



Centrox

PSA Oxygen Concentrator



INSTRUCTION MANUAL

Ownership Data

Take a moment to note important information below about your AirSep Centrox PSA Oxygen Concentrator. Keep this instruction manual, along with your invoice, to serve as a permanent record of your purchase.

PSA Oxygen Concentrator

Model Number	<input type="text"/>
Serial Number	<input type="text"/>
Invoice Date	<input type="text"/>
Start-up Date	<input type="text"/>
AirSep Representative	
Company	<input type="text"/>
Contact	<input type="text"/>
Address	<input type="text"/>
City/Town	<input type="text"/>
State	<input type="text"/>
Zip/Postal Code	<input type="text"/>
Country	<input type="text"/>
Fax	<input type="text"/>
Phone	<input type="text"/>
Cell	<input type="text"/>



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

Symbols/Abbreviations

Symbols are frequently used on equipment in preference to words with the intention of lessening any possibility of misunderstanding caused by language differences. Symbols can also permit easier comprehension of a concept within a restricted space.

The following table is a list of symbols and definitions that may be used with AirSep oxygen equipment. These symbols are referenced from the appropriate International Electro-technical Commission (IEC) standards:

Symbol	Description	Symbol	Description
	ON (power switch on)		OFF (power switch off)
	No smoking		Do not disassemble
	Date of manufacture		Consult instructions for use
	Warning – Describes a hazard or unsafe practice that if not avoided can result in severe bodily injury, death or property damage		See Instructions
	Caution – Describes a hazard or unsafe practice that if not avoided can result in minor bodily injury or property damage		Safety agency for CAN/CSA C22.2 No. 601.1 M90 for medical electrical equipment
	Note – Provides information important enough to emphasize or repeat		Keep unit and accessories dry
	Manufacturer		Proper disposal of waste of electrical and electronic equipment required
	Use no oil or grease		Do not expose to open flames
	Catalog number		Keep in the vertical position
	Safety agency for CAN/CSA C22.2 No. 601.1 M90 for medical electrical equipment		Serial number
	Fragile – handle with care		Authorized Representative in the European Community

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1.0 Introduction

1.1 GENERAL

This instruction manual provides a description of the AirSep Centrox Pressure Swing Adsorption (PSA) Oxygen Concentrator as well as instructions for its installation, operation, and maintenance. Pertinent drawings and component information are also included.

To ensure safe operation and proper system maintenance, AirSep Corporation recommends that you keep this instruction manual readily available for reference.

1.2 WARNINGS, CAUTIONS, AND NOTES

As you read the instruction manual, pay special attention to the Warning, Caution, and Note messages. They identify safety guidelines or other important information as follows:

 WARNING	Provides information that can prevent severe bodily injury or death.
 CAUTION	Provides information that can prevent minor bodily injury or property damage.
 NOTE	Provides information important enough to emphasize or repeat.

1.3 REFERENCES TO CONTROLS AND INDICATORS WITH LABELS

This operating manual uses uppercase characters (e.g., ON/OFF switch) to refer to controls and indicators. Refer to section 4 for a description of all the controls and indicators of the oxygen concentrator.

2.0 Safety

2.1 GENERAL

Oxygen, the most abundant of the elements, makes up about 50 percent of the earth's crust. In its free state, it forms about one-fifth of our air by volume. Although oxygen is classified as a non-flammable gas, it supports combustion. As an active element, it combines directly or indirectly with all elements except the rare gases. It is an invisible gas that is colorless, odorless, and tasteless.

To ensure your safety, thoroughly read and familiarize yourself with this Safety section. AirSep Corporation strongly recommends that you review this section periodically.

2.2 POTENTIAL HAZARDS

Before you attempt to install, operate, or repair the Centrox Oxygen Concentrator, read and thoroughly understand this instruction manual. Improper operation can result in severe bodily injury, damage to the system, or poor performance.

 WARNING	<p>It is recommended to have an alternate source of oxygen supply if a power failure or equipment malfunction occurs.</p>
 CAUTION	<p>Take extreme care to keep all the oxygen piping and vessel clean. To avoid a fire or an explosion, oxygen clean all surfaces that can come in contact with oxygen. Check all oxygen fittings/joints for leaks with an oxygen-compatible leak-detecting solution.</p>
 WARNING	<p>Always place power cords in a manner that prevents trip or possible accidental strangulation.</p>

 <p>CAUTION</p>	<p>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.</p> <p>To avoid a fire or an explosion, keep gasoline, kerosene, oil, grease, cotton fibers, paint, and any other combustible material away from any part of the Centrox Oxygen Concentrator or optional auxiliary oxygen receiver.</p> <p>Do not smoke or use an open flame near the oxygen concentrator or optional auxiliary oxygen receiver.</p> <p>Post “NO SMOKING OR OPEN FLAMES” signs in the area where the oxygen concentrator and optional auxiliary oxygen receiver are located. AirSep STRONGLY recommends that only individuals trained and experienced in the safe handling of oxygen operate this system.</p>
 <p>CAUTION</p>	<p>The interior of the Centrox Oxygen Concentrator contains electrical parts that can produce an electrical hazard if not handled properly. To prevent electrical shock, read and thoroughly understand the Troubleshooting section of this instruction manual before you service the system.</p>
 <p>WARNING</p>	<p>Connect the oxygen concentrator power cord to a properly grounded wall outlet on a circuit that cannot be accidentally turned off. Do not use extension cords.</p>
 <p>CAUTION</p>	<p>To prevent fire or electrical shock, locate the oxygen concentrator and the auxiliary oxygen receiver (if supplied) indoors away from rain or any other type of moisture.</p>
 <p>CAUTION</p>	<p>Disconnect power before servicing oxygen generator</p>
 <p>CAUTION</p>	<p>To prevent fire or product oxygen contamination, locate the unit away from hazardous fumes, chemical or pollutants.</p>

2.3 SAFETY PUBLICATIONS

This section is not a complete summary of required safety procedures. Review the following publications for additional information on the safe handling of oxygen:

- “Installation of Bulk Oxygen Systems at Consumer Sites;” NFPA No. 50; National Fire Protection Association; 1 Batterymarch Park; P. O. Box 9101; Quincy, Massachusetts 02269-9101 USA.
- “Oxygen;” Pamphlet G-4; Compressed Gas Association; 1725 Jefferson Davis Highway; Arlington, Virginia 22202-4102 USA.
- “Cleaning Equipment For Oxygen Service;” Pamphlet G-4.1; Compressed Gas Association; 1725 Jefferson Davis Highway; Arlington, Virginia 22202-4102 USA.

3.0 System Description

3.1 INTRODUCTION

Air Contains 21 % oxygen, 78% nitrogen, 0.9% argon, and 0.1% other gases. AirSep Oxygen Concentrator separates this small percentage of the oxygen from the compressed air through a unique Pressure Swing Adsorption (PSA) process.

The Centrox unit consists of two modules. The smaller module contains two compressors that supply air for the process. Each compressor has a dedicated switch and circuit breaker. The cord from the module plugs in to the PSA module. This cord must not be plugged in to any other power supply outlet. Circuitry inside the PSA module controls the power supplied to the compressors. The power cord from the PSA module controls the power supplied to the compressors. The power cord from the PSA module plugs into the wall. Figure 3.1 shows the two modules of the Centrox oxygen concentrator.



Figure 3.1: Centrox Oxygen Concentrator

The air compressor module (See Figure 3.1) supplies pressurized air to the PSA concentrator module. Inside the PSA concentrator module, the pressurized air enters the feed & waste manifold (See Figure 4.4). A series of valves in the feed & waste manifold controls the flow of air into each of the adsorber beds (See Figure 4.4). Valves also connect the beds to two mufflers (See Figure 4.4) that allow waste gas to be vented from the beds. The oxygen concentrator uses in its adsorber vessels an inert ceramic material called molecular sieve to separate compressed air into the oxygen and the other gases. The unique properties of molecular sieve allow it to attract, or adsorb, nitrogen physically from air under pressure. This allows oxygen to exit the adsorbers as a product gas. Oxygen from top of the beds then flows to the check valve assembly and then to the product manifold (See Figure 4.4). The check valve assembly supplies product oxygen to the flow controller. The product manifold controls the flow of oxygen from one bed to another during various stages of the oxygen generating process. The product oxygen then flows through

the product valve to the customer's application. An oxygen analyzer continuously monitors the purity of oxygen and provides an alarm in case of low purity.

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

This instruction manual serves as the guidelines for the Centrox oxygen concentrator. Refer to the illustrations, located in the Appendix A of this instruction manual, for the detailed flow diagram and electrical schematic of the oxygen concentrator referenced in this instruction manual.

4.0 Controls, Parts, and Connections

4.1 INTRODUCTION

The section describes the various parts, controls, indicators and connections required for the Centrox oxygen concentrator.

4.2 OXYGEN CONCENTRATOR CONTROLS AND INDICATORS

4.2.1. COMPRESSOR MODULE

Figure 4.1 shows the compressor module along with all the controls and indicators.



Figure 4.1: Air Compressor Module

ON/OFF (Power) Switch

The individual ON/OFF switches (green color) on the compressor module starts and stops the operation of the oxygen compressors. When you supply power to the system, the green indicator light of the switches turns on. It remains lit whether the switch is in the ON or OFF position (See Figure 4.1).

Circuit Breaker Reset Buttons

The individual circuit breaker reset buttons on the compressor module are used to reset the compressors after an electrical overload shutdown (See Figure 4.1).

4.2.2. AIR INTAKE FILTERS

Located on the left side panel, the air intake filter removes any foreign particles from the air that enters the compressor module (See Figure 4.1).

 CAUTION	Fuses/Circuit Breakers, if required, must be replaced with the same type and amp rating as the original.
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4.2.3. PSA MODULE

Figure 4.2 shows the controls and indicators of the PSA concentrator module.



Figure 4.2: PSA Concentrator Module Controls and Indicators

ON/OFF (Power)Switch

The ON/OFF switch starts and stops the operation of the oxygen concentrator. When you supply power to the system, the switch's green indicator light turns on. It remains lit whether the switch is in the ON or OFF position (See Figure 4.2).

AUTO/MANUAL Switch

The AUTO/MANUAL switch includes a blue indicator light. In the AUTO position, the concentrator cycles on and off to meet oxygen demand. In the MANUAL position, the concentrator cycles continuously. The concentrator produces oxygen only while the blue light is lit (See Figure 4.2).

Hour Meter

The hour meter indicates the total number of hours the concentrator has cycled (See Figure 4.2).

Low Purity Light

The unit is equipped with an oxygen sensor. If the purity supplied to the tank is below 85 % ($\pm 3\%$), the red light on the PSA concentrator module will be on (See Figure 4.2).

Low Purity Alarm

If the purity is below 85 % ($\pm 3\%$) for more than 30 minutes, an audible alarm will sound (See Figure 4.2).



The low oxygen purity alarm will sound for 4 seconds when the unit is turned on.

Feed Air Pressure Gauge

The FEED AIR PRESSURE gauge indicates the pressure of the feed air before it enters the PSA concentrator module (See Figure 4.2).

Product Pressure Gauge

The PRODUCT PRESSURE gauge indicates the pressure of oxygen coming out of the adsorber beds (See Figure 4.2).

4.3 OXYGEN CONCENTRATOR PARTS

Figure 4.3 and Figure 4.4 show the internal components of the Centrox oxygen concentrator.

4.3.1. COMPRESSOR MODULE

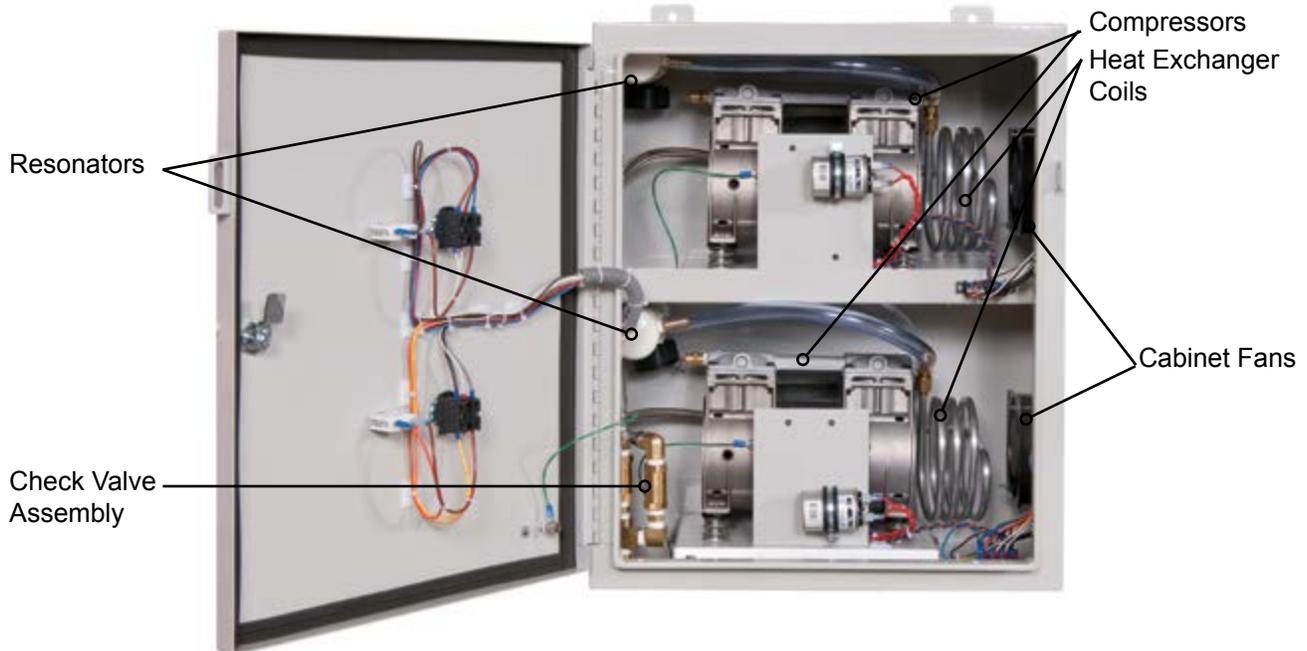


Figure 4.3: Compressor Module Internal Components

Compressors

The compressors compress the air entering the module before it is supplied to the PSA concentrator module (See Figure 4.3).

Cabinet Fans

The cabinet fans provide internal cooling for the air compressor. Fans also help in better circulation of the air inside the compressor module (See Figure 4.3).

Compressor Intake Filter

This filter provides additional filtration for the air as it enters the air compressor. This filter is attached to the gray PVC pipe. The complete assembly of the PVC pipe and the filter is called resonator(See Figure 4.3).

Heat Exchanger

The heat exchanger coils cool the compressed air leaving the compressor module (See Figure 4.3).

Check Valve Assembly

Check Valve assembly prohibits the back flow of compressed air.

4.3.2. PSA MODULE

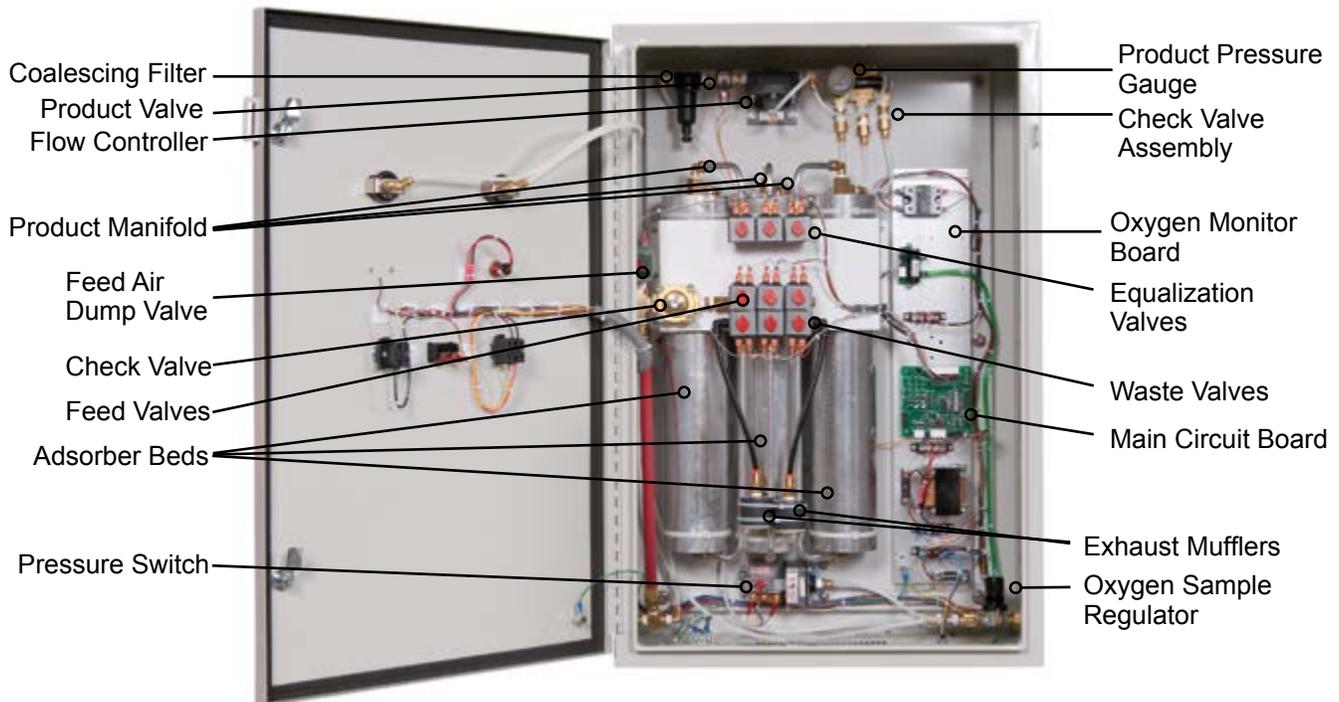


Figure 4.4: PSA Module Internal Components

Adsorber Beds

The adsorbers contain the molecular sieve that adsorbs (attracts) nitrogen from compressed air and allows oxygen to pass through as product gas (See Figure 4.4).

Main Circuit Board

Main circuit board provides signal to all the valves based on the status of the oxygen generator.

Feed Air Dump Valve

The solenoid-operated valve is used to dump the compressed feed air for 3-5 sec at the initial start-up and 1 sec at the start of standby mode. This removes any pressure that builds up inside the compressor to ensure easy start-up.

Check Valve

Check Valve assembly prohibits the back flow of compressed air.

Feed Valves

The automatic feed air valves control the flow of the feed air as the air enters the adsorbers (See Figure 4.4).

Waste Valves

The automatic waste valves control the flow of waste gas as it exits the adsorbers (See Figure 4.4).

Exhaust Mufflers

The mufflers muffle the noise produced by the waste gas that vents through the beds (See Figure 4.4).

Product Manifold

Product manifold facilitates the oxygen flow across adsorber beds (from top of the adsorber beds) and to the product delivery line.

Equalization Valves

The equalization valves on the product manifold controls the flow of oxygen from one bed to another during various steps of the oxygen generation process (See Figure 4.4).

Check Valves Assembly

The check valve assembly supplies the product oxygen to the flow controller. See Figure 4.4.

Product Pressure Gauge

Product pressure gauge mounted on the check valve assembly (See Figure 4.4) displays the pressure of the product oxygen.

Flow Controller

The flow controller regulates the flow of oxygen (See Figure 4.4).

Product Valve

The valve prevents the supply of oxygen when the unit is in standby mode (Refer to section 6 for the description of different types of mode). See Figure 4.4 for the location of the product valve.

Coalescing Filter

The coalescing filter serves as bacteria filter and removes any bacteria present in the oxygen supply (See Figure 4.4).

Oxygen Monitor Board

The oxygen sensor monitors the purity supplied from the PSA module. If the oxygen purity decreases below the setpoint, low purity light on the PSA module will be on. If the problem persists for more than 30 minutes, a low purity alarm will sound.

Oxygen Sample Regulator

A regulator before the oxygen monitor board regulates the pressure to 4-5 psig to the oxygen monitor board. Refer to the section 7 for the regulator adjustment.

Pressure Switch

When the oxygen concentrator operates in AUTO mode, the pressure switch monitors the oxygen pressure at the outlet of the oxygen concentrator. When the pressure at the oxygen concentrator outlet increases to the pressure switch upper setpoint, the pressure switch circuit closes and the oxygen concentrator starts a timed shutdown that stops the unit at the end of the shutdown sequence (After 10 additional cycles). When the pressure at the oxygen concentrator outlet decreases to the lower setpoint of the switch, the pressure switch opens to activate the oxygen concentrator and the oxygen production begins. When the oxygen concentrator operates in MANUAL mode, the pressure switch circuit remains open and the oxygen concentrator cycles continuously. Refer to the Appendix A of the manual for lower and upper setpoint settings of the pressure switch.

4.4 AUXILIARY KITS INFORMATION (OPTIONAL)

The items discussed in this section are supplied as ordered. Listed below are the different starter kits available as per the oxygen concentrator ordered.

Unit #		Kit # (Customer Supplied Tank)	Kit # (AirSep Supplied Tank)
AS074-1	120 VAC/60 Hz	KI470-1	KI470-1
		KI046-1	KI046-1
			TA150-1
AS074-2	220 VAC/50 Hz	KI470-1	KI470-1
		KI046-1	KI046-1
			TA150-1
AS074-3	220 VAC/60 Hz	KI470-1	KI470-1
		KI046-1	KI046-1
			TA150-1

Table 4.1: Optional Starter Kits for the Concentrator Purchased

Kit #	Description	Qty.
KI046-1	Primary/Secondary Ball Valve Assembly	1
	Hose Assembly, Oxygen-clean, (Secondary Hose)	1
KI470-1	Regulator-Flowmeter Assembly	1
	Hose Assembly, Oxygen-clean (Main Oxygen Outlet Hose)	1
TA150-1	60 Gallon Tank Assembly, O ₂ Cleaned	1

Table 4.2: Description of the Parts included in the Starter Kits

Please contact an AirSep Corporation Sales representative for ordering the starter kits. Below is a brief description of items included in the starter kits.

Primary Oxygen Ball Valve

The primary oxygen ball valve controls the flow of oxygen from the oxygen concentrator to your oxygen distribution system. See Figure 5.1.

Secondary Oxygen Ball Valve

The secondary oxygen ball valve controls the flow of a backup source of oxygen to your oxygen distribution system. This ball valve should always be closed unless a backup source is connected to it. See Figure 5.1.

Regulator-Flowmeter Assembly

This assembly consists of a pressure regulator and a flowmeter. The pressure regulator attaches to the outlet port of the oxygen receiver to regulate the pressure of the oxygen. The flowmeter is used to regulate the flow of the oxygen at the outlet of the oxygen receiver. Refer to Figure 5.1 for the installation location of this assembly.

Oxygen Isolation Ball Valve Assembly

The oxygen isolation ball valve stops the flow of oxygen to the oxygen receiver during troubleshooting. The oxygen relief valve in the assembly prevents excess pressure from building in the oxygen receiver if a system malfunction occurs. This assembly is shipped mounted on the oxygen receiver. See Figure 4.5.

Main Oxygen Hose

An oxygen-clean hose is provided that connects the outlet of the supply valve assembly (Refer to section 4.5) on the oxygen concentrator to the oxygen isolation ball valve assembly on the oxygen receiver.

Secondary Oxygen Hose

Secondary hose is provided to connect the outlet of the regulator-flowmeter assembly to the inlet of the primary oxygen ball valve. Refer to Figure 5.1.

Oxygen Receiver

The oxygen receiver stores oxygen produced by the oxygen concentrator. It also provides stable flow and purity for short-term surges of oxygen that exceed the rated capacity of the oxygen concentrator.

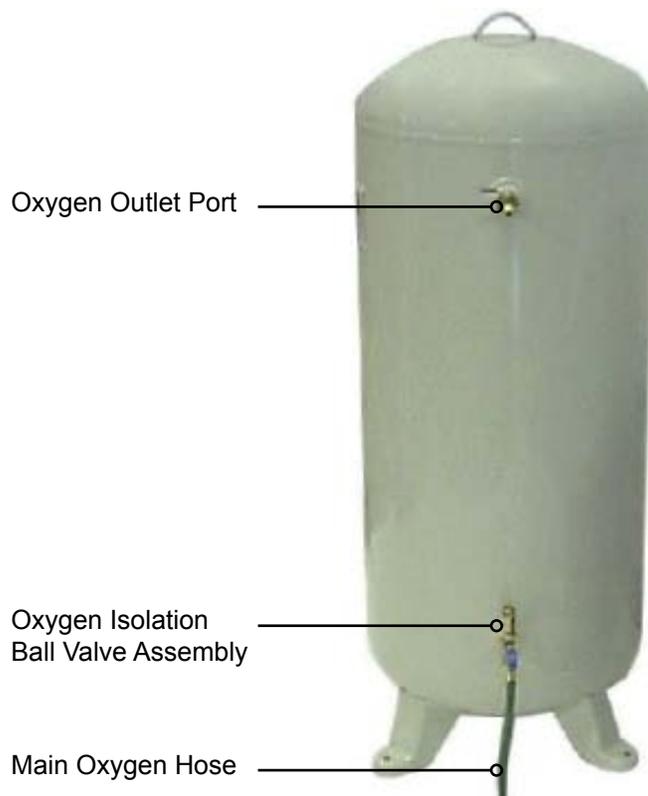


Figure 4.5: Oxygen Receiver

4.5 CONNECTIONS

Supply Valve Assembly

This assembly is shipped loose and must be connected to the PSA concentrator module oxygen outlet. The supply valve assembly limits the amount of flow to the oxygen receiver during purge. Refer to Figure 5.1 and 6.1.

Power Cord

This power cord and its grounded electrical plug supply power to the Centrox when connected to a grounded electrical outlet.

5.0 Installation

5.1 UNPACKING

AirSep Corporation ships Centrox Oxygen Concentrators on a wooden skid covered with corrugated cardboard. This container includes an accessory kit with an instruction manual and all the items necessary to properly install the oxygen concentrator. The oxygen receiver (if supplied) is shipped separately. Contact your AirSep Corporation's Sales representative for ordering the auxiliary kits supplied with the Centrox oxygen concentrator.

AirSep recommends that you follow these unpacking guidelines carefully to protect yourself against loss from any damage caused during shipment.

1. Inspect the exterior for damage. If you observe any damage, note it on the freight bill or the express receipt before you sign it.



Failure to note exterior damage on the freight bill or the express receipt at the time of delivery can result in the carrier's refusal of a damage claim.

2. Carefully cut and remove any banding straps from the container. Then remove the corrugated cardboard.



Remove the corrugated cardboard very carefully. You may need to return the oxygen concentrator if it was damaged during shipment.

3. Remove the oxygen concentrator from the wooden skid while following proper lifting techniques. The PSA cabinet is approximately 160 lb (73 kg) and the compressor cabinet is approximately 100 lb (45 kg). It is recommended to lift with more than one person. Ensure you are lifting with your legs while keeping your back straight.
4. Thoroughly inspect the oxygen concentrator interior and exterior for damage caused during shipment. Pay special attention to the cabinet switches, gauges, brackets, etc.
5. Remove the accessory kit and inspect the contents for damage.
6. Although the Centrox is carefully inspected, tested, and packed, it can be damaged during shipment due to improper handling. If you find any concealed damage (loss or damage not found until the concentrator is unpacked), immediately call the delivery carrier and file a concealed-damage claim. Keep ALL container material and interior packing for the

carrier's inspection.

	YOU MUST MAKE A CONCEALED-DAMAGE CLAIM WITHIN 24 HOURS OF DELIVERY. Only the consignee can file this claim.
	Follow these unpacking guidelines carefully to protect yourself against loss from any damage caused during shipment.

5.2 PRE-INSTALLATION GUIDELINES

Before you install the Centrox oxygen concentrator, and the oxygen receiver, if supplied, refer to the Specifications section in the Appendix of this instruction manual to determine the applicable space, and the power requirements for your particular model.

 WARNING	<p>A backup source of oxygen must be available if a power failure or system malfunction occurs.</p>
 NOTE	<p>Make sure the area that surrounds the oxygen concentrator is well ventilated, and provide sufficient space around the unit [at least three feet] to allow for cool air flow as well as to allow safe operation and maintenance.</p>
 CAUTION	<p>Locate the oxygen concentrator in an area where the ambient air temperature remains between 4°C (40°F) and 40°C (104°F) to prevent damage not covered under the AirSep Corporation Product Warranty.</p>
 WARNING	<p>Connect the oxygen concentrator power cord only to a properly grounded electrical outlet on a circuit that cannot be accidentally turned off. Do not use extension cords.</p>
 CAUTION	<p>Provide proper voltage to the oxygen concentrator to prevent damage not covered under the AirSep Product Warranty.</p>
 NOTE	<p>Do not plug in the power cord until you complete the installation of the oxygen concentrator.</p>

5.3 INSTALLATION INSTRUCTIONS

To assure proper installation and safe operation of your Centrox PSA Oxygen Concentrator, AirSep Corporation recommends that you review this entire section before you attempt to install the unit.

 WARNING	Do not turn off power to any component unless you are sure the medical facility does not require any oxygen, or there is a sufficient alternative/backup source of oxygen.
 WARNING	Before you attempt to install, operate, or repair the oxygen concentrator, read and thoroughly understand this instruction manual. Improper operation can result in severe bodily injury, damage to the system, or poor performance.

Refer to Figure 5.1 as you follow the installation instructions:

1. Place the oxygen concentrator near the inlet of your oxygen distribution system.
2. Mount both the modules securely to a wall, ensuring that there is a minimum of two feet between the two modules and minimum of three feet between the compressor module and a wall. The compressor module can be on either side of the PSA module.
3. Open the compressor module and remove the tie wrap from each compressor. The tie wrap holds the compressor to a bracket support for shipping purpose.
4. Attach the red air hose from the compressor module to the fitting on the left hand side of the PSA module (See Figure 4.5 and 5.1).

 NOTE	The supply valve assembly at the outlet of the oxygen concentrator has a small hole drilled in it and allows a controlled amount of flow during purging process (See Section 6) of the 60 gallon tank (If supplied).
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5. Mount the supply valve assembly (shipped loose) at the outlet of the PSA module. Refer to Figure 5.1 and 6.1.
6. Attach the main oxygen hose from the supply valve to the inlet of the oxygen isolation ball valve assembly at the oxygen tank (See Figure 4.5 and 5.1).
7. Attach the regulator-flowmeter assembly at the outlet of the oxygen receiver.

8. Connect the inlet of the primary oxygen ball valve to the outlet of the regulator-flowmeter assembly (See Figure 5.1) with the secondary oxygen hose.

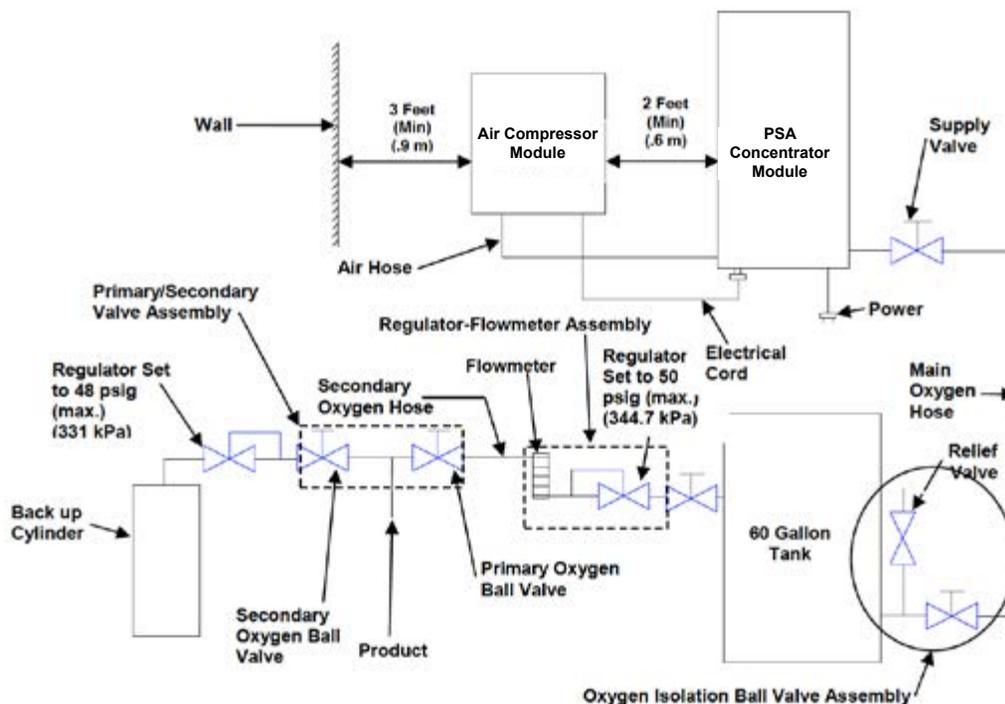


Figure 5.1: General Arrangement of the Centrox Concentrator

9. Attach a regulator set at 48 psig (331 kPa) (not supplied by AirSep Corporation) to the outlet of the back up cylinder.
10. Connect the inlet of the secondary oxygen ball valve to the outlet of the above regulator using oxygen-clean hose.
11. Attach the center fitting of the primary/secondary ball valve assembly 'T' to your distribution system. The flow rate setting of the flowmeter should not exceed the value specified in the Appendix A of the manual.
12. Plug the electrical cord coming out of the compressor module to the PSA module as shown in the Figure 5.1.
13. Plug the cord from the PSA module into the power supply outlet.
14. Make sure that the secondary ball valve is closed.

6.0 Operation

6.1 INITIAL START-UP

 <p>WARNING</p>	<p>Before you attempt to install, operate, or repair the Centrox Oxygen Concentrator, read and thoroughly understand this instruction manual. Improper operation can result in severe bodily injury, damage to the system, or poor performance.</p>
 <p>WARNING</p>	<p>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.</p> <p>To avoid a fire or an explosion, keep gasoline, kerosene, oil, grease, cotton fibers, paint, and any other combustible material away from any part of the oxygen concentrator.</p> <p>Do not smoke or use any open flame near the oxygen concentrator or oxygen receiver.</p> <p>Post “NO SMOKING OR OPEN FLAMES” signs in the area where the components are located. AirSep STRONGLY recommends that only individuals trained and experienced in the safe handling of oxygen operate this system.</p>
 <p>NOTE</p>	<p>Before the Centrox can supply oxygen within purity specifications, you must purge all air from the oxygen receiver(s).</p>
 <p>NOTE</p>	<p>Provide proper voltage to the oxygen concentrator to prevent damage not covered under the AirSep Product Warranty.</p>
 <p>NOTE</p>	<p>When you turn the oxygen concentrator on for the first time, it can take 20-30 minutes for the oxygen purity to reach the specification.</p>

1. Observe that the ON/OFF switch on the PSA module is in the off position.
2. Insert the compressor module electrical plug to the electrical inlet at the bottom of the PSA module. Refer to Figure 5.1.
3. Connect the PSA module power cord to a properly grounded electrical outlet that cannot be accidentally turned off. Do not use extension cords.



If a power light is off, first check the electrical connection and then the oxygen concentrator circuitry. If this condition still exists, refer to the Troubleshooting section.

5. Set the AUTO/MANUAL switch on the PSA module to the MANUAL position.
6. Ensure that oxygen isolation ball valve is open (See Figure 5.1).



If the unit is equipped with an oxygen monitor, the oxygen monitor light on the control panel remains on until the oxygen purity reaches 85% ±3%. The oxygen monitor alarms intermittently after 30 minutes if the Centrox does not reach proper oxygen purity. During start-up, this alarm is silenced for 30 minutes.



Air exhausts for 3-5 seconds from the feed air dump valve (See Figure A.1). This is normal. It removes any pressure that builds up inside the compressor to ensure easy start-up.

8. Close the primary and the secondary oxygen ball valves (See Figure 5.1).
9. Remove the hose that connects the center fitting of the primary/secondary ball valve assembly to your distribution system. This will allow the air in the tank to be vented to the atmosphere.
10. Put the supply valve in the closed position (See Figure 6.1).



There is a small hole drilled in the supply ball valve to allow a controlled amount of gas to flow into the tank receiver when the valve is in the closed position.

11. Set both the ON/OFF switches on the compressor module in the 'ON' position.

12. Set the PSA module's ON/OFF switch to the ON position. At this stage, all the green ON/OFF switches should be ON.
13. Open the primary oxygen ball valve.
14. Fully open the regulator and flowmeter (See Figure 5.1). Oxygen should start coming out of the outlet once the regulator and flowmeter are open.
15. Allow the unit to run to purge air out of the tank and to achieve the minimum purity level of the oxygen as specified in the Appendix A of the operating manual. This step may take 20-30 minutes.
16. Make sure that the minimum purity level of the oxygen as specified in the Appendix A of the operating manual has been reached (the low purity light and the alarm goes off).
17. Fully close the primary oxygen ball valve (See Figure 5.1).
18. Set the AUTO/MANUAL switch on the PSA module to the AUTO position.
19. Allow the oxygen receiver to attain a pressure of 55-65 psig (379.2 – 448 kPa). Make sure oxygen concentrator enters the standby mode and the blue AUTO/MANUAL light shuts off.
20. Fully open the supply valve on the PSA module.
21. Make sure that the regulator at the outlet of the oxygen tank is set at 50 psig (345 kPa) (Open the primary oxygen ball valve slightly to adjust the regulator).
22. Close the primary oxygen ball valve and reattach the hose to the distribution system.
23. Open the primary oxygen ball valve.
24. Allow 15 LPM (max.) to flow through the flowmeter.
25. Make sure that the regulator at the outlet of the backup oxygen supply is set at 48 psig (331kPa).
26. Open backup cylinder isolation valve (secondary oxygen ball valve).
27. Check all fittings and connections for leaks.

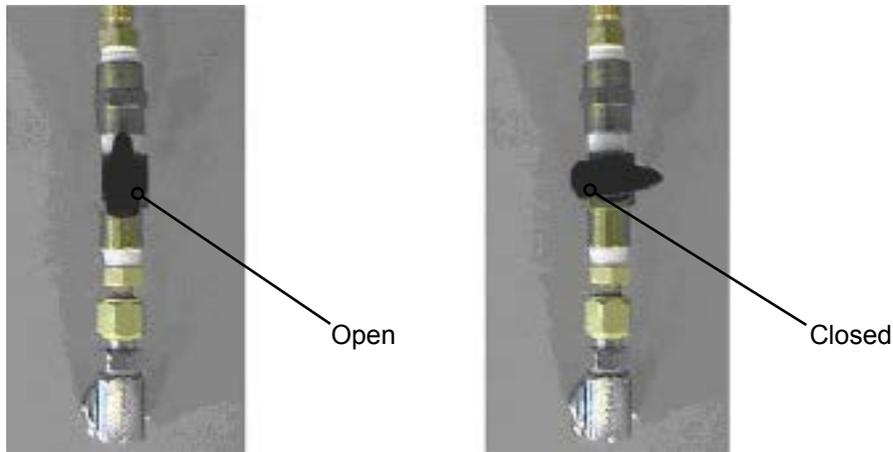


Figure 6.1: PSA Module Supply Valve Assembly

6.2 OPERATION

AUTO Mode

With the AUTO/MANUAL switch on the PSA module's panel in the AUTO position, the oxygen concentrator cycles on and off automatically based on oxygen demand. When the PRODUCT PRESSURE gauge increases to the approximate pressure switch maximum pressure specified in this instruction manual, oxygen production stops after ten cycles and enters the Standby mode. At this stage, the blue indicator light on the AUTO/MANUAL switch shuts off. When the pressure of the oxygen coming out of the adsorber beds decreases to approximately the pressure switch minimum pressure specified in this instruction manual, the oxygen concentrator resumes oxygen production and the blue indicator light on the AUTO/MANUAL switch illuminates. The AUTO mode enables the most energy-efficient operation of the oxygen concentrator. Use the AUTO mode during normal operation and to shut down the oxygen concentrator.

MANUAL Mode

With the AUTO/MANUAL switch on the oxygen concentrator control panel in the MANUAL position, the oxygen concentrator cycles continuously, regardless of the pressure fluctuations. Use the MANUAL mode during initial start-up or start-up after an extended shutdown of the oxygen concentrator and, depending on the oxygen flow, pressure, and purity requirements of your application, as directed by your AirSep Corporation representative.

6.3 SHUTDOWN



Do not turn off power to the oxygen concentrator unless you are sure that the facility does not require any oxygen, or there is a sufficient alternative/backup source of oxygen.

1. Close the primary oxygen ball valve.
2. Observe that the AUTO/MANUAL switch is in the AUTO position, and wait until the blue light shuts off and the Centrox concentrator enters the standby mode.
3. Set the ON/OFF switch on the PSA module to the OFF position.
4. Set the ON/OFF switches on the compressor module to the OFF position.
5. Close the oxygen isolation ball valve (See Figure 5.1).



Failure to wait until the blue light on the AUTO/MANUAL switch automatically shuts off will result in initial lower purity oxygen during subsequent startup.

6.4 NORMAL START-UP

1. Make sure the AUTO/MANUAL switch is in the AUTO position and the ON/OFF switch's green power light is on.
2. Ensure that the oxygen isolation ball valve is open (See Figure 5.1).
3. Set the ON/OFF switch on the compressor module to the ON position.
4. Set the ON/OFF switch on the PSA module to the ON position.
5. Open the primary oxygen ball valve.

6.5 START-UP AFTER AN EXTENDED SHUTDOWN

When the Centrox oxygen concentrator is turned on after an extended shutdown, the oxygen receiver may be full of air or low purity oxygen. Before the Centrox can supply oxygen within purity specifications, you must purge all air from the oxygen receiver. To do this, follow all steps described in Section 6.1.



Using the oxygen generator at flows higher than 15% above those specified in Appendix A of this manual, will result in the likely contamination of the molecular sieve beds. This damage is not covered under the standard warranty.

7.0 Maintenance/Service

To ensure the long life of your Centrox Oxygen Concentrator, maintain the unit as described in the following sections. Follow the procedures described in this section of the instruction manual for daily, semi-annual, and annual maintenance.

Time Period	Action
Weekly	Remove and wash air intake filters.
Semi-Annual	Clean compressor intake filters.
Annually	Replace coalescing filter element. The filter element should be changed if found very dirty even if one year time period has not elapsed. Check performance of all the solenoid valves. Replace or rebuild as necessary.
12,000 Hours	Rebuild the feed air compressor.

Table 7.3: Maintenance Chart

Foreign particles in the feed air affect the operation of the oxygen concentrator. The filters supplied in the concentrator are factory-selected based on the unit's air requirements and average air conditions.

 WARNING	The interior of the Centrox Oxygen Concentrator contains electrical parts that can produce an electrical hazard if not handled properly. To prevent electrical shock, use extreme care when you service the system.
 CAUTION	AirSep selects concentrator filters based on their ability to perform in severe conditions. Use of other than Original Equipment Manufacturer filters/elements can cause damage not covered under the AirSep Product Warranty.
 CAUTION	Failure to maintain the air intake and compressor intake filters can allow foreign particles in the air to enter the oxygen concentrator and cause damage not covered under the AirSep Product Warranty.

7.1 WEEKLY MAINTENANCE

Once every seven days. (Remove the air intake filters (See Figure 4.1) from the left side of the compressor module and wash it with soap and water.)

7.2 SEMI-ANNUAL MAINTENANCE

7.2.1. CLEANING THE COMPRESSOR INTAKE FILTERS

Once every six months or as often as necessary, use the following procedure to clean the compressor intake filters.

1. Close the primary oxygen ball valve.
2. Observe that the AUTO/MANUAL switch is in the AUTO position, and wait until the blue light shuts off.
3. Set the ON/OFF switch to the OFF position on both the modules.
4. Unplug the unit from main power supply.
5. Open the compressor module.
6. Pull up on the black cap on the compressor intake filter housing to remove it. This is attached to the gray PVC pipe (See Figure 4.3: Resonator).
7. Remove and wash the foam insert with soap and water.
8. Replace the foam insert.
9. Replace the black cap.
10. Close the compressor module.
11. Follow all steps in Section 6.1 – Initial Start-up.

7.2.2. ADJUSTING THE OXYGEN SAMPLE REGULATOR



Ensure that the backup supply of oxygen is present with the secondary oxygen ball valve open, if oxygen is needed while adjusting the oxygen monitor regulator.

1. Close the primary oxygen ball valve.
2. Observe that the AUTO/MANUAL switch is in the AUTO position, and wait until the blue light shuts off.
3. Set the ON/OFF switch on the PSA module to the OFF position.
4. Open the PSA module.
5. Pull outward on the oxygen monitor regulator knob and turn it fully counterclockwise.

6. Disconnect the tubing at the oxygen sample regulator. See Figure 4.4 for location of oxygen sample regulator.



Remove any tie-wraps from the tubing before you disconnect it.

7. Connect the tubing from regulator pressure test kit# KI488-1 to oxygen sample regulator.
8. Set the AUTO/MANUAL switch to MANUAL position
9. Set the ON/OFF switch to ON position.



The interior of the Centrox Oxygen Concentrator contains electrical parts that can produce an electrical hazard if not handled properly. To prevent electrical shock, use extreme care when you service the system.

10. Adjust the knob on the oxygen sample regulator until the gauge registers 4-5 psig (27.5 – 34.5 kPa).
11. Lock the oxygen sample regulator knob by pressing it. Confirm the setting after locking the regulator.



Do not set the oxygen sample regulator above 5 psig (34.5 kPa) as it may create an overdrawing condition and result in low purity oxygen alarm.

12. Set the ON/OFF switch to the OFF position.
13. Remove the oxygen regulator pressure kit tubing from the oxygen sample regulator.
14. Reconnect the tubing from oxygen monitor board to the oxygen sample regulator.
15. Secure the tubing with new tie-wraps.
16. Close the PSA module.
17. Follow all steps in Section 6.1 (Initial Start-up).

7.3 ANNUAL MAINTENANCE

The expected life of the coalescing filter element is approximately 12 months. Failure to replace the filter element on schedule results in a void AirSep Product Warranty.

 CAUTION	<p>AirSep selects concentrator filters based on their ability to perform in severe conditions. Use of other than Original Equipment Manufacturer filters/elements can cause damage not covered under the AirSep Product Warranty.</p>
 CAUTION	<p>Failure to maintain the air intake and compressor intake filters can allow foreign particles in the air to enter the concentrator and cause damage not covered under the AirSep Product Warranty.</p>

7.3.1. COALESCING FILTER ELEMENT REPLACEMENT

The coalescing filter is located inside the PSA concentrator module (See Figure 4.4). It removes any foreign particles present in the oxygen supply.

 NOTE	<p>Order the element to be replaced through the AirSep Commercial Service Department. Specify Part Number FI018-1, cleaned for oxygen service. Contact AirSep at 1-800-320-0303 or (716) 691-0202 outside of the USA/Canada.</p>
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1. Wash your hands thoroughly, and make sure they are oil-free before you begin this procedure.

 WARNING	<p>Oxygen can cause spontaneous combustion, and as such, is a fire hazard. Make sure that no flammable materials are located in the oxygen concentrator area designated "Oxygen in Use — No Smoking."</p>
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2. Close the primary oxygen ball valve. See Figure 5.1 for location of this valve.
3. Observe that the AUTO/MANUAL switch is in the AUTO position, and wait until the blue light shuts off.
4. Set the ON/OFF switch of the PSA module to the OFF position.
5. Close the oxygen isolation ball valve. See Figure 5.1 for location of this valve.
6. Unplug the PSA module power cord from the electrical outlet.

7. Open the PSA module.
8. Push up on the pin or unscrew the plastic nut (whichever applicable) on the bottom of the filter bowl.



Pressure releases when you push up on the pin or unscrew the plastic nut (whichever applicable) on the filter bowl.

9. When the PRODUCT PRESSURE gauge registers 0 psig, the unit is depressurized.
10. When the unit is depressurized, replace the filter element.
11. To gain access to the element, you must remove the filter bowl. Unscrew the bowl counterclockwise to remove it. Use one hand to steady the filter head while removing the bowl with the other to ensure you do not loosen the fittings and hoses connected to the sides of the filter.
12. Unscrew the filter element, and remove the O-ring. Replace the element and the O-ring with new one, taking care to ensure that ring remains oil and grease-free. Reconnect the bowl to the filter body. Use one hand to steady the filter head while making sure the filter bowl is completely screwed on with the other.
13. Follow all the steps in Section 6.1 (Initial Start-up)
14. Leak test the coalescing filter assembly.

7.4 PRESSURE SWITCH ADJUSTMENT PROCEDURE

In the Centrox units, typically the normally open contact of the pressure switch is used for the wiring purposes. Please refer to Figure 7.1 for the following adjustment procedure:

1. If the oxygen concentrator is in the line of the final application when adjustment(signal setting) is made to the pressure switch, be sure that the switch can be test operated without effecting the other equipment.
2. Remove switch cover, if any.
3. Turn adjusting nut at top of the switch clockwise until setting indicator is fully up. Turn deadband adjusting knob on front of the switch clockwise as far as possible. Refer to Figure 7.1.



Adjusting nut and knob will turn easily until they hit a stop. Do not over torque. Over torque may cause damage.

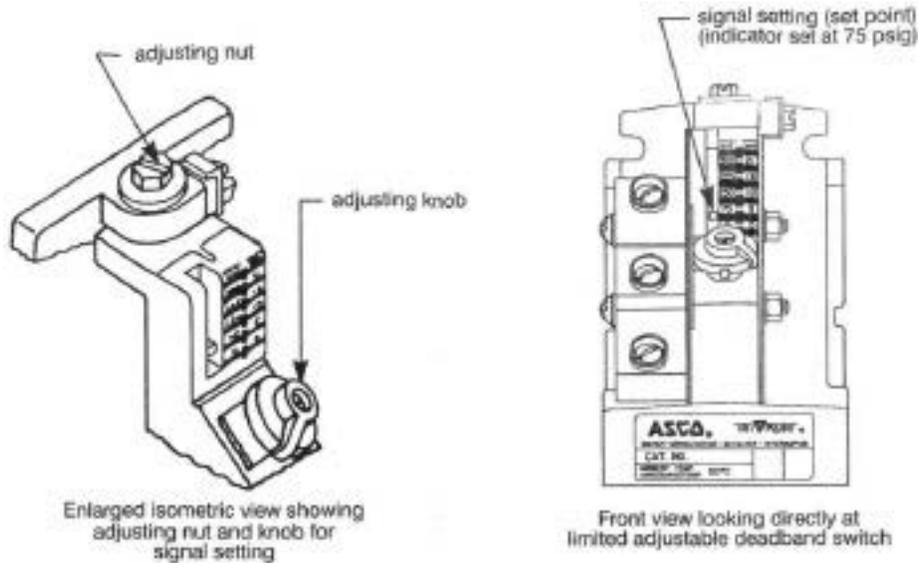


Figure 7.1: Pressure Switch

4. Follow the steps in the chart below to make signal settings.

	Adjustment Procedure	Normally Open	
		Electrical Connection to Switch	Position of Test Lamp On-Off
1.	Starting with zero signal, connect the test lamp to common.	Normally Open Terminal	Off (Open Circuit)
2.	Apply desired actuation pressure. Then back off (counter-clockwise) top adjusting nut until switch actuates (set point increasing).	Normally Open Terminal	On (Closed Circuit)
3.	Lower pressure to desired re-actuation signal. Then turn dead band adjusting knob counterclockwise until switch re-actuates (set point decreasing).	Normally Open Terminal	Off (Open Circuit)

5. Cycle pressure between two desired signals and make minor adjustments to adjusting nut and knob as required to achieve exact set points.



If the adjustment of the switch has been made when the oxygen concentrator is not in the line of final application, the switch should be retested when installed in the final line of application. Follow adjustment instruction. Be sure switch can be test operated without affecting the other equipment.

8.0 Troubleshooting

The AirSep Centrox Oxygen Concentrator runs pressurized during normal operation. **You must depressurize the unit BEFORE you attempt any REPAIRS.**

Use the following procedure to depressurize the oxygen concentrator safely.

1. Shut down the oxygen concentrator as described in Section 6.3.
2. To depressurize the concentrator, follow the steps in the Coalescing Filter Element Replacement procedure in Section 7.3.1.



If the unit needs to be pressurized to troubleshoot it, close the oxygen isolation ball valve and primary oxygen ball valve and let the unit run in the AUTO position while the ON/OFF switch is in the ON position. Make sure you open the oxygen isolation ball valve and primary oxygen ball valve after you complete the troubleshooting.

3. The PRODUCT PRESSURE gauge should now register 0. If it does not, stop and contact your nearest AirSep Service Representative or the AirSep Commercial Service Department for further instructions.

Contact the AirSep Commercial Service Department by phone at **1-800-320-0303** or **(716) 691-0202** outside of the USA/Canada.

Send fax inquiries anytime to **(716) 564-2717**.

Address written inquiries to:

AirSep Corporation
260 Creekside Drive
Buffalo, NY 14228-2085 USA
Attention: Commercial Products Service Department

Send e-mail inquiries to info@airsep.com.

Visit www.airsepcpd.com to learn about our complete range of standard Oxygen Generators.

4. Proceed to determine and repair the problem.
5. When you complete the repair, start up the oxygen concentrator as described in Section 6.1 – Initial Start-up.

8.1 TROUBLESHOOTING CHART

The chart on the following pages is a guide for troubleshooting the AirSep Centrox Oxygen Concentrator.

 WARNING	<p>The interior of the oxygen concentrator contains electrical parts that can produce an electrical hazard if not handled properly. To prevent electrical shock, use extreme care when you service the system.</p>
 CAUTION	<p>The Printed Circuit Boards (PCBs) contain components that are sensitive to electrostatic discharge (ESD) and can be damaged if not handled properly. As when handling any ESD-sensitive PCB, observe standard ESD safety procedures. These procedures include the following:</p> <ul style="list-style-type: none"> ■ Handle the PCB only by the edges ■ Work on a grounded ESD mat ■ Wear a grounded wrist strap ■ Store PCBs only in anti-static bag

Problem	Probable Cause	Solution
<p>Oxygen compressor(s) do not start. No green power light.</p>	<p>PSA module not plugged to the power supply.</p>	<p>Plug in the PSA module.</p>
	<p>Compressor module not plugged in to the PSA module.</p>	<p>Plug in compressor module to the PSA module.</p>
	<p>Tripped Circuit breaker(s).</p>	<p>Reset circuit breaker(s).</p>
	<p>ON/OFF switches on the compressor module are in OFF position.</p>	<p>Put the ON/OFF switches on the compressor module in ON position.</p>
	<p>ON/OFF switch on the PSA module in OFF position.</p>	<p>Put the ON/OFF switch on the PSA module in ON position.</p>
	<p>Defective ON/OFF switch.</p>	<p>Replace ON/OFF switch.</p>
	<p>Blown 1A or 15A fuse in PSA module.</p>	<p>Replace the appropriate fuse.</p>
	<p>Faulty electrical connections.</p>	<p>Check electrical connections.</p>
<p>Defective circuit board.</p>	<p>Replace circuit board. (Refer to Section 8.2.2).</p>	

Problem	Probable Cause	Solution
Oxygen concentrator does not cycle. No green power light on the PSA module.	Unit not plugged in to the power supply.	Plug in unit to the electrical outlet.
	No power supply to the wall outlet.	Replace fuse or reset breaker.
	Blown 15A fuse.	Replace fuse.
Oxygen concentrator does not cycle, but green power light is ON on the PSA module. AUTO/MANUAL switch is set to MANUAL position, and blue light is off.	ON/OFF switch is off.	Set ON/OFF switch to ON position.
	Defective ON/OFF switch.	Replace ON/OFF switch.
	Blown 1A fuse.	Replace fuse.
	Defective AUTO/MANUAL switch.	Replace AUTO/MANUAL switch.
	Defective power wire to circuit board.	Repair or replace wire.
	Low voltage condition.	Call electric company.
	Defective transformer.	Replace transformer.
	Defective circuit board.	Replace circuit board.

Problem	Probable Cause	Solution
<p>Oxygen concentrator does not cycle. Green power light is ON on the PSA module; AUTO/MANUAL switch is set to AUTO position. Blue light is off. Product Pressure gauge registers less than 50 psig (205 kPa).</p>	<p>ON/OFF switch is set to OFF position.</p>	<p>Set ON/OFF switch to ON position.</p>
	<p>Defective ON/OFF switch.</p>	<p>Replace ON/OFF switch.</p>
	<p>Defective wire to circuit board.</p>	<p>Repair or replace wire.</p>
	<p>Pressure switch improperly adjusted.</p>	<p>Adjust pressure switch correctly. (Refer to Section 8.1.1.)</p>
	<p>Defective pressure switch.</p>	<p>Replace pressure switch.</p>
	<p>Defective circuit board.</p>	<p>Replace circuit board.</p>
<p>Oxygen concentrator turns on. Green power light on the PSA module is not ON.</p>	<p>Defective ON/OFF switch on the PSA module.</p>	<p>Replace ON/OFF switch on the PSA module.</p>
<p>Oxygen concentrator cycles, but blue light does not turn ON. AUTO/MANUAL switch is set to AUTO position.</p>	<p>Defective wire.</p>	<p>Repair or replace wire.</p>
	<p>Defective AUTO/MANUAL switch.</p>	<p>Replace AUTO/MANUAL switch.</p>
	<p>Defective circuit board.</p>	<p>Repair or replace circuit board.</p>

Problem	Probable Cause	Solution
<p>Oxygen concentrator cycles continuously.</p> <p>AUTO/MANUAL switch is set to AUTO position. Blue light is ON. Oxygen Receiver Pressure gauge registers less than 50 psig (345 kPa).</p> <p>Oxygen purity is acceptable.</p>	Compressor does not build up adequate pressure.	Replace compressor.
	Compressor intake filter plugged.	Clean or replace compressor intake filter.
	Feed air dump valve leaks.	Check all wires and connections (Refer to the wiring diagrams in Appendix A). If problem continues, replace the valve.
	Compressor relief valve leaks.	Replace relief valve
	Air leak in system.	Check oxygen concentrator. Repair as necessary.
	Oxygen usage is greater than capacity of oxygen concentrator.	Check oxygen usage. If usage exceeds system capacity (32 SCF/hr [15 LPM]), reduce usage.
	Oxygen leak in system.	Check oxygen concentrator and oxygen distribution system for leaks. Repair as necessary.
<p>Oxygen concentrator cycles continuously. AUTO/MANUAL switch is set to AUTO position. Blue light is on.</p> <p>Oxygen Receiver Pressure gauge registers 63 psig (435 kPa) or higher.</p>	Pressure switch improperly adjusted.	Readjust pressure switch. (Refer to Section 8.1.1).
	Defective wire to AUTO/MANUAL switch.	Repair or replace wire to AUTO/MANUAL switch.
	Defective AUTO/MANUAL switch.	Replace AUTO/MANUAL switch.
	Defective wire to pressure switch.	Repair or replace wire to pressure switch.
	Defective pressure switch	Replace pressure switch.
	Defective circuit board.	Replace circuit board. (Refer to Section 8.2.2).

Problem	Probable Cause	Solution
<p>Low purity oxygen (21-82%) temporarily after start-up.</p> <p>Alarm sounds. Oxygen monitor light illuminates.</p>	Incorrect initial start-up.	Refer to Start-Up procedure given section 6.1.
	Extended shutdown (oxygen receiver pressure registers 0).	Refer to Start-Up procedure given in section 6.1.
	Momentary power loss.	Purge system. (Refer to Start-Up procedure.)
	Leaky feed air check valve.	Replace feed check valve.
	Oxygen leak in system.	Check oxygen concentrator and oxygen distribution system for leaks. Repair as necessary.
<p>Low purity oxygen (21-82%) continuously after start-up.</p> <p>Alarm sounds. Oxygen monitor light illuminates.</p>	Oxygen System overdrawn.	Check the oxygen usage. The oxygen system must not be used beyond the rated capacity.

Problem	Probable Cause	Solution
Oxygen receiver pressure registers less than 50 psig (345 kPa).	Defective solenoid valve.	Identify and rebuild valve.
	Defective wire to circuit board.	Repair or replace wire.
	Oxygen leak in system.	Check oxygen concentrator for leaks. Repair as necessary.
	Leaky check valves in check valve assembly.	Clean or replace check valves.
	Plugged waste muffler.	Replace muffler.
	System does not cycle properly.	Check all wires and connections. Repair as needed. If problem continues, replace circuit board.
	Defective circuit board.	Replace circuit board. (Refer to Section 8.2.2).
	Compressor pressure not adequate.	Replace compressor.
Solenoid valve chatters loudly.	Molecular sieve contaminated.	Replace molecular sieve. Contact AirSep Commercial Service Department for assistance.
	Low voltage condition.	Check power supply.
	Dirty valve.	Clean or rebuild valve.
	Worn valve core.	Rebuild valve.
	Bad Coil.	Replace Coil.
Low voltage to valve from circuit board.	Replace circuit board. (Refer to Section 8.2.2).	

Problem	Probable Cause	Solution
<p>Concentrator runs with intermittent alarm. Oxygen flow 32 SCF/hr (15 LPM). Purity is within specifications.</p>	<p>Oxygen sample regulator not set correctly.</p>	<p>Reset the regulator. Refer to section 7.2.2.</p>
	<p>Faulty electrical connection.</p>	<p>Check electrical connection.</p>
	<p>Defective oxygen monitor board.</p>	<p>Replace monitor board.</p>
<p>Concentrator runs with oxygen monitor light illuminated for more than 30 minutes. Audible alarm does not sound. Low purity oxygen (21-82%).</p>	<p>Faulty electrical connections.</p>	<p>Check all wires and connections. (Refer to the wiring diagrams in Appendix A.) If problem continues, replace alarm board.</p>
	<p>Defective alarm buzzer.</p>	<p>Replace alarm buzzer.</p>
<p>Concentrator runs with audible alarm for more than 15 minutes. Oxygen monitor light is not illuminated. Low purity oxygen (21-82%).</p>	<p>Faulty electrical connections.</p>	<p>Check all wires and connections. (Refer to the wiring diagrams in Appendix A.) If problem continues, replace alarm board.</p>
	<p>Defective oxygen monitor light.</p>	<p>Replace oxygen monitor light.</p>

8.1.1. PRESSURE SWITCH TROUBLESHOOTING

The pressure switch is located at the bottom of the PSA concentrator module (Figure 4.4).

If the pressure switch does not work properly, review the following probable causes:

Probable Cause	Solution
Incorrect electrical connections.	Check leads to switch. Make sure they are properly connected.
Faulty control circuit.	Check electrical power supply to switch. Check for open-circuited or grounded wires and loose connections at terminal block or switch.
Incorrect adjustment.	Check high and low adjustments for proper setting. (See Appendix D — Component Literature.)

If you can not correct the operation of the pressure switch, replace the entire switch.

8.2 SOLENOID VALVE TROUBLESHOOTING

If a solenoid valve does not energize, review the following probable causes:

Probable Cause	Solution
Defective wire to valve.	Repair or replace wire.
Defective coil.	Replace coil.
Defective valve.	Rebuild or replace valve.
Defective circuit board.	Replace circuit board.

If a solenoid valve stays constantly energized then the circuit board is defective. Replace the circuit board.

To determine if a solenoid valve, main circuit board, or wire is defective, review the following:

Solenoid Valves

Set a voltmeter to DC, and carefully connect the leads to the two terminal spades energized, and 0 when de-energized.

Feed Air Dump Valve

This valve is normally closed. A problem with the valve exists only if air constantly escapes from the outlet.

	Whenever you start up the Centrox, it is normal for air to escape from the feed air dump valve for 3-5 seconds.
	If all of the solenoid valves receive the proper voltage but a solenoid valve still malfunctions, proceed to rebuild the valve.

If any valve, with the exception of the feed air dump valve, does not energize during normal operation:

1. Check the wires from the circuit board to the valves for defects.
2. If the problem still exists, check the solenoid valve coils. Replace coil, if found defective.
3. If the problem still exists, replace the circuit board.

8.2.1. MAIN CIRCUIT BOARD REMOVAL

1. Set the unit's ON/OFF switch of the PSA module to the OFF position, and unplug the power cord.
2. Open the PSA module.
3. Disconnect the connectors from the circuit board. If the unit has oxygen monitor installed, the main circuit board is the lower one (Figure 4.4).
4. Push in on the board support tabs with a slotted screwdriver while you pull each corner.
5. Remove the circuit board.

	<p>The Printed Circuit Boards (PCBs) contain components that are sensitive to electrostatic discharge (ESD) and can be damaged if not handled properly. As when handling any ESD-sensitive PCB, observe standard ESD safety procedures. These procedures include the following:</p> <ul style="list-style-type: none">■ Handle the PCB only by the edges■ Work on a grounded ESD mat■ Wear a grounded wrist strap■ Store PCBs only in anti-static bag
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8.2.2. MAIN CIRCUIT BOARD INSTALLATION

	<p>Handle the new circuit board only by the edges to prevent an electrostatic short.</p>
---	--

1. Push the circuit board on to the four support tabs.
2. Firmly plug the connectors into the new circuit board so that the connectors' locking tabs lock against the circuit board.
3. Close the PSA module.

8.2.3. COMPRESSOR REMOVAL

To remove the compressor for exchange, follow the steps below:

1. Set the ON/OFF switch on both the modules to the OFF position, and unplug the power cord.
2. Close the oxygen isolation ball valve.
3. Open the compressor module.
4. Remove the suction tube and the other end of the stainless-steel hose that comes out from the compressor outlet.
5. Disconnect the two power cords from the terminal block and the two capacitor wires.
6. Also disconnect the ground wire from the compressor.

7. Remove the four bolts that connect the compressor plate to the base of the unit.
8. Slide out the compressor.



Take note of the assembly of the spring mounts. These components will need to be reinstalled when the new compressor is assembled.

10. Carefully place the compressor upside down, and remove the four bolts that connect the compressor to the mounting plate.
11. Carefully remove all the fittings from the compressor.

8.2.4. COMPRESSOR INSTALLATION

To install a new compressor, follow the steps below:

1. Place the new compressor upside-down.
2. Align the holes of the spring mount plates with the holes on the compressor.
3. Place the springs on the spring mount plates.
4. Place the compressor mounting bracket onto the springs.
5. Thread the four bolts into the compressor ensuring that all spring mount assembly parts are present.
6. Turn the compressor right side up. Make sure that the springs are centered on the black plastic bushings.
7. Thread the brass fittings and pressure relief valve into the compressor.
8. Follow the compressor removal procedure in reverse order.
9. Reconnect both side panels on the unit.

A. Appendix Technical Data

A.1 SPECIFICATIONS

Data in this section refer to Centrox Oxygen Concentrators. This data may vary as per the customer's requirements.

Centrox	
Product Flow	32 SCFH (0.84 Nm ³ /hr or 15 LPM)*
Product Pressure	50 psig (345 kPa or 3.5 barg)*
Product Concentration	Up to 95%
Product Dew Point	-100°F (-73°C)
Dimensions (W x D x H) (Nominal)	
▪ Air Compressor Module	21 x 13 x 27 in (52 x 32 x 68 cm)
▪ PSA Concentrator Module	27 x 15 x 38 in (68 x 37 x 97 cm)
Weight	
▪ Compressed Air Inlet	100 lb (45 kg)
▪ Product Gas Outlet	160 lb (73 kg)
Physical Connections** Product Gas Outlet	¼" NPT x B size oxygen demand valve
Ambient Operating Conditions	Locate the oxygen generator in a well-ventilated area that is protected from weather elements and remains between 40°F (4°C) and 112°F (44°C)
Control Power Requirements (Single Phase)	120 V ~ ±10%, 60 Hz, 11.0 A or 220 V ~ ±10%, 50 Hz, 5.5 A
Pressure Switch Setting***	For 120 VAC, 60 Hz power supply
(minimum)	58 psig 400 kPa 4.0 barg
(maximum)	63 psig 434 kPa 4.3 barg
Pressure Switch Setting***	For 240 VAC, 50 Hz power supply
(minimum)	52 psig 359 kPa 3.6 barg
(maximum)	58 psig 400 kPa 4.0 barg
Certifications and Approvals	CE category IIa

*SCF (Standard cubic foot) gas measured at 1 atmosphere and 70°F / Nm³ (Normal cubic meter) gas measured at 1 atmosphere and 0°C / LPM (Liters per minute) gas measured at 1 atmosphere and 21°C.

**Check the label on the control panel for appropriate power supply.

***Data may vary as per the customer's requirements.

Table A.1: Centrox Specifications

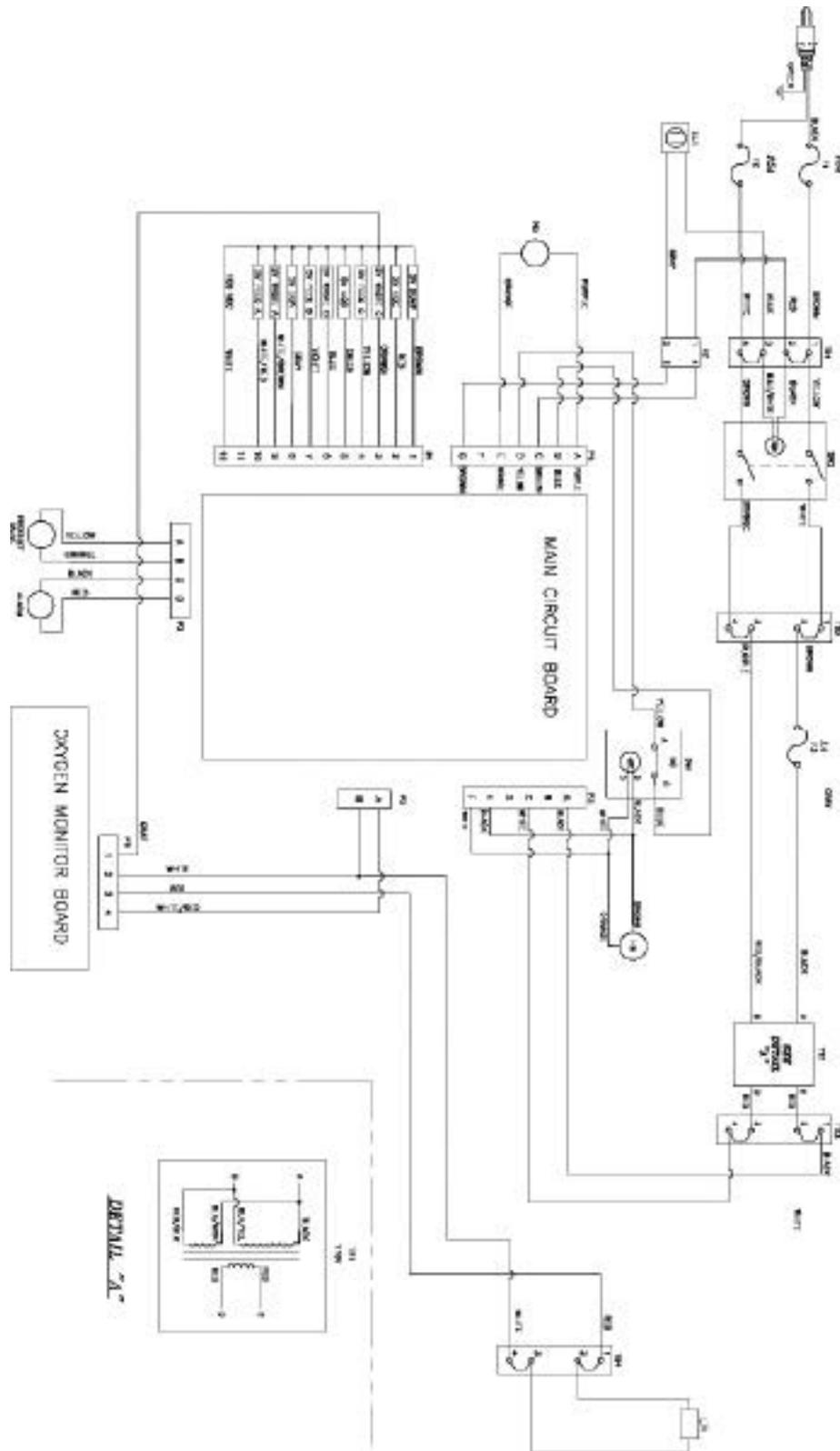


Figure A.2: Wiring Schematic (120 V, 60 Hz) – PSA Module

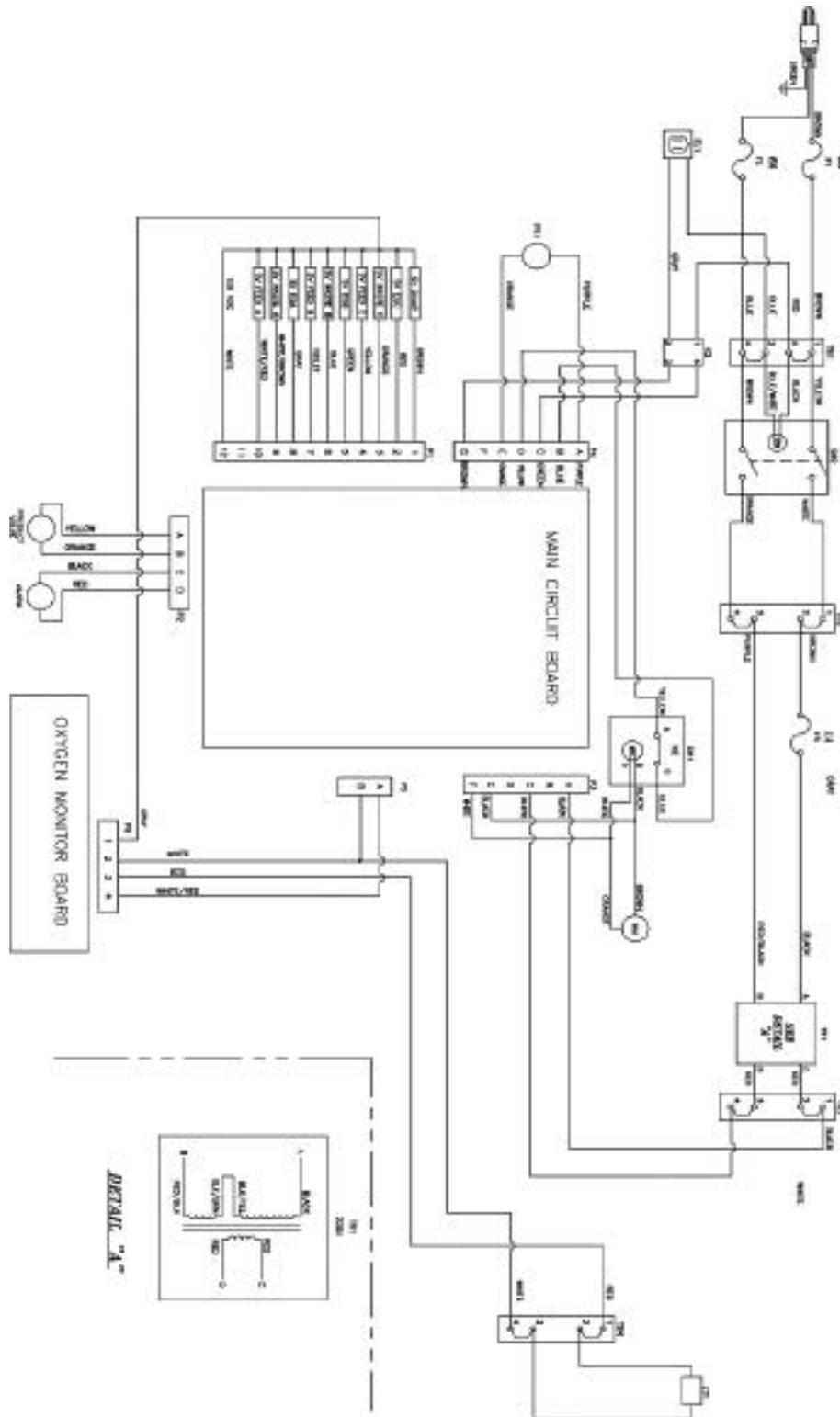


Figure A.3: Wiring Schematic (240 V, 50 Hz) – PSA Module

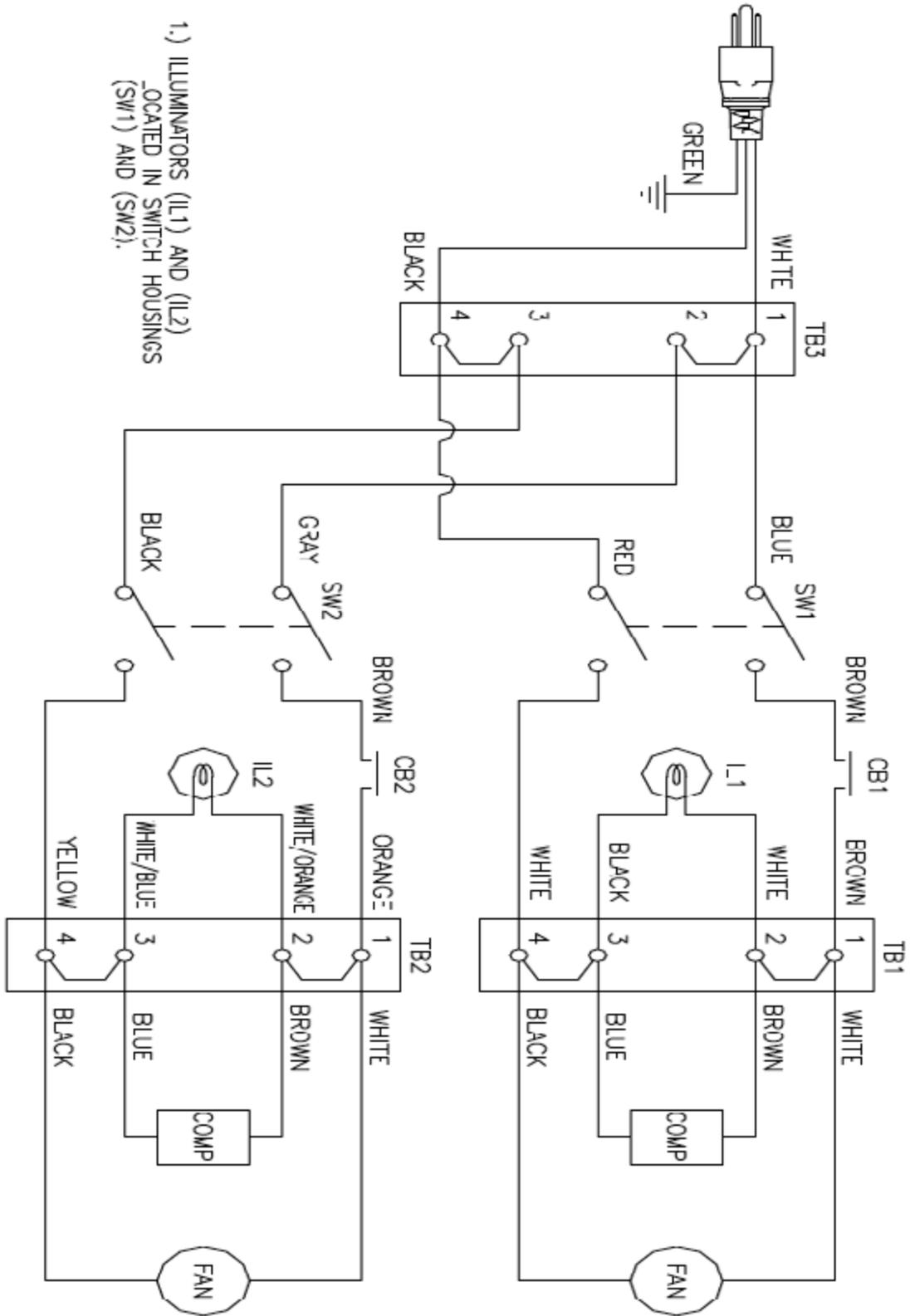


Figure A.4: Wiring Schematic (120 V, 60 Hz) – Compressor Module

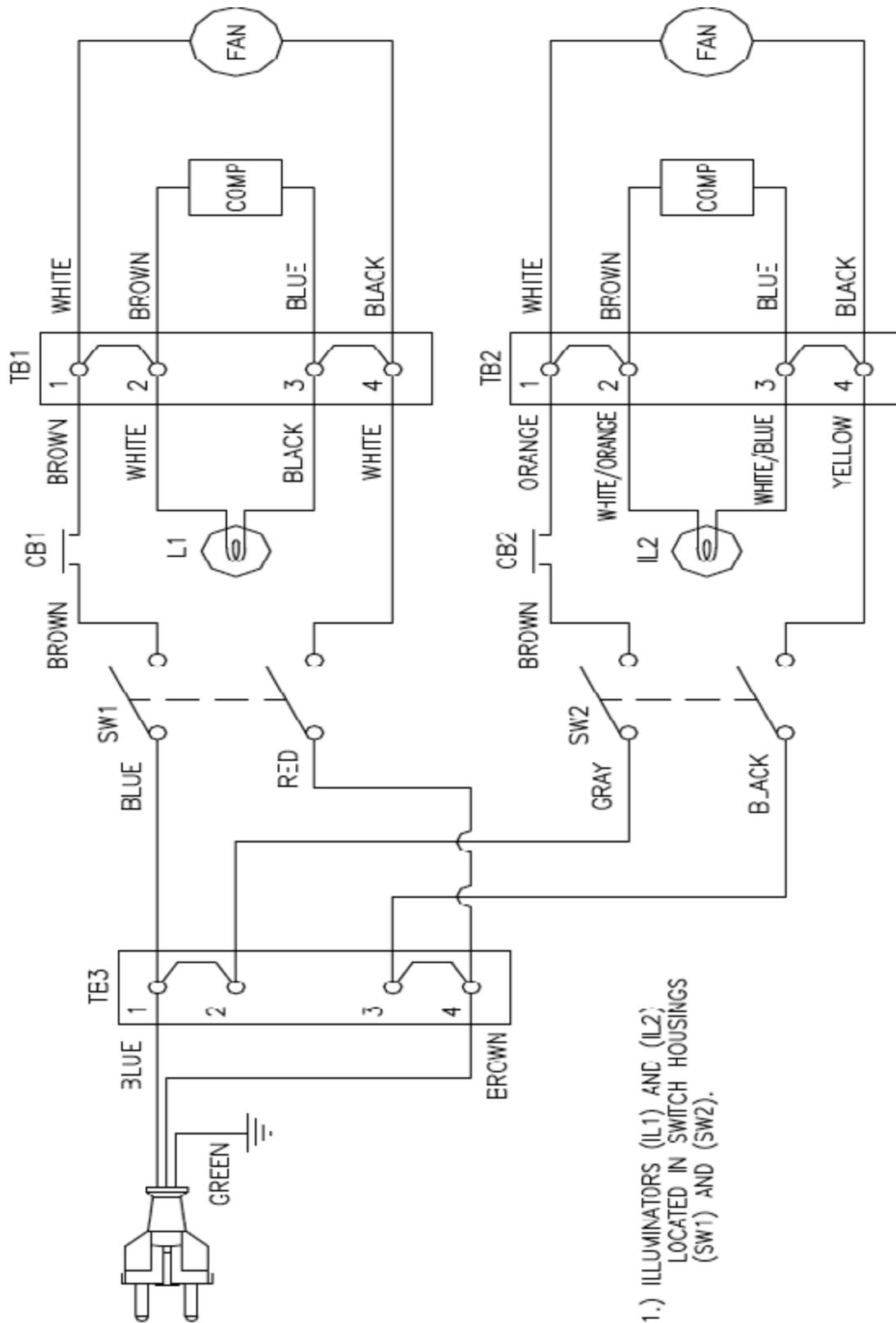


Figure A.5: Wiring Schematic (240 V, 50 Hz) – Compressor Module

B. Appendix Warranty>Returns

B.1 PRODUCT WARRANTY

AirSep Corporation (“AirSep”) warrants to the party purchasing from AirSep (the “original purchaser”) the PSA Oxygen Concentrator to be free from defect in parts and workmanship for one year from the date of start-up, not to exceed eighteen (18) months from the date of shipment to the original purchaser, under normal use, maintenance and operation*. TO THE EXTENT PERMITTED UNDER APPLICABLE LAW, ALL WARRANTIES WITH RESPECT TO SUCH UNIT SHALL ONLY EXTEND TO AND BE FOR THE BENEFIT OF THE ORIGINAL PURCHASER AND SHALL NOT BE ASSIGNABLE TO, EXTEND TO OR BE FOR THE BENEFIT OF ANY OTHER PARTY. AirSep’s obligations under this warranty are limited, at AirSep’s option, to the repair, replacement or refunding the purchase price of any such unit of equipment (or part thereof) found by AirSep to be defective in parts or workmanship; provided, however, that AirSep shall have no obligation hereunder with respect to a defective part unless it receives written notice of such defect prior to the expiration of the applicable warranty period as referenced above.

Each unit of equipment for which a warranty claim is asserted shall, at the request of AirSep, be returned on a prepaid basis with proof of purchase date to the AirSep factory specified by AirSep at the expense of the original purchaser. Replacement parts shall be warranted as stated above for the unexpired portion of the original warranty. This warranty does not extend to any unit or part subjected to misuse (at AirSep’s sole determination), accident, improper maintenance or application, or which has been repaired or altered outside of the AirSep factory without the express prior written authorization of AirSep.

Notwithstanding anything to the contrary contained herein, during the applicable warranty period, as specified above, AirSep will pay the cost of return freight charges to the original purchaser, provided an authorized AirSep representative approved return of the unit or parts, for any equipment found by AirSep to be defective. For warranty repairs performed during the first 90 days from the date of invoice, AirSep will pay freight both ways. After the applicable parts warranty period has expired, the original purchaser is responsible for freight both ways.

* Please refer to the appropriate product documentation for applicable installation and operating requirements.

B.2 LIMITS OF LIABILITY

THE FOREGOING WARRANTY IS THE ONLY WARRANTY MADE BY AIRSEP WITH RESPECT TO THE EQUIPMENT (OR ANY PART THEREOF) AND IS IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IN FACT OR IN LAW, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. IT IS EXPRESSLY UNDERSTOOD THAT THE SOLE AND EXCLUSIVE REMEDY FOR ANY DEFECT IN PARTS OR WORKMANSHIP IS LIMITED TO ENFORCEMENT OF AIRSEP'S OBLIGATIONS AS SET FORTH ABOVE, AND AIRSEP SHALL NOT BE LIABLE TO ORIGINAL PURCHASER OR ANY OTHER PARTY FOR LOSS OF USE OF THE EQUIPMENT, LOST PROFITS OR FOR ANY OTHER SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (EVEN IF AIRSEP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES).

B.3 RETURNING THE OXYGEN CONCENTRATOR OR A COMPONENT FOR SERVICE

If the oxygen Concentrator or a defective part requires service, contact your distributor. If instructed by your distributor to contact AirSep Corporation, follow the procedure below to return the oxygen Concentrator or a component for service or credit.

1. Obtain a Return Goods Authorization (RGA) number from the AirSep Commercial Products Service Department. (Refer to Chapter 8, Troubleshooting for information about contacting AirSep Corporation.) Before you call for service assistance, have the following information readily available:
 - Oxygen Concentrator Model
 - Serial Number
 - Hours of Use
 - Invoice Date



AirSep Corporation issues no credit for any warranted item until you present the model number, serial number, and invoice date of the oxygen Concentrator, and defective part is returned to AirSep Corporation.

2. Write the RGA number clearly on the outside of the shipping container.



AirSep Corporation accepts no item(s) for service or credit unless prior written authorization was issued by AirSep Corporation.

3. Return item(s) in their original packaging material. Pack merchandise for a safe return. AirSep Corporation assumes no responsibility for damage that occurs in transit. Any damage to the oxygen concentrator or a component because of failure to follow this procedure is the sole responsibility of the customer.



Return item(s) on a freight prepaid basis only.

C. Appendix

C.1 OXYGEN GENERATOR DECOMMISSIONING AND DISPOSAL GUIDELINE

Introduction:

Oxygen generator must be assessed for its redundancy and thereby managed according to the owner's existing policies for proper decommissioning and disposal. In situations where policies are not well defined, this guideline may be used to decommission and dispose the oxygen generator.

This guideline describes typical process to ensure effective decommissioning and disposal of the oxygen generator.

Definitions:

Decommission - Process of removing oxygen generator from service.

Reuse – Using the oxygen generator at a different location after decommissioning it from its current location.

Scrapping – Disposing the oxygen generator following all local governing ordinances and recycling plans.

Procedure:

1. Identify the status of the redundant oxygen generator, i.e.
 - Fully Functional
 - Partially Functional/Repairable
 - Damaged/Non-repairable
2. Decommission

Decommissioning of the oxygen generator shall be performed in accordance to the owner's quality assurance procedures. A typical decommissioning includes the following:

 - Updating the equipment database
 - Removal of maintenance contracts and/or service schedules
 - If the oxygen generator is fully functional or can be repaired for reuse, an assessment should be done for the current value. An assessment report on type and cost of repairs (if required) should also be prepared. Also, probable future owners should be identified and advised of the availability of the device

- Redundant oxygen generator should be assessed for contamination with chemical, biological or radiological substances. Contaminated device or its components must be accompanied by a signed risk assessment and may only be disposed following the local governing ordinances to an authorized recipient
3. Reuse
If the oxygen generator can be reused (For example: by a different department, by selling it to a new owner), all the necessary instructions for safe and efficient operation shall be transferred to the new user.
 4. Scrapping
Oxygen generator that cannot be reused shall be scrapped to a scrap metal recycling center following all the governing ordinances and recycling plans.

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