

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 (similar 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

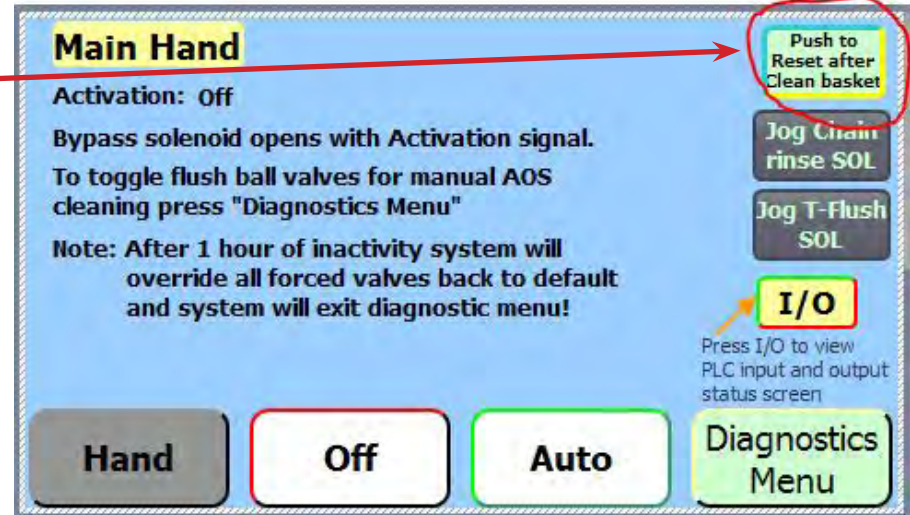
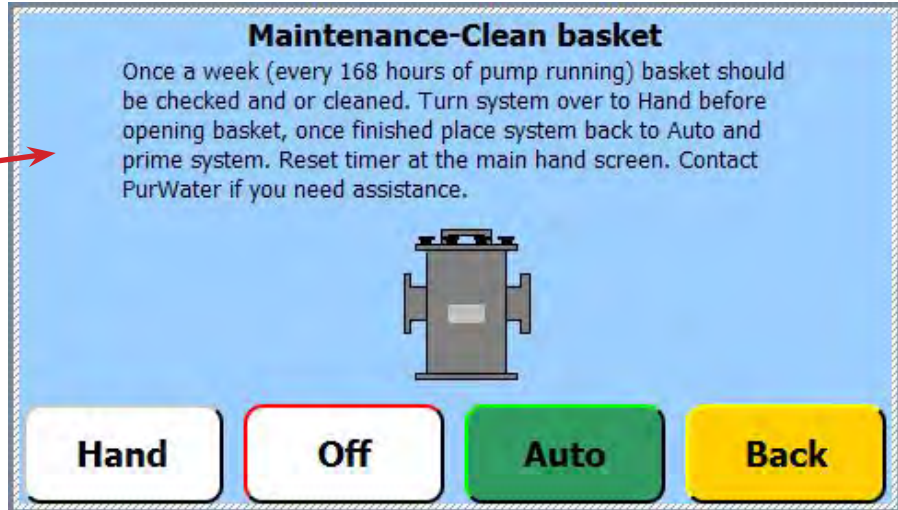
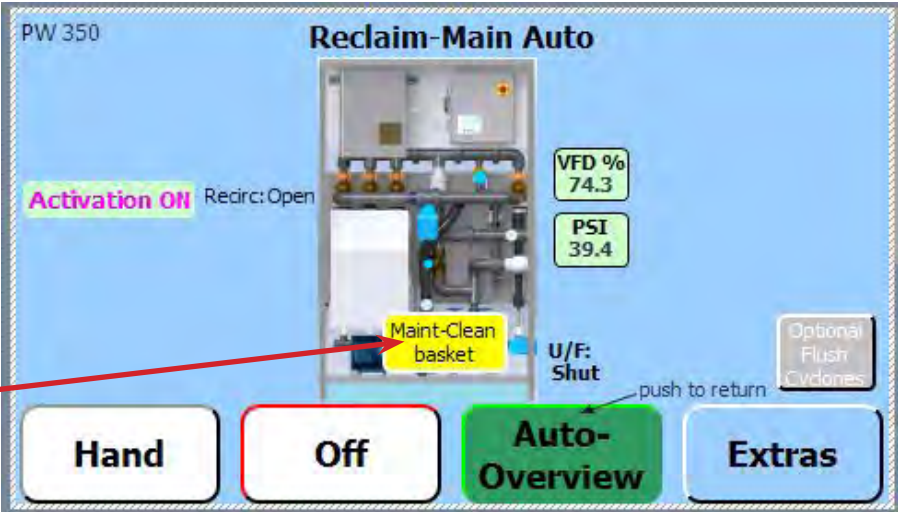
NOTE: This does not cause the system to fault or shut down - it merely "flags" the operator.

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.

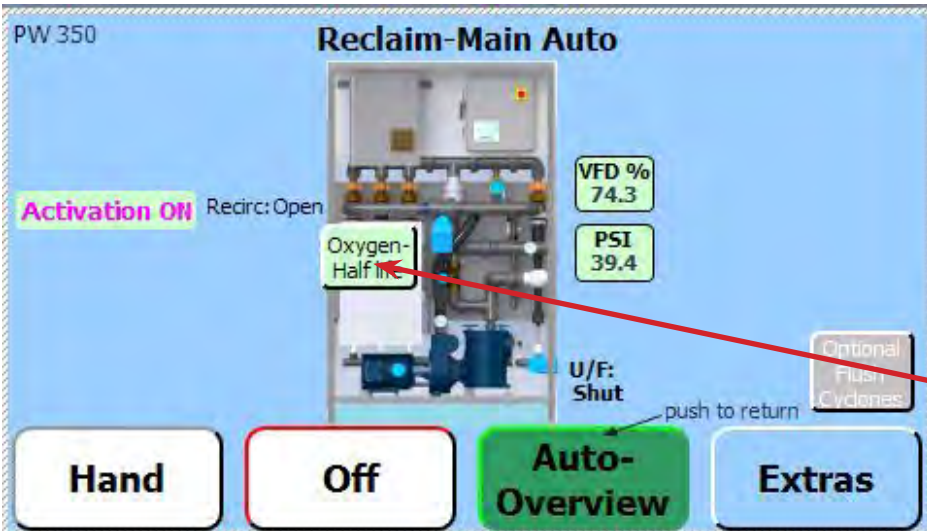
After cleaning the basket, follow the screen prompts and reset the basket timer by using the touch screen.



System Troubleshooting - O2 and O3 Half Life Messages

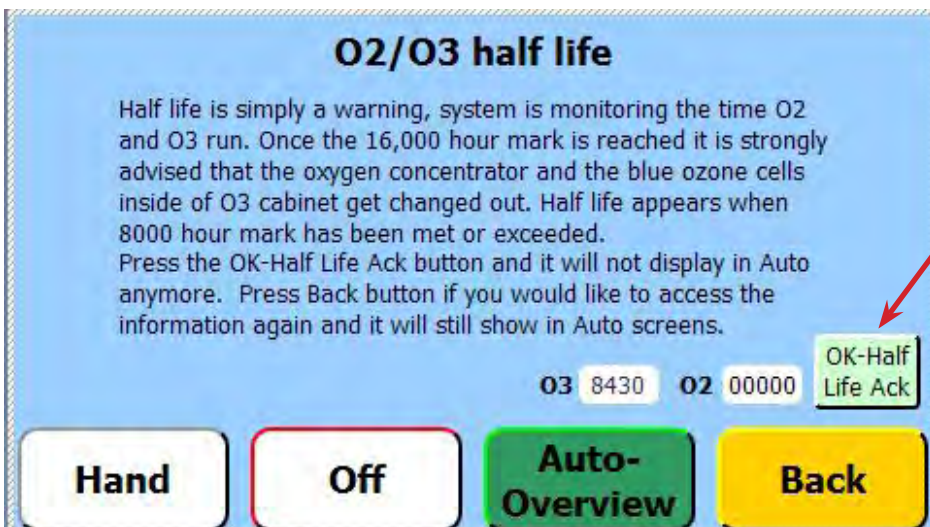
The Gen 3 Reclaim System has an internal timer that informs the operator when the Ozone Components (Oxygen Concentrator & the Ozone Reaction Chambers) depending on exactly how the system was built have reached 8,000 elapsed hours -- indicating half life. This is nothing more than a “heads up” for the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

Reclaim-Main Auto
 PW 350
 Activation ON Recirc: Open
 Oxygen-Full life
 VFD % 74.3
 PSI 39.4
 U/F: Shut push to return
 Optional Flush Cyclones
 Hand Off Auto-Overview Extras

O2/O3 full life
 Full life is an indication oxygen and ozone cells have passed the 16,000 hour mark and should be watched closely or replaced no matter what their current status is, working or not. In the case of the oxygen concentrator the whole unit needs to be replaced but for the ozone just the blue cells need to be changed. You can press the remind me later button and this maintenance fault will not show again for 30 days. There is a limit to the amount of times the "Remind me later" button can be used. Contact PurWater for help and once parts have been swapped for help in resetting timers. 02 00000 03 16210
 Hand Off Auto-Overview Back

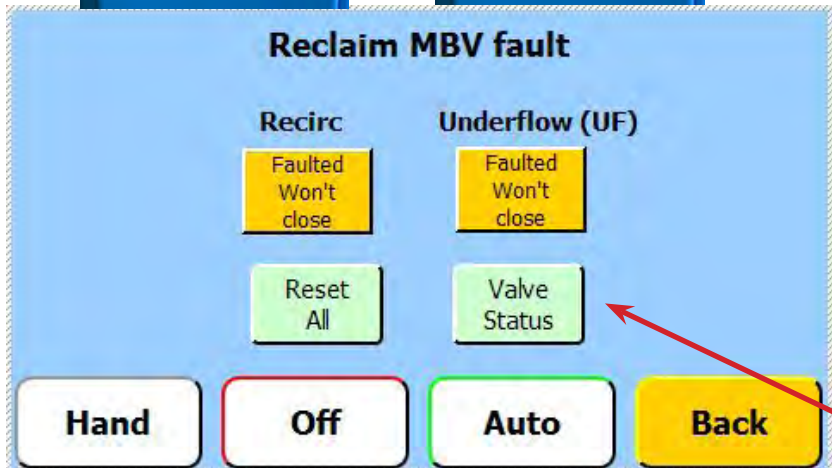
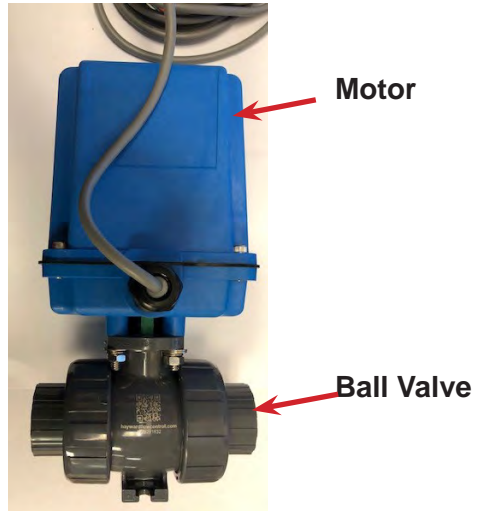
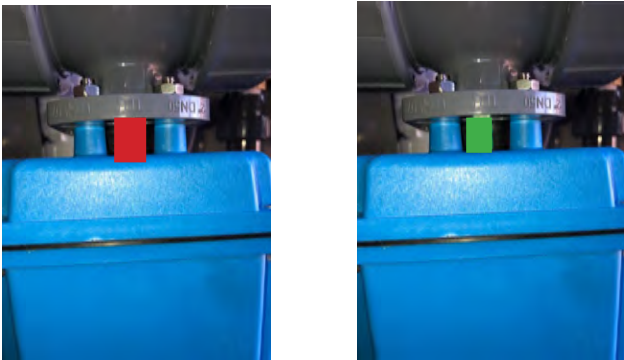
Ozone & O2 Resets
Project Information
 Project Name: PWS5MV8.19 (NewOptions)
 Program Name: PWS5MHMIV8.19R2
 Created: 1/20/2019 (R2 6/5/2019)
 Author: Purclean Engineering
 Ask about Remote Monitoring Options Available.. 1 800 882 8854
 Hand Off Auto Exit

OZONE SYSTEM HRS RESET
 32150 Reclaim PUMP Hrs RESET
 O2 HRS RESET RESET OXYGEN CONCENTRATOR RUNNING HOURS use after replacing concentrator 16210
 O3 Cell HRS RESET RESET OZONE CELL RUNNING HOURS use after replacing cell/cells 16208
 O2 O3 hrs Reset all RESET BOTH O2 and O3 SYSTEM HOURS use only if both systems replaced at same time
 TO RESET HOURS HOLD BUTTON DOWN MORE THAN 20sec
 Contact Purclean if any questions on if you should reset. Resetting will not gain run time on old components
 Hand Off Auto-Overview Exit

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

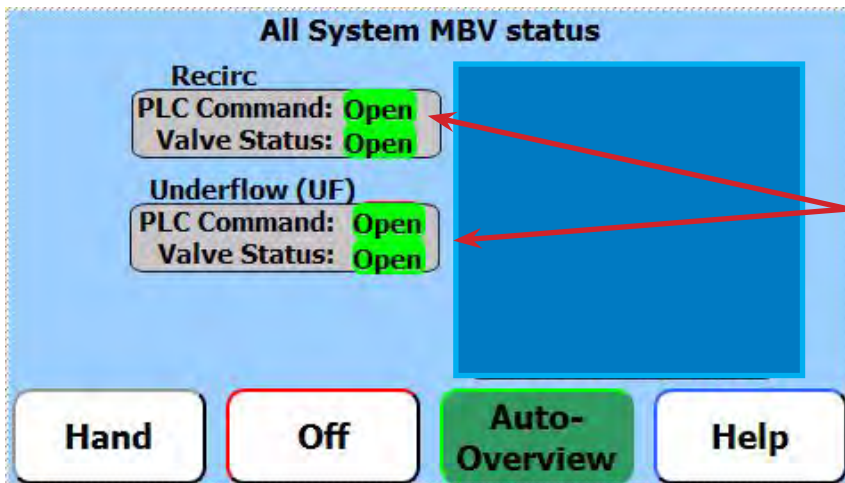
The Underflow or UF valve function is described in detail on page 42. As noted, it flushes automatically at 2am. If there is an error with regards to UF valve position it will likely be discovered during the daily walk thru.

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



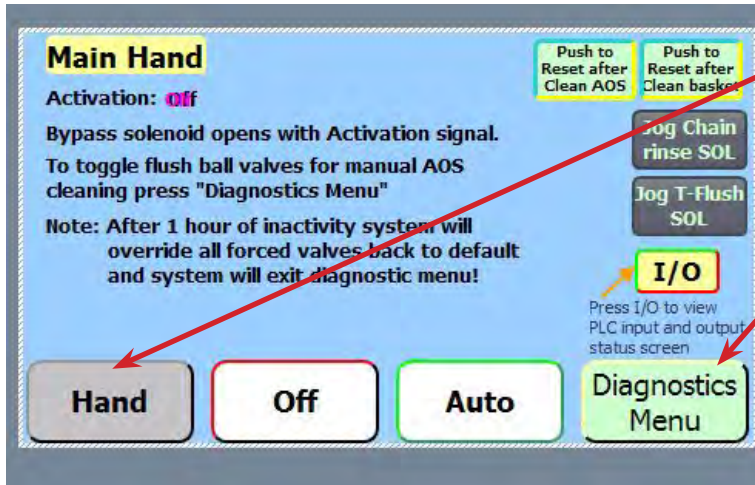
If either the Recirculation or Underflow Valve is out of the expected position, a "Reclaim MBV Fault" will be present on the touch screen. The Recirc Valve opens and closes several times a day. When a wash activation signal comes on it should open & likewise, it should close when the signal goes away.

Touching "Valve Status" will advance to the lower screen.



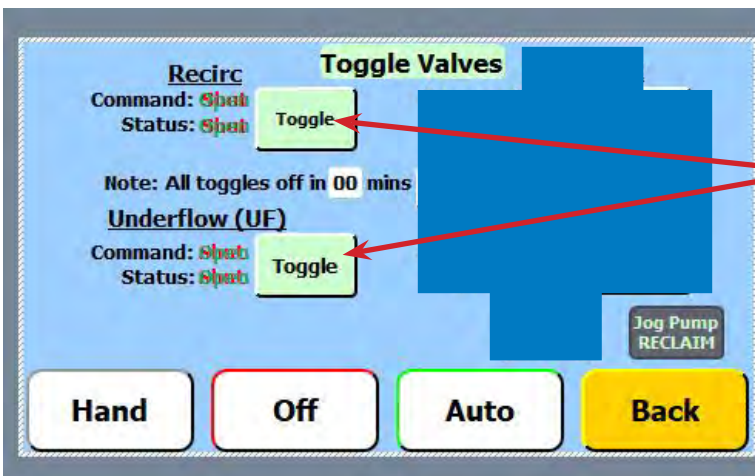
In this case, there is no mismatch between the command status and actual valve status. If there were, it would be indicated

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!!!



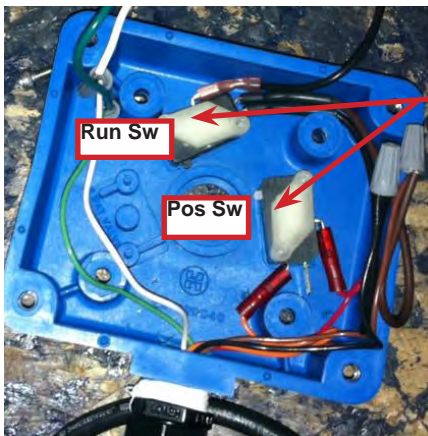
System Troubleshooting - Minor Fault Recirculation or Underflow (UF) Valve Not Opening / Not Closing (Electrical)

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.



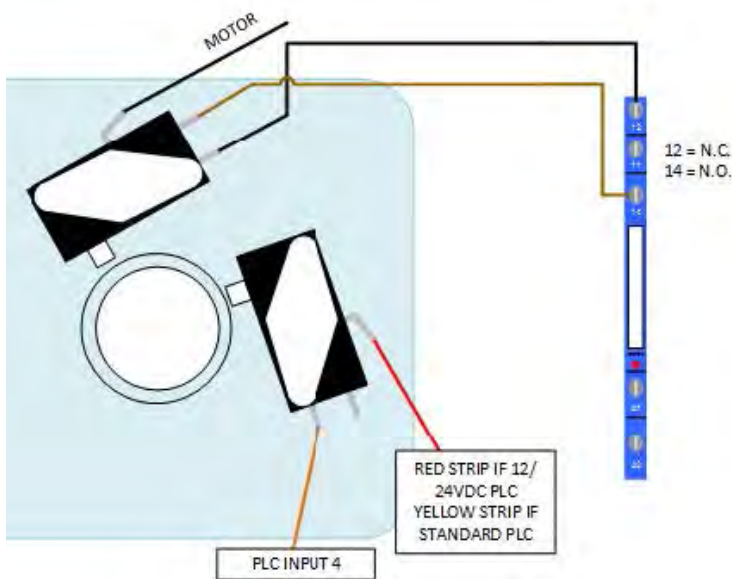
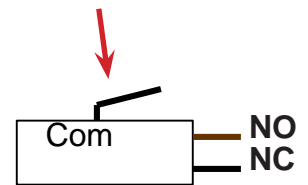
This will expose the area where the switches are mounted. There are small studs or alignment pins for mounting each switch. Each switch has a white plastic "keeper" to hold it in place.

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

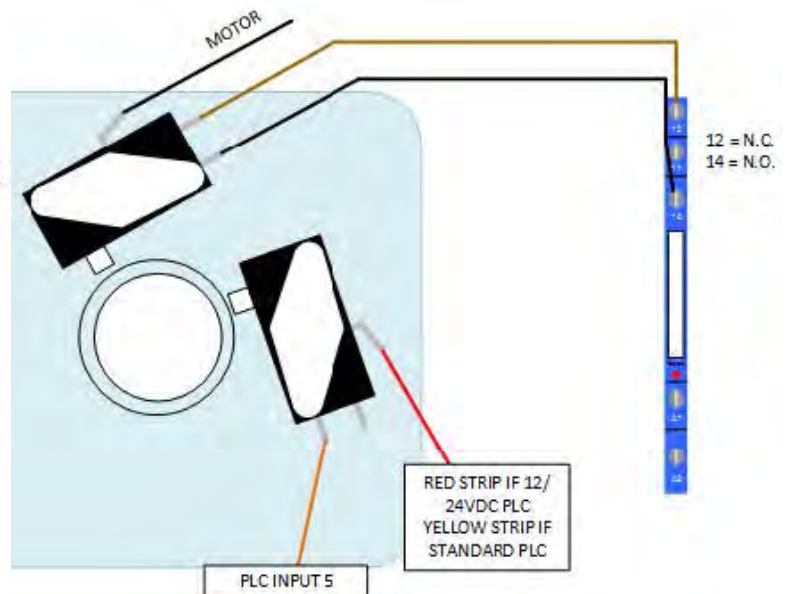
If unable to resolve an electrical problem following the steps above, the schematics pages 55-57, and a voltmeter, call for Technical Support 800-882-8854.

NOTE:

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



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.

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 mazzei. 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 52 and 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 vacuum. If there is vacuum 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.

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.



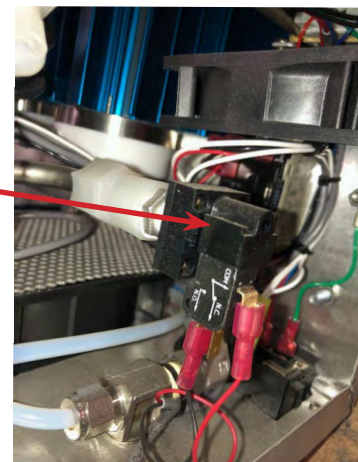
Message on Ozone Generator Panel



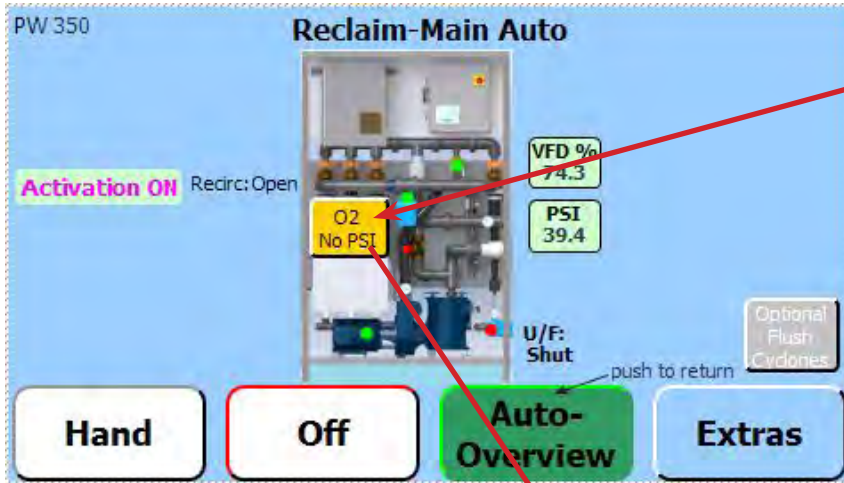
Mazzei "Exploded"
Spring Ball Washer



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

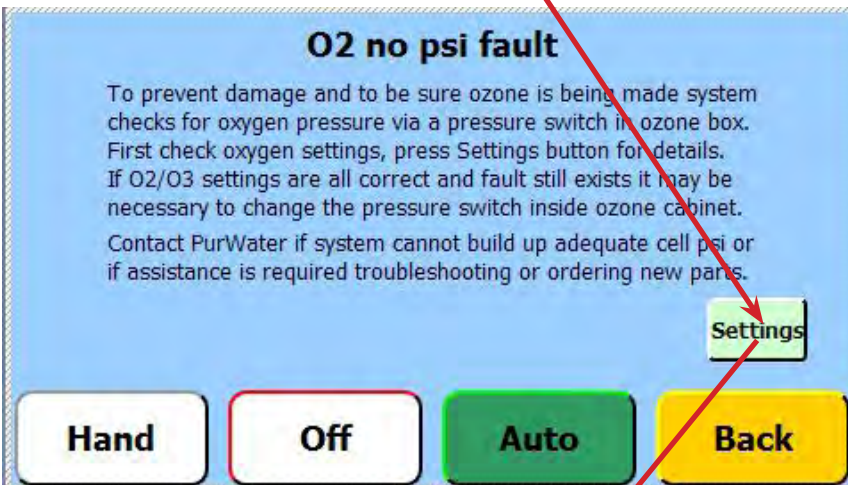


System Troubleshooting - Minor Fault Oxygen Concentrator Fault



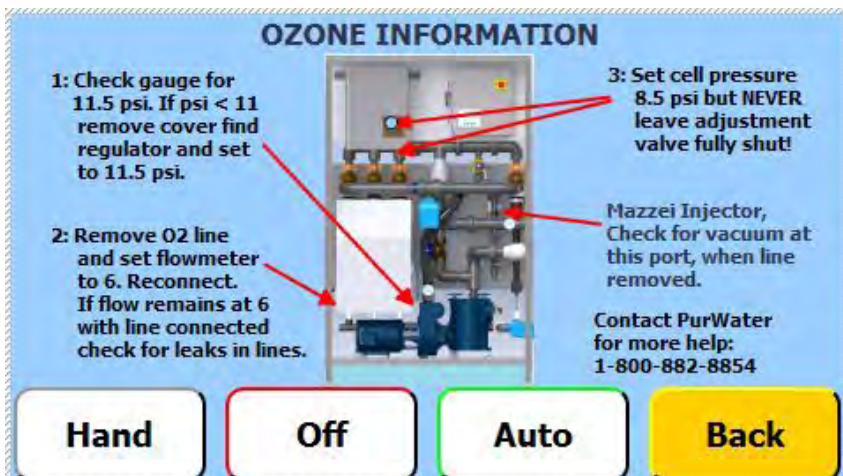
“Touch” the Yellow Fault Box to go to next screen. Then “touch” the “Settings” button on that screen.

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 the 12 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.

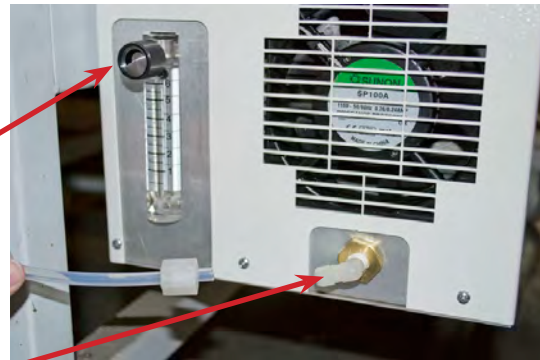


NOTE: if there is a powdery substance all over the internals the O2 Concentrator has failed. Note the internal hour meter any time the cover is removed. Life expectancy is 16,000 hours.

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".

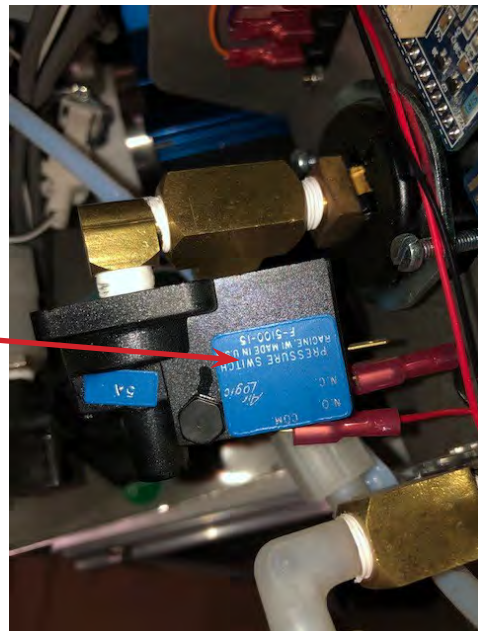
Cover the output fitting with a finger and verify the ball "crashes" to the floor of the flow meter. If it does not - the concentrator has an internal leak. If the flow meter ball (once the line is reconnected) returns to 2-4 on the flowmeter, all appears normal.



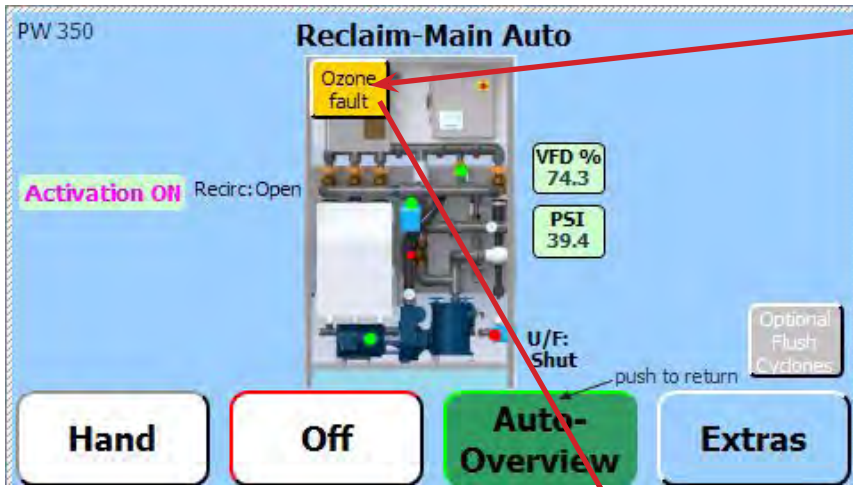
NOTE: if the ball in the flowmeter does not drop after reconnecting - this indicates that there is a leak somewhere past the output and likely is in the ozone generator itself.

Pressure Switch Location

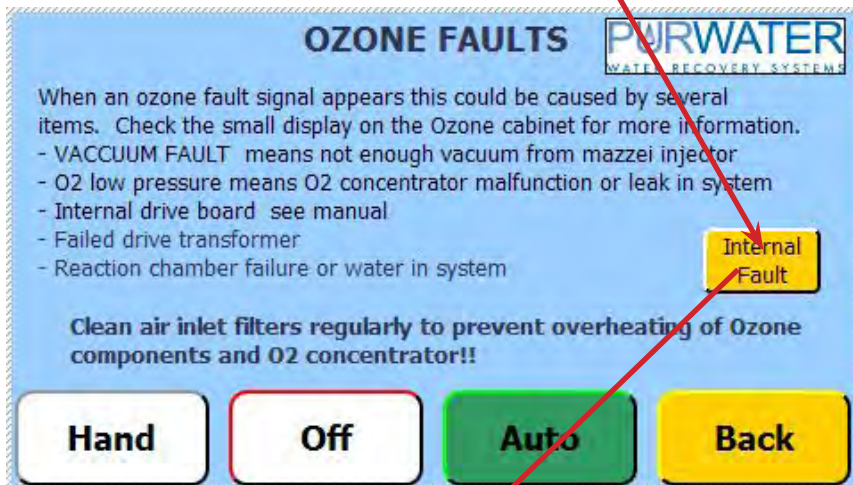
The device that generates the O2 Low error is located in the ozone generator itself. It can be found for further troubleshooting by removing the cover of the ozone generator and locating it behind the gauge panel.



System Troubleshooting - Minor Fault Ozone Fault

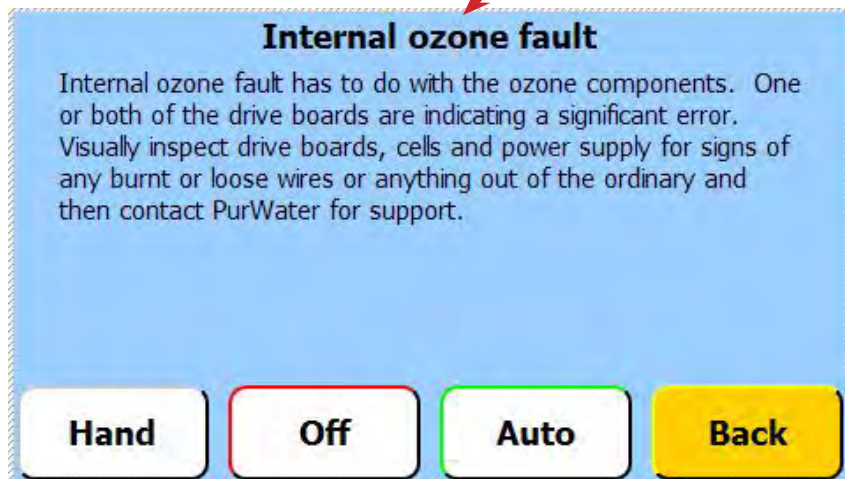


“Touch” the Yellow Fault Box to go to the next screen. Then “touch” the “Internal Fault” button on that screen to arrive at the bottom screen.



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 front 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.

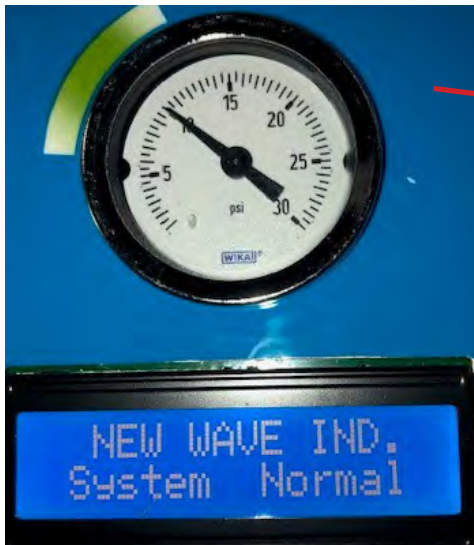
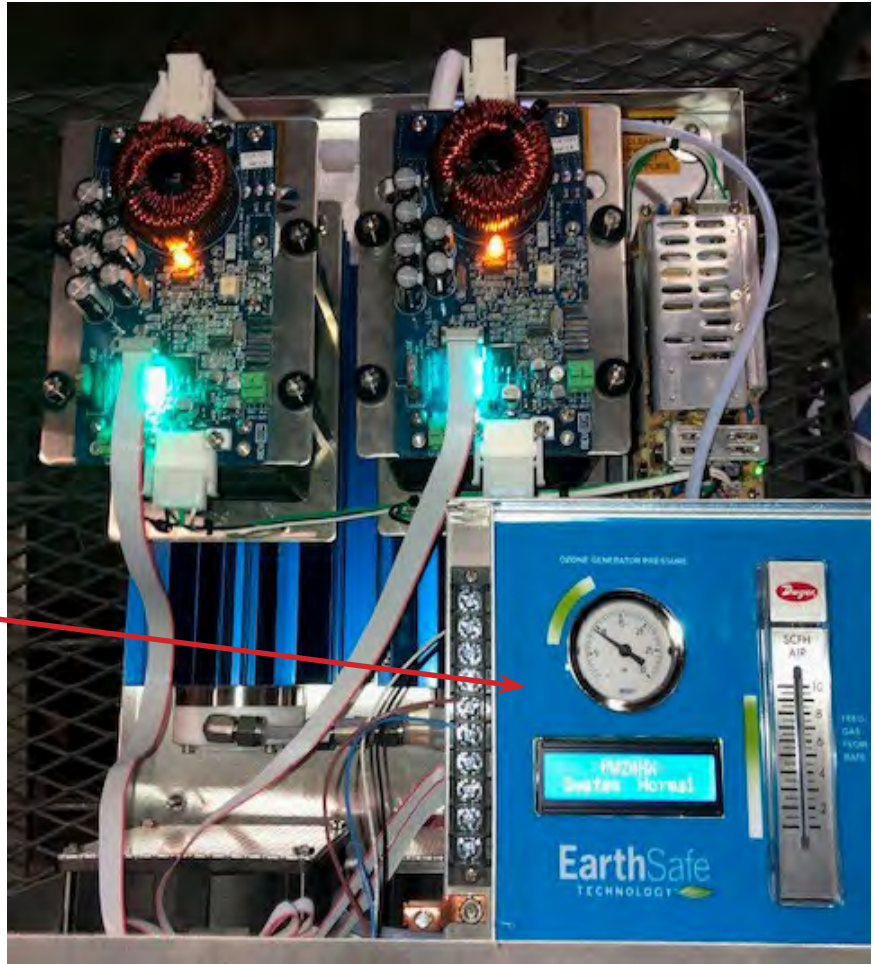
A functioning drive board has 2 lit green LED's and one amber LED which indicates that ozone is being produced.

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 Component 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:

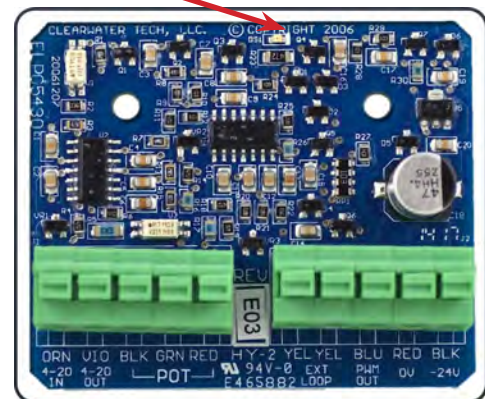
The “Gen 3” cabinet has many of the same basic components as the prior builds but is in a much smaller enclosure. When trouble shooting an internal fault start with a quick look at the components. Any visual defects or burned components?

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

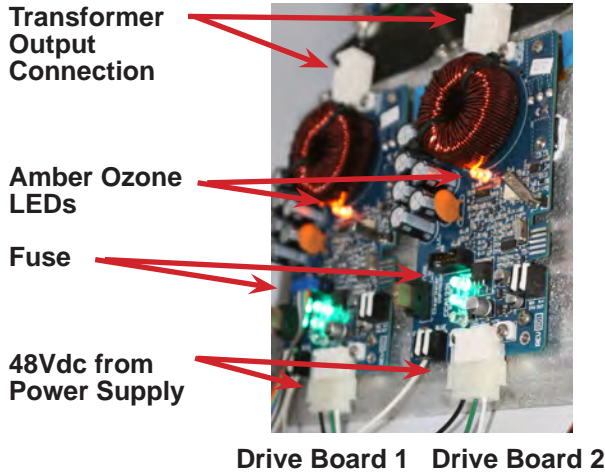
If the red LED is on - it indicates a problem with the external loop / dry contact in an open condition.



System Troubleshooting - Minor Fault Ozone Fault - Parts Identification

Internal Fault Troubleshooting: (cont)

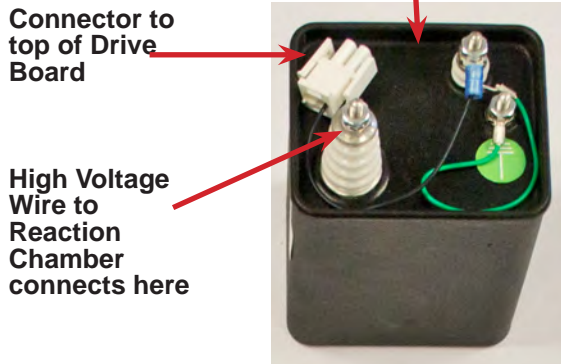
Look at the Drive Board(s): Do either or both have two green LEDs on (a good thing) as shown on the left? There is a red fault light located below the two green LEDs. Is either one on? (a bad thing). There is an Amber LED approximately 2/3 of the way up each board. If lit - good thing. These get brighter 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.



Drive Board 1 Drive Board 2

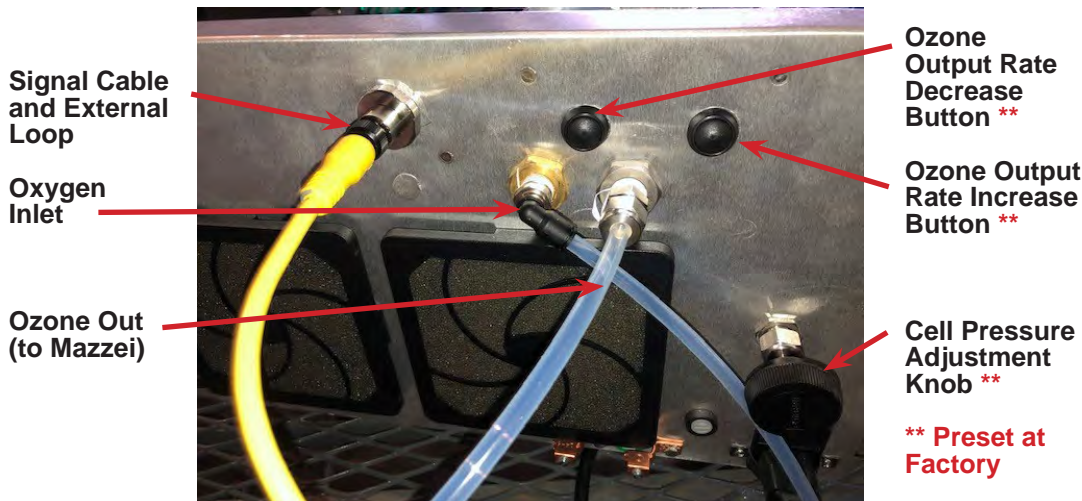
NOTE: Since there are 2ea of the drive boards, transformers, and reaction chambers on a 24gram generator- it makes troubleshooting a bit easier if one of the two combined components is operating.

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.



Ozone Generator Bottom View

Connections / Controls



**** Preset at Factory**

System Troubleshooting - Minor Fault Ozone Fault - Drive Board Troubleshooting

Red Fault 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 reaction 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.

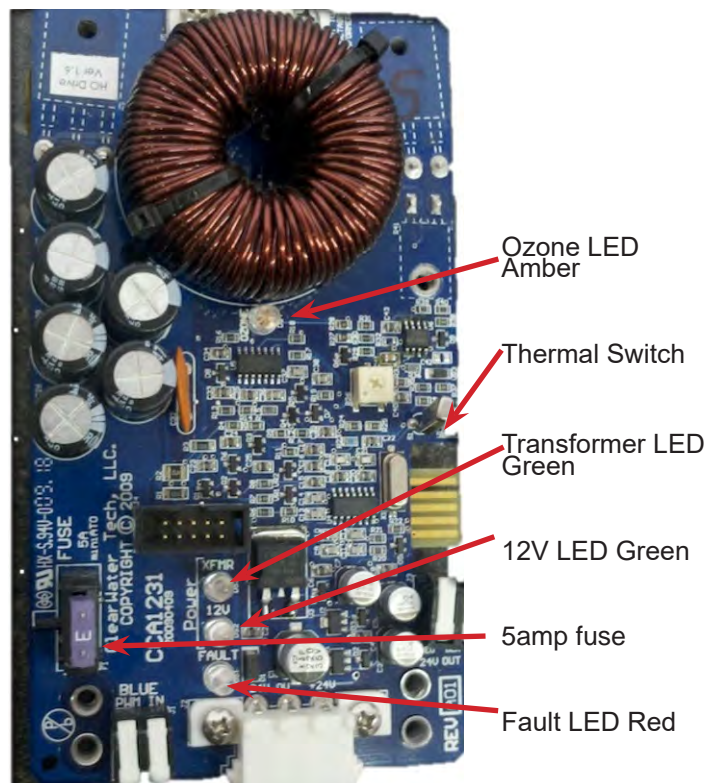
Fault Light Flashing Three Times per Second could mean:

--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	<ul style="list-style-type: none"> - No power to drive module from power supply - LED is not illuminated during startup sweep. - Blown drive board module on board fuse 	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - If drive module "Main Power" LED(s) not illuminated, the "XFMR Power" LED will not illuminate - No power to drive module from power supply 	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - The remote 4-20mA control signal is not sensed by the 4-20mA control board 	<ul style="list-style-type: none"> - Check for loose wires or connections - See "Installation Procedures - Electrical"
Fault, "Red" LED illuminated With 1 or 2 Blinks every second	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Unit is over heating 	<ul style="list-style-type: none"> - Check fan for proper operation and clean fan filter - Check operating temperature - See "Installation Procedures - Getting Started...Equipment Placement"
Fan not operating	<ul style="list-style-type: none"> - Fan obstructed - Power supplies not operating - Fan inoperable 	<ul style="list-style-type: none"> - Remove obstruction - Check main power, check fuses. Repair or Replace as required - Replace fan
Low air flow or no air flow	<ul style="list-style-type: none"> - Air prep system not operating properly - Fouled inline filter - Air leak - Incorrect wiring to air prep system 	<ul style="list-style-type: none"> - 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.**

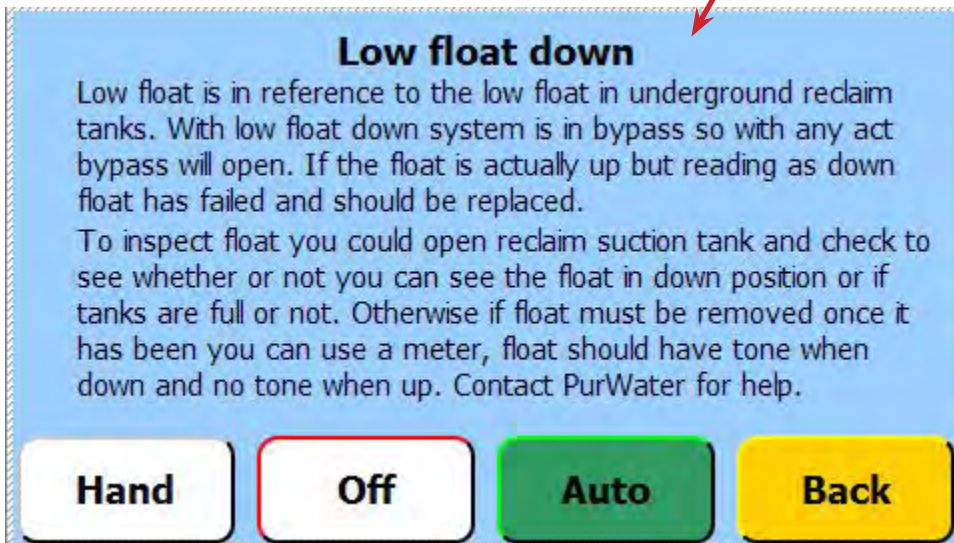
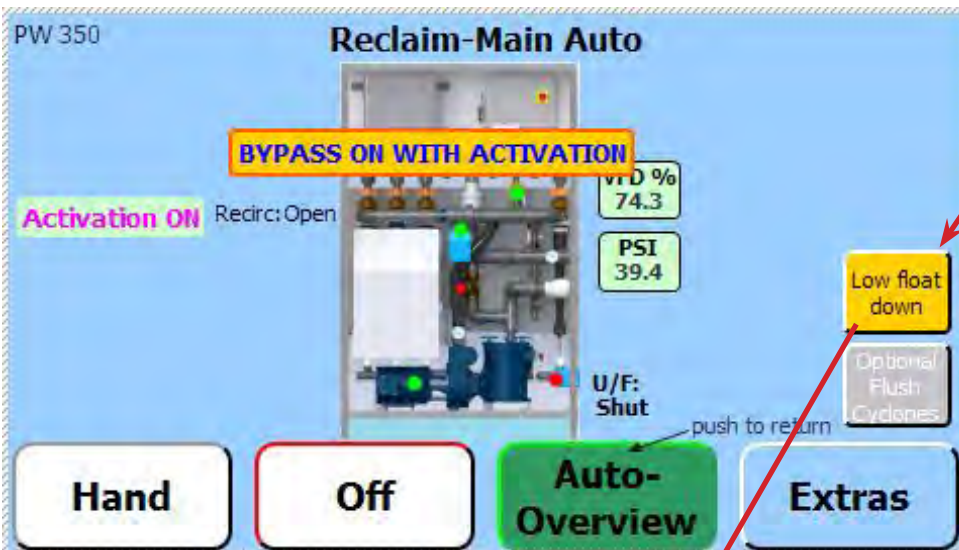
NOTE: This fault should be noticed during the operator daily walk-thru!!

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.



Replacement Float
PN MYEL40

Float Weight
PN SJE102230



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

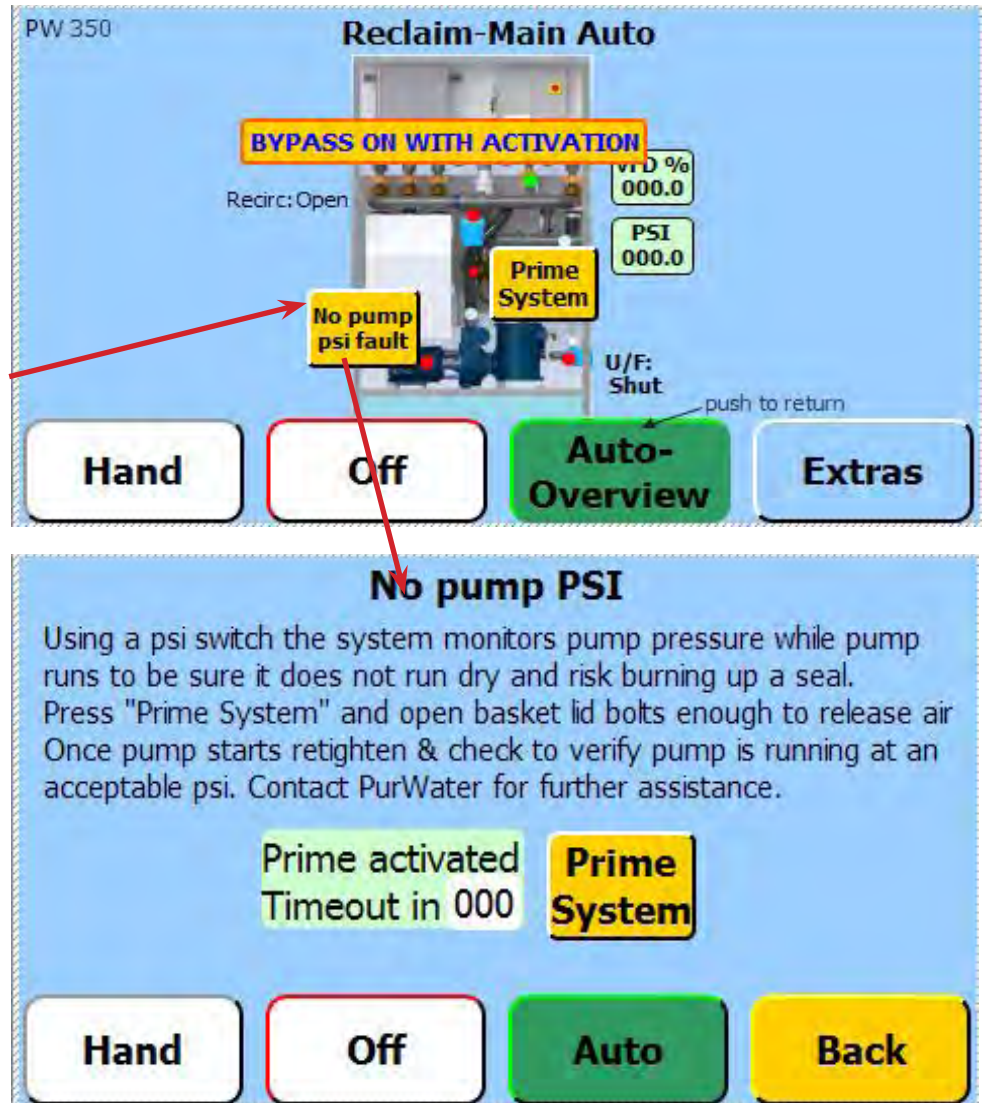
System Troubleshooting - Major Fault - “No Pump psi”

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 strainer basket inlet.

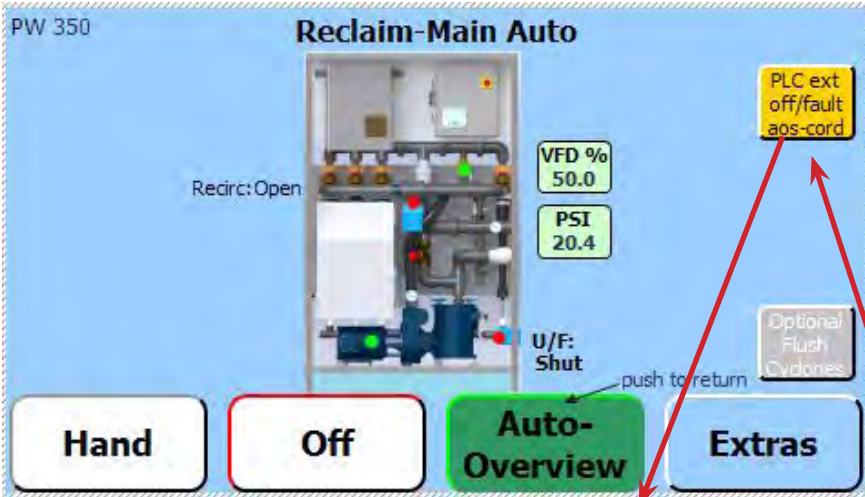
If this fault occurs on an older system, check the strainer basket lid oring and sealing surface. The suction line in the tanking may have a problem with the foot valve. The flap may be damaged, it could be obstructed with an object such as a plastic bag or some cloth. It may need to be removed and inspected.



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**

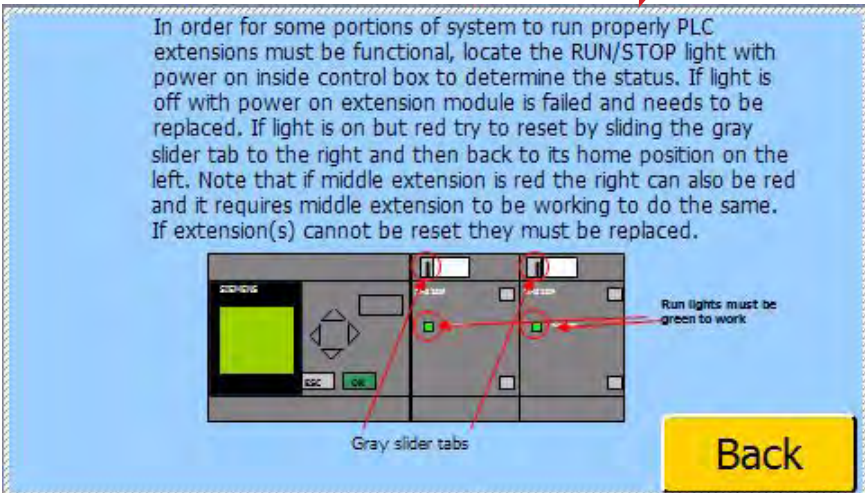
System Troubleshooting - Major Fault - "PLC Ext Off / Fault"



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.



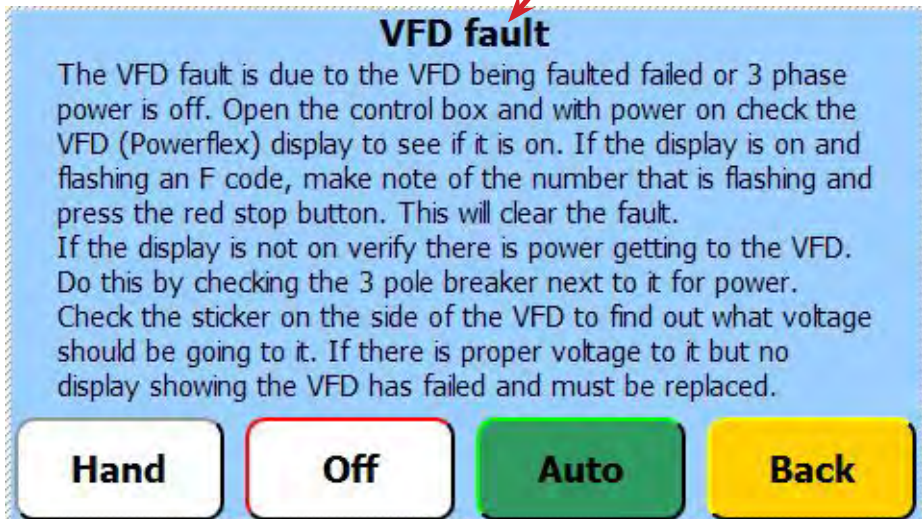
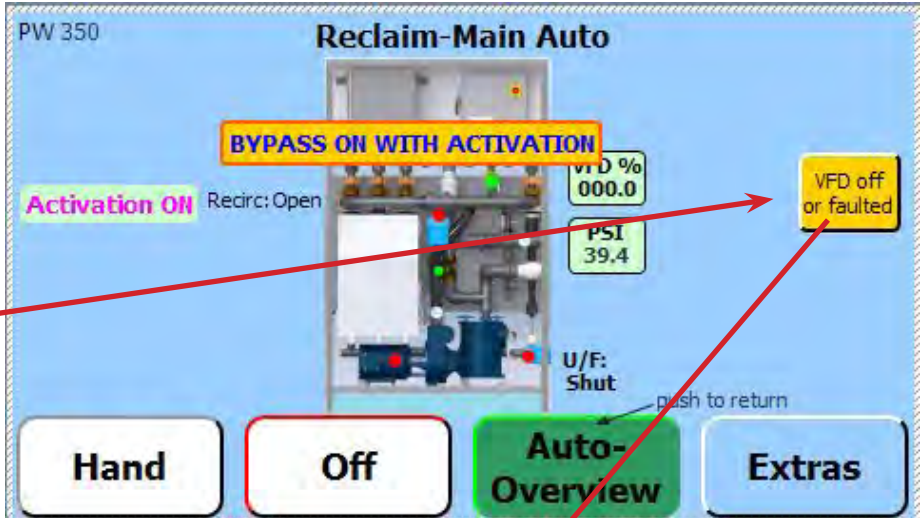
The lower picture on the left illustrates a non-working set of the PLC / Extensions indicated by the PLC Screen Content and the red LEDs on the extensions.

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 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 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.

F003

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.

F004

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.

F005

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