SpectraPure®
INNOVATORS IN WATER TECHNOLOGY

Coffee Lovers™ System

CLS-5-90

OPERATIONS MANUAL

RO Drinking Water System for *Coffee Lovers*

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.

SpectraPure®Inc. assumes no responsibility for water damage due to leaks. It is the user's responsibility to determine that the system is leak-free.

DWS-CLS Rev. 1-12-2009

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 can 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 Micro-Tec ™ sediment pre-filter. 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 pre-filter. This filter is used to remove organics and chlorine from the feed water that can damage the membrane. The next stage of the system are the R.O. membranes. High-rejection Thin Film Composite (TFC) membrane(s) are used in this system.

They remove over 98% of most inorganic salts, all micro-organisms and almost all high molecular weight organics in the water.

Dual-Pass ™ technology - A post carbon filter and a re-mineralization 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 pre-filters. (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. The air-gap 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 pressurzied 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. Additonal 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.

Re-Mineralization 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 (2.75-6.9 bar).
pH Range:	3-11.
Max. Temperature:	100°F (38°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.
Langlier Saturation Index (LSI):	must be negative.

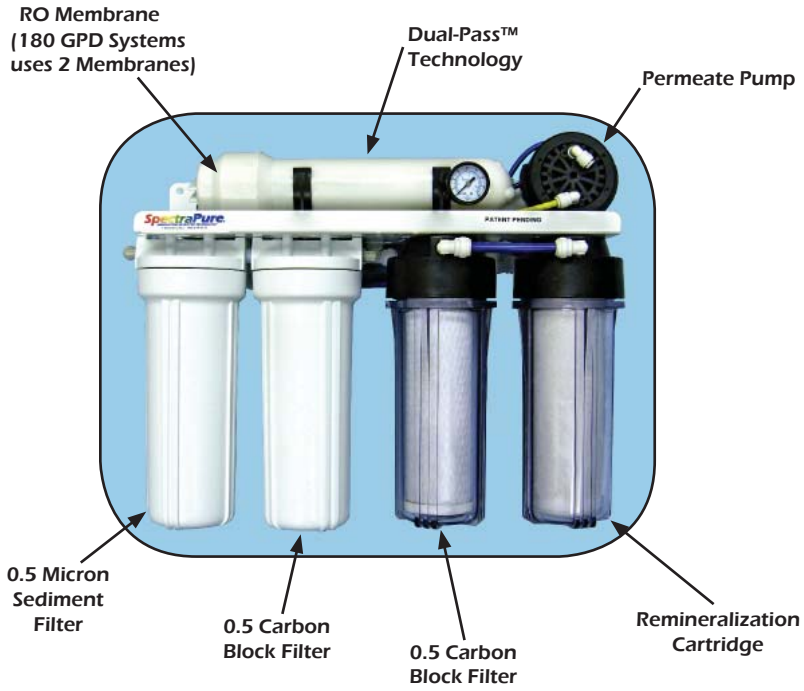
NOTE: MOST MUNICIPAL WATER SUPPLIES MEET THE ABOVE REQUIREMENTS. IF WELL WATER IS USED, PLEASE MAKE SURE THAT YOU OBTAIN A WATER TEST BEFORE INSTALLATION.

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

COFFEE LOVERS SYSTEM

(1) 5-Stage System
- (1) Membrane (90)
- (1) 0.5 Micron Sediment Filter
- (2) 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 Gal Pressurized Storage Tank (Blue or White)
(1) Air-Gap Faucet with parts bag
(1) Drain Saddle
(1) Feed Water Adapter
(1) UV Sterilizer Light (optional)



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 Drinking Water System, Bladder Tank, Feed Water Connection, Drain Saddle, and the Air-Gap or Non-Air Gap Faucet for your specific application.

3. TOOLS RECOMMENDED FOR INSTALLATION:
   - 7/8" or 1/2" Hole Saw Bit for Faucet Opening (depends on faucet used
   - Round Knock out Punch for Stainless Sinks, 7/8" & 1/2"
   - Adjustable Wrench
   - Sharp Knife
   - Open End Wrench
   - Phillips Screw Driver
   - Needle Nose Pliers- Adjustable Pliers
   - Electric Drill

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 masonary bit is recommended. **SpectraPure® accepts no responsibility for consequential damage resulting from the installation of the faucet.**

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 large hole (For AIR-GAP Faucet 7/8"). 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 back splash 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 hole saw to punch the hole in the sink. (For AIR-GAP Faucet 7/8". For NON AIR-GAP Faucet 1/2").

FEED SUPPLY VALVE INSTALLATION

STEP 1. Follow the cold water line from shut-off 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.

a. Remove the 1/2" Compression Nut from Valve body. Be carefull not to loose the plastic or brass Insert and the Conical Compression Sleeve.
b. Insert the 1/4" Black Tubing into the Compression Nut with the threads towards the end of the tube.
c. Slip the Conical Compression Sleeve onto the Black Tube with the long slope pointing toward the end of the tube.
d. Place the Insert into the end of the Black Tubing. Make sure you push the insert in all the way.
e. Tighten Compression Nut back on the Valve body.

STEP 5. When installation of the valve is complete, check for leaks as follows:

a. Close Feed Supply Valve that you just installed.
b. 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

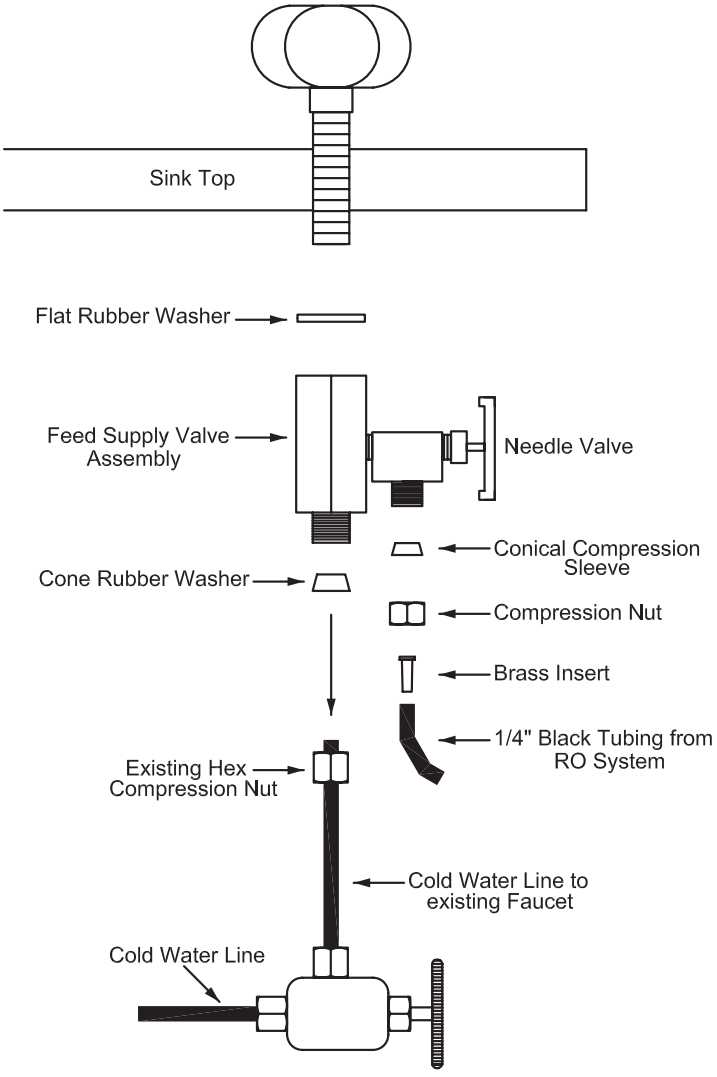


FIGURE 1: FEED SUPPLY INSTALLATION

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 pro-rated 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.

Flow Restrictor may require adjustment if any of the following conditions exist:

- Extreme hard water (> 15 grains hardness)
- Very warm water temperatures (> 80 F water temperatures).
- Line pressure outside of 50-70 psi range. (If line pressure is over 80 psi, a pressure regulator is needed).

Procedure:

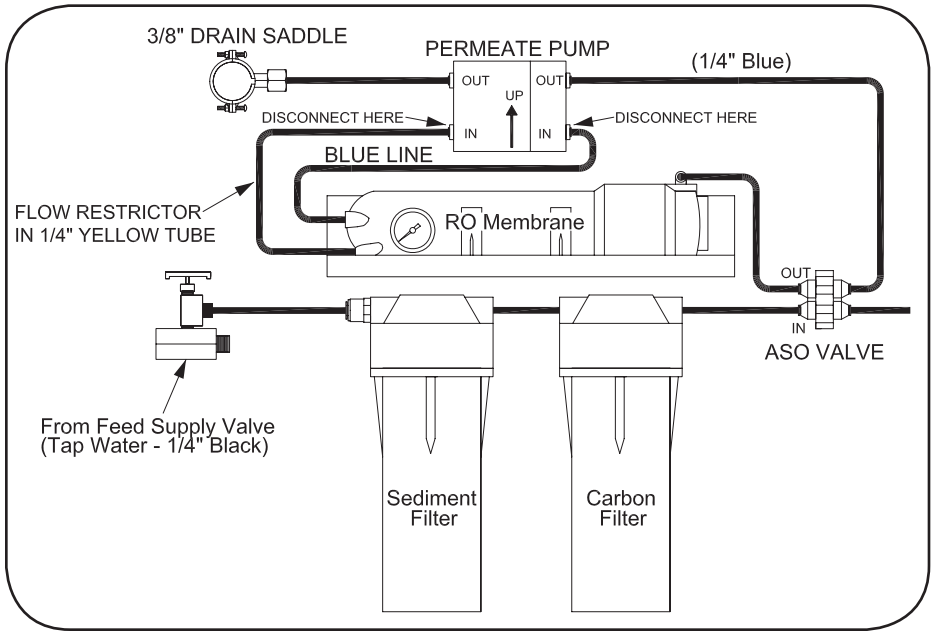
1. Locate the yellow and blue line (shown in the Diagram below) and disconnect them from pump to proceed with Measuring Waste to Product Water Ratio.
2. Turn on the Feed Supply Valve and let the system run for 20 min.
3. Collect product water from the blue line into a measuring cup for one minute. Measure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

WASTE IN MILLILITERS_____
DIVIDED BY
PRODUCT IN MILLILITERS_____

The resultant is the Concentrate to Product Ratio

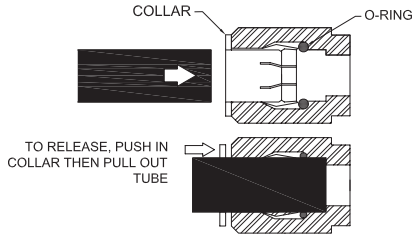
(Although not needed in this procedure, the daily product flow rate in Gallons per Day (GPD) can be calculated to be equal to the product flow rate times 0.38).

4. If ratio is ***less than 4:1***
5. Follow instructions on page 7
   (MAKE SURE YOU RECONNECT WATER LINES FOR DWS-PP)
6. 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. 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 other-wise damage the end of the capillary tubing protruding from the end of the insert.

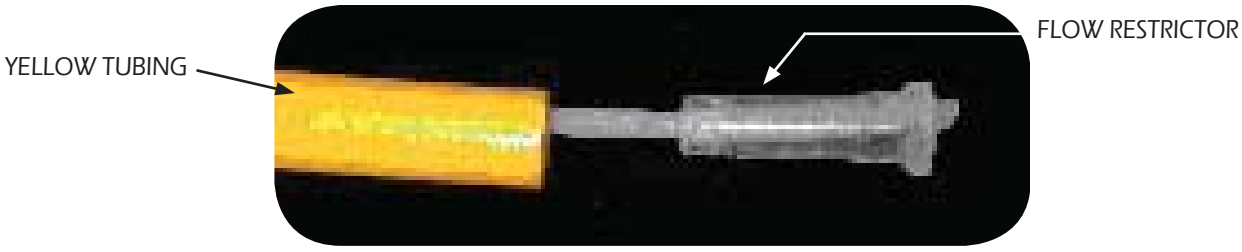
6. Re-insert the yellow tubing into its push-fitting in the RO membrane as follows:
   a.) Moisten the O-ring seal inside the concentrate outlet fitting by dripping a few drops of clean water into the fitting.
   b.) Grasp the yellow tubing near the flow restrictor end, and insert the tubing into the 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.

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

FAUCET INSTALLATION

AIR-GAP FAUCET INSTALLATION

A. Place the chrome counter plate and rubber washer over the threaded shaft and barbed nipples on the faucet (Refer to Figure 3).
B. Pass the Blue 3/8" tubing, the Yellow 1/4" tubing, and the Black 3/8" tubing up through the drilled counter-top hole and temporarily secure them so they don't fall back through the hole.
C. 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.
D. Insert the Blue 3/8" tubing into the Quick Connect Tubing Adapter.
E. Connect the 1/4" yellow tubing to the smaller barb and connect the 3/8" Black tubing to the larger barb.
F. Drop the entire assembly into the hole, resting on the chrome counter plate. Loosen the nut and position the Galvanized Flange under the countertop and then securely tighten the hex nut.
G. 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.

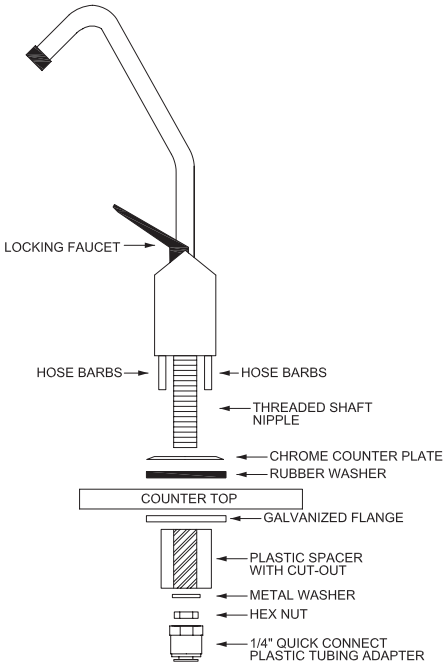


Figure 3

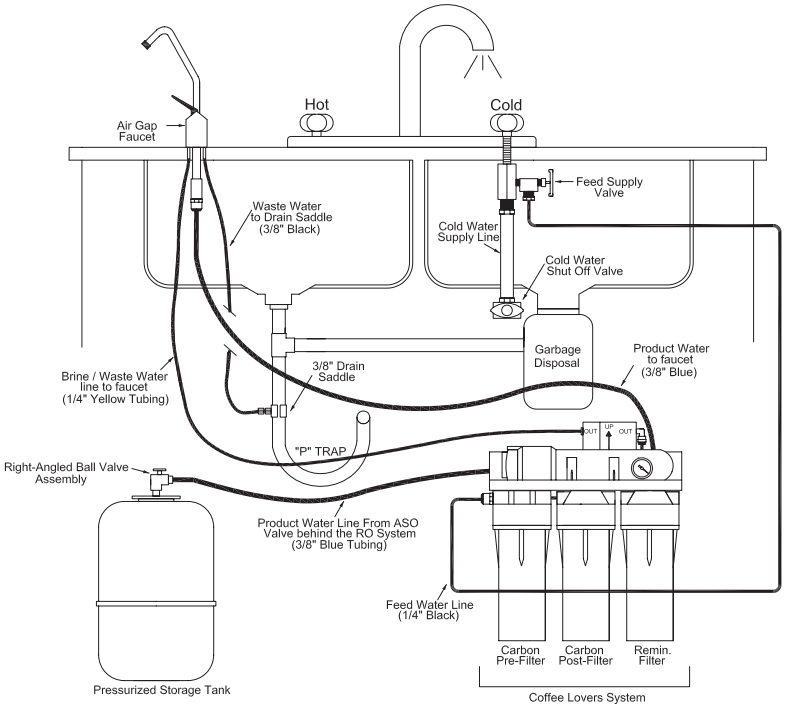
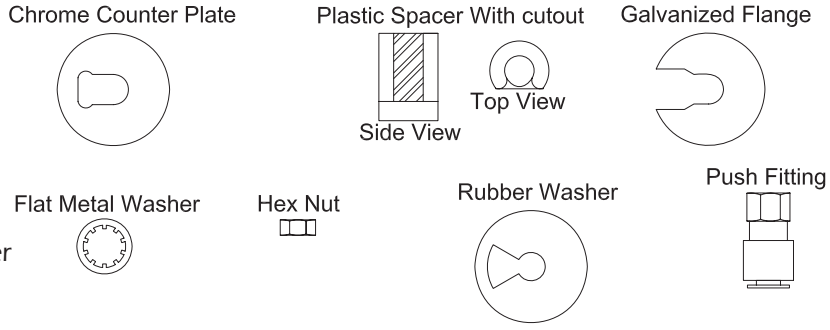


Figure 4: INSTALLATION FOR DWS & DWS-PP SYSTEM

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



DRAIN SADDLE INSTALLATION

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. Place the half of the drain saddle with threaded nipple at a pre-determined location. Slide a pencil through the plastic nipple and make a mark on the drain pipe. Use a small punch and indent a start position to prevent the drill bit from wandering. 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.

Refer to Figure 8 showing the drain saddle assembly sequence. Press nuts in back half of drain saddle assembly. 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. Install the back half of the drain saddle and clamp assembly to drain pipe by screwing in the mounting bolts until snug.

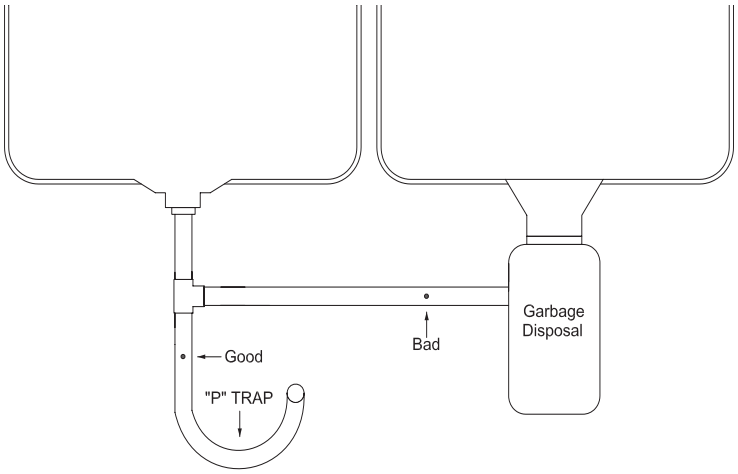
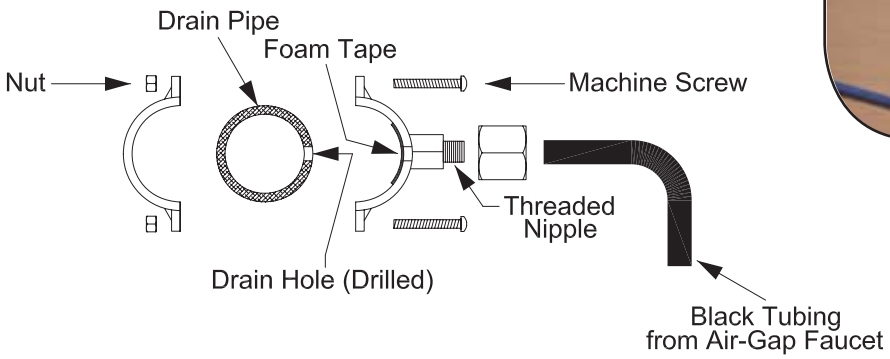


Figure 7: Drain Saddle Mounting Locations



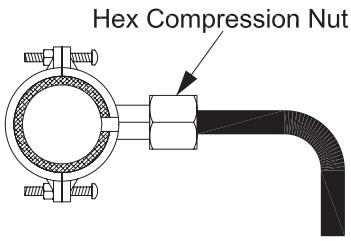


Figure 8: Drain Saddle Assembly Sequence

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.

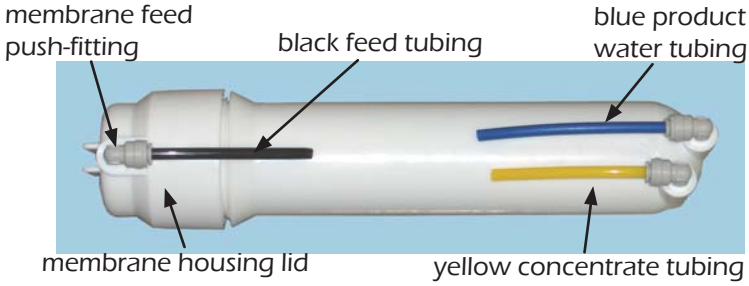
STEP 2. Thread the Ball Valve (supplied in the parts bag) onto the stainless steel nipple on top of the tank. Hand tighten only.

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.

Refer to operation and maintenance on page 15.

TANK INSTALLATION

STEP 1. Position tank in desired location. Stand it upright (using the black plastic stand). Measure the Blue tube from the RO Membrane over to the tank and cut it to length.
STEP 2. Connect the Blue tube to the Righ-Angle Ball Valve that is attached to the top of the tank.
STEP 3. Connect the 3/8" Blue tube that is connected to the quick connect tubing adapter on the Threaded Shaft of the faucet (Page 10), to the Carbon Post-Filter (3rd filter from the left).
STEP 4. Connect the 3/8" Black tube to the Drain Saddle and tighten the compression nut.



Tubing Connections to Membrane

ICE MAKER HOOK-UP (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.

MOUNTING SYSTEMS INSTALLATION

STEP 1. Determine best location for the RO system to be mounted to allow for future system maintenance. Use two (2) self tapping screws and a Phillips screwdriver. Measure the distance between the key hole 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.

START-UP PROCEDURES

1. Slowly turn the cold water supply to full flow. Check for leaks. Turn off the ball valve at the storage tank and open the faucet.
   - Watch the clear housings fill with water. When water comes out of the faucet, turn the faucet off. The system will pressurize rapidly and should shut off with a "click".

   NOTE: It is important that air is purged from 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, pre-filter housings are horizontal). Allow a minimum of 15 minutes operation with this orientation.

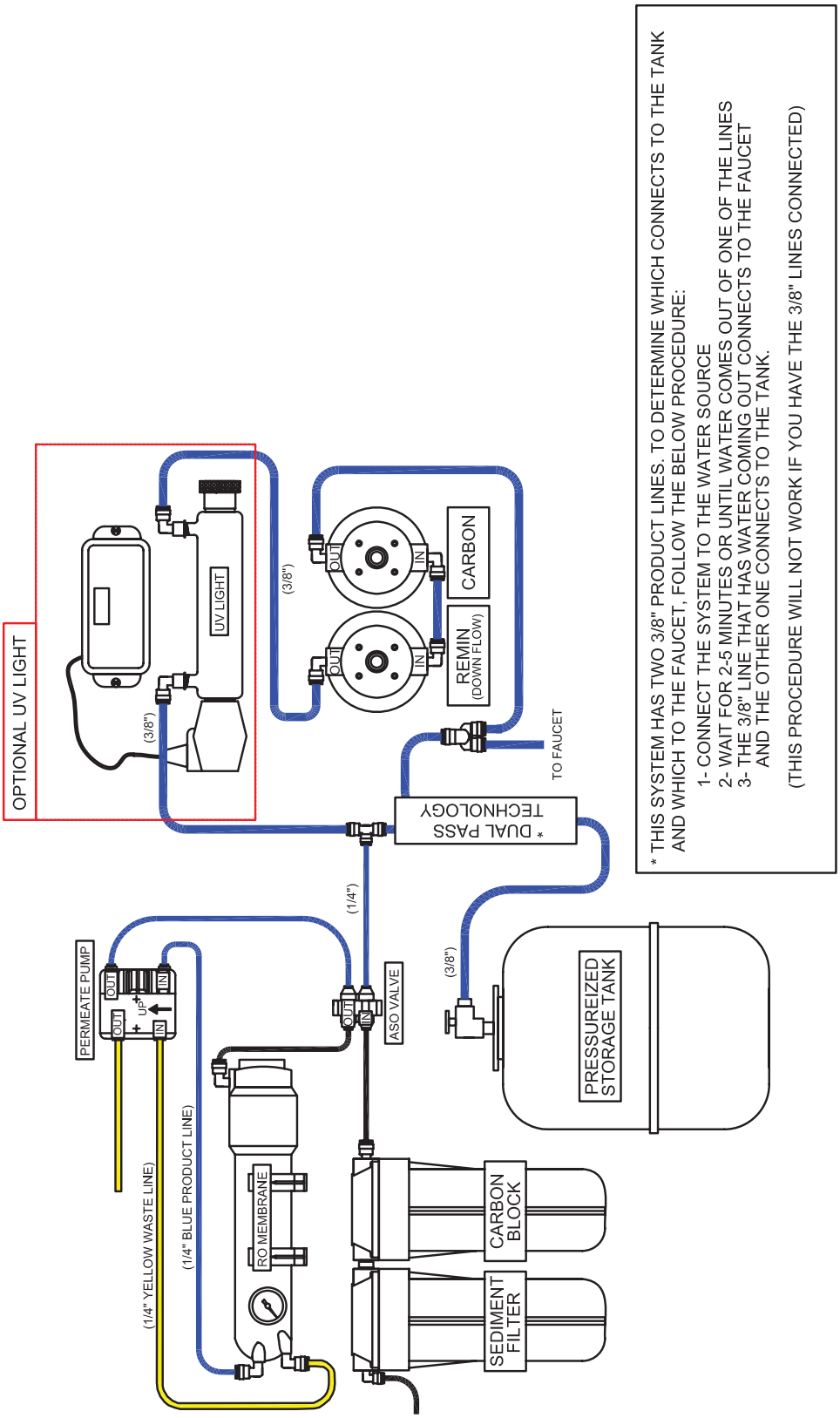
2. **Look for leaks and do not leave the system alone until you are sure there are no leaks.** Now, turn the valve on the tank to the "ON" position.

3. Before using the system, allow three tank fillings to occur, then flushing the contents between each filling by locking the faucet lever to the open position until drained.

4. Wait for an hour before drawing water from of the faucet.

Note: NEVER RUN HOT WATER (>100°F) THROUGH THE SYSTEM.

Figure 9: System Schematic for Coffee Lovers System with Air-Gap Faucet



MAINTENANCE PROCEDURES

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

Sediment pre-filter and Carbon block pre-filter 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 micro-tec sediment pre-filter, 0.5 micron carbon block pre-filter, 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.
3. Discard old filters.
4. 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.
5. Install the new sediment pre-filter (for the Deluxe System Only) in the left most housing, check to be sure that the O-ring is positioned in its groove and hand tighten housing.
6. Install carbon block pre-filter in appropriate housing making sure, O-ring and black gaskets are in place. Hand tighten housing.
7. Turn feed supply valve "ON" and check for leaks. (See "Start-Up proceedures" on page 13).

RO membrane Replacement

Maintenance Regime: As needed (Refer to procedure for testing membrane quality on page 23).
Materials Needed: Replacement TFC membrane, pliers.

Procedure:
1. Shut off feed supply valve to the DWS 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 lower 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 thorougly 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. Re-install 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. Flush the membrane and membrane housings 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 "Start-Up proceedures" on page 13).

MAINTENANCE PROCEDURES (continued)

Post-filter Replacement

Maintenance Regime: At least once in 12 months or whenever odor or bad taste occurs.
Materials Needed: Replacement Carbon Post-FIter.

Procedure:
1. Turn off feed supply valve and tank shut-off 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 shut-off valve and feed supply valve. (Check for leaks)

Re-Mineralization Cartridge Replacement

Maintenance Regime: At least once in 12 months or whenever more than 50% of the minerals are exhausted.
Materials Needed: Replacement StablePure ™ Re-Mineralization Cartridge

Procedure:
1. Turn off feed supply valve and tank shut-off 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 shut-off 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 till 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 replacement.

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 change-out. 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 half-way 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. 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.
11. Close the feed supply valve.
12. Remove post-filter housings from the system and then rinse them with tap water and drain completely.
13. Install new post-carbon and remineralization filters and hand tighten the housings.
14. 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.

TROUBLESHOOTING GUIDE FOR RO/DI SYSTEM

	Problem		Cause		Corrective Action
1.	Low production rate.	a.	plugged pre-filters.	i.	Replace pre-filters.
		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.
2.	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.
3.	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.

	Problem		Cause		Corrective Action
4.	Red light on push to test button monitor comes on - When RO water stored in tank is being tested.	a.	TDS build-up in the bladder tank.	i.	Drain tank completely and re-test TDS.
		b.	Bad membrane.	ii.	Replace membrane.
		c.	Faulty monitor/probe.	iii.	Replace monitor/probe.
5.	Red light on push-to-test button monitor comes on - When membrane product water is being tested.	a.	Bad membrane.	i.	Replace membrane.
		b.	Faulty monitor/probe.	ii.	Replace monitor/probe.
6.	Pressure gauge does not register anything.	a.	Plugged pre-filters.	i.	Replace pre-filters
		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 re-test.
		d.	Plugged pressure gauge orifice.	iv.	Clean orifice with a needle.
		e.	Defective pressure gauge.	v.	Replace it.
7.	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.
8.	Milky colored water.	a.	Air in system.	i.	Air in the system is a normal occurrence with intial start-up of the RO system. This milky appearance will disappear during normal use within 1-2 weeks. If condition reoccurs after filter changes, drain tank 1 to 2 times.
9.	Reject (yellow) line never stops flowing water.	a.	Faulty check valve.	i.	Replace it.
		b.	Faulty auto shut-off valve.	ii.	Replace it.
10.	Broken faucet handle.	a.		i.	Purchase a faucet repair kit.

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

CALCULATING EXPECTED GPD/LPD 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.

Expected GPD = Rated GPD × PCF × TCF × OCF

where 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 multipled by the PCF (Pressure correction factor).

   PCF = Pressure available (in psi) ÷ 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 presssure increases with 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 can be assumed to be 1.

Example: What is the expected GPD from a 50 GPD DWS system at 40 psi pressure and 60°F water temperature?

PCF = 40 ÷ 60 = 0.666
TCF = 0.754 (from Table 1)
OCF = 1
Expected GPD = 50 ´ 0.666 ´ 0.754 = 25.1 GPD

Important Note: This calculation makes the assumption that purified water from the system is going into an open tank or reservoir. Actual System GPD will be lower for the DWS System because of the back pressure exerted by the pressurized storage tank. Addition of the Permeate Pump Retrofit-Kit (PPRFK-DW, Part #: KT2300-015) eliminates the back pressure and operates your DWS System as if the product water were going into a open tank.

TESTING THE QUALTIY 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] ´ 100 .
9. Put the faucet lever back to the DOWN position and then turn the right-angled ball valve to the ON position.

* Conductivity in the above procedure could be replaced by hardness, alkalinity, nitrate, phosphate, silica etc. (measured in ppm or mg/l). These test kits are commonly available at aquarium stores.

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) ÷ X = 143 ÷ 150 = 0.953
5. Rejection = [(X - Y) ÷ X] ×100 = 0.953 ×100 = 95.3

Membrane Hardness Rejection = 95.3 % Þ Membrane OK.

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. They are:

1. Replacement of 0.5 micron Micro-Tec ™ 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 #: CTK-05 (Total Chlorine Test Kit).

THREE YEAR LIMITED WARRANTY

Effective on products purchased after March 10, 2005.

All standard water purification products manufactured by SpectraPure have a 3 year limited warranty, except the Eliminator™ MarinePro™, Industrial, Laboratory, Custom Systems, and electrical products which have a 1 year limited warranty. LiterMeters™ have a 2 year limited warranty. OEM equipment resold by SpectraPure carry the original manufacturer's warranty.

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 (see exceptions above) 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.

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 bacterica. 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 & OPTIONAL PARTS

Replacement Parts for 5-Stage CLS

No.	Catalog No.	Replacement Parts	Description
1.	SF-MT-0.5-10	Sediment Filter	0.5 Micron Sediment Filter (1st Stage)
2.	CF-0.5-10	Carbon Filter	0.5 Micron Carbon Pre-Filter (2nd Stage)
3.	MEM (25-90)	RO Membrane	25, 40, 60, or 90 gallon a day Membrane (3rd Stage)
4.	FR (25-90)	Flow Restrictor	25, 40, 60, or 90 gallon a day Flow Restrictor
5.	CF-5.0-10	10" in-line post carbon filter	Polishes water and removes any taste (4th Stage)
6.	V-ASO-PP-4JG	Permeate Pump ASO	ASO Valve for Permeate Pump (ONLY FOR DWS-PP)
7	V-ASO-4JG	ASO Valve	Completely shuts off Product water and Waste water
8.	VA-CK-IL-1/2LB-4	Check Valve	Is used in conjunction with the ASO Valve.

Optional Parts

No.	Catalog No.	Optional Part
1.	IMK	Ice Maker Kit
2.	PPRFK-DI	Permeate Pump Retro-Fit Kit used for RO/DI systems
3.	BPLF-PS-115	Booster pump kit for use with up to 60 GPD system
4.	BPHF-PS-115	Booster pump kit for use with over 60 GPD systems
5.	FAU-REP	Faucet repair kit
6.	V-PREG-0-125-4GJ	Pressure reducing valve (pressure regulator)