

# HT2000

## Operation Manual



FOR ILLUSTRATION PURPOSES ONLY

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## UNIT SPECIFICATIONS

Model	DESIGN CONDITIONS				PLUMBING		ELECTRICAL			PLUMBING w/1.5" pump		ELECTRICAL		
	Permeate Flow GPD	GPM	Conc. Flow GPM	Design Recovery (%)	Inlet (Inches)	Outlet (Inches)	Voltage (AC)	Full* Load (Amps)	Control Voltage (AC)	Inlet (Inches)	Outlet (Inches)	Voltage (AC)	Full* Load (Amps)	Control Voltage (AC)
HT 2000	2,000	1.4	1.4	50%	1	1	110v	10	24	1.5	1.5	230v	9.5	24
HT 4000	4,000	2.8	2.8	50%	1	1	110v	10	24	1.5	1.5	230v	9.5	24
HT 6000	6,000	4.2	4.2	50%	1	1	110v	10	24	1.5	1.5	230v	9.5	24
HT 8000	8,000	5.6	5.6	50%	1	1	110v	10	24	1.5	1.5	230v	9.5	24
HT 600	600	0.42	0.42	50%	.5	.375	110v	<1	24	N/A	N/A	N/A	N/A	N/A

\* Models with reclaim or boost pump installed may require a 20 amp dedicated circuit as a power supply

### Unit Operating Parameters

- Unit rated at: 77°F (25°C) at 500 PPM TDS operating at 80 psi (5.62 kg/cm<sup>2</sup>) pressure. Unit capacity changes significantly with water temperature. For higher TDS, a water analysis must be performed and could result in modifications to the unit.
- Minimum feed pressure to unit: 80 psi.
- Chlorine must be removed if present in feed water prior to RO with a carbon filter or with chemical injection.
- Feed water turbidity: less than 1 NTU; feed water Silt Density index (SDI) : 5 maximum. If exceeded, pretreatment with media filter recommended. All pretreatment equipment and SDI test kits are available from Puroserve.
- Capacity Basis: 24 hours/day

### Unit Design Notes

- Permeate Flow: indicates design flow rate from RO membranes as product water for use.
- Concentrate Flow: Water flowing to the drain. Concentrate flow is critical for proper unit operation. For proper concentrate flows, refer to unit design information above.



System pressure is a variable. It is important to adjust the pressure to get the correct permeate & concentrate flows. The exact value of the pressure is not important.



Permeate flow will increase at higher temperatures.

Feed Water Temperature		Correction Factor
C°	F°	
5	41.0	2.58
6	42.8	2.38
7	44.6	2.22
8	46.4	2.11
9	48.2	2.00
10	50.0	1.89
11	51.8	1.78
12	53.6	1.68
13	55.4	1.61
14	57.2	1.54
15	59.0	1.47
16	60.8	1.39
17	62.6	1.34

Feed Water Temperature		Correction Factor
C°	F°	
18	64.4	1.29
19	66.2	1.24
20	68.0	1.19
21	69.8	1.15
22	71.6	1.11
23	73.4	1.09
24	75.2	1.04
25	77.0	1.00
26	78.8	.97
27	80.6	.94
28	82.4	.91
29	84.2	.88
30	86.0	.85



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## OPERATING DOs AND DON'Ts

### Do:

1. Change the cartridge filter regularly.
2. Monitor the unit and, ideally, keep a monthly log.
3. Run the unit as often as possible on a continuous basis.

### Don't:

1. Permit chlorine in the feed water.
2. Shut down the unit for extended periods.
3. Close the throttle valve completely.
4. Operate the unit with insufficient flow.

## UNIT AUTOMATION

The unit will automatically turn on when the water level in the permeate tank reaches the mid level float, and will turn off when the water meets the high level float.

There are three (3) float switches on the unit:

- **High-level switch:** Signals when tank is full and shuts down the unit.
- **Mid-level float switch:** Signals when the tank is half empty and turns the unit on.
- **Low Level Bypass float switch:** Signals when the tank is nearly empty to bypass the RO system, passing city water through the plumbing system. The by-pass light on front panel will turn on.

### Example of Typical Start-up Sequence

1. The water level in the permeate tank drops to low level.
2. A solenoid opens to allow feed water into the unit.
3. Permeate and concentrate flows are determined by manual control of the concentrate valve.
4. Unit will continue to run until the water level in the tank activates the high-level float switch, at which point it will shut itself off.

## UNIT SHUT-DOWN

1. Shut off the water supply.
2. Turn off the main power disconnect. This removes all power from both the power and control enclosures.
3. If the unit is to be shut down for more than two weeks a membrane preservative should be used. Refer to the instructions for preserving the unit.
4. When the unit is restarted after an extended shutdown period, both permeate and concentrate should be diverted to the drain for at least thirty (30) minutes.

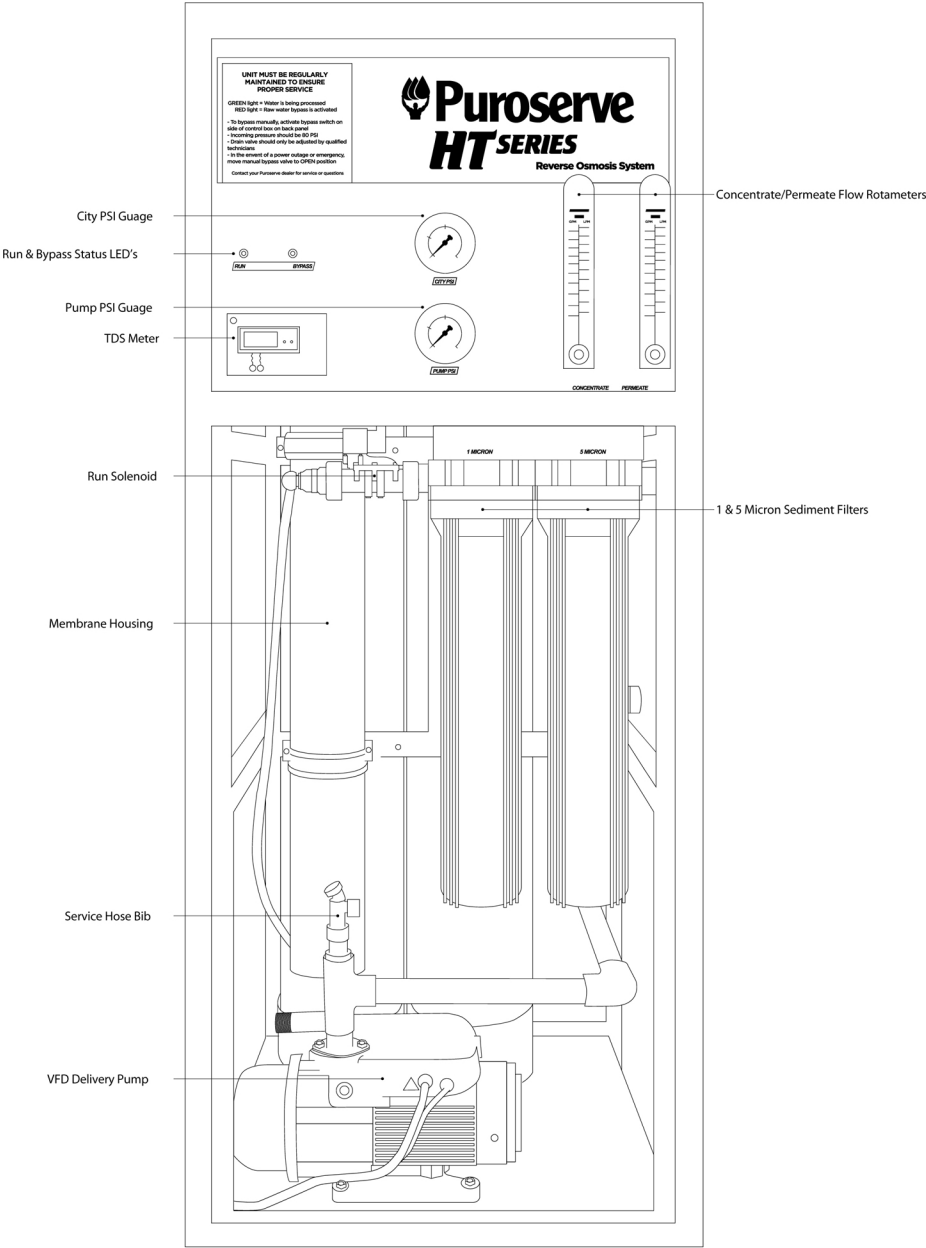
## UNIT MONITORING AND MAINTENANCE AND RECORD KEEPING

The unit should be monitored and all pertinent data recorded on a monthly basis. Data is needed to determine the operating efficiency and for performing unit maintenance, including cleaning of the membranes, adjusting the operating conditions, replacement of the membranes and antiscalant use. Use the unit logging form included in this manual.

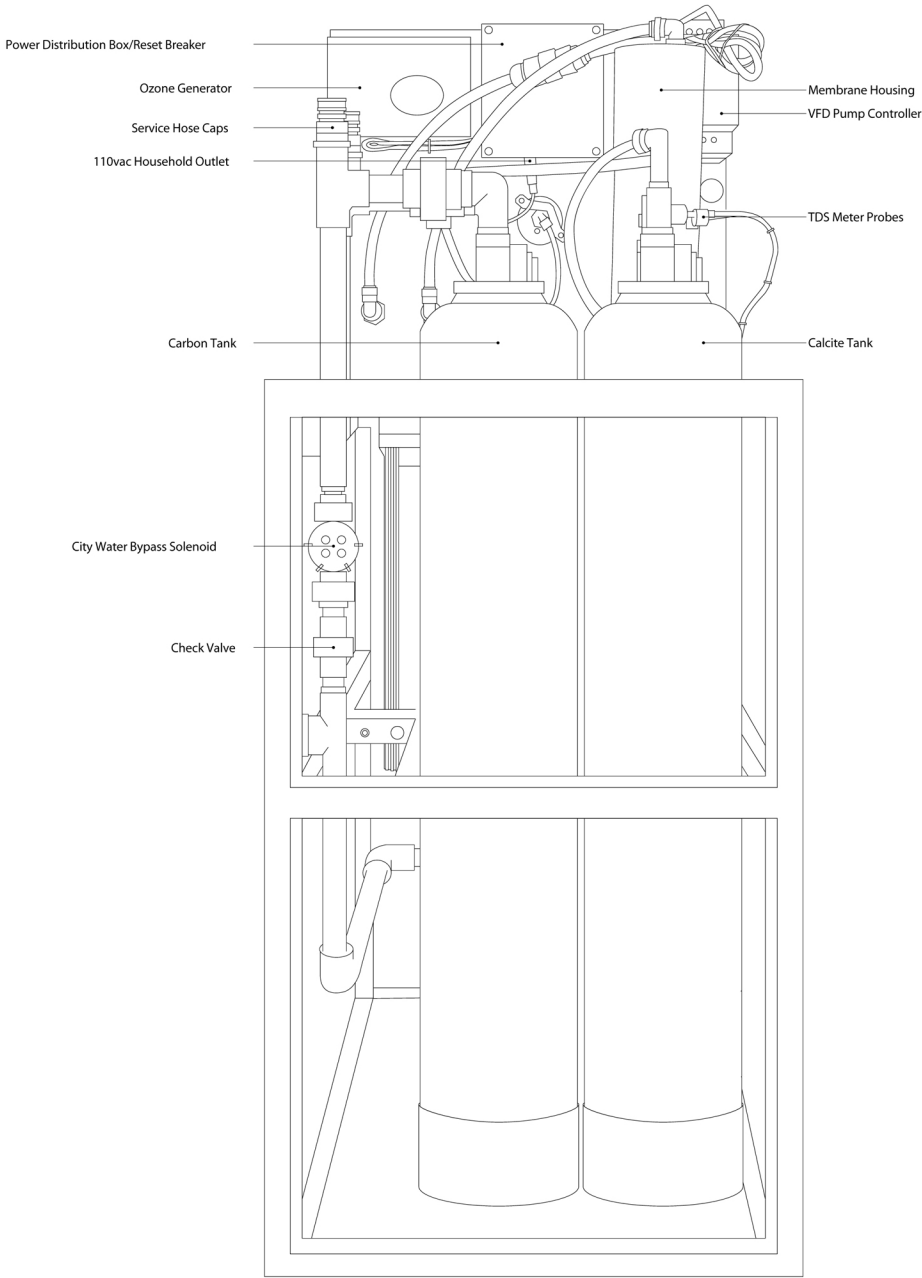
\*Membrane warranty claims cannot be processed without adequate operating data and history of the RO unit.

# HT Series Overview

Front View



Back View



## GENERAL INFORMATION & SAFETY

### Warning

Flush the system for at least 30 minutes before use to remove all chemicals present.

### Caution

Chlorine will damage the membranes. Chlorine must be removed from the feed stream before entering the system.

### Service Warning

To prevent electrical shock, disconnect power to the system prior to servicing.

### Warning

Do not make any alteration or modification in the wiring or plumbing of the system. This can result in damage to the system and cause injury to operators or users.

## SYSTEM INSTALLATION

### Location

Select a location for the unit with adequate clearance from walls and other equipment to enable servicing of the pump/motor assemblies, membranes, cartridge prefilter and other serviceable components. Allow at least four (4) feet of clearance at the top end of the membrane housing(s) for future membrane replacement.

\*Contact your Puroserve representative for optional drain features compatible with the HT Series.

A grounded G.F.I. power supply of the appropriate voltage matching your unit's voltage with 15 amp fuse protection and a local disconnect switch is required.



Do not locate the unit near any corrosive chemicals or where the temperature may exceed 113°F (45°C)



Ground the unit correctly to avoid the risk of electric shock.



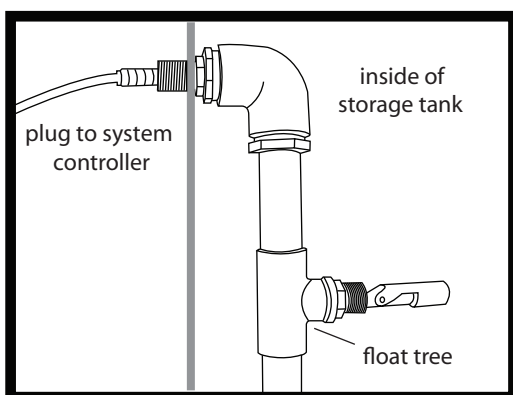
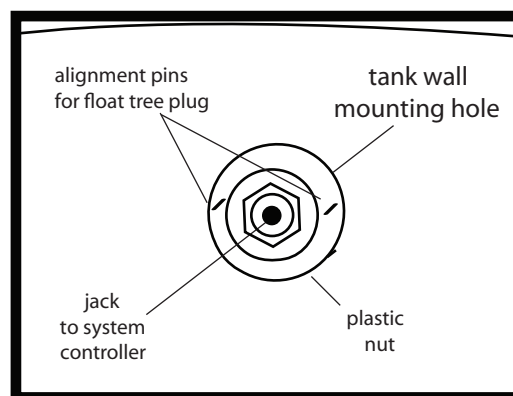
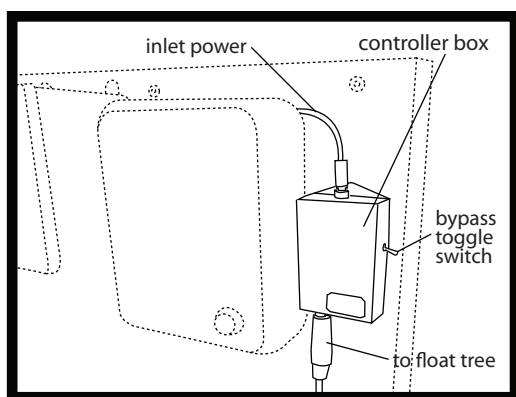
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## PRODUCT WATER STORAGE TANK FLOAT TREE INSTALLATION

1. Carefully place the float switch tree inside the storage tank.
2. Attach white nut to threaded end of float switch tree that protrudes out from mounting hole on tank (see diagram below).
3. Connect the float switch tree plug-end to the HT Series controller, located on the side of the controller box and connect plug-end to the float tree.



Make sure all electrical components are in accordance with the NESC guidelines and as dictated by the authorities holding proper jurisdiction in your community.



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**FOR ILLUSTRATION PURPOSES ONLY**

**INSET**

**RECLAIM**

**CLEAR OZONE TUBING**

**165 GALLON STORAGE TANK**

**High-Level Float Switch (Deactivates Unit)**

**Mid-Level Float Switch (Activates Unit)**

**Low Level Float Switch**

**30"**

**PRODUCT TO TANK**

**SEE INSET**

**RECLAIM TO DRAIN**

**OZONE AIR STONE**

**RIGID LINE OR HARD PIPE**

**TO HOME**

**OUT**

**3 VALVE BYPASS (NOT INCLUDED) SHOULD BE INSTALLED AS SHOWN**

**PLUMBING LAYOUT**

The diagram illustrates the plumbing layout for the Ozonator system. It shows the connection between the Ozonator unit and a 165-gallon storage tank. The Ozonator unit has two main sections: a top section with a pump and tubing, and a bottom section with two large cylindrical tanks. The top section is connected to the storage tank via clear ozone tubing. The bottom section is connected to the storage tank via rigid line or hard pipe. The storage tank has three float switches: a High-Level Float Switch (Deactivates Unit), a Mid-Level Float Switch (Activates Unit), and a Low Level Float Switch. The Ozonator unit also has a 3-valve bypass (not included) that should be installed as shown. The diagram includes labels for 'PRODUCT TO TANK', 'RECLAIM TO DRAIN', 'OZONE AIR STONE', 'RIGID LINE OR HARD PIPE', 'TO HOME', 'OUT', and '3 VALVE BYPASS (NOT INCLUDED) SHOULD BE INSTALLED AS SHOWN'. An inset shows a close-up of the tubing connections. A note at the top states 'FOR ILLUSTRATION PURPOSES ONLY'.

## PLUMBING LAYOUT

## PLUMBING



All plumbing is to be done in accordance with state and local codes.



This unit produces high-quality water that must be neutralized to prevent leaching of the plumbing following the system. Make sure to use plumbing materials suitable for your specific application.

### Preparation

- Pre-carbon tank must be flushed thoroughly before connecting to system. Flush carbon tank with any potable water source until no carbon fines or discoloration exist.
- Calcite neutralizer tank must be flushed as well. Flush the neutralizer with any potable water source until the effluent water is clear.

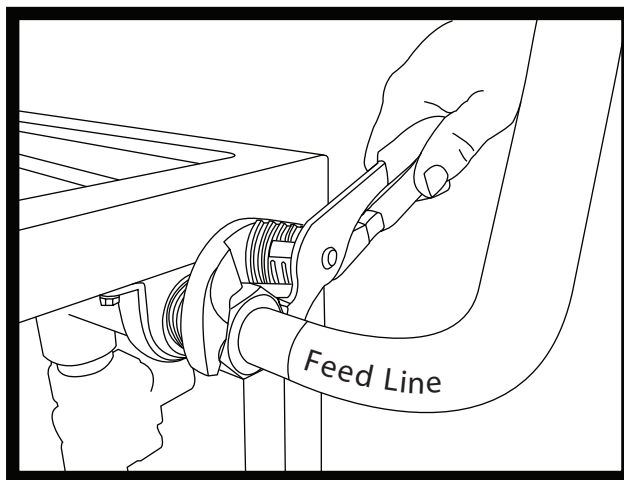
### Materials

Plumbing materials can significantly contribute to the contamination of the water. Take the time to choose the right kind of material for your application. Teflon® tape is suitable for all threaded connections in this system.

### Feed Water Connection

Connect the raw water supply to the inlet of the HT Series RO System, making sure to observe the following:

- The line size shall be 3/4" or larger to minimize pressure loss (8000 Series or larger must use 1" inlet).
- A manual valve can be installed on this line to shut off the water supply if needed. Be sure that this valve in no way restricts the water flow when it is fully open.
- Minimum working water pressure must be at least 80 psi. Maximum static water pressure must be no more than 125 psi. A pressure regulator may be required.



\*Do not over-torque fittings.



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## PLUMBING (CONTINUED)

### Permeate

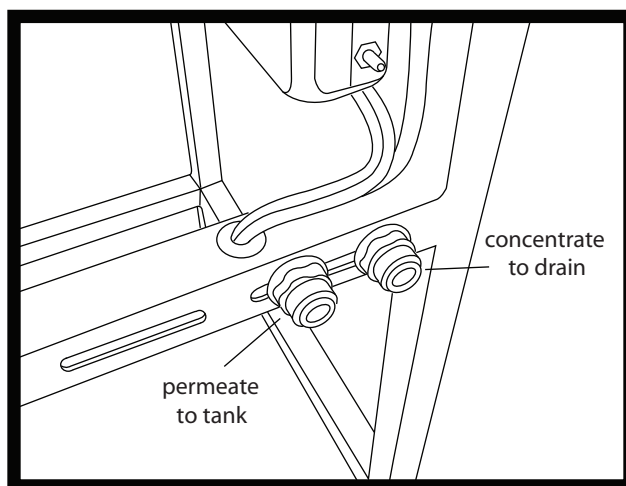
#### Product Water Tubing Connection

Connect Permeate Outlet located on the side of the HT Series to the elbow located on top of the storage tank.

### Concentrate

#### Drain Tubing Connection

Connect Concentrate Outlet located on the side of the HT Series to a suitable drain using 1/2" O.D. tubing.



To avoid damage to the elements, tubing should not exceed a height of 4 feet above the top of the membrane housing(s).



Be sure to install an overflow draw to storage tank at the highest point possible. Drain to the outside drain for protection against overfilling due to possible float failure. 1/2" drain line should be sufficient.

\*Contact your Puroserve Representative for optional drain features compatible with the HT Series.

## INITIAL SYSTEM STARTUP

1. Direct your product water tubing to drain.
2. Open the feed water supply valve.
3. System will be on. Note inlet water pressure must be at least 80 psi.



If the pump chatters loudly it is starving for water (cavitating). Turn the unit OFF immediately to prevent pump damage. Correct the low pressure condition before proceeding.

4. If incoming pressure is too high, an inlet pressure regulator (not included) may be installed. This should be set at 80-90 psi.
5. Some fittings may have loosened during shipment. Check for leaks at all tube fittings and threaded joints.
6. Allow the unit to run for at least 30 minutes to flush any preservative solution from the unit.
7. Once the preservative solution has been flushed from the unit, shut it down by turning off the feed water and re-directing permeate flow to the desired product storage tank, or down-stream equipment.
8. Restart the unit.
9. Adjust the Throttle Valve to get the desired permeate. NEVER close the valve completely—you will damage the membrane.
10. Run unit and check again for leaks, which should be repaired prior to placing the unit in service.



Do not operate the unit with the throttle valve closed.



If the pump does not shut off, turn the unit off immediately to prevent pump damage. Disconnect the electrical power source, then check the wiring and replace or adjust the switch as needed.

11. Once all the desired flows are set, allow the unit to run for approximately 30 minutes. Then record the performance information using the unit operation data log included in this manual. The values recorded at startup will be important for determining unit performance at a later date.

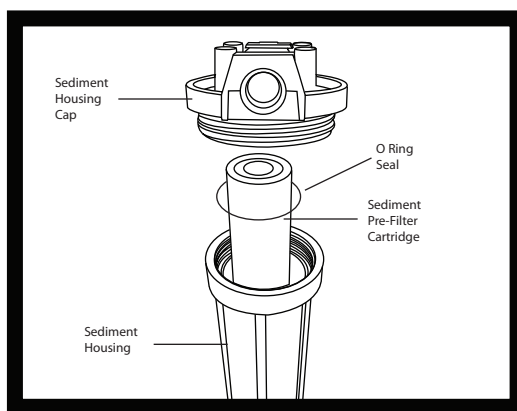
## SYSTEM MAINTENANCE

### Sediment Pre-Filter Cartridge

The sediment cartridge filters should be changed regularly to maintain proper pressure and flow. 6 month pre-filter changes are recommended, or as needed.

### Changing Cartridge Filters

1. Close inlet supply valve.
2. Turn unit off by unplugging the unit from the electrical outlet.
3. City PSI gauge should read zero( NOTE: City PSI Gauge must read zero PSI or removal of Sediment Housing will be difficult).
4. Un-assemble the filter housing (twist the sump counter-clockwise).
5. Remove and inspect the cartridge. Replace as needed.
6. Before replacing housing, insure that O ring seal is lubed and placed in groove of housing. Inspect seal and replace as needed.
7. Assemble housing (turn the sump clockwise into the cap until tight).



## MEMBRANE CLEANING

### When to Clean Membranes

In normal operation, the membrane in reverse osmosis elements can become fouled by mineral scale, biological matter, and grime. These deposits build up during operation until they cause loss in water output or loss of salt rejection, or both. Elements should be cleaned whenever the water output rate by 10 percent from its initial flow rate (the flow rate established during the first 24 to 48 hours of operation), or when salt content in the product water rises noticeably.



Check water temperature and apply temperature correction to determine if flow loss is due to low feedwater temperature. A malfunction in the pretreatment, pressure control or pump can cause a drop in feedwater delivery pressure, feedwater flow, or product water output, or an output, or an increase in salt passage. If such adjustments are needed, the element may not require cleaning.

## RO SYSTEM STORAGE AND BIOCIDIAL PROTECTION

To prevent biological growth during storage, shipping or system shutdowns, it is recommended that RO membranes be immersed in a 5% citric acid solution.

### System Preservation Procedure

1. Shut down RO system.
2. Disconnect the permeate line and direct permeate to drain during cleaning/preservation.
3. Remove the sediment filter cartridge from the pre-filter housing.
4. Disconnect calcite filter tank.
5. Replace the filter cartridge with the preservative cartridge and assemble into the filter housing.
6. Turn system ON. After 30-40 seconds, shut the unit down.
7. Drain the system of the permeate solution as much as possible by opening a valve/fitting at a low point in the system. Close off the inlet and outlet to the membrane/unit.

### Preservative Flush/Unit Restart Procedure

1. Open valves, etc. Put the unit back in its original position, before the preservation process began.
2. Remove the empty preservative cartridge and replace it with a new cartridge filter.
3. Restart the unit. Direct permeate to drain for at least 30 minutes.
4. Resume normal unit operation.

## DISINFECTION AND STERILIZATION OF RO ELEMENTS

- An excellent disinfectant for spiral elements is a 5% citric acid solution. Citric acid inhibits bacterial growth while maintaining the high flux and salt rejection of elements. Elements should be flushed with this solution before storage or at the beginning of long down periods.
- Sterilization can be achieved with formaldehyde. However, this reagent should not be used unless the element is first operated for 24 hours. Otherwise, severe flux losses may occur in the membrane. After this initial period, the membrane will tolerate any customary formaldehyde concentration used in sterilization.
- Other disinfectants and sterilants can be used. Hydrogen peroxide at 100 to 1000 ppm (0.01 to 0.1 percent) is effective at room temperature. Hydrogen peroxide will damage the membrane at higher temperatures, however. Chloramine Chloramines T and N chloroisocyanurates can be used in spiral elements. They are not very effective as sterilants, however. Also, if they are used in combination with an already fouled (biological) test loop or system, flux losses are occasionally experienced from dead bacterial matter in the feed stream depositing on membrane surfaces. Chlorine dioxide, free of hypochlorite or chlorine, may be used as a disinfectant. Both Chloramines and chlorine dioxide readily pass through membranes, appearing in the permeate.
- Chlorine (hypochlorite) is not recommended for disinfecting membrane elements. Permanent damage will occur.
- Iodine, quaternary compounds, and phenolic disinfectants cannot be used with spiral elements. All three cause severe flux losses.



Handle all chemical with care. Wear protective clothing and eye protection.



The system must be flushed thoroughly between acid and alkaline cleanings.



The diagram illustrates the electrical control system for the Puroserve HT2000. It begins with a 110 vac power source connected to a 24 vac transformer and a standard duplex outlet. The 24 vac transformer provides power to the control circuit, which includes a latching relay. The relay is controlled by three tank level switches: 'R/O off', 'R/O run', and 'Bypass'. The 'R/O off' switch is a normally closed contact, while the 'R/O run' and 'Bypass' switches are normally open contacts. The relay's output is connected to the 'Inlet Solenoid' and the 'Bypass Solenoid'. The 'Inlet Solenoid' is also controlled by a 'Red LED' indicator, and the 'Bypass Solenoid' is controlled by a 'Grn. LED' indicator.

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## MAINTENANCE PROCEDURES (to be performed in order by a Puroserve-trained technician)

### Items Required

1. 20" 1-micron sediment filter
2. 10' Female by Female hose.
3. (2) 5' lengths of 1/2" tubing joined with a union with a female tubing push fitting on one end.
4. A telescopic pole with a scrub head
5. 4 ounces of chlorine (12% concentration preferred)
6. A 4-6 foot ladder

### 1. Take Note Of

1. City PSI
2. Pump PSI
3. Any visible leaks
4. Tank level
5. Calcite level

### 2. If unit is not in run mode actuate the float switches in the tank or use service box (technician tool).

### 3. With system in run mode, observe the following:

- a. Product (Permeate) flow rate
- b. Reclaim (Concentrate) flow rate
- c. City PSI
- d. TDS in membrane outlet (Pre-calcite)
- e. TDS out (Calcite tank outlet)
- f. Ozone generator is working properly

### 4. Storage tank cleaning should be performed every 3-5 years or as needed.

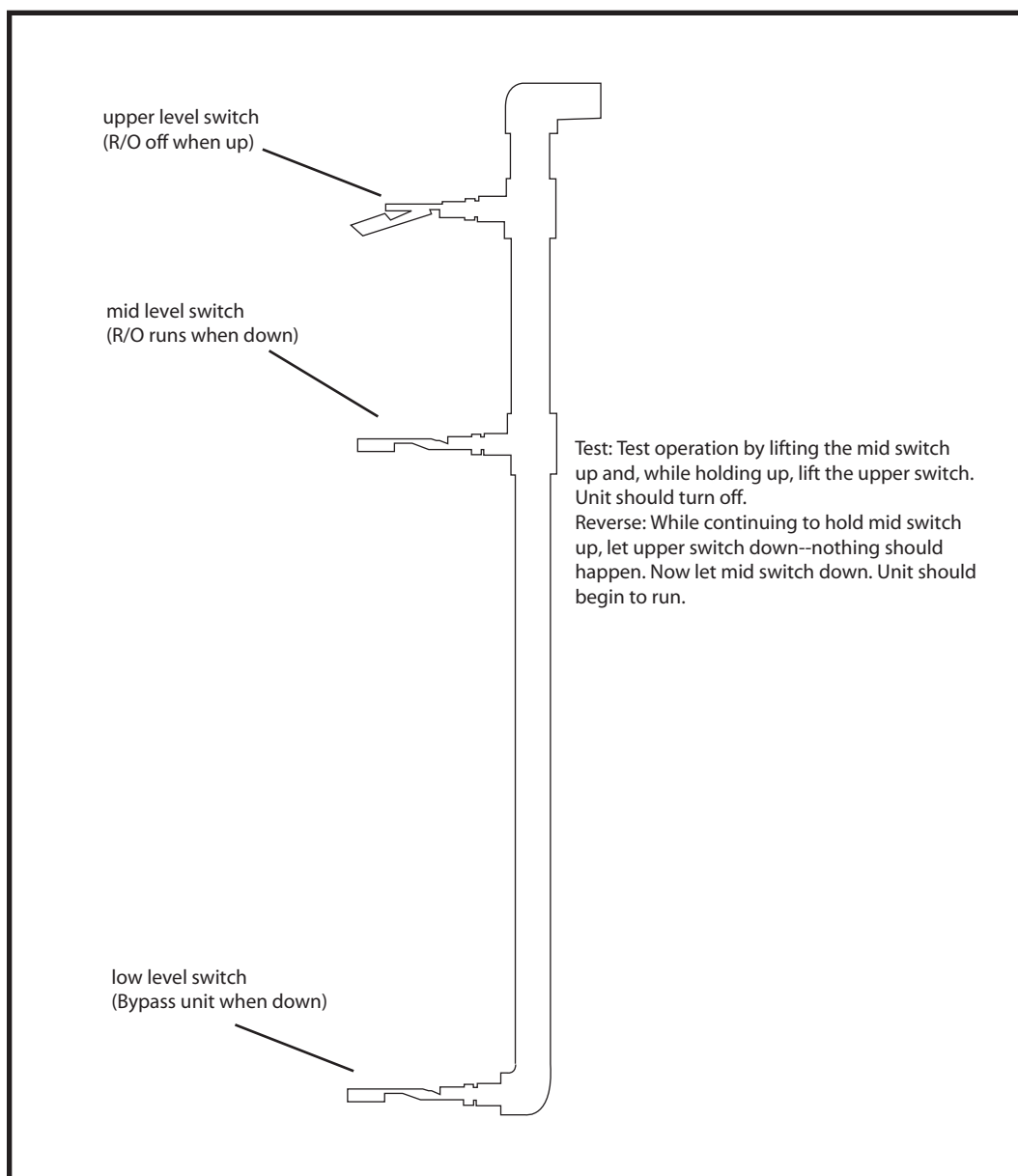
- a. Have a garden hose ready and connected to a live hose bib. Hose should reach storage tank.
- b. Turn feed water off to system.
- c. Unplug the main power cord.
- d. Unplug the float tree from the control box and remove from tank (HANDLE FLOAT TREE WITH CARE).
- e. Add approx. 4 ounces of chlorine (sodium hypochlorite) to storage tank.
- f. Using telescopic pole and scrub head, scrub and turbulate the inside of the tank, being careful not to touch the float tree (if not removed).
- g. Connect hose to bib above pump to draw tank. Once tank has reached within a few inches of bulkhead fitting for pump inlet, add water to tank with garden hose and agitate the water in the bottom as much as possible. Repeat this until water in bottom of tank is clear.

### 5. While storage tank is draining, backwashing of the carbon tank can be done.

- a. Connect garden hose to outlet of the carbon tank and direct inlet to drain line from top of membrane to run drain through rotameter. (If HT drain is feeding soaker lines then locate winter bypass on drain line and open to sewer. If no bypass then open feed to local drain or use to water garden).
- b. Open feed to carbon tank at moderate flow.
- c. Use rubber mallet and tap tank while backwashing.
- d. Run water through tank until water runs clear, being careful not to flush too fast, as carbon will come out of tank.
- e. Turn off feed, disconnect from hose bib and allow to siphon water out of carbon tank.
- f. Once drained replace cap on carbon tank and replace drain line to top of membrane.

**MAINTENANCE PROCEDURES (CONTINUED)**

6. Change 20" 1-micron sediment filter.
7. Open drain fully.
8. Slowly turn feed water to unit back on.
  - a. Expell all air.
  - b. If drain line is bypassed or disconnected, return to normal.
  - c. Adjust drain to normal operation (GPM).
9. Test operation of level switched on float tree (see diagram below).

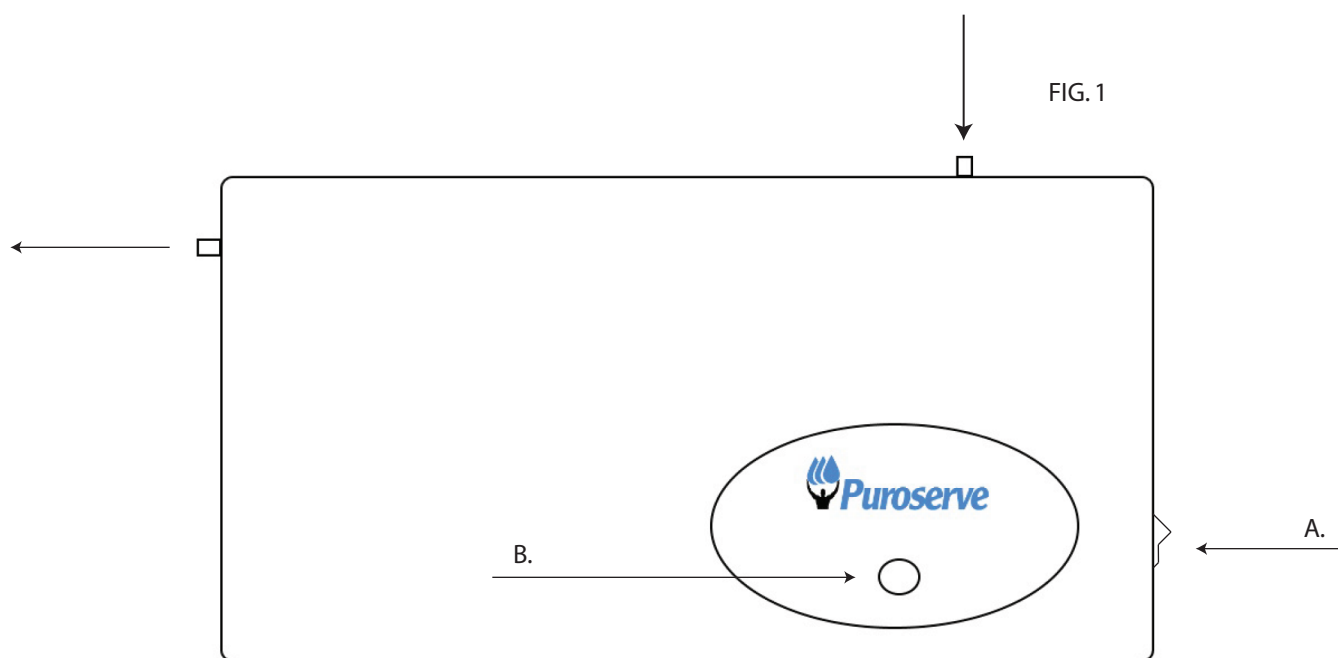


## MAINTENANCE PROCEDURES (CONTINUED)

10. Test operation of ozone generator.

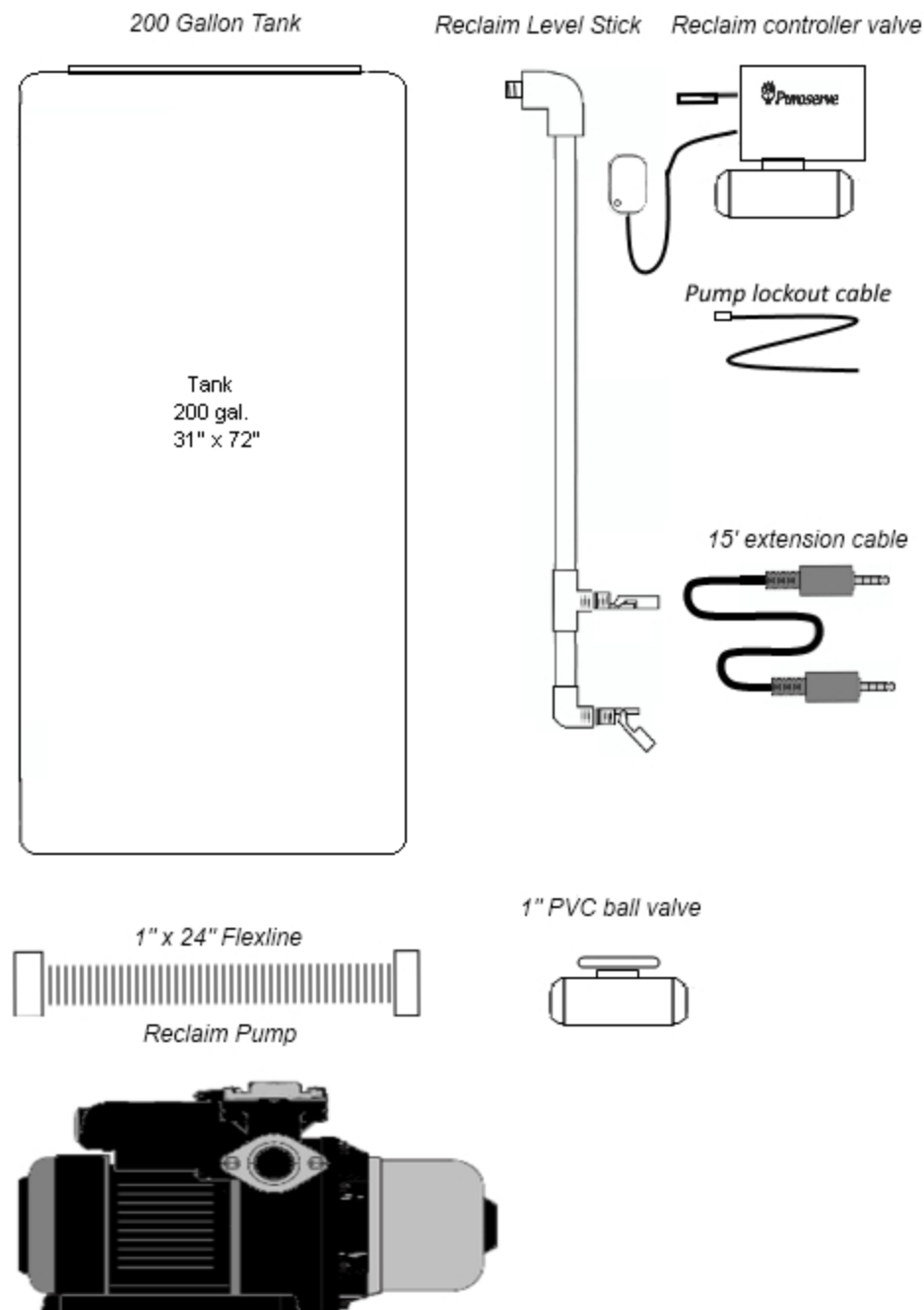
### OZONE GENERATOR SETUP

- Locate the on/off rocker switch on the right hand side of the ozone generator in figure 1. (A)
- Ensure it is switched on (red illumination from on/off switch)
- Depress the soft button on the front of the ozone generator. (B)
- The ozone generator will run for exactly 5 minutes every 24 hours from when the initial startup occurred.

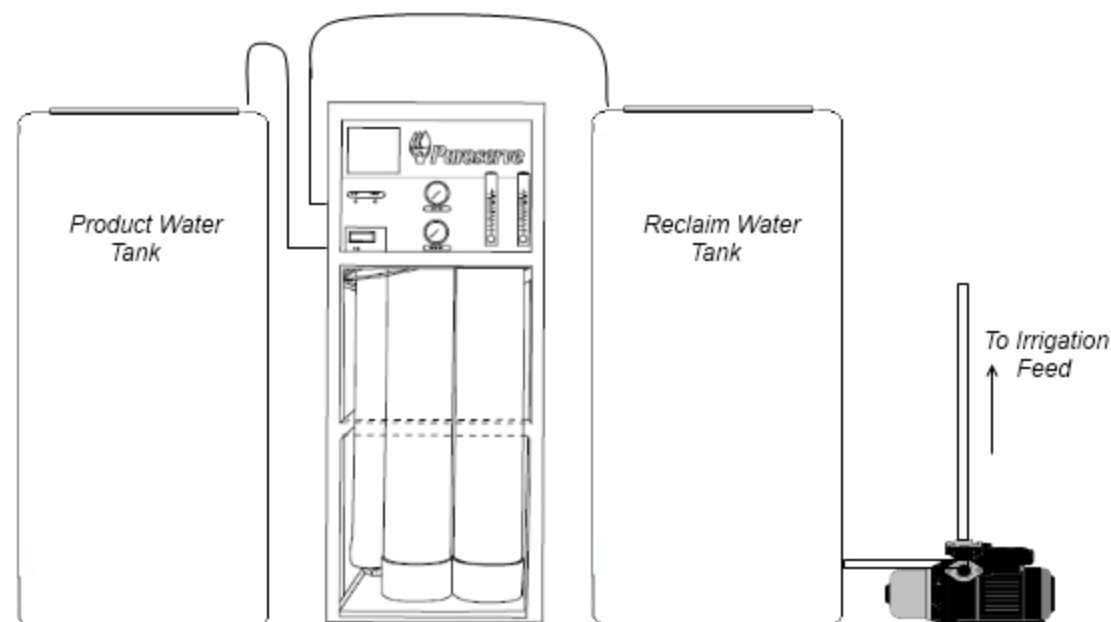


This unit outputs 200mg of ozone per hour via corona discharge method.

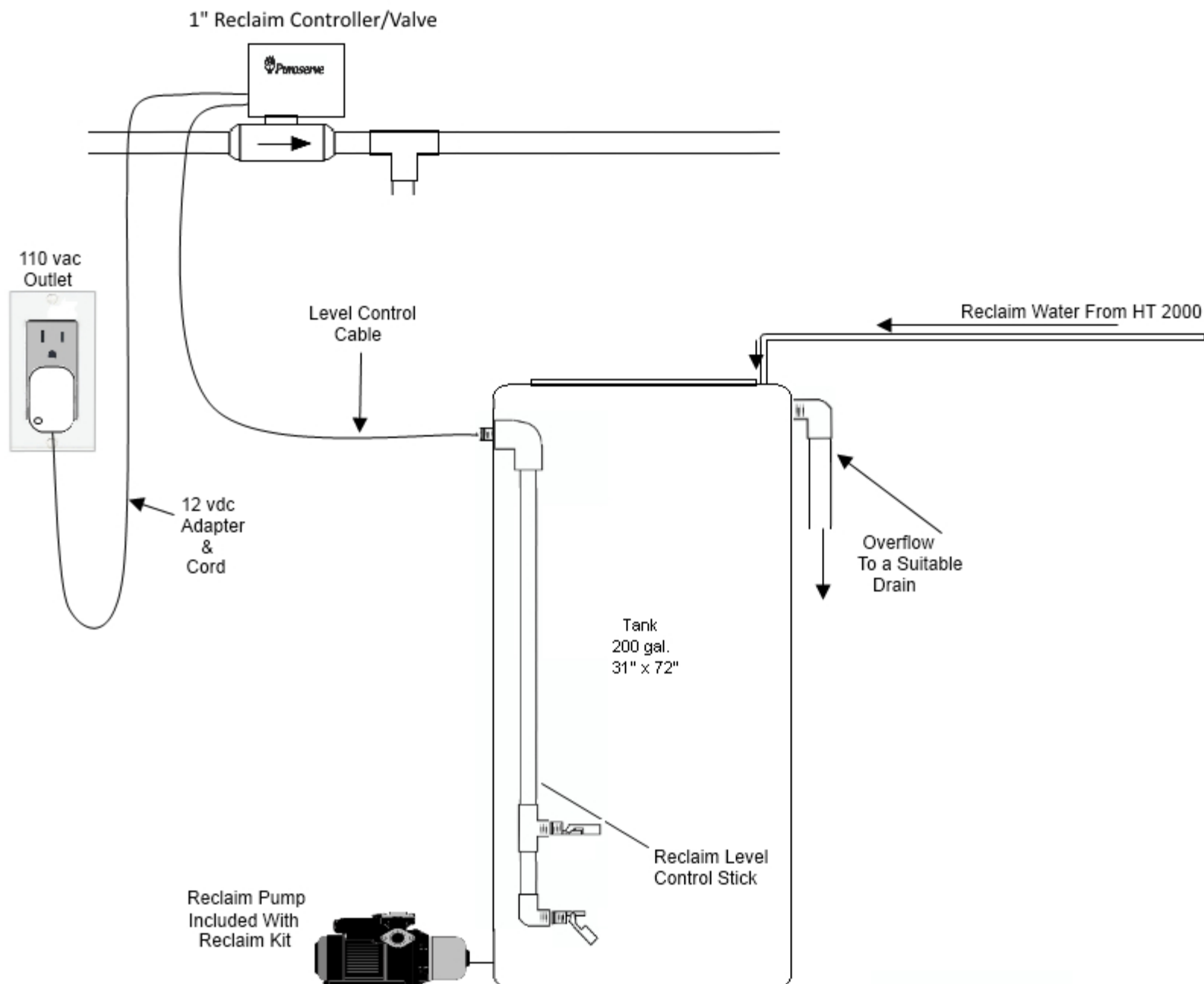
## Operation



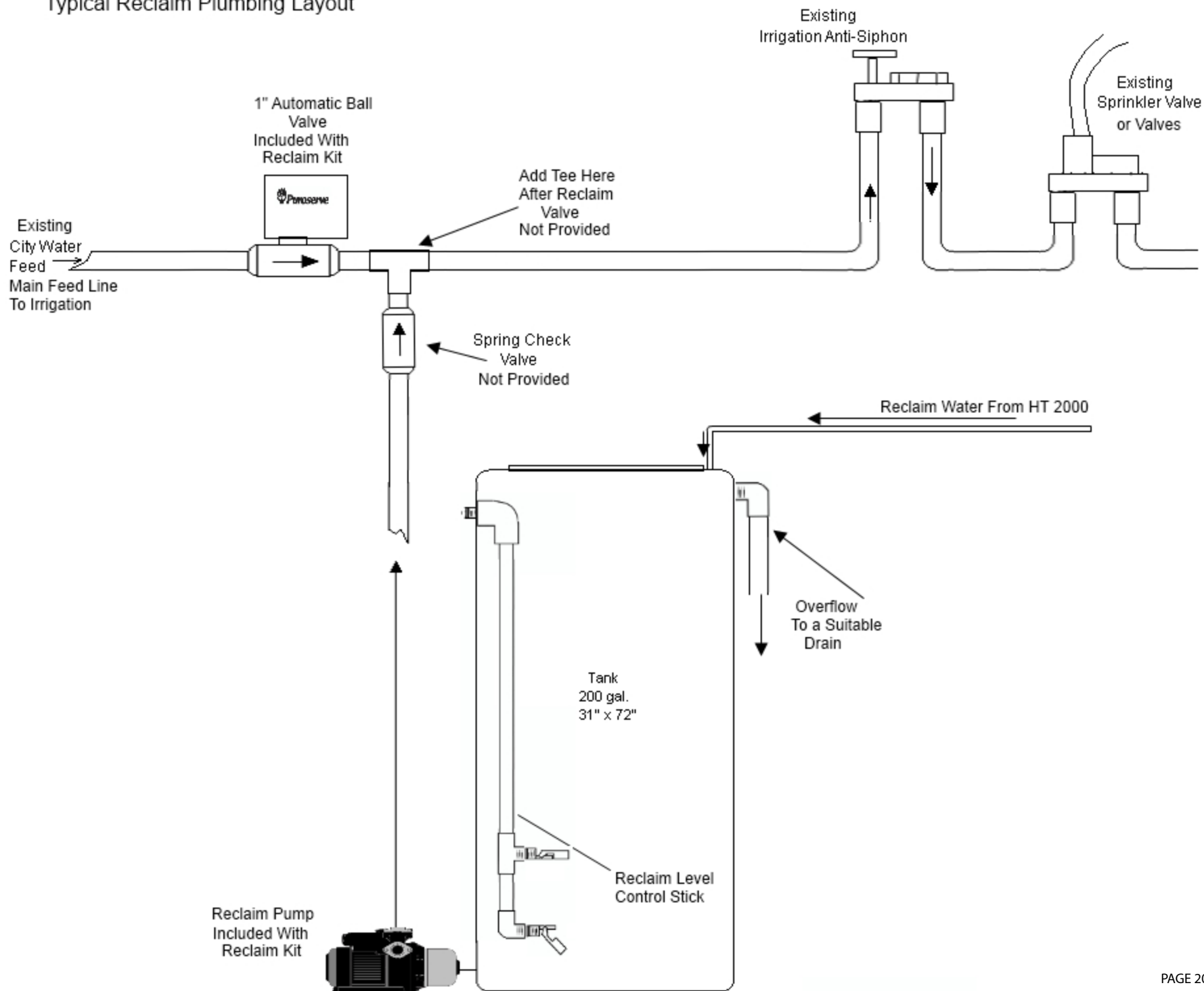
- \*Reclaim water from the HT series R/O enters the Reclaim tank.
- \*If no irrigation water is called for, reclaim water simply overflows to drain
- \*When irrigation water is needed the reclaim pump sends the reclaim water into the irrigation plumbing.
- \*If the irrigation demand exceeds the amount of reclaim water in the tank, the controller will open the automatic ball valve and allow city water to feed the irrigation plumbing.
- \*When the reclaim tank has refilled past the upper level switch the controller will close the automatic ball valve allowing reclaim water to be used again.



# Irrigation Reclaim System



## Typical Reclaim Plumbing Layout



## TROUBLESHOOTING

### No water to home?

Could be:

- a. No power to unit
- b. Repressurization pump failure
- c. Manual bypass valve is off

Solutions:

- a. Check power supply
- b. Check operation of pump (consult pump manual)
- c. Check position of bypass

### Unit in bypass, No water in storage tank?

Could be:

- a. Excessive water usage
- b. Water production failure
- c. Level switch failure

Solutions:

- a. Check home for leaks
- b. Determine customer's consumption
- c. Check operation of level switches

### Low or no water production?

Could be:

- a. Insufficient feed PSI
- b. Sediment filter plugged
- c. Carbon bed plugged
- d. Membrane scaled
- e. Inlet solenoid failure

Solutions:

- a. Check that incoming PSI is at least 80 PSI during production
- b. Check and change sediment filters as needed
- c. Backwash or change carbon bed
- d. Replace or de-scale membrane as needed
- e. Ensure that the inlet solenoid is opening properly

### High TDS? (after membrane)

Could be:

- a. Membrane worn

Solution:

- a. Replace membrane

### Low TDS? (after membrane)

Could be:

- a. Calcite tank is empty

Solution:

- a. Refill calcite tank as needed



## GLOSSARY OF WATER TERMS

### absolute

When referring to filters, used in reference to the micron rating of cartridge or disc filters, indicating that all particles larger than a specified size will be trapped within or on the filter and will not pass through.

### absorb

The process by which a liquid penetrates the solid structure of the absorbent's fibers or particles, which then swell to accommodate the liquid.

### absorption

The process of taking up a substance into the physical structure of a liquid or solid by physical or chemical action, but without chemical reaction.

### activated carbon

A form of granulated carbon used to remove tastes, odor, chlorine, chloramines, and some organics from water.

### aeration

The process of adding air to a water supply for the purpose of oxidizing or mixing.

### alkalinity

A substance's capacity for neutralizing acid usually due to the presence of bicarbonate or carbonate ions. Hydroxide, borate, silicate, or phosphate ions may contribute to alkalinity in treated waters.

### anion

Negatively-charged ion in a solution.

### backwash

Reversal of a solution's flow through a filtration system. Often used as a cleansing mechanism in sand and dual-media filters.

### bacteria

Any of a class of microscopic single-celled organisms, characterized by round, rod-like spiral or filament-like bodies. Often found in soil, water, organic matter, and inside humans, many bacterial strains are of use to humans, while others are known health risks.

### cartridge filter

A filter device, usually disposable, filtering in the range of 0.1 micron to 100 microns, and usually 2-4 inches (51-102mm) in diameter and 6-60 inches (152-1524mm) in length.

### cation

Positively-charged ions in a solution.

### chlorine

Chemical used in water treatment for its qualities as a bleaching, oxidizing, or disinfecting agent in water purification.

### concentrate

In crossflow filtration, the portion of a feed stream which does not permeate the medium but retains and is increased in the amount of ions, organics, and suspended particles which are rejected by the medium.

### conductivity

In regards to water, the property of its ability to transmit electricity. Conductivity is the opposite or resistivity, and is measured in microSiemens/cm.

## GLOSSARY OF WATER TERMS (CONTINUED)

### deionization (DI)

Process utilizing specially-manufactured ion exchange resins which remove ionized salts from water. Can theoretically remove 100% of salts. Deionization typically does not remove organics, viruses, or bacteria, except through "accidental" trapping in the resin and specially-made strong base anion resins which will remove gram-negative bacteria.

### disinfection

The process of killing pathogenic organisms in a water supply or distribution system by means of heat, chemicals, or UV light.

### dissolved solids

The residual material remaining from a filtered source after evaporating the solution to a dry state.

### effluent

The output stream exiting a treatment system.

### evaporation

Process in which water passes from a liquid state to a vapor state.

### feed/feed water

The input solution to a treatment/purification system, including the raw water supply prior to any treatment.

### filtration

The process by which solid particles are separated from a liquid by passing through a permeable material. Also, the physical or mechanical process of separating insoluble particulate matter from a fluid, by passing the fluid through a filter medium that will not let the particulates through.

### gpd

Abbreviation for gallons per day.

### grains per gallon (gpg)

A unit of concentration equal to 17.1 milligrams per liter (17.1 ppm).

### hardness

The concentration of calcium and magnesium salts in water.

### high-purity water

Highly-treated water with attention to microbiological reduction or elimination; the term commonly used in the pharmaceutical industry.

### housing

A ported chamber with closure, which directs the flow of liquid through the filter element.

### influent

The fluid entering the filter.

### ion

an atom or molecule which has lost or gained one or more electrons, thereby acquiring a net electric charge.

### ion exchange

a process in which ions are preferentially based on equilibrium, adsorbed from a solution for equivalently-charged ions attached to small solid-resin beads.

## GLOSSARY OF WATER TERMS (CONTINUED)

### media

The material that performs the actual separation of solids from liquids. Sometimes incorrectly used to mean septum.

### membrane

Highly-engineered polymer film containing a regular distribution of pores. Membranes serve as a barrier permitting the passage of materials only up to a certain size, shape, or character. Membranes are used as the separation mechanism in reverse osmosis, electrodialysis, ultrafiltration, nanofiltration, microfiltration, as disc filters in laboratories, and as pleated final filter cartridges, particularly in pharmaceutical and electronic applications.

### mg/L

Milligrams per liter of water; approximately equal to parts per million (ppm).

### micron

A metric unit of measurement equivalent to  $10^{-6}$  meters,  $10^{-4}$  centimeters. Represented by "μ" symbol.

### module

a membrane element combined with the membrane element housing.

### osmosis

The spontaneous flow of water from a less concentrated solution to a more concentrated solution through a semipermeable membrane until energy equilibrium is achieved.

### ozonator

A device which generates ozone ( $O_3$ ) by passing a high-voltage current through a chamber containing air or oxygen. Used as a disinfection system.

### permeable

Allowing some material to pass through.

### permeate

That portion of the feed stream which passes through a membrane, separated from a concentrate stream.

### pH

An expression of hydrogen ion concentration; specifically, the negative logarithm of the hydrogen ion concentration. The range is from 0 to 14, with 7 considered neutral, 0 to less than 7 acidic, and from more than 7 to 14 being alkaline (or basic).

### ppm

Parts per million, commonly considered equivalent to milligrams per liter (mg/L).

### psi

Pounds per square inch (pressure).

### resistivity

The property of water to resist the flow of electricity; the measurement of that resistance. The inverse of conductivity. Measured by a resistivity monitor and described in megohms/cm.

## GLOSSARY OF WATER TERMS (CONTINUED)

### reverse osmosis

The separation of one component of a solution from another component by flowing the feed stream under pressure across a semipermeable membrane. RO concentrates ionized salts, colloids, and organics down to 150 molecular weight in the concentrate stream and provides a purified stream of water. May also be called hyperfiltration.

### scaling

The buildup of precipitated salts on such surfaces as pipes, tanks, and boiler condensate tubes.

### static pressure

The degree of water pressure built up inside a unit (measured in PSI) when it is installed into a plumbing system but is not operational

### semipermeable

In membranes, a membrane which allows a solvent such as water to pass through, while rejecting certain dissolved or colloidal substances.

### suspended solids

Solid organic and inorganic particles that are held in suspension in a solution.

### TDS

An acronym for Total Dissolved Solids.

### TSS

Total Suspended Solids--the residual matter which can be removed from a solution by filtration.

### working pressure

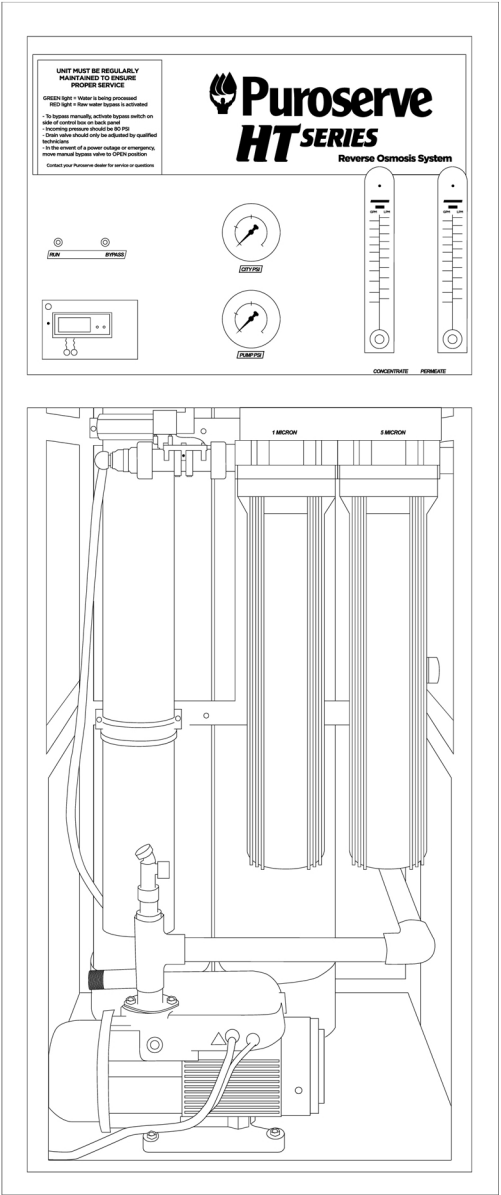
The degree of water pressure built up inside a unit (measured in PSI) when it is installed into a plumbing system and is operating.

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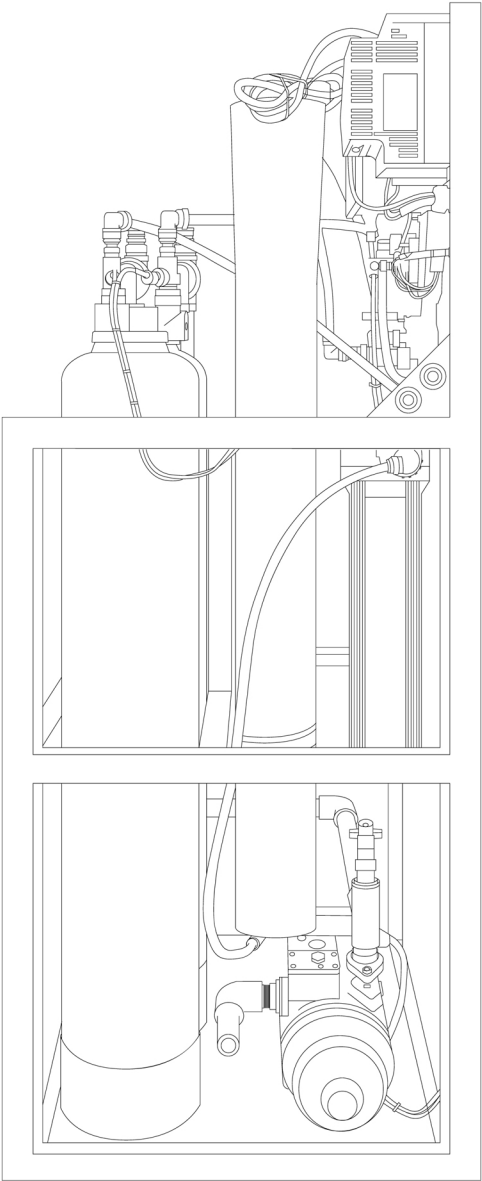


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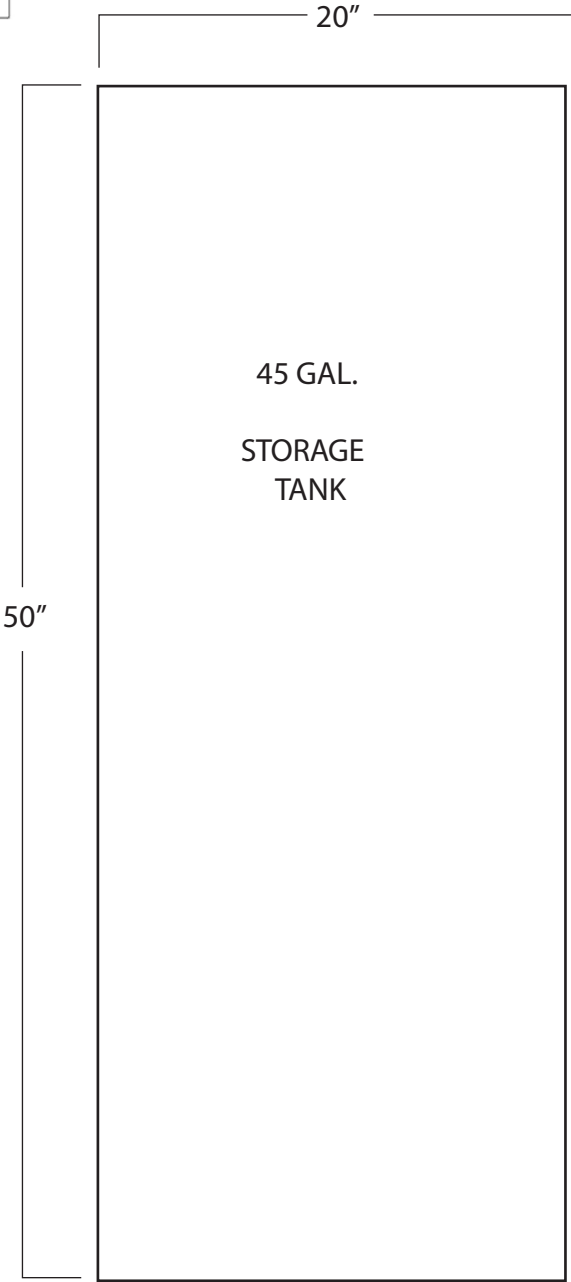
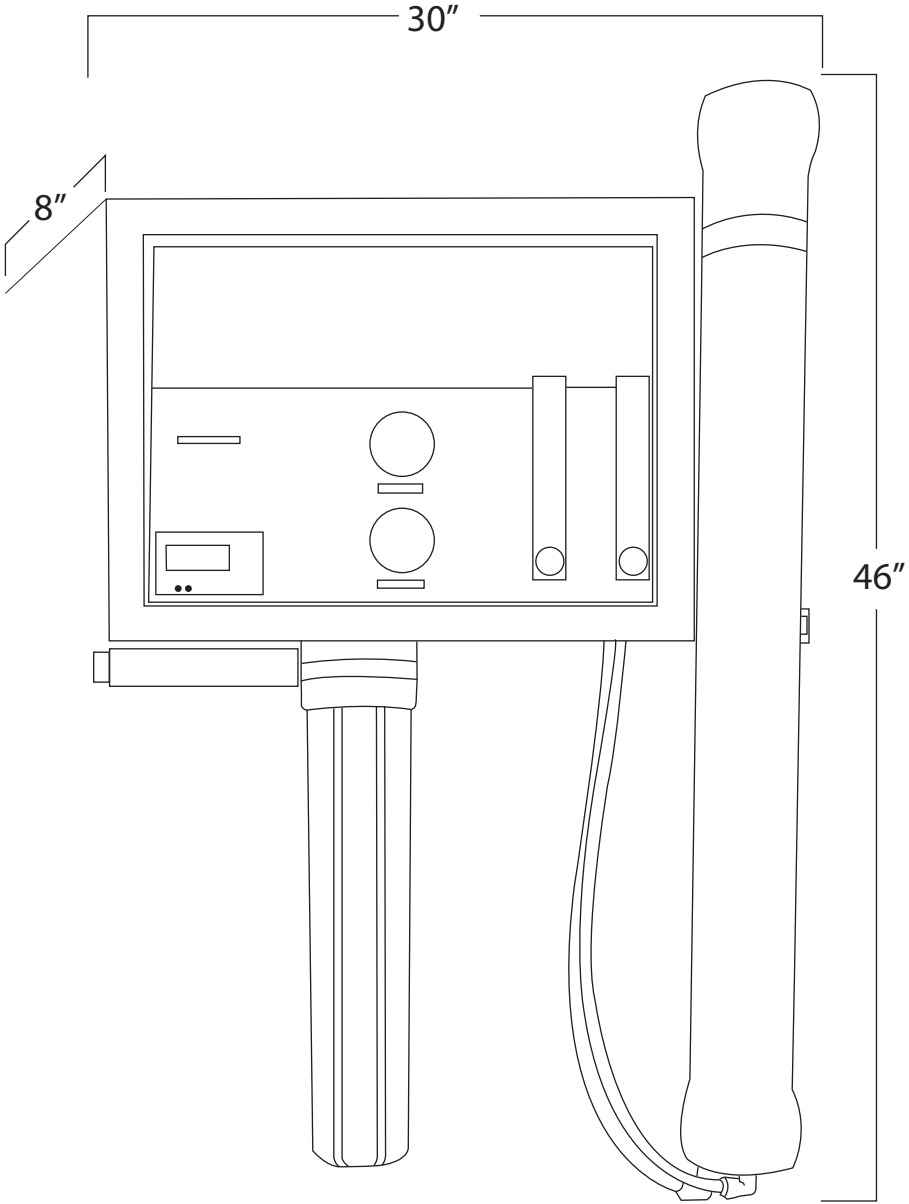


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PUROSERVE HT 2000  
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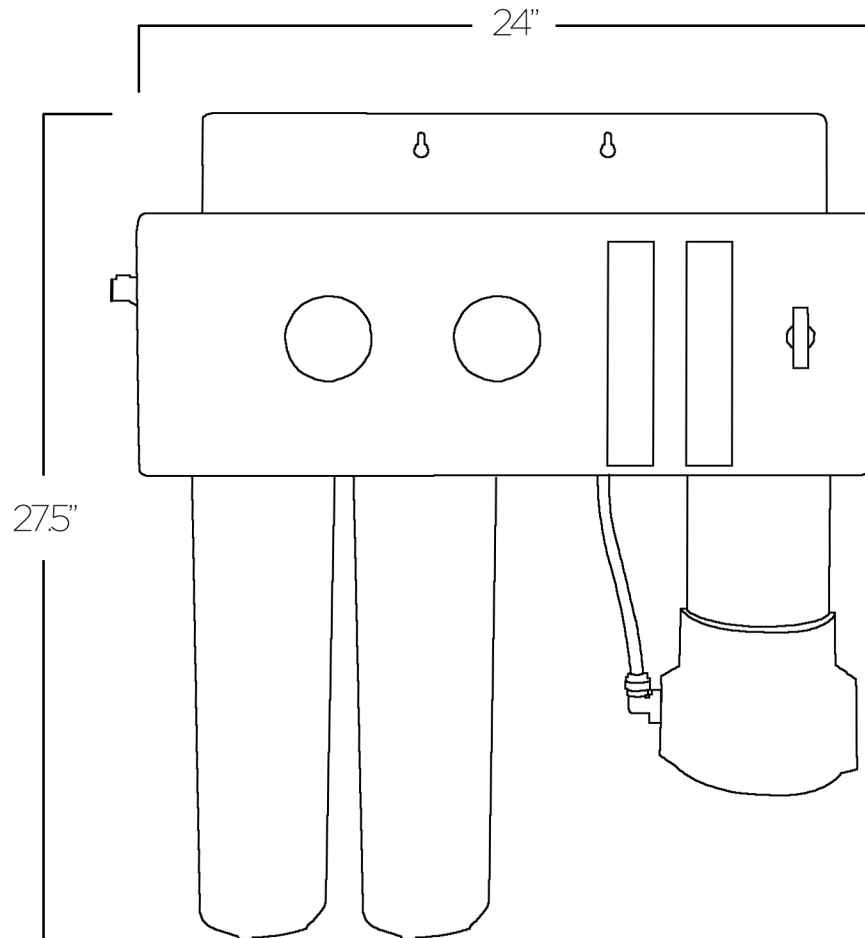
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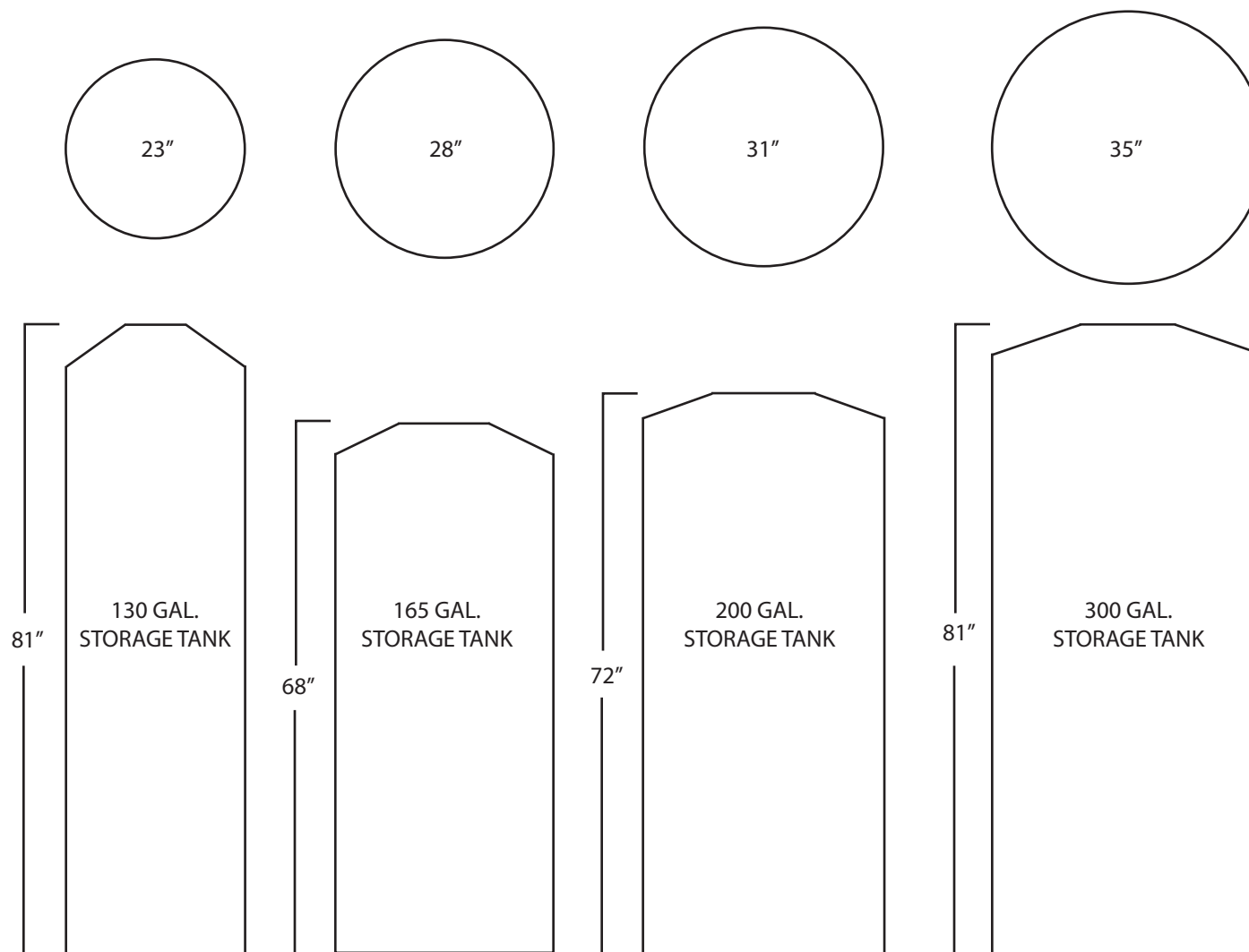
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		1



## RO Service Record Information

Model:\_\_\_\_\_

Installation Date: \_\_\_\_\_


Installed by:\_\_\_\_\_

Contact: \_\_\_\_\_ Phone: \_\_\_\_\_

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## Notes

[illegible]

 **Puroserve®** Water Conditioning, Inc. 6925  
Canoga Avenue

Canoga Park, CA 91303  
www.puroserve.com | (800) 594-3300

CUSTOMER NAME \_\_\_\_\_

INSTALL ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

PHONE NO. \_\_\_\_\_ EMAIL \_\_\_\_\_

DATE OF PURCHASE \_\_\_\_ / \_\_\_\_ / \_\_\_\_ MODEL \_\_\_\_\_ S/N \_\_\_\_\_

DEALER \_\_\_\_\_ DEALER No. \_\_\_\_\_

## PUROSERVE WATER CONDITIONING, INC. LIMITED WARRANTY

### COVERAGE

**Puroserve** warrants to the original consumer purchaser that the water purification system (hereafter "the system") specified below by model and serial number, and the parts listed in this section below, will be free from defects in material and workmanship from the date of purchase for the following periods:

Puroserve rack, membrane housing (excluding membrane element & o-rings) & bulk water storage tank	-----10 years
Pre-filter housing (excluding filter element), hard plumbing, flow meters and gauges	-----5 years
Pump, float assembly, electrical and electronic components	-----2 years
Entire system, including labor	-----1 year

THIS WARRANTY IS EFFECTIVE TO ORIGINAL PURCHASER ONLY SO LONG AS THE SYSTEM REMAINS AT THE ORIGINAL INSTALLATION SITE.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

No sales representative, distributor, dealer, or other person is authorized to make any other warranty on behalf of **Puroserve**. Upon expiration of the applicable warranty periods, **Puroserve** shall have no further liability related to the products to which the periods apply, except with respect to warranty claims asserted during the appropriate warranty period.

This warranty does not cover installation or damage to units resulting from direct sun exposure, freezing, mishandling, improper installation, water pressure in excess of **100 psi**, or from hot water back-up or ambient temperatures in excess of 120° F. Labor charges incurred in connection with the repair and/or replacement of parts, tanks or water purification units, other than repairs done at official Puroserve repair centers, are expressly excluded from this warranty. All transportation and freight costs in connection with the repair and/or replacement of parts, tanks or water purification systems are also expressly excluded from this warranty. This warranty does not cover failures or defects that are the result of misuse, mishandling, misapplication, neglect, abuse, alteration of product or the adjustment or repair performed by anyone other than **Puroserve** or one of **Puroserve's** authorized agents, or where the water purification system has not been installed in compliance with local plumbing codes and ordinances. This warranty does not apply to commercial use and is extended to the original consumer purchaser only.

All warranties are subject to the requirements set forth in the owner's manual. Upon receipt of any defective product specified above, **Puroserve** will, at its discretion, repair or replace the product at its expense, provided that the original purchaser of that product has followed the procedure for obtaining warranty performance set forth below. The product so repaired or used as a replacement will be shipped to the purchaser at the purchaser's cost.

PURCHASER'S REMEDIES FOR DEFECTS OR FAILURES, TO THE EXTENT PERMITTED BY APPLICABLE LAW, ARE LIMITED TO THE REMEDY PROVIDED BY THIS WARRANTY, TO THE EXTENT ENFORCEABLE UNDER APPLICABLE LAW. **PUROSERVE** SHALL IN NO EVENT BE LIABLE FOR CONSEQUENTIAL INCIDENTAL OR SPECIAL DAMAGES ARISING OUT OF THE USE OF, OR INABILITY TO USE, THE PRODUCT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

As soon as the purchaser discovers any defect or failure, the purchaser must, within the period of the applicable warranty, notify his/her local **Puroserve** dealer of that defect. The purchaser must then return the defective part or item, with all transportation charges prepaid, to his/her local **Puroserve** dealer.

Information regarding warranty performance may be obtained by writing to **Puroserve**, 6925 Canoga Avenue, Canoga Park, CA 91303

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