OXO-200
Oxygen Generator

Installation and Operation Manual

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Cautions, Warnings, and Hazards

Refer to this manual to assure proper location, installation, and connections of all equipment.

Ensure that the oxygen generator is in a well-ventilated area. Do not allow rain or condensation to contact the system. These units must be operated indoors or in an enclosure in a non-condensing environment.

NOTICE: Before you attempt to install, operate, or repair the oxygen generator, read and thoroughly understand this instruction manual. Improper installation, operation, or repairs can result in severe bodily injury, damage to the oxygen generator, or poor performance.

Carefully review and familiarize yourself with the following important safety information statements concerning the use of oxygen for industrial applications:

WARNING Oxygen vigorously accelerates the burning of combustible materials. In an oxygen-enriched atmosphere, many materials that do not burn in normal air require only a slight spark or moderate heat to set them aflame.

WARNING To reduce the risk of fire or explosion, keep gasoline, kerosene, oil, grease, cotton fibers, wood, paint, and other combustible material away from all parts of the oxygen generator.

WARNING Do not allow smoking, open flame, or usage of electronic devices that may generate sparks (e.g., cellular telephones) near the oxygen generator. Post "NO SMOKING OR OPEN FLAMES" signs conspicuously near the location of the oxygen generator.

WARNING Take extreme care to keep all oxygen piping and vessels clean. To avoid fire or explosion, oxygen clean all surfaces that can come in contact with the product oxygen. Check all oxygen fittings for leaks with an oxygen-compatible, leak-detecting solution.

WARNING Disconnect power before servicing oxygen generator.

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Introduction

The OXO-200 oxygen concentrator is a free standing unit for providing oxygen highly concentrated oxygen for industrial use. It produces concentrated oxygen by removing Nitrogen from the same kind of air that we breathe.

Compressed air flows through a particulate filter which removes condensed water, oil, dirt, scale, etc. from the feed air, and then, a separate coalescing filter removes additional oil and water vapor.

The dry air then enters the sieve bed to remove the nitrogen. The sieve material adsorbs (physically attracts) the nitrogen and allows the oxygen and other trace gases to pass through to the oxygen storage tank. When one sieve bed has become saturated with nitrogen, the valves then re-direct the dry air to the second bed while venting the nitrogen from the first bed back to the atmosphere. Some of the oxygen passing through the second bed is directed to the first bed to flush nitrogen from it, while the rest of the oxygen is directed to the oxygen storage tank. This process of removing nitrogen is called pressure swing adsorption (PSA).

The entire oxygen generating process is completely regenerative, which makes it both reliable and virtually maintenance-free. The zeolite molecular sieve does not normally require replacement.

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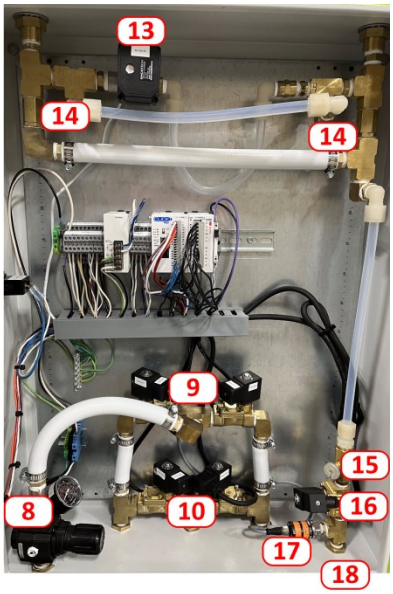
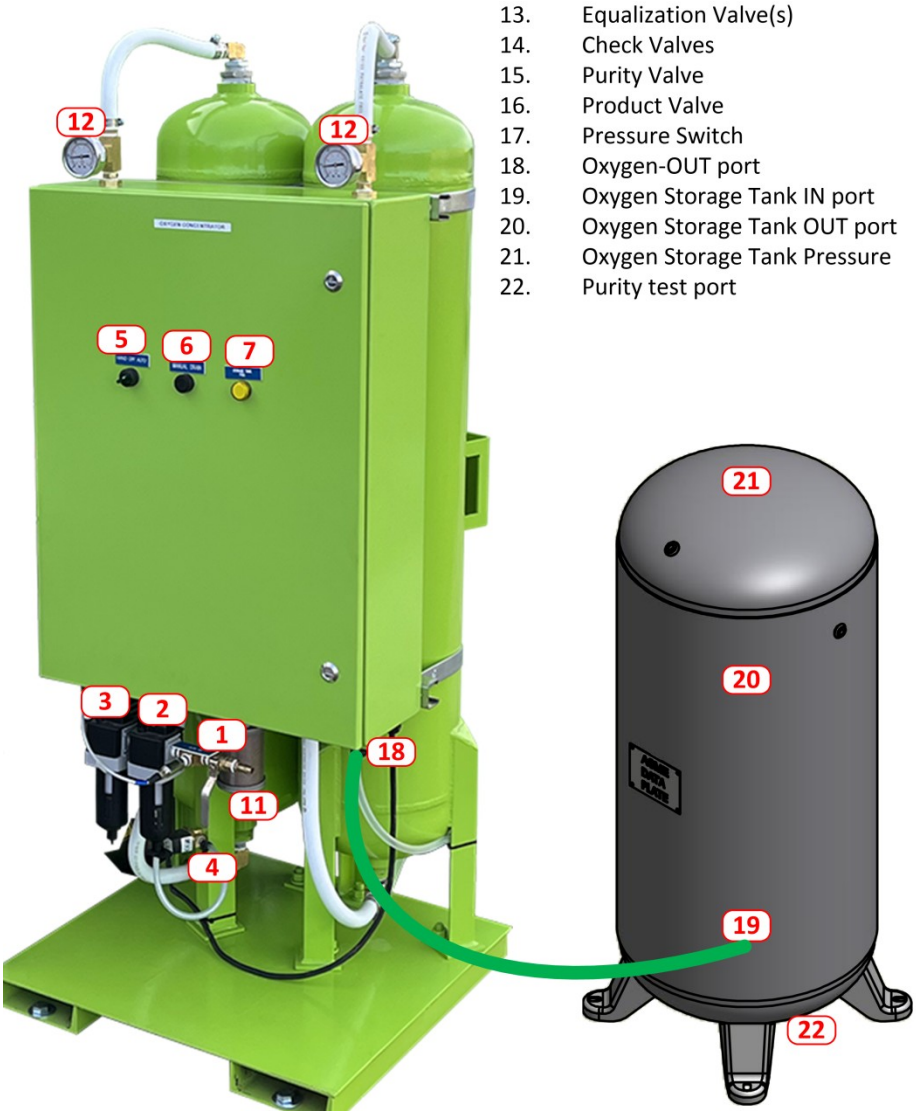
Oxygen Generator Components



1. Air-IN port
2. Air filter – primary
3. Air filter – secondary
4. Condensate drain valve
5. Power (Hand/Off/Auto) Switch
6. Condensate drain button
7. Storage Tank Full indicator
8. Feed Air Regulator
9. Feed Valves
10. Waste Valves
11. Exhaust Muffler
12. Sieve Bed Pressure
13. Equalization Valve(s)
14. Check Valves
15. Purity Valve
16. Product Valve
17. Pressure Switch
18. Oxygen-OUT port
19. Oxygen Storage Tank IN port
20. Oxygen Storage Tank OUT port
21. Oxygen Storage Tank Pressure
22. Purity test port



Oxygen Generator Components Descriptions

1. **Air-IN port –** Connection port for compressed air supply to the OXO-200. Recommended piping size for the air is ½" for lengths under 10 feet. For longer distances then ¾" piping is required. For installations where the air tank is more than 100 feet away then 1" piping is recommended

2. **Air filter – primary –** Removes any residual moisture or large contaminants from the compressed air feed. Normally there should be **no** visible water or oil in this filter since the air prep equipment supplying the OXO-200 should feed clean, dry air. If water or oil is ever present in this filter or draining from the drain valve then the supply air prep equipment (compressor, dryer) requires maintenance.

3. **Air filter – secondary –** Removes any residual oil from the compressed air feed. Normally there should be **no** visible water or oil in this filter since the air prep equipment supplying the OXO-200 should feed clean, dry air. If water or oil is ever present in this filter then the supply air prep equipment (compressor, dryer) requires maintenance.

4. **Condensate Drain Valve –** Opens on a timed basis to release any moisture or oil captured by the primary air filter. Normally there should be **no** water or oil from this drain since the air prep equipment supplying the OXO-200 should feed clean, dry air. If water or oil is ever noticed at this drain then the supply air prep equipment (compressor, dryer) requires maintenance.

5. **Power (Hand/Off/Auto) Switch –** Turns the unit ON or OFF. The switch will be illuminated when the OXO-200 is running.

    - **HAND mode** – Unit runs continually even after the storage tank reaches set pressure.

    - **AUTO mode** – Unit will automatically start/stop as required to maintain 45-68 PSI in the storage tank.

6. **Condensate drain button –** Press this button to test the condensate drain valve function.

7. **Storage Tank Full indicator –** Illuminates when the storage tank reaches 68 PSI. Turns off when the tank drops below 45 PSI.

8. **Feed Air Regulator –** Controls the air pressure feeding the sieve beds. Normally set to 68-70 PSI. Never exceed 75 PSI feed pressure to prevent sieve bed damage.

9. **Feed Valves –** Automatically divert compressed air to each sieve bed based on timing sequence.

10. **Waste Valves –** Automatically vent nitrogen from each sieve bed based on timing sequence.

11. **Exhaust Muffler –** Nitrogen is exhausted from the sieve beds at this muffler.

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12. **Sieve Bed Pressure –** Indicates pressure on the sieve bed. The sieve beds will alternate in filling, with pressure reaching up to 70 PSI each cycle.

13. **Equalization Valve(s) –** Automatically diverts air/oxygen from one sieve bed to the other based on timing sequence.

14. **Check Valves –** Permit the flow of oxygen out to the storage tank, but not back into the sieve beds.

15. **Purity Valve –** Sets flowrate exiting the sieve beds. Factory-set for optimum purity and flow. *Adjusting this valve will not increase oxygen production. DO NOT adjust this valve.*

16. **Product Valve –** Automatically opens to allow oxygen flow from the sieve bed based on timing sequence.

17. **Pressure Switch –** Turns on/off the OXO-200 based on storage tank pressure.

18. **Oxygen-OUT port –** Connection for oxygen line leading to the storage tank. Tubing and fittings must be oxygen-compatible and at least 3/8" inside diameter.

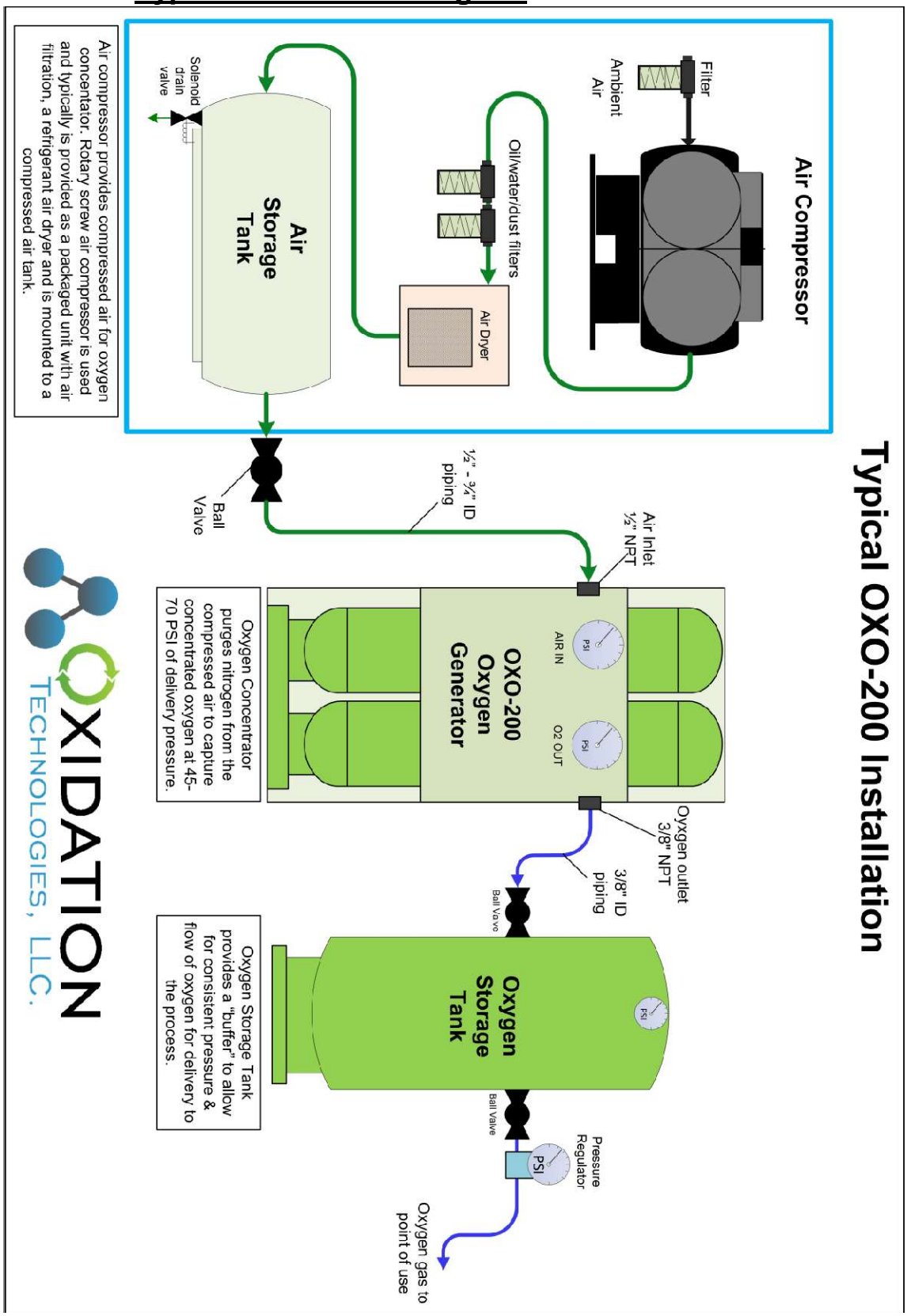
19. **Oxygen Storage Tank IN port –** Connection for oxygen line from the OXO-200.

20. **Oxygen Storage Tank OUT port –** Connection for oxygen line to point of use. Where applicable, a pressure regulator and/or filter may be present at this port.

21. **Oxygen Storage Tank Pressure –** Indicates oxygen pressure in the storage tank.

22. **Purity test port –** Ball valve with barbed connection which may be used to connect an oxygen purity meter, or to purge low purity from the tank. Normally this valve is should be closed unless testing purity.

Typical Installation Diagram



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Installation

IMPORTANT: Remove the Oxygen Generator and components from shipping crates and remove any packaging before use. Packaging may also be found **inside** control cabinets so please inspect carefully.

IMPORTANT: Choose a location for the unit that does not allow rain or condensation to contact the unit. The cabinet is rated for indoor use only.

IMPORTANT: Compressed Air Quality – The cleanliness and moisture content in the compressed air supply will directly affect on the longevity of the sieve material in the OXO-200. To maximize the life of your machine and to prevent costly repairs, ensure that the following parameters are met:

- Air must be dried to a dew-point of 37 deg F or better for reliable operation.
- Air must be filtered and dried to meet the requirements of **ISO8573.1 Class 1.4.1**
- Feed air temperature must not exceed 100F.
- Air pressure at the connection port must be maintained at minimum 90 PSI.
- Recommended supply air tank pressure is 100-125 PSI.
- Air pressure up to 150 PSI is acceptable.

Location

Choose a well-ventilated room suitable for the oxygen generator.

> *NOTICE: Ventilation may be required to prevent decreased **unsafe** oxygen levels in the room. If ventilation is not available then contact Oxidation Technologies for instructions on how to pipe the nitrogen vent directly outdoors.*

Ensure the skid is mounted flat and in a safe place. Both the OXO-200 and the oxygen storage tank should be bolted to the floor to prevent tipping over in the event of accident or earthquake.

Connections

Electrical power The unit can plug into a standard 120VAC/15A power outlet.

- **Voltage:** 120 VAC
- **Full Load Amps:** 1.5
- **Recommended Branch Circuit:** 15A

Remote Control Connection: The OXO-200 can be controlled remotely by simply turning the 120VAC power to the unit ON/OFF. Use dry contacts rated at least 120VAC and 1.5A to control the power outlet which provides power to the unit.

Compressed Air Connection: Located underneath the cabinet, at the ball valve where the air enters the filters. ½" NPT port size.

Oxygen Storage Tank Connections: Reference diagram on previous page.

- Connect the O2 OUT port of the OXO-200 to the O2 IN port of the storage tank.
- Use the fitting at the O2 OUT port of the storage tank to supply your process.
- Tubing and fittings must be oxygen-compatible and at least 3/8" inside diameter.

Exhaust Connection: An exhaust connection is not required, but the unit may be vented outdoors if desired.

- To vent the unit outdoors, remove the exhaust muffler (under the cabinet) and connect piping at this port.
- The piping must be at least 1-½" diameter and is limited to 10ft length. For longer distances, consult factory for recommendation.
- The muffler may be re-installed at the end of the piping if desired for noise control, but is not required for operation.

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Oxygen System Start-up and Operation

Startup procedure when O2 storage tank pressure is low

To start the oxygen generator for the first time or whenever the oxygen storage tank pressure is below 45 PSI:

1. Close all ball valves on the oxygen storage tank (at the IN and OUT ports)
2. Set the power switch on the control panel to HAND.
3. Ensure that your compressed air supply can maintain at least 90 PSI supply to the system while the sieve beds are cycling.
4. Ensure that the sieve bed pressures are alternating and each sieve is reaching 68-72 PSI every cycle.
5. Open the Oxygen-IN ball valve on the oxygen storage tank to allow the tank to fill to at least 60 PSI.
6. If full purity is critical for your process then proceed to step 7, otherwise when the tank reaches 60 PSI you may begin using oxygen and you may change the switch to AUTO mode if desired.
7. Allow the storage tank to reach at least 65 PSI, then open the ball valve at the bottom of the storage tank and allow it to vent until the tank pressure drops to 45 PSI.
8. Allow the storage tank to again reach 65 PSI. At this time the purity in the tank will be at or near 88% and will continue to rise as oxygen is pulled from the tank. You may begin using oxygen and you may change the switch to AUTO mode if desired.

Startup procedure when O2 storage tank pressure is above 45 PSI

To start the oxygen generator for daily use:

1. Whenever the unit is shut down, ensure that the oxygen storage tank is not drained below 45 PSI. This will permit quicker startup with better purity on startup. If the tank pressure is below 45 PSI then follow the steps above for initial startup.
2. The concentrator may be stopped and started as desired simply using the HAND/OFF/AUTO switch.
3. The unit will require 2-3 full cycles (about 5 minutes) of running before the oxygen reaches full purity, so take care to avoid turning the unit on and off too frequently.

Normal Operating Parameters

- Supply air pressure = 100-125 PSI
- Feed air pressure (gauge inside cabinet) = 70 PSI
- Sieve beds pressure = 68-72 at end of fill cycle, -0- at end of purge cycle
- Oxygen tank pressure = 45-70 PSI
- Oxygen flow from tank = 1-200 CFH
- Oxygen purity = 88-93%

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Maintenance

Daily System Checks

Normal operational checks should include the following, and should be done daily.

- Test the condensate drain by pressing the MANUAL DRAIN button.
- Ensure that no water or oil is present in the bowls of the air-IN filters and that no water or oil is draining from the filters.
- Ensure that compressed air supply is maintained so that reliable air is provided to the system. Check dewpoint indicator on compressor, and any dryers or filter drains in your compressed-air system.
- Oxygen storage tank pressure remains above 45 PSI.

Periodic Maintenance – reference the components diagram numbering to identify the parts listed in the maintenance schedule below:

No.	Description	Part #	Recommend as spares	Quarterly maintenance	Annual maintenance
n/a	Ensure that all periodic maintenance is completed on the compressed air system	n/a		1	1
2	Air-In filter primary - replace	MSP-96-649	1	1	1
3	Air-In filter secondary - replace	MTP-96-648	1	1	1
4	Condensate drain 1/8" EPDM or PVDF 120VAC - Inspect quarterly, rebuild as-needed	SV-4-B	1		1
9	Feed valves qty. 2 - rebuild (Granzow)	GZ-RK-W0V2			2
9	Feed valves qty. 2 - rebuild (SMC)	SMC VXD25F-KTD	2		2
10	Waste valves qty. 2 - rebuild (Granzow)	GZ-RK-W0V2			2
10	Waste valves qty. 2 - rebuild (SMC)	SMC VXD25F-KTD	2		2
13	EQ valve - replace	AE3CW	1	1	1
14	Check valve x2 - inspect quarterly, replace as-needed	OXO-check valve 1/2"	2		2
16	Product valve - rebuild (Granzow)	GZ-RK-W0V1			1
16	Product valve - rebuild (SMC)	SMC-VX223DJB-Kit	1		1
n/a	Inspect - Replace zeolite if dusting or low purity (approx. 250lb)	XP-Molecular Sieve	30		

Quarterly:

- Replace Air-IN primary and secondary filter elements.
- Ensure that EQ valve moves fully open/closed with every cycle.
- Test purity of oxygen exiting the storage tank.
- Inspect system for leaks

Annually:

- Rebuild Feed, Waste, and EQ valves. Replace check valves.
- Test purity of oxygen exiting the storage tank while running at full rated oxygen flow from tank for at least one hour.
- Top-off zeolite level in sieve beds.

Depressurizing the system

For maintenance purposes it may be necessary to release all pressure from the oxygen generator so that filters and valves can be replaced.

1. With power ON to the machine, set the power switch to HAND.
2. Close all ball valves including the Air-IN supply and the valves on the oxygen storage tank.
3. Allow the machine to cycle (with no air feed) for at least 5 minutes.
4. Verify pressure is at -0- by viewing the pressure gauge inside the cabinet and both of the sieve bed pressure gauges.
5. Unplug the machine to disconnect power.

Troubleshooting

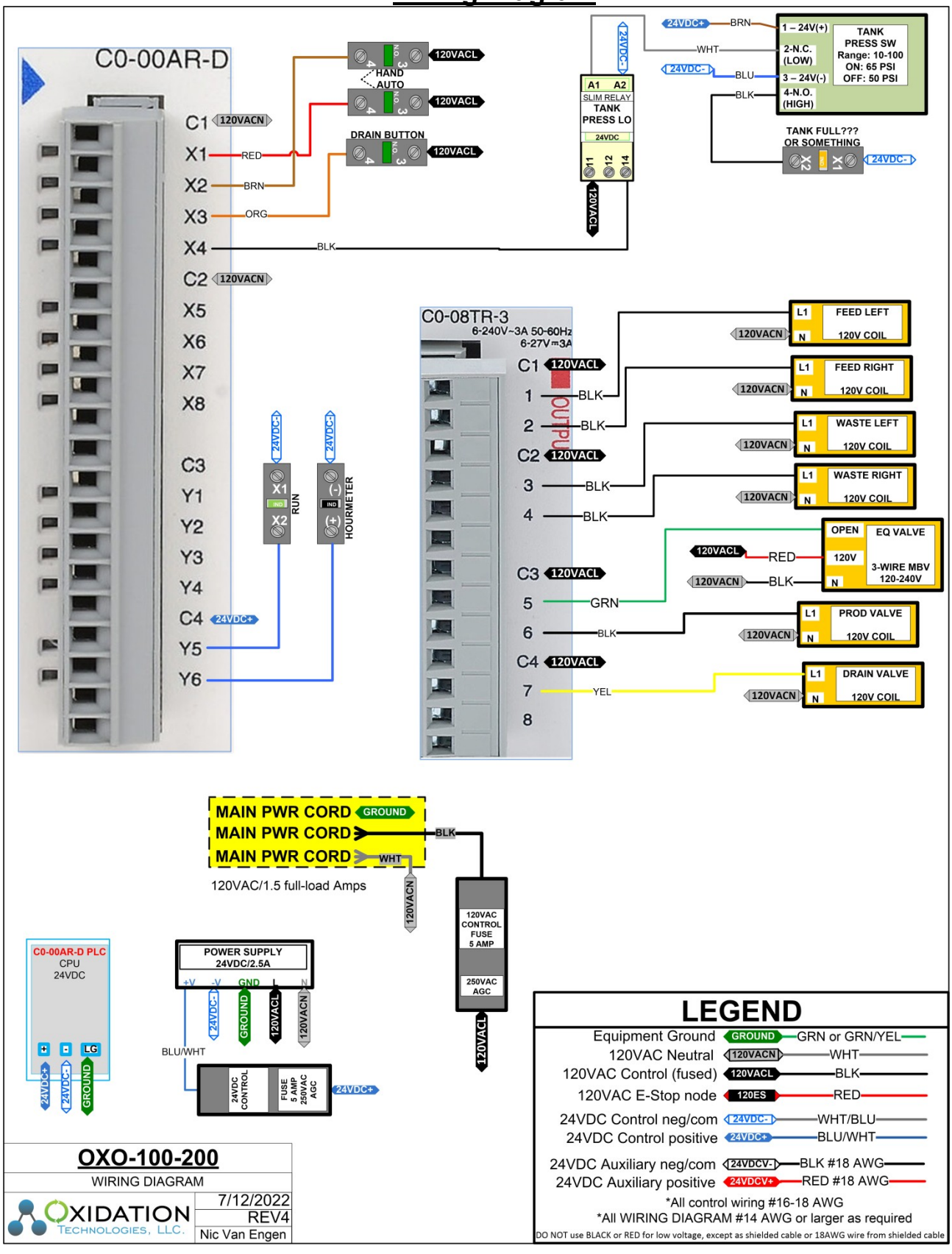
Low Oxygen Tank Pressure

- Check that all manual ball valves are fully open.
- Check compressed air tank supply pressure, ensure it maintains at least 90 PSI at all times.
- Inspect air filters, replace if necessary.
- Ensure that oxygen usage (flow from tank) does not exceed the rating of the machine.
- Check sieve bed pressures, should cycle up to 68-72 PSI each cycle. If all other parameters are good but the unit does not reach cycle pressure, then inspect the system for leaks.

Low Oxygen Purity

- Ensure that compressed air feed is clean and dry as specified in the installation section of this manual.
- Ensure that the unit remains powered and cycles on/off no more than 3x per hour. Set the switch to HAND mode and run for 1 hour with at least 20 CFH oxygen flowing from the tank, then re-test oxygen purity.
- Ensure that oxygen tank pressure is maintained above 45 PSI.
- Check sieve bed pressures, should drain to -0- PSI each cycle. If not, then inspect muffler (or other exhaust vent plumbing, if present) for restriction.

Wiring Diagram



Specifications

Environment:

Operating Temperature: 40°F to 100°F
Storage Temperature: 40°F to 100°F

Mechanical:

Oxygen Generator Dimensions: 32”W x 26”D x 75” H
Oxygen Generator Dry Weight: 820 lbs

Capabilities:

Oxygen Flow: built-to-order 180-230 CFH
Oxygen Pressure: 45 PSI (up to 65 PSI at lower flowrates)
Compressed air requirement @ 100 PSI:

- 180 CFH requires 36 CFM
- 205 CFH requires 44 CFM
- 230 CFH requires 52 CFM

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