SpectraPure®
INNOVATORS IN WATER TECHNOLOGY

The MaxCap® RO/DI System

Reverse Osmosis/Ion Exchange Water Purification System

(Single (90) or Dual (180) Membrane Model)

INSTALLATION AND OPERATING MANUAL

WARNING

Please read carefully before proceeding with installation. Failure to follow any attached instructions or operating parameter may lead to the product's failure and possible damage to property.

REV_1: 2012-10-01

SpectraPure®

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Thank You for your purchase of a *SpectraPure® System. With proper installation and maintenance, this system will provide you with high quality water for years to come. All SpectraPure® products are rigorously tested by us for safety and reliability. If you have any questions or concerns, please contact our customer service department at 1.800.685.2783 or refer to our online troubleshooting at www.spectrapure.com.*

SYSTEM SPECIFICATIONS:

Sediment Pre-Filter	0.5 micron MicroTec™ sediment pre-filter
Carbon Filter	0.5 micron carbon block pre-filter
RO Membrane Type	Thin-Film Composite (TFC)
DI Cartridges	*MAXCAP® DI* SilicaBuster™ DI
Rejection Rate	98% average
Input Water Pressure	60 psi (4.15 bar) line pressure*
Input Water Temp	77˚F (25˚C)
Recovery Rate	20% (i.e. 20% of the water will be collected as pure water)

Nominal Membrane Flow Rates @ 60 psi & 77˚ F :

GPD (lpd)	Product Water Flow Rate	Concentrate Flow Rate
90 (340)	235ml/min	940 ml/min
180 (340)	470ml/min	1880ml/min

Reverse Osmosis Membrane Feed Water Requirements

For the 1 year SpectraSelect TFC membrane pro-rated warranty to be honored, the following conditions must be met:

Operating Pressure*	40 – 80 psi (2.75 – 5.5 bar)
pH Range	3 – 11
Maximum Temperature	100˚ F (38˚ C)
Maximum Turbidity	1.0 NTU
Maximum Silt Density Index	5.0 (based on 15 min. test time)
Maximum Chlorine	less than 0.1 ppm
Maximum TDS	2000 ppm
Maximum Hardness	10 grains (170 ppm as CaCO3)
Maximum Iron	less than 0.1 ppm
Maximum Manganese	less than 0.1 ppm
Maximum Hydrogen Sulfide	0 ppm
Langlier Saturation Index	LSI must be negative

*Operating pressure less than 40 psi may require a booster pump:
Use BPLF-MO-115(-230) for Manual Operation, or
BPHF-PS-250/4-115 with Electronic Solenoid and Pressure Switch Control

*Operating pressure greater than 80 psi will require a pressure reducing valve.

SYSTEM DESCRIPTION:

1. First, the incoming feed water (1/4" Black line) is passed through a 0.5 micron Micro-Tec sediment pre-filter. This filter is required to remove excess turbidity (particulate matter) that may cause the carbon block filter to plug.
2. The second stage of filtration is a 0.5 micron carbon block pre-filter. This filter removes organics and chlorine from the feed water that can damage the membrane.
3. The third filtration stage of the system is a high rejection thin film composite (TFC) reverse osmosis membrane. It removes over 98% of most inorganic salts, all micro-organisms and organics above 100 diatoms molecular weight. *(90 gpd Systems have 1 membrane, 180 Systems have 2 membranes.)*
4. The fourth and fifth stage filters are our *MAXCAP® DI* cartridge followed by SpectraPure's SilicaBuster™ DI cartridge.

The *MAXCAP® RODI* system comes equipped with two Dual Inline TDS monitors. The first monitor shows TDS levels of pre-and post- RO membrane water. The second monitor helps detect the exhaustion points of the DI stages.
The *MaxCap® DI* is used as a "roughing" cartridge followed by our original SilicaBuster™ DI . For example, if the RO water has 25 ppm TDS (Total Dissolved Solids) entering a SilicaBuster™ DI cartridge alone, it may only process about 200 gallons of pure DI water. By placing a *MaxCap® DI* cartridge in front of the SilicaBuster™ cartridge, ***600 gallons*** of water will pass through both cartridges before the Max Cap® DI is exhausted. The SilicaBuster™ DI cartridge will be only one-third exhausted. A second Max Cap® DI will process another ***600 gallons*** and the SilicaBuster™ DI cartridge will now be two-thirds exhausted. Only after a third Max Cap® DI cartridge processes another ***600 gallons*** will the SilicaBuster™ DI cartridge finally become fully exhausted.

This example illustrates that **three MaxCap® DI cartridges plus the original mixed-bed cartridge** will process 1800 gallons of pure DI water. It would have taken **nine** standard mixed-bed cartridges to produce the same amount of pure DI water.

SYSTEM INITIALIZATION:

1. Attach the garden hose adapter to your cold water source. If you want to permanently install the tap water to the system, you will need a Feed Water Adapter and a Drain Saddle. The Feed Water Adapter connects the cold water line to the system and the Drain Saddle connects the waste water (concentrate) to a drain pipe. **Never run hot water (greater than 100 F (38 C)) through system.**
2. Place the *Yellow (concentrate, or brine)* and *Blue (Product Water)* tubing into a drain. Do not restrict flow from these lines.
3. Slowly open the cold water supply valve and allow the housings to fill. You may use pressure up to 80 psi. If the pressure is less than 40 psi, a booster pump may be required. If the pressure is much greater than 80 psi, a pressure regulator may be required. ***Let system run for 15-20 min.***
4. There are two groups of sensor wires. At the end of the wires, you will find a white connector. Just insert it into the receptacle on the top of each TDS monitor. You can then use the Velcro on the back to mount it where desired.

   The two TDS meters can monitor every step in the purification process. The IN probe of the left-side meter shows the tap water TDS. The OUT probe of the left-side meter shows the RO water TDS. The IN probe of the right-side meter shows the TDS coming out of the MaxCap DI and the OUT probe of the right-side meter shows the TDS of the final product water (out of the SilcaBuster DI).
5. Set the right-side meter to "OUT" and run the system until the right-side meter reads zero. The water is now ready to use. You can set either meter to read either probe at any time.

This completes the system initialization.

If the unit is not used for several days, run the system for at least 10 minutes before collecting any water.

Upon start-up, air may be trapped in the DI cartridges (housing may not appear full), this is a normal condition and it will not affect the operation of the DI system. However, if you later install an ASO Valve/Check Valve for automatic operation, all air must be kept purged from the housings.

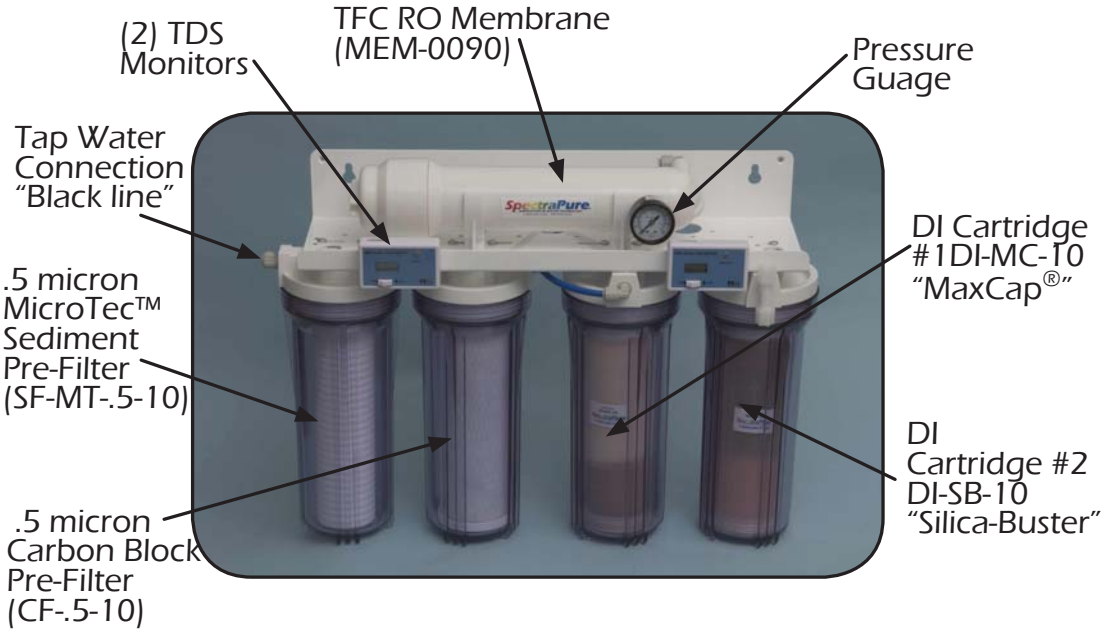
Now follow the instructions for testing the concentrate to purified water ratio on pages 7 through10.

CHECK:

- Ensure that all fittings are tight and leak-free before leaving the system unattended.

- The concentrate line (yellow) includes a smaller capillary tube (flow restrictor) that is located "inside" of the tubing. Do not remove or discard this restrictor; the system will not produce permeate water without the flow restrictor.

Fig. A: System Components



BLACK LINE: *Tap Water Input to system. (Supplied with garden hose adapter)*
BLUE LINE: *Product Water. (Automate the product water with Liquid Leve Controllers)*
YELLOW LINE: *Concentrated Waste Water. (Goes to drain. Use a drain saddle to connect to drain pipe)*

CHECKING THE CONCENTRATE TO PURIFIED WATER RATIO

This procedure will assure you of maximum life and reliability of your SpectraPure System.
Failure to perform this procedure can permanently damage the membrane.

In order to maximize the life of your SpectraPure RO Membrane, you may need to adjust the ratio of the concentrate to purified water. If not enough concentrate is allowed to flow past the membrane during operation, the impurities will precipitate out on the membrane surface, clogging the RO Membrane. To keep this from happening, the Concentrate to Purified Water Ratio must be checked and adjusted in order to compensate for pressure and temperature variations that exist in all water supplies. The flow rate of the concentrate must be a minimum of 3X the product flow rate. *3X to 5X is an acceptable concentrate flow rate.*

PROCEDURE: (You will need a Stop Watch and Measuring Cup)

1. Open the cold water supply valve and let the system run for 5 minutes. Direct both tube down the drain.
2. Collect product water from the blue tubing into a measuring cup for one minute. Measure the collected amount in *milli-liters (236 mL = 1 cup)*. Do the same with the waste water from the yellow line.

WASTE (YELLOW) IN MILILITERS_____

DIVIDED BY

PRODUCT (BLUE) IN MILILITERS_____

The resultant is the Concentrate to Product Ratio

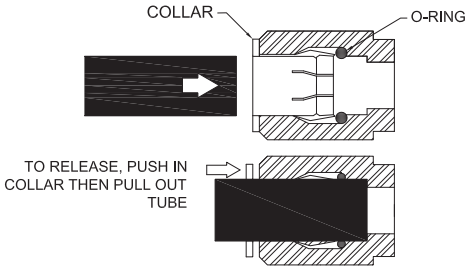
(Although not needed in this proceedure, the daily product flow rate in Gallons per Day (GPD) can be calculated to be equal to the product flow rate times 0.38).

3. **If your ratio is less than 3:1** *Disconnect yellow drain line from the membrane housing and then remove flow restrictor as shown on page 8-9 Use the appropriate Flow Restrictor Chart to determine how long to cut the flow restrictor in order to obtain a 3:1 to 4:1 ratio. (page 10)*
4. **If ratio is greater than 6:1**, additional flow restriction is required (Please contact SpectraPure Inc for possible solutions).
5. Turn on feed supply and check for leaks.
6. This completes the procedure.

NOTE: WHEN TESTING AND ADJUSTING THE RATIO, THE WATER PRESSURE SHOULD BE BETWEEN 40-80 PSI. IF YOUR PSI IS BELOW 40, YOU MIGHT BENEFIT FROM A BOOSTER PUMP.

FLOW RESTRICTOR REMOVAL, ADJUSTMENT & REPLACEMENT

1. Locate the yellow concentrate tubing (Fig. B). Remove tubing from its push-fitting:
   a.) Firmly depress and hold the push-fitting collar down with your thumbnail.
   b.) While the push-fitting collar is depressed, pull the tubing straight out of the push-fitting. Once the tubing is removed, release the collar.



2. Carefully remove the flow restrictor assembly, now visible as a plastic insert In the end of the yellow tubing (Fig. C). You may use an object such as a dull knife to help pry the flow restrictor insert from the end of the tubing. The entire flow restrictor (consisting of the insert coller and thin capillary tubing) may then be gently extracted.

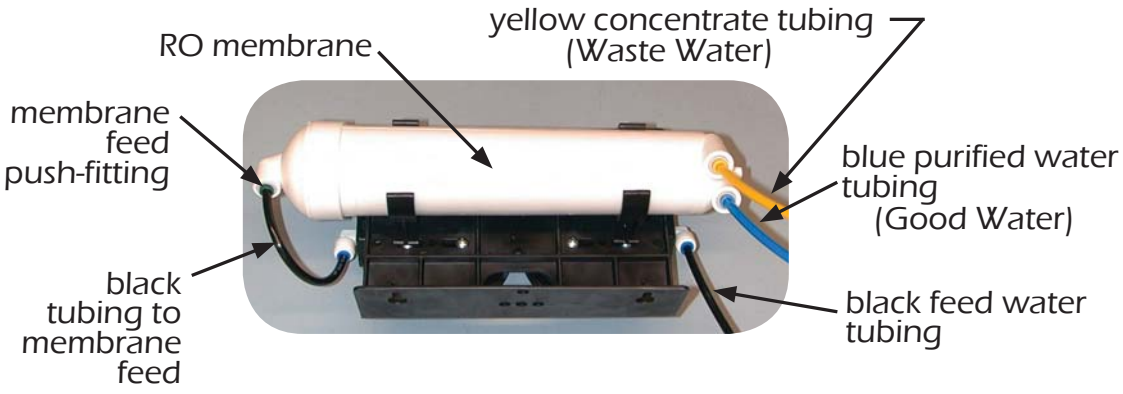
   Note: Sometimes, the Flow Restrictor might get stuck in the membrane fitting. To remove, use needle nose pliers and rock the plastic collar back and forth, while pulling. Take care not to crush or otherwise damage the delicate capillary tubing.

3. Refer to the Flow Restrictor Tables (Fig. D). Find the table that represents the Flow Restrictor Assembly for the system that you have. Find the **product flow rate** in the left-most column and the **length of the flow restrictor** in the right-most column. To be safe, add two inches to that specified length.

   Example: If your Flow Restrictor Assembly is for a 90 GPD Membrane and the **product flow rate** is 175 mL/min, then the flow restrictor length should be a total of 6 (+2) inches, or 8 inches (20.3 cm.).

Fig. B: Reverse Osmosis Assembly

Top/Rear View



4. Using a ***new*** single-edge razor blade, carefully measure and then cut the flow restrictor to the total length you calculated. ***(Do not cut with scissors)***

5. Re-insert the flow restrictor assembly into the yellow tubing and firmly re-seat the insert into the end of the yellow tubing by carefully pressing on the insert with your thumbnail. *Care should be taken not to crush or otherwise damage the end of the capillary tubing protruding from the end of the insert.*

6. Re-insert the yellow tubing into its push-fitting in the RO membrane as follows:
   a.) Moisten the O-ring seal inside the concentrate outlet fitting by dripping a few drops of clean water into the fitting.
   b.) Grasp the yellow tubing near the flow restrictor end, and insert the tubing into the push-fitting. Push the tubing into the fitting until resistance is felt, approximately 1/2 inch (12.7 mm). The tubing is now resting on the O-ring seal inside the fitting.
   c.) Firmly push the tubing approximately an additional 1/4 inch (6.35 mm) further into the fitting to completely seat the line into the fitting and O-ring seal.

7. Turn on the system water supply and check for leaks prior to further use or testing. If a leak is observed, you may not have pushed the yellow tubing into the push-fitting far enough to seal the tubing against the O-ring. Turn off the system water supply and re-seat the tubing as described above. If the re-tested ratio is between 3:1 and 4:1, this procedure is complete.

Fig. C: Flow Restrictor Assembly

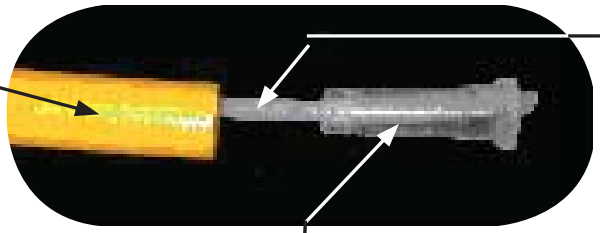


Fig. D: Flow Restrictor Tables
(For 4:1 Concentrate to Product Ratio)

FR-90 (YELLOW or WHITE)

PRODUCT RATE		CUT TO LENGTH	
ml./min.	gpd	in.	cm.
269	102	1	2.5
233	88	2	5.1
213	81	3	7.6
198	75	4	10.2
183	69	5	12.7
175	67	6	15.2
164	62	7	17.8
154	58	8	20.3
148	56	9	22.9
141	54	10	25.4
136	52	11	27.9
133	50	12	30.5
129	49	13	33.0
128	48	14	35.6
124	47	15	38.1
124	47	16	40.6

FR-180 (GREEN)

PRODUCT RATE		CUT TO LENGTH	
ml./min.	gpd	in.	cm.
490	186	1	2.5
460	175	2	5.1
430	163	3	7.6
400	152	4	10.2
379	144	5	12.7
356	135	6	15.2
344	131	7	17.8
326	124	8	20.3
311	118	9	22.9
300	114	10	25.4
289	110	11	27.9
281	107	12	30.5
270	103	13	33.0
263	100	14	35.6
259	98	15	38.1
256	97	16	40.6

METERING AND DIAGNOSTICS:

This SpectraPure purification system has been fully equipped with sufficient instrumentation to make monitoring and troubleshooting an easy process. The provided pressure gauge is used to determine the tap water pressure and to evaluate the condition of the sediment and carbon prefilters. The pressure will drop as the pre-filters become clogged by dirt [turbidity] from the tap water.

The digital TDS meter (left side) will provide a reliable means of evaluating the efficiency of the RO membrane. This meter will indicate the tap water conductivity ("IN") and the RO water conductivity ("OUT").

The difference between the two meter readings will be used to calculate the percentage of rejection of the (TFC) RO membrane.

The Digital TDS meter (right side) will be used to determine the condition of the two stages of the DI system. As the reading on the meter begin to rise above zero, the operator will be alerted to the possibility that the DI system may have deteriorated past the exhaustion point and that the DI cartridge(s) may need to be replaced. ***(See page 16 for DI exhaustion details.)***

USING THE PRESSURE GAUGE

The pressure gauge is used to monitor the condition of the Sediment and Carbon Pre-Filters. With the Sediment and Carbon filters removed, the gauge will indicate the "actual" tap water input pressure. When the prefilters are "new", the pressure shown on the gauge will be slightly less than the actual tap water pressure and as the filters age, the pressure will drop due to the dirt that will collect in the pre-filters. When the pressure on the gauge drops below 40-PSI or as the filters collect particulates and the pressure drop is greater than 15% to 20% of the normal water pressure, the pre-filters are in need of replacement.

NOTE: When the pressure on the pressure gauge drops below the normal readings; do not "assume" that the sediment filter is the only cause. In some geographical areas where the input water contains a high percentage of very small micron particulates, the carbon filter may become clogged before the sediment filter. (The filters may look "new" but still cause the water pressure to drop). Do not judge the condition of the pre-filters by their color, always use the pressure gauge to determine the condition of the pre-filters.

SEDIMENT PRE-FILTER REPLACEMENT:

A Sediment Filter will usually last approx. 4-6 months, depending on its micron rating and quality of water. (The life span of the filter is determined by the turbidity, iron content, organics, and total particulate volume in your water source). The best way to determine when your Sediment Pre-Filter needs replacement is to use a Pressure Gauge. When you have a drop in pressure between 15-20% from your normal house pressure, replace the filter. To check this, run water through the system without the filter in its housing. If the pressure jumps back to the normal house pressure without the filter, you know the filter you just took out was plugged up.

**NOTE: A drop in the system's production is "in most cases" an indication that the sediment filter has become saturated with contaminants and will need to be replaced. If you remove the sediment and the pressure does not return to normal, the carbon filter may be plugged.

Sediment Pre-Filter Replacement

Materials Required: 0.5 micron MicroTec™ Sediment Filter (SF-MT-0.5-10), Filter Wrench

Procedure:

1. Turn off water supply to the system.
2. Refer to Fig. A (System Pic). Using the provided filter housing wrench, remove the first housing on the left. Unscrew it counterclockwise as viewed from the bottom.
3. Remove the old filter and discard.
4. Thoroughly wash the housing with a mixture of hot soapy water and a few teaspoons of household bleach. Rinse well with clean hot water.
5. Install the new pre-filter into the housing.
   Screw the housing back onto the assembly, and hand-tighten **only**.
   NOTE: Do not use the filter wrench to tighten housings.
   Over-tightening will damage housings and void your warranty.
6. Proceed with carbon block filter replacement, if needed.

** If your water contains a great deal of sediment or chlorine, the pre-filters may require more frequent changes to maintain adequate production rate and extended membrane life.

CARBON BLOCK FILTER REPLACEMENT:

A Carbon Filter will usually lasts approx. 4-6 months ,depending on micron rating for the filters, usage and the chlorine content of your tap water. The best way to determine when the Carbon Block Pre-Filter needs replacement is to use a chlorine test kit.

Any chlorine level above 0.1 ppm will cause damage to the membrane and indicates that the carbon block filter must be changed. To test for chlorine breakthrough , collect a 10 ml sample of the concentrate from the yellow tubing and test the chlorine concentration using test kit TK-CL-5-KIT. If the chlorine concentration is above 0.1ppm, replace the carbon pre-filter.

**NOTE: A drop in the system's production is "in most cases" an indication that the sediment filter has become saturated with contaminants, but a carbon filter can also drop production, if it's covered with extremely fine sediment. If the carbon becomes plugged with sediment, it will no longer be able to remove chlorine.

Carbon Block Filter Replacement

Materials Required: 0.5 micron Carbon Block Filter (CF-0.5-10), Filter Wrench, Chlorine Test Kit (TK-CL-5-KIT)

Procedure:

1. Turn off water supply to the system.
2. Refer to Fig. A (System Pic). Using the provided filter housing wrench, remove the second housing from the left. Unscrew it counterclockwise as viewed from the bottom.
3. Remove the old filter and discard.
4. Thoroughly wash the housing with a mixture of hot soapy water and a few teaspoons of household bleach. Rinse well with clean hot water.
5. Install the new carbon block filter, making sure that the black gaskets on both ends of the filter are firmly seated in the gasket recesses.
6. Screw the housing back onto the assembly, and hand tighten **only**. **NOTE: Do not use filter wrench to tighten housings. Over-tightening will damage housings and void your warranty.**
7. Turn on system water supply and check for leaks.

RO MEMBRANE DIAGNOSTIC:

Although RO membranes are capable of maintaining high water quality over extended periods of time they eventually will begin to deteriorate. Normally, the conductivity of the permeate water will increase as the membranes age, and/or the production slows down as they plug-up with hardness. By comparing the difference in TDS readings between the Tap water conductivity and the RO water conductivity, the percentage of rejection of the RO membrane may be calculated and the resultant may then be used to determine the condition of the membrane and the operator will know when the membrane needs to be replaced. Membrane failure can be indicated by a reduction of the percentage of rejection which will be determined by calculating the differential between the input and output TDS values.

In order to accurately determine the condition of the RO Membrane, a conductivity (TDS) meter capable of reading the tap water conductivity and the permeate (or product) water conductivity has been provided with this system. With the assistance of the TDS meter you will be able to easily determine the RO membrane's condition.

Before performing the diagnostic test on the RO membrane, make sure that the RO system has been "ON" and producing water for a minimum of 10 minutes. Also check the brine (yellow) line to make sure that water is flowing and that the flow ratio between the permeate water and the brine water is at a ratio that is between 3 to 1 and 4 to 1. (NOTE: The pressure gauge should indicate a pressure reading of > 40 PSI during this test period.

Procedure:

1. Turn on the left meter by depressing the on switch.
2. Locate the meter slide switch on the front of the TDS meter.
3. Slide the switch to the Left "IN" position, read the Tap water conductivity and record the reading _____ .
4. Next, slide the switch the to Right "OUT" position, read the RO water conductivity and record the reading _____.
5. See page 15 on "TESTING THE RO MEMBRANE REJECTION RATE "

TESTING THE RO MEMBRANE REJECTION RATE USING THE TDS METER ON THE LEFT SIDE

PROCEEDURE:

1. First, make sure that the system has been turned on and producing water (filling the tank) for 5-10 minutes.

2. Turn the left meter on by depressing the "ON" switch then locate the slide switch on the front of the meter.
   A. Measure the tap water conductivity by sliding the switch to the Left "IN". (Call it X)
   B. Measure RO water conductivity by sliding the switch to the Right "OUT". (Call it Y).
   C. Subtract RO water conductivity from tap water conductivity. (X - Y)
   D. Divide this quantity by tap water conductivity. (X - Y) ÷ X
   E. Rejection = [(X - Y) ÷ X] ×100

*** Conductivity in the above procedure could be caused by hardness, alkalinity, nitrate, phosphate, silica etc. (The measurement is in ppm or mg/l).**

Rejection of the RO Membrane Calculation Example

1. Tap water hardness = 150 ppm (X)
2. RO water hardness = 7 ppm (Y)
3. X - Y = 143 ppm
4. (X - Y) ÷ X = 143 ÷ 150 = 0.953
5. Rejection = [(X - Y) ÷ X] ×100 = 0.953 ×100 = 95.3

Membrane Hardness Rejection = 95.3 % : Rejection rates less than 95% may indicate that the membrane should be replaced.

As a general rule; the RO membrane would be considered in good condition when the rejection rate is equal to or greater than 95%.

NOTE: There are many variables in the input (Tap) water chemistry that may affect the rejection rate of the RO membrane. (If, after testing the membrane, there are questions regarding its condition, please call our Technical Support staff for assistance).

Membrane Output Calculation

Membranes produce the rated gallons per day (GPD) at 60 psi (4.1 bars) operating pressure, 77˚F (25˚C) operating temperature and 500 ppm total dissolved solids.

Membrane output gallons per day (GPD) depends on operating pressure, water temperature and the ppm TDS in the feed water.

Expected GPD = Rated GPD × PCF × TCF

PCF is the pressure correction factor
TCF is the temperature correction factor

Calculation of Pressure Correction Factor (PCF): The output (GPD) from the membrane is directly proportional to the applied pressure.

Note: The membrane is rated to produce the rated GPD at 60 psi. For any pressure other than 60 psi the output GPD is multipled by the PCF.

PCF = Line Pressure (in psi) ÷ 60

Calculation of Temperature Correction Factor (TCF): The output (GPD) also decreases with decrease in temperature. This is because water viscosity increases with decrease in water temperature.

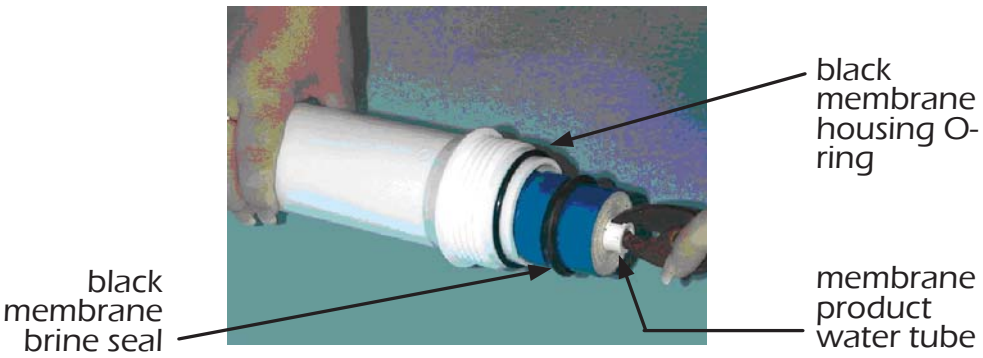
Temperature Correction Factor Table (TCF)

˚F /˚C	TCF	˚F \˚C	TCF	˚F \˚C	TCF
41.0 /5	0.521	59.0 /15	0.730	77.0 /25	1.000
42.8 /6	0.540	60.8 /16	0.754	78.8 /26	1.031
44.6 /7	0.560	62.6 /17	0.779	80.6 /27	1.063
46.4 /8	0.578	64.4 /18	0.804	82.4 /28	1.094
48.2 /9	0.598	66.2 /19	0.830	84.2 /29	1.127
50.0 /10	0.620	68.0 /20	0.857	86.0 /30	1.161
51.8 /11	0.640	69.8 /21	0.884	87.8 /31	1.196
53.6 /12	0.661	71.6 /22	0.912	89.6 /32	1.232
55.4 /13	0.684	73.4 /23	0.941	91.4 /33	1.267
57.2/14	0.707	75.2 /24	0.970	93.2 /34	1.304

RO MEMBRANE REPLACEMENT

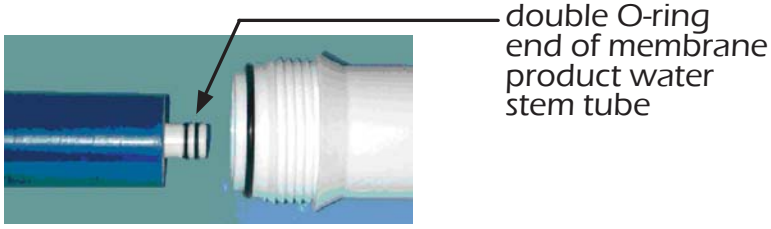
1. Turn off the water supply to the RO system. Place the system where the membrane housing is easily accessible.
2. Remove the black tubing from the membrane feed push-fitting by depressing the collar on the fitting with your thumb and pulling the tubing from the push-fitting (Page 8).
3. Lift the membrane housing from the retention clips.
4. Unscrew the membrane housing lid. This may require two people.
5. Use a pair of pliers to grasp the membrane stem and pull the membrane from the housing (Fig. E).

Fig. E: Removing the Membrane Element



6. Remove the black housing O-ring (Fig. E). Wash the empty housing with soapy water. Rinse thoroughly with hot, clean water.
7. Insert new membrane into the housing, with the double O-ring end first (Fig. F). The tube must fit into the recess at the bottom of the membrane housing. When the membrane is aligned with the hole, firmly push the membrane into the hole until it bottoms out.

Fig. F: Inserting the New Membrane Element



8. Place the black housing O-ring on the housing rim and carefully screw the lid back on to the base.

Housing O-Ring →

9. Reconnect the black tubing to the membrane feed push-fitting.

   Note: If you have a dual-membrane system, perform steps 2 thru 9 on the second membrane now.

**** If the new replacement membrane is rated differently in gallons per day than the original membrane, you will need to remove the old flow restrictor, replace it with the correctly matched one and follow this procedure for adjustment:***

1. Disconnect the yellow concentrate tubing (page 9) from the membrane housing. Remove and discard the flow restrictor (Fig. C).
2. Reconnect yellow concentrate tubing back to membrane housing and run water through system for at least 2 gallons. (This step will flush out membrane preservatives.)
3. Insert the new flow restrictor and follow procedure on page 7 for measuring waste to product water ratio.
4. Check for leaks. Allow at least 2 gallons of water to run through the system before using water.

**** If the replacement membrane is rated identical in gallons per day than the original membrane:***

1. Disconnect the yellow concentrate tubing (page 9) from the membrane housing. Remove flow restrictor and set aside.
2. Reconnect yellow concentrate tubing back to membrane housing and run water through system for at least 2 gallons. (This step will flush out membrane preservatives.)
3. Re-insert flow restrictor and check for leaks. Allow at least 2 gallons of water to run through the system before using water.

MAXCAP DI MAINTENANCE AND REPLACEMENT:

Procedure:

1. When the reading on the right-hand TDS meter (set to "IN") displays 50% of the reading on the left-hand TDS meter (set to "OUT"), it is time to replace the *MAXCAP® DI* cartridge.
2. Make sure the DI cartridge is installed in the correct direction as marked on the cartridge shell and be sure that the top seal is securely attached to the top of the cartridge.
3. Tighten the cartridge housing by rotating it clockwise and hand tighten.
4. Turn on system and check for leaks.

SILICA-BUSTER MAINTENANCE AND REPLACEMENT:

Procedure:

1. When the reading on the right-hand TDS meter (set to "OUT") displays "001", it is time to replace the SilicaBuster ™ DI cartridge.
2. Make sure the DI cartridge is installed in the correct direction as marked on the cartridge shell and be sure that the top seal is securely attached to the top of the cartridge.
3. Tighten the cartridge housing by rotating it clockwise and hand tighten.
4. Turn on system and check for leaks.

DM-1 METER Specifications:

Range	0-1999 PPM	**Resolution**	1PPM (1-999 PPM)
Accuracy	2%	**Probe**	¼"
Power Source	(2) 1.5V button batteries	**Battery life**	Approx 1000 hours

For service or repair of these monitors, please send to:

HM DIGITAL, INC
5819 Uplander Way
Culver City, CA 90230

TROUBLESHOOTING GUIDE:

1. Low production rate:
   - a. plugged pre-filters. — i. Replace pre-filters.
   - b. low water temperature. — ii. Heat feed water OR use higher GPD membrane.
   - c. low line pressure. — iii. Use booster pump OR use higher GPD membrane.
   - d. high TDS content. — iv. Use booster pump OR use higher GPD membrane.
   - e. fouled membrane. — v. Replace membrane to restore flux.
   - f. plugged flow restrictor. — vi. Replace flow restrictor & membrane.

2. Zero production rate:
   - a. Missing flow restrictor. — i. Install flow restrictor in the yellow line.
   - b. Dried RO membrane. — ii. Try to restore flux by soaking in rubbing alcohol OR replace the membrane.
   - c. Plugged flow restrictor. — iii. Replace flow restrictor and replace the membrane.

3. Extremely high production rate:
   - a. Ruptured membrane. — i. Replace
   - b. Very high line pressure (> 80 psi). — ii. Use a pressure regulator.

4. Pressure gauge does not register pressure when the system is "ON":
   - a. Missing flow restrictor. — i. Put flow restrictor in the yellow line.
   - b. Pressure gauge screwed in too far. — ii. Unscrew pressure gauge one turn and retest.
   - c. Plugged pressure gauge orifice. — iii. Clean orifice with a needle.
   - d. Defective pressure gauge. — iv. Replace it.

5. Low deionization cartridge life:
   - a. Defective membrane. — i. Replace it.
   - b. Low pressure (< 40 psi). — ii. Use booster pump.
   - c. High CO2 levels in water (> 5 ppm). — iii. Aerate RO product water.
   - d. High TDS in feed water (> 1000 ppm). — iv. NO EASY SOLUTION.
   - e. Bad or faulty DI cartridge.
   - f. High pH tap water (> 9.0). — vi. Acidify feed water to the RO membrane to improve its rejection.
   - g. Faulty monitor/probe. — vii. Test and Replace if required.

MAINTENANCE:

- SANITIZING SYSTEM -
(It is recommended that you sanitize the system once a year.)

1. Turn tap water source off and remove all filters from the system, including the RO membrane
2. Mix together hot water, soap and a little bleach.
3. Scrub filter housings and rinse with clean tap water to remove soap and bleach.
4. Place filters back into housings and reconnect lines.

- TIPS FOR LONG MEMBRANE LIFE -

1. Replacement of 0.5 micron sediment filter once every 6 months. This will prevent membrane fouling due to silt or sediment depositing on the membrane.
2. Replacement of 0.5 micron carbon block filter at least once every 6 months or when chlorine breakthrough occurs. This will ensure good membrane life and protect the membrane from chlorine damage.
3. Membrane should not be operated at lower than the recommended concentrate to purified water ratios, as described on page 7.
4. Operating reverse osmosis systems on softened feed water greatly reduces the chances of membrane fouling.

STORAGE:

1. It is recommended that you store your RO System in a cool place when not being used. (a Flush Valve Kit is recommended for manually operated systems)
2. If your system is exposed to sunlight you will grow algae in the housing and it may damage your system. Your RO System must be protected from freezing or temperatures above 100° F (38°C).
3. MEMBRANE WARNING: All SpectraPure RO membranes, except for encapsulated membranes, must remain moist at all times. It is the customer's responsibility to inspect the membrane upon receipt and maintain adequate moisture.

Replacement membranes should be kept in the sealed non-permeable shipping bag and in a refrigerator until use. The membrane can be kept there for up to 1 year. **(DO NOT FREEZE)**

CHOOSING A MOUNTING LOCATION:

When considering a location for the installation of the RO System, consider the following factors:

Light Sources

1. Most of the components of this system are plastic and are subject to damage by ultraviolet light from the sun and other sources such as metal halide lighting.
2. Algae is more likely to thrive inside the clear filter housings when exposed to bright light.
3. Avoid installing this unit in bright light or direct sunlight.

Temperature Extremes

1. The unit must be kept out of areas that are subject to freezing temperatures.
2. High temperatures greater than 100° F (38° C) must be avoided. If the unit is used outside, avoid putting the system in direct sunlight or connecting it to a garden hose that may be exposed to sunlight.

SpectraPure®

THREE YEAR *MANUFACTURERS* WARRANTY

Effective on products purchased after March 10, 2005.

SpectraPure, Inc.® warrants the product to the original owner only to be free of defects in material and workmanship for a period of three years from the date of receipt. SpectraPure's liability under this warranty shall be limited to repairing or replacing at SpectraPure's option, without charge, F.O.B. SpectraPure's factory, any product of SpectraPure's manufacture. SpectraPure will not be liable for any cost of removal, installation, transportation or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by SpectraPure are subject to the warranty provided by the manufacturer of said products and not by SpectraPure's warranty. SpectraPure will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair or, if the product was not installed in accordance with SpectraPure's or other manufacture's printed installation and operating conditions, or damage caused by hot water, freezing, flood, fire or acts of God.

SpectraPure will not be responsible for any consequential damages arising from installation or use of the product, including any water or mold damage due to flooding which may occur due to malfunction or faulty installation, including, but not limited to failure by installer to over- or under-tighten fittings, housings, and/or push-style fittings, or improper installation of push-style fittings. Consumable items such as pre filters and membranes are not covered under the two year warranty.

SpectraPure warrants (pro-rated) the performance of tested SpectraSelect™ RO membrane elements only, for one year from date of receipt by the buyer, providing that the loss of performance was not caused by fouling , neglect or water conditions exceeding the feed water parameters listed in the applicable product manual (refer to detailed membrane warranty information). SpectraPure will, on confirmation of loss of performance during the warranty period, credit the pro-rated amount of the current catalog price of the element. The disposable filters and cartridges are not covered under the warranty.

To obtain service under this warranty, the defective system or components must be returned to SpectraPure with proof of purchase, installation date, failure date and supporting installation data. Any defective product to be returned to the factory must be sent freight prepaid; documentation supporting the warranty claim and a Return Goods Authorization (RGA) number must be included. SpectraPure will not be liable for shipping damages due to the improper packaging of the returned equipment and all returned goods must also have adequate insurance coverage and a tracking number.

SpectraPure will not pay for loss or damage caused directly or indirectly by the presence, growth, proliferation, spread or any activity of "fungus", wet or dry rot or bacteria. Such loss or damage is excluded regardless of any other cause or event that contributes concurrently or in any sequence to the loss. We will not pay for loss or damage caused by or resulting from continuous or repeated seepage or leakage of water, or the presence or condensation of humidity, moisture or vapor, that occurs over a period of 14 days or more. "Fungus" and "fungi" mean any type or form of fungus or Mycota or any by-product or type of infestation produced by such fungus or Mycota, including but not limited to, mold, mildew, mycotoxins, spores, scents or any biogenic aerosols.

SpectraPure will not be liable for any incidental or consequential damages, losses or expenses arising from installation, use, or any other causes. There are no expressed or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above.

*** The three year limited warranty does not apply to consumable items, including but not limited to, filters and cartridges unless specifically stated above**

REPLACEMENT PARTS

Model	Replacement Part
SF-MT-0.5-10	.5 micron MicroTec™ Sediment Filter
CF-0.5-10	.5 micron Carbon Block Pre-Filter
MEM-0090	90 or180 gpd Membranes (2) 90gpd membranes are in the 180 GPD System
FR-90	Flow Restrictor for 90 gpd System
FR-180	Flow Restrictor for 180 gpd System
DI-MC-10	*MaxCap DI* ™ Cartridge
DI-SB-10	*SilicaBuster* ™ DI Cartridge
GHA-4	1/4" (6.35 mm) Garden Hose Adapter
WR-UNIV	Filter Wrench

Optional Accessories

Model	Optional Part
FAU-SNP	Quick Connect Faucet Coupler
DS-4T	Drain Saddle - Connects waste water to drain
LLC-S	Fills a Single tank automatically
TK-CL-5-KIT	Total Chlorine Test Kit
BPHF-MO-115	Hi-Flow Booster Pump, 115V
BPHF-MO-230	Hi-Flow Booster Pump, 230V

See our Catalog or our Web Site for Liquid Level Controls and other Optional Accessories