System Troubleshooting

The PurWater 2.0 Reclaim System was designed with easy troubleshooting in mind. The first step is typically to determine what the HMI says. If the screen is flashing, press and hold F3 briefly and the screen will stop flashing. All faults are displayed on the HMI 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 HMI will display the VFD fault and disregard the ball valve fault until the VFD problem is fixed.
From there, read the message and then find the cause and solution on the next few pages.
If the screen is not displaying a fault, go to page 68.

When contacting PurWater's Technical Support department, it is often necessary to have your PurWater serial number available. On the Pro Series systems, the serial number is located in the middle of the frame between the contol box and the oxygen concentrator.

Pro Series serial number location

Maintenance Faults

Maintenance faults are not technically faults in that they do not necessarily indicate a problem. Instead, it is indicative of an action required or a warning of upcoming maintenance needed. Looking just like a fault, the screen will flash and you can press F3 to stop the screen from flashing to read the fault. Maintenance faults only appear in Auto.

Please clean basket then press F4 in Off to reset

Cause: This is the most common of the maintenance faults and is simply a reminder to clean or check the basket strainer once a week. There is a default of 168 hours of the pump running, equal to 7 days. This is a conservative number but it is always best to check the basket too often rather than not often enough. Even if the basket is clean to start with, over time the basket will inevitably need to be cleaned more often between the tanks being freshly pumped out and as the date approaches of them needing to be pumped out again.

Solution: Clean the basket strainer (see maintenance page 47). After cleaning the basket, remember to press F4 in the default Off screen (see below) and the timer will be reset.

System off
Auto=Pump
F4=Reset the basket timer

F4 not pressed

System off
Auto = Pump
Basket timer is now reset

F4 pressed

O2/O3 half life warning 8XXX hours F3 5 secs to

Cause: The purpose of the reminder is so that someone is aware (or otherwise notified when the fault shows up) that the ozone and oxygen components will require replacing at 16000 hours. Note: The 8XXX indicates what will most likely be showing, as the fault comes on at 8000 hours and does not go away without being acknowledged.

Solution: The oxygen and ozone half life fault requires no other action other than to press and hold the F3 (Auto) button for five seconds to be cleared.

O2/O3 full life warning 16XXX hours Check manual

Cause: The oxygen and ozone full life indicates that it is time to replace the oxygen concentrator and the ozone cells. The fault cannot be acknowledged until the parts are replaced.

Solution: Contact PurWater or your PurWater distributor for information on ordering the parts and how to clear this maintenance fault once the parts have been installed.

Minor System Faults

All minor system faults are relevant to the motorized ball valve positions. The 2” is referred to as the recirc, both on the HMI and in the troubleshooting guide. The 1” ball valve is referred to as the underflow or U/F valve, but only the U/F valve on the HMI. The minor system faults can cause a lack of water to the wash or through the recirc line, but will not disable the reclaim pump.

U/F valve on bottom of machine won’t open

Cause: The 1” valve on the underflow is or was out of position. Locate the view port (see photo) and determine if the valve is currently open or closed. Note: Unless it is 2 AM, the clock is set wrong, or someone just tried to force the U/F flush via the Auto submenu this valve should be closed.

Solution: After checking view port, if the valve is closed (red for closed) press F4. This will clear the fault. Wait 10 seconds to see if fault reappears. If it does not, force an underflow flush through the Auto submenu (see page 33 or 76) and check the view port to see if the valve opens. If it does open (green for open) check the HMI to see if fault comes back. If fault comes back and the valve is opening, contact PurWater for further assistance.

If the valve does not open, turn the system to Hand to place it in bypass and remove valve by loosening the two unions. Inspect the valve for debris built up on or in it, also check the underflow line to see if there are solids backed up there. If the wash can be briefly shut down from washing cars go to Off mode, then through the startup menu and try to force the valve open while disconnected from the plumbing.
If it still will not open, contact PurWater for further assistance. If the valve will open when disconnected from the plumbing, after it closes re-attach it to the plumbing and try again. If it does open, turn the system back to Auto and try it again under pressure through the Auto submenu.

U/F valve on bottom of machine wont close

Cause: The 1” valve on the underflow is or was out of position. Locate the view port (see photo) and determine if the valve is currently open or closed. Note: Unless it is 2 AM, the clock is set wrong, or someone just tried to force the U/F flush via the Auto submenu this valve should be closed.

Solution: After checking view port, if the valve is open (green for open) and should not be press Hand to place the system in bypass mode and remove valve by loosening the two unions. Inspect the valve for debris built up on or in it, also check the underflow line to see if there are solids backed up in the line. If removing the valve from the underflow line does not close it, remove the two bolts that hold the motor to the valve. Unbolt the motor and try to force the valve closed by hand. Note: This will most likely turn the motor portion to the correct closed position, when it’s time to re-attach to try and close valve you will need to go to Off Startup Menu and force the motor to line up with the valve.
If possible, spray the valve portion once disconnected with a pressure washer gun or blow compressed air through plumbing and orifice hole. After cleaning, go to Startup menu and force motor to line up with valve, re-attach and see if it will now open.If it does not, unbolt the motor and try to force the valve closed by hand. If it still will not close, contact PurWater for further assistance. **If at any point the valve closes when disconnected from the plumbing, re-attach it to the plumbing and force a U/F flush (see auto submenu) to be sure it opens and closes properly on its own.**

U/F Valve View Port: Red for Closed (top) Green for Open (bottom)

Use 7/16” wrench and socket (front and back) to disassemble valve from motor

Valve and collar must line up before reattaching (top). Blowing compressed air through valve (left)

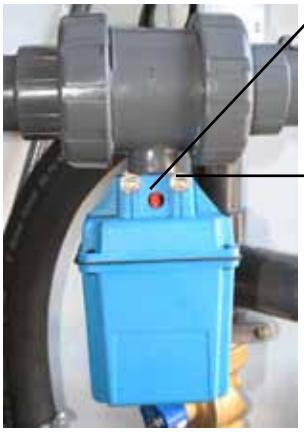
Recirc valve not closing Look at view port to see

Cause: The 2” valve on the pump output plumbing is or was out of position. Locate the view port (see photo) and determine if the valve is currently open or closed. Note: In Auto when there is not a wash signal, this valve should be closed.

Solution: After checking view port, if the valve is open (green for open) and should not be, press Hand to place system in bypass mode and remove valve by loosening the two unions. Inspect the valve for debris built up on or in it, also check the pump discharge line to see if there are solids backed up in the line. Reconnect the valve and press Auto, then check to see when the wash is not active if the valve closes. If it does not, unbolt the motor and try to force the valve closed by hand. Note: This will most likely turn the motor portion to the correct closed position, when it’s time to re-attach to try and close valve you may need to go to Off Startup Menu and force the motor to line up with the valve.
If the valve still does not close, it may be necessary to close the wash briefly, go to the Startup menu and try to force the valve closed after disconnecting it from the plumbing again.
If you need further assistance contact PurWater.

View Port on Recirc Valve: Green for open

View Port on Recirc Valve: Red for closed



Use 7/16” wrench and socket (front and back) to disassemble valve from motor

Valve needs to be turned so that it lines up with the motor collar

Recirc valve not opening Look at view port to see

Cause: The 2” valve on the pump output plumbing is or was out of position. Locate the view port (see photo) and determine if the valve is currently open or closed. Note: In Auto when there is not a wash signal, this valve should be closed.

Solution: After checking view port, if the valve is closed (red for closed) and should not be press Hand to place system in bypass mode and remove valve by loosening the two unions. Inspect the valve for debris built up on or in it, also check the pump discharge line to see if there are solids backed up in the line.

If removing the valve from the line does not open it, remove the two bolts that hold the motor to the valve. Note: This will most likely turn the motor portion to the correct open position, so when it’s time to re-attach to try and close valve you will need to go to Off Startup Menu and force the motor to line up with the valve.

If possible, spray the valve portion once disconnected with a pressure washer gun or blow compressed air on both sides of the valve. After cleaning, try to force the valve open by hand. If it still will not open, go to Startup menu and force motor to line up with valve, re-attach and see if it will now open. If it still will not open, contact PurWater for further assistance. **If at any point the valve opens when disconnected from the plumbing, re-attach it to the plumbing and verify it closes and opens properly with the system running.**

View Port on Recirc Valve: Red for closed

View Port on Recirc Valve: Green for open

There is a safety switch that removes power when ozone cabinet is opened to prevent injury from high voltage shock. Should you need to get into the ozone cabinet, for your safety wait at least one minute after opening cabinet to allow capacitors to discharge before placing hands in cabinet.

Ozone System Faults

Ozone (often referenced as O3) system faults will only register if you have a reclaim system with the ozone upgrade. Ozone faults do not appear immediately after the pump turns on. There is a delay for the ozone to come on after the oxygen concentrator has been running for 15 seconds, ozone faults only register after the delay. Ozone faults prevent the system from making ozone, but there will still be power to the oxygen concentrator and in the ozone cabinet, so you will still have green lights on both during any ozone fault.

Ozone off Pressure low from oxygen unit Check

Cause: The pressure switch inside of the ozone cabinet is not satisfied likely because it is not seeing enough pressure from the oxygen concentrator. To protect the ozone components if there is not enough air pressure going to the cells the system shuts the ozone off.

Solution: Check the cell pressure gauge, if it reads below 8 psi use the cell pressure adjustment to raise the pressure. **Note: If you fully close the valve mark where the pressure gets up to and quickly turn the valve back ¼ turn. Never leave the adjustment valve closed for longer than 15 seconds. Damage can occur to oxygen/ozone components.** If you cannot reach 8 psi with the valve in that ¼ turn position first verify you have 11psi on the gauge on the right side of the oxygen concentrator (see photo next page). If you have less than 11psi remove the cover of the O2 concentrator and locate the regulator in the center upper section (see pic, next page). Pull the regulator out toward you and then slowly turn it clockwise to increase the pressure while watching the gauge on the right until it reaches 11 psi. If the pressure goes past 11 psi turn the regulator slowly back to the left until it reaches 11. Once 11 is obtained, press the regulator back into it's original locked position. If you have 11psi on that gauge, remove the O2 hose and be sure the flowmeter registers roughly 60%. If it does not read 6 with the hose removed adjust the flow dial until it does. After you are positive the oxygen pressure and flow are correctly set, with the oxygen tube connected and the valve at the ¼ turn open status, if you do not have 8psi next verify the gauge is not giving you a false reading by opening the ozone cabinet and removing the tube from the back of the gauge. If the gauge does not go to zero gently lift the black rubber gasket at the top of the gauge to try to vent the gauge and move it back to zero (see photo page 61). Reconnect and check psi, if the gauge does go to zero or if it still will not reach 8psi, you most likely have a leak somewhere between the oxygen discharge line and the cell pressure gauge. Look at all connections starting with the oxygen discharge line, focusing especially on the pushlock fittings and pressure switch. If you cannot find the leak, start by disconnecting the

oxygen inlet pushlock fitting on the bottom left hand side of the ozone cabinet and putting your finger over the end of it, watch the ball on the oxygen flowmeter and watch to see if it drops to zero. Do not cut off flow for more than 15 seconds at a time. If the ball drops to zero, move on to the next fitting, disconnect and see if the ball drops to zero with your finger over it until you find the leak.

Flowmeter with O2 hose connected (left)
Flowmeter with O2 hose disconnected @ 6 (right)

Setting the O2 Concentrator to 11 psi

Cell Pressure

Cell Pressure Adjustment

Venting the Ozone Pressure Gauge

Ozone off
No vacuum at black mazzei inject point

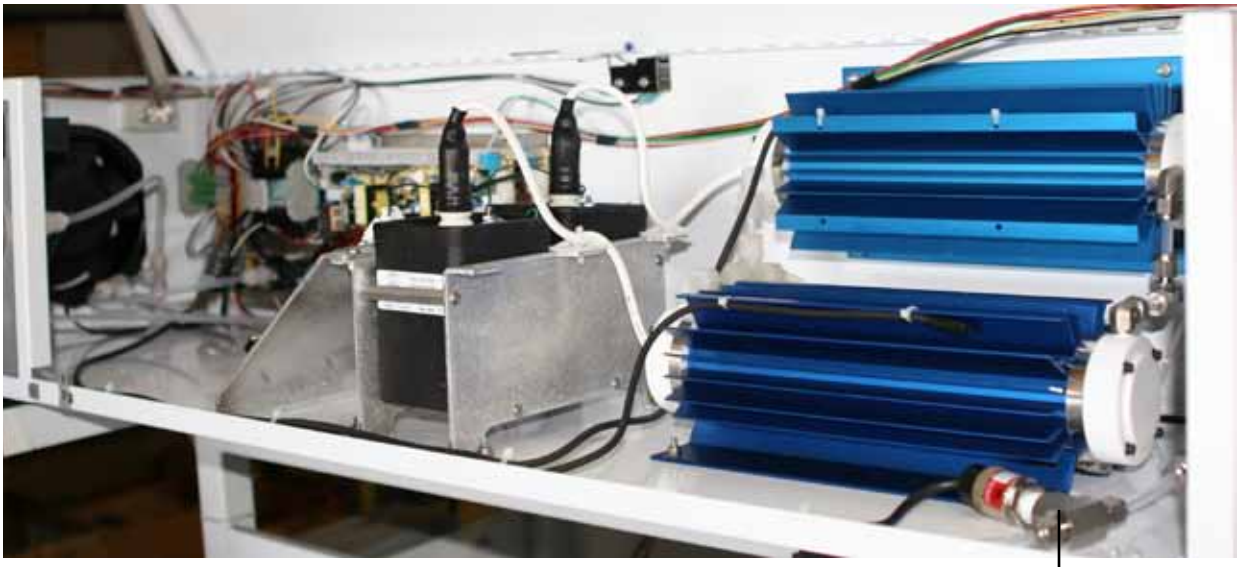
Cause: The vacuum switch is registering that there is not enough vacuum from the mazzei eductor to run the ozone generator. As water runs through the mazzei, it creates a vacuum to draw in ozone, if it fails to do so the system shuts down ozone production.

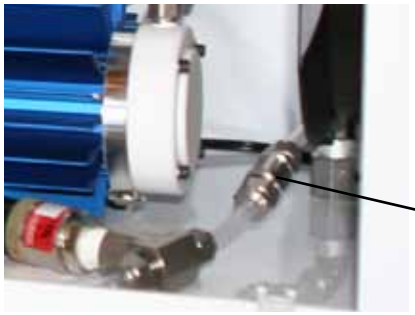
Solution: Check cell pressure is 8 psi and pump pressure is above 15 psi. Remove the ozone line from the mazzei at the stainless steel compression fitting. Put your finger over the hole and see if it is pulling any vacuum (see photo next page). If it is pulling vacuum go to Step 2 (below). If it is not, turn the system to bypass by pressing hand, disassemble the suction portion (See maintenance, page 45) check for debris and clean. After cleaning, verify the flow arrow is pointing downward when re-attaching and try again. If still no vacuum on the suction port verify there is good water flow through the mazzei by disconnecting the bottom union and turning it so the outlet of the mazzei can free flow onto the floor. While free flowing onto the floor, check the suction port and see if it is pulling vacuum. If so, there is blockage downstream on the recirc line and it may require pumping out the tanks. If it is still not pulling in vacuum it will be necessary to replace the mazzei.

Step 2

If you are getting good vacuum at the mazzei but still getting the no vacuum fault locate the stainless steel check valve up in the ozone cabinet near to the right hand cooling fan. Disconnect the inlet compression fitting (the one closer to the front of the machine) and feel if the same vacuum is pulling through the check valve. If no, remove the check valve, run a small piece of wire through it, reconnect and run same test again. If the check valve will not work correctly, replace it. If you are getting good suction through the check valve, re-attach and try to run ozone again.

If you are getting good vacuum all the way through the check valve and are still getting the no vacuum fault, it's time to adjust the vacuum switch. Do so by loosening the brass locking ring, then turning the black part on the left with the cord counter-clockwise ¼ turn and then loosely turning the brass ring tight to avoid it spinning loose. Close the ozone box and see if the fault is still present. If not, try adjusting the switch another ¼ turn. If it does not clear, replace the vac switch. If adjusting the vac switch clears the fault and the blue light comes on, remove the hose from the mazzei to verify it was not adjusted too far and that it will still shut the ozone off if no vacuum is present. If removing the hose does not shut the ozone off, turn the vacuum switch back a little bit until you find a spot the ozone will run when connected and not when disconnected. Contact PurWater for more information.





Vaccum Switch

Check Valve

Ozone off Temperature trip Check digital temp

Cause: The temperature switch is indicating the temperature is too high so the system has shut down the ozone to protect the ozone components.

Solution: First, verify the temperature switch is displaying above 140 degrees F. If it is not, go to Step 2 (below). If the temperature is above 140 verify that the fans are running, and that the filters are clean and not impeding the fans airflow. If all of that is checked, be sure that the fan blades are not broken, bent or damaged in some way.

Step 2

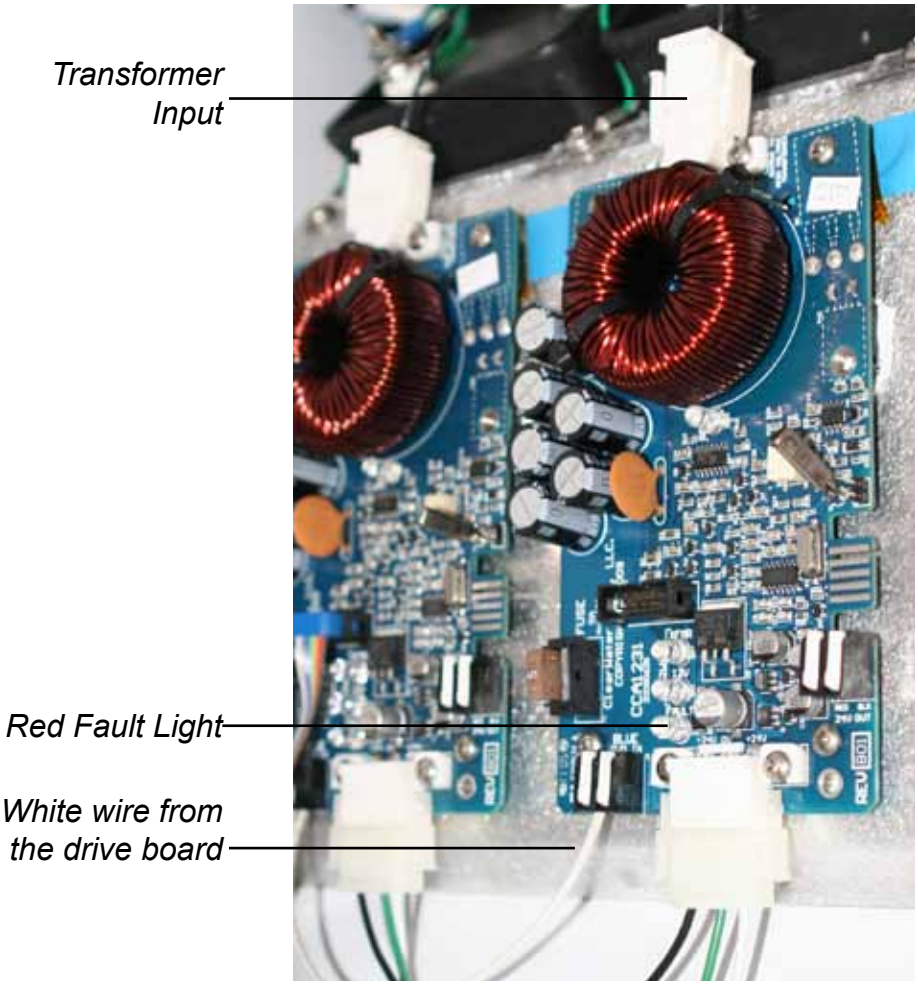
If the temp switch is reading less than 140, verify the setpoint is correct on the temp switch(es). Press and hold the set button on the temp switch for 8 seconds and release when the display changes. The first display will show 0. Press set again, the display will show SP for set point. Press the up or down arrow to make it 140 if it is not already. When done press set and SP will display. Note: If it will not let you set it at 140, go to the other settings first and then go back to SP.

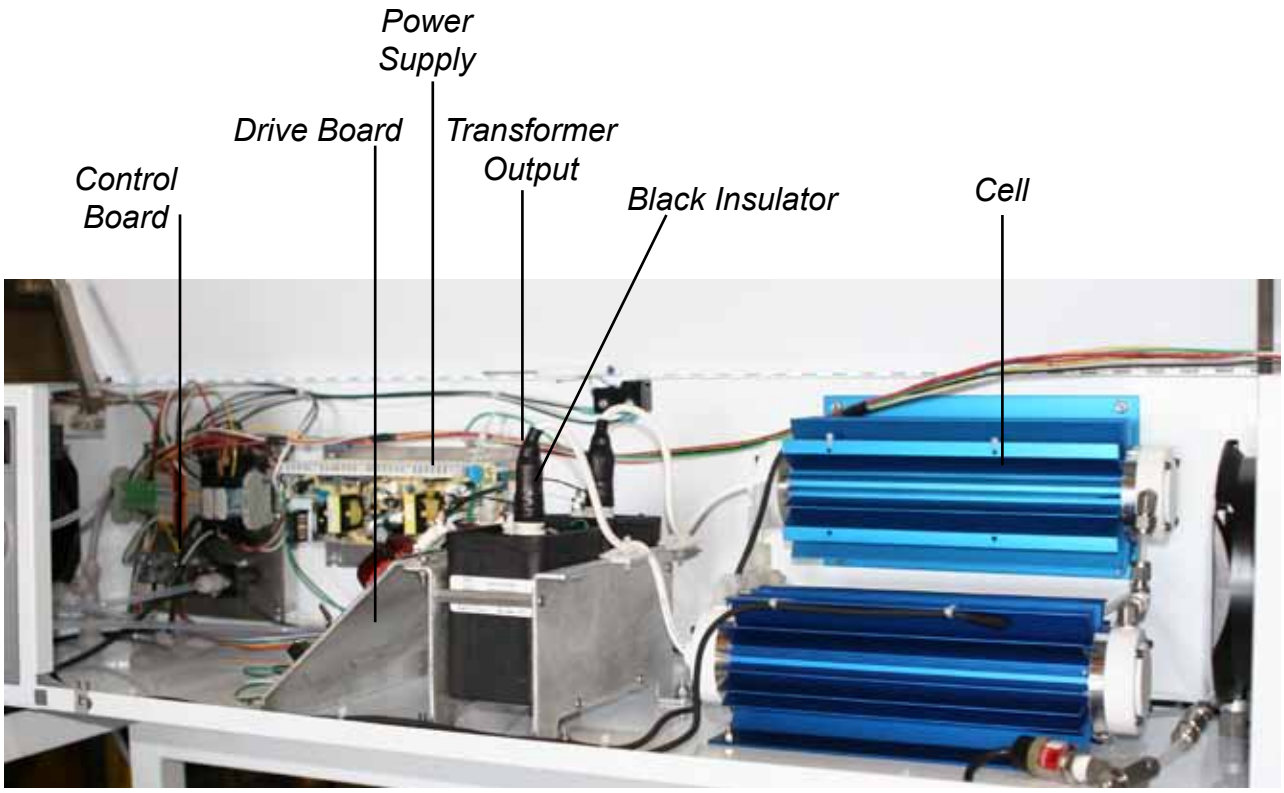
While in the menu scroll though the other settings used by the ozone in the temp switch to verify they are also correct. Press the up arrow once and the display will read Ro. Press set, if it does not show 10, change it to 10 and then press set. Press the up arrow to get to R2 and press set, if it does not show 170 press up arrow until it does and then press set. Up to To, set to 200. Leave screen without pressing anything for 2 minutes to return to the temperature display.

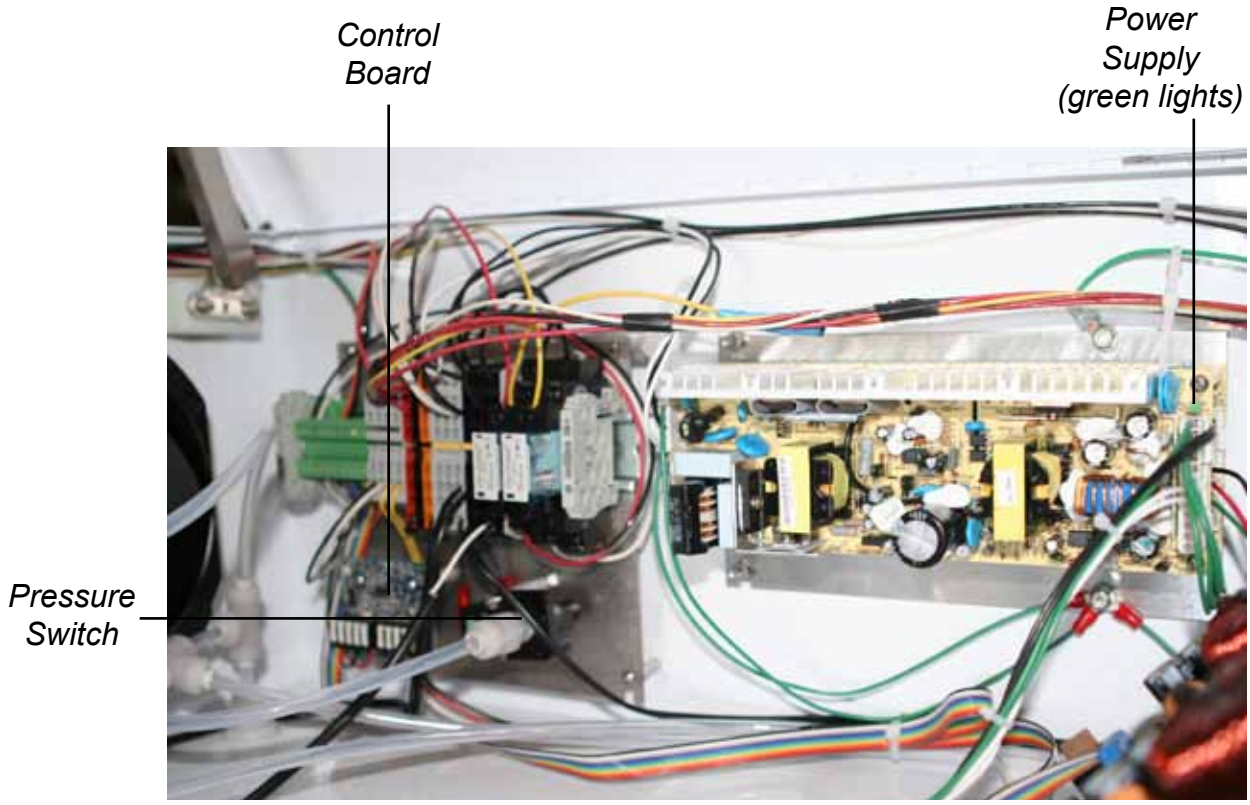
Ozone off Fault with components in cabinet

Cause: The circuit board(s) inside the ozone cabinet is sending a signal to the reclaim system indicating there is a fault with one or more of the ozone components. This fault has many possible causes, the two most common causes include if the drive board or control board is faulty.

Solution: Open the ozone cabinet then disconnect the white wire from the drive board (see photo). Either place a wire nut over the white wire or secure it in a way that there is no chance it will arc against the frame. Close the lid on the ozone and see if the ozone fault still exists. If that fixes it the control board is most likely the problem. If it does not,push down safety switch and verify there are two green lights on the power supply and that the ground wires are securely connected. If there is not two green lights on power supply, replace the fuse for the side that is not lit and apply power. Contact PurWater for more info.




Power Supply
Drive Board
Transformer Output
Control Board
Black Insulator
Cell


Control Board
Power Supply (green lights)
Pressure Switch

Major System Faults

Major system faults are relevant to the pump being able to operate correctly without risking damage to it. In a major fault the system shuts down the pump and the bypass is energized if a wash activation comes on. Two of the three major faults will reset if the problem is corrected on its own.

VFD off fail or faulted Open control box to check

Cause: The VFD is not receiving power, has power and is faulting due to a problem with it or with the pump motor, or has failed meaning it is being powered but is not displaying anything and is non-operational. Fault will clear automatically if possible.

Solution: Open the control box, force the disconnect back on so there is power in the control box and look at the VFD. If the display 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 drive 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.

Low level float down check tanks If float is

Cause: The float switch installed out in the tank the suction lines are in is in the down position or has failed. Fault will clear automatically if possible.

Solution: Locate the tank the suction lines and float are in. Verify the tank is full, ideally if you can see the float in the up position that would be best. If the tank is empty or below the float level try to determine where the water is going. The way most car washes are set up they are always overflowing water from the reclaim tanks to sewer and so once the tanks are full they stay full. If the tanks are full and the float is up replace the float or if needed bypass by unwiring the field wiring landed on terminals 1 & 2 in the control box.

Note: There is a pressure switch that will shut the pump down if it runs dry due to lack of water, making it possible to not use a float in most cases.

Pump off on Low pressure Check basket Press Prime

Cause: The pump ran for 10 seconds without having made the pressure switch. The pressure switch is there to avoid the pump from running dry and burning out seals. This fault will not clear automatically; it requires operator involvement.

Solution: First, if this is the initial installation, or a VFD or pump motor has recently been changed, verify the pump is spinning the right direction. It's easiest to put a finger on the motor shaft while it's spinning to check (see page 27). Also if it is a new install be sure there is a straight pipe with no elbows in front of the basket and that the suction line piping does not ever rise above the inlet of the basket and then back down to it. Check the basket strainer and make sure it's not clogged. If clean, check the lid on the basket strainer to be sure the o-ring that is on it is clean and not squished flat. It is sometimes helpful to put some Vaseline on the o-ring. If everything looks good, re-attach the lid to the basket strainer, get the dog ears tight and start the priming sequence (page 28). If the pressure gauge is showing 15-20 psi but the fault is still coming on the problem could be that the tube that connects the switch to the plumbing is clogged. Check by pressing Hand, disconnecting the tube at the switch and, while pointing the tube at a drain, turning back to Auto. You should get a full stream of water flowing through the tube when the pump kicks on. If this does not occur, clean out the tube.

If the pressure fault keeps occurring or if the pump is running at a low pressure or is having a hard time keeping the pressure switch made, the problem could be with the suction line or foot valve. If possible, be sure the system was installed with the foot valves PurWater supplied, or if not, valves like them with no springs or screens attached. If the foot valves are okay, there could be a problem with the suction piping. If accessing the foot valve is at all possible, inspect and replace if needed. Otherwise, switching to the spare line will help determine where the problem is.

Troubleshooting Without a Fault on the HMI

Not enough water going out to feed wash

Check to see what the VFD is displaying while feeding car wash. During wash, the VFD operates based on the product line pressure. Using the transducer it tries to maintain 40 psi on the line. If the product line is displaying less than 40 psi, the VFD should be showing 60.0 hz. If so, contact PurWater for more info on the flows you can expect to get from that particular model.

Water smells

Verify there is a check valve on the sewer discharge line to prevent sewage from backing up into the reclaim tanks. If the tanks have not been pumped out in the last 6 months it is time to pump them out.
If sparger unit, see below. If ozone unit, is the blue light on up at the ozone cabinet? If not, open and inspect ozone cabinet for a blown fuse or for other problems. (See fuses blowing below if needed.) If blue light is on, be sure the ozone output is set to 100% and the cell pressure adjustment is not closed all the way shut. With ozone set at 100, the blue light on, and the cell pressure adjustment not fully closed ozone should be entering the tanks on a constant basis. Further check by opening the 2nd compartment of the 1st tank and look for the small ozone bubbles and a slight ozone smell in the tanks.

PurWater AquaLink System (AOS)

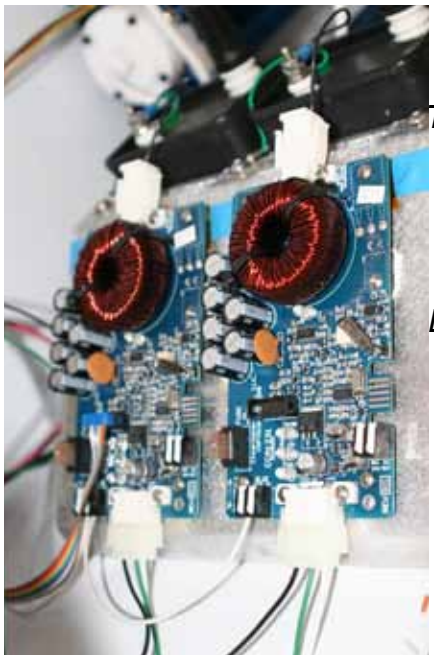
If the ozone is working but there is still a smell on a single cell (12 gram) ozone system, it is possible to upgrade to a dual cell (24 gram) to double the ozone output. Also, if it is determined that the ozone is working properly and there is still a problem with the water smelling, it is possible to upgrade to an AOS system which will assist the ozone in further removing the reclaim water smell. Contact PurWater for more information about the AOS system and how it works.

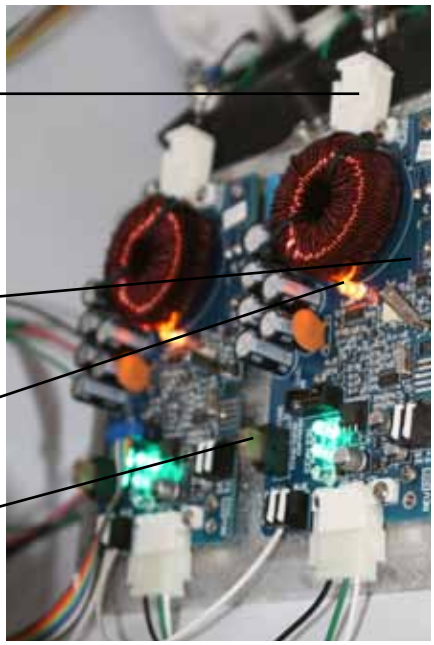
The air sparger system does not compare to an ozone system as far as eliminating bacteria growth and smell in the water. If sparger unit, verify sparger is drawing in air like it is supposed to and consider other bacterial management methods. Sparger units are built to be capable of upgrading to an ozone system in the field, contact PurWater for more information.

Ozone fuses blowing

If you have two drive boards determine if one or both fuses are blown. Open the cabinet so the power is removed from the ozone cabinet. Put new fuse in and disconnect the transformer connection on the right (see photo). Close cover which will reapply power in the ozone cabinet. Open cabinet back up and see if the fuse blew with the transformer disconnected. If the fuse did blow, replace the drive board. If the fuse did not blow pull the black insulator up and disconnect the white high voltage cable from the transformer. Set cable in a way it will not arc to transformer or any other electrical connection. Close cover, and see if the fuse blew. If so, replace transformer. If it did not blow, replace the cell.

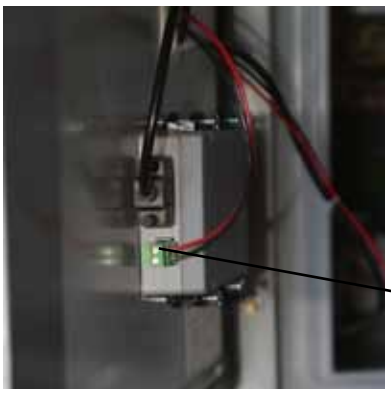
Lights illuminated on the drive board indicate that the system is creating ozone (right)





No display on HMI

If the HMI has no display showing, open the cabinet and force the disconnect to the on position to verify the 110v power source is active in the control box. Next, check the two wires on the green connector on the HMI for 24VDC. If you do not have 24VDC at the green connector, check the power supply for a green light and for 24VDC. If there is not 24 volts and no green light on the power supply, replace the power supply. If there is 24 volts to the HMI replace the HMI and contact PurWater for instructions on running the reclaim system without the HMI until the new one arrives.



Green connector on the HMI

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.

F008

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.

F012

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.

F013

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.

F033

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.

F122

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.