

Aerous Troubleshooting Guide

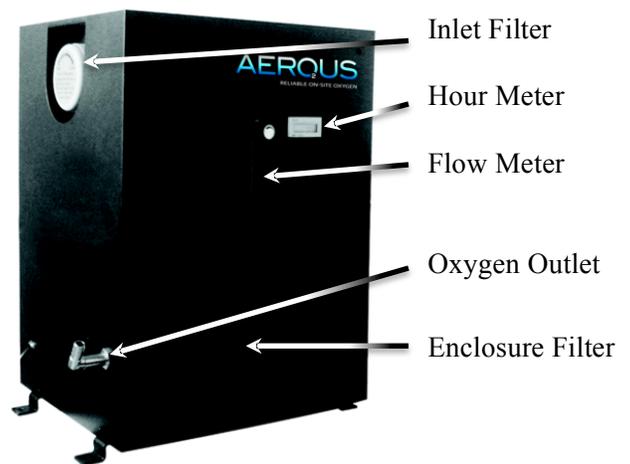
FOR AEROUS 8 & 15 OXYGEN CONCENTRATORS

System Operation

The AEROUS Oxygen Concentrator is a PSA (pressure swing adsorption) system. The system operation begins with ambient air being drawn in through the compressor air inlet filter. The air is then compressed and pressurized before being delivered to the sieve beds. The sieve beds trap most of the moisture and nitrogen allowing the oxygen to pass through. This oxygen is concentrated in the sieve beds where some of the pressure created by the compressor delivers oxygen out of the system at 90-93%.

The remaining pressure is used in the sieve bed recovery cycle. In the recovery cycle the residual pressure continually purges the sieve beds of the moisture and nitrogen. The solenoid valve opens allowing one of the sieve beds to dispense oxygen to use, while the other sieve bed is depressurized in the recovery cycle expelling moisture and nitrogen in a vapor form to waste.

If the recovery cycle fails, the sieve beds can become saturated. This will cause backpressure to the compressor, which will cause the compressor pressure relief valve (PRV) to relieve air.



Environmental and Installation Parameters

Airflow rate – The maximum airflow rate should not be exceeded on the oxygen concentrators. The flow meter installed on the front cover displays the airflow in Standard Cubic Feet per Hour (SCFH). Operating below (or at zero) recommended airflow does not harm the system.

Model	Maximum output
Aerous 8	8SCFH at 10PSI
Aerous 15	15SCFH at 10PSI

Replace filters regularly – Replace the inlet filter twice a year, and enclosure filter once a year. Clean or replace more often if the environment requires it. A video showing this can be found at: http://youtu.be/4XtMSS1_rFY



Temperature – If the ambient temperature is regularly above 85 F, this will affect the longevity of the unit. To reduce the effect, the two back covers can be removed (exposing the compressor). This will reduce the internal temperature of the concentrator. *Note: This should only be done if the environment is relatively clean, dry and indoor is ideal.*

Humidity – Installations where the ambient humidity is above 95% RH condensing, a coalescing filter with auto-drain will need to be used. An Aerous 15 High Humidity version is available.

Vacuum draw through Aerous while unpowered – At no time should a vacuum be drawn through the oxygen concentrator. In a standard ozone system installation a vacuum created by a venturi is used to draw ozone gas into the water line. If this vacuum is drawn while the oxygen concentrator is 'OFF', the sieve beds will trap the moisture and nitrogen in the same fashion. However, because the compressor and solenoid valve is not 'ON', the sieve beds cannot be purged of the adsorbed moisture and nitrogen. This will saturate the sieve beds, causing failure.

Troubleshooting

When troubleshooting an oxygen concentrator, the best tool is an oxygen meter to confirm if a system is functioning or not. When operating properly, the system should produce 90-93% oxygen. If a meter is unavailable, the indicating media (silica gel) within the inline particulate filter of the ozone generator can be observed. When the oxygen concentrator is not functioning properly, the media will turn from blue, to pink or white. This process may take a day of operation.



*Inline particulate filters
The original blue and two colors
that indicate a nonfunctioning
oxygen concentrator*



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Possible symptoms:

No Power LED / Won't Turn On

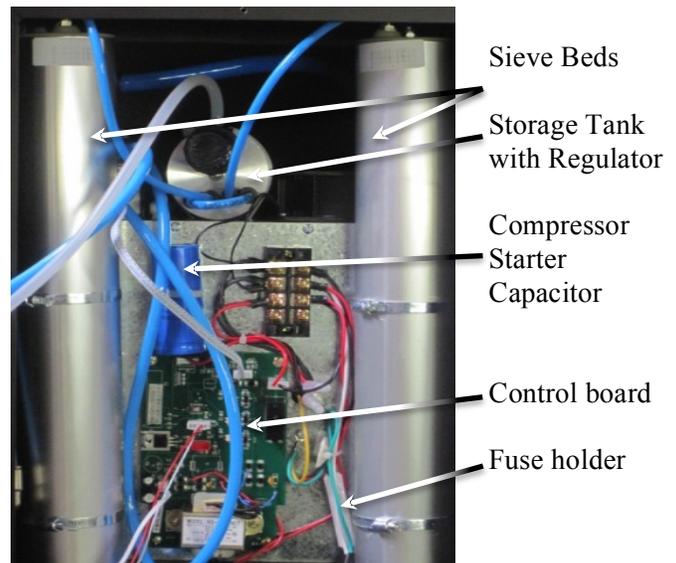
Zero / Low / High / Erratic Pressure or Flow Rate

Odd Noises (usually coupled with erratic pressure or flow rate)

No Power LED / Won't Turn On

First, verify power is being delivered to the unit. If there is no power backtrack to the power source and troubleshoot it. The trouble-shooting will likely not involve the oxygen concentrator, except that if a venturi injector is involved and vacuum has been applied to the oxygen concentrator while it has been unpowered (or compressor offline), it can saturate the sieve chambers.

- Check the 10A Fuse - it is within a white fuse holder connected to the incoming power cord.
 - If the fuse is blown, replace it to see if it resolves the issue (random fuse pop). If the replacement fuse pops it is likely the control board shorting out, replace it.
- Power is delivered to the unit, and the fuse is intact, you will likely find power is delivered to half of the terminal block (see wiring diagram); but power is not being rebounded back from the control board relay to power the rest of the terminal block.
 - Replace the control board.



*Aerous 8 with front panel removed
-Orientation of components different within Aerous
15 oxygen concentrator*

Zero / Low / High / Erratic Pressure or Flow Rate

This is the typical issue with these units and can be caused by a number of possibilities: Failing/failed compressor, disconnected tubing or leak at a fitting, malfunctioning solenoid valves, loose wiring on the solenoid valves, saturated sieve chambers, or an incorrectly set pressure regulator on the storage tank. Testing the output of the solenoid valve test can narrow these possibilities down.

Solenoid Valve Operation Test - A video showing this test can be found at: <http://youtu.be/AzFju88WWaA>

- Disconnect power from the unit and remove the screws from the front cover and angle it aside, there is no need to disconnect anything from the inside of the cover.
- Disconnect the two large tubing connections from the underside of both sieve bed chambers.
- Power the system and observe the air flow as it comes out of the two tubes.
- Air should flow in a pattern; it will flow out of one tube for ~8 seconds, then out both tubes, then switch to the other tube for 8 seconds. The cycle is then repeated. Two LEDs on the control board illuminate when a solenoid valve is opened, use the lights to confirm the pattern. Stop the airflow with your fingers and confirm the pressure relief valve in the back of the unit vents air (loud noise).
 - If the solenoid valves are routing air correctly and the pressure relief valve vented properly, this confirms that everything in the back half of the oxygen concentrator is likely fine.
 - If airflow never, or continuously, flows out of one tube then the solenoid valve is not functioning.
 - Check the four wires connecting to the solenoid valve assembly for bad connections. To check to see if they are wired properly: Hold the ribbon flat and insure that no wires cross each other when connecting to the terminals.
 - If the solenoid valve is wired properly and there are no loose connections, replace the solenoid valve assembly and the two sieve chambers (as they are likely compromised).

A video overviewing replacement of the solenoid valve can be found at:

<http://youtu.be/AjeaGRDo02w>



*Solenoid valve assembly
in Aerous 8, top view
-Orientation is reversed
in Aerous 15*



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- If there is no airflow out either tubing, open the back two plates of the oxygen concentrator to expose the compressor.
 - Confirm the cooling fan above the compressor is spinning, replace if not.
 - Confirm the compressor is operating; replace the starter capacitor if it is not. If it is still not starting up, replace the compressor.
 - If the compressor is operating: Verify the tubing between the compressor and underside of the solenoid valve is not disconnected. If it is disconnected, or if you wish to reinforce this component, replace the compressor output tubing and compression fittings.
- Check for a leak on the front side of the system: Reconnect the tubing to the underside of the sieve chambers, and disconnect the braided tubing from the external side of the unit. Power the system so it blows out oxygen to ambient air. Open the gauge on the front cover to raise the ball to at least 8SCFH. Finally close off the outlet oxygen flow with your finger, and confirm the airflow gauge on the front panel drops to zero.
 - If the ball still floats at a number, there is likely a leak at tubing connection at the upper slot on the airflow gauge. Remove the tubing, cut off the end and reconnect it. Use a zip tie to secure the connection point.
 - If the ball drops to zero, there is no leak between the gauge and output fitting. Check for oxygen output with a meter or run the airflow through indicating media for a day to check for moisture.
 - If the system is not concentrating oxygen, replace the sieve chambers. They have become saturated due to a clogged filter on the side of the unit, possibly vacuum from a venturi injector has been delivered to the oxygen concentrator while it has been powered down, or a simple failure of the sieve beds.
 - If the system is concentrating oxygen, examine the storage tank, regulator and the fittings for cracks or leaks. A length of tubing held to your ear and used like a stethoscope is a fast method for finding leaking fittings.
 - If no leaks are detected, pull apart the pressure regulator on the small storage tank (follow the white tubing from the gauge in the front panel). It is likely the nut rotated off the thread within it. Reassemble the pressure regulator and adjust it to 10PSI (assuming the associated ozone generator requires pressure, which will provide the pressure gauge).

Odd Noise (usually coupled with odd pressure or flow rate)

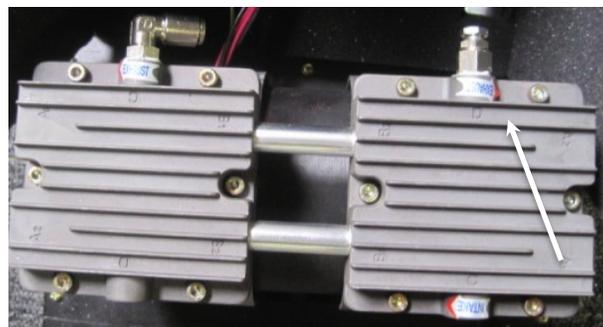
This issue usually involves letting people know the unit does normally vent air internally, almost continuously. It is a long, low, whooshing noise in a repeating cycle. This is the sound of the recovery cycle of the oxygen concentrator.

Another noise can be a sharp hissing or popping, which can be the pressure relief valve of the compressor. This will likely give you low airflow and pressure, and the system will likely not be concentrating oxygen.

Confirm the solenoid valve is operating properly and follow the troubleshooting steps.

Replacement of the pressure relief valve is recommended if it has been actuating continuously.

The other possible noises involve the compressor that can start squeaking as it gets old (15000 hours+), or if one of the four mounts has become loose, and the compressor will rattle against the chassis.



*Compressor in Aerous 8, top view
-Orientation is reversed in Aerous 15
-Pressure relief valve indicated by arrow*



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Part #	Description
CMT200	OXYGEN MONITOR, HANDHELD - MINI OX I
CMT201	OXYGEN SENSOR HEAD - MINI OX I
FLT34	INLINE PARTICULATE FILTER
ASP70A	MAINT KIT - AEROUS 8 - FILTERS
ASP71A	REBUILD KIT - AEROUS 8 - SIEVES, SOLENOID & FILTERS
ASP75A	MAINT KIT - AEROUS 15 - FILTERS
ASP76A	REBUILD KIT - AEROUS 15 - SIEVES, SOLENOID & FILTERS
OXU350	ENCLOSURE FILTER - AEROUS 8
OXU351	ENCLOSURE FILTER - AEROUS 15
OXU371	INLET FILTER PACKAGE - AEROUS 8 & 15
FUS25	FUSE 10AMP SLOW BLOW
OXU375	SIEVE BED (SINGLE) - AEROUS 8
OXU381	SIEVE BED (SINGLE) - AEROUS 15
OXU379	SOLENOID VALVE ASSEMBLY - AEROUS 8 & 15
OXU385	CABLE, SOLENOID - AEROUS 8 & 15
OXU373	COMPRESSOR - AEROUS 8 120V 60HZ
OXU374	COMPRESSOR - AEROUS 8 220/240V 50/60HZ
OXU340	COMPRESSOR - AEROUS 15 120V 60HZ
OXU345	COMPRESSOR - AEROUS 15 220/240 50/60HZ
OXU346	COMPRESSOR MOUNT REPLACEMENT KIT
OXU348	STARTER CAPACITOR FOR COMPRESOR - AEROUS 8 & 15
FA41	COOLING FAN - AEROUS 8 120V 60HZ
FA42	COOLING FAN - AEROUS 8 220V 50/60HZ
FAN20	COOLING FAN - AEROUS 15 120V 60HZ
FAN21	COOLING FAN - AEROUS 15 220V 50/60HZ
OXU387	OXYGEN OUTLET REPLACEMENT FITTINGS - AEROUS 8 & 15
OXS362	PRESSURE RELIEF VALVE - AEROUS 8 & 15 - 45PSI
OXU388	COMPRESSOR OUTLET FITTING & TUBING REPLACEMENT - AEROUS 8
OXU389	COMPRESSOR OUTLET FITTING & TUBING REPLACEMENT - AEROUS 15
OXU380	PRESSURE REGULATOR - AEROUS 8 & 15
OXU384	OUTPUT STORAGE TANK WITH REGULATOR - AEROUS 8 & 15
OXU372	CONTROL BOARD - AEROUS 8 120V 60Hz
OXU386	CONTROL BOARD - AEROUS 8 220/240V
OXU377	CONTROL BOARD - AEROUS 15 120V 60HZ
OXU378	CONTROL BOARD - AEROUS 15 220/240V

- The maintenance kits include the inlet filter package (OXU371) and the appropriate enclosure filter (OXU350 or OXU351).
- Rebuild kits include the filters of the maintenance kit in addition to a solenoid valve assembly (OXU379) and two sieve beds (2x OXU375 or OXU381).
- The OXU371 inlet filter package contains the same two felt filters and foam spacer included with the original purchase of the Aerous oxygen concentrator.



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