



Coffee Lovers™ System

with our patented Dual-Pass technology

U.S. Patent No: 7,303,666



CLS-90

OPERATIONS MANUAL

RO Drinking Water System for *Coffee Lovers*

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.

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SYSTEM DESCRIPTION

The Coffee Lovers System™ (CLS) is a five-stage reverse osmosis drinking water system. Due to the Dual-Pass™ Technology, the system may also be described as having seven (7) virtual stages. The incoming feed water from a cold supply pipe valve is directed through 1/4" tubing and to a 0.5 micron MicroTec™ sediment prefilter. This filter is used to remove excessive turbidity, sand, dust, silt, etc., that may cause the carbon filter to plug up. The next stage of filtration is a 0.5 micron carbon block prefilter. This filter is used to remove organics and chlorine from the feed water that can damage the membrane. The next stage of the system is the RO membrane. High-rejection Thin Film Composite (TFC) membrane(s) are used in this system. They remove over 98% of most inorganic salts, all microorganisms and almost all high molecular weight organics in the water.

Dual-Pass™ technology (U.S. Patent No: 7,303,666) — A post carbon filter and a remineralization cartridge process the RO water twice for proper taste and hardness, once when being stored in the tank and a second time on the way to the faucet.

TDS Meter — Provides information about membrane performance. Monitors pre- and post- membrane TDS (total dissolved solids) levels. Can be used to determine the “percent rejection” and performance of the membrane.

Pressure Gauge — The pressure gauge will alert you when it is time to change the sediment and the carbon prefilters. (See Page 15.)

Faucet — The sinktop or countertop faucet dispenses the drinking water. To meet plumbing codes, an air gap is built into the faucet drain water tubes. This prevents a back siphon of drain water.

Automatic Shutoff — When the pressurized storage tank has filled with product water, a pair of pressure switches automatically shuts off feed water flow to the membrane via the input solenoid valve and resumes flow to the membrane when the pressure tank is half emptied.

Check Valve — A check valve is installed on the product water outlet of the RO housing. The check valve prevents a backward flow of product water from the pressurized storage tank to the membrane. A backward flow could rupture the membrane.

Electric Booster Pump — Booster Pump provides elevated and consistent membrane pressure for more efficient operation. (Needed if your water pressure is insufficient.)

Permeate Pump — Most ordinary RO drinking water systems needlessly waste huge quantities of water. SpectraPure's drinking water systems with Permeate Pump provide a solution. The Permeate Pump can reduce waste water more than 300% compared to conventional RO drinking water systems. Additional advantages include longer filter and membrane life, greatly improved water quality, tank refills in half the time, greater tank holding capacity, and extended low line pressure operation.

Remineralization Cartridge — Reintroduces certain minerals to the RO water to provide a pH-balanced and better tasting water especially suited for brewing coffee and tea.

Sump Kit (Optional) — An optional sump kit can be added to the CLS System enabling you to fill an open reservoir with pure water for aquarium, hydroponics or other uses.

OPERATIONAL SPECIFICATIONS

RO Feed water requirements

Operating Pressure:	40-80 psi (2.75-5.5 bar)
pH Range:	3-11
Max. Temperature:	113°F (45°C)
Max. Feed Turbidity:	1.0 NTU
Max. Silt Density Index:	5.0 (based on 15 min. test time)
Maximum Chlorine:	< 0.1 ppm
Maximum TDS:	2000 ppm
Maximum Hardness:	10 grains (170 ppm as CaCO ₃)
Maximum Iron:	< 0.1 ppm.
Maximum Manganese:	< 0.1 ppm.
Maximum Hydrogen Sulfide:	0 ppm
Langelier Saturation Index (LSI):	must be negative

NOTE: MOST MUNICIPAL WATER SUPPLIES MEET THE ABOVE REQUIREMENTS. IF WELL WATER IS USED, PLEASE MAKE SURE THAT YOU OBTAIN A WATER TEST BEFORE INSTALLATION.

NOTE: THE OPERATING PRESSURE IN YOUR HOME SHOULD BE TESTED OVER A 24 HOUR PERIOD TO OBTAIN THE MAXIMUM PRESSURE. IF IT IS ABOVE 80 psi THEN A PRESSURE REGULATOR WILL BE REQUIRED.

COFFEE LOVERS SYSTEM

(1) 5-Stage System

- (1) TFC RO Membrane (90 GPD)
- (1) 0.5 Micron Sediment Filter
- (1) 0.5 Micron Carbon Block
- (1) Remineralization Cartridge
- (1) Permeate Pump with ASO Valve
- (1) Electronic Booster Pump and Pressure Switch (optional)

(1) Filter Wrench

- (1) 4 Gallon Pressurized Storage Tank
- (1) Air Gap Faucet with parts bag
- (1) Drain Saddle
- (1) Feed Water Adapter



IF ANY OF THE ITEMS LISTED ABOVE ARE MISSING PLEASE CONTACT SPECTRAPURE PRIOR TO INSTALLATION. ALL RETURNS WITHOUT RMA# WILL BE REFUSED. CLAIMS MUST BE WITHIN 10 DAYS FROM RECEIPT.

PREPARATION

1. Prepare for installation by removing all items from under the sink. Locate and turn off the COLD water supply and open the sink faucet to relieve any remaining pressure.
2. Determine an appropriate location for the Coffee Lovers System, Bladder Tank, Feed Water Connection, Drain Saddle, and the Air gap Faucet for your specific application.
3. TOOLS RECOMMENDED FOR INSTALLATION:
 - Adjustable Wrench
 - Sharp Knife
 - Open End Wrench
 - Phillips Screw Driver
 - Needle Nose Pliers-Adjustable Pliers
 - Electric Drill
 - 7/8" Hole Saw Bit for Faucet Opening
 - Round Knockout Punch for Stainless Sinks, 7/8"



DRILL HOLE FOR FAUCET IN A PORCELAIN SINK

NOTE: Porcelain sink material is extremely hard and can crack or chip quite easily. To avoid this, use extreme caution when drilling. A carbide tipped masonry bit is recommended. **SpectraPure® accepts no responsibility for consequential damage resulting from the installation of the faucet.**

When drilling, allow time for the drill bit to cool down so that it does not overheat and crack porcelain.

A gurgling sound may be heard coming from the Air gap Faucet when the system is running. This is normal and is in compliance with UPC Codes.

- STEP 1. Determine a desired location for the faucet on your sink and place a piece of masking tape on the location where the hole is to be drilled. Mark the center of the hole on the tape.
- STEP 2. Use a variable speed drill on the slowest speed. Drill a 1/8" Pilot hole through both porcelain and metal casing of sink at the center of the desired location. (If drill bit gets hot it may cause the porcelain to crack or chip.)
- STEP 3. Use a hole saw and proceed to drill the 7/8" hole. Keep drill speed on the slowest speed and use lubricating oil or liquid soap to keep the hole saw cool during cutting.
- STEP 4. Make sure the surroundings of the sink are cooled before mounting the faucet to the sink after drilling. Remove all sharp edges with a file.

PUNCH HOLE FOR FAUCET IN STAINLESS STEEL SINK

- STEP 1. If mounting faucet to a Stainless Steel Sink you will need a bimetal or carbide tipped hole saw.
- STEP 2. The Faucet opening should be centered between the backsplash and the edge of the sink, ideally on the same side as the vertical drain pipe.
- STEP 3. Drill a 1/4" pilot hole. Use a bimetal or carbide tipped 7/8" hole saw to punch the hole in the sink.

FEED SUPPLY VALVE INSTALLATION

- STEP 1. Follow the cold water line from shutoff valve to the existing faucet and unscrew the threaded connection.
- STEP 2. Insert feed supply valve between cold water line and existing connection.
- STEP 3. Follow the assembly sequence shown for attaching valve to the existing cold water line.
- STEP 4. Connect Black line from RO system as shown in Fig 1.
- Remove the 1/2" Compression Nut from Valve body. Be careful not to loose the plastic or brass Insert and the Conical Compression Sleeve.
 - Insert the 1/4" Black Tubing into the Compression Nut with the threads towards the end of the tube.
 - Slip the Conical Compression Sleeve onto the Black Tube with the long slope pointing toward the end of the tube.
 - Place the Insert into the end of the Black Tubing. Make sure you push the insert in all the way.
 - Tighten Compression Nut back on the Valve body.
- STEP 5. When installation of the valve is complete, check for leaks as follows:
- Close Feed Supply Valve that you just installed.
 - Open cold water supply valve and check for leaks around feed supply valve fittings. Tighten if necessary.

NOTE: To be certain of the cold line; turn on the hot water, allow water to run until pipe becomes warm. Then attach fitting to the cold water line. If you run hot water through your system it will damage the membrane.



FEED VALVE



INSTALL ON COLD WATER LINE

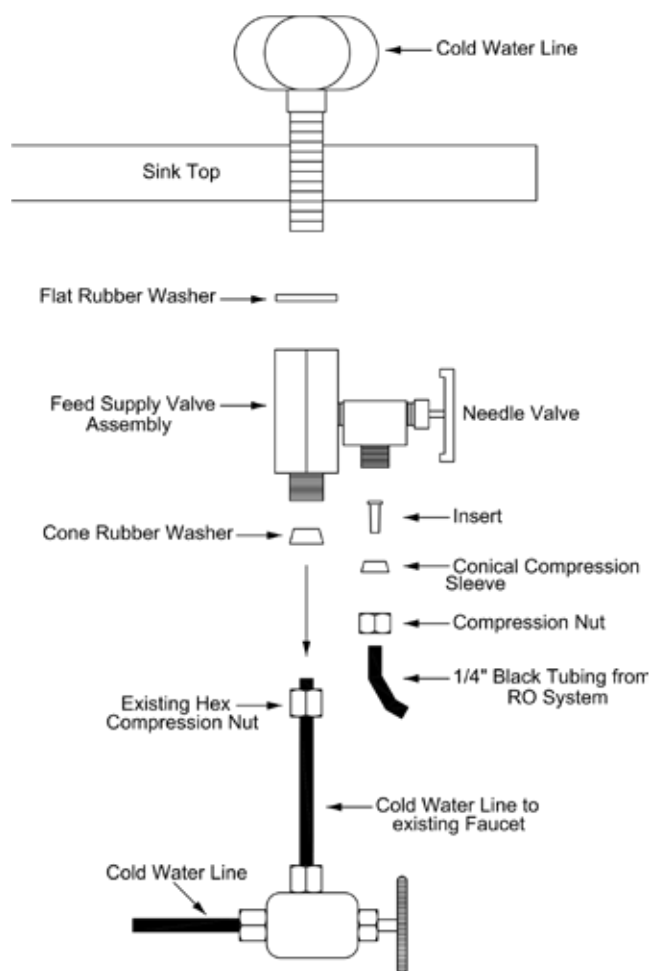


FIGURE 1: FEED SUPPLY INSTALLATION

PROCEDURE FOR MEASURING WASTE TO PRODUCT 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 and will void the prorated Membrane Warranty.

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 4X the product flow rate. 4X to 6X is an acceptable concentrate flow rate.

Procedure:

1. Locate the yellow and blue line (shown in the Diagram below) and disconnect them from the pump to proceed with Measuring Waste to Product Water Ratio.
2. Turn on the Feed Supply Valve and let the system run for 20 minutes.
3. Collect product water from the blue line into a measuring cup for one minute. Measure the collected amount in milliliters. Do the same with the waste water.

WASTE IN MILLILITERS _____

DIVIDED BY

PRODUCT IN MILLILITERS _____

The result is the Concentrate to Product Ratio

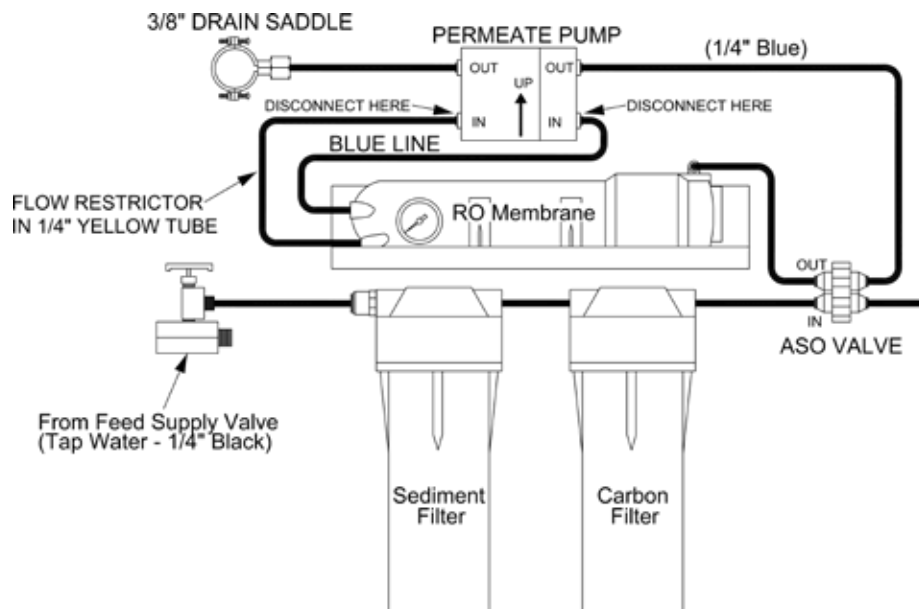
(Although not needed in this procedure, the daily product flow rate in Gallons per Day (GPD) can be calculated to be equal to the product flow rate times 0.38.)

If ratio is **less than 4:1**

Follow instructions on page 8 (MAKE SURE YOU RECONNECT WATER LINES)

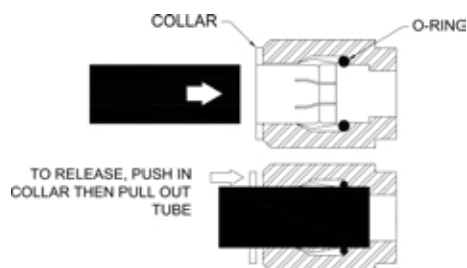
If ratio is **greater than 6:1**

Flow restrictor requires replacement (Please contact SpectraPure Inc).



FLOW RESTRICTOR REMOVAL, ADJUSTMENT AND REPLACEMENT

1. Locate the yellow concentrate tubing. Remove the tubing from its push fitting at the membrane as follows:
 - 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. 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 collar and thin capillary tubing) may then be gently extracted.

NOTE: Take care not to crush or otherwise damage the delicate capillary tubing.

3. Refer to the Flow Restrictor Tables (Page 8). Find the table that represents the Flow Restrictor Assembly for the system that you have. Find the **product flow rate** in the left-hand column and the **length of the flow restrictor** in the right-hand column.

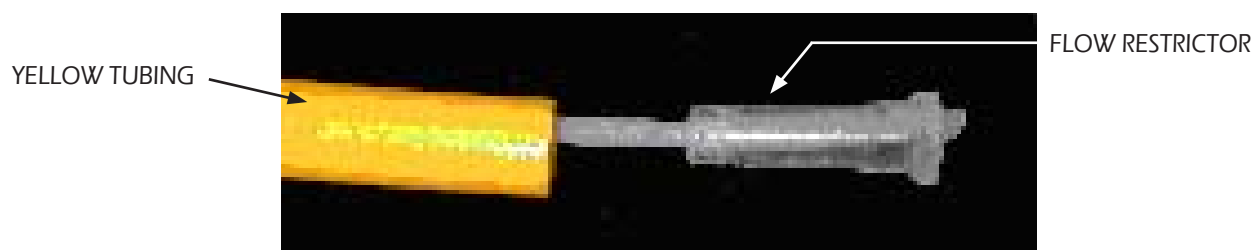
EXAMPLE: If your Flow Restrictor Assembly is for a 90 GPD Membrane and the **product flow rate** is 170 ml/min, then the flow restrictor length should be cut to 6.5 inches (16.5 mm). 170 is about halfway between 164 (7 in.) and 175 (6 in.).

4. Using a new single-edge razor blade, carefully measure and then cut the flow restrictor to the total length indicated.
5. Reinsert the flow restrictor assembly into the yellow tubing and firmly reseal 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. Reinsert 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 reseal the tubing as described above.

Flow Restrictor Chart

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

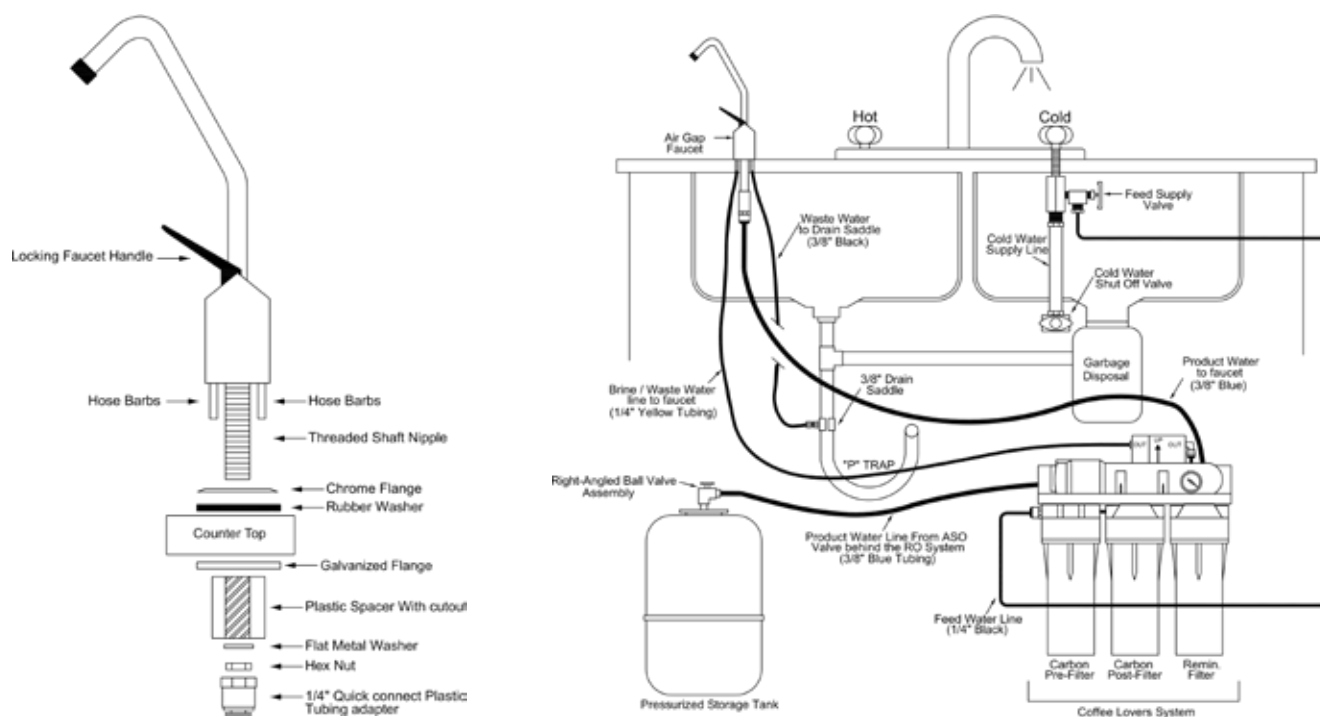


Flow Restrictor Assembly

AIR GAP FAUCET INSTALLATION

- Place the chrome counter plate and rubber washer over the threaded shaft and barbed nipples on the faucet (Refer to Figure 3 below).
- Pass the Blue 3/8" tubing, the Yellow 1/4" tubing, and the Black 3/8" tubing up through the drilled countertop hole and temporarily secure them so they don't fall back through the hole.
- Place the galvanized flange, plastic spacer, flat metal washer, and hex nut in sequence over the threaded shaft and temporarily hand-tighten, then screw the push fitting onto the end of the threaded shaft.
- Insert the Blue 3/8" tubing into the Quick Connect Tubing Adapter.
- Connect the 1/4" yellow tubing to the smaller barb and connect the 3/8" Black tubing to the larger barb.
- Drop the entire assembly into the hole, resting on the chrome counter plate. Loosen the nut and position the Galvanized Flange under the counter top and then securely tighten the hex nut.
- DO NOT CUT EXCESS TUBING AT THIS POINT. YOU WILL NEED THE TUBING TO INSTALL TANK.

TIP: When connecting the tubes to the hose barbs, try using HOT water to soften the plastic tubes. When connecting the drain lines to the saddle, make the lengths as short and straight as possible to reduce drainage noise.



INSTALLATION DIAGRAM

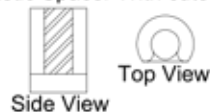
AIR-GAP FAUCET PARTS LIST

- Faucet
- Galvanized Flange
- Rubber Washer
- Flat Metal Washer with "U" Cutout
- Plastic Spacer with Cutout
- Flat Metal Washer
- Hex Nut
- 1/4" Quick Connect Plastic Tubing Adapter

Chrome Counter Plate



Plastic Spacer With cutout



Galvanized Flange



Flat Metal Washer



Push Fitting



Rubber Washer

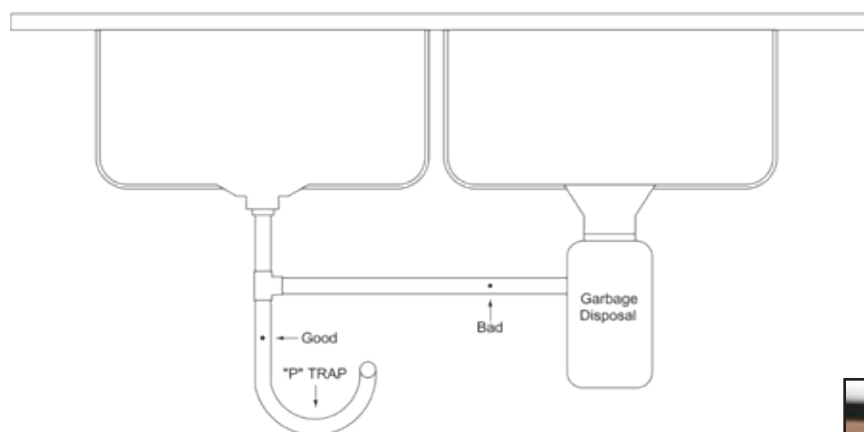


Hex Nut



DRAIN SADDLE INSTALLATION

1. Refer to Figure 7 and determine the location for the drain saddle assembly and drain hole. It must be located above the "P" trap ("U" shaped bend in drain pipe) on the sink side of the drain pipe.
2. Place the half of the drain saddle with threaded nipple at a predetermined location. Slide a pencil through the plastic nipple and make a mark on the drain pipe.
3. Use a small punch and indent a start position to prevent the drill bit from wandering.
4. Drill a 3/8" hole in the drain pipe through the mark **on one side only**, do not drill through both sides of the drain pipe. Clean any loose shavings from around the hole.
5. Refer to Figure 8 showing the drain saddle assembly sequence. Press nuts in back half of drain saddle assembly.
6. Align the front half of the drain saddle by inserting a pencil through the plastic nipple and the newly drilled hole in the drain pipe.
7. Install the back half of the drain saddle and clamp assembly to drain pipe by screwing in the mounting bolts until snug.



Drain Saddle Mounting Locations

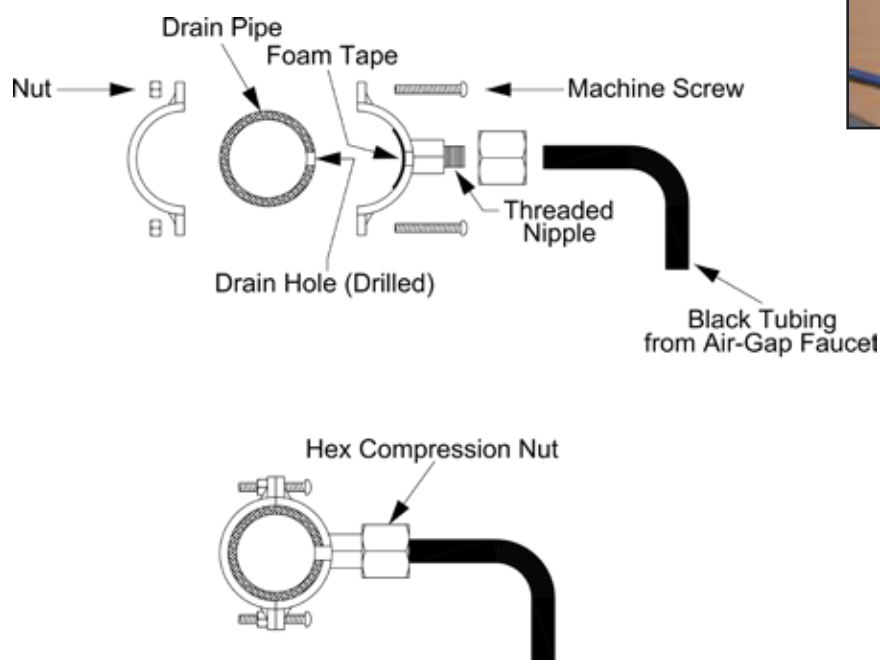
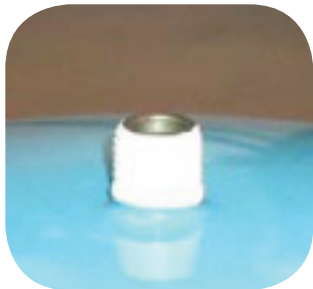


Figure 8: Drain Saddle Assembly Sequence

INSTALLING BALL VALVE ON TANK



STEP 1. If there is not Teflon tape applied to the nipple on the tank, wrap (7-12 turns) around the pipe threads (MPT) on the Stainless Steel fitting.

STEP 2. Thread the Ball Valve (supplied in the parts bag) onto the stainless steel nipple on top of the tank. Hand-tighten only.

NOTE: The storage tank is pressurized with air at the factory to 6 psi with the tank totally drained. Over a period of time, air may leak out causing the delivery rate of the stored water to decrease. If this occurs, verify correct tank pressure using a low pressure air gauge on the tire valve stem located on the bottom, or near the flange at the top of the tank with tank completely empty of water.

TANK INSTALLATION

1. Position tank in desired location. Stand it upright (using the black plastic stand). Measure the distance from the Quick Connect fitting on the rear "Y" on the LEFT side of the unit (when viewed from the front) over to the tank and cut a piece of 3/8" Blue tube to length.
2. Connect that 3/8" Blue tube to the LEFT side "Y" and to the Right-Angle Ball Valve that is attached to the top of the tank.
3. Measure and cut another length of 3/8" Blue tube and connect it to the quick connect tubing adapter on the Threaded Shaft of the faucet and to the Quick Connect fitting on the rear "Y" on the RIGHT side of the unit (when viewed from the front).
4. Connect the 3/8" Black tube to the hose barb on the faucet and to the Drain Saddle. Tighten the compression nut.

REAR VIEW Connections Out to Faucet and Tank



ICE MAKER HOOKUP (OPTIONAL)

1. Turn off feed supply valve and the ball valve on tank.
2. Locate the Blue tube that leads to the faucet.
3. Cut the tube and reconnect the cut ends with a 3/8" x 3/8" x 1/4" Tee.
4. Connect 1/4" Tubing to the third leg of the tee and route to refrigerator.
5. Turn on feed supply valve and the ball valve on tank.
6. Check for leaks.

MOUNTING SYSTEMS INSTALLATION

1. Determine best location for the RO system to be mounted to allow for future system maintenance.
2. Use two (2) self-tapping screws and a Phillips screwdriver. Measure the distance between the keyhole slots on the back of the bracket and install screws. Leave enough space and tubing so that you can pull the system out for maintenance.



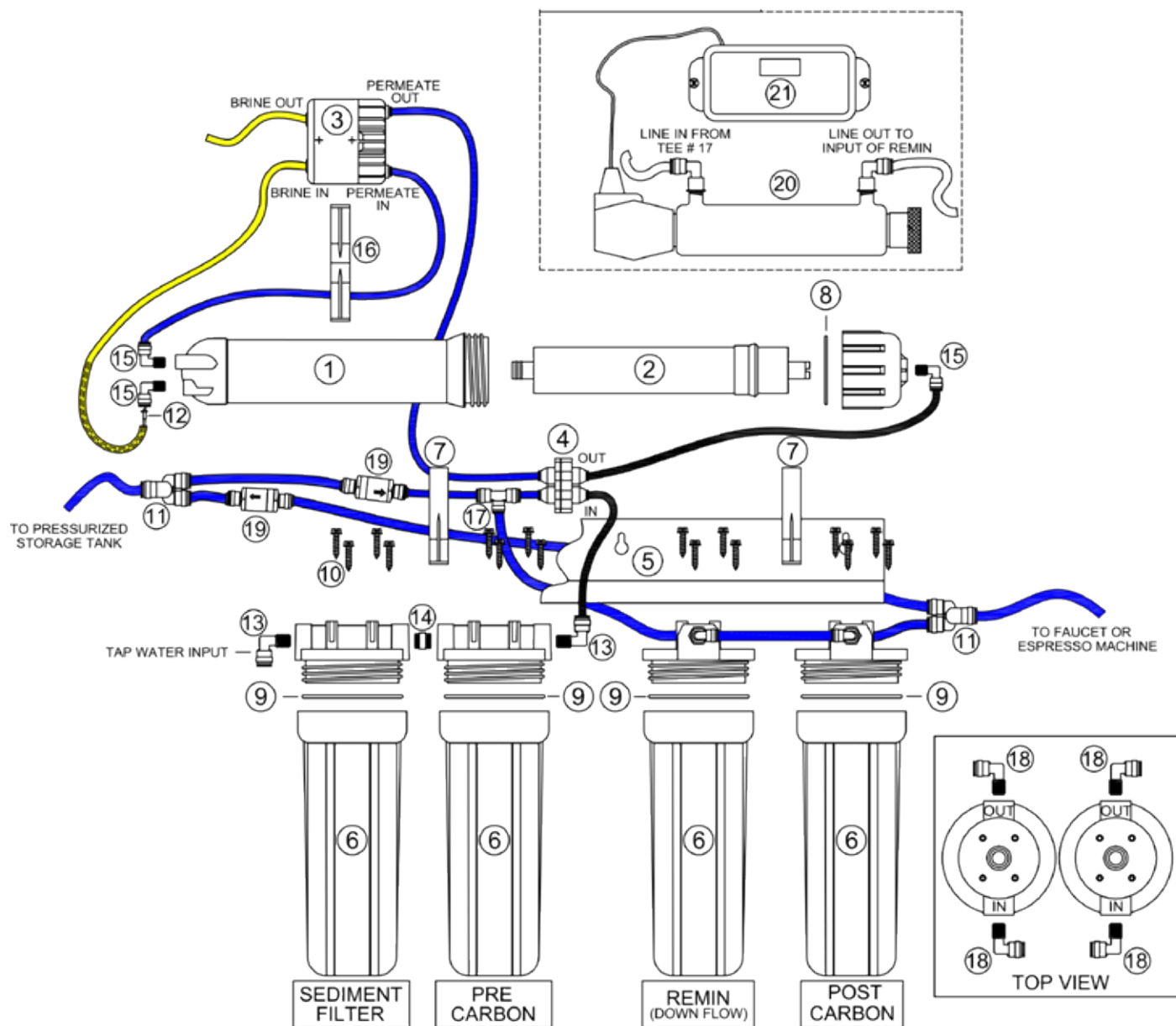
STARTUP PROCEDURES

1. Slowly turn the cold water supply to full flow. Check for leaks.
2. Turn off the ball valve at the storage tank and open the faucet.
3. When water comes out of the faucet, turn the faucet off. The system will pressurize rapidly and shut off.

NOTE: To ensure proper operation of the Automatic Shutoff Valve, it is important that air is purged from the system during initial operation. To do this, orient the RO unit with the product (permeate) and reject (brine) water ports pointing upwards. (Round end of RO membrane housing is up, prefilter housings are horizontal). Allow a minimum of 15 minutes operation with this orientation.

4. **Look for leaks and do not leave the system alone until you are sure there are no leaks.** Now, turn the valve on the tank to the "ON" position.
5. Before using the system, allow three tank fillings to occur while flushing the contents between each filling by locking the air gap faucet lever to the open position until drained.
6. Wait for an hour before drawing water from of the faucet.

Note: NEVER RUN HOT WATER (>113°F/45°C) THROUGH THE SYSTEM.



- | | |
|---|--|
| 1- Membrane Housing | 11- 3/8" Union "Y" Connectors |
| 2- Reverse Osmosis Membrane | 12- Flow Restrictor (inside waste water line) |
| 3- Permeate Pump | 13- 1/4" x 1/4" Elbow Fitting (DM-40-4-4) for Filter Housings |
| 4- Automatic ShutOff Valve for P.P. | 14- Brass or Nylon Hex Nipple (NP-HEX-4) |
| 5- 4 Position Metal Bracket | 15- 1/4" x 1/8" Elbow Fitting (DM-40-4-2) for Membrane Housing |
| 6- Filter Housings (10": optional 20" available) | 16- Dual Mounting Clip for Permeate Pump to Membrane Housing |
| 7- Mounting Clips for Membrane Housing | 17- 1/4" x 3/8" Push Fitting Tee |
| 8- Rubber O-Ring for Membrane Housing Seal | 18- 3/8" x 1/4" Elbow Fitting (DM-40-6-4) for Filter Housings |
| 9- Rubber O-Ring for Filter Housings | 19- 1 lb Check Valves (3/8") |
| 10- Stainless Steel Sheet Metal Screws
(Secures housings to bracket) | 20- Stainless Steel U.V. Light Housing. (optional) |
| | 21- U.V. Light Ballast. (optional) |

MAINTENANCE PROCEDURES

Prefilter Replacement

For maximum contaminant removal and long membrane life, the sediment and carbon prefilters should be changed at 6-month intervals. If your water contains a great deal of sediment or chlorine, the prefilters might have to be changed at more frequent intervals to maintain an adequate production rate.

Sediment prefilter and Carbon block prefilter Replacement:

Maintenance Regime: 15-20% drop in pressure OR at least once in 6 months OR when chlorine breakthrough occurs.
Materials Needed: 0.5 micron MicroTec™ sediment prefilter, 0.5 micron carbon block prefilter, filter wrench.

Procedure:

1. Shut off feed supply valve and wait until pressure is relieved.
2. Remove the filter housings from their caps by unscrewing them clockwise as viewed from top or side. A filter wrench may be needed. Discard old filters.
3. Thoroughly wash out the housings with hot soapy water to which a few teaspoons of household bleach have been added, and rinse well with clean hot water.
4. Install the new sediment prefilter in the leftmost housing. Check to be sure that the O-ring is positioned in its groove and hand tighten housing.
5. Install carbon block prefilter in the second housing from the left, making sure O-ring and black gaskets are in place. Hand tighten housing.
6. Turn feed supply valve "ON" and check for leaks.

RO Membrane Replacement

Maintenance Regime: As needed (Refer to procedure for testing membrane quality on page 19.)
Materials Needed: Replacement TFC membrane, pliers.

Procedure:

1. Shut off feed supply valve to the System and wait until pressure is relieved from the housing.
2. Next, remove the short 1/4" black tubing from the input elbow of the membrane and lift the membrane housing from the clips.
3. Unscrew the RO housing lid counterclockwise from base.
4. With a pair of pliers, grasp the membrane stem and pull the membrane from the housing.
5. Wash housing with soapy water and rinse thoroughly with hot clean water.
6. Insert new membrane into the housing, with the O-ring end first. The O-ringed tube must fit into the recess at the bottom of the RO housing. When the membrane is aligned with the hole, push the membrane into the hole until it bottoms out.
7. Replace housing O-ring on the housing rim and carefully screw the lid back on to the base.
8. Reconnect the 1/4" black tubing to the input elbow of the membrane.
9. Disconnect the yellow drain line from the membrane housing and remove the flow restrictor from the end of the yellow tubing and reconnect the yellow tubing without the flow restrictor to the membrane housing.
10. Turn on feed supply valve to the System. Flush the membrane and membrane housing for 10 minutes.
11. Turn off the water supply to the System. Remove the yellow drain line from the membrane housing and replace the flow restrictor in the yellow line.
12. Reconnect the yellow drain line with the flow restrictor to the membrane housing, turn water supply on and check for leaks.
13. Check ratio of waste water to product water. It should be at least 4:1. If it is not 4:1, check the flow restrictor for particle plugging or adjust ratio to 4:1. (See Page 8)

MAINTENANCE PROCEDURES (continued)

Post Filter Replacement

Maintenance Regime: At least once every 12 months or whenever odor or bad taste occurs.
Materials Needed: Replacement Carbon Post Filter (CF-0.5-10)

Procedure:

1. Turn off feed supply valve and tank shutoff valve.
2. Remove the filter housing from its cap by unscrewing it clockwise as viewed from the top or side.
3. Discard old filter.
4. Thoroughly wash out the housing with hot soapy water to which a few teaspoons of household bleach have been added, and rinse well with clean hot water.
5. Install the new post filter.
6. Turn on both tank shutoff valve and feed supply valve. (Check for leaks)

Remineralization Cartridge Replacement

Maintenance Regime: At least once every 12 months or whenever more than 50% of the minerals are exhausted.
Materials Needed: Replacement Remineralization Cartridge (FA-REMIN-10)

Procedure:

1. Turn off feed supply valve and tank shutoff valve.
2. Remove the filter housing from its cap by unscrewing it clockwise as viewed from the top or side.
3. Discard old cartridge.
4. Thoroughly wash out the housing with hot soapy water to which a few teaspoons of household bleach have been added, and rinse well with clean hot water.
5. Install the new cartridge.
6. Turn on both tank shutoff valve and feed supply valve. (Check for leaks)

Recharging the Bladder Tank

If the storage capacity of the tank is diminished significantly it is likely that the tank has lost its air charge. Recharging the bladder tank will restore its capacity.

1. Put the dispenser faucet in the "open" position (lever in up position). Leave the faucet in the open position until the procedure is completed.
2. Drain as much water as possible from the tank.
3. Hook up an air pump to the "Schrader" (tire) valve on the pressure tank and start pumping air into the tank.
4. Expel all the water from the tank.
5. Continue pumping air into the tank until the pressure reads 6 psi.
6. This completes the procedure.

NOTE: Should this procedure fail to restore the capacity of the tank, it is very likely that the bladder in the tank is ruptured and the tank needs to be replaced.

MAINTENANCE PROCEDURES (continued)

SANITIZING THE DRINKING WATER SYSTEMS

Sanitizing is recommended at least once every year or if water smells or tastes bad, even after a post carbon filter replacement. A convenient time for sanitization is during a filter changeout. IT IS IMPORTANT THAT YOU HAVE CLEAN HANDS WHILE HANDLING INNER PARTS OF THE SYSTEM.

1. Be sure water supply to the RO system is turned off, and the dispenser faucet is open. This will completely drain the pressure tank.
2. Remove the post carbon filter and the remineralization filter from the system.
3. Put 1.5 - 2.0 oz. of household bleach in the right filter housing and fill it halfway with tap water.
4. Next, close the dispenser faucet (put lever in DOWN position).
5. Open the feed supply valve.
6. Allow 10 minutes for the bleach solution to flow through the system and into the storage tank.
7. Open dispenser faucet and keep the lever in the UP position till some bleach solution is dispensed through the faucet. IMMEDIATELY close the faucet as soon as the bleach solution is detected. This will sterilize the faucet and the line going to the faucet.
8. Let the system sit for 2 hours.
9. Open the dispenser faucet to drain bleach solution from the pressure tank as completely as possible and then close the faucet.
10. Open the feed supply valve fully.
11. Allow the tank to fill until pressure gauge reaches at least 40 psi. Then open the dispenser faucet and flush system until all bleach solution has been dispensed from the system.
12. Close the feed supply valve.
13. Remove post filter housings from the system and then rinse them with tap water and drain completely.
14. Install new post carbon and remineralization filters and hand tighten the housings.
15. Open the feed supply valve and check for leaks. This completes the procedure.

NOTE: Do not use filter wrench to tighten housings. Over-tightening will damage housings and void your warranty.

CALCULATING EXPECTED OUTPUT FROM THE MEMBRANE

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.

$$\text{Expected GPD} = \text{Rated GPD} \times \text{PCF} \times \text{TCF} \times \text{OCF}$$

PCF is the pressure correction factor, TCF is the temperature correction factor and OCF is the osmotic correction factor.

1. Calculation of PCF: The output GPD from the membrane are 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 multiplied by the PCF (Pressure correction factor).

$$\text{PCF} = \text{Pressure available (in psi)} \div 60$$

2. Calculation of TCF: The output GPD also decreases with decrease in temperature. This is because the water viscosity increases with decrease in water temperature.

The GPD increases by approximately 3% for every °C rise in temperature. (Refer to the following table for TCF values).

°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

Table 1: Temperature Correction Factor (TCF)

3. Calculation of OCF: The output GPD of the system decreases with an increase in ppm TDS of tap water. This is because the osmotic pressure increases with an increase in ppm TDS, and the increased osmotic pressure reduces the net driving force for pure water passage through the membrane. The osmotic pressure is approximately 1 psi for every 100 ppm TDS.

NOTE: Generally speaking, the effect of osmotic pressure can be neglected for most tap water supplies and the OCF may be assumed to be 1.

Example: What is the expected GPD from a 90 GPD system at 40 psi pressure and 60°F water temperature?

$$\text{PCF} = 40 \div 60 = 0.666$$

$$\text{TCF} = 0.754 \text{ (from Table 1)}$$

$$\text{OCF} = 1$$

$$\text{Expected GPD} = 90 \times 0.666 \times 0.754 = 45.2 \text{ GPD}$$

TESTING THE QUALITY OF THE MEMBRANE

The performance of a RO membrane is measured in terms of its rejection characteristics. Note: Test the quality of the membrane once every 6 months.

Method 1: Using a test kit

The rejection of the membrane is measured using the following procedure:

1. Turn the right-angled ball valve on the top of the pressure tank to the OFF position. Flip the faucet lever into the UP position.
2. Measure tap water conductivity* (Call it X).
3. Run the system for 30 minutes.
4. Rinse test instrument cell 2-3 times with RO water.
5. Measure RO water conductivity* (Call it Y).
6. Subtract RO water conductivity* from tap water conductivity* (X - Y) .
7. Divide this quantity by tap water conductivity* (X - Y) , X .
8. Rejection = $[(X - Y) / X] \times 100$.
9. Put the faucet lever back to the DOWN position and then turn the right-angled ball valve to the ON position.

Example: Calculation of Rejection of the RO Membrane.

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

Membrane Hardness Rejection = 95.3 %

*Depending on your tap water chemistry, the rejection characteristics of the membrane may vary significantly.

TIPS FOR GOOD MEMBRANE LIFE

Following tips will ensure a good membrane life:

1. Replacement of 0.5 micron MicroTec™ sediment filter once every 6 months OR when the pressure indicated by the pressure gauge drops by 15-20% (whatever happens first). 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 the pressure indicated by the pressure gauge drops 15-20% (whatever happens first) OR when chlorine breakthrough occurs*. This will ensure good membrane life and prevent membrane from chlorine damage.
3. Membrane should not be operated at lower than 4:1 waste water to product water ratios. If you have a lower ratio, change the length of the flow restrictor to adjust to at least 4:1.
4. Running reverse osmosis systems on softened feed water reduces the chances of membrane fouling.

* Method to check for chlorine breakthrough: Detection of chlorine levels > 0.1 ppm in brine (1/4" yellow waste water line). USE PART #: TK-CL-10-KIT (Total Chlorine Test Kit).

TROUBLESHOOTING GUIDE FOR COFFEE LOVERS SYSTEM

Problem	Cause	Corrective Action
Low production rate.		
	a. Plugged prefilters.	i. Replace prefilters.
	b. Low water temperature.	ii. Use higher GPD membrane.
	c. Low water pressure (<40 psi).	iii. Use booster pump OR use higher GPD membrane.
	d. High TDS content (<1000 ppm).	iv. Use booster pump OR use higher GPD membrane.
	e. Fouled membrane.	v. Replace membrane.
	f. Plugged flow restrictor.	vi. Replace flow restrictor & membrane.
	g. Tank bladder lost air charge.	vii. Repressurize bladder to 6 psi (when empty).
	h. Too much pressure in bladder tank.	viii. Repressure bladder to 6 psi (when empty).
	i. Ruptured bladder.	ix. Replace tank.
Zero production rate.		
	a. Missing flow restrictor.	i. Put flow restrictor in the yellow brine line.
	b. Dried out membrane.	ii. Replace membrane.
	c. Plugged flow restrictor.	iii. Replace flow restrictor and membrane.
	d. bladder lost air charge.	iv. Repressurize bladder to 6 psi (when empty).
	e. Ruptured bladder.	v. Replace tank.
Extremely high production rate.		
	a. Ruptured membrane.	i. Replace it.
	b. Very high line pressure (over 90 psi).	ii. Use a pressure reducing regulator.

Troubleshooting Guide Continued on Next Page.

TROUBLESHOOTING GUIDE FOR COFFEE LOVERS SYSTEM (continued)

Problem	Cause	Corrective Action
Pressure gauge does not register anything.		
	a. Plugged prefilters.	i. Replace prefilters
	b. Missing flow restrictor.	ii. Put flow restrictor in the yellow brine line.
	c. Pressure gauge screwed in too far.	iii. Unscrew pressure gauge one turn and retest.
	d. Plugged pressure gauge orifice.	iv. Clean orifice with a needle.
	e. Defective pressure gauge.	v. Replace it.
Water smells bad.		
	a. Exhausted post carbon filter.	i. Replace it.
	b. Ruptured bladder in storage tank.	ii. Replace tank.
	c. Bacterial contamination of bladder tank.	iii. Sanitize RO system.
Milky colored water.		
	a. Air in system.	i. Air in the system is a normal occurrence with initial startup of the RO system. This milky appearance will disappear during normal use within 1-2 weeks. If condition recurs after filter changes, drain tank 1 to 2 times.
Reject (yellow) line never stops flowing water.		
	a. Faulty check valve.	i. Replace it.
	b. Faulty auto shutoff valve.	ii. Replace it.
Broken faucet handle.		
		i. Purchase a faucet repair kit.

Troubleshooting Guide Continued on Next Page.

TROUBLESHOOTING GUIDE FOR COFFEE LOVERS SYSTEM (continued)

Problem	Cause	Corrective Action
Leak under the faucet handle.		i. Purchase a faucet repair kit.
Leak around the base of the spout.	a. Displaced O-rings. b. Worn O-rings.	i. Pull the faucet spout out. Seat O-rings in place. ii. Replace O-rings (Purchase a faucet repair kit).
Noise from faucet or drain.	a. Air gap faucet. b. Location of drain saddle. c. Restriction in drain tube - sometimes caused by debris from garbage disposal or dishwasher. d. Water pressure exceeds 80 psi.	i. Inherent sound with air gap faucets. ii. See Page 11 for proper location of drain saddle. iii. Clear blockage. iv. Use a pressure regulator.
Faucet leaks from air gap hole on side of faucet.	a. Drain tube clogged. b. Crimp or sag in the 3/8" black drain line. c. Restriction in 3/8" black drain line.	v. Caused by dishwasher or garbage disposal. Disconnect the 3/8" black line at the drain, clean the 3/8" black line out with a wire, then reconnect. Note: Blowing air through the line will not always remove clog. i. Check tubing. ii. Straighten all drain lines. Cut off any excess tubing.

ONE YEAR LIMITED WARRANTY

SpectraPure, Inc.® warrants the product to the original owner only to be free of defects in material and workmanship for a period of one year 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 manufacturer'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 prefilters and membranes are not covered under the one year 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 Merchandise Authorization (RMA) 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 byproduct 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 one year limited warranty does not apply to consumable items, including but not limited to, filters and cartridges unless specifically stated above.**

TERMS AND CONDITIONS:

1. Shipping charges on units or parts submitted to our facility for repair or replacement must be borne by the registered purchaser. After repair or replacement, the factory will return the unit or part freight prepaid to the customer.
2. We assume no warranty liability in connection with our equipment other than as herein specified.
3. This warranty is in lieu of all other warranties expressed or implied, including warranties of fitness for a particular purpose.
4. We do not authorize any person or representative to assume for us any other obligation on the sale of our equipment. This is the exclusive remedy and liability for consequential damages under any and all warranties which are excluded to the extent exclusion is permitted by law.
5. Proof of original purchase date must accompany all warranty claims.
6. SpectraPure, Inc. Reserves the right to change prices without notice when necessary. All prices in the catalog are quoted in US dollars.
7. Claims for error in quantity or condition must be made within 10 days of receipt of material. SpectraPure, Inc. will not be responsible for any claimed shortages not reported within 10 days. Returns other than warranty claims may be subject to 20% restocking fee.
8. SpectraPure, Inc. cannot be held liable for damage or loss to a shipment by a freight carrier. Check shipment for damage before acceptance or note on freight bill subject to inspection for concealed damage. Consignee must file claim. SpectraPure, Inc. will offer as much assistance as possible.
9. A complete credit check is required prior to shipping on a Net 30 basis. In the interim period during which credit references are being evaluated, all orders must be prepaid until approved.
10. All returned checks (due to insufficient funds or closed accounts) will be subjected to a **\$35 penalty charge**.
11. Invoices on Net 30 accounts not paid within 30 days of shipment will be considered delinquent and will accrue Finance charges at the rate of 1.5% per month (18% per annum).

REPLACEMENT PARTS

<u>Part No.</u>	<u>Replacement Parts</u>	<u>Description</u>
SF-MT-0.5-10	Sediment Filter	0.5 Micron Sediment Filter (1 st Stage)
CF-0.5-10	Carbon Filter	0.5 Micron Carbon Prefilter (2 nd Stage)
MEM-0090	RO Membrane	90 gallon a day Membrane (3 rd Stage)
FR-90	Flow Restrictor	90 gallon a day Flow Restrictor
FA-REMIN-10	Remineralization Cartridge	Adds minerals to product water for flavor (4 th Stage)
CF-0.5-10	Carbon Filter	Polishes water and removes any taste (5 th Stage)
V-ASO-PP-4JG	Permeate Pump ASO	ASO Valve for Permeate Pump

OPTIONAL PARTS

<u>Part No.</u>	<u>Description</u>
IMK	Ice Maker Kit
BPHF-PS-115	Booster pump kit for use with over 60 GPD systems
V-PREG-70-4GJ	Pressure reducing valve (pressure regulator)