

# REVERSE OSMOSIS INSTALLATION INSTRUCTIONS

## INTRODUCTION

Congratulations on your purchase of the finest reverse osmosis water treatment product available today. With a minimum amount of care, this quality appliance will serve your family's drinking water requirements for years.

## HOW THE REVERSE OSMOSIS (R/O) SYSTEM WORKS

The R/O appliance is not a simple filter that collects and retains contaminants that occur in tap water. Instead, this sophisticated product acts as a molecular separating device utilizing a semi-permeable membrane. As tap water flows through the R/O system, it is pre-filtered to remove sediment and then it is divided into two streams. Part of the tap water is forced through the system's R/O element which contains a semi-permeable membrane. The water that passes through the R/O element emerges from the system as drinking water.

The rest of the tap water entering the system carries away the concentration of dissolved minerals, contaminants and

salts that were removed from the drinking water. This second stream allows self cleansing of the system's membrane to ensure greater effectiveness over a long period of use.

The system's semi-permeable membrane is formed so that its openings will allow water molecules to pass through slowly when forced by normal household water line pressure. A high percentage of larger molecules such as dissolved minerals will not pass through and will be carried down the drain system.

The drain stream rate of flow in the R/O system is set at about five times that of the drinking water production rate to effectively remove contaminants from the system.

The R/O Water Treatment System also incorporates an activated carbon post filter to remove residual chlorine and other organic chemical contaminants that destroy the natural great taste of the drinking water.

## SPECIFICATIONS AND RECOMMENDED OPERATING LIMITS MODEL 343-0005

System Storage Capacity	3.6 Gallons
Dimensions Storage Tank	15" H x 11" Diameter
Dimensions R.O. Module	13-3/4" W x 6-1/4" D x 15-1/2" H
Shipping Wt.	21 lbs.
Membrane Type	Cellulose Tri-Acetate
Pre-Filter	5 Micron-Sediment
Post-Filter	50 Micron-Activated Carbon
System Production Capacity*	7 - 16 Gallons Per Day
Total Dissolved Solids	2000 Parts Per Million Max.
Recovery	17%
Feed Water Temperature	40°F Min./4°C - 85°F Max./29°C
Feed Water Pressure	40 PSI Min. - 125 PSI Max.
Feed Water Hardness	20 Grains Per Gallon Max.
Feed Water Iron	<0.1 Part Per Million Max.
Feed Water pH	3 pH Min. - 8 pH Max.
Feed Water Chlorine	2 PPM Max - 0.2 PPM Min.
Manganese	< 0.05 PPM

\*Depending upon water temperature and pressure. The system should produce on average about 1/2 gallon per hour of product water.

\*\*Replacement averages 1 per year.

NOTE: PERIODIC REPLACEMENT OF R.O. MEMBRANE AND FILTER CARTRIDGES IS REQUIRED.

**CAUTION** Do not use on water that is microbiologically unsafe or with water of unknown quality without adequate disinfection before or after the unit.

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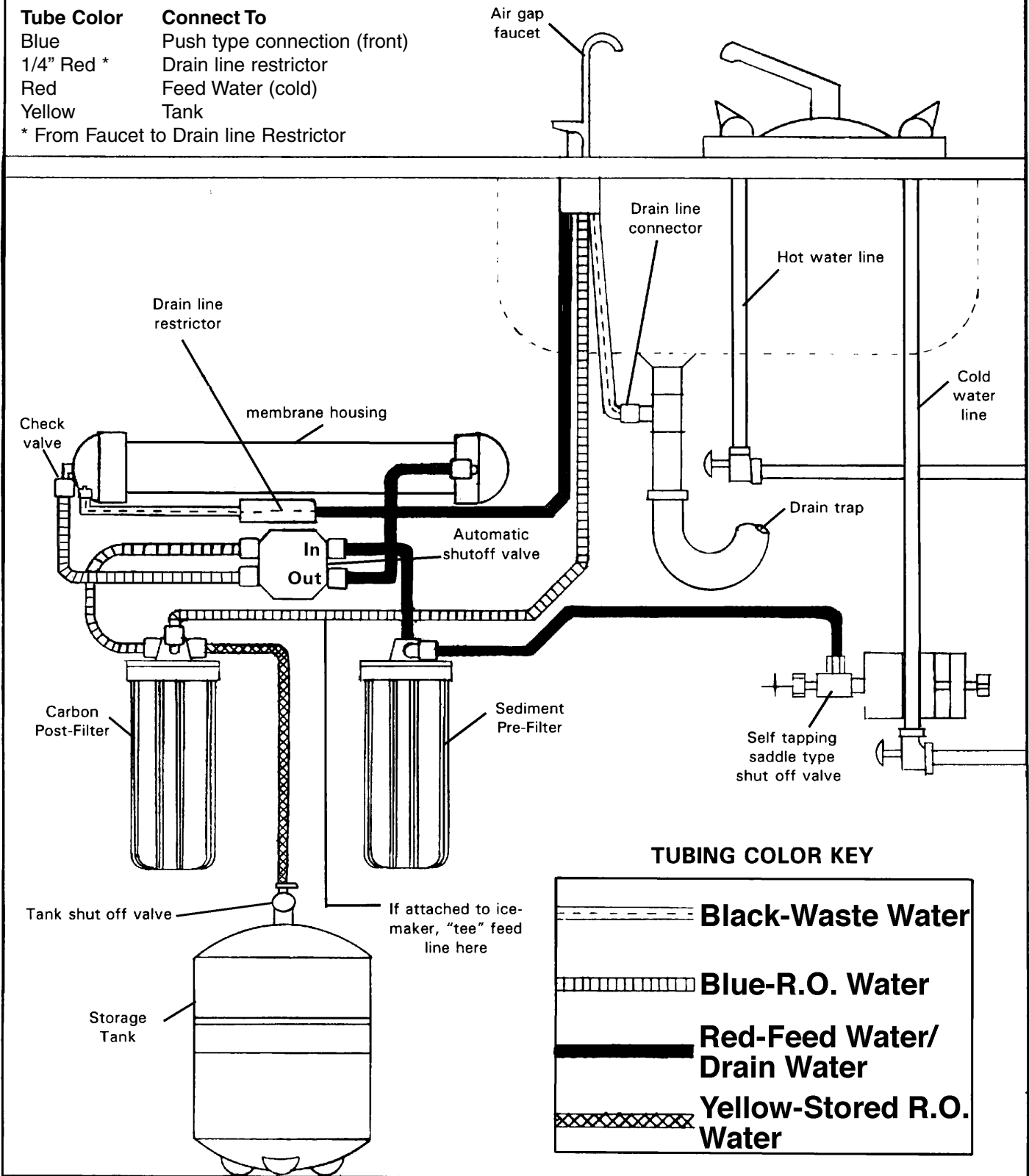
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Figure 2

When making the tubing connections, use the following table:

Tube Color	Connect To
Blue	Push type connection (front)
1/4" Red *	Drain line restrictor
Red	Feed Water (cold)
Yellow	Tank

\* From Faucet to Drain line Restrictor



NOTE: R.O. components are shipped already attached on a mounting bracket. Bracket not shown on diagram for clarity.

**▲CAUTION** REVIEW THE FOLLOWING INSTRUCTIONS COMPLETELY BEFORE ATTEMPTING TO INSTALL THE R/O SYSTEM. DO NOT USE WHEN WATER IS MICROBIOLOGICALLY UNSAFE. TO RID THE SYSTEM OF STORAGE PRESERVATIVES, LET TANK FILL COMPLETELY, THEN DRAIN AND REFILL BEFORE USING OR CONSUMING WATER. IMPORTANT: CHECK AND COMPLY WITH ALL STATE & LOCAL PLUMBING AND SANITATION CODES.

## INSTALLATION GUIDE

### Preparation

1. Check the following list of components to ensure that all parts are packed with the unit.

Qty.	Description
1	Storage Tank
1	Air Gap Faucet Assembly with tubing
1	Installation Kit (all fittings provided for typical undersink system hookup)
1	System Module (includes the following):
A.	Pre-Filter (sediment cartridge)
B.	Post-Filter (taste & odor carbon cartridge)
C.	Reverse Osmosis Membrane Assembly

2. Determine approximate location of the three major components of the system: storage tank, system module and faucet. Two requirements to keep in mind, are access to the tap water system, and the waste water drain system. The most common and useful place is in the area of the kitchen sink:

**Faucet** - may be installed on any 2" flat surface. (The underside should be flat as well). If the sink has an unused opening of 1" to 1-1/2", this is ideal. The main considerations are convenience of use and an open area below the faucet for connection of the drinking water line.

**Storage Tank** - may be placed in any convenient space within a three-foot radius of the faucet, generally under the kitchen sink or in an adjacent unused cabinet. The tank may be installed in either a vertical or horizontal position.

**System Module Assembly** - the best location is generally under the kitchen sink. Some prefer to mount module assembly to basement rafters, extending water lines to alleviate under-counter congestion.

3. Remove all loose or stored materials from under the sink or other areas of desired installation. Place cloth rags or a towel on the cabinet floor to catch any water drips that may occur during installation.

4. List of tools required:
- Flat head and Phillips head screwdrivers
  - Sharp knife or tube cutter
  - Adjustable wrench
  - Pliers
  - Electric drill-variable speed.
  - 1/8" & 1/4" metal drill bits
  - 1-1/2" metal drill bit or hole saw bit, and round file

may be required if the sink does not have an extra opening to accommodate the system faucet.

Note: Installation of the Water Treatment System requires the use of the common tools listed above. If you are not familiar with the use of these tools it is advisable to hire a plumber or other qualified persons to install the system. Follow all local and state plumbing codes.

## OPERATING REQUIREMENTS

1. The R/O System is designed for undersink application and must be installed to the cold water supply only. Do not attempt to condition hot water. The system operates on water temperature of 40°F./4°C. min - 100°F./38°C. max. Temperatures below the minimum will freeze and crack the R/O membrane. Above 100°F./38°C., the membrane will rapidly deteriorate.

2. A suitable drain must be available for attachment of the drain assembly. Refer to the section entitled Drain Outlet Assembly Installation.

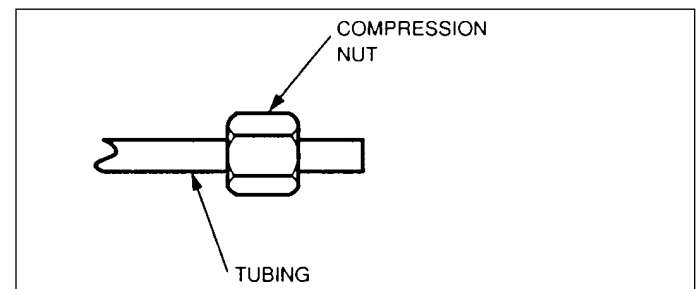
3. The R/O system is equipped with a "CTA" cellulose tri-acetate membrane. The quality, temperature and pressure of the water must meet the standards listed under the section entitled Specifications and Recommended Operating Limits.

The hardness of the feed water should not exceed 20 GPG and should not contain iron above 0.1 PPM, otherwise, an iron filter or softener may be required before the R.O. system.

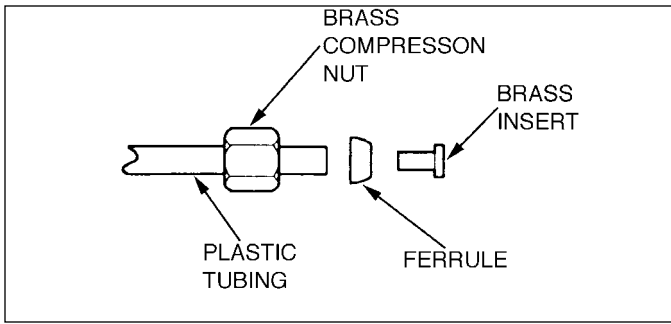
If the feed water contains hydrogen sulfide (sulfur), it must be removed through filtration also.

## SYSTEM TUBING CONNECTIONS (FIGURES 3, 4 & 5)

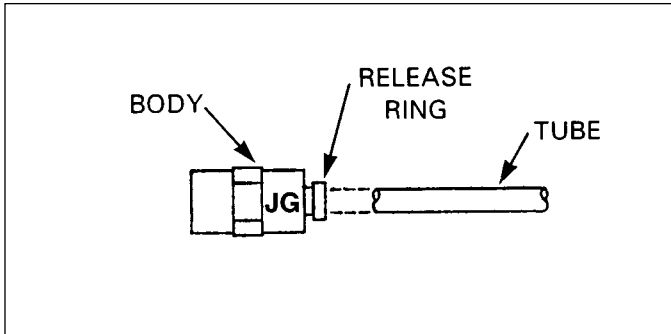
Three types of fittings are used on the reverse osmosis system. The first type as illustrated in Figure 3, uses a plastic nut with built-in ferrule. The second type, as illustrated in Figure 4, uses a brass nut and a separate plastic ferrule. When using the second type of compression fitting with the supplied plastic tubing, the brass ferrule must be removed and replaced with the supplied plastic ferrule (see Figure 4).



**PLASTIC COMPRESSION NUT CONNECTION (FIGURE 3)**



**BRASS COMPRESSION NUT  
(FIGURE 4)**



**JG PUSH TYPE TUBE CONNECTION  
(FIGURE 5)**

The third type of connection, as illustrated in Figure 5, is connected by simply pushing tubing fully into release ring. The tubing is now locked into place. Make sure to push the tubing all the way in, or leakage will occur. To disconnect the tubing, push tube into body and hold release ring against body while pulling tube out.

### **TAP WATER FEED ASSEMBLY INSTALLATION (FIGURE 6)**

1. Locate the cold water shut off valve on the cold water line under your sink. If you are not sure which is the cold water line, turn on the hot water for a few minutes and feel the pipes.

#### **DO NOT INSTALL FEED WATER ASSEMBLY ON THE HOT WATER LINE.**

2. Use shut off valve to turn off cold water supply and then drain line by opening sink faucet. Some mixing type faucets may require that the hot water be shut off as well. If no shut off valve is installed under your sink, shut off main water valve during this installation.

3. Turn the valve handle on the tap water feed assembly counter-clockwise so that the piercing needle is fully retracted. (Figure 6)

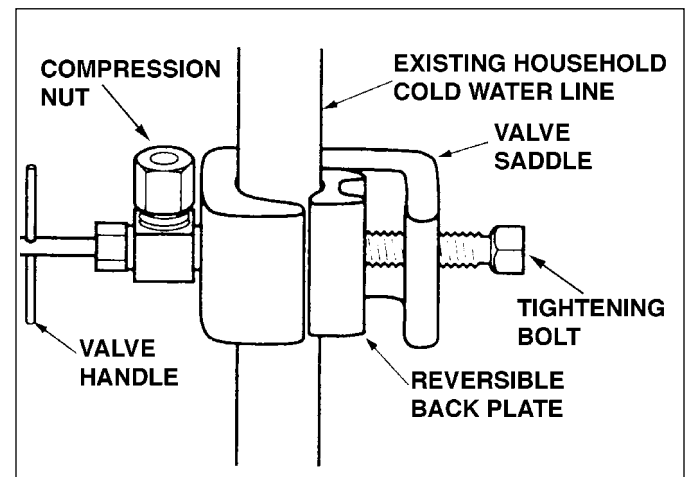
**NOTE:** The self-piercing valve may also be used on 3/8" or 1/2" galvanized steel pipe or on plastic pipe. Pre-drill the feed hole with a 1/8" bit and attach the valve as described

above. Be sure to center the valve so that the piercing needle fits exactly into the pre-drilled hole.

4. Attach valve saddle to cold water line. The loose backplate is reversible for use on either 3/8" or 1/2" pipe. (For installation on 1/2" pipes, the reversible plate must be slipped into saddle from the top or bottom after saddle is in place).

5. Tighten bolt finger-tight and then 1/4 turn more with a wrench. Do not overtighten or flatten water line.

6. Turn valve handle clockwise until it "bottoms out" to pierce the water line and close the valve. Note: Do not open saddle valve handle until entire installation has been completed. Use the plastic ferrule for this assembly, not the brass when connecting red tubing from the pre-filter. Put compression nut on tubing behind ferrule and tighten. Remember to put the insert in the tubing for support. The brass ferrule will not be needed.



**SELF-PIERCING TAP WATER FEED  
ASSEMBLY (FIGURE 6)**

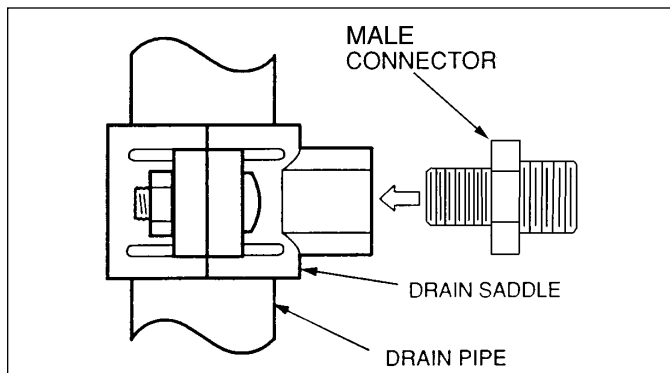
7. Turn on cold water shut off valve to check installation for leaks. Allow water to run from sink faucet for a few minutes to clear any debris in the line caused by installation.

### **DRAIN OUTLET ASSEMBLY INSTALLATION (FIGURE 7)**

The drain outlet assembly should be installed on a straight length of drain pipe between the "P" or "S" trap and the sink. If possible, orient the hole to be drilled toward the desired location of the drinking water faucet. Installation should be as far away as practical from garbage disposal. If you have a double sink, install drain outlet on the sink drain opposite to the disposal.

1. Position drain outlet saddle on drain pipe. Position pad between pipe and inside of drain saddle. Allow adequate space for drilling operation. (Figure 7)

2. Tighten saddle bolts evenly on both sides. Avoid over-tightening.
3. Using the opening in the drain outlet saddle as a guide, drill a 1/4" hole in the drain pipe.
4. Screw the male connector into the threaded opening in the saddle and hand tighten until snug. Make sure end that screws into saddle has plumbers tape. The ferrule nut included with the drain saddle will not be needed. Use the nut supplied with the connectors.



**DRAIN OUTLET ASSEMBLY  
(FIGURE 7)**

### FAUCET LOCATION

Note: If your sink area already has an unused opening of at least a 1-1/2" diameter that is suitable for the faucet, proceed to instructions for faucet installation.

Check desired location for the faucet to be sure that there is at least a 2" flat surface on the top and the underside. The faucet nipple must be accessible from below when the hole is completed. Once this is done, follow the hole drilling instructions listed below that match the sink or countertop composition.

### ATTACHING TO AUTOMATIC ICEMAKER

This system can be installed to supply R/O water to automatic icemakers by putting a tee in the blue line that connects to the faucet. Due to the aggressive nature of R/O water, the line to the icemaker should be a plastic line.

### ENAMEL OVER STEEL OR CAST IRON SINK

1. Use a 1/4" masonry or metal cutting drill bit to drill a pilot hole at center of desired location. Before drilling, firmly apply downward pressure on enamel with bit until you hear a slight crunching. This will fracture a small area of the enamel and prevent the bit from walking.
2. The faucet hole should be completed by using a 1-1/2" hole saw (Fig. 8) to cut through the enamel and the underlying metal. Drill through the enamel slowly using only a light pressure to avoid heat build-up that can crack the enamel. When cutting through the metal, use a firm, steady pressure but be careful not to "bottom out" on the enamel

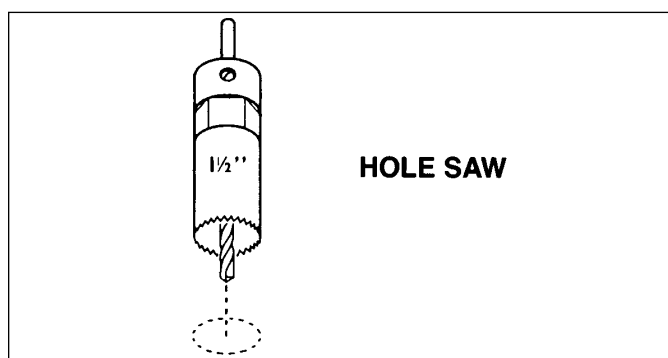
when the bit goes through the sink.

3. WHEN HOLE IS COMPLETE, REMOVE METAL CHIPS FROM THE SINK. METAL CHIPS WILL STAIN ENAMEL VERY QUICKLY WHEN WET.

4. Remove any burrs with a round file.

### STAINLESS STEEL SINK

1. Use a nail or center punch to make a small indent to mark center of desired location.
2. Drill a pilot hole with a 1/8" metal cutting bit and then enlarge with a 1/4" bit.
3. Complete hole using a 1-1/2" hole saw (Fig. 8) or a drill bit. Remove any burrs with a round file.



**HOLE SAW (FIGURE 8)**

### FORMICA OR WOOD COUNTERTOP

Drill hole at desired location using a 1-1/2" hole saw or a flat spade wood bit.

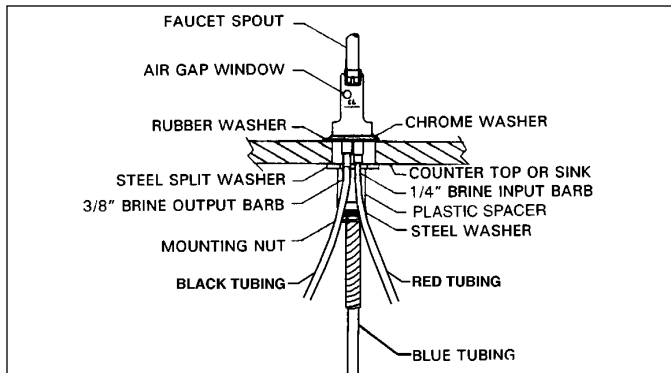
### TILE COUNTER TOP

1. Drill through tile using procedure described above for cutting through enamel or an enamel over metal sink.
2. Complete hole by drilling through the underlying wood support using a 1-1/2" hole saw or flat spade wood bit.

### FAUCET INSTALLATION (FIGURE 9)

1. Lower faucet tubing connections down through previously drilled counter top hole.
2. Loosen mounting nut (Figure 9).
3. Place chrome washer and rubber washer on base of faucet. (See Figure 9).
4. Place plastic spacer, steel washer, steel split washer and mounting nut on faucet as shown in Figure 9.
5. Tighten mounting nut to secure faucet on counter top, making sure all feed lines and the faucet stem are below the counter top hole.

- Remove piece of tubing from spout hole and secure faucet spout in place.
- Connect 3/8" tubing to the male connector on the drain saddle, using the ferrule nut provided on the connector. Make sure this black tubing leads straight down to the connector with no kinks or areas where water will flow upward. Cut the tubing if necessary. Connect the red tubing through the membrane clip to the drain restrictor. Connect the blue tube to the push type connection on the post-filter. See Figure 2.



**FAUCET INSTALLATION (FIGURE 9)**

## INSTALLING THE R/O MODULE AND STORAGE TANK

- Position the R/O module and storage tank under the sink. The R/O module must be mounted horizontally, while the tank can be placed in either a vertical or horizontal position.

Note: The R/O module will require service at least every 12 months for replacement of pre and post filter cartridges so leave enough room for service.

- If R/O module is to be hung on a wall, drill two 1/8" holes approximately 16" above the cabinet baseboard and 5-13/16" apart. Use screws to hold module in place.
- Before installing tank check the tank air pressure precharge with a gauge. The tank precharge is factory preset at 5 to 7 psi when empty. For this reason tanks should be positioned so that the air valve is accessible. Remove the black air cap to make pressure check. Tank must be empty of water when making air check. Plumbers tape should be applied to tank threads on the inlet at the top of the tank. The storage tank valve included in the bag of parts should be screwed on at the top of the tank. Connect the yellow tube to the valve.

## SYSTEM START-UP

- Slowly, open needle valve allowing raw water to enter the system. Check for leaks!! Make sure needle valve is opened completely when finished.
- Slowly move valve lever on storage tank to open (parallel to tube) position. Check for leaks!!

- Allow system to run while cleaning up tools.
- Check all connections, including those on the unit, for leaks!
- The system's storage tank has been sanitized at the factory. To activate the sanitizing agent, allow the tank to fill for 6 hours or longer and then drain system by opening the system faucet until the tank is empty. After tank fills again, there may be some residual chlorine taste due to the sanitizing agent. The second tankful should be drained as well and allowed to fill for the third time before drinking.

**CAUTION** It is very important that two tankfuls of water be made and drained before drinking, or sickness may occur from the preservative in the membrane.

NOTE: Water may appear black when water first comes out of the faucet. This black water is carbon particles from the post filter. They will go away after the first flushing of the system.

## USING AND CARING FOR THE R/O WATER TREATMENT SYSTEM

The drinking water appliance will function with little attention for several months. The following tips will assure maximum performance and use from the system.

- The system is most efficient when it is used frequently. The clean, good tasting water it provides should be used for all consumable such as coffee, tea, juice from concentrates, soup and ice cubes.
- Water from the system may be stored outside of the tank in any clean container for household purposes when room temperature water is desired. This would include use for steam irons, humidifiers, household plants, pets and aquariums.
- IMPORTANT** ABOUT ONCE A MONTH, COMPLETELY DRAIN THE STORAGE TANK. This will help the system operate more efficiently, especially if the normal water usage is less than 1 gallon per day. If drained just before bedtime, the system will fill the storage tank again by morning. To drain the storage tank open the system faucet fully and let the water run until the water flow is dripping. Close the faucet.
- The module assembly should continue to remove 80 to 90% of the total dissolved solids (TDS) in the tap water for 1 year or more. Many different combinations and concentrations of impurities occur in tap water. Therefore, it is best to replace the membrane annually.

- The membrane module assembly includes a check valve and a restrictor valve. These should be replaced when low product water flow or low rejection rates are

encountered and the other system components are functioning properly.

6. The carbon post filter cartridge should be replaced least once every 12 months or if an unpleasant taste or odor returns to the water. The sediment pre-filter cartridge should be replaced every 12 months or when filter becomes excessively loaded with sediment particles. Filter cartridges are replaced by unscrewing the filter housings with the filter wrench provided. Replacement membranes, filter cartridges and the check valve/restrictor kit may be purchased from your local dealer. Instructions are included with replacement parts.

NOTE: When replacing the above components of the unit, shut off the systems water flow by closing the valve on the tap water feed assembly, close the storage tank valve and open the system faucet.

After replacement components are installed open the tap water feed valve and the storage tank valve. Allow the tank to drain completely by opening the system faucet.

Close the system faucet and allow the storage tank time to refill with fresh R.O. water.

7. Sanitizing the R.O. Unit

The best time to sanitize an RO unit is when the pre-filter/post-filter and membrane are to be replaced. Use the following as a guide.

- A. Depressurize unit by shutting off inlet saddle valve.
- B. Open faucet and allow all water to drain. (Tank valve open.)
- C. Remove pre- and post- filter housings and drain water from them.
- D. Pour 1/2 cup of Clorox bleach into each housing and reinstall without filters inside.

E. Remove membrane from housing and reconnect unit without membrane inside.

F. Turn on inlet saddle valve and run water thru system, allowing tank to fill. Shut off tank valve; open faucet until chlorine odor is detected and then shut off faucet.

G. Allow unit to sit undisturbed for 2 hours.

H. Open tank valve and system faucet, allowing system to flush itself until no chlorine odor is detected.

I. Depressurize unit once again (following steps 1 & 2.)

J. Install cartridges & membrane.

K. Open saddle valve to activate system.

L. Let system fill storage tank with RO water and then empty tank; approximately 6 hours.

M. Repeat tank flushing once more, and system will be ready for use.

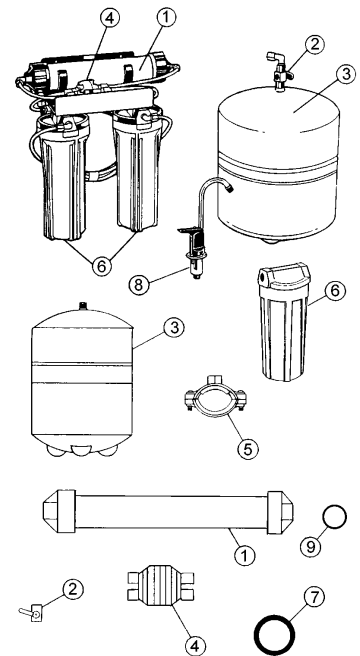
**STORING SYSTEM FOR EXTENDED PERIODS**

When the system will not be used for long periods of time (not recommended) such as in the case of a summer home, the life of the membrane will be greatly affected. It is suggested that a fresh membrane be installed at the start of each season, but the membrane life can be maximized during storage in the following manner:

Shut off water supply and storage tank valve. Release pressure by opening faucet. Remove entire membrane housing by removing the tubing from the three connections on the membrane housing. Put membrane housing in airtight container such as a ziploc bag and store in refrigerator. To reactivate the system, reinstall membrane housing and follow system start up procedures.

**REPAIR PARTS - REVERSE OSMOSIS SYSTEMS  
343-0005 CTA MEMBRANE**

ITEM	PART NO.	DESCRIPTION
1	136259	Housing, Membrane, Less Fitting
2	136829	Valve, Storage Tank
3	136830	Storage Tank
4	138569	Shut Off Valve
5	136833	Clamp, Drain Line Connector
6	136834	Filter Housing
7	136835	O-Ring, Filter Housing
8	136579	Faucet
9	139484	O-Ring Membrane Housing
THE FOLLOWING ITEMS ARE AVAILABLE BUT NOT SHOWN		
	136321	Check Valve
	136322	Flow Restrictor
	10-1373	CTA Membrane
	10-1371	Pre-Sediment Filter Cartridge
	10-1372	Post-Carbon Filter Cartridge
	138566	1/4" x 1/4" Male Branch Tee
	138565	1/4" x 1/8" Quick Connect Elbow
	138564	1/4" x 1/4" Quick Connect Elbow



## TROUBLESHOOTING CHART

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
<b>NO WATER</b>	<ol style="list-style-type: none"> <li>1. Tank improperly pressurized</li> <li>2. Water supply turned off</li> <li>3. Low water pressure (40 PSI min.)</li> <li>4. Pre-filter clogged</li> <li>5. Module damaged or clogged</li> <li>6. Product line crimped</li> <li>7. Post-filter clogged</li> <li>8. Ball valve closed on storage tank</li> <li>9. Check valve/restrictor valve clogged</li> </ol>	<ol style="list-style-type: none"> <li>1. Set tank pressure at 5-7 PSI when empty</li> <li>2. Turn on</li> <li>3. Call dealer for assistance</li> <li>4. Replace</li> <li>5. Replace</li> <li>6. Remove crimp</li> <li>7. Replace</li> <li>8. Move valve to up position</li> <li>9. Replace</li> </ol>
<b>SLOW FLOW THROUGH FAUCET</b>	<ol style="list-style-type: none"> <li>1. Post-filter clogged</li> <li>2. Low air in holding tank</li> <li>3. Pre-filter clogged</li> <li>4. Low water pressure (40 PSI min.)</li> <li>5. Check valve/restrictor valve clogged</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Raise pressure to 5-7 PSI when empty</li> <li>3. Replace</li> <li>4. Call dealer for assistance</li> <li>5. Replace</li> </ol>
<b>LEAKING MODULE HOUSING</b>	<ol style="list-style-type: none"> <li>1. Threaded end cap leak</li> <li>2. Compression fitting leak</li> <li>3. Leak at screw cap</li> </ol>	<ol style="list-style-type: none"> <li>1. Lube o-ring and tighten</li> <li>2. Tighten, apply Teflon tape, or replace</li> <li>3. Replace o-ring if damaged</li> </ol>
<b>LEAKING POST-FILTER</b>	<ol style="list-style-type: none"> <li>1. Leak at compression fitting</li> <li>2. Leak at post-filter seam</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten, apply Teflon tape, or replace</li> <li>2. Replace</li> </ol>
<b>LEAKING FAUCET</b>	<ol style="list-style-type: none"> <li>1. Fitting leak</li> <li>2. Leak at base or brass barbs</li> <li>3. Faucet drips</li> <li>4. Overflow at air gap</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten or replace</li> <li>2. Replace faucet</li> <li>3. Install faucet repair kit</li> <li>4. Shorten 3/8" line from faucet to drain connection Clean 3/8" line from faucet to drain connection</li> </ol>
<b>BAD TASTE</b>	<ol style="list-style-type: none"> <li>1. Defective membrane</li> <li>2. Restriction in waste flow</li> <li>3. Carbon post-filter</li> <li>4. Growth in tank</li> <li>5. Low water pressure (40 PSI Min.)</li> <li>6. Check valve/restrictor valve clogged</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Clear</li> <li>3. Replace</li> <li>4. Sanitize</li> <li>5. Call dealer for assistance</li> <li>6. Replace</li> </ol>