OptiPure™

# BWS1500
## Advanced Membrane Separation System

Installation, Operation & Maintenance Manual
Rev. 2.1


**Manufactured By:**
**OptiPure Div. of**
**Aquion, Inc.**
**2605 Technology Drive, Bldg. 300**
**Plano, TX 75074**
**P: 972.881.9797 F: 972.422.6262**

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## General Information

### Safety Warning

Electrical work should be performed by a qualified electrician in accordance with all applicable codes and regulations.

### Service Contact

For local maintenance and service information please contact your nearest Authorized Service Representative. Service inquiries may be directed to technical support at:

OptiPure div. of Procam Controls, Inc.
2605 Technology Dr. Bldg. 300
Plano, TX 75074 USA

Phone #: 972.881.9797
Fax #: 972.422.6262

E-mail correspondence to:
techsupport@optipure.net

### Environmental Conditions

The BWS1500 is certified to operate under the following conditions:

1. Altitude up to 2000 m.
2. Ambient temperature of 40-105°F (5 - 40°C).
3. Max relative humidity 80% at 88°F (31°C).
4. Main supply voltage not to exceed +/- 10%.
5. Installation category II.
6. Pollution degree II.
7. Indoor use only, protect from elements.

### Explanation of Symbols

The following symbols are used on the water processor. The symbols and their explanation is given below:

Earth ground:

WARNING: Hazardous Voltage:

## Safety Instructions

1. Please read and follow these instructions when connecting and using the system.
2. To avoid electrical shock, never touch the inside of the electrical box. Only a qualified technician should open the electrical box.
3. Never use the system if the power cord or float switch cable has been damaged. Do not allow anything to rest on the power cord or float switch cable, and keep the cords away from any place where people may trip over them.
4. When disconnecting from the electric socket hold the plug, not the cord.
5. If the processor does not function properly, especially if there is an unusual sound or smell coming from it, immediately unplug the processor. Call your authorized service representative.
6. Unplug the processor and RP pump from the AC outlet prior to any service.
7. Locate the RP Assembly as close as possible to an AC outlet.
8. Securely bolt processor to wall before operating.
9. Avoid cross-connections and install on cold water supply only.
10. Use approved Air-Gaps when connecting to drain lines.
11. Do not exceed system pressure rating and use water hammer arrestors when water hammer is evident.
12. Turn off Feed-Water supply before filter or membrane cartridge replacement.

## Getting To Know Your System

The BWS1500 Advanced Membrane Separation System is designed specifically for users that desire the ability to customize the TDS (Total Dissolved Solids) level or "Mineral Content" of the treated water. The BWS1500 utilizes a precision multi-turn **Blending Valve** to accomplish this with great accuracy. This system design maximizes the ability to accurately blend a calculated percentage of the filtered water with the product water exiting the Membrane, providing an Optimized Water to your equipment with the characteristics that you desire.


**120VAC Power Cord** (Coming from bottom rear of bracket) - Plug in to standard wall outlet.

**Emergency Bypass Valve -** User can switch from Optimized Water to Untreated Water when needed, by turning handle horizontal.

**Feed water Inlet** 3/8" Push-To-Connect - Connect to Water Supply Valve.

**3@ CTO-Q Pre-Filters PN: 300-05830**

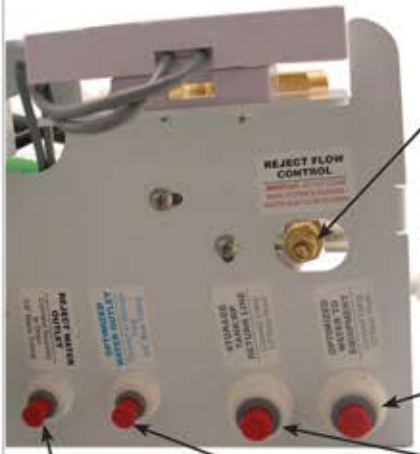
**Water Quality Indicator -** Operates momentarily, push purple button to turn on. Push "IN" button for the TDS of the water going into your equipment. Push "OUT" button for the TDS of the purified water from the membrane.

**Blending Valve** - Allows precise adjustment of optimized water TDS (mineral content).

**System Status Display & Bypass Switch** - LEDs show state of system. Bypass Switch turns Processor OFF when system is in Emergency Bypass.

**Operating Pressure Gauge** Shows feed pressure only when processor is operating (when level in storage tank is low).

### Underside of Processor:




**Reject Flow Control Valve**
NOTE: Never close Reject Flow Control Valve nor limit Reject flow to less than Permeate flow!

**Sample Port**
- 3/8" Push-to-Connect - Used to flush pre filters, gather a water sample, measure production, or drain water from storage tank.

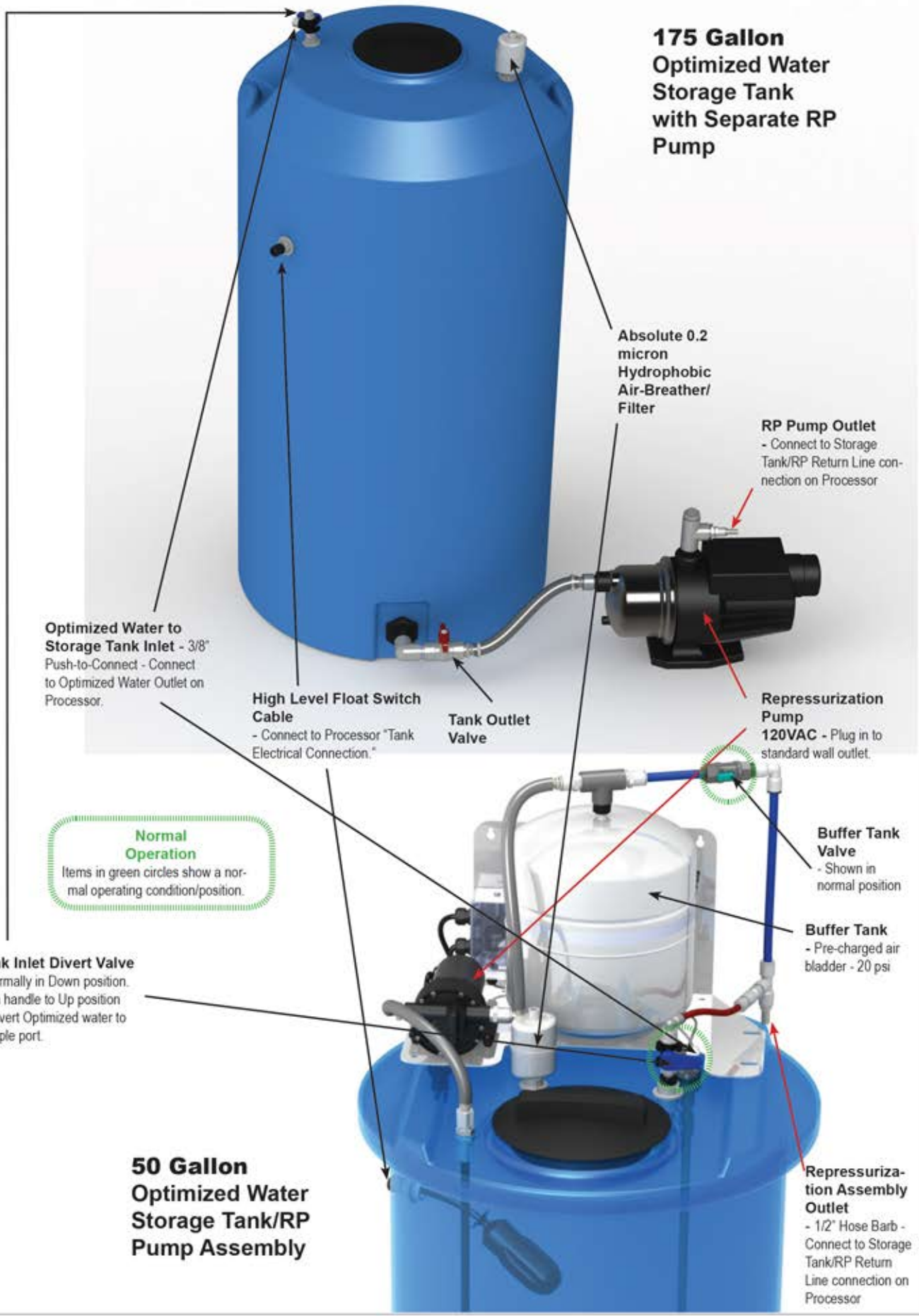
**Pressurized Optimized Water to Equipment Outlet**
- 1/2" gray hose
- Connect to End User Equipment

**Reject Water Outlet**
- 1/4" Push-to-Connect
- Connect to drain per local regulations.

**Optimized Water Outlet**
- 3/8" Push-To-Connect
- Connect to Optimized Water Storage Tank Inlet

**Storage Tank/RP Return Line**
-1/2" gray hose
- Connect to Repressurization Assembly Outlet

**Normal Operation**
Items in green circles show a normal operating condition/position.


175 Gallon
Optimized Water Storage Tank with Separate RP Pump
Absolute 0.2 micron Hydrophobic Air-Breather/ Filter
RP Pump Outlet - Connect to Storage Tank/RP Return Line connection on Processor
Optimized Water to Storage Tank Inlet - 3/8" Push-to-Connect - Connect to Optimized Water Outlet on Processor.
High Level Float Switch Cable - Connect to Processor "Tank Electrical Connection."
Tank Outlet Valve
Repressurization Pump 120VAC - Plug in to standard wall outlet.
Normal Operation
Items in green circles show a normal operating condition/position.
Buffer Tank Valve - Shown in normal position
Buffer Tank - Pre-charged air bladder - 20 psi
Tank Inlet Divert Valve - Normally in Down position. Turn handle to Up position to divert Optimized water to sample port.
50 Gallon Optimized Water Storage Tank/RP Pump Assembly
Repressurization Assembly Outlet - 1/2" Hose Barb - Connect to Storage Tank/RP Return Line connection on Processor

## Installation Requirements

This section and the next provide the water, electrical and space requirements for the BWS1500. **Pay special attention to the feed-water chemistry requirements.** Operating a system on water supplies outside of these parameters may lead to premature membrane failure. This product is for commercial use only and must be installed and maintained in accordance with manufacturer's guidelines and local regulatory plumbing and electrical codes.

### Operating parameters

| | |
|---|---|
| Typical Membrane TDS* rejection: | 97+% |
| Feed Temperature: | 40 - 100° F (4 - 38° C) |
| Feed pressure: | 50 - 80 psi (3.4 - 5.9 bar) at 3 gpm |
| Production** ***(at 77°F, 60 psi)*** | 1500 gals/day, 62.5 gals/hr, 1.0 gpm |
| Recovery: | up to 40%. |

**IMPORTANT NOTE:** The nominal production rate is strictly dependent on feed water temperature and pressure. Reduced temperature or pressure will reduce production. For example: Operating pressure of 30 psi will cut production by 50%. 48°F feedwater will cut production by 50%.

### Location

The system should be installed indoors, in the proximity of the equipment (within 25 feet) and protected from the elements. Do not let the processor or storage tank freeze or be exposed to rain or direct sunlight.

### Post-treatment

Treated water stored in a tank may absorb organic compounds from the tank, which can affect water taste and odor. If product water is for consumption, an optional post-treatment filter, such as an OptiPure FX or QT carbon filter, should be installed after the tank. If used, it is best installed as close to the point of use as possible. Other specialized post-treatment is also available.

### Feed water connection

An adequate flow and pressure of water to the unit is essential for successful operation. Provide a dedicated 3/4" water line to the vicinity of the installation. Install a full-flow ball valve and pressure gauge with 3/4" female pipe thread (user supplied) for connection to installation hardware provided with the system. A 1/2" male pipe thread x 1/2" push-to-connect adapter is included in the installation kit.

**TDS (total dissolved solids) create conductivity in water and are expressed in ppm or mg/l (parts per million or milligram per liter). System Reject % depends on blended water setting.*

***Nominal production @ 77°F (25°C) @ 500 ppm based on a 24 hr day. Actual production will vary based on variations in blend setting, water temperature, pressure, and TDS.*

### Drain

A drain should be located within 5 feet of the location of the unit. Drain must allow a minimum flow of 5 gallons per minute. Compliance with most local plumbing codes requires installation of an approved air gap in the drain line. The drain connection should be accessible for system set-up and service.

### Electrical requirements

A power source with two outlets should be located within 5 feet of the location of the unit.

| | |
|---|---|
| Processor | 120V, 60Hz 6 Amps |
| RP Pump | 120V 60Hz 8 Amps |

### Feed-water chemistry

| | |
|---|---|
| Feed TDS | Up to 1200 ppm |
| Feed pH | 6 - 10 |
| Hardness | 28 grains or less |
| Free chlorine | <2 mg/l |
| Iron (Fe) | 0.1 mg/l max. |
| Turbidity | <0.05 NTU |
| Manganese | 0.05 mg/l max. |
| Hydrogen sulfide | 0.0 mg/l |

A water analysis must be conducted before installing the system, or the information requested above can be obtained from your local water utility. If your water analysis shows that any of these parameters are not within range, additional pretreatment and/or higher frequency of maintenance may be required. Contact your OptiPure distributor for assistance. The presence of silica or flocculants such as alum or cationic polymers in the feedwater may cause membrane fouling and may require special chemical pretreatment or periodic membrane cleaning. Please note that membrane failure due to fouling is not covered by the warranty.

### Storage Tank/RP Pump

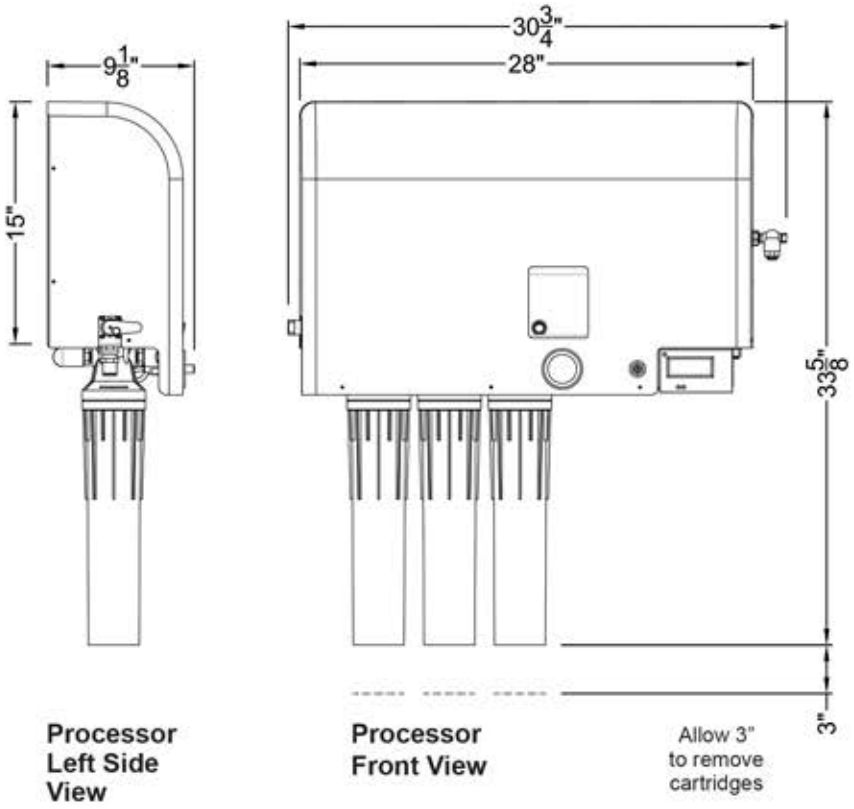
The tank must be located within 10 feet of the water processor unit. The floor beneath the storage tank should be smooth, clean and free of sharp objects that could puncture the bottom of the tank. **Note: The tank is atmospheric, with a sub-micron, hydrophobic air breather filter.**

For a 175 Gallon Tank, the separate RP Pump must be placed next to the tank at a height even with the bottom of the tank, or on a stand no more than 6" above the bottom of the tank.

### Optimized Water Lines to Equipment

Tubing, piping and associated fittings connecting Optimized water lines to equipment shoud be food grade material that meets NSF Std 51 or 61 with a minimum pressure rating of 75 PSI. Optimized water may react with most metal piping imparting a bad taste. Plastic pipe or reinforced opaque beverage tubing are acceptable choices for Optimized water distribution. The larger inside diameter tubing or hose, the better to minimize pressure drop.

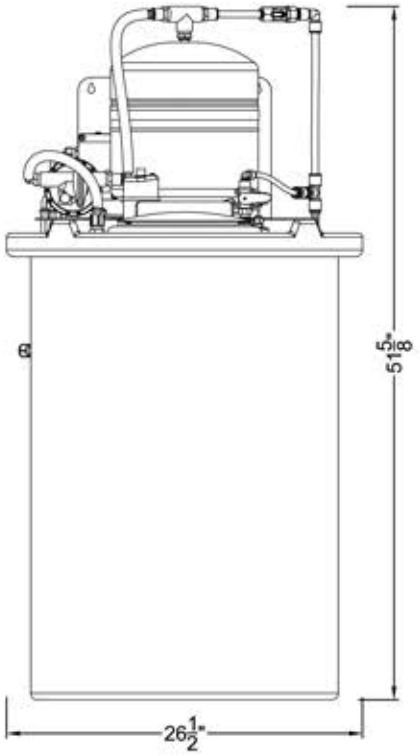
## Equipment Dimensions



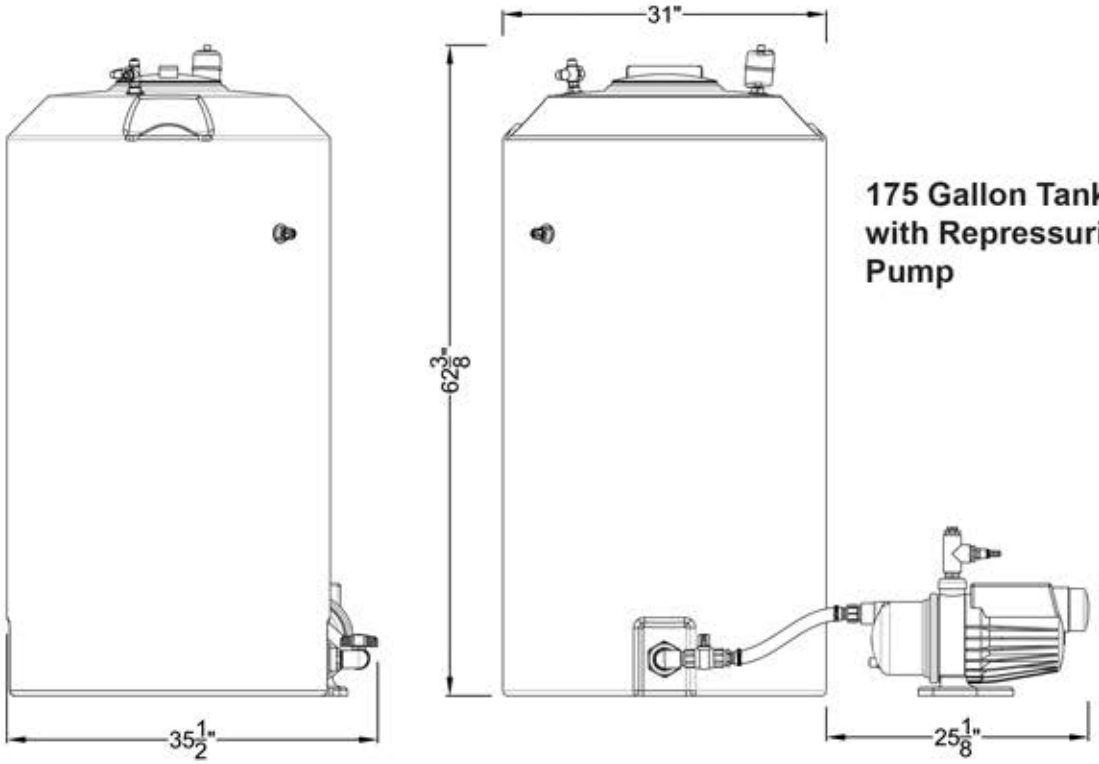

**Processor Left Side View**

**Processor Front View**

**50 Gallon Tank Repressurization Assembly**



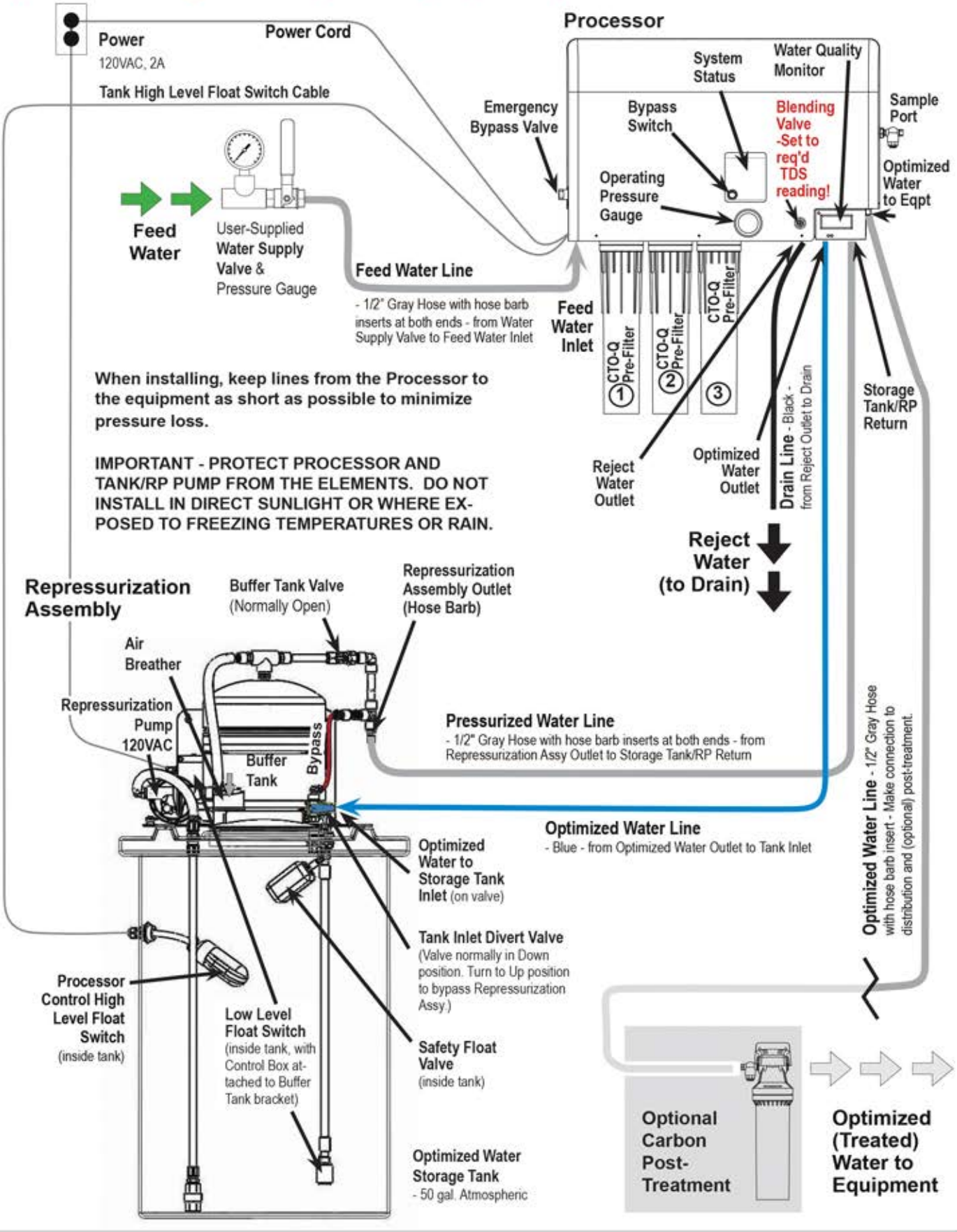

IMPORTANT - ALLOW A MINIMUM OF 24" IN FRONT OF THE PROCESSOR FOR MAINTENANCE AND SERVICE. DO NOT MOUNT SYSTEM ABOVE THE CEILING OR IN A LOCATION THAT IS NOT EASILY ACCESSIBLE. WHEN THE 50 GAL. TANK ASSEMBLY IS FULL OF OPTIMIZED WATER IT WILL WEIGH 450 LBS (THE 175 GAL. TANK, 1500 LBS). ALWAYS LOCATE THE STORAGE TANK WHERE IT CAN BE ACCESSED DURING SERVICE.




**175 Gallon Tank with Repressurization Pump**

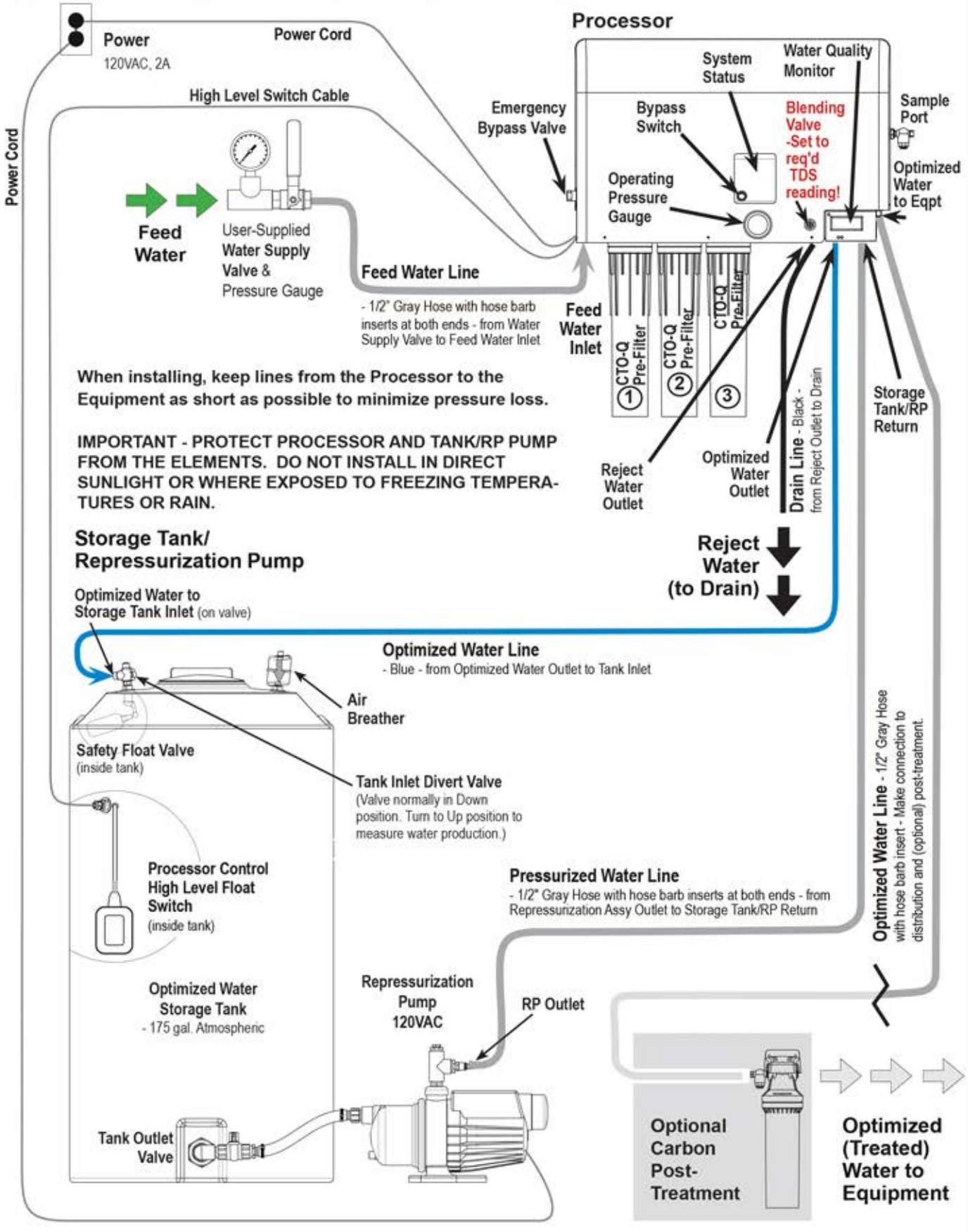
## Typical Installation with 50 Gal. Atmospheric Tank

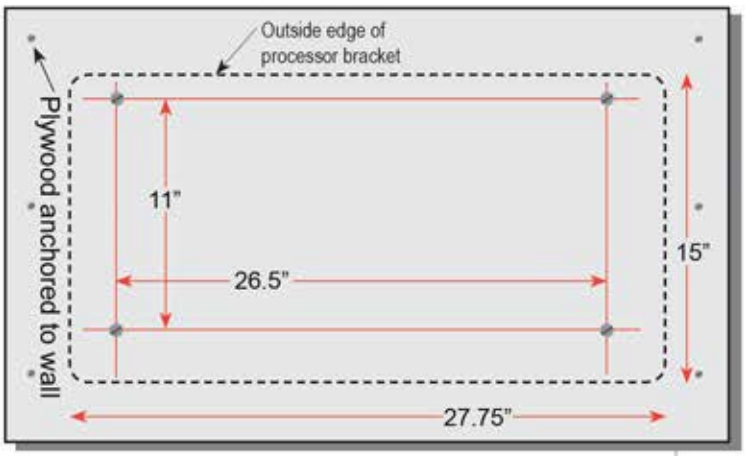
**Important: Plumbing should be performed by a qualified plumber in accordance with local codes.**



# Typical Installation with 175 Gal. Atmospheric Tank

**Important: Plumbing should be performed by a qualified plumber in accordance with local codes.**






## Wall Mounting

**Before beginning installation of the system, remove the plastic cover from the BWS1500 processor. Replace cover at the end when installation and adjustments are complete.**

The processor should always be mounted where it is well-supported, either using anchors in a cement wall, or using the support of studs in a wall-board wall. **Never mount it directly to sheet-rock alone.** Instead, mount it on a sheet of plywood which is anchored to the wall studs, as shown above.

Four user-supplied bolts or screws with a head diameter between 3/8" and 1/2" (which will fit into the keyholes in the system bracket, but will not slip out when tightened) should be used to hang the system. This will allow the unit to be lifted off the bolts, if necessary for maintenance, without removing all the bolts from the wall.

Mark the mounting screw locations with dimensions as shown above. BE SURE TO ALLOW 3" BELOW THE CARTRIDGES TO ALLOW FOR REMOVAL. Screw the four bolts or screws in place, leaving approximately 1/4" clearance between the bottom of each screw head and the wall. Position the system over the mounting screws, and let the bracket slip down into the keyholes. Tighten the screws.

## System Installation

**Note: Do not plug in the power cord from the RP pump until completing the section "System Start-Up".**

**Refer to "Typical Installation" diagram on pages 7 & 8, and "How to Use Our Quick-Connect Fittings" on the last page of this manual, when making the following connections.**

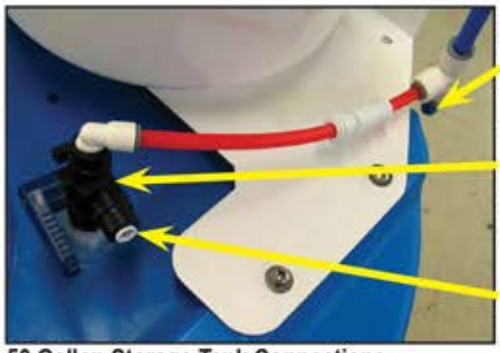
A feed water ball valve and pressure gauge (user supplied) should be installed to provide water to the system FEED WATER INLET with the 1/2" gray hose (supplied). Hose, tubing and fittings for making connections between the processor, storage tank and drain are supplied in the installation kit. Hose and tubing will need to be cut to appropriate lengths.

1. Remove the tank lid. Inside the tank, the float valve may be secured for shipping. Remove any wrapping on the float to allow it to hang and move freely.
2. DRAIN: Connect the 3/8" black tubing from the installation kit to the REJECT WATER OUTLET on the processor. Run the line to an appropriate drain. Observe local plumbing codes and supply an appropriate air gap. (Any fittings for connecting to the drain will need to be supplied by the customer.) Fix tubing in place at the drain.
3. FEED WATER: Apply 3 wraps of Teflon tape to the 1/2" FPT x 1/2" push-connect fitting (supplied). Screw the fitting into the Feed Water Supply Ball Valve and tighten (DO NOT OVERTIGHTEN). Insert one of the supplied 1/2" Hose Insert x 1/2" Tube Stem fittings into the 1/2" gray hose and secure it with a hose clamp. (See "Hose Fitting Assembly" photo.) Insert this fitting into the push-connect fitting at the Feed Water Supply. Route the hose to the Processor and cut to appropriate length. Using another Hose Insert x Tube Stem fitting, connect the other end of the hose to the FEED WATER INLET located on the Bypass Valve on the left side of the Processor.
4. PROCESSOR TO TANK: Connect a piece of the 3/8" blue tubing to the OPTIMIZED WATER OUTLET fitting on the Processor. Connect the other end of this tubing to the OPTIMIZED WATER INLET on the INLET DIVERT VALVE (see photo) at the top of the Storage Tank.

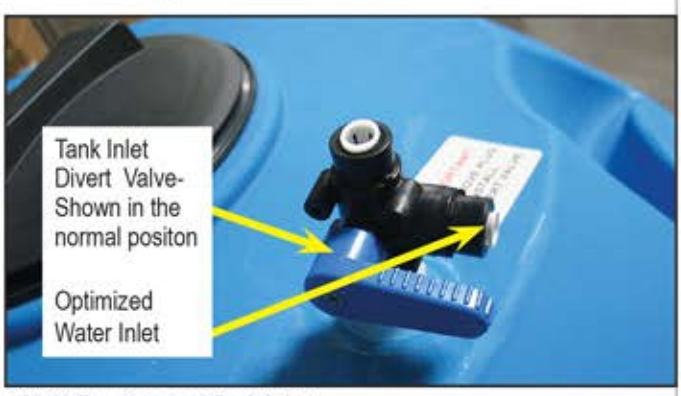
**NOTE: When cutting the tubing, use a sharp tubing cutter or blade and make a clean, straight cut before inserting into a push-connect fitting. When routing tubing, do not make sharp bends or crimp the tubing.**

5. TANK/RP PUMP - **175 Gallon Storage Tank Only**: Place the pump near the storage tank, on the floor or on a stand no more than 6" above the bottom of the tank, with the pump inlet towards the tank. Using the supplied 1" hose and large hose clamps, connect the tank outlet hose barb to the pump inlet hose barb.
6. TANK/RP PUMP TO PROCESSOR: Using two of the 1/2" hose barb inserts (supplied), a piece of 1/2" gray hose, and two hose clamps, connect hose from the REPRESSURIZATION ASSEMBLY OUTLET on the **50 Gallon Repressurization Assembly** - for the **175 Gallon Tank**, the push-connect fitting in the tee on top of the RP Pump - to the STORAGE TANK/RP RETURN LINE connection on the Processor.
7. HIGH LEVEL SWITCH CABLE: Route the cable coming from the high level switch through the hole in the rear

**Hose Fitting Assembly**




**50 Gallon Storage Tank Connections**



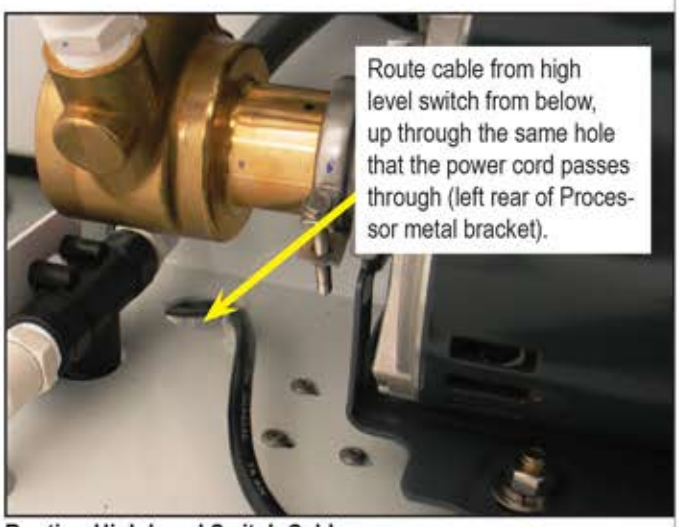

**175 Gallon Storage Tank Inlet**

**Connecting 175 Gallon Storage Tank & RP Pump**

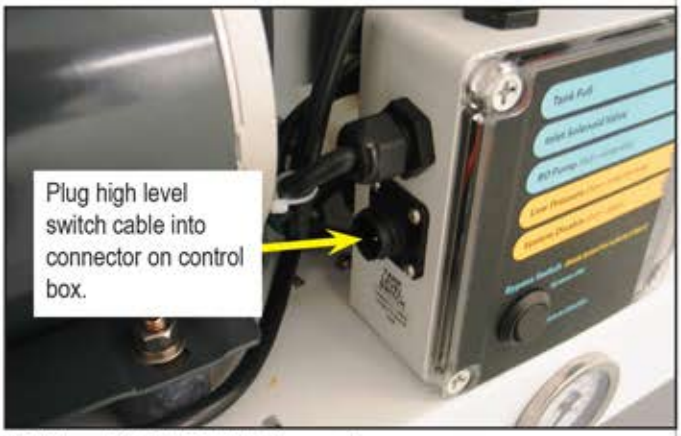
left of the Processor bracket, to the electrical control box on the Processor. Connect the AMP connector to the HIGH LEVEL SWITCH connector located on the left side of the box. (See photos.)

8. OPTIMIZED WATER TO EQUIPMENT: Connect a piece of 1/2" ID gray hose to the OPTIMIZED WATER TO EQUIPMENT outlet on the Processor with a 1/2" hose barb insert and clamp (supplied). At a later time, the other end of this line will be connected to the distribution line that will deliver Optimized Water to the equipment, but for now leave the line loose and route the loose end of the gray hose into a drain or bucket. (Make certain the hose length will reach the storage tank; this will be required for the Start-Up procedure.) Prepare any necessary plumbing to make the connection between the 1/2" hose and the distribution line, which will be completed in "Connect to Equipment".

NOTE: If Post Filtration is used, it will be installed between the Optimized Water Outlet and the designated equipment.




**Routing High Level Switch Cable**

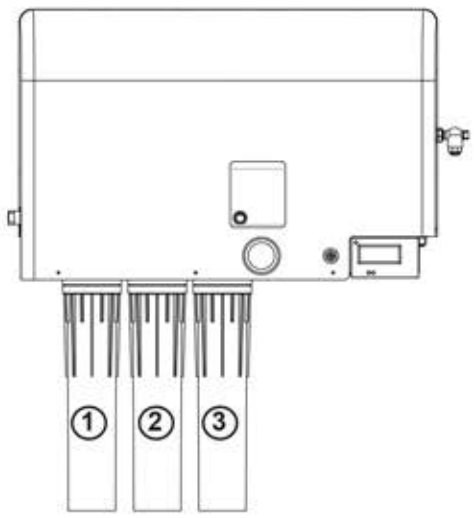



**High Level Switch Cable Connection**

## Install QT Cartridges

NOTE: Before installing the QT Cartridges make sure to remove the plugs in the QT heads on the Processor.

Insert the CTO-Q cartridges into QT heads 1, 2 & 3 (starting from the left side of the Processor) and turn to align arrows.



## Optional RP Assembly Location

For the **50 Gallon Tank only**, the Repressurization Pump and Buffer Tank assembly is on a stand that can be remote from the storage tank. If this type of installation is required, the RP Assembly should be built as a remote unit from the OptiPure, with additional installation instructions supplied.

## System Start-Up

Refer to illustrations "Typical Installation" (pages 7 & 8) and "Switch Testing" (last page of this manual).

**IMPORTANT:** Before proceeding, position the Processor EMERGENCY BYPASS VALVE in the "SERVICE" position, and position the TANK INLET DIVERT VALVE in the down position (Blue Valve Handle pointing sideways). For a **50 Gallon Tank**, assure that the BUFFER TANK VALVE is open. For a **175 Gallon Tank**, ensure that the tank outlet valve at the bottom of the tank is open (handle parallel to the valve body).

1. Open the WATER SUPPLY VALVE. Plug the processor power cord into a 120VAC outlet. Allow the filter housings to fill, and then the pump will turn on. (Water will flow into the tank and from the end of the 3/8" black tubing routed to the drain. Allow several minutes to flush the system until water flows smoothly into the tank and also from the drain line. Check all of the plumbing connections and correct any leaks if necessary.
2. Test the high level float switch. With the tank lid removed and the system running, raise and tilt the processor control float (in the tank). As you raise the float upward, the ball inside the float will roll from one end of the float to the other, activating the switch.
   - With the float in the upright position, the water processor should shut off the water flow. The pump should turn off and there should be an LED light indicating "Tank Full" on the control box.
   - Lower the float allowing the ball to drop back down. The water should begin flowing again after a delay.
3. The Storage Tank must have about 14 gallons in it to start-up and purge the Repressurization Assembly. **You can quickly fill the storage tank to the appropriate level using the "System Bypass" on the processor.** To do this:
   - Route the 1/2" gray hose from the processor OPTIMIZED WATER TO EQUIPMENT outlet directly into the storage tank lid opening.

**NOTE: Before performing the next step, be certain to firmly grip the gray hose.**

   - Turn the EMERGENCY BYPASS VALVE on the processor to the "BYPASS" position. This will allow feed water to bypass the processor and quickly fill the storage tank.
   - **When the tank fills approximately 14 gallons (1/3 full with the 50 gal. tank, or 2 feet of water in the 175 gal. tank), return the PROCESSOR EMERGENCY BYPASS VALVE to the "SERVICE" position.**

**NOTE: Before performing the next step, be certain to firmly grip the gray hose.**

4. Plug the power cord from the RP pump into the outlet. For a **175 Gallon Tank**, turn on the RP Pump (button on top of pump). Water should begin to flow rapidly from the Storage Tank to the Processor and back into the Storage Tank through the gray hose. Allow the pump to recirculate the water for several minutes until all the air is purged from the Repressurization Assembly (50 Gallon Tank), or from the RP Pump (175 Gallon Tank). As the air is purged, the pump will begin to run more smoothly and the water flowing from the gray hose will become steady.
5. Unplug the RP Pump cord.

## Connect to Equipment

Refer to the illustration "Typical Installation" on pages 7 & 8.

1. Remove the 1/2" gray hose that was routed into the storage tank (from the Optimized Water Outlet at the Processor) and make the connection to the distribution line that delivers Optimized Water to post-treatment (if used) and to designated equipment.
2. Ensure that any manual or automated valves on the connected equipment are closed. Plug the RP Pump power back in (and turn it on if a **175 Gallon Tank**). The pump will run and build pressure (on a 50 Gallon Tank, it will fill the Buffer Tank until the pressure in the Buffer Tank reaches 70 psi), and then the RP Pump will shut off.
3. Open downstream valves at the equipment to allow water to flow and air to purge through the post-treatment (if used) and from the distribution lines. When purging distribution lines **do not allow the water level in the storage tank to drop below the bottom outlet fitting (on 175 Gallon Tank). On a 50 Gallon Tank, the pump will shut off automatically if the water level drops too low. (Add more water to the tank if necessary.)** Once distribution lines are flushed and all air is purged, close the equipment valves. When there is no demand for water the RP Pump will shut off automatically.
4. Before proceeding, follow these steps to empty the storage tank of untreated feed water:
   - Connect a piece of 3/8" blue tubing into the push-to-connect fitting of the SAMPLE PORT VALVE on the right side of the processor, and route the other end of the tubing into a drain or bucket.
   - Open the Sample Port Valve to drain water from the storage tank. When the pump begins to suck air (or, with a 50G tank, it shuts off), close the Sample Port Valve.
5. Replace and tighten the lid onto the storage tank.

## System Blend Adjustment

**IMPORTANT: The TDS Blend must be properly adjusted before operating the connected equipment. If you do not know the "TARGET TDS" SET THE BLEND "IN" between 60 and 80.** The owner/operator should consult with their OptiPure Dealer or contact the OptiPure factory for assistance in determining an appropriate TDS Target Range.

**An improper TDS Blend setting or failure to properly maintain the system can cause damage to equipment.** Factors that can impact the TDS of the Optimized Water include changes in water pressure and temperature,

seasonal changes in water quality, and municipal source blending practices. To assure maintaining your target TDS range year-round we recommend periodically checking the "IN" TDS and making adjustments as needed.

**Optimized Water TDS - Blending Adjustment**

1. Allow the system to operate for at least 5 minutes before continuing to Step 2.
2. Push the purple "POWER" button on the Water Quality Monitor located on the upper left corner. It will immediately display the "IN" or Optimized Water - TDS (Total Dissolved Solids) in PPM (parts per million). By adjusting the blend valve you are able to change the "IN" TDS to the desired Target Range.
3. Within 30 seconds, push the "OUT" button to display the Permeate Water TDS (from the RO membrane).
4. If the "IN" TDS is outside of the desired range:
   - Turn the Blending Valve knob counter-clockwise to open the Blending Valve, increasing the amount of Filtered Water blending with the RO water, thereby increasing the TDS of the Optimized Water.
   - Turn the Blending Valve know clockwise to close the Blending Valve, decreasing the amount of Filtered Water blending with the RO water, thereby decreasing the TDS of the Optimized Water.
5. Once the desired TDS is obtained allow the system to run for several minutes, periodically checking the "IN" TDS. Make smaller incremental adjustments as necessary until the TDS "Target" is achieved.

## Complete the Installation

**Transition to Owner/Operator**

The FINAL STEP is to meet with the Owner/Operator, familiarize them with the system and complete the **Post-Installation Check List.**

The system is now in "normal operating" mode and the storage tank will fill with Optimized Water from the Processor. Complete the **"Post Installation Checklist"** to **Confirm Normal Operation and System Settings**.

**Allow the storage tank to fill before beginning operation of the connected equipment.**

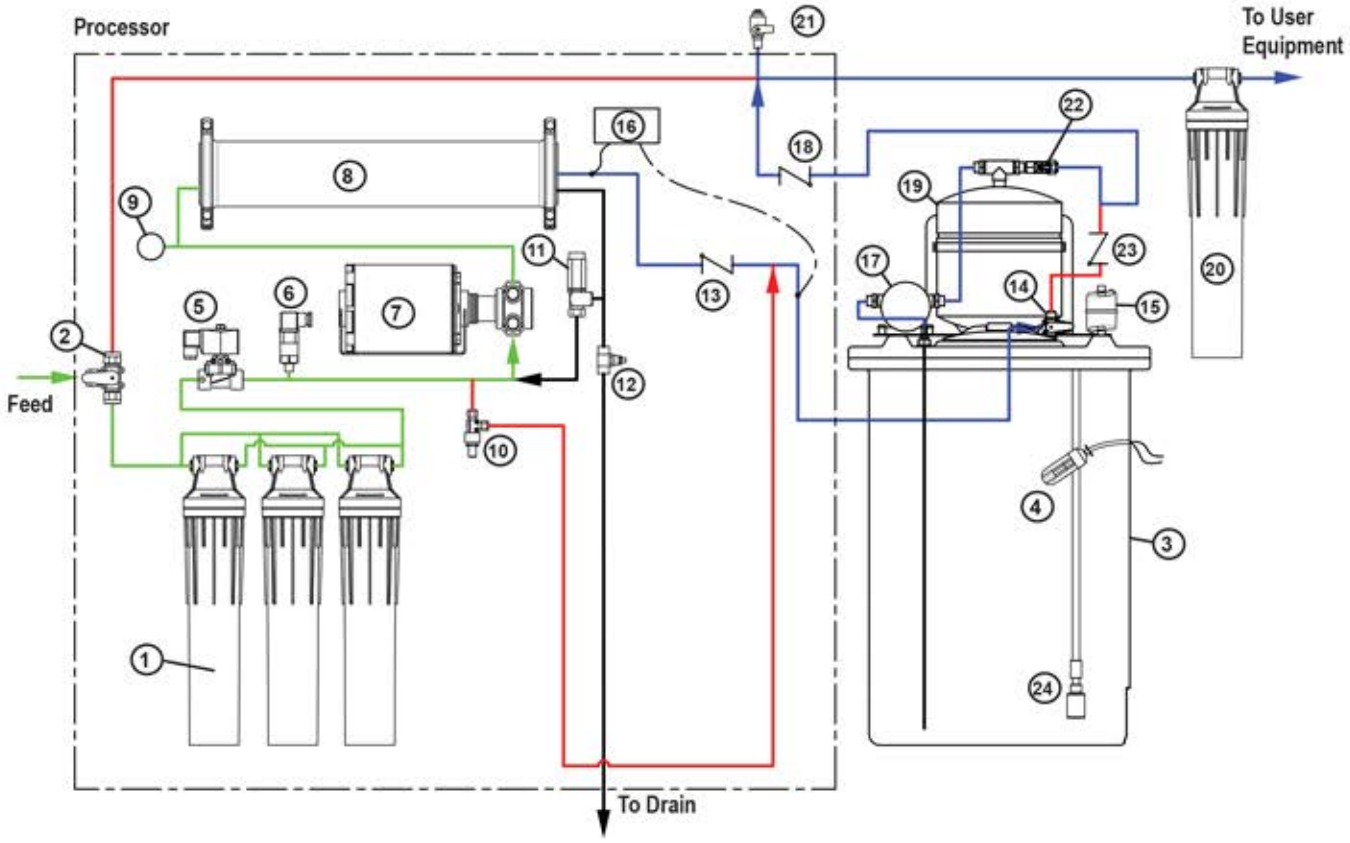
## Emergency Bypass Operation

The System Bypass is used for any interruption of Optimized Water flow (such as filter change or component failure), to bypass the processor and RP assembly and allow flow of tap water to the equipment. To place the system in Bypass mode, place the Bypass Switch on the Controller in the "System Disable" position to turn off the Processor Pump. Unplug or turn off the RP Pump. Turn the Emergency Bypass Valve on the Processor to the "System Bypass" position. When normal operation is restored, toggle the Bypass Switch, plug in/turn on the RP Pump, and turn the Bypass Valve to the "Service" position.

## What are all those parts and what do they do?

**This section will give you an overview of how the system works. Refer to diagram on following page.**

- Incoming water is filtered by the prefilters (1), which remove sediment, chlorine and organics.
- When the Emergency Bypass Valve (2) is in the normal SERVICE mode, water flows through the Processor. When the Bypass Valve (2) is in System Bypass mode, the water is diverted directly out to the equipment, bypassing both the Processor and the Tank/RP Pump.
- When water in the Storage Tank (3) is at a low storage level, the High Level Float Switch (4) drops, causing the Switch to close, causing the Solenoid Valve (5) in the Processor to open and allowing filtered water to flow through the Processor. The Pressure Switch (6) closes when there is sufficient water pressure to operate the system, allowing the Pump (7) to operate, pressurizing the water flowing to the Membrane (8). The Membrane feed water pressure is indicated by the Operating Pressure Gauge (9). Some filtered water is also diverted away through the Blending Valve (10).
- The water flowing to the Membrane (8) is split by the Membrane into a pure water stream ("permeate") and a reject water stream. The Pressure Regulator Valve (11) allows some of the reject water to recirculate back to the Pump (7). The rest of the reject water, controlled by the Reject Flow Control Valve (12), flows out to the drain. Recirculating a portion of the reject water causes a higher flow velocity through the Membrane, serving to clean the Membrane surface and increase Membrane life.
- The pure water stream from the Membrane continues through the Permeate Check Valve (13), blends with the metered filtered water from the Blending Valve (10) to create an Optimized water stream which then goes on to the Storage Tank (3) through the Tank Inlet Divert Valve (14) on top of the Tank. Air in the tank is displaced by the incoming water and vented out of the Sub-Micron Air Breather (15).
- When the tank completely fills, the High Level Float Switch (4) rises, causing the switch to open, causing the Solenoid Valve (5) to close, stopping the flow through the Processor.
- When the "IN" button is actuated on the Water Quality Monitor (16), it measures the TDS of the Optimized Water in the Optimized Water Line going to the storage tank. When the "OUT" button is actuated, the Water Quality Monitor (16) indicates the TDS of the pure water




stream exiting the Membrane (8). The Water Quality Monitor is battery powered with two AA batteries. It will automatically shut-off after 30 seconds.

- As long as the Low Level Float Switch (24) detects a minimum level of water in the Tank, the Repressurization ("RP") Pump (17) is enabled to draw from the Atmospheric Storage Tank (3) and dispense Optimized water by way of the Buffer Tank (19 - on a 50 Gallon Tank only) through the Processor and the Pressurized Water Check Valve (18). (Note that, due to the design of the RP Pump used with the 175 Gallon Tank, no Buffer Tank and no Low Level Float Switch are needed.) When the pressure drops in the Buffer Tank (with 50 G Tank) or downstream (with 175 G Tank), the RP Pump runs until pressure is restored, then shuts off.
- The Optional Post-Treatment Filter (20) is designed to provide additional treatment based upon specific application requirements. For beverage applications an activated carbon filter is recommended.
- As Optimized Water is dispensed from the storage tank by the Repressurization Pump (17), air is replaced in the tank through the Sub-Micron (0.2 micron) Air Breather (15).
- If the RP Pump (17) fails, water flow can be restored to the equipment by turning the Emergency Bypass Valve (2) to the "SYSTEM BYPASS" position. (The Bypass Switch on the Controller must also be placed in the "System Disable" position.) This allows tap water to bypass the processor and RP assembly.
- A Sample Port (21) allows sampling and draining of Optimized Water from the Tank (drain by closing the Feed Water Valve or unplugging the Processor to stop filling of the Tank, and opening Sample Port) .
- The Tank Inlet Divert Valve (14) and/or Sample Port (21) additionally provide(s) the ability to measure membrane production. With a 175 Gallon Tank/RP Pump, this is done by turning the Tank Inlet Divert Valve (14) to the bypass or UP position and sampling at the Tank Inlet Divert Valve. With a 50 Gallon Tank/Repressurization Assy, this is done by closing the Buffer Tank Valve (22), turning the Tank Inlet Divert Valve (14) to the bypass or UP position and opening the Sample Port (21). This diverts the permeate through the Bypass Check Valve (23) and back to the Sample Port (21) at the Processor where permeate can be sampled. Note that on a 175 Gallon Tank/RP Pump, there is neither a Buffer Tank Valve (22) nor Bypass Check Valve (23). Instead, there is a Tank Outlet Valve at the bottom of the Tank.

## Repressurization Pump Details

**50 Gallon Tank**

The Repressurization Assembly with a 50 Gallon Storage Tank includes a diaphragm pump controlled by an internal Pressure Switch, and a Buffer Tank between the Pump and the downstream equipment maintains downstream pressure. Water demand for downstream equipment is directly supplied from the Buffer Tank, and deman can go on and

off as necessary. The RP Pump is not directly affected by downstream demand, and downstream equipment is also not affected by the automatic starting or stopping of the RP Pump. When the pressure drops sufficiently in the Buffer Tank, the Pump starts automatically and repressurizes the Buffer Tank. The operating pressure for the Buffer Tank is preset (to 70 psi) and is NOT field adjustable. The pump also incorporates check valves to keep the Buffer Tank and downstream line pressurized. The pump is equipped with auto-reset, thermal overload protection and is designed for intermittent duty.

**If the pump runs erratically, allow the pump to run to open drain with valve fully open to purge air from the pump head. Disconnect the power and reconnect several times to facilitate air purging.**

The pump will prime only if all the pressure is relieved from the outlet port. The pump is self-priming up to 11 ft. The pump can run dry but will overheat and the pump overload will shut the pump off.

**175 Gallon Tank**

The Repressurization Pump with a 175 Gallon Storage Tank is a demand-controlled pump that maintains pressure downstream at all times. It shuts off automatically when there is no demand for water.

As long as the Pump is placed at a height even with the bottom of the tank, it will have a flooded suction from the tank and will not require priming.

## Storage Tank Level Controls

(See also the Electrical Schematic at the end of this manual.) When the Storage Tank becomes full, the High Level Float Switch shuts off the Processor, preventing flow to the Tank.

**50 Gallon Tank Low Level Control**

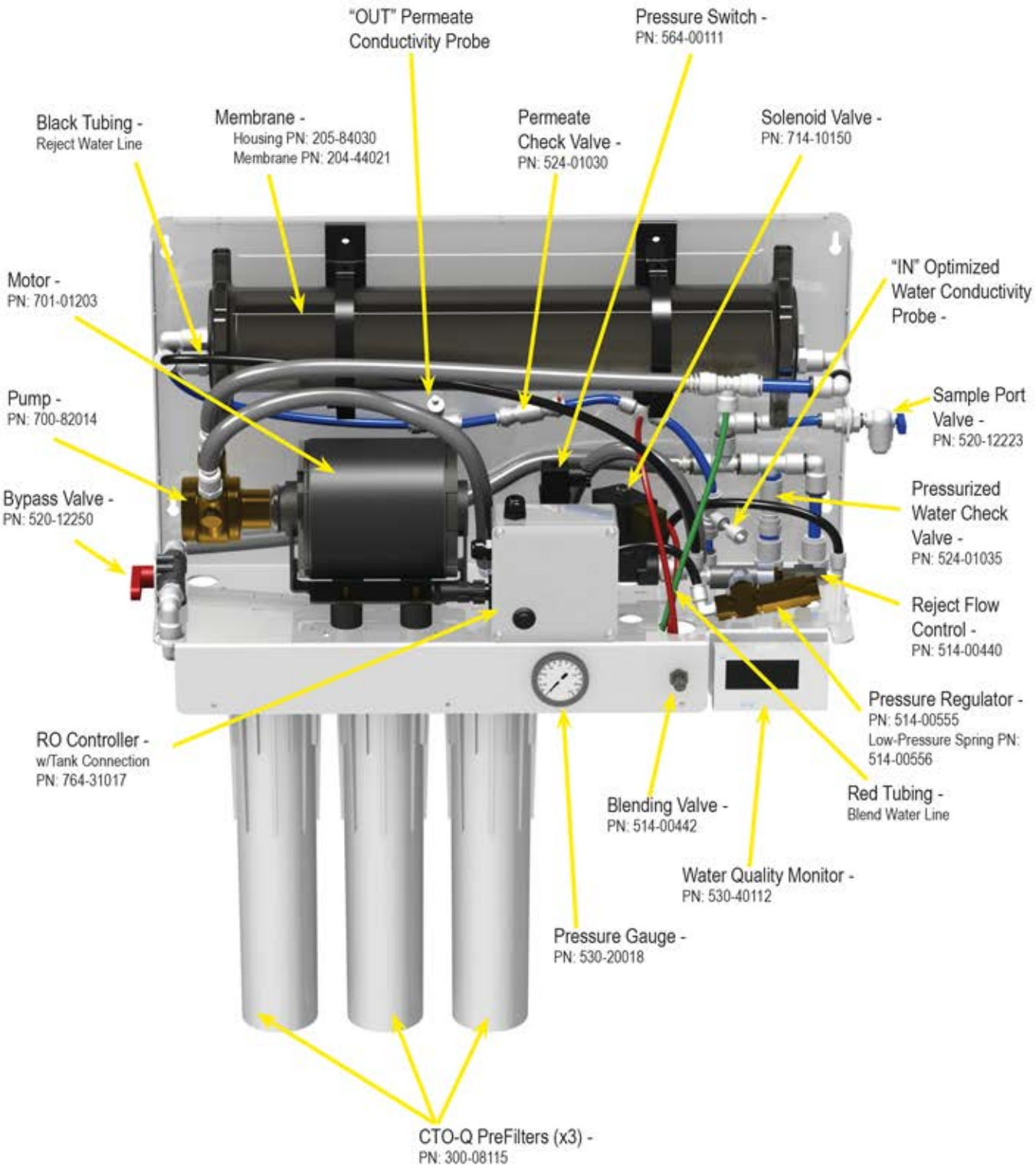
For a 50 G Tank, if the tank is empty, the Low Level Float Switch automatically shuts off the RP Pump. As long as the power cord from the Tank/RP unit is plugged in, and there is a minimal amount of water in the Storage Tank, the green light is illuminated on the Control Box (attached to the Buffer Tank bracket), indicating that power is supplied to the RP Pump. This light means the RP unit is enabled, even though the RP Pump may be automatically turned off when the Buffer Tank is pressurized and operation of the Pump is not needed.

**Low Level Float Switch Indicator light**

**175 Gallon Tank Low Level Control**

For a 175 G Tank, there is no Low Level Float Switch. The RP Pump will automatically shut off if there is no water in the tank.

## BWS1500 Processor Components



## 50 Gallon Tank RP Assembly Components

Buffer Tank -
PN: 340-50004

Buffer Tank Valve -
PN: 520-14501

Low Level Control Relay -
(in Control Box)
PN: 740-01290

Tank Bracket -
PN: 594-80510

RP Pump -
PN: 704-35513

Bypass Check Valve-
PN: 524-01030

Air Breather -
PN: 300-40005

RP Assy Outlet -
1/2" Hose Barb Insert,
PN: 550-08730
Connect to equipment inlet.

Tank Inlet Divert Valve -
PN: 520-12225
In normal operation, handle should be down (horizontal). For measuring water production or purging air from system, turn Divert Valve handle up.

Float Valve -
(inside tank beneath inlet)
PN: 520-01203

Optimized Water Inlet -
Connect line from Optimized Water Outlet on BWS1500 processor.

High Level Float Switch -
(inside tank)
PN: 740-01120
Controls Processor. When tank is full, float switch is in up positon and switch inside float is open, causing Processor to shut off.

Low Level Float Switch -
(inside tank)
PN: 740-01116

Foot Valve -
(inside tank, at base of pump suction tube)
PN: 520-10221

50 Gal Storage Tank -
PN: 570-00056

# 175 Gallon Tank/RP Pump Components

**Tank Inlet Divert Valve -**
PN: 520-12225
In normal operation, arrow on handle of valve should point down towards tank. For sampling Optimized Water Quality or purging air from system turn Divert Valve handle so the arrow points up towards the Sample Port.

**Optimized Water Inlet -**
Connect line from Optimized Water To Storage Tank Outlet on BWS1500 processor.

**Float Valve -**
(inside tank)
PN: 520-01203

**Air Breather -**
PN: 300-40005

**175 Gal Storage Tank -**
PN: 570-00062

**High Level Float Switch -**
(inside tank)
PN: 740-01120
Controls Processor. When tank is full, float switch is in up positon and switch inside float is open, disconnecting power to Processor.

**Tank Outlet Valve Assy -**
Connect to RP Pump with 1" hose

**RP Pump -**
PN: 704-10335

# Product/Reject Flow Rate Adjustments

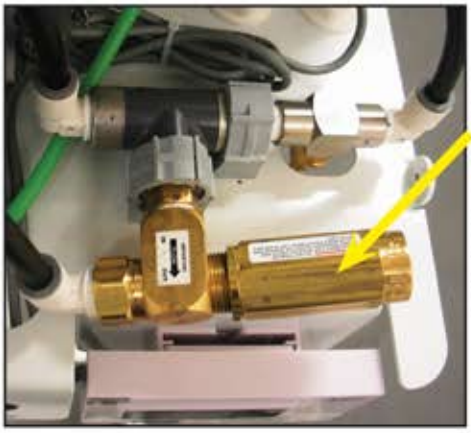
**Introduction**
The Reverse Osmosis membrane uses pressure to allow pure water molecules to filter through its semipermeable membrane separating pure water from dissolved solids (salts) and other contaminants. In essence the membrane splits feed water into two separate streams. One stream is the water produced for use (product or pure water), and the other contains the salts and contaminants filtered out by the membrane (reject) carried away to the drain. The OptiPure BWS1500 is designed to produce water at a 30% recovery rate which means it uses water at a ratio two gallons of reject water for each gallon of pure water produced. This is a **Product/Reject Ratio of 1/2**.

The "pure water" produced by the membrane is not always appropriate for use with food service equipment. The BWS1500 system also allows blending filtered water with the pure water to produce **Optimized Water** which can be adjusted to provide the ideal characteristics for food service equipment applications. Instructions for blending Optimized water are on page 11.

**Each system is adjusted at the factory for the proper operating parameters.**
In most cases the factory setting should not be changed. However, due to certain conditions, an adjustment may produce better operating efficiency and membrane performance. Conditions that can influence the ideal Product/Reject Flow Rate Ratio include feed water quality (TDS level, Turbidity and specific contaminants such as iron and silica), water temperature and water pressure. The determination of whether to make a Product/Reject Flow Rate adjustment is complex. An understanding of your water chemistry and operating conditions is necessary in order to safely deviate from the factory setting. **It is strongly recommended that you contact your OptiPure dealer or the factory for assistance before changing the factory setting.**

**Permeate Flow Rate Adjustment**
The processed water (permeate) flow rate is directly proportional to the system operating pressure (e.g. higher pressure = higher flow, lower pressure = lower flow). The system is set at the factory for proper operation at 70° F. The operating pressure can be increased to compensate for low temperature feed water, but only if the water temperature will not later go up without a corresponding adjustment being made to the operating pressure. The maximum safe permeate flow rate is **1200 gpd/50 gph/0.83 gpm (4500 liters per day/190 liters per hour/3200 milliliters per minute)**. Under no condition is it safe to operate the system at higher permeate flow rates. Likewise, if your water temperature is higher than 70° F, you should reduce the operating pressure to bring the permeate flow rate down to 1200 gpd. If you increase the operating pressure to compensate for cold water in the winter, be sure to reduce the pressure once the water warms up. Before making any adjustment, turn the Blending Valve clockwise until it is closed all the way. Remove Processor plastic cover. Locate the pressure regulator on the right side of the Processor (see photo). Loosen the lock nut on the regulator handle.

**NOTE: The handle of the regulator should never be loosened by more than a turn or two, as loosening all the way will allow the handle to come off and water to spray out of the regulator.**



Pressure Regulator (Permeate Flow Control)
Adjust with Blend Valve Closed

**Do not raise the operating pressure higher than 150 psi.**

To increase the system operating pressure (and permeate flow rate), turn the knob of the pressure regulator clockwise. To decrease the pressure, turn it counterclockwise. After achieving the desired pressure, tighten the lock nut on the regulator. See "Measuring Product Flow Rate" on the next page.

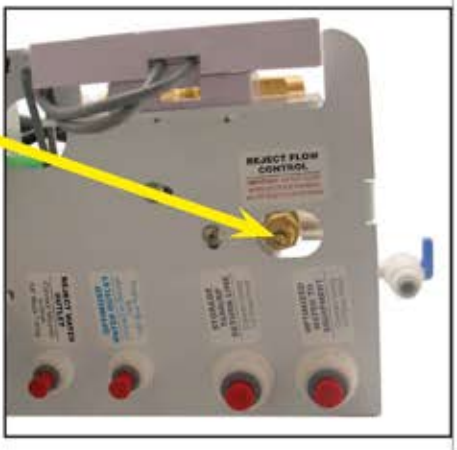
**Reject Flow Rate Adjustment**
The **Reject Flow Rate** is the amount of water used to carry away the impurities rejected by the membrane. It is critical that both the Product Flow Rate and the Reject Flow Rate are measured to confirm the desired Product/Reject Ratio has been achieved. The higher the ratio of product flow to reject flow, the shorter the life of the membrane will be.

**IMPORTANT: Never close the Reject Flow Control Valve, and never adjust it such that the Reject flow rate is less than the Permeate (Product) flow rate! This will cause premature fouling and shorten membrane life.**

To adjust the reject flow rate, locate the reject flow control valve. Loosen the lock-nut (at the base of the valve stem) just slightly.

IMPORTANT: Before adjusting Reject Flow Rate **CLOSE** the BLENDING VALVE (turn clockwise all the way).

Reject Flow Control
(Adjust with Blend Valve Closed)
– Never close it nor limit Reject flow to less than Permeate flow!



## Operating Parameters

| Ratio Product/ Reject | Oper Temp (°F) | PRODUCT FLOW RATE (gal/day) | (gpm) | (L/day) | (lpm) | REJECT FLOW RATE (gal/day) | (gpm) | (L/day) | (lpm) |
|---|---|---|---|---|---|---|---|---|---|
| 1/2 | 48 | **600** | **0.42** | **2270** | **1.6** | **2400** | **1.7** | **9000** | **6.3** |
| 1/2 | 60 | **816** | **0.57** | **3090** | **2.2** | **2400** | **1.7** | **9000** | **6.3** |
| 1/2 | 70 | **1040** | **0.72** | **3950** | **2.7** | **2400** | **1.7** | **9000** | **6.3** |
| **1/2** | **77** | **1200** | **0.83** | **4540** | **3.2** | **2400** | **1.7** | **9000** | **6.3** |
| 1/2 | 85 | **1360** | **0.95** | **5150** | **3.6** | **2400** | **1.7** | **9000** | **6.3** |

- The flow rates above are for 60 psi feed pressure.
- To convert gallons per minute (gpm) to ounces per minute, multiply gpm by 128.
- To convert gallons per minute (gpm) to milliliters per minute, multiply gpm by 3785.

To increase the reject flow rate, use a slot screw driver to turn the valve stem counterclockwise. To reduce the reject flow rate, turn it clockwise. A minor adjustment makes a big difference in the flow rate, so begin with small (1/2 turn) adjustments. After making an adjustment, measure the reject and product water flow rates (described below). Make additional adjustments until the desired Product/Reject Ratio is achieved, then tighten the lock-nut.

Use the "Operating Parameters" table above as a guideline for safe operating flow rates and ratios. This table provides an indication as to how Feed Water temperature affects the Product Water output of the system.

**Measuring Product Flow Rate**
Connect a piece of 3/8" tubing to the Sample Port on the Processor and route it to a bucket or drain. If equipped with a **175 Gallon Tank/RP Pump**, connect another piece of 3/8" tubing to the top port of the Tank Inlet Divert Valve and also route it to a bucket or drain. If the tank is full, turn the Sample Port valve to the sample position and allow about 20 gallons to drain out of the storage tank, then close the Sample Port valve. Turn the Tank Inlet Divert Valve to the divert position (Up). If equipped with a **50 Gallon Tank/ Repressurization Assembly**, then also close the Buffer Tank Valve on the Repressurization Assembly and open the Sample Port on the Processor. While the system is operating in normal mode (Emergency Bypass Valve in Service position), use a graduated cylinder or other measuring vessel to collect and measure the amount of Permeate water that is produced in 60 seconds. **With a 50 Gallon Tank/ Repressurization Assembly**, this water will be collected from the Sample Port on the Processor. **With a 175 Gallon Tank/RP Pump**, this water will be collected from the tubing connected to the Tank Inlet Divert Valve on the top of the Tank. To convert ounces per minute to gallons per minute, divide ounces/min by 128. To convert milliliters per minute to gallons per minute, divide ml/min by 3785. Multiply gpm times 1440 to get gallons per day production.

When finished, turn the Tank Inlet Divert Valve to the Down position and (**with a 50 Gallon Tank/Repressurization Assembly**) close the Sample Port and open the Buffer Tank Valve.

**Measuring Reject Flow Rate**
Access the Reject Drain Line and measure the flow in a similar way to that described in "Measuring Product Flow Rate." (Collect and measure reject flow for 60 sec, and convert if necessary to gal/day. No operation of valves is necessary for this.)

**Limitations on Adjustment of Reject Flow Rate**
The factory sets the Product/Reject Ratio to 1:2 with the Blending Valve closed based on 60 psi Operating Pressure and 77°F. Never close Reject Flow Control Valve nor limit Reject flow to less than Permeate flow!

**The membrane is rated for a target daily output of 1200 gallons per day of Product Water when the feed water temperature is 77°F and the operating pressure is 60 psi. Do not exceed the rated output of 1200 gpd/50 gph/0.83 gpm (4500 liters per day/190 liters per hour/3200 milliliters per minute). Always keep in mind that feed water temperature and pressure will affect the Product Water output. Depending on feed water pressure and temperature it may not be possible to achieve the rated production of 1200 gpd.**

**Blending Impact on Product/Reject Ratio**
Once the Blending Valve is opened to blend Filtered Water with the RO Product Water the combined Optimized Water flow rate will be greater than the Product Flow Rate. For example, if the Feed Water TDS is 300 ppm, the membrane product water TDS will be 9-15 ppm. If your desired Optimized Water TDS is 75 ppm, then you will be adding approximately 9% of the Filtered Water to your RO product water, increasing your Optimized Water flow from 30% recovery to 39% recovery.

In this example, your daily Optimized Water Production is approximately 1540 gpd at 77°F Feed Water temperature and 60 psi Operating Pressure.

## Processor Controller Overview

The controller display will indicate the status of the Processor. The controller also manages all the automatic functions of the BWS1500 System, such as automatic flushes, stopping the pump when the tank is full, and protecting the pump by monitoring inlet pressure and controlling time delays. The following overview will provide an understanding of the primary controller functions.

**Normal Operation**

1. **System On/Running:** With power supplied to the Processor, the Feed Water Valve opened, the Bypass Valve in "Service" position, and the tank not full, the "Inlet Solenoid Valve" red LED will turn on, indicating that the valve has been opened, and the "RO Pump" LED will flash green. After a brief delay, the pump will start running and the "RO Pump" LED will be steady on red.
2. **Full Tank:** When the tank becomes full, the pump will stop running and "Tank Full" green LED will come on. When the tank has been depleted, the system will start.
3. **System Disable:** When the Bypass Switch on the front of the Controller is in the Disable position, the pump will not operate and the "System Disable" LED will flash red. Place the switch in Disable position when using the Bypass Valve to allow unfiltered water to pass through to equipment (such as during filter changes).

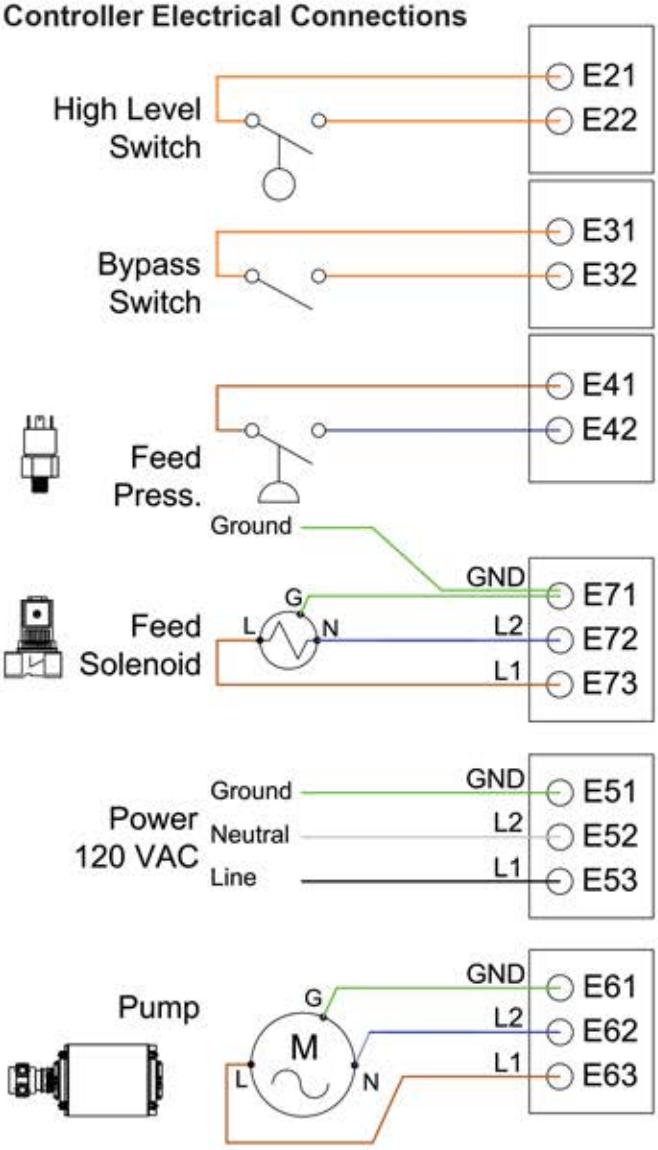
**Problem Conditions**

1. **Low Inlet Pressure Fault:** If the pressure at the pump inlet drops below 10 psi, the pump will automatically turn off, and the "Low Pressure" LED will turn on red. If sufficient inlet pressure is restored, then after a delay, the pump will be turned on again.

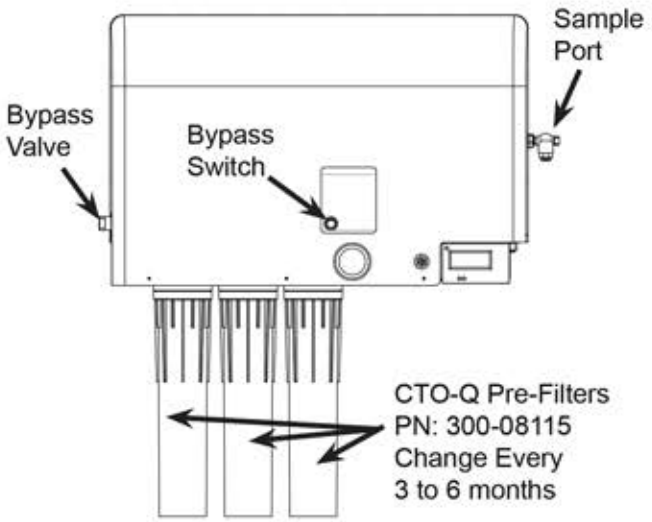
***NOTE: If low feed pressure exists, then service is required. The usual cause of low feed pressure is a prefilter assembly that has loaded up with dirt.***

2. **Low Pressure Fault Shutdown:** The controller monitors low-pressure faults, and if they occur repeatedly, it will shut down the system to protect it from incessant cycling. Once shut down, the system will not immediately startup again even if the pressure is restored. After remaining off for an hour, the system will allow startup again if sufficient inlet pressure is restored. Also see note above.
3. **Low Pressure Timeout:** When the system is turned on, the feed water solenoid valve is opened so that the controller can monitor inlet pressure. When the feed water solenoid valve is open, water can slowly pass through the processor under line pressure. To prevent indefinite processing of water under this condition (inlet pressure that is insufficient to operate normally), persistent low pressure will eventually result in a Low Pressure Fault Shutdown as above, and the feed water solenoid valve will be closed. Also see note above.

**Controller Electrical Connections**



## Routine Maintenance




Normally, the most frequent routine maintenance required on the system is periodic replacement of the carbon/sediment pre-filters and the optional post-treatment cartridge. The CTO-Q cartridges should be changed every 1 month to 2 months, depending on water usage. In areas with high levels of sediment and other contaminants the CTO-Q cartridges may require more frequent changes.

**Pre-Filter change procedure**

1. Unplug the RP Pump power cord.
2. Toggle the Bypass Switch (on the Processor control box) to turn off the Processor pump. Either close the Water Supply Valve (shutting off all water flow), or put the Emergency Bypass Valve (left side of the Processor) in the System Bypass position (allowing untreated water to continue to flow to the equipment).
3. Wait a moment for system pressure to drain off.
4. Once the system pressure has been relieved, remove the three CTO-Q cartridges by turning a quarter-turn to the left and pulling down on the cartridge.
5. Install the new CTO-Q cartridges into the QT heads by aligning the notches and pushing up, then turn a quarter-turn to the right.
6. Install a piece of 3/8" tubing in the Sample Port on the Processor **(if using a 50 Gallon Tank/RP Assy),** or in the top port of the Tank Inlet Divert Valve **(on a 175 Gallon Tank/RP)**, and direct the tubing to a bucket or drain.
7. Turn the Tank Inlet Divert Valve to the Bypass Mode (Handle Pointing UP). **If using a 50 Gallon Tank/RP Assy,** then also open the Sample Port on the Processor.
8. Open the Water Supply Valve and put the Emergency Bypass Valve in the "SERVICE" position, allowing water to run into the new Pre-Filter cartridges and through the Tank Inlet Divert Valve to drain, and purging air from the system.
9. Once the air has been purged and filters flushed, return the Tank Inlet Divert Valve to the Normal position (handle horizontal or down). **If using a 50 Gallon Tank/RP Assy,** close the Sample Port on the Processor.
10. Check for leaks.
11. Plug in the RP Pump power cord.

**Optional Post-treatment cartridge change procedure** (if applicable)

1. Close the ball valve at the inlet to the Post-Treatment assembly.
2. Remove the existing cartridge and discard.
3. Install the new cartridge.
4. Open the ball valve and the RP pump should actuate filling the housing with water.

**Storage Tank Cleaning**

If the Storage Tank becomes dirty, regular cleaning and sanitization may be required. (Request a Storage Tank Cleaning Guide from OptiPure.) The Tank can be emptied for cleaning by doing the following:

1. Close the Water Supply Valve
2. Connect 3/8" tubing from the Sample Port on the Processor to the drain.
3. Open the Sample Port. The RP Pump should operate, pumping water to the drain until the Tank is nearly empty.
4. Unplug the RP Pump power cord.
5. When finished, close Sample Port, plug in RP Pump, and open Water Supply Valve.

**RP Pump Motor Brushes**

Over time or with heavy usage, the motor brushes in the RP Pump can become worn, causing the Pump to no longer operate reliably. (See "RP Pump Does Not Turn On" under Trouble-Shooting for symptoms.) For a system with heavy usage, it may be necessary to replace motor brushes under a preventive maintenance schedule, such as annually. To restore a Pump with worn brushes, order and install **Brush Kit 704-39905**, which is supplied with instructions.

**Buffer Tank Pre-Charge Pressure**

Very slowly over time, the air pre-charge in the RP Assembly Buffer Tank can diminish, reducing the ability of the Buffer Tank to maintain downstream pressure. Annually, the pre-charge should be checked using a tire gauge on the valve, which is on the side or bottom of the Buffer Tank. If it is lower than 20 psi, air should be added to restore it to 20 psi.

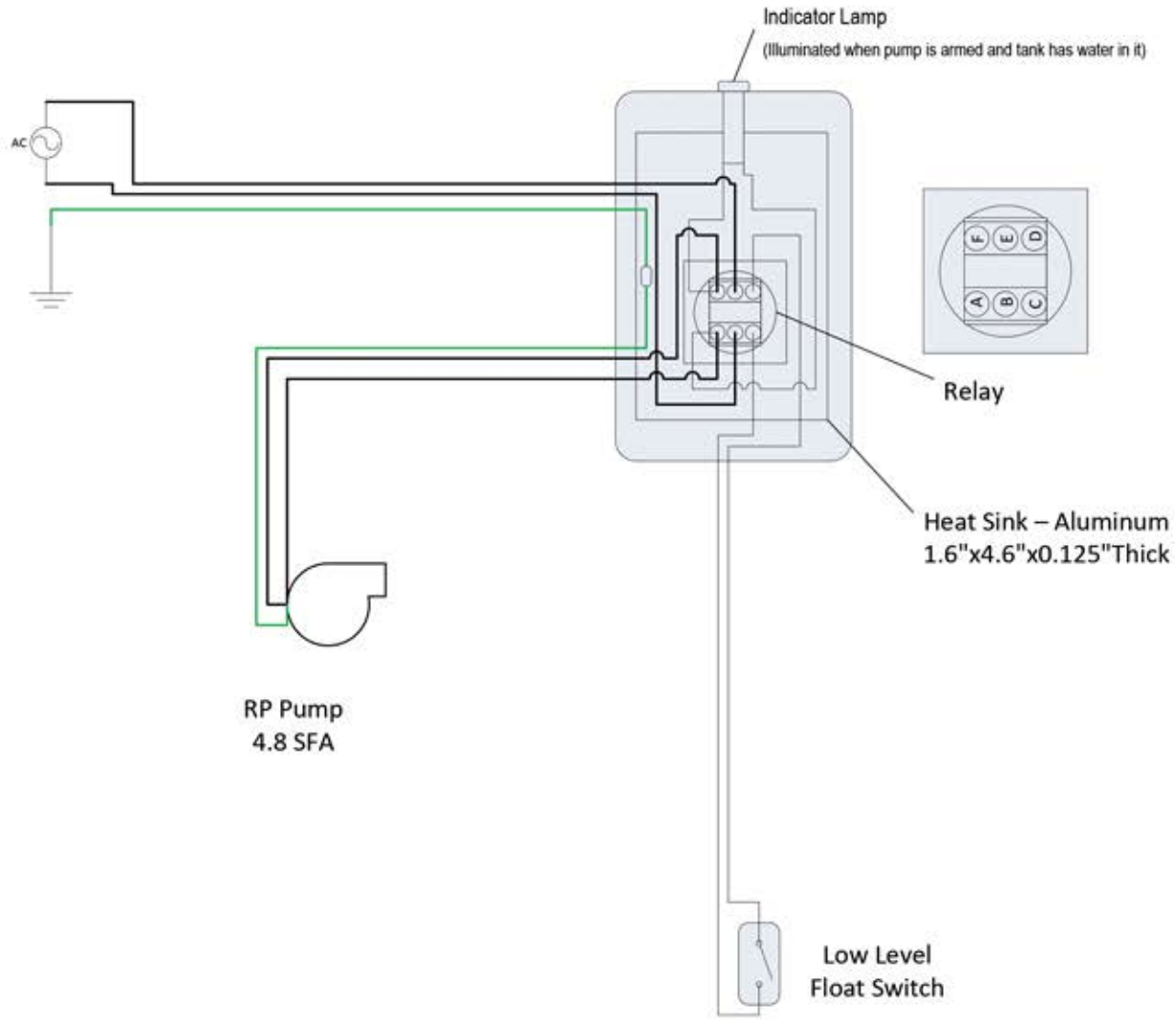
## Trouble-Shooting

| Problem | Possible Cause | Resolution |
|---|---|---|
| Running out of water. | Valves in incorrect operating position | Ensure the Processor Bypass Valve is in Service position, the Repressurization Assy (RP) Tank Divert Valve is in Down position, & Buffer Tank Valve (50 Gal Storage Tank) or Tank Outlet Valve (175 Gal Storage Tank) is Open (handle parallel to valve body). |
| | Processor or RP Pump not turning on when it should | See "Processor Does Not Turn On" and "RP Pump Does Not Turn On" below |
| | Pressure feeding pump reduced due to loaded Pre-Filters | Pre-Filters need to be replaced |
| | Very cold Feed Water temperature | Raise water temp to increase production or determine if higher capacity system is required |
| | Low Feed Water Pressure (LED will indicate "Low Pressure".) | Resolve restriction in Feed Water Supply upstream of Processor |
| | Demand exceeds system capacity | Determine if the demand is unusual or inconsistent, or resize system |
| | High Level Float Switch Open (LED will indicate "Tank Full".) | Remove Storage Tank lid and actuate Float Switch up and down |
| Poor water quality. | Blend Valve mis-adjusted | Follow steps to adjust Blending Valve |
| | Membrane failure | Replace membrane |
| Short membrane life. | Product/Reject Ratio mis-adjusted | Measure and adjust the Reject Flow Rate |
| | Poor Feed Water quality, presence of iron, silica or non-calcium carbonate hardness | Determine Feed Water quality by obtaining a water quality report from city water supply utility or contact your OptiPure dealer |
| Short Pre-Filter life | Heavy sediment loading | Add FXAF01-12 or -12B for added Pre-Filter protection |
| Processor Either Does Not Shut Off or Turn On | High Level Float Switch not functioning (LED will indicate incorrect "Tank Full" status.) | Remove Storage Tank lid and actuate Float Switch up and down. Observe "Tank Full" LED indicator on Controller.<br>Replace High Level Float Switch |
| Processor Does Not Turn On<br>(See also "Processor Either Does Not Shut Off or Turn On" above.) | Controller Bypass Switch left in OFF position (LED will indicate "System Disable") | Actuate Bypass Switch on front of controller |
| | Loaded Pre-Filters or Low Feed Water Pressure (LED will indicate "Low Pressure".) | Pump will not turn on if pressure feeding pump is insufficient. Replace Pre-Filters or resolve issue with Feed Water Pressure. |
| | Solenoid Valve not functioning | Possible Solenoid Valve issue: LED indicates "Inlet Solenoid Valve" but Operating Pressure gauge shows 0 psi. Replace Solenoid Valve. |
| | Pressure Switch not functioning | Possible Pressure Switch issue: LED indicates "Low Pressure" even though pressure is sufficient. Replace Pressure Switch.<br>(Contact OptiPure dealer for help with troubleshooting Solenoid Valve or Pressure Switch.) |
| Water Quality Monitor will not turn on | Dead batteries | Replace batteries by sliding Water Quality Monitor up and removing the six screws on the back cover. Remove cover to access battteries. |
| On 50 Gal Tank: RP Pump Does Not Turn On | No power to Pump (Green LED Off at top of Control Box - attached to Buffer Tank bracket) | If LED is On, RP Pump is operational (Pump will turn on only when the Buffer Tank is empty). If LED is Off, ensure power cord is plugged into an outlet with power (check circuit breaker), & that there is water in Tank. If LED will not turn On (with power & water in tank), there may be a problem with Low Level Float Switch or Relay. |
| | Low water level in Tank (Green LED on Control Box is Off) | Allow Processor to partially fill Tank with water. Green LED indicates RP Pump is operational, & will turn on when Buffer Tank is empty. |
| | RP Pump motor brushes worn | Try bumping the RP Pump with your hand. If it turns on temporarily, the brushes are probably worn. Order & install Brush Kit 704-39905. |
| | RP Pump damaged | (Green LED is On, Buffer Tank is empty) If bumping RP Pump yields no response, Pump could be damaged or brushes may still be worn. Call for service. |

## Trouble-Shooting, Continued

| | | |
|---|---|---|
| On 175 Gal Tank: RP Pump Does Not Turn On | No power to Pump<br>RP Pump switch Off<br>Error on RP Pump | Ensure power cord is plugged into outlet with power (check circuit breaker).<br>Press switch on top of RP Pump to turn it On.<br>Check the top of the RP Pump for errors, contact OptiPure to resolve errors. |
| On 50 Gal Tank: RP Pump runs intermittently or rough. | Air trapped in pump head.<br>RP Pump motor brushes worn | Unplug pump temporarily and open downstream valve to empty Buffer Tank.<br>See "RP Pump motor brushes worn" above. |
| On 50 Gal Tank: RP Pump cycles on-off frequently | Low air pre-charge in Buffer Tank (possible on aged system) | Empty Buffer Tank and re-charge air pressure to 20 psi. |

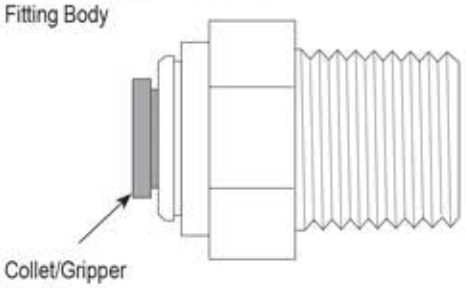
## Electrical Schematic, 50 Gal Low Level Float Switch / RP Pump



# How to Use Our Push-to-Connect Fittings

## Fitting Overview

Fitting Body

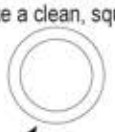


Collet/Gripper
(Dark Gray)

## Tubing Preparation

The outside of the tubing must be free of knicks and gouges.

Cut tubing with a plastic tubing cutter or a razor knife. Make a clean, square cut.



After cutting, make sure the end of the tube is round. Correct any out of roundness that may have occured in cutting the tubing.

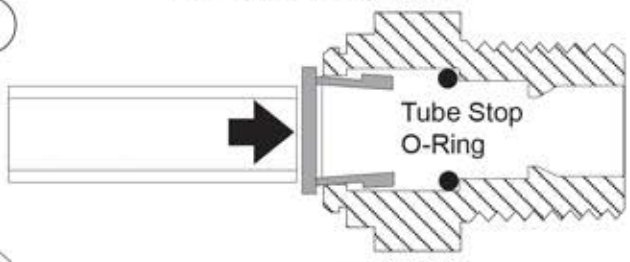
## To Attach Tubing:

To ease insertion, moisten end of tubing with fresh water or 3% hydrogen peroxide solution.

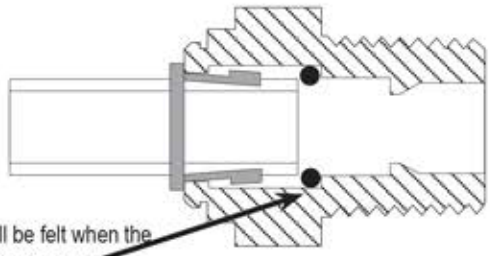
Push tubing straight in.

Cutaway view of fitting and tubing

1



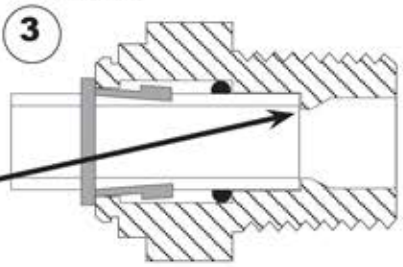

2



Resistance will be felt when the tubing meets the O ring.

3

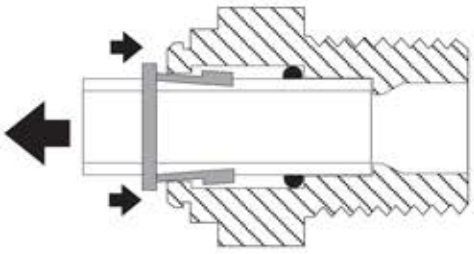
Keep pushing until the resistance is overcome and the tubing rests against the stop.



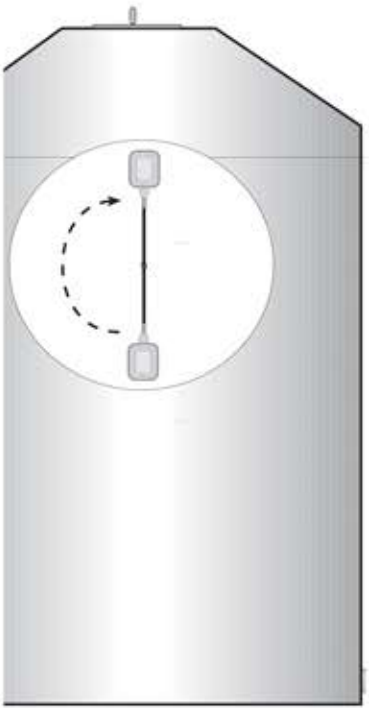
## To Remove Tubing:

Press collet in to release grippers. While holding the collet in, pull out on the tubing.

It may be necessary to use a partially open crescent wrench or similar device to hold both sides of the collet in while pulling the tubing out.



## High Level Switch Testing



**Switch Test:**
**Float UP,**
**Processor OFF**

**Float DOWN,**
**Processor ON**