PURCLEAN™
SPOT-FREE RINSE SYSTEMS

PURWATER™ RECLAIM 3.0 SYSTEM
Technical Manual

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www.purclean.com

MAKING EVERY DROP COUNT

NEWWAVE INDUSTRIES™ LTD.

MADE IN THE USA

Revision 1 February 2020

Warning!
Hazardous Voltage: Can Cause Serious Injury or Death.

- Disconnect power at main panel before connecting electrical power supply to PurWater unit panel or working on electrical connections.
- Wire unit for correct voltage. See "Installation & Operating Instructions" label on the electrical panel cover.
- Meet National Electrical Code and local codes for wiring.
- Follow wiring instructions in this manual when connecting the PurWater unit to the power source.

Caution! This system has been evaluated for use with water only. Product output is for non-potable use only.

For Assistance, Contact PurWater 800-882-8854

Table of Contents

Reclaim Water Systems

General Description

The use of reclaim water has become an important method for the car wash operator to reduce his / her operating expenses (water and sewer costs) and start-up costs (impact and connection fees). Many municipalities are now requiring the use of water reclamation systems in car wash operations and operators are continually looking for ways to increase profits. As a result, reclaim systems are becoming essential in the overall operation of the wash.

Reclaim water is the re-use of water that has already been used in the wash and recovered by the drain system in the wash bay. Most drain systems consist of a catch basin to settle out the large solids, followed by a series of underground settling tanks to remove oil and grease, floatable materials and settle-able solids. Overflow water from the last reclaim tank is then discharged to sewer or through an oil / water separator and then to a sewer.

Water from the reclaim tanks contains solids that have not settled within the tank. These solids are typically small in size (less than 150 microns) and consist of clay and silt. These solids can increase wear on pumps, piping and nozzles, and increase the potential of plugging nozzles. The environment inside reclaim water tanks will promote unwanted biological growth. Anaerobic bacteria grows in the absence of oxygen, this bacteria will grow in the reclaim tank. Anaerobic bacteria produces hydrogen sulfide and methane gas that has an odor similar to rotten eggs. A properly designed reclaim system must both remove solids and provide odor control.

A PurWater reclamation system takes water from the last compartment of the reclaim tank and treats it further so that the quality is acceptable for re-use in the wash. The PurWater reclaim system also returns a portion of the water back to the reclaim tank to provide biological / odor control. Reclaimed water that is treated by a PurWater system can then be used for the undercarriage, side panel blasters, mitters, high pressure rinse cycles, and landscape irrigation. Using reclaimed water on these applications greatly reduces the overall amount of city water required by the wash. It also reduces the amount of water discharged to sewer. The Reclaim treats 100% of the water entering the tanking and typically, 60-75% of the water used on the car can be reclaimed water.

PurWater Reclaim System

The PurWater Reclaim System consists of cyclonic separators to remove solids down to the 5 micron range and one of two methods (air sparger, or ozone addition) to control odor and biological growth. The system is contained on a compact frame with its own pump / motor and controls. The system will recirculate water continuously back to the reclaim tank system for odor and biological control. When a demand for reclaim water is received from the wash, the system will provide treated reclaim water at a set pressure of 40psi.

General Description (Cont)

PW 050/100/200/300/350/400-M5 (5 Micron) Series Systems

The PW 050/100/200/300/350/400-5M series systems consist of high efficiency cyclonic separators, a pump / motor, controls and one of two odor control systems, either an air sparger, or ozone addition. The standard systems are designed to treat 30, 60, 90, 120, and 160 Gallons Per Minute (GPM) of reclaim water. The new generation of high efficiency cyclones will remove down to 5 micron solids, so that the treated water can be used by high pressure touchless or friction in-bay automatics as well as tunnel wash applications. The system utilizes a Variable Frequency Drive (VFD) on the pump motor which is controlled by the wash demand, to vary the amount of water that is treated and delivered. Water is recirculated back to the reclaim tanks. This is a continuous process both when water is demanded by the wash and when there is no demand. Up to three different activation inputs from the wash are incorporated into the control box. The PW050/100/200/300/350/400-5M system piping also incorporates a city water intake line for use as: 1) a bypass solenoid to meet wash water demands in case the system is not operating due to a system fault; and 2) an automatic pump prime operation for system start-up.

Air Sparger

Biological and odor control are accomplished by using one of two methods, depending upon the model number supplied. The first method uses an air sparger (models ending in 5MAS), which is mounted within the reclaim tank above the water level. The air sparger will bring in air as water is passed through the sparger. The aerated water will add oxygen to the tank water which will control the anaerobic bacteria growth. The location of the air sparger is noted on page 12 showing the discharge to be 6”-12” off the surface of the water for maximum aeration.

Ozone

The other method utilizes ozone to kill the bacteria (models ending in 5M040, 5M12O or 5M24O). Ozone is a contact killing agent, similar to chlorine used in city water. Ozone (O3) is generated by concentrating the oxygen (O2) in ambient air and passing the concentrated oxygen through a high voltage electric current to produce ozone. The ozone laden gas is then inducted into the recirculation water stream and into the reclaim tank to kill the bacteria. The ozone line is terminated in a “T” as noted on page 13 and placed 3,000 gallons prior to the suction lines.

Caution: Inhaling concentrated ozone can create severe breathing problems. Precautions must be made to prevent exposure to concentrated ozone.

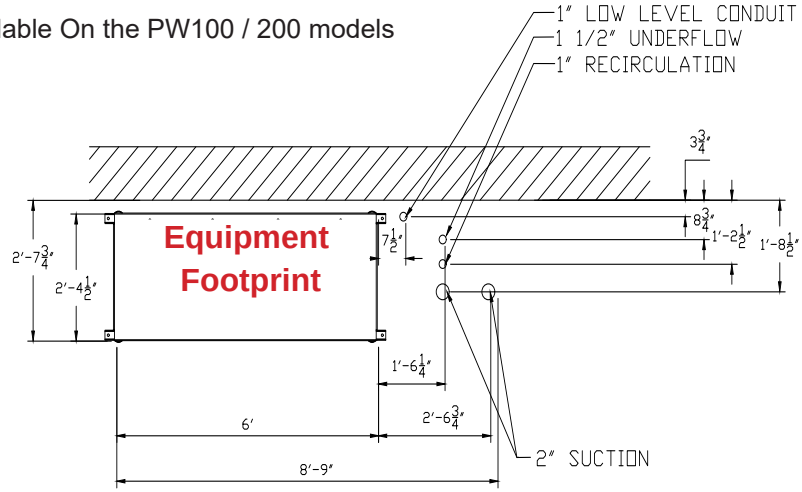
Equipment Footprint & Plumbing Stub-up Layout

The “Gen 3” PW100 / 200 / 300 / 350 Reclaim unit frame is expanded to 19” deep and 48” wide and is shown 2” off the equipment room wall. The PW400 frame is 24” deep and 60” wide.The required and optional stub up locations and sizes are all shown in the drawings. It is highly suggested that two suction lines be included when designing and installing the plumbing - one primary and one spare. It is also strongly suggested that the suction lines be pressure tested and monitored during backfill of the trench. **Note:** The suction line size is 2” for a PW100 / 200 / 300 and is 3” for a PW350 or PW400

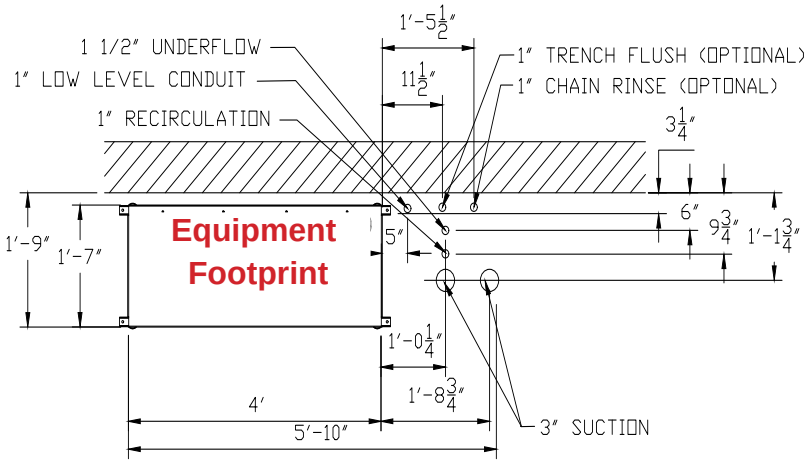
Trench Flush & Chain Rinse Options are not available On the PW100 / 200 models

PW100, 200, 300

Note 2” Suction Lines



STUB UP DETAIL



STUB UP DETAIL

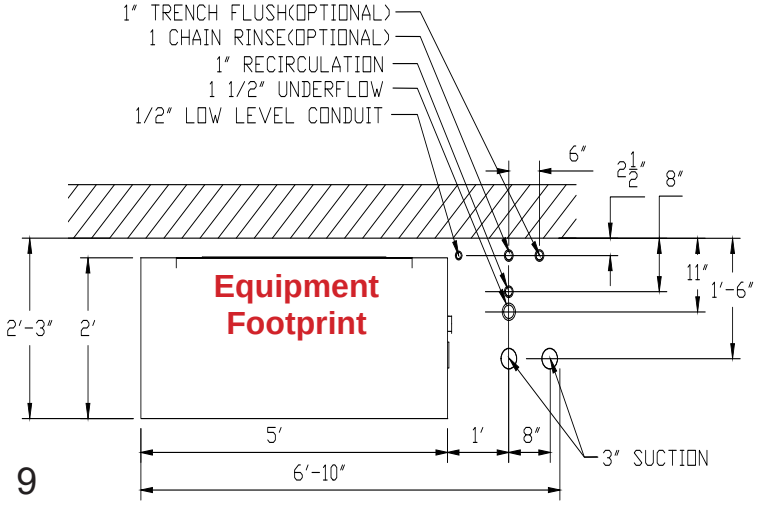
PW350

Note 3” Suction Lines

PW400

Note 3” Suction Lines

& Larger Footprint



Tanking - Preinstallation

Reclaim Tanks

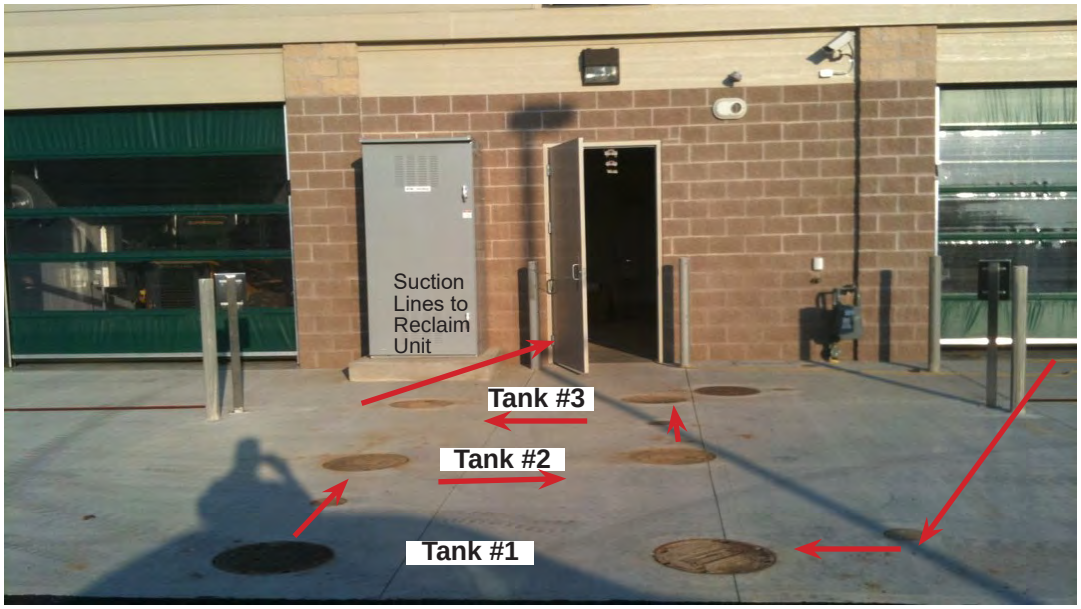
PurWater does not supply the underground reclaim tanks. These are typically precast concrete vaults that are sourced locally, however, it is required that the tanks comply with the following design parameters to ensure a successful operation. **NOTE: if the local tanking is atypical to design - contact PurWater for assistance. The tanking, underground plumbing, and stub-up locations in the equipment room are important key factors to have an effective, efficient running Reclaim system.**

Location Consideration for Tanks

- Locate the reclaim tanks close to the equipment room to minimize the length of suction pipe to run to the reclaim unit.
- Locate the reclaim tanks so that bends and elbows are minimized on the suction piping. “Double 45’s” or “Sweeps” rather than 90’s are highly recommended.
- Keep the suction piping below the reclaim pump inlet.
- For ozone units, the reclaim tanks should be located outside the wash bay and equipment room in an area that is well ventilated. If located inside - the tanks should be sealed and vented to the outside.

Note: The tanks can be configured end-to-end as shown in the drawings on pages 12 & 13 or side by side. Whatever is best for the site layout is fine.

The picture in the photo below indicates a “Three Reclaim Tank Side By Side Layout” The trench drains to the right side of tank #1 as indicated by the lower right arrow. The water flows through the second chamber of tank #1 into the first chamber of tank #2, again, per the red arrows. and on into tank #3. Following the red arrow path, the suction lines are located in tank #3 chamber #2. One of the suction lines is connected to the basket inlet and one is a spare.



Tanking Details

Interconnecting Piping- Critical to System Functionality

- The piping between the tanks/compartments will set the liquid level in each tank. The elevation and downward elbow help prevent floating material and settled solids from moving to the next tank.
- For the PW050/100 / 200 / 300 series, the interconnecting piping needs to be a minimum of 4". For PW350 / 400 / 700 series, the minimum is 6" to help with flow through the tanks.

Sewer Overflow

- The sewer overflow connection is above the normal liquid level and will normally overflow while washing vehicles.
- The sewer connection should slope downward to the main sewer line.
- **There must be a backflow preventer installed between the reclaim tanks and the main sewer line to prevent sewage from entering the reclaim tanks.**

Low Level Float Switch

- PurWater will supply one "Normally Closed" two-wire (yellow float) level switch, (Float is not required in standard underground setups but highly recommended.)
- The float should be wired into a water-tight junction box within the last reclaim tank and wired through the 1" conduit to the PurWater unit in the equipment room.
- The float should be installed a minimum of 12" above the bottom of the check valve when the float is in the down position.

Misc. Items - Reclaim Tank Plumbing

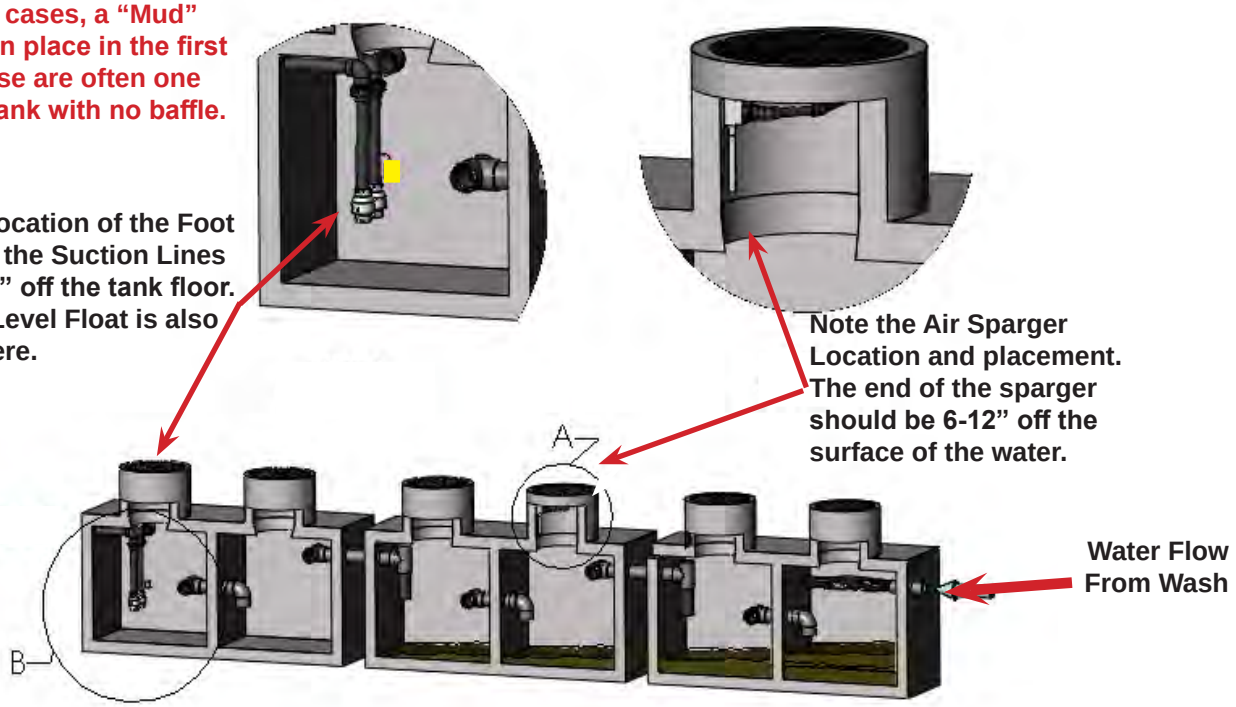
- Piping and conduit materials should be PVC. PurWater recommends using schedule 80 pipe as it is more durable than schedule 40.
- All piping to/from the PurWater Unit should be accessible from a manway for frequent maintenance and troubleshooting.
- A spare or "back-up" secondary suction line is shown on standard drawings. Do not overlook installing a back up suction line.
- All floor drains emptying into the reclaim tanks should be piped to go below the water level within the tanks. This prevents any gas from backing up through the line into the bay or the equipment room. **This is especially important for ozone units.**
- **The following should not be piped into the reclaim system:** Domestic sewer lines (sinks/toilets), regeneration from softeners, blowdown from compressors or boilers, drains from service/ detail bays / areas where tire shine is applied.
- If self serve bays are to be piped into the reclaim tanks, a separate reclaim tank should be used. Contact PurWater for details.

Important Note: Vent pipes from reclaim tanking should not terminate in the equipment room floor or in the wash bay. Vents (typically) are above the water line in the reclaim tank(s) and odors or possibly Ozone will exit the vents. Any venting in the equipment room or wash bay should terminate outside - typically at roof level to outside air.

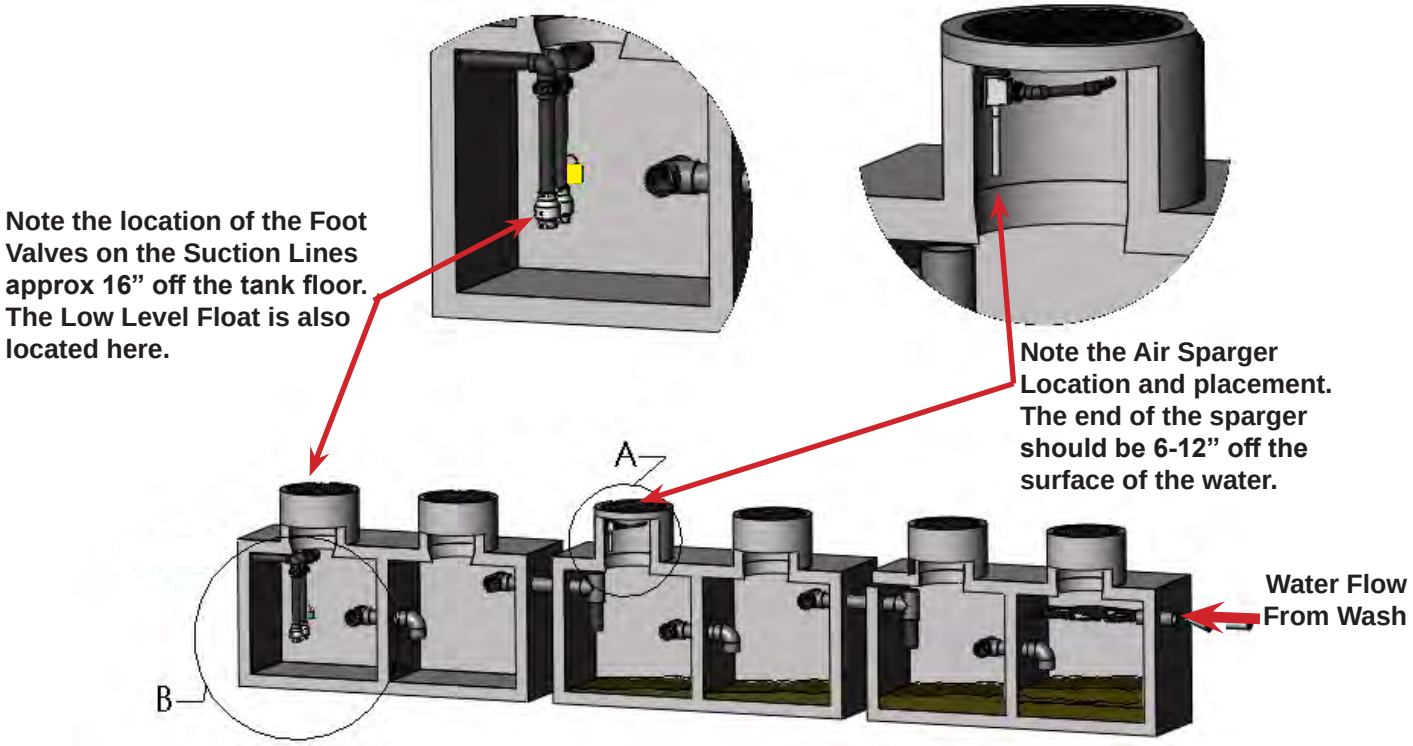
Typical Tanking Layouts

Three 1500 Gallon (ea) Reclaim Tanks - Air Sparger (4500 gals total)

Note In some cases, a "Mud" tank may be in place in the first position. These are often one large single tank with no baffle.

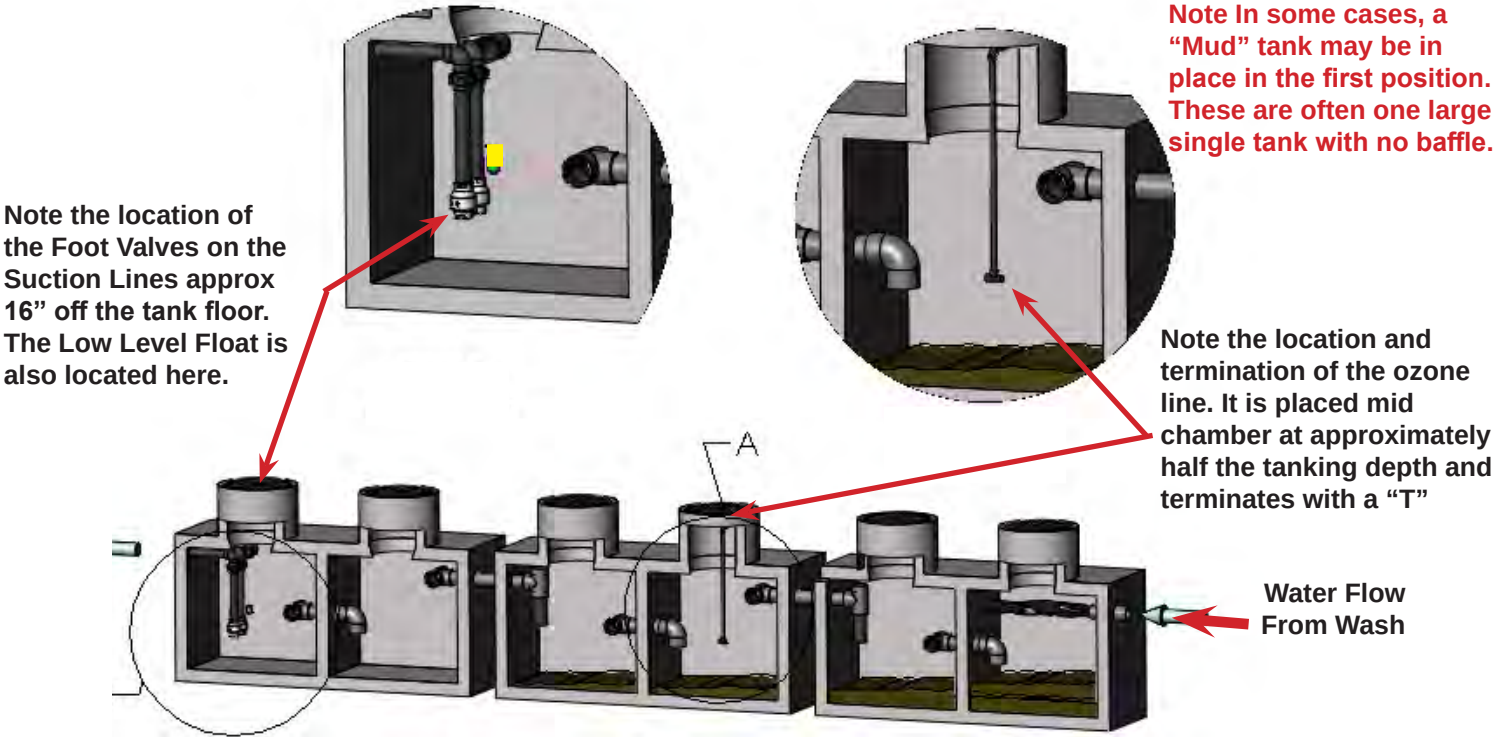


Three 2000 Gallon (ea) Reclaim Tanks - Air Sparger (6000 gals total)



Typical Tanking Layouts

Three 1500 Gallon (ea) Reclaim Tanks - Ozone Systems (4500 gals total)



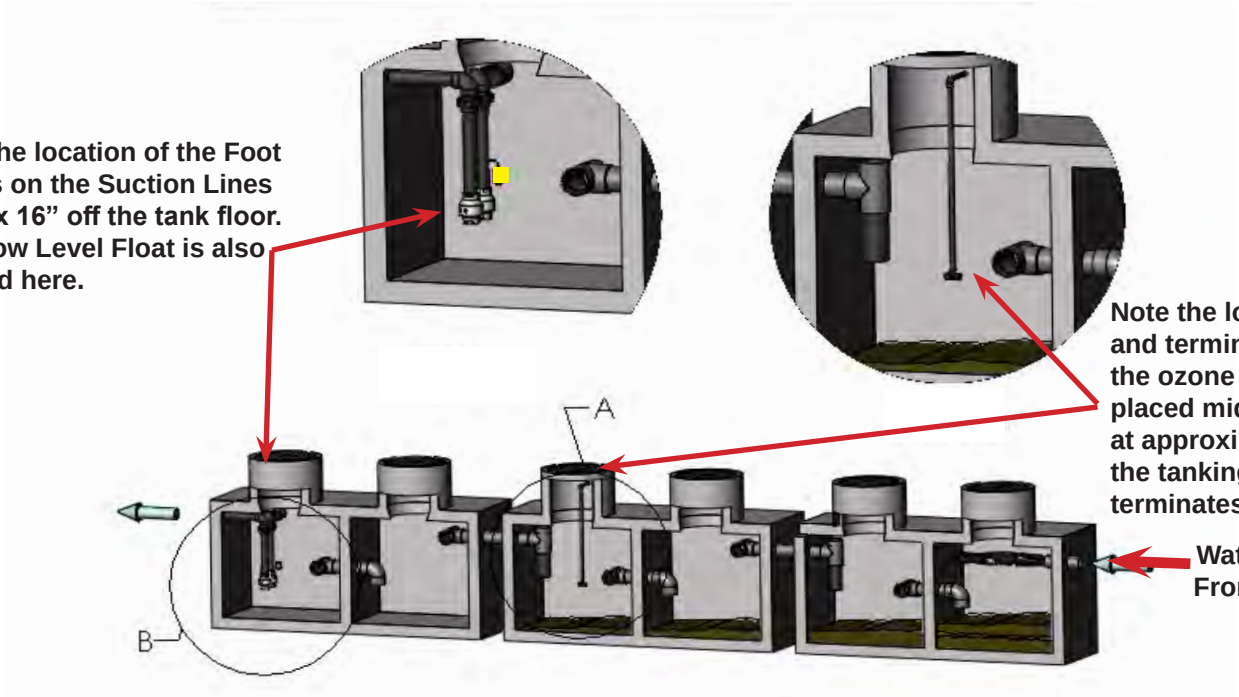
Note In some cases, a "Mud" tank may be in place in the first position. These are often one large single tank with no baffle.

Note the location of the Foot Valves on the Suction Lines approx 16" off the tank floor. The Low Level Float is also located here.

Note the location and termination of the ozone line. It is placed mid chamber at approximately half the tanking depth and terminates with a "T"

Water Flow From Wash

Three 2000 Gallon (ea) Reclaim Tanks - Ozone Systems (6000 gals total)



Note the location of the Foot Valves on the Suction Lines approx 16" off the tank floor. The Low Level Float is also located here.

Note the location and termination of the ozone line. It is placed mid chamber at approximately half the tanking depth and terminates with a "T"

Water Flow From Wash

System Installation

PurWater systems are designed for easy installation. However, if you should have any questions please contact us at (916) 978.9990 or (800) 882.8854 in Sacramento, CA. Our office hours are 7am to 5pm PST, Monday through Friday. Emergency after hours help is also available.

For All PW050/100/200/300/350/400-5M Series Reclaim Systems

Frame

The system is to be installed in a clean, dry, temperature controlled and covered area. It is not designed to be in the wash bay or outdoors. The “Gen 3” stainless steel frame requires a floor space of 48” wide by 19” deep with a height of 81”. The “Xtreme” cabinet requires floor space of 48” wide by 17” dep with a height of 68”. PW400 systems require a floor space of 60” wide by 24” deep with a height of 77”. The system also requires a minimum clearance of 18” along the sides, front and top of all frames to allow for routine maintenance and inspection. The floor frame should be placed with its back along a wall and should be secured to the wall to prevent movement of the frame. The area should be free of excessive moisture which can cause extreme corrosion or electrical failure.

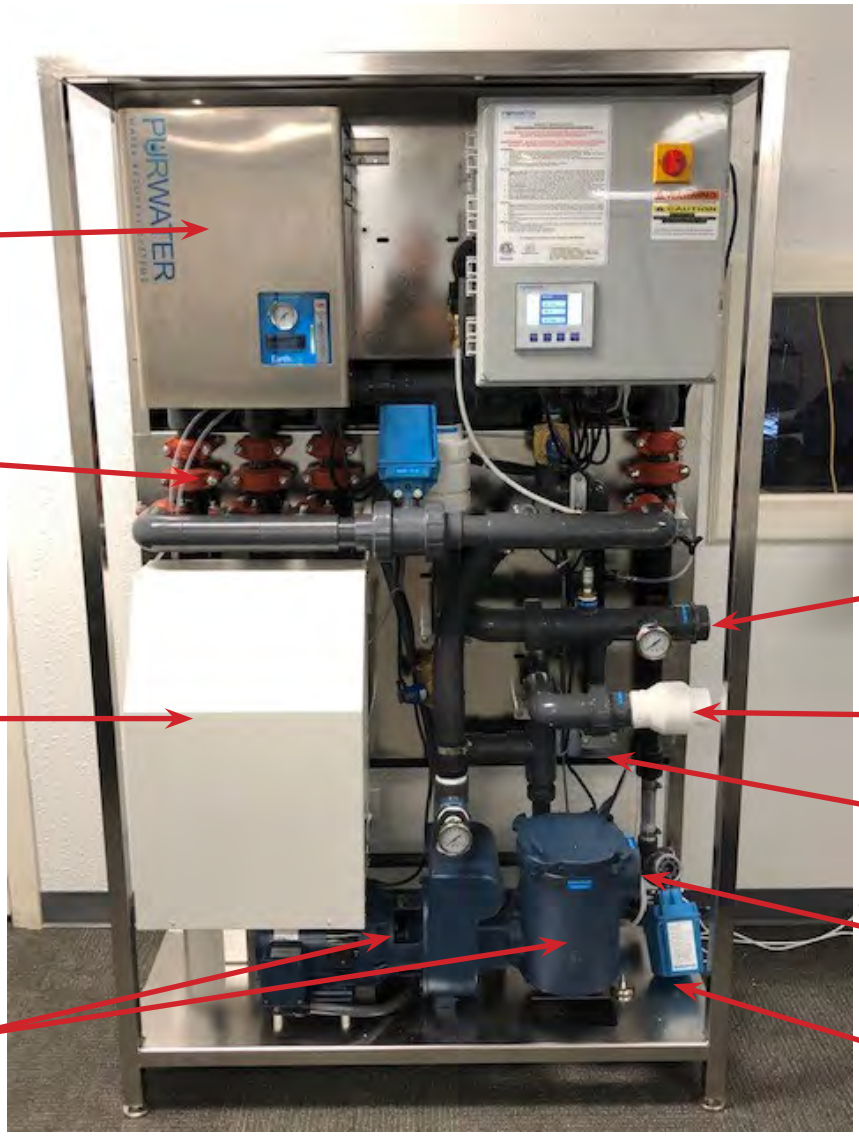
Piping

Fittings on these systems have some “unionized” threaded connections which are loosened prior to shipment.

There are two unions used on the motorized ball valve on the inlet piping, on the cyclone underflow piping, on the recirculation line, and on the Mazzei eductor (for ozone units) on the recirculation line. There are also two unions on the underflow flush (U/F flush) motorized ball valve.

Re-tighten (Hand Tighten Only) all union connections and any other threaded connections prior to introducing water into the system.

PurWater recommends using Schedule 80 PVC for all connections to the reclaim unit.



1. Treated Water Line

This line is to be connected to a manifold that feeds reclaim water to the wash equipment. Valves need to be installed. Some are controlled by the wash controller. Some are controlled by tank level (Ex: toilet bowl float) when water is demanded by the wash. **Do not reduce the line size until reaching the wash equipment to prevent flow restriction and pressure reduction.** (See page 22 on direct feed concept for high pressure pumps.)

2. City Water Line

City water is to be connected, which will then provide fresh water for a bypass function to the wash and the pump prime sequence. The city water supply line needs to be 1” for the PW50 / 100 series and 2” for larger units to ensure enough pressure and flow are available. **City water should not exceed a pressure of 65 psi.** High incoming city water pressure can prevent the Prime and / or Bypass Valves from closing completely.

3. Recirculation Line

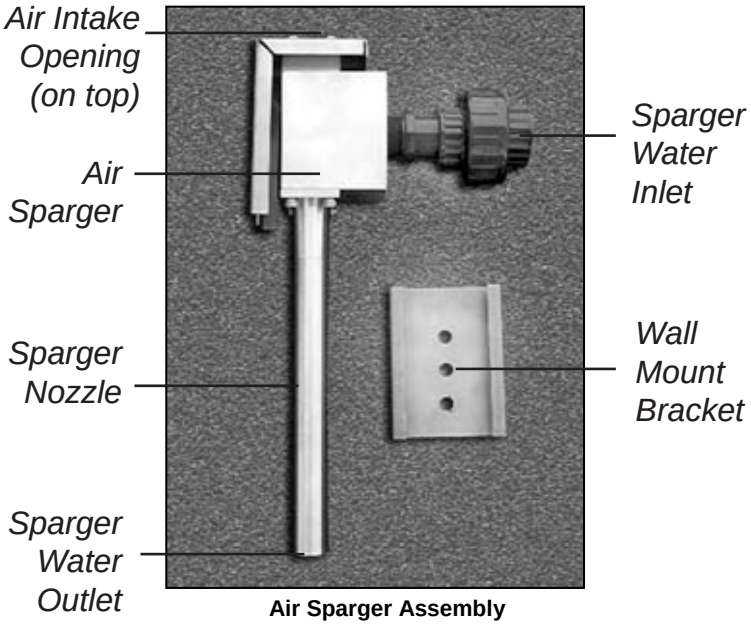
This 1" line provides a return line of treated water back into the reclaim tanking. The Recirculation line output discharge in the tanking should be **3,000 gallons** prior to the suction line as shown on page 13. A solenoid valve (normally open) on this line closes only during the pump prime sequence.

Air Sparger Units (Models ending in -5MAS) *See photo below*

The recirculation line is connected to the air sparger within the reclaim tank as shown on page 12. (See below for air sparger assembly installation.)

Air Sparger Assembly

The air sparger assembly is installed into the reclaim tank (see drawings page 12). **It should be located so that it is accessible from the manway as frequent inspection and maintenance are required.**
Ensure the wall mount bracket is placed to allow the assembly to be removed easily. The assembly consists of the air sparger, mounting brackets and inlet piping with a union. The bottom of the sparger nozzle should be set 6-12" above the water level and pointed downward. If this is not possible, mount the sparger horizontally so that it sprays against a side wall. The top opening on the sparger body should have clearance to allow air flow into the sparger. The union on the inlet allows the assembly to be easily pulled out of the tank for maintenance and inspection.



Air Sparger Assembly

PurWater System with Air Sparger

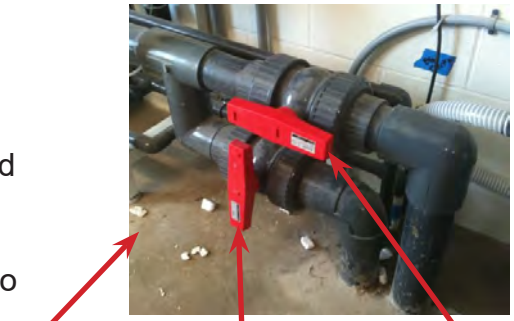
Ozone Units (Models ending in -5M04O-5M12O-5M24O)

The recirculation line is coupled in line with a Mazzei eductor. The Mazzei eductor creates a vacuum drawing ozone from the ozone gernerating system. The line in the tank should extend and terminate in a tee to split the flow in the tank (see page 13). The tee should be placed 20-24" off tank floor or half of the water depth. An air sparger is not / can not be used with an ozone system. All piping containing ozone must be PVC. **Rubber hose is not compatible with Ozone!! Ozone will eat through rubber hoses and poly flow tubing.**

PurWater System with Ozone

4. Pump Suction Line

Connect the suction line from the last compartment of the last reclaim tank into the basket strainer inlet on the reclaim unit. Keep the size of the line 2" for the PW100 / 200 / 300 units and 3" for larger units. Piping between the tank and reclaim system should have a minimal amount of 90's, threaded connections and **should never go higher than the basket strainer inlet.** The suction line within the Reclaim tank should have a flapper type foot valve at the very end of it and a union installed for maintenance. Unions must be above the water level to allow removal of the suction line from the manway to access foot valves without draining the tank. Unions must be tight to prevent suction loss. **Do not over tighten!** PurWater supplies two PVC flapper check valves to attach to the suction lines. The bottom of the valve in the tank should be a minimum of 16" above the bottom of the tank floor. **Do not use spring loaded check valves or valves with screens on the suction line.** Pressure testing of both suction lines is recommended before connecting to the reclaim unit. Two suction lines are recommended. One is for use and one is a spare. It is a real good idea to plumb the two suction lines into a manifold during installation with ball valves to facilitate making the switch from the primary to the secondary suction line.



Secondary Line (BV off)

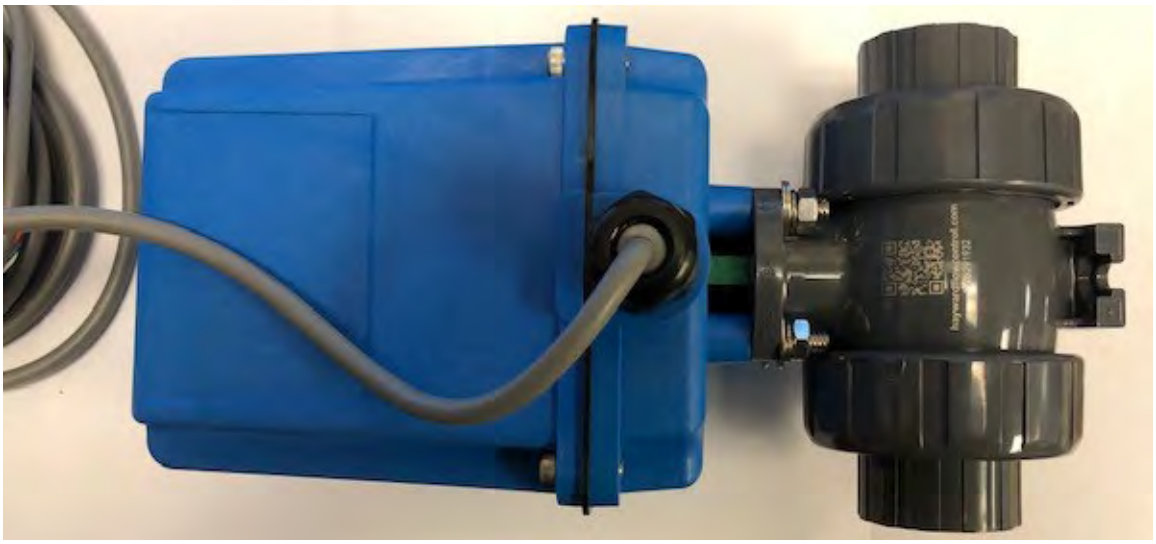
Primary Line (BV on)

An example of a very effective suction line manifold

NOTE: Suction Line Height can not be above basket inlet!!

5. Underflow Line

Connect the 1.5” line from the bottom of the cyclones to the catch basin or trench. An underflow flush (or U/F flush) motorized ball valve assembly is installed on this line between two unions. This valve has a 5/32” hole drilled in it acting as an orifice that passes water flowing from the manifold at the bottom of the cyclonic seperators. Once each day at 2am the system will open the valve and ramp up the pump to flush the underflow for one minute. The pump will ramp back down to recirculation speed at the end of the cycle. **The underflow line should be level or sloping downward to prevent solids build-up in the piping or cyclones.**



PW100 Underflow Plumbing (Rear View)

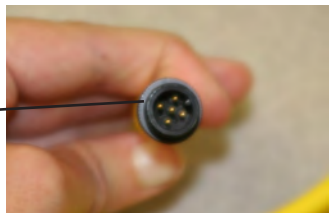
PW200/300/350 Underflow Plumbing (Front View)

System Installation - Extras

Some reclaim systems are ordered with extra features. This manual covers the most common ones. If installing something that does not pertain to these three, check the back of this manual for any site specific diagrams or instructions.

AquaLink (AOS)

The Gen 3 Reclaim is set up for simple and quick installation or retrofit of the AOS-I or the AOS-II system add-on. Plumb the system as follows: 1) Tape / thread the male adaptor (supplied) to the recirculation line output as indicated in the picture. 2) Plumb from the male adaptor to the AOS inlet port (top fitting) 3) Plumb the AOS outlet port (bottom) to the recirculation line "stub up" on the equipment room floor. There is no wiring required, simply unscrew the black cover from the AOS receptacle and screw in the yellow cable from the AOS control box (see photos below). Please note: There is a finder pin in the receptacle and cable so there is only one way it will screw together. Verify that the pump runs when it should. **See the appropriate Aqualink Manual for more details!**



Yellow cable from AOS I

AOS I receptacle on reclaim control box closed (left) and open (right)

Note: If an AOS-II option is ordered - there will be an additional manifold with a 1" outlet to supply treated water to the pump for flushing the bio-balls. (Reference pg 21 for more details)

Recirculation Line Output AOS I & II

Male Adaptor

AOS II CAT 5 receptacle on the right side of the reclaim control box and AOS II control box bottom (right)

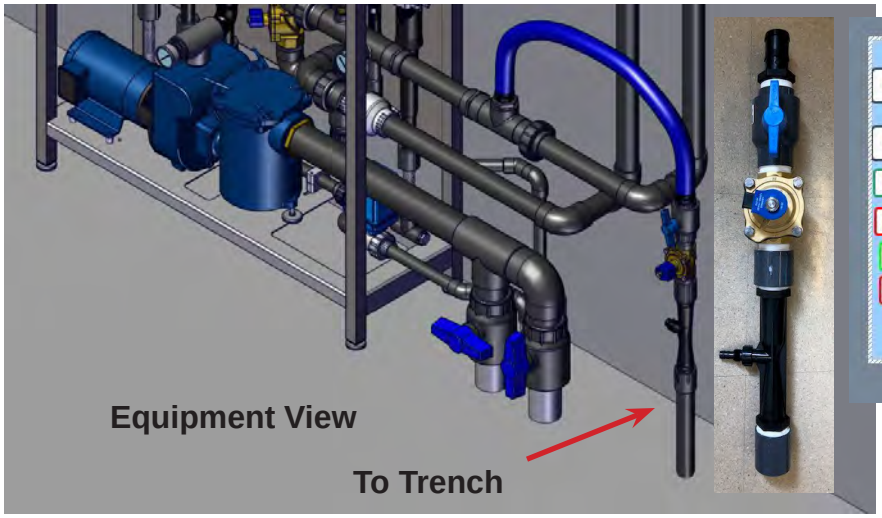
System Installation - Extras

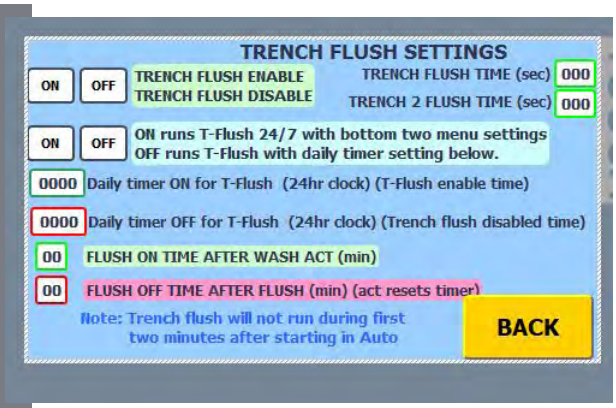
Enhanced Trench Flush

The PurWater Enhanced Trench Flush has two purposes. The first one is to wash down the Conveyor trench after the wash activation to the reclaim has turned off. This will run for the duration set on the HMI touch screen. The second is to turn the water over in the reclaim tanks overnight. Water will sit in the Conveyor pit and the first couple reclaim tanks over night not moving. This water will start growing bacteria (Anaerobic) over night and during the first hour of washing the water may have an odor. The program turns on the Enhanced Trench Flush every 30 min and runs it for 5 min aerating the water flowing in the tanks and turning the tanks over. The Enhanced Trench Flush timer is adjustable. The deration between activation and the run time is adjustable (see picture of screen below). If this option is ordered the PurWater Reclaim is Pre-built with a DIN cord for the solenoid connection for an easy connection once the hardware is installed.

Operation

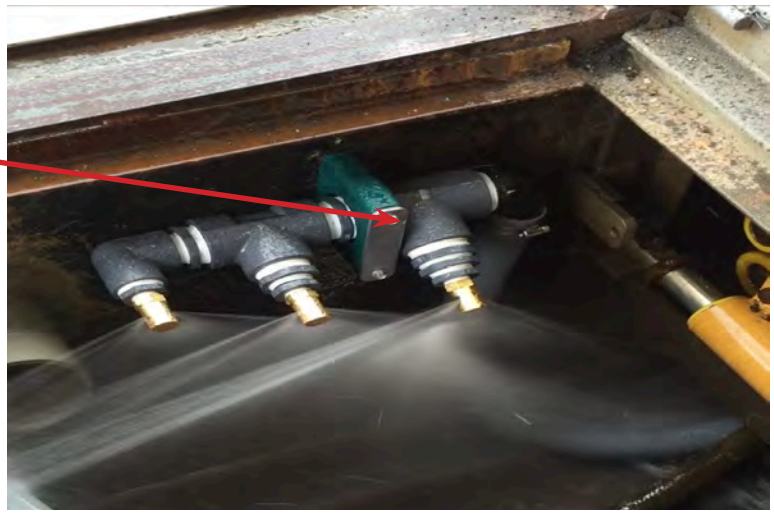
The reclaim system will open the 1 ½" valve on the enhanced trench flush. During this operation, the reclaim pump will maintain a line pressure of about 40 PSI. The water going through the valve will be fed down to a ball valve. This ball valve is there to adjust water flow to the trench. With this ball valve open full you will get 45 GPM at 40 psi. A 1 ½" Mazzei is after the valve to aerate the water. The Mazzei will pull 26.7 SCFM of air into the water stream. After the flush turns off the solenoid will close and the reclaim pump will ramp back down to its recirculation speed. If at any time a wash activation turns on, the trench flush solenoid will close, and the reclaim treated water will be directed to the car wash. After the wash activation is finished, the trench flush will turn on again for the set time. Detailed installation is included when this option is purchased.





Trench View

The three nozzle manifold assembly is pictured above and an active installation is shown in the picture on the right. Note that the manifold has a barbed fitting (see arrow) and can be installed as either "right or left handed" by rotating the nozzles 180 degrees. **Install the manifold at the "high" point of the trench & flush toward the drain!**



System Installation - Extras

Chain Rinse

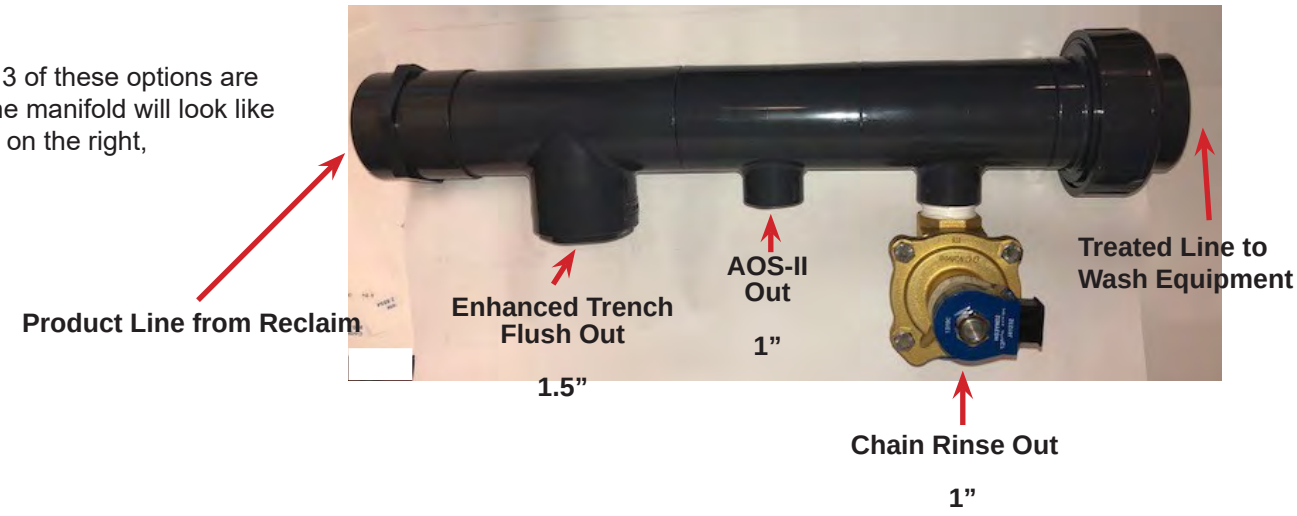
The Chain Rinse option hardware is illustrated in the picture below. If this option is ordered, the PurWater Reclaim is pre-built with a DIN cord for an easy connection to the solenoid once the hardware is installed. The hardware is mounted on the treated water line and plumbed to a hose that feeds a nozzle that sprays on the conveyor chain or belt. If the “Conveyor On” or “Belt On” signal is used for the Reclaim activation, the solenoid will be open anytime the wash activation is on. The line can terminate as desired by the operator. It may be a nozzle assembly or possibly just an open PVC line. Flow can be regulated or restricted via a ball valve if desired.

The site work pre-plumbing is key.

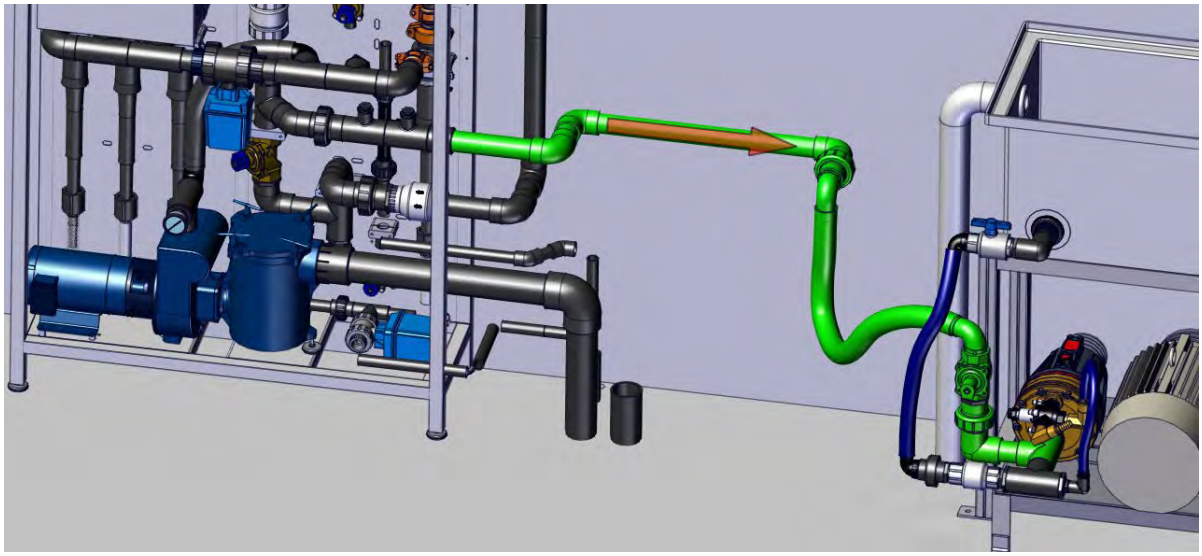
Note: If the Reclaim system has the “Two Trench Flushes” option ordered - the chain rinse option is not available.

AOS-II, Enhanced Trench Flush, and Chain Rinse Combined

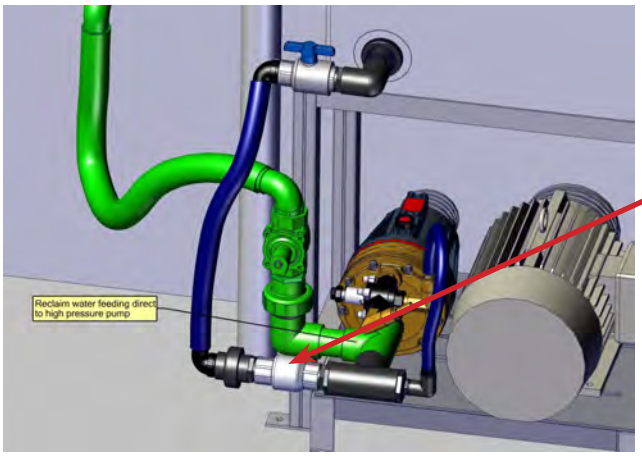
Note: If all 3 of these options are ordered, the manifold will look like the picture on the right,



Direct Feed Concept



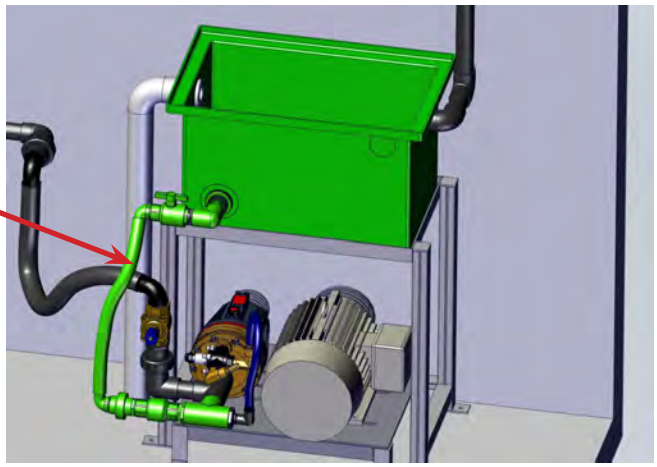
The concept of direct feeding high pressure pumps in reclaim applications is illustrated in the drawing above. This eliminates reclaim water sitting in the reservoir for extended periods resulting in stagnant, unpleasant odor conditions.The reservoir is cleaned & kept full of fresh water - isolated via a check valve as fresh water back-up



The picture on the left shows the flow path of the reclaim water in green to the high pressure pump. Note: The reclaim water is isolated from the fresh water by the check valve indicated by the arrow.

NOTE: <u>DO NOT</u> install any screens or filters on the Reclaim Treated Water Line!!!

The picture on the right shows the flow path of the fresh water back-up from the holding reservoir in green. In the event that reclaim water flow stops or does not meet the pump demand for some reason, the pump will draw fresh water from the reservoir..

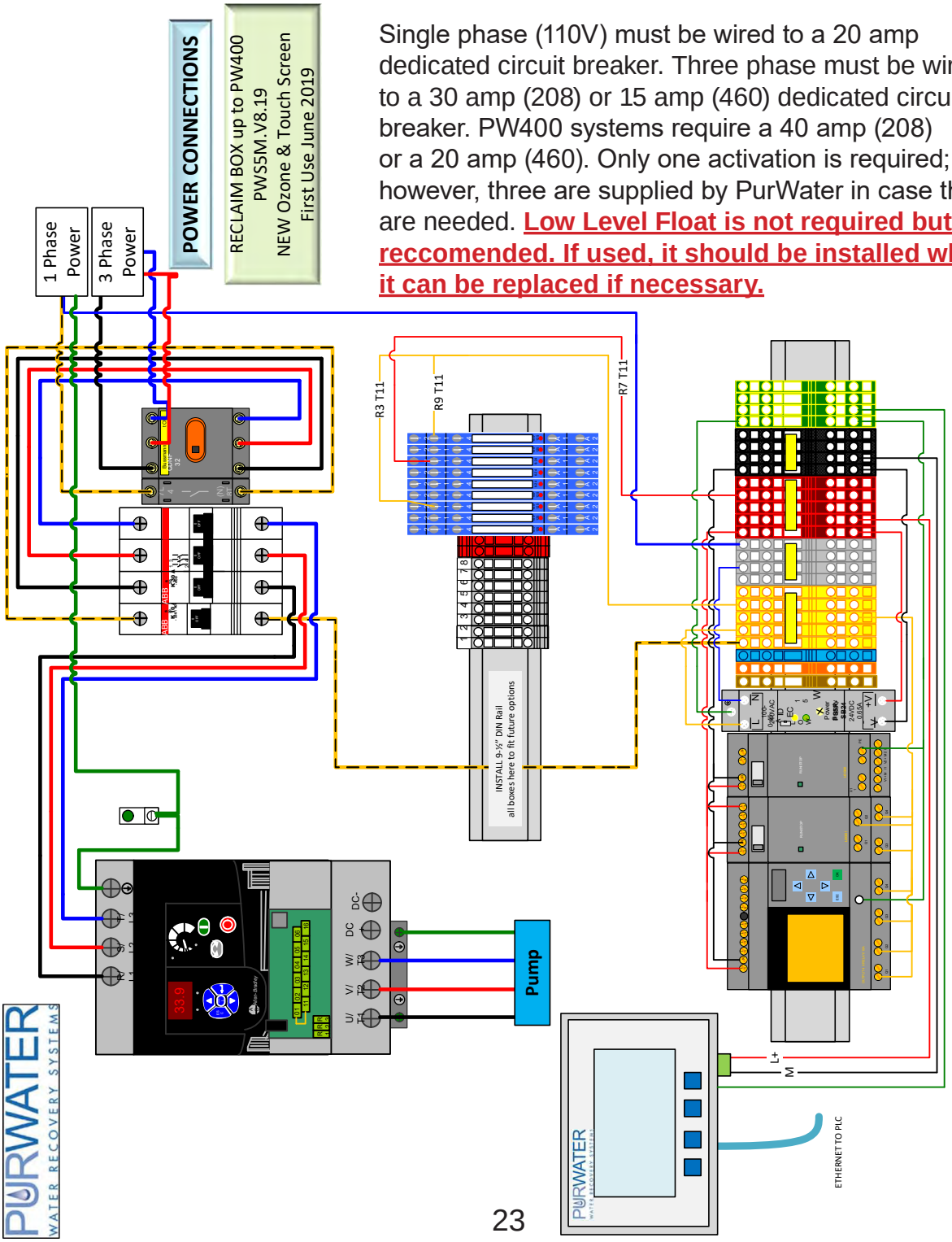


Direct feed Kits are availble in 1”, 1.5”, and 2” sizes and should match the size of the pump inlet.

AC Wiring

Land the Single and Three Phase wiring as shown below. If the Three Phase Power is 460-480 High Voltage the wiring color code will be Brown - Orange - Yellow.

Please note: This diagram shows the standard reclaim wiring setup. Go to the electrical schematics on page 54-58 for more detailed schematics.



Single phase (110V) must be wired to a 20 amp dedicated circuit breaker. Three phase must be wired to a 30 amp (208) or 15 amp (460) dedicated circuit breaker. PW400 systems require a 40 amp (208) or a 20 amp (460). Only one activation is required; however, three are supplied by PurWater in case they are needed. **Low Level Float is not required but is reccomended. If used, it should be installed where it can be replaced if necessary.**

Customer Connections - Low Level Float - Examples for Activation

A signal indicating the tunnel conveyor is on or a signal indicating there is a car in the automatic bay (wash in use) is sufficient and simple for a “wash activation”. If that is not an option, use the signal that opens the solenoid for each application you are using for Reclaim on: (one for mitters, another for undercarriage, etc.). Timing on this can be difficult to set. PurWater recommends ramping up the Reclaim via the “Conveyor On” signal All activations send a signal to run the pump on the transducer, therefore, there is no difference between Activations noted below as Acts 1, 2 or 3.

Please note:
If your control box has more terminals than the 1-8 shown in the diagram, go to the electrical schematics in the Appendix on page 57 to find the correct diagram.

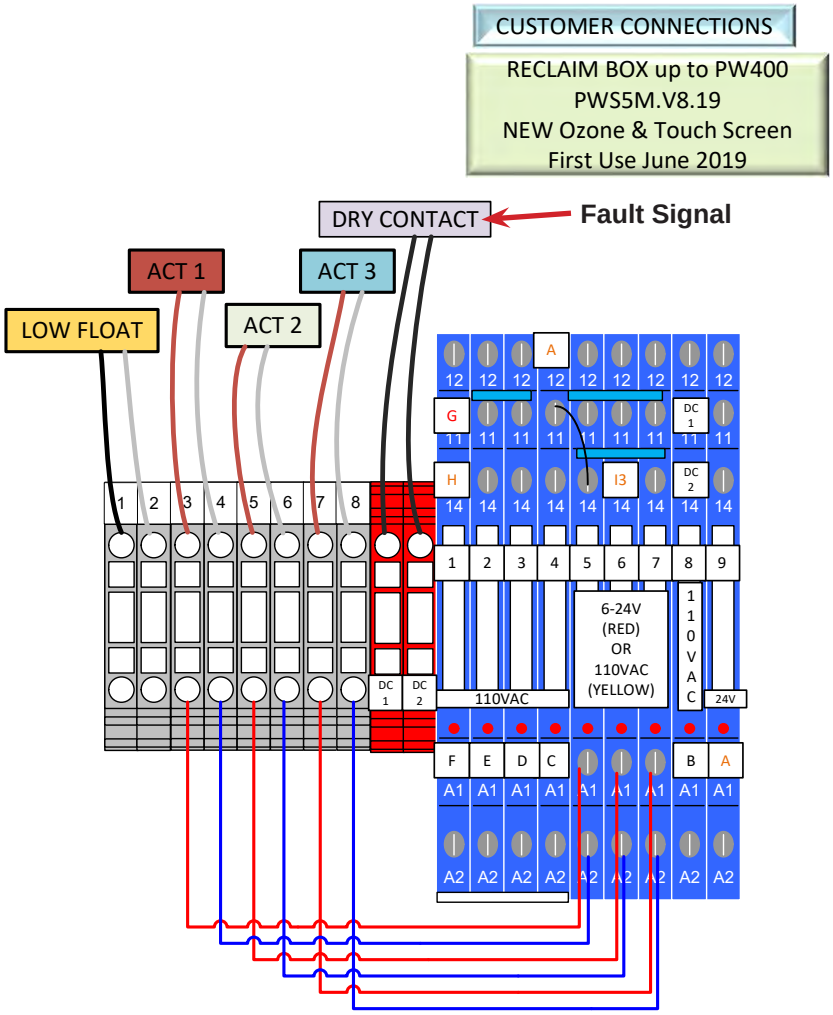
For more information on the relay bank and how each relay operates within the system, go to the Operation section on page 40.

PURWATER
WATER RECOVERY SYSTEMS

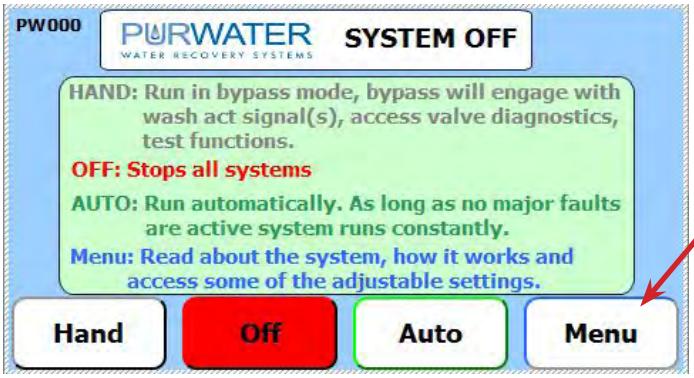
CUSTOMER CONNECTION	TERMINAL BLOCKS
(1) LOW LEVEL FLOAT	T -Blocks 1&2
(2) Wash Activation #1	T -Blocks 3&4
(3) Wash Activation #2	T -Blocks 5&6
(4) Wash Activation #3	T -Blocks 6&7
(5) Dry Contact for Faults	T -Blocks 9 & 10

Note: Activation Signals should include a power and Neutral from its source. Activation Relays can be Ordered in 110V and 24V standard. Other options on request.

Any activation will switch the Reclaim System from Recirculation to Run Mode. The pump speed will vary to maintain setpoint pressure of 40psi with activation.

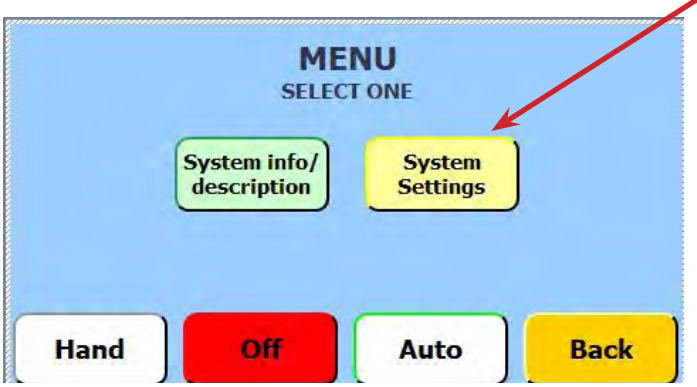


Setting the Time and Date on the PLC
("Gen 3" Machines Built after January 1, 2020)

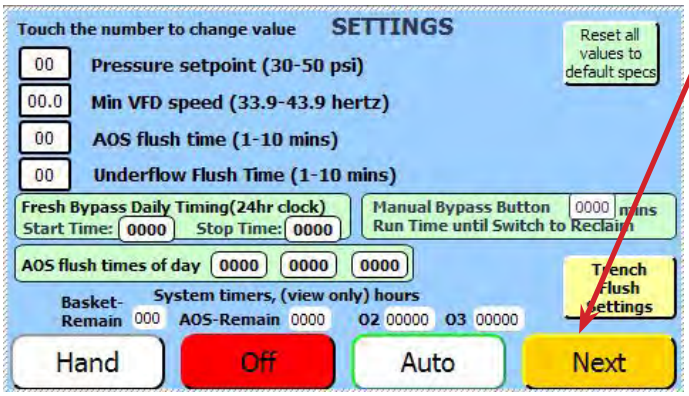


Prior to System Start Up and with the Reclaim connected to facilities power.....

Touch the "Menu" button on the touch screen

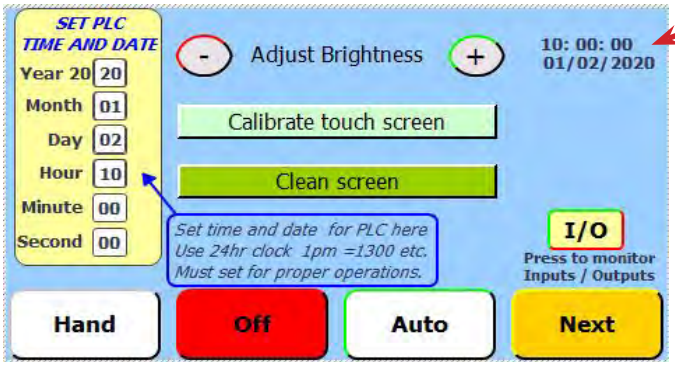


Touch the "System Settings" button on the touch screen.

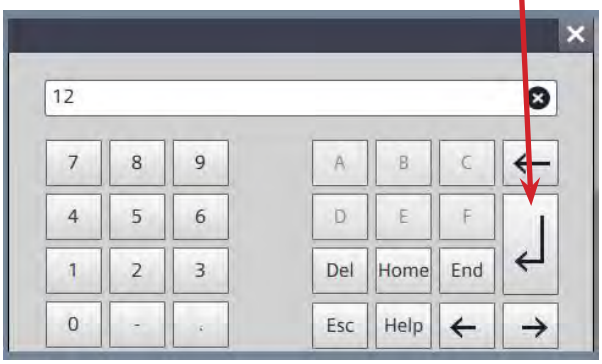


Touch the "Next" button on the touch screen which takes the operator to the final screen on the lower left.

After arriving at this screen, the Date and Time can be set. A stylus can be handy to have on hand, however, a well placed finger will also work fine. The Year, Month, Day, and Time were set at the factory for testing and may still be correct in part. If not, touch the box for any parameter which must be set. This will take the operator to the screen below for the correct number to be input. Once the input is correct, set it into memory using the "carriage return" key below.

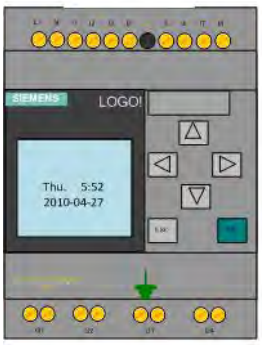


Once everything is set, the correct time and date will be in the upper right hand corner. Touch the "Off" button to exit

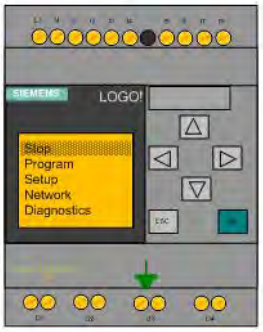


Setting the Time and Date on the PLC

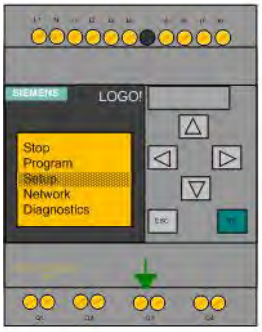
1



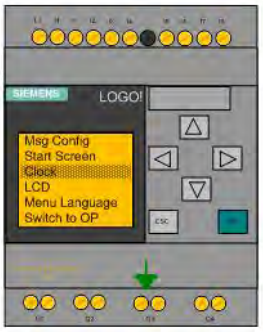
2



3

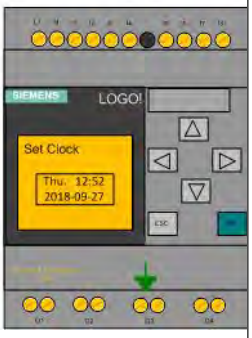


4



5

6



NOTE

THE PROCEDURE ON THIS PAGE WILL WORK ON ALL "GEN 3" SYSTEMS BUT IT IS THE ONLY OPTION FOR"PRE 2020" RECLAIM SYSTEMS OR THOSE WITHOUT A TOUCH SCREEN HMI.

Prior to System Start-up and with the PurWater System connected to facilities power…..

1. Open the Control Box, turn the three pole breaker off &verify that the single pole breaker is on. Using a wrench or pliers, rotate the main disconnect rod clockwise to the "On" position. Locate the PLC- the Time & Date should be flashing as shown in screen shot #1. Press the "ESC" button.

2. "Stop" will appear highlighted on the screen. as shown in screen shot #2.

3. Use the Down Arrow Key and scroll to "Setup" as shown in screen shot #3. Press the OK button.

4. Again, using the Down Arrow Key, scroll to "Clock" as shown in screen shot #4 and press the OK button.

5. Again, using the Down Arrow Key, scroll to "Set Clock" as shown in screen shot #5 and press the OK button.

6. Use the Right Arrow Key and scroll through the Time and Date using the Up / Down Arrow Keys to change and set the numbers. Note that miltary time is required. Ex: 1pm = 13:00. When complete, press ESC 3 times to return to the Initial Blue Screen with correct Time and Date.

7. Rotate the disconnect rod counter-clockwise to the off position. Leave the single pole breaker on. Flip the three pole breaker from the off to the on position. Close the Control Box Door & tighten the screws in upper & lower right hand corners.

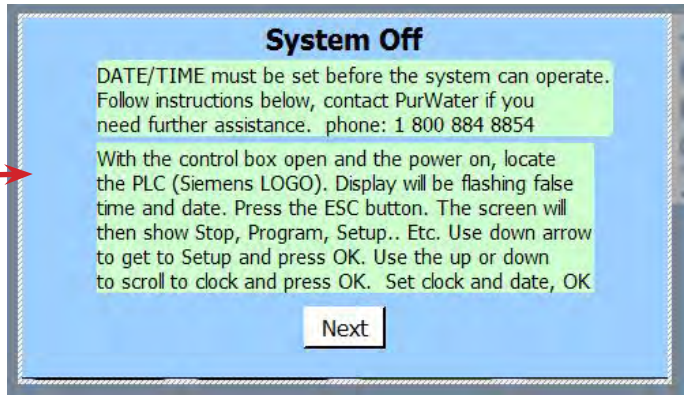
8. Continue with System Start-up

System Start-up

After the system is plumbed, wired correctly, and the time / date has been set leaving the 3 phase and single phase breakers in the control box on with the door closed..... Turn the disconnect switch to the on position (see photo below). This will turn on power to the control box which will initiate the Touch Screen and the PLC. From this point forward, the control box will not require opening unless an internal problem occurs.

Please note: If the HMI Touch Screen does not initiate, open the control box and verify that the 110V wiring is terminated and the single pole breaker in the control box and the one from the breaker is on. If power is verified and there is still no visible activity on the HMI Touch Screen screen - turn to the Troubleshooting section or contact PurWater technical support.

NOTE: In the event that the Time / Date has not been set, the message on the right will be displayed. The Reclaim system must have this set to proceed with start up. The "OK" button must be used at the end of the procedure to save the information.



Turn the disconnect switch clockwise from the OFF position (left) to the ON position (right)

Quickstart Guide Overview

1. Verify that the system is plumbed (see page 14) and wired according to drawings and schematics (see page 23.) Tighten all plumbing unions. **Hand Tighten Only!!**

2. Verify the clock was set on the PLC. Refer to the set clock guide pgs 25-26.

3. Check pump rotation per the procedure pages 29-30 .

4. Test the Wash in Hand Mode per the procedure on page 31. This also confirms the fresh water bypass valve functionality.

5. Verify the underground tanks are full of water. This may require running the wash in the hand / bypass mode until the tanks are full or manually filling the tanks depending on site preference.

6. Prime the system per the procedure on page 32 and check for leaks.

Note: If the system is primed multiple times and cannot catch prime contact PurWater. The suction line should NEVER be higher than the basket inlet. This is the primary cause of issues where the system fails to hold prime.

7. Test the Reclaim System in Auto & verify all operations are functional per the procedure on page 33.

8. . Again - Check for leaks and verify ozone or sparger is operating properly.

9a. Check Air Sparger functionality in tanking (if equipped)

9b. Check Oxygen Concentrator & Ozone component functionality (if equipped)

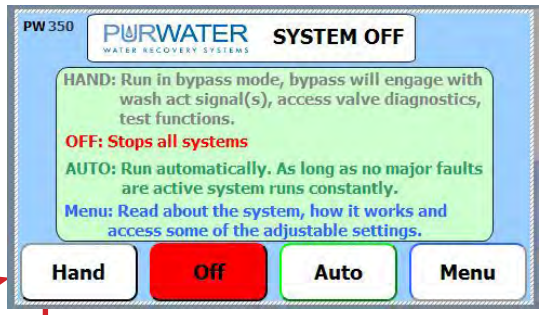
Please refer to the detailed instructions on the following pages for clarification on the above steps. If you need further assistance, please contact PurWater at 800.882.8854.

System Start-up

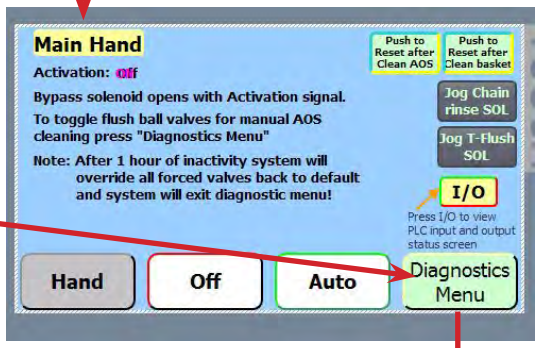
Please note: The Touch Screen Buttons are called out F1, F2, F3 and F4. They are called out by their F numbers when they are not used for their primary functions. Example: Press F3 in Auto mode; the system is already in Auto, the button then serves as a special function, F3. However, Off and Hand still will serve as Off and Hand if the system is in Auto. Press and hold Hand, Off, Auto, or Settings butttons firmly until you see desired action or change in screen. These functions (and other screen responses) are also accessed via the Touch Screen itself. When scrolling through menus, wait 5 seconds between pressing buttons, an easy way to be sure of the time is to wait until prompted to press a button by the HMI. If system is left in any screen other than the default for two minutes without a button being pressed, the program will revert it back to the default screen for that mode.

Checking Pump Rotation

On power up - the intial screen is shown on the right.

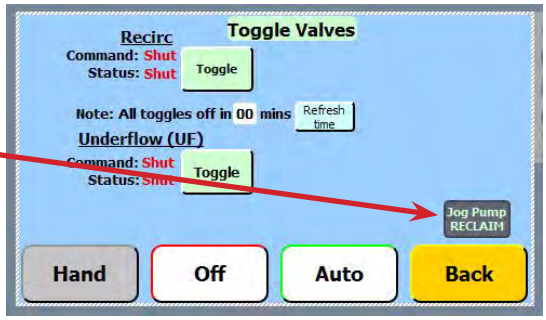


Go to “Hand Mode” by either the “F1” button or touching “Hand” option on the Touch Screen resulting in the screen shot on the right.



Go to the diagnostics menu by either the “F4” button or by touching the “Diagnostics Menu”

Activate the “Jog Pump Reclaim” function via the Touch Screen. This will make the pump rotate for a few seconds.



System Start-up (Continued)

Checking Pump Rotation (continued).

Note the rotation check points of the pump motor shaft as shown to check rotation. The motor should be rotating clockwise when looking from the end of the motor (left side of the machine). There is also a rotation indicator arrow on the pump volute.

10 HP Motor

3 or 5 HP Motor

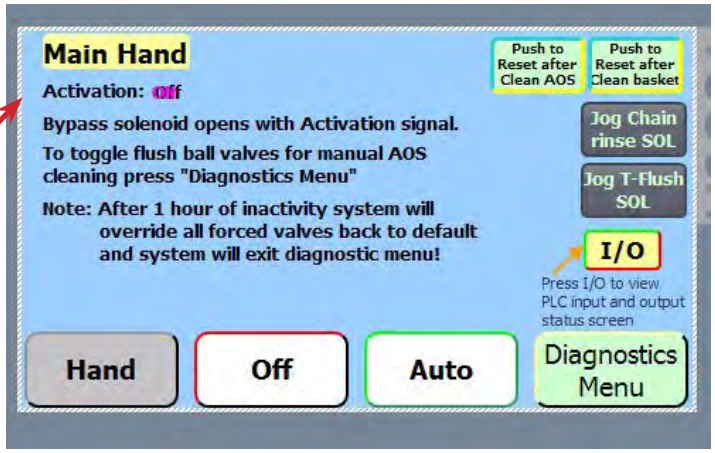
If the motor is rotating in the wrong direction - reverse two of the leads in the main breaker box or disconnect on the wall and verify pump rotation is now correct.

Once pump rotation has been verified, go back to “Hand Mode” by either the “F1” button or touching “Hand” option on the Touch Screen resulting in the screen shot on the top of the next page.

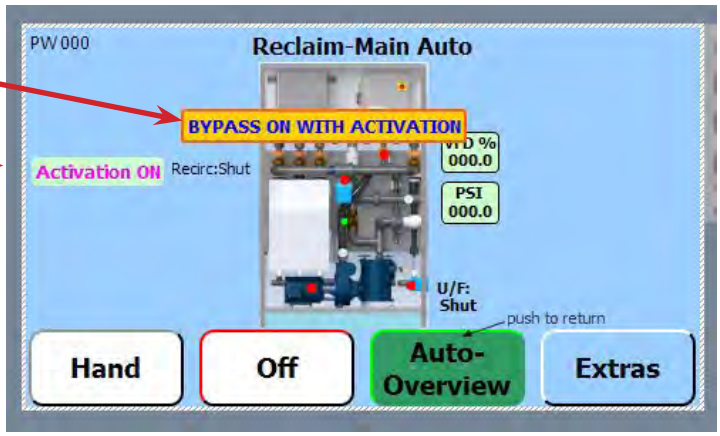
System Start-up (Continued)

Test the Wash Activation Signal is active in "Hand Mode"

Press "Hand" on the touch screen or the "F1" button. Note that there is no Wash Activation on at this time.

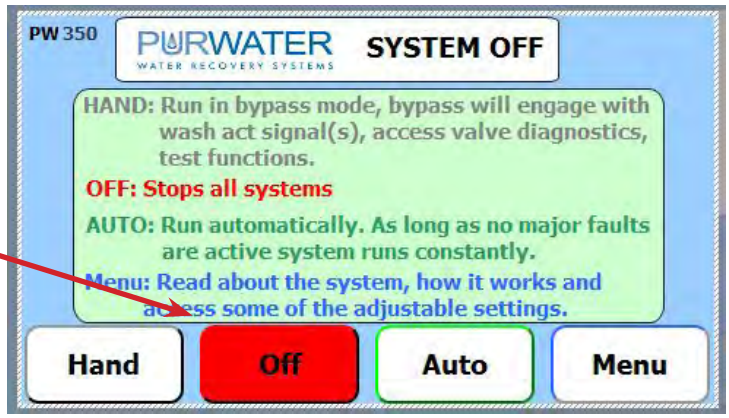


Go the Car Wash Controller and initiate a Wash or a Reclaim function manually to verify that the wash activation signal is working and that the Reclaim responds to that signal. If everything is working (fresh water plumbed to the Reclaim unit is on and the activation signal is present) the screen will indicate it is in Bypass running on fresh water with an Activation "ON".



Be sure to verify that all functions are working correctly and the Reclaim Machine is delivering water to the car wash equipment.

After testing in Bypass, turn the system to "Off" via the touchscreen off button.

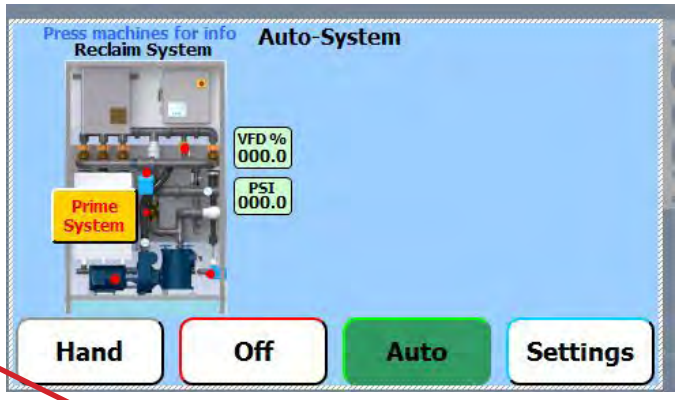


System Start-up (Continued)

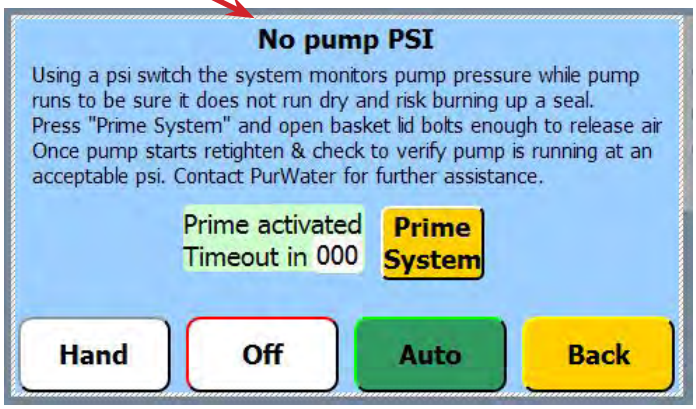
Priming the System

Verify the reclaim tanks are full and the city water supply is on. Put the machine into “Auto” via the Touchscreen.

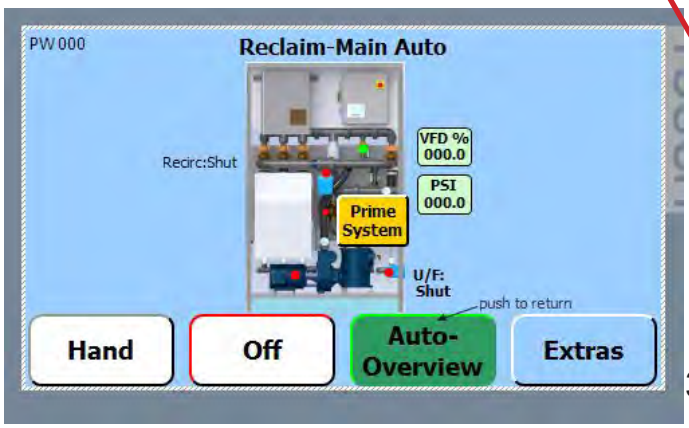
Loosen the 4 “T-Bolts” that hold the pump basket lid tight. It’s best to keep the front bolts tighter than the back to direct water flow to the rear keeping the operator dry. If a larger system with the PVC housing, open the bleed valve on top of the housing. Then activate the “Prime Button” to start the prime process.

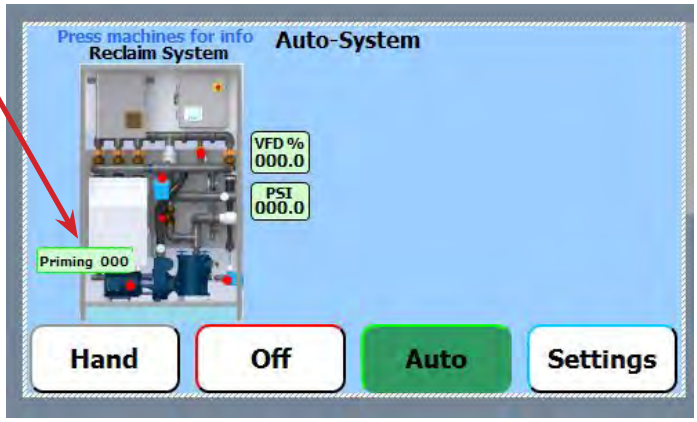


The 3/8” prime solenoid will open, the normally open solenoid will close, and city water will flow into the basket while filling up the suction line all the way to the foot valve in the tank. Once all the air is displaced, the basket will fill and eventually overflow. As soon as water starts overflowing the basket, tighten all 4 “T-Bolts” or close the bleed valve depending on the build. As soon as the pressure switch is satisfied, the pump should start and hopefully, catch prime. It is not unusual to get the “No pump PSI” fault at this time. It may take several iterations of the prime sequence to get the Reclaim to catch prime and remain running. Typical pump pressure after priming is successful will be 15-25psi depending on reclaim model.



There are a few different screens that may appear to prime the system. The yellow “Prime System” prompts indicate that activating them will start the prime sequence. When the prime sequence is in progress there will be a white text box counting down with a 5 minute timer.





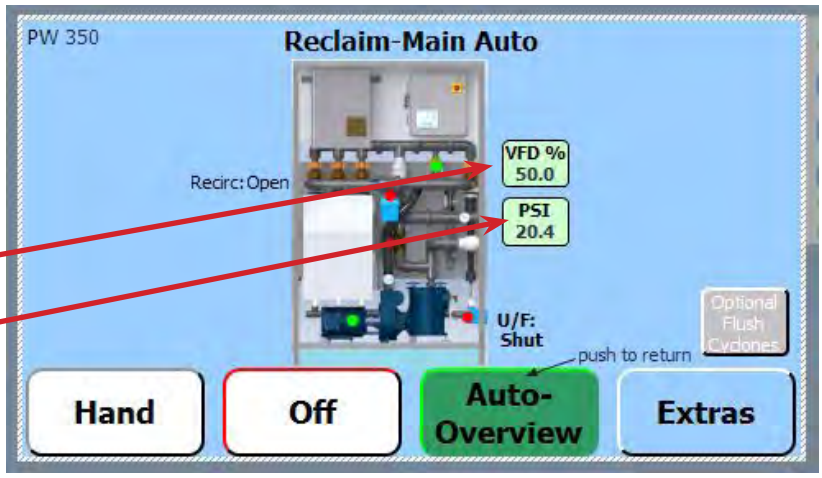
System Start-up (Continued)

Checking For Leaks

There are several unions on the Reclaim Machine that should be checked for leaks. The machine is “Wet Tested” and verified at the factory for function, leaks, etc. The unions are loosened to drain down the system prior to shipment and should have been tightened earlier in this process. Check all unions and fittings for leaks at this time.

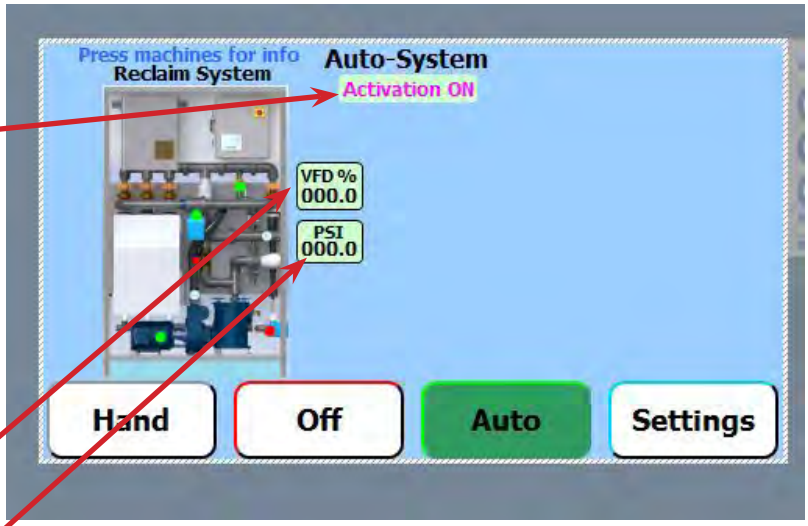
Testing the Reclaim in “Auto”

The wash activation signal has already been tested in the “Hand / Bypass” mode. The machine should be idling in recirculation mode once the priming has been completed. The VFD speed is indicated in a percentage & the delivery pressure is shown with the Reclaim idling in Auto with no activation signal present.



Once the Reclaim Machine is holding prime, go ahead and initiate a car wash. The Touch Screen will indicate that it is in Auto and will also display “Activation On”.

Test all activations (if more than one is being used). The Reclaim Machine is designed to deliver reclaim product water at 40psi in the designated volume based on the model purchased. The variable frequncy drive (VFD) will vary the pump motor speed up to a maximum of 60 Hertz based on transducer feedback. VFD speed is displayed in a percentage and treated line pressure is displayed in PSI (pounds per square inch)



Again, check all fittings and unions for leaks at this time.

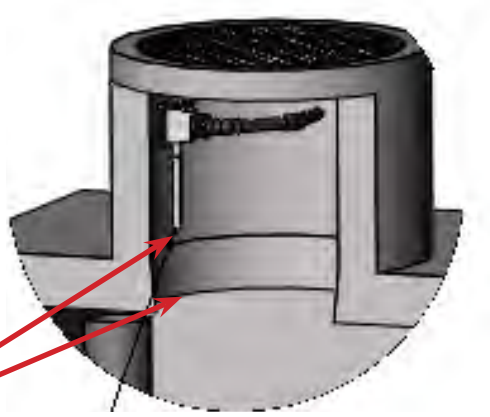
Reclaim Output Ratings

PW100 - 30gpm @40psi
PW200 - 60gpm @ 40psi
PW300 - 90gpm @ 40psi
PW350 - 120gpm @ 40ps
PW400 - 160gpm @ 40psi

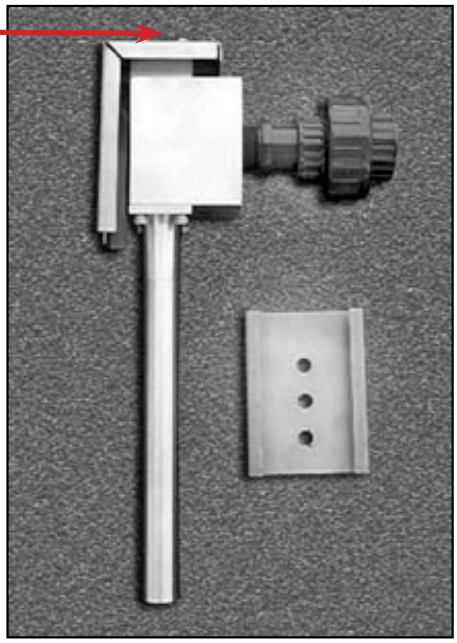
System Start-up (Continued)

Checking Air Sparger Function (if equipped)

Air Sparger installation details are covered in depth on page 12. Locate the Air Sparger in the tanking. It should be visible from the manway and installed with a union so it can be removed for maintenance.



Verify the bottom of the sparger nozzle is set 6-12” above the water level and pointed downward or spraying horizontally if space is limited. If mounted horizontally it should be spraying vigorously against the sidewall of the tank. Verify that a vacuum is felt when covering the air intake on the top of the air sparger.



System Start-up (Continued)

Checking Oxygen Concentrator on Systems with Ozone Option (if equipped)

The Oxygen Concentrator is preset at the Factory. The purpose of the concentrator is to send pure oxygen to the ozone generator (O2) where it will be turned into ozone (O3)

This component has an on / off switch on the right side of the unit & should be in the on position and illuminated green. It will be running when the Reclaim Machine is in "Auto" with the pump running. There are two key items to Check on the right side: 1) The switch is on and "green". 2) The pressure gauge is at 11.5psi and steady. There is one item to check on the left side of the unit. <u>There is a flow meter that is preset at the factory to 6 with the line disconected.</u> When running, the flow meter will typically be in the 2-4 range with the line attached.

Right Side

Left Side

NOTE: The "Gen 3" Reclaim System has the Oxygen Concentrator on the lower left of the frame. This location has a higher risk of water leak entering the cooling fan assembly so a "splash guard" has been added. Be certain to transfer the splash guard if the concentrator is replaced!!!

Front View

The Oxygen Concentrator will need replacement or rebuild after 16,000 hours. It has an internal hour meter which can be accessed by removing the cover. The Reclaim Machine Touch Screen will flag the end user with a half life message at 8,000 elapsed hours of run time and a full life message at 16,000 hours to indicate it is time for replacement.

System Start-up (Continued)

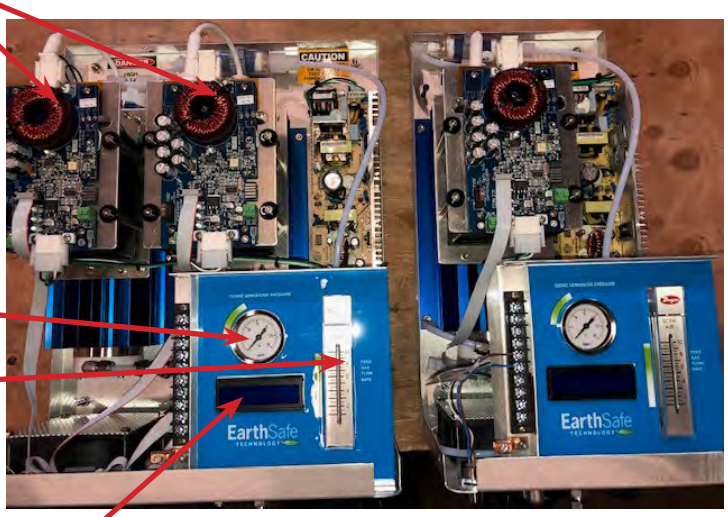
Checking the 12 or 24 Gram Ozone Generator on Systems with Ozone Option (if equipped)

Similar to the Oxygen Concentrator, the Ozone Generator will be running when the Reclaim Machine is in "Auto" with the pump running. It relies on the concentrator to supply it with pure O2 as noted to run correctly. The current ozone generators carry many of the same components as the "Gen 2" cabinets but are mounted within the reclaim frame as opposed to being on top of the machine. The 24 gram is larger than the 12 gram unit as shown. A quick glance at the internal photo reveals two drive boards, two transformers, and two of the 12 gram ozone cells requiring the larger enclosure for the 24 gram generator.

External View

24 Gram 12Gram

Internal View

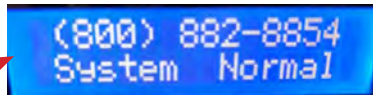


The Pressure Gauge should be in the "Green Zone" and read approx-imately 8.5-9psi

The Feed Gas Flow Rate will be reading 8.5-9 SCFH

Regardless of size in this style of generator, It has been preset at the factory to maximum output.

There are two screens of concern to check after start-up shown at the right. If a fault is detected the screen will indicate that. See the troubleshooting section for fault countermeasures.



System Start-up (Continued)

Checking the 4 Gram Ozone Generator on Systems with Ozone Option (if equipped)

The 4 gram Ozone Option will be running when the Reclaim Machine is in “Auto” with the pump running. This ozone option is a “stand alone” add-on that does not require an oxygen concentrator. As a result, the cabinet enclosure contains internal components that filter / purify the incoming air providing pure O2 to the internal ozone cell.

If the Reclaim Machine is purchased with the 4 gram option, it will have one cabinet mounted on the machine. The single 4 gram cabinet will run for 30 minutes producing ozone and then regenerate the sieve bed for 15 minutes in a repeating cycle.

The Ozone output is preset at the factory via the ozone output potentiometer on the bottom of each cabinet. It should be set and running at the maximum setting or 100% output at all times.

Verify that “power” is on and that the ozone output lights are active when the individual cabinet is producing ozone.

System Operation

Overview

The PurWater Reclaim System 3.0 is controlled by a Programmable Logic Controller known as a PLC that is coupled with two extensions. The PLC and the two extensions have a series of input connections located on the top of the devices that receive signals from various components on the machine. Based on the internal programming and the inputs being received, the PLC directs output signals (outputs are located on the bottom of the devices) which control machine components including the pump, valves, ozone components, visual touch screen, transducer, etc.

The PurWater Reclaim System 3.0 is designed to run in Auto 24x7. In Auto - the pump runs continuously if no major faults are present. The pump runs on the Variable Frequency Drive (VFD) in one of two ways - either Recirculation or Activation. In Recirculation mode, the pump runs at a preset speed of either 33.9 or 39.9 Hz, the recirculation motorized ball valve (except on PW050 and PW100 units) is closed running water through one or two cyclones only. The system constantly runs treated water back into the tanking. During a Wash Cycle, the pump speed varies based on transducer feedback as the VFD controls the pump speed to maintain 40 psi on the treated water line. The recirculation valve opens during the wash cycle which allows a water path through all cyclones. The pump still recirculates some treated water back into the tanks at this time. Reclaimed water enters in the upper portion of the cyclonic separators and spins the water to separate the solids from the water which get directed downward. Five micron or lower treated reclaim water is directed upward to the wash equipment via the treated line. Solids are then routed out the bottom of the cyclones via the underflow line to either the trench or directly back to the first chamber of the first tank. If a major fault occurs, the system turns the fresh water bypass valve on only when the wash activation signal comes on.

The major faults that will shut the pump down and open the bypass solenoid (on Wash Activation) include if the VFD is off, faulted or failed, the low level float (if installed in the last tank) is down indicating a low water level, or if the pump runs under 4 psi for more than 10 seconds continuously. If a low float fault clears on its own (water level is back up in the tank), the system will go back to running the pump. Minor faults include either of the mechanical ball valves not opening or closing, and require being acknowledged on the touch screen. If the system has ozone components installed, faults will shut only the ozone components down and may clear on their own. Not addressing minor faults can lead to larger problems.

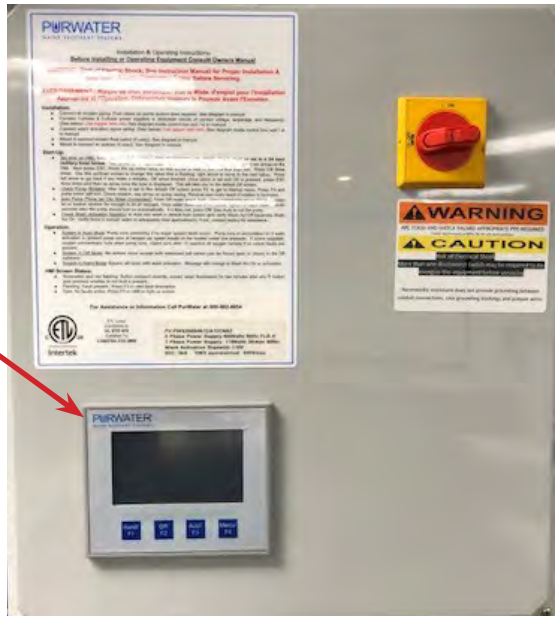
Hand and Off mode are available in the event there is no desire to run the reclaim system. For example, if there was a leak in the product line and it was being repaired, the system would be Off. Another example would be when doing maintenance and cleaning the basket strainer. The system would be in “Hand” to run in fresh water bypass during the maintenance interval.

Key Electrical System Component Overview

Identifying and understanding the key components of the PurWater System can be very helpful in maintaining and operating the system as well as troubleshooting minor and major faults if an when they may occur. The Touch Screen on the front of the electical control box door allows the operator to view system status and provides direction and guidance in the event of a fault. The “Gen 3” machine has many familiar components of the “Gen 2” version. The Control Box is a bit larger & the HMI (Gen2) is now a color touch screen with several advanced features.

Touch Screen

The touch screen is mounted on the control box door and allows the operator of the system to view the status of the reclaim system without opening the control box. There are 3 different modes the system can be in - Off, Hand or Auto. The newer color touch screen version allows for a great deal of text to be displayed which guides the operator through fault resolution and troubleshooting the system. There are submenus and status indicators that can be read depending on the mode the system is in. The easiest way to navigate through each is by reading the message in full and then following the message prompts.The Touch Screen has a reported approximate running life of 6 years, depending on ambient conditions like heat and humidity. If in extremely hot or humid situations, the life span of the Touch Screen can be reduced significantly.

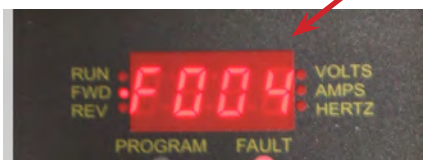


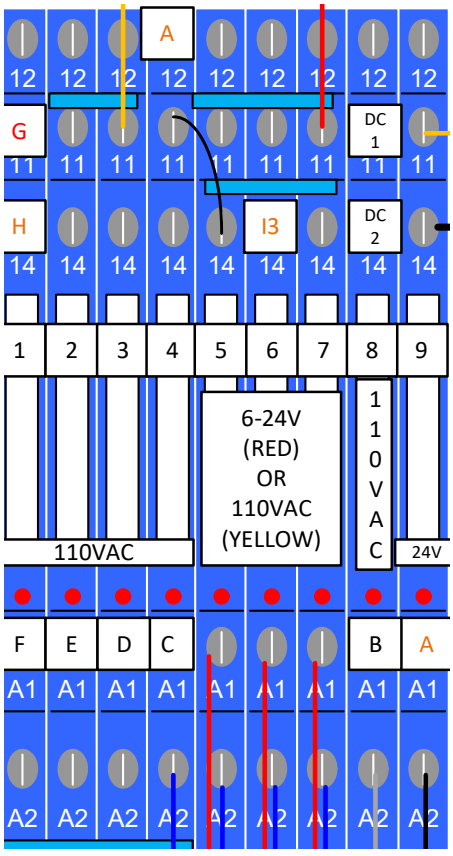
Programmable Logic Controller (PLC)

The Siemens PLC is mounted inside the control box and operates the system by providing control of various functions of the reclaim unit. The PLC is programmed at the factory. The PLC displays status and error messages through the Human Machine Interface (HMI) Touch Screen. The PLC takes Hand, Off, Auto and Prime commands from the HMI The current “Gen 3” PLC looks very similar to the “Gen 2” version, and, two PLC extensions are required.The PLC (and extensions) do not have a definite approximate running life.

Key Electrical System Component Overview (cont.)

Hertz or Fault Code Display





Variable Frequency Drive (VFD)

The VFD is located within the control box in the upper left corner. The VFD controls the pump motor speed by varying the Hz supplied by the motor. The VFD allows the reclaim system to operate at a low motor speed and water output from the pump when it is in recirculation mode and an increased speed and water output with a wash activation signal. The VFD utilizes a pressure transducer located on the treated manifold which sends a signal to the PLC and then to the VFD to ramp up or slow down the pump based on the pressure of the product line. The default display on the VFD shows the current operating Hz of the pump. If it shows an F code (see image) go to the Trouble Shooting section.

The VFD running life can vary greatly depending on multiple different factors, the biggest one being heat. The standard life of the VFD can range from 2-5 years depending on the heat inside of the drive and how busy the wash is. This equates to how often the VFD spends ramped up which puts more stress on the drive and also generates more heat. The VFD is also sensitive to voltage spikes & lightning related power surges

Relays

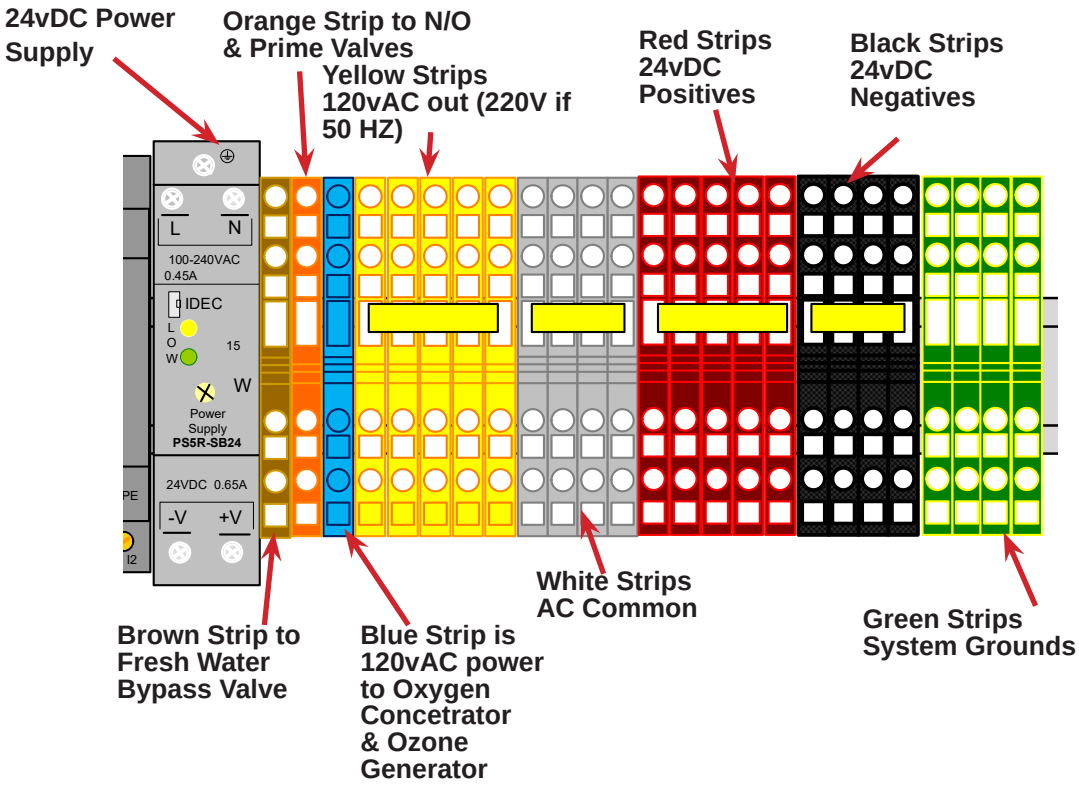
There is a bank of relays that work in conjunction with the PLC and various devices including the VFD, Recirc and U/Fvalves, activation signals, and optional add-ons. The standard bank of 9 relays is shown to the left. Note that not all these relays are identical in terms of the voltage rating and are not interchangeable. The relays and bases must be replaced if a voltage change is required for the activation relays.If more system options are ordered, there will be additonal relays added to the array.

Relay #1 - Run signal to VFD
Relay #2 - Recirculation Motorized 2” Ball Valve. Wired normally open. The relay powers on to close the valve.
Relay #3 - Underflow Motorized 1” Ball Valve. Wired as normally closed. The relay powers on to open the valve.
Relay #4 - 1” Bypass Relay - wired as normally closed. Powers on to prevent bypass valve from opening.
Relays #5,6,7 - Standard Activation Relays. These are jumped together & connect to Input 3 on PLC. Common on the relay is powered. Relay volatge depends on activation voltage from wash and controlled by car wash controller.
Relay #8 - Dry Contact for external signal indicates Reclaim OK or Fault status.
Relay #9 - Additional bypass relay for “fail safe” operation should the PLC fail.

Key Electrical System Component Overview (cont.)

24Vdc Power Supply and "WAGO" Strip Layout

The PLC and extensions require a 24Vdc power supply on the "Gen3" systems. The power supply is shown below & is located to the immediate right of the analog PLC extension. There are several WAGO strips of various colors on the same DIN rail as the PLC and the extensions. The color code breakdown of the Wago strips is indicated below.



Key Plumbing System Component Overview

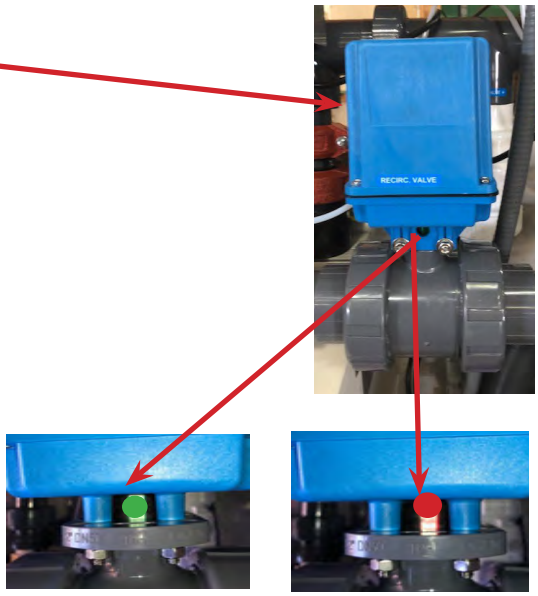
The majority of the "passive" Reclaim System plumbing components are built in shedule 80 PVC. The plumbing has several "sub-assemblies" with unions on each end for simplifying replacement should there be a need at some point. The picture at the right is an example of a portion of the reclaim plumbing out of the parts catalog. There are 7 "unionized" plumbing connections shown in this photo.

In the event of a failure, it's reccomended that a picture be emailed to **parts@purclean.com** for fast efficient service. Parts can be purchased through the local distributor.

Key Plumbing System Component Overview (cont.)

Recirculation Valve

The 2” Recirculation or “Recirc” Motorized Ball Valve is located high on the system plumbing and is controlled by the PLC . It closes when the Reclaim is running in Auto and a wash signal is not present. That way, when the system is recirculating water, it is running through one or two cyclones only depending on the system model. This keeps the pressure up in order for the cyclone to spin out solids It also closes in prime mode to provide backpressure to help activate the pressure switch. The valve opens on a wash activation circulating water to all of the cyclonic seperators. This valve is equipped with a position switch to indicate to the PLC if it is open or closed. (There is no recirc valve on the PW050 or PW100.) If the position switch detects an error, a minor fault will display on the touch screen. There is a viewport on the valve that also gives a status indication showing Green when open and Red when closed. This is also true with the underflow flush valve which opens only when the Reclaim is in the OFF mode.



Open Closed

U/F Flush Valve

The 1” Underflow Flush or U/F Flush valve is located on the bottom of the cyclone manifold section to remove solids spun downward by the cyclonic action. It is controlled by the PLC and opens once daily at 2am to flush out the cyclones. The pump ramps up in speed during this flush period. A manual flush of the cyclones can also be done from the touch screen. The purpose of this daily flush is to keep solids from backing up at the bottom of the cyclones and hardening creating a blockage. There is a viewport on the valve that gives a status indication showing Green when open and Red when closed similar to the Recirc Valve. The Gen 3 Reclaim Systems have two different plumbing configurations depending on the Reclaim model. Pictures on the right illustrate the two different U/F valve plumbing layouts.

NOTE: Regardless of size, the U/F valve, despite being a ball valve has a 5/32” hole drilled in it as an orifice. Water should be coming through the orifice when the ball valve is closed. See picture to the right

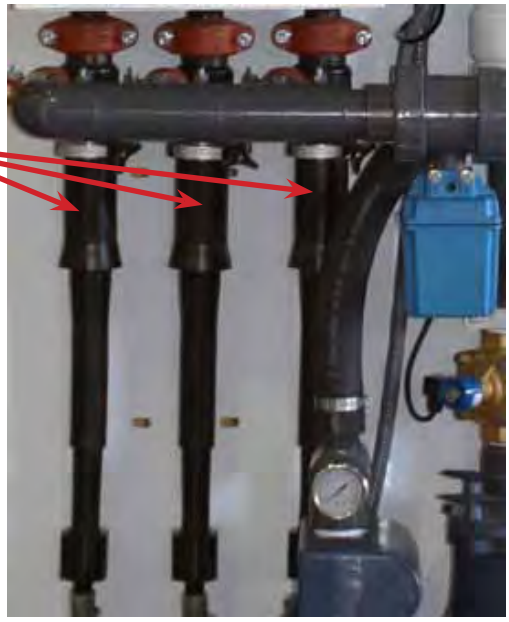
PW100 U/F Valve Plumbing

PW200 & Larger U/F Valve Plumbing

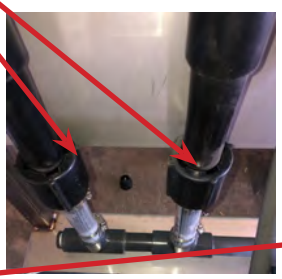
Key Plumbing System Component Overview (cont.)

Cyclonic Separators

All 5 micron reclaims come with one or more cyclonic separators, or cyclones, for short. The number of cyclones present will vary based on Reclaim Model. The larger the system is - the more cyclones it will have. The cyclones take the water from the system pump via a manifold to the inlet in the middle, spin the water in a vortex (420 Gforce) sending the heavy material (solids) to the bottom and the 5 micron water to the top which becomes the treated water as well as the water that gets recirculated back to the first tank.



The Cyclonic Seperators are connected at the bottom with a series of braided hoses into a PVC manifold. The “solids” that move to the bottom of each individual cyclone will flow through the manifold & exit the Reclaim System via the Underflow Flush Valve.



Prime Solenoid Valve

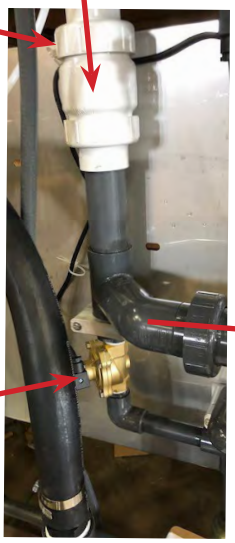
The prime solenoid is a 3/8” valve located on the lower right of the system near the U/F Flush valve. This valve will flow city water into the bottom of the strainer basket filling the basket & the suction line all the way back to the foot valve in the last reclaim tank.

Normally Open Solenoid Valve

This valve is located on the manifold just above the mazzei eductor. It typically has a yellow sticker on it for identification purposes. The only time it closes is during the prime sequence to assist the system in catching prime. This valve exisits to assist the Reclaim in building pressure while priming. It blocks the city water path. Once the pressure reaches 4psi at the pressure switch, the pump will start.

Key Plumbing System Component Overview (cont.)

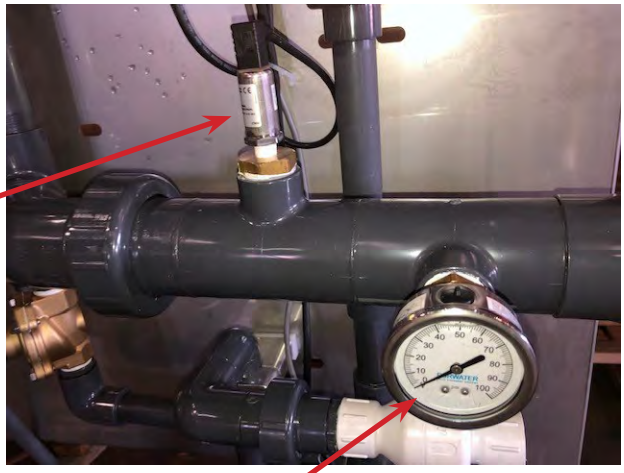
Double Union Check Valve
This check valve is plumbed on the product manifold and isolates the 5 micron reclaim water from the fresh water bypass loop. Reclaim water flows in the down direction. Should the system go to fresh water bypass, it "checks" the fresh water from flowing back through the reclaim system thus going out the "Treated" line to the wash equipment.



Fresh Water Bypass Solenoid Valve
The Fresh Water Bypass Solenoid on the Reclaim System is a back-up water source and will open should a major system fault occur that stops the pump from running or the system is placed in hand mode and a wash activation signal is present. The valve will vary in size depending on system model but the purpose remains the same. **NOTE: The valve may not close if the incoming pressure exceeds 70psi.**

Treated Water Line Components
The treated water line manifold is a unionized assembly that is plumbed out to the wash equipment. The line size should not be reduced at the reclaim system connection. If necesary, reduce the line at the point of delivery. (ie at the pump or valve)

Pressure Transducer
The pressure transducer (as noted on page 40) works in conjunction with the PLC and the VFD to deliver a steady 40psi to the wash equipment. The VFD will "max out" at 60 Hz in which case the pressure may not reach 40psi. **NOTE: the "Gen 3" transducer is a 0-10 volt DC device vs the older reclaims using a 4-20mA device.**



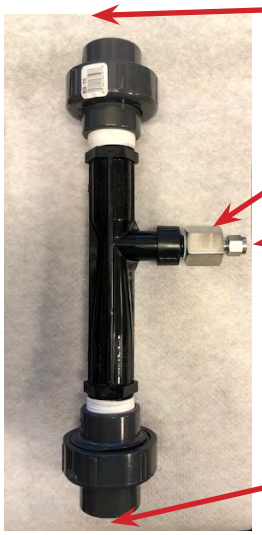
Pressure Gauge

This is a 0-100psi pressure gauge which reflects treated water delivery pressure.

Key Plumbing System Component Overview (cont.)

Mazzei Eductor

The Mazzei Eductor is a very basic vacuum generator. Water passes through it at a high rate. The shape of the mazzei is similar to the “V” shape of a venturi. Water rushes through pulling the check valve inward drawing in ozone from the ozone generator. If the outbound line becomes restricted - water flow at the outlet will drop off and a vacuum error will occur shutting down the ozone generator and oxygen concentrator.



Stainless Steel Check Valve

This check valve is found on the ozone inlet tubing. It is a safety device to prevent the possibility of any water backflowing to the ozone generator in the event that the mazzei check valve failed. NOTE: Ozone tubing is PVC. Never replace with polyflow or alternative type. Ozone will “eat” the tubing from the inside.

Ozone (O3) Flow from the Ozone Generator:

The ozone gas flows down through the check valve & is drawn into the mazzei where it mixes with the treated water.

Oxygen Concentrator & Ozone Generator

These components were covered on pages 35 and 36 in this manual in depth. If any questions, please re-visit those pages.

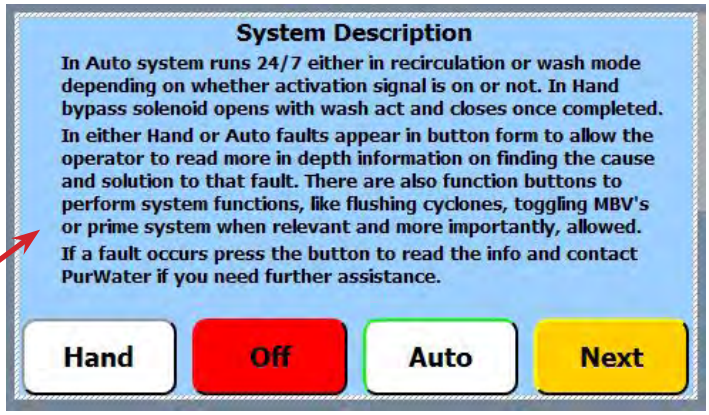
Pressure Switch

The Pressure Switch is physically located on the left side of the control box, and, arguably could be covered in key electrical components. The poly pick up tube is connected above the pump outlet on the manifold. If the pump pressure is lower than 4psi, the switch will let the PLC know and shut the pump off on a low pressure fault. NOTE: It’s a good idea to clean the tube once per year.

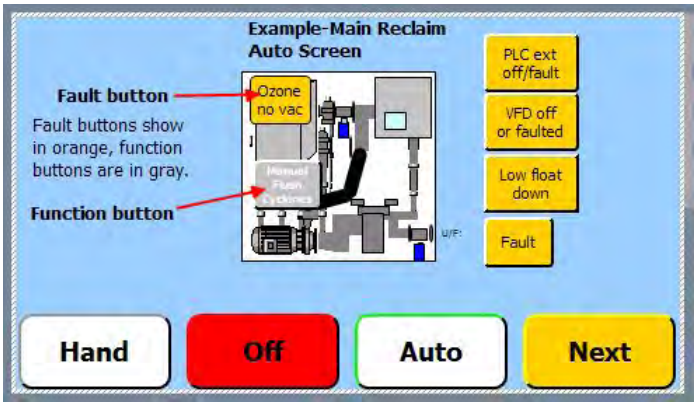
Pick-up Tube

Reclaim System Basics / Faults & Screen Information

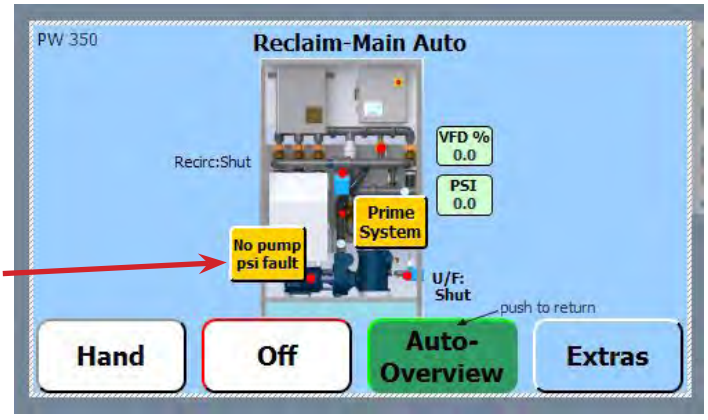
Ths PurWater Reclaim System Manual has covered the key points of getting the machine running in the preceding pages. Customer connections have been landed, time and date have been set on the PLC, the system has been tested in both “Hand” and “Auto”, basic operation has been covered, and key components identified. The “Gen 3” machine will display system status as well as key details should a fault occur and instructions for troubleshooting leading to resolution. The Reclaim is intended to be left in “Auto” running 24 x 7. The screen description on the right is a capture of the type of information displayed when turned off.



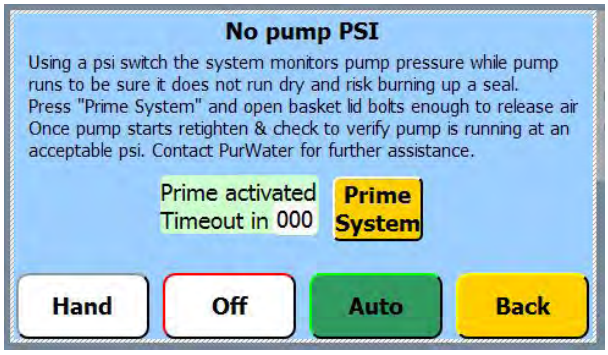
The next screen is an example of what might be seen should a fault of some sort occur in Auto. As the screen states - Fault buttons are in yellow and function buttons are in grey.



The next screen actually captures a “no pump pressure fault” & directs the operator to prime the system. Note that it shows there is no VFD percentage indicating the VFD is not running nor is there any pressure (PSI) present. Priming the system as done on page 32 would be the immediate countermeasure to try here. Touching the yellow “No pump psi fault” will advanceto the next screen.



This screen is the descriptor that explains why the fault occured & a reminder of the correct procedure for priming the system.



System Maintenance Schedule

Maintenance Task	Daily	Weekly	Monthly	Quarterly	Bi-Annual (6 Mos)	16,000 Hours	Estimated Time Required
FOR ALL PURWATER UNITS							
Check Touch Screen	*						<1 min.
Check Pump Pressure		*					<1 min.
Clean Basket Strainer		*					<1 min.
Verify Flow - UF Valve		*					<5 min.
Pump Out Settling Tanks					*		1 Day
Clean Motorized Ball Valves				*			30 min.
FOR OZONE UNITS							
VerifyOzone Production		*					<1 min
Clean Oxygen Concentrator & Ozone Generator Filters			*				5 min
Clean Mazzei Eductor				*			10 min
Replace Ozone Cells & Oxygen Concentrator						*	60 min
FOR SPARGER UNITS							
Check Sparger Flow & Vac			*				5 min
Remove / Clean Sparger				*			30 min

Please note: Daily visual checks and periodic PMs can be easily performed by the car wash operator and will ensure proper operation of the reclaim unit. All recommended monthly and quarterly maintenance / service should be performed by a trained and authorized PurWater technician. Contact PurWater Technical Support at 800.882.8854 to request the name of the authorized technician for your market.

The information below is long term maintenance that needs to be completed on any PurWater machine that contains the particular item. Please be aware that all timing is approximate and can vary greatly depending on the conditions that the reclaim is in (heat, humidity, etc.) and how well the maintenance was kept up on the machine. For more information please contact PurWater.

Oxygen Concentrator* _____ 1.8 years / 16,000 hours

Ozone Cells* _____ 1.8 years / 16,000 hours

VFD _____ 2-5 years

Touch Screen _____ 6 years

*Please note that the Oxygen Concentrator and the Ozone Generator need to be replaced at the above times regardless of whether the equipment is still working or not. All other items are replaced when they cease to work.

System Maintenance

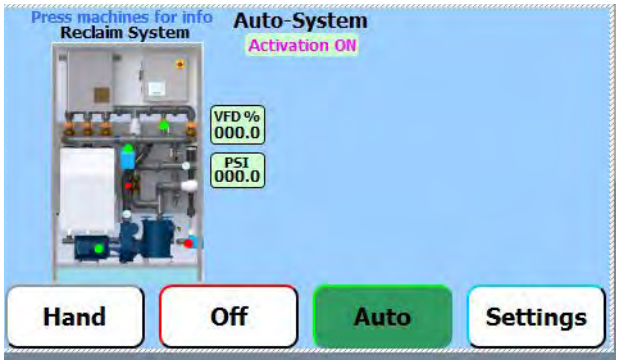
Check Touch Screen Daily

If possible, to avoid running in bypass mode for prolonged periods of time without realizing it, take a quick look at the HMI touch screen:

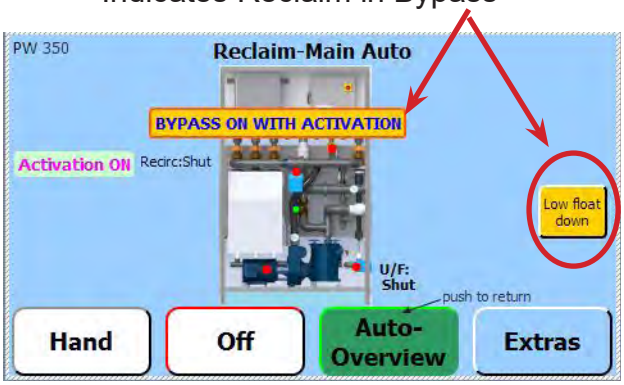
--Is a normal “Auto” Screen on the display?

--Is a fault present on the screen? See message & fault in yellow background. If so - follow the screen prompts for resolution. If unable to resolve the issue go to the troubleshooting section for a better understanding of the cause and solution for the fault message.

Normal Screen



Typical Fault Screen
Indicates Reclaim in Bypass

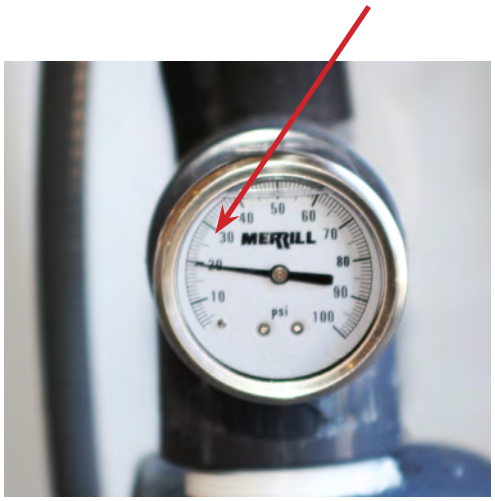


Check Pump Pressure Gauge Weekly

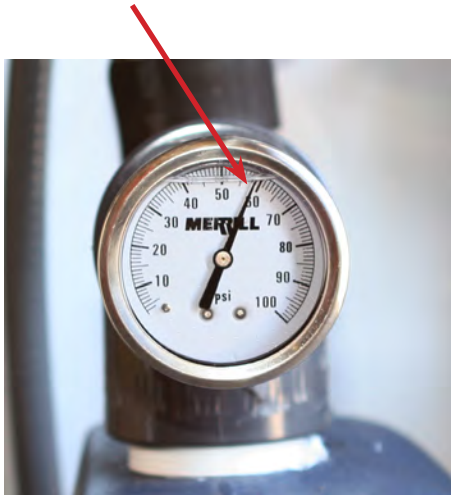
- The pump pressure gauge should show pressure when the motor is running.
- This pressure will vary. If a wash activation is on it will be much higher than when the Reclaim is running at recirculation speed and the wash is idle.
  - In the low frequency recirculation mode the pressure should be about 15-25 psig
  - At higher pump speeds, when there is an activation signal from the car wash, the pump pressure may read as high as 50-55 psig.
- If there is no pressure please refer to the Troubleshooting Section.

Pump pressure gauge

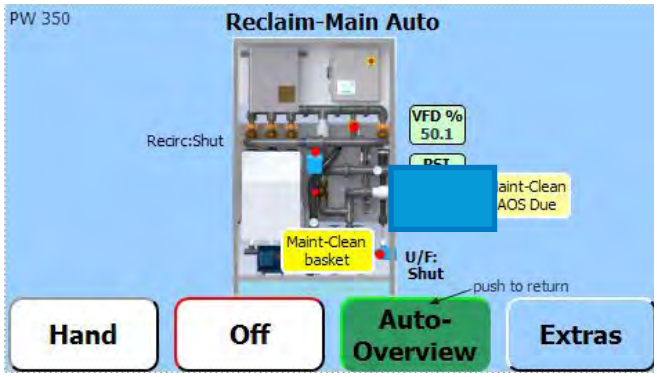
Typical Pressure During Recirculation



Typical Pressure During Wash Activation



Clean Basket Strainer Weekly



The Reclaim has a timer and will display a message to clean the basket once per week. Follow the system prompts.
--Turn the system to Hand mode. This will put the system in bypass mode so that the carwash can continue to run.
--Loosen the dogear bolts holding down the strainer basket housing lid.
--Remove one of the two dogear bolts closest to the front. The front left one works well.
--Rotate the strainer basket housing lid counter clockwise and slide the lid off the strainer basket housing.
--If the lid does not rotate or slide, remove all the dogear bolts and gently pry the lid from the strainer basket housing.
--Reach into the housing, grasp the strainer basket handle and twist the basket enough to break it free in the event it is lodged. Lift the strainer basket in a twisting motion to avoid breaking the handle and remove it from the housing.
--Remove and properly dispose of any large particulates that may have accumulated in the strainer basket.
--Rinse the basket with fresh water. Once it is clean, replace the basket into the housing.
--Inspect basket strainer lid O-Ring by running a finger around the circumference of the oring that is seated in the groove of the lid. It should not be cracked or cut and protruding slightly above the sealing surface. Over time, the O-Ring may flatten and require replacement. Check the basket sealing surface for debris. Clean as needed.
--Replace the lid and the dogear bolts.
--Tighten the dogear bolts in a cross pattern to ensure the strainer basket housing lid is evenly seated on the housing. Leave the rear two slightly loose.
--Press Off, follow the touch screen instructions to reset the basket timer.
--When you press F4 the screen will say you have reset the basket timer.
--Go into Auto and prime the pump - tighten the two rear dogear bolts when water appears as in the startup procedure on page 32. **NOTE: If this is a larger Reclaim with the PVC strainer basket, reference page 32 for priming by loosening the bleed valve. The basket is accessed by spinning the top off using the two protruding "ears" as handles.**

See page 62 for detailed instructions

Basket Strainer with one dogear bolt removed and lid rotated for removal

Basket Strainer lid removed

Basket Strainer being removed

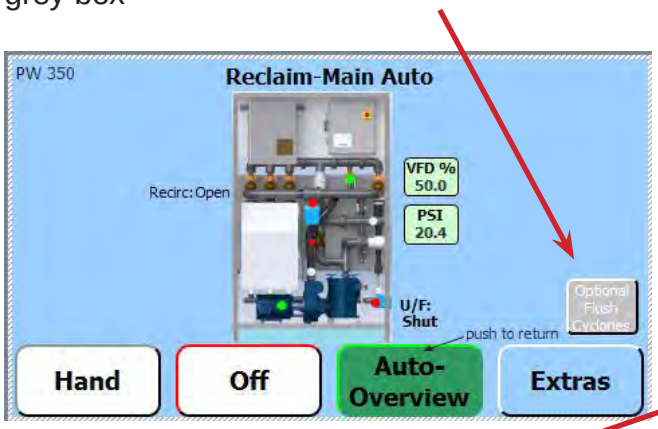
Verify Flow Through Underflow (U/F) Valve Weekly

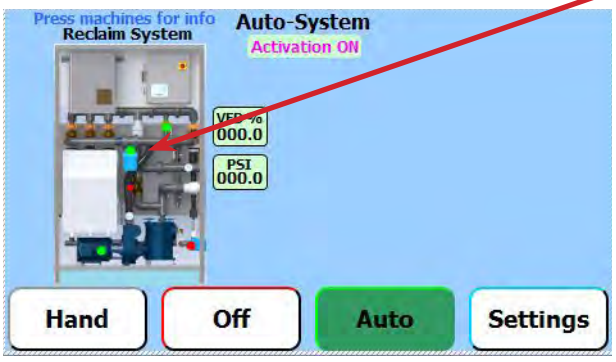
--Verify underflow is not backed up by loosening the front side union while the pump is running in Auto.
--If a stream of water is coming through the valve - that is all that is required (see pic below)
--If there is no flow, replace the union and force a “Cyclone Flush” from the touch screen then recheck by removing the union fitting.
--If the Cyclone (U/)F flush did not break the solids free, turn the system to Hand, disconnect the entire valve by loosening both unions and find out where the blockage is.
--This is important because if solids get trapped behind the valve for too long it can clog up the cyclones causing untreated water being sent out to the wash. The cyclones can be extremely difficult to impossible to unclog and may require removal & complete disassembly.

Cyclone Flush Procedure (A)

--Look at the Touch Screen and see if a grey “Flush Cyclones” box is present in the lower right of the screen.

--If present, activate the flush by touching the grey box





U/F Flush Valve with Water Flowing Through

Cyclone Flush Procedure (B)

--Look at the Touch Screen and see if a grey box is present in the lower right of the screen.

--If not present, touch the Reclaim System graphic on the Touch Screen and the grey “Flush Cyclones” box will appear.

--Activate the flush by touching the grey box

Pump Out Settling Tanks -- A Minimum Of Every 6 Months

--Call a local company that pumps out septic tanks and have them pump out the tanks.
--For best results, wash down the tank walls down while empty and pump that out as well.
--Inspect the foot valves and recirculation line. Repair or replace if necessary.
--Refill tanks running in bypass (Hand) or refilling the tanks before turning the system back to Auto and repriming the system.

Verify Ozone Production (Reference pages 35-37) Weekly

With the power on and the system operating in Auto, check for ozone production (There should not be any errors on the Touch Screen or the Ozone Generator Screens).

- Remove the manhole cover over the underground reclaim tank where ozone gas is injected. An odor of ozone should be present.

Caution: Inhaling concentrated ozone can create severe breathing problems.

Precautions must be made to prevent exposure to concentrated ozone.

12 or 24 gram Ozone Generator Sceren Normal Readouts

4 gram Ozone Generator Screen Normal Readout See page 36 for a larger look at the label.

Clean Oxygen Concentrator and Ozone Generator Filters Monthly

With the power On and system operating in Hand:

--Remove the air filter located on the right side under the splash shield on the oxygen concentrator. Gently remove the element. There is no cover retaining this filter. (See the right side picture below)

--Remove the cover(s) retaining the filter element on the bottom of the ozone generator(s) Note that 4gram and 12gram units have one filter each. The 24gram has two. Once the cover is off - remove the filter element. (See the left side picture below).

--Shake the filters or use dry air to blow the dirt out of the filter. If needed, the filter element can be washed with mild detergent and water, but should be completely dry before reinstalling. Note that the filter will expand if it gets wet. The dry method is preferred.

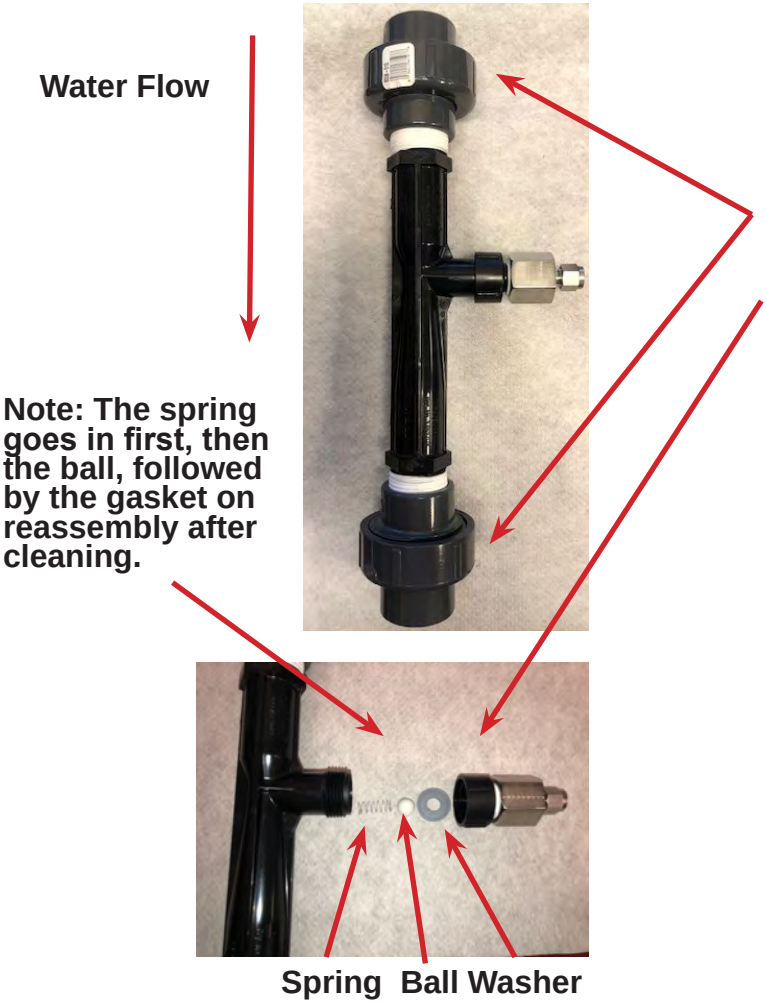
--Reinstall the filter(s).

If the filter element becomes frayed or damaged, replace it immediately. Contact PurWater for replacements.

NOTE: Disregarding maintenance of the filter could result in the system overheating and possible failure.

Ozone Generator Air Filter with Snap-on Cover Still in Place

Oxygen Concentrator Air Filter with Splash Guard Removed



Clean the Mazzei Eductor Qtrly

--Place the system into Hand mode via the touch screen. This will put the system in bypass mode so that the wash does not need to be closed.
--Remove the Mazzei eductor from its unions.
--Visually inspect both the body of the Mazzei eductor and the nozzle / ball check valve assembly to ensure that it is not clogged. Clean if necessary and replace the check valve components.
--Reinstall the Mazzei eductor and ensure that the inlet end (marked on the body) is pointed up.

Please note: When removing the cap from the Mazzei eductor nozzle / ball check assembly be careful not to lose the plastic seat, ball and spring. The spring is compressed and may have enough force to launch the plastic seat and ball and spring free from the Mazzei body when the nozzle cap is removed.

Replace Oxygen Concentrator & Ozone Cells - 16,000 Hours

The Reclaim System has a built in timer that will display a “Half Life” message on the touch screen at 8,000 hours of elapsed run time which does not require any action beyond acknowledging the message. When elapsed run hours reach 16,000 hours - a “Full Life” message will be displayed indicating it is time to replace the ozone components.
--If this is a 4 gram system, go thru the local distributor and order a rebuilt 4 gram ozone unit. One option is to purchase a rebuild kit as well as a rebuild tools kit. The original cabinet (if replaced), will be returned to PurWater (reversing the core charge) for rebuild and restocking.
--If this a 12 or 24 gram system, both the Oxygen Concentrator AND the Ozone Cell(s) require replacement at this time. Contact the local distributor for replacement components. Leave the system running even though the full life warning is present.

--The oxygen concentrator will be removed from the frame and replaced with a new concentrator or rebuilt with a kit purchased from PurWater. (PN for rebuild kit is “**AS 13 REBUILD KIT**”

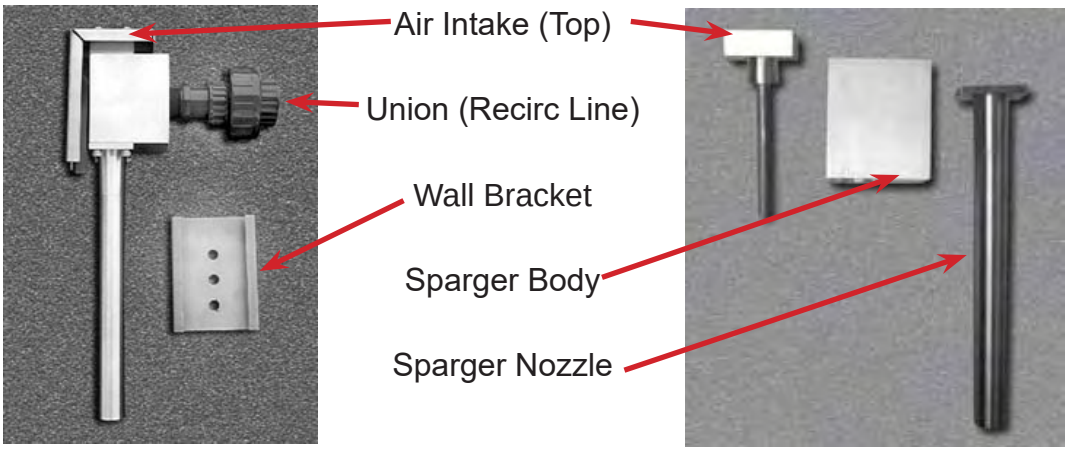
--The original concentrator will be discarded if replaced by a new unit.

--The ozone cell(s) will be removed and replaced with rebuilt cells. The original cells will be returned to PurWater (reversing the core charge) for rebuild and restocking.

It is considered “Best Practice” to replace these components simultaneously and resetting the “Full Life” timer at the time of replacement.

Check Sparger Operation Monthly (Non Ozone Systems Only)

--Remove the manhole cover over the underground reclaim tank where the sparger is located.
-- Check to see if there is a stream of water flow from the end of the sparger mixing tube.
--Place a finger over the air intake port on top of the sparger and check for suction.
--Remove and clean the sparger assembly if there is no stream of water from the end of the mixing tube or if there is no suction from the air intake. (See next section.)

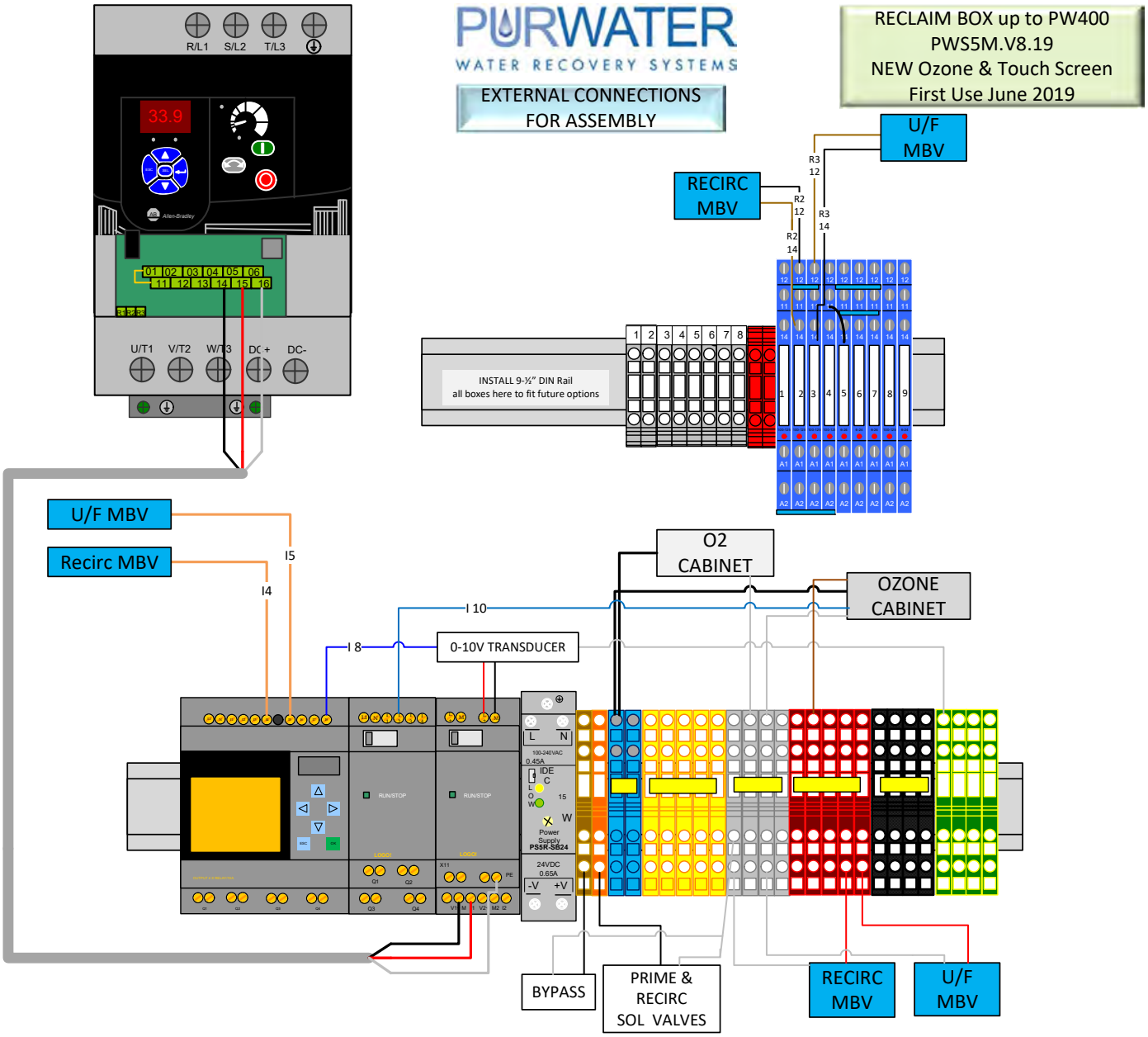


Remove and Clean Sparger Quarterly

--Place the system into Hand mode via the touch screen. This will put the system in bypass mode so that the wash can continue to run in Fresh Water Bypass Mode.
--Disconnect the recirculation water inlet at the union and remove the sparger assembly from the tank by sliding the assembly out of the wall bracket.
--Check the air intake port on the sparger and ensure it is not clogged. Flush with water to clear any debris .
--Check the recirculation water inlet and ensure it is not clogged. Flush with water to clear any debris.
--Check the sparger nozzle outlet and ensure it is not clogged. Flush with water to clear any debris.
NOTE: If flushing with water does not clear the debris, the air intake and sparger nozzle pieces can be removed from the main sparger body for better cleaning access.
--Before attaching the cleaned air sparger, prime the reclaim system and allow it to run for 1-2 minutes to flush out the recirculation line between the reclaim unit and the oultet in the tank.
--Return the system to Hand mode at the Touch Screen. Reinstall the sparger onto the wall bracket and reconnect the Sparger / Recirculation Line union. Be sure the top air intake port is not obstructed.
--Re-prime and restart the reclaim system. Check that the sparger is flowing water and a strong vaccum is present at the air intake port.

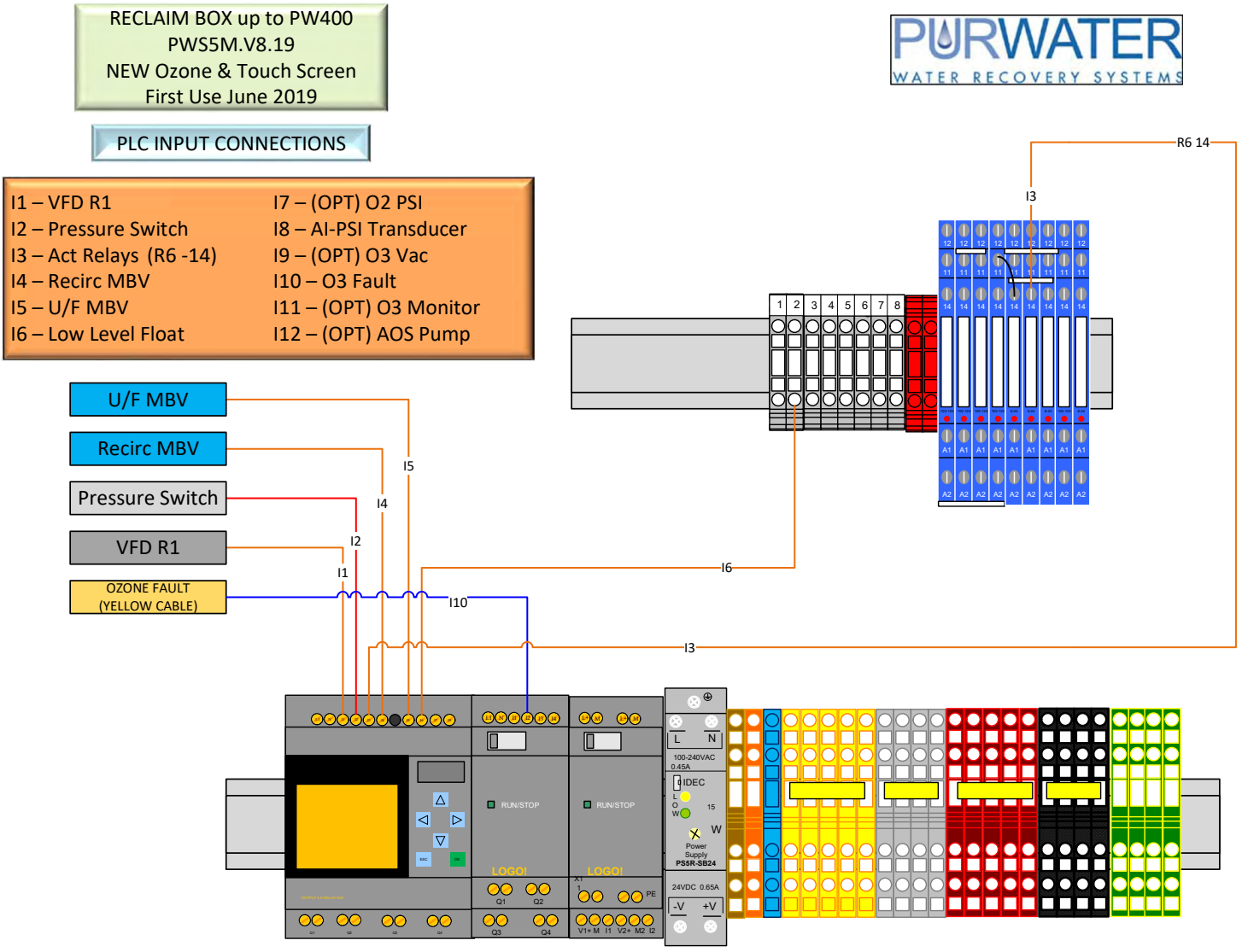
Electrical Diagrams - External Connections

This diagram shows the connection points for the standard components that are located external to the control box on the Reclaim unit. In the event that one of these components is replaced - this will show where to land the wiring for that particular component.



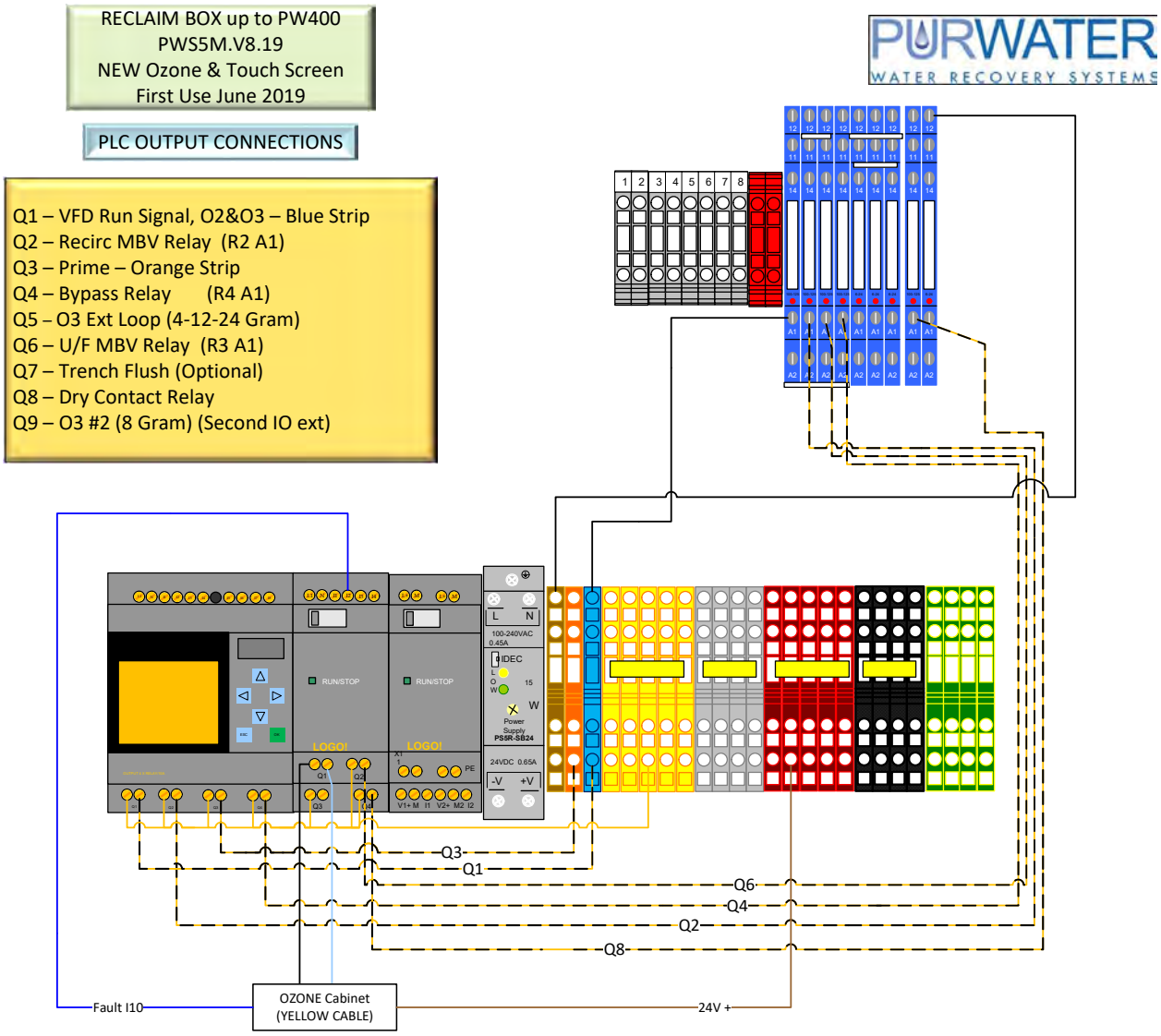
Electrical Diagrams - PLC Inputs

This diagram shows the PLC input connections, Note that the PLC has “L1 “on the top left which is PLC power. The next connection is “N”for netral. Continuing in the right direction is “I-1 thru I-8” which are the inputs from various components - reference the input table for each one. To the right of the PLC are two extensions with identical “L-1 & N” connections. The first extension has 4 inputs which equate to “I-9 thru I-12” in the programming. The second extension similarly wired would be Inputs “I-13 thru I-16”. To the right of the second extension is a 24Vdc power supply.



Electrical Diagrams - PLC Outputs

This diagram shows the PLC output connections. Note that the PLC is also known as a “smart switch” or a “smart relay”. There are 4 outputs labeled “Q1-Q4” on the PLC and each of the two extensions. The PLC is Q1-Q4 in the programming. The first extension equates to “Q5 thru Q8” & the second extension is “Q9 thru Q12”. Based on the programming & the information gleaned from the inputs - the PLC will close an individual output (relay). The voltage on the wire on the left side of the output will then be present on the right side wire activatng the connected component.



Electrical Diagrams - Relay Descriptions

This diagram shows relay descriptions, a brief overview of the connected components, the wiring color scheme, and the relay connection points. This should be helpful for troubleshooting.

PURWATER
WATER RECOVERY SYSTEMS

RELAY DESCRIPTIONS

Relay 1: Run signal to VFD.

Relay 2: 2" Recirc motorized ball valve wired as normally open so the relay powers on to close valve.

Relay 3: 1" underflow (U/F) motorized ball valve, wired as normally closed so the relay powers on to open valve. Relay is controlled by the PLC.

Relay 4: 1st bypass relay wired as normally closed so the relay powers on to prevent the bypass valve from opening. Relay is controlled by the PLC.

Relays 5, 6, and 7: Standard activation relays, jumpered together so if one or all are on, a signal is sent to Input 3 on the PLC, and the common on the bypass relay is powered. Voltage varies based on wash needs, either 110V, or 24V AC or DC. Relay is controlled by car wash controller.

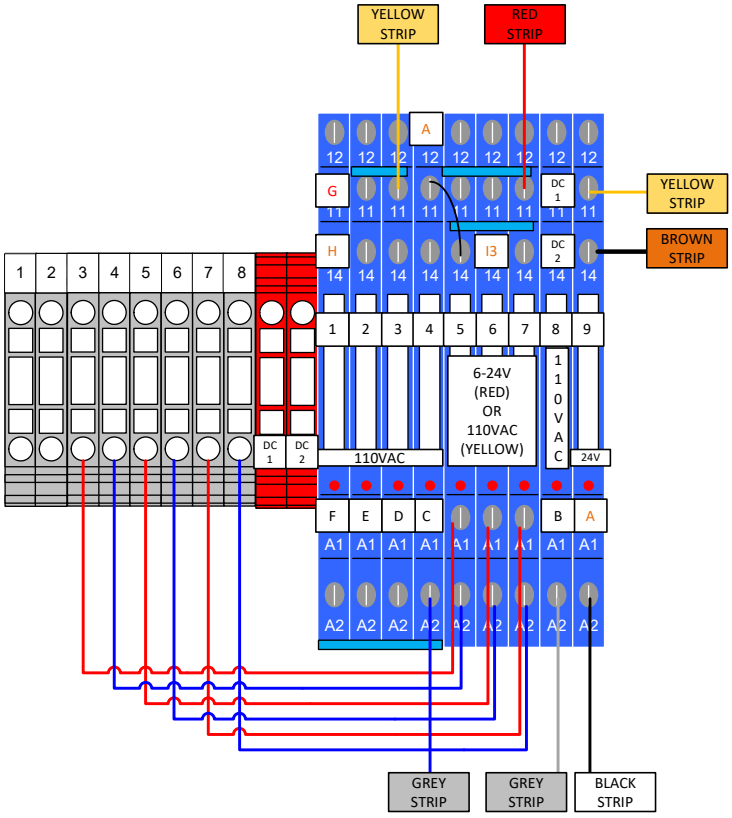
Relay 8: Dry contact for external signal to indicate reclaim OK/fault status.

Relay 9: 2nd bypass relay for fail safe operation if PLC fails. (24v coil)

Tag Wire Color	Routing
(A) – ORANGE / BLACK TRACER	R4 #12 to R9-A1
(B) – Q8 YELLOW / BLACK TRACER	R8-A1 to PLC Q8
(C) – Q4 YELLOW / BLACK TRACER	R4- A1 to PLC Q4
(D) – Q6 YELLOW / BLACK TRACER	R3-A1 to PLC Q6
(E) – Q2 YELLOW / BLACK TRACER	R2-A1 to PLC Q2
(F) – BLUE STRIP YELLOW / BLACK TRACER	R1-A1 to Blue TermBlocks
(G) – 01 ON VFD RED	R1-11 to VFD term 01
(H) – 02 ON VFD ORANGE	R1-14 to VFD term 02

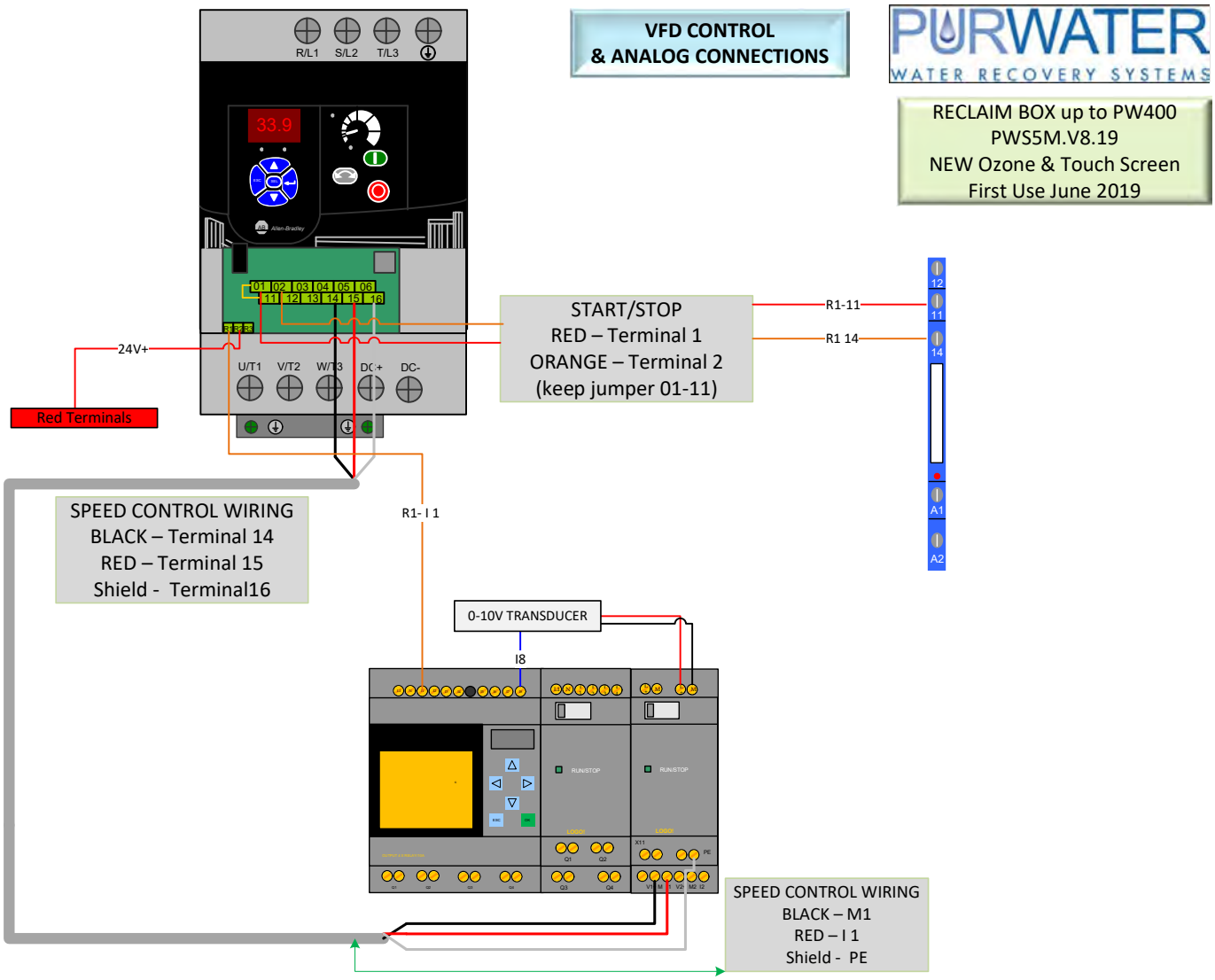
RELAY FUNCTIONS

RECLAIM BOX up to PW400
PWS5M.V8.19
NEW Ozone & Touch Screen
First Use June 2019



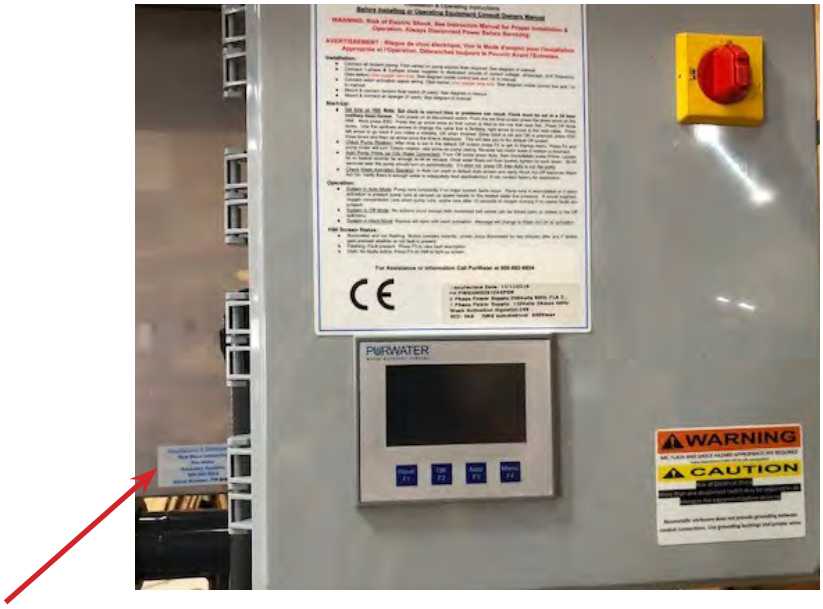
Electrical Diagrams - VFD Control & Analog Connections

This diagram shows the Variable Frequency Drive (VFD) control & analog connections. It will be helpful if VFD replacement becomes necessary.



System Troubleshooting

The PurWater 3.0 Reclaim System (“Gen 3”) was designed with easy troubleshooting in mind. The first step is typically to see what the Touch Screen Display reads. If the screen is flashing, press and hold F3 briefly and the screen will stop flashing. All faults are displayed on the Touch Screen and are prioritized to show in sequence by importance. For example, if the VFD is faulted and the recirc ball valve is out of position, the Touch Screen will display the VFD fault and disregard the ball valve fault until the VFD problem is fixed.



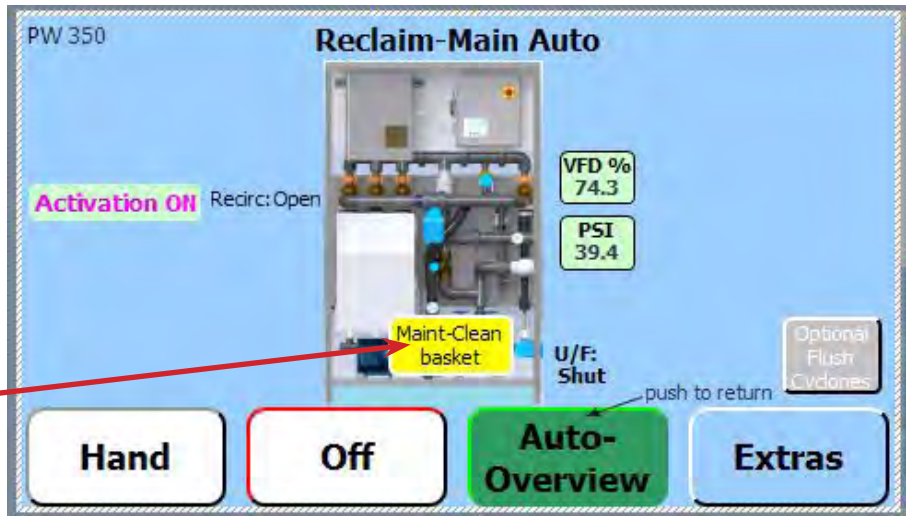
When contacting PurWater’s Technical Support department, it is often necessary to have your PurWater serial number available. On the Gen 3 systems (simlar to prior generations), the serial number is located in the middle of the frame to the left of the control box as indicated by the red arrow.

System Troubleshooting - Weekly Basket Clean Screens

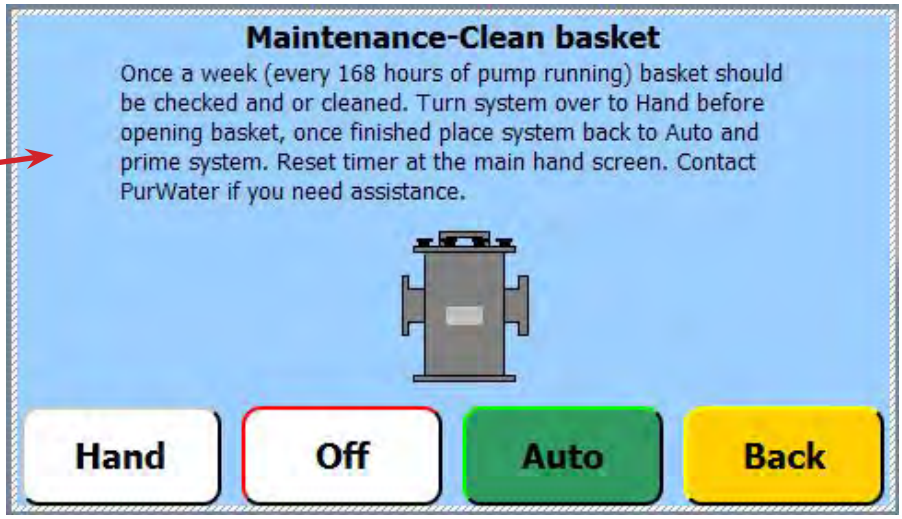
NOTE: This does not cause the system to fault or shut down - it merely "flags" the operator.

The Gen 3 Reclaim System has an internal timer that informs the operator that a weekly strainer basket clean is due.

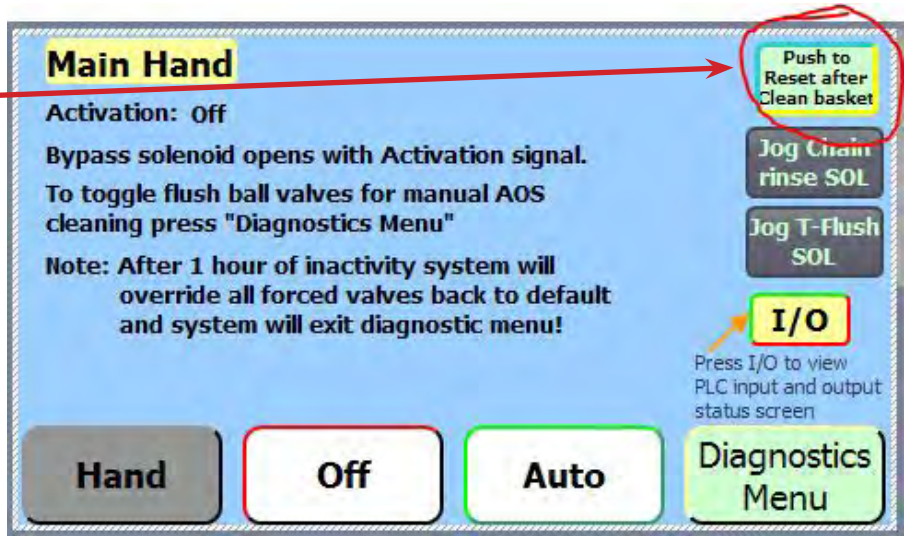
The timer triggers the "Maint-Clean Basket" yellow flagged message every 168 hours. The operator should "touch" the flagged message which then opens the next message.



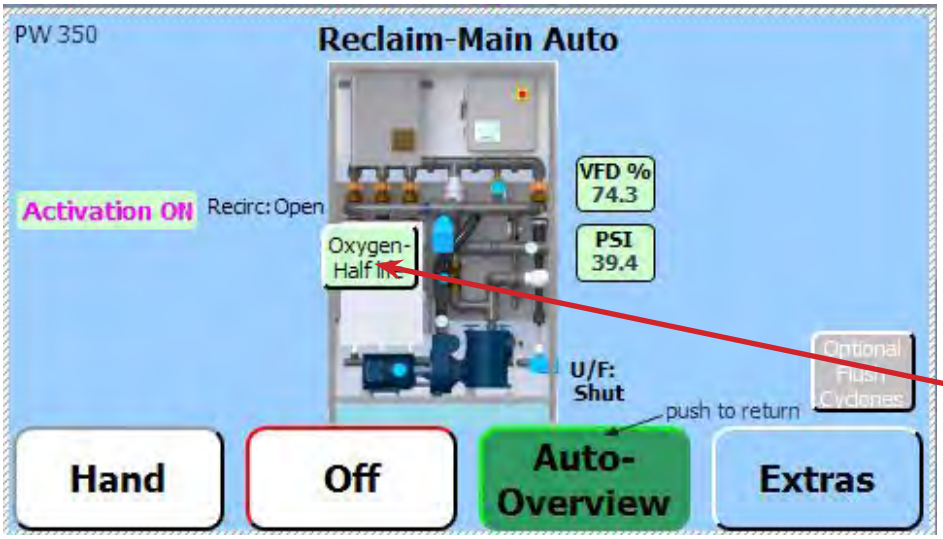
The message to Clean the basket is a brief overview of the procedure that is outlined in depth in the system maintenance section found on page 49.



After cleaning the basket, follow the screen prompts and reset the basket timer by using the touch screen.

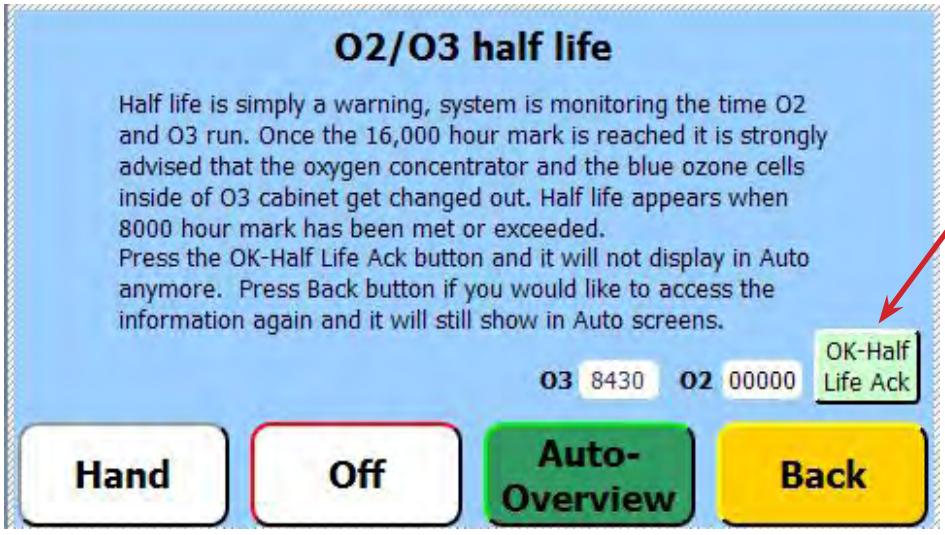


System Troubleshooting - O2 and O3 Half Life Messages



The Gen 3 Reclaim System has an internal timer that informs the operator when the Ozone Components (Oxygen Concentrator & the Ozone Reaction Chambers) depending on exactly how the system was built have reached 8,000 elapsed hours -- indicating half life. This is nothing more than a “heads up” for the operator.

All that is required at this point is to acknowledge the message. Start by touching the message on the screen.

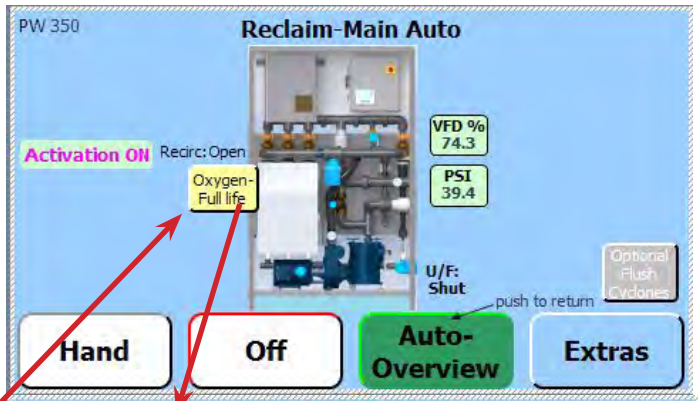


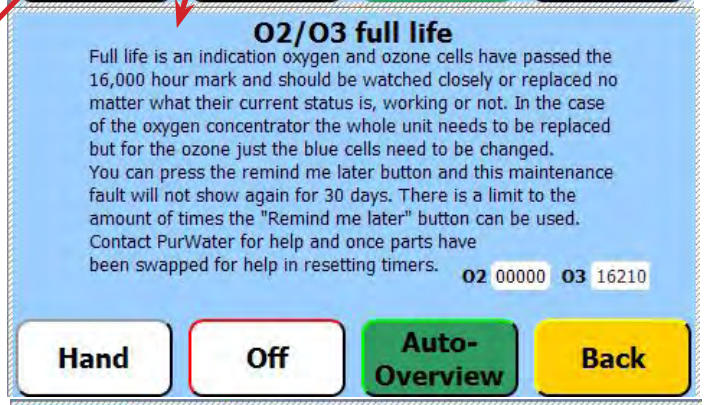
Once acknowledged, the second message appears. The text box has a good explanation of system status at this time.

Simply touch the “OK-Half Life Ack” area on the touch screen

System Troubleshooting - O2 and O3 Full Life Messages

The Gen 3 Reclaim System has an internal timer that informs the operator when the Ozone Components (Oxygen Concentrator & the Ozone Reaction Chambers) depending on exactly how the system was built, have reached 16,000 elapsed hours -- indicating full life. This lets the operator know that components need to be replaced and / or rebuilt. Pages 35-37 show possible component configuration. Touching the “Oxygen Full Life” will take the operator to the second screen full of text.

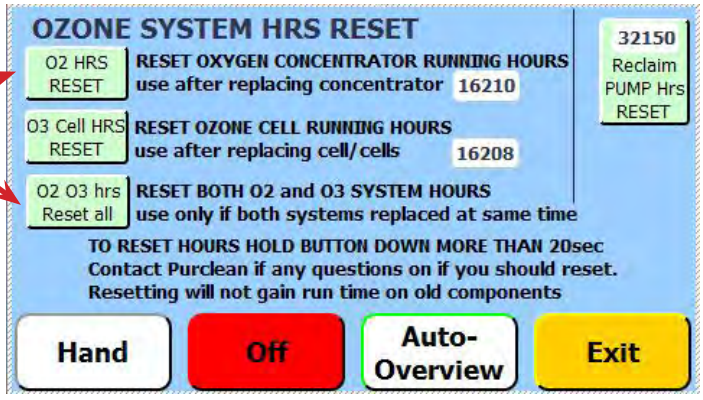




The operator can contact the local distributor for parts. If the ozone components are still functional, keep the system running until replacement parts are installed.

After the components are replaced, the run hour timers should be reset. Access the screen to the right and touch the grey “Ozone & O2 Resets” area. Reference pages 35-37 on component adjustments and set points once they are up and running.

In the lower screen, the reset options are displayed. Follow the screen prompts & select the appropriate option on the touch screen.

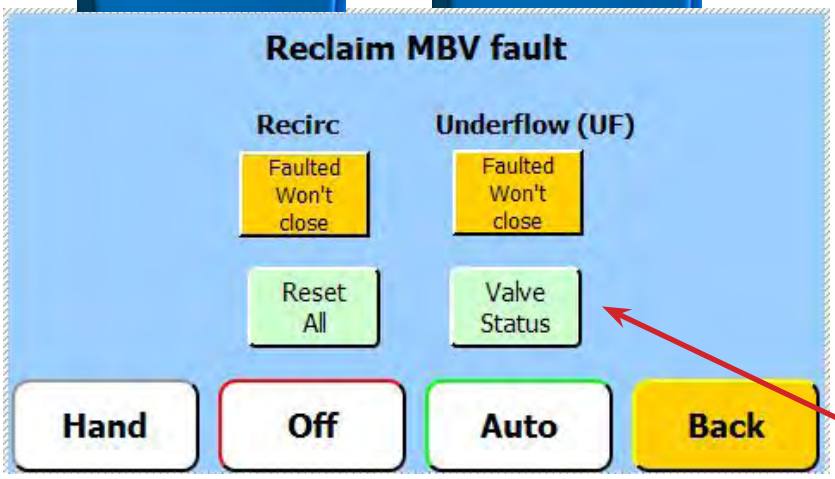


Feel free to contact PurWater for technical support at 800-882-8854 for guidance.

System Troubleshooting - Minor Fault
Recirculation or Underflow (UF) Valve Not Opening / Not Closing

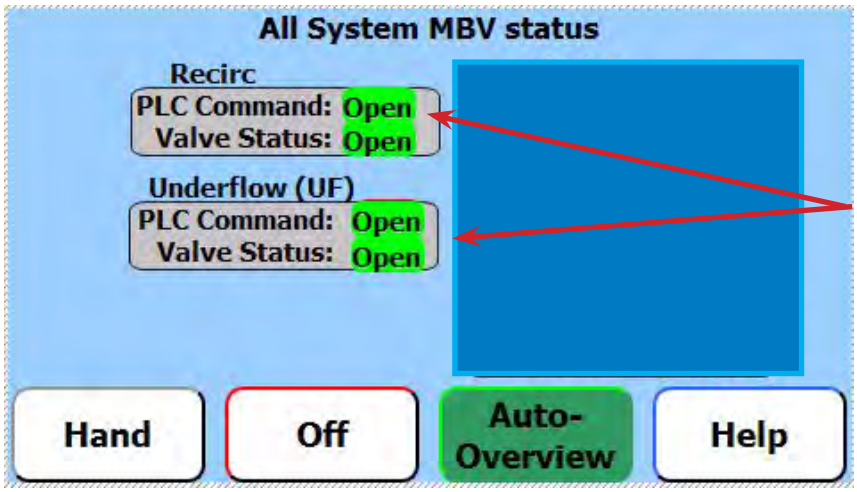
The Underflow or UF valve function is described in detail on page 42. As noted, it flushes automatically at 2am. If there is an error with regards to UF valve position it will likely be discovered during the daily walk thru.

Valve position is recognized externally based on the color seen in the viewport. Green indicates open and Red indicates closed.



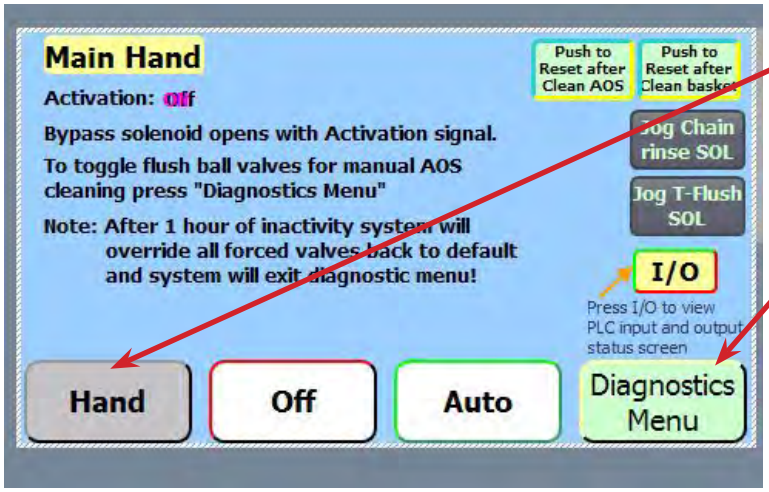
If either the Reciculation or Underflow Valve is out of the expected position, a “Reclaim MBV Fault” will be present on the touch screen. The Recirc Valve opens and closes several times a day. When a wash activation signal comes on it should open & likewise, it should close when the signal goes away.

Touching “Valve Status” will advance to the lower screen.



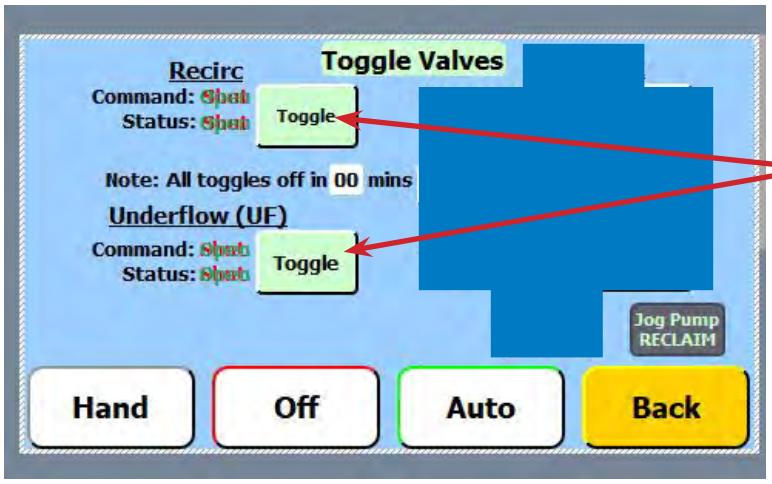
In this case, there is no mismatch between the command status and actual valve status. If there were, it would be indicated

System Troubleshooting - Minor Fault
Recirculation or Underflow (UF) Valve Not Opening / Not Closing



If either valve position error occurs, go to the “Hand mode” via the Hand portion of the touch screen in the lower left corner.

Then, advance to the toggle screen by activating the “Diagnostics” mode via the touch screen.



At this point, the status of both the Recirculation Valve and the Underflow Valves can be seen. Note that either valve can be toggled to move from the open to close or close to open position by touching the toggle area of the screen. If the valve does not move, it is time to determine if the issue is related to the motor or if it is a mechanical bind in the PVC portion of the valve itself.

Use a 7/16” wrench and remove the mounting nuts that connect the blue motor to the PVC portion of the valve. Be careful not to drop the motor. Place the motor safely & repeat the toggle attempt for the valve in question. If the motor toggles (rotates 90 degrees) as it should, this indicates the problem is a mechanical binding issue with the PVC portion of the ball valve.

Continue troubleshooting on the next page.....

System Troubleshooting - Minor Fault
Recirculation or Underflow (UF) Valve Not Opening / Not Closing (Mechanical)

Motor Separated From PVC

Continuing on from previous step.....

The motor did turn 90 degrees. This indicates that the motor and wiring are fine. It points to a mechanical issue with the PVC portion of the ball valve itself. Place the Reclaim in “Hand” to go into Fresh Water Bypass. Loosen both unions and Remove the PVC portion of the valve assembly. Visually inspect the interior of the valve. Is it dirty? Take a look at the bottom of the valve and note the “stem” of the valve.

Valve Bottom View

Using a 1/2” wrench, rotate the valve position. Clean the valve in the open & closed positions.

Once the valve is clean, rotate it several times - is it relatively easy to do so? If not, continue on.

Locate the adjusting nut for valve seat tension on one side of the valve.

Using a large adjustable wrench, turn the adjusting nut counter-clockwise about 1/8 of a turn.

Recheck the tension using the 1/2” wrench on the stem. Feel better? If so, re-assemble & test using the touch screen toggle button. If all is well, replace the valve assembly on the machine and hand tighten the unions.

Place the Reclaim back into “Auto”.

SAFETY NOTE!!

NEVER PLACE FINGERS INSIDE OF ANY OF THE PVC PORTION OF A MOTORIZED BALL VALVE WITH THE MOTOR ATTACHED!!!

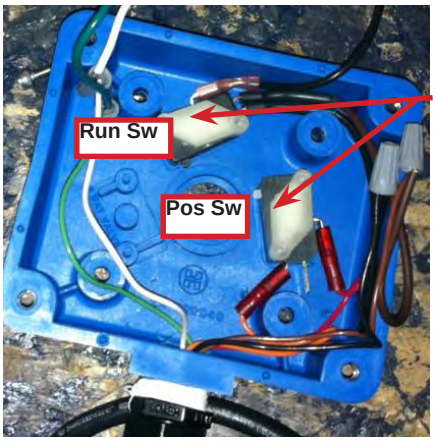
System Troubleshooting - Minor Fault
Recirculation or Underflow (UF) Valve Not Opening / Not Closing (Electrical)

The most common electrical issue with one of the mechanical ball valves is that there is a problem with either the “Motor Run” switch or the “Position Switch.”

To gain access to the switch area, pry off the coupler from the motor shaft using a flat bladed screwdriver or something similar.

Then remove the four Allen or Hex Head screws from the underside of the motor cover.

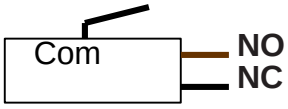
This will expose the area where the switches are mounted. There are small studs or alignment pins for mounting each switch. Each switch has a white plastic “keeper” to hold it in place.



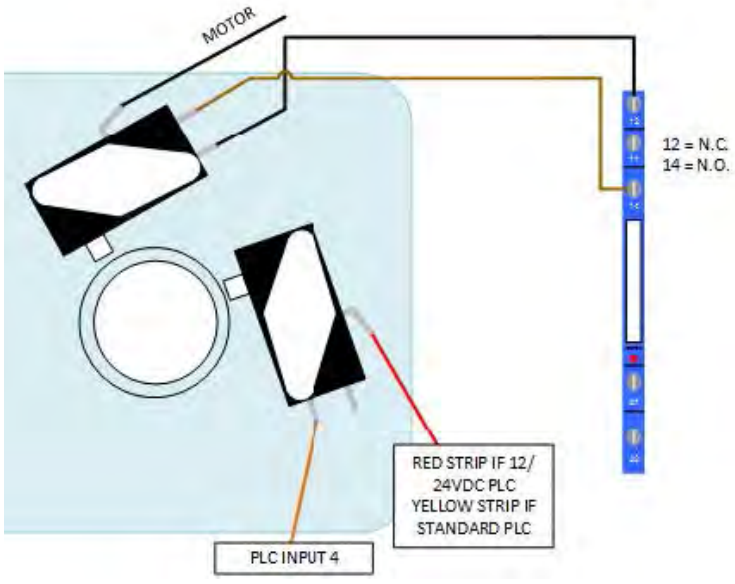
If neither switch is out of position then verify physical switch function by checking continuity using a digital or analog volt meter.

NOTE:

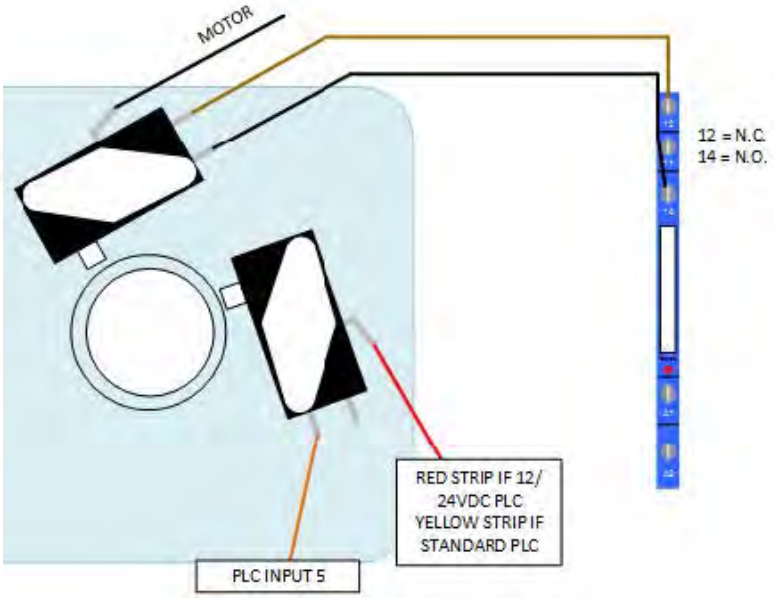
When “Ohm-ing” out the switches, reference the call-out below.



If unable to resolve an electrical problem following the steps above, the schematics pages 55-57, and a voltmeter, call for Technical Support 800-882-8854.



Recirculation Ball Valve Wiring

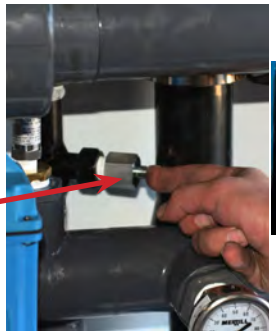


Underflow Ball Valve Wiring

System Troubleshooting - Minor Fault
Ozone Fault

Vacuum Fault:

Start the troubleshooting leaving the Reclaim in Auto and by disconnecting the Ozone line from the mazzei at the stainless steel compression fitting. Cover the mazzei hole with a finger and see if vacuum can be felt.



Message on Ozone Generator Panel

If a strong vacuum is felt and the fault is still present, there is a good chance there is a restriction or clog “above” the mazzei. The likely cause would be the stainless steel check valve mounted above the mazzel. Remove it & see if it is restricted. Be sure to reinstall in proper orientation.

If there is no vacuum felt, this is an indication that the fault is due to a clog or restriction at or “below” the mazzei. If the Reclaim includes a first or second generation of the Advanced Oxidation System (AOS), the bioballs may need maintenance.

The Mazzei Eductor **IS** a PM item - it should be cleaned quarterly. Reference the procedure on page 52and clean the Mazzei if overlooked. After cleaning, reinstall the Mazzei and leave the lower union loose. Restart the Reclaim (there should be A LOT of water gushing out of the bottom of the mazzei. Quickly check the mazzei for vacuum as above. If a vacuum is felt, turn the Reclaim to OFF or HAND. Then connect the lower union and re-check for vaccum. If there is vaccum present and the fault clears with the compression fitting reconnected, the problem is resolved. If a lack of vacuum is still generating a fault - the lack of flow or restriction is “downstream or below” the Mazzei.

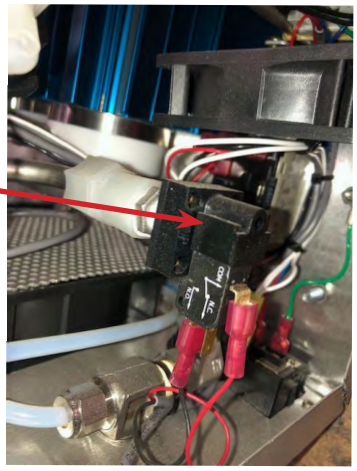
Mazzei “Exploded”

Spring Ball Washer

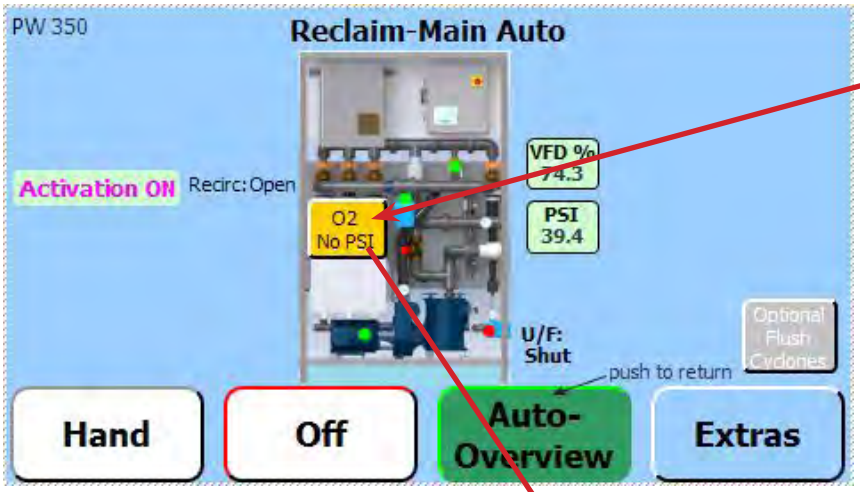
If a good vacuum is present with the fault still active contact Technical Support to discuss adjusting the Vac Switch.

If no vacuum is present, the troubleshooting will have to continue to clear the restriction.

The Vaccum Low error is generated by the vacuum switch pictured on the right. The Vac Switch is located inside of the ozone generator itself.

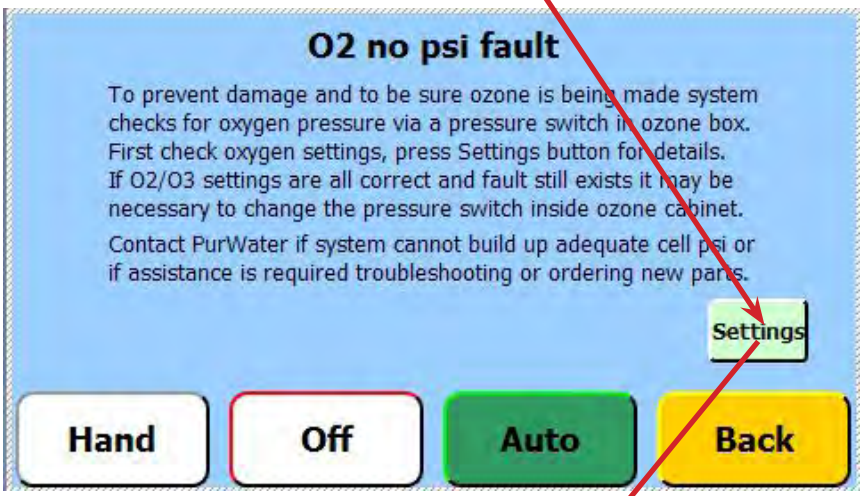


System Troubleshooting - Minor Fault
Oxygen Concentrator Fault



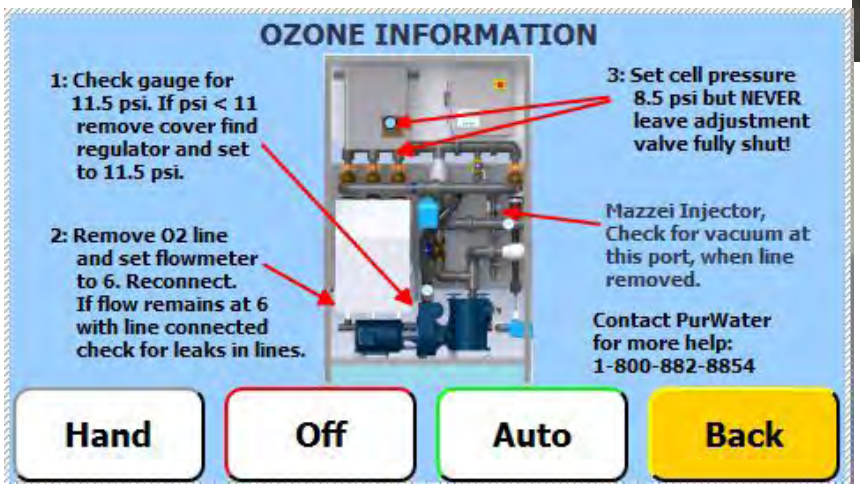
"Touch" the Yellow Fault Box to go to next screen. Then "touch" the "Settings" button on that screen.

An "O2 No PSI" fault is a minor fault that does not shut down the Reclaim. It does stop ozone output, however. If the Reclaim was built with either the12 or 24 gram ozone option, it will have an oxygen concentrator on board. If the system was built with the 4 gram ozone option (or no ozone option at all), there will not be an oxygen concentrator.



It is an indicator that the pressure switch inside of the ozone generator is not satisfied. Refer to page 35 & verify that the Oxygen Concentrator pressure gauge on the right side is set at 11.5psi. (Adjustment info on next page)

Also check the flowmeter on the left side. It should be around 2-4 with the line connected.



System Troubleshooting - Minor Fault
Oxygen Concentrator Fault

Message on Ozone Generator Panel

Checking The Concentrator Adjustments

If the Oxygen Concentrator Pressure is Low:

Remove the front cover to access the internal adjustment knob of the regulator by extracting the 4 phillips head screws.

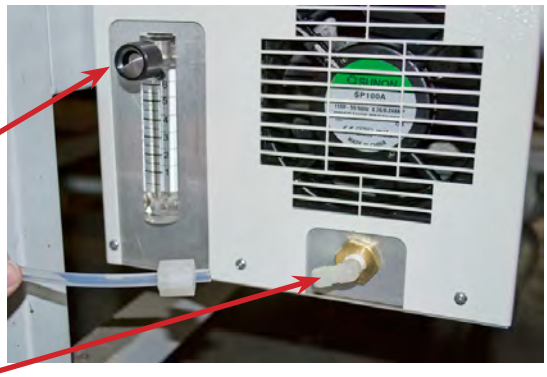
Pull out the knob to engage the regulator & adjust to 11.5psi on the right side external gauge. The internal gauge above the knob will fluctuate and should be ignored.

NOTE: if there is a powdery substance all over the internals the O2 Concentrator has failed. Note the internal hour meter any time the cover is removed. Life expectancy is 16,000 hours.

Verify the Flowmeter Setting & O2 Concentrator has no internal leaks.

Remove the line as shown in the picture on the right. Adjust the black knob on the flowmeter and set the ball to “6”.

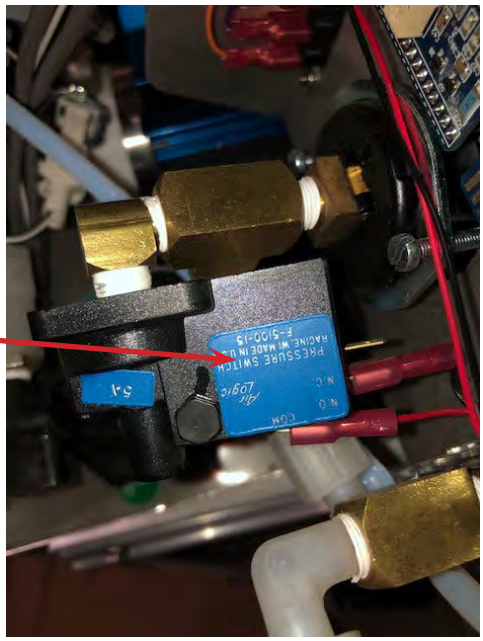
Cover the output fitting with a finger and verify the ball “crashes” to the floor of the flow meter. If it does not - the concentrator has an internal leak. If the flow meter ball (once the line is reconnected) returns to 2-4 on the flowmeter, all appears normal.



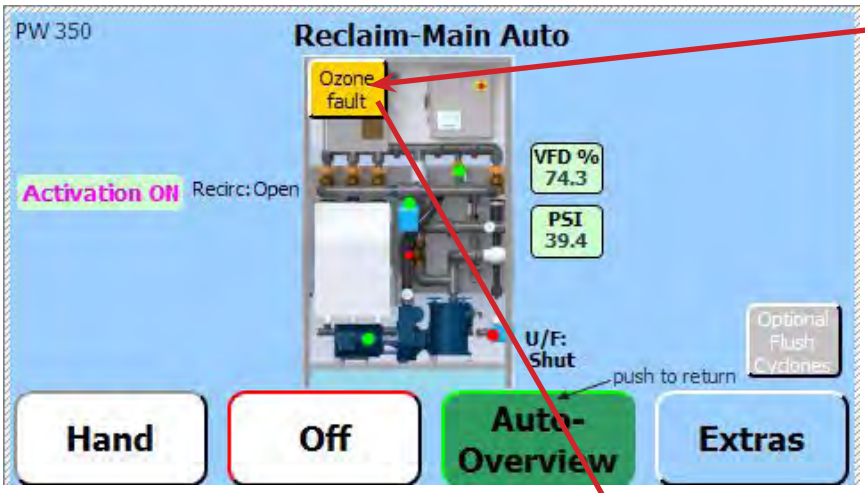
NOTE: if the ball in the flowmeter does not drop after reconnecting - this indicates that there is a leak somewhere past the output and likely is in the ozone generator itself.

Pressure Switch Location

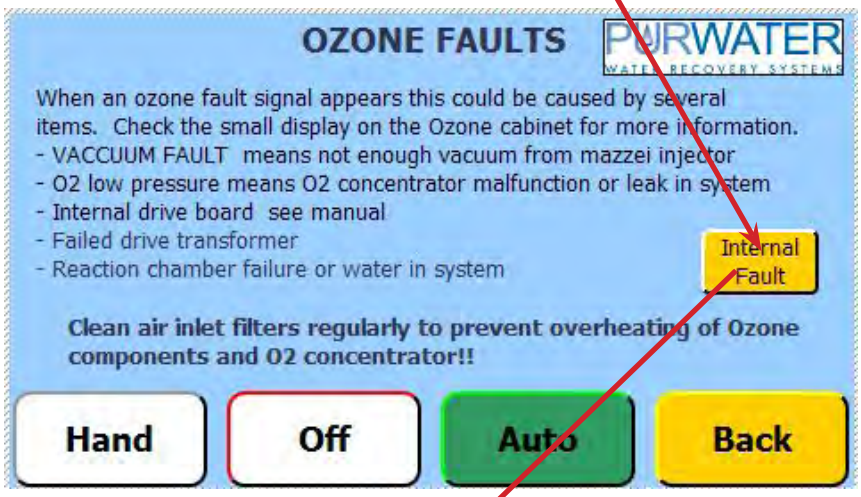
The device that generates the O2 Low error is located in the ozone generator itself. It can be found for further troubleshooting by removing the cover of the ozone generator and locating it behind the gauge panel.

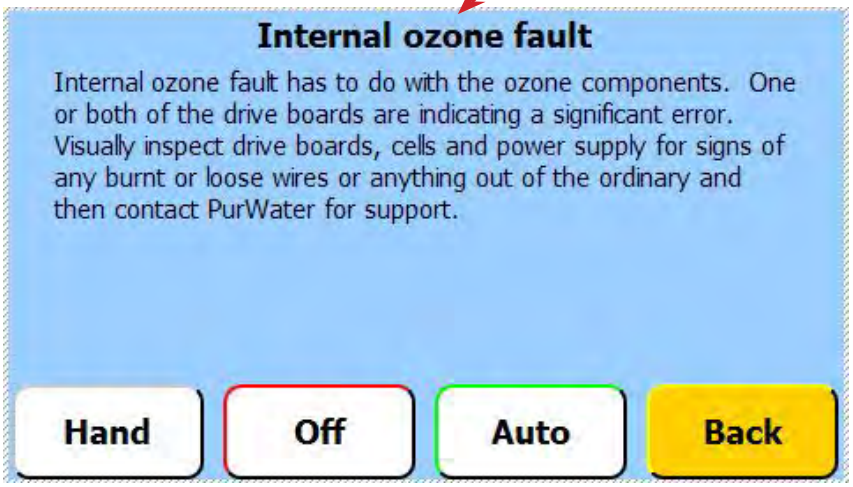


System Troubleshooting - Minor Fault
Ozone Fault



"Touch" the Yellow Fault Box to go to the next screen. Then "touch" the "Internal Fault" button on that screen to arrive at the bottom screen.





If the system is displaying an "Internal Fault", it can be one of several different components inside of the ozone generator itself. It's a good idea to do visual checks of the 48Vdc Power Supply, the drive board(s), the transformer(s), and the reaction chamber(s) also known as cells. See the following pages. Internal faults can be a bit challenging to isolate.

Check the frint of the Ozone Generator Cabinet & look at the digital message display. See if on of the display message indicates any useful information.

If the display message reads like the message above or the one below, remove the cover and reference the next page to investigate further.

System Troubleshooting - Minor Fault
Ozone Fault

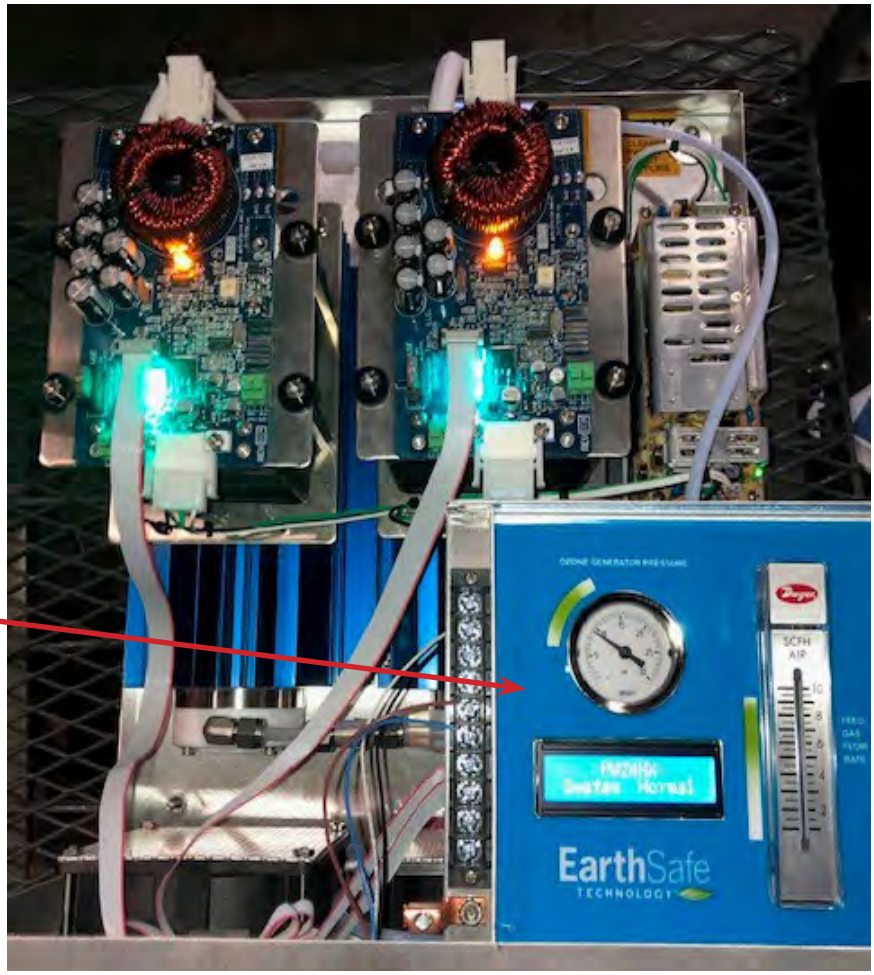
The picture on the right shows a 24gram Ozone Generator with the cover removed that is working correctly. Note that Drive Board 1 is on the left & #2 is on the right.

A functioning drive board has 2 lit green LED's and one amber LED which indicates that ozone is being produced.

If either board has a red fault LED lit up, there is a problem.

Normal Displays are also shown. The ball in the flowmeter is difficult to see but is typically around 8.5-9.0

Board #1 **Board #2**



The picture shown on the right shows a drive board that is faulted for some reason.

In this case, the amber LED is out indicating no ozone production at present. The red fault light indicates a fault of some type has occurred.

Both green LEDs lit is a positive sign. If this is a 24 gram unit as shown above, one side may be working fine with one side in a faulted state. At times, this can help the troubleshooting.

System Troubleshooting - Minor Fault
Ozone Fault - Internal Fault

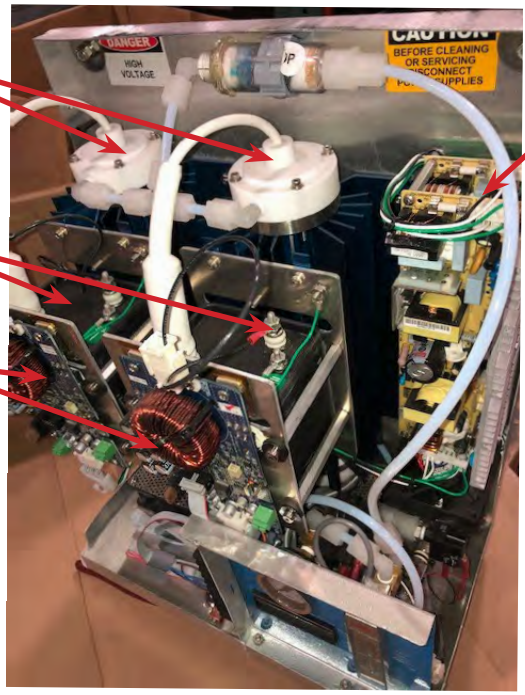
"Gen 3" 24 Gram Ozone Cabinet Componnent I.D.

Reaction Chambers**

Transformers**

Drive Boards**

****Two of each in a 24 gram unit-only one of each in a 12 gram unit.**



Power Supply (one regardless if 12 or 24 gram unit.

Fuses

Green LED's on bottom

Internal Fault Troubleshooting:

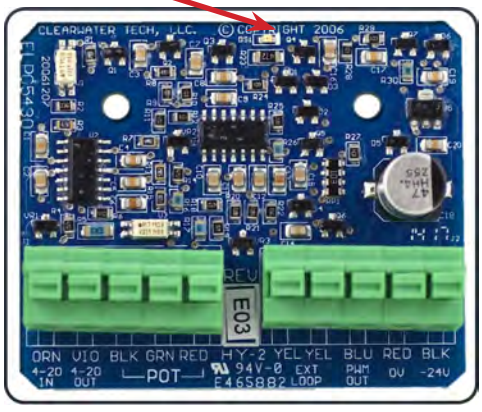
The "Gen 3" cabinet has many of the same basic components as the prior builds but is in a much smaller enclosure. When trouble shooting an internal fault start with a quick look at the components. Any visual defects or burned components?

Suggested Path

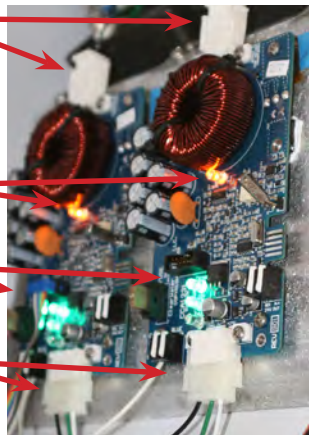
1) Look at the power supply. This is a double stacked 24V netting 48Vdc out. If operating, there will be a green LED lit on each layer providing 48 V to the drive boards. There is also a fuse on the upper portion of each layer. Occasionally (but not often) replacing the fuse can resolve the issue.

2) Look at the 4-20mA Board

If the red LED is on - it indicates a problem with the external loop / dry contact in an open condition.

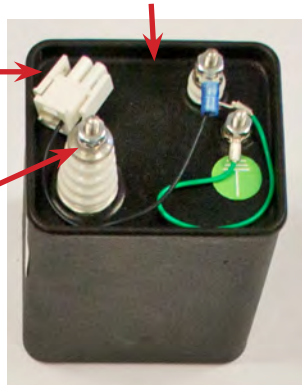


System Troubleshooting - Minor Fault
Ozone Fault - Parts Identification



Drive Board 1 Drive Board 2

Transformer



Ozone Generator Bottom View

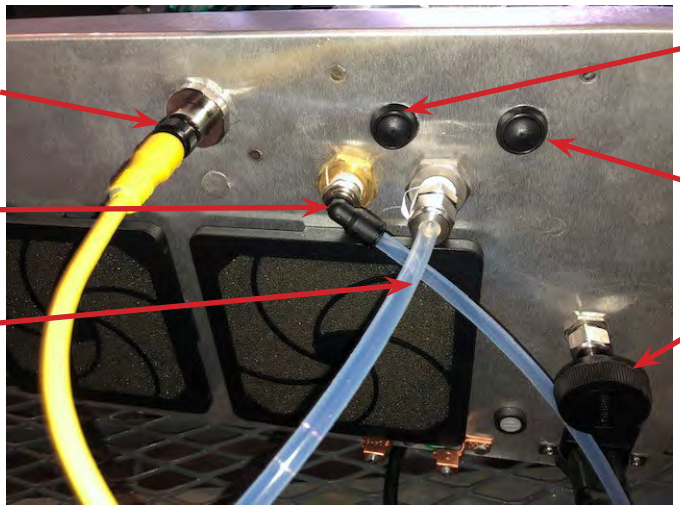
Internal Fault Troubleshooting: (cont)

Look at the Drive Board(s): Do either or both have two green LEDs on (a good thing) as shown on the left? There is a red fault light located below the two green LEDs. Is either one on? (a bad thing). There is an Amber LED approximately 2/3 of the way up each board. If lit - good thing. These get brighter as Ozone output is raised. Maximum brightness is at 100% output. These will fail periodically. At times, an arc from an older cell will harm this board or cause the fuse to blow. See page 74 for more drive board info.

NOTE: Since there are 2ea of the drive boards, transformers, and reaction chambers on a 24gram generator- it makes troubleshooting a bit easier if one of the two combined components is operating.

The transformers are very stable devices and rarely fail. Usually a good visual check for case swelling / expansion or leakage underneath is all that's required. The other method is to "shake" the transformer - if a liquid "slosh" is heard, replace it.

Connections / Controls



** Preset at Factory

System Troubleshooting - Minor Fault
Ozone Fault - Drive Board Troubleshooting

Red Faullt Light on Solid (No Flashing)

--Replace the Drive Board, the fault light should always flash if the problem is external to the board.

Fault Light Flashing Once per Second could mean:

--The blue reaction chamber (cell) is not receiving enough voltage from the transformer.

--Check the terminal screw on the high voltage side of the chamber. The screw may be loose and not making a solid connection. (This is the white wire that resembles a spark plug wire from the transformer to the reaction chamber.)

Fault Light Flashing Twice per Second could mean:

--Transformer is bad: Inspect the transformer for oil leaking. If oil is found, replace the transformer.

--Remove the transformer and shake it near the ear. If water or “sloshing” sound is heard - replace the transformer.

--Reaction chamber or High Voltage wire is bad.

--High Voltage wire not making a good connection. Check at both transformer and resction chamber. Verify connections are tight.

--Look for evidence of arcing or shorting of high voltage wire to chassis. Is the wire showing signs of brown or black “arcing”?

--Reaction Chamber Glass is broken.

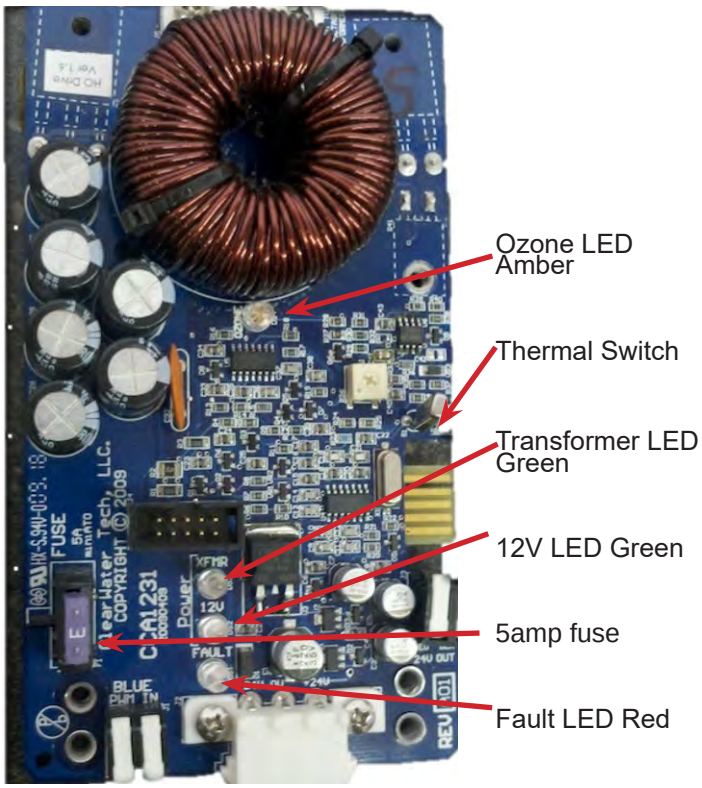
Fault Light Flashing Three Times per Second could mean:

--Thermal Switch on drive board has closed. System overheating. Generally means cooling fan failure. Check fan.

--Internal Temp is greater than 140 degrees F. Cool down unit and check fan for operation and filter material for blockage.

NOTE: When the ozone generator is operating correctly, the drive board will have the amber ozone LED, the green “Xformer” LED, and the Green 12V LED all on.

The red Fault LED will be off and the “System Normal” screen will be on.



System Troubleshooting - Minor Fault
Ozone Fault - Factory Manual Troubleshooting Tips

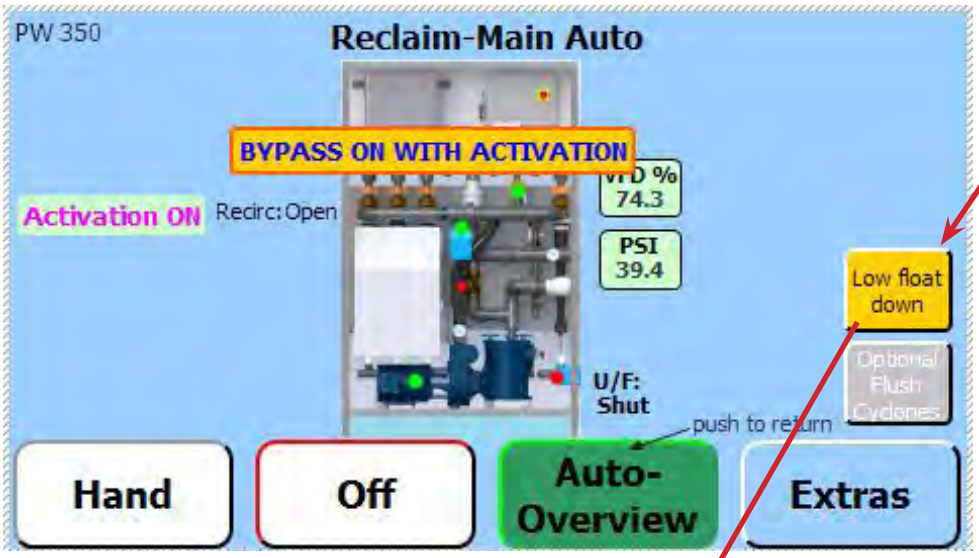
TROUBLESHOOTING THE OZONE GENERATOR

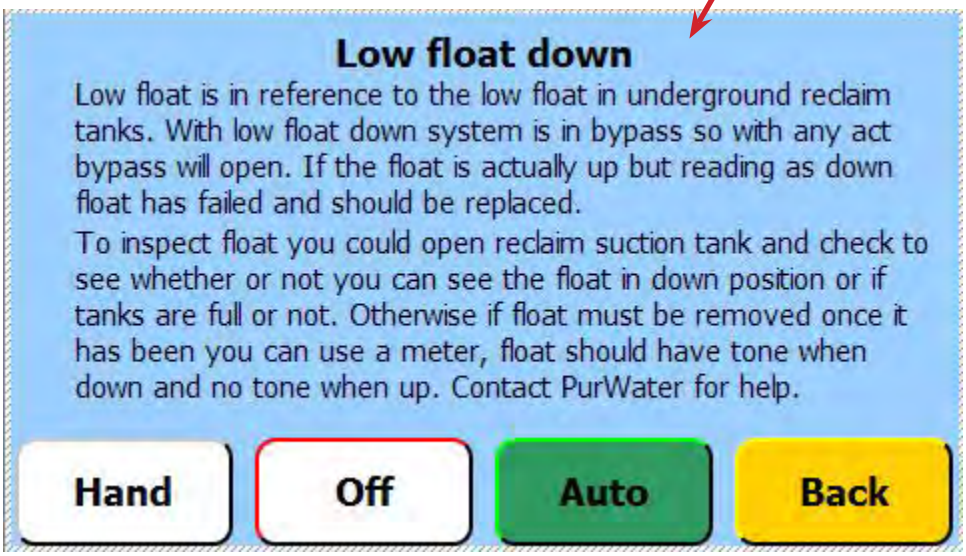
PROBLEM/SYMPTOM	POSSIBLE CAUSE	SOLUTION
Drive Module - Main Power "Green" LED(s) not illuminated	- No power to drive module from power supply - LED is not illuminated during startup sweep. - Blown drive board module on board fuse	- Check main power to unit - Test voltage from power supply to drive module (see "Appendix – Drive Module Input Voltages") - Check for loose wires or connectors - Turn contact signal up (POT or 4-20) to let unit complete startup sweep. - Replace "on board" fuse
Transformer (XFMR) Power, "Green" LED not illuminated	- If drive module "Main Power" LED(s) not illuminated, the "XFMR Power" LED will not illuminate - No power to drive module from power supply	- Test voltage from power supply to drive module (see "Appendix–Drive Module Input Voltages") - Check main power, check for loose wires or connectors
Ozone Output, "Amber" LED not illuminated	- If the Transformer (XFMR) Power LED is not illuminated, the "Ozone Output" LED will not illuminate - The Manual Ozone Output is turned down to 0% - Drive board is in "Fault" mode	- Check all wires and connectors - Turning the Manual Ozone Output knob clockwise will increase ozone output percentage and the "Ozone Output" LED will begin to illuminate (see "Installation Procedures - Electrical, Optional Equipment") - See Troubleshooting, "Fault" LED
The "Ozone Output" LED(s) not responding to the remote 4-20mA control signal	- The remote 4-20mA control signal is not sensed by the 4-20mA control board	- Check for loose wires or connections - See "Installation Procedures – Electrical"
Fault, "Red" LED illuminated With 1 or 2 Blinks every second	- Loose wire harness connection from the drive board to the drive transformer - Failed drive board - Failed drive transformer - Broken dielectric - Water in ozone reaction chamber - Excessive dirt or debris in the ozone reaction chamber - Loose or disconnected High Voltage Lead to transformer	- Check all wires and connectors - Replace drive board - Replace drive transformer - Replace dielectric - Clean dielectric and replace O-rings reaction chamber - Clean dielectric and replace O-rings - Attach High Voltage lead to transformer
Fault, "Red" LED illuminated With 3 Blinks every second	- Unit is over heating	- Check fan for proper operation and clean fan filter - Check operating temperature - See "Installation Procedures - Getting Started...Equipment Placement"
Fan not operating	- Fan obstructed - Power supplies not operating - Fan inoperable	- Remove obstruction - Check main power, check fuses. Repair or Replace as required - Replace fan
Low air flow or no air flow	- Air prep system not operating properly - Fouled inline filter - Air leak - Incorrect wiring to air prep system	- See "Start Up & Calibration" - Step 5 - Change inline filter - Check all fittings, tighten as needed - See "Installation Procedures - Electrical"

System Troubleshooting - Major Fault - Low Level Float

A "Major Fault", by definition, is a fault that will take the machine out of Auto shutting off the pump and any sub-systems including the ozone components. These are typically discovered in a daily walk through. The yellow banner across the touch screen is the flag.
NOTE: This is the only major system fault that will automatically allow the pump to restart once the fault clears. The tank level rises which clears the fault.

NOTE: This fault should be noticed during the operator daily walk-thru!!





Replacement Float
PN MYEL40

Float Weight
PN SJE102230

Reference the float location and position illustrated in the tanking drawings on pages 12 & 13.

A "Low Float Down" will automatically put the system in fresh water bypass and the Reclaim will send fresh water out the treated line only when a wash activation signal is sent from the car wash controller.

Once the operator touches the yellow fault button, the screen will go to the lower screen filled with text.

Although this fault puts the machine in bypass it is not considered a severe major fault since the Reclaim can run without the yellow low level safety float as shown on page 11.

Replace the yellow low level safety float if the tanks are full & the float is in the up position AND the 120vAC float signal is coming back to the PLC. As a "work around" in order to get the Reclaim running - simply disconnect the float in the control box. Reference the Customer Connections on page 24 and, in this case, simply pull the low float wires out of the #1 & #2 WAGO connections. The fault will clear and the Reclaim can be restarted.

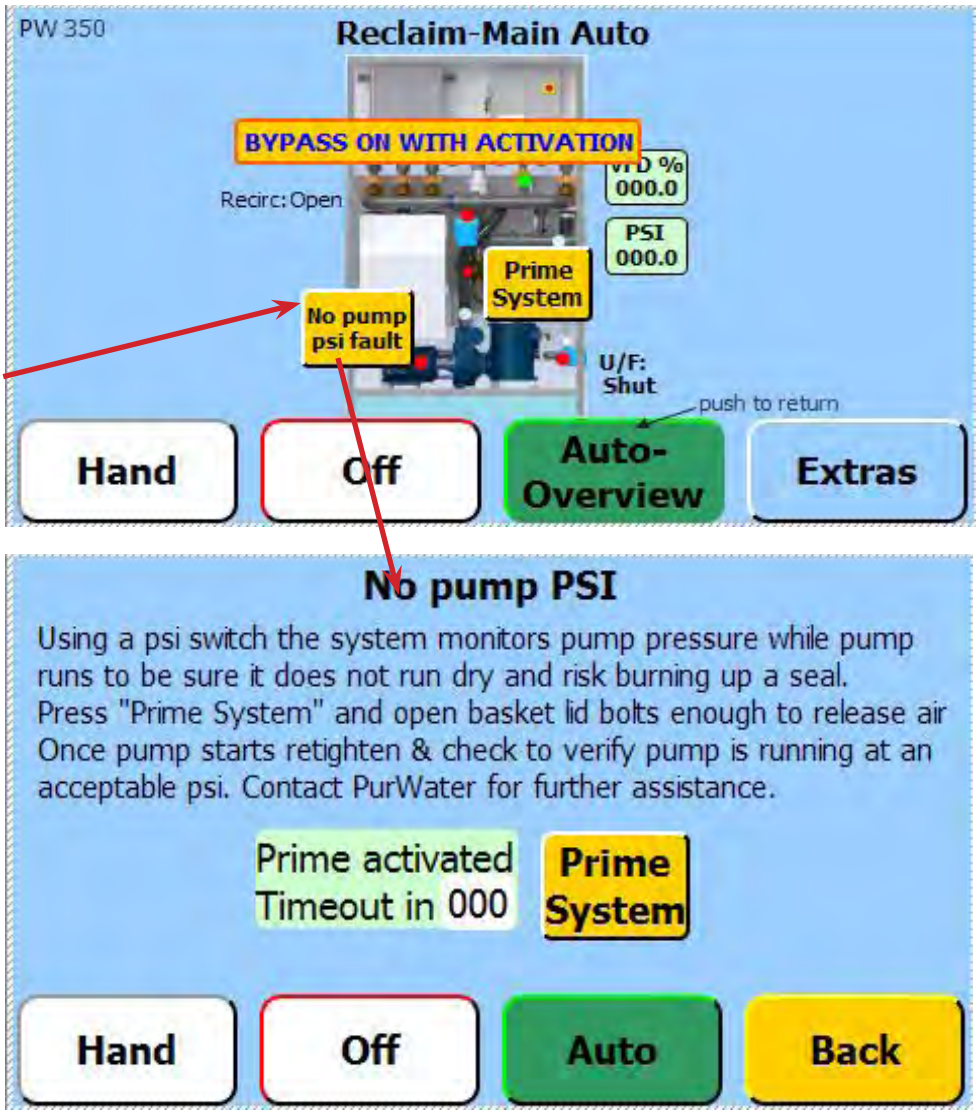
System Troubleshooting - Major Fault - “No Pump psi”

A “No Pump psi Fault” will automatically put the system in fresh water bypass and the Reclaim will run using fresh water when a wash activation signal is present.

Once the operator touches the yellow fault button, the screen will go to the lower screen filled with text.

A system with this fault can not be run until the fault is corrected. If this fault occurs when priming a brand new system it may take a few iterations to get all the air out of the suction line. Make certain that none of the suction line is higher than the stariner basket inlet.

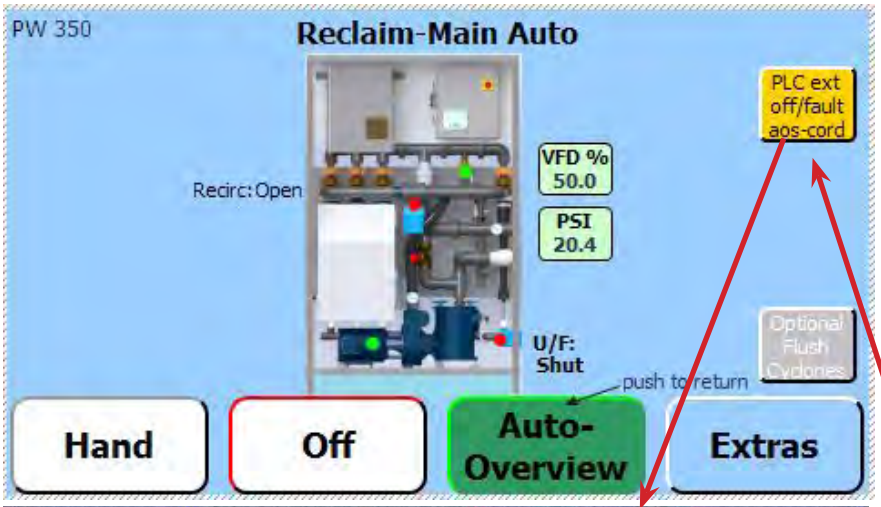
If this fault occurs on an older system, check the strainer basket lid oring and sealing surface. The suction line in the tanking may have a problem with the foot valve. The flap may be damaged, it could be obstructed with an object such as a plastic bag or some cloth. It may need to be removed and inspected.

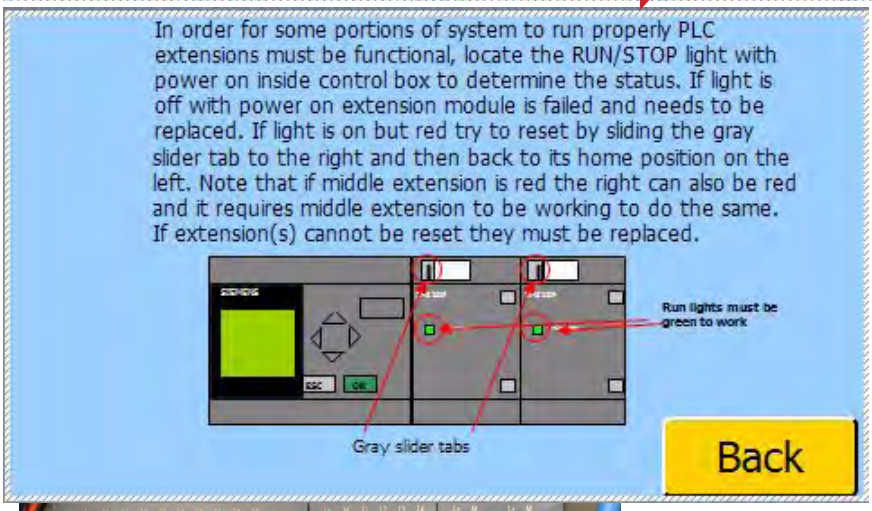


Don’t forget the basics!! Make sure the strainer basket is not clogged! Is it being cleaned weekly as a PM item?

Another issue to consider if there is a problem with the pressure switch (located on the left side of the control box) or the line that goes to the pressure switch. Disconnecting the line from the bottom of the pressure switch & starting the prime sequence should result in a large stream of water! The pump pressure gauge should read around 15-25psi in recirculation mode. If the gauge pressure drops off as it faults the pressure switch is likely okay. **Don’t hesitate to call for Technical Support at 800-882-8854**

System Troubleshooting - Major Fault - “PLC Ext Off / Fault”





The PLC and the two extensions are “the brains” of the Reclaim System as noted in the overview on page 39.

If this fault is noted on the touch screen display, the pump may or may not shut down as a result depending on which component has failed. The Reclaim system will not continue to operate correctly in this condition.

Touching the yellow fault box on the touch screen will take the operator to the text seen in the second screen IF the PLC is not the failed component and one or both of the extensions is.

The control box door must be opened to gain access to the PLC and the two extension array. There is a way to defeat the main disconnect and leave the power on to the internals of the control box but this must only be attempted by a factory trained technician. High Voltage is present inside the control box.

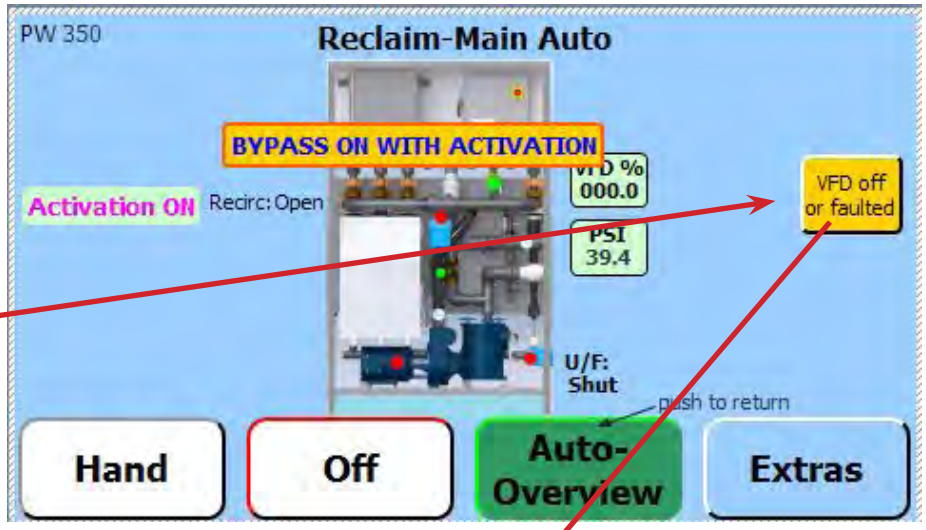
The picture to the left illustrates a working set of the PLC / Extensions indicated by the PLC Screen Content and the green LEDs on the extensions.

The extensions have a “lock” that must be slid to the left to connect electrically with the PLC for programming. If a red light is on the extension, try unlocking & relocking the tab. There may be dust or oxidation causing the issue.

The lower picture on the left illustrates a non-working set of the PLC / Extensions indicated by the PLC Screen Content and the red LEDs on the extensions.

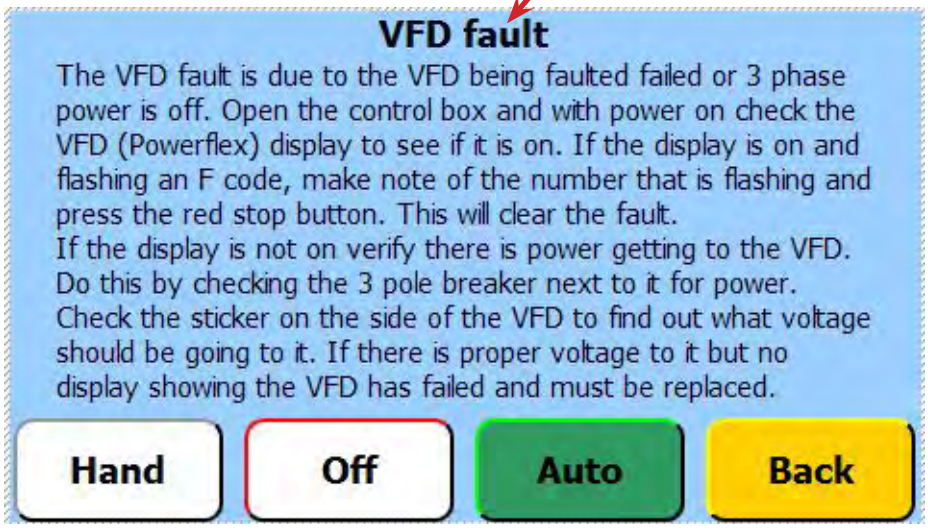
System Troubleshooting - Major Fault - “VFD off or Faulted”

This fault can indicate that the VFD (variable frequency drive) is not receiving power, has power and is faulting due to a problem with it not sending a signal through R1 & R2,a problem with the pump motor, or has failed meaning it is being powered but is not displaying anything and is non-operational. the fault will clear automatically if possible. Touch the yellow fault box to display the text in the lower box.



The control box door must be opened to gain access to the VFD. There is a way to defeat the main disconnect and leave the power on to the internals of the control box but this must only be attempted by a factory trained technician. High Voltage is present inside the control box.

Look at the VFD. If the diplay is on and showing an F### note which numbers are showing on the fault, and press the red stop button. This should clear the fault and the system will start the pump on its own. If there is no display verify there is power going to the VFD by checking the bottom side of the three phase breaker. If there is the correct voltage going to it and no display showing, the VFD has failed and needs to be replaced. If there is no voltage to it, check the top side of the breaker for power and follow it through the disconnect and back to the breaker panel.



Troubleshooting Tips:

1. Verify all 3 legs are present to ground and leg-to-leg during voltage checks. If all are present and the VFD has no display - the VFD has failed.

2. If attempting to start the system and the pump simply won’t start - turn off the 3 phase breaker and check the electrical connections (wire nuts) on the pump’s access box.

3. If the VFD has voltage & the display shows 0 hertz. Disconnect the wiring going to the pump from the VFD and simulate starting the system. If the display jumps to normal recirculation frequency display of 39.9Hz - suspect a bad motor. (assuming the wiring was checked in step 2).

VFD Fault Information

VFD Faults

The VFD has a number of different fault codes that will make it inoperable until the fault is cleared. Some faults, the VFD will clear by itself some require the operator to clear manually. If you need to clear a fault manually, first take note of which number the fault code is and then press the red stop button. If the fault no longer exists, the fault will clear and the VFD will turn the pump back on. If the fault is still present pressing the red stop button will not change anything.

These are the faults that are the most likely to be seen on the VFD for a PurWater reclaim system. If you see any other fault code be sure to note the number before resetting. If you are having repeated faults or can not clear one of the faults listed contact PurWater for assistance.

Description: Excessive DC bus voltage ripple.
Translation: Most likely a problem with the incoming power.
Solution: Check incoming power at the bottom of the three phase breaker both to each other and each leg to ground for an inconsistent reading between power legs, a low voltage reading or a reading that jumps around erratically. Contact an electrician if needed.
This fault will not automatically reset.

Description: Undervoltage fault.
Translation: The line power is less than the required power to run the VFD. Note: This fault will appear briefly after the power has been removed from the VFD while the capacitors discharge.
Solution: Check incoming power at the bottom of the three phase breaker both to each other and each leg to ground. Contact an electrician if needed.
This fault will automatically reset.

Description: Overvoltage fault.
Translation: The line power is more than the allowed power to run the VFD or the motor is decelerating too fast causing motor regeneration.
Solution: Check incoming power at the bottom of the three phase breaker both to each other and each leg to ground. Contact an electrician if needed. If power seems ok, verify that parameter P040 (decel speed 1) is not set below 2.0.
This fault will automatically reset.

VFD Fault Information

Description: Overtemp fault
Translation: The VFD is too hot to run.
Solution: Verify the fans are running. Check parameter D024, it will display the VFD temperature in Celsius. If fans are working, check hole size on the drain portion and increase hole size but do not exceed 3/8".
This fault will automatically reset.

F008

Description: Hardware Overcurrent fault
Translation: There is too much current going out to the motor.
Solution: Check amp draw, verify wiring is snug in motor junction box and on VFD screws.
This fault will not automatically reset.

F012

Description: Ground fault
Translation: There is a leak to ground detected on the VFD output to the pump.
Solution: Try to reset, if fault will not reset, power down, disconnect pump and check and see if fault is still present. If not, check motor connections in motor junction box and replace pump if needed.
This fault will not automatically reset.

F013

Description: Auto restart timeout fault
Translation: The VFD had a different fault, tried to reset it automatically twice and could not.
Solution: Press stop button, if fault clears check D007 through D009 for the last 3 VFD faults that occurred to find the cause of the fault number that caused the original problem.
This fault will not automatically reset.

F033

Description: I/O Board Fail
Translation: There is a problem detected with one of the circuit boards on the VFD.
Solution: Turn VFD off and then back on to see if problem clears itself. If not, the board or the drive will need to be replaced.
This fault will not automatically reset.

F122

Pump Seal Replacement - 5 HP Pump

Service 9

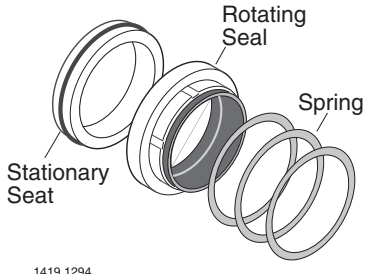


Figure 3

REMOVAL OF OLD SEAL

Refer to Figure 3 for Mechanical Seal parts indentificaiton.

Step 1. Disconnect all power to pump.

Step 2. Close isolation valves to cut pump off from system.

Step 3. Drain pump; be sure to vent pump.

Step 4. Remove motor hold down bolts and bolts holding adapter/seal plate (Key No. 6, Page 11) to pump body (Key No. 20). Slide motor, adapter/ seal plate and impeller (Key No. 12) backward to clear pump body.

Step 5. Remove impeller screw and washer from end of shaft and slide impeller off of shaft.

Step 6. Unbolt adapter/seal plate from motor.

Step 7. Use two screwdrivers (Figure 4) or bearing puller to carefully separate motor from adapter/seal plate, bringing rotating half of seal (Key No. 10) off with adapter/seal plate. Shaft sleeve (Key No. 2A) may come off with seal.

Step 8. Use hammer, if necessary, to drive shaft sleeve out of seal. Clean up shaft sleeve with emery paper if necessary.

Step 9. Place adapter/seal plate face down on bench and drive old stationary half of seal out of adapter/seal plate by carefully taping with screwdriver and hammer (Figure 5).

Step 10. Use a wire brush to thoroughly clean adapter/seal plate cavity. Be sure all dust and grime are out of seal cavity before installing new seal.

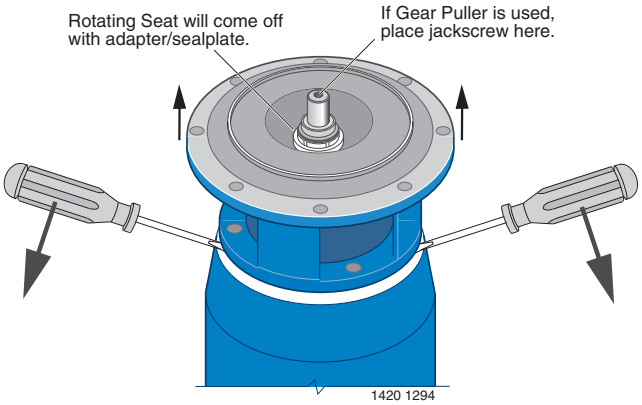


Figure 4

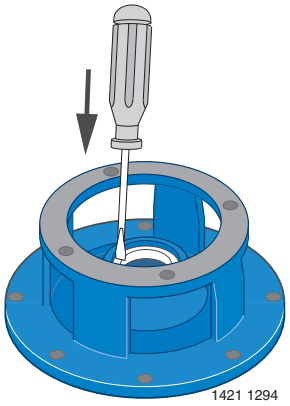


Figure 5

Pump Seal Replacement - 5 HP Pump

Service 10

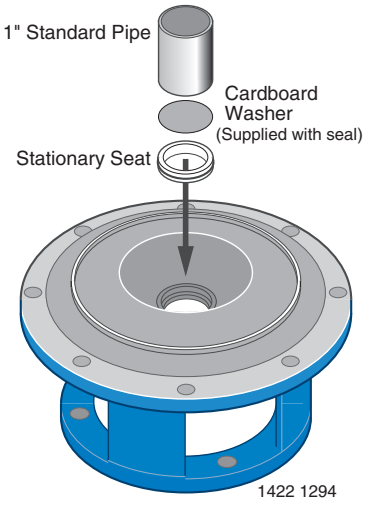


Figure 6

INSTALLING NEW SEAL

Step 1. **IMPORTANT:** Seal faces are highly polished and lapped. **Handle with care. Any** mar, nick or scratch on seal face will cause it to leak. **BE SURE** to install with polished faces toward each other.

Step 2. Clean polished surface of ceramic seat with clean cloth.

Step 3. Wet O-Ring around ceramic seat with liquid soap.

Step 4. Press stationary (ceramic) half of seal into cavity firmly and squarely with thumb pressure. If it does not seal properly, remove and place **face up** on bench. Re-clean adapter/seal plate cavity. Seal should now seat correctly.

Step 5. If seal does not seat after recleaning adapter/seal plate cavity, place a cardboard washer over polished face of seal and **carefully** press into place using a piece of 1″ standard pipe as a press. (Figure 6). **NOTE: BE SURE** you do not scratch seal face.

Step 6. Dispose of cardboard washer and recheck seal face to be sure it is free of dirt, foreign particles, scratches and grease.

7. Inspect shaft and shaft sleeve to be sure they are clean.

8. Re-install O-Ring, shaft sleeve and slinger (Key No. 4) on shaft. **NOTE:** A small amount of grease or Never-Seez under shaft sleeve will help prevent shaft and sleeve from freezing together when pump is in service.

9. Remount adapter/seal plate to motor, being careful not to scratch seal face.

Step 10. Apply liquid soap to inside diameter and outside face of rubber drive ring on rotating half of seal.

Step 11. Slide seal assembly onto shaft sleeve (sealing face first) far enough so that seal spring is located on shaft sleeve. **NOTE: Be careful not to nick carbon seal face when passing it over end of shaft sleeve.**

Step 12. Slide impeller and gaskets (Key Nos. 12 and 11) onto shaft with key (Key No. 3) in position. Be sure to maintain proper order as shown in Exploded View, Page 11.

Step 13. Install washer, gaskets, and impeller screw (Key Nos. 14, 15, 16, 17) on end of shaft and tighten screw until it is snug. This should locate seal in place and bring seal faces together.

Step 14. Re-install motor, adapter and impeller assembly on volute, using new gasket (Key No. 7).

Step 15. Re-install motor hold-down bolts.

Step 16. Check all bolts for tightness.

Step 17. Pumps below water level: Close drains; open isolation valves to fill pump. Pumps above water level: Prime pump. Open isolation valves if they were closed at disassembly.

Step 18. When pump is full, close air vents.

Step 19. Reconnect power to pump and system is ready for operation.

NOTE: To view a video of this procedure go to You Tube and do a search for:

purcleantech

There is a sreies of videos,

click on the video titled:

D Series Shaft Seal Replacement

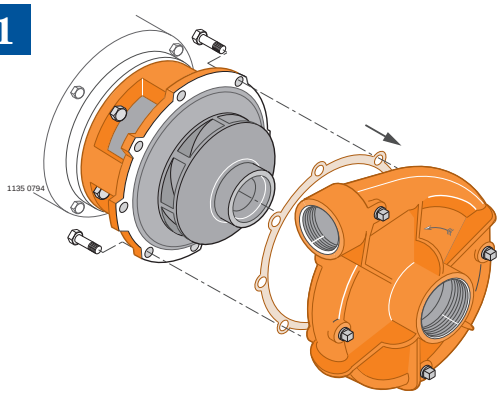
Pump Seal Replacement - 10, 15 HP Pump

MAINTENANCE

Mechanical Seal Replacement

Disassembly – Motor Drive

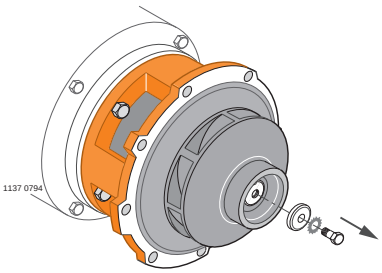
1



- Unfasten hardware holding volute to bracket. **NOTE:** For model B4EY, consult factory for special instructions.
- Remove volute case to expose impeller.

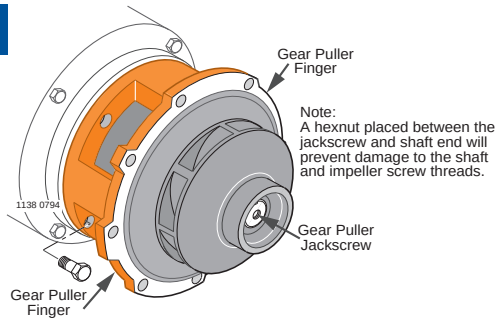
2

Procedure and parts will vary slightly depending on pump style.



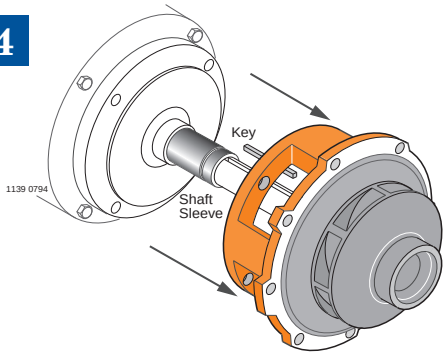
- Peel off old gasket or O-Ring and discard.
- Hold impeller stationary and remove impeller screw and associated hardware.

3

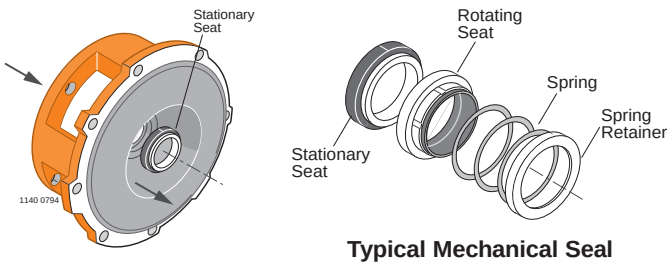


- Remove capscrews holding bracket to motor.
- Install a standard gear puller to shaft end and motor bracket placing puller fingers in the area shown.
- Rotate gear puller jackscrew until impeller clears shaft. Mechanical shaft seal will come off with motor bracket.
- If a seal retaining ring is part of the assembly, it will need to be replaced.

4



5



Typical Mechanical Seal

- Push stationary seat out of seal cavity from the back of bracket.
- Clean seal cavity in bracket thoroughly.

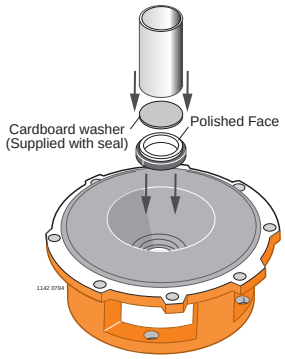
Pump Seal Replacement - 10, 15 HP Pump

MAINTENANCE

Mechanical Seal Replacement

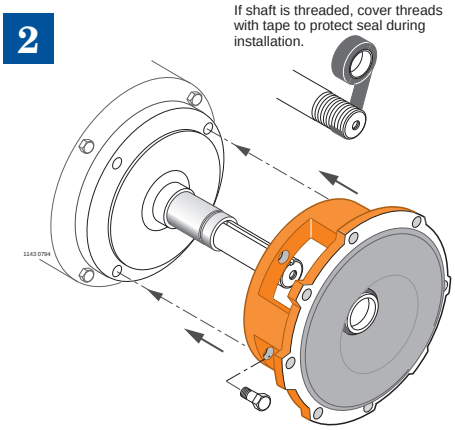
Reassembly – Motor Drive

1



- Place bracket on a smooth, flat surface, pump side up.
- Apply a small amount of mineral oil to O-Ring on stationary seat and press into seal cavity. Cover ceramic face with cardboard washer and press

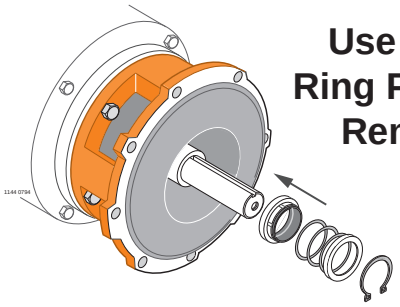
2



straight in using a piece of pipe or tubing.

- Reinstall bracket on motor using extreme care not to scratch or chip ceramic face of seal with shaft.

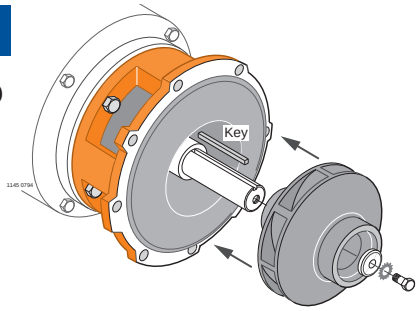
3



Use Snap Ring Pliers to Remove

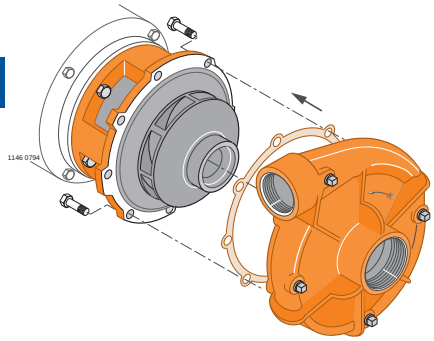
- Apply a small amount of mineral oil to inside diameter of rubber ring in rotating seat and outside of shaft sleeve. Slide rotating seat onto shaft, polished face first, until it is tight against ceramic face.
- Compress seal spring, and install retaining ring (if used) in shaft sleeve groove.

4



- Place impeller key in motor shaft keyway. Slide impeller on to shaft as far as possible.
- Apply non-permanent thread adhesive to impeller capscrew and shaft threads.
- Install impeller washer, shakeproof lockwasher, and capscrew.

5



- Install new gasket or O-Ring and volute case onto bracket.
- Install new O-Ring gasket and volute case on to bracket.
- Apply anti-seizing compound to capscrews and tighten securely.

Procedure and parts will vary slightly depending on pump style.

4 Gram Ozone System (CD12/AD)

The feed gas (Oxygen) is drawn through the ozone generator by the vacuum created at the ozone injector rather than by the pressure from the air preparation system compressors. As the feed gas enters the thermally-protected reaction chambers inside the ozone generator, some of the oxygen molecules are split while passing through the high voltage electrical field (the "corona"), forming single oxygen atoms (O_1). These oxygen atoms then recombine with other oxygen molecules in the air stream, forming ozone.

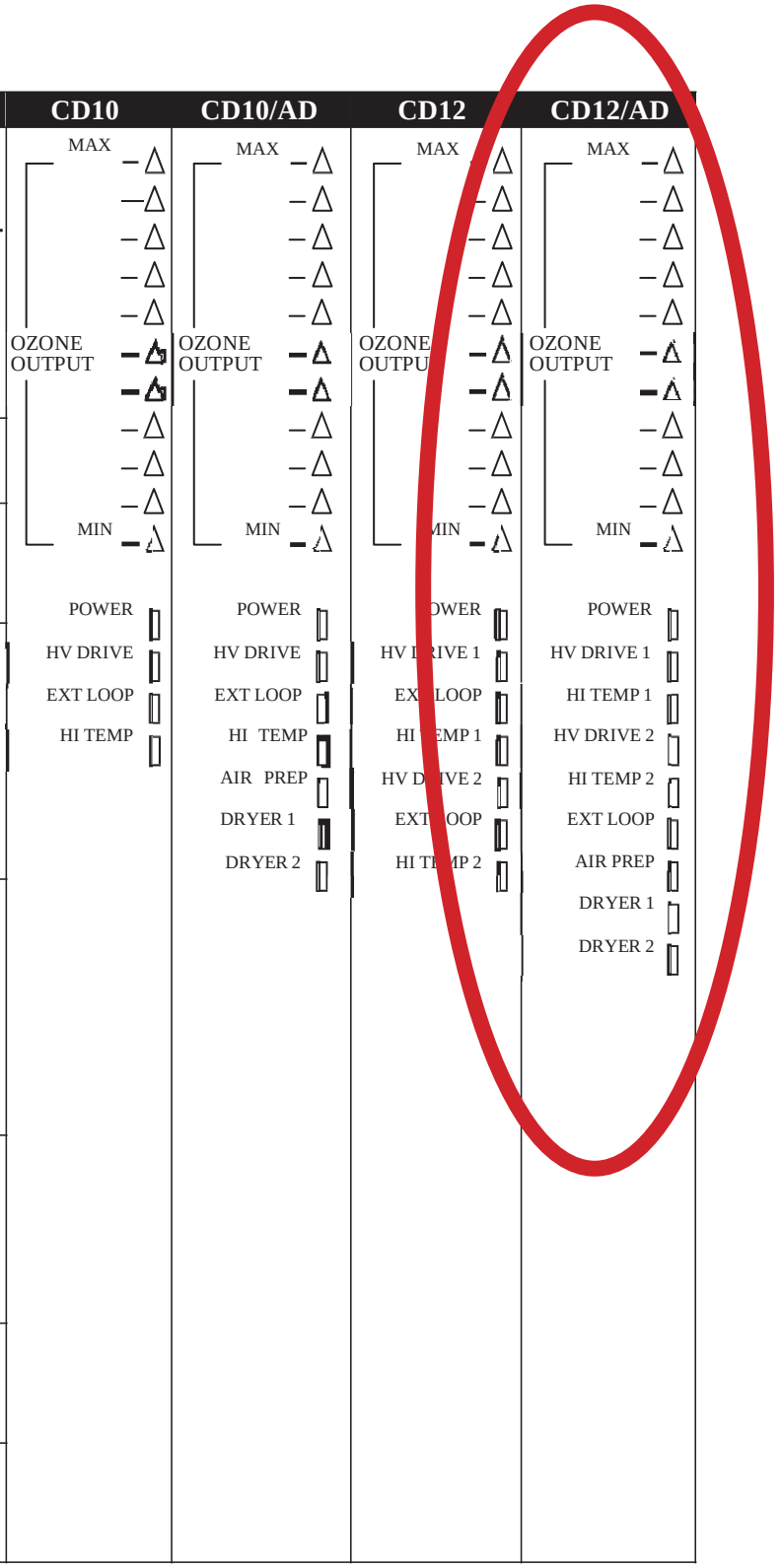
The Ozone Generators are designed to produce Ozone for 30 minutes after first being powered up and then requires a 30 minute cool down period. This cycle is controlled by the Reclaim System's PLC and the status of whether the Ozone is "On or Off" can be read on the display of the HMI screen, located on the Reclaim's Main Control Box.

Many safety features are also built in, including main power fuses, thermal protection, cover safety switch, and back flow prevention.

Ozone Generator LED Display

Figure 11

LED	Function
OZONE OUTPUT	The ten LEDs represent 0-100%, minimum to maximum ozone output. Each LED is equal to 10% output. These LEDs can be adjusted with the manual output control knob located at the bottom of the ozone generator or automatically with a remote 4-20mA control signal.
POWER	Main Power is "ON" to the ozone generator, when LED is illuminated.
HV DRIVE	Power is being sent to the high voltage drive board, when the LED is illuminated.
EXT LOOP	The External Loop has continuity through it when the LED is *not* illuminated, which indicates ozone is being produced. The External Loop *does not have* continuity, when the LED is illuminated, which indicates no ozone production.
HIGH TEMP	The High Temp LED will not be illuminated during normal operation. If the ozone generator's internal temperature is in excess of 150˚F the High Temp LED will illuminate, which will also discontinue ozone production.
AIR PREP	CD10/AD and CD12/AD Only: The Dryer Timer LED will flash continuously during normal operation and indicates that the dryer timer cycle is operating correctly.
DRYER 1	CD10/AD and CD12/AD Only: DRYER 1 LED will be illuminated when dryer chamber #1 is heating.
DRYER 2	CD10/AD and CD12/AD Only: DRYER 2 LED will be illuminated when dryer chamber #2 is heating.



Note: There is a 30 minute period where Dryer #1 and Dryer #2 are off. This is normal. The dryers are in a cool down phase before switching.

Maintenance

Maintenance of the ozone system is critical to its longevity and operating efficiency. While all system components are built to provide years of reliable service with minimum maintenance, following the procedures outlined below is strongly recommended.

All maintenance procedures have been segmented by interval: daily, monthly, semi-annual and annual. Daily procedures involve quick visual checks for changes in normal operating conditions. Monthly and annual procedures include cleaning and/or replacement of certain critical parts.

System Shutdown Procedures

CAUTION: **The ozone generator operates at high voltages. Follow these steps carefully before performing any semi-annual or annual maintenance procedures.**

Step 1: Turn off power to any peripheral system hydraulic components and air prep system.

Step 2: Turn the Main Power switch on the ozone generator to the "OFF" position. The LED display on the front cover should *not* be illuminated.

Step 3: Disconnect the power to the ozone system either at the service disconnect box (if so equipped) or main circuit breaker.

Daily Procedures

Ozone Generator

- Indicator Lights: Check the indicator lights on the ozone generator. (see Figure 11 for Ozone Generator LED Display function)
- Vacuum: Check the SCFH/vacuum gauge assembly attached to the ozone generator. Make sure pressure is within the range of -1to -3 PSI.

Monthly Procedures

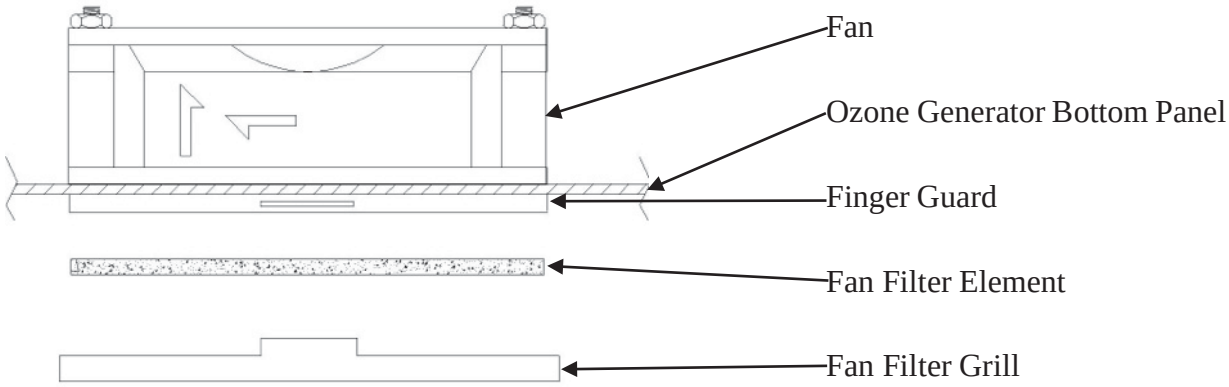
Ozone Generator

• Cooling Fan Operation: Check to make sure the cooling fan mounted on the bottom panel of the ozone generator is operating. If not, refer to the Troubleshooting Guide.

• Cooling Fan Filters: Check the cooling fan filter element mounted on the fan assembly located at the bottom panel of the ozone generator and clean as required. Operating conditions in the equipment area will dictate the frequency required for this procedure. Remove the filter element and clean with soap and water, drying them completely before re-installing (see Figure 13).

Ozone Generator Cooling Fan Assembly

Figure 13



Annual Procedures

CD12/AD

- Every 12-18 months the CD12/AD will need to be rebuilt. Contact PurWater regarding our rebuild/exchange program. The rebuild will consist of replacing the Air Preparation media and replacing the ozone cells.

Ozone Generator

Air Preparation – Heat Regenerative Dry Air

Problem/Symptom	Possible Cause	Solution
Air Prep LED not flashing	-Air dryer board not functioning	-Replace air dryer board
Dryer 1 or 2 LED not illuminated	-Air dryer board not functioning -Dryer 1 LED will not illuminate when Dryer 2 LED is illuminated -Dryer 1 is in cool down mode -Dryer 2 LED will not illuminate when Dryer 1 LED is illuminated -Dryer 2 LED is in cool down mode	-Replace air dryer board -See “Theory of Operation and Product Description - Air Preparation System” -See “Ozone Generator LED Display, Figure 11”
Dryer chamber(s) not heating	-Heating element not functioning	-Replace Heating element
Indicating desiccant cartridge has changed from blue & white to all pink or white. Moisture has entered air prep system.	-Unit does not have constant power -Excessive duty cycle -Excessive relative humidity -Solenoid valve not operating -Air dryer board not functioning	-Unit must have constant power -Duty cycle must not exceed 10 hours in a 24 hour period -Relative humidity must not exceed 75% -Replace solenoid valve -Replace air dryer board

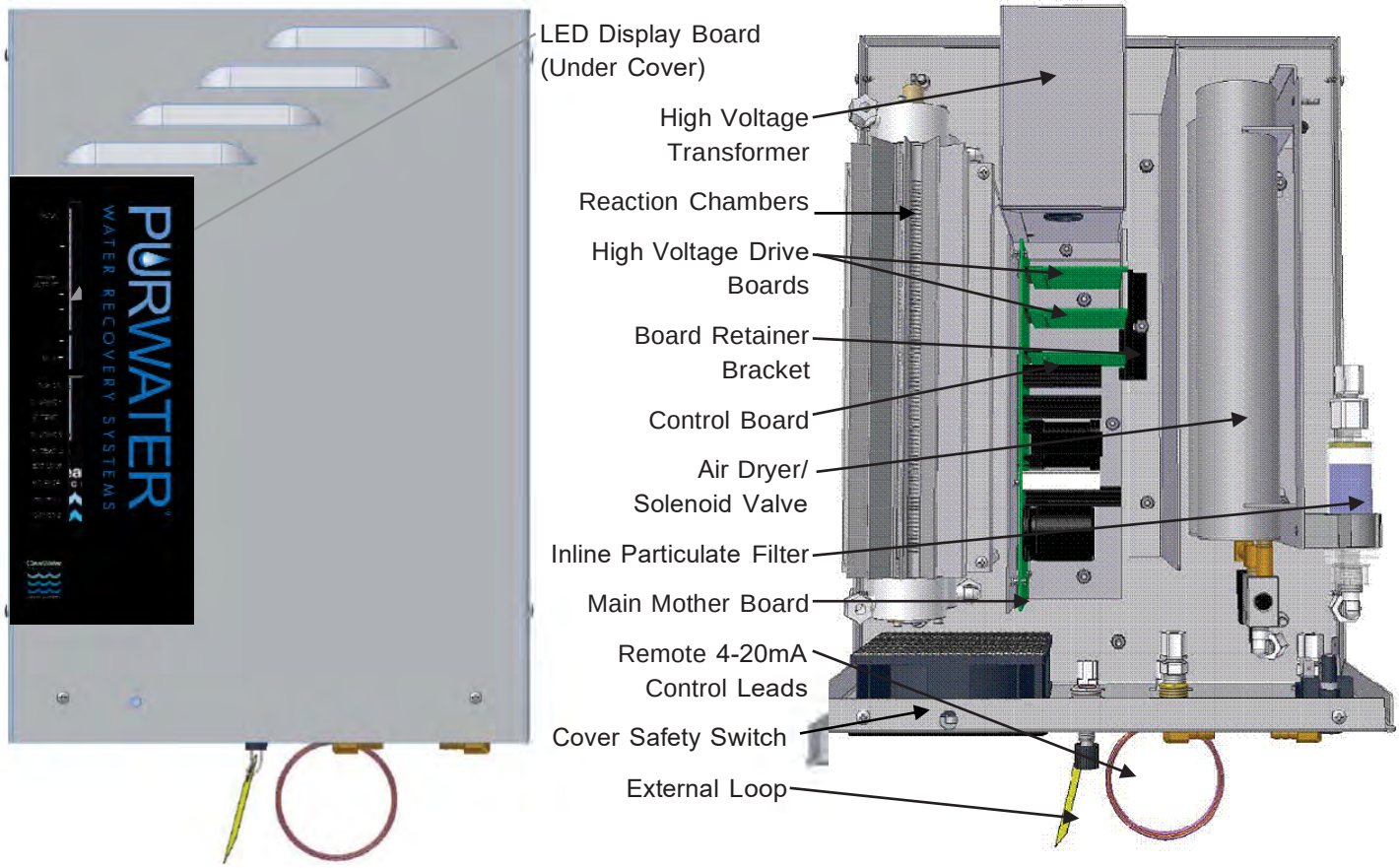
Ozone Generator

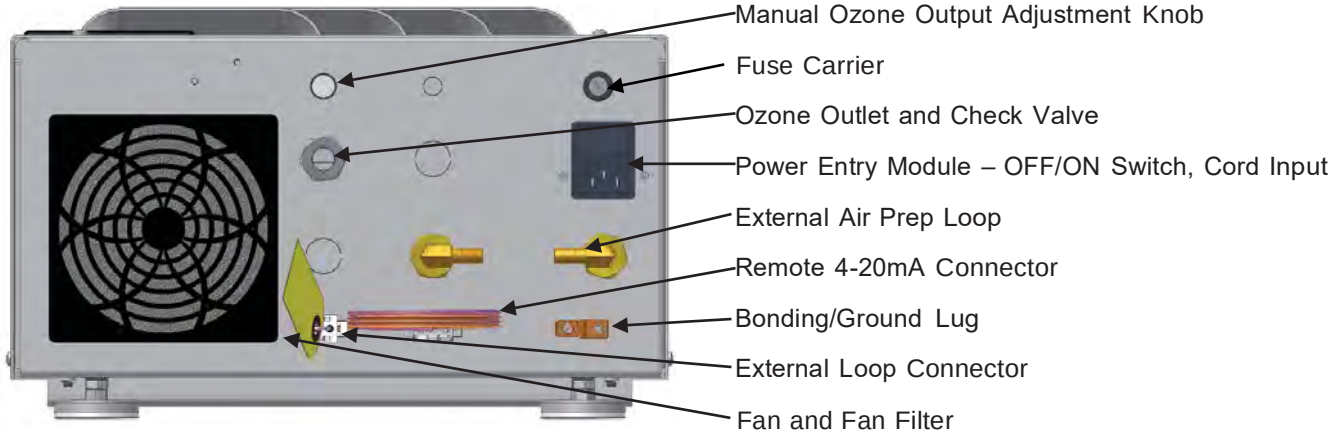
Problem/Symptom	Possible Cause	Solution
Low vacuum	-Hydraulics/Pneumatics out of adjustment -Defective check valve(s) -Loose internal fittings -Defective dielectrics	-See “Reclaim Manual – Low Vacuum Fault” -Replace check valves -Check all fittings, tighten as required -Check & replace as required
Unit flooded with water	-Defective check valve(s)	-Assess damage, repair as required, replace check valve(s)
Ozone smell detected from or near ozone generator	-Insufficient vacuum at venturi -Loose internal fittings -Defective O-ring seals in reaction chamber(s)	- See “Reclaim Manual – Low Vacuum Fault” -Check all fittings, tighten as required -Check & replace as required

Ozone Generator

Problem/Symptom	Possible Cause	Solution
LED display is not illuminated	-No power to unit -Main power switch is in the "OFF" position -Blown fuse(s) -Incorrect wiring -LED display board ribbon cable is disconnected from output control board	-Check circuit breakers -Turn switch to the "ON" positioning -Replace fuse(s) -See PurWater Reclaim Control Panel W/ 4 Gram Ozone System Diagram & Logic Schematic -Connect ribbon cable (be sure all of the pins
'Main Power' LED is not illuminated, but all other LED's are illuminated	-LED display board is inoperable	-Replace LED display board
Circuit breaker trips	-Incorrect wiring -Circuit breaker amperage does not match draw -Unit flooded with water	-See PurWater Reclaim Control Panel W/ 4 Gram Ozone System Diagram & Logic Schematic -Replace with correct circuit breaker -Assess damage, correct cause and rebuild as required
'HV Drive' LED is not illuminated	-No power to the high voltage drive board	-Check board to be sure it is attached securely to the mother board -Bad high voltage drive board, replace as required
'External Loop' LED is illuminated	-The external loop does not have continuity -System is in a 30 minute cool down period	-Check HMI Screen on Reclaim Control Panel for fault status - Check HMI Screen on Reclaim Control Panel "Ozone On or Ozone Off" status
'Ozone Output' LED's are not illuminated	-The manual 0-100% output potentiometer is set to 0% output	-Adjust potentiometer clock wise to desired set point
'Hi Temp' LED illuminated	-Unit is overheating	-Check fan for proper operation and clean fan filter -Check operating temperature
Internal Mother Board 'Power' LED not illuminated	-No power to mother board -Inoperable mother board -Blown mother board fuse	-See "Installation Procedures – Electrical" -Replacement Mother Board -Replace fuse
Receive an electrical shock upon touching the unit	-Incorrect wiring -Unit not grounded -Unit flooded with water	-See PurWater Reclaim Control Panel W/ 4 Gram Ozone System Diagram & Logic Schematic -Ground unit according to local codes -Assess damage, correct cause and rebuild as required
Fan not operating	-Debris caught in fan -Fan inoperable	-Remove debris -Replace fan

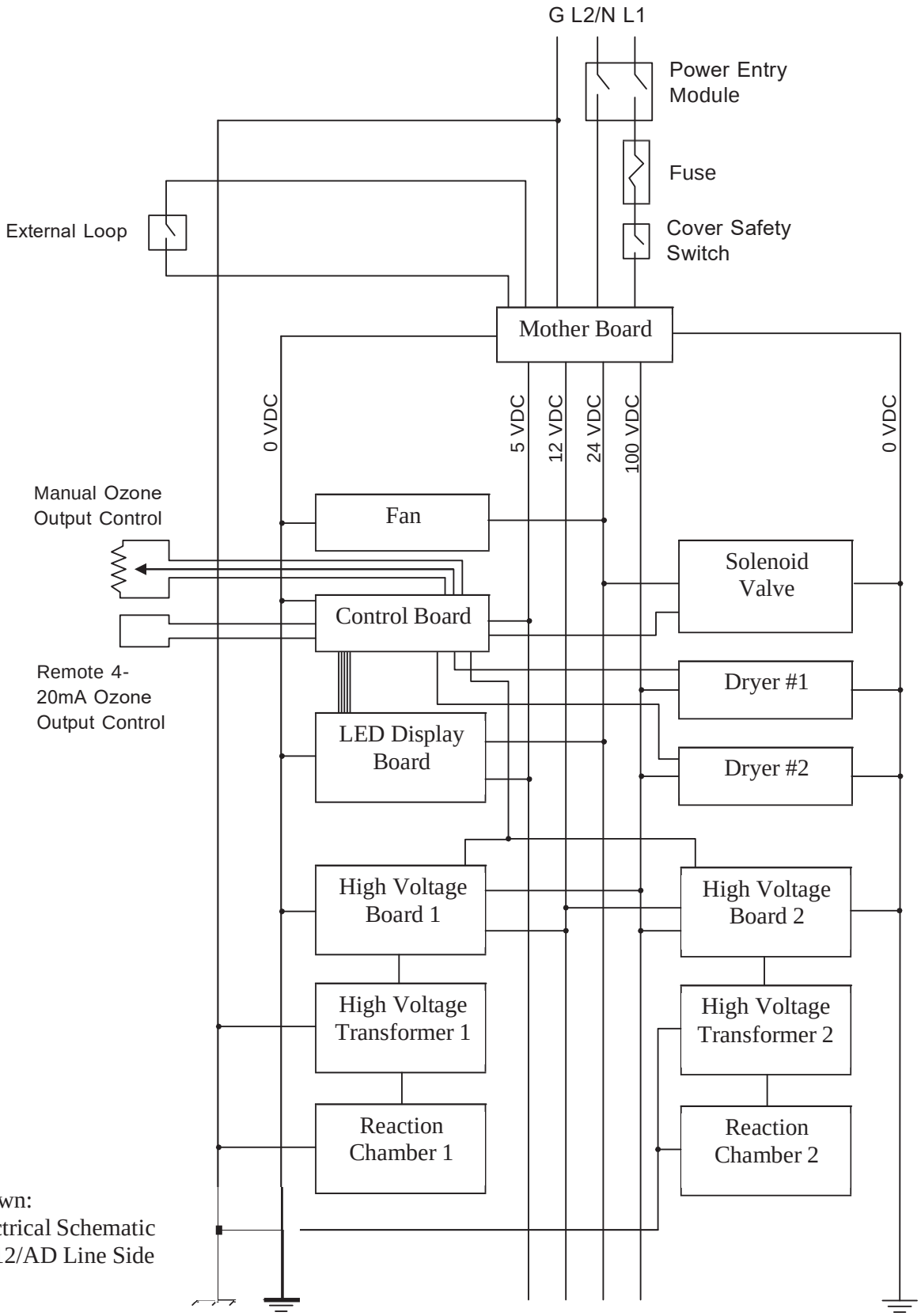
CD12/AD





OZONE GENERATOR	SPECIFICATIONS
CD12/AD	92 22”h x 13.5”w x 8.25”d, 20 lbs
Mounting Bracket Measurement	Z-Bar Mount

CD12/AD



Shown:
Electrical Schematic
CD12/AD Line Side

START-UP WARRANTY VALIDATION

SITE:_____ **DATE:** _____

COMPANY NAME: _____

MODEL # _____ **SERIAL #** _____

MODEL # _____ **SERIAL #** _____

MODEL # _____ **SERIAL #** _____

ADDITIONAL INFORMATION

SOLD TO: _____

ADDRESS: _____

CITY: _____ **STATE:** _____ **ZIP:** _____

PHONE: _____ **CONTACT:** _____

COMPLETE AND RETURN FOR WARRANTY CONSIDERATION

PLEASE RETURN VIA FAX TO: (916) 978-9995

WARRANTY

NEW WAVE INDUSTRIES, LTD. LIMITED WARRANTY

NEW WAVE INDUSTRIES, LTD. warrants to the original purchaser only, that all PUR-WATER RECLAIM SYSTEMS will be free of defects in materials and/or workmanship for a period of (1) one year from the date of delivery to the original customer, provided the enclosed instructions for operation, maintenance and care have been strictly complied with and the validation page has been sent to and received by NEW WAVE INDUSTRIES, LTD.

This warranty is expressly limited to the repair or replacement of the defective component.

Excluded from warranty are gauges, strainer baskets, and pump seals.

This warranty does not extend to damages to person(s) or property or liabilities incidental, consequential or contingent.

Purchaser shall notify NEW WAVE INDUSTRIES, LTD. in writing or by telephone should any defect appear or should any damage occur to the unit(s) for notification of valid warranty claim.

RETURN GOODS POLICY

NEW WAVE INDUSTRIES, LTD. RGA POLICY AND PROCEDURE POLICY

- All returns must be authorized by NEW WAVE INDUSTRIES, LTD. (Service Department) with a Returned Goods Authorization (RGA) form prior to return.
- All returned goods must be received by NEW WAVE INDUSTRIES, LTD. within 30 days or you will not receive credit. All goods not received within 30 days will not receive credit.
- Credit is contingent upon a credit evaluation inspection. 6

  Customer must prepay freight. **PROCEDURE**
- Contact New Wave's Service Department and give original invoice number and date of order to request an RGA.
- New Wave's Service Department will issue an RGA form and send it via fax or mail.
- Include the RGA form inside the package and clearly write the RGA number on the outside of the package.
- Customer must prepay freight.
- When returned parts are received by NEW WAVE INDUSTRIES, LTD., credit for the parts is contingent upon credit evaluation inspection and warranty terms.
- If the customer wants to place an order for the part(s) during the return process, then the customer is agreeing to purchase the replacement part(s) and pay the invoice when received. If the returned part(s) is found to be a warranty item NEW WAVE INDUSTRIES, LTD. will issue a credit redeemable in parts.
- If New Wave Industries, LTD. sends a part that was not ordered by the customer, the customer needs to get an RGA number from NEW WAVE INDUSTRIES, LTD.
- Include the RGA number clearly on the outside of the box and the part(s) to be returned.
- NEW WAVE INDUSTRIES, LTD. will issue a call tag to the customer for pickup of the wrong part(s) and ship it back to New Wave's factory, at New Wave's expense.
- NEW WAVE INDUSTRIES, LTD. will pay standard ground freight for warranty replacement parts. If the distributor/customer requires overnight/second day air delivery, shipping will be at customer's expense.

Revision History

2003 Generation 1.0 Reclaim launched with three position Hand-Auto-Off switch and "Ozonology" brand Ozone option

2007 Generation 1.5 Reclaim upgrade to Clearwater Ozone option

20011 Generation 2.0 Reclaim upgrade: HMI external screen, automated Underflow Valve added, Recirculation Valve modified: both Underflow & Recirculation Valves give feedback status to PLC.

2020 Complete re-write Generation 3.0 Reclaim upgrade: HMI replaced by Touchscreen, Frame modified to accommodate CD-30 Ozone option (frame taller but overall height reduction with ozone generator within frame), introduction of external network fault monitoring option.