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## CP-5 CLARK PUMP CHECKOUT

If the watermaker is not working properly first check the automatic controls, prefilters, and feed pumps. If no problems are found proceed to check out the Clark Pump.

First open the pressure relief ½ turn and start the feed pump using the manual control. Listen to see if the Clark pump cycles. If it does not cycle the fault may lie in the pilot valve spool pins. If these are bent or broken the pump won't cycle and no water will flow when the pressure relief is closed.

If the pump does not cycle but water does flow through it, The problem is probably a check valve stuck open. This can sometimes be solved on 150, 200, and 380 systems ONLY, by blocking the brine discharge and opening it suddenly to "shock" the system. On 400, 700 & 1000 models, or if this doesn't work, see the manual for instructions on check valve service.

If the Clark pump cycles, remove the test plug on the side of the center block just above the High Pressure Outlet. Close the pressure relief. If water runs, pulses or squirts out of the test port, you have a bad piston rod seal. An occasional drip of water is not a problem. On models 200 through 1000 this can usually be repaired by replacing the seals. On model Ventura 150 you may have to replace the center block.

If the pump stops cycling when the pressure relief is closed but runs ok with it open, you probably have a broken reversing valve spool. See CP-7 Spool Valve Repair

If the pump keeps cycling, Check the feed pressure readings. On automated systems you can use the MPC-3000 display to check feed pressures even though you are running the feed pump manually. If possible, install a suitable pressure gauge in the feed pump discharge line to take pressure readings. Manual units will have a pressure gauge installed. Check with the factory for nominal pressures for your unit. The feed pressures should be within 5% of each other on each stroke, and that the pressure spikes about the same. If the pressures are far different (asymmetrical) on each stroke look for one of these problems:

1. Listen for a hissing noise on the low pressure stroke. This is an indication of a broken annular ring in the upper valve body. See CP-1 Reversing Valve Problems
2. If the pressures are asymmetrical without a hissing noise, the most likely cause is a bad check valve in the lower center block.

If the pressures are symmetrical but low you may have an internal leak. Check the pressure relief valve for damage or foreign material. Inspect the check valves in the center block for dirt or damage. While the cylinders are off check the bores for scoring. Some light scoring is normal but deep damage will cause leakage around the pistons.

Full Instructions for Clark pump repair can be downloaded from our website at [www.spectrawatermakers.com](http://www.spectrawatermakers.com) click "Repair Manual".

6/17/04

## HS LF-1 POOR PRODUCT QUALITY SHURFLO

With any product water quality issue you need to check the calibration of the salinity tester that you are using before proceeding.

Membranes are not an exact science and two identical systems can have a different product quality result. World health standards deem water of up to 1000 PPM of total dissolved solids acceptable for drinking consumption. We consider anything below 700 PPM acceptable but not ideal and anything below 500 PPM excellent. Factors that could affect water quality are addressed below.

1. **LOW SYSTEM FLOW OR PRESSURE** will equate to lower product quality (higher ppm). A 200-C system running at 70 psi will deliver product water in the 400- 500 ppm range, while the 380-C systems with twice the flow and operating at 100 psi into the same size membrane, will produce 200-300 ppm water. Ventura 150 systems, which have a higher feed to output pressure ratio (See MISC-4 nominal pressures), as well as a higher feed flow/membrane area ratio, will produce water in the 150-200 ppm range. These improvements in product quality come at the expense of energy efficiency.
2. **Damage to the membrane by CHLORINE** contamination. Flushing with the system with chlorinated water will irreparably damage the membrane. Charcoal filters are used to absorb any chlorine which might be present in flush water. They must be of proper specification to be suitable. There is no test for Chlorine damage except the process of elimination of other causes.
3. **DIRTY OR SCALED** membranes. A dirty (foreign material), scaled (mineral deposits), or contaminated (bacterial growth) membrane can result in poor water quality, and abnormal operating pressures. If operating pressures are above normal then cleaning is indicated. If the system pressures are within operating normal range, cleaning may have little result. Cleaning is no better for a membrane than it is for your clothes. Avoid cleaning as a diagnostic tool.
4. **Mechanical LEAKAGE** within the membrane pressure vessel. This is an unlikely but possible cause of poor water quality on the old style Codeline pressure vessels (white) that we used in the past. The Spectra pressure vessel has a double O-ring arrangement that includes a tell tale hole between them so that any salt water leaking past an o-ring will drip into the boat and not go into the product water.

If system flow (product plus brine) is 1.5 GPM or above on one pump, the membrane is clean, the product flows are consistent with the system flow and the water quality is still not acceptable then replacement of the membrane is indicated. See HS-LF2 Flow Check for instructions on checking flow rates

7/6/14

## HS LF-2 FLOW TEST/ SHURFLO

Before the test, change all filters and clean the strainer. Make sure that there are no leaks. Check for air leaks. Air in the system will cause low production and erratic salinity. Look for air bubbles in the product flow meter, feed pump discharge hose, and brine overboard hose.

Run the system and watch the pressures very closely. Make sure that on each shift everything is even from side to side. If the feed pressure to the Clark pump is different (asymmetrical) on one stroke than the other this could be part of the problem. A couple psi is ok but anything over that is an issue. If the pump is asymmetrical Clark pump repairs should be done before continuing with these tests. Ask for CP-5 Clark Pump Checkout instructions.

If no asymmetry is noted, Please do this test. Note: on 150 and 200 models with only one feed pump, disregard the instructions concerning “Pump Two” and “Both”

Make sure the Shurflo overpressure cutout switches, p/n PL-PMP-SFPH, are set to 125 psi. With pump 1 running, close the brine service valve. The feed pressure should rise to 125psi and the pump should shut off. Repeat with pump 2. If the pumps shut off at a lower pressure see SF-2 Adjust Shurflo Pressure Switch bulletin.

1. Log the pressure on pump 1, pump 2, and both. Log the product GPH (LPH) at the same time.
2. Log the voltage at the feed pumps at the same time. Confirm at least 12.5 volts at the pumps. You may have to run the engine or battery charger.
3. Measure the total flow rate of the system. Run the system making water and divert BOTH the brine discharge AND product water into a bucket. Time how long it takes to make a given amount of water. Repeat with pump 2 and both pumps.

In order to make good water to spec. you need the proper amount of feed water flow. Each pump alone should produce 1.5 gallons per minute (5.7 lpm). Running on both pumps the flow should be 2.7gpm (10 lpm).

Compare the product flow to the total feed flow. Product flow should be 7% of total flow for a 150, and 9.5% of total flow for a 200 or 380 model. If product percentage is low you may have an internal leak in the Clark pump.

For every 1/10<sup>th</sup> of a gpm feed water flow loss we will lose about 1/2 gallon per hour of product flow and the salinity will go up 100ppm.

Low feed flow combined with low system pressures, (see Misc-4: Nominal Pressures), is most frequently due to worn Shurflo pump heads, p/n PL-PMP-SFPH.

9/24/04

## HS-LF 5 VOLTAGE DROP 380

Low voltage at the feed pumps can result in low product flow and poor quality. If the system is performing to spec with one pump running by itself and then drops off when both are on this is a sign that when both are running the voltage drop is greater. To measure the voltage drop, have the system running and making water. Run on pump one and measure the voltage AT the feed pump. Repeat with pump two and then with both. Log the voltage, feed pressure and product flow. Now with the system still running with both pumps measure the voltage at the batteries being used to run the system. **DO NOT RELY** on the boats panel meter or monitor. The higher the voltage at the pump the better the system will perform. We recommend using a wire size that will give a total drop (Hot and Ground side combined) of not more than ½ Volt.

5/06/04

## HS-LF-6 POOR PRODUCT QUALITY, VANE PUMP

High salinity is directly related to both feed pressure and flow. On Spectra watermakers this can be caused by restricted suction, air leaks, restricted discharge, cavitation, worn or damaged feed pump, or restricted brine overboard piping. Internal leakage in the Clark pump or a failing membrane can also cause high salinity. Be sure all filters and strainers are clean before proceeding.

On systems with vane pumps (300, 400, 700, and 1000 models) the first thing to check for is air leakage into the system. This will cause lowered feed flows and erratic salinity readings. Check for air bubbles flowing along in the feed pump suction hose, the feed pump discharge line, the brine discharge hose, or the product hose. Air can only get into the system on the suction side of the feed pump. Check the strainer, the 50 micron filter, and all the joints and hose clamps. Repair air leaks before proceeding. Always grease the threads and o-rings on the strainers and filters.

Check all the hoses for kinks or restrictions. Check that the pressures and flows are normal. On manual systems check the product flow rate and feed pressure. If product flow is low see the flow test bulletin on how to proceed. The problem could be a worn out feed pump, misadjusted pressure regulator, or faulty Clark pump.

If product flow is normal but salinity is high the problem may be the membrane. Membranes can only be tested by putting them into a water maker that is known to make good water. If testing is not possible try cleaning the membrane with SC-3 acid cleaner. Use SC-2 Cleaner only when all else fails.

6/28/04

## HS LF-7 FLOW TEST VANE PUMP

The correct feed water flow rate is essential to producing rated product flow and quality. Feed water flow should be measured as follows. You will need a large container or small drum and a watch. If the Controls are rejecting the product you will have to break into the product line at the membrane or diversion valve with a separate hose. Before starting the test clean all the filters and check for leaks. Check for and repair air leaks in the low pressure inlet side. Air leaks cause low production and erratic salinity. Listen carefully for cavitation in the feed pump. Cavitation will be caused by a restricted feed water suction.

Set up the unit so that the brine discharge and the product can be directed into the container. On automated units the system will have to be run for a minute or two as it times through the start cycle. You may have to direct the brine and product into the bilge until the test starts. Once the unit is running normally, direct the brine and product into the bucket. Time how long it takes to fill the container with a given amount of water. For example, if it takes 60 seconds to produce 4 gallons (15.2l) your feed rate (brine + product) is 4gpm (15.2lpm.)

Empty the container. Direct the product into the container with the brine going overboard and time the product flow rate.

Compare your readings with these nominal flow rates for the various models:

Model 300: feed 2.3gpm, product 12.5gph. Model 400: feed 2.8gpm, product 16.7gph.  
Model 700: feed 3.8gpm, product 29 gph. Model 1000: feed 3.5gpm, product 41.7 gph.  
If you are working in liters divide liters by 3.8 to convert to US Gallons.

If the feed flow is low there may be something wrong with the feed pump, the unit could be sucking air, or the suction lines may be restricted. A restricted inlet will result in cavitation and the feed pump will make a grinding noise. Air in the system can be seen as bubbles in the feed, brine, and product hoses. If there are no air leaks or restrictions check the feed pump pressure regulator: See VP-4 "Adjust Relief Valve". If the regulator is not the problem it may be a worn or damaged feed pump. Models 700 and 1000 have variable speed feed pumps. Contact the factory for details on adjusting feed pump speed.

If the feed flow is up to spec but product flow rate is low the problem is leakage in the high pressure side, probably in the Clark pump. See CP-5 Clark Pump Checkout.

9/27/04

## MISC-2 SERIAL NUMBERS

Spectra watermakers Models 150, 300, 400, 700, and 1000 have a Serial Number Attached to the outside of the Feed Pump Module: (XX/XX000/00/00). This number provides us with the model, size, and date of manufacture of the unit.

Model 380 and 200 watermakers with MPC-3000 have a similar serial number on the MPC-3000 electrical box.

In addition, each Clark Pump is given a separate serial number engraved in the front of the Center Block just above the feed water inlet: (0000- 00).

When contacting the factory for registration, technical support, or parts, please reference the Clark pump serial number followed by the number found on the Pump module or Electrical box.

Note: earlier models had only a ten digit Clark Pump serial number.

6/03/04

## MISC-4 NOMINAL PRESSURES

Reverse osmosis water maker system pressures are temperature related. There are two fundamentally different principles of watermaker operation: Spectra Watermakers operate on a Constant Flow Principle while less energy efficient water makers use a Constant Pressure System. In colder water a watermaker will make the same amount of product (Spectra Constant Flow Principle) at a higher pressure, or less product (Other Constant Pressure Systems) at the regulated pressure.

Product water salinity (ppm) is a function of pressure across the membrane. The higher the pressure the more salt rejected, and the lower the salinity.

The Spectra Clark pump takes lower pressure from the feed pump and “intensifies” it to the higher pressures (approx 800psi) required at the membrane. Various models have different ratios of intensification. The pressures shown on the Spectra gauges and panels are the feed pressure not the membrane pressure. Because each model has a different feed pressure ratio, each model will have a different Nominal operating pressure. And, because sea temperatures vary widely and Spectra Watermaker membrane pressures vary with sea temperature, each model has a Nominal Operating Pressure Range.

|              |             |
|--------------|-------------|
| VENTURA 150  | 55-70 PSI   |
| 200C         | 70-80 PSI   |
| CATALINA 300 | 90-110 PSI  |
| 380C         | 90-110 PSI  |
| NEWPORT 400  | 100-115 PSI |
| NEWPORT 700  | 160-170 PSI |
| NEWPORT 1000 | 190-210 PSI |

Normal pressures may fall outside of these nominal pressures in extreme arctic or tropical inland sea conditions.

If pressures are out of range, before proceeding, check product quality with a calibrated TDS meter, check product flow rate with a flow meter or timed quantity check, and check power consumption with an accurate meter.

Pressures below nominal can be due to worn Feed pumps, Low voltage, suction side flow restriction, poor membrane condition or a Clark pump problem. Pressures above normal are often caused by discharge side pre-filters, Clark pump, membrane condition and brine discharge system restriction.

5/20/04

## MPC-1 SYSTEM STALLED/ SHURFLO

System stalled means the Mpc-3000 thinks the high pressure Clark pump is not cycling. The system will try to start three times and then alarm SYSTEM STALLED.

1. Confirm that the feed pump or pumps are running. If the fan is running but the pump is not see SF-1 PUMP WON'T RUN. If the fan is not running find and repair the power supply problem.

2. If the pump is running confirm that water is flowing through the system. Open the pressure relief valve on the Clark pump and check the flow at the brine overboard. If the pumps are running but no water is flowing the pumps may be air bound. Open the pressure relief ½ turn to allow any air to be expelled out the brine discharge. Watch the feed hose for bubbles, if air bubbles continue to appear check the seat strainer and suction lines for leaks.

4. Confirm that the Clark pump is actually shifting. Close the pressure relief valve. If the Clark pump is shifting, confirm that the green light on the sensor is going on and off with each shift. NOTE: the stroke sensor, p/n EC-MPC-SC15, is on the side of the high pressure pump valve body. It is connected with a gray wire and snaps into a pocket in the side of the top section of the Clark pump.

If the pump is not cycling perform the CP-5 Clark Pump Checkout Tests

If the pump is cycling but the light is not blinking perform the MPC-4 Stroke Sensor Test.

If the light is blinking and you still get System Stalled, the problem is in the MPC-3000 itself or the sensor wiring. Open the MPC-3000 box and look at the Printed circuit board. Next to the 3 telephone style jacks there is an 8 pin connector marked "1STROKE SENSORS2 PRES SWITCH". Make sure the connections are tight and the plug is firmly in place. Try moving the stroke sensor wiring from "STROKE SENSOR 1" to "STROKE SENSOR 2". Red wire goes to "P," Green goes to "S," Black goes to "G."

6/03/04

## MPC-2 SYSTEM STALLED, VANE PUMP

SYSTEM STALLED means the MPC-3000 thinks that the high pressure Clark pump is not cycling (The pump should thump every shift). The system should try to start three times and then alarm SYSTEM STALLED if there is no feed flow, the Clark pump has failed or if the stroke sensor has failed. Also, if the pressure relief valve on the Clark pump is open more than one turn, the pump may not cycle. Do not open the pressure relief more than ½ turn. On new units ensure that the temporary spacer under the pressure relief knob has been removed.

First, confirm that the Clark pump is not cycling. The feed pump can be operated on manual if necessary to test the Clark pump.

IF THE CLARK PUMP IS NOT CYCLING the feed pump may have an air lock or a failed coupling/rotor shaft. To clear an air lock, do a fresh water flush by pushing and holding the AUTO STORE button for five seconds. The Clark pump should cycle during auto flush. If the Clark pump cycles during auto flush but won't cycle when the feed pump is running, the feed pump drive may have failed. See VP-1 Vane Pump Drive failed. If the feed pump is good and the Clark pump won't cycle, see CP-5 Clark Pump Checkout.

IF THE PUMP IS CYCLING Check the strokes sensor. (See MPC-4, STROKE SENSOR TEST).

9/27/04

## MPC-3 FEED PRESSURE SENSOR TEST

There are two pressure sensors and a vacuum sensor on MPC-3000 automated units.

The two pressure sensors, p/n EL-SSR-XX, are on the discharge side of the feed water pump. One is located at the inlet to the prefilters and the other at the outlet. The inlet side sensor is used for the MPC-3000 FEED PRESSURE reading and alarm. The inlet pressure is also compared to the outlet side sensor reading to determine the pressure drop across the filters for the SERVICE PREFILTERS function. Before proceeding replace both filter elements with new ones,

If you are getting SERVICE PREFILTER false alarms you can zero out the pressure sensors with the key pad as follows. The system should be running with the pressure relief closed. Run the system manually if necessary. Simultaneously press the ALARM/DISPLAY button and the AUTO/STORE button. Watch the display when you do it. When you get it right you will see some numbers flash in the upper left corner of the display. Keep trying until you see the flash. Once it flashes the sensors are calibrated to zero differential. On the test stand with clean filters our "Prefilter Good/Replace" display reads 0 squares.

If there is no feed pressure reading, swap the sensor wiring, so that the upstream red plug is plugged into the green sensor and vice versa. If the MPC-3000 now shows a feed pressure reading then the fault is with the upstream sensor. If there is still no reading then the wiring is bad or the MPC-3000 has a fault.

If the feed pressure reading is high and you are tripping on HIGH PRESSURE, swap the plugs as above. If the pressure reading is lower, then the upstream sensor is reading high. If the reading is the same you either really do have high feed pressure or the controller may need to be reprogrammed using the Spectra software.

If you determine that you are getting a false SERVICE PREFILTER or HIGH PRESSURE alarm, these alarms can be defeated by unplugging the inlet (red) sensor or unplugging the green ten pin connector on the MPC-3000 printed circuit board. Monitor the system carefully if running with the alarms defeated.

The vacuum sensor is found inside the pump module and is used for the CHK SEA STRAINER alarm to warn of a clogged strainer or 50 micron filter. It is set for 15 inches Hg. It has three terminals: normally open, normally closed, and common. It should be wired to normally open (NO) and Common (C). If it is wired to (NC) you will get a false alarm. If you unplug the sensor the system should run normally. If you still get an alarm with the sensor unplugged there is a problem in the MPC-3000.

02/16/05

## MPC-4 STROKE SENSOR TEST

The stroke sensor, p/n EL-MPC-SC15, is located on the Clark pump in a cavity on the valve body end cap. It has a small green light that blinks on and off with each pump cycle. The stroke sensor is used by the MPC-3000 controller to calculate the GPH (LPH) PRODUCT display, and for the SYSTEM STALLED alarm. Inside the stroke sensor are two magnetically actuated switches. One switch turns the light on and off using power between the red and black wires. The other switch is between the green signal wire and the black ground wire. The signal wire has 4.9 volts supplied to it from the Printed Circuit Board. The magnetic switch is alternately open, keeping 4.9 volts on the signal wire, and closed, dumping the signal voltage to ground and dropping the voltage on the signal wire to zero.

If you can hear the Clark pump cycling but the green light is not blinking you can test it as follows: Remove it from the cavity for testing [use a pocket knife to pry it out]. With the power on to the watermaker, place a magnet next to the back of the sensor and see if the light comes on. NOTE: the magnet must be polarized properly so try both sides. If the light goes on and off the sensor may be good. In this case the problem could be with the magnet in the valve body of the Clark pump. If the light does not come on check the wiring and the connections inside the MPC-3000 box. There should be five volts between the red and black wires in the stroke sensor cable. If there is no power to the sensor the printed circuit board has a fault. If there is power to the sensor but it won't blink it could be either the sensor or the wiring that has failed.

If the light is going on and off with each cycle of the Clark pump but you are getting a SYSTEM STALLED alarm, then the signal that the Clark pump is stroking is not getting through to the controller. Check the voltage from the green wire to the black wire in the sensor cable connector. The voltage should cycle between 4.9 volts and 0 volts with each stroke of the Clark pump. If it stays at 4.9 volts, either the stroke sensor is bad or the green signal wire is broken or has a bad connection. Carefully check the wiring.

If the voltage stays at zero while the green light is cycling on and off either the stroke sensor is bad, the Printed Circuit Board is not providing power to the signal terminal, or there is a short in the cabling between Signal and ground. First remove the green signal wire from the connector and check for voltage. If the voltage comes up to 4.9V the sensor is bad or there is a short in the wiring.

If the voltage at the connector stays at zero with the signal wire disconnected, it is a PCB problem. Try moving the wires to the other set of stroke sensor terminals in the connector. If that doesn't work replace the PCB.

10/11/04

## MPC-6 PCB FUSES

The CHECK FUSE alarm indicates that one of the seven fuses on the MPC-3000 Printed Circuit Board has blown. These fuses are the flat color coded small ATM automotive style. The alarm display will indicate by number which fuse has blown. The fuse bases are numbered on the PCB. Before replacing the fuse find and repair the problem that caused the fuse to blow. The fuses supply power to the terminal strip on the PCB as follows.

Fuse #1 5A: PVLV (priming valve solenoid) and FWV (fresh water flush valve solenoid)

Fuse #2 5A: AUX 3 not used.

Fuse #3 15A: PMP1 Feed pump number 1

Fuse #4 was 30A, now 10A: DVLV (diversion valve solenoid)

Fuse #5 15A: PMP 2 Feed pump number 2 (model 380 only). Powers feed pump during flush cycle on other models

Fuse #6 10A: AUX 1, powered when display illuminated, and AUX 2, powered when feed pumps running

Fuse #7 5A: STER (ultra violet sterilizer)

Before replacing fuse: Shut off the main power supplies. Remove the lead wire that goes to the affected component from the terminal strip. Using a digital ohmmeter, check the circuits for dead short. You should see about 10 ohms or more on the solenoid valve circuits.

On Newport systems the feed pump is powered through an external relay from the MPC-3000. You should see in excess of 50 ohms on the feed pump relay circuit.

On Catalina systems the feed pump relay is inside the MPC-3000 box, but readings should be the same as on the Newport.

On 150, 200, and 380 systems using Shurflo feed pumps, the pumps are run directly from the board. The Shurflo pumps must be disconnected from the MPC-3000 and tested for current draw using an ammeter or independent circuit breaker.

7/21/04

## SF-1 SHURFLO PUMP WON'T RUN

If the pump has power to it (the fan runs), but the pump won't run, the first thing to check is the pressure switch. The pressure switch, p/n EL-FP-PS, is located on the wet end of the pump and has two red wires plugged into it. Jump the two red wires together and see if the pump runs. You can safely run the system with the pressure switch jumped, just keep an eye on the pressure gauge and don't let system pressure exceed 110 psi. Replace the switch when a spare is available.

If the pump will not run with the pressure switch jumped then it is most likely a problem with the brushes or overheat protection switch inside the motor. The motor will come completely apart by removing the two screws on the end of the motor. Remove the rear cover and paper insulator. Pull out the plastic brush holder. The thermal switch is located on one of the brush leads. With an ohmmeter, check for continuity through the switch. If it is open, you can make temporary repairs by wiring around it, being careful that your new wiring doesn't chafe on the moving parts, nor resist the springs that push the brushes on to the commutator.

If any corrosion is apparent the brushes may be sticking. Once apart clean all the carbon dust from all the parts. Clean the commutator with light sand paper. Make sure to clean the small grooves on the commutator with a small sharp tool to remove the carbon in between the segments. Adjust the springs on the brush holders so the brushes slide smoothly in and out. If the bearings are rough and binding, remove the rubber dust cover and clean the best you can, grease them, and work it free by hand. Don't service the bearing unless absolutely necessary. Reassemble in reverse order. You can hold the carbon brushes back with papers clips inserted through the slots in the brush holder so they don't hang up on the bearing during assembly. Make sure the corrugated bearing shim doesn't push out, if it does, push it back into place.

This will at least keep you going until the motor can be replaced if necessary.

6/03/04

## VP-4 VANE PUMP PRESSURE RELIEF

The Spectra vane type feed pumps are equipped with an adjustable internal pressure relief valve. When this valve opens water is allowed to flow from the discharge side of the pump to the suction side. The valve will frequently make a “chirping” noise as it opens each time the Clark pump shifts. In cases where the feed pump is not producing its rated flow and pressure, or you here a high pitched chirp at each shift, the internal relief valve setting should be checked

On the side of the pump is an acorn nut. Remove the nut, being careful not lose the o-ring which fits into a groove in the nut. If the unit is running the pump will now suck air and make a lot of noise. Under the acorn nut is a slotted screw. Turn the screw clockwise to increase the pressure setting. Remember how many turns you give it. Replace the acorn nut. If the product flow and feed pressure readings increase then the valve was open. If there is no change the valve was closed. If the valve was closed return the screw to its original position.

If the flow increased set the valve as follows. Install a bronze shut off valve in the brine overboard line. Use an analog gauge if available, or the MPC-3000 pressure display to set the pressure. With the unit operating on manual, start closing the valve in the brine overboard line while watching the pressure. The maximum pressure is the relief valve set point. Stop the feed pump, remove the acorn nut and turn the screw clockwise. Replace the acorn nut. Restart the pump and check the new set point. Repeat until the maximum pressure matches the system design pressure. The correct system pressure is printed or engraved on the pump.

9/27/04