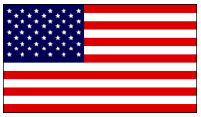
OPERATING MANUAL

Reverse Osmosis Equipment
Model: Compact - II



Made in U.S.A.

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SAFETY INSTRUCTIONS

1) Read this manual before installing system.

2) Electrical connection must be made by a licensed electrician or qualified person that can make all connections to code.

3) Check that the proper-sized breaker(s) is used to prevent possible fire risk. This R.O. system must be grounded.

4) All water connections must be made by a licensed plumber.

5) Make sure that all electrical connections will not become exposed to water in case of leaks or possible rupture in water lines due to pressure spikes, possible component failure, etc.

6) Give the area around the system plenty of room for servicing and general maintenance. Allow for plenty of ventilation in the room where the system is placed. Some installations may have to be made where the system is placed outside. If installed outside, it is advisable to construct a small box around the system to protect it from the elements.

7) The water supply must be turned off before servicing.

INSTALLATION GUIDELINES AND REQUIREMENTS

ELECTRICAL REQUIREMENTS: A label identifying the voltage requirement is affixed to the junction box where the power cord is located. The voltage will be either “220v or 110v” and “50HZ or 60HZ, single-phase”.

WATER SUPPLY: A minimum of a 1/2" copper or PVC pipe leading close to the R. O. System as possible. From there, feed line requirements to the system vary depending on system size:

- 150, 250, 450 gpd models have 3/8" FPT connection.
- The 800 gpd model has 1/2" FPT connection.

DRAIN: The drain for R. O. waste water can be one of the following:

- Floor sink
- Standard household or commercial ABS drain line (accessible)
- Leach field - used only if local laws allow waste discharge from an R. O. to be drained into a leach field.

FEED WATER CONDITIONS: In order to operate efficiently, the conditions of the feed water must be:

- Turbidity free
- Silica level @ 50 ppm maximum
- Iron level @ .05 maximum
- Free of hydrogen sulfide
- Feed water temperature 85^{o}F maximum
- Feed water pressure 40 - 80 psi
- Operating pressure 200 psi maximum
- pH range 3 - 11
- Feed water TDS 2,000 ppm maximum. If levels are higher than 2,000, consult the factory for possible system design changes.

R. O. SYSTEM INSTALLATION

The following is a typical installation procedure for installing the R. O. System in a normal application. There may be other procedures for installing the R. O. System, since the application varies for R. O. system use (such as pre-treatment, post-treatment, reclaim and processing). Consult factory if there are any special circumstances for installation.

Decide where the R. O. System is to be placed, keeping in mind that sufficient space is available to service the system. There must be ample space around the system for heat dissipation from the motor. A drain must be accessible. Feed water must be accessible. Electrical supply must be available.

ELECTRICAL REQUIREMENTS:

- 110v: The R. O. System uses very little current for operation. If designed for 110v power supply, the R. O. System can be plugged into any household outlet receptacle.

- 220v: If the R. O. System was specified to be built for a 220v power supply, you will need to supply your own 220v plug (can be purchased at a local hardware store or electrical parts supplier). Install the 220v plug onto existing power cord of the R. O. System.

- Have a licensed electrician run conduit for a power supply and connect to the R. O. System, if the system is to be hard-wired.

FLOAT SWITCH CONNECTION (optional)

- The float switch (if supplied) is a non-mercury style liquid-level switch. The switch is supplied with a piggy back plug.

  For 110v power requirements, the R. O. System plugs directly into the piggy back plug of the float switch. The other side of the piggy back plug to plug into 110v outlet. Instructions are supplied by the manufacturer of the float switch.

  For 220v power requirements, the piggy back plug must be cut-off of the float switch cord. Then, follow the instructions supplied by the manufacturer of the float switch.

FEED WATER CONNECTION: The feed water fitting is to be supplied by the installer. The connection is made at the inlet of the pre-filter.

- Models 150, 250, 450 gpd R. O. Systems have 3/8" FPT.

- The 800 gpd R. O. System has 1/2" FPT connection.

NOTE: If there is a considerable distance from the R. O. System to feed water supply, it is best that 1/2" copper or PVC is used to bring the water supply as close to the R. O.

System as possible. This will help eliminate a potential cycling problem due to insufficient water pressure or volume supplies. Make sure that a shut-off is located at the end of the piping for turning off water supply to the R. O. System.

DRAIN CONNECTION

- Use 3/8" polyethylene tubing from drain (waste) water connection on the R. O. System to drain. Make sure that a tubing insert is used as a tubing support. CAUTION: Failure to use polyethylene tubing can result in possible leaks. Refer to drawing for more details on drain fitting.

- Connect drain (waste) line according to local codes if using a floor sink.

- A drain saddle may be used if connecting drain line to a typical sink drain.

- The drain (waste) water from the R. O. System should not be elevated more than necessary (maximum 10 feet). If drain line is elevated, use a 2 PSI, or less, check valve so the waste water does not return back to the R. O. System. This will help prevent contamination, in case of sewage back-up.

PRODUCT WATER CONNECTION
(pressurized or atmospheric storage “open storage”)

- Use 3/8" polyethylene tubing from R. O. System to storage tank. Make sure a tubing insert is used as a tubing support. Install into tubing and tighten. CAUTION: Failure to use polyethylene tubing can result in possible leaks. Refer to drawing for more details on product fitting.

PRODUCT WATER CONNECTION - pressurized storage:

If the R. O. System was purchased with pressure switch operation, the system will be set-up for that purpose. When the pressure in the product water line reaches 50 PSI (or field re-adjusted pressure setting), the product pressure switch on the R. O. System will turn the R. O. System off. It will then turn back on when the pressure in the product water line drops to approximately 20 PSI, re-filling the pressurized storage tank. When using a pressurized storage tank (bladder tank), make sure that the tank is approved for reverse osmosis or purified water use. The diaphragm pressure should be set to about 15 PSI. IMPORTANT: Some tanks are supplied with galvanized inlet fittings. These galvanized fittings will deteriorate when subjected to reverse osmosis or purer waters. Replace these fittings with PVC.

Use a T-connection on the pressurized tank. One side of the T-connection will be connected with polyethylene tubing from product water of the R. O. System. The other side of the T-connection will be used as a connection to P.O.U. (Point Of Use) after post-filtration. It is advisable to install a ball-valve on the tank connection to shut-off water flow coming out of the tank, in case of emergency or service. CAUTION: Failure to use polyethylene tubing can result in possible leaks.

PRODUCT WATER CONNECTION - Atmospheric (open) storage

If your R. O. System was purchased for float switch operation, there will be a float switch supplied for this operation. Read all instructions regarding this float switch for proper set-up and understanding of float switch operation. If you do not use the float switch provided, the R. O. System will not turn off and will overflow the storage tank, causing flood damage.

When using an atmospheric storage tank, connect 3/8" polyethylene tubing from product connection to the upper portion of tank. Use a bulkhead (tank adaptor) for making this connection. Make sure that the connection is not higher than float switch shut-off level. Follow directions enclosed in float switch carton for operation. CAUTION: Failure to use polyethylene tubing can result in possible leaks.

NOTE: Installation connections such as feed water, tank adaptors, tank fittings, 220v electrical plugs, drain clamps, polyethylene tubing, and misc. accessories are not included with the R. O. System due to many types of installations. These are common items found at your local hardware or electrical supply store.

SYSTEM PRE-START AND START CHECK LIST

After the R. O. System connections have been made, including the post-treatment and dispensing mechanism, a Checklist has been provided to review that all required steps have been followed:

_____ Feed water connection has been made and secured.

_____ Drain connection has been made and secured.

_____ Product from R. O. System has been made to storage tank and secured.

_____ Float switch (if applicable) is installed into tank, adjusted and secured.

_____ Post-treatment installed, plumbed, and secured, including faucet and post-filters.

_____ Necessary shut-off valves installed on feed water supply, storage tank, etc., and turned-off.

_____ Install pre-filters into the R. O. System in order, according to the R. O. System diagram.

_____ Turn water supply on from feed water connection and check for any leaks on all pre-filters for the R. O. System.

_____ Connect R. O. System to electrical supply and turn power on. At this time, the inlet solenoid valve will open and allow water to enter into the pump. After the pressure stabilizes throughout the R. O. System, it will start to run. The R. O. System may start and stop a few times. If the R. O. System continues to start and stop, disconnect power and refer to the trouble shooting guide.

_____ When the R. O. System continues to run, observe system pressure gauge. If the pressure exceeds 200 PSI, adjust the pressure relief valve located on the pressure pump. ***200 PSI MAXIMUM***. If your R. O. System has been equipped with an automatic hourly flush feature, pressure adjustments must NOT be made during flushing cycle. Adjustments must now be made to the waste and recycle valves.

When adjusting the waste and recycle valves, the system pressure and waste flow rates must be monitored.

TO ADJUST VALVES (with optional flow meters):

1. Note system pressure

2. Note waste flow rate.
3. If the system pressure is low, slowly close waste valve to increase pressure. In doing so, the waste flow rate will drop. DO NOT EXCEED 200 PSI.

4. If the flow rate to waste is too low (depending on desired recovery rate), the waste valve must be opened a little.

The recycle valve can now be closed slowly to increase system pressure. DO NOT EXCEED 200 PSI. Check the waste flow rate again to make sure desired recovery rate is correct.

TO ADJUST VALVES (without optional flow meters):

1. Same as above, but the waste flow must be monitored manually. To do this, use a container which has capacity markings to catch the waste water. Calculations must be made for a 24/hour period. This will indicate the total for the waste flow. Use this method to determine desired recovery rate.

Recovery rate is the amount of total water used, divided into good water produced. Example:

150 gpd product flow and 300 gpd waste flow equals:	450 total gallons
150 gallons divided by 450 gallons equals:	33 % recovery

It is not suggested to obtain more than 33 % recovery if there is no pre-treatment used in front of the R. O. System, such as water softener, antiscalant injections, etc.

If proper pre-treatment is in place, or the water conditions allow, a 50 % recovery could be set.

_____ Check to ensure water is running to drain.

_____ Check product pressure shut off.
If pressurized storage tank application, turn off valve at pressurized storage tank and dispensing faucet. At this time, pressure will begin to build. The R. O. System should shut off after a while. The gauge on the front panel is used to check system ON and OFF pressures. The product water must fill all post-treatment and associated lines. This will determine how long it will take to pressurize and shut-off the R. O. System. Water should discontinue to run to storage tank and drain. Once the R. O. System shuts off, check all post-treatment water lines, filters, etc. Storage tank pressure can be increased (instructions located inside pressure switch cover), but DO NOT EXCEED 80 PSI turn off pressure.

_____ If atmospheric storage tank application, allow the R. O. System to run. Raise float switch inside the storage tank and check for system shut-off.

Water should discontinue to run into tank and drain line.

_____ Turn storage tank shut-off to the ON position.

_____ Turn off feed water supply and check the R. O. System for low water pressure shut-off. Make sure the R. O. System stays turned off when water supply is interrupted. If the R. O. System turns off and on too long, the low pressure switch must be set for a higher setting. Adjustment instructions are inside low pressure switch cover.

_____ Turn water supply back on.

_____ Instruct customer about all shut-off valves and electrical disconnections. Also, tell customer that the storage tank will take some time to fill. Once storage tank is full, the post-filter should be rinsed before using the water.

GENERAL MAINTENANCE

- PRE-FILTERS: There are pre-filter-in and pre-filter-out gauges mounted on the front panel. These gauges measure the water pressure before and after the pre-filters. When there is a drop 10 - 15 psi difference of pressure readings between the two gauges, the pre-filters are getting clogged and must be changed.

- R. O. MEMBRANE: The quality of the product water should be checked periodically for rejection of total dissolved solids (TDS). When the rejection is below desired limit, the membrane should be changed or cleaned.

- PRESSURE SWITCHES: The operation of the pressure switches should be checked at least once a year for proper operation.

- PUMP: The single-stage vane pump and has carbon impellers to increase the water pressure. Over time, the impeller may begin to wear. Adjustments can be made to the pressure relief on the pump to bring the pump back to desired operating pressure. If the impellers are too worn, the pressure relief adjustment will have little or no effect on system pressure. If this occurs, the pump must be replaced.

ITEMIZATION OF COMPONENTS

(refer to front and back view image of system)

1) SYSTEM PRESSURE GAUGE: This gauge is liquid-filled with a range of 0-300 psi. It will register the pressure of water applied to the input of the membrane only while system is running.

2& 3) PRE-FILTER INLET AND OUTLET PRESSURE GAUGES: The two gauges on the pre-filters sense the pressure between the inlet and final pressure after passing through the pre-filters. When there is a pressure drop of 15 psi or more between gauge readings, the filters should be changed. The pre-filter in gauge will register a reading at all times. The pre-filter out gauge will register a reading only while system is running.

4) PRESSURIZED STORAGE PRESSURE GAUGE (if applicable): This gauge is used to monitor tank pressure. System product ON and OFF pressures can be set by viewing this gauge.

5) 20" CARBON BLOCK PRE-FILTER AND HOUSING: The carbon block filter is used before the membrane to remove the chlorine from the inlet water. TFC membranes used on this system are chlorine sensitive. Care must be taken to ensure that all chlorine is removed from the water supply. It is suggested that a ½ cu.ft. carbon filter is used on 800 gpd R. O. Systems to limit the frequency of carbon pre-filter change-outs.

6) 20" 5 MICRON PRE-FILTER AND HOUSING: The sediment pre-filter (rated at 5 micron) removes the dirt particles to 5 micron and larger. This filter helps extend membrane life.

7) INLET WATER CONNECTION: The feed water connection is made at the inlet of the sediment pre-filter. The fitting is to be supplied by the installer. Connection sizes 3/8" FPT or 1/2" FPT.

8) INLET SOLENOID VALVE: The inlet solenoid valve provides positive water flow shut-off when the R. O. system is not in operation.

9) LOW INLET WATER PRESSURE SWITCH: This switch registers the amount of inlet water pressure supplied to the R. O. pump. If the inlet pressure is too low, (below 10 psi) the pump will not start. This is a protection feature to extend pump life. This switch is rated for 30 amps

9) AUTOMATIC FLUSHING SOLENOID VALVE (optional): This is an optional feature to the R. O. System. Once an hour for two minutes, only during system operation, this valve opens. The drain flow is dramatically increased at this time. This increased flow rate helps remove any particles clogged in the membrane.

11) R. O. MEMBRANE AND HOUSING: The Thin Film Composite membrane removes up to 99%+ of the suspended solids. The membrane housing contains the R. O. membrane.

12) WASTE ADJUSTING VALVE: This valve restricts the flow of waste water exiting the membrane. It creates the necessary operating pressure in the membrane. CAUTION: This waste control valve should NEVER be closed completely. Recovery rates are determined by pre-treatment used and the type of water supply the R. O. System is installed on.

13) RECYCLE ADJUSTING VALVE: This valve takes a portion of the waste water

from the R. O. membrane and feeds it back into the inlet side of the pump. It is used to fine-tune and adjust the pressure of the pump.

14) SINGLE-STAGE ROTARY VANE PUMP: The pressure pump increases the inlet pressure and flow to the membrane. The increased pressure must not be more than 200 psi maximum. The pump is constructed of brass with carbon impellers.

15) PRESSURE RELIEF ADJUSTING SCREW: The pressure relief adjustment will increase or decrease the operating pressure of the pump. Adjustments with the relief valve should only be used when pump output flow decreases due to carbon impeller wear over time.

16) MOTOR: The motor turns the pump at 1725 rpm at a 60hz electrical supply and 1425 rpm at 50hz electrical supply. On 50hz electrical supplies, the operating pressure will be lower than 200 psi because the motor turns slower than the pump output specifications require.

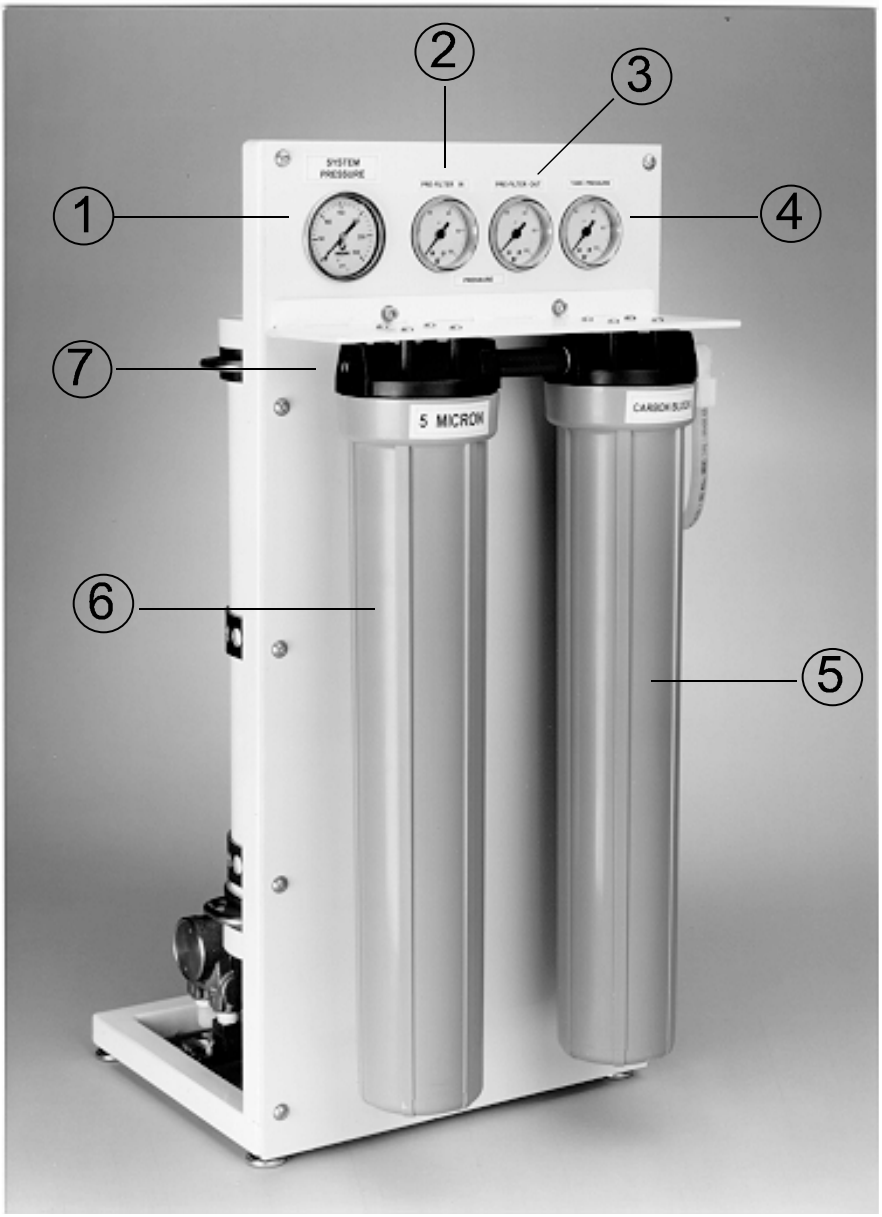
17) ELECTRICAL CORD (110v comes with plug, 220v without plug): The electrical cord is provided for connection to a power supply.

18) JUNCTION BOX WITH ELECTRICAL REQUIREMENTS AND RATING: A label is affixed to the junction box identifying voltage requirements. There should be no reason for removing this cover, unless any of the electrical components on this R. O. System is to be replaced.

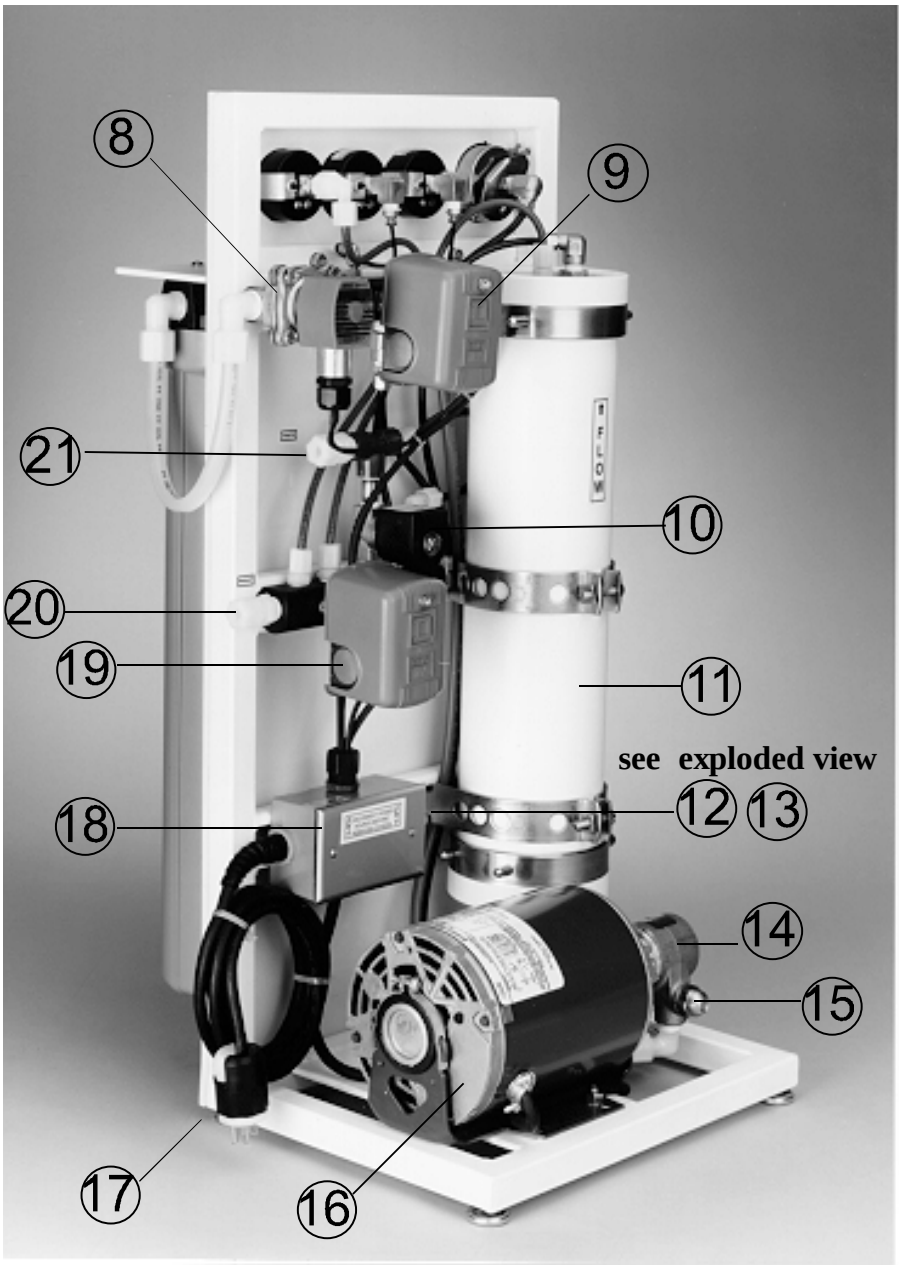
19) PRESSURIZED STORAGE TANK PRESSURE SWITCH: This pressure switch is standard and is necessary for pressurized storage tanks. It will allow the R. O. System to fill the pressurized storage tank until 45 - 50 psi is sensed by the switch and shuts off the R. O. System. This switch is rated for 30 amps.

20) PRODUCT OUTLET CONNECTION: This is where the product water comes out of the membrane. This water must be connected to the pure water storage tank. A plastic compression fitting is at this location that has a 3/8" OD dimension. MUST USE 3/8" POLYETHYLENE TUBING. Failure to use polyethylene tubing can result in possible leaks.

21) WASTE OUTLET CONNECTION: There must be water flowing across the membrane at all times during operation. There is a portion of water that is “de-salted”; what’s left behind is a concentrate. This concentrate must be directed to the drain at a certain flow rate. This flow rate is adjusted with the waste valve. This valve must NEVER be completely turned off. Damage to the membrane will occur. A plastic 3/8" compression fitting will make the connection to drain. MUST USE 3/8" POLYETHYLENE TUBING. Failure to use polyethylene tubing can result in possible leaks.

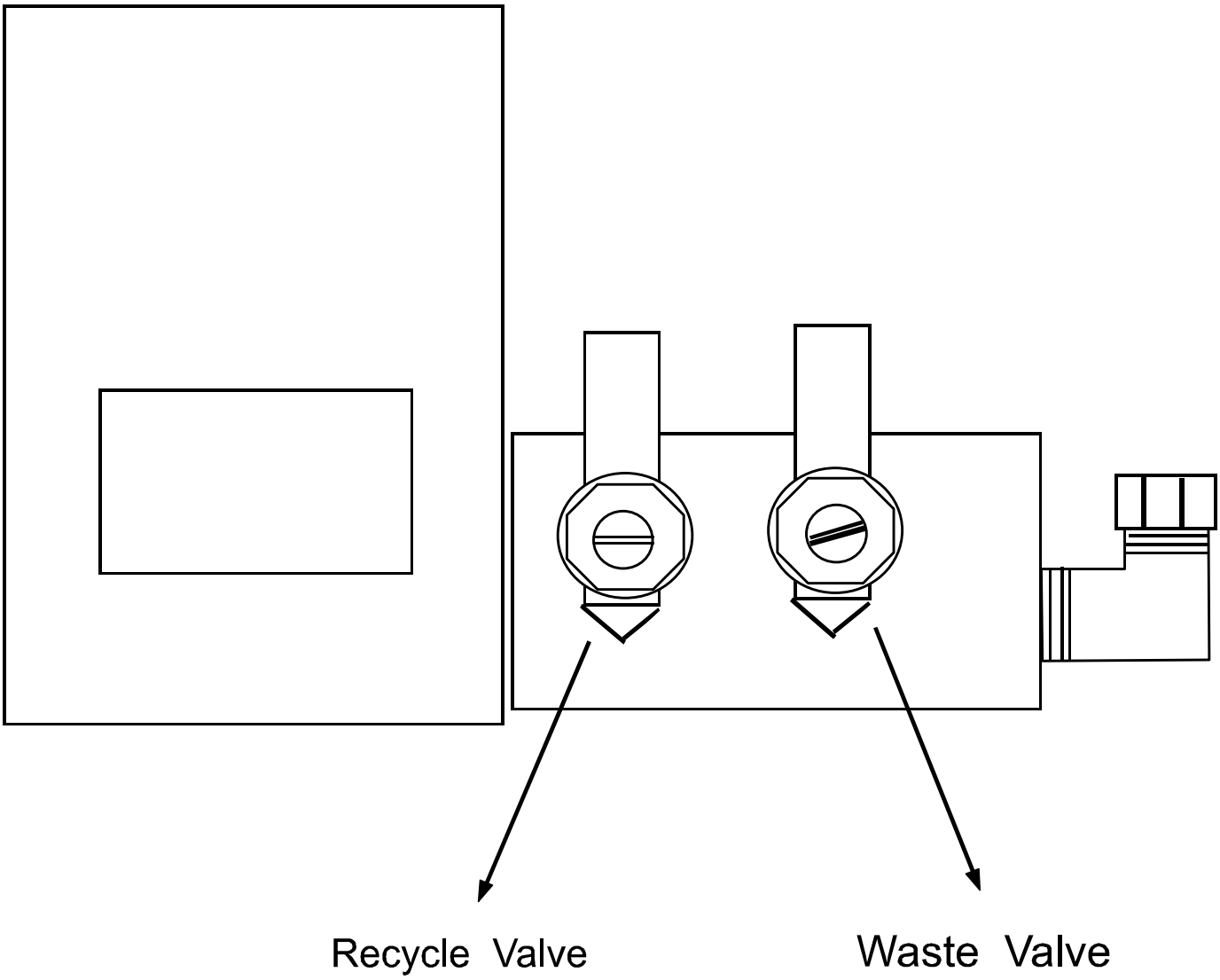


COM-II (front view)

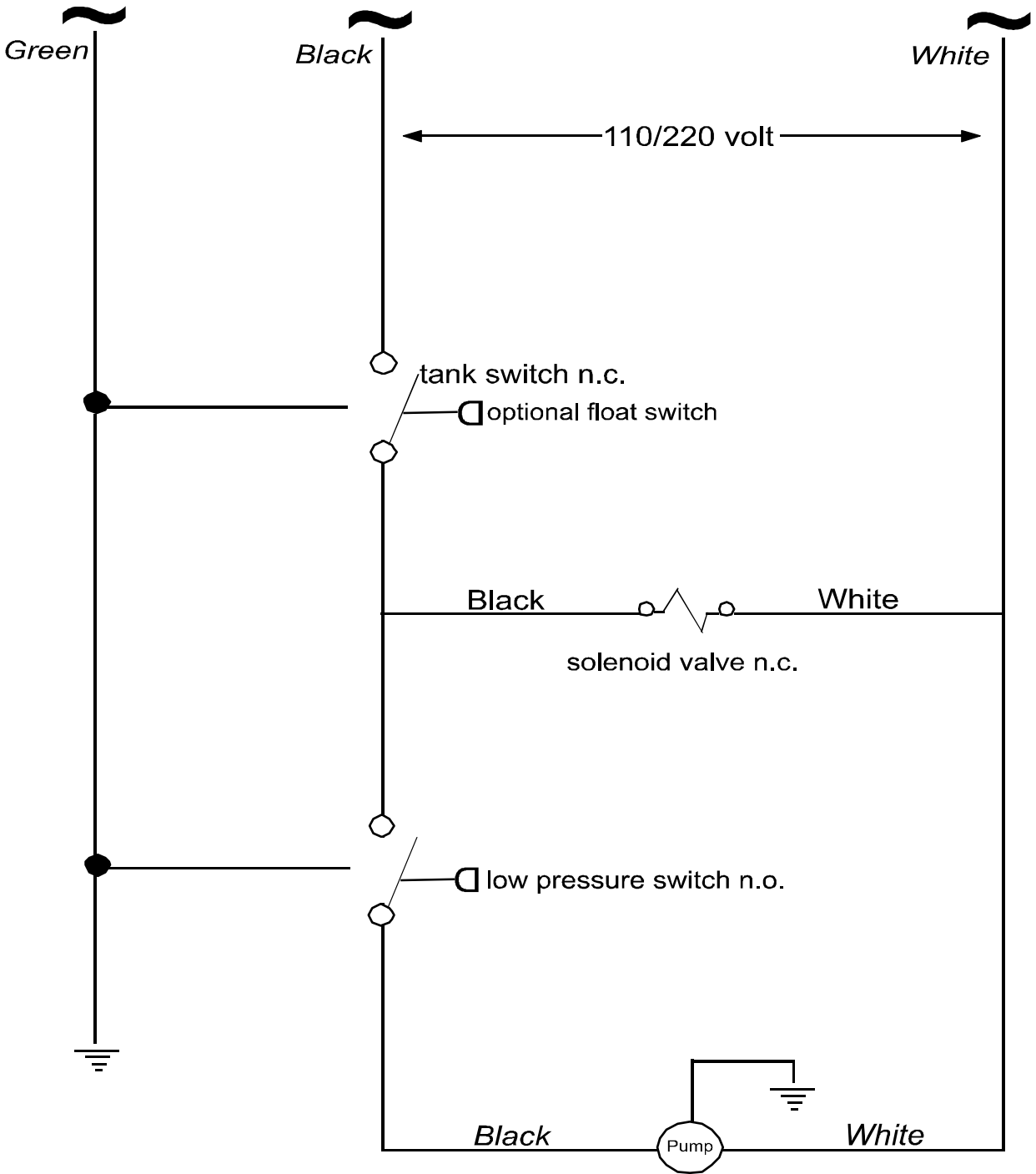


COM-II (back view)

Item #12 & #13



COM & COM-II WIRING DIAGRAM



TROUBLE SHOOTING GUIDE

SYSTEM NOT STARTING	1) Check power supply to system 2) Inlet solenoid non-functional 3) Pre-filter clogged 4) Low pressure switch defective 5) Not enough water pressure (must be at least 15 psi) 6) Defective motor 7) Product pressure switch non-functional
SYSTEM NOT TURNING OFF WHEN TANK IS FULL	1) Defective product pressure switch
SYSTEM CYCLING ON AND OFF	1) Clogged pre-filters 2) Malfunctioning low pressure switch 3) Defective product check valve
SYSTEM NOT UP TO FULL PRESSURE (175-195 psi)	1) Defective pump 2) Defective flow control
FOUL TASTE OF PRODUCT WATER	1) Defective membrane 2) Check carbon post-filter