

Suggested List Price \$25.00 (U.S.D.)

**AirSep[®] Corporation
PSA Oxygen Generator
Onyx/Onyx+/Onyx Ultra**

Instruction Manual



MN109-1 01/12 Rev. D



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Ownership Data

Please take a moment to note below important information about your AirSep® Corporation PSA Oxygen Generator. Retain this instruction manual, along with your invoice, to serve as a permanent record of your purchase.

PSA Oxygen Generator

Model Number:

Serial Number:

Invoice Date:

Start-up Date:

AirSep Representative

Company:

Contact:

Address:

City/Town: State: Zip:

Country: Fax:

Phone: Telex:



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

Table of Contents

<u>1.0</u>	<u>Introduction</u>	<u>1-1</u>
1.1	<u>General</u>	<u>1-1</u>
1.2	<u>Warnings, Cautions, and Notes</u>	<u>1-1</u>
1.3	<u>References to Controls and Indicators with Tags or Labels</u>	<u>1-2</u>
<u>2.0</u>	<u>Safety</u>	<u>2-1</u>
2.1	<u>General</u>	<u>2-1</u>
2.2	<u>Potential Hazards</u>	<u>2-1</u>
2.3	<u>Safety Publications</u>	<u>2-2</u>
<u>3.0</u>	<u>Generator Description</u>	<u>3-1</u>
3.1	<u>General</u>	<u>3-1</u>
<u>4.0</u>	<u>Components Description</u>	<u>4-1</u>
4.1	<u>External Components</u>	<u>4-1</u>
4.2	<u>Internal Components</u>	<u>4-3</u>
<u>5.0</u>	<u>Installation</u>	<u>5-1</u>
5.1	<u>Handling and Unpacking</u>	<u>5-1</u>
5.2	<u>Pre-installation Operational Check</u>	<u>5-2</u>
5.3	<u>Installation Instructions</u>	<u>5-3</u>
<u>6.0</u>	<u>System Operation</u>	<u>6-1</u>
6.1	<u>Start-up</u>	<u>6-1</u>
6.2	<u>Operation</u>	<u>6-1</u>
6.3	<u>Shutdown</u>	<u>6-1</u>
6.4	<u>Oxygen Purity Test</u>	<u>6-2</u>
<u>7.0</u>	<u>Maintenance</u>	<u>7-1</u>
7.1	<u>Cleaning the Gross Particle Filter</u>	<u>7-1</u>
7.2	<u>Cleaning the Enclosure</u>	<u>7-2</u>

<u>8.0</u>	<u>Troubleshooting</u>	<u>8-1</u>
8.1	<u>Technical Support</u>	<u>8-1</u>
8.2	<u>Troubleshooting Chart</u>	<u>8-1</u>
8.3	<u>Procedures</u>	<u>8-6</u>
<u>A</u>	<u>Appendix Technical Data & Drawings</u>	<u>A-1</u>
<u>B</u>	<u>Appendix Warranty>Returns</u>	<u>B-1</u>
<u>C</u>	<u>Appendix Parts List</u>	<u>C-1</u>
<u>D</u>	<u>Appendix Component Literature</u>	<u>D-1</u>

List of Illustrations

<u>Figure 4-1 External Components (Typical Oxygen Generator)</u>	<u>4-1</u>
<u>Figure 4-2 Internal Components (Typical Oxygen Generator)</u>	<u>4-3</u>
<u>Figure A-1: Onyx Flow Schematic</u>	<u>A-5</u>
<u>Figure A-2: Onyx+ Flow Schematic</u>	<u>A-6</u>
<u>Figure A-3: Onyx Ultra Flow Schematic</u>	<u>A-7</u>
<u>Figure A-4: Electrical Schematic</u>	<u>A-8</u>

1.0 Introduction

1.1 General

This instruction manual provides description of the AirSep Corporation Onyx, Onyx+ and Onyx Ultra PSA Oxygen Generators, as well as instructions for their installation, operation, and maintenance. The Appendix of this instruction manual also includes pertinent specifications and warranty information.

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

1.2 Warnings, Cautions, and Notes

As you read this instruction manual, pay special attention to the WARNING, CAUTION, and NOTE messages. They identify safety guidelines or other important information as follows:



Provides information that can prevent severe bodily injury or death.



Cautions against the risk of electric shock.



Provides information important enough to emphasize or repeat.

1.3 References to Controls and Indicators with Tags or Labels

This instruction manual uses uppercase characters (e.g., ON/OFF switch) to refer to controls and indicators identified by tags or labels. Numbers inside parentheses (e.g., V-2) identify manually operated flow controls (e.g., manual valves). Refer to Chapter 4 for a description of the oxygen generator components.

2.0 Safety

2.1 General

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

To ensure your safety, thoroughly read and familiarize yourself with this entire section of the instruction manual. In addition, AirSep Corporation strongly recommends that you review this section periodically.

2.2 Potential Hazards



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.

To avoid fire or an explosion, keep gasoline, kerosene, oil, grease, cotton fibers, paint, and any other combustible material away from any part of the oxygen generator.

Do not smoke or use an open flame near the oxygen system.

Post "NO SMOKING OR OPEN FLAMES" signs in the area where the oxygen system is located. AirSep Corporation **STRONGLY** recommends that only individuals trained and experienced in the safe handling of oxygen operate this unit.



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.



To prevent fire or electrical shock, locate the oxygen generator indoors, away from rain or any other type of moisture.



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.



Only trained personnel may open the oxygen generator. The interior of the oxygen generator control cabinet contains electrical parts that can produce an electrical shock hazard if not handled properly. To prevent electrical shock, read and thoroughly understand Section 8 — Troubleshooting in this instruction manual before you service the oxygen generator.



Do not position the generator in an area that makes it difficult to disconnect the power.
Disconnect power before servicing oxygen generator.



Do not disconnect protective earth

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:

- “Standard for 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 Generator Description

3.1 General

The AirSep Corporation PSA Oxygen Generator is a self-contained unit that utilizes Pressure Swing Adsorption (PSA) technology to produce oxygen on site. The oxygen generator uses compressed air to produce oxygen. Air enters the Oxygen Generator through an external air intake gross particulate filter. This filtered air enters the compressor via a suction resonator, which quiets the compressor's suction sound. Pressurized air then exits the compressor and passes through a heat exchanger. The heat exchanger reduces the temperature of the compressed air. Next, a two-way solenoid feed valve directs the air into the adsorber vessels.

The oxygen generator uses in its adsorber vessels, an inert ceramic material called molecular sieve to separate compressed air into oxygen and 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. Each adsorber produces oxygen for approximately eight seconds. Oxygen exits the adsorbers through a pressure regulator, flow control valve, and flowmeter. The flow control valve, which is part of the flowmeter, controls the amount of oxygen delivered to the application.

While one adsorber produces oxygen, the other depressurizes to exhaust the waste gases it adsorbed (collected) during the oxygen production cycle. 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 when maintained and used according to this instruction manual.

4.0 Components Description

The drawings in this section illustrate the location of the main components of the Onyx/Onyx+/Onyx Ultra oxygen generators. All models include similar components unless noted otherwise; however, the location and size of these components varies among the different models. Refer to Appendix A of this instruction manual for general layout drawings and specifications.

4.1 External Components

Figure 4-1 below illustrates the external components.



Figure 4-1 External Components (Typical Oxygen Generator)

The design of the AirSep Onyx, Onyx+ and Onyx Ultra Oxygen Generators allows for easy access and removal of most components. This allows you to perform scheduled maintenance, repair, and replacement of parts with minimal time and effort.

Flowmeter

The flowmeter allows you to view and adjust the flow rate of the product oxygen.

Oxygen Outlet

The “B” size oxygen adapter connects to your application.

ON/OFF Power Switch

The ON/OFF switch starts and stops the operation of the unit.

Power Cord

The power cord connects the unit to a properly grounded electrical outlet to supply electrical power to the unit.

Gross Particle Filter

The washable gross particle filter removes airborne particulate matter from the room air drawn into the unit.

Cabinet

The cabinet protects the components inside the unit (e.g. – circuit board, air compressor, pressure switch, and valves).

Hour Meter

The hour meter indicates the total number of hours that the unit cycles.

Circuit Breaker

The circuit breaker protects the unit from power surges.

4.2 Internal Components

Figure 4-2 below illustrates the internal components.



Figure 4-2 Internal Components (Typical Oxygen Generator)

Adsorbers (Sieve Beds)

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

Capacitor

The capacitor stores additional electrical power to enable the air compressor to start.

Cooling Fan

The cooling fan increases airflow inside the enclosure to cool the air compressor.

Air Compressor

The air compressor pressurizes ambient air and delivers it to the adsorbers.

Circuit Board

The circuit board controls the cycle time and sequence of each solenoid valve.

Valve Block

The valve block houses the feed and waste solenoid valves.

Equalization Valve

The equalization valve balances the pressure between the two sieve beds.

5.0 Installation

5.1 Handling and Unpacking

AirSep Corporation ships the oxygen generator in a heavy-duty cardboard carton with two cutout-carrying handles. The unit's size and weight allow easy transport by manual lifting; the enclosure also has handles and casters for ease of mobility.

To unpack the oxygen generator, follow these guidelines:

- 1) Inspect the shipping carton, and open it immediately upon receipt.
- 2) If the exterior of the carton is severely damaged, note it on the freight bill before you sign it.
- 3) Unpack the unit, and remove any protective wrapping and packaging. Retain the carton and packaging to facilitate future shipping and transporting of the unit.
- 4) Place the unit in an upright position, and thoroughly inspect the enclosure and all external components (e.g., flowmeter) for damage.
- 5) Remove the side, back and lower front panels, and inspect the interior for loose or damaged parts.



Only trained personnel may open the oxygen generator. To prevent electrical shock, make sure the main power supply is disconnected when you remove the panels and inspect the internal components.



In the event of freight damage, you must submit a damage claim within 24 hours of delivery. A claim can be filed only by the consignee.

- 6) After inspecting the interior of the enclosure, re-install the panels on the unit.
- 7) Locate the plastic bag that contains the instruction manual, extra particle filter, and barb connection for the oxygen outlet. Remove the instruction manual and read the entire manual before installing and operating the unit.

5.2 Pre-installation Operational Check

Although every oxygen generator is tested thoroughly after it is manufactured, perform the following test to insure that no damage occurred during shipping and handling:

- 1) Make sure the panels fasten securely to the unit.
- 2) Make sure the gross particulate filter completely covers the air intake.
- 3) Make sure the power cord is securely attached to the unit.
- 4) Connect the power cord to a properly grounded electrical outlet.
- 5) Set the ON/OFF power switch to the ON position.
- 6) Listen for the sound of the air compressor in operation.
- 7) Verify that exhaust air emits from the air exhaust panel on the left side of the enclosure.
- 8) Rotate clockwise the knob on the flowmeter until it stops at the fully-closed position. Verify that the flowmeter indicates zero flow.
- 9) Rotate counterclockwise the knob on the flowmeter until the flowmeter indicates maximum flow.

When nothing connects to the oxygen outlet, the ball in the flowmeter should rise to the top of the flowmeter. If this does not occur, contact the AirSep Commercial Products Service Department.

- 10) Set the ON/OFF power switch to OFF.



Locate the oxygen generator 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.



The generator should only be used in the manner specified in the manual to prevent damage not covered under the AirSep Corporation Product Warranty.



AirSep oxygen generators are sold for indoor use only. Make sure the area that surrounds the oxygen generator is well ventilated, and provide sufficient space around the unit [at least one meter (three feet)] to allow for cool air flow as well as to allow safe operation and maintenance.

5.3 Installation Instructions

- 1) To ensure optimum performance of the oxygen generator and prevent damage not covered under the AirSep Corporation Product Warranty, make sure location of the unit meets the following conditions:
 - Locate the unit in an area that is protected from the weather elements.
 - To enable adequate airflow to cool the unit, locate the unit away from any source of heat, and make sure the sides of the unit remain at least six inches away from any wall or other obstruction.
 - Locate the unit within ten feet of a grounded electrical outlet that cannot be turned off accidentally.



Do not position the equipment in an area that makes it difficult to disconnect the power.
Do not use extension cords with the oxygen generator.

- Connect the unit to electrical power that continuously meets the specifications in Appendix A of this instruction manual.
- 2) Place the oxygen generator in an upright position on a level surface.
 - 3) Connect the oxygen outlet to the inlet of your application.



Use only oxygen-compatible materials for the hoses, tubing, and connections between the oxygen outlet and the inlet to your application.

If you use tubing at the inlet to your application, connect to the oxygen outlet the barb and fastener provided in the plastic bag shipped with the unit. Insert the barb into the tubing connected to your application, and clamp the tubing securely to the barb.



Clean your hands thoroughly before handling the barb and fastener. Make sure the tools used to secure the connection between the oxygen outlet and your application does not contaminate the hoses, tubing, or connections with oil or other petroleum-based products.



NOTE

If a continuous supply of oxygen is critical to your application, provide a backup source of oxygen to use if a power failure or equipment malfunction occurs.

6.0 System Operation

When you complete installation as described in the previous section, the oxygen generator is ready for easy start-up and operation.

6.1 Start-up

- 1) Set the ON/OFF power switch to ON, and wait five minutes to allow the product oxygen to attain the purity specified in Appendix A of this instruction manual.
- 2) Rotate the flowmeter knob counterclockwise to increase flow or clockwise to decrease flow as required for your application.
- 3) The flowmeter is calibrated on a LPM scale. Set the flowmeter at the designed flow rate of the unit. Refer to Appendix A for the specified flow rates. For proper flowrate setting, ensure that top of the ball of the flowmeter is at the level mark.
- 4) If your application requires the pressure of the product oxygen to differ from the pressure specified in Appendix A of this instruction manual, contact the AirSep CPD Service Department.



Increasing the flow of the product oxygen above the flow specified in Appendix A of this manual results in reduced purity of the product oxygen.

- 5) Begin oxygen use by your application.

6.2 Operation

The oxygen generator operates automatically after start-up. Monitor the performance of the oxygen generator at regular intervals to make sure the product oxygen remains within the specifications (Appendix A) of this instruction manual.

6.3 Shutdown

- 1) Set the ON/OFF power switch to OFF.

6.4 Oxygen Purity Test

- 1) Disconnect your application from the oxygen outlet.
- 2) Set the unit's ON/OFF power switch to the ON position. (It takes approximately five minutes for the oxygen purity to stabilize.)
- 3) Verify that the product flow rate delivered by the unit matches the flow capacity of the unit as specified in section 6.1 and does not exceed the capacity of the unit.
- 4) Connect a calibrated oxygen purity analyzer to the oxygen outlet.
- 5) Take oxygen purity readings every 60 seconds until the analyzer shows the same result for two consecutive readings.
- 6) Disconnect the oxygen analyzer and reconnect your application.



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

The oxygen generator requires little maintenance. Use the following chart as a guide to perform preventive maintenance at the required intervals.

Interval	Maintenance
Every week	Clean gross particle filter. (Refer to Section 7.1 — Cleaning the Gross Particle Filter.)
Every month	Make sure product oxygen remains within specifications in Appendix A of this instruction manual.* Clean enclosure. (Refer to Section 7.2 — Cleaning the Enclosure.)
* If product oxygen does not meet specifications, refer to Section 8.0 — Troubleshooting.	

7.1 Cleaning the Gross Particle Filter

Clean the gross particle filter on the back of the oxygen generator enclosure every week, or more frequently if site conditions warrant. A clean filter allows the unit to cool properly.

Use the following procedure to clean the gross particle filter:

- 1) Shut down the oxygen generator as described in Section 6.3 — Shutdown.



Do not operate the unit without the gross particle filter in place.

- 2) Remove the filter, and insert the second filter provided with the unit.
- 3) Restart the unit as described in Section 6.1 — Start-up.
- 4) Wash the filter removed from the unit in a solution of soap and warm water.
- 5) Rinse the filter thoroughly and remove excess water with a soft, absorbent towel.
- 6) Allow the filter to dry, and then store it in a clean location. Alternate the clean filter with the filter on the unit each time you perform this procedure.

7.2 Cleaning the Enclosure



Only trained personnel may open the oxygen generator. To prevent electrical shock, shut down the oxygen generator and disconnect the main power supply before you clean the enclosure.

Use the following procedure to clean the enclosure:

- 1) Shut down the oxygen generator as described in Section 6.3 — Shutdown.
- 2) Disconnect the power cord from the electrical outlet.
- 3) Use a dry, lint-free cloth on the enclosure, taking care to wipe the enclosure clean.



Dry cloth clean only. Do not apply liquid directly to the enclosure or use any petroleum-based solvents or cleaning agents.

8.0 Troubleshooting

8.1 Technical Support

For assistance in troubleshooting or repairing the unit, or to order replacement parts, contact the AirSep Commercial Products Service Department by telephone Monday through Friday between 7:30 a.m. and 4:30 p.m. Eastern Time. In the USA or Canada, call **1-800-320-0303**. Outside the USA or Canada, call **(716) 691-0202**. Send fax inquiries anytime to **(716) 691-1255**. Address written inquiries to:

AirSep Corporation
260 Creekside Drive
Buffalo
NY 14228-2075 USA
Attention: Commercial Products Service Department

E-mail: cpdservice@airsep.com

Visit www.airsep.com to know about our complete range of standard Oxygen Generators.

8.2 Troubleshooting Chart

Use the following chart as a guide to troubleshoot the oxygen generator.



Electrical shock hazard. The interior of the oxygen generator contains electrical parts that can produce an electrical shock if not handled properly. Disconnect the main power supply before removing the panels.



Because the capacitor stores electrical power, it presents an electrical shock hazard even when the main power is disconnected. Never touch both leads on the capacitor simultaneously. Before handling the capacitor, safely discharge the power from the capacitor by using an insulated screwdriver to contact both leads simultaneously.

Problem	Probable Cause	Solution
Unit does not operate.	No electrical power to unit.	Make sure power cord connects to electrical outlet and that electrical outlet receives power.
	Circuit breaker tripped.	Set ON/OFF switch to OFF. Reset circuit breaker and restart unit.
	Faulty electrical connections.	Disconnect main power supply, and make sure all electrical connections, including power cord leads, connect securely.
	Defective ON/OFF switch.	Replace ON/OFF switch.
Unit stops unexpectedly.	No electrical power to unit.	Make sure power cord connects to electrical outlet and that electrical outlet receives power.
	Circuit breaker tripped.	Set ON/OFF switch to OFF, reset breaker, and restart unit. If circuit breaker immediately trips again, check ON/OFF switch, circuit board, capacitor, and air compressor. Replace all defective components.
Air compressor stops unexpectedly or does not operate when cooling fan operates.	Restricted air flow to air compressor.	Clean gross particle filter or remove obstruction.
	Extreme cold ambient temperature.	Allow temperature of unit to increase above 4°C (40°F).
	Thermal shutdown activated on air compressor.	Allow air compressor to cool, then restart unit.
	Faulty electrical connections.	Disconnect main power supply, and ensure that all electrical connections, including the compressor leads, connect securely.
	Defective capacitor.	Replace capacitor.
	Defective air compressor.	Replace air compressor.
Unit operates, but air does not circulate into unit.	Improper power voltage.	Make sure power meets the specifications.
	Faulty electrical connections to cooling fan.	Disconnect main power supply, and ensure that all electrical connections, including cooling fan leads, connect securely.
	Defective cooling fan.	Replace cooling fan.

Problem	Probable Cause	Solution
Purity of product oxygen does not remain within specification in Appendix A of this instruction manual.	Leak in unit.	Pressurize unit, set ON/OFF power switch to OFF, and disconnect main power supply. Remove panels and make sure tubing remains connected to fittings. Use soapy water to check all hoses, tubing, and fittings in unit. Most leaks are audible when area is quiet. Repair leaks and replace hoses or tubing as necessary.
	Defective or worn air compressor.	Replace air compressor.
	Excess temperature inside enclosure due to inadequate ventilation outside enclosure, high ambient temperature, dirty gross particle filter, blocked air intake, or defective cooling fan.	Provide proper ventilation, make sure ambient temperature does not exceed specification in Appendix A of this instruction manual, clean filter, remove obstruction, or replace cooling fan.
	Defective circuit board.	Replace circuit board.
	Contaminated adsorbers.	Replace adsorbers.
	Obstructed exhaust muffler.	Replace exhaust muffler.
	Defective solenoid valve(s).	Repair or replace solenoid valve(s).
Flowmeter fluctuates or flow rate of product oxygen changes unexpectedly.	Leak in unit.	Pressurize unit, set ON/OFF power switch to OFF, and disconnect main power supply. Remove panels and make sure tubing remains connected to fittings. Use soapy water to check all hoses, tubing, and fittings in unit. Most leaks are audible when area is quiet. Repair leaks and replace hoses or tubing as necessary.
	Improperly set or defective pressure regulator.	Check regulator setting or replace defective regulator.
	Defective solenoid valve(s).	Repair or replace solenoid valve(s).
	Defective air compressor.	Replace air compressor.
	Defective circuit board.	Replace circuit board.

Problem	Probable Cause	Solution
Pressure of product oxygen changes unexpectedly.	Relief valves release.	Refer to “Popping’ sound indicates release of relief valves” problem in troubleshooting chart.
	Improperly set or defective pressure regulator.	Check regulator setting or replace defective regulator.
	Leak in unit.	Pressurize unit, set ON/OFF power switch to OFF, and disconnect main power supply. Remove panels and make sure tubing remains connected to fittings. Use soapy water to check all hoses, tubing, and fittings in unit. Most leaks are audible when area is quiet. Repair leaks as necessary.
	Defective air compressor.	Replace air compressor.
“Popping” sound indicates release of relief valves.	Leak in unit.	Pressurize unit, set ON/OFF power switch to OFF, and disconnect main power supply. Remove panels and make sure tubing remains connected to fittings. Use soapy water to check all hoses, tubing, and fittings in unit. Most leaks are audible when area is quiet. Repair leaks as necessary.
	Contaminated adsorbers.	Replace adsorbers.
	Defective solenoid valve(s).	Repair or replace solenoid valve(s).
	Defective circuit board.	Replace circuit board.
	Improperly set or defective pressure regulator.	Check regulator setting or replace defective regulator.
	Obstructed exhaust muffler.	Replace exhaust muffler.
Chattering or buzzing noise from solenoid valve(s).	Defective or worn solenoid valve(s).	Repair or replace solenoid valve(s).
	Low voltage to valve(s).	Make sure electrical power remains within specification in Appendix A of this instruction manual. If power at inlet to unit is correct but is low at valve(s), contact AirSep Commercial Products Service Department.

Problem	Probable Cause	Solution
Circuit board has fewer than two lights lit at any given time.	Defective solenoid.	Replace solenoid coil.
	Faulty electrical connections.	Make sure all electrical connections are secure.
	Defective circuit board.	Replace circuit board
Circuit board has more than two lights lit at any given time.	Defective circuit board.	Replace circuit board.

8.3 Procedures

The following are proper procedures intended for use when performing scheduled maintenance on the generator or in the unlikely event that the generator would require minor repairs.

8.3.1 Cabinet

Removing Side Panels

To remove one or both side panels, unscrew the ¼ turn fastener(s) and remove the panel(s).

Removing Back Panel

Remove both side panels, and lift off the back panel. Make sure the power cord can pass freely through the power cord cutout.

Removing Lower Front Cover

Firmly grasp panel with both hands, and slightly bow panel outward to remove.

Superstructure

The weight and forces of the internal components rest solely on three parts: the superstructure, compressor plate, and the base. These parts were specially designed and formed. They should never require replacement under normal use.

Caster Replacement

Remove the cabinet panels to expose the caster nut. Remove the caster nut with a 9/16-inch socket. (Use an extension for the two front caster nut removals.) Install the new caster and washer, and tighten the nut. Reconnect the cabinet panels.

8.3.2 Compressor

The compressor is the “pump” within the oxygen concentrator that pushes the ambient air into the bottom of the sieve beds. This allows oxygen to flow out of the top.

Two different aspects of the compressor cause concern: the output and the sound level.

Output

Compressor output refers to how much compressed air the compressor can produce. This depends upon the model of the compressor, stroke size, bore size, and cup seal condition. The cup seals form the seal between the piston and the cylinder wall. As the cup seals wear, the compressor’s output begins to gradually decrease. This reduction in

compressor output results in less air for the sieve beds. Therefore, the production of oxygen decreases.

Since this drop in oxygen production occurs over a very long period of time, there is no regular preventative maintenance required on the compressor. In the event of degradation in the performance of the unit, the compressor should be replaced.

Sound Level

The condition of the compressor's bearings mainly determines its sound level.

There are four bearings located within the compressor that allow the inner components of the compressor to rotate. If the bearings wear to the point that they become noisy, the compressor becomes noticeably loud and needs servicing.

8.3.2.1 Compressor Assembly Removal

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

1. Set the unit's ON/OFF switch to the OFF position, and unplug the power cord.
2. Remove both sides and lower front panels.
3. Disconnect the suction tube.
4. Disconnect the blue compressor lead at the terminal strip and the brown lead at the temperature switch.
5. Disconnect the two leads to the capacitor and remove if necessary.
6. Disconnect the compression fitting for the heat exchanger located at the bottom center of the compressor.
7. Remove the two screws that connect the compressor plate to the base of the unit, and slide out the compressor assembly.
8. Remove compressor from the plate by removing the four compressor bolts.

8.3.2.2 Compressor Assembly Installation

To install the compressor assembly, follow the steps listed below:

1. Perform the compressor removal procedure in reverse order.
2. Make sure to position the compressor's lead wires behind the braided suction tube.
3. Leak test all connections.

8.3.2.3 Capacitor Replacement

The capacitor starts the compressor. If the compressor cannot start, the capacitor may be defective and require replacement. To replace the capacitor, follow the steps listed below:

1. Set the unit's ON/OFF switch to the OFF position, and unplug the power cord.
2. Remove both sides and lower front panels.
3. Disconnect the two leads to the capacitor and slide capacitor out of the tie wraps holding it in place.
4. To install the new capacitor, connect the leads and slide the capacitor into the tie wraps.
5. Reconnect the front and the side panels.

8.3.3 Solenoid Valves

The oxygen generation unit uses 5 two-way solenoid valves: two feed, two waste, and one equalization. Each valve has an open (energized) and closed (de-energized) position. As the unit operates, two valves are always energized.

The solenoid valves of the unit require no scheduled maintenance. If a valve becomes noisy, you can easily replace the internal valve parts. To identify the noisy valve, observe which green circuit board light illuminates at the time of the noise. The lighting matrix on the circuit board corresponds to the valve location.

8.3.3.1 Feed or Waste Valve Rebuilding

The two feed valves and two waste valves are located on the unified valve block. This valve block does not require removal to rebuild a feed or waste valve.

1. Set the ON/OFF switch to the OFF position, and unplug the power cord.
2. Remove both sides and back panels.
3. Remove the red cap from the appropriate valve with a slotted head screwdriver.
4. Lift off the solenoid coil.



Correct direction of spring is required for proper valve function.

5. Loosen and remove the solenoid base with a one-inch deep well socket.
6. Install the rebuild kit, which contains all parts of the solenoid assembly except the solenoid coil.
7. To reassemble the feed or waste valves, reverse the order of steps 1-6, and test for leaks.

8.3.3.2 Solenoid Valve Coil Replacement

If a solenoid valve coil does not operate, its corresponding green light on the circuit board will not illuminate.

1. Set the ON/OFF switch to the OFF position, and unplug the power cord.
2. Remove both sides and back panels.
3. Remove the red cap from the appropriate valve with a slotted head screwdriver.
4. Disconnect the solenoid leads, and lift off the solenoid coil.
5. Replace with the new coil.
6. Press the red cap back on top of the coil, and reconnect the solenoid leads.
7. Reconnect the back and side panels.

8.3.4 Sieve Beds



Do not expose molecular sieve (contents of bed) to air for an extended period of time. Prolonged exposure of molecular sieve to the moisture in room air results in contamination and permanent damage to the sieve material. Keep all openings to the sieve beds sealed.



If replacement is necessary, you must replace both sieve beds at the same time.

8.3.4.1 Sieve Bed Removal

1. Set the ON/OFF switch to the OFF position, and unplug the power cord.
2. Remove both sides and back panels.
3. Cut the tie-wraps at the brass “T” fitting and disconnect the green ¼-inch product tubes.
4. Cut the tie-wraps at the top of the sieve beds and disconnect the ¼-inch equalization tubes.
5. Remove the 9/16-inch compression fitting on the bottom of each sieve bed.
6. Cut the white tie-wraps and remove the sieve beds.
7. Plug the opening on the top and bottom of the sieve beds.

8.3.4.2 Sieve Bed Installation

To install the sieve beds, follow the sieve bed removal procedure in reverse order. It is very important to tighten all tubes to eliminate leaks. However do not over tighten.

To check for leaks, take the following steps:

1. Plug in the unit.
2. Set the unit’s ON/OFF switch to ON for three minutes with the flowmeter closed to pressurize the system.
3. Set the unit’s ON/OFF switch to OFF and unplug the power cord.
4. Apply soapy water around the sieve bed tube connections and check for leaks.
5. Reconnect the back and the side panels.



Leaks can be so small in air loss that purity is not affected immediately. The sieve material can become contaminated gradually. Careful leak testing is important.

8.3.5 Cabinet Fan Replacement

The cabinet fan for the oxygen generator is located in the back of the unit.

To replace the cabinet fan, take the following steps:

1. Set the unit’s ON/OFF switch to the OFF position and unplug the power cord.

2. Remove both sides and back panels.
3. Remove the two screws that hold the fan to the superstructure and remove the fan.
4. Disconnect the fan leads.
5. Position the new compressor fan so that the air flow arrow points toward the compressor and the electrical connections are in the bottom right corner.
6. Connect the fan leads and install the cabinet fan screws.
7. Reconnect the back and side panels.

8.3.6 Circuit Board Replacement

The solid-state printed circuit board controls the sequential timing operation of the five solenoid valves. The five-green-light matrix corresponds to the valve configuration of the Oxygen generator. Two green lights should always illuminate and rotate (cycle) during normal operation.

A green light that fails to illuminate indicates a disconnected or faulty solenoid coil or an electrical malfunction in that valve circuit.



The Printed Circuit Boards (PCBs) contain components that are sensitive to electrostatic discharge (ESD) and can damage the board if not handled properly. As when handling any ESD-sensitive PCB, observe standard ESD safety procedures. These include the following:

- Handle the PCB by the edges only.
- Work on a grounded ESD mat.
- Wear a grounded wrist strap.

Store PCBs only in anti-static bags.

8.3.6.1 Circuit Board Removal

1. Set the ON/OFF switch to the OFF position, and unplug the power cord.
2. Remove both sides and back panels.
3. Disconnect the main power 10-pin connector from the circuit board.

4. With a slotted screwdriver, push in on the board support tabs, while you lift each corner of the circuit board.
5. Remove any tubing connected to the circuit board (If applicable).
6. Remove the circuit board.



Handle the new circuit board only by the edges to prevent electrostatic damage to the unit.

8.3.6.2 Circuit Board Installation

1. Push the circuit board onto the support tabs.
2. Firmly plug in the 10-pin connector.
3. Reconnect (If applicable) any tubing disconnected during the circuit board removal procedure.
4. Reconnect the back and side panels.

A Appendix Technical Data & Drawings

Specifications

Data in this section refers to standard Onyx, Onyx+ and Onyx Ultra oxygen generators. Consult your sales representative to determine whether your oxygen generator requires modifications for your application.



Provide proper voltage from a grounded outlet to the oxygen generator. Main power supply voltage fluctuation must not exceed 10% of the nominal supply voltage.

Onyx

Oxygen output:	12 SCFH at 9 psig (6LPM on the flowmeter) 0.31 Nm ³ /hr at 62.1 kPa**
Oxygen purity:	90% minimum
Oxygen dew point:	-73°C (-100°F)
Dimensions:	15.7 x 14.5 x 28.5 in. (W x D x H) 40 x 36.8 x 72.4 cm (W x D x H)
Approximate weight:	54 lb; shipping weight – 61.0 lb 25 kg; shipping weight – 28 kg
Power requirements:	100 V ~±10%, 50/60 Hz, Single Phase, 5.5A 120 V ~±10%, 60 Hz, Single Phase, 5.0A 240 V ~±10%, 50 Hz, Single Phase, 2.3A 240 V ~±10%, 60 Hz, Single Phase, 2.3A
Other Specifications:	
Pollution Degree	2
Installation Category	II
Altitude	2000 m

*SCFH (standard cubic feet per hour) gas measured at 1 atmosphere and 70°F.

**Nm³ (normal cubic meters) gas measured at 1 atmosphere and 0°C.

Onyx+

Oxygen output:	17 SCFH at 20 psig (8 LPM on the flowmeter) 0.44 Nm ³ /hr at 137.9 kPa**
Oxygen purity:	90% minimum
Oxygen dew point:	-73°C (-100°F)
Dimensions:	15.7 x 14.5 x 28.5 in. (W x D x H) 40 x 36.8 x 72.4 cm (W x D x H)
Approximate weight:	56 lb; shipping weight – 63.0 lb 25 kg; shipping weight – 29 kg
Power requirements:	120 V ~±10%, 60 Hz, Single Phase, 5.0A 240 V ~±10%, 50 Hz, Single Phase, 2.3A 240 V ~±10%, 60 Hz, Single Phase, 2.3A
Other Specifications:	
Pollution Degree	2
Installation Category	II
Altitude	2000 m

If you have purchased a Onyx+ (120 V/ 60 Hz) with the flowmeter calibrated in lpm scale instead of percentage, please ensure that top of the ball of the flowmeter touches the 6.5 lpm marked line for standard specifications.

*SCFH (standard cubic feet per hour) gas measured at 1 atmosphere and 70°F.

**Nm³ (normal cubic meters) gas measured at 1 atmosphere and 0°C.

Onyx Ultra

Oxygen output:	21 SCFH at 20 psig (10 LPM on the flowmeter) 0.55 Nm ³ /hr at 137.9 kPa**
Oxygen purity:	90% minimum
Oxygen dew point:	-73°C (-100°F)
Dimensions:	15.7 x 14.5 x 28.5 in. (W x D x H) 40 x 36.8 x 72.4 cm (W x D x H)
Approximate weight:	58 lb; shipping weight – 65.0 lb 26 kg; shipping weight – 30 kg
Power requirements:	120 V ~±10%, 60 Hz, Single Phase, 6.0A 240 V ~±10%, 50 Hz, Single Phase, 3.0A
Other Specifications:	
Pollution Degree	2
Installation Category	II
Altitude	2000 m

*SCFH (standard cubic feet per hour) gas measured at 1 atmosphere and 70°F.

**Nm³ (normal cubic meters) gas measured at 1 atmosphere and 0°C.

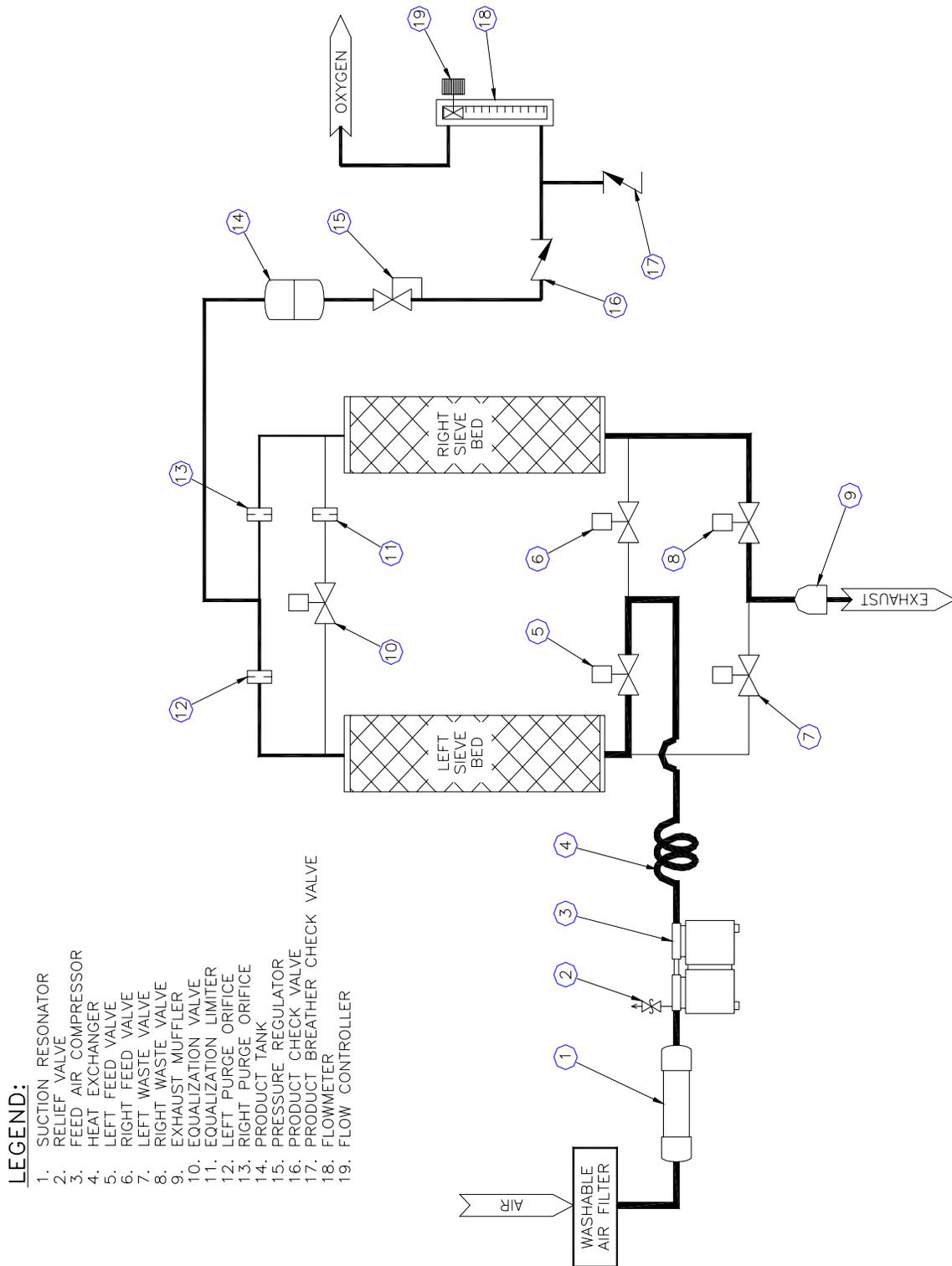


Figure A-1: Onyx Flow Schematic

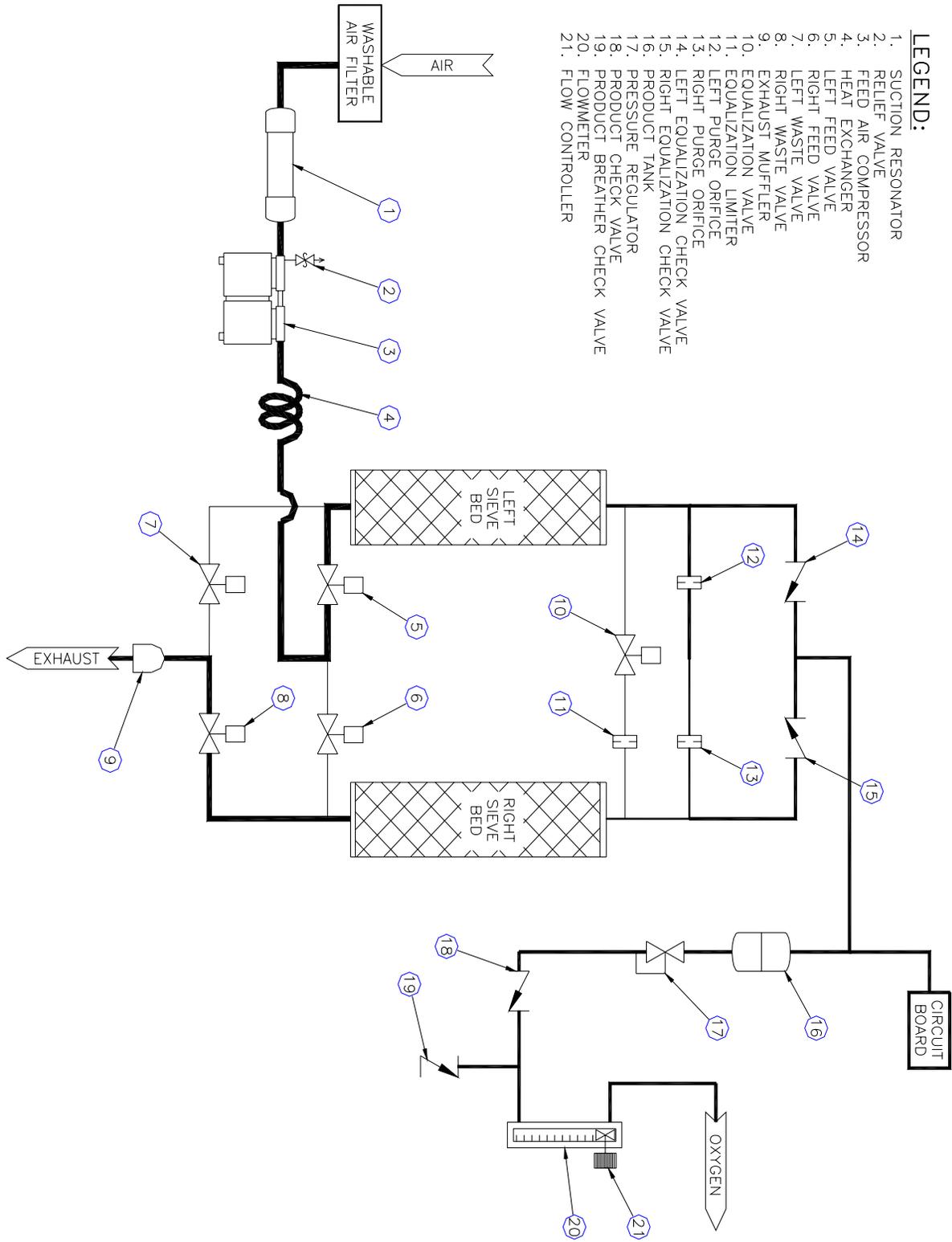


Figure A-2: Onyx+ Flow Schematic

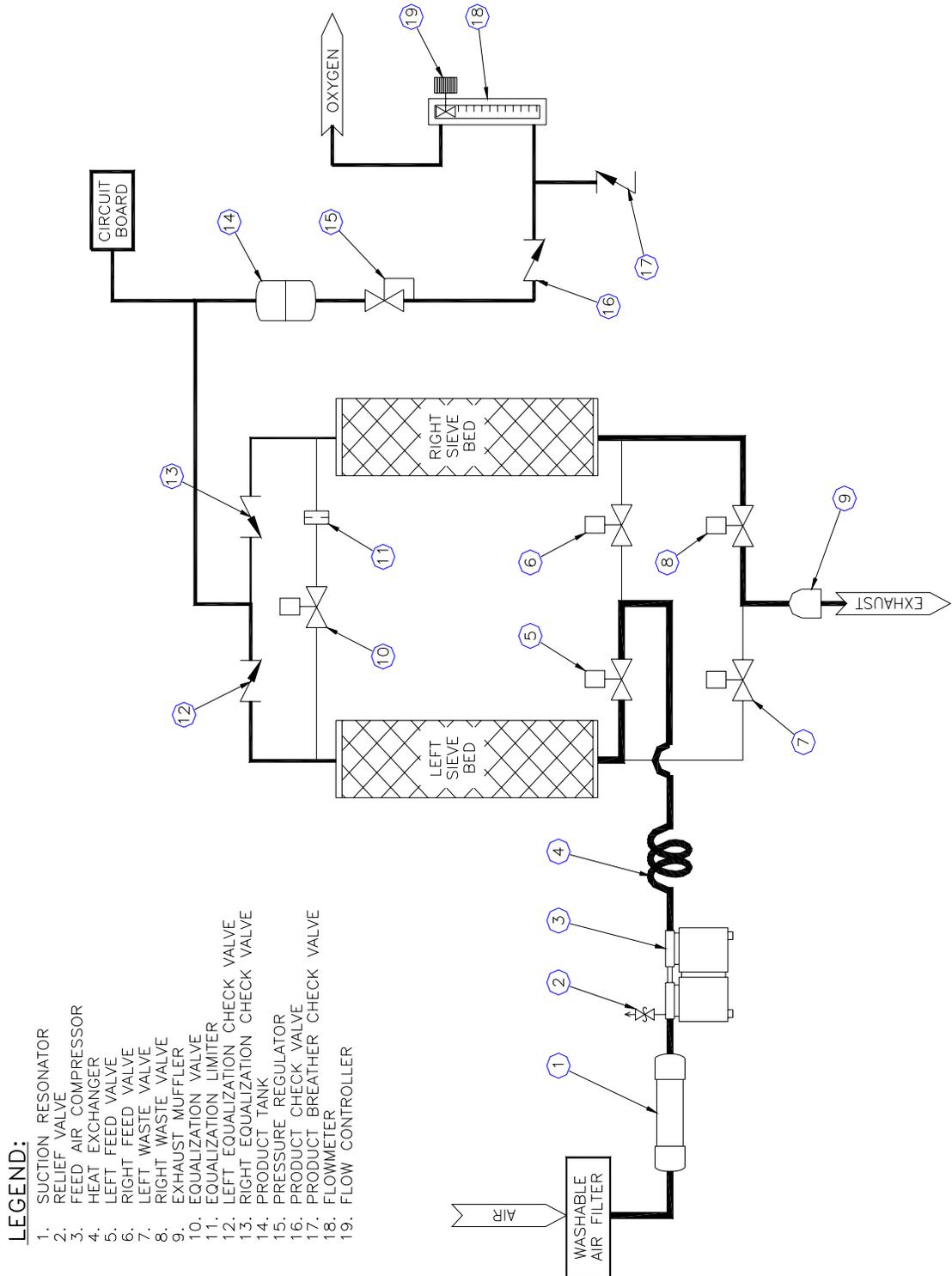


Figure A-3: Onyx Ultra Flow Schematic

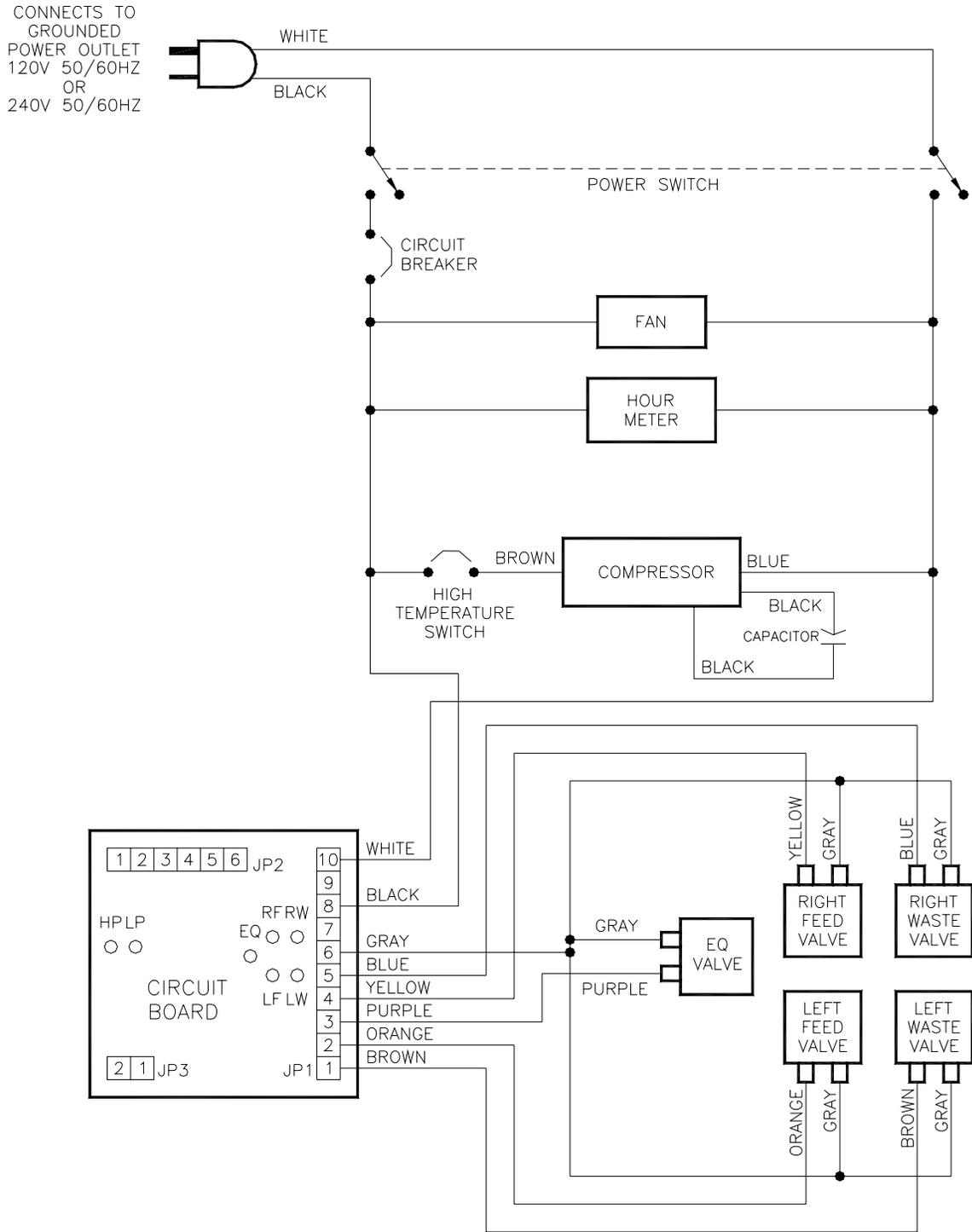


Figure A-4: Electrical Schematic

B Appendix

Warranty>Returns

Product Warranty

AirSep Corporation (“AirSep”) warrants to the party purchasing from AirSep (the “original purchaser”) the Onyx/Onyx+/Onyx Ultra oxygen generator 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.

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).



AirSep oxygen generators are sold for use in industrial applications only. Contact AirSep Corporation or an authorized AirSep Corporation representative before you use this unit for any medical application.

Returning the Oxygen Generator or a Component for Service

If the oxygen generator 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 generator 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 Generator 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 generator, 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 generator 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

Parts List

Use the following lists to order parts for the oxygen generator. To order, please contact your distributor. If instructed by your distributor to contact AirSep Corporation, contact the AirSep Commercial Products Service Department (Section 8.1 – Technical Support). If the list does not contain the part you require, please provide a precise description of the part when you call.

Onyx Spare Parts List (115V generators)

Item	Qty	Part #
12,000 Hour /2 yr New compressor or Rebuild Existing		
Compressor 115/60 , Compressor Only	1	CO240-1
Compressor, 115/60 Complete Assby Mtd, fittings, heat x-chg	1	CO006-1
Compressor 100/50/60	1	CO093-1
Compressor, Rebuild Kit 2619 & 2639	1	CO012-6
Compressor, Rebuild Kit 2669190A&B	1	CO012-8
Compressor, Rebuild Kit 2669190	1	CO012-9
Compressor, Rebuild Kit 2660	1	CO012-11
30,000 Hour Kit/ 4 Year		
Feed and Waste Valve Rebuild Kit	4	VA034-1
Equalization Valve Replacement	1	VA003-9
Emergency Kit		
PC Board	1	CB004-1
Feed and Waste Valve Rebuild Kit	1	VA034-1
Feed and Waste Valve Coil	1	VA054-1
Equalization Valve Replacement	1	VA003-9
Equalization Valve Coil	1	VA052-1
Capacitor	1	CC006-3
Circuit Breaker	1	CR001-1
Rebuilt Sieve Bed Assembly Onyx (2 Beds)	1	BE036-1
Supplemental Equipment		
Oxygen Analyzer	1	AN009-2
Replacement Sensor (MedR-17)	1	AN014-2
On-Off Switch, rocker, two pole	1	SW114-1
Regulator	1	RG022-1
Flowmeter, 6 LPM	1	FM080-1
Plastic, Adapter B-size, "Christmas Tree"	1	F0025-1

Onyx Spare Parts List (220V generators)

Item	Qty	Part #
12,000 Hour /2 yr New compressor or Rebuild Existing		
Compressor, 220/50, Compressor Only	1	CO240-2
Compressor, 220/60	1	CO240-5
Compressor, 220/50 Complete Assby, Mtd / fittings, heat x-chg	1	CO006-4
Compressor, 220/60 Complete Assby, Mtd / fittings, heat x-chg	1	CO006-7
Compressor, Rebuild Kit 2619 & 2639	1	CO012-6
Compressor, Rebuild Kit 2669190A&B	1	CO012-8
Compressor, Rebuild Kit 2669190	1	CO012-9
Compressor, Rebuild Kit 2660	1	CO012-11
30,000 Hour Kit/ 4 Year		
Feed and Waste Valve Rebuild Kit	4	VA034-1
Equalization Valve Replacement	1	VA003-10
Emergency Kit		
PC Board	1	CB004-2
Feed and Waste Valve Rebuild Kit	1	VA034-1
Feed and Waste Valve Coil	1	VA119-1
Equalization Valve Replacement	1	VA003-10
Equalization Valve Coil	1	VA117-1
Capacitor	1	CC006-6
Circuit Breaker	1	CR001-5
Rebuilt Sieve Bed Assembly Onyx (2 Beds)	1	BE036-1
Supplemental Equipment		
Oxygen Analyzer, Model AX-300	1	AN009-2
Replacement Sensor(MedR-17)	1	AN014-2
On-Off Switch, rocker, two pole	1	SW114-1
Regulator	1	RG022-1
Flowmeter, 6 LPM	1	FM080-1
Plastic, Adapter B-size, "Christmas Tree"	1	F0025-1

Onyx+ Spare Parts List (115V generators)

Item	Qty	Part #
12,000 Hour /2 yr New compressor or Rebuild Existing		
Compressor 115/60, Compressor Only	1	CO240-9
Compressor 115/60, Complete Assby, Mtd	1	CO006-18
Compressor, Rebuild Kit 2660	1	CO012-11
30,000 Hour Kit/ 4 Year		
Feed and Waste Valve Rebuild Kit	4	VA034-1
Equalization Valve	1	VA003-9
Emergency Kit		
PC Board	1	CB068-3
Feed and Waste Valve Rebuild Kit	1	VA034-1
Feed and Waste Valve Coil	1	VA054-1
Equalization Valve Replacement	1	VA003-9
Equalization Valve Coil	1	VA052-1
Capacitor	1	CC006-3
Circuit Breaker	1	CR001-1
Sieve Bed Assembly Onyx (2 Beds)	1	BE155-1
Supplemental Equipment		
Oxygen Analyzer, Model AX-300	1	AN009-2
Replacement Sensor, MedR-17	1	AN014-2
On-Off Switch, rocker, two pole	1	SW114-1
Regulator	1	RG088-1
Flowmeter, 8 LPM	1	FM080-2
Plastic, Adapter B-size, "Christmas Tree"	1	F0025-1

Onyx+ Spare Parts List (220V generators)

Item	Qty	Part #
12,000 Hour /2 yr New compressor or Rebuild Existing		
Compressor, 220/50, Compressor Only	1	CO240-7
Compressor, 220/60, Compressor Only	1	CO240-8
Compressor, 220/50, Complete Assby Mtd	1	CO006-19
Compressor, Rebuild Kit 2660	1	CO012-11
30,000 Hour Kit/ 4 Year		
Feed and Waste Valve Rebuild Kit	4	VA034-1
Equalization Valve	1	VA003-10
Emergency Kit		
PC Board	1	CB068-7
Feed and Waste Valve Rebuild Kit	1	VA034-1
Feed and Waste Valve Coil	1	VA119-1
Equalization Valve Replacement	1	VA003-10
Equalization Valve Coil	1	VA117-1
Capacitor	1	CC005-9
Circuit Breaker	1	CR001-5
Sieve Bed Assembly Onyx (2 Beds)	1	BE155-1
Supplemental Equipment		
Oxygen Analyzer, Model AX-300	1	AN009-2
Replacement Sensor, MED R-17	1	AN014-2
On-Off Switch, rocker, two pole	1	SW114-1
Regulator	1	RG088-1
Flowmeter, 8 LPM	1	FM080-2
Plastic, Adapter B-size, "Christmas Tree"	1	F0025-1

Onyx Ultra Spare Parts List (115V generators)

Item	Qty	Part #
12,000 Hour /2 yr New compressor or Rebuild Existing		
Compressor 115/60, Compressor Only	1	CO305-1
Compressor, Rebuild Kit 2660	1	CO012-11
30,000 Hour Kit/ 4 Year		
Feed and Waste Valve Rebuild Kit	4	VA034-1
Equalization Valve	1	VA003-9
Emergency Kit		
PC Board	1	CB068-9
Feed and Waste Valve Rebuild Kit	1	VA034-1
Feed and Waste Valve Coil	1	VA054-1
Equalization Valve Replacement	1	VA003-9
Equalization Valve Coil	1	VA052-1
Capacitor	1	CC006-3
Circuit Breaker	1	CR001-1
Sieve Bed Assembly Onyx (2 Beds)	1	BE186-1
Supplemental Equipment		
Oxygen Analyzer, Model AX-300	1	AN009-2
Replacement Sensor, MedR-17	1	AN014-2
On-Off Switch, rocker, two pole	1	SW114-1
Regulator	1	RG088-1
Flowmeter, 10 LPM	1	FM080-3
Plastic, Adapter B-size, "Christmas Tree"	1	F0025-1

Onyx Ultra Spare Parts List (220V generators)

Item	Qty	Part #
12,000 Hour /2 yr New compressor or Rebuild Existing		
Compressor, 220/50, Compressor Only	1	CO337-1
Compressor, Rebuild Kit 2660	1	CO012-11
30,000 Hour Kit/ 4 Year		
Feed and Waste Valve Rebuild Kit	4	VA034-1
Equalization Valve	1	VA003-10
Emergency Kit		
PC Board	1	CB107-1
Feed and Waste Valve Rebuild Kit	1	VA034-1
Feed and Waste Valve Coil	1	VA119-1
Equalization Valve Replacement	1	VA003-10
Equalization Valve Coil	1	VA117-1
Capacitor	1	CC005-9
Circuit Breaker	1	CR001-5
Sieve Bed Assembly Onyx (2 Beds)	1	BE186-1
Supplemental Equipment		
Oxygen Analyzer, Model AX-300	1	AN009-2
Replacement Sensor, MED R-17	1	AN014-2
On-Off Switch, rocker, two pole	1	SW114-1
Regulator	1	RG088-1
Flowmeter, 10 LPM	1	FM080-3
Plastic, Adapter B-size, "Christmas Tree"	1	F0025-1

D Appendix

Component Literature

Compressors

- Thomas Industries
2660 Series, Compressors
CE32, CG32, CG36, CHI37 and CHI42
[Exploded View and Parts List](#)
- Thomas Industries
2660 Series, Compressors
CE32, CG32, CG36, CHI37 and CHI42
[Wiring Diagram](#)
- Thomas Industries
2660 Series, Compressors
CE32, CG32, CG36, CHI37 and CHI42
[Troubleshooting Guide](#)
- Thomas Industries
2660 Series, Compressors
CE36
[Exploded View and Parts List](#)
- Thomas Industries
2660 Series, Compressors
CE36
[Wiring Diagram](#)
- Thomas Industries
2660 Series, Compressors
CE36
[Troubleshooting Guide](#)
- Thomas Industries
2660 Series, Compressors
CS37
[Exploded View and Parts List](#)
- Thomas Industries
2660 Series, Compressors
CS37
[Wiring Diagram](#)
- Thomas Industries
2660 Series, Compressors
CS37
[Troubleshooting Guide](#)

- Thomas Industries
2660 Series, Compressors
CE50
[Exploded View and Parts List](#)
- Thomas Industries
2660 Series, Compressors
CE50
[Wiring Diagram](#)
- Thomas Industries
2660 Series, Compressors
CE50
[Troubleshooting Guide](#)
- Thomas Industries
2660 Series, Compressors
CHI56
[Exploded View and Parts List](#)
- Thomas Industries
2660 Series, Compressors
CHI56
[Wiring Diagram](#)
- Thomas Industries
2660 Series, Compressors
CHI56
[Troubleshooting Guide](#)

Fans

- Sunon Inc.
SP Series, Fans
[Specification Sheet](#)
- Sunon Inc.
SP Series, Fans
[Model Numbering System](#)

Regulator

- Norgren
R07 Series Regulator
[Data Sheet](#)
- Norgren
R07 Series Regulator
[Installation and Maintenance Instructions](#)

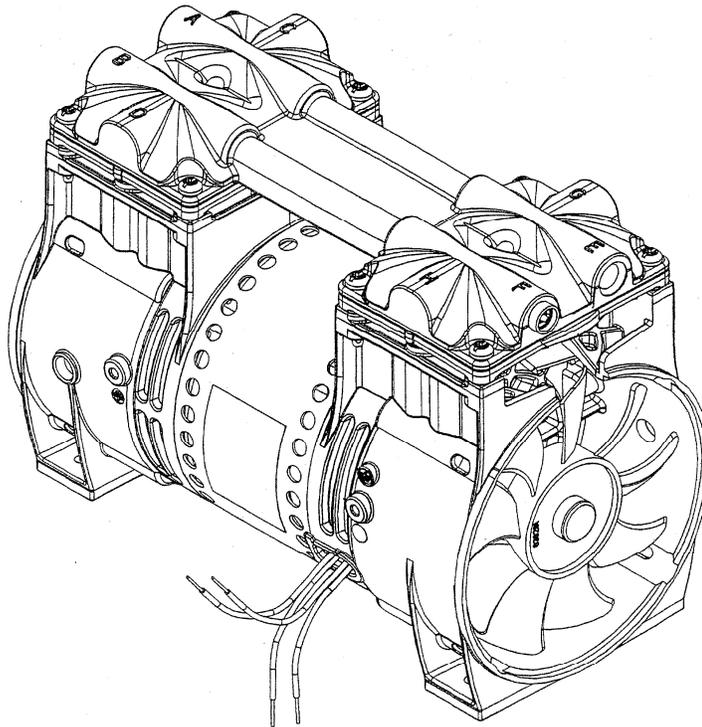
Valves

- ASCO Valve Inc.
U8016 & US8016, Valves
Open-Frame Solenoids
[Installation and Maintenance Instructions](#)



**2660CE32-190, 2660CHI37-190, 2660CG32-190,
2660CHI42-190 & 2660CG36-190**

Compressor



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FSM 0132 Revision D 11/04

Field Service Parts List for Thomas 2660 Series Compressors

Item No.	Part No.	Qty. Per Asmbly	Qty. Per Unit	Description
1*	See Chart	-	2	Connecting Rod, Eccentric & Bearing Assembly
2	624677	1	2	Piston Cup
3	625776	1	2	Screw - Piston Cup Retainer
4	626392	1	2	Piston Cup Retainer
5	618114	1	2	Cylinder Sleeve
6	662809	-	1	Head
7	623143	-	2	O-Ring - Head Gasket
8	625175	-	8	Screw - Head
9	621591	-	2	Valve Plate Assembly
10	617177	1	2	Valve Restraint
11	617562	2	4	Valve Keeper Strip
12	621485	2	4	Valve Flapper - Intake & Exhaust
13	621641	1	2	Valve Plate
14	625094	2	4	Screw - Valve Flapper
15	623137	-	2	O-Ring Valve Plate
16	638281	-	1	Fan - Gray
17	638282	-	1	Fan - Black
18	638701	-	1	Valve - Pressure Relief
19	623093	-	1	Retaining Clip - PRV

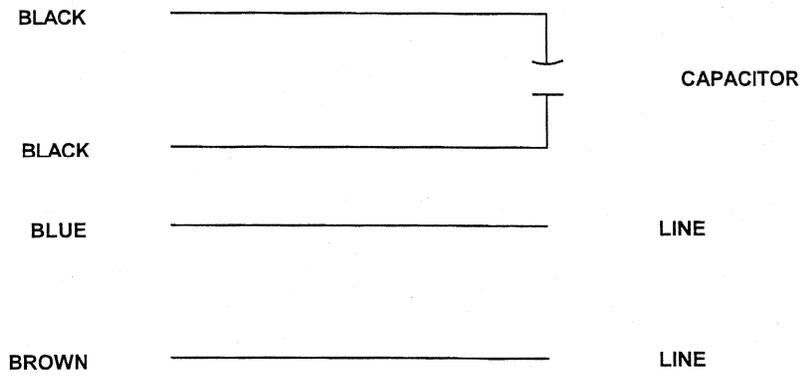
Connecting Rod, Eccentric & Bearing Assembly

Item	Part No.	Description	Qty
1*	666800	2660CE32-190 and 2660CG32-190	2
1*	666660	2660CHI37-190 Compressor	2
1*	666702	2660CHI42-190 Compressor	2
1*	666855	2669CG36-190 Compressor	2

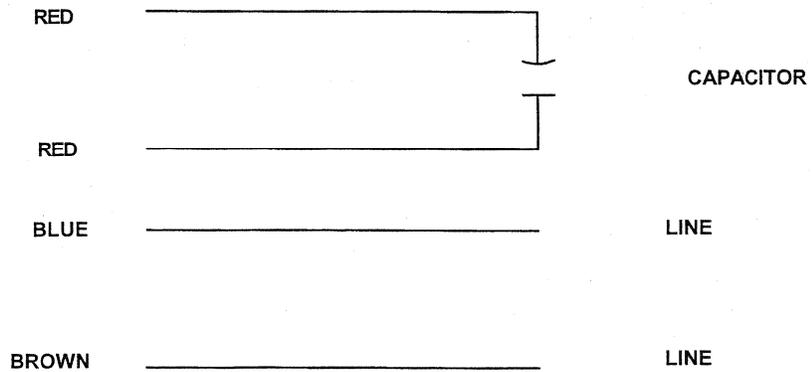
Wiring Diagram

Use this wiring diagram to connect your compressor to the power source.

2660CE32-190



2660CHI37-190, 2660CHI42-190, 2660CG32-190 & 2660CG36-190



Troubleshooting Guide

If you are having a problem with your compressor, use this table to help determine the cause(s):

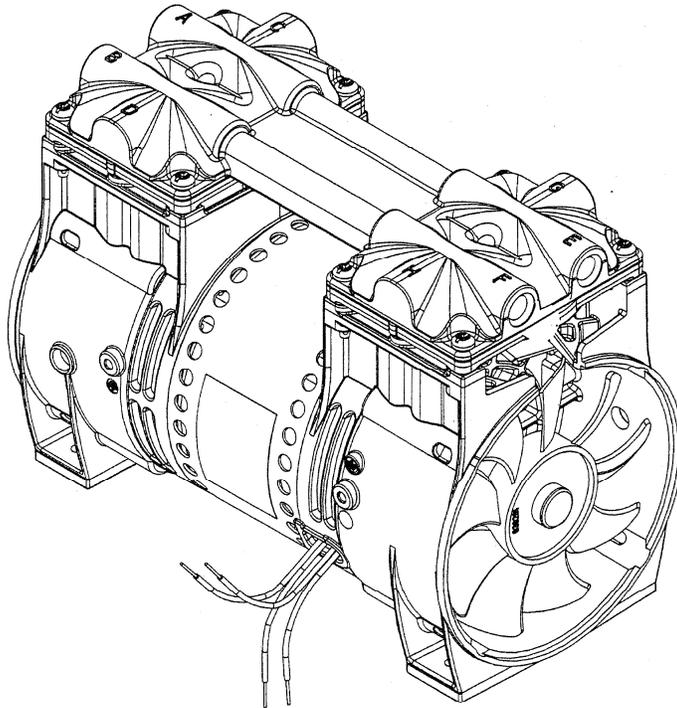
Low Flow	Low Pressure	Problem		Loud Unit	Possible Cause	Corrective Action
		Unit Will Not Start	Motor ^① Overheats			
			x		High voltage at compressor	Reduce voltage
x	x	x	x		Low voltage at compressor	Increase voltage
x	x			x	Damaged valves	Replace flapper valves
x	x			x	Debris in valves	Remove debris and check for valve damage
x	x			x	Damaged gaskets	Replace gaskets
x	x			x	Worn Cup	Replace connecting rod assembly or cup
x	x			x	Loose head screws	Tighten head screws
			x		Broken fan	Replace fan
		x	x	x	Bent motor shaft	Replace entire unit
		x	x		Damaged capacitor	Replace capacitor
x					Loose fittings	Tighten fittings
x			x		Insufficient ventilation in enclosure	Increase air circulation to enclosure
		x		x	Worn bearings	Replace eccentric and bearing assembly
				x	Loose rod clamping screw	Apply Loctite® 242 and retighten

① Thermal protector in motor will interrupt current when motor overheats.



2660CE35-190 & 2660CE36-190

Compressor

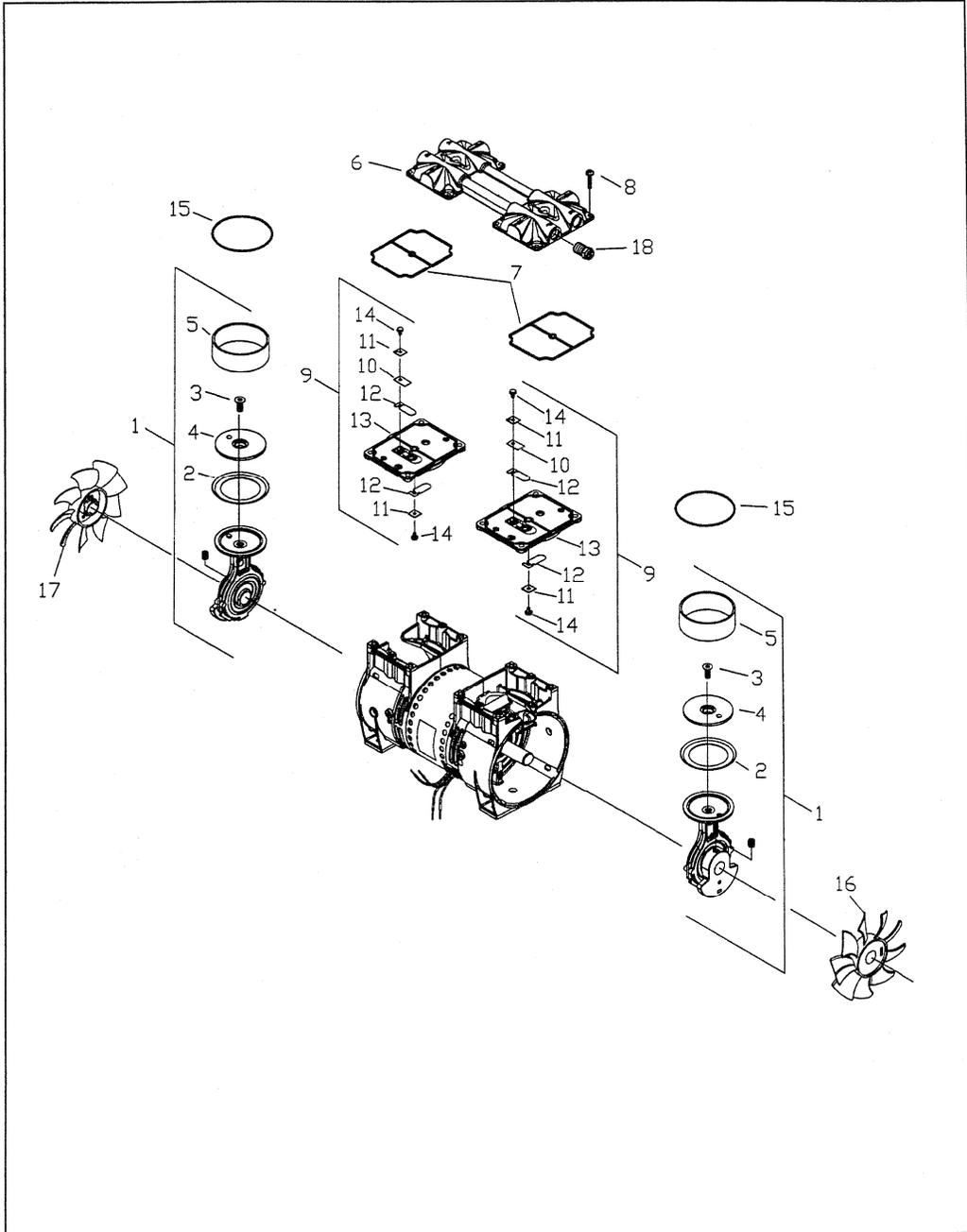


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FSM 0166 Rev. A 07/04

Exploded View and Parts List

Exploded View of the Thomas 2660 Series Compressor



Field Service Parts List for Thomas 2660 Series Compressor

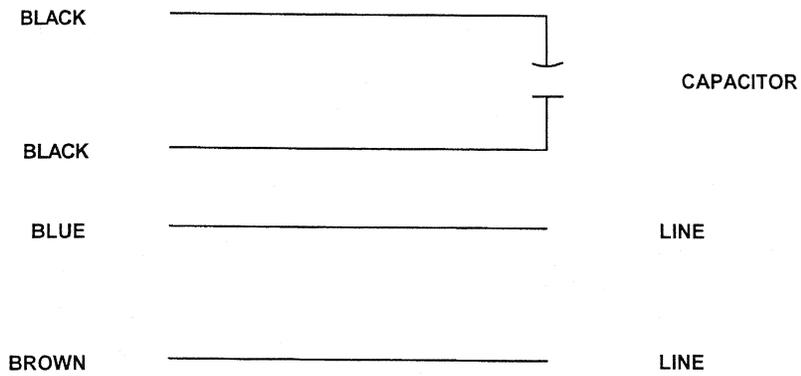
Item No.	Part No.	Qty. Per Asmbly	Qty. Per Unit	Description
1	See Chart	–	2	Connecting Rod, Eccentric & Bearing Assembly
2	614942	1	2	Piston Cup
3	625776	1	2	Screw - Piston Cup Retainer
4	626392	1	2	Piston Cup Retainer
5	618114	1	2	Cylinder Sleeve
6	610534	–	1	Head
7	623143	–	2	O-Ring - Head Gasket
8	625175	–	8	Screw - Head
9	621591	–	2	Valve Plate Assembly
10	617177	1	2	Valve Restraint
11	617562	2	4	Valve Keeper Strip
12	621485	2	4	Valve Flapper - Intake & Exhaust
13	621641	1	2	Valve Plate
14	625094	2	4	Screw - Valve Flapper
15	623137	–	2	O-Ring Valve Plate
16	638281	–	1	Fan - Gray
17	638282	–	1	Fan - Black
18	638581	–	1	Valve - Pressure Relief

Item No.	Part No.	Qty/Unit	Model Number
1	666750	2	2660CE35-190
1	666855	2	2660CE36-190

Wiring Diagram

Use this wiring diagram to connect your compressor to the power source.

2660CE35-190 & 2660CE36-190



Troubleshooting Guide

If you are having a problem with your compressor, use this table to help determine the cause(s):

Low Flow	Low Pressure	Problem Unit Will Not Start	Motor Overheats ^①	Loud Unit	Possible Cause	Corrective Action
			x		High voltage at compressor	Reduce voltage
x	x	x	x		Low voltage at compressor	Increase voltage
x	x			x	Damaged valves	Replace flapper valves
x	x			x	Debris in valves	Remove debris and check for valve damage
x	x			x	Damaged gaskets	Replace gaskets
x	x			x	Worn Cup	Replace connecting rod assembly or cup
x	x			x	Loose head screws	Tighten head screws
			x		Broken fan	Replace fan
		x	x	x	Bent motor shaft	Replace entire unit
		x	x		Damaged capacitor	Replace capacitor
x					Loose fittings	Tighten fittings
x			x		Insufficient ventilation in enclosure	Increase air circulation to enclosure
		x		x	Worn bearings	Replace eccentric and bearing assembly
				x	Loose rod clamping screw	Apply Loctite® 242 and retighten

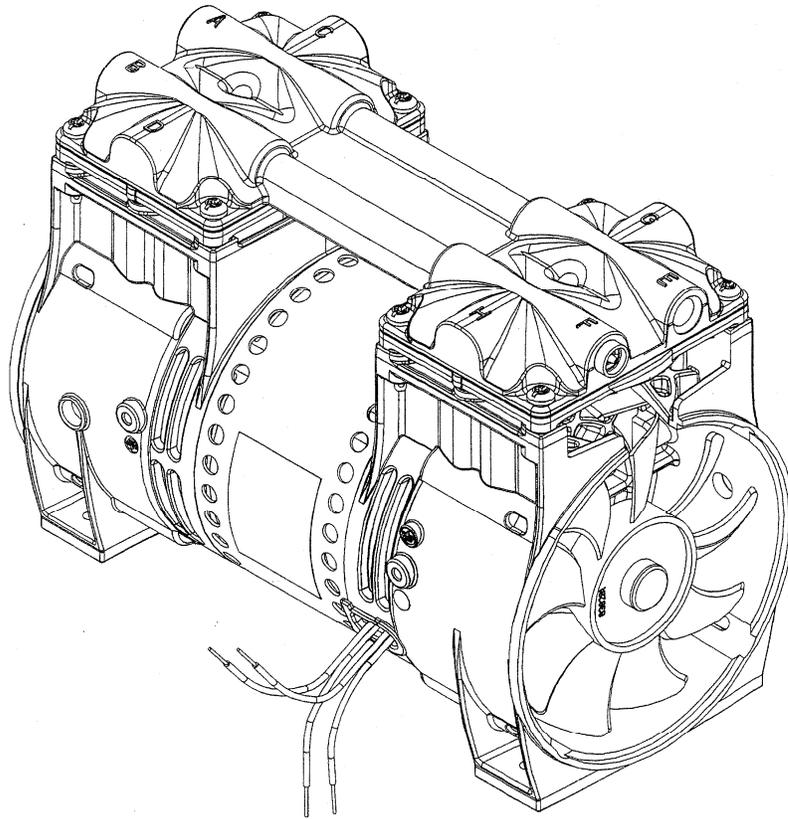
① Thermal protector in motor will interrupt current when motor overheats.



2660CS37-190

Compressor

Field Service Manual

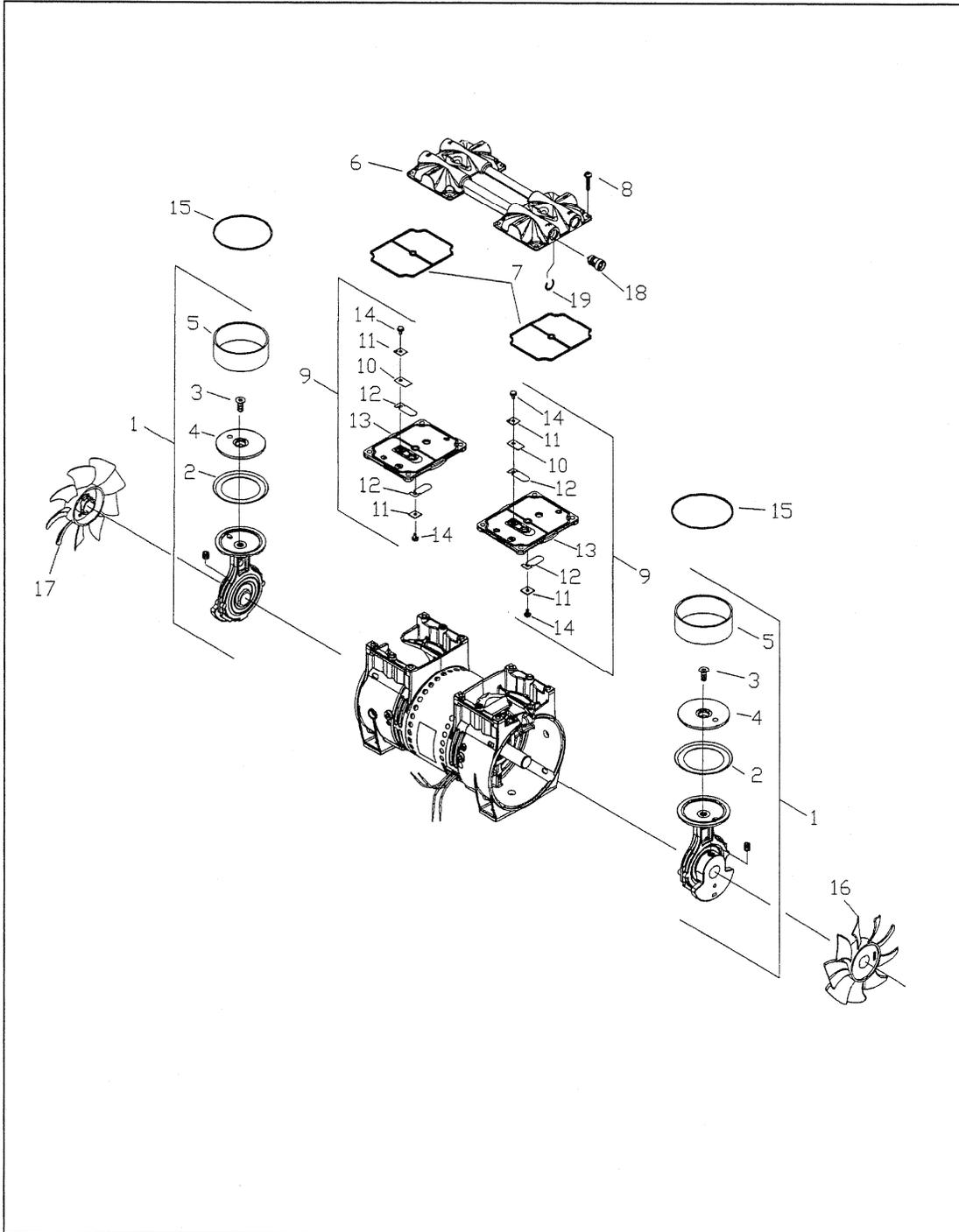


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FSM0160
Rev. B 06/04

Exploded View and Parts List

Exploded View of the Thomas 2660 Series Compressor



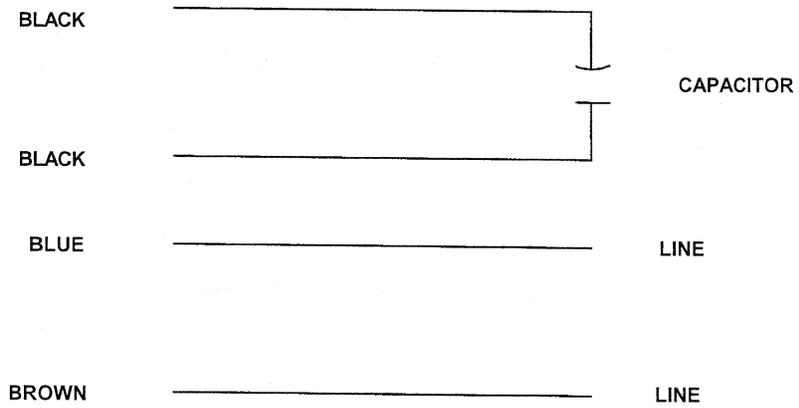
Field Service Parts List for Thomas 2660 Series Compressor

Item No.	Part No.	Qty. Per Asmbly	Qty. Per Unit	Description
1	666660	-	2	Con. Rod, Eccentric & Bearing Assembly
2	624677	1	2	Piston Cup
3	625776	1	2	Screw - Piston Cup Retainer
4	626392	1	2	Piston Cup Retainer
5	618114	1	2	Cylinder Sleeve
6	662809	-	1	Head
7	623143	-	2	O-Ring - Head Gasket
8	625175	-	8	Screw - Head
9	621591	-	2	Valve Plate Assembly
10	617177	1	2	Valve Restraint
11	617562	2	4	Valve Keeper Strip
12	621485	2	4	Valve Flapper - Intake & Exhaust
13	621641	1	2	Valve Plate
14	625094	2	4	Screw - Valve Flapper
15	623137	-	2	O-Ring Valve Plate
16	638281	-	1	Fan - Gray
17	638282	-	1	Fan - Black
18	638701	-	1	Valve - Pressure Relief
19	623093	-	1	Retaining Clip - Pressure Relief Valve

Wiring Diagram

Use this wiring diagram to connect your compressor to the power source.

2660CS37-190



Troubleshooting Guide

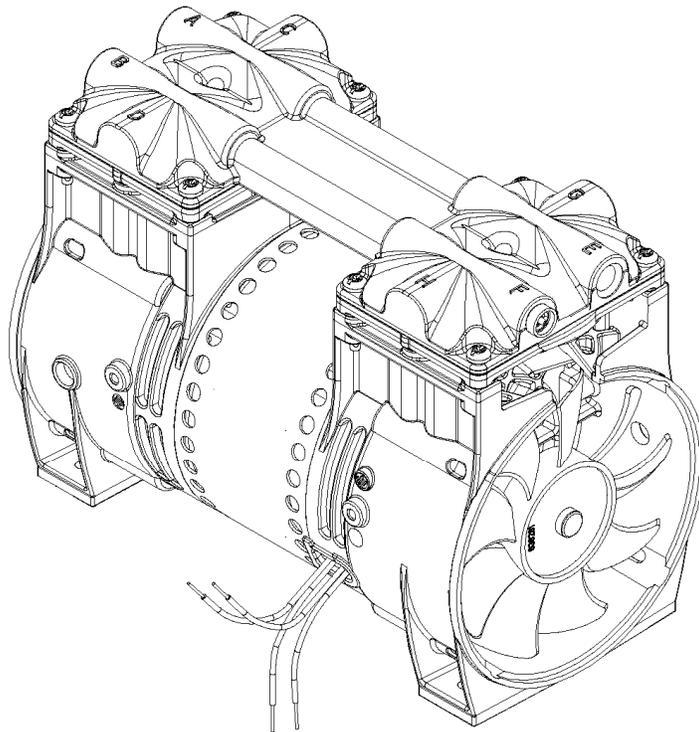
If you are having a problem with your compressor, use this table to help determine the cause(s):

Low Flow	Low Pressure	Problem Unit Will Not Start	Motor ^① Overheats	Loud Unit	Possible Cause	Corrective Action
			x		High voltage at compressor	Reduce voltage
x	x	x	x		Low voltage at compressor	Increase voltage
x	x			x	Damaged valves	Replace flapper valves
x	x			x	Debris in valves	Remove debris and check for valve damage
x	x			x	Damaged gaskets	Replace gaskets
x	x			x	Worn Cup	Replace connecting rod assembly or cup
x	x			x	Loose head screws	Tighten head screws
			x		Broken fan	Replace fan
		x	x	x	Bent motor shaft	Replace entire unit
		x	x		Damaged capacitor	Replace capacitor
x					Loose fittings	Tighten fittings
x			x		Insufficient ventilation in enclosure	Increase air circulation to enclosure
		x		x	Worn bearings	Replace eccentric and bearing assembly
				x	Loose rod clamping screw	Apply Loctite® 242 and retighten

① Thermal protector in motor will interrupt current when motor overheats.

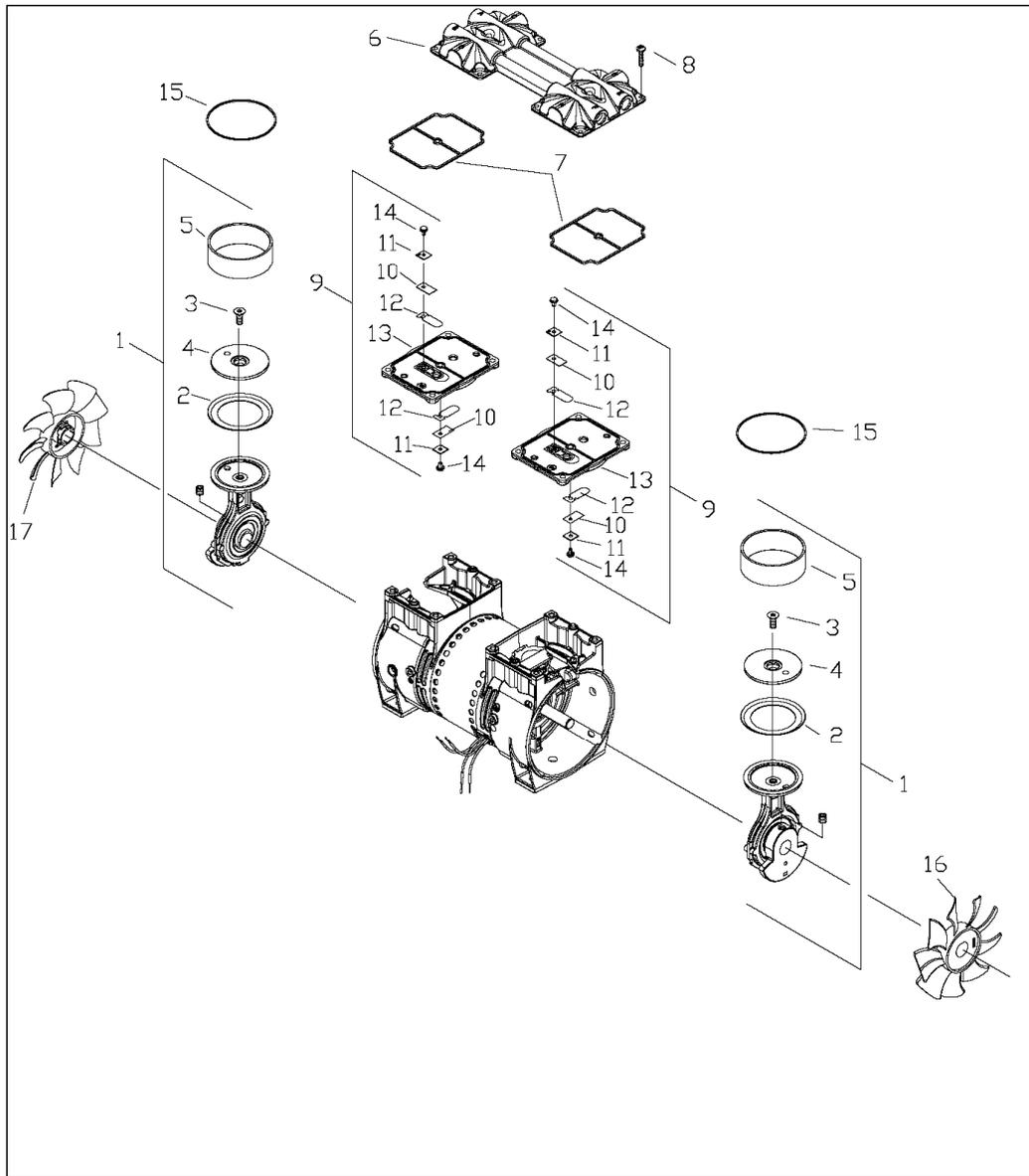


2660CE50-190



Exploded View and Parts List

Exploded View of the Thomas 2660CE50-190 Compressor



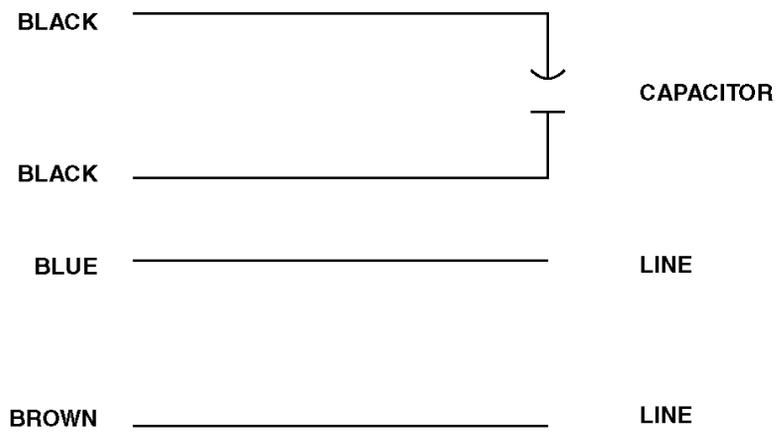
Field Service Parts List for Thomas 2660CE50-190 Compressor

Item No.	Part No.	Qty. Per Assembly	Qty. Per Unit	Description
1	640213	--	2	Connecting Rod, Eccentric & Bearing Ass'y
2	624285	1	2	Piston Cup
3	625776	1	2	Screw - Piston Cup Retainer
4	626577	1	2	Piston Cup Retainer
5	618114	1	2	Cylinder Sleeve
6	662809	--	1	Head
7	623143	--	2	O-Ring - Head Gasket
8	625175	--	8	Screw - Head
9	621780	--	2	Valve Plate Assembly
10	621647	2	4	Valve Retrait
11	617562	2	4	Valve Keeper Strip
12	621485	2	4	Valve Flapper - Intake & Exhaust
13	621641	1	2	Valve Plate
14	625094	2	4	Screw - Valve Flapper
15	623137	--	2	O-Ring Valve Plate
16	638423	--	1	Fan - Gray
17	638424	--	1	Fan - Black
18	638701	--	1	Pressure Relief Valve (Not Shown)
19	623093	--	1	Retaining Clip - PRV (Not Shown)

Wiring Diagram

Use this wiring diagram to connect your compressor to the power source.

2660CE50-190



Troubleshooting Guide

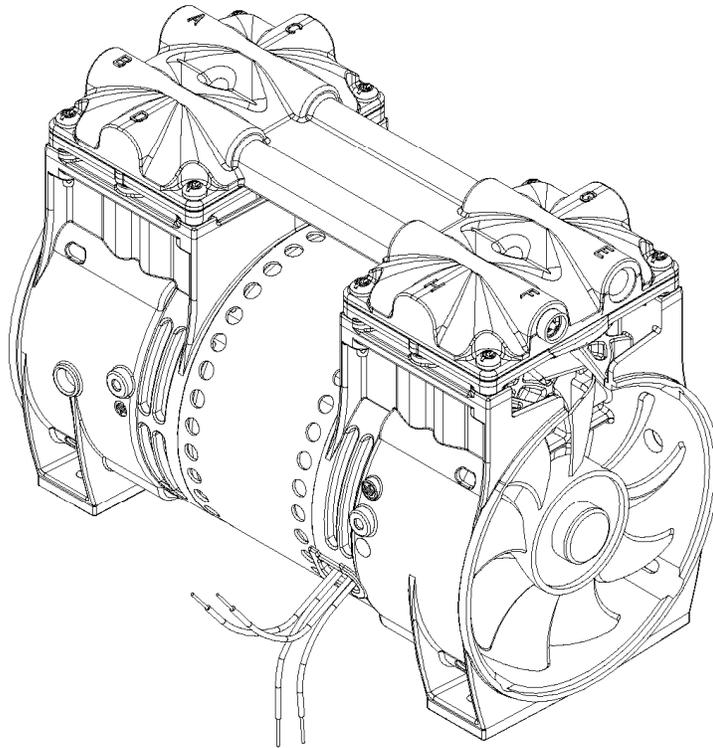
If you are having a problem with your compressor, use this table to help determine the cause(s):

Problem					Possible Cause	Corrective Action
Low Flow	Low Pressure	Unit Will Not Start	Motor Overheats	Loud Unit		
			x		High voltage at compressor	Reduce voltage
x	x	x	x		Low voltage at compressor	Increase voltage
x	x			x	Damaged valves	Replace flapper valves
x	x			x	Debris in valves	Remove debris and check for valve damage
x	x			x	Damaged gaskets	Replace gaskets
x	x			x	Worn Cup	Replace connecting rod assembly or cup
x	x			x	Loose head screws	Tighten head screws
			x		Broken fan	Replace fan
		x	x	x	Bent motor shaft	Replace entire unit
		x	x		Damaged capacitor	Replace capacitor
x					Loose fittings	Tighten fittings
x			x		Insufficient ventilation in enclosure	Increase air circulation to enclosure
		x		x	Worn bearings	Replace eccentric and bearing assembly

① Thermal protector in motor will interrupt current when motor overheats.



2660CHI56-190

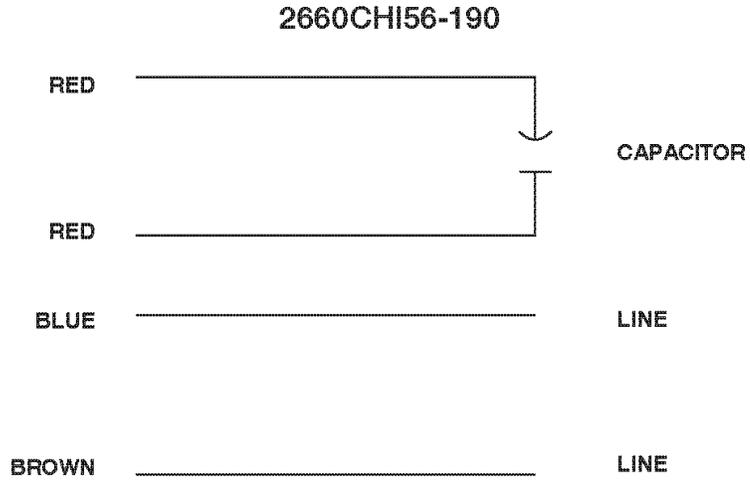


Field Service Parts List for Thomas 2660CHI56-190 Compressor

Item No.	Part No.	Qty. Per Assembly	Qty. Per Unit	Description
1	621780	--	2	Connecting Rod, Eccentric & Bearing Assy
2	624285	1	2	Piston Cup
3	625776	1	2	Screw - Piston Cup Retainer
4	626577	1	2	Piston Cup Retainer
5	618114	1	2	Cylinder Sleeve
6	662809	--	1	Head
7	623143	--	2	O-Ring - Head Gasket
8	625175	--	8	Screw - Head
9	621780	--	2	Valve Plate Assembly
10	621647	2	4	Valve Retraint
11	617562	2	4	Valve Keeper Strip
12	621485	2	4	Valve Flapper - Intake & Exhaust
13	621641	1	2	Valve Plate
14	625094	2	4	Screw - Valve Flapper
15	623137	--	2	O-Ring Valve Plate
16	638423	--	1	Fan - Gray
17	638424	--	1	Fan - Black
18	638701	--	1	Pressure Relief Valve
19	623093	--	1	Retaining Clip - PRV

Wiring Diagram

Use this wiring diagram to connect your compressor to the power source.



Troubleshooting Guide

If you are having a problem with your compressor, use this table to help determine the cause(s):

Problem					Possible Cause	Corrective Action
Low Flow	Low Pressure	Unit Will Not Start	Motor Overheats	Loud Unit		
			x		High voltage at compressor	Reduce voltage
x	x	x	x		Low voltage at compressor	Increase voltage
x	x			x	Damaged valves	Replace flapper valves
x	x			x	Debris in valves	Remove debris and check for valve damage
x	x			x	Damaged gaskets	Replace gaskets
x	x			x	Worn Cup	Replace connecting rod assembly or cup
x	x			x	Loose head screws	Tighten head screws
			x		Broken fan	Replace fan
		x	x	x	Bent motor shaft	Replace entire unit
		x	x		Damaged capacitor	Replace capacitor
x					Loose fittings	Tighten fittings
x			x		Insufficient ventilation in enclosure	Increase air circulation to enclosure
		x		x	Worn bearings	Replace eccentric and bearing assembly

① Thermal protector in motor will interrupt current when motor overheats.

120X120X38 mm

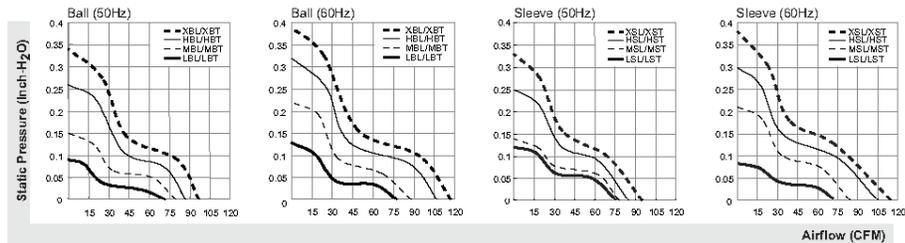
SUNON

70-117 CFM

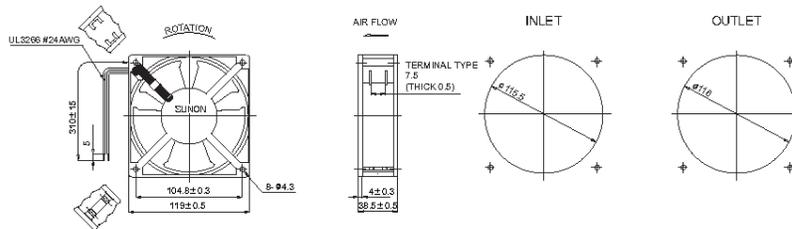


Model	P/N	Bearing ● VAPOR □ BALL ○ Sleeve	Rating Voltage (V.A.C)	Freq. (Hz)	Power Current (AMP)	Power Consumption (WATTS)	Speed (RPM)	Air Flow (CFM)	Static Pressure (Inch-H ₂ O)	Noise (dBA)	Weight (g)
SP100A	1123XSL.GN	●	115	50/60	0.26/0.24	22/20	2700/3100	95/115	0.33/0.38	44/49	550
SP100A	1123XST.GN	●	115	50/60	0.26/0.24	22/20	2700/3100	95/115	0.33/0.38	44/49	550
SP101A	1123HSL.GN	●	115	50/60	0.21/0.18	20/18	2550/2900	85/105	0.25/0.30	43/48	550
SP101A	1123HST.GN	●	115	50/60	0.21/0.18	20/18	2550/2900	85/105	0.25/0.30	43/48	550
SP102A	1123MST.GN	●	115	50/60	0.17/0.16	15/15	2400/2800	78/84	0.14/0.21	33/38	550
SP102A	1123MST.GN	●	115	50/60	0.17/0.16	15/15	2400/2800	78/84	0.14/0.21	33/38	550
SP103A	1123LSL.GN	○	115	50/60	0.13/0.11	11/11	2200/2000	78/70	0.12/0.08	38/38	550
SP103A	1123LST.GN	○	115	50/60	0.13/0.11	11/11	2200/2000	78/70	0.12/0.08	38/38	550
SP100A	1123XBL.GN	○	115	50/60	0.26/0.24	22/20	2850/3150	97/117	0.34/0.39	45/50	550
SP100A	1123XBT.GN	○	115	50/60	0.26/0.24	22/20	2850/3150	97/117	0.34/0.39	45/50	550
SP101A	1123HBL.GN	○	115	50/60	0.21/0.18	20/18	2750/3050	87/107	0.26/0.32	45/50	550
SP101A	1123HBT.GN	○	115	50/60	0.21/0.18	20/18	2750/3050	87/107	0.26/0.32	45/50	550
SP102A	1123MBL.GN	○	115	50/60	0.17/0.16	16/15	2500/2700	80/88	0.15/0.22	35/40	550
SP102A	1123MBT.GN	○	115	50/60	0.17/0.16	16/15	2500/2700	80/88	0.15/0.22	35/40	550
SP103A	1123LBL.GN	○	115	50/60	0.13/0.11	11/11	2150/2300	72/78	0.09/0.13	37/39	550
SP103A	1123LBT.GN	○	115	50/60	0.13/0.11	11/11	2150/2300	72/78	0.09/0.13	37/39	550

Frame : Aluminum alloy



UNITS:mm



*All model could be customized on voltage or any other requirements to fit your need.
 *Specifications subject to change without notice. Please Visit SUNON web site at <http://www.sunon.com> for update information.



R07

Miniature Series 07 General Purpose Regulator 1/8" and 1/4" Port Sizes

- Compact design
- Full flow gauge ports
- Low torque, non-rising adjusting knob
- Snap action knob locks pressure setting when pushed in
- Standard relieving models allow reduction of outlet pressure even when the system is dead-ended
- Can be disassembled without the use of tools or removal from the air line



Ordering Information. Models listed include PTF threads, relieving diaphragm, 5 to 100 psig (0.3 to 7 bar) outlet pressure adjustment range*, with gauge.

Port Size	Model Number	Flow† scfm (dm³/s)	Weight lbs (kg)
1/8"	R07-100-RGKA	14 (6.5)	0.31 (0.19)
1/4"	R07-200-RGKA	15 (7)	0.31 (0.19)

† Approximate flow at 100 psig (7 bar) inlet pressure, 90 psig (6.3 bar) set pressure and a droop of 14.5 psig (1 bar) from set.

Alternative Models

R07 - ★★ - ★★

Port Size	Substitute
1/8"	1
1/4"	2

Option	Substitute
Not applicable	0

Option	Substitute
Standard	0
Low flow seat	2

Threads	Substitute
PTF	A
ISO Rc taper	B
ISO G parallel	G

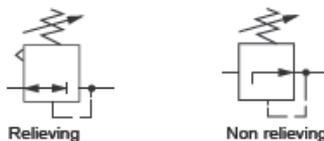
Outlet Pressure Adjustment Ranges*	Substitute
1 to 10 psig (0.1 to 0.7 bar)	A
5 to 50 psig (0.3 to 3.5 bar)	E
5 to 100 psig (0.3 to 7 bar)	K

Gauges	Substitute
With	G
Without	N

Diaphragm	Substitute
Relieving	R
Non relieving	N

* Outlet pressure can be adjusted to pressures in excess of, and less than, those specified. Do not use these units to control pressures outside of the specified ranges.

ISO Symbols



See Section ALE-25 for Accessories

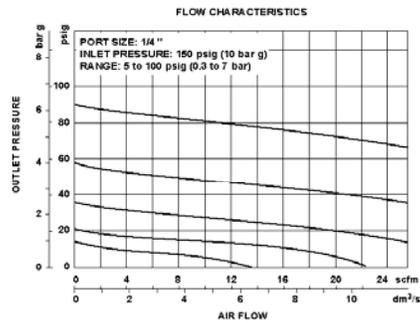
R07 General Purpose Regulators



Technical Data

Fluid: Compressed air
 Maximum pressure: 300 psig (20 bar)
 Operating temperature: -34° to 150°F (-35° to 65°C) *
 * Air supply must be dry enough to avoid ice formation at temperatures below 2°C (35°F).
 Typical flow at 150 psig (10 bar) inlet pressure, 90 psig (6.3 bar) set pressure and a droop of 15 psig (1 bar) from set:
 1/8" ports: 14 scfm (6.5 dm³/s)
 1/4" ports: 15 scfm (7 dm³/s)
Gauge ports:
 1/8" PTF with PTF main ports
 1/8" ISO Rc with ISO Rc main ports
 1/8" ISO Rc with ISO G main ports
Materials:
 Body: Zinc
 Bonnet: Acetal
 Valve: Brass/nitrile
 Valve seat: Acetal
 Elastomers: Nitrile

Typical Performance Characteristics

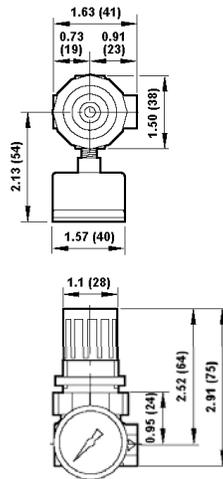


Service Kits

Item	Type	Part number
Service kit	Relieving	3407-02
	Non relieving	3407-01

Service kit includes slip ring, diaphragm, standard valve seat with o-ring, valve, valve spring.

All Dimensions in Inches (mm)



Panel mounting hole diameter 1.19" (30 mm)
 Maximum panel thickness 0.25" (6 mm)



Littleton, CO USA

Phone 303-794-2611

Fax 303-795-9487

ALE-5-3



Regulator
R07 - ★★ - ★★

R07
Installation & Maintenance
Instructions

Port 1....1/8" 2....1/4"	Option 0....Not applicable	Option 0....Standard 2....Low flow seat	Diaphragm R....Relieving N....Non relieving	Gauge G....With N....Without	Spring (Outlet Pressure Range) * A....0,1 to 0,7 bar (1 to 10 psig) E....0,3 to 3,5 bar (5 to 50 psig) K....0,3 to 7 bar (5 to 100 psig)	Thread Form A....PTF B....ISO Rc taper G....ISO G parallel
---------------------------------------	--------------------------------------	--	--	---	--	--

* Outlet pressure can be adjusted to pressures in excess of, and less than, those specified. Do not use these units to control pressures outside of the specified ranges.

TECHNICAL DATA

Fluid: Compressed air
 Maximum pressure: 20 bar (300 psig)
 Operating temperature*: -34° to +65°C (-30° to +150°F)
 * Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F).
 Typical flow with 10 bar (150 psig) inlet pressure, 6,3 bar (90 psig) set pressure and 1 bar (15 psig) droop from set:
 1/8" Ports: 6,5 dm³/s (14 scfm)
 1/4" Ports: 7 dm³/s (15 scfm)
Gauge ports:
 1/8 PTF with PTF main ports
 Rc1/8 with ISO Rc main ports
 Rc1/8 with ISO G main ports
Materials:
 Body: Zinc
 Bonnet: Acetal
 Valve: Brass/nitrile
 Valve seat: Acetal
 Elastomers: Nitrile

REPLACEMENT ITEMS

Service kit (includes items circled on exploded view)
 Relieving.....3407-02
 Non-relieving.....3407-01
 Tamper resistant knob.....18-001-092

PANEL MOUNTING DIMENSIONS

Panel mounting hole diameter: 30 mm (1.19")
 Panel thickness: 2 to 6 mm (0.06" to 0.25")

INSTALLATION

- Shut off air pressure. Install regulator in air line -
 - with air flow in direction of arrow on body,
 - upstream of lubricators and cycling valves,
 - as close as possible to the device being serviced,
 - at any angle.
- Connect piping to proper ports using pipe thread sealant on male threads only. Do not allow sealant to enter interior of regulator.
- Install a pressure gauge or plug the gauge ports. Gauge ports can also be used as additional outlets for regulated air.
- Install a Norgren general purpose filter upstream of the regulator.

ADJUSTMENT

- Before applying inlet pressure to regulator, turn adjustment (2 or 5A) counterclockwise to remove all force on regulating spring (6).
- Apply inlet pressure, then turn adjustment clockwise to increase and counterclockwise to decrease pressure setting.
- Always approach the desired pressure from a lower pressure. When reducing from a higher to a lower setting, first reduce to some pressure less than that desired, then bring up to the desired pressure.

NOTE

With non-relieving regulators, make pressure reductions with some air flow in the system. If made under no flow (dead-end) conditions, the regulator will trap the over-pressure in the downstream line.

- Push adjusting knob down to lock pressure setting; pull up to release. Install tamper resistant knob (see **Replacement Items**) to make setting tamper resistant.

DISASSEMBLY

- Regulator can be disassembled without removal from air line.
- Shut off inlet pressure. Reduce pressure in inlet and outlet lines to zero.
- Turn adjustment (2 or 5A) fully counterclockwise to remove all force on regulating spring (6).
- Disassemble in general accordance with the item numbers on exploded view.

CLEANING

- Clean parts with warm water and soap.
- Rinse and dry parts. Blow out internal passages in body with clean, dry compressed air.
- Inspect parts. Replace those found to be damaged.

ASSEMBLY

- Lubricate seals and o-rings with o-ring grease.
- Assemble the unit as shown on the exploded view.
- Torque Table

ITEM	TORQUE NM (INCH-POUNDS)
2, 5A (Bonnet)	7,34 to 8,47 (65 to 75)
9 (Early valve seat)	0,45 to 0,68 (4 to 6)†
11 (Current valve seat)	0,34 to 0,56 (3 to 5)†

† Diaphragm pin (8) must slide freely thru valve seat after torquing.

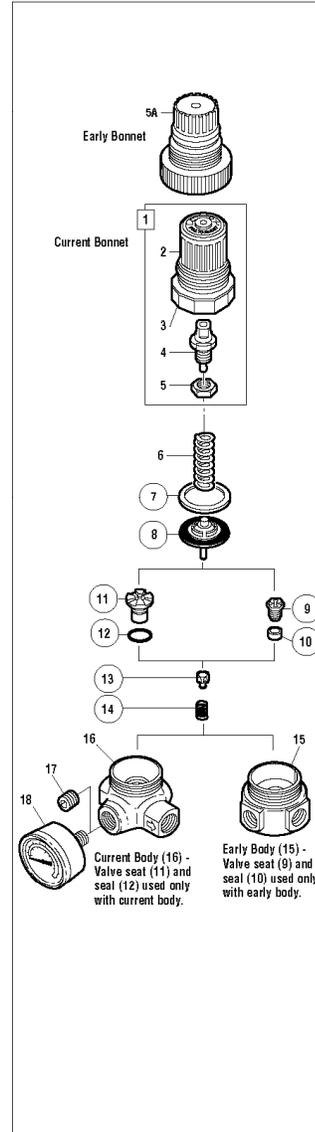
WARNING

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under **Technical Data**.

If outlet pressure in excess of the regulator pressure setting could cause downstream equipment to rupture or malfunction, install a pressure relief device downstream of the regulator. The relief pressure and flow capacity of the relief device must satisfy system requirements.

The accuracy of the indication of pressure gauges can change, both during shipment (despite care in packaging) and during the service life. If a pressure gauge is to be used with these products and if inaccurate indications may be hazardous to personnel or property, the gauge should be calibrated before initial installation and at regular intervals during use.

Before using these products with fluids other than air, for non industrial applications, or for life-support systems consult Norgren.



Installation & Maintenance Instructions

OPEN-FRAME SOLENOIDS

SERIES
U8016
US8016

Form No.V6917R1

NOTICE: See separate valve installation and maintenance instructions for information on: Operation, Positioning, Mounting, Piping, Strainer or Filter Requirements, Flow Controls, Cleaning, Preventive Maintenance, Causes of Improper Operation, Disassembly and Reassembly of Basic Valve.

DESCRIPTION

Series U8016 are open-frame, pull type solenoid operators. When installed just as a solenoid and not as part of an ASCO valve, the core has a 0.250–28 UNF–2B tapped hole with 0.38 minimum full thread.

Series US8016 open-frame solenoid operators are the same as Series U8016 except they are provided with spade terminal coils.

OPERATION

When the solenoid is energized, the core is drawn into the solenoid base sub-assembly.

IMPORTANT: When the solenoid is de-energized, the initial return force for the core, whether developed by spring, pressure or weight, must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force for AC construction is 11 ounces; 5 ounces for DC construction.

INSTALLATION

Check nameplate for correct catalog number, voltage, frequency, wattage and service.

▲ CAUTION: To protect the solenoid valve or operator, install a strainer or filter, suitable for the service involved in the inlet side as close to the valve or operator as possible. Clean periodically depending on service conditions. See ASCO Series 8600, 8601 and 8602 for strainers.

▲ WARNING: To prevent the possibility of electrical shock from the accessibility of live parts, install the open-frame solenoid in an enclosure.

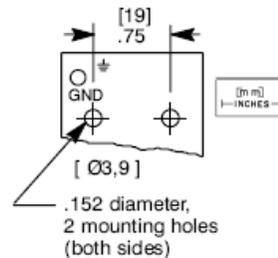
Positioning

This solenoid is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub-assembly area.

If open-frame solenoid is supplied on an ASCO valve, check basic valve instructions for positioning.

Mounting

Refer to Figure 1 (below) for mounting.



▲ CAUTION: Be sure mounting screws do not penetrate yoke far enough to damage coil.

Figure 1. Yoke mounting dimension (partial view).

Wiring

Wiring must comply with local codes and the National Electrical Code. Coils are provided with lead wires or 1/4" spade terminals. The solenoid yoke is provided with a hole for a grounding screw, see Figure 2. Grounding screw not supplied with solenoid. To facilitate wiring, the solenoid may be rotated 360° by removing the retaining cap, clip or hi-shock clip.

▲ CAUTION: When metal retaining clip disengages, it will spring upward.

Rotate solenoid enclosure to desired position. Then replace retaining cap, clip or hi-shock retaining clip before operating. Be sure hi-shock retaining clip seats in the circular groove around side wall of solenoid base sub-assembly. Tighten retaining clip securely so that the retaining clip ends meet.

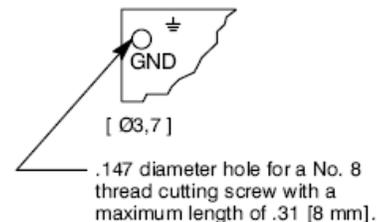


Figure 2. Hole for grounding screw (partial view).

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Page 1 of 4

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Note: Alternating current (AC) and direct current (DC) solenoids are built differently. To convert from one to the other, it is necessary to change the complete solenoid including the core and solenoid base sub-assembly, not just the coil. Consult ASCO.

Solenoid Enclosure Assembly

Catalog Numbers U80161, U80162, US80161 and US80162 open-frame solenoids may be assembled as a complete unit. Tightening is accomplished by means of a hex flange at the base of the solenoid.

▲ CAUTION: Care must be taken not to mar the upper core surface, when installing core or positioning solenoid.

Solenoid Temperature

Standard solenoids are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid yoke becomes hot. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

MAINTENANCE

▲ WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power, depressurize solenoid operator or valve, and vent fluid to a safe area before servicing.

Cleaning

All solenoid operators and valves should be cleaned periodically. The time between cleanings will vary depending on the medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise or leakage will indicate that cleaning is required. In the extreme case, faulty operation will occur and the solenoid operator or valve may fail to shift. Clean strainer or filter when cleaning the operator or valve.

Preventive Maintenance

- Keep the medium flowing through the solenoid operator or valve as free from dirt and foreign material as possible.
- While in service, the solenoid operator or valve should be operated at least once a month to insure proper opening and closing.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any worn or damaged parts.

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic *click* signifies that the solenoid is operating. Absence of the *click* indicates loss of power supply. Check for loose or blown fuses, open-circuited or grounded solenoid, broken lead wires or splice connections.
- **Burned-Out Coil:** Check for open-circuited coil. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate and marked on the

coil. Check ambient temperature and check the core is not jammed.

- **Low Voltage:** Check voltage across the coil leads. Voltage must be at least 85% of rated voltage.

Coil Replacement/Solenoid Disassembly

1. Disassemble solenoid in an orderly fashion using exploded views for identification and placement of parts.
2. Disconnect coil lead wires from power supply and grounding wire from yoke.
3. Remove retaining cap, clip or hi-shock clip and spacer (if present) from top of solenoid.

▲ CAUTION: When metal retaining clip disengages, it will spring upward.

4. Slip yoke containing coil, sleeves and insulating washers off the solenoid base sub-assembly. Insulating washers are omitted when a molded coil is used.
5. Remove coil, sleeves (2) and insulating washers (if present) from yoke.

Note: for panel mount (Figure 6) or hi-shock (Figure 5) construction remove additional parts as required.

6. For additional disassembly, unscrew solenoid base sub-assembly or bonnet. The bonnet requires a special wrench adapter which is supplied in ASCO Rebuild Kits. For wrench adapter only, order Wrench Kit No. K218948.
7. Refer to basic valve instructions for further disassembly.

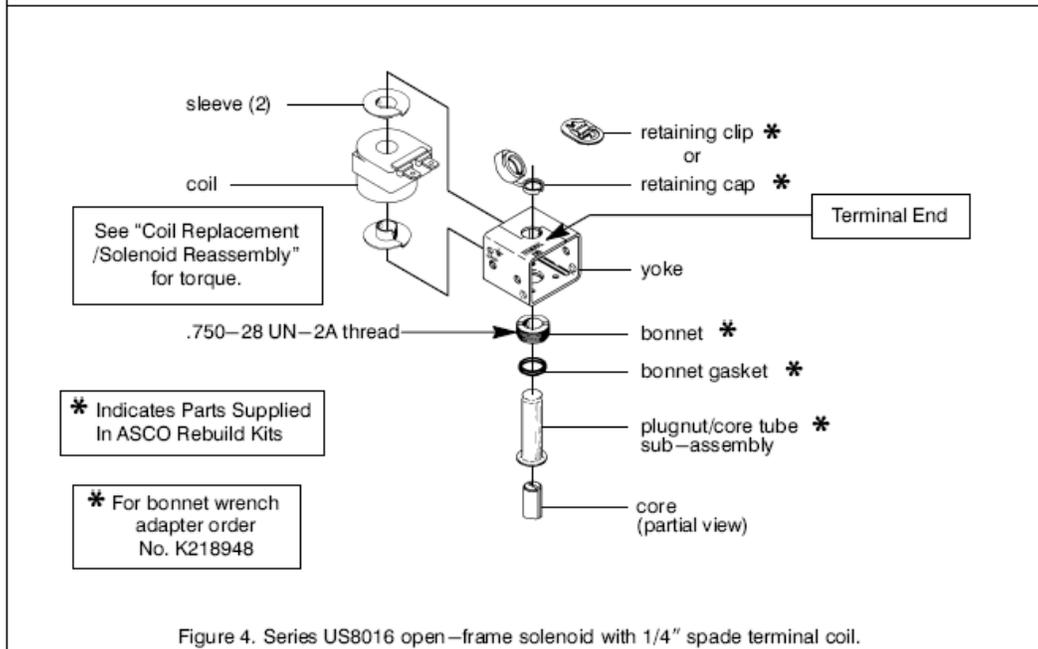
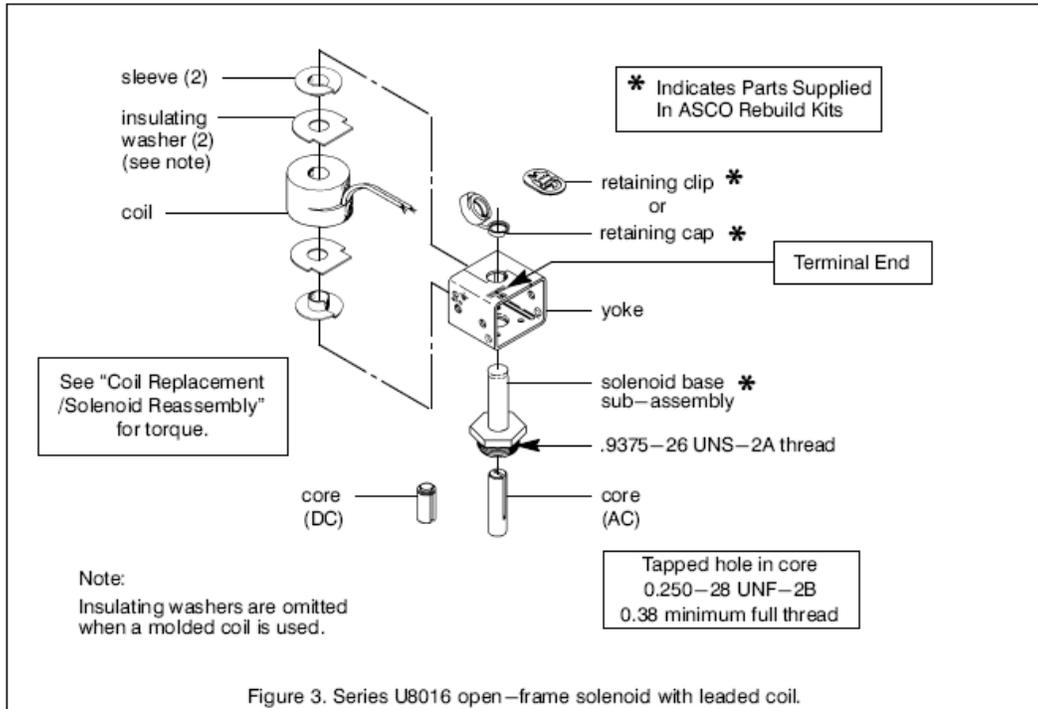
Coil Replacement/Solenoid Reassembly

1. Install solenoid base sub-assembly or plugnut/core tube sub-assembly with bonnet gasket and bonnet. Torque solenoid base sub-assembly to 175 ± 25 in-lbs [$19,8 \pm 2,8$ Nm]. Torque valve bonnet to 90 ± 10 in-lbs [$10,2 \pm 1,1$ Nm].
2. Reassemble open-frame solenoid following exploded views.
3. For solenoid using a hi-shock retaining clip be sure retaining clip seats in circular groove around side wall of solenoid base sub-assembly. Then tighten retaining clip securely so that the retaining clip ends meet.
4. Make electrical connections to solenoid, see *Wiring* section.

▲ CAUTION: Solenoid must be fully reassembled because the yoke and internal parts complete the magnetic circuit. Be sure to replace insulating washer at each end of non-molded coil.

ORDERING INFORMATION FOR SOLENOID OPERATORS OR COILS

When Ordering Solenoid Operators or Coils, specify Catalog Number, Serial Number, Voltage and Frequency. For Coils, specify number stamped on coil (if visible).



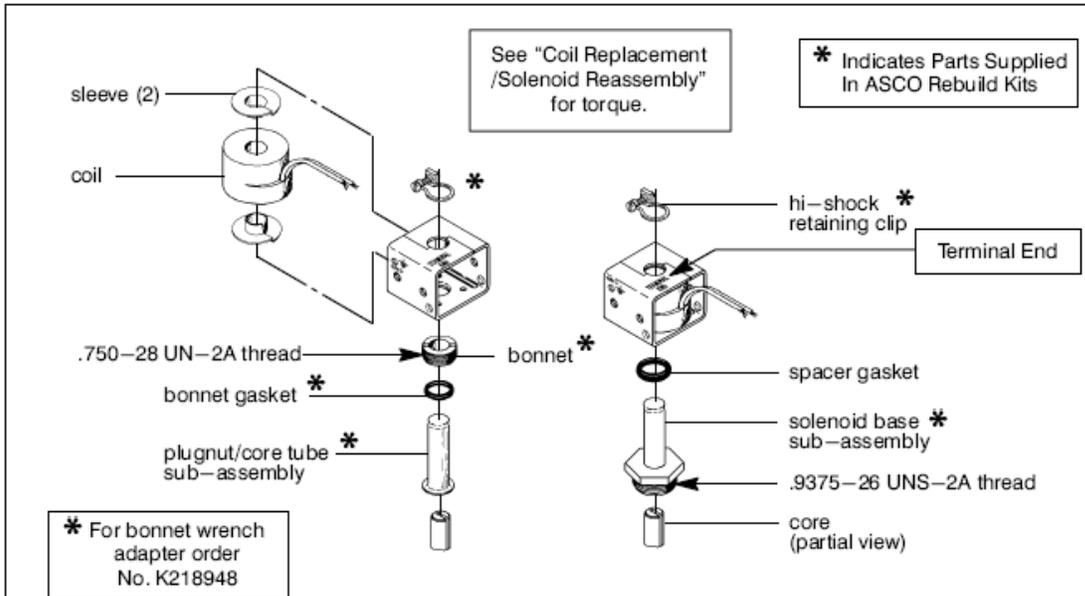


Figure 5. Series U8016 hi-shock clip construction - open-frame solenoid with leaded coil.

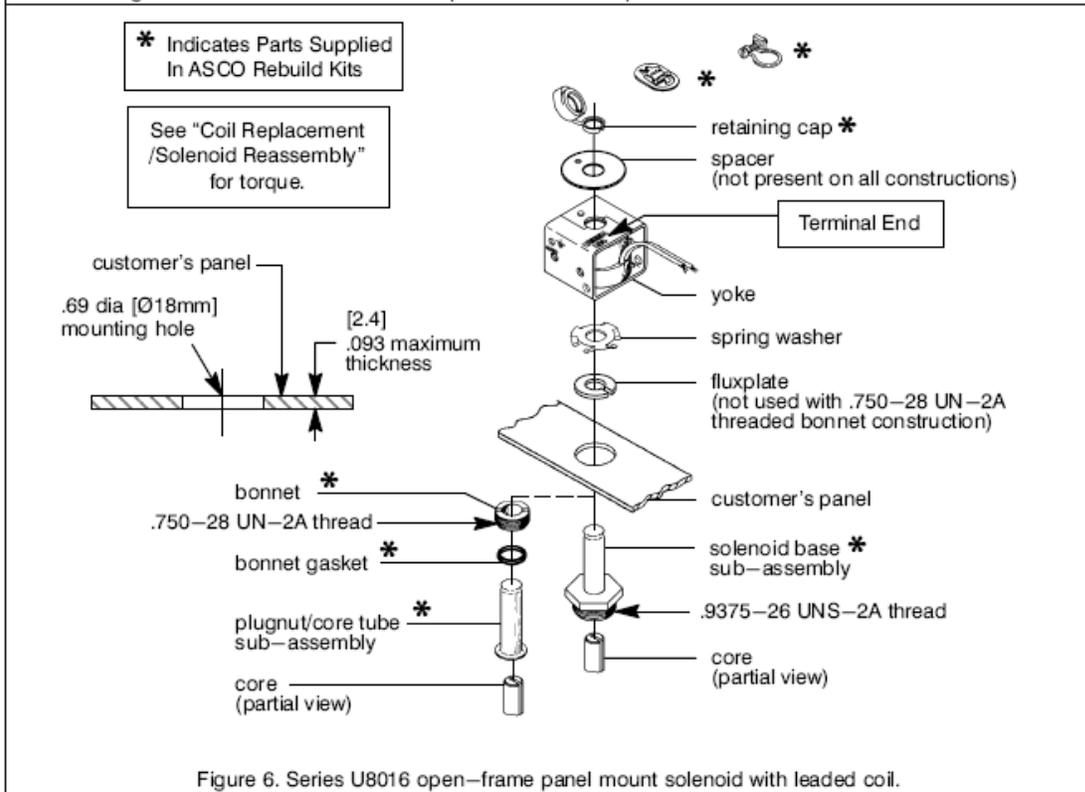


Figure 6. Series U8016 open-frame panel mount solenoid with leaded coil.