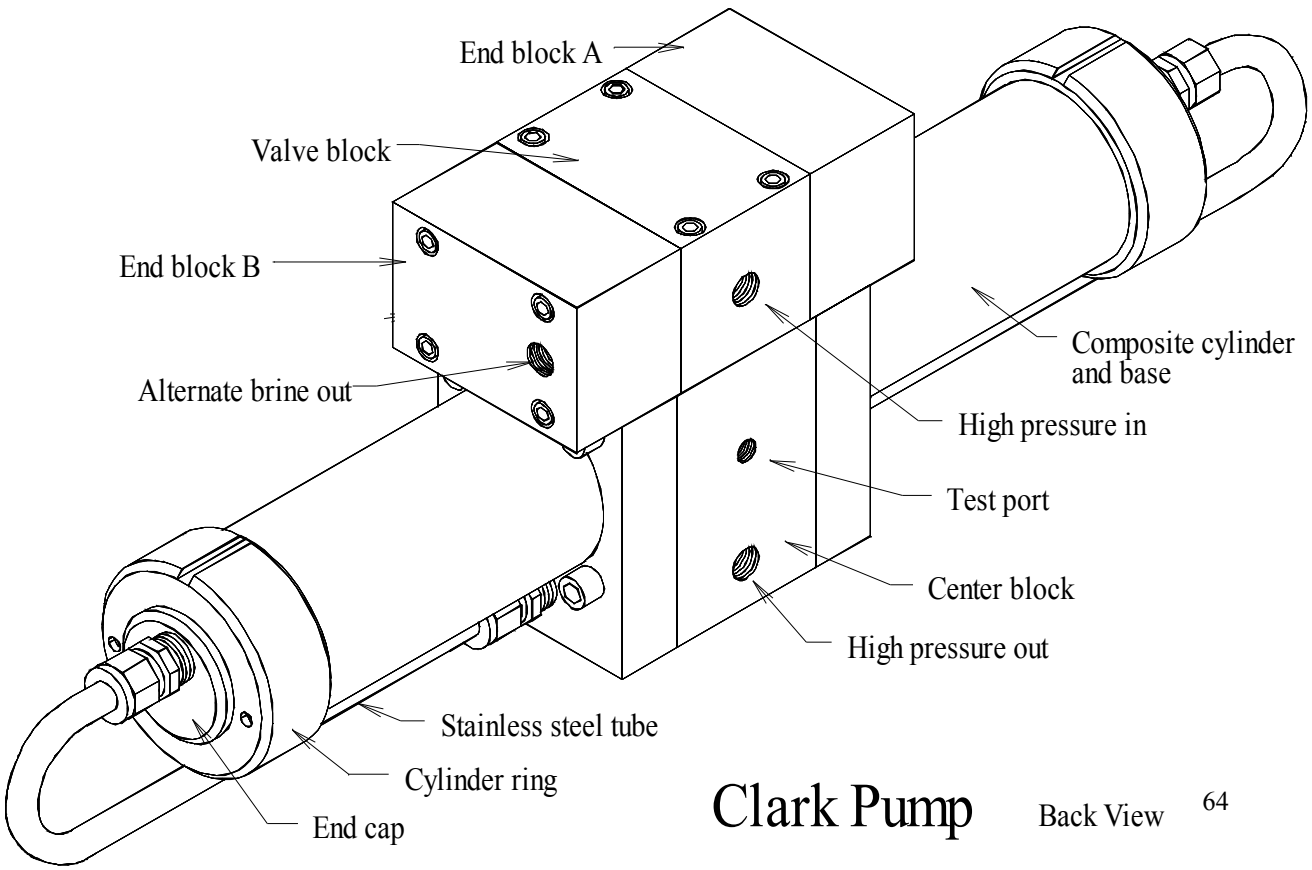
PL-HBE-7/8SX3/4
7/8"-14S X 3/4" HOSE BARB EL SS.

PL-MTE-3/4S1/2B
3/4"-16S X 1/2"TUBE 90DEG. AL-BRZ

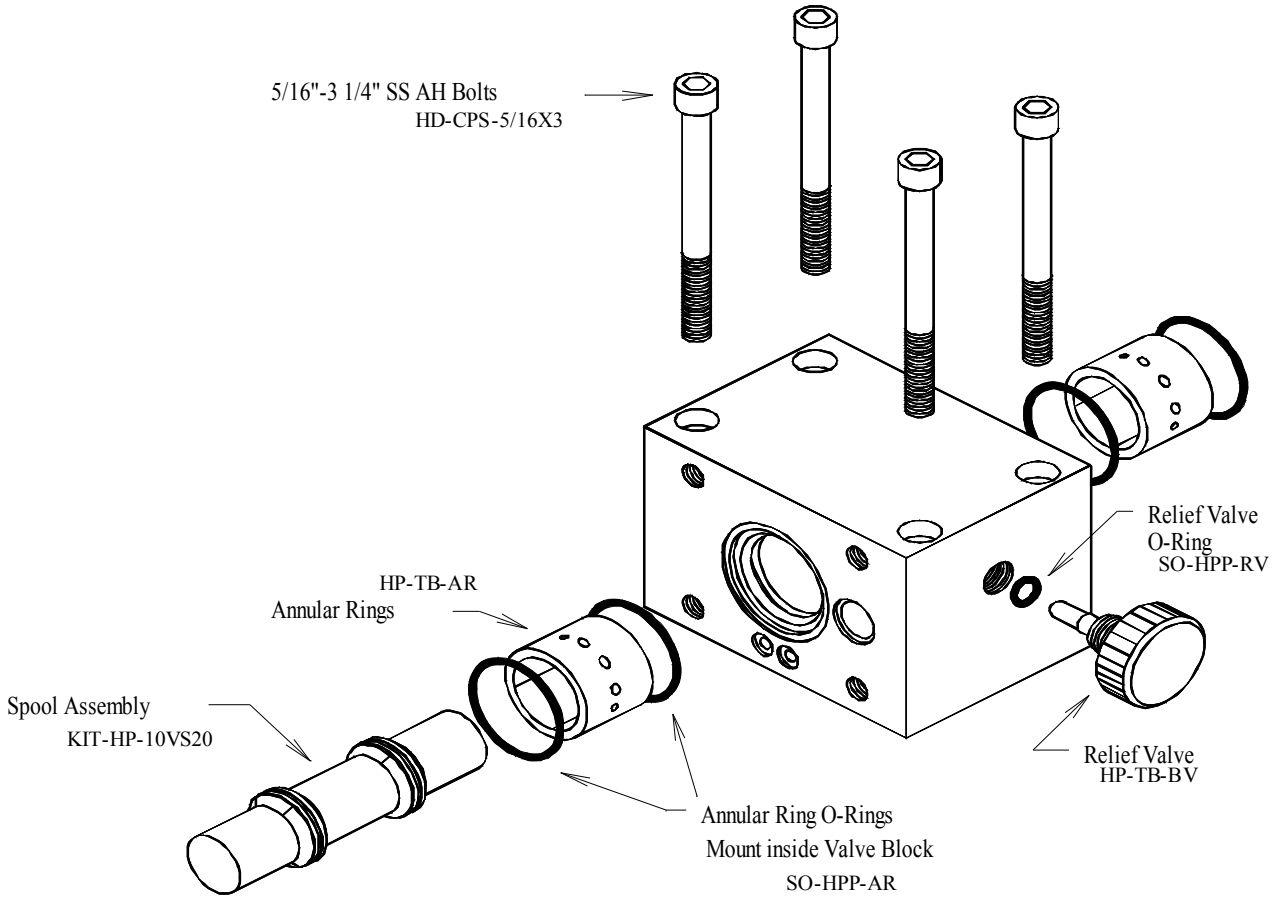
PL-MTE-7/8SX1/2
7/8"-14S X 1/2" TUBE FITTING EL SS.



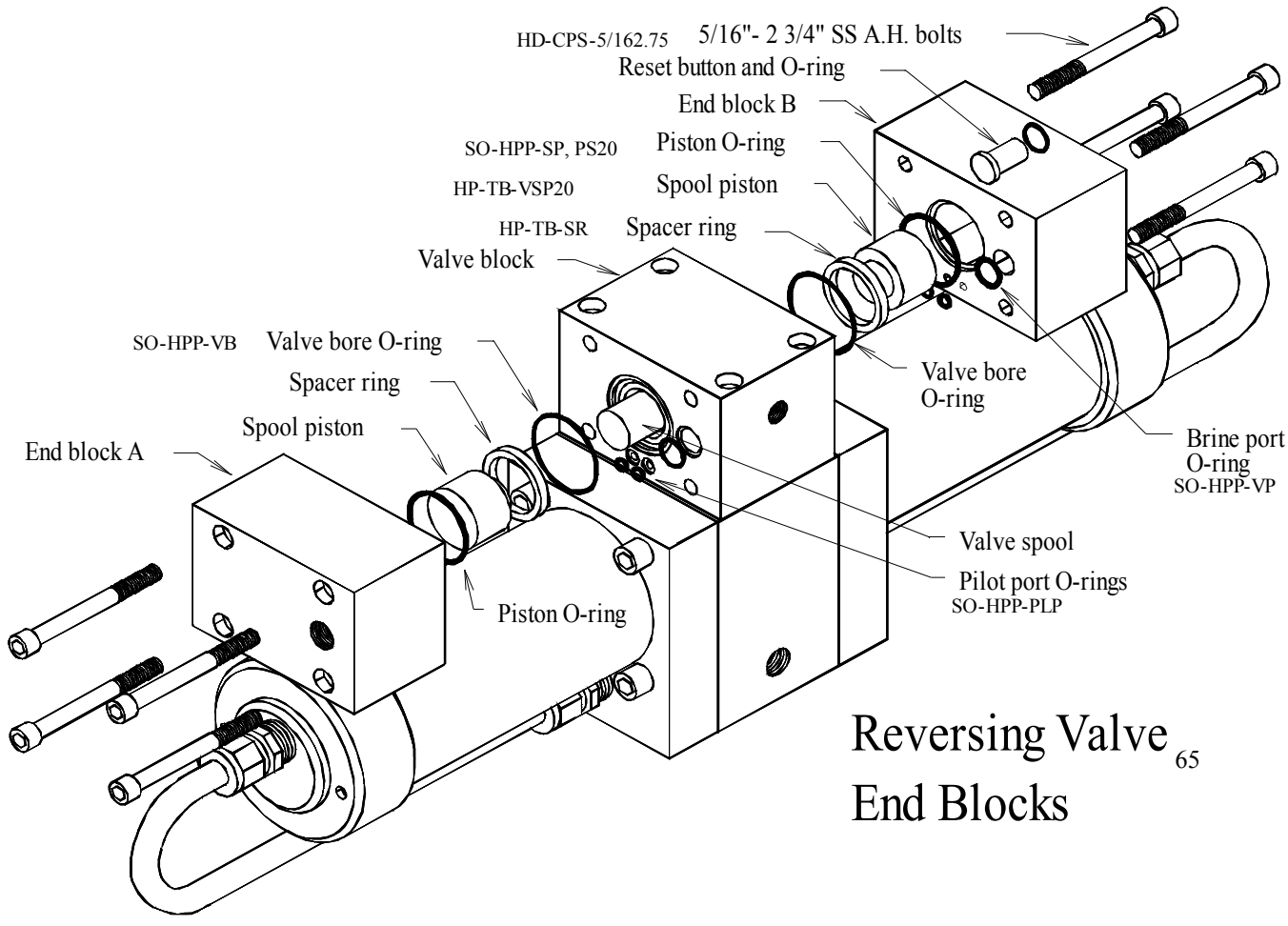
Clark Pump Front View



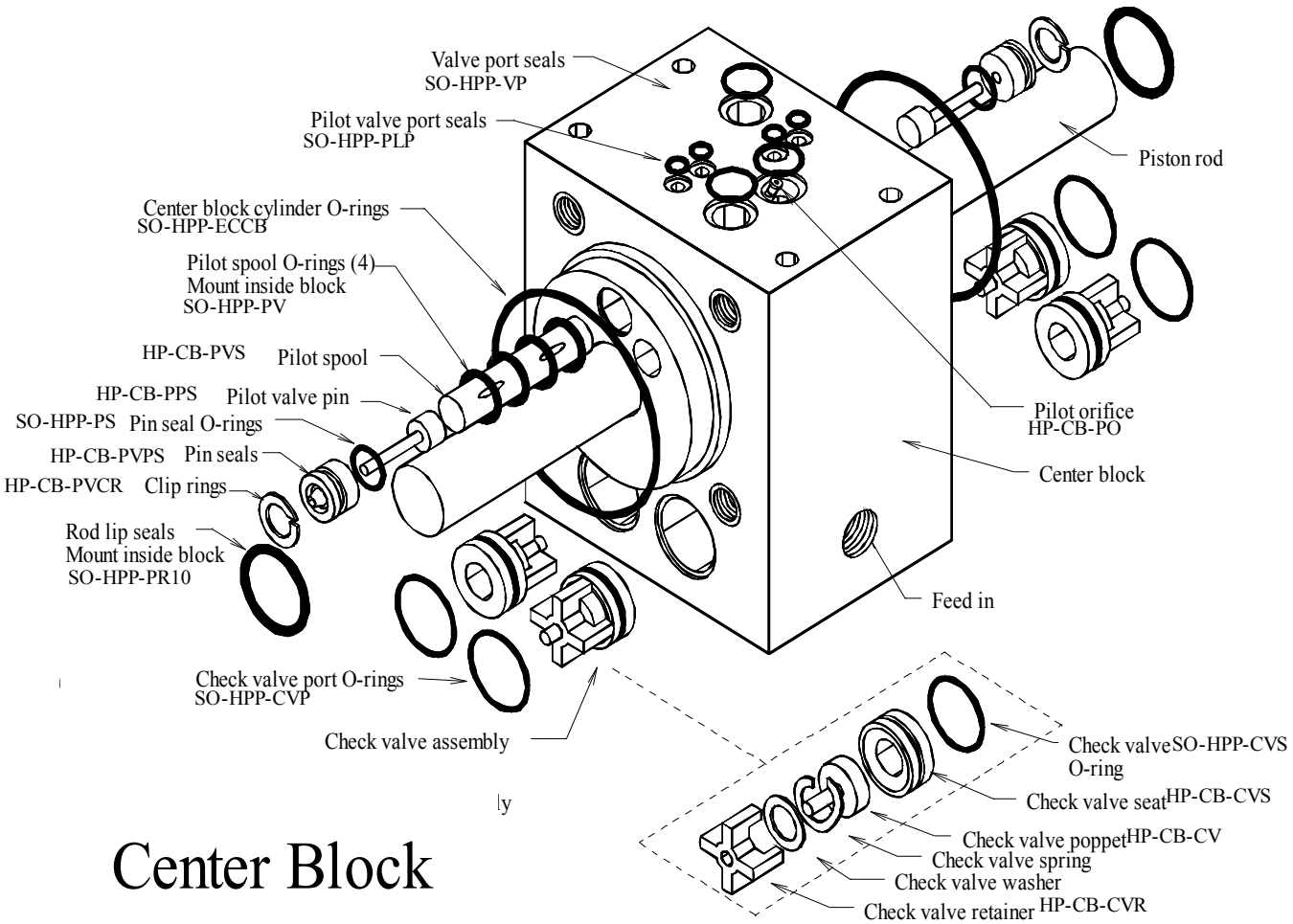
Clark Pump Back View



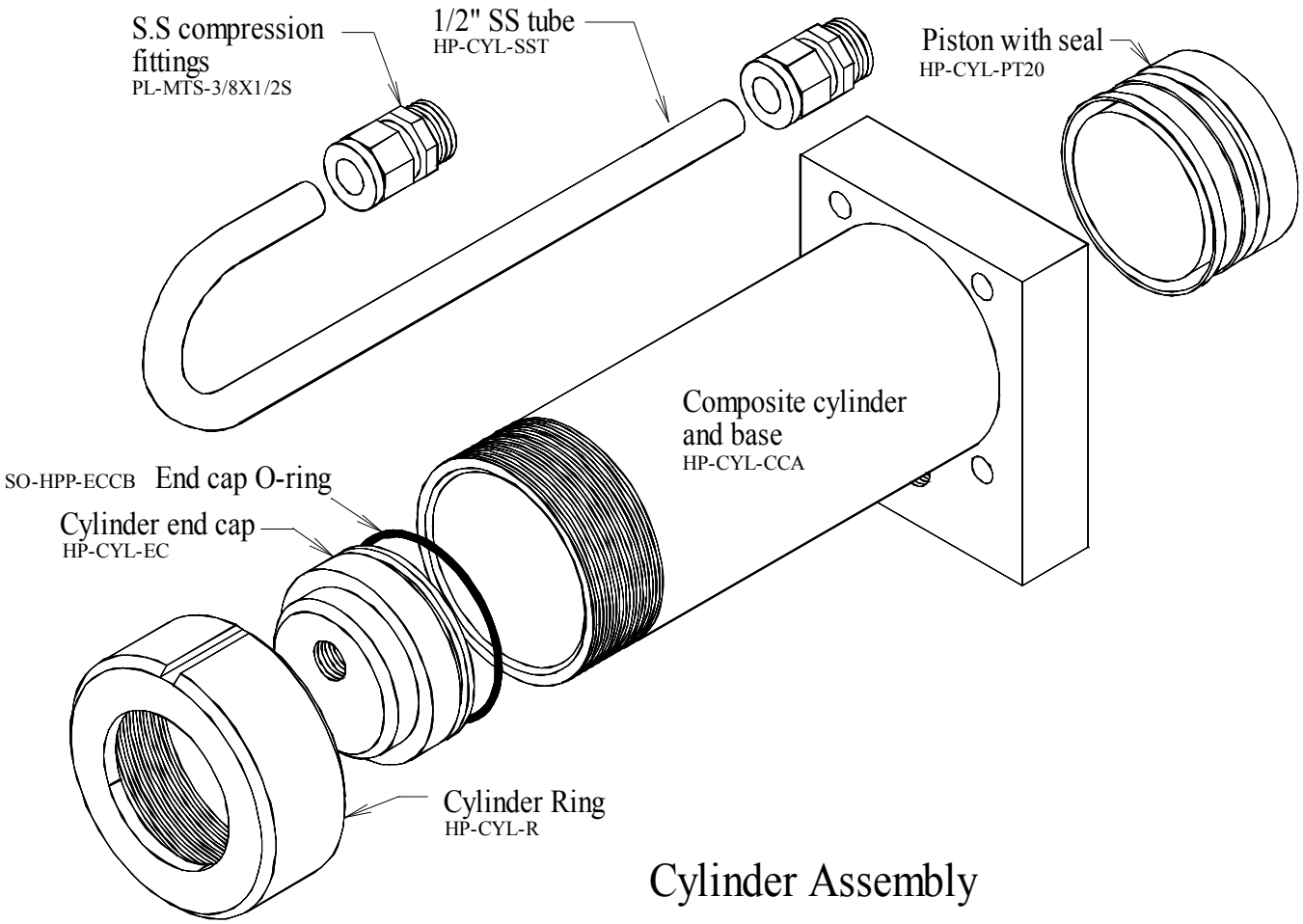
Valve Block



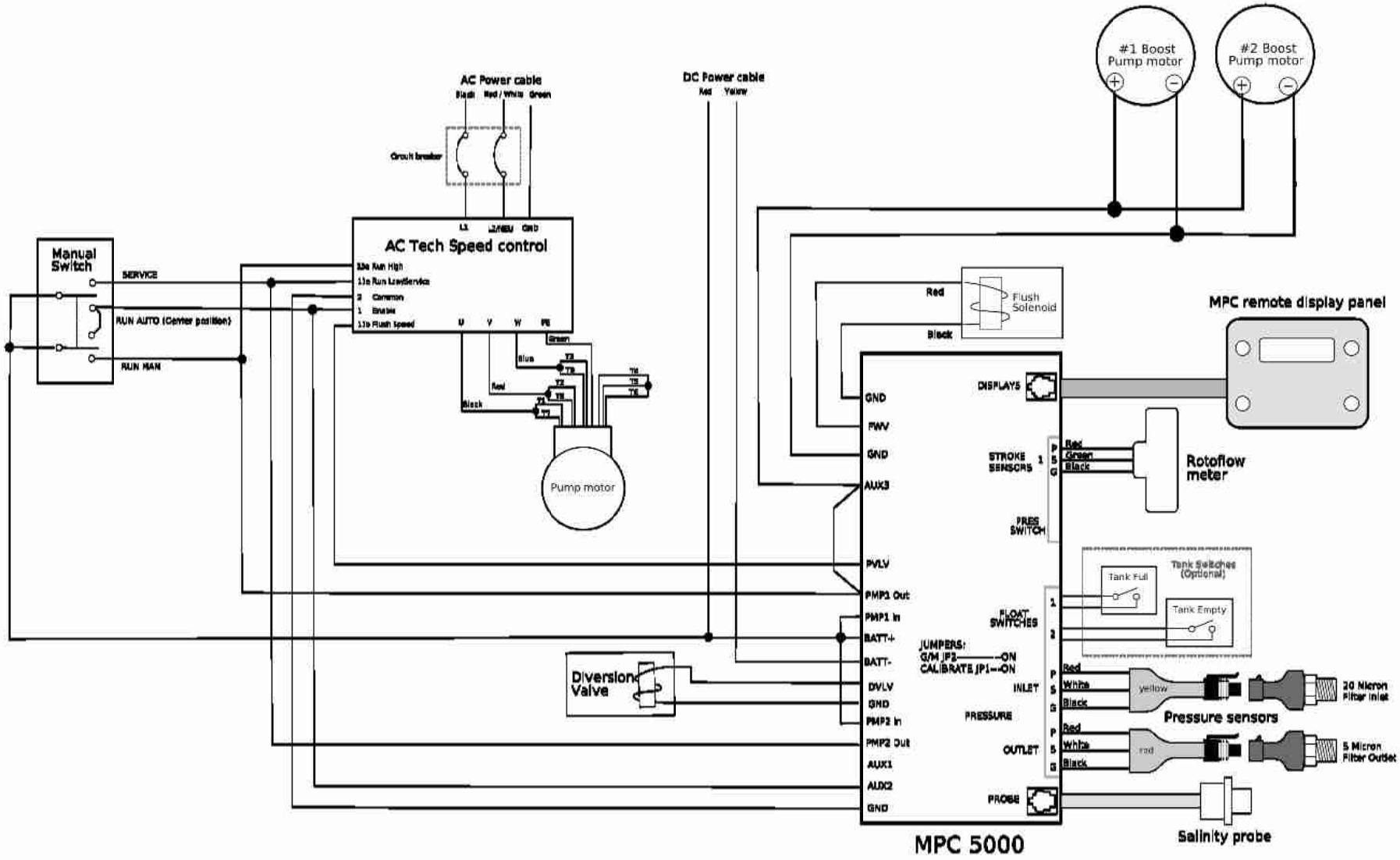
Reversing Valve
End Blocks



Center Block



Cylinder Assembly



Revision History

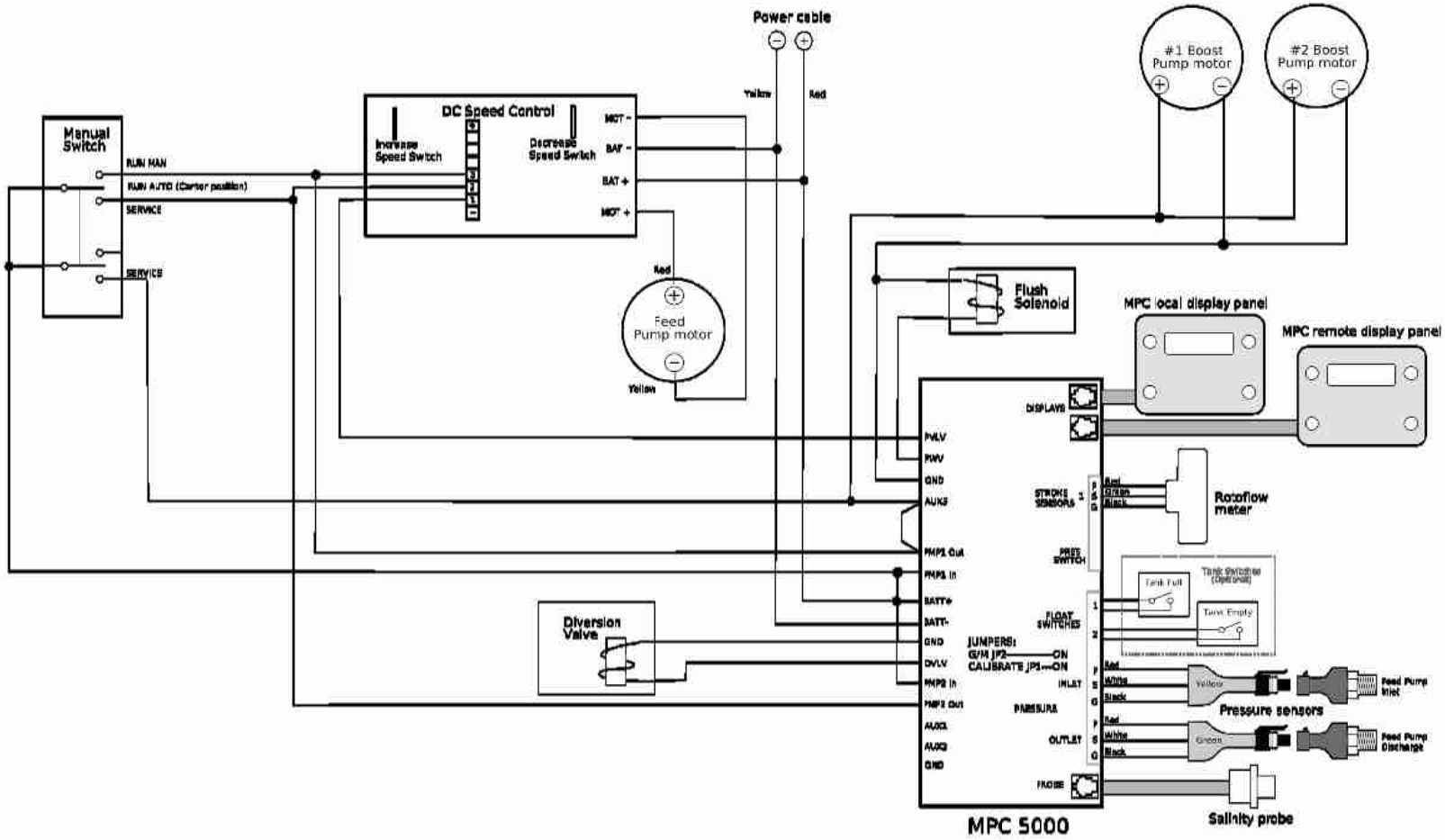
Date	Description
02/20/08	Add Jumper AUX 3 to PMP1
12/10/08	Remove Voltage Regulators on 24V Controls

Newport MK 2 AC MPC-5000

Revision: 2008-DEC 10

Spectra Watermakers

Dwg No WS5 rev 0



Revision History

Date	Description
02/20/08	Added Pole to Man Switch for Aux3
12/10/08	Removed Voltage Regulators on 24V Controls
06/08/09	Added Jumper b/t Aux3 and PMP1 Out

Newport 700/1000 MK II DC

Revision: 2009 - JUN 8

Spectra Watermakers

Dwg. No: WS3