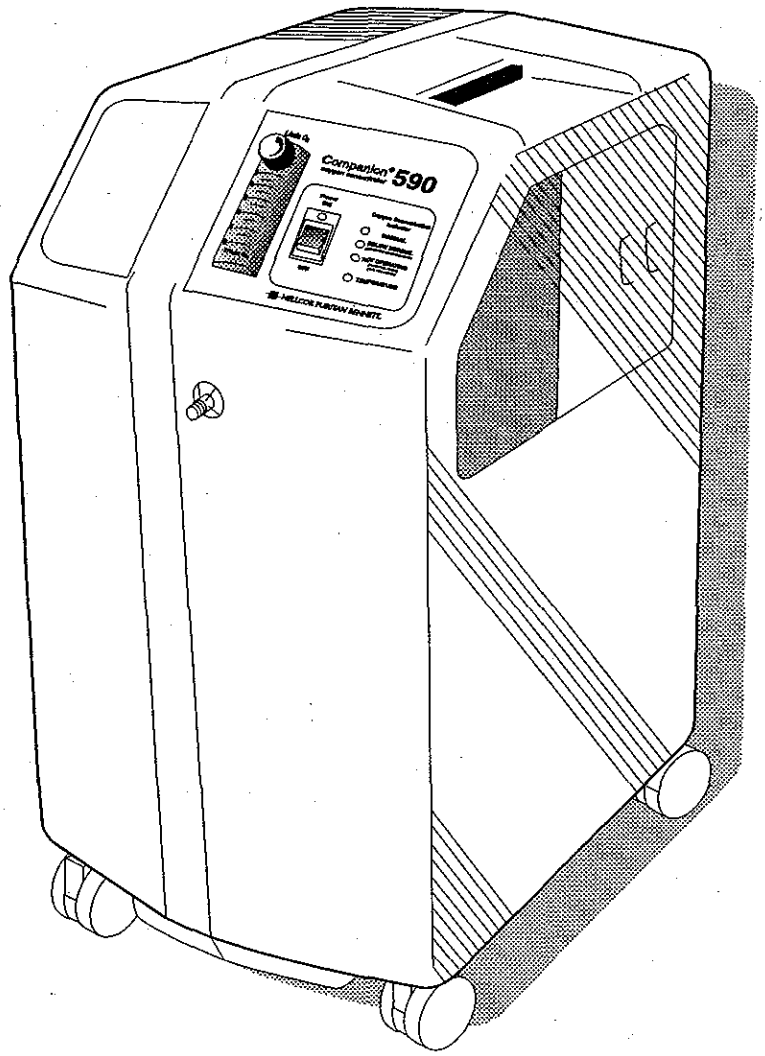
PURITAN-BENNETT

Companion® 492a/590 Oxygen Concentrators

SERVICE MANUAL



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Part Number 494438 Rev. B

PREFACE

This manual provides information needed to service and maintain the Puritan-Bennett Companion 492a and Companion 590 oxygen concentrators. This manual is intended for use by technicians and personnel authorized to repair and service oxygen concentrators.

DISCLAIMER

This manual describes the use, servicing, and maintenance needs of the Companion 492a and 590 oxygen concentrators. The Companion units should only be serviced by qualified personnel trained in their operation. Use and service by unqualified and untrained personnel may result in injury or property damage. Any attempt to operate, repair, or service the Companion 492a and 590 without adequate training may result in serious injury, property damage, or patient injury.

Mallinckrodt denies liability for any modification or interface with other equipment which is not in conformance with the specifications and information contained within this manual.

WARRANTY

Contact the Mallinckrodt Technical Services Department at 1-800-496-2299 for warranty information.

CONTRAINDICATION

Patient oxygen supplied by this equipment is for supplemental use and is not intended to be life sustaining.

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HOW TO USE THIS MANUAL

Please read carefully.

Read this manual before attempting to operate or service Companion oxygen concentrators. Keep the manual for future reference, as it contains important

information about the service, maintenance, and safe operation of the Companion Oxygen Concentrator. Service personnel should read this manual carefully, become familiar with the functions described, and follow the recommended procedures.

- Read all warnings and cautions.
- Become familiar with all definitions and abbreviations.
- Refer to the Troubleshooting Guide (Section 4).
- Do not modify existing features or use with other equipment (that is, fittings, gauges, etc.) which are not in conformance with the specifications in this manual.

DEFINITIONS OF STATEMENTS

Statements in this manual preceded by the following words are of special significance.

WARNING: Means there is a possibility of injury or death to yourself or others.

CAUTION: Means there is a possibility of damage to the instrument or other property.

NOTE: Indicates points of particular interest or emphasis that make for more efficient and convenient operation of the equipment.

DEFINITIONS OF SYMBOLS

Statements in this manual preceded by the following symbols are of special significance.

WARNING OR CAUTION

ELECTRIC SHOCK WARNING

STATIC SENSITIVE

ACRONYMS

The following acronyms are used throughout this manual.

ESD	Electrostatic Discharge
HEPA	High Efficiency Particulate Air
LED	Light Emitting Diode
OCI	Oxygen Concentration Indicator
PCB	Printed Circuit Board

Table of Contents

ILLUSTRATIONS

Section 1

THEORY OF OPERATION

This section details the operational theory for the Companion 492a/590 Oxygen Concentrator. It includes an overview of the operation and a description of the pneumatic system components, the electrical system components, the pressure swing adsorption process, and the safety features.

NOTE: Numeric values quoted in this section are nominal values used for descriptive purposes only. Due to atmospheric pressure changes and other factors, pressure characteristics may vary.

1.1 OVERVIEW

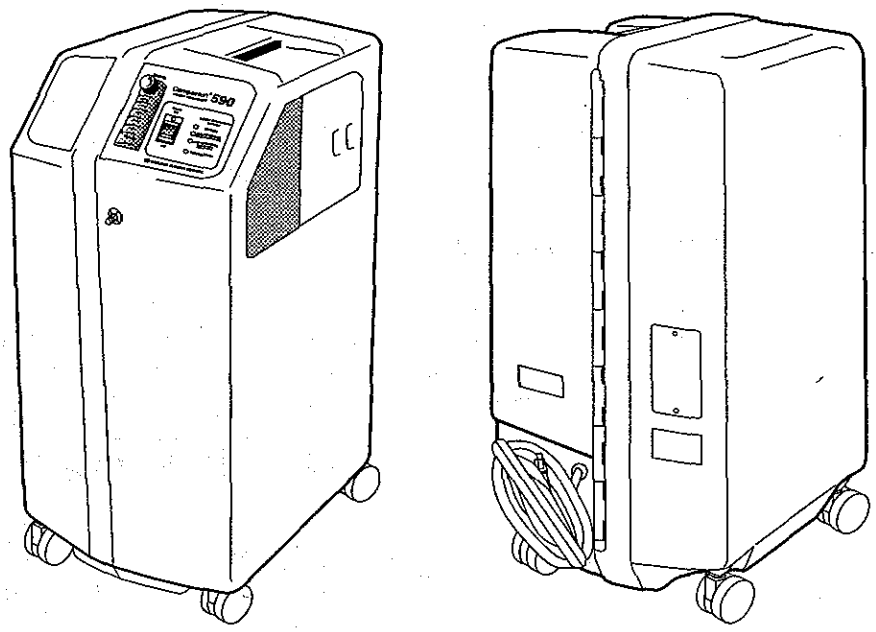


Figure 1-1: Companion 590, Front and Rear Views

The Companion 492a/590 Oxygen Concentrator intakes room air, adsorbs the nitrogen content of this air under pressure, and provides supplemental oxygen at high concentrations. (See Section 8, Performance Specifications, for oxygen concentration ranges.)

The compressor draws room air into the concentrator and compresses the air before passing it into the reservoir canister. Using a pressure swing adsorption process, the compressed air is alternately applied to the two sieve canisters. The sieve canisters contain molecular sieve material which adsorbs (attracts) nitrogen from the air and allows oxygen and trace gases to pass through.

A series of solenoid valves controls the actuation of five pilot valves, which in turn route the gas flow into and out of the two sieve canisters. The product oxygen from the sieve canisters is stored in the product canister and is then dispensed to the patient by an amount controlled by the flowmeter.

An optional Oxygen Concentration Indicator (OCI) system is available for use on the 492a/590 to monitor oxygen concentration levels.

The pneumatic system (Figure 9-1) produces a source of compressed supply air, switches supply air between the two molecular sieve canisters using pneumatic valves and an electronic timing system, regulates the oxygen system pressures, and controls the oxygen output.

The electrical system (Figure 9-2, 9-3, 9-4, and 9-5) provides the controlling and monitoring functions for the concentrator and distributes the electrical power required for operation.

1.2 PNEUMATIC SYSTEM COMPONENTS

The pneumatic system produces a source of compressed supply air, switches supply air between the two molecular sieve canisters, regulates the oxygen system pressures, and controls the oxygen output.

1.2.1 Air Intake Filter

The air intake filter (Figure 1-2) is a gross-particle filter made of reusable foam material. Large particles are filtered from the room air drawn into the concentrator cabinet by the action of the cooling fan. For ease in cleaning, Velcro strips secure the filter to the filter grill on the right side of the cabinet.

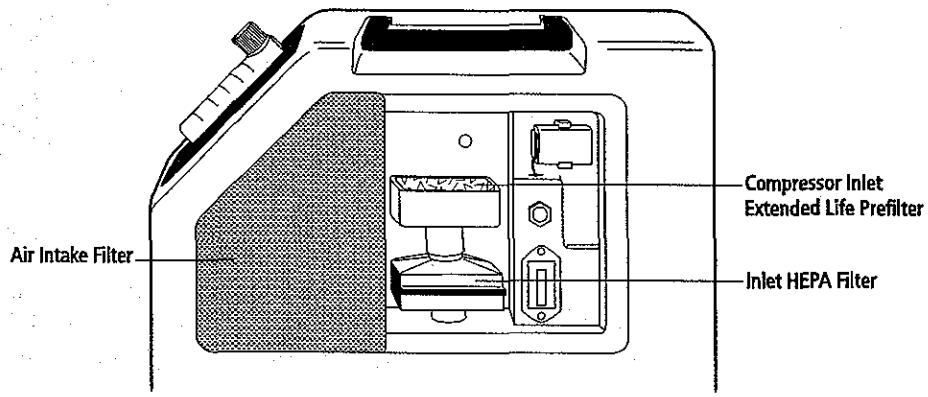


Figure 1-2: Right Side

1.2.2 Compressor Inlet Extended Life Prefilter

Within the compressor inlet extended life prefilter (Figure 1-2 and 1-3), four felt elements filter particles from the room air drawn into the compressor. All elements of the compressor inlet extended life prefilter are contained inside a housing located in the filter compartment, which is accessible from the cabinet's right side. Both upper and lower elements are individually replaceable.

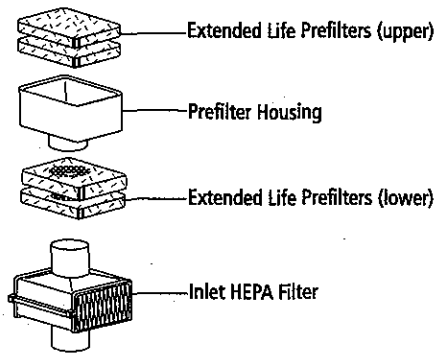


Figure 1-3: Compressor Inlet Extended Life Prefilters

1.2.3 Compressor Inlet HEPA Filter

The compressor inlet HEPA filter (Figure 1-2 and 1-3) removes particles greater than 0.3 micrometer in diameter from the room air drawn into the compressor. This filter is located in the filter compartment, accessible from the cabinet's right side. In combination, the compressor inlet prefilter and the compressor inlet HEPA filter provide clean air to the sieve canisters and the valve system.

1.2.4 Inlet Silencer

Molded into the compressor platform, the inlet silencer (Figure 1-4) is a hollow chamber that reduces the sound of the air being drawn into the compressor.

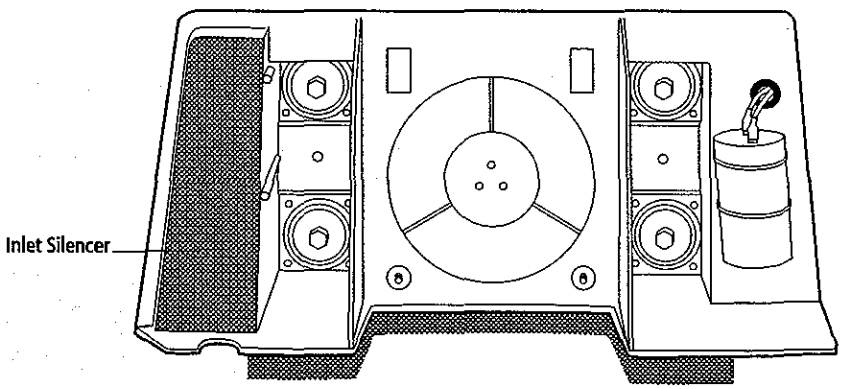


Figure 1-4: Compressor Platform, Bottom View

1.2.5 Compressor

The compressor (Figure 1-5) is an oil-less piston design with dual cooling fans. The two fans draw in cooling air from each end of the compressor and exhaust it out the center to provide equal cooling of the bearings and the motor. An automatic thermal cutout switch in the motor interrupts electrical power to the compressor if it overheats. Pressurized, filtered air is routed to the molecular sieve canisters where nitrogen extraction occurs.

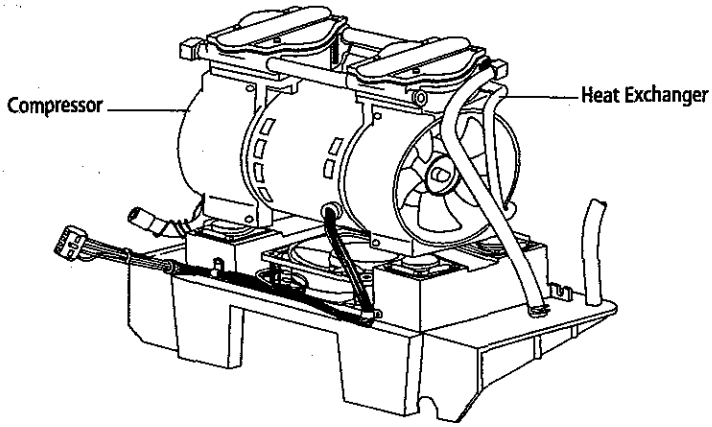


Figure 1-5: Compressor Platform, Front View

1.2.6 Heat Exchanger

The heat exchanger (Figure 1-5) is a loop of aluminum tubing that routes the compressor outlet gas to the reservoir canister. The heat exchanger is located in the path of the compressor cooling air flow and dissipates heat through the walls of the tube. This component and the four aluminum canisters (reservoir, two sieves, and product) create a heat sink to allow the warm, compressed gas to cool (by dissipation) during the concentrator's operation.

1.2.7 Reservoir Canister

The reservoir canister (Figure 1-6) is a hollow, aluminum tank, approximately 2.3 liters in volume. It stores air from the compressor, moderates pressure pulses generated by the two compressor pistons, and supplies the large volume of air required to charge the sieve canister. This source of compressed air also actuates the five pilot valves. In addition, the reservoir canister assists in the heat dissipation process.

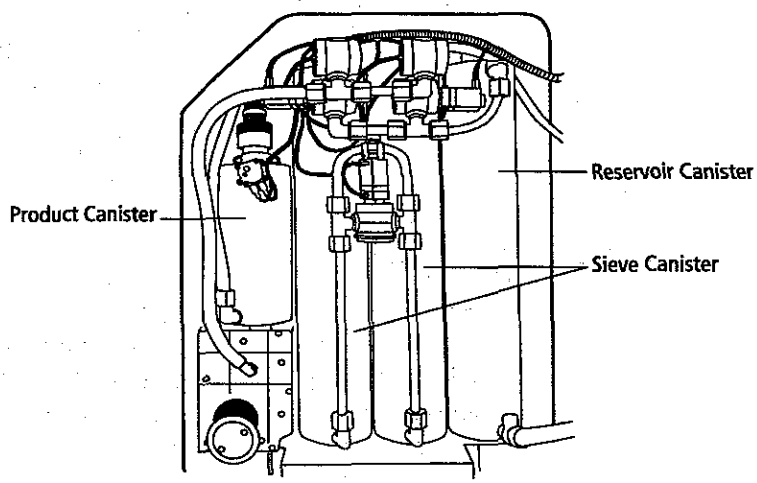


Figure 1-6: Reservoir, Sieve, and Product Canisters

1.2.8 Pilot Air Filter

The pilot air filter (Figure 1-7) is a small, sintered-bronze element that is an integral part of the reservoir canister (or is sealed in a plastic housing located in the pilot air line). It filters fine particles in the pilot line air coming from the reservoir canister. This filtering action prevents contaminants from accumulating in the solenoid valves. Normally, the pilot air filter should not need service.

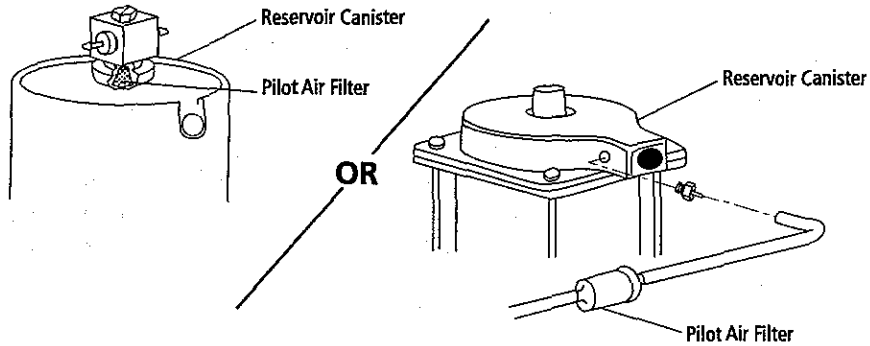


Figure 1-7: Pilot Air Filters

1.2.9 Solenoid Valves

Three miniature DC solenoid valves (Figure 1-8) control the actuation of the pilot valves. If one sieve bed is open to supply air, the opposite sieve bed is open to exhaust. Therefore, if solenoid valve 1 is activated, pilot pressure is applied to supply pilot valve 1 and exhaust pilot valve 2. If solenoid valve 2 is activated, pilot pressure is applied to supply pilot valve 2 and exhaust pilot valve 1. If solenoid valve 3 is activated, pilot pressure is applied to the balance pilot valve.

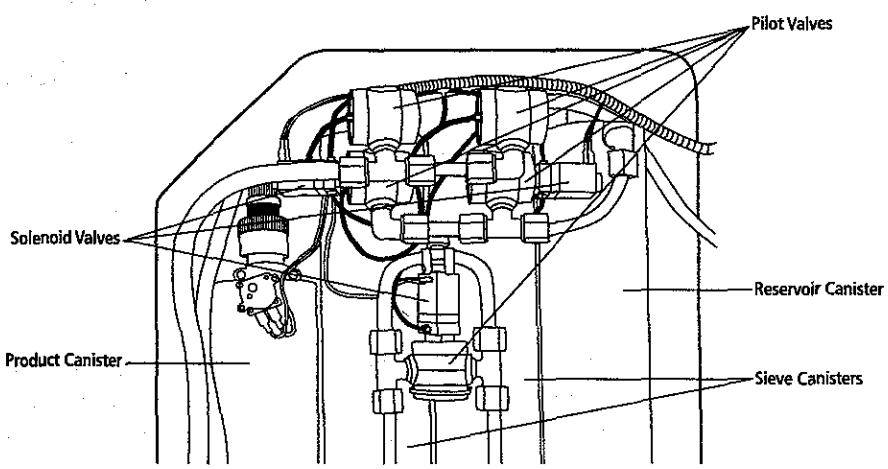


Figure 1-8: Solenoid and Pilot Valves

1.2.10 Pilot Valves

Five air-actuated (Figure 1-8 and 1-9), diaphragm-poppet pilot valves route gas flow into and out of the two sieve canisters. Upon application of air pressure to a valve's pilot port, the poppet assembly (a brass stem with two rubber diaphragms at each end) is forced down, allowing gas to flow through the valve. Upon

removal of air pressure, pressure against the unbalanced area of the bottom diaphragm moves the poppet assembly against its seat to stop flow through the valve. All valves close when the concentrator is off, preventing gas flow into the sieve beds.

Actuation of a supply pilot valve admits compressed air from the reservoir canister to a sieve canister, beginning the oxygen concentration process. Simultaneously, the corresponding exhaust pilot valve actuates and adsorbed nitrogen from a sieve canister exits through the exhaust pilot valve, into the expansion chamber and muffler, and to the atmosphere. When the balance pilot valve actuates, the sieve canisters pneumatically connect, allowing the oxygen layer at the bottom of one sieve bed to flow to the opposite bed. This pre-charge of oxygen increases the pressure in a bed before the beginning of its concentrating cycle, resulting in greater efficiency in the nitrogen adsorption process.

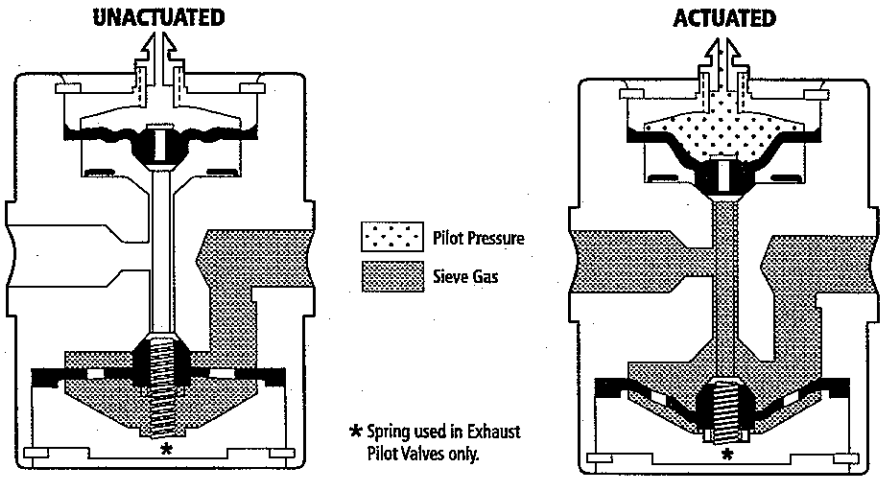


Figure 1-9: Pilot Valve Operation

1.2.11 Sieve Canisters

The two sieve canisters (Figure 1-8) are aluminum tanks containing molecular sieve material (a nitrogen-selective zeolite) that strips nitrogen from air by an adsorption process, while allowing oxygen and trace gases to pass through the sieve.

Molecular sieves belong to a class of compounds known as zeolites. Both naturally occurring and synthetically produced zeolites are highly porous adsorbents. Each granule of man-made zeolite has within it a system of precisely arrayed cavities and pores. The pores are uniform in size and molecular dimension, thereby causing the zeolite to adsorb the nitrogen molecules.

In the oxygen concentrator, nitrogen-selective zeolite (sieve material) adsorbs nitrogen molecules in a pressurized canister. By pneumatic force (pressure) this molecular sieve traps nitrogen, yet allows other gases to flow through the sieve bed. Nitrogen molecules are then desorbed (released) by venting the sieve bed to the atmosphere, thus reducing canister pressure and the adsorptive force.

Nitrogen adsorption occurs when the sieve canister is pressurized with compressed room air, from approximately 14 to 20 psi (96 to 138 kPa). A sieve canister saturated with adsorbed nitrogen regenerates (desorbs) by venting the sieve canister pressure to atmospheric pressure. Some of the product oxygen is used as a purge gas to increase the efficiency of regenerating the sieve by removing any residual nitrogen molecules remaining in the canister.

The purge oxygen readily combines with the nitrogen and is flushed from the canister by the purge pressure. The sieve canisters must remain sealed from the atmosphere to prevent contamination of the molecular sieve material by migration of moisture (humidity) into the canister. Because of the sieve material's high affinity for water, moisture drawn into the sieve canister without proper purging will render the sieve useless for future nitrogen adsorption.

High oxygen concentration and long sieve bed life are accomplished by the proper use of pressure swing cycles and efficient purging. However, molecular sieve will displace any other molecule in favor of water. When this happens, nitrogen-selective zeolite loses its affinity for nitrogen and is considered contaminated.

During normal operation, room humidity does not affect the sieve's ability to adsorb nitrogen. A thin layer of sieve at the top of the bed wicks humidity from the supply gas, preventing further contamination during a concentrating cycle. This moisture is returned to the atmosphere during the exhaust phase. Regeneration of the sieve bed is then completed by purging the exhausting tank with concentrated, humidity-free oxygen.

1.2.12 Expansion Chamber/Muffler Assembly

The expansion chamber/muffler assembly (Figure 1-10) consists of a muffler assembly and a plastic, foam-lined chamber connected to the pilot valve's exhaust tube. The assembly effectively muffles the sound of gas exhausting to atmosphere when a sieve canister depressurizes (desorbs) during the regeneration (exhaust) cycle.

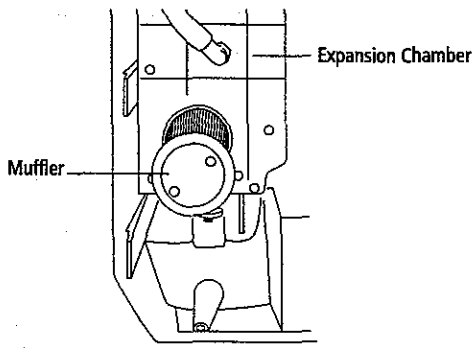


Figure 1-10: Expansion Chamber and Muffler Assembly

1.2.13 Restrictor Tube Assemblies

Two restrictor tube assemblies (Figure 1-11) are located just above the balance pilot valve, between the tubing coming from the outlets of the sieve canisters and the product canister. Each restrictor tube assembly contains an orifice of a specific size.

While supply air enters one sieve bed, the restrictor creates back pressure in this canister, determining the rate at which room air can flow through the sieve bed. Meanwhile, the opposite restrictor acts as a metering device, allowing a small amount of product gas (oxygen) to pass through the orifice and into the bottom of the exhausting sieve bed for purge. Therefore, increasing or decreasing the orifice size will alter the balance of pressure within the sieve beds. This pressure regulation allows a filling canister to pressurize properly for maximum nitrogen adsorption. The checking action of the restrictor tube maintains the product canister pressure while permitting a sufficient amount of product gas to pass through the orifice and into the exhausting canister to efficiently purge any residual nitrogen.

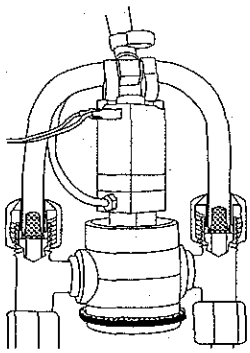


Figure 1-11: Restrictor Tube Assemblies

1.2.14 Product Canister

The product canister (Figure 1-12) is a hollow, aluminum tank, with an approximate one-liter volume, that stores product gas (oxygen) from the sieve canisters under pressure. The product canister stores oxygen to ensure a smooth, steady outlet flow as the unit cycles back and forth between the sieve canisters.

The amount of purge oxygen is directly dependent upon the product canister pressure. In turn, the product canister pressure is affected by both the size of the restrictors and the flowmeter setting.

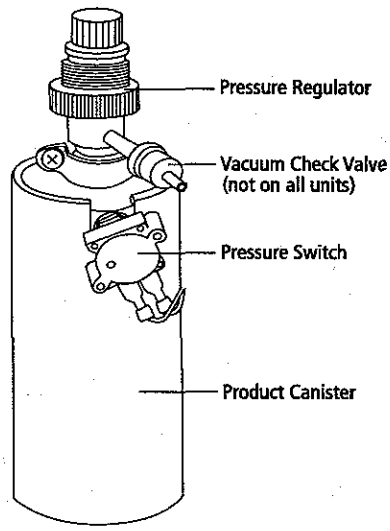


Figure 1-12: Product Canister

1.2.15 Pressure Regulator

The adjustable pressure regulator (Figure 1-12) reduces a nominal oxygen pressure in the product canister to a constant 5 psi (34 kPa) outlet pressure. The concentrator flowmeter requires a constant 5 psi (34 kPa) source pressure to accurately control the flow of oxygen through the flowmeter and to the patient.

1.2.16 Vacuum Check Valve

The vacuum check valve (Figure 1-12), located on the regulator's output side, functions as a siphon break when the concentrator cools down after shutoff. The valve prevents a vacuum (created when gas in the product canister cools after concentrator shutoff) from drawing water in a humidifier bottle into the flowmeter. When the concentrator is operating, the valve's checking action prevents output flow from bleeding to the atmosphere.

NOTE: The vacuum check valve is not required on units with Control/OCI PCB with Removable Sensor.

1.2.17 OCI Transducer (optional)

The OCI transducer (Figure 1-13) is a real-time sampling device that uses ultrasonic sound wave technology to analyze the product gas being delivered to the patient.

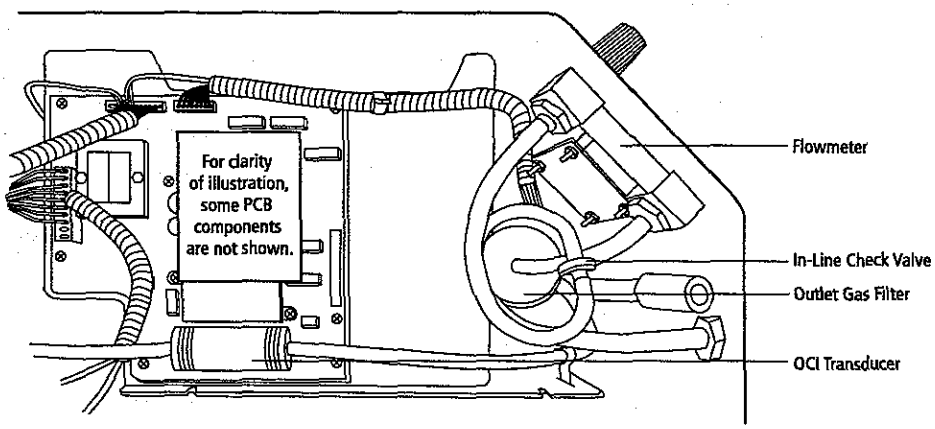


Figure 1-13: Right Cabinet Interior (Control/OCI Combo PCB)

1.2.18 OCI Sensor (optional)

A small amount of the concentrated product gas flows from the product tubing to the OCI sensor (Figure 1-14), where a heated zirconium oxide ceramic sensor measures the oxygen purity. The sensor emits an electrical charge that is proportional to the percent oxygen in the gas surrounding the sensor, and the circuitry measures this charge and correlates it to the precise oxygen concentration. The result is then displayed through one of three LEDs on the front of the concentrator.

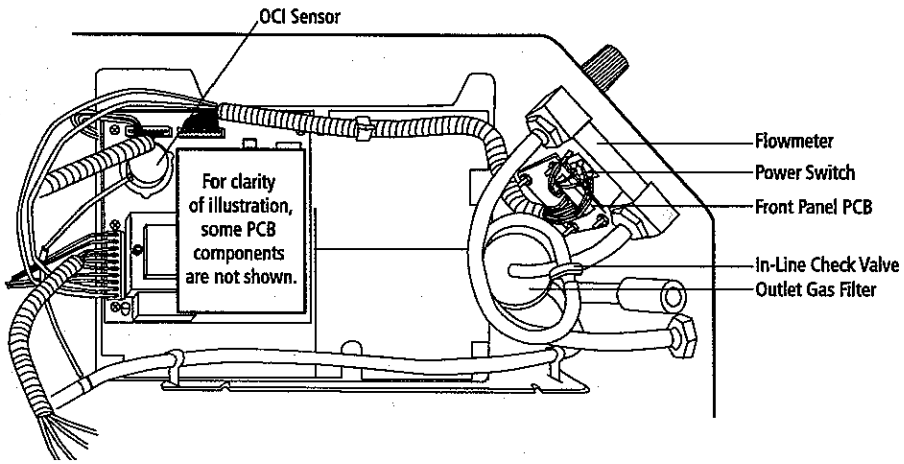


Figure 1-14: Right Cabinet Interior (Control/OCI PCB with Removable Sensor)

1.2.19 Outlet Gas Filter

Located in a sealed housing, the outlet gas filter (Figure 1-13 and 1-14) removes particles greater than 0.3 micrometer in diameter from the oxygen passing through the flowmeter to the patient.

1.2.20 Flowmeter

The flowmeter (Figure 1-13, 1-14, and 1-15) is a back-pressure compensated, gas-measuring device that controls the amount of product oxygen dispensed to the patient. It consists of a tapered, hollow tube inscribed with flow markings, a needle valve, an adjusting knob, an indicator ball, and inlet and outlet ports. During concentrator operation, the patient can adjust flow (as indicated by the ball) to the correct flow rate, as prescribed by the physician.

1.2.21 In-Line Check Valve

The in-line check valve (Figure 1-13 and 1-14) is located in the outlet gas tubing between the flowmeter and outlet gas fitting. The check valve ensures that water from the humidifier bottle is not drawn into the flowmeter when the concentrator is off. (A vacuum is created when the gas in the canisters cools after the concentrator is shut off.)

1.3 ELECTRICAL SYSTEM COMPONENTS

The electrical system (Figure 9-2, 9-3, 9-4, and 9-5) controls and monitors the concentrator and distributes the electrical power required for operation.

1.3.1 Power Switch and Power LED

The POWER switch is either a double-pole, single-throw rocker switch with a bezel-mounted green LED indicator (Figure 1-15) or a push button with a green LED. When the switch is ON, the LED is illuminated and one set of contacts

routes an AC voltage to the coil of a relay mounted on the Control PCB. The relay activates the compressor, cooling fan, hour meter, and PCB timing circuits. The second set of contacts routes DC voltage from the circuit board to the pressure switch and audible alarm. This DC voltage is provided at 12V while the concentrator is attached to an AC wall outlet. In case of power failure, DC voltage is supplied by a 9V battery.

NOTE: For units equipped with Control/OCI PCB with Removable Sensor, the DC voltage is provided at 5V while the concentrator is attached to an AC wall outlet.

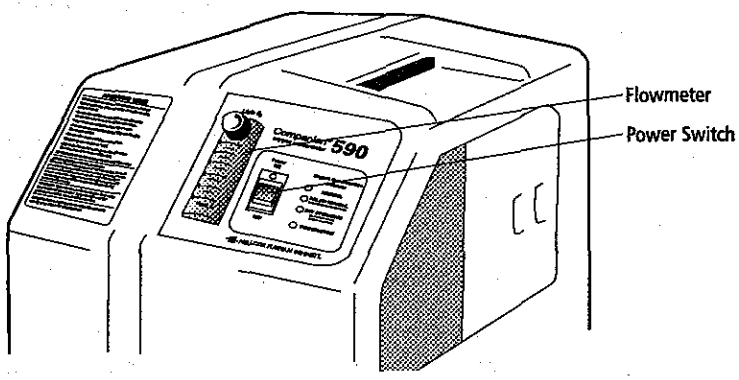


Figure 1-15: Control Panel

NOTE: If the POWER switch is in the ON position, the audible alarm will sound when the pressure switch contacts close, whether the concentrator is plugged into an electrical outlet or not.

1.3.2 Control PCB

The Control PCB contains the electronic logic for controlling the concentrator's operation. The Control PCB contains circuitry that converts AC voltage to DC voltage for PCB use and for powering the solenoids. A fuse protects the PCB components in the event of an over-current condition. The circuitry includes a timing generator and a detector circuit.

The timing generator produces pulses that are used by the alternate/dwell circuit and the pre-charge time circuit. The alternate/dwell circuit uses the timing pulses to activate solenoid valve 1 and solenoid valve 2 alternately for approximately eight seconds each. A dwell period, approximately 0.8 seconds occurring between the activation of solenoid valves 1 and 2, enables the balance time circuit to activate solenoid valve 3 for the balance cycle.

The detector circuit activates a relay if an open condition is detected in a solenoid's electrical circuit (caused, for example, by a disconnected wire or an open solenoid coil). The relay, when activated, removes power from the compressor and cooling fan. The detector circuit thus prevents the concentrator from operating with an electrical failure of the solenoid circuit that could contaminate the molecular sieve material and destroy its nitrogen-adsorbing properties.

1.3.3 Control/OCI Combo PCB (optional)

The Control/OCI Combo PCB (Figure 9-9) makes use of the well-known principle that different gases have different characteristics in their abilities to propagate, or transmit, ultrasonic sound waves. One of the system's components is a gas sample chamber that samples the concentrator gas in a continuous flow. A sound wave is transmitted over a fixed distance from one end of the gas sample chamber to the other. The time-to-fly is electronically measured and converted to an electronic signal. The time-to-fly is dependent upon the product gas purity, temperature, and pressure. A temperature sensor located within the product gas stream electronically compensates for temperature effects. The product gas in the sample chamber is maintained at a constant pressure.

The OCI measures the time-to-fly, converts it to an electronic signal, compensates for external factors, and processes the resultant output into useful analytical information (the LEDs and shutdown system) through standard electronic circuitry.

1.3.4 Control/OCI PCB with Removable Sensor (optional)

The OCI sensor and PCB together measure the oxygen purity of the product gas sample using a zirconium oxide ceramic sensor. When heated to a precise temperature, this sensor emits an electrical charge that is proportional to the percent oxygen in the gas surrounding the sensor. The circuitry measures the charge and correlates it to the precise oxygen concentration. The result is displayed through one of three LEDs on the front of the concentrator.

1.3.5 OCI Indicator Lights

Oxygen concentrators equipped with OCI feature a front panel with three OCI LEDs: NORMAL, BELOW NORMAL, and NOT OPERATING (Figure 1-16).

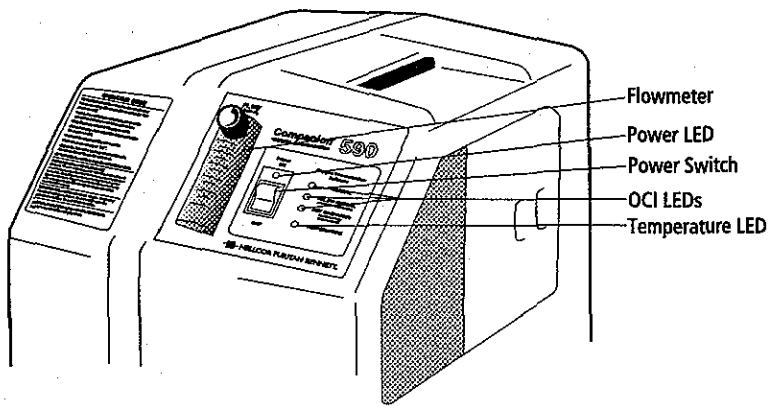


Figure 1-16: OCI Indicator LEDs

The green NORMAL LED indicates normal operation. Oxygen concentration is 85% or above.

The yellow BELOW NORMAL LED indicates oxygen concentration between 70% and 85%.

The red NOT OPERATING LED indicates oxygen concentration is below 70%. The OCI will shut down the oxygen concentrator.

Concentrators equipped with a Control/OCI PCB with Removable Sensor also feature a yellow TEMPERATURE LED that indicates when the temperature inside the concentrator has exceeded 140 °F (60 °C). The unit will shut down.

1.3.6 Pressure Switch

The electro-pneumatic pressure switch (Figure 1-17) is mounted on the product canister and senses the pressure of the product gas (oxygen) in the product canister. Normal product canister pressure keeps the switch contacts open. If the product canister pressure drops below the pressure switch threshold setting of 4.0 psi ±0.2 psi (27 kPa ±1.38 kPa), the switch contacts close and the audible alarm will sound.

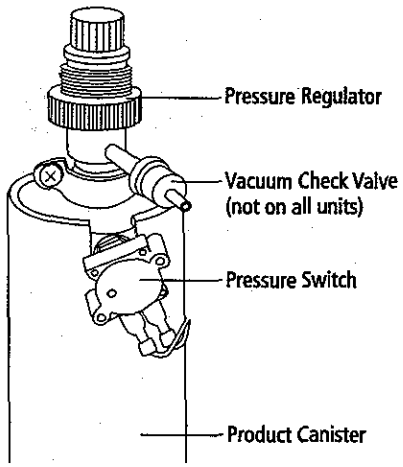


Figure 1-17: Pressure Switch

1.3.7 Audible Alarm

The audible alarm consists of an electronic module powered by either the Control PCB or the 9V battery. When the POWER switch is in the ON position, and the pressure switch contacts are closed, the audible alarm sounds. In the event of an AC power failure, the 9V battery powers the audible alarm.

In non-OCI units and units equipped with OCI PCB or Control/OCI Combo PCB, the audible alarm is located on the right side behind the air intake filter (Figure 1-18).

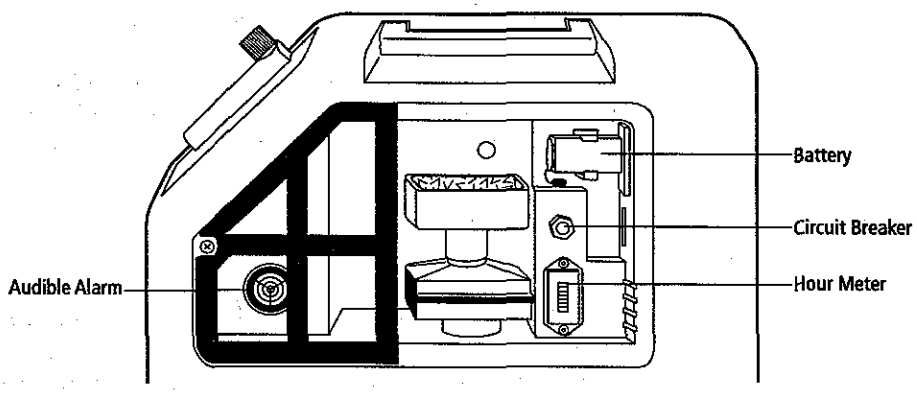


Figure 1-18: Right Side View

On units equipped with Control/OCI PCB with Removable Sensor, the audible alarm is located on the front panel PCB (Figure 1-19). Alarms and their associated causes are listed below.

ALARM SEQUENCE	CAUSE
Continuous alarm	Power Failure/Low Pressure
Single beeps	Solenoid Valve Detection
Series of double beeps	Low Oxygen Concentration
Series of triple beeps	High Internal Temperature

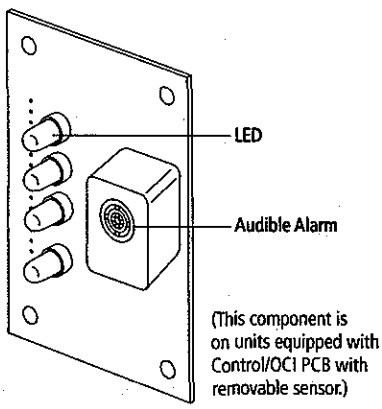


Figure 1-19: OCI Front Panel PCB

1.3.8 Battery

A 9V alkaline battery (Figure 1-18), located behind the removable side panel, provides backup power to the audible alarm.

1.3.9 Hour Meter

The hour meter (Figure 1-18), located behind the removable side panel, indicates total concentrator running time.

1.3.10 Circuit Breaker

The AC electrical system is protected from short circuits and power surges by a resettable, push-button circuit breaker (Figure 1-18), located behind the removable side panel.

CIRCUIT BREAKER CHART

PART NUMBER	AMPERE	CONCENTRATOR MODEL	COMPRESSOR
492196	5	492a (120V, 60 Hz)	Thomas
492437 [1]	6	590 (120V, 60 Hz)	Thomas (Standard)
493531 [2]	8	590 (120V, 60 Hz) [3]	Thomas (High Efficiency)
493531 [2]	8	590 (120V, 60 Hz) [4]	Thomas (2639 Series)
493531 [2]	8	590 (120V, 60 Hz)	Gast
493531 [2]	8	590 (120V, 60 Hz) [5]	Thomas (2650 Series)

[1] Manufactured before April 26, 1993.
[2] Washers required, Part Number 493567.
[3] Manufactured after Nov. 12, 1992.
[4] Manufactured after May 1, 1996.
[5] Manufactured after Oct. 22, 1997.

1.3.11 Cooling Fan

A cooling fan located beneath the compressor provides cooling air flow through the concentrator. The fan draws in cooling air through the air intake filter located on the upper right side of the cabinet (Figure 1-20). The cooling air travels down across the concentrator's four canisters and the compressor, and is exhausted out the bottom left side of the cabinet. Both the air intake filter and exhaust vents of the cabinet must be free of obstructions for proper cooling system function.

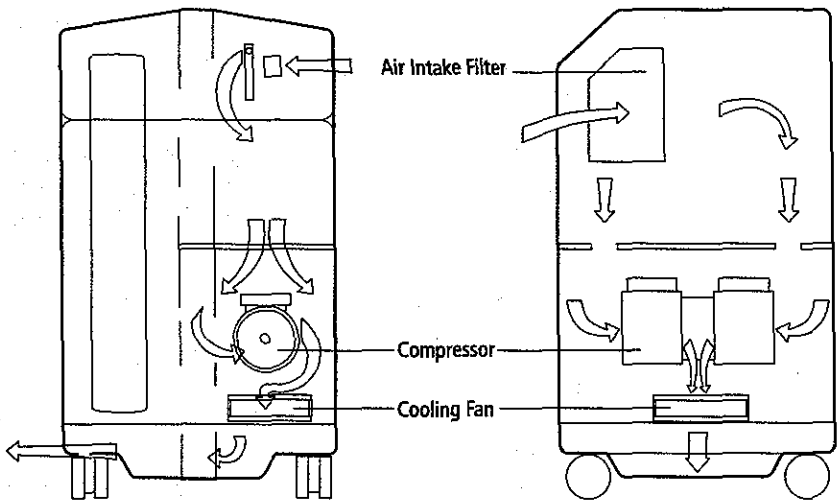


Figure 1-20: Cooling Fan Airflow

1.3.12 Capacitor

The capacitor (Figure 1-21) is an electrical storage device that helps start the compressor motor and improves compressor performance during operation.

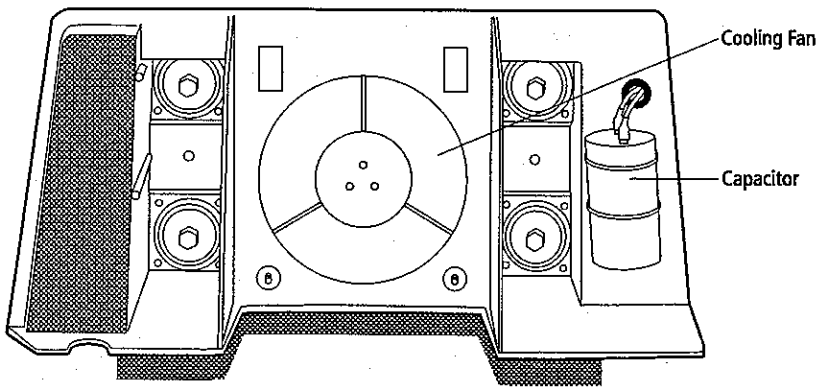


Figure 1-21: Compressor Platform, Bottom View

1.4 CONCENTRATOR SYSTEM OPERATION

1.4.1 General

The Companion 492a/590 Oxygen Concentrator concentrates oxygen from room air by a process known as pressure-swing adsorption. This cyclic process involves two molecular sieve canisters which are alternately pressurized with room air and then vented to atmospheric pressure. The nitrogen-selective zeolite in the molecular sieve canisters adsorbs nitrogen from air under pressure and, in turn, desorbs (releases) nitrogen when the canister is vented to atmospheric pressure. The process is further enhanced by incorporating a pressure-balance cycle and using product gas (oxygen) as purge gas to increase the efficiency of regenerating the sieve.

A complete system cycle of approximately 17.6 seconds consists of two, 8-second concentrating cycles and two, 0.8-second balance cycles. Gas flow through the pneumatic system is shown in Figure 9-6, 9-7, and 9-8.

1.4.2 Concentrating Cycle 1, Sieve Canister 1

The compressor pressurizes the supply air tubing, the reservoir canister, and the pilot air tubing with filtered room air (Figure 9-6). At the appropriate time, the electronic timing circuit on the Control PCB sends a DC voltage signal to energize solenoid valve 1 for approximately eight seconds. Pilot gas under pressure flows through solenoid valve 1 and is applied to the pilot ports of supply pilot valve 1 and exhaust pilot valve 2, simultaneously opening these pilot valves.

Supply air from the reservoir canister passes through the open supply pilot valve 1 and into sieve canister 1. Water vapor is attracted from the supply air and held in the top of sieve canister 1. Nitrogen is then adsorbed from the supply air and oxygen-rich gas flows to the product canister metered by restrictor tube assembly 1. Some oxygen-rich gas passes through restrictor 2 and into sieve canister 2 once the pressure in sieve canister 2 has been exhausted to atmosphere through exhaust pilot valve 2. This purge oxygen migrates up into sieve canister 2 to increase the

efficiency of regenerating the molecular sieve by removing any trace nitrogen in the canister.

Oxygen in the product canister, at a pressure higher than that required at the flowmeter, is reduced and maintained at 5 psi (34 kPa) by the pressure regulator. Oxygen then passes through the outlet gas filter, the flowmeter, and finally the oxygen outlet.

1.4.3 Balance Cycle 1

After sieve canister 1 has been concentrating for approximately eight seconds, the electronic timing circuit on the Control PCB simultaneously de-energizes solenoid valve 1 and energizes solenoid valve 3 for approximately 0.8 seconds (Figure 9-7). When solenoid valve 1 is de-energized, the pilot pressure source for supply pilot valve 1 and exhaust pilot valve 2 is cut off, and the piloting pressure for the valves is vented to atmosphere through the normally open port of solenoid valve 1. Pressure against the unbalanced area of the bottom diaphragm closes supply pilot valve 1. An internal spring closes exhaust pilot valve 2. Solenoid valve 3 is then energized and pilot air pressure is applied to the pilot port of the balance pilot valve to open this valve.

With the balance pilot valve open and the remaining pilot valves closed, oxygen-rich gas at system pressure from sieve canister 1 is routed directly to sieve canister 2 to increase pressure in this canister in preparation for its concentrating cycle.

The placement of restrictor 1 and restrictor 2 downstream of the balance pilot valve ports allows gas from sieve canister 1 under pressure to flow into sieve canister 2 and pressurize it during the balance cycle with minimal effect on gas in the product canister. This increase of pressure in sieve canister 2 during the balance cycle helps ensure immediate oxygen flow from this canister at the beginning of its concentrating cycle.

1.4.4 Concentrating Cycle 2, Sieve Canister 2

At the end of balance cycle 1, the electronic timing circuit on the Control PCB simultaneously de-energizes solenoid valve 3 and energizes solenoid valve 2 for approximately eight seconds (Figure 9-8).

When solenoid valve 3 is de-energized, the pilot pressure source for the balance pilot valve is cut off, and the piloting pressure for this valve is vented to atmosphere through the normally open port of solenoid valve 3. Pressure against the unbalanced area of the bottom diaphragm closes the balance pilot valve. When solenoid valve 2 is energized, pilot gas under pressure flows through solenoid valve 2 and is applied to the pilot ports of supply pilot valve 2 and exhaust pilot valve 1, simultaneously opening these pilot valves.

Supply air from the reservoir canister passes through open supply pilot valve 2 and into sieve canister 2. Water vapor is attracted from the supply air and held in the top of the sieve canister. Nitrogen is then adsorbed from the supply air and oxygen-rich gas flows to the product canister metered by restrictor tube assembly 2.

Meanwhile, gas exhausts out of sieve canister 1 through open exhaust pilot valve 1 and to atmosphere. This exhaust gas drives any water vapor from the top of the sieve bed back into the room. Maintaining this desiccant layer through proper valving action is critical to long sieve bed life.

After the pressure in sieve canister 1 has been exhausted to atmosphere, oxygen-rich purge gas passes through restrictor 1 and into sieve canister 1. The purge oxygen migrates up into sieve canister 1 to increase the efficiency of regenerating the molecular sieve by removing any trace nitrogen in the canister. This cycle duplicates the process of the first concentrating cycle and ensures constant flow of oxygen to the product canister.

1.4.5 Balance Cycle 2

After sieve canister 2 has been concentrating for approximately eight seconds, the electronic timing circuit on the Control PCB simultaneously de-energizes solenoid valve 2 and energizes solenoid valve 3 for approximately 0.8 seconds (Figure 9-7). This cycle then allows the pressure between the two sieve canisters to pre-charge sieve canister 1 in preparation for its concentrating cycle. Upon completion of balance cycle 2, the complete system cycle begins again.

Section 2

ROUTINE MAINTENANCE

This section outlines the recommended maintenance schedules for the Companion 492a/590 Oxygen Concentrator.

NOTE: Operating the concentrator in a dusty environment may increase the maintenance frequency.

NOTE: There are no recommendations regarding routine service intervals for the Companion 492a and 590 oxygen concentrators. However, in accordance with good standards of care for oxygen concentrators, home care providers may establish their own routine service intervals for the Companion 492a and 590 oxygen concentrators.

2.1 MAINTENANCE SCHEDULE SUMMARY

FREQUENCY	COMPONENT	ACTION
Daily	Humidifier Bottle P/N 493809 or equivalent	Refer to the appropriate manufacturer's operating manual.
Daily	Air Intake Filter P/N 492672	Clean daily. Replace as needed.
Monthly [1]	Compressor Inlet Prefilter P/N 492193, 2 pieces	Replace
As needed	Compressor Inlet Extended Life Prefilter P/N 493931 (Upper), 2 pieces P/N 493930 (Lower), 2 pieces	Replace
As needed [2]	Compressor Inlet HEPA Filter P/N 492190	Replace
As needed	Alarm battery, P/N 492297	Replace
As needed	Outlet gas filter, P/N 492141	Replace
As needed	Cabinet exterior	Clean
As needed	Cabinet interior	Clean

[1] For those units with OCI installed, change the Compressor Inlet Prefilter every 90 days or as indicated by OCI (low oxygen concentrations).

[2] When the Compressor Inlet HEPA Filter is used in combination with the Compressor Inlet Prefilter, replace the Inlet HEPA Filter every six months.

Detailed instructions on each maintenance item are located in the following pages.

2.2 MAINTENANCE INSTRUCTIONS

CAUTION: To prevent PCB damage while performing routine maintenance:

- **Do not release insect spray or aerosol fresheners into the cabinet air inlet while the unit is running.**
- **Do not allow leak detection fluid, cleaning solutions, or wet towels to make contact with PCBs.**
- **Do not use shop-compressed air to blow off dust accumulation on PCBs.**
- **Do not touch PCBs without being properly grounded.**
- **Do not allow tools to contact the PCBs without being properly grounded.**

FREQUENCY	COMPONENT	ACTION
Daily	Humidifier bottle	For cleaning or replacement instructions, refer to the appropriate manufacturer's operating manual.
Daily	Air intake filter	Remove the foam air intake filter from the right side of the concentrator (Figure 2-1) by pulling the air intake filter away from the Velcro strips.

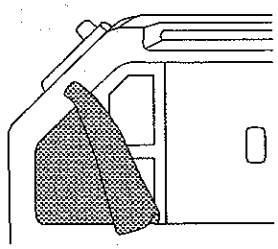


Figure 2-1: Air Intake Filter Removal

Vacuum the air intake filter and/or wash it in a mild detergent solution.

Rinse the air intake filter thoroughly, squeeze out any excess water, and air dry. Replace as needed.

CAUTION: Do not apply heat to dry the air intake filter. This may damage the filter. Replace as needed.

CAUTION: Do not operate the concentrator without the air intake filter in place. Replace as needed.

Place the air intake filter in position on the right side of the concentrator and press firmly against the Velcro strips to secure it in place.

FREQUENCY	COMPONENT	ACTION
Monthly	Compressor inlet prefilter	Remove the side panel of the concentrator (Figure 2-2) that covers the filter compartment.

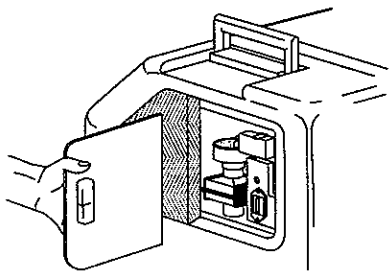


Figure 2-2: Side Panel Removal

Pull up the compressor inlet prefilter housing to disconnect it from the compressor inlet HEPA filter.

Remove both compressor inlet prefilters from the compressor inlet prefilter housing (Figure 2-3).

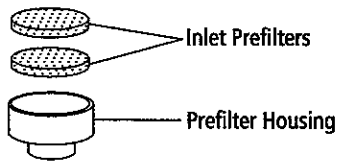


Figure 2-3: Compressor Inlet Prefilter

Dispose of the top compressor inlet prefilter. Check the bottom compressor inlet prefilter and discard if dirty.

Place the two compressor inlet prefilters in the compressor inlet prefilter housing. Place the new compressor inlet prefilter on the bottom and the old compressor inlet prefilter (previously on the bottom) on top.

Place the compressor inlet prefilter housing in position on the compressor inlet HEPA filter and push it down to secure it in place.

Reposition the side panel of the concentrator to cover the filter compartment.

As needed when indicated by low oxygen concentrations	Compressor inlet extended life prefilter	Remove the side panel from the concentrator (Figure 2-2). Lift the prefilter assembly to remove it from the inlet HEPA filter. Remove and discard the outer upper and the outer lower extended life prefilters (Figure 2-4).

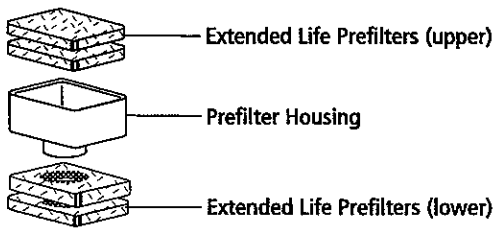
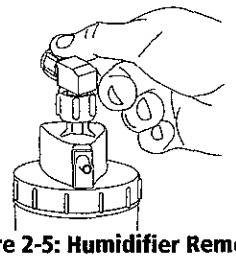


Figure 2-4: Inlet Extended Life Prefilter

FREQUENCY	COMPONENT	ACTION
	Compressor inlet extended life prefilter (continued)	Remove and retain the inner upper and inner lower extended life prefilters. Install the new upper and lower extended life prefilters in the inner filter positions. Install the upper and lower prefilters (which were retained) in the outer filter positions. Reinstall the prefilter assembly on the inlet HEPA filter. Install the side panel on the concentrator. Allow the concentrator to run for a minimum of 10 minutes. If an undesirable condition still exists, replace the outer upper and outer lower filters with new filters.
As needed (When used with the compressor inlet prefilter, replace every six months)	Compressor inlet HEPA filter	Remove the side panel of the concentrator (Figure 2-2) that covers the filter compartment. Pull up the compressor inlet HEPA filter to disconnect both it and the compressor inlet prefilter housing from the concentrator. Separate the compressor inlet prefilter housing from the compressor inlet HEPA filter. Discard the compressor inlet HEPA filter. Place the compressor inlet prefilter housing in position on the inlet port of the new compressor inlet HEPA filter. Place the exit port of the compressor inlet HEPA filter in position in the concentrator and push the compressor inlet HEPA filter and the compressor inlet prefilter housing down to secure them in place. Reposition the side panel of the concentrator to cover the filter compartment.
As needed	Alarm battery	Remove the side panel (Figure 2-2) that covers the filter compartment. Unplug the battery from the connector. Check the battery with the alarm switched on. Replace the battery if it registers less than 8V. Place battery in position behind the side panel (Figure 6-1). Plug the battery into the connector. Reposition the side panel to cover the filter compartment.

FREQUENCY	COMPONENT	ACTION
As needed when indicated by low oxygen concentrations	Outlet gas filter	**WARNING** **Hazardous voltage can shock, burn, or cause death. To prevent the possibility of an electrical shock or damage to the concentrator, disconnect the power cord from the power supply before opening the cabinet.** If a humidifier is installed, remove it from the oxygen outlet connector (Figure 2-5).  **Figure 2-5: Humidifier Removal** Remove the air intake filter from the right side of the concentrator by pulling the air intake filter away from the Velcro strips that hold it in place. **CAUTION: The concentrator will become unstable on its casters if the two halves of the cabinet are opened by more than 90°. Misalignment of the heat exchanger may occur.** Using a No. 2 Phillips screwdriver, remove the long screw from the right side of the cabinet (Figure 6-1). Using a No. 2 Phillips screwdriver, with a shaft of at least 7 in. (18 cm), loosen the short screw from the right side of the cabinet (Figure 6-1), taking care not to lose the O-ring on the end of the short screw. The two halves of the cabinet separate as the short screw is loosened. **NOTE:** It is not necessary to remove the short screw completely from the right side of the cabinet. Pull the two halves of the cabinet away from one another to open the cabinet. The two halves of the cabinet will pivot around the hinges at the rear of the concentrator.

FREQUENCY	COMPONENT	ACTION
	Outlet Gas Filter (continued)	Cut the oxygen tubing at both the inlet and outlet of the outlet gas filter (Figure 2-6) and discard the outlet gas filter.

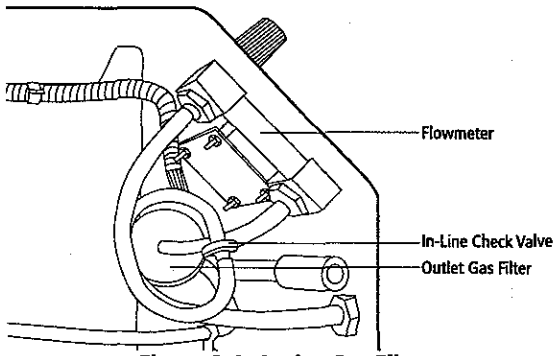


Figure 2-6: Outlet Gas Filter

Install the new outlet gas filter between the two ends of previously cut oxygen tubing.

NOTE: If there is a directional flow arrow on the outlet gas filter, install the outlet gas filter so the arrow points towards the oxygen tube which is connected to the flowmeter inlet. Outlet gas filters without flow arrows can be installed in either direction.

Insert the short screw into position in the right side of the cabinet and place the O-ring on the end of it.

Pull the two halves of the cabinet together to within approximately 2 in. (5 cm) of each other, so you can still see the upper cabinet tubes in both halves of the cabinet.

Insert the long screw into position in the right side of the cabinet and push it into the cabinet so it extends through the upper cabinet tube in both halves of the cabinet.

Tighten the long screw until the two halves meet. Then tighten the short screw, causing the two halves of the cabinet to close.

Place the air intake filter in position in the right side of the concentrator and press firmly against the Velcro strips to secure it in place.

Reinstall the humidifier to the oxygen outlet connector, if required.

As needed	Cabinet exterior	**WARNING** **Hazardous voltage can shock, burn, or cause death. To prevent the possibility of an electrical shock or damage to the concentrator, disconnect the power cord from the power supply before opening the cabinet.** Wipe the exterior of the cabinet with a cloth or sponge, dampened with a mild detergent solution.

FREQUENCY	COMPONENT	ACTION
As needed	Cabinet interior	If a humidifier is installed, remove the humidifier from the oxygen outlet connector (Figure 2-5).

WARNING

Hazardous voltage can shock, burn, or cause death. To prevent the possibility of an electrical shock or damage to the concentrator, disconnect the power cord from the power supply before opening the cabinet.

Remove the air intake filter from the right side of the concentrator (Figure 2-1) by pulling the air intake filter away from the Velcro strips that hold it in place.

Using a No. 2 Phillips screwdriver, remove the long screw from the right side.

Using a No. 2 Phillips screwdriver, with a shaft of at least 7 in. (18 cm), loosen the short screw from the right side of the cabinet, taking care not to lose the O-ring on the end of the short screw. The two halves of the cabinet will separate as the short screw is loosened.

NOTE: It is not necessary to remove the short screw completely from the right side.

CAUTION: The concentrator will become unstable on its casters if the two halves of the cabinet are opened by more than 90°. Misalignment of the heat exchanger may occur.

Pull the two halves of the cabinet away from one another to open the cabinet. The two halves of the cabinet will pivot around the hinge at the rear of the concentrator.

CAUTION: PCBs are ESD-sensitive devices. Always properly ground yourself prior to making contact with PCBs. To prevent PCB damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

FREQUENCY	COMPONENT	ACTION
	Cabinet Interior (continued)	**CAUTION: PCBs may be damaged if the compressed air supply used to clean the cabinet interior is not clean and oil free. Avoid blowing compressed air or leak detection solution onto the PCBs. (Direct the compressed air away from them.)** Using a compressed air supply, remove any dust which may have accumulated inside the cabinet. **CAUTION: Any plastic or metal vacuum attachment equipment must be grounded at the nozzle end.** Ensure that the air inlet and exhaust vents are unobstructed. Insert the short screw into position in the right side of the cabinet. Place the O-ring on the end of the short screw. Pull the two halves of the cabinet together to within approximately 2 in. (5 cm) of each other, so you can still see the upper cabinet tubes in both halves of the cabinet. Insert the long screw into its position in the right side of the cabinet. Push it into the cabinet so it extends through the upper cabinet tube in both halves of the cabinet. Tighten the long screw, causing the two halves of the cabinet to close. Tighten the short screw. Place the air intake filter in position in the right side of the concentrator and press firmly against the Velcro strips to secure it in place. Reinstall the humidifier to the oxygen outlet connector, if required.

Section 3

PERFORMANCE VERIFICATION

This section is designed to help the technician:

- Verify that the concentrator is operating within specifications.
- Identify a suspected problem.
- Check the concentrator functions before operation (after the repair or replacement of a component).

NOTE: Numeric values quoted in this section are nominal values used for reference purposes only. Due to changing factors in your area (such as atmospheric pressure and heat), pressure characteristics may vary.

NOTE: Unless otherwise indicated, pressure and flow readings are based on Full Scale. If readings exceed the top end of the specification, consider the test equipment tolerances before diagnosing the unit as faulty. If flow and oxygen levels are within specifications, do not adjust operating pressures down to the midpoint of the range.

This section is divided into different performance areas. Although each may be considered as a separate system or function for testing purposes, they all must perform in harmony to achieve the concentrator's end result—high oxygen purity delivered at a continuous flow rate.

If the concentrator fails to pass any of the performance verification tests, see either the Troubleshooting Guide (Section 4) or the Disassembly Guide (Section 5).

WARNING

Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

CAUTION: PCBs are ESD-sensitive devices. Always properly ground yourself prior to making contact with PCBs. To prevent PCB damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

3.1 PRETESTING CHECKS

Before testing, ensure that:

- The air intake filter, compressor inlet prefilters, compressor inlet HEPA filter, and 9V battery are installed correctly.
- The power cord and plug are not damaged or frayed.
- The humidifier bottle and any other delivery apparatus are removed from the concentrator outlet.

3.2 OXYGEN CONCENTRATION

Oxygen concentration levels may be checked when it is necessary to verify that the concentrator is producing the correct oxygen purity. Due to system design, this area of performance verification may be considered the most crucial. If the concentrator is producing oxygen at, or above, the minimum specification at the maximum flow rate, it is an indication that other systems are operating properly.

3.2.1 Oxygen Test

1. With the concentrator connected to the AC outlet, set the POWER switch to the ON position.
2. Set the flowmeter to its maximum flow rate (4 L/min or 5 L/min) and allow the unit to run for 30 minutes in an open environment. Check the flowmeter ball occasionally and adjust the flow to ensure the ball is bisected by the line corresponding to the selected flow rate.

NOTE: High ambient temperatures, low voltage, and other environmental conditions may lower oxygen purity.

3. Using a properly calibrated oxygen analyzer (Figure 3-1), follow the manufacturer's recommendations for how to sample the oxygen outflow of the oxygen concentrator. (Generally, it is necessary to allow the oxygen to flow across the sampling device of the analyzer. Do not allow the oxygen to back pressure against the sampling device.)

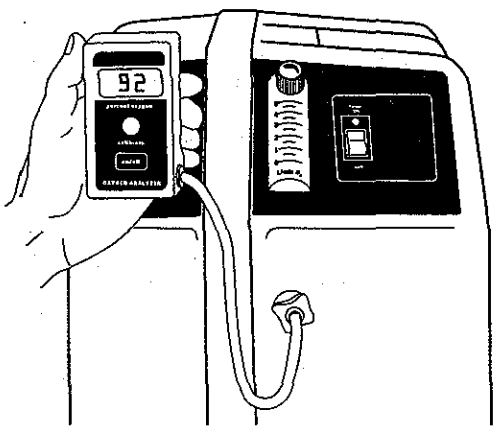


Figure 3-1: Oxygen Concentration Testing

4. Record the oxygen concentration and compare it to the following performance specifications:

CONCENTRATOR MODEL	OXYGEN CONCENTRATION
492a	95% ±3% at 1 L/min to 3 L/min 92% ±3% at 4 L/min
590	95% ±3% at 1 L/min to 4 L/min 90% ±3% at 5 L/min

5. If the oxygen concentration is not within the specified levels, check that:
   - the air intake filter, compressor inlet prefilters, and compressor inlet HEPA filter are clean.
   - the flowmeter setting is correct (Section 3.6).
   - the analyzer is accurate (that is, correctly calibrated, battery not weak, and adequate oxygen supplied to the sampling device).
   - the unit is not located in close proximity to high temperatures.
   - a low voltage condition does not exist from the power source (that is, the wall outlet).
   - the altitude does not exceed 3,000 ft (914 m).
6. If the concentration is still not within the specified levels, perform the Low Concentration Check (Section 4.1.1).

3.3 PNEUMATIC SYSTEM

Because oxygen concentrators are principally pneumatic devices, verifying the pressure specifications in the Companion concentrator is valuable information in analyzing its performance.

NOTE: The Companion Pneumatic Test Kit (Section 6.2) or equivalent should be used for all tests in this section.

3.3.1 Leak Test

A leak in the concentrator system may cause loss of oxygen concentration or sieve contamination. It is important to leak test the unit before performing any pressure tests.

1. Open the cabinet, as described in Section 5.1.1.
2. Inspect all hoses, connections, and fittings in the pneumatic system, checking for tightness, kinks, wear, or damage to parts. Correct any deficiencies.

3. Connect the concentrator's power cord to the AC outlet, set the POWER switch to the ON position, and allow the concentrator to run for approximately 10 minutes.

WARNING

When applying leak detection solution, do not allow it to come into contact with electrical connectors or components. Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

CAUTION: Do not apply leak detection solution to pneumatic connections on the OCI transducer or OCI sensor.

CAUTION: Never apply leak detection fluid into the top exhaust port of the solenoid valves.

4. Carefully apply leak detection solution on all connections in the concentrator, starting with the compressor and working through all of the canisters and valves to the outlet. Observe the connections for a bubbling action indicating a leak.

NOTE: The outlet side of each exhaust pilot valve does not need to be leak tight.

If you detect a leak, remove the part. Remove any debris from the threads. Then add LOX 8 thread sealant or Teflon tape and reinstall the part.

NOTE: Do not use LOX 8 thread sealant or Teflon tape on O-ring style fittings.

CAUTION: Begin applying Teflon tape one thread from the end of the fitting.

3.3.2 Pressure Tests

Perform three pressure tests on the Companion concentrator to check the reservoir canister pressure (which indicates sieve canister filling pressure), the product canister pressure, and the outlet gas pressure.

Because the pressure in a concentrator can vary with altitude, barometric changes, and compressor performance, a range of acceptable pressures are shown for the following tests. With experience, you should be able to identify a normal range for your testing location and concentrators.

1. Perform the leak test, as described in Section 3.3.1.
2. Set the POWER switch to the OFF position.

3. Locate the ¼ in. (6.35 mm) i.d. tubing which connects the brass tee and the product canister (above the restrictor tube assemblies).
4. Remove the clamp and product canister tubing from the tee fitting.
5. Tee in the ¼ in. (6.35 mm) i.d. tubing from the pneumatic test kit (Figure 3-2).

NOTE: Secure all connections with tubing clamps to prevent leaks.

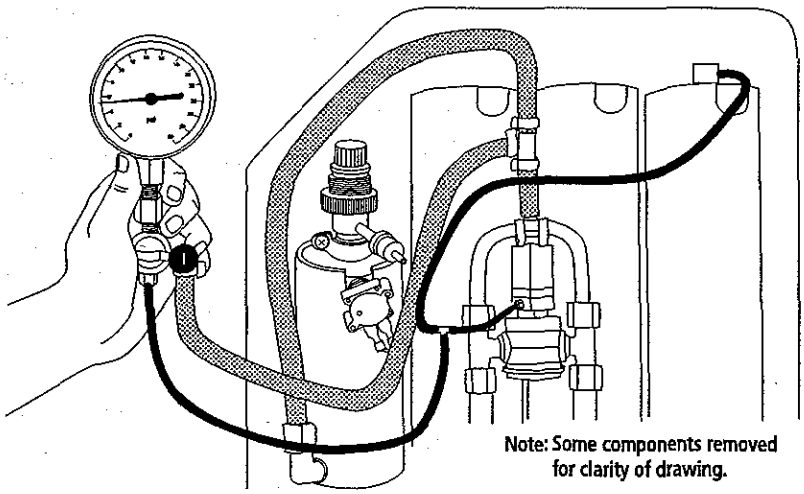


Figure 3-2: Pneumatic Test Kit Connection

6. Locate the 1/16 in. (1.58 mm) pilot air tubing leading to the brass nipple on the balance solenoid valve and disconnect it from the balance solenoid valve.
7. Tee in the 1/16 in. (1.58 mm) i.d. tubing from the pneumatic test kit.
8. Set the selector switch on the pneumatic test kit to the left (Figure 3-3). This indicates reservoir canister pressure.

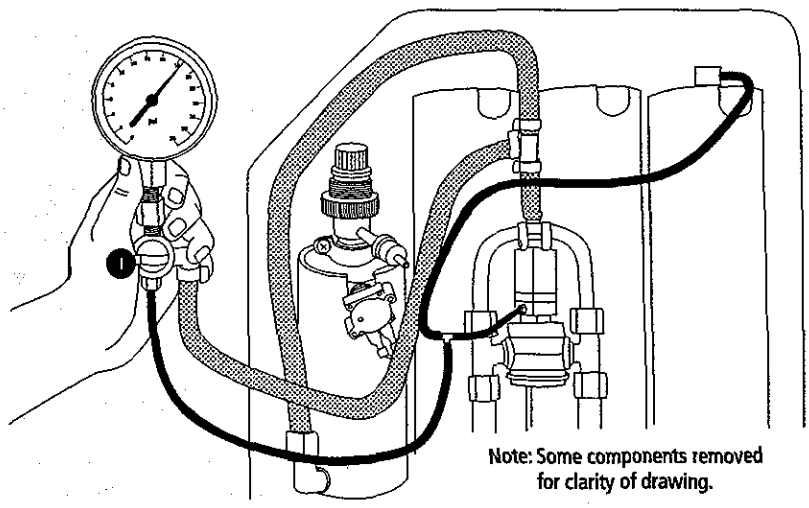


Figure 3-3: Pressure Test, Reservoir Canister

9. Set the POWER switch to the ON position.
10. Set the flowmeter to the maximum L/min indicated on its scale and allow the concentrator to run for approximately 30 minutes.

NOTE: If the needle on the gauge greatly exceeds 30 psi (207 kPa), set the POWER switch to the OFF position and see Troubleshooting (Section 4) relating to high reservoir tank pressure.

11. Verify that the pressure in the reservoir canister slowly increases from 15 psi ±3.0 psi (103.5 kPa ±20.7 kPa) (drop point) to 20 psi ±3.0 psi (138 kPa ±20.7 kPa) (fill) and then rapidly climbs to 28 psi ±3.0 psi (193 kPa ±20.7 kPa) (kick). After the kick, the pressure should fall back to the drop point and the cycle repeats.
12. Record all three pressures (drop point, fill, and kick) on two consecutive cycles. Record the drop point pressures to an accuracy of 0.2 psi (1.38 kPa) only.
13. Verify that the balance (the difference of pressure) at the drop point on two consecutive cycles is not greater than 0.4 psi (2.75 kPa).
    a. If the balance is less than 0.4 psi (2.75 kPa), proceed to step 14.
    b. If the balance is greater than 0.4 psi (2.75 kPa), balance the orifices as described in Section 3.3.3.
14. Set the selector switch on the test kit to the right. This indicates product canister pressures.
15. Crimp the short ¼ in. (6.35 mm) i.d. tube above the brass restrictor tube tee to restrict the flow of gas to the test kit gauge and product canister (Figure 3-4).

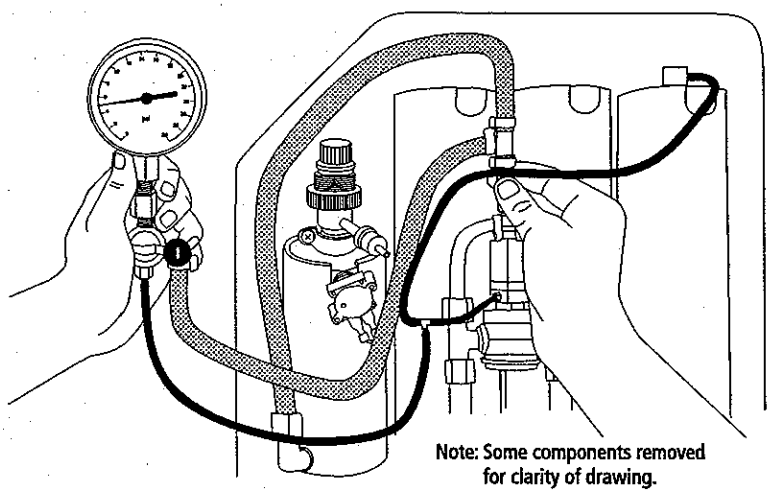


Figure 3-4: Pressure Switch Testing

16. Gradually reduce the gauge pressure until the pressure switch in the product canister activates the audible alarm. The alarm sounds at 4.0 psi ±0.2 psi (27.5 kPa ±1.38 kPa). If the alarm fails to sound at 4.0 psi ±0.2 psi

(27.5 kPa ±1.38 kPa), refer to Section 3.4.2 for troubleshooting the pressure switch.

17. Set the POWER switch to the OFF position.
18. Disconnect the test kit tubing.
19. Reconnect the ¼ in. (6.35 mm) i.d. tubing from the product canister to the restrictor tube assembly brass tee and secure the tubing with a new clamp.
20. Reconnect the 1/16 in. (1.58 mm) i.d. tubing to the brass nipple at the base of the balance solenoid valve.
21. Connect the tailpiece and wing nut outlet adapters to the concentrator outlet.
22. Connect the ¼ in. (6.35 mm) i.d. tubing of the test kit to the adapter.
23. Set the selector switch on the pneumatic test kit to the right. This indicates product gas pressures.
24. Set the POWER switch to the ON position, turn the flowmeter to the maximum L/min indicated, and let the concentrator run for approximately 30 minutes.
25. Cover the open end of the large tee from the test kit by placing one finger over the open end (Figure 3-5).

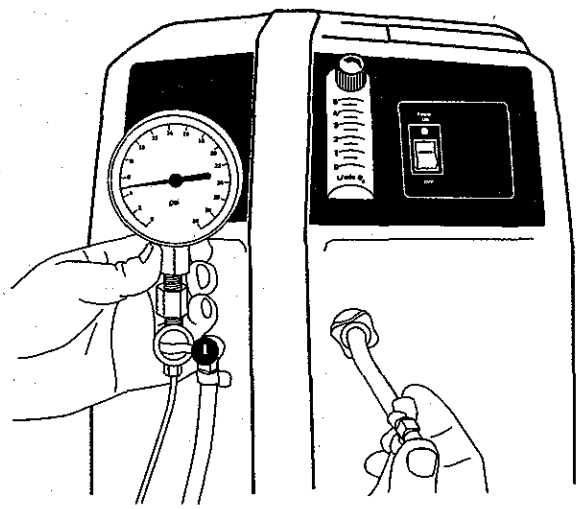


Figure 3-5: Outlet Pressure Testing

26. Verify that the concentrator outlet static pressure is 5.0 psi ±0.5 psi (34.5 kPa ±3.5 kPa). If the pressure is out of tolerance, see Section 4.
27. Disconnect the ¼ in. (6.35 mm) i.d. tubing and outlet adapters.

3.3.3 Balancing the Restrictor Orifices

Each restrictor tube assembly contains a restrictor orifice of a specific size. Each restrictor has a rating that represents the L/min flow rate of gas through the orifice at a standard pressure. The orifices are balanced (that is, the pressures are within 0.4 psi [2.75 kPa] of each other at the drop point).

1. Open the cabinet, as described in Section 5.1.1.
2. Ensure all leaks have been eliminated from the concentrator's pneumatic system (Section 3.3.1).
3. Connect the pneumatic test kit.
    a. Locate the small pilot air tubing leading to the brass nipple on the balance solenoid valve and disconnect it from the balance solenoid valve.
    b. Tee in the 1/16 in. (1.58 mm) i.d. tubing from the pneumatic test kit.
    c. Set the selector switch on the test kit to the left. This indicates reservoir canister pressure.
    d. Set the POWER switch to the ON position.
    e. Set the flowmeter to the maximum L/min indicated on its scale and allow the concentrator to run for approximately 30 minutes.

    NOTE: If the needle on the gauge greatly exceeds 30 psi (207 kPa), set the POWER switch to the OFF position and see Troubleshooting (Section 4) relating to high reservoir tank pressure.

    f. Verify that the pressure in the reservoir canister slowly increases from 15 psi ±3.0 psi (103.5 kPa ±20.7 kPa) (drop point) to 20 psi ±3.0 psi (138 kPa ±20.7 kPa) (fill) and then rapidly climbs to 28 psi ±3.0 psi (193 kPa ±20.7 kPa) (kick).

    After the kick, the pressure should fall back to the drop point and the cycle repeats.

    g. Record all three pressures (drop point, fill, and kick) on two consecutive cycles. Record the drop point pressures to an accuracy of 0.2 psi (1.38 kPa) only.
4. Determine the balance pressure of the sieve beds by comparing the drop point pressures of two consecutive pressure cycles. If the pressures differ by more than 0.4 psi (2.75 kPa), see Troubleshooting (Section 4).
5. Determine which drop pressure value corresponds to which restrictor tube (and consequently which sieve bed) by operating the concentrator and observing the test gauge, as follows:
    a. Place one finger lightly over the open exhaust port on the end of solenoid valve 1.
    b. With the test gauge connected to the concentrator and the concentrator operating, feel for a slight puff of air from the exhaust port of solenoid 1. This represents the close of the solenoid and thus the end of the fill cycle for sieve canister 1.
    c. Immediately observe the test gauge. You should observe a rapid climb in the pressure (kick).

d. After reaching the kick pressure, the test gauge needle should fall to the next drop point. This drop point is the beginning pressure for the right sieve canister (sieve canister 2), which corresponds to the right restrictor tube.

6. Try to balance the orifices by replacing one of the restrictor orifices with a restrictor orifice of larger or smaller rating. Preferably, you should try to raise the lower drop pressure up to the higher drop pressure of the other sieve canister.

   A restrictor orifice of larger rating will result in more flow and lower sieve bed filling pressure. A restrictor orifice of smaller rating will result in less flow and higher sieve bed filling pressure.

7. Although the actual pressures may change up or down as the concentrator stabilizes, the drop point balance should remain constant.

   Occasionally a drop point balance may exist, but the oxygen concentration may not be within specification. In this case, the restrictor tubes may have orifice sizes that are too small (low purge flow) or too large (excessive purge flow).

   Increase or decrease the orifice sizes as appropriate by observing the reservoir canister pressure specifications as a guide.

8. Whenever a restrictor orifice has been replaced, allow the concentrator to run for a minimum of four hours before rechecking both the reservoir canister pressures and the oxygen concentration for specification compliance.

RESTRICTOR TUBE ASSEMBLY SET — PART NUMBER 493375
(add suffix to part number for correct size)

SUFFIX	RESTRICTOR SIZE	COLOR
-02	B	Orange
-03	C	Green
-04	D	Blue

3.4 ELECTRICAL SYSTEM

The electrical systems provide the controlling and monitoring functions for the oxygen concentrator.

3.4.1 Physical Observation

1. Disconnect the power cord from the AC supply.
2. Open the cabinet, as described in Section 5.1.1.
3. Inspect all wires, connectors, and terminals for tightness, wear, or fraying. Repair or replace components as necessary.
4. Inspect the power cord and plug. Replace components if necessary.

3.4.2 Low Pressure Alarm

1. Disconnect the power cord from the AC supply.
2. Turn the flowmeter control knob counterclockwise to drain any residual pressure from the product canister.
3. Remove the 9V battery from its holder behind the removable side panel.
4. Using a multimeter tester, check the battery voltage, and replace with an alkaline battery if it is less than 8V.
5. Connect the concentrator's power cord to an appropriate AC outlet and set the POWER switch to the ON position.
6. Verify that the audible alarm activates.
7. Set the POWER switch to the OFF position.
8. Connect the 9V battery to its holder.
9. Disconnect the power cord from the AC power supply and set the POWER switch to the ON position.
10. Verify that the audible alarm activates.
11. Set the POWER switch to the OFF position.

NOTE: When the concentrator is connected to an AC power supply, the audible alarm is powered by a DC voltage from the Control PCB. The 9V battery powers the audible alarm only during a loss of AC power or a Control PCB failure.

3.4.3 Control PCB

1. Open the cabinet, as described in Section 5.1.1.
2. Turn the flowmeter control knob counterclockwise to drain any residual pressure from the product canister.
3. With the concentrator plugged in, set the POWER switch to the ON position.
4. Verify that the audible alarm sounds until pressure builds in the product canister.
5. Verify that the front panel power indicator is illuminated.
6. Verify that the cooling fan and the compressor operate.
7. Verify that the solenoids cycle by listening for a slight puff of air followed by the exhaust of a sieve canister approximately every eight seconds.

3.5 VENTILATION (COOLING) SYSTEM

1. Remove, inspect, and clean (if necessary) the air intake filter. Reinstall the air intake filter.
2. Open the cabinet, as described in Section 5.1.1.

3. Inspect the air vents at the bottom left half of the cabinet. Clean and remove any vent blockage.
4. Connect the concentrator's power cord to an appropriate AC outlet and set the POWER switch to the ON position.
5. Observe the cooling fan and verify its operation.
6. Close the cabinet, as described in Section 5.1.2, and verify that there is a strong push of air coming from the vents at the bottom left of the cabinet.

3.6 FLOW

1. Connect the concentrator's power cord to an appropriate AC outlet and set the POWER switch to the ON position.
2. Allow the concentrator to run for a minimum of 30 minutes at maximum indicated L/min flow rate.
3. Verify that the outlet static pressure is 5 psi ±0.5 psi (34.5 kPa ±3.5 kPa).
4. Connect a test flowmeter to the concentrator (Figure 3-6).

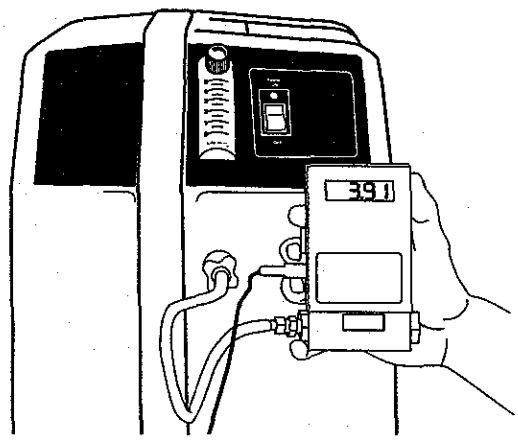


Figure 3-6: Flowmeter Testing

5. With the line bisecting the flowmeter ball, verify that the flow is ±5% of full scale at each setting.

3.7 SOUND

Occasionally, it may be necessary to determine if a concentrator is operating above the minimum acceptable decibel levels. Achieving an accurate measurement requires duplicating the same environmental conditions under which the factory tests are conducted. This may prove expensive and difficult. As an alternative, there are comparison tests and observations that may resolve concerns about the noise level of a Companion concentrator.

If you hear an unusually loud noise, you can generally detect the problem by attempting to locate the source of the sound.

Open the cabinet, as described in Section 5.1.1, and inspect for the following:

- Compressor inlet HEPA filter properly seated in filter compartment.
- Compressor inlet hoses properly connected.
- Worn or broken shock mounts that allow the compressor to drop; loose compressor bolts.
- Heat exchanger rubbing.
- Internal tubing disconnected; check exhaust hose at exhaust pilot valves and expansion chamber.
- Noisy compressor or cooling fan; disconnect one terminal from the cooling fan during operation to determine the source of the noise, and reconnect when done.

NOTE: To resolve the problem, see Disassembly Guide (Section 5).

If a Companion concentrator is reported noisy, it may be helpful to compare it to several other concentrators. The sound level (as measured in decibels) is a weighted average of many frequencies. Some users may be more sensitive to certain frequency ranges and, therefore, perceive more sound.

3.8 OCI PCB AND CONTROL/OCI COMBO PCB

Before attempting to verify the performance of the OCI, it is essential that the Companion concentrator meets all performance specifications.

CAUTION: Do not attempt to recalibrate or adjust the Control/OCI PCB with Removable Sensor. If you suspect problems with this component, call Technical Support at 1-800-496-2299.

During this process, if the OCI is suspect or prevents further concentrator verification (such as the unit shutting off), perform the following:

1. Open the cabinet, as described in Section 5.1.1.

   NOTE: Determine if the OCI PCB is an 1815, 2009, or Control/OCI Combo PCB by comparing it to Figure 9-9. If the unit has a Control/OCI PCB with Removable Sensor, see Section 3.9.

2. With the concentrator unplugged, disconnect the OCI. On the 1815 or 2009 board do this by disconnecting the wire harness header from the OCI board at J5. On the Control/OCI Combo PCB do this by using an alligator clip or a shunt across the test connector pins (Figure 9-9). This will disarm the OCI and control panel indicators but will not affect the concentrator's operation.
3. Set the POWER switch to the ON position and allow the concentrator to stabilize by running it for a minimum of 30 minutes at the maximum flow rate as indicated on the flowmeter.

4. Attach a properly calibrated oxygen analyzer to the outlet spout and verify that the concentrator's performance is within specification.
5. Set the POWER switch to the OFF position.
6. Reattach the J5 header or remove the shunt across the test connector pins.
7. Set the POWER switch to the ON position and allow the concentrator to stabilize by running it for a minimum of 30 minutes at the maximum flow rate as indicated on the flowmeter.
8. Verify that the green OCI front panel indicator labeled NORMAL is illuminated within five minutes of concentrator start-up.
9. Rotate the flowmeter knob counterclockwise (two turns or more for the 492a or a quarter turn or more for the 590) to increase the flow beyond the maximum indicated flow and thereby decrease oxygen concentration.
10. Observe the oxygen analyzer. Within several minutes the concentration will drop. When the analyzer reads approximately 85%, the yellow front panel indicator should illuminate.
11. Allow the concentration to fall until the unit shuts off and the red front panel indicator is illuminated. The analyzer readout should be approximately 70%.

NOTE: The oxygen analyzer is located several feet downstream from the concentrator. Therefore, the oxygen analyzer is measuring the product gas at a different location and point in time than the OCI. This fact, combined with the instantaneous measurement time of the OCI as compared to the relatively long measurement time of common analyzers, may cause an apparent disagreement between the OCI and the analyzer indicators.

12. Within a few minutes, the audible alarm should sound.
13. Set the POWER switch to the OFF position.

3.8.1 OCI PCB Recalibration

This section describes field calibration techniques for OCI indicators manufactured in Companion 492a and 590 Oxygen Concentrators from 1989 to 1993. Normally, there is no routine calibration required for the OCI indicator. However, there are conditions which may require OCI recalibration. These conditions include:

Condition 1: Moisture or direct contact with liquids can create bridges for the circuitry, resulting in damage to the PCB. To prevent this:

- DO NOT release insect spray into cabinet air inlet while unit is running.
- DO NOT release aerosol air fresheners into cabinet air inlet while unit is running.
- DO NOT allow leak detection fluid to make contact with the PCBs.
- DO NOT allow cleaning solutions or damp towels to make contact with the PCBs.

Condition 2: Shock damage can loosen or break electronic components and/or connections resulting in failure of the PCB. To prevent this:

- DO NOT drop the concentrator. (Often orders for broken casters include OCI PCB replacement.)
- DO secure the concentrator from movement when transporting.

Condition 3: Heat damage can occur when the specifications of the concentrator are exceeded. To prevent this:

- DO prevent blockage of the concentrator cabinet air intake.
- DO NOT attempt to operate the concentrator without a properly functioning cooling fan.
- DO NOT operate the unit at extreme ambient temperatures (above 110 °F [43 °C]).
- DO NOT store the unit at extreme ambient temperatures (above 158 °F [70 °C]).

Condition 4: Electrostatic discharge (ESD) damage can result from various sources inside or outside of a concentrator. To prevent this:

- DO NOT use shop-compressed air to blow off dust accumulation on PCBs. Shop-compressed air can cause a buildup of electrostatic energy which, if discharged, can result in damage to the PCB. Additionally, shop air contains oils which can damage the PCB.
- DO NOT touch the PCBs without being properly grounded.
- DO NOT allow tools to contact the PCBs without being properly grounded.
- DO return PCBs (if instructed by Technical Service) to Mallinckrodt in ESD packaging to ensure ESD protection.

Power surges and spikes (for example a lightning strike close to the house) are nearly impossible to filter to prevent PCB damage.

If the yellow OCI light is illuminated while measured oxygen is above 85% ±3%, an operating condition exists that may indicate the OCI requires recalibration.

Follow these instructions to check and recalibrate the OCI if you suspect the OCI is out of calibration. If there are any questions concerning this procedure, please call Technical Service at 1-800-496-2299.

CAUTION: Do not attempt to recalibrate or adjust the Control/OCI PCB with Removable Sensor. If you suspect problems with this component, call Technical Support at 1-800-496-2299.

3.8.1.1 Introduction

This section outlines the necessary steps to check the output of the OCI PCB (P/N 492744) against a known standard. There are also guidelines provided in the event that an adjustment is required.

WARNING

The main power supply for the Companion 492a/590 Oxygen Concentrator exists at the Control PCB next to the OCI PCB. Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

CAUTION: PCBs are ESD-sensitive devices. Always properly ground yourself prior to making contact with PCBs using the suggested grounding equipment listed below.

Make certain that all measurement equipment is properly calibrated and appropriately accurate prior to making any adjustments or determinations (calibration procedures conform to National Institute of Standards and Technology guidelines).

RECOMMENDED TOOLS:

PART NUMBER	DESCRIPTION
494083	Potentiometer Adjustment Tool
494057	Black patch cord
492381	Pneumatic Test Kit: U.S. Gauge 0 psi to 30 psi (0 kPa to 207 kPa) with 0.2 psi (1.38 kPa) divisions or equivalent
–	Oxygen analyzer: Use ±0.1% accuracy Servomex Oxygen analyzer or equivalent.
–	Voltmeter: Use Fluke 73, Fluke 87 multimeters or equivalent.

GROUNDING EQUIPMENT

Use the following grounding equipment or equivalent:
Manufacturer: Contact East Corp. US, Telephone: 508-682-2000
Wrist strap cord and plug adapter U.S.A. version.

NOTE: If you have an OCI PCB, use Section 3.8.1.2, steps 1 through 12. If you have a Control/OCI Combo PCB use Section 3.8.2.2, steps 1 through 12.

3.8.1.2 Check and Adjustment

Follow the steps outlined below to check the output of the OCI PCB and to adjust the PCB if required.

1. Disconnect the concentrator from the AC electrical outlet and open the cabinet as described in Section 5.1.1.

NOTE: Determine if the OCI PCB is a 2009 series or 1815 series by comparing the PCB to Figure 9-9.

2. Remove the black negative voltmeter lead from the voltmeter. Replace with the black negative patch cord (P/N 494057).
3. Attach the black negative patch cord to the specified connection point on the OCI PCB (see Figure 9-9). Use the red positive lead when taking a reading from the PCB using a voltmeter.

CAUTION: Properly ground yourself using the suggested grounding equipment listed above before making contact with the PCB.

4. Connect the concentrator to an AC electrical outlet and start the unit.

WARNING

The main power supply for the Companion 492a/590 Oxygen Concentrator exists at the Control PCB next to the OCI PCB. Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

5. Set the concentrator flow to 3 L/min ±0.2 L/min.

CAUTION: When attaching an oxygen analyzer, check the flowmeter indicator ball. If the ball drops, the concentrator is receiving a back pressure from the oxygen analyzer. Relieve back pressure before making adjustments by inserting a tee fitting in the line between the concentrator and the oxygen analyzer (See Figure 3-7).

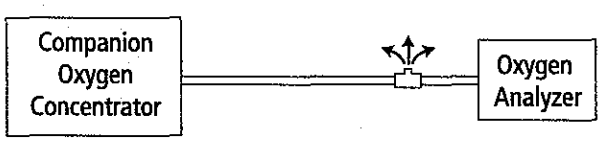


Figure 3-7: Back Pressure Relief

6. Allow the concentrator to run for 30 minutes and check the outlet pressure. (The pressure specification is 5 psi ±0.2 psi [34 kPa ±1.38 kPa].) If the outlet pressure is not within this specification, adjust the pressure regulator (see Section 5.14.7).
7. Allow the concentrator to run for at least four hours prior to checking the concentration and the OCI reading.

8. After the four hours have passed, set the voltmeter to read volts DC and verify the calibration of the oxygen analyzer. Touch the red voltmeter lead to the "TP9" pad on the OCI PCB (Figure 9-9). Compare the voltmeter reading (x100), to the oxygen analyzer reading. The specification should be ±3% between the reading of the instruments. If the reading is not within 3%, proceed to step 9. If the reading is within 3%, the OCI is within specification; turn off and disconnect the concentrator from the AC electrical outlet. Disconnect the patch cord and close the concentrator.

NOTE: Allow both the oxygen analyzer reading and the voltmeter reading to stabilize prior to making any determinations or adjustments.

9. If the reading is outside of the ±3% specification, an adjustment of the offset potentiometer is required. (See Figure 9-9 for location of offset potentiometer.)

NOTE: It may be necessary to remove some of the orange tamper seal on the adjustment screw prior to adjusting the offset potentiometer.

CAUTION: Do not adjust other potentiometers on the OCI PCB.

10. If the voltmeter reading is below the oxygen analyzer's reading, adjust the offset potentiometer clockwise to increase the voltmeter reading to agree with the oxygen analyzer.

11. If the voltmeter reading is above the oxygen analyzer, adjust the offset potentiometer counterclockwise to decrease the voltmeter reading to agree with the oxygen analyzer.

NOTE: If the PCB cannot be calibrated (for example, if full adjustment of the offset potentiometer does not bring the voltmeter reading to the desired value), contact Technical Support at 1-800-496-2299 for assistance.

12. Turn off the concentrator, disconnect it from the AC electrical outlet, disconnect the black patch cord from the OCI PCB, and then close the cabinet as described in Section 5.1.2.

3.8.2 Control/OCI Combo PCB

NOTE: The following section is for Control/OCI Combo PCB recalibration. If you have an OCI PCB refer to Section 3.8.1.2, steps 1 through 12.

This section describes field calibration techniques for OCI indicators manufactured in Companion 492a and 590 Oxygen Concentrators from 1993 to April 1997.

3.8.2.1 Introduction

This section outlines the necessary steps to check the output of the Control/OCI Combo PCB against a known standard. Guidelines are also provided in the event that an adjustment is required.

WARNING

The main power supply for the Companion 492a/590 Oxygen Concentrator exists at the Control PCB next to the OCI PCB. Hazardous voltage can shock, burn or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

CAUTION: PCBs are ESD-sensitive devices. Always properly ground yourself prior to making contact with PCBs using the suggested grounding equipment listed below.

Make certain that all measurement equipment is properly calibrated and appropriately accurate prior to making any adjustments or determinations (calibration procedures conform to National Institute of Standards and Technology guidelines).

RECOMMENDED TOOLS:

PART NUMBER	DESCRIPTION
494083	Potentiometer Adjustment Tool
494058	Harness assembly, DVM to Control/OCI Combo PCB
492381	Pneumatic Test Kit: U.S. Gauge 0 psi to 30 psi (0 kPa to 207 kPa) with 0.2 psi (1.38 kPa) divisions or equivalent
–	Oxygen analyzer: Use ±0.1% accuracy Servomex Oxygen analyzer or equivalent.
–	Voltmeter: Use Fluke 73, Fluke 87 multimeters or equivalent.

GROUNDING EQUIPMENT

Use the following grounding equipment or equivalent.
Manufacturer: Contact East Corp. US, Telephone: 508-682-2000
Wrist strap cord and plug adapter U.S.A. version.

3.8.2.2 Check and Adjustment

Follow the steps outlined below to check the output of the Control/OCI Combo PCB and to adjust the PCB if required.

1. Disconnect the concentrator from the electrical outlet and open the cabinet as described in Section 5.1.1.

2. Attach the harness assembly (P/N 494058) to the open connector on the right side of the Control/OCI Combo PCB (see Figure 9-9).

CAUTION: Properly ground yourself using the suggested grounding equipment listed above before making contact with the PCB. Do not allow the multimeter plugs of the wire harness to touch while the connector is hooked to the PCB; damage to the PCB may result. Always cover plugs when not in use.

3. Connect the concentrator to an AC electrical outlet and start the unit.

WARNING

The main power supply for the Companion 492a/590 Oxygen Concentrator exists at the Control/OCI Combo PCB. Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

4. Set the concentrator flow to 3 L/min ±0.2 L/min.

CAUTION: When attaching an oxygen analyzer, check the flowmeter indicator ball. If the ball drops, the concentrator is receiving a back pressure from the oxygen analyzer. Relieve back pressure before making adjustments by inserting a tee fitting in the line between the concentrator and the oxygen analyzer. (Figure 3-7.)

5. Allow the concentrator to run for 30 minutes and check the outlet pressure. (The pressure specification is 5 psi ±0.2 psi [34 kPa ±1.38 kPa].) If the outlet pressure is not within this specification, adjust the pressure regulator (Section 5.14.7).

6. Allow the concentrator to run for at least four hours before checking the concentration and the OCI reading.

7. Connect the harness assembly to the voltmeter.

8. After the four hours have passed, set the voltmeter to read volts DC and verify the calibration of the oxygen analyzer. Compare the voltmeter reading (x100) to the oxygen analyzer reading. The specification is ±3% between the reading of the instruments. If the reading is not within 3%, proceed to step 9. If the reading is within 3%, the OCI is within specification; turn off and disconnect the concentrator from the AC electrical outlet. Disconnect the wire harness and close the concentrator.

NOTE: Allow both the oxygen analyzer reading and the voltmeter reading to stabilize prior to making any determinations or adjustments.

9. If the reading is outside of the ±3% specification, an adjustment of the offset potentiometer is required. (See Figure 9-9 for location of offset potentiometer.)

NOTE: It may be necessary to remove some of the orange tamper seal prior to adjustment of the offset potentiometer.

CAUTION: Do not adjust other potentiometers on the Control/OCI Combo PCB.

10. If the voltmeter reading is below that of the oxygen analyzer, adjust the offset potentiometer clockwise to increase the voltmeter reading to agree with the oxygen analyzer.
11. If the voltmeter reading is above that of the oxygen analyzer, adjust the offset potentiometer counterclockwise to decrease the voltmeter reading to agree with the oxygen analyzer.

NOTE: If the PCB cannot be calibrated (for example, if full adjustment of the offset potentiometer does not bring the voltmeter reading to the desired value), contact Technical Support at 1-800-496-2299 for assistance.

12. Turn off the concentrator, disconnect it from the AC electrical outlet, disconnect the wire harness from the Control/OCI Combo PCB, and then close the cabinet as described in Section 5.1.2.

3.9 CONTROL/OCI PCB WITH REMOVABLE SENSOR

CAUTION: Do not attempt to recalibrate or adjust the Control/OCI PCB with Removable Sensor. If you suspect problems with this component, call Technical Support at 1-800-496-2299.

Before attempting to verify the performance of the OCI, it is essential that the Companion concentrator meets all performance specifications.

1. Open the cabinet, as described in Section 5.1.1.
2. Turn the flowmeter control knob counterclockwise to drain any residual pressure from the product canister.
3. With the concentrator plugged in, set the POWER Switch to the ON position.
4. Verify that the audible alarm sounds until pressure builds in the product canister.
5. Verify that the front panel power indicator is illuminated.
6. Verify that the cooling fan and the compressor operate.

7. Verify that the solenoids cycle by listening for a slight puff of air followed by the exhaust of a sieve canister approximately every eight seconds.
8. Adjust the flowmeter to 5 L/min and allow the concentrator to run for five minutes to verify that the green NORMAL light illuminates.
9. Immediately after the green NORMAL light illuminates, open the flowmeter approximately an additional 1 to 1¼ turns to increase the flow past 5 L/min and decrease the oxygen concentration.
10. Allow concentrator to run for 10 minutes and verify that the yellow BELOW NORMAL light illuminates. This should be accompanied by a series of double beeps.
11. Adjust the flowmeter approximately an additional ¼ to ¾ turn, again increasing the flow and decreasing the oxygen concentration.
12. Allow the concentrator to run for 10 minutes and verify that the red NOT OPERATING light illuminates. This should be accompanied by a series of double beeps, followed by a continuous alarm once pressure in the product canister drops below 4.0 psi (1.38 kPa).

Section 4

TROUBLESHOOTING GUIDE

4.1 OPERATIONAL CHECKS

This section will help you determine the reason for an operational failure and the source of the problem. Used in conjunction with the Troubleshooting Instructions, these checks will provide you with a logical approach to thoroughly determine equipment malfunctions.

Three categories of concentrator failures are listed:

- Low concentration.
- Concentrator won't run.
- Improper operation.

Refer to the category that best suits the concentrator's problem and follow the checks to reveal the symptoms describing the problem.

Then, refer to the Troubleshooting Instructions by matching your concentrator's symptoms to those listed to suggest the component or system most suspect. Follow the suggested corrective action to test and resolve the problem.

4.1.1 Low Concentration

1. Verify that the oxygen analyzer is calibrated and working properly. Refer to the manufacturer's operating instructions for proper use and maintenance.
2. Allow the concentrator to run for a minimum of 30 minutes and then measure the oxygen concentration at the maximum setting on the flowmeter scale to determine if the concentrator is producing the following minimum specified level of oxygen.

CONCENTRATOR MODEL	OXYGEN CONCENTRATION
492a	95% ±3% at 1 L/min to 3 L/min 92% ±3% at 4 L/min
590	95% ±3% at 1 L/min to 4 L/min 90% ±3% at 5 L/min

3. Inspect and clean all filters.
4. Open the cabinet as described in Section 5.1.1 and visually inspect all hoses, tubes, and fittings for looseness or kinks.
5. Connect the pneumatic test kit to the concentrator as described in Section 3.
6. Set the POWER switch to the ON position.

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7. With the concentrator running, apply leak detection solution to all pneumatic fittings and observe for a bubbling action, which indicates a leak. All fittings (with the exception of those coming from the pilot exhaust valves to the muffler) must be air tight.

CAUTION: Do not apply leak detection solution to pneumatic connections on the OCI transducer or OCI sensor.

CAUTION: Never apply leak detection fluid into the top exhaust port of the solenoid valves.

If you detect a leak, remove the part. Remove any debris from the threads, then add LOX 8 thread sealant or Teflon tape and reinstall the part.

NOTE: Do not use LOX 8 thread sealant or Teflon tape on O-ring style fittings.

CAUTION: Begin applying Teflon tape one thread from the end of the fitting.

NOTE: All leaks must be eliminated from the concentrator before proceeding.

8. After leaks have been eliminated, set the POWER switch to the ON position.
9. Set the selector switch on the pneumatic test kit to the left. This indicates reservoir canister pressure.
10. Set the flowmeter to the maximum L/min indicated on its scale and allow the concentrator to run for approximately 30 minutes.

NOTE: If the needle on the gauge greatly exceeds 30 psi (207 kPa), turn the concentrator OFF and refer to the Troubleshooting (Section 4) relating to high reservoir tank pressure.

11. Verify that the pressure in the reservoir canister slowly increases from 15 psi ±3.0 psi (103.5 kPa ±20.7 kPa) (drop point) to 20 psi ±3.0 psi (138 kPa ±20.7 kPa) (fill) and then rapidly climbs to 28 psi ±3.0 psi (193 kPa ±20.7 kPa) (kick). After the kick, the pressure should fall back to the drop point and the cycle repeats.
12. Record all three pressures (drop point, fill and kick) on two consecutive cycles. Record the drop point pressures to an accuracy of 0.2 psi (1.38 kPa) only.
13. Verify that the balance (the difference of pressure) at the drop point on two consecutive cycles is not greater than 0.4 psi (2.75 kPa). If the balance is greater than 0.4 psi (2.75 kPa), balance the orifices as described in Section 3.3.3.

4.1.2 Concentrator Won't Run

1. Open the cabinet, as described in Section 5.1.1, and visually inspect all wiring and connections for loose or disconnected fittings.
2. Turn the flowmeter knob fully counterclockwise to drain the product canister.
3. Plug the power cord into an acceptable AC electrical outlet.
4. Set the POWER switch to the ON position.
5. Verify that the green front panel power LED is illuminated and that the audible alarm is activated. If the circuit breaker pops out, see the Troubleshooting Instructions (Section 4.2).
6. Test the operation of the fan by placing your hand over the vents at the bottom front side of the compressor platform.
7. Observe the compressor and cooling fan. If the compressor stops immediately and the cooling fan slows down, see Section 5.

4.1.3 Improper Operation

1. The source of any noise that is outside of normal operational noises is usually detectable by careful observation with the cabinet open (Section 5).
2. A pneumatic leak, especially at the intake tubes and fittings of the compressor, may cause excessive noise.
3. Compressor vibration may be caused by the heat exchanger contacting the compressor platform.
4. See Section 3.7 for further information on sound.

4.2 TROUBLESHOOTING INSTRUCTIONS

This section is designed for easy reference when a problem occurs with a concentrator. Generally, you will need to perform a preliminary investigation to discover what symptoms the concentrator is exhibiting.

1. The operational checks (see Section 4.1) should be performed before consulting the Troubleshooting Instructions to get a clear understanding of all of the symptoms of the suspected concentrator problem.
2. From the listing in the SYMPTOMS column, select the description that matches the concentrator's problem as accurately as possible.
3. Refer to the PROBABLE CAUSE column, which details several possible explanations (arranged in order of the most likely to least likely to occur) for the concentrator's observed behavior.
4. Refer to the CORRECTIVE ACTION column which suggests possible solutions, tests, and repairs which may resolve a suspected probable cause.

NOTE: This guide is not an all-inclusive list. It is intended to serve as an outline for resolving operational problems.

WARNING

Some of the following procedures require AC power application when testing. Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

CAUTION: PCBs are ESD-sensitive devices. Always properly ground yourself prior to making contact with PCBs. To prevent PCB damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
No audible alarm when the POWER switch is set to the ON position and AC power is connected to the concentrator.		**CAUTION: Disconnect the AC power cord from the wall outlet before proceeding with the following electrical checks.**
	Residual pressure in product tank	Turn the flowmeter knob counter-clockwise to reduce product canister pressure below 4.0 psi (27.5 kPa).
	Control PCB fuse	Test and replace the Control PCB fuse (Section 5).
	Loose electrical connection	Inspect all electrical connections (especially the pressure switch, POWER switch, audible alarm, and J2 on the Control PCB) for good connection.
	Defective audible alarm	Remove the wires from the audible alarm terminals. Using a voltmeter, and observing both the battery and alarm polarity, connect the voltmeter directly to the alarm wires. If the voltmeter indicates 9V DC, replace the alarm (Section 5).
	Defective pressure switch	Remove the wires from the pressure switch terminals. Using wire jumpers, connect both wires together. If the alarm activates, replace the pressure switch (Section 5).
	Defective POWER switch	Test the POWER switch by jumping the white and black wires connected to terminals 4 and 5. If the alarm is activated, replace the POWER switch (Section 5). If the unit is equipped with OCI, check the voltage at the audible alarm. If the reading is less than 8V, replace the Power switch (Section 5).
	Defective Control PCB	Replace the Control PCB or control/OCI Combo PCB (Section 5).

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
Continuous alarm with the POWER switch set to the ON position, POWER LED not lit, concentrator not operating.	No power to concentrator	Connect the power cord to an AC outlet.
	No power at AC outlet	Inspect the home AC circuit breaker or fuse.
	Concentrator circuit breaker activated or defective	Reset the concentrator circuit breaker. If the circuit breaker is activated again, disconnect the concentrator from the AC supply and inspect the internal wiring for short circuits. Inspect also for locked compressor, shorted capacitor, or faulty circuit breaker.
	Control PCB fuse	Test the Control PCB fuse and replace, if necessary (Section 5).
	Loose electrical connection	Inspect the power cord, circuit breaker, POWER switch, and Control PCB for good connections.
	Defective Control PCB	Replace the Control PCB or control/OCI combo PCB (Section 5).
	Defective POWER switch	Test the POWER switch by jumping the blue and brown wires connected to terminals 1 and 2. If the concentrator starts, replace the POWER switch (Section 5).
Continuous alarm with the POWER switch set to the ON position and POWER LED on, but the compressor and cooling fan are not running.	Disconnected wire to one of the solenoids	Set the POWER switch to the OFF position. Reconnect the wire to the solenoid and then set POWER switch to the ON position.
	Loose electrical connection	Inspect all connections of the internal wiring.
	Defective solenoid valve	Test the solenoid valve and replace it, if necessary (Section 5).
	Defective POWER switch	Test the POWER Switch. After setting the front panel switch to the ON position, check for line voltage at the compressor molex connector. If line voltage is not present, replace the POWER switch (Section 5).
	Defective Control PCB	Replace the Control PCB (Section 5).
	Defective cooling fan causing compressor thermal cutoff switch or cabinet thermal sensor to activate after concentrator has been operating.	Test for 120V AC at the fan terminal wires and replace the cooling fan, if necessary (Section 5). Also, check for any blockage at the cabinet inlet or exhaust. Check ambient temperature (not to exceed 110 °F [43 °C]). Exceeding 110 °F (43 °C) may cause the cabinet thermal sensor to turn off the compressor and cooling fan.
Continuous alarm with the POWER switch set to the ON position and the POWER LED on, but the compressor runs for a period of time, then stops while the cooling fan still operates.	Compressor overheating due to restricted cabinet cooling airflow	Check that the concentrator is operating in an open environment and air inlet is unobstructed. Allow the compressor to cool and retest (Section 3).
	Defective compressor internal thermal switch	Replace the compressor (Section 5).
Continuous alarm with the POWER switch set to the ON position and POWER LED on. The compressor won't start, but the cooling fan operates.	Residual pressure in reservoir canister	Wait 10 to 18 seconds for the valves to cycle and then relieve the pressure.
	Defective capacitor	Check the wire terminals at the capacitor for attachment of connectors to terminals. Replace the capacitor, if necessary (Section 5).
	Loose electrical connection	Inspect the internal wiring.
	Faulty compressor	Replace the compressor (Section 5).

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
Concentrator runs, but the POWER switch LED is off.	Loose wires to LED	Check all wires to the POWER switch LED.
	Plug to LED reversed	The POWER LED is a polarity-sensitive device. Rotate the plug 180°, so the longer LED lead is connected to position 2 (white wire) on the wire connector. Reinstall the connector and retest the LED.
	Faulty LED	Replace the LED (Section 5).
Low reservoir pressure and low concentrations with the compressor and cooling fan running. The concentrator alarm may sound.	Compressor inlet prefilters or compressor inlet HEPA filter dirty	Replace the dirty filters.
	Leak	Leak test the entire pneumatic system (Section 3).
	Diaphragm leak in supply, exhaust, or balance pilot valves	Inspect all five pilot air valves. Replace as necessary (Section 5).
	Defective solenoid valve	If air leaks through the solenoid valve exhaust port, and the pilot valve has been inspected with no problems found, replace the solenoid valve (Section 5).
	Weak capacitor	Replace capacitor (Section 5).
	Weak or worn compressor	Replace the piston cup seals or replace the entire compressor (Section 5).
High reservoir canister pressure and low concentrations. The concentrator alarm may sound.	Outlet pressure too low	Test the outlet pressure (Section 3). If the pressure is incorrect, reset the regulator (Section 5).
	Pilot air valve not opening fully	Inspect the solid diaphragms in the supply and exhaust pilot valves. Inspect solenoid valves for mechanical malfunction (Section 5).
	Contaminated sieve beds	Replace the contaminated sieve beds (Section 5).
Imbalance in drop point pressure. Low concentration. The concentrator alarm may sound.	Leaks	Leak test the system (Section 3). Check especially the bottoms of the sieve beds, and the supply and balance pilot valve fittings. Replace as necessary (Section 5).
	Fittings	Nylon elbows and tees in the supply pilot valves or balance pilot valve may be inserted too deeply, blocking the airflow through the valves.
		Remove and retape fitting with Teflon tape. Reinsert, leaving two threads exposed outside of the valve body.
	Faulty diaphragm in pilot air valve	Check the diaphragms in the pilot air valves. Replace, if necessary. (Section 5)
	Blocked restrictor tube assembly	Remove the compression nuts from the restrictor tube assemblies and inspect the orifice for blockage.
	Mismatched restrictor tube assembly	If the drop point differences are greater than 0.4 psi (2.75 kPa) between cycles, balance the orifices (Section 3).

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
Low or erratic product canister pressure. Low concentrations. The concentrator alarm may sound.	Leaks	Leak test the system (Section 3). Check especially from the restrictor tubes to the flowmeter. Repair as necessary (Section 5).
	Regulator dirty, out of adjustment, or defective	Disassemble, clean, reassemble, and test the regulator (Section 5). Replace if necessary.
	Faulty diaphragm in balance pilot valve	Remove and test the diaphragm. Replace if necessary (Section 5).
	Supply or exhaust pilot valve not fully open	Disassemble and inspect the supply pilot valve diaphragms. Then disassemble and inspect the exhaust pilot valve diaphragms (Section 5).
	Incorrectly sized restrictors	Change the restrictors (Section 5).
Concentrator alarms and cycles. Oxygen flow and concentration are within specifications. Pressures are normal.	Defective pressure switch or setting out of adjustment	Test the pressure switch. Replace if necessary (Section 5).
Low or no oxygen flow or pressure. Concentrator operating. No alarm. Unit alarm.	Flowmeter knob turned off	Set the flow to the desired level.
	Kinked or obstructed tubing	Inspect the internal tubing from the product canister to the flowmeter.
	Regulator out of adjustment or defective.	Test the regulator (Section 3). Replace if necessary.
	Disconnected tubing	Inspect the internal tubing and connections from the compressor to the flowmeter.
Noise. Pulsating air. Grinding sound.	Component rubbing	Inspect the components (Section 3).
	Tubing disconnected	Inspect the tubing (Section 3).
	Compressor	The piston seal may be torn or worn out. Inspect and replace if necessary (Section 5).
	Compressor or cooling fan	Inspect the compressor and cooling fan (Section 3). Replace as necessary.

4.3 OCI TROUBLESHOOTING INSTRUCTIONS

This section is designed for easy reference when a problem occurs with a concentrator equipped with OCI. Generally, you will need to perform a preliminary investigation to discover what symptoms the concentrator is exhibiting.

1. The operational checks (see Section 4.1) should be performed before consulting the OCI Troubleshooting Instructions to get a clear understanding of all of the symptoms of the suspected concentrator problem.
2. From the listing in the SYMPTOMS column, select the description that matches the concentrator's problem as accurately as possible.
3. Refer to the PROBABLE CAUSE column, which details several possible explanations (arranged in order of the most likely to least likely to occur) for the concentrator's observed behavior.
4. Refer to the CORRECTIVE ACTION column which suggests possible solutions, tests, and repairs which may resolve a suspected probable cause.

NOTE: This guide is not an all-inclusive list. It is intended to serve as an outline for resolving operational problems.

CAUTION: PCBs are ESD-sensitive devices. Always properly ground yourself prior to making contact with PCBs. To prevent PCB damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
Concentrator runs for five minutes, then shuts off	No flow	Set flow at minimum of 0.25 L/min.
	Flowmeter set too high	Set flowmeter ball at or below maximum setting on flowmeter scale.
	Oxygen below 70%	Troubleshoot concentrator (Section 4.2).
	High outlet pressure	Check outlet pressure (Section 3). Reset if necessary (Section 5).
	Defective OCI	Disconnect wire harness from OCI PCB connector J5. Run unit for five minutes at the maximum flow rate. If oxygen is above 70%, recalibrate the OCI PCB (Section 3) or replace OCI PCB (Section 5).

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
	Defective Control/OCI Combo PCB	Place jumper across the two test leads extending from the upper right corner of the Control/OCI Combo PCB (see Figure 9-9). Run unit for five minutes at maximum flow rate. If oxygen is above 70%, recalibrate the Control/OCI Combo PCB (Section 3) or replace Control/OCI Combo PCB (Section 5).
	Defective Control/OCI PCB with Removable Sensor	**CAUTION: Do not attempt to recalibrate or adjust the Control/OCI PCB with Removable Sensor. If you suspect problems with this component, call Technical Support at 1-800-496-2299.**
Concentrator runs, concentration is above 85%, and the green OCI LED is not illuminated.	Concentrator has not run for five minutes	Run unit for more than five minutes.
	Flowmeter set too high	Set flowmeter ball at or below maximum setting on flowmeter scale.
	Loose connection	Verify secure wire harness connections between front panel PCB and OCI PCB or Control/OCI Combo PCB.
	High outlet pressure	Check outlet pressure (Section 3). Reset, if necessary (Section 5).
	Defective OCI	Follow OCI Performance Verification (Section 3).
		CAUTION: Do not attempt to recalibrate or adjust the Control/OCI PCB with Removable Sensor. If you suspect problems with this component, call Technical Support at 1-800-496-2299.
		If yellow and red LEDs illuminate (concentrator shuts down), or if no LEDs illuminate, but the concentrator shuts off below 70%, then the front panel PCB may be defective. Replace the front panel PCB (Section 5).
		If no OCI LEDs function, and unit does not shut off below 70%, then the OCI PCB is most likely defective. Replace the OCI PCB (Section 5).
Concentrator runs, but concentration range does not agree with OCI indicators (Section 3).	Incorrect outlet pressure	Check outlet pressure (Section 3). Reset, if necessary (Section 5).
	OCI PCB board requires recalibration	Follow OCI recalibration procedure (Section 3.8.1).
		CAUTION: Do not attempt to recalibrate or adjust the Control/OCI PCB with Removable Sensor. If you suspect problems with this component, call Technical Support at 1-800-496-2299.

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
Good concentrations, but yellow OCI LED is illuminated.	Defective OCI PCB	Replace OCI PCB (Section 5).
Good concentrations, but alternating green to yellow OCI LED.	OCI PCB or Control/OCI Combo PCB may require recalibration	See Section 3.8 for step-by-step recalibration procedures.
	Defective Control/OCI PCB with Removable Sensor	⚠ **CAUTION: Do not attempt to recalibrate or adjust the Control/OCI PCB with Removable Sensor. If you suspect problems with this component, call Technical Support at 1-800-496-2299.**
Red light. Audible alarm sounding. Unit not running	Internal temperature exceeds 140 °F (60 °C) because of:	
	1) Obstruction at cooling inlet or cooling exhaust side of cabinet	1) Remove any obstructions from the cooling inlet or cooling exhaust. Allow the unit to cool and restart.
	2) Unit has overheated because of proximity to extreme heat source (fireplace, stove, floor register, etc.)	2) Remove the unit from the proximity of extreme heat source. Allow the unit to cool and restart.
	NOTE: Operating concentrator in ambient temperatures above 110 °F (43 °C) may result in concentrator shutdown.	⚠ **CAUTION: When running at maximum allowable temperatures, allow adequate time for unit to cool between turning off and restarting.**
	3) Unit is running in a high-temperature environment which has a high ambient temperature.	3) Move the concentrator to a cooler environment and allow adequate time for the concentrator to cool before restarting.
	4) Faulty cooling fan	4) Replace cooling fan. (Section 5.12.)
	Defective solenoid valve	Follow solenoid valve REMOVAL and INSTALLATION (Section 5.15).
	Concentrations below 70%	Refer to Section 4.1.1 to determine possible internal malfunctions that could result in low concentrations.

Section 5

DISASSEMBLY GUIDE

This section describes how to service individual components of the Companion 492a and 590 oxygen concentrators. Included are instructions (where applicable) for removal, disassembly, operational check, cleaning, adjustment, alignment, reassembly, and installation.

After removing a component, visually inspect for damage or any other indication that the component is defective. Unless otherwise specified, replace as needed with a new component. See Section 6 (Parts Lists) for component part numbers.

WARNING

Some of the following procedures require AC power application when testing. Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

CAUTION: After replacing a component, verify the concentrator's overall system operation (Section 3, Performance Verification) before using the concentrator.

CAUTION: This device produces oxygen. Ensure that the compressed air supply used to clean and dry components is clean and oil-free.

CAUTION: PCBs are ESD-sensitive devices. Always properly ground yourself prior to making contact with PCBs. To prevent PCB damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

5.1 CABINET

5.1.1 Opening

Figure 6-1: Cabinet Exterior

1. Set the POWER switch to the OFF position.

2. If a humidifier is installed, remove the humidifier from the oxygen outlet connector.

WARNING

Some of the following procedures require AC power application when testing. Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

3. Remove the air intake filter **16** from the right side of the concentrator by pulling the air intake filter away from the Velcro strips that hold it in place.
4. Using a No. 2 Phillips screwdriver, remove the upper fastener screw **19** from the right side of the cabinet.
5. Using a No. 2 Phillips screwdriver, with a shaft of at least 7 in. (18 cm), loosen the cabinet screw **6** from the right side of the cabinet, taking care not to lose the O-ring (Figure 6-6, item **33**) on the end of the screw. The two halves of the cabinet body will separate as the cabinet screw is loosened.

NOTE: It is not necessary to remove the cabinet screw completely from the right side of the cabinet.

CAUTION: The concentrator can become unstable on its casters if the two halves of the cabinet are opened by more than 90°. Misalignment of the heat exchanger may occur.

6. Pull the two halves of the cabinet away from one another to open the cabinet. The two halves of the cabinet will pivot around the hinge at the rear of concentrator.

5.1.2 Closing

Figure 6-6: Right Cabinet Interior

1. Insert the cabinet screw **25** into its position in the right side of the cabinet.
2. Place the O-ring **33** on the end of the cabinet screw **25.**
3. Pull the two halves of the cabinet body together to within approximately 2 in. (5 cm) of each other. Align the upper fastener tubes in both halves of the cabinet and pull the two halves completely closed.
4. Insert the upper fastener screw **11** into its position in the right side of the cabinet.
5. Push the upper fastener screw **11** into the cabinet so it extends through the upper fastener tube **39** in both halves of the cabinet.
6. Tighten the upper fastener screw **11**, causing the two halves of the cabinet to close.

7. Tighten the cabinet screw **25**.
8. Place the air intake filter (Figure 6-1, item **16**) in position in the right side of the concentrator and press it against the Velcro strips (Figure 6-1, item **13**) to secure it in place.
9. Reinstall the humidifier to the oxygen outlet connector **18**, if required.

5.2 CIRCUIT BREAKER

5.2.1 Removal

Figure 6-23: Non-OCI PCB and Control Panel

1. Open the cabinet, as described in Section 5.1.1.

CAUTION: PCBs are ESD-sensitive devices. Always properly ground yourself prior to making contact with PCBs. To prevent PCB damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

2. Remove the three Control PCB wire harness connectors **17, 18, 26** from the Control PCB **23**. Remove wiring harness **18** from wiring harness clamps **19**.
3. Remove the product gas tube **14** from the tube clamp **22**.
4. Remove the five inlet air duct cover screws **21** and the inlet air duct cover **20** from the right cabinet interior. The Control PCB **23** does not need to be removed from the air inlet duct cover.

NOTE: On units with a Control/OCI Combo PCB, the PCB must be removed from the air inlet duct cover to remove the air inlet duct cover.

5. Detach the two wire connectors from the circuit breaker terminals.
6. Remove the side panel (Figure 6-6, item **7**).
7. Remove the hex nut and washers (Figure 6-1, items **17** and **10**) from the circuit breaker (Figure 6-1, item **8**).
8. Remove the circuit breaker (Figure 6-6, item **41**) from the cabinet interior.

5.2.2 Installation

Figure 6-1: Cabinet Exterior

1. On units manufactured before May 10, 1993, install the knurled nut **9** onto the circuit breaker's **8** threaded shaft so that approximately ¼ in.

(6.35 mm) of threads are exposed. On units manufactured after May 10, 1993, install the knurled nut **9** onto the circuit breaker's **8** threaded shaft so approximately ¾ in. (19.05 mm) of threads are exposed.

2. Install the circuit breaker **8** in the right side so the circuit breaker number is in a vertical, readable position. Secure the circuit breaker in position by reversing 5.2.1, steps 7 through 8.
3. Using needle-nose pliers and an old circuit breaker as a guide, carefully bend each of the circuit breaker's terminals—at approximately a 45° angle—toward the cabinet hinge. Attach the connectors to the terminals.

NOTE: The circuit breaker is not polarity sensitive, so the connectors may be attached to either terminal.

4. Reverse the REMOVAL procedures (Section 5.2.1, steps 2 through 4) for the air inlet duct cover, the tube, and the Control PCB wire harness connectors.
5. Close the cabinet, as described in Section 5.1.2.
6. Verify the performance of the system (Section 3) before using the concentrator.

5.3 HOUR METER

5.3.1 Removal

Figure 6-23: Non-OCI PCB and Control Panel

1. Open the cabinet, as described in Section 5.1.1.

CAUTION: PCBs are ESD-sensitive devices. Always properly ground yourself prior to making contact with PCBs. To prevent PCB damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

2. Remove the three PCB wire harness connectors **17, 18, 26** from the Control PCB **23**. Remove wiring harness **18** from wiring harness clamps **19.**
3. Remove the product gas tube **14** from the tube clamp **22.**

4. Remove the five inlet air duct cover screws **21** and the inlet air duct cover **20** from the right case interior. The Control PCB **23** does not need to be removed from the cover.

NOTE: On units with a Control/OCI Combo PCB, the PCB must be removed from the air inlet duct cover to remove the air inlet duct cover.

5. Detach the two hour meter connectors from their terminals.
6. Remove the side panel (Figure 6-6, item **7**).
7. Using a ⅛ in. (3.17 mm) drill, remove the two rivets that secure the hour meter (Figure 6-6, item **40**) in position.
8. Remove the hour meter (Figure 6-6, item **40**).

5.3.2 Installation

Figure 6-6: Right Cabinet Interior

1. Insert the hour meter **40** into the mounting hole so the last digits are toward the bottom of the concentrator.
2. Secure the hour meter to the cabinet using two ⅛ in. (3.17 mm) pop-rivets.
3. Using needle-nose pliers and an old hour meter as a guide, carefully bend each of the hour meter's terminals—at approximately a 45° angle—toward the cabinet hinge. Attach the connectors to the terminals.

NOTE: The hour meter is not polarity sensitive, so the connectors may be attached to either terminal.

4. Reverse the removal procedures (Section 5.3.1, steps 2 through 4) for the air inlet duct cover, the tube, and the Control PCB wire harness connectors.
5. Close the cabinet, as described in Section 5.1.2.
6. Verify the performance of the system (Section 3) before using the concentrator.

5.4 AUDIBLE ALARM

NOTE: On units equipped with Control/OCI PCB with Removable Sensor, the audible alarm is located on the front panel PCB. (See Section 5.24 for OCI Front Panel PCB removal and installation instructions.)

The following instructions apply to units with the audible alarm located in the right side cabinet behind the air intake filter.

5.4.1 Removal

Figure 6-1: Cabinet Exterior

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two connectors from the audible alarm terminals.
3. Remove the retaining ring **18** from the audible alarm **12**, which is located behind the foam intake filter.
4. Remove the audible alarm **12** from the cabinet interior.

5.4.2 Installation

Figure 6-1: Cabinet Exterior

1. Insert the audible alarm **12** into its mounting hole from the cabinet interior.
2. Attach the retaining ring **18** to the replacement audible alarm located behind the intake filter.
3. Reconnect the red wire of the audible alarm to the positive terminal and the black wire to the negative terminal.
4. Close the cabinet, as described in Section 5.1.2.
5. Verify the performance of the system (Section 3) before using the concentrator.

5.5 FLOWMETER FLOW CONTROL VALVE

5.5.1 Removal

Figure 6-23: Non-OCI PCB and Control Panel

1. Remove the flowmeter knob **1** by pulling it away from the flowmeter **3**.
2. Remove the flow control valve **2** from the flowmeter body using a ½ in. (12.7 mm) deep well socket wrench.

CAUTION: To prevent flowmeter damage, the flow control valve must be set to a fully counterclockwise position before reassembly.

5.5.2 Installation

Figure 6-23: Non-OCI PCB and Control Panel

1. Install the flow control valve **2** into the flowmeter body and carefully tighten it using a ½ in. (12.7 mm) deep well socket wrench.
2. Align the flowmeter knob **1** with the flat on the flow control valve shaft and push it into position.
3. Verify the performance of the system (Section 3) before using the concentrator.

5.6 FLOWMETER

5.6.1 Removal

Figure 6-23: Non-OCI PCB and Control Panel

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two product gas tubes **10, 12** from the flowmeter inlet and outlet connectors.
3. Remove the two flowmeter brackets **8** and nuts **9** from the flowmeter's threaded connectors.
4. Remove the flowmeter **3** from the cabinet's control panel.

5.6.2 Installation

Figure 6-23: Non-OCI PCB and Control Panel

1. Install the flowmeter **3** in its mounting hole with the control knob **1** positioned toward the top of the concentrator.
2. Install the flowmeter brackets **8** and nuts **9** on the replacement flowmeter. Torque the nuts to 4 lbf · in ±1 lbf · in (0.452 N · m ±0.113 N · m).
3. With the product gas tubing correctly positioned, reconnect the oxygen tubing **10, 12** to the inlet and outlet flowmeter connectors.
4. Close the cabinet, as described in Section 5.1.2.
5. Verify the performance of the system (Section 3) before using the concentrator.

5.7 POWER SWITCH

5.7.1 Removal

Figure 6-23: Non-OCI PCB and Control Panel

1. Open the cabinet, as described in Section 5.1.1.
2. Using needle-nose pliers, unplug the connector from the leads of the power LED **5**.
3. Detach the four connectors from the power switch **6** terminals.
4. Locate the four retaining tabs at each corner of the power switch body.
5. One after the other, press the four retaining tabs inward with a flat-blade screwdriver, while pushing the switch through the control panel toward the outside of the cabinet.

5.7.2 Installation

Figure 6-23: Non-OCI PCB and Control Panel

NOTE: The power LED **5** is mounted in a removable bezel. The bezel and LED are supplied with the replacement power switch. Verify that the bezel is correctly positioned before installation. The power LED should be positioned above the switch closest to terminals No. 2 and No. 5.

1. Position the power switch **6** so that the power LED **5** is toward the top of the concentrator.
2. Press the power switch **6** into its mounting hole from the outside of the control panel until the retaining tabs catch.
3. With the wires correctly positioned, attach the four connectors to the terminals of the power switch **6.**
4. With the connectors correctly positioned, attach the power LED leads to the wire harness connector. The longer LED lead must connect to position 2 (white wire) on the wire connector.

NOTE: The power LED **5** is a polarity-sensitive device. Improper connection of the wire harness connector will not damage the LED, but will prevent illumination when power is applied. Verify proper operation of the power LED after installation. If the LED does not illuminate, remove the connector, rotate it 180°, reinstall the connector, and retest.

5. Close the cabinet, as described in Section 5.1.2.
6. Verify the performance of the system (Section 3) before using the concentrator.

5.8 CONTROL PCB

5.8.1 Fuse Testing

Figure 6-23: Non-OCI PCB and Control Panel

1. Open the cabinet, as described in Section 5.1.1.

CAUTION: The Control PCB contains complementary metal oxide semiconductor (CMOS) integrated circuits (ICs) which are static-sensitive devices. Use care when handling the board to prevent static discharge from possibly damaging board components. To prevent IC damage, observe standard safety procedures, as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

2. Remove the fuse **25** from the fuse holder on the Control PCB **23.**

3. Using a digital multimeter, verify that fuse **25A** has a resistance of approximately 15 ohms or fuse **25B** has a resistance of 35.7 ohms.
4. Reinstall the fuse **25** in the fuse holder.

5.8.2 Removal

Figure 6-23: Non-OCI PCB and Control Panel

1. Remove the three PCB wire harness connectors **17, 18, 26** from the Control PCB **23** (see Figure 9-10 for screw sequence).
2. Remove the five screws **24** from the Control PCB and separate the Control PCB from the air inlet duct cover **20.**

5.8.3 Installation

Figure 6-23: Non-OCI PCB and Control Panel

1. Install the Control PCB **23** into the cabinet and secure it in position with the five screws **24.**
2. Reinstall the three wire harness connectors **17, 18, 26** by reversing the removal procedures.
3. Close the cabinet, as described in Section 5.1.2.
4. Verify the performance of the system (Section 3) before using the concentrator.

CAUTION: To ensure accurate failure investigation, follow these ESD guidelines:
- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

5.9 COMPRESSOR PLATFORM ASSEMBLY

5.9.1 2618 Thomas

5.9.1.1 Removal—2618 & 2619 Thomas (with rubber mounts)

Figure 6-6: Right Cabinet Interior

1. Open the cabinet, as described in Section 5.1.1.
2. Remove the blue hose from the bottom fitting located on the reservoir canister.
3. Disconnect and remove the compressor wire harness connector **36** and grommet **35** from the air dam **48.**

4. Using a magnetic tip No. 2 Phillips screwdriver, remove the two screws **25** from the compressor platform assembly.
5. Disconnect the inlet tube **15** from the platform connector while sliding the platform assembly out of the cabinet.

5.9.1.2 Disassembly—2618 & 2619 Thomas (with rubber mounts)

Figure 6-7: 2618 & 2619 Thomas Compressor Platform Assembly

1. Remove the inlet tube **3** from the compressor.
2. Remove the two screws **15** and two clamps **16, 22** from the platform assembly.

WARNING

Hazardous voltage can shock, burn, or cause death. To prevent the possibility of an electrical shock or damage to the capacitor, disconnect the power cord from the power supply before opening the cabinet and discharge the capacitor by shorting its terminals with an insulated-handle screwdriver.

3. Detach the two connectors **20** from the capacitor terminals.
4. Cut strap **8** and pull each capacitor wire one at a time through the grommet **17**.
5. Detach the two connectors **24** from the cooling fan terminals.
6. Place the compressor on a work surface with the compressor heads down and the compressor feet up. Remove the four bolts **13** with a 7/16 in. (11 mm) deep well socket wrench. Separate the compressor from the platform.
7. Use a 5/64 in. (2 mm) 90° Allen wrench and a 5/16 in. (8 mm) socket to remove the two screws **35**, washer **33**, and locknuts **32** from the compressor. The two clamps on the heat exchanger do not need to be removed.
8. Unscrew the brass nut **38** from the compressor elbow **36** and remove the heat exchanger **31**.

5.9.1.3 Reassembly—2618 & 2619 Thomas (with rubber mounts)

Figure 6-7: 2618 & 2619 Thomas Compressor Platform Assembly

1. Reassemble the compressor platform assembly by reversing the DISASSEMBLY procedure.

NOTE: Apply a small amount of LOCTITE 242 to the threads of the four compressor mounting bolts **13** before reassembly.

5.9.1.4 Installation—2618 & 2619 Thomas (with rubber mounts)

Figure 6-7: 2618 & 2619 Thomas Compressor Platform Assembly

1. Replace the compressor platform assembly by reversing the REMOVAL procedure. Do not over-tighten the two screws (Figure 6-6, item **25**) which affix the compressor platform to the cabinet.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.9.2 2619 Thomas (Drawing A)

5.9.2.1 Removal—2619 Thomas (Drawing A)

Figure 6-6: Right Cabinet Interior

1. Open the cabinet, as described in Section 5.1.1.
2. Remove the blue hose from the bottom fitting located on the reservoir canister.
3. Disconnect and remove the compressor wire harness connector **36** and grommet **35** from the air dam **48**.
4. Using a magnetic tip No. 2 Phillips screwdriver, remove the two screws **25** from the compressor platform assembly.
5. Disconnect the inlet tube **15** from the platform connector while sliding the platform assembly out of the cabinet.

5.9.2.2 Disassembly—2619 Thomas (Drawing A)

Figure 6-8: 2619 Thomas Compressor Platform Assembly (Drawing A)

1. Remove the inlet tube **3** from the compressor.
2. Remove the two screws **14** and two clamps **15, 16** from the platform assembly.

WARNING

Hazardous voltage can shock, burn, or cause death. To prevent the possibility of an electrical shock or damage to the capacitor, disconnect the power cord from the power supply before opening the cabinet and discharge the capacitor by shorting its terminals with an insulated-handle screwdriver.

3. Detach the two connectors **20** from the capacitor terminals.
4. Cut the strap **8** and pull each capacitor wire one at a time through the grommet **17**.

5. Detach the two connectors **30** from the cooling fan terminals.
6. Place the compressor on a work surface with the compressor heads down and the compressor feet up. Remove the four nylock nuts **12** with a 7/16 in. (11 mm) deep well socket wrench. Separate the compressor from the platform.
7. Use a 5/64 in. (2 mm) 90° Allen wrench and a 5/16 in. (8 mm) socket to remove the two screws **41**, washer **38**, and locknuts **37** from the compressor. The two clamps on the heat exchanger do not need to be removed.
8. Unscrew the brass nut **44** from the heat exchanger **40** and remove the heat exchanger from the compressor.

5.9.2.3 Reassembly—2619 Thomas (Drawing A)

Figure 6-8: 2619 Thomas Compressor Platform Assembly (Drawing A)

1. Reassemble the compressor platform assembly by reversing the DISASSEMBLY procedure.

NOTE: Apply a small amount of LOCTITE 242 to the threads of the four spring bolts **26** before reassembly.

5.9.2.4 Installation—2619 Thomas (Drawing A)

Figure 6-8: 2619 Thomas Compressor Platform Assembly (Drawing A)

1. Replace the compressor platform assembly by reversing the REMOVAL procedure. Do not over-tighten the two screws (Figure 6-6, item **25**) which affix the compressor platform to the cabinet.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.9.3 2619 Thomas (Drawing B), 2639 Thomas, & Gast

5.9.3.1 Removal—2619 Thomas (Drawing B), 2639 Thomas, & Gast

Figure 6-6: Right Cabinet Interior

1. Open the cabinet, as described in Section 5.1.1.
2. Remove the blue hose from the bottom fitting located on the reservoir canister.
3. Disconnect and remove the compressor wire harness connector **36** and grommet **35** from the air dam **48**.
4. Using a magnetic tip No. 2 Phillips screwdriver, remove the two screws **25** from the compressor platform assembly.

5. Disconnect the inlet tube **15** from the platform connector while sliding the platform assembly out of the cabinet.

5.9.3.2 Disassembly—2619 Thomas (Drawing B), 2639 Thomas & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. Remove the inlet tube **6** from the compressor.
2. Remove the two screws **16** and two clamps **17, 18** from the platform assembly.

WARNING

Hazardous voltage can shock, burn, or cause death. To prevent the possibility of an electrical shock or damage to the capacitor, disconnect the power cord from the power supply before opening the cabinet and discharge the capacitor by shorting its terminals with an insulated-handle screwdriver.

3. Detach the two connectors **22** from the capacitor terminals.
4. Cut the strap **10** and pull each capacitor wire one at a time through the grommet **19**.
5. Detach the two connectors **32** from the cooling fan terminals.
6. Place the compressor on a work surface with the compressor heads down and the compressor feet up. Remove the four nylock nuts **14** with a 7/16 in. (11 mm) deep well socket wrench. Separate the compressor from the platform.
7. Using a 7/16 in. (11 mm) wrench, remove the four spring bolts **28** from the compressor.
8. (Gast only) Using a No. 2 Phillips screwdriver, remove the four fan shroud screws (Figure 6-12, item **44**) which attach the heat exchanger **2** to the compressor. Save the screws for reassembly.
9. Unscrew the brass nut **42** from the heat exchanger and remove the heat exchanger **2** from the compressor.

5.9.3.3 Reassembly—2619 Thomas (Drawing B), 2639 Thomas, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. Reassemble the compressor platform assembly by reversing the DISASSEMBLY procedure.

NOTE: Apply a small amount of LOCTITE 242 to the threads of the four spring bolts **28** before reassembly.

5.9.3.4 Installation—2619 Thomas (Drawing B), 2639 Thomas, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. Replace the compressor platform assembly by reversing the REMOVAL procedure. Do not over-tighten the two screws (Figure 6-6, item **25**) which affix the compressor platform to the cabinet.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.9.4 2650 Thomas Compressor

5.9.4.1 Removal - 2650 Thomas

Figure 6-6: Right Cabinet Interior

1. Open the cabinet, as described in Section 5.1.1.
2. Remove the blue hose from the bottom fitting located on the reservoir canister.
3. Disconnect and remove the compressor wire harness connector **36** and grommet **35** from the air dam **48**.
4. Using a magnetic tip No. 2 Phillips screwdriver, remove the two screws **25** from the compressor platform assembly.
5. Disconnect the inlet tube **15** from the platform connector while sliding the platform assembly out of the cabinet.

5.9.4.2 Disassembly - 2650 Thomas

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Remove the inlet tube **6** from the compressor.
2. Remove the two screws **21** and two clamps **20, 23** from the platform assembly.
3. Detach the two connectors **27** from the capacitor terminals.
4. Cut the strap **14** and pull each capacitor wire one at a time through the grommet **24**.

5. Detach the two connectors **10** from the cooling fan terminals.
6. Place the compressor on a work surface with the compressor heads down and the compressor feet up. Remove the four bolts **19** with a 7/16 in. (11 mm) deep well socket wrench. Separate the compressor from the platform.
7. Unscrew the brass nut **34** from the heat exchanger and remove the heat exchanger **2** from the compressor.

5.9.4.3 Reassembly - 2650 Thomas

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Reassemble the compressor platform assembly by reversing the DISASSEMBLY procedure.

NOTE: Apply a small amount of LOCTITE 242 to the threads of the four compressor mounting bolts **19** before reassembly.

5.9.4.4 Installation - 2650 Thomas

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Replace the compressor platform assembly by reversing the REMOVAL procedure. Do not over-tighten the two screws (Figure 6-6, item **25**) which affix the compressor platform to the cabinet.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.10 COMPRESSOR

5.10.1 2618 Thomas

5.10.1.1 Removal—2618 Thomas

1. Remove the compressor platform assembly. Perform the REMOVAL and DISASSEMBLY procedures (Section 5.9.1.1 and 5.9.1.2).

5.10.1.2 Disassembly—2618 Thomas

Figure 6-13: 2618 Thomas Compressor

1. Remove the 12 cylinder head screws **1** from the cylinder heads **9, 26.**
2. Remove both cylinder heads **9, 26,** the connector tubes **2,** and both valve plates **4.**

3. Remove both piston sleeves **6**.

5.10.1.3 Housing Well A—2618 Thomas

Figure 6-13: 2618 Thomas Compressor

1. Pry the four-blade fan **19** away from the motor shaft **15** with a flat-blade screwdriver.
2. Turn the motor shaft **15** until the piston rod screw **8** is visible through the lower access port on the side of the housing.
3. Loosen the piston rod screw **8** several turns using a 5/32 in. (4 mm) Allen wrench.
4. Turn the eccentric **18** until the set screw **17** is visible through the upper access port.
5. Loosen the set screw **17** only a quarter turn using a 1/8 in. (3.17 mm) Allen wrench.
6. Slip the piston rod off of the bearing **16** and slide the entire eccentric bearing assembly **20** off the shaft.

NOTE: The bearing is bonded to the piston rod with LOCTITE. If necessary, insert a screwdriver blade into the slit at the bottom of the rod and turn the screwdriver to break the rod loose from the bearing.

7. Grasp the piston **21** at the top, inside the housing well, and slip the piston rod **7** off the shaft **15**.
8. Move the piston rod **7** to one side of the shaft, and then lift the rod while moving it back into the housing above the shaft. Remove the piston rod through the top of the housing.
9. Replace the piston rod screw **8**.

5.10.1.4 Housing Well B—2618 Thomas

Figure 6-13: 2618 Thomas Compressor

1. Repeat Section 5.10.1.3 to remove the five-blade fan, eccentric bearing assembly, and piston.

5.10.1.5 Cleaning—2618 Thomas

Figure 6-13: 2618 Thomas Compressor

WARNING

To prevent personal injury or death, use a face shield and observe standard safety procedures when using a compressed air gun.

1. Blow out or brush away dirt and dust from the cylinder head interiors and housing wells.
2. Wipe off both sides of the valve plates **4** with a clean cloth.
3. Wipe off the eccentric bearing assemblies **20** with a clean cloth and scrape off excess LOCTITE from the outer bearing surface.

5.10.1.6 Reassembly—2618 Thomas

Figure 6-13: 2618 Thomas Compressor

1. Stand the compressor body on its end with housing well A facing upward.

CAUTION: Keep LOCTITE away from all plastic parts.

2. Place only one drop of LOCTITE 242 on the screw threads of the piston rod screw **8** and insert it into the side hole on the piston rod, but do not tighten it.
3. Position the piston **21** above the housing well so that the piston rod screw head **8** is facing the wire harness side of the housing.
4. Insert the piston rod **7** into the housing, and place over the shaft end **15.**
5. Wipe off any grease or oil from the outer face of the bearing **16.**

CAUTION: Do not allow LOCTITE to seep inside the bearing or onto the eccentric.

6. Apply a very thin film of LOCTITE 680 to the outer circumference of the bearing **16** with a small pad.
7. Position the eccentric bearing assembly **20** so that the set screw **17** is aligned with the flat side on the shaft.
8. Hold the piston steady with one hand, and slip the eccentric bearing assembly **20,** bearing first, onto the shaft **15** and into the piston rod **7.**
9. Turn the eccentric **18** until the piston rod screw **8** is visible through the lower access port on the wire harness side of the housing.
10. Center the piston rod **7** on the eccentric bearing assembly **20** so that the bearing face is flush with the rod face.

CAUTION: To prevent bearing failure, do not over-tighten the piston rod screw.

11. Tighten the piston rod screw **8** and torque to 15 lbf · in (1.69 N · m).
12. Wipe out the inner surface of the sleeve **6** and inspect it for scratches and burrs.
13. Position the sleeve **6** above the housing well so that the stepped edge is facing outward.
14. Install the sleeve **6** carefully onto the piston, taking care not to damage the seal around the piston head.
15. Set the compressor body on its feet.

5.10.1.7 Eccentric/Piston Alignment—2618 Thomas

Figure 6-13: 2618 Thomas Compressor

1. Position the sleeve **6** in the center of the housing well.
2. Position the valve plate **4** over the piston, with the O-ring **5** side downward, so that the head of the leaf valve screw **25** is aligned with the notch on the piston head.
3. Place the valve plate **4** on the housing well to engage the stepped edge of the sleeve, ensuring that the six mounting holes in the valve plate are aligned with those in the housing.
4. Insert two of the six cylinder head screws **1** into the two valve plate holes on the housing's center line. Rotate the screws two turns.
5. Hold the valve plate **4** in place over the piston **21** and spin the motor shaft **15**.
6. Turn the motor shaft **15** until the eccentric set screw **17** is visible through the upper access port.
7. Tighten the set screw **17** to 30 lbf · in (3.39 N · m) using a torque wrench, but do not allow the eccentric **18** to move on the shaft **15**.
8. Remove the two cylinder head screws **1** and then remove the valve plate **4**.
9. Hold the sleeve **6**, turn the eccentric **18**, and ensure that the sleeve is not touching the front or back shoulder of the well.
10. Inspect the O-ring **5** for cuts and tears and ensure it is properly seated in the valve plate groove.
11. Repeat 5.10.1.7, steps 2 and 3, for the other valve plate.
12. Inspect the cylinder head gasket **3** for cuts and tears and ensure it is properly seated in the cylinder head groove.

13. Place the cylinder head **26** over the valve plate **4** and place the piston rod **7** in the upward position.
14. Insert the two cylinder head screws **1** into the holes on the housing's center line and tighten them until snug.
15. Turn the eccentric **18** and check for alignment between the piston **7** and valve plate **4.**
16. Repeat 5.10.1.6, Step 2 through 5.10.1.7, Step 15 for the other housing well, making sure that the connector tubes **2** are inserted between cylinder head A and B before head B is connected to the housing.
17. Insert the remaining cylinder head screws **1** into the heads and torque to 20 lbf · in (2.27 N · m) in the correct sequence. (See Figure 9-11.)
18. Repeat 5.10.1.7, Step 17 for 30 lbf · in (3.41 N · m).
19. Press the four-blade fan **19** onto the housing well A shaft. Align the flat in the fan hole with the flat on the shaft and face the spring clamp inward.
20. Press the five-blade fan **11** onto housing well B shaft. Align the flat in the fan hole with the flat on the shaft and face the spring clamp inward.

CAUTION: Ensure that both fans are securely in place.

5.10.1.8 Installation—2618 Thomas

Figure 6-13: 2618 Thomas Compressor

1. Install the compressor platform assembly by reversing the DISASSEMBLY and REMOVAL procedures 5.9.1.1, Step 1, through 5.9.1.2, Step 8.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.10.2 2619 & 2639 Thomas Compressor

5.10.2.1 Removal—2619 & 2639 Thomas Compressor

1. Remove the compressor platform assembly. Perform the REMOVAL and DISASSEMBLY procedures (5.9.2.1, Step 1, through 5.9.2.2, Step 8).
   (2619 Thomas Compressor Assembly, Drawing A)
2. Remove the compressor platform assembly. Perform the REMOVAL and DISASSEMBLY procedures (5.9.3.1, Step 1,

through 5.9.3.2, Step 9).
(2619 Thomas Compressor Assembly, Drawing B)
(2639 Thomas Compressor Assembly)

5.10.2.2 Disassembly—2619 & 2639 Thomas Compressor

Figure 6-14: 2619 Thomas Compressor
Figure 6-15: 2639 Thomas Compressor

NOTE: When performing a cup seal and/or sleeve replacement, see Section 5.21.

NOTE: Some compressors may require a No. 25 torx-head screwdriver to remove the eight cylinder head screws.

1. Remove the eight cylinder head screws **27** from the cylinder heads **10, 26.**
2. Remove both cylinder heads **10, 26,** the connector tubes **1,** and both valve plates **3.**
3. Remove both piston sleeves **5.**

5.10.2.3 Housing Well A—2619 & 2639 Thomas Compressor

Figure 6-14: 2619 Thomas Compressor
Figure 6-15: 2639 Thomas Compressor

1. Pry fan A **18** away from the motor shaft **21** with a flat-blade screwdriver and label fan A for correct reassembly.
2. Turn the motor shaft **21** until the piston rod screw **15** is visible through the lower access port on the wire harness side of the housing.
3. Loosen the piston rod screw **15** several turns using a 5/32 in. (4 mm) Allen wrench.
4. Turn the eccentric **19** until the set screw **16** is visible through the upper access port.
5. Loosen the set screw **16** only a quarter turn using a 1/8 in. (3.17 mm) Allen wrench.
6. Slip the piston rod assembly **9** off the bearing **20** and slide the entire eccentric bearing assembly **19** off the shaft **21.**

NOTE: The bearing is bonded to the piston rod with LOCTITE. If necessary, insert a screwdriver blade into the slit at the bottom of the rod and turn it to break the rod loose from the bearing.

7. Grasp the top of the piston assembly inside the housing well, and slip the piston rod **9** off the shaft **21.**

8. Move the piston rod **9** to one side of the shaft. Then lift the piston rod while moving it back into the housing above the shaft. Remove the piston rod through the top of the housing and replace the piston rod screw **15**.

9. Remove the four screws **6** on each piston to separate the retaining plate **7**, cup seal **8**, and piston rod **9**.

5.10.2.4 Housing Well B—2619 & 2639 Thomas Compressor

Figure 6-14: 2619 Thomas Compressor
Figure 6-15: 2639 Thomas Compressor

1. Repeat 5.10.2.3 to remove fan B, eccentric bearing assembly, and piston.

WARNING

To prevent personal injury or death, use a face shield and observe standard safety procedures when using a compressed air gun.

2. Blow out or brush away dirt and dust from the cylinder head interiors and housing wells.

5.10.2.5 Cleaning—2619 & 2639 Thomas Compressor

Figure 6-14: 2619 Thomas Compressor
Figure 6-15: 2639 Thomas Compressor

CAUTION: Use care not to damage the intake and exhaust leaf valves on the valve plates.

1. Wipe off the valve plates **3** and piston assembly components **7, 9** with a clean cloth.

2. Wipe off the eccentric bearing assemblies **19** with a clean cloth and scrape off any excess LOCTITE from the outer bearing surface.

5.10.2.6 Reassembly—2619 & 2639 Thomas Compressor

Figure 6-14: 2619 Thomas Compressor
Figure 6-15: 2639 Thomas Compressor

1. Stand the compressor body on its end, with the housing well A facing upward.

2. Install the cup seal **8** on the stepped edge of retaining plate **7**, with the cupped side of the cup seal facing the retaining plate. (See Figure 5-1.)

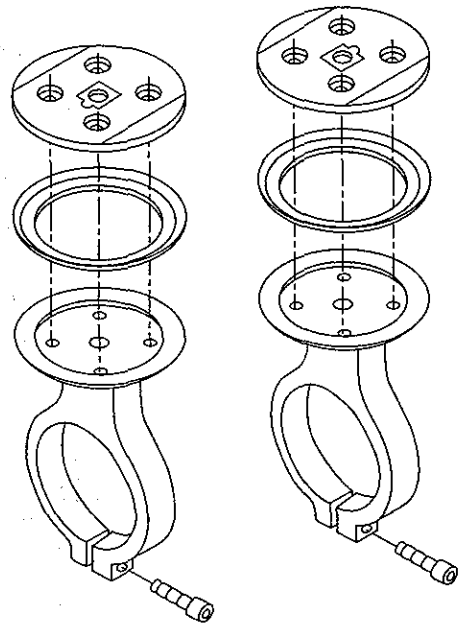

Figure 5-1: Retaining Plates

3. Install the cup seal **8** and retaining plate **7** on the piston rod **9**. Rotate the retaining plate to position the index mark and beveled edges.
4. Place one drop of LOCTITE 242 on the threads of the four screws **6**. Install the screws and torque them to 20 lbf · in (2.27 N · m).
5. Repeat 5.10.2.6 steps 2 through 4 for the second piston assembly.

CAUTION: Keep LOCTITE away from all plastic parts.

6. Place one drop of LOCTITE 242 on the threads of the new piston rod screw **15**. Insert the screw into the side hole on the piston rod, but do not tighten it.
7. Position the piston above the housing well so that the piston rod screw head is facing the wire harness side of the housing.
8. Insert the piston into the housing, and place the piston rod **9** over the shaft end **21**.
9. Wipe any grease or oil off the outer edge of the bearing **20**.

CAUTION: Do not allow LOCTITE to seep inside the bearing or onto the eccentric.

10. Apply a thin film of LOCTITE 680 to the outer circumference of the bearing **20** with a small pad.

11. Position the eccentric bearing assembly **19** so that its set screw **16** is aligned with the flat on the shaft.
12. Hold the piston steady with one hand and slip the eccentric bearing assembly **19**, bearing first, onto the shaft **21** and into the piston rod **9**.
13. Turn the eccentric **19** until the piston rod screw **15** is visible through the lower access port on the wire harness side of the housing.
14. Center the piston rod **9** on the eccentric bearing assembly **19** so the bearing face is flush with the rod face.

CAUTION: To prevent bearing failure, do not over-tighten the piston rod screw.

15. Tighten the piston rod screw **15** to 15 lbf · in (1.69 N · m) using a torque wrench.
16. Wipe out the inner surface of the sleeve **5** and inspect it for scratches and burrs.
17. Install the sleeve **5** carefully onto the piston, taking care not to damage the cup seal **8**.
18. Set the compressor body on its feet.

5.10.2.7 Eccentric and Piston Alignment—2619 & 2639 Thomas Compressor

Figure 6-14: 2619 Thomas Compressor
Figure 6-15: 2639 Thomas Compressor

1. Position the sleeve **5** in the center of the housing well.
2. Position the valve plate **3** over the piston, O-ring **4** side down, so that the head of the leaf valve screw **25** is aligned with the notch on the piston head and the leaf valve **22** on the top of the valve plate is positioned nearest to the harness side of the compressor.
3. Place the valve plate **3** on the housing well to engage the edge of the sleeve **5**, so that the four mounting holes are aligned with those in the housing.
4. Insert the four cylinder head screws **27** into the four valve plate holes and rotate each of the screws two turns.
5. Hold the valve plate **3** in place over the piston, and spin the motor shaft **21**.
6. Turn the motor shaft **21** until the eccentric set screw **16** is visible through the upper access port.

7. Tighten the set screw **16** to 30 lbf · in (3.39 N · m) using a torque wrench, but do not allow the eccentric **19** to move on the shaft **21**.
8. Remove the four cylinder head screws **27** and then remove the valve plate **3**.
9. Hold the sleeve **5** and turn the eccentric **19**, ensuring that the sleeve is not touching the front or back shoulder of the well.
10. Inspect the O-ring **4** for cuts and tears. Ensure the O-ring is properly seated in the valve plate groove.
11. Repeat 5.10.2.7, steps 1 and 2 for the other valve plate.
12. Inspect the head gasket **2** for cuts and tears and ensure it is properly seated in the cylinder head.
13. Place the cylinder head **26** over the valve plate **3**, and place the piston rod **9** in the up position.
14. Insert the four cylinder head screws **27** into the holes on the housing and tighten until snug.
15. Turn the eccentric **19** and ensure the piston does not contact the valve plate **3**.
16. Repeat 5.10.2.7, steps 14 and 15 for the cylinder head B side of the compressor making sure that the connector tubes **1** are inserted between cylinder head A and B before head B is connected to the housing.
17. Tighten all the cylinder head screws **27** to 20 lbf · in (2.27 N · m) using a torque wrench in a crisscross pattern (Figure 9-11).
18. Repeat 5.10.2.7, Step 17 to 30 lbf · in (3.39 N · m).
19. Press fan A **18** onto housing well A shaft. Align the flat in the fan hole with the flat on the shaft and face the spring clamp inward.
20. Press fan B **11** onto housing well B shaft. Align the flat in the fan hole with the flat on the shaft and face the spring clamp inward.

CAUTION: Ensure that both fans are securely in place.

5.10.2.8 Installation—2619 & 2639 Thomas Compressor

Figure 6-14: 2619 Thomas Compressor
Figure 6-15: 2639 Thomas Compressor

1. Install the compressor platform assembly by reversing the DISASSEMBLY and REMOVAL procedures (Section 5.10.2.1, steps 1 through 2).
2. Verify the performance of the system (Section 3) before using the concentrator.

5.10.3 Gast Compressor

5.10.3.1 Removal—Gast Compressor

1. Remove the compressor platform assembly. Perform the REMOVAL and DISASSEMBLY procedures 5.9.3.1, Step 1, through 5.9.3.2, Step 9.

5.10.3.2 Disassembly—Gast Compressor

Figure 6-17: Gast Compressor

NOTE: Refer to Mallinckrodt part number 494134 on the Gast compressor motor housing label to verify 17mm model. See Section 6.3.19 for part numbers.

NOTE: When performing a cup seal and/or sleeve replacement, see Section 5.21.

1. Remove the eight cylinder head screws **1** from the head covers **2, 11**.
2. Remove both head covers **2, 11**, the connector tubes **4**, and then both valve plate assemblies **13, 24**.
3. Remove both piston sleeves **7**.

5.10.3.3 Housing Well A—Gast Compressor

Figure 6-17: Gast Compressor

1. Remove the four fan shroud screws **14** from the fan shroud **18**.
2. Pry fan A **17** away from the motor shaft **19** with a flat-blade screwdriver.
3. Loosen the set screw **16** only a quarter turn using a ⅛ in. (3.17 mm) Allen wrench.
4. Slip the eccentric bearing/piston rod assembly **20** off the shaft **19**.
5. Remove the two screws **8** on each piston to separate the retaining plate **9** and cup seal **10** from the eccentric bearing/piston rod assembly **20**.

5.10.3.4 Housing Well B—Gast

Figure 6-17: Gast Compressor

1. Repeat 5.10.3.3 to remove the second fan, eccentric bearing assembly, and piston.

WARNING

To prevent personal injury or death, use a face shield and observe standard safety procedures when using a compressed air gun.

2. Blow out or brush away dirt and dust from the head cover interiors and housing wells.

5.10.3.5 Cleaning—Gast Compressor

Figure 6-17: Gast Compressor

CAUTION: Use care not to damage the intake and exhaust leaf valves on the valve plates.

1. Wipe off the valve plates **13, 24** and piston assembly components **9, 20** with a clean cloth.

5.10.3.6 Reassembly and Eccentric Piston Alignment—Gast Compressor

Figure 6-17: Gast Compressor

NOTE: When performing a cup seal and/or sleeve replacement, see Section 5.21.

1. Install the cup seal **10** on the stepped edge of the retaining plate **9**, with the cupped side of the cup seal facing the retaining plate.
2. Install the cup seal **10** and retaining plate **9** on the piston rod **20.**
3. Place one drop of LOCTITE 242 on the threads of the two screws **8.** Install the screws and torque them to 36 lbf · in (4.07 N · m)
4. Repeat 5.10.3.6, steps 1 through 3, for the second piston assembly.

CAUTION: Keep LOCTITE away from all plastic parts.

5. Place the eccentric bearing/piston rod assembly **20** over the shaft end **19** and slowly press into place.

6. Wipe out the inner surface of the sleeve **7** and inspect it for scratches and burrs. Install the sleeve **7** carefully onto the piston, taking care not to damage the cup seal **10**.
7. Position the sleeve **7** in the center of the housing well. Make sure the sleeve is oriented with the ID bevel on top.
8. Inspect the O-ring **6** for cuts and tears. Ensure the O-ring is properly seated in the valve plate groove.
9. Position the valve plate **24** over the piston, O-ring **6** side down, so that the head of the leaf valve screw **21** is aligned with the notch on the piston head and the leaf valve **23** on the top of the valve plate is positioned so that it is covering the valve plate port nearest the harness side of the compressor.
10. Place the valve plate **24** on the housing well to engage the edge of the sleeve **7**, so that the four mounting holes are aligned with those in the housing.
11. Inspect the valve plate gasket **3** for cuts and tears and ensure it is properly aligned in the valve plate **24**.
12. Place the head cover **2** over the valve plate **24**, making sure the orientation is correct.
13. Insert the four head cover screws **1** through the valve plate **24** and into the housing and tighten them to 36 lbf · in (4.07 N · m). (See Figure 9-11.)
14. Repeat 5.10.3.6, steps 5 through 13 for the other side. Make sure the connector tubes **4** are inserted between the valve plates **13, 24** before connecting the second valve plate to the housing.
15. Spin the motor shaft several times, positioning the piston rod assembly **20** on the motor shaft **19.**
16. Carefully align the set screw **16** against the flat on the shaft **19** and then tighten the set screw **16** to 50 lbf · in (6.65 N · m).
17. Press fan **17** onto the well A motor housing shaft **19**. Align the flat in the fan hole with the flat on the shaft and face the spring clamp inward. Repeat for second fan **12.**

CAUTION: Ensure that both fans are securely in place.

18. To reinstall the fan shroud **18,** place shroud over the fan **17** and align the screw holes in the shroud with the holes in the housing. Insert the four fan shroud screws **14** and hand tighten. Repeat for the second fan shroud.

5.10.3.7 Installation—Gast Compressor

Figure 6-17: Gast Compressor

1. Install the compressor platform assembly by reversing the DISASSEMBLY and REMOVAL procedures.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.10.4 2650 Thomas Compressor

5.10.4.1 Removal—2650 Thomas Compressor

1. Remove the compressor platform assembly. Perform the REMOVAL and DISASSEMBLY procedures 5.9.4.1, Step 1, through 5.9.4.2, Step 7.

5.10.4.2 Disassembly—2650 Thomas Compressor

Figure 6-16: 2650 Thomas Compressor

NOTE: Remove the eight cylinder head screws and retaining plate with a No. 25 torx-head screwdriver.

1. Remove the eight cylinder head screws **1** from the cylinder head **2**.
2. Remove the cylinder head **2** and both valve plates **4**.
3. Remove both piston sleeves **13**.

5.10.4.3 Housing Well A—2650 Thomas Compressor

Figure 6-16: 2650 Thomas Compressor

1. Pry fan A **21** away from the motor shaft **22** with a flat-blade screwdriver and label fan A for correct reassembly.
2. Turn the motor shaft **22** until the eccentric set screw **19** is visible through the access port on the bottom of the housing.
3. Loosen the set screw **19** only a quarter turn using a 1/8 in. (3.17 mm) Allen wrench.
4. Slip the piston rod and eccentric bearing assembly off the shaft **22**.
5. Remove screw **10** from each piston to separate the retaining plate **11**, cup seal **12**, and piston rod **14**.

5.10.4.4 Housing Well B—2650 Thomas Compressor

Figure 6-16: 2650 Thomas Compressor

1. Repeat procedure 5.10.4.3 to remove fan B, eccentric bearing assembly, and piston.
2. Blow out or brush away dirt and dust from the cylinder head interiors and housing wells.

5.10.4.5 Cleaning—2650 Thomas Compressor

Figure 6-16: 2650 Thomas Compressor

CAUTION: Use care not to damage the intake and exhaust leaf valves on the valve plates.

1. Wipe off the valve plates **4** and piston assembly components **11**, **14** with a clean cloth.
2. Wipe off the eccentric **20** with a clean cloth.

5.10.4.6 Reassembly—2650 Thomas Compressor

Figure 6-16: 2650 Thomas Compressor

1. Stand the compressor body on its end, with the housing well A facing upward.
2. Install the cup seal **12** on the stepped edge of retaining plate **4**, with the cupped side of the cup seal facing the retaining plate.
3. Install the cup seal **12** and retaining plate **11** on the piston rod **14**. Rotate the retaining plate to position the indexing key.
4. Place one drop of LOCTITE 242 on the threads of the screw **10**. Install the screw and torque it to 60 lbf · in (6.78 N · m).
5. Repeat procedure 5.10.4.6, steps 2 through 4, for side B.

CAUTION: Keep LOCTITE away from all plastic parts.

6. Position the eccentric bearing assembly **20** so that its set screw **19** is aligned with the flat on the shaft.
7. Slip the piston onto the shaft **22**.
8. Wipe out the inner surface of the sleeve **13** and inspect it for scratches and burrs.
9. Install the sleeve **13** carefully onto the piston, taking care not to damage the cup seal **12**.

10. Repeat procedure 5.10.4.6, steps 6 through 9, for side B.
11. Set the compressor body on its feet.

5.10.4.7 Eccentric and Piston Alignment—2650 Thomas Compressor

Figure 6-16: 2650 Thomas Compressor

1. Position sleeves **13** in the center of the housing wells.
2. Inspect O-rings **9** for cuts and tears. Ensure the O-rings are properly seated in the valve plate grooves.
3. Inspect the head gaskets **3** for cuts and tears and ensure they are properly seated in the valve plates.
4. Position both valve plates **4** over the pistons, O-ring **9** side down, so the exhaust leaf valves are positioned nearest to the harness side of the compressor.
5. Place both valve plates **4** on the housing wells to engage the edge of the sleeves **13**, so that the eight mounting holes are aligned with those in the housings.
6. Place the compressor heads over the valve plates, aligning the four holes in each side of the compressor heads with the valve plates and housings.
7. Insert the eight compressor head screws **1** into the valve plate holes and tighten all the compressor head screws **1** to 40 lbf · in (4.52 N · m) using a torque wrench in a crisscross pattern (Figure 9-11).
8. With both valve plates assembled, spin the motor shaft **22** several turns.
9. Turn the motor shaft **22** until the eccentric set screw **19** is visible through the bottom access port.
10. Tighten the set screw **19** to 55 lbf · in (6.21 N · m) using a torque wrench, but do not allow the eccentric **20** to move on the shaft **22**.
11. Press fan A **21** onto housing well A shaft. Align the flat in the fan hole with the flat on the shaft and face the spring clamp inward.
12. Press fan B **15** onto housing well B shaft. Align the flat in the fan hole with the flat on the shaft and face the spring clamp inward.

CAUTION: Ensure that both fans are securely in place.

5.10.4.8 Installation—2650 Thomas Compressor

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Install the compressor platform assembly by reversing the REMOVAL and DISASSEMBLY procedures.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.11 CAPACITOR

5.11.1 2618 Thomas & 2619 Thomas (Drawing A)

5.11.1.1 Removal—2618 Thomas and 2619 Thomas (Drawing A)

Figure 6-7: 2618 & 2619 Thomas Compressor Assembly
Figure 6-8: 2619 Thomas Compressor Assembly (Drawing A)

1. Open the cabinet, as described in Section 5.1.1.
2. Remove the compressor platform assembly. Perform the REMOVAL procedure, 5.9.1.1, steps 1 through 5.

WARNING

Hazardous voltage can shock, burn, or cause death. To prevent the possibility of an electrical shock or damage to the concentrator, disconnect the power cord from the power supply before opening the concentrator cabinet and discharge the capacitor by shorting its terminals with an insulated-handle screwdriver.

NOTE: See Capacitor Chart for part numbers.

Capacitor Chart

PART NUMBER	µF	CONCENTRATOR MODEL	COMPRESSOR	MOTOR NUMBER
492989	7	492a (120V, 60 Hz)	Thomas	608546
492989	7	590 (120V, 60 Hz)	Thomas (Standard)	608208
493530	15	590 (120V, 60 Hz)	Thomas (High Efficiency)	608729
493530	15	590 (120V, 60 Hz)	2639 Thomas	608932
493530	15	590 (120V, 60 Hz)	2650 Thomas	600087
493530	15	590 (120V, 60 Hz)	2650 Thomas, 17mm	608970
493621	7.5	590 (120V, 60 Hz)	Gast	7124-1199

3. Detach the two connectors **20** from the capacitor terminals.

4. Cut the two straps **19** and remove the capacitor **18** from the compressor platform.

5.11.1.2 Installation—2618 Thomas & 2619 Thomas (Drawing A)

Figure 6-7: 2618 & 2619 Thomas Compressor Assembly
Figure 6-8: 2619 Thomas Compressor Assembly (Drawing A)

1. Attach the capacitor **18** to the underside of the platform assembly with two new straps **19.**
2. Attach the two connectors **20** to the capacitor terminals.

NOTE: The capacitor is not a polarity-sensitive component. Connect either wire to either terminal.

3. Install the compressor platform assembly as described in Section 5.9.3.3.
4. Close the cabinet, as described in Section 5.1.2.
5. Verify the performance of the system (Section 3) before using the concentrator.

5.11.2 2619 Thomas (Drawing B), 2639 Thomas, & Gast

5.11.2.1 Removal—2619 Thomas (Drawing B), 2639 Thomas, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. Open the cabinet, as described in Section 5.1.1.
2. Remove the compressor platform assembly. Perform the REMOVAL procedure, 5.9.3.1, steps 1 through 5.

WARNING

Hazardous voltage can shock, burn, or cause death. To prevent the possibility of an electrical shock or damage to the concentrator, disconnect the power cord from the power supply before opening the concentrator cabinet and discharge the capacitor by shorting its terminals with an insulated-handle screwdriver.

NOTE: See Capacitor Chart for part numbers.

Capacitor Chart

PART NUMBER	µF	CONCENTRATOR MODEL	COMPRESSOR	MOTOR NUMBER
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493530	15	590 (120V, 60 Hz)	Thomas (High Efficiency)	608729
493530	15	590 (120V, 60 Hz)	2639 Thomas	608932
493530	15	590 (120V, 60 Hz)	2650 Thomas	600087
493530	15	590 (120V, 60 Hz)	2650 Thomas, 17mm	608970
493621	7.5	590 (120V, 60 Hz)	Gast	7124-1199

3. Detach the two connectors **22** from the capacitor terminals.
4. Cut the two straps **21** and remove the capacitor **20** from the compressor platform.

5.11.2.2 Installation—2619 Thomas (Drawing B), 2639 Thomas, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. Attach the capacitor **20** to the underside of the platform assembly with two new straps **21**.
2. Attach the two connectors **22** to the capacitor terminals.

NOTE: The capacitor is not a polarity-sensitive component. Connect either wire to either terminal.

3. Install the compressor platform assembly. (See Section 5.9.3.4.)
4. Close the cabinet, as described in Section 5.1.2.
5. Verify the performance of the system (Section 3) before using the concentrator.

5.11.3 2650 Thomas Compressor

5.11.3.1 Removal—2650 Thomas

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Open the cabinet, as described in Section 5.1.1.
2. Remove the compressor platform assembly. Perform the REMOVAL procedure, 5.9.4.1, steps 1 through 5.
3. Detach the two connectors **27** from the capacitor terminals.

4. Cut the two straps **26** and remove the capacitor **25** from the compressor platform.

5.11.3.2 Installation—2650 Thomas

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Attach the capacitor **25** to the underside of the platform assembly with two new straps **26.**
2. Attach the two connectors **27** to the capacitor terminals.

NOTE: The capacitor is not a polarity-sensitive component. Connect either wire to either terminal.

3. Install the compressor platform assembly (Section 5.9.4.4).
4. Close the cabinet, as described in Section 5.1.2.
5. Verify the performance of the system (Section 3) before using the concentrator.

5.12 COOLING FAN

5.12.1 2618 Thomas Compressor Assembly

5.12.1.1 Removal—2618 Thomas

Figure 6-7: 2618 & 2619 Thomas Compressor Platform Assembly

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two connectors **24** from the cooling fan terminals.
3. Remove the two screws **4** which attach the cooling fan to the compressor platform assembly.
4. Remove the cooling fan **23** by sliding the fan toward the front of the compressor platform assembly. The rear of the cooling fan is retained by clips that are molded into the platform.

5.12.1.2 Installation—2618 Thomas

Figure 6-7: 2618 & 2619 Thomas Compressor Platform Assembly

1. Position the fan **23** with the flow arrow pointing downward and the blades pointing upward.
2. Slide the rear of the fan into the two clips on the compressor platform.
3. Install the two screws **4** into the cooling fan and then the compressor platform assembly and tighten them.

4. Attach the two connectors **24** to the cooling fan terminals.
5. Verify that the cooling fan **23** operates correctly.

NOTE: The cooling fan is not a polarity-sensitive component. Connect either wire to either terminal.

6. Close the cabinet, as described in Section 5.1.2.
7. Verify the performance of the system (Section 3) before using the concentrator.

5.12.2 2619 Thomas Compressor Assembly (Drawing A)

5.12.2.1 Removal—2619 Thomas (Drawing A)

Figure 6-8: 2619 Thomas Compressor Platform Assembly (Drawing A)

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two connectors **30** from the cooling fan terminals.

NOTE: On units manufactured after March 13, 1996, observe the new position of the attaching leads.

3. Remove the two screws **4** that attach the cooling fan to the compressor platform assembly.
4. Remove the cooling fan **29** by sliding the fan toward the front of the compressor platform assembly. The rear of the cooling fan is retained by clips which are molded into the platform.

5.12.2.2 Installation—2619 Thomas (Drawing A)

Figure 6-8: 2619 Thomas Compressor Platform Assembly (Drawing A)

1. Position the fan **29** with the flow arrow pointing downward and the blades pointing upward.
2. Slide the rear of the fan into the two clips on the compressor platform.
3. Install the two screws **4** into the cooling fan and then the compressor platform assembly and tighten them.
4. Attach the two connectors **30** to the cooling fan terminals.

NOTE: On units manufactured after March 13, 1996, observe the new position of the attaching leads.

5. Verify that the cooling fan **29** operates correctly.

NOTE: The cooling fan is not a polarity-sensitive component. Connect either wire to either terminal.

6. Close the cabinet, as described in Section 5.1.2.
7. Verify the performance of the system (Section 3) before using the concentrator.

5.12.3 2619 Thomas (Drawing B), 2639 Thomas, & Gast Compressor Assemblies

5.12.3.1 Removal—2619 Thomas (Drawing B), 2639, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two connectors **32** from the cooling fan terminals.

NOTE: On units manufactured after March 13, 1996, observe the new position of the attaching leads.

3. Remove the two screws **4** which attach the cooling fan to the compressor platform assembly.
4. Remove the cooling fan **31** by sliding the fan toward the front of the compressor platform assembly. The rear of the cooling fan is retained by clips that are molded into the platform.

5.12.3.2 Installation—2619 Thomas (Drawing B), 2639, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. Position the fan **31** with the flow arrow pointing downward and the blades pointing upward.
2. Slide the rear of the fan into the two clips on the compressor platform.
3. Install the two screws **4** into the cooling fan and then the compressor platform assembly and tighten them.
4. Attach the two connectors **32** to the cooling fan terminals.

NOTE: On units manufactured after March 13, 1996, observe the new position of the attaching leads.

5. Verify that the cooling fan **31** operates correctly.

NOTE: The cooling fan is not a polarity-sensitive component. Connect either wire to either terminal.

6. Close the cabinet, as described in Section 5.1.2.
7. Verify the performance of the system (Section 3) before using the concentrator.

5.12.4 2650 Thomas Compressor

5.12.4.1 Removal—2650 Thomas

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two connectors **10** from the cooling fan terminals.
3. Remove the two screws **8** which attach the cooling fan to the compressor platform assembly.
4. Remove the cooling fan **9** by sliding the fan toward the front of the compressor platform assembly. The rear of the cooling fan is retained by clips which are molded into the platform.

5.12.4.2 Installation—2650 Thomas

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Position the fan **9** with the flow directional arrow pointing downward and the blades pointing upward.
2. Slide the rear of the fan into the two clips on the compressor platform.
3. Install the two screws **8** into the cooling fan and then the compressor platform assembly and tighten.
4. Attach the two connectors **10** to the cooling fan terminals.
5. Verify that the cooling fan **9** operates correctly.

NOTE: The cooling fan is not a polarity-sensitive component.Connect either wire to either terminal.

6. Close the cabinet, as described in Section 5.1.2.
7. Verify the performance of the system (Section 3) before using the concentrator.

5.13 PRESSURE SWITCH

5.13.1 Left Cabinet Interior (with Threaded Rod Sieve Canisters)

5.13.1.1 Removal

Figure 6-2a: Left Cabinet Interior (with Threaded Rod Sieve Canisters)

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two connectors from the pressure switch terminals.
3. Using a 7/16 in. (11 mm) open-end wrench, remove the pressure switch **21** from the product canister **14**.

5.13.1.2 Installation

Figure 6-2a: Left Cabinet Interior (with Threaded Rod Sieve Canisters)

NOTE: Do not use LOX 8 thread sealant or Teflon tape on O-ring style fittings.

CAUTION: Begin applying Teflon tape one thread from the end of the fitting.

1. Apply a small amount of LOX 8 thread sealant or Teflon tape to the pressure switch **21** thread. Distribute the sealant around the entire fitting. Do not allow the sealant to enter the pressure switch interior.
2. Install the pressure switch **21** into the product canister **14** so that the terminals are toward the top of the concentrator.
3. Using a wrench, tighten the pressure switch **21**, taking care not to over-tighten.
4. Attach the two connectors to the pressure switch terminals.

5.13.1.3 Setting

Figure 6-2a: Left Cabinet Interior (with Threaded Rod Sieve Canisters)

1. The pressure switch **21** is factory preset at 4 psi ±0.2 psi (27.6 kPa ±1.38 kPa). Verify the current setting.

   If incorrect, turn the adjustment screw on the face of the switch with a small screwdriver and retest the pressure switch. If the switch will not hold a setting, replace it.

   NOTE: The pressure switch is not a polarity-sensitive component. Connect either to either terminal.

2. Close the cabinet, as described in Section 5.1.2.

3. Verify the performance of the system (Section 3) before using the concentrator.

5.13.2 Left Cabinet Interior (with Non-O-Ring Fittings)

5.13.2.1 Removal

Figure 6-3a: Left Cabinet Interior (with Non-O-Ring Fittings)

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two connectors from the pressure switch terminals.
3. Using a 7/16 in. (11 mm) open-end wrench, remove the pressure switch **21** from the product canister **22**.

5.13.2.2 Installation

Figure 6-3a: Left Cabinet Interior (with Non-O-Ring Fittings)

NOTE: Do not use LOX 8 thread sealant or Teflon tape on O-ring style fittings.

CAUTION: Begin applying Teflon tape one thread from the end of the fitting.

1. Apply a small amount of LOX 8 thread sealant or Teflon tape to the pressure switch **21** thread. Distribute the sealant around the entire fitting. Do not allow the sealant to enter the interior of the pressure switch.
2. Install the pressure switch **21** into the product canister **22** so that the terminals are toward the top of the concentrator.
3. Using a wrench, tighten the pressure switch **21**, taking care not to over-tighten.
4. Attach the two connectors to the pressure switch terminals.

5.13.2.3 Setting

Figure 6-3a: Left Cabinet Interior (with Non-O-Ring Fittings)

1. The pressure switch **21** is factory preset at 4 psi ±0.2 psi (27.6 kPa ±1.38 kPa). Verify the current setting.

   If incorrect, turn the adjustment screw on the face of the switch with a small screwdriver and retest the pressure switch. If the switch will not hold a setting, replace it.

NOTE: The pressure switch is not a polarity-sensitive component. Connect either wire to either terminal.

2. Close the cabinet, as described in Section 5.1.2.
3. Verify the performance of the system (Section 3) before using the concentrator.

5.13.3 Left Cabinet Interior (with O-Ring Fittings)

5.13.3.1 Removal

Figure 6-4a: Left Cabinet Interior (with O-Ring Fittings)

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two connectors from the pressure switch terminals.
3. Using a 11/16 in. (17 mm) wrench, hold the pressure switch fitting **22** while removing the pressure switch **25** from the product canister **30** with a 7/16 in. (11 mm) open-end wrench.

5.13.3.2 Installation

Figure 6-4a: Left Cabinet Interior (with O-Ring Fittings)

NOTE: Do not use LOX 8 thread sealant or Teflon tape on O-ring style fittings.

CAUTION: Begin applying Teflon tape one thread from the end of the fitting.

1. Apply a small amount of LOX 8 thread sealant or Teflon tape to the pressure switch **25** thread. Distribute the sealant around the entire fitting. Do not allow the sealant to enter the interior of the pressure switch.
2. Install the pressure switch **25** into the product canister **30**.
3. Using a wrench, tighten the pressure switch **25**, taking care not to over-tighten.
4. Attach the two connectors to the pressure switch terminals.

5.13.3.3 Setting

Figure 6-4a: Left Cabinet Interior (with O-Ring Fittings)

1. The pressure switch **25** is factory preset at 4 psi ±0.2 psi (27.6 kPa ±1.38 kPa). Verify the current setting.

If incorrect, turn the adjustment screw on the face of the switch with a small screwdriver and retest the pressure switch. If the switch will not hold a setting, replace it.

NOTE: The pressure switch is not a polarity-sensitive component. Connect either wire to either terminal.

2. Close the cabinet, as described in Section 5.1.2.
3. Verify the performance of the system (Section 3) before using the concentrator.

5.14 PRESSURE REGULATOR

5.14.1 Removal

Figure 6-4a: Left Cabinet Interior

1. Open the cabinet, as described in Section 5.1.1.
2. Disconnect the vacuum check valve **17** and tubing **16** from the pressure regulator connector.
3. Disconnect the product gas tubing **11** from the pressure regulator connector.
4. Turn the pressure regulator **15** counterclockwise at the fitting assembly until the regulator and fitting are removed from the product canister **30**.

5.14.2 Disassembly

Figure 6-18: Pressure Regulator

1. Hold the regulator body **9** firmly in one hand and unscrew the bonnet assembly **1**.

CAUTION: To prevent damage to the regulator plastic seat 5, remove the seat carefully from the body of the regulator using a ⅜ in. (9.52 mm) flat-blade screwdriver.

NOTE: During disassembly, it is not necessary to remove the fitting assembly from the regulator body.

2. Remove the internal parts **2, 3, 4, 5, 6, 7, 8** of the regulator body.

5.14.3 Cleaning

Figure 6-18: Pressure Regulator

WARNING

To prevent personal injury or death, use a face shield and observe standard safety procedures when using a compressed air gun.

1. Using isopropyl alcohol, wipe the cavities of the regulator body **9**, plastic seat **5**, and poppet **7**, using a lint-free cotton swab.
2. Blow dry the regulator body using a compressed air gun.

5.14.4 Reassembly

Figure 6-18: Pressure Regulator

CAUTION: To prevent damage to regulator plastic seat 5, install the seat carefully into the body and lightly tighten with a 3/8 in. (9.52 mm) flat-blade screwdriver. Torque to 5 lbf · in ±1 lbf · in (0.56 N · m ±0.11 N · m).

1. Replace the internal parts **2, 3, 4, 5, 6, 7, 8** in the regulator body **9.**
2. Screw the bonnet assembly **1** onto the regulator body **9,** taking care not to over-tighten.

5.14.5 Installation

Figure 6-4a: Left Cabinet Interior

NOTE: If installing a replacement regulator, reuse the fitting assembly from the faulty regulator. Remove the assembly and clean any debris from the threads. Apply a small amount of LOX 8 thread sealant or Teflon tape to the replacement regulator and fitting assembly threads. Distribute the sealant around the entire fitting. Do not allow sealant to enter the interior of the regulator. Do not over-tighten.

NOTE: Do not use LOX 8 thread sealant or Teflon tape on O-ring style fittings.

CAUTION: Begin applying Teflon tape one thread from the end of the fitting.

1. With the regulator correctly positioned, install the pressure regulator **15** into the product canister **30,** taking care not to cross the threads.
2. Connect the product gas tubing **11** to the pressure regulator.
3. Connect the vacuum check valve **17** and tube **16** to the pressure regulator **15.**

5.14.6 Testing

Figure 6-23: Non-OCI PCB and Control Panel

WARNING

Some of the following procedures require AC power application when testing. Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

1. Connect the AC power cord to an AC outlet.
2. Set the POWER Switch **6** to the ON position.
3. Adjust the flow on the flowmeter **3** to 5 L/min.

   If you are installing a new regulator, turn the regulator adjustment knob several turns clockwise to achieve an outlet pressure.

NOTE: Allow the concentrator to run for approximately 30 minutes until it stabilizes before proceeding with the test.

4. Connect the test pressure gauge to the oxygen outlet spout (Figure 6-6, item **18** or **32**).
5. Perform subsection 3.3.2, steps 21 through 25.
6. Verify that the pressure reading on the test pressure gauge is 5 psi ±0.5 psi (34.5 kPa ±3.5 kPa).

5.14.7 Adjustment

Figure 6-18: Pressure Regulator

1. On units manufactured before Sept. 3, 1996, cut and remove strap.
2. Pull the lock ring **14** up against the adjustment knob **15**.

NOTE: To prevent pressure trapping between the pressure regulator and the test pressure gauge, adjust the regulator in small increments and release the product gas at the pressure gauge between each adjustment.

3. Adjust to obtain a test pressure gauge reading of 5 psi ±0.5 psi (34.5 kPa ±3.5 kPa).
4. Push down the lock ring **14** to lock it in position.
5. Set the POWER Switch (Figure 6-23, item **6**) to the OFF position.
6. Disconnect the power cord from the wall outlet.
7. Disconnect the test pressure gauge.
8. Close the cabinet, as described in Section 5.1.2.

9. Verify the performance of the system (Section 3) before using the concentrator.

5.15 SOLENOID

NOTE: When replacing a solenoid, verify whether the replacement solenoid should be 5V or 24V.

5.15.1 Disconnecting

Figure 6-4b: Left Cabinet Interior

1. Open the cabinet, as described in Section 5.1.1.
2. Detach the two connectors from the solenoid terminals **46, 61.**

5.15.2 Electrical Testing

Figure 6-4b: Left Cabinet Interior

1. Verify that the concentrator is not attached to the wall outlet and the POWER switch is in the OFF position.
2. Using a digital multimeter, verify that the resistance between the 24V solenoid terminals **46, 61** is approximately 850 ohms.

NOTE: On units equipped with Control/OCI PCB with Removable Sensor, verify that the resistance between the 5V solenoid terminals is approximately 30 ohms to 70 ohms.

3. Reattach the two connectors to the solenoid terminals **46, 61.**

NOTE: The solenoid valve is not a polarity-sensitive component. Connect either wire to either terminal.

5.15.3 Pneumatic Test

Figure 6-4b: Left Cabinet Interior

WARNING

Some of the following procedures require AC power application when testing. Hazardous voltage can shock, burn, or cause death. The compressor and other internal components are not grounded. Follow electrical testing safety procedures.

1. Connect the AC power cord to the AC outlet.
2. Set the POWER Switch (Figure 6-23, item **6**) to the ON position.
3. Lightly apply a finger to the top exhaust port of the solenoid. There should be a slight puff of air escaping as the valve operates.

4. Verify that the solenoid valve **46, 61** correctly actuates the pilot valve **54, 62** by observing the presence of appropriate supply, exhaust, or balance gas flows. Perform Section 3.3.2, steps 6 through 13, for correct cycling.

CAUTION: Never apply leak detection fluid into the top exhaust port of the solenoid valves.

5. Leak test the solenoid gasket joints and threaded connection by applying a conservative amount of leak detection solution.
6. Set the POWER Switch (Figure 6-23, item **6**) to the OFF position.
7. Remove the AC power cord from the AC outlet.

5.15.4 Removal

Figure 6-4a and 6-4b: Left Cabinet Interior

1. Mark the small pilot air tubing **39 c** or **e** for correct replacement location and then remove the tubing from the solenoid brass connectors.
2. Remove the snap ring (Figure 6-21, item **1**) from the pilot valve (Figure 6-21, item **6**) and remove the solenoid valve **46, 61** with the top pilot valve cap attached to the solenoid.

5.15.5 Installation

Figure 6-4b: Left Cabinet Interior

NOTE: Do not use LOX 8 thread sealant or Teflon tape on O-ring style fittings.

1. Correctly position the solenoid's electrical terminals while installing the replacement solenoid valve **46, 61** onto the pilot valve **54, 62.**
2. Attach the two connectors to the valve terminals of the replacement solenoid valve.

NOTE: The solenoid valve is not a polarity-sensitive component. Connect either wire to either terminal.

3. Leak test the threaded connection of the solenoid valve **46, 61** by applying a conservative amount of leak detection solution.
4. Close the cabinet, as described in Section 5.1.2.
5. Verify the performance of the system (Section 3) before using the concentrator.

5.16 SIEVE CANISTER ASSEMBLY

5.16.1 Removal

Figure 6-4a and 6-4b: Left Cabinet Interior

NOTE: Replacement of sieve canisters is not a normal maintenance procedure. Sieve canisters should only be replaced when all other efforts to achieve factory specified oxygen levels have been exhausted. Consult your authorized Mallinckrodt repair facility before proceeding.

NOTE: When replacing or retrofitting sieve canisters, refer to Figure 6-2, 6-3, and 6-4 to verify sieve bed configuration as Threaded Rod, Impact Non-O-ring, or O-ring. Refer to Figure 6-5 and Parts List Section 6.3.7 for correct part numbers for replacement and retrofit sieve canisters.

1. Open the cabinet, as described in Section 5.1.1.

CAUTION: The following service procedure requires the removal of fittings or components which will expose the sieve canister's internal sieve material to room air. Ensure that this material is not exposed to room air for long periods of time (such as overnight). Whenever possible, plug open ports and fittings to prevent sieve contamination.

2. On units manufactured before Aug. 26, 1993, cut and remove the two straps (Figure 6-2b, item **56**) which hold the balance valve (Figure 6-2b, item **51**) in place. On units manufactured after Aug. 26, 1993 and before June 20, 1996, remove the balance valve holder **63** and the balance valve tube holder **64**. On units manufactured after June 20, 1996, remove the balance valve holder **63**.
3. Loosen and disconnect the two compression nuts **52** (connected to the plastic elbows **29** on the bottom of the sieve canisters **31**) from the plastic elbows.
4. Disconnect the product gas tubing **26** from the center port of the brass tee **58**.
5. Disconnect the pilot air tubing **35** from the brass fitting **42** of the balance solenoid valve **61**.
6. Remove the balance pilot valve **62** (including attached fitting and components) from the concentrator cabinet and set it aside.
7. Remove the canister insulation **70** from the concentrator's interior.
8. Remove the 1/16 in. (1.58 mm) pilot air tubing **39 c, e** from both brass connectors **42** of the supply solenoid valve **46** and remove the 1/16 in. (1.58 mm) pilot air tubing from both exhaust pilot valves **55**.
9. Loosen the six plastic compression nuts **27, 52** (connected to the elbows and tees of the four pilot valves) and disconnect the plastic tubing from the pilot valve's elbows **29** and tee **53**.
10. Remove the two screws **37** and canister clamp **36** for each sieve canister **31**.

11. Remove the sieve canister **31** by pulling the top of the canister away from the cabinet interior and sliding the canister toward the top of the concentrator. (See Figure 5-2).

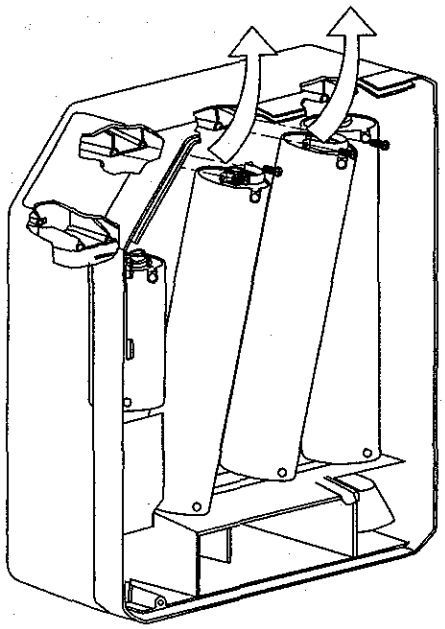


Figure 5-2: Sieve Canister Removal

NOTE: For this procedure you do not have to separate each sieve canister's solenoid valve, exhaust pilot valve, and supply pilot valve from each other. You may remove these components from each sieve canister as an assembly, thereby reducing the possibility of creating system leaks.

CAUTION: When removing the solenoid and pilot valves from the sieve canister, do not apply force to the solenoid body. Remove this assembly as described below.

12. Remove the solenoid, exhaust pilot, and supply pilot valves as one assembly from each sieve canister by turning the nut **40** counterclockwise with a 11⁄16 in. (17.5 mm) wrench. Then, using a ½ in. (12.7 mm) open-end wrench, remove the entire valve assembly from the sieve bed.

13. Remove the two plastic elbows **29** connected to the bottom of each sieve canister **31**.

NOTE: Do not use LOX 8 thread sealant or Teflon tape on O-ring style fittings.

CAUTION: When applying LOX 8 thread sealant to a fitting, do not allow the sealant to enter the fitting.

CAUTION: Begin applying Teflon tape one thread from the end of the fitting.

5.16.2 Reassembly and Replacement

Figure 6-4a and 6-4b: Left Cabinet Interior

1. If retrofitting Threaded Rod sieve canisters with Impact Non-O-ring sieve canisters, see the instructions which are included with the Retrofit Kit, part number 493815 (4 L/min) or 493817 (5 L/min).
2. If replacing Impact Non-O-ring or O-ring sieve canisters, reverse the REMOVAL instructions Section 5.16.1, steps 1 through 13.
3. Close the cabinet, as described in Section 5.1.2.
4. Verify the performance of the system (Section 3) before using the concentrator.

5.17 PILOT VALVE

5.17.1 Disassembly

Figure 6-4a and 6-4b: Left Cabinet Interior

1. Open the cabinet, as described in Section 5.1.1.

CAUTION: If the pilot valve remains disassembled for extended lengths of time (for example, longer than necessary to perform service), seal the valve openings to prevent contamination of the sieve material.

NOTE: If replacing the pilot valve and you also need to replace the pilot air tubing, refer to Figure 6-2, 6-3, and 6-4 to verify the sieve bed configuration as Threaded Rod, Impact Non-O-ring, or O-ring. Pilot air tubing for Threaded Rod sieve canister configuration is 6 in. (152.4 mm) long. Pilot air tubing for Impact Non-O-ring and O-ring configurations is 16 in. (406.4 mm) long.

2. If disassembling the supply **54** or balance pilot **62** valves, remove the connector wires and pilot air tubing **33, 35** from the solenoid valve **46, 61** and remove the solenoid from the pilot valve **54, 62.** Refer to solenoid valve REMOVAL and INSTALLATION procedures when necessary.

Figure 6-21: Pilot Valve

3. Carefully remove the snap ring **1** from the end cap **2** with a 90° tip snap-ring pliers.
4. Remove the end cap **2** slowly and then carefully pull the spring **3** out (for exhaust pilot valves only).
5. Peel the edge of the slotted diaphragm **4** away from the valve body **6,** and pull it off of the poppet **5.**
6. Carefully remove the snap ring **1** from the port cap **9.**
7. Pull the port cap **9** carefully away from the valve body **6.**

8. Push the poppet **5**, with the solid diaphragm **8** attached, out of the pilot valve body **6**.
9. Remove the support washer **7** from the valve body **6**.

5.17.2 Cleaning

Figure 6-21: Pilot Valve

WARNING

To prevent personal injury or death, use a face shield and observe standard safety procedures when using a compressed air gun.

1. Using a lint-free cotton swab, apply isopropyl alcohol to the cavities and seating surfaces of the pilot valve body **6**. Blow the pilot valve body dry using a compressed air gun.
2. Using a lint-free cotton swab, apply isopropyl alcohol to the two diaphragms **4, 8**. Blow the two diaphragms dry using a compressed air gun.

5.17.3 Inspection

Figure 6-21: Pilot Valve

1. Hold the two diaphragms **4, 8** up to the light and stretch them to check for cuts, holes, and cracks, especially at the seating surfaces. If either is defective, replace both diaphragms with item **10**, Section 6.3.23.
2. Inspect the pilot valve body **6** for corrosion or damaged seat area. If it is defective, replace the entire component.

5.17.4 Reassembly

Figure 6-21: Pilot Valve

CAUTION: To prevent damage to the concentrator, ensure that all parts remain clean during the reassembly procedures.

1. Place the support washer **7** into the port cap side of the body, with the concave end facing inward (Figure 5-3).

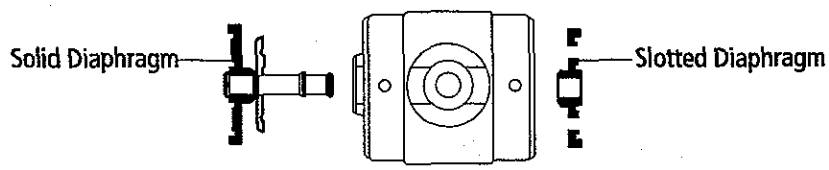


Figure 5-3: Pilot Valve

2. Place the poppet **5**, with the solid diaphragm **8** attached, into the port cap side and push inward until the diaphragm meets the support washer **7**.

3. Place the slotted diaphragm **4** into the end cap side of the body with the seating surface facing inward.
4. Hold the poppet **5** steady at the port cap side and at the end cap side. Press the seating surface around the poppet flange until the flange is visible as shown below (Figure 5-4).

Figure 5-4: Pilot Valve, Flange Placement

5. For exhaust pilot valves only, install the spring **3** into the cavity of the poppet **5** on the slotted diaphragm side of the pilot valve.
6. Install the end cap **2** over the slotted diaphragm **4** and secure it with a snap ring **1**. Ensure that the snap ring is pressed into the valve body **6** groove with the ring's sharp edge facing outward.
7. Install the port cap **9** over the solid diaphragm **8** and secure it with the snap ring **1**. Ensure that the snap ring **1** is pressed into the valve body **6** groove with the ring's sharp edge facing outward

NOTE: Do not use LOX 8 thread sealant or Teflon tape on O-ring style fittings.

CAUTION: Begin applying Teflon tape one thread from the end of the fitting.

8. If removing the solenoid from the top port cap **9**, clean any sealant that might remain on the solenoid threads. Add a small amount of LOX 8 thread sealant or Teflon tape to the threads of the solenoids. Evenly distribute the sealant around the entire solenoid fitting without allowing any sealant to enter the interior of the solenoid. Reinstall each solenoid and reconnect the appropriate terminal wires.

NOTE: The solenoid is not a polarity-sensitive device. Connect either wire of the appropriate wire pair to either solenoid terminal.

9. Close the cabinet, as described in Section 5.1.2.
10. Verify the performance of the system (Section 3) before using the concentrator.

5.18 RESTRICTOR TUBE ASSEMBLIES

5.18.1 Removal

Figure 6-4a and 6-4b: Left Cabinet Interior

1. Open the cabinet, as described in Section 5.1.1.

CAUTION: If removing the restrictor tubes for extended lengths of time (that is, longer than necessary to perform service), seal the open legs of the tees connected to the balance pilot valve to prevent contamination of the sieve material.

NOTE: If replacing parts for restrictor tube assemblies, and you also need to replace the nylon tee, refer to Figure 6-2, 6-3, and 6-4 to verify the sieve bed configuration as Threaded Rod, Impact Non-O-ring, or O-ring. Nylon tees and O-rings for O-ring sieve canister configurations are part numbers 493608 and 493591. Nylon tees for Impact Non-O-ring and Threaded Rod configurations are part number 492874.

2. Remove the oxygen tube **26** from the center leg of the brass tee **58.**
3. Loosen and remove the two plastic compression nuts **27** (attached to the bottom of the restrictor tubes) from the balance pilot valve's two nylon tees **53.**
4. Loosen the clamps **57** attached to each restrictor tube **59** at the brass tee **58.** Remove the restrictor tubes **59.**
5. Remove the two restrictors **28** and plastic compression nuts **27** from the restrictor tubes.

5.18.2 Installation

Figure 6-4a and 6-4b: Left Cabinet Interior

1. Attach the plastic compression nuts **27** to the replacement restrictor tube assemblies and then insert the restrictors **28.**
2. Reinstall the restrictor tube assemblies onto the balance valve tees **53.** Reconnect and hand tighten the plastic compression nuts **27.** Reconnect oxygen tubing **26** to the center leg of the brass tee **58** with new clamps **57.**
3. Locate the small pilot air tubing **35** which leads to the brass nipple **42** on the balance solenoid valve **61.** Disconnect it from the balance solenoid valve.
4. Tee in the 1/16 in. (1.58 mm) i.d. tubing from the pneumatic test kit.
5. Set the selector switch on the test kit to the left (this indicates reservoir canister pressure).
6. Set the POWER Switch (Figure 6-23, item **6**) to the ON position.
7. Set the flowmeter (Figure 6-23, item **3**) to the maximum L/min indicated on its scale and allow the concentrator to run for approximately 10 minutes.

NOTE: If the needle on the gauge reaches 30 psi (207 kPa), set the POWER Switch to the OFF position and refer to the Troubleshooting Instructions.

8. Verify that the pressure in the reservoir canister **32** slowly increases from 15 psi ±3.0 psi (103.5 kPa ±20.7 kPa) (drop point) to 20 psi ±3.0 psi (138 kPa ±20.7 kPa) (fill) and then rapidly climbs to 28 psi ±3.0 psi (193 kPa ±20.7 kPa) (kick). After the kick, the pressure should fall back to the drop point and the cycle repeats.
9. Record all three pressures (drop point, fill, and kick) on two consecutive cycles. Record the drop point pressures to an accuracy of 0.2 psi (1.38 kPa) only.
10. Verify that the balance (the difference of pressure) at the drop point on two consecutive cycles is not greater than 0.4 psi (2.75 kPa).
11. If the balance is greater than 0.4 psi (2.75 kPa), balance the orifices as described in Section 3.3.3.
12. Close the cabinet, as described in Section 5.1.2.
13. Verify the performance of the system (Section 3) before using the concentrator.

5.19 OUTLET GAS FILTER

5.19.1 Removal

Figure 6-23: Non-OCI PCB and Control Panel

1. Open the cabinet, as described in Section 5.1.1.
2. Cut the oxygen tubing **12, 14** flush with the inlet and outlet of the outlet gas filter **13** and discard the outlet gas filter.

5.19.2 Installation

Figure 6-23: Non-OCI PCB and Control Panel

1. Install the replacement outlet gas filter **13** between the oxygen tubes **12, 14**. If flow arrows are present on the replacement outlet gas filter, point the arrow toward the oxygen tube which is connected to the flowmeter inlet. Outlet gas filters without arrows may be installed in either direction.
2. Close the cabinet, as described in Section 5.1.2.
3. Verify the performance of the system (Section 3) before using the concentrator.

5.20 SHOCK MOUNTS

5.20.1 2618 Thomas Compressor Assembly

5.20.1.1 Removal—2618 & 2619 Thomas Compressor Assembly

NOTE: Companion 492a and 590 models manufactured before July 6, 1994, may be replaced with rubber mounts or retrofitted with Spring Shock Mount Kit part number 493934. See Figure 6-22, Revision C and parts list Section 6.3.24, Revision C.

1. Remove the compressor platform assembly. Perform REMOVAL and DISASSEMBLY procedures 5.9.1.1, Steps 1 through 5 and 5.9.1.2, Steps 1 through 6.

5.20.1.2 Disassembly—2618 & 2619 Thomas Compressor Assembly

Figure 6-7: 2618 & 2619 Thomas Compressor Platform Assembly

1. Using a ⅛ in. (3.17 mm) drill bit, drill out the center of the sixteen ⅛ in. (3.17 mm) rivets **7**. Remove and discard the rivets.
2. Remove the four shock mounts **9** from the compressor platform and discard.

5.20.1.3 Reassembly—2618 & 2619 Thomas Compressor Assembly

Figure 6-7: 2618 & 2619 Thomas Compressor Platform Assembly

1. Place the four replacement shock mounts **9** on the compressor platform **10**. Align the rivet holes of the shock mounts with the rivet holes in the compressor platform.
2. Secure each shock mount to the compressor platform with four ⅛ in. (3.17 mm) rivets **7**.
3. Replace the compressor platform assembly. Perform REASSEMBLY and INSTALLATION procedures 5.9.1.3, Step 1 through 5.9.1.4, Step 2.
4. Verify the performance of the system (Section 3) before using the concentrator.

5.20.2 2619 Thomas Compressor Assembly (Drawing A)

5.20.2.1 Removal—2619 Thomas Compressor Assembly (Drawing A)

1. Remove the compressor platform assembly. Perform REMOVAL and DISASSEMBLY procedures 5.9.2.1, steps 1 through 5, and 5.9.2.2, steps 1 through 6.

5.20.2.2 Replacement of Cup Liners—2619 Thomas Compressor Assembly (Drawing A)

Figure 6-8: 2619 Thomas Compressor Platform Assembly (Drawing A)

1. If the cup liners **24** are damaged, remove the spring **23** and cup liner **24** and discard the damaged cup liner.
2. Place a drop of silicone sealant on the underside of the new cup liner **24.**
3. Insert the spring **23** (wide side down) into the spring cup **22** and place the cup liner **24** on top of the spring **23.** Push down until secure.

5.20.2.3 Replacement of Springs—2619 Thomas Compressor Assembly (Drawing A)

Figure 6-8: 2619 Thomas Compressor Platform Assembly (Drawing A)

1. If any of the springs **23** are damaged, remove all four springs and replace with new springs.
2. Place a drop of silicone sealant on the underside of the cup liner **24.**
3. Insert the spring **23** (wide side down) into the spring cup **22** and place the cup liner **24** on top of the spring **23.** Push down until secure.

5.20.2.4 Replacement of Spring Cups—2619 Thomas Compressor Assembly (Drawing A)

Figure 6-8: 2619 Thomas Compressor Platform Assembly (Drawing A)

1. If the spring cups **22** are damaged, drill out the center of the sixteen ⅛ in. (3.17 mm) rivets **7,** using a ⅛ in. (3.17 mm) drill bit.
2. Remove and discard the rivets. Remove the four spring cups **22** from the compressor platform and discard.
3. Place the four replacement spring cups **22** on the compressor platform **9** with the raised edges facing outward. Align the rivet holes of the spring cups with the rivet holes in the compressor platform.
4. Secure each spring cup to the compressor platform with four ⅛ in. (3.17 mm) rivets **7.**

5.20.2.5 Reassembly—2619 Thomas Compressor Assembly (Drawing A)

Figure 6-8: 2619 Thomas Compressor Platform Assembly (Drawing A)

1. Replace the compressor platform assembly. Perform REASSEMBLY and INSTALLATION procedures 5.9.2.3, Step 1 through 5.9.2.4, Step 2.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.20.3 2619 Thomas (Drawing B), 2639 Thomas, & Gast Compressor Assemblies

NOTE: Companion 492a and 590 models manufactured before July 6, 1994, may be replaced with rubber mounts or retrofitted with Spring Shock Mount Kit part number 493934. See Figure 6-22, Revision C and parts list Section 6.3.24, Revision C.

CAUTION: Rubber motor mounts 15 are not for use with Gast compressors.

5.20.3.1 Removal—2619 Thomas (Drawing B), 2639 Thomas, & Gast

1. Remove the compressor platform assembly. Perform REMOVAL and DISASSEMBLY procedures 5.9.3.1, steps 1 through 5 and 5.9.3.2, steps 1 through 6.

5.20.3.2 Replacement of Cup Liners—2619 Thomas (Drawing B), 2639 Thomas, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. If the cup liners **26** are damaged, remove the spring **25** and cup liner **26** and discard the damaged cup liner.
2. Place a drop of silicone sealant on the underside of the cup liner **26**.
3. Insert the spring **25** (wide side down) into the spring cup **24** and place the cup liner **26** on top of the spring **25**. Push down until secure.

5.20.3.3 Replacement of Springs—2619 Thomas (Drawing B), 2639 Thomas, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. If any of the springs **25** are damaged, remove all four springs and replace with new springs.
2. Place a drop of silicone sealant on the underside of the cup liner **26**.

3. Insert the replacement spring **25** (wide side down) into the spring cup **24** and place the cup liner **26** on top of the spring **25.** Push down until secure.

5.20.3.4 Replacement of Spring Cups—2619 Thomas (Drawing B), 2639 Thomas, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. If the spring cups **24** are damaged, drill out the center of the sixteen ⅛ in. (3.17 mm) rivets **9**, using a ⅛ in. (3.17 mm) drill bit.
2. Remove and discard the rivets **9**. Remove the four spring cups **24** from the compressor platform and discard.
3. Place the four replacement spring cups **24** on the compressor platform **11** with the raised edges facing outward. Align the rivet holes of the spring cups with the rivet holes in the compressor platform.
4. Secure each spring cup to the compressor platform with four ⅛ in. (3.17 mm) rivets **9**.

5.20.3.5 Reassembly—2619 Thomas (Drawing B), 2639 Thomas, & Gast

Figure 6-9: 2619 Thomas Compressor Platform Assembly (Drawing B)
Figure 6-10: 2639 Thomas Compressor Platform Assembly
Figure 6-12: Gast Compressor Platform Assembly

1. Replace the compressor platform assembly. Perform REASSEMBLY and INSTALLATION procedures 5.9.3.3, Step 1 through 5.9.3.4, Step 2.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.20.4 2650 Thomas Compressor

5.20.4.1 Removal—2650 Thomas

1. Remove the compressor platform assembly. Perform REMOVAL and DISASSEMBLY procedures 5.9.4.1, steps 1 through 5, and 5.9.4.2, steps 1 through 7.

5.20.4.2 Replacement of Shock Mounts—2650 Thomas

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. If the compressor mounts **15** are damaged, drill out the center of the sixteen 1/8 in. (3.17 mm) rivets **13**, using a 1/8 in. (3.17 mm) drill bit.
2. Remove and discard the rivets **13**. Remove the four compressor mounts **15** from the compressor platform and discard.
3. Place the four replacement compressor mounts **15** on the compressor platform. Align the rivet holes of the compressor mounts with the rivet holes in the compressor platform.

CAUTION: Rubber motor mounts 15 are not for use with Gast compressors.

4. Secure each compressor mount to the compressor platform with four 1/8 in. (3.17 mm) rivets **13**.

5.20.4.3 Reassembly—2650 Thomas

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Replace the compressor platform assembly. Perform REASSEMBLY and INSTALLATION procedures 5.9.4.3, Step 1, through 5.9.4.4, Step 2.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.21 COMPRESSOR CUP SEAL

5.21.1 2619 & 2639 Thomas Compressor

5.21.1.1 Removal—2619 & 2639 Thomas Compressor

1. Remove the compressor platform assembly. Perform REMOVAL and DISASSEMBLY procedures 5.9.2.1, steps 1 through 5, and 5.9.2.2, steps 1 and 8.

   (2619 Thomas Compressor Assembly, Drawing A)

2. Remove the compressor platform assembly. Perform REMOVAL and DISASSEMBLY procedures 5.9.3.1, steps 1 through 5, and 5.9.3.2, steps 1 and 9.

   (2619 Thomas Compressor Assembly, Drawing B)
   (2639 Thomas Compressor Assembly)

NOTE: Some compressors may require a No. 25 torx-head screwdriver to remove the eight cylinder head screws.

Figure 6-14: 2619 Thomas Compressor

Figure 6-15: 2639 Thomas Compressor

3. Remove the eight cylinder head screws **27** from the cylinder heads **10, 26**.
4. Remove both the cylinder heads **10, 26**, the valve plates **3**, and the connector tubes **1**.
5. Remove and discard the piston sleeves **5**.
6. Remove the four retaining plate screws **6** on each piston to separate the retaining plate **7**, the cup seal **8**, and the piston rod **9**. Discard the cup seals.

5.21.1.2 Reassembly—2619 & 2639 Thomas Compressor

Figure 6-14: 2619 Thomas Compressor
Figure 6-15: 2639 Thomas Compressor

NOTE: An extra piston rod is required to fit the cup seal and retaining plate into the piston sleeve.

1. Place the piston sleeve **5** over the top of the extra piston rod **9** and let it drop to the bottom of the rod.
2. Place a new cup seal **8** onto the top of the extra piston rod **9**. Ensure that the inside diameter of the cup seal **8** fits over the outside diameter of the ridge on the top of the piston rod **9**.
3. Place the retaining plate **7** over the cup seal **8** and the piston rod **9**, lining up the screw holes.
4. Install two of the four screws **6** and hand tighten, to secure the retaining plate **7** and cup seal **8** to the extra piston rod **9**.
5. Pull the piston sleeve **5** up around the cup seal **8** and the retaining plate **7** to form the cup seal.
6. With the piston sleeve **5** in place over the cup seal **8**, remove the two screws **6** and remove the complete assembly from the extra piston rod **9**.
7. Place the piston sleeve **5**, cup seal **8**, and retaining plate **7** assembly on the piston rod **9** in the compressor. Rotate the retaining plate to position the index mark and beveled edges. (See Figure 5-1.)
8. Place LOCTITE 242 in the four screw holes of the piston rod and torque the four screws to 20 lbf · in (2.26 N · m).
9. Repeat steps 1 to 8 for the other piston.
10. Replace the valve plates **3**, cylinder heads **10, 26** and connector tubes **1** by reversing the REMOVAL procedures.

11. Install the eight cylinder head screws **27** and torque them to 30 lbf · in (3.39 N · m) in a crisscross pattern. (See Figure 9-11.)

5.21.1.3 Installation—2619 & 2639 Thomas Compressor

1. Replace the compressor platform assembly. Reverse DISASSEMBLY and REMOVAL procedures 5.9.2.1, steps 1 through 5, and 5.9.2.2, steps 1 and 8.

   (2619 Thomas Compressor Assembly, Drawing A)

2. Replace the compressor platform assembly. Reverse DISASSEMBLY and REMOVAL procedures 5.9.3.1, steps 1 through 5, and 5.9.3.2, steps 1 and 9.

   (2619 Thomas Compressor Assembly, Drawing B)
   (2639 Thomas Compressor Assembly)

3. Verify the performance of the system (Section 3) before using the concentrator.

5.21.2 Gast Compressor

5.21.2.1 Removal—Gast Compressor

Figure 6-17: Gast Compressor

1. Remove the compressor platform assembly. Perform REMOVAL and DISASSEMBLY procedures 5.9.3.1, steps 1 through 5, and 5.9.3.2, steps 1 and 9.
2. Remove the eight cylinder head screws **1** from the cylinder heads **2, 11**.
3. Remove both the cylinder heads **2, 11**, the valve plates **13, 24** and the connector tubes **4**.
4. Remove and discard the piston sleeves **7**.
5. Remove the two retaining plate screws **8** on each piston to separate the retaining plate **9** and the cup seal **10** from the piston rod **20**. Discard the cup seals.

5.21.2.2 Reassembly—Gast Compressor

Figure 6-17: Gast Compressor

NOTE: An extra piston rod is required to fit the cup seal and retaining plate into the piston sleeve.

1. Place the piston sleeve **7** over the top of the extra piston rod **20** and let it drop to the bottom of the rod.

2. Place a new cup seal **10** onto the top of the extra piston rod **20.** Ensure that the inside diameter of the cup seal **10** fits over the outside diameter of the ridge on the top of the piston rod **20.**
3. Place the retaining plate **9** over the cup seal **10** and the piston rod **20,** lining up the screw holes.
4. Install the two screws **8** and hand tighten to secure the retaining plate **9** and cup seal **10** to the extra piston rod **20.**
5. Pull the piston sleeve **7** up around the cup seal **10** and the retaining plate **9** to form the cup seal.
6. With the piston sleeve **7** in place over the cup seal **10,** remove the two screws **8** and remove the complete assembly from the extra piston rod **20.**
7. Place the piston sleeve **7,** cup seal **10,** and retaining plate **9** assembly on the piston rod **20** in the compressor.
8. Place LOCTITE 242 in the two screw holes of the piston rod and torque the two screws to 36 lbf · in (4.07 N · m).
9. Repeat steps 1 to 8 for the other piston.
10. Replace the valve plates **13, 24,** cylinder heads **2, 11** and connector tubes **4.** Reverse the REMOVAL procedures (5.21.2.1).
11. Install the eight cylinder head screws **1** and torque them to 36 lbf · in (4.07 N · m) in a crisscross pattern (Figure 9-11).

5.21.2.3 Installation—Gast Compressor

1. Replace the compressor platform assembly. Reverse DISASSEMBLY and REMOVAL procedures 5.9.3.1, steps 1 through 5, and 5.9.3.2, steps 1 and 9.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.21.3 2650 Thomas Compressor

5.21.3.1 Removal—2650 Thomas Compressor

1. Remove the compressor platform assembly. Perform REMOVAL and DISASSEMBLY procedures 5.9.4.1, steps 1 through 5, and 5.9.4.2, steps 1 and 2.

NOTE: Remove the eight cylinder head screws and retaining plates with a No. 25 torx-head screwdriver.

Figure 6-16: 2650 Thomas Compressor

3. Remove the eight cylinder head screws **1** from the cylinder head **2.**
4. Remove both the cylinder head **2** and the valve plates **4.**
5. Remove and discard the piston sleeves **13.**
6. Remove the retaining plate screw **10** on each piston to separate the retaining plate **10,** the cup seal **12,** and the piston rod **14.** Discard the cup seals.

5.21.3.2 Reassembly—2650 Thomas Compressor

Figure 6-16: 2650 Thomas Compressor

NOTE: An extra piston rod is required to fit the cup seal and retaining plate into the piston sleeve.

1. Place the piston sleeve **13** over the top of the extra piston rod **14** and let it drop to the bottom of the rod.
2. Place a new cup seal **12** onto the top of the extra piston rod **14.** Ensure that the inside diameter of the cup seal **12** fits over the outside diameter of the ridge on the top of the piston rod **14.**
3. Place the retaining plate **11** over the cup seal **12** and the piston rod **14,** lining up the screw hole and indexing key.
4. Install the screw **10** and hand tighten, to secure the retaining plate **11** and cup seal **12** to the extra piston rod **14.**
5. Pull the piston sleeve **13** up around the cup seal **12** and the retaining plate **11** to form the cup seal.
6. With the piston sleeve **13** in place over the cup seal **12,** remove the screw **10** and remove the complete assembly from the extra piston rod **14.**
7. Place the piston sleeve **13,** cup seal **12,** and retaining plate **11** assembly on the piston rod **14** in the compressor. Rotate the retaining plate to position the indexing key (Figure 6-16).
8. Place LOCTITE 242 on the screw threads and torque the screw to 60 lbf · in (6.78 N · m).
9. Repeat steps 1 to 8 for the other piston.
10. Replace the valve plates **4** and cylinder head **2** by reversing the REMOVAL procedures.
11. Install the eight cylinder head screws **1** and torque them to 40 lbf · in (4.52 N · m) in a crisscross pattern (Figure 9-11).

5.21.3.3 Installation—2650 Thomas Compressor

Figure 6-11: 2650 Thomas Compressor Platform Assembly

1. Replace the compressor platform assembly. Reverse DISASSEMBLY and REMOVAL procedures 5.9.4.1, steps 1 through 5, and 5.9.4.2, steps 1 and 2.
2. Verify the performance of the system (Section 3) before using the concentrator.

5.22 OCI PCB

CAUTION: The OCI PCB contains complementary metal oxide semiconductor (CMOS) integrated circuits (ICs), which are ESD-sensitive devices. Take precautions handling the board to prevent static discharge, which could damage board components. To prevent IC damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

5.22.1 Removal

Figure 6-24: Control OCI PCB and Control Panel

1. Open the cabinet, as described in Section 5.1.1.
2. Disconnect all wiring on the OCI PCB **16**.
3. Carefully cut the two product gas tubes where they connect to the gas sampling chamber on the OCI PCB.
4. Remove the six screws **15** which attach the OCI PCB to the air inlet duct cover **18**.

5.22.2 Installation

Figure 6-24: Control OCI PCB and Control Panel

NOTE: The wire harness connectors are keyed and may only be installed in one direction. Match connector configuration to OCI PCB pins before attempting to reinstall the connector.

1. Install the OCI PCB by reversing the REMOVAL procedure.
2. Tighten the six screws **15** of the OCI PCB in a crisscross pattern.
3. Close the cabinet, as described in Section 5.1.2.
4. Verify the performance of the system (Section 3) before using the concentrator.

5.23 CONTROL/OCI COMBO PCB

CAUTION: The Control/OCI Combo PCB contains complementary metal oxide semiconductor (CMOS) integrated circuits (ICs), which are ESD-sensitive devices. Take precautions handling the board to prevent static discharge, which could damage board components. To prevent IC damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

5.23.1 Removal

Figure 6-25: Control/OCI Combo PCB and Control Panel

1. Perform OPENING procedure as described in Section 5.1.1.
2. Disconnect all wiring **12, 13, 14** on the Control/OCI Combo PCB.
3. Carefully cut the two product gas tubes where they connect to the gas sampling chamber on the Control/OCI Combo PCB.
4. Remove the 10 screws **16** which attach the Control/OCI Combo PCB to the air inlet duct cover **18.**

5.23.2 Installation

NOTE: The wire harness connectors are keyed and may only be installed in one direction. Match connector configuration to Control/OCI Combo PCB pins before attempting to reinstall the connector.

1. Reverse REMOVAL procedure. Install and tighten the 10 screws **16** in a crisscross pattern (Figure 9-10).
2. Perform CLOSING procedures in Section 5.1.2.
3. Verify the performance of the system (Section 3) before using the concentrator.

5.24 OCI FRONT PANEL PCB

5.24.1 Removal

Figure 6-24: Control OCI PCB and Control Panel
Figure 6-25: Control/OCI Combo PCB and Control Panel

CAUTION: The OCI PCB and the Control/OCI Combo PCB contain complementary metal oxide semiconductor (CMOS) integrated circuits (ICs), which are static-sensitive devices. Take precautions handling the board to prevent static discharge, which could damage board components. To prevent IC damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

1. Open the cabinet, as described in Section 5.1.1.
2. Remove the product gas tubes from the flowmeter **1** inlet and outlet connectors.
3. Remove the two flowmeter brackets **5** and nuts **6** from the flowmeter threaded connectors.
4. Remove the flowmeter **1** from the concentrator.
5. Remove any wiring harnesses from the OCI front panel PCB **8.**
6. Remove the four nylon nuts **9** using a 5/16 in. (8 mm) socket wrench.
7. Remove the OCI front panel PCB **8** from the concentrator cabinet interior.

5.24.2 Installation

NOTE: The wire harness connectors are keyed and may only be installed in one direction. Verify correct location and match connector configuration to front panel PCB pins before attempting to reinstall the connector.

1. Install the replacement OCI front panel PCB **8** by reversing the REMOVAL procedure. (Section 5.24.1, steps 2 through 7.)
2. After hand-tightening the four nylon nuts **9,** turn each nut no more than three quarters of a turn.
3. Verify the correct connection of the product gas tubing to the flowmeter **1.**
4. Close the cabinet, as described in Section 5.1.2.
5. Verify the performance of the system (Section 3) before using the concentrator.

5.25 CONTROL/OCI PCB WITH REMOVABLE SENSOR

5.25.1 Removal

NOTE: If there is a need to replace the POWER Switch, refer to electrical schematic, Figure 9-5.

Figure 6-26: Control/OCI PCB with Removable Sensor and Control Panel

1. Open concentrator cabinet using the cabinet opening instructions from the Oxygen Concentrator Service Manual (see Section 5.1.1).

CAUTION: The OCI PCB contains circuitry which is ESD-sensitive. Take precautions handling the board to prevent static discharge, which could damage board components. To prevent IC damage, observe standard safety procedures as follows:

- **Wear an ESD grounding wrist strap properly connected to a grounded source.**
- **Work on grounded conductive mat.**
- **Handle PCB by edges only.**
- **Store PCB in an ESD static-shielding bag. Do not place PCB on bag exterior.**
- **Never apply leak detection solution to a PCB.**

2. Disconnect power switch wiring harness **2** from **J2.**
3. Disconnect low voltage wiring harness **3** from **J3.**
4. Disconnect main power wiring harness **1** from **J1.**
5. Remove the 1/16 in. (1.58 mm) i.d. oxygen tubing **4** from sensor housing.
6. Remove eight screws **5.**
7. Remove OCI board **6** from the air inlet duct cover **7.**
8. Carefully place OCI board into the ESD static-shielding bag.
9. Ship the replaced OCI board to Mallinckrodt Oxygen Concentrator Division: Mallinckrodt Inc., 3 Missouri Research Park Drive, St. Charles, MO 63304-5685.

5.25.2 Installation

Figure 6-26: Control/OCI PCB with Removable Sensor and Control Panel

For Control/OCI PCB with Removable Sensor **6A**, reverse the REMOVAL procedure, steps 1 through 8, making sure to tighten the eight screws **5** in the sequence shown (Figure 9-10) and torque to 5.0 lbf · in ±1 lbf · in (0.57 N · m ±0.1 N · m).

NOTE: For Control/OCI PCB with Removable Sensor **6B,** tighten the seven screws **5** in the sequence shown (Figure 9-10) and torque to 6.0 lbf · in ±1 lbf · in (0.68 N · m ±0.1 N · m).

Section 6

PARTS LISTS

6.1 TOOLS

The standard tools used to test and service the Companion 492a/590 are listed below. If any tools other than those specified are used, the substitute must be equal to or better than that listed.

DESCRIPTION	MANUFACTURER	MODEL/PART NO.
Pop-Rivet Gun Kit	Local Supplier	⅛ in. (3.17 mm) Pop Rivet
Pliers, Truarc (for internal retaining ring with ⅛ in. [3.17 mm] hole)	Mallinckrodt	493383
Wrench, Torque	Local Supplier	0 lbf · in to 60 lbf · in (0 N · m to 6.68 N · m)
No. 0 Phillips screwdriver	Local Supplier	NA
No. 2 Phillips screwdriver (minimum shaft length of 7 in. [18 cm])	Local Supplier	NA
No. 2 Magnetic Phillips screwdriver	Local Supplier	NA

6.2 EQUIPMENT

Standard test equipment and materials used to test and service the Companion 492a/590 are listed below. If you use any test equipment or materials other than those specified, the substitute must be equal to or better than that listed.

DESCRIPTION	MANUFACTURER	MODEL/PART NO.
Digital Multimeter	John Fluke Co., Seattle, WA	8000A
Oxygen Analyzer	Hudson	6400, cell 5500
Test Flowmeter	Sierra Instruments	820 Top Trak
Stopwatch	Local Supplier	NA
Pneumatic Test Kit	Mallinckrodt	492381
Replacement Gauge for 492381	Mallinckrodt	492378
Replacement Switch for 492381	Mallinckrodt	492969
Potentiometer Adjustment Tool	Mallinckrodt	494083
Black Patch Cord	Mallinckrodt	494057
Harness Assembly	Mallinckrodt	494058
Wrist Strap Cord and Plug Adapter	East Corp. US	NA
Alcohol, Isopropyl	Local Supplier	NA
LOCTITE 242	Loctite Corp.	242
LOCTITE 680	Loctite Corp.	680
Swabs, Cotton (Lint Free)	Local Supplier	NA
Thread Sealant	Flouramics Inc.	LOX 8
Leak Detector	Local Supplier	NA
Cabinet Touch-Up Paint, 4 oz. (28 g)	Mallinckrodt	492648
Silicone Sealant	Local Supplier	NA
Teflon Tape	Local Supplier	NA
Capacitance Test Meter	Local Supplier	NA

6.3 CONCENTRATOR PARTS LISTS

6.3.1 Literature

The following Mallinckrodt literature may be used with the Companion 492a and 590 Oxygen Concentrators.

PART NUMBER	LITERATURE
492931 [1]	Companion 492a Patient Instruction Manual
492778 [1]	Companion 492a Patient Instruction Manual with OCI [2]
492932 [1]	Companion 590 Patient Instruction Manual
492827 [1]	Companion 590 Patient Instruction Manual with OCI [2]
492977 [1]	Companion 590 Patient Instruction Manual with OCI, FR/CAN [2]
493556 [1]	Companion 590 Patient Instruction Manual with OCI, Mexico [2]
494248 [1]	Companion 590 Patient Instruction Manual with OCI with Removable Sensor
494289 [1]	Companion 590 Patient Instruction Manual with OCI with Removable Sensor, FR/CAN
494290 [1]	Companion 590 Patient Instruction Manual with OCI with Removable Sensor, Mexico

[1] Appropriate part supplied with unit.
[2] Refer to Section 3.8 for information concerning OCI.

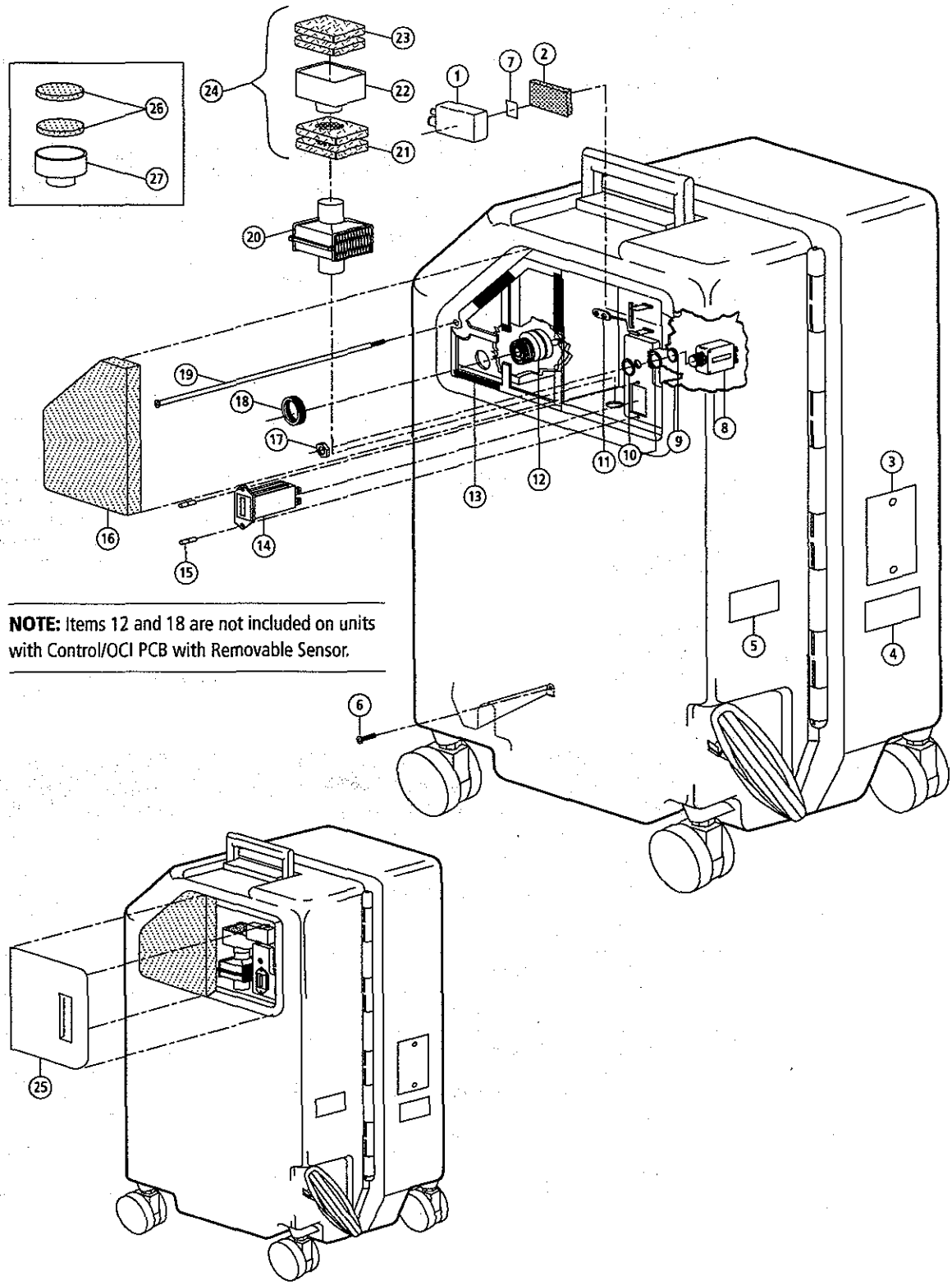
6.3.2 Accessories

The following accessories may be used with the Companion 492a and 590 Oxygen Concentrators.

PART NUMBER	DESCRIPTION
492922 [1]	Adapter, Humidifier (standard)
492024	Adapter, Humidifier (chrome) 1153229
492392	Adapter, Humidifier (long)
492587	Tail Piece
492588	Wing Nut
492821	Shipping Carton, with foam
493809	Humidifier, Bubble (disposable)
492888	Oxygen Concentration Indicator (OCI) Conversion Kit (installation required) [2]
493870	Spout, Outlet
494245	Air Intake Filter, Foam, 1⅜ in. (34.9 mm)

[1] Appropriate part supplied with unit
[2] Refer to Section 3.8 for information concerning OCI.

6.3.3 Companion 492a/590 Exterior



NOTE: Items 12 and 18 are not included on units with Control/OCI PCB with Removable Sensor.

Figure 6-1: Cabinet Exterior

Companion 492a/590 Exterior Parts List
(see Figure 6-1)

ITEM	PART NUMBER	DESCRIPTION
1	492297	Battery, 9V
2	492884 [3]	Battery Cushion
3	Reference [1]	Serial Plate
4	492908	Patent Label
	494297	Patent Label, Mexico
5	492288	Warning Label
6	492661	Screw, Pan Head, #10-32 x 5/8 in. long
7	492350	Battery Label
8	see chart below	Circuit Breaker
9	included in item 8	Knurled Nut
10	493567	Washer, Circuit Breaker
11	492832 [2]	Battery Connector Assembly
12	492782	Audible Alarm
13	492687	Velcro Hook (5 required)
14	492187	Hour Meter, 120V
15	492111	Pop Rivet, Aluminum, 1/8 in. (3.17 mm) (2 required)
16	492672	Intake Filter, Foam
17	included in item 8	Hex Nut
18	included in item 12	Locking Ring
19	492662	Screw, Upper Fastener
20	492190	Compressor Inlet HEPA Filter
21	493930	Compressor Inlet Extended Life Prefilter, Lower (2 required)
22	493707	Prefilter Housing
23	493931	Compressor Inlet Extended Life Prefilter, Upper (2 required)
24	493932	Compressor Inlet Extended Life Prefilter Assembly (includes items 21, 22, & 23)
25	492647	Side Panel
26	492193	Compressor Inlet Prefilter
27	492192	Compressor Inlet Prefilter Housing

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.
[2] When replacing the Battery Connector Assembly, splice the new wires to the old connector. The new Molex connectors will not fit the old amp header.
[3] Not used on concentrators manufactured after October 1998. Order for replacement only.

Circuit Breaker Chart

PART NUMBER	AMPERE	CONCENTRATOR MODEL	COMPRESSOR
492196	5	492a (120V, 60 Hz)	Thomas
492437	6	590 (120V, 60 Hz) [4]	Thomas (Standard)
493531 [5]	8	590 (120V, 60 Hz) [6]	Thomas (High Efficiency)
493531 [5]	8	590 (120V, 60 Hz) [7]	Thomas (2639 Series)
493531 [5]	8	590 (120V, 60 Hz) [8]	Thomas (2650 Series)
493531 [5]	8	590 (120V, 60 Hz)	Gast

[4] Manufactured before April 26, 1993.
[5] Washers required (Part Number 493567).
[6] Manufactured after Nov. 12, 1992.
[7] Manufactured after May 1, 1996.
[8] Manufactured after Oct. 22, 1997.

6.3.4 Left Cabinet Interior with Threaded Rod Sieve Beds

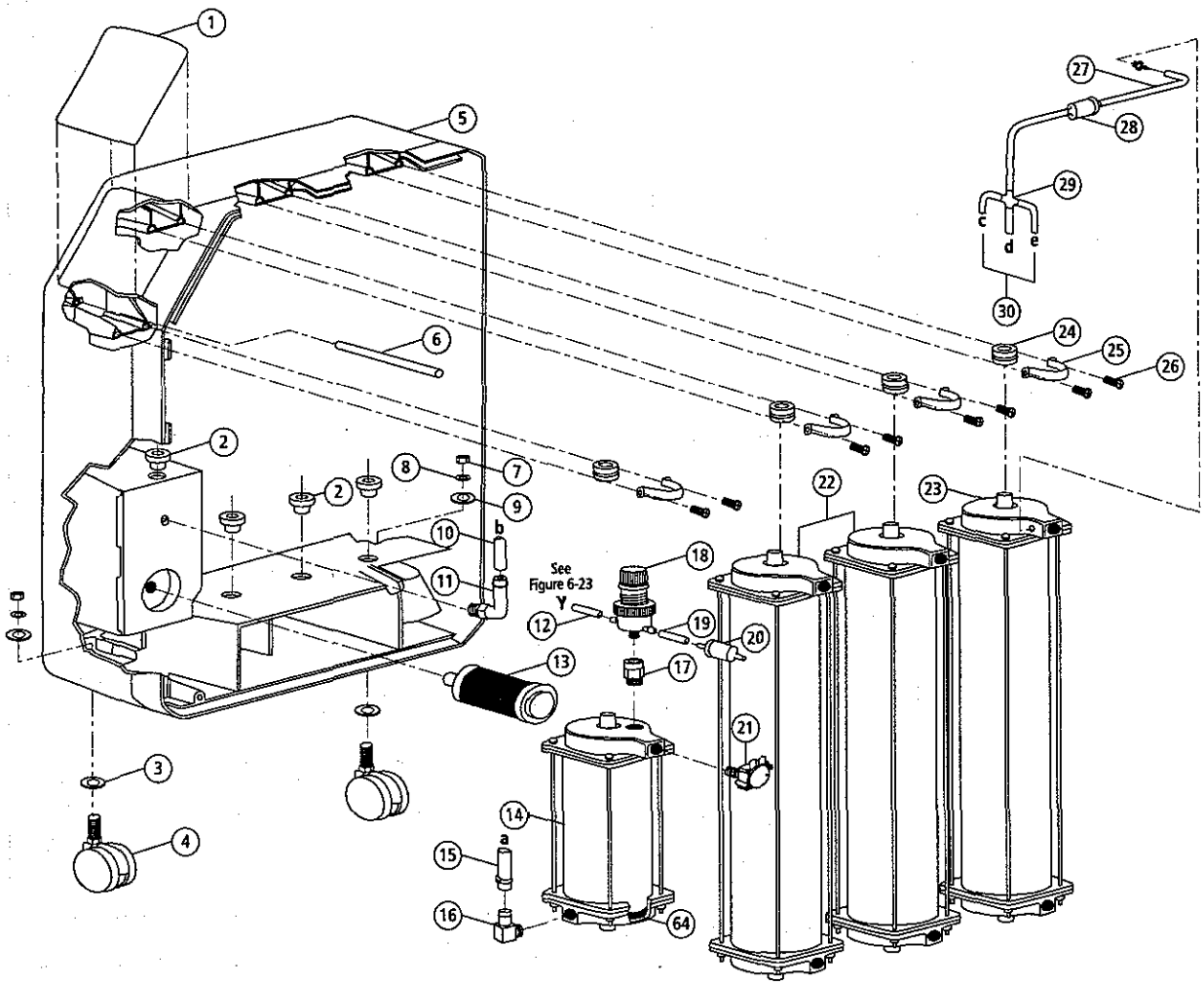


Figure 6-2a: Left Cabinet Interior with Threaded Rod Sieve Beds

Left Cabinet Interior with Threaded Rod Sieve Beds

(see Figure 6-2a)

ITEM	PART NUMBER	DESCRIPTION
1	see 6.3.29	Label, Control Panel
2	492910	Bushing
3	492309	Washer, Caster, 5/16 in. (8 mm)
4	492174	Caster
5	492967	Cabinet Assembly, Left (does not include items 1 and 63)
6	492663	Fastener Tube, Upper Left
7	492171	Hex Nut, 5/16 in.
8	492172	Splitlock Washer, 5/16 in.
9	492873	Washer, Caster, 5/16 in. i.d. x 1 1/2 in. o.d. x 1/8 in. thick (8 mm i.d. x 38.1 mm o.d. x 3.17 mm thick)
10	493178 [1]	Tubing, 3/8 in. i.d. x 1/2 in. o.d. x 17 in. long (9.52 mm i.d. x 12.7 mm o.d. x 431.8 mm long)
11	492182	Elbow Fitting, 1/4 in. x 3/8 in.
12	493174 [2]	Tubing, 3/16 in. i.d. x 5/16 in. o.d. x 39 1/4 in. long [5] (4.76 mm i.d. x 8 mm o.d. x 996.95 mm long) [5]
13	492114	Exhaust Muffler
14	493300	Product Canister Assembly
15	494345 [2]	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 22 in. long (6.35 mm i.d. x 9.52 mm o.d. x 558.8 mm long)
16	492139	Elbow Fitting, Brass 3/8 in. x 1/4 in.
17	492953	Fitting Assembly
18	492621	Pressure Regulator
19	included in item 20	Tubing
20	492050	Vacuum Check Valve Assembly
21	492633	Pressure Switch
22	Reference [3]	Sieve Canister, 4 L/min (Threaded Rod)
	Reference [3]	Sieve Canister, 5 L/min (Threaded Rod)
	493815 [4]	Retrofit Sieve Bed Kit, 4 L/min
	493817 [4]	Retrofit Sieve Bed Kit, 5 L/min
23	Reference [3]	Reservoir Canister Assembly
24	493565	Wire Grommet
25	492664	Canister Clamp
26	492717	Screw, THD Forming, #14-b x 1 1/8 in. long
27	Reference [3]	Tubing, 1/16 in. i.d. x 5/16 in. o.d. x 6 in. long (1.58 mm i.d. x 8 mm o.d. x 152.4 mm long)
28	included in item 29	Pilot Air Filter
29	492760	Pilot Air Line Assembly
30	Reference [3]	Tubing, 1/16 in. i.d. x 5/16 in. o.d. x 4 in. long (1.58 mm i.d. x 8 mm o.d. x 101.6 mm long)
64	492549	O-Ring U-Cup Seal

[1] Tubing sold in 3 ft. (0.92 m) lengths. Cut individual pieces as specified.
[2] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.
[3] Item shown for descriptive purposes only and is not available for sale as an individual repair part.
[4] See Section 6.3.7 for a parts list and Figure 6-5 for a drawing of the Retrofit Sieve Bed Kit.
[5] If unit is equipped with OCI, this tube should be 37 1/4 in. (946.15 mm) long.

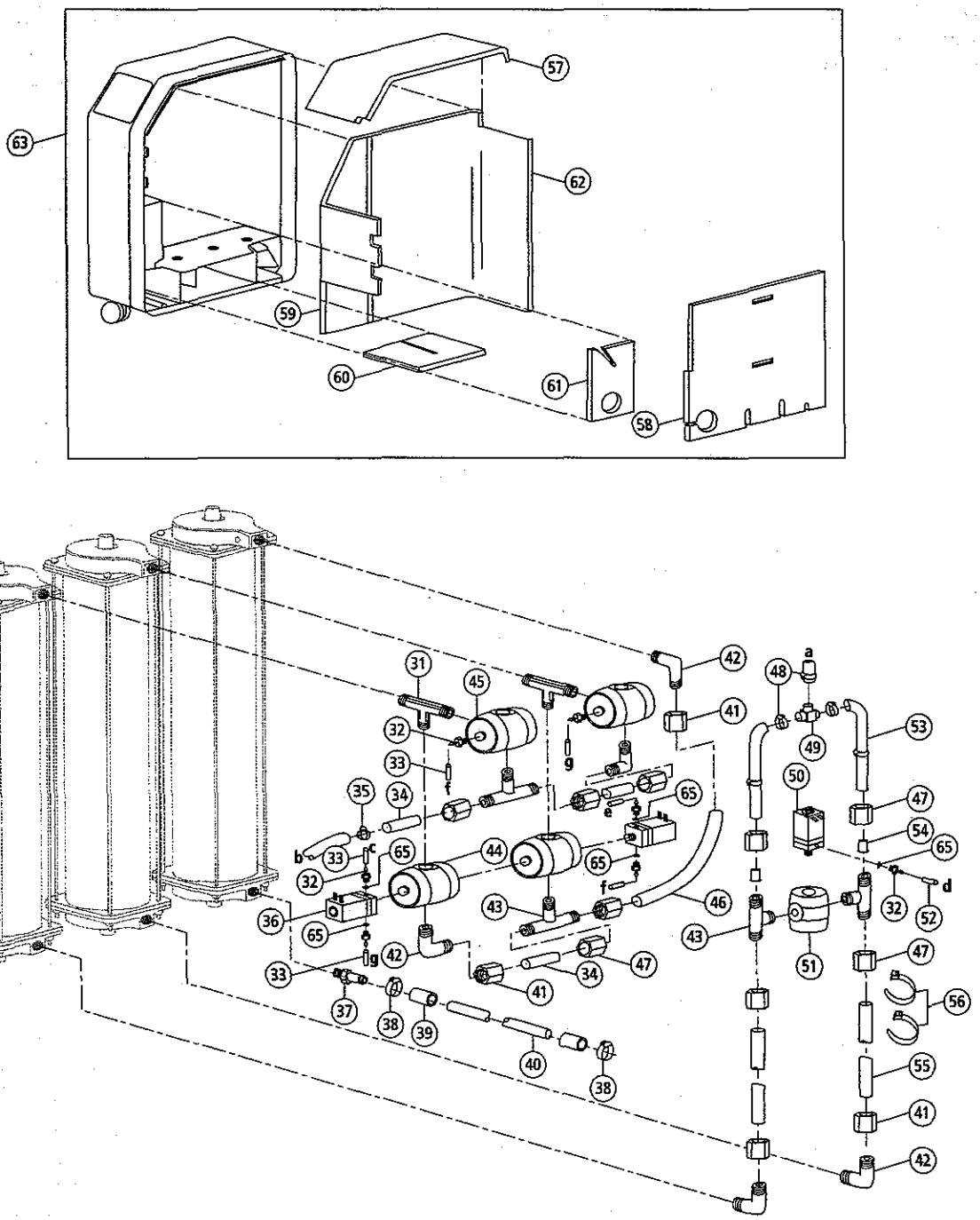


Figure 6-2b: Left Cabinet Interior with Threaded Rod Sieve Beds

Left Cabinet Interior with Threaded Rod Sieve Beds

(see Figure 6-2b)

ITEM	PART NUMBER	DESCRIPTION
31	492666	Tee Fitting, Male, 1/4 in. NPT
32	492284	Brass Nipple Fitting, 1/16 in. x 1/4 in.
33	493176 [1]	Tubing, 1/16 in. i.d. x 1/8 in. o.d. x 10 1/2 in. long (1.58 mm i.d. x 3.17 mm o.d. x 257.25 mm long)
34	492087	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 2 3/4 in. long (6.35 mm i.d. x 9.52 mm o.d. x 69.85 mm long)
35	492104	Cable Tie, Large
36	493799	Supply Solenoid Valve, 24V [3]
37	492556	Brass Fitting, 1/4 in. NPTF x 3/8 in.
38	492890	Plastic Clamp, Size G
39	492926	Exhaust Hose Sleeve
40	494346 [2]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)
41	included in item 42	Compression Nut
42	492875	Nylon Elbow with Insert (includes item 41)
43	492874	Nylon Tee with Insert (includes item 47)
44	492100	Supply or Balance Pilot Valve
45	492089	Exhaust Pilot Valve, 90°
46	492095	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 5 1/8 in. long (6.35 mm i.d. x 9.52 mm o.d. x 130.17 mm long)
47	included in item 43	Compression Nut
48	492134	Clamp
49	492135	Brass Tee
50	493798	Balance Solenoid Valve, 24V [3]
51	492100	Supply or Balance Pilot Valve
52	493176 [1]	Tubing, 1/16 in. i.d. x 1/8 in. o.d. x 6 in. long (1.58 mm i.d. x 3.17 mm o.d. x 152.4 mm long)
53	493375	Restrictor Tube Assembly Set (add suffix to part number for correct size) Suffix / Restrictor Size / Color -02 / B / Orange -03 / C / Green -04 / D / Blue
54	Reference [4]	Tubing Support
55	492130	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 9 1/2 in. long (6.35 mm i.d. x 9.52 mm o.d. x 241.3 mm long)
56	492104	Cable Tie, Large
57	included in item 63	Cabinet Insulation
58	492801	Canister Insulation
59	included in item 63	Cabinet Insulation
60	included in item 63	Cabinet Insulation
61	included in item 63	Cabinet Insulation
62	included in item 63	Cabinet Insulation
63	492929	Left Cabinet Insulation Kit (does not include item 58)
65	493630	Washer, Solenoid

[1] Tubing sold in 3 ft. (0.92 m) lengths. Cut individual pieces as specified.

[2] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.

[3] Retrofits to all 492a and 590 models with 24V solenoids. See Solenoid Valve Progression (Figure 6-20).

[4] The Tubing Support is no longer available as an individual repair part and is shown for descriptive purposes only. Replace with item 53, Restrictor Tube Assembly Set.

6.3.5 Left Cabinet Interior with Non-O-Ring Fittings

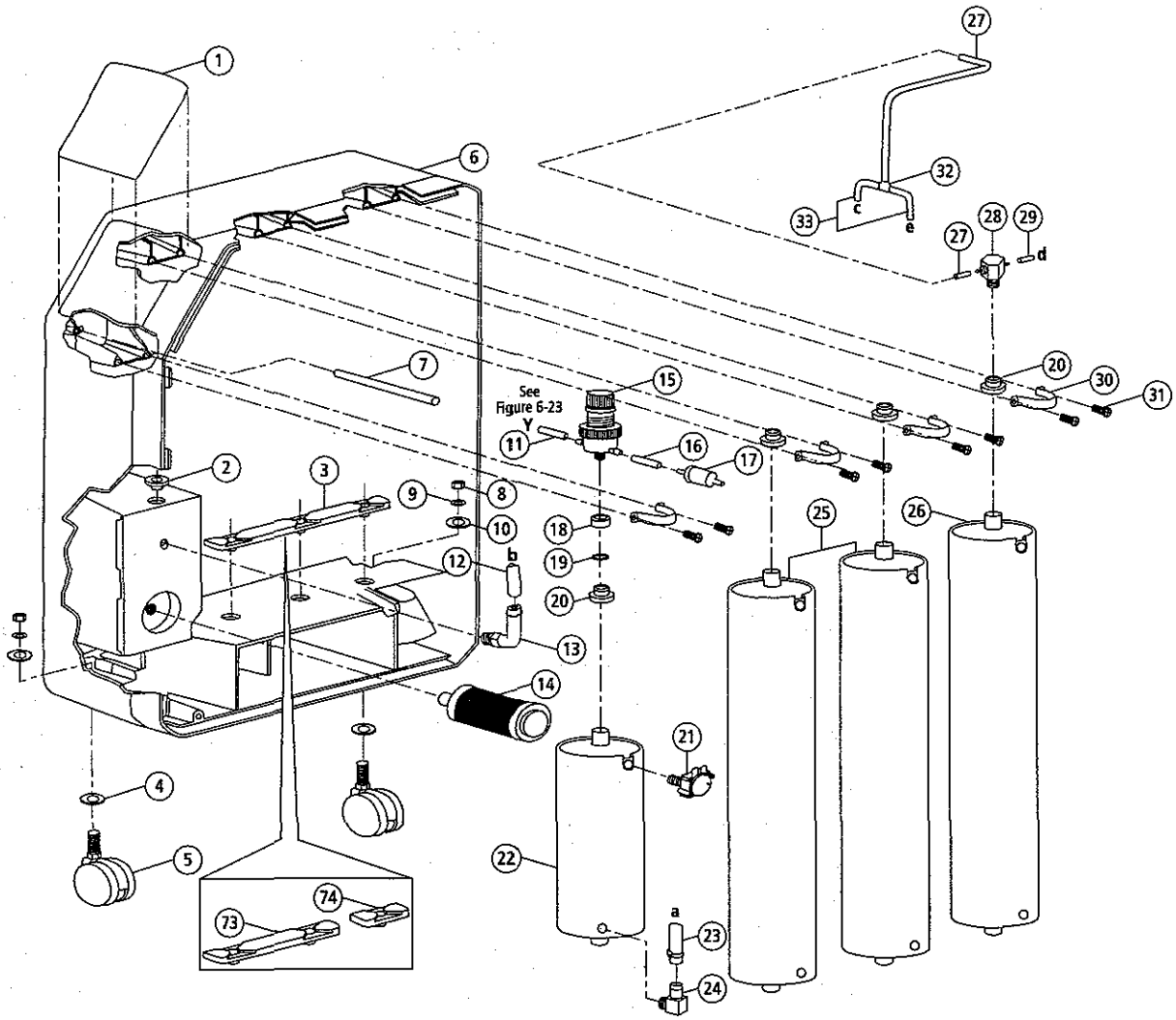


Figure 6-3a: Left Cabinet Interior with Non-O-Ring Fittings

Left Cabinet Interior with Non-O-Ring Fittings
(see Figure 6-3a)

ITEM	PART NUMBER	DESCRIPTION
1	see 6.3.29	Label, Control Panel
2	492910	Bushing
3	Reference [5]	Torque Strip
4	492309	Washer, Caster, 5/16 in. (8 mm)
5	492174	Caster
6	492967	Cabinet Assembly, Left (does not include items 1 and 66)
7	492663	Fastener Tube, Upper Left
8	492171	Hex Nut, 5/16 in.
9	492172	Splitlock Washer, 5/16 in.
10	492873	Washer, Caster, 5/16 in. i.d. x 1 1/2 in. o.d. x 1/8 in. thick (8 mm i.d. x 38.1 mm o.d. x 3.17 mm thick)

ITEM	PART NUMBER	DESCRIPTION
11	493174 [2]	Tubing, 3/16 in. i.d. x 5/16 in. o.d. x 39 1/4 in. long [4] (4.76 mm i.d. x 8 mm o.d. x 996.95 mm long) [4]
12	493178 [1]	Tubing, 3/8 in. i.d. x 1/2 in. o.d. x 17 in. long (9.52 mm i.d. x 12.7 mm o.d. x 431.8 mm long)
13	492182	Elbow Fitting, 1/4 in. x 3/8 in.
14	492114	Exhaust Muffler
15	492621	Pressure Regulator
16	included in item 17	Tubing
17	492050	Vacuum Check Valve Assembly
18	493670	Sleeve
19	493547	O-ring
20	493396	Bushing
21	492633	Pressure Switch
22	494373	Product Canister Assembly
23	492139	Elbow Fitting, Brass 3/8 in. x 1/4 in.
24	494345 [2]	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 22 in. long (6.35 mm i.d. x 9.52 mm o.d. x 558.8 mm long)
25	493681	Replacement Sieve Canister, 4 L/min (non O-ring style)
	493682	Replacement Sieve Canister, 5 L/min (non O-ring style)
26	494377	Reservoir Canister Assembly, 492a
	494372	Reservoir Canister Assembly, 590
27	Reference [3]	Tubing, 1/16 in. i.d. x 5/16 in. o.d. x 6 in. long (1.58 mm i.d. x 8 mm o.d. x 152.4 mm long)
28	493536	Brass Fitting, Barbed Tee
29	493176 [1]	Tubing, 1/16 in. i.d. x 1/8 in. o.d. x 16 in. long (1.58 mm i.d. x 3.17 mm o.d. x 406.4 mm long)
30	492664	Canister Clamp
31	492717	Screw, THD Forming, #14-b x 1 1/8 in. long
32	493560	Barbed Tee, Nylon Fitting
33	Reference [3]	Tubing, 1/16 in. i.d. x 5/16 in. o.d. x 4 in. long (1.58 mm i.d. x 8 mm o.d. x 101.6 mm long)
73	494449	Torque Strip, 2-position
74	494495	Isolation Strip

[1] Tubing sold in 3 ft. (0.92 m) lengths. Cut individual pieces as specified.
[2] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.
[3] Item shown for descriptive purposes only and is not available for sale as an individual repair part.
[4] If unit is equipped with OCI, this tube should be 37 1/4 in. (946.15 mm) long.
[5] Item shown for descriptive purposes only and is not available for sale as an individual repair part. Replace with Items 73 and 74.

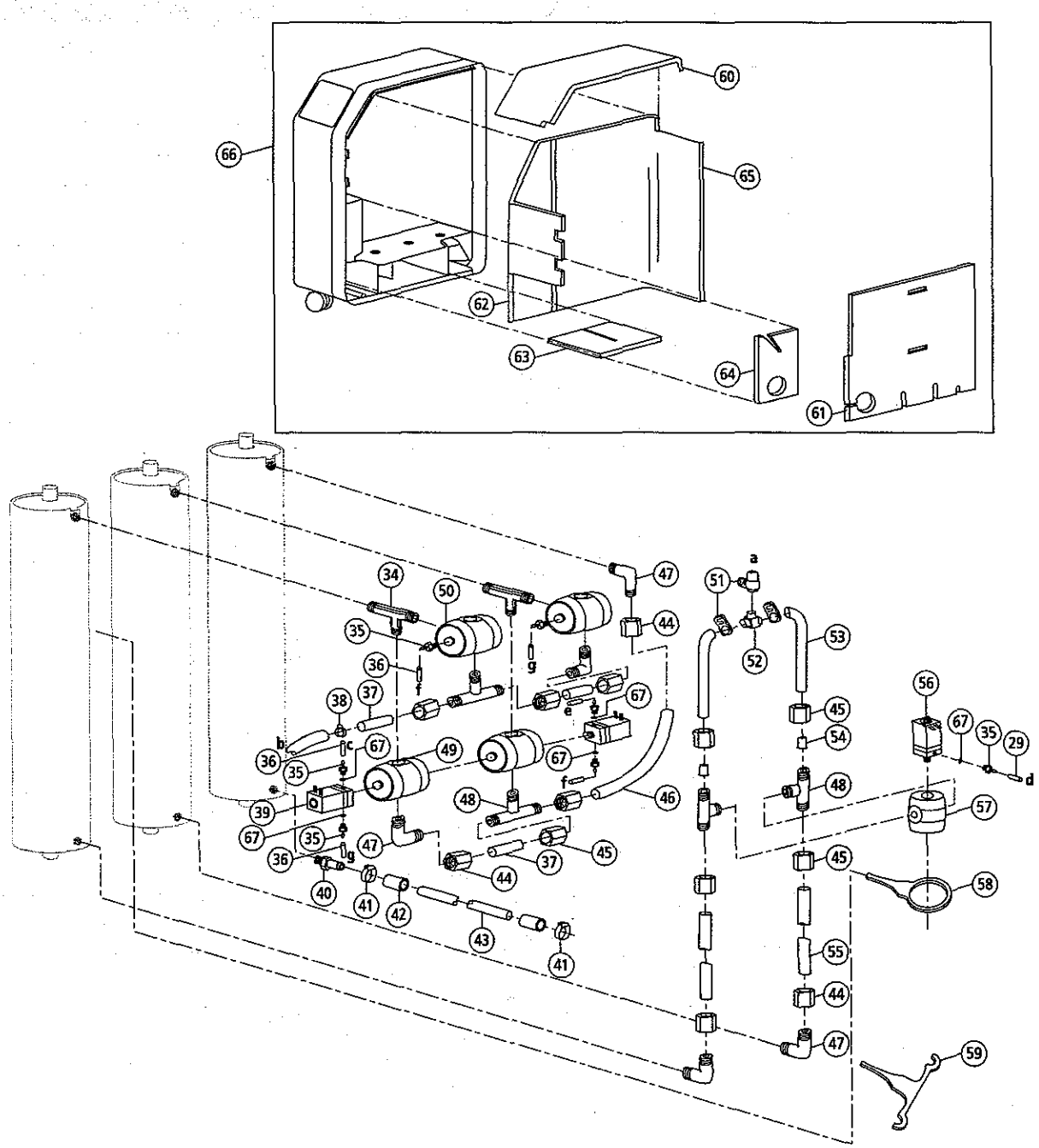


Figure 6-3b: Left Cabinet Interior with Non-O-Ring Fittings

Left Cabinet Interior with Non-O-Ring Fittings

(see Figure 6-3b)

ITEM	PART NUMBER	DESCRIPTION
29	493176 [1]	Tubing, 1/16 in. i.d. x 1/8 in. o.d. x 16 in. long (1.58 mm i.d. x 3.17 mm o.d. x 406.4 mm long)
34	493265	Tee Fitting, Male, Extended 1/4 in. NPT
35	492284	Brass Nipple Fitting, 1/16 in. x 1/4 in.
36	493176 [1]	Tubing, 1/16 in. i.d. x 1/8 in. o.d. x 10 1/2 in. long (1.58 mm i.d. x 3.17 mm o.d. x 257.25 mm long)
37	492087	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 2 3/4 in. long (6.35 mm i.d. x 9.52 mm o.d. x 69.85 mm long)
38	492104	Cable Tie, Large
39	493799	Supply Solenoid Valve, 24V [2]
40	492556	Brass Fitting, 1/4 in. NPTF x 3/8 in.
41	492890	Plastic Clamp, Size G
42	492926	Exhaust Hose Sleeve
43	494346 [1]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)
44	included in item 47	Compression Nut
45	included in item 48	Compression Nut
46	492095	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 5 1/8 in. long (6.35 mm i.d. x 9.52 mm o.d. x 130.17 mm long)
47	492875	Nylon Elbow with Insert (includes item 44)
48	492874	Nylon Tee with Insert (includes item 45)
49	492100	Supply or Balance Pilot Valve
50	492089	Exhaust Pilot Valve, 90°
51	492134	Clamp
52	492135	Brass Tee
53	493375	Restrictor Tube Assembly Set (add suffix to part number for correct size) Suffix / Restrictor Size / Color -02 / B / Orange -03 / C / Green -04 / D / Blue
54	included in item 53	Restrictor
55	492130	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 9 1/2 in. long (6.35 mm i.d. x 9.52 mm o.d. x 241.3 mm long)
56	493798	Balance Solenoid Valve, 24V [2]
57	493886	Balance Pilot Valve
58	493521	Balance Valve Holder, 4 L/min
	493568	Balance Valve Holder, 5 L/min
59	493522 [3]	Balance Valve Tube Holder, 4 L/min
	493569 [3]	Balance Valve Tube Holder, 5 L/min
60	included in item 66	Cabinet Insulation
61	492801	Canister Insulation
62	included in item 66	Cabinet Insulation
63	included in item 66	Cabinet Insulation
64	included in item 66	Cabinet Insulation
65	included in item 66	Cabinet Insulation
66	492929	Left Cabinet Insulation Kit (does not include item 61)
67	493630	Washer, Solenoid

[1] Tubing sold in 3 ft. (0.92 m) lengths. Cut individual pieces as specified.

[2] Retrofits to all 492a and 590 models with 24V solenoids. See Solenoid Valve Progression (Figure 6-20).

[3] Not used on concentrators manufactured after June 20, 1996.

6.3.6 Left Cabinet Interior with O-Ring Fittings

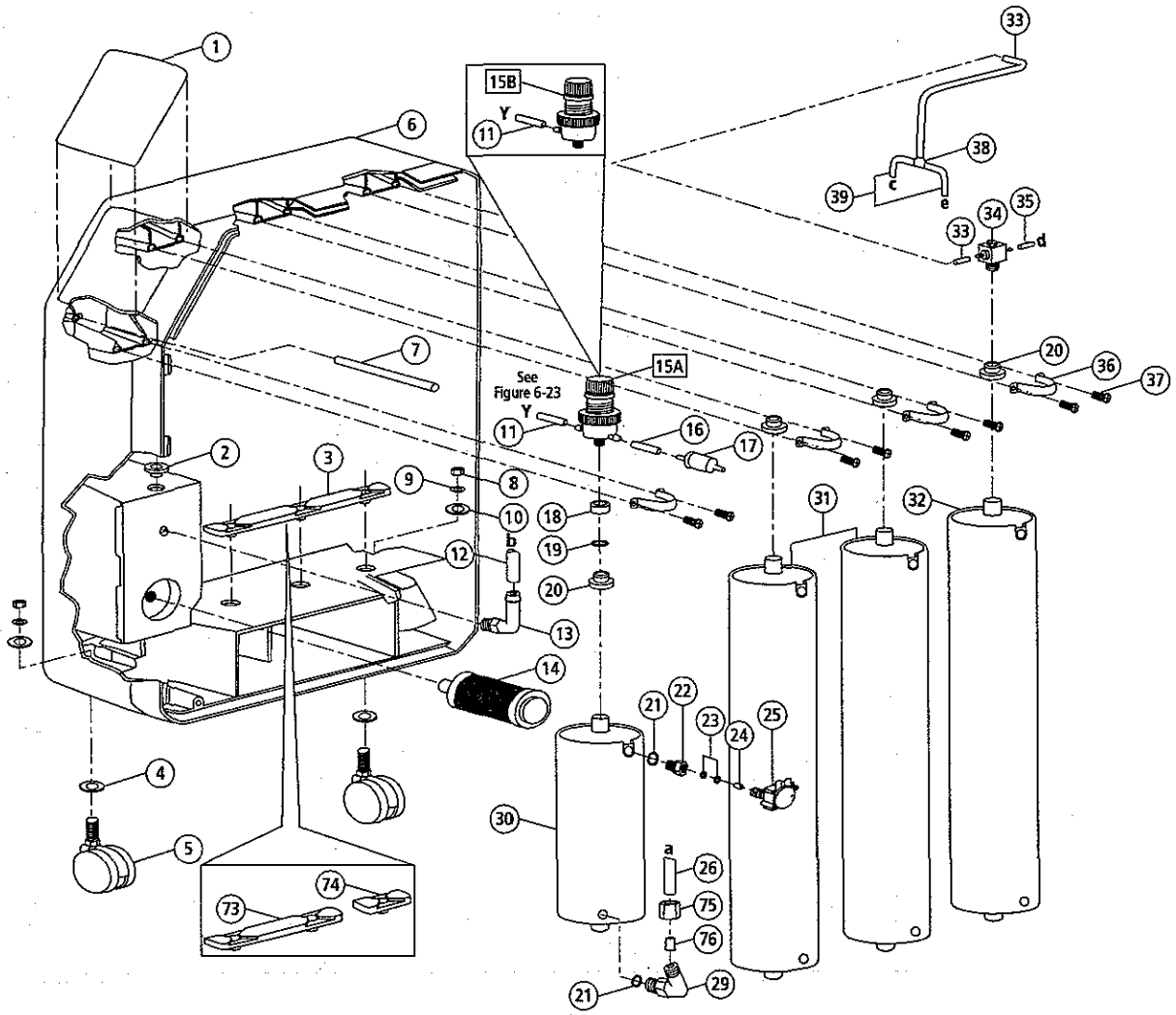


Figure 6-4a: Left Cabinet Interior with O-Ring Fittings

Left Cabinet Interior with O-Ring Fittings
(see Figure 6-4a)

ITEM	PART NUMBER	DESCRIPTION
1	see 6.3.29	Label, Control Panel
2	492910	Bushing
3	Reference [5]	Torque Strip
4	492309	Washer, Caster, 5/16 in. (8 mm)
5	492174	Caster
6	492967	Cabinet Assembly, Left (does not include items 1 and 71)
7	492663	Fastener Tube, Upper Left
8	492171	Hex Nut, 5/16 in.
9	492172	Splitlock Washer, 5/16 in.
10	492873	Washer, Caster, 5/16 in. i.d. x 1 1/2 in. o.d. x 1/8 in. thick (8 mm i.d. x 38.1 mm o.d. x 3.17 mm thick)

ITEM	PART NUMBER	DESCRIPTION
11	493174 [2]	Tubing, 3/16 in. i.d. x 5/16 in. o.d. x 391/4 in. long [4] (4.76 mm i.d. x 8 mm o.d. x 996.95 mm long) [4]
12	493178 [1]	Tubing, 3/8 in. i.d. x 1/2 in. o.d. x 17 in. long (9.52 mm i.d. x 12.7 mm o.d. x 431.8 mm long)
13	492182	Elbow Fitting, 1/4 in. x 3/8 in.
14	492114	Exhaust Muffler
15A	492621	Pressure Regulator, Dual Port
15B	494437	Pressure Regulator, Single Port (for use with OCI only)
16	included in item 17	Tubing
17	492050	Vacuum Check Valve Assembly (includes item 16)
18	493670	Sleeve (includes item 19)
19	included in item 18	O-ring
20	493396	Bushing
21	493591	O-ring, 0.426 in. i.d. x 0.070 in. o.d. (10.82 mm i.d. x 1.78 mm o.d.)
22	493696	Pressure Switch Fitting
23	493698	O-ring
24	493697	Pressure Switch Insert
25	492633	Pressure Switch
26	494345 [2]	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 22 in. long (6.35 mm i.d. x 9.52 mm o.d. x 558.8 mm long)
29	493607	Nylon Elbow with O-ring
30	494374	Product Canister Assembly
31	493980	Replacement Sieve Canister, 5 L/min (O-ring style) (sealed for shipping)
32	494375	Reservoir Canister Assembly, 492a
	494376	Reservoir Canister Assembly, 590
33	Reference [3]	Tubing, 1/16 in. i.d. x 5/16 in. o.d. x 6 in. long (1.58 mm i.d. x 8 mm o.d. x 152.4 mm long)
34	493536	Brass Fitting, Barbed Tee
35	493176 [1]	Tubing, 1/16 in. i.d. x 1/8 in. o.d. x 16 in. long (1.58 mm i.d. x 3.17 mm o.d. x 406.4 mm long)
36	492664	Canister Clamp
37	492717	Screw, THD Forming, #14-b x 1 1/8 in. long
38	493560	Barbed Tee, Nylon Fitting
39	Reference [3]	Tubing, 1/16 in. i.d. x 5/16 in. o.d. x 4 in. long (1.58 mm i.d. x 8 mm o.d. x 101.6 mm long)
73	494449	Torque Strip, 2-position
74	494495	Isolation Strip
75	493579	Ferrule Nut
76	492132	Tube Fitting

[1] Tubing sold in 3 ft. (0.92 m) lengths. Cut individual pieces as specified.
[2] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.
[3] Item shown for descriptive purposes only and is not available for sale as an individual repair part.
[4] If unit is equipped with OCI, this tube should be 37 1/4 in. (946.15 mm) long.
[5] Item shown for descriptive purposes only and is not available for sale as an individual repair part. Replace with items 73 and 74.

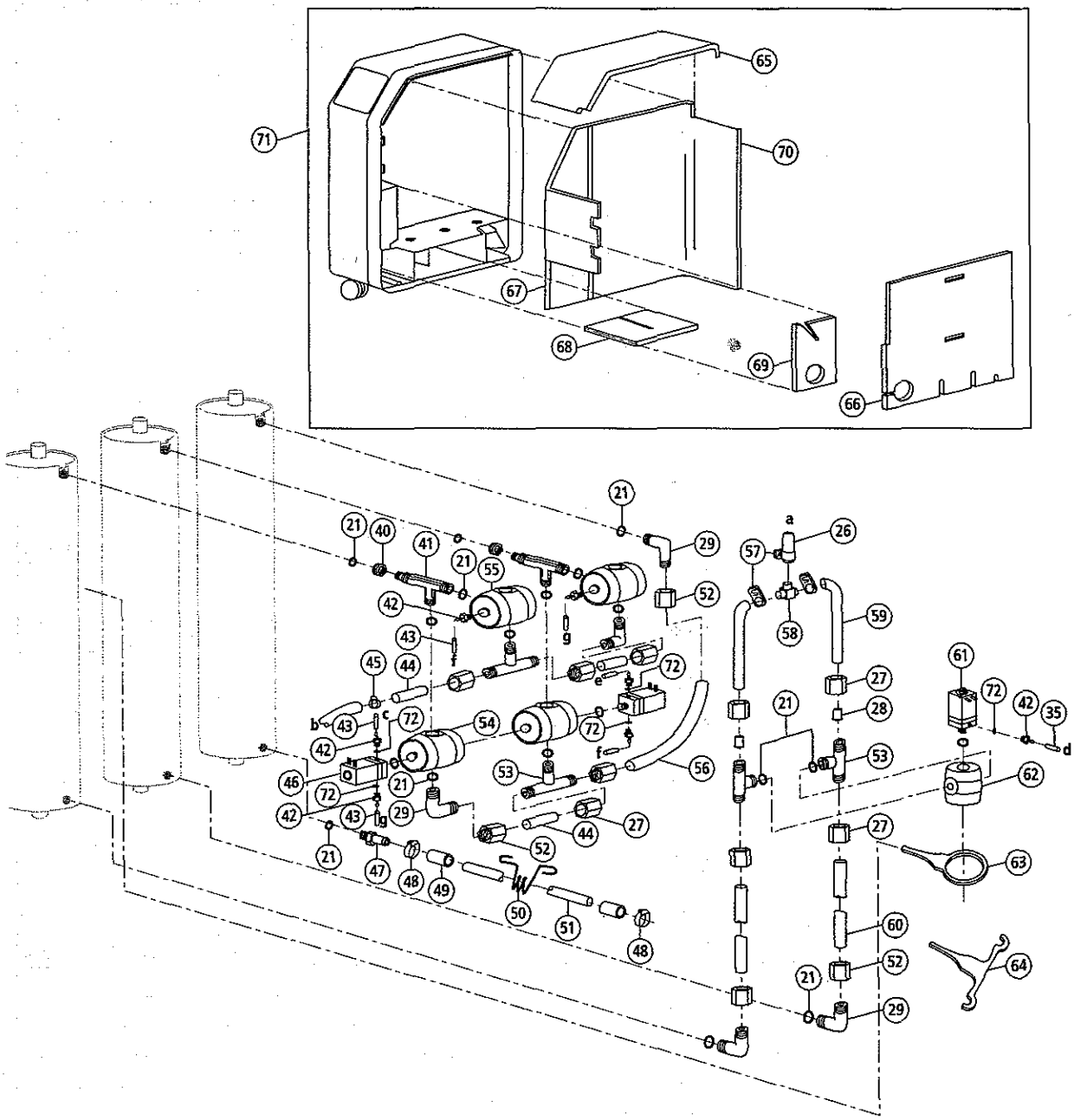


Figure 6-4b: Left Cabinet Interior with O-Ring Fittings

Left Cabinet Interior with O-Ring Fittings
(see Figure 6-4b)

ITEM	PART NUMBER	DESCRIPTION
21	493591	O-ring, 0.426 in. i.d. x 0.070 in. o.d. (10.82 mm i.d. x 1.78 mm o.d.)
26	494345 [2]	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 22 in. long (6.35 mm i.d. x 9.52 mm o.d. x 558.8 mm long)
27	included in item 53	Compression Nut
28	included in item 59	Restrictor
29	493607	Nylon Elbow with O-ring (includes item 52)
40	493586	Hex Nut

ITEM	PART NUMBER	DESCRIPTION
41	493609	Tee Fitting, Male, 1/4 in. NPT
42	492284	Brass Nipple Fitting, 1/16 in. x 1/4 in.
43	493176 [1]	Tubing, 1/16 in. i.d. x 1/8 in. o.d. x 10 1/2 in. long (1.58 mm i.d. x 3.17 mm o.d. x 257.25 mm long)
44	492087	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 2 3/4 in. long (6.35 mm i.d. x 9.52 mm o.d. x 69.85 mm long)
45	492104	Cable Tie, Large
46	493799	Supply Solenoid Valve, 24V [3]
	494288	Supply Solenoid Valve, 5V
47	492556	Brass Fitting, 1/4 in. NPTF x 3/8 in.
48	492890	Plastic Clamp, Size G
49	492926	Exhaust Hose Sleeve
50	494158	Compressor Hose Splint
51	494346 [2]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)
52	included in item 29	Compression Nut
53	493608	Nylon Tee with O-ring (includes item 27)
54	493583	Supply Pilot Valve
55	493582	Exhaust Pilot Valve, 90°
56	492095	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 5 1/8 in. long (6.35 mm i.d. x 9.52 mm o.d. x 130.17 mm long)
57	492134	Clamp
58	492135	Brass Tee
59	493375	Restrictor Tube Assembly Set (add suffix to part number for correct size) Suffix / Restrictor Size / Color -02 / B / Orange -03 / C / Green -04 / D / Blue
60	492130	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 9 1/2 in. long (6.35 mm i.d. x 9.52 mm o.d. x 241.3 mm long)
61	493798	Balance Solenoid Valve, 24V[3]
	494287	Balance Solenoid Valve, 5V
62	493886	Balance Pilot Valve
63	493521	Balance Valve Holder, 4 L/min
	493568	Balance Valve Holder, 5 L/min
64	493522 [4]	Balance Valve Tube Holder, 4 L/min
	493569 [4]	Balance Valve Tube Holder, 5 L/min
65	Included in item 71	Cabinet Insulation
66	492801	Canister Insulation
67	Included in item 71	Cabinet Insulation
68	Included in item 71	Cabinet Insulation
69	Included in item 71	Cabinet Insulation
70	Included in item 71	Cabinet Insulation
71	492929	Left Cabinet Insulation Kit (does not include item 66)
72	493630	Washer, Solenoid

[1] Tubing sold in 3 ft. (0.92 m) lengths. Cut individual pieces as specified.
[2] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.
[3] Retrofits to all 492a and 590 models with 24V solenoids. See Solenoid Valve Progression (Figure 6-20).
[4] Not used on concentrators manufactured after June 20, 1996.

6.3.7 Retrofit Sieve Bed Assembly

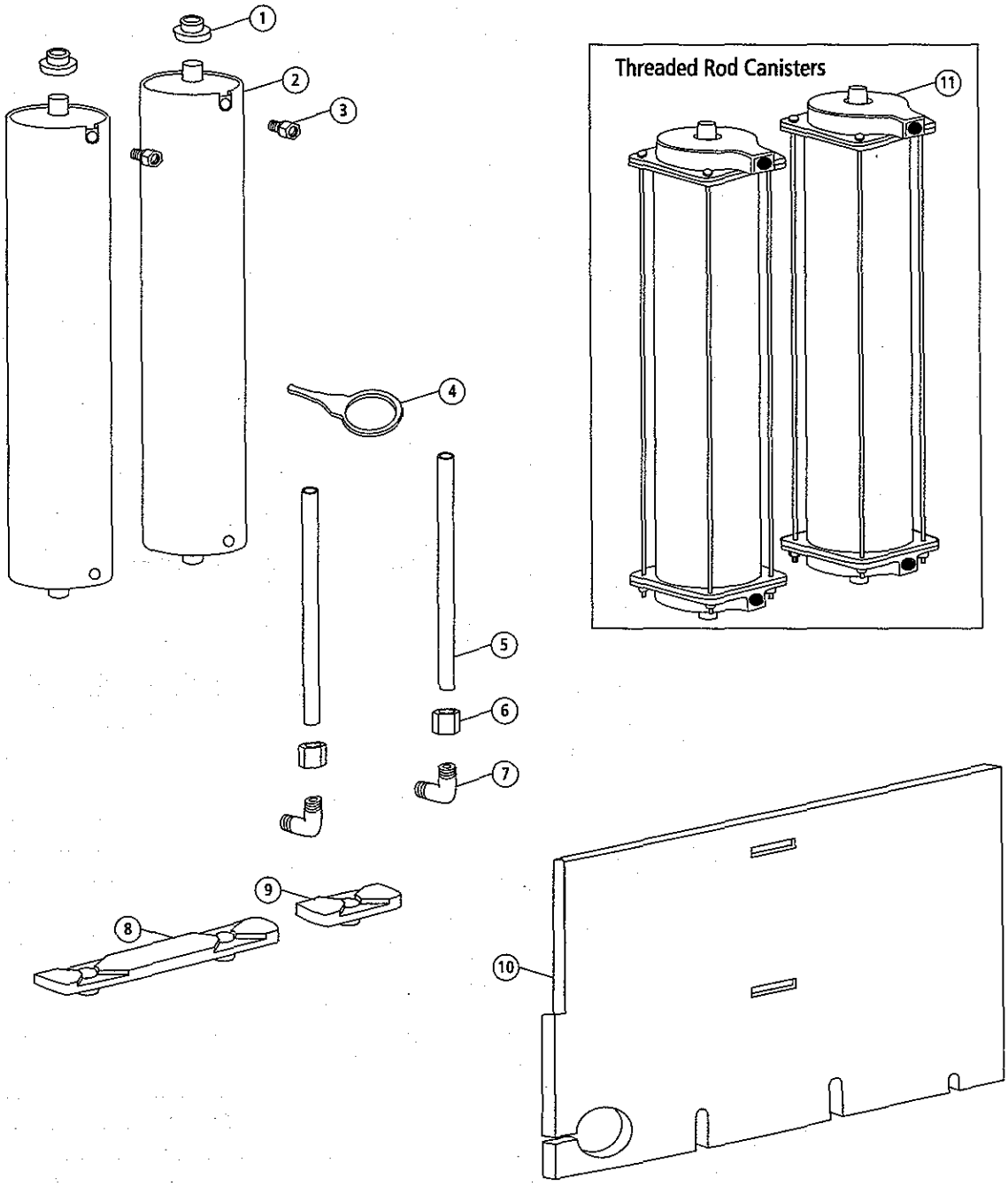


Figure 6-5: Retrofit Sieve Bed Assembly

Retrofit Sieve Bed Assembly

(see Figure 6-5)

ITEM	PART NUMBER	DESCRIPTION
—	493815 [1]	Retrofit Sieve Bed Kit, 4 L/min (includes items 1 through 10)
—	493817 [1]	Retrofit Sieve Bed Kit, 5 L/min (includes items 1 through 10)
1	493396	Bushing
2	493681 [2]	Replacement Sieve Canister, 4 L/min (non O-ring style) (set of 2)
	493682 [2]	Replacement Sieve Canister, 5 L/min (non O-ring style) (set of 2)
3	493813	Tee Adapter
4	493521	Balance Valve Holder, 4 L/min
	493568	Balance Valve Holder, 5 L/min
5	492130	Tubing, 1/4 in. i.d. x 3/8 in. o.d. x 9 1/2 in. long (6.35 mm i.d. x 9.52 mm o.d. x 241.3 mm long)
6	included in item 7	Compression Nut
7	492875	Nylon Elbow with insert (includes item 6)
8	494449	Torque Strip, 2-position
9	494495	Isolation Strip
10	492801	Canister Insulation
11	Reference [3]	Sieve Canister, 4 L/min (Threaded Rod) [1]
	Reference [3]	Sieve Canister, 5 L/min (Threaded Rod) [1]

[1] To convert from Threaded Rod, order 493815 or 493817.

[2] To replace non-O-ring style canisters, order 493681 or 493682.

[3] Item shown for descriptive purposes only and is not available for sale as an individual repair part.

6.3.8 Right Cabinet Interior

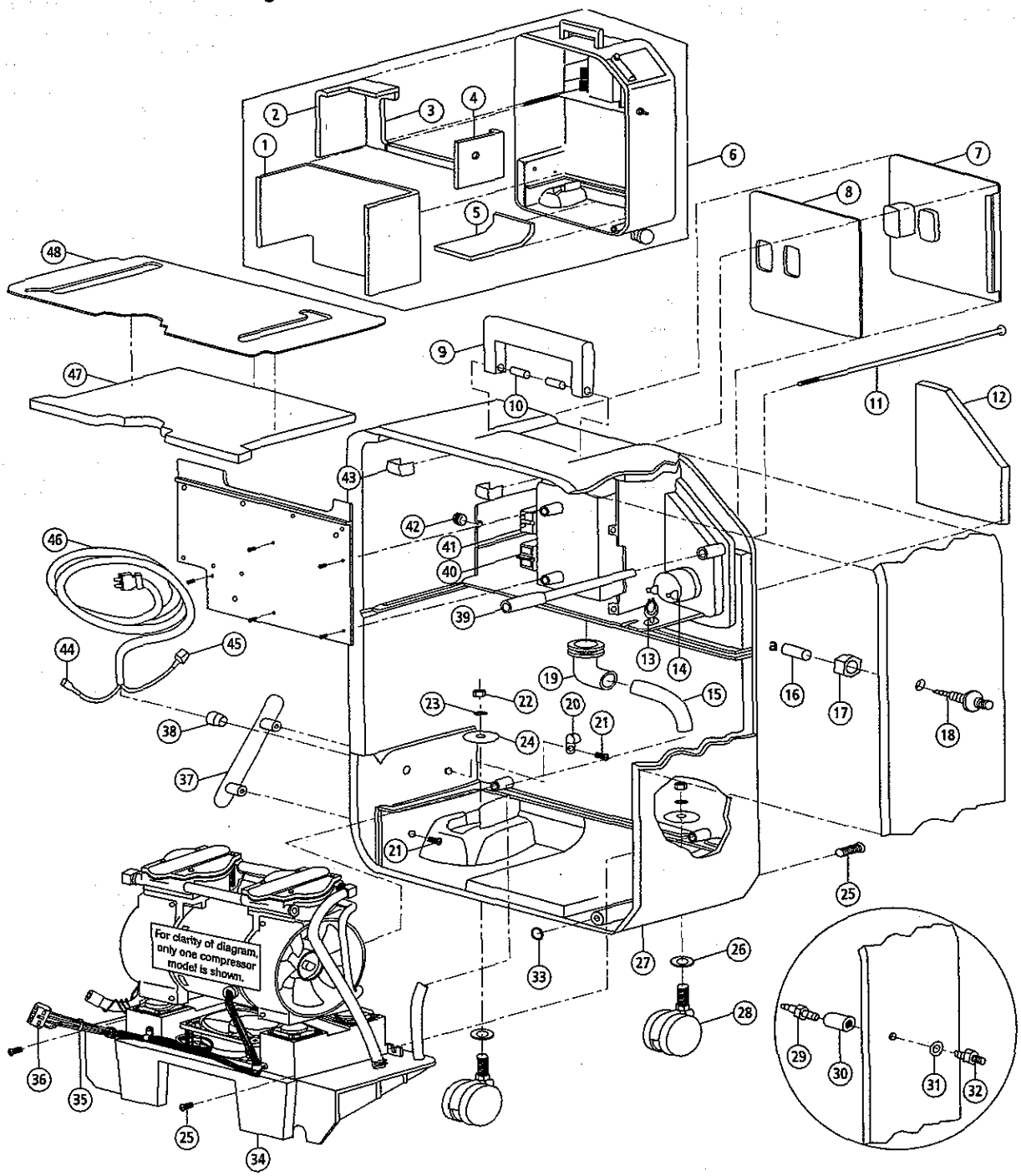


Figure 6-6: Right Cabinet Interior

Right Cabinet Interior
(see Figure 6-6)

ITEM	PART NUMBER	DESCRIPTION
1	included in item 6	Insulation, Middle
2	included in item 6	Insulation, Top Back
3	included in item 6	Insulation, Top Middle
4	included in item 6	Insulation, Top Front

ITEM	PART NUMBER	DESCRIPTION
5	included in item 6	Insulation, Exhaust Tunnel
6	492928	Right Cabinet Insulation Kit
7	492647	Side Panel
8	492802	Filter Door Insulation, Right Cabinet (included in item 6)
9	492652	Handle
10	492654	Dowel Pins
11	492662	Screw, Upper Fastener
12	492672	Intake Filter, Foam
13	492987	Clamp, Standoff, 1/2 in. (12.7 mm)
14	492782	Audible Alarm
15	493175 [1]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 17 in. long (9.52 mm i.d. x 15.87 mm o.d. x 431.8 mm long)
16	493174 [1]	Tubing, 3/16 in. i.d. x 5/16 in. o.d. x 7 1/2 in. long (4.76 mm i.d. x 8 mm o.d. x 190.5 mm long)
17	492885	Nylon Nut, Oxygen Outlet Spout Fitting
18	492627	Oxygen Outlet Spout Fitting
19	492682	Intake Filter Adapter
20	492107	Cord Clamp
21	492673	Screw, THD Forming, 1/4-10 x 3/4 in.
22	492171	Hex Nut, 5/16 in.
23	492172	Splitlock Washer, 5/16 in.
24	492873	Washer, Caster, 5/16 in. i.d. x 1 1/2 in. o.d. x 1/8 in. thick (8 mm i.d. x 38.1 mm o.d. x 3.17 mm thick)
25	492661	Screw, Pan Head, #10-32 x 5/8 in. long
26	492309	Washer, Caster, 5/16 in. (8 mm)
27	492964	Right Concentrator Cabinet (does not include item 6 or Control Panel Label)
28	492174	Caster
29	492278	Spout Fitting, Nylon, 1/4 in. x 3/16 in.
30	492168	Coupling Fitting, Interior
31	492167	Washer, Chrome, 9/16 in. i.d. x 1 in. o.d. (14.29 mm i.d. x 25.4 mm o.d.)
32	492166	Oxygen Outlet Spout Fitting, Brass, Chrome
33	492290	O-ring
34	refer to Figure 6-19	Compressor Platform Base Assembly
35	included in item 34	Grommet
36	included in item 34	Compressor Wiring Harness
37	492653	Cord Wrap
38	492771	Cord Strain Relief
39	492656	Right Upper Cabinet Tube
40	492187	Hour Meter, 120V
41	see Section 6.3.30	Circuit Breaker
42	492671	Wire Grommet
43	492651	Handle Cap
44	included in item 46	Connector
45	included in item 46	Connector
46	492870	Power Cord Assembly, 120V
47	492800	Air Dam Insulation, Right Cabinet
48	492774	Air Dam

[1] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.

6.3.9 2618 and 2619 Thomas Compressor Platform Assemblies (4 L/min)

(This assembly was not manufactured after January 1995.)

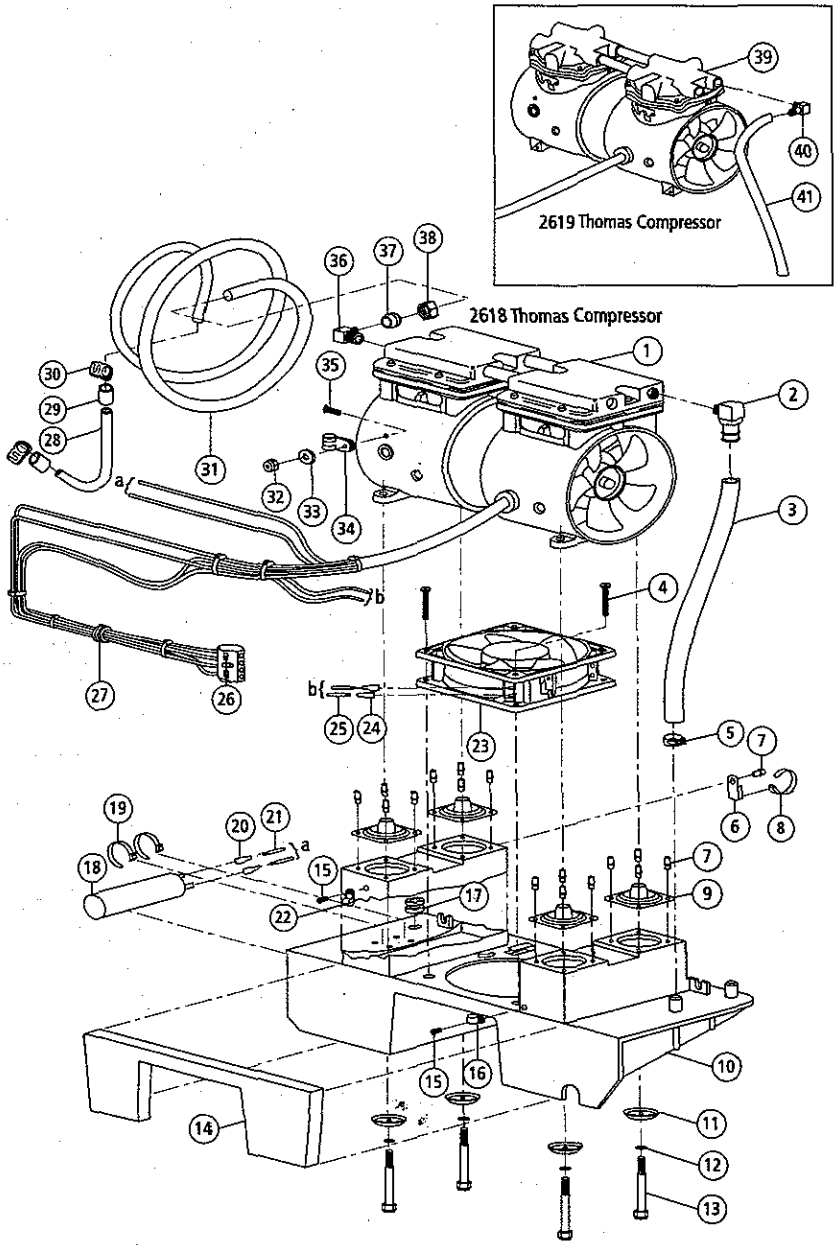


Figure 6-7: 2618 and 2619 Thomas Compressor Platform Assemblies

2618 & 2619 Thomas Compressor Platform Assemblies
(see Figure 6-7)

ITEM	PART NUMBER	DESCRIPTION
1	492956	2618 Thomas Compressor Assembly, New, 120V AC
	492957	2618 Thomas Compressor Assembly, Remanufactured, 120V AC
2	492043	Brass Elbow, ¼ in. NPT x ⅜ in. i.d.
3	494347 [1]	Tubing, ⅜ in. i.d. x ⅝ in. o.d. x 8⅞ in. long (9.52 mm i.d. x 15.87 mm o.d. x 225.42 mm long)
4	492108	Screw, Pan Head, 8-32 x 2 in.
5	492822	Clamp, Metal, ⅝ in. (15.87 mm)

ITEM	PART NUMBER	DESCRIPTION
6	493564	Mount, Tie Wrap
7	492111	Pop Rivet, Aluminum, ⅛ in. (3.17 mm)
8	492044	Plastic Strap, Small
9	494480	Rubber Mount [2]
10	492965	Platform Assembly (includes items 6, 7, 9, 14 & 17)
11	492078	Washer
12	492079	Washer, Splitlock, ¼ in. (6.35 mm)
13	493289	Hex Bolt, Compressor, ¼-20 x 1¾ in.
14	492799	Insulation, Compressor Gasket, Right Cabinet
15	492789	Screw, THD Forming, #6-19 x 5⁄16 in.
16	492107	Cord Clamp
17	493565	Wire Grommet
18	see chart below	Capacitor
19	492104	Cable Tie, Large
20	included in item 1	Connector
21	included in item 1	Wire Harness
22	492773	Clamp, Wire, 3⁄16 in. (4.76 mm)
23	492109	Cooling Fan, 120V AC
24	included in item 1	Connector
25	included in item 1	Wire Harness
26	included in item 1	Connector & Wire Harness
27	included in item 1	Grommet
28	494346 [1]	Tubing, ⅜ in. i.d. x ⅝ in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)
29	492926	Exhaust Hose Sleeve
30	492890	Plastic Clamp, Size G
31	492966	Heat Exchanger Assembly (includes items 36, 37, and 38)
32	492944 [3]	Nylon Locknut Screw, #6-32
33	492946 [3]	Washer, #6 SAE
34	492942 [3]	Clamp, Heat Exchanger
35	492943 [3]	Screw, Button Head, #6-32 x ½ in.
36	492042	Exhaust Fitting Assembly (includes items 37 & 38)
37	included in item 36	Ferrule
38	included in item 36	Brass Nut
39	492959	2619 Thomas Compressor Assembly, New, 120V AC (Standard) [4]
	492961	2619 Thomas Compressor Assembly, Remanufactured, 120V AC (Standard) [4]
	493575	2619 Thomas Compressor Assembly, New, 120V AC (High Efficiency) [4]
	493576	2619 Thomas Compressor Assembly, Remanufactured, 120V AC (High Efficiency) [4]
40	492043	Brass Elbow, ¼ in. NPT x ⅜ in. i.d.
41	494347 [1]	Tubing, ⅜ in. i.d. x ⅝ in. o.d. x 12 in. long (9.52 mm i.d. x 15.87 mm o.d. x 304.8 mm long)

[1] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.
[2] Can be replaced with rubber mounts or retrofitted with P/N 493934 (Figure 6-22, Revision C and parts list Section 6.3.24, Revision C).
[3] An additional set of items 32, 33, 34 and 35 are installed on the rear of the compressor but are not shown in this figure.
[4] This 2619 Thomas Compressor used with this Compressor Platform Assembly between November 1989 and December 1992.

Capacitor Chart

PART NUMBER	µF	CONCENTRATOR MODEL	COMPRESSOR	MOTOR NUMBER
492989	7	492a (120V, 60 Hz)	Thomas	608546
492989	7	590 (120V, 60 Hz)	Thomas (Standard)	608208
493530	15	590 (120V, 60 Hz)	Thomas (High Efficiency)	608729
493530	15	590 (120V, 60 Hz)	Thomas (2639 Series)	608932

6.3.10 2619 Thomas Compressor Platform Assembly, Drawing A (5 L/min)

(This assembly not manufactured after June 1996.)

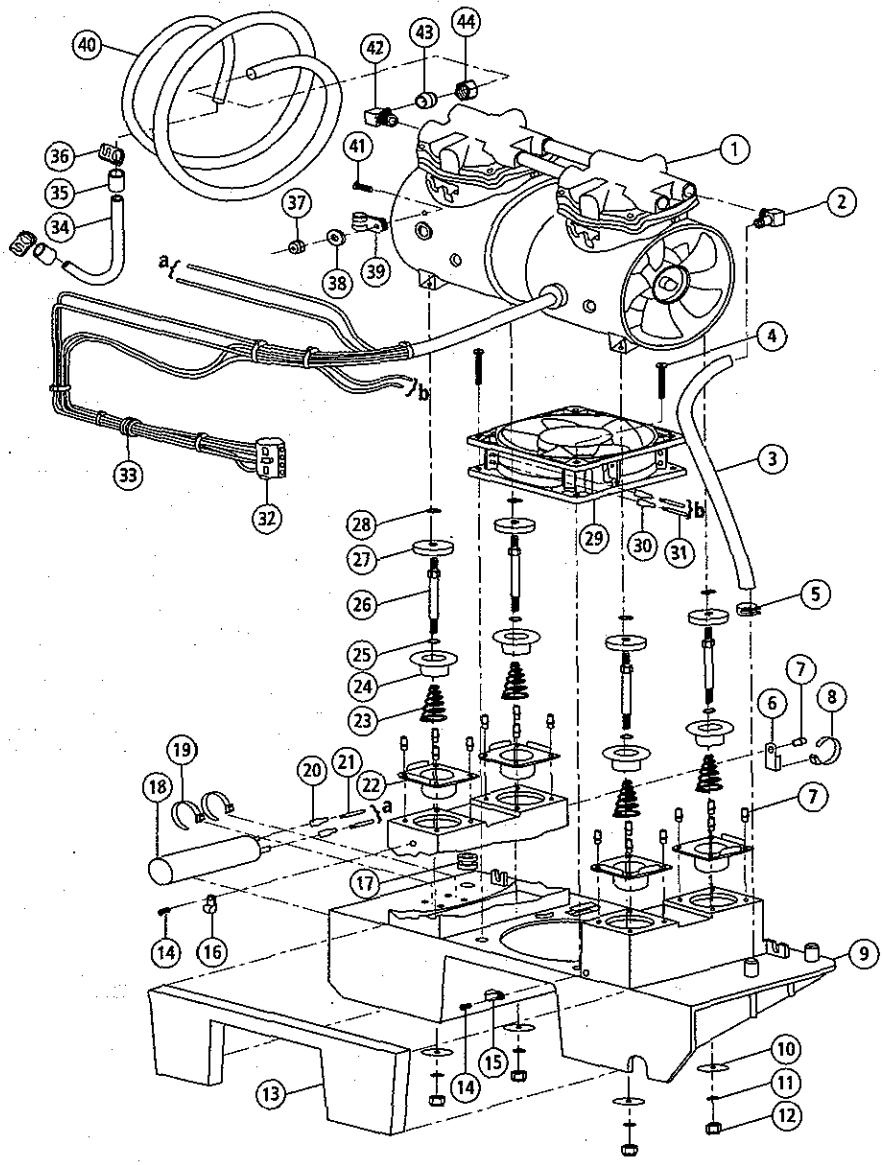


Figure 6-8: 2619 Thomas Compressor Platform Assembly, Drawing A

2619 Thomas Compressor Platform Assembly, Drawing A
(see Figure 6-8)

ITEM	PART NUMBER	DESCRIPTION
1	492959	2619 Thomas Compressor Assembly, New, 120V AC (Standard)
	492961	2619 Thomas Compressor Assembly, Remanufactured, 120V AC (Standard)
	493575	2619 Thomas Compressor Assembly, New, 120V AC (High Efficiency)
	493576	2619 Thomas Compressor Assembly, Remanufactured, 120V AC (High Efficiency)
2	492043	Brass Elbow, ¼ in. NPT x ⅜ in. i.d.
3	494347 [1]	Tubing, ⅜ in. i.d. x ⅝ in. o.d. x 12 in. long (9.52 mm i.d. x 15.87 mm o.d. x 304.8 mm long)
4	492108	Screw, Pan Head, 8-32 x 2 in.
5	492822	Clamp, Metal, ⅝ in. (15.87 mm)
6	493564	Mount, Tie Wrap

ITEM	PART NUMBER	DESCRIPTION
7	493603	Pop Rivet, Aluminum, ⅛ in. (3.17 mm)
8	492044	Plastic Strap, Small
9	494002	Platform Assembly (includes items 6, 7, 13, 17, & 22)
10	493602	Bottom Washer
11	493639	Splitlock Washer, #12
12	493673	Nylock Nut, 12-24
13	492799	Insulation, Compressor Gasket, Right Cabinet
14	492789	Screw, THD Forming, #6-19 x 5/16 in.
15	492107	Cord Clamp
16	492773	Clamp, Wire, 3/16 in. (4.76 mm)
17	493565	Wire Grommet
18	see chart below	Capacitor
19	492104	Cable Tie, Large
20	included in item 1	Connector
21	included in item 1	Wire Harness
22	493598	Spring Cup
23	493903	Spring Mount, 28 lb [4]
24	493969	Spring Cup Liner
25	493902	Nylon Washer, Spring Mount
26	493599	Spring Bolt
27	493600	Cup Washer
28	493601	Spacer, Spring Mount
29	492109 [2]	Cooling Fan, 120V AC
30	included in item 1	Connector
31	included in item 1	Wire Harness
32	included in item 1	Connector & Wire Harness
33	included in item 1	Grommet
34	494346 [1]	Tubing, ⅜ in. i.d. x ⅝ in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)
35	492926	Exhaust Hose Sleeve
36	492890	Plastic Clamp, Size G
37	492944 [3]	Nylon Locknut Screw, #6-32
38	492946 [3]	Washer, #6 SAE
39	492942 [3]	Clamp, Heat Exchanger
40	492966	Heat Exchanger Assembly
41	492943 [3]	Screw, Button Head, #6-32 x ½ in.
42	492042	Exhaust Fitting Assembly (includes items 43 & 44)
43	included in item 42	Ferrule
44	included in item 42	Brass Nut

[1] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.
[2] On units manufactured after March 13, 1996, note the new position of attaching leads.
[3] An additional set of items 37, 38, 39, and 41 are installed on the rear of the compressor but are not shown in this figure.
[4] Springs sold in sets of 4. Replacement Kit Part Number 494011 (kit includes items 12, 23, 24 and 25). If one spring needs to be replaced, be sure to replace all four.

Capacitor Chart

PART NUMBER	µF	CONCENTRATOR MODEL	COMPRESSOR	MOTOR NUMBER
492989	7	492a (120V, 60 Hz)	Thomas	608546
492989	7	590 (120V, 60 Hz)	Thomas (Standard)	608208
493530	15	590 (120V, 60 Hz)	Thomas (High Efficiency)	608729
493530	15	590 (120V, 60 Hz)	Thomas (2639 Series)	608932

6.3.11 2619 Thomas Compressor Platform Assembly, Drawing B (5 L/min)

(This assembly only manufactured between March 1996 and April 1996.)

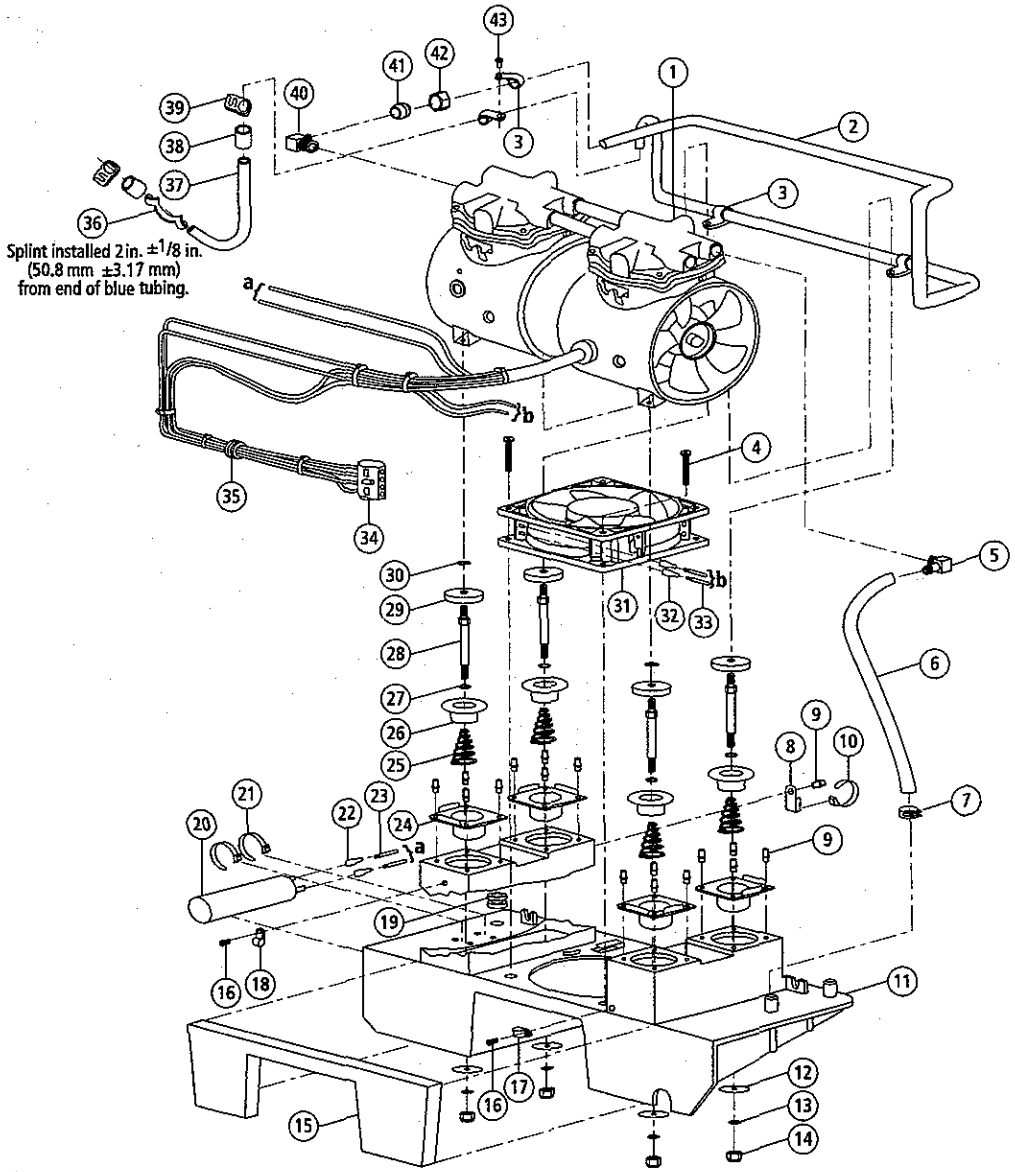


Figure 6-9: 2619 Thomas Compressor Platform Assembly, Drawing B

2619 Thomas Compressor Platform Assembly, Drawing B
(see Figure 6-9)

ITEM	PART NUMBER	DESCRIPTION
1	492959	2619 Thomas Compressor Assembly, New, 120V AC (Standard)
	492961	2619 Thomas Compressor Assembly, Remanufactured, 120V AC (Standard)
	493575	2619 Thomas Compressor Assembly, New, 120V AC (High Efficiency)
	493576	2619 Thomas Compressor Assembly, Remanufactured, 120V AC (High Efficiency)
2	494147 [3]	Heat Exchanger Assembly
3	492942	Clamp, Heat Exchanger
4	492108	Screw, Pan Head, 8-32 x 2 in.
5	492043	Brass Elbow, ¼ in. NPT x ⅜ in. i.d.
6	494347 [1]	Tubing, ⅜ in. i.d. x ⅝ in. o.d. x 12 in. long (9.52 mm i.d. x 15.87 mm o.d. x 304.8 mm long)
7	492822	Clamp, Metal, ⅝ in. (15.87 mm)

ITEM	PART NUMBER	DESCRIPTION
8	493564	Mount, Tie Wrap
9	493603	Pop Rivet, Aluminum, 1/8 in. (3.17 mm)
10	492044	Plastic Strap, Small
11	494002	Platform Assembly (Includes items 8, 9, 15, 19, & 24)
12	493602	Bottom Washer
13	493639	Splitlock Washer, #12
14	493673	Nylock Nut, 12-24
15	492799	Insulation, Compressor Gasket, Right Cabinet
16	492789	Screw, THD Forming, #6-19 x 5/16 in.
17	492107	Cord Clamp
18	492773	Clamp, Wire, 3/16 in. (4.76 mm)
19	493565	Wire Grommet
20	see chart below	Capacitor
21	492104	Cable Tie, Large
22	included in item 1	Connector
23	included in item 1	Wire Harness
24	493598	Spring Cup
25	493903	Spring Mount, 28 lb [5]
26	493969	Spring Cup Liner
27	493902	Nylon Washer, Spring Mount
28	493599	Spring Bolt
29	493600	Cup Washer
30	493601	Spacer, Spring Mount
31	492109 [2]	Cooling Fan, 120V AC
32	included in item 1	Connector
33	included in item 1	Wire Harness
34	included in item 1	Connector & Wire Harness
35	included in item 1	Grommet
36	494158 [4]	Compressor Hose Splint
37	494346 [1]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)
38	492926	Exhaust Hose Sleeve
39	492890	Plastic Clamp, Size G
40	492042	Exhaust Fitting Assembly (includes items 41 & 42)
41	included in item 40	Ferrule
42	included in item 40	Brass Nut
43	Reference [6]	Rivnut, Aluminum, 10-24

[1] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.
[2] On units manufactured after March 13, 1996, note the new position of attaching leads.
[3] When ordering item 2, order item 40 also.
[4] Replaced with Wire Form Splint on May 21, 1996. Part number stays the same.
[5] Springs sold in sets of 4. Replacement Kit Part Number 494011 (kit includes items 14, 25, 26 and 27). If one spring needs to be replaced, be sure to replace all four.
[6] This rivnut requires a special tool for installation. Send any unit requiring this repair to Mallinckrodt for factory installation.

Capacitor Chart

PART NUMBER	µF	CONCENTRATOR MODEL	COMPRESSOR	MOTOR NUMBER
492989	7	492a (120V, 60 Hz)	Thomas	608546
492989	7	590 (120V, 60 Hz)	Thomas (Standard)	608208
493530	15	590 (120V, 60 Hz)	Thomas (High Efficiency)	608729
493530	15	590 (120V, 60 Hz)	Thomas (2639 Series)	608932

6.3.12 2639 Thomas Compressor Platform Assembly (5 L/min)

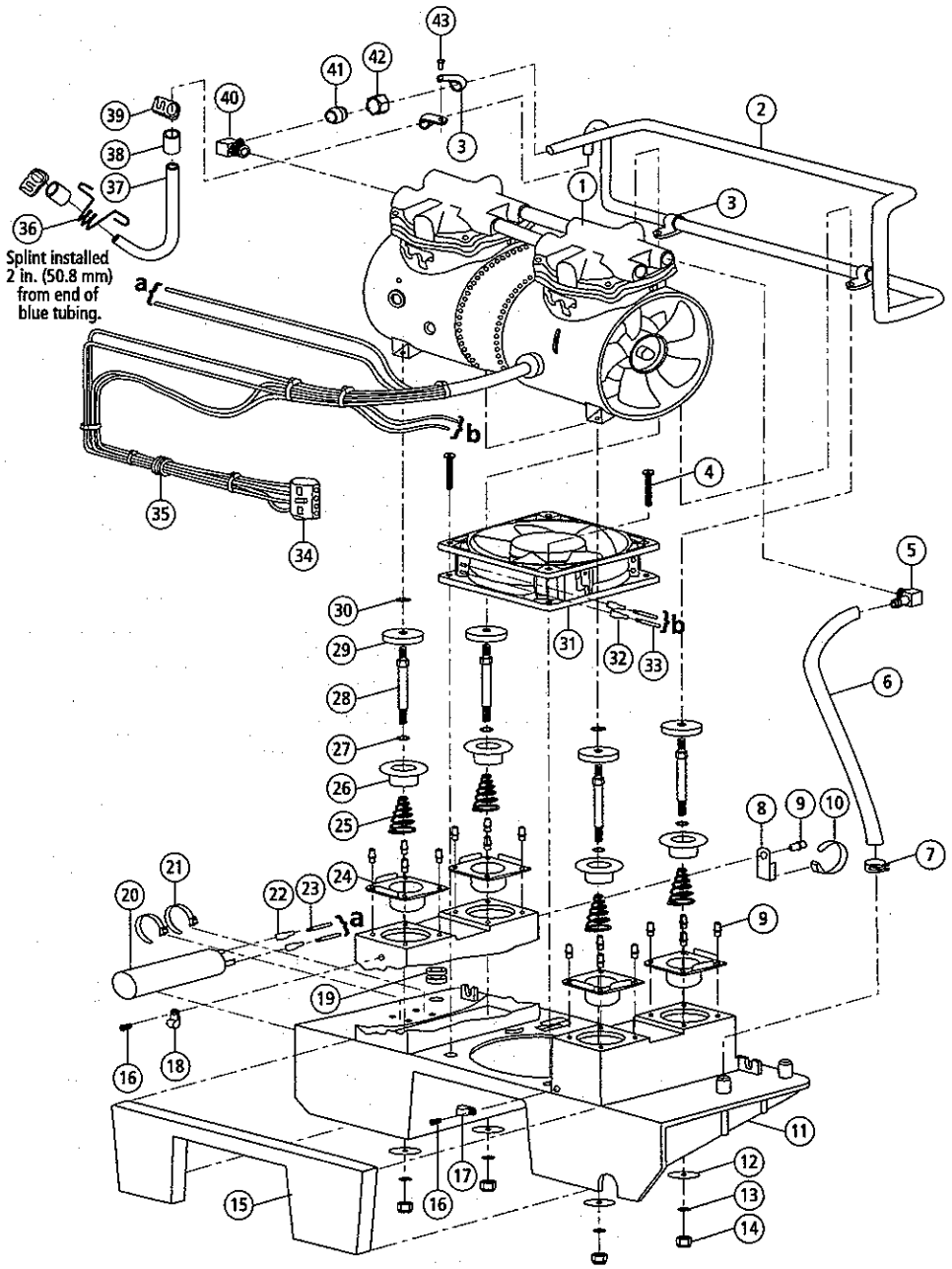


Figure 6-10: 2639 Thomas Compressor Platform Assembly

2639 Thomas Compressor Platform Assembly (see Figure 6-10)

ITEM	PART NUMBER	DESCRIPTION
1	494142	2639 Thomas Compressor Assembly, New
	494141	2639 Thomas Compressor Assembly, Remanufactured
2	494147 [3]	Heat Exchanger Assembly
3	492942	Clamp, Heat Exchanger
4	492108	Screw, Pan Head, 8-32 x 2 in.
5	492043	Brass Elbow, ¼ in. NPT x ⅜ in. i.d.
6	494347 [1]	Tubing, ⅜ in. i.d. x ⅝ in. o.d. x 12 in. long (9.52 mm i.d. x 15.87 mm o.d. x 304.8 mm long)
7	492822	Clamp, Metal, ⅝ in. (15.87 mm)

ITEM	PART NUMBER	DESCRIPTION
8	493564	Mount, Tie Wrap
9	493603	Pop Rivet, Aluminum, 1/8 in. (3.17 mm)
10	492044	Plastic Strap, Small
11	494002	Platform Assembly (Includes items 8, 9, 15, 19 & 24)
12	493602	Bottom Washer
13	493639	Splitlock Washer, #12
14	493673	Nylock Nut, 12-24
15	492799	Insulation, Compressor Gasket, Right Cabinet
16	492789	Screw, THD Forming, #6-19 x 5/16 in.
17	492107	Cord Clamp
18	492773	Clamp, Wire, 3/16 in. (4.76 mm)
19	493565	Wire Grommet
20	see chart below	Capacitor
21	492104	Cable Tie, Large
22	included in item 1	Connector
23	included in item 1	Wire Harness
24	493598	Spring Cup
25	493903	Spring Mount, 28 lb [4]
26	493969	Spring Cup Liner
27	493902	Nylon Washer, Spring Mount
28	493599	Spring Bolt
29	493600	Cup Washer
30	493601	Spacer, Spring Mount
31	492109 [2]	Cooling Fan, 120V AC
32	included in item 1	Connector
33	included in item 1	Wire Harness
34	included in item 1	Connector & Wire Harness
35	included in item 1	Grommet
36	494158	Compressor Hose Splint
37	494346 [1]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)
38	492926	Exhaust Hose Sleeve
39	492890	Plastic Clamp, Size G
40	492042	Exhaust Fitting Assembly (includes items 41 and 42)
41	included in item 40	Ferrule
42	included in item 40	Brass Nut
43	Reference [5]	Rivnut, Aluminum, 10-24

[1] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.

[2] On units manufactured after March 13, 1996, note the new position of attaching leads.

[3] When ordering item 2, order item 40 also.

[4] Springs sold in sets of 4. Replacement Kit Part Number 494011 (kit includes items 14, 25, 26 and 27). If one spring needs to be replaced, be sure to replace all four.

[5] This rivnut requires a special tool for installation. Send any unit requiring this repair to Mallinckrodt for factory installation.

Capacitor Chart

PART NUMBER	µF	CONCENTRATOR MODEL	COMPRESSOR	MOTOR NUMBER
492989	7	492a (120V, 60 Hz)	Thomas	608546
492989	7	590 (120V, 60 Hz)	Thomas (Standard)	608208
493530	15	590 (120V, 60 Hz)	Thomas (High Efficiency)	608729
493530	15	590 (120V, 60 Hz)	Thomas (2639 Series)	608932

6.3.13 2650 Thomas Compressor Platform Assembly

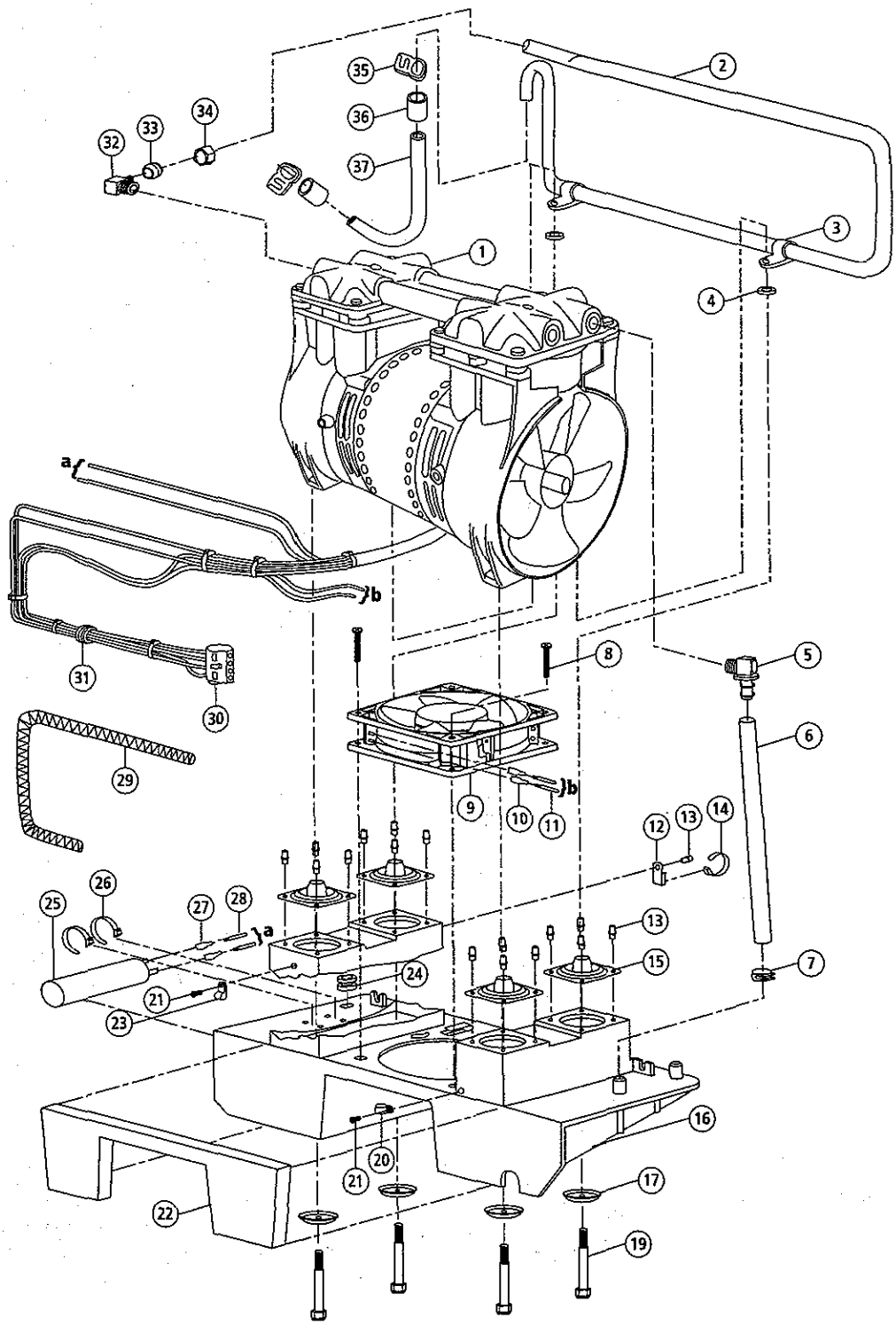


Figure 6-11: 2650 Thomas Compressor Platform Assembly

2650 Thomas Compressor Platform Assembly
(see Figure 6-11)

ITEM	PART NUMBER	DESCRIPTION
1	494522	2650 Thomas Compressor Assembly, New
	494521	2650 Thomas Compressor Assembly, Remanufactured
2	494519 [2]	Heat Exchanger Assembly
3	492942	Clamp, Heat Exchanger
4	493601 [3]	Spacer
5	492043	Brass Elbow, 1/4 in. NPT x 3/8 in. i.d.
6	494346 [1]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)
7	492822	Clamp, Metal, 5/8 in. (15.87 mm)
8	492108	Screw, Pan Head, 8-32 x 2 in.
9	492109	Cooling Fan, 120V AC
10	included in item 1	Connector
11	included in item 1	Wire Harness
12	493564	Mount, Tie Wrap
13	492111	Pop Rivet, Aluminum, 1/8 in. (3.17 mm)
14	492044	Plastic Strap, Small
15	494480 [4]	Rubber Motor Mount
16	492965	Platform Assembly (Includes items 12, 13, 15, 22, 24)
17	492078	Washer
19	493289	Hex Bolt, Compressor, 1/4-20 x 1 3/4 in.
20	492107	Cord Clamp
21	492789	Screw, THD Forming, #6-19 x 5/16 in.
22	492799	Insulation, Compressor Gasket, Right Cabinet
23	492773	Clamp, Wire, 3/16 in. (4.76 mm)
24	493565	Wire Grommet
25	see chart below	Capacitor
26	492104	Cable Tie, Large
27	included in item 1	Connector
28	included in item 1	Wire Harness
29	492893	Split Tubing, 13 in. long
30	included in item 1	Connector & Wire Harness
31	included in item 1	Grommet
32	492042	Exhaust Fitting Assembly (includes items 33 and 34)
33	included in item 32	Ferrule
34	included in item 32	Brass Nut
35	492890	Plastic Clamp, Size G
36	492926	Exhaust Hose Sleeve
37	494346 [1]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)

[1] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.
[2] Includes item 32.
[3] Spacers are not required for units manufactured after Dec. 2, 1997.
[4] Not for use with Gast Compressor.

Capacitor Chart

PART NUMBER	µF	CONCENTRATOR MODEL	COMPRESSOR	MOTOR NUMBER
493530	15	590 (120V, 60 Hz)	2650 Thomas	600087
493530	15	590 (120V, 60 Hz)	2650 Thomas, 17 mm	608970

6.3.14 Gast Compressor Platform Assembly (5 L/min)

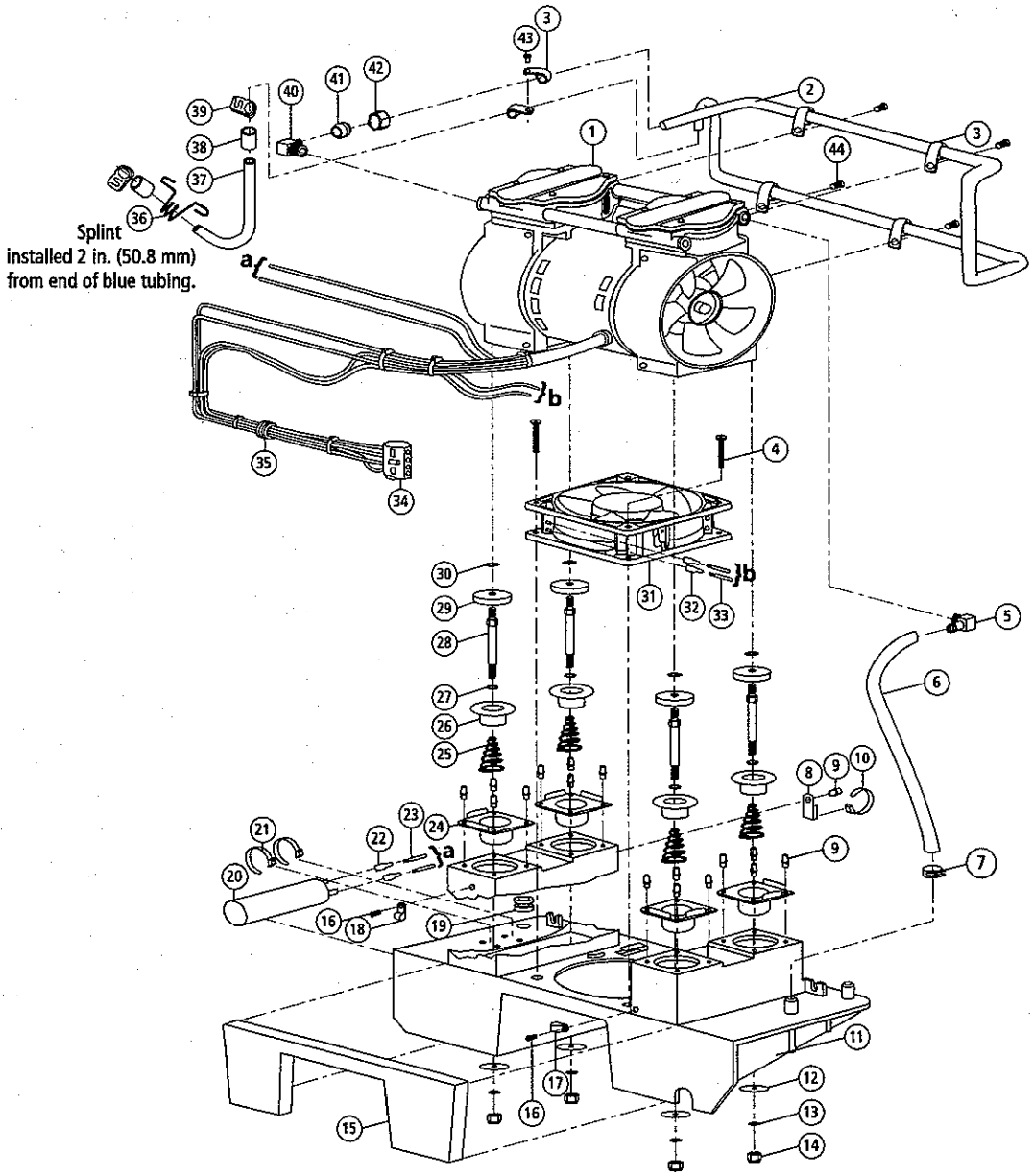


Figure 6-12: Gast Compressor Platform Assembly

Gast Compressor Platform Assembly
(see Figure 6-12)

ITEM	PART NUMBER	DESCRIPTION
1	494241	Gast Compressor Assembly, Remanufactured
	494181	Gast Compressor Assembly, New, 17 mm [5]
	494239	Gast Compressor Assembly, Remanufactured, 17 mm [5]
2	494147 [3]	Heat Exchanger Assembly (includes item 44)
3	492942	Clamp, Heat Exchanger
4	492108	Screw, Pan Head, 8-32 x 2 in.
5	492043	Brass Elbow, ¼ in. NPT x ⅜ in. i.d.

ITEM	PART NUMBER	DESCRIPTION
6	494347 [1]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 12 in. long (9.52 mm i.d. x 15.87 mm o.d. x 304.8 mm long)
7	492822	Clamp, Metal, 5/8 in. (15.87 mm)
8	493564	Mount, Tie Wrap
9	493603	Pop Rivet, Aluminum, 1/8 in. (3.17 mm)
10	492044	Plastic Strap, Small
11	494002	Platform Assembly (Includes items 8, 9, 15, 19, & 24)
12	493602	Bottom Washer
13	493639	Splitlock Washer, #12
14	493673	Nylock Nut, 12-24
15	492799	Insulation, Compressor Gasket, Right Cabinet
16	492789	Screw, THD Forming, #6-19 x 5/16 in.
17	492107	Cord Clamp
18	492773	Clamp, Wire, 3/16 in. (4.76 mm)
19	493565	Wire Grommet
20	493621	Capacitor, 7.5 µF
21	492104	Cable Tie, Large
22	included in item 1	Connector
23	included in item 1	Wire Harness
24	493598	Spring Cup
25	493903	Spring Mount, 28 lb [4]
26	493969	Spring Cup Liner
27	493902	Nylon Washer, Spring Mount
28	493599	Spring Bolt
29	493600	Cup Washer
30	493601	Spacer, Spring Mount
31	492109 [2]	Cooling Fan, 120V AC
32	included in item 1	Connector
33	included in item 1	Wire Harness
34	included in item 1	Connector & Wire Harness
35	included in item 1	Grommet
36	494158	Compressor Hose Splint
37	494346 [1]	Tubing, 3/8 in. i.d. x 5/8 in. o.d. x 10 in. long (9.52 mm i.d. x 15.87 mm o.d. x 254 mm long)
38	492926	Exhaust Hose Sleeve
39	492890	Plastic Clamp, Size G
40	492042	Exhaust Fitting Assembly (includes items 41 and 42)
41	included in item 40	Ferrule
42	included in item 40	Brass Nut
43	Reference [6]	Rivnut, Aluminum, 10-24
44	included in item 2	Fan Shroud Screw

[1] Tubing sold in 4 ft. (1.2 m) lengths. Cut individual pieces as specified.

[2] On units manufactured after March 13, 1996, note the new position of attaching leads.

[3] When ordering item 2, order item 40 also.

[4] Springs sold in sets of 4. Replacement Kit Part Number 494011 (Kit includes items 14, 25, 26 and 27). If one spring needs to be replaced, be sure to replace all four.

[5] Refer to Mallinckrodt part number 494134 on the Gast compressor motor housing label to verify 17mm model.

[6] This rivnut requires a special tool for installation. Send any unit requiring this repair to Mallinckrodt for factory installation.

6.3.15 2618 Series Thomas Compressor

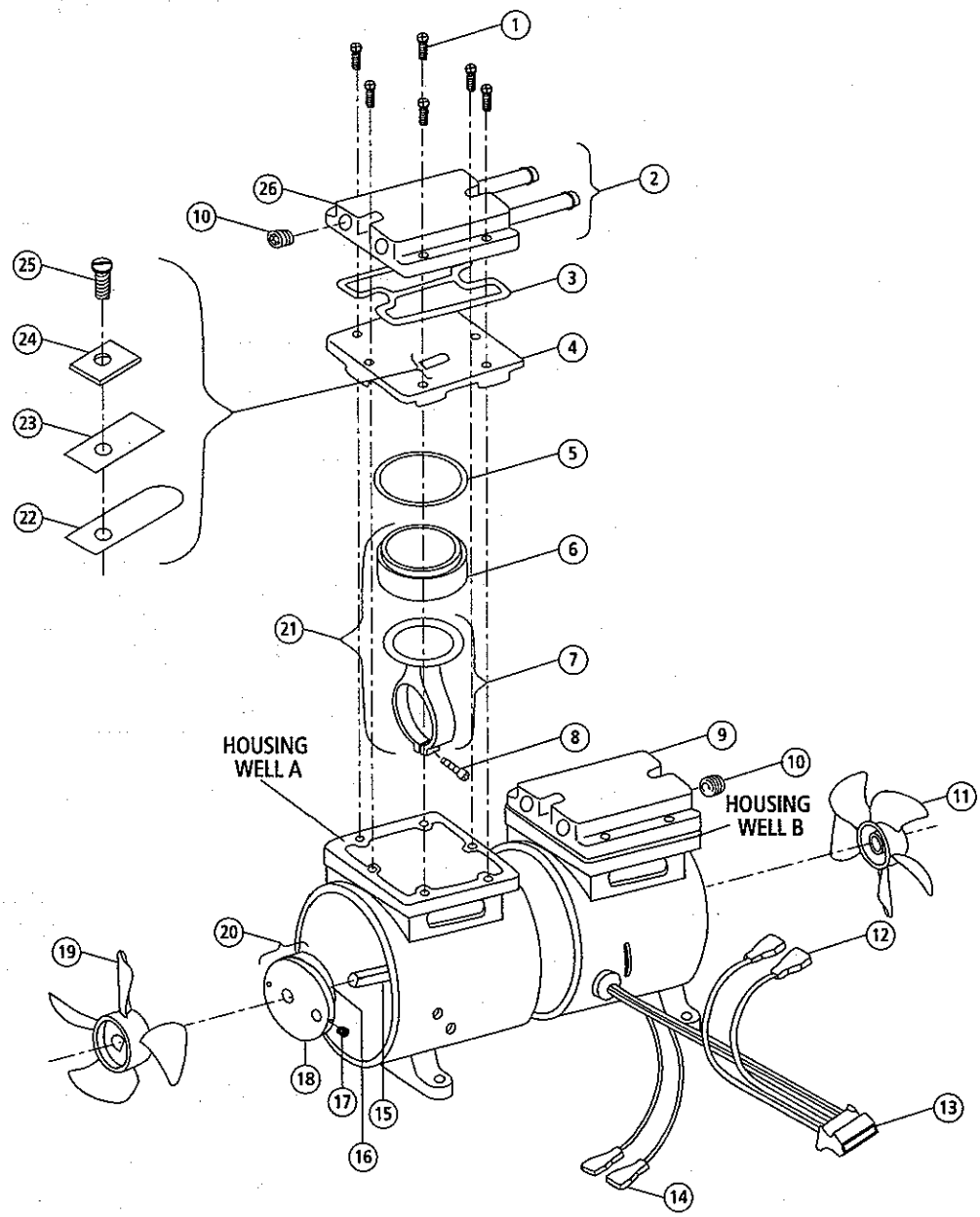


Figure 6-13: 2618 Series Thomas Compressor

2618 Series Thomas Compressor

(see Figure 6-13)

ITEM	PART NUMBER	DESCRIPTION
—	492956	2618 Thomas Compressor Assembly, New, 120V AC (includes items 1–26)
—	492957	2618 Thomas Compressor Assembly, Remanufactured, 120V AC (includes items 1–26)
1	492027	Cylinder Head Screw
2	492028	Connector Tubes (2) and O-Rings (4)
3	492031	Head Gasket
4	492032	Valve Plate
5	492033	Valve Plate O-ring
6	included in item 21	Sleeve
7	included in item 21	Piston Rod Assembly
8	492036	Piston Rod Screw
9	492030	Cylinder Head B
10	492592	Cylinder Head Plug
11	492038	Fan B
12	Reference [1]	Cooling Fan Wires/Connectors
13	Reference [1]	Compressor Wire/Connectors
14	Reference [1]	Capacitor Wires/Connectors
15	Reference [1]	Motor Shaft
16	included in item 20	Bearing
17	492039	Set Screw
18	included in item 20	Eccentric
19	492040	Fan A
20	492041	Eccentric Bearing Assembly (includes items 16, 17 & 18)
21	492954	Piston & Sleeve Assembly (includes items 6 & 7)
22	492465 [2]	Compressor Leaf Valve
23	492963	Compressor Valve Restraint
24	492563 [2]	Compressor Valve Keeper Strip
25	492962 [2]	Compressor Valve Plate Screw
26	492029	Cylinder Head A

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.

[2] Items 22, 24 and 25 are also used on the underside of each valve plate item 4. The leaf valve restraint, item 23, is not used in this location.

6.3.16 2619 Series Thomas Compressor

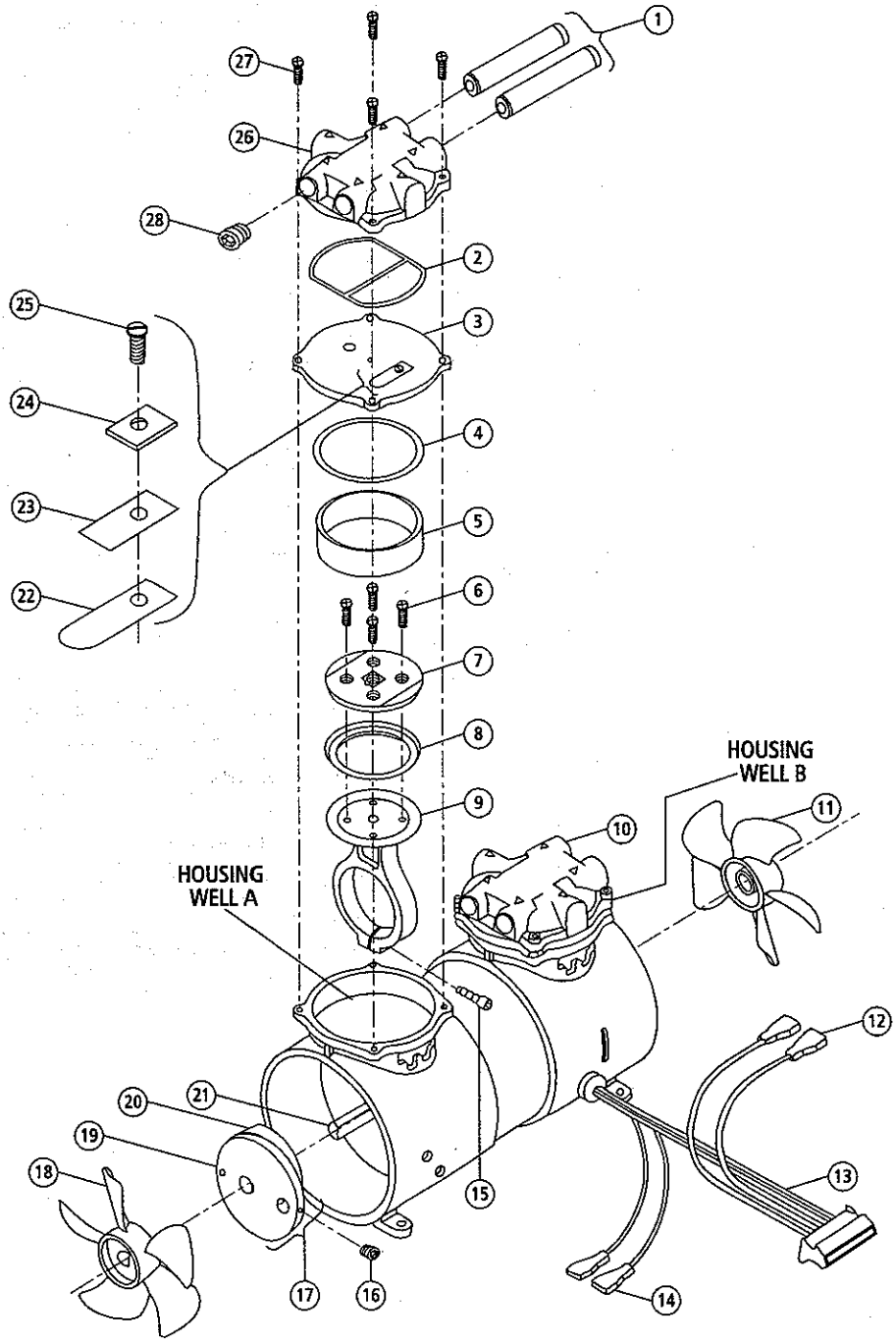


Figure 6-14: 2619 Series Thomas Compressor

2619 Series Thomas Compressor

(see Figure 6-14)

ITEM	PART NUMBER	DESCRIPTION
—	492959	2619 Thomas Compressor Assembly, New, 120V AC (Standard) (includes items 1–28)
—	492961	2619 Thomas Compressor Assembly, Remanufactured, 120V AC (Standard) (includes items 1–28)
—	493575	2619 Thomas Compressor Assembly, New, 120V AC (High Efficiency)
—	493576	2619 Thomas Compressor Assembly, Remanufactured, 120V AC (High Efficiency)
1	492482	Connector Tubes (2) and O-Rings (4)
2	492481	Head Gasket
3	492480	Valve Plate
4	492479	Valve Plate O-ring
5	492478	Sleeve
6	492477	Retaining Plate Screw
7	492476	Retaining Plate
8	492475	Cup Seal
9	493125	Piston Rod
10	492471	Cylinder Head B
11	492038	Fan B
12	Reference [1]	Cooling Fan Wires/Connectors
13	Reference [1]	Compressor Wire Harness
14	Reference [1]	Capacitor Wires/Connectors
15	492036	Piston Rod Screw
16	492039	Set Screw
17	493340	Eccentric Bearing Assembly (includes items 16, 19 & 20)
18	492470	Fan A
19	included in item 17	Eccentric
20	included in item 17	Bearing
21	Reference [1]	Motor Shaft
22	492465 [2]	Compressor Leaf Valve
23	492963	Compressor Valve Restraint
24	492563 [2]	Compressor Valve Keeper Strip
25	492962 [2]	Compressor Valve Plate Screw
26	492472	Cylinder Head A
27	492027	Cylinder Head Screw
28	492592	Cylinder Head Plug

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.

[2] Items 22, 24 and 25 are also used on the underside of each valve plate item 3. The leaf valve restraint, item 23, is not used in this location.

6.3.17 2639 Series Thomas Compressor

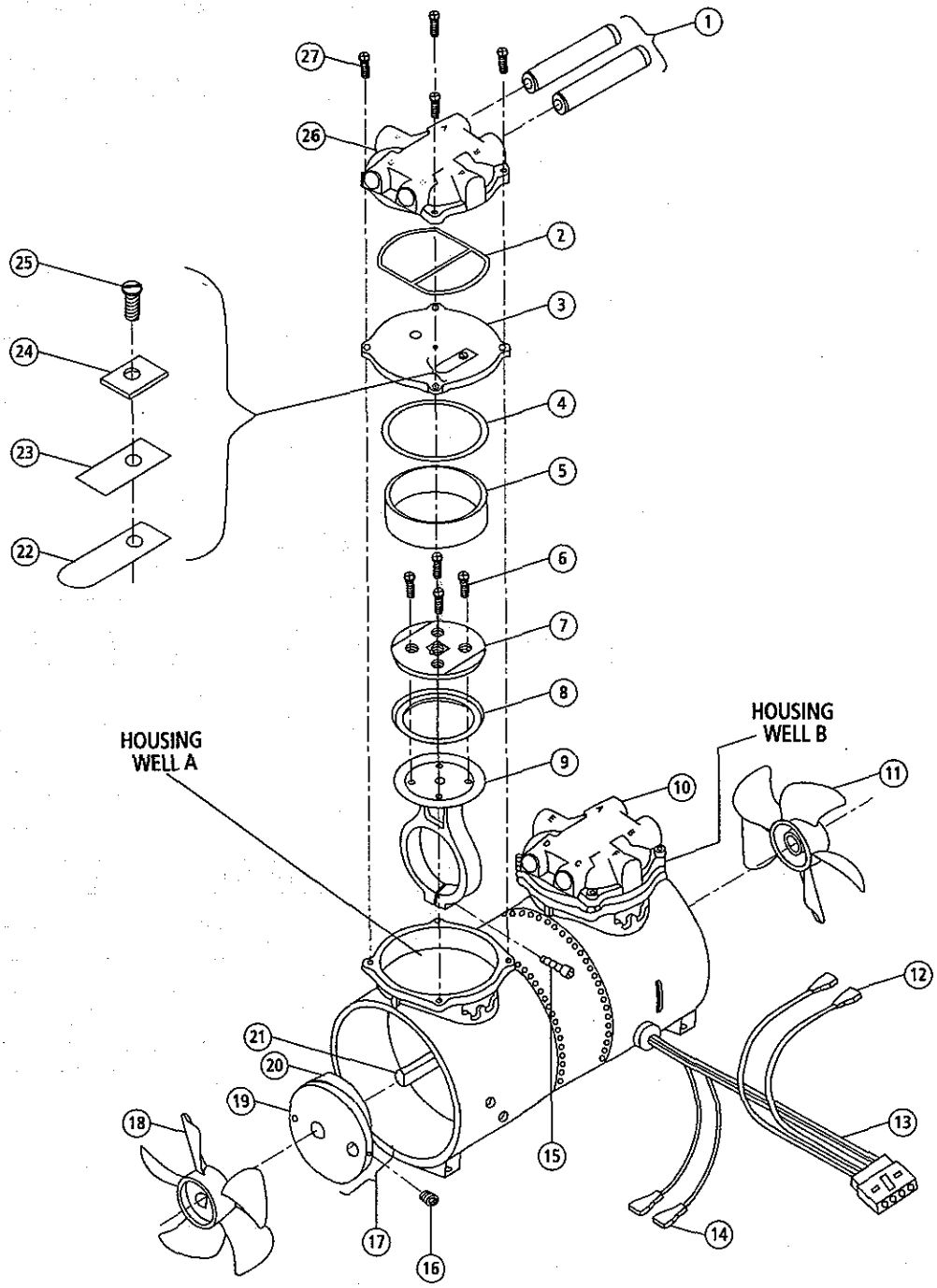


Figure 6-15: 2639 Series Thomas Compressor

2639 Series Thomas Compressor

(see Figure 6-15)

ITEM	PART NUMBER	DESCRIPTION
—	494142	2639 Thomas Compressor Assembly, New (includes items 1–27)
—	494141	2639 Thomas Compressor Assembly, Remanufactured (includes items 1–27)
1	492482	Connector Tubes (2) and O-Rings (4)
2	492481	Head Gasket
3	492480	Valve Plate
4	492479	Valve Plate O-ring
5	492478	Sleeve
6	492477	Retaining Plate Screw
7	492476	Retaining Plate
8	492475	Cup Seal
9	493125	Piston Rod
10	492471	Cylinder Head B
11	492038	Fan B
12	Reference [1]	Cooling Fan Wires/Connectors
13	Reference [1]	Compressor Wire Harness
14	Reference [1]	Capacitor Wires/Connectors
15	492036	Piston Rod Screw
16	492039	Set Screw
17	493340	Eccentric Bearing Assembly (includes items 16, 19 & 20)
18	492470	Fan A
19	included in item 17	Eccentric
20	included in item 17	Bearing
21	Reference [1]	Motor Shaft
22	492465 [2]	Compressor Leaf Valve
23	492963	Compressor Valve Restraint
24	492563 [2]	Compressor Valve Keeper Strip
25	492962 [2]	Compressor Valve Plate Screw
26	492472	Cylinder Head A
27	492027	Cylinder Head Screw

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.

[2] Items 22, 24 and 25 are also used on the underside of each valve plate item 3. The leaf valve restraint, item 23, is not used in this location.

6.3.18 2650 Thomas Compressor

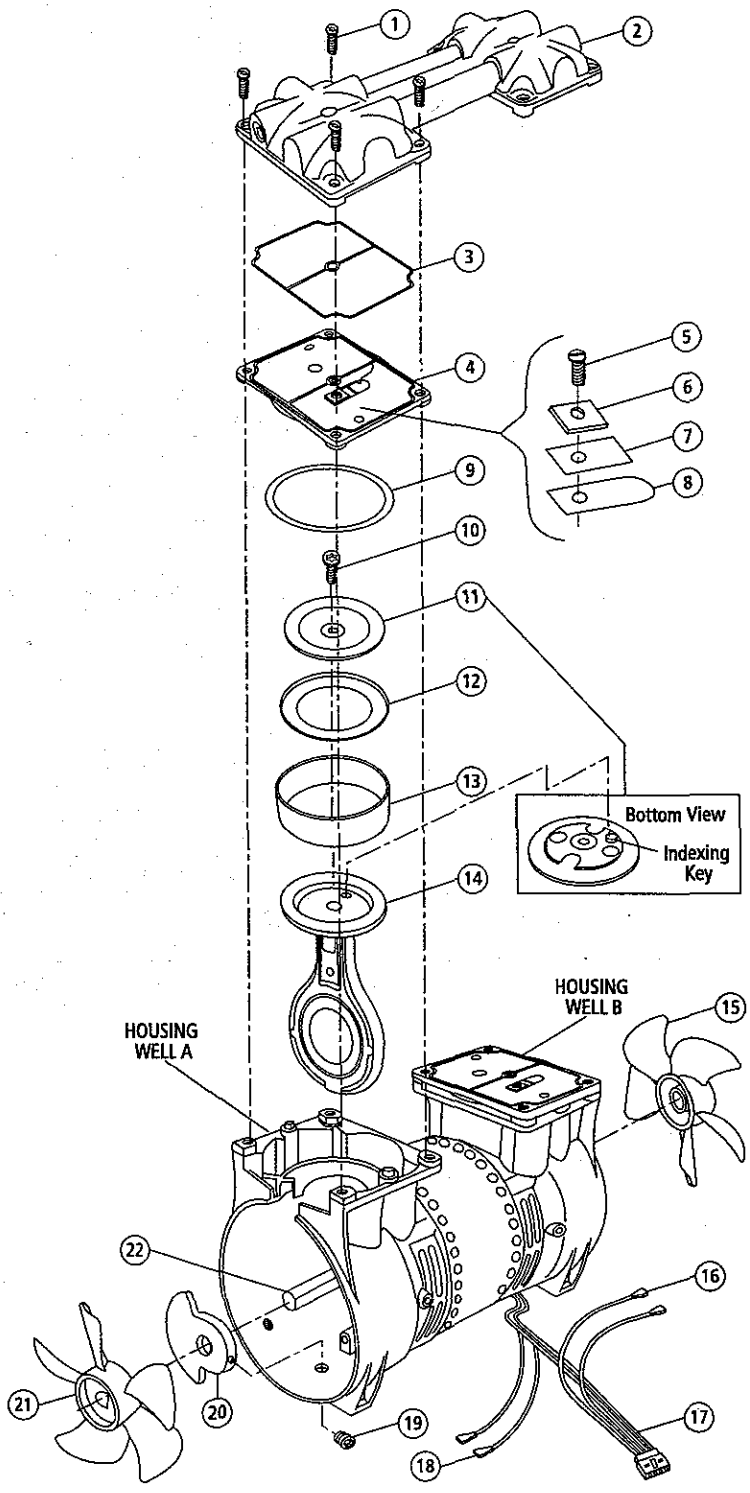


Figure 6-16: 2650 Thomas Compressor

2650 Thomas Compressor
(see Figure 6-16)

ITEM	PART NUMBER	DESCRIPTION
—	494522	2650 Thomas Compressor Assembly, New (includes items 1 to 22)
—	494521	2650 Thomas Compressor Assembly, Remanufactured (includes items 1 to 22)
—	494520	2650 Thomas Compressor, Remanufactured
—	494615	2650 Thomas Compressor, 17 mm, New
—	494616	2650 Thomas Compressor, 17 mm, Remanufactured
1	Reference [1]	Cylinder Head Screw
2	Reference [1]	Cylinder Head
3	Reference [1]	Head Gasket
4	Reference [1]	Valve Plate
5	Reference [1 2]	Compressor Valve Plate Screw
6	Reference [1 2]	Compressor Valve Keeper Strip
7	Reference [1]	Compressor Valve Restraint
8	Reference [1 2]	Compressor Leaf Valve
9	Reference [1]	Valve Plate O-ring
10	Reference [1]	Retaining Plate Screw
11	Reference [1]	Retaining Plate
12	Reference [1]	Cup Seal
13	Reference [1]	Sleeve
14	Reference [1]	Piston Rod
15	Reference [1]	Fan B
16	Reference [1]	Cooling Fan Wires/Connectors
17	Reference [1]	Compressor Wire Harness
18	Reference [1]	Capacitor Wires/Connectors
19	Reference [1]	Set Screw
20	Reference [1]	Eccentric
21	Reference [1]	Fan A
22	Reference [1]	Motor Shaft

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.
[2] Items 5, 6, and 8 are also used on the underside of each valve plate item 4. The leaf valve restraint, item 7, is not used in this location.

6.3.19 Gast Compressor

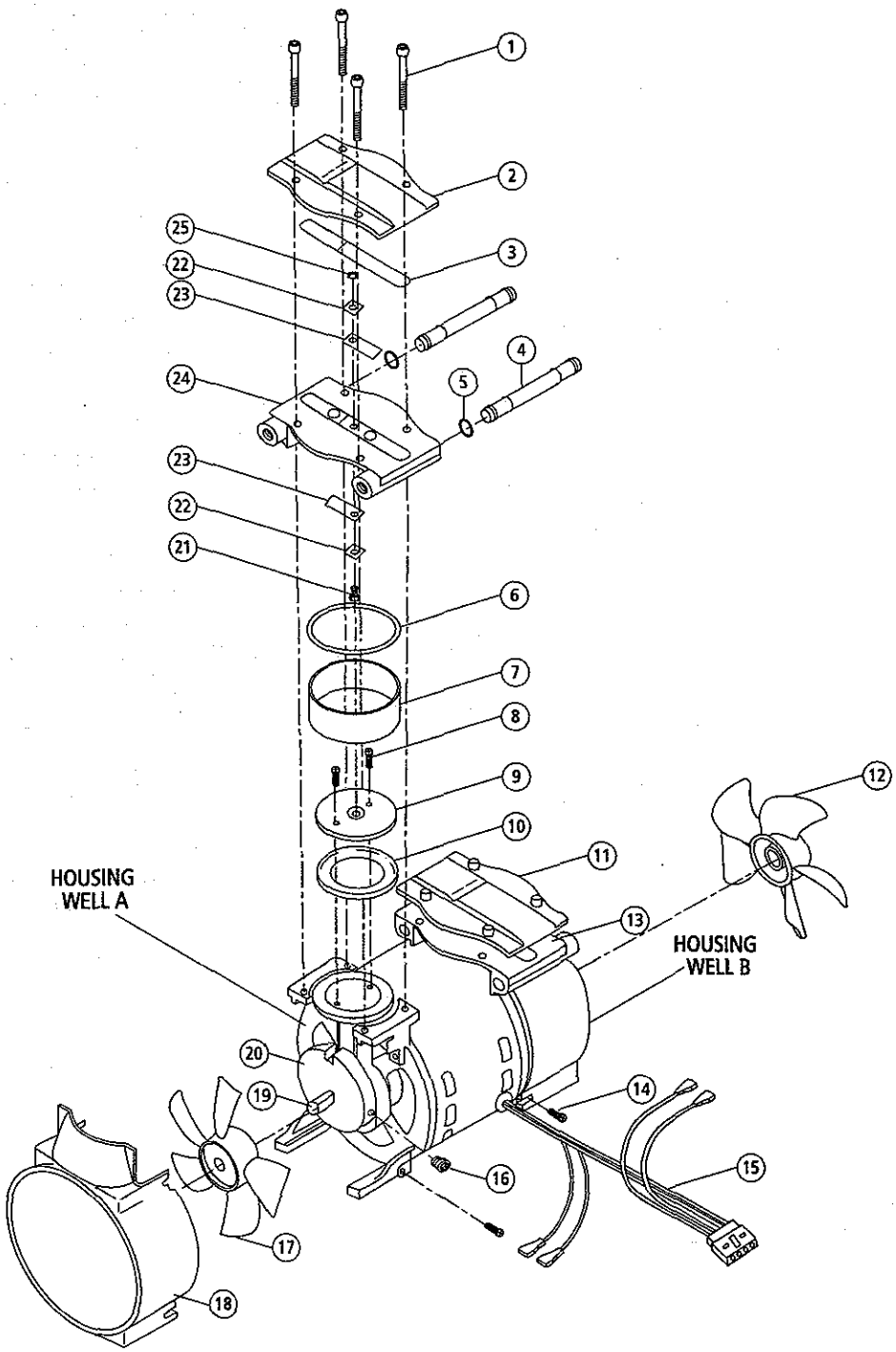


Figure 6-17: Gast Compressor

Gast Compressor
(see Figure 6-17)

ITEM	PART NUMBER	DESCRIPTION
—	494241	Gast Compressor Assembly, Remanufactured (includes items 1–25)
—	494181	Gast Compressor Assembly, New, 17 mm (includes items 1–25) [2]
—	494239	Gast Compressor Assembly, Remanufactured, 17 mm (includes items 1–25) [2]
1	Reference [1]	Screw, Cap
2	Reference [1]	Gast Compressor Head
	Reference [1]	Gast Compressor Head, 17 mm [2]
3	494279	O-ring, Head (2)
4	Reference [1]	Crossover Tube
5	494278	O-ring, Crossover Tube
6	494277	O-ring, Cylinder
7	494268	Gast Piston Cup Cylinder
8	Reference [1]	Screw, Piston Cup Retainer
9	Reference [1]	Plate, Retainer
10	494270	Cup, Piston
11	Reference [1]	Gast Compressor Head
	Reference [1]	Gast Compressor Head, 17 mm [2]
12	Reference [1]	Fan B (counterclockwise) Reference
	Reference [1]	Fan B (counterclockwise), 17 mm [2]
13	Reference [1]	Valve Plate
14	Reference [1]	Screw, Fan Shroud
15	Reference [1]	Motor Wire Leads
16	Reference [1]	Set Screw
17	Reference [1]	Fan A (clockwise)
	Reference [1]	Fan A (clockwise), 17 mm [2]
18	Reference [1]	Fan Shroud
19	Reference [1]	Shaft End
20	Reference [1]	Piston Rod
	Reference [1]	Piston Rod, 17 mm [2]
21	Reference [1]	Screw, Leaf Valve (2)
22	494273	Leaf Valve Retainer (4)
23	494274	Leaf Valve (4)
24	Reference [1]	Valve Plate
	Reference [1]	Valve Plate, 17 mm [2]
25	Reference [1]	Nut, Leaf Valve Retainer (2)
26	Reference [1]	Gast Valve Plate/Head Assembly Kit (includes items 1, 2, 24)
	Reference [1]	Gast Valve Plate/Head Assembly Kit, 17mm [2] (includes items 1, 2, 24)
27	494276	Gast Compressor O-ring Kit (includes items 3, 5, 6)
28	494271	Gast Valve Kit (includes items 21, 22, 23, 25)
29	494267	Gast Piston Cup Seal Replacement Kit (includes items 7, 8, 10)
30	Reference [1]	Gast Fan Shroud Kit (includes items 14, 18)

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.
[2] Refer to Mallinckrodt part number 494134 on the Gast compressor motor housing label to verify 17mm model.

6.3.20 Pressure Regulator

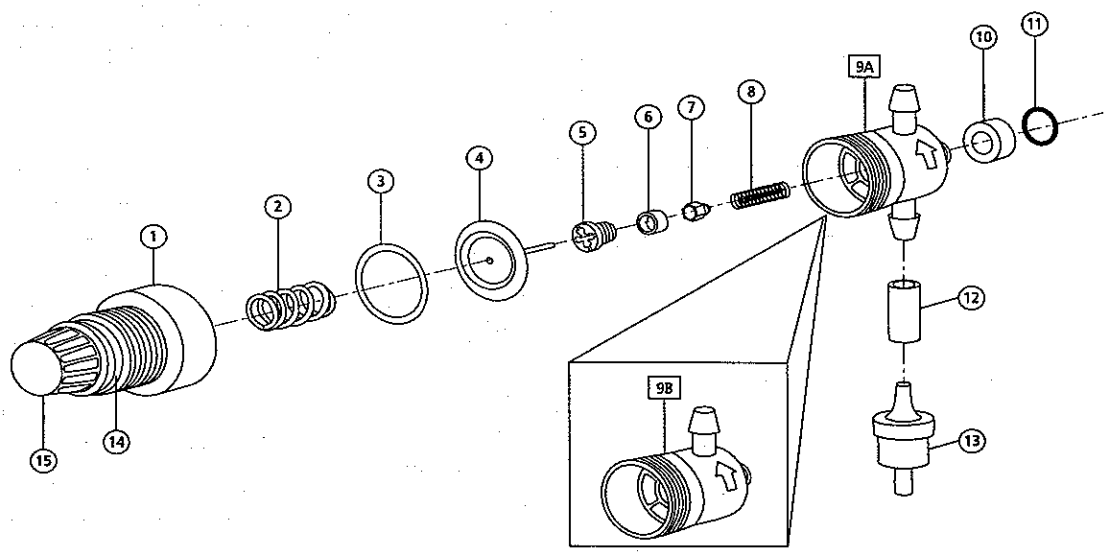


Figure 6-18: Pressure Regulator

ITEM	PART NUMBER	DESCRIPTION
—	492621	Pressure Regulator, Dual Port, Complete (items 1–9A)
—	494437	Pressure Regulator, Single Port, Complete (items 1–9B)
1	Reference [1]	Bonnet Assembly
2	Reference [1]	Spring
3	Reference [1]	Plastic Washer
4	Reference [1]	Diaphragm
5	Reference [1]	Plastic Seat
6	Reference [1]	Black Seal
7	Reference [1]	Poppet
8	Reference [1]	Spring
9A	Reference [1]	Regulator Body, Dual Port
9B	Reference [1]	Regulator Body, Single Port
10	493670	Sleeve
11	493547	O-ring
12	included in item 13	Tube
13	492050	Vacuum Check Valve Assembly (includes item 12)
14	Reference [1]	Lock Ring
15	Reference [1]	Adjustment Knob

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.

6.3.21 Compressor Platform Base Assembly

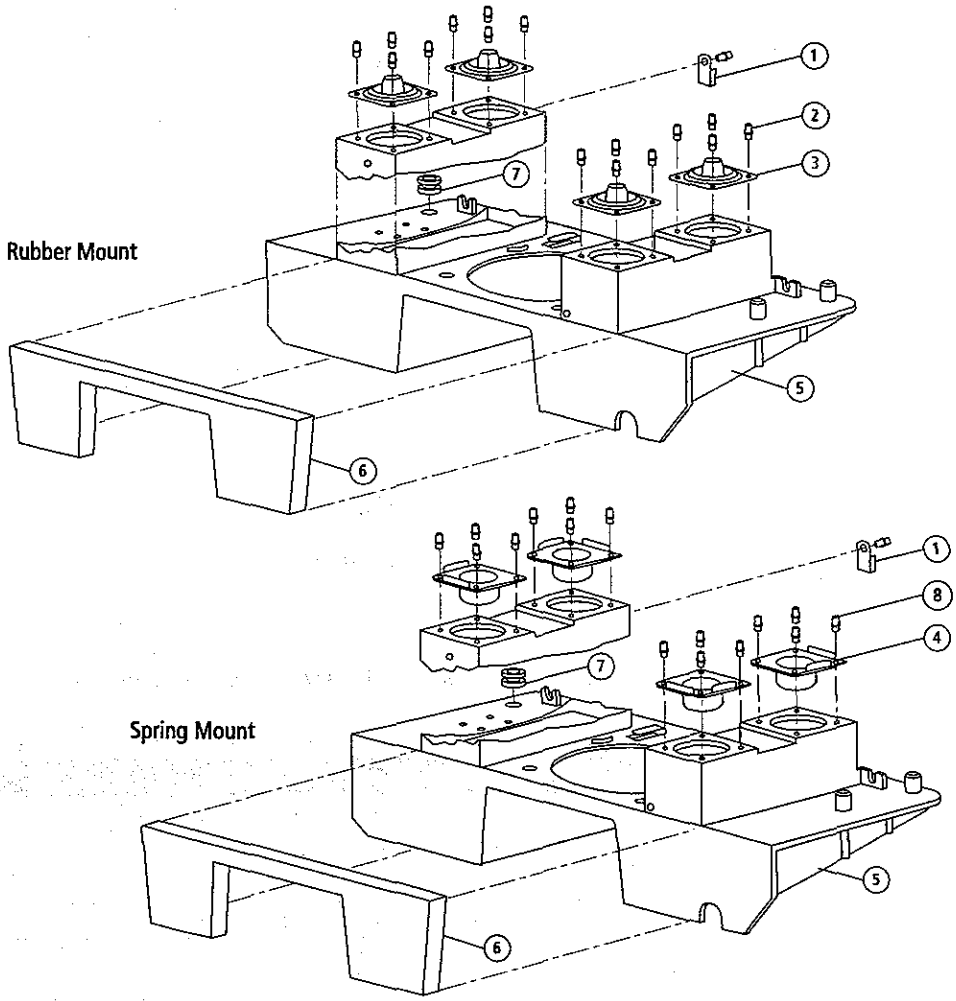


Figure 6-19: Compressor Platform Base Assembly

ITEM	PART NUMBER	DESCRIPTION
1	493564	Mount, Tie Wrap
2	492111	Pop Rivet, Aluminum, ⅛ in. (3.17 mm)
3	494480	Rubber Mount [1]
4	493598	Spring Cup
5	492965	Platform Assembly, with Rubber Shock Mounts (includes items 1, 2, 3, 6 & 7)
	494002	Platform Assembly, with Spring Shock Mounts (includes items 1, 4, 6, 7 & 8)
6	492799	Insulation, Compressor Gasket, Right Cabinet
7	493565	Wire Grommet
8	493603	Pop Rivet, Aluminum, ⅛ in. (3.17 mm)

[1] Can be retrofitted with Spring Mount Retrofit Kit Part Number 494011.

CAUTION: Rubber motor mounts are not for use with Gast compressors.

6.3.22 Solenoid Valve

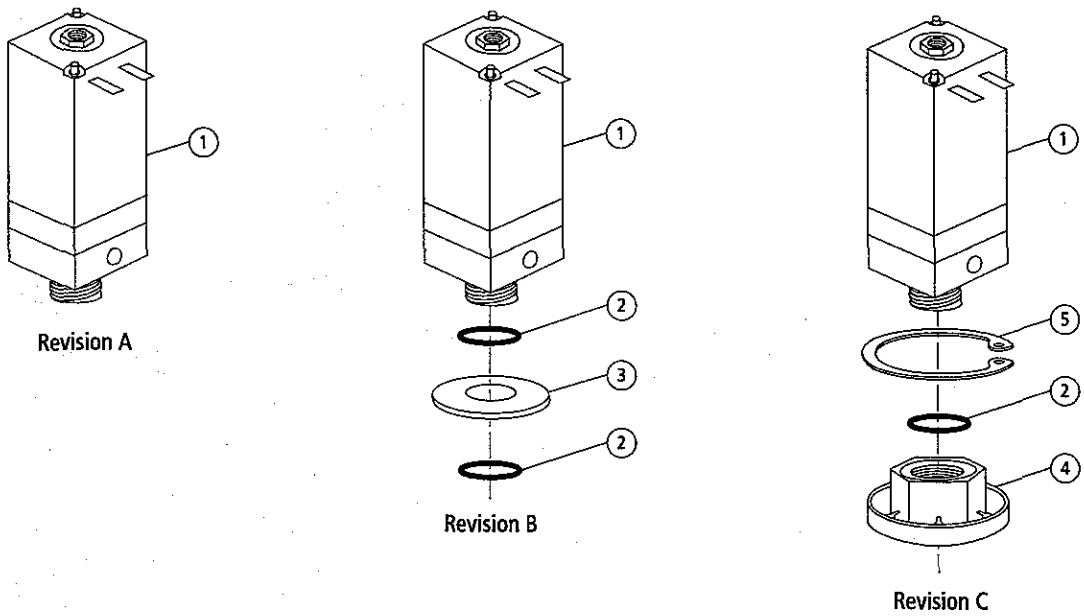


Figure 6-20: Solenoid Valve Progression

ITEM	PART NUMBER	DESCRIPTION
1	—	Balance or Supply Solenoid Valve
2	Reference [1]	O-ring, 0.489 in. (12.42 mm) i.d.
3	Reference [1]	Pilot Valve O-Ring Retainer
4	Reference [1]	Pilot Valve Cap (Counter Bored)
5	Reference [1]	Snap Ring

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.

6.3.23 Pilot Valve

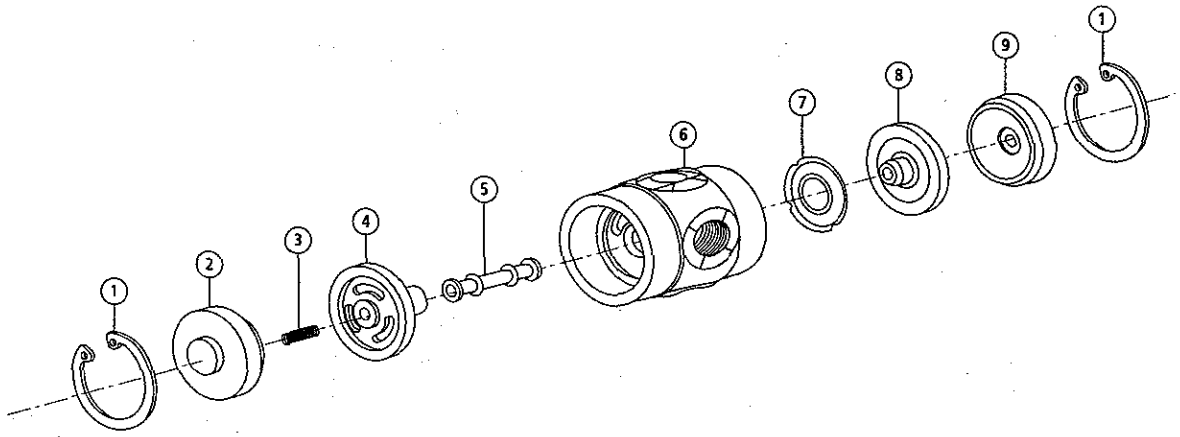


Figure 6-21: Pilot Valve

ITEM	PART NUMBER	DESCRIPTION
—	493582	Exhaust Pilot Valve, 90°
—	493884	Supply or Balance Pilot Valve
1	492052	Snap Ring
2	Reference [1]	End Cap
3	492935	Spring (used only in exhaust pilot valve)
4	included in item 10	Diaphragm (slotted)
5	492936	Poppet
6	Reference [1]	Valve Body
7	492055	Support Washer
8	included in item 10	Diaphragm (solid)
9	Reference [1]	Port Cap
10	492952	Pilot Valve Diaphragm Kit (items 4 & 8)

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.

6.3.24 Shock Mount Progression

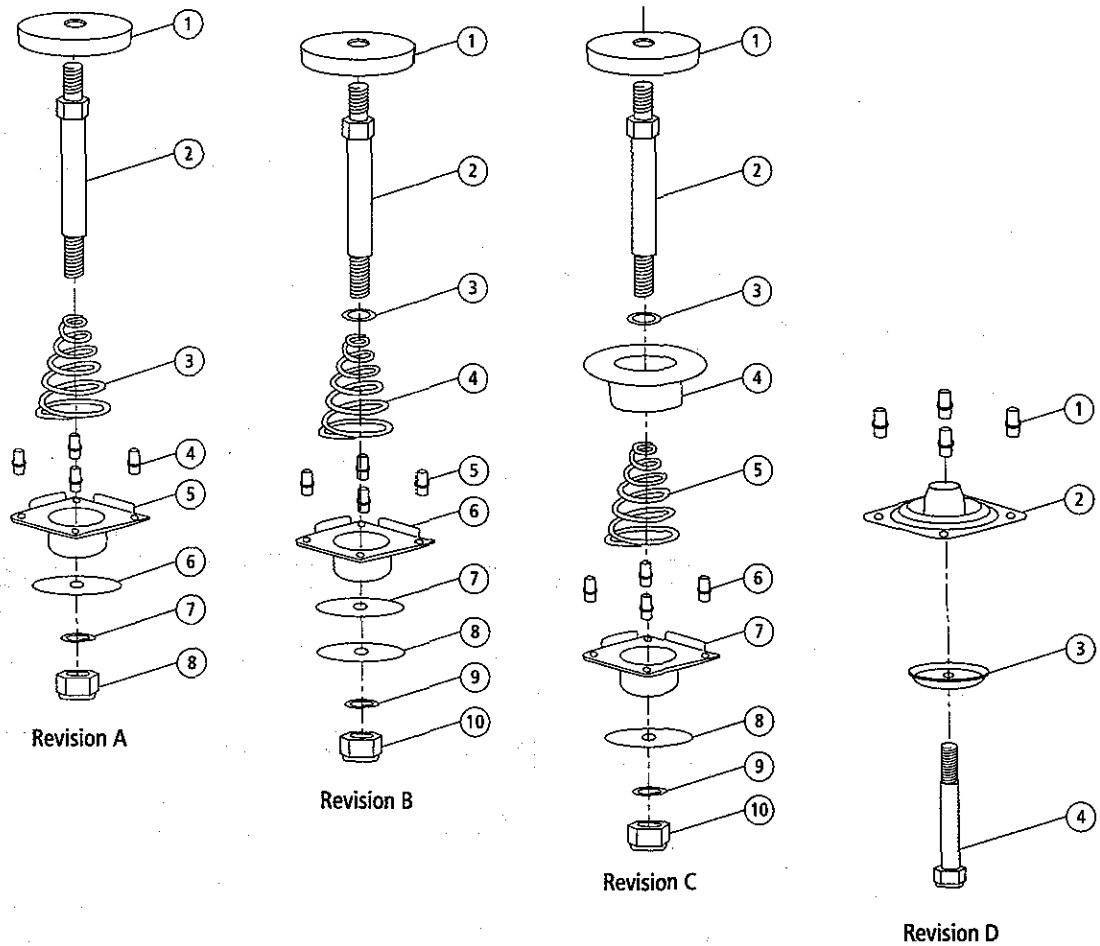


Figure 6-22: Shock Mount Progression

NOTE: Shock mounts on units manufactured before July 6, 1994 were rubber. After July 6, 1994, shock mounts were changed to conical spring mounts. The current configuration is Revision D.

Revision A (This revision not manufactured after August 1995.)

ITEM	PART NUMBER	DESCRIPTION
1	493600	Cup Washer
2	493599	Spring Bolt
3	Reference [1]	Spring Mount, 21 lb [2]
4	493603	Pop Rivet, Aluminum, 1/8 in. (3.17 mm)
5	493598	Spring Cup
6	493602	Bottom Washer
7	493639	Splitlock Washer, #12
8	493673	Nylock Nut, 12-24

[1] For reference only. Not available as a replacement part.
[2] Springs sold in sets of 4. If one spring needs to be replaced, be sure to replace all four.

Revision B (This revision not manufactured after June 1996.)

ITEM	PART NUMBER	DESCRIPTION
1	493600	Cup Washer
2	493599	Spring Bolt
3	493902	Nylon Washer, Spring Mount
4	493903	Spring Mount, 28 lb [1]
5	493603	Pop Rivet, Aluminum, 1/8 in. (3.17 mm)
6	493598	Spring Cup
7	493901	Neoprene Washer, Spring Mount
8	493602	Bottom Washer
9	493639	Splitlock Washer, #12
10	493673	Nylock Nut, 12-24

[1] Springs sold in sets of 4. If one spring needs to be replaced, be sure to replace all four.

Revision C (This revision not manufactured after Oct. 22, 1997.)

ITEM	PART NUMBER	DESCRIPTION
—	493934	Retrofit Spring Shock Mount Kit (includes items 1–5 and 7–10)
1	493600	Cup Washer
2	493599	Spring Bolt
3	493902	Nylon Washer, Spring Mount
4	493969	Spring Cup Liner
5	493903	Spring Mount, 28 lb [1]
6	493603	Pop Rivet, Aluminum, 1/8 in. (3.17 mm)
7	493598	Spring Cup
8	493602	Bottom Washer
9	493639	Splitlock Washer, #12
10	493673	Nylock Nut, 12-24

[1] Springs sold in sets of 4—Replacement Kit Part Number 494011 (kit includes items 3, 4, 5 and 9). If one spring needs to be replaced, be sure to replace all four.

Revision D

ITEM	PART NUMBER	DESCRIPTION
1	492111	Pop Rivet, Aluminum, 1/8 in. (3.17 mm)
2	494480	Rubber Mount
3	492078	Washer
4	493289	Hex Bolt, 1/4-20 x 1 3/4 in.

CAUTION: Rubber motor mounts are not for use with Gast compressors.

6.3.25 Non-OCI PCB and Control Panel

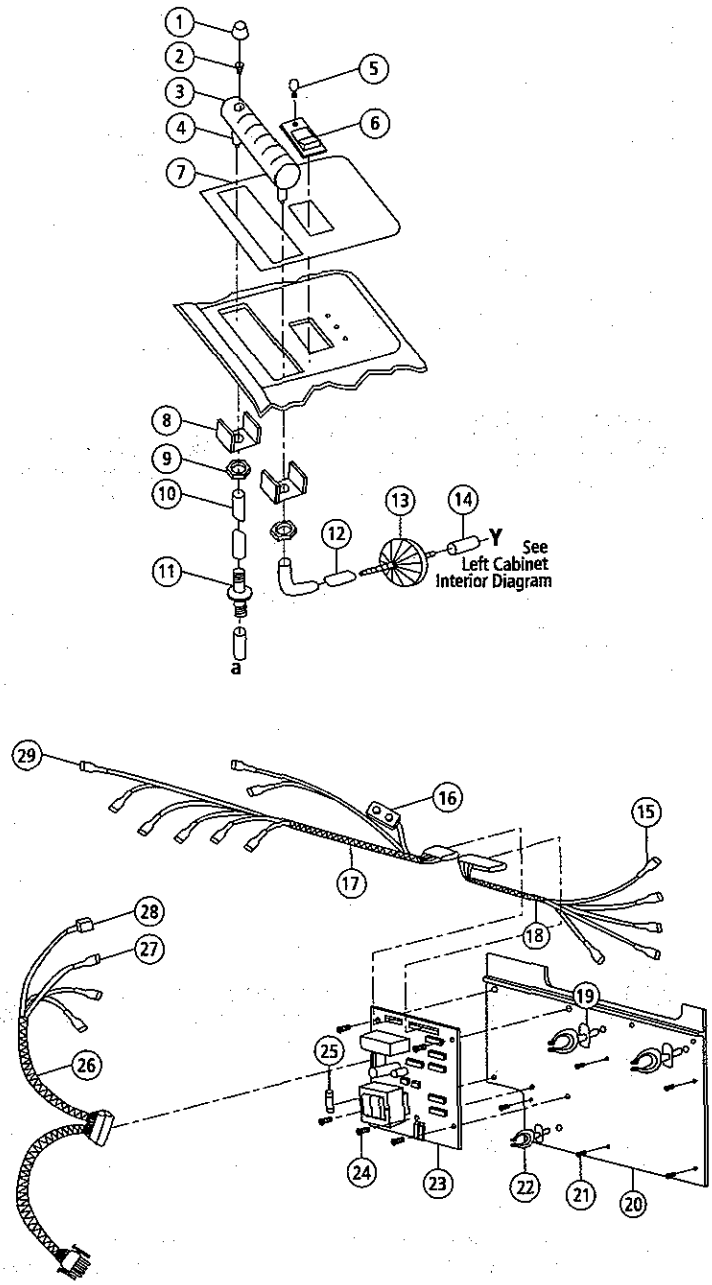


Figure 6-23: Non-OCI PCB and Control Panel

Non-OCI PCB and Control Panel
(see Figure 6-23)

ITEM	PART NUMBER	DESCRIPTION
1	492596	Flowmeter Knob
2	492595	Flowmeter Valve Assembly
3	492072	Flowmeter, 492a, 4 L/min
	492558	Flowmeter, 590, 5 L/min
4	492807	Flowmeter Fitting
5	492828	LED Indicator, Green
6	492823	Power Switch, 120V with LED (includes item 5)
7	see 6.3.29	Label, Control Panel
8	492597	Flowmeter Bracket
9	492210	Flowmeter Nut
10	493174 [1]	Tubing, 3/16 in. i.d. x 5/16 in. o.d. x 7 1/2 in. long (4.76 mm i.d. x 8 mm o.d. x 190.5 mm long)
11	492071	Check Valve
12	493174 [1]	Tubing, 3/16 in. i.d. x 5/16 in. o.d. x 4 1/2 in. long (4.76 mm i.d. x 8 mm o.d. x 114.3 mm long)
13	492141	HEPA Filter, Outlet Gas
14	493174 [1]	Tubing, 3/16 in. i.d. x 5/16 in. o.d. x 39 1/4 in. long [2] (4.76 mm i.d. x 8 mm o.d. x 996.95 mm long) [2]
15	included in item 18	Connector
16	492832 [3]	Battery Connector Assembly
17	492868	Low Voltage Harness Assembly
18	492839 [6]	Power Switch Harness Assembly
19	492713	Clamp, Standoff, 1/2 in. x 7/16 in.
20	492650	Air Inlet Duct Cover
21	492660	Screw, THD Forming, #2-28 x 3/8 in.
22	492987	Clamp, Standoff, 1/2 in. (12.7 mm)
23A	492746 [4]	Control PCB, 120V [1]
23B	494697 [5]	Control PCB, 115V [1]
24	492789	Screw, THD Forming, #6-19 x 5/16 in.
25A	492560	PCB Fuse, 63 mA (used on Control PCB, P/N 492746)
25B	493269	PCB Fuse, 40 mA (used on Control PCB, P/N 494697)
26	492840	High Voltage Wiring Harness
27	included in item 26	Connector
28	included in item 26	Connector
29	included in item 17	Connector

[1] For Control/OCI Combo PCB see Section 6.3.27.

[2] If unit is equipped with OCI, this tube should be 37 1/4 in. (946.15 mm) long.

[3] When replacing Battery Connector Assembly, splice the new wires to the old connector. New Molex connectors will not fit old amp header.

[4] Non-OCI concentrators manufactured prior to March 16, 1999 use the 120V Control PCB (P/N 492746).

[5] Non-OCI concentrators manufactured after March 16, 1999 use the 115V Control PCB (P/N 494697).

[6] If unit is equipped with OCI, refer to Section 6.3.26, 6.3.27, or 6.3.28 for appropriate part numbers.

6.3.26 Control OCI PCB and Control Panel

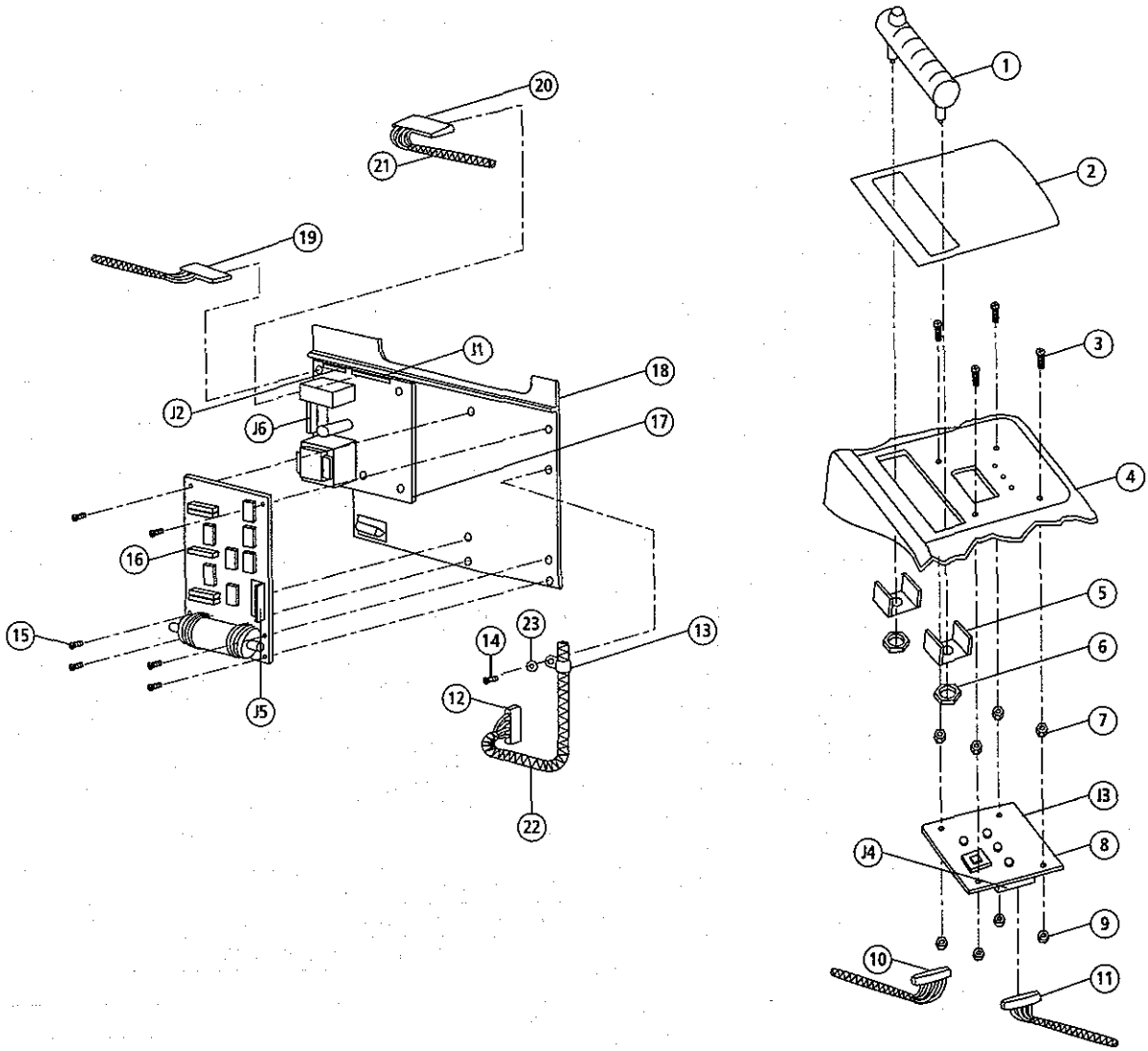


Figure 6-24: Control OCI PCB and Control Panel

Control OCI PCB and Control Panel
(see Figure 6-24)

ITEM	PART NUMBER	DESCRIPTION
1	492072	Flowmeter, 492a, 4 L/min
	492558	Flowmeter, 590, 5 L/min
2	see 6.3.29	Label, Control Panel
3	492438	Screw, Nylon, 6-32 x 1 in. long
4	492964	Right Concentrator Cabinet
5	492597	Flowmeter Bracket
6	492210	Flowmeter Nut
7	492667	Nylon Spacer
8	492745	Front Panel PCB
9	492439	Nylon Nut
10	Reference [1]	Connector (15 pin)
11	Reference [1]	Connector (14 pin)
12	Reference [1]	Connector (14 pin)
13	492939	Clamp
14	492741	Screw, THD Forming, #4-20 x 5/16 in. long
15	492789	Screw, THD Forming, #6-19 x 5/16 in. long
16	492744	OCI PCB
	493205 [2]	OCI PCB (Remanufactured)
17	492746	Control PCB, 120V
18	492650	Air Inlet Duct Cover
19	Reference [1]	Connector (11 pin)
20	Reference [1]	Connector (15 pin)
21	492837	Wire Harness (Control PCB to Front Panel PCB)
22	492838	Wire Harness (Front Panel PCB to OCI PCB)
23	492946	Washer, #6 SAE
J1	Reference [1]	Control PCB connector (connects to front panel PCB J3)
J2	Reference [1]	Control PCB connector
J3	Reference [1]	Front panel PCB connector (connects to Control PCB J1)
J4	Reference [1]	Front panel PCB connector (connects to OCI PCB J5)
J5	Reference [1]	OCI PCB connector (connects to front panel PCB J4)
J6	Reference [1]	Control PCB connector

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.
[2] When available. If 493205 is not available, 492744 will be shipped.

6.3.27 Control/OCI Combo PCB and Control Panel

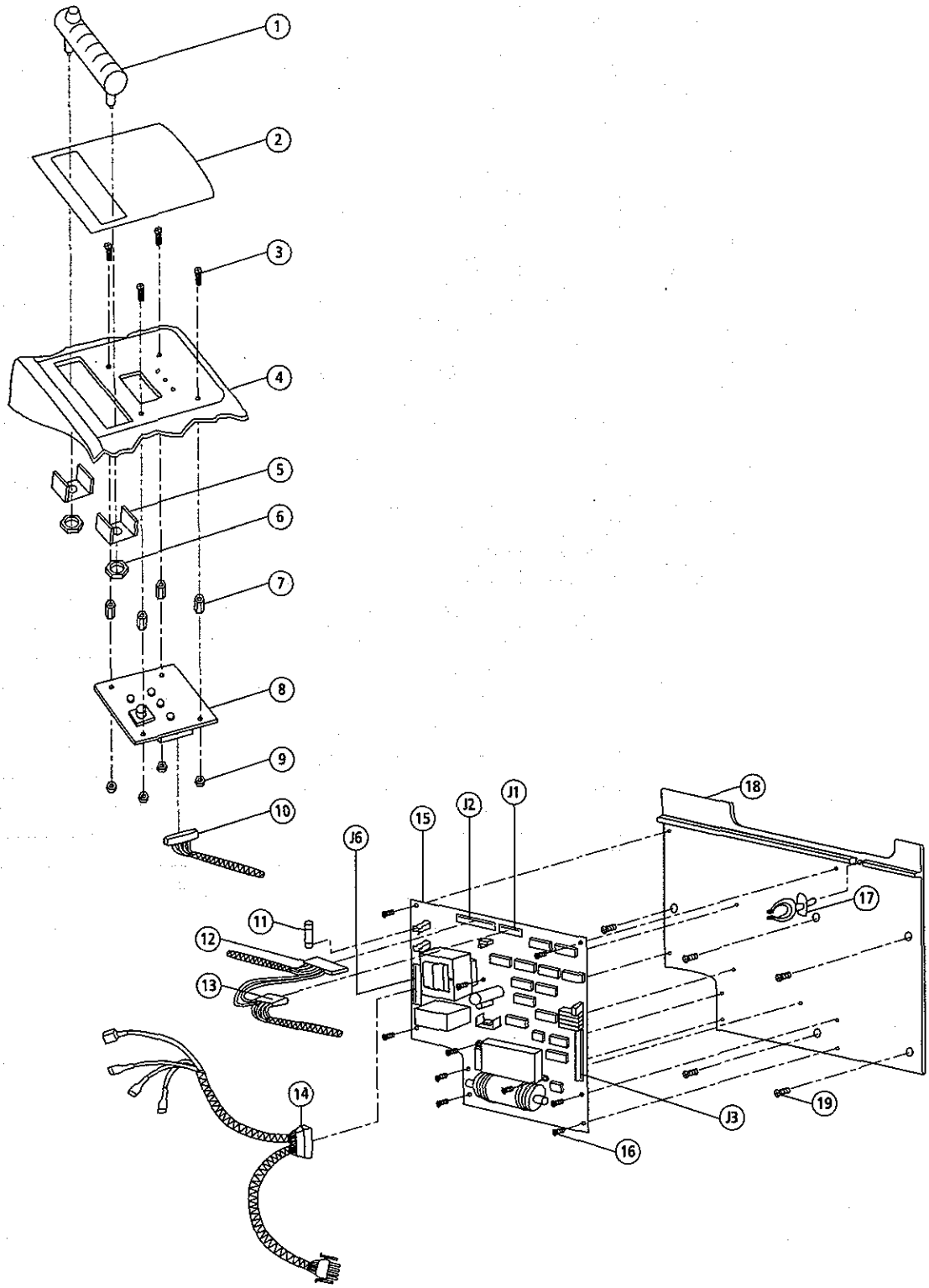


Figure 6-25: Control/OCI Combo PCB and Control Panel

Control/OCI Combo PCB and Control Panel

(see Figure 6-25)

ITEM	PART NUMBER	DESCRIPTION
1	492072	Flowmeter, 492a, 4 L/min
	492558	Flowmeter, 590, 5 L/min
2	see 6.3.29	Label, Control Panel
3	492438	Screw, Nylon, 6-32 x 1 in. long
4	492964	Right Concentrator Cabinet
5	492597	Flowmeter Bracket
6	492210	Flowmeter Nut
7	492667	Nylon Spacer
8	493325	Front Panel PCB
9	492439	Nylon Nut
10	Reference [1]	Connector (15 pin)
11	493637	Fuse, 100 mA
12	included in item 13	Low Voltage Wiring Harness
13	493629	Power Switch Wiring Harness (includes item 12)
14	492840	High Voltage Wiring Harness
15	493634	Control/OCI Combo PCB Board (New)
	492971 [2]	Control/OCI Combo PCB Board (Remanufactured)
16	492789	Screw, THD Forming, #6-19 x 5/16 in. long
17	492713	Clamp, Standoff, 1/2 in. x 7/16 in.
18	493631	Air Inlet Duct Cover
19	492660	Screw, THD Forming, #2-28 x 3/8 in.
J1	Reference [1]	Front panel PCB 8-pin connector (connects to front panel PCB J1)
J2	Reference [1]	Control PCB 12-pin connector (connects to solenoid and pressure switch)
J3	Reference [1]	Control PCB 18-pin connector (currently not used)
J6	Reference [1]	Control PCB 10-pin connector (connects to timer and compressor)

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.
[2] When available. If 492971 is not available, 493634 will be shipped.

6.3.28 Control/OCI PCB with Removable Sensor and Control Panel

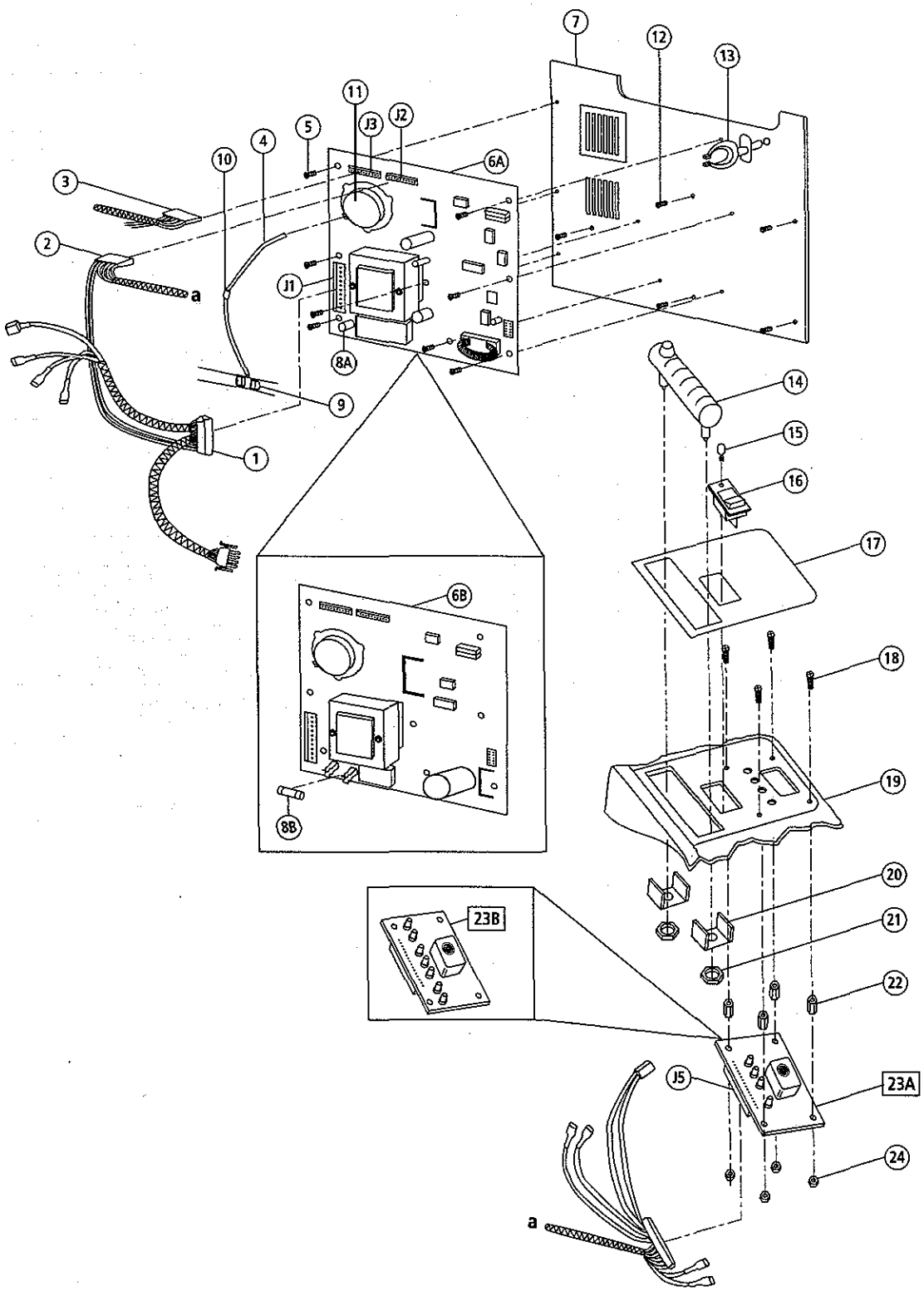


Figure 6-26: Control/OCI PCB with Removable Sensor and Control Panel

Control/OCI PCB with Removable Sensor and Control Panel

(see Figure 6-26)

ITEM	PART NUMBER	DESCRIPTION
1	494386	High Voltage Wiring Harness (includes item 2)
2	included in item 1	Power Switch Wiring Harness
3	500010	Low Voltage Wiring Harness
4	494387	Orifice, Sensor Assembly (includes item 9 and 10)
5	492789	Screw, THD Forming, #6-19 x 5/16 in. long
6A	Reference [2]	Control/OCI PCB with Removable Sensor
6B	494694 [3]	Control/OCI PCB with Removable Sensor
7	500027	Air Inlet Duct Cover
8A	494314	Fuse, 200 mA (used on item 6A)
8B	494781	Fuse, 160 mA (used on item 6B)
9	included in item 4	Fitting, OCI, Barbed Tee
10	included in item 4	Filter Orifice
11	included in item 6	Sensor, Oxygen
12	492660	Screw, THD Forming, #2-28 x 3/8 in.
13	492713	Clamp, Standoff, 1/2 in. x 7/16 in.
14	492558	Flowmeter, 590, 5 L/min
15	492828	LED Indicator, Green
16	492823	Power Switch, 120V with LED (includes item 15)
17	494280	Label, Control Panel
18	492438	Screw, Nylon, 6-32 x 1 in. long
19	494378	Right Concentrator Cabinet
20	492597	Flowmeter Bracket
21	492210	Flowmeter Nut
22	492667	Nylon Spacer
23A	Reference [4]	Front Panel PCB
23B	494696	Front Panel PCB
24	492439	Nylon Nut
J1	Reference [1]	
J2	Reference [1]	
J3	Reference [1]	
J5	Reference [1]	

[1] Item shown for descriptive purposes only and is not available for sale as an individual repair part.
[2] For reference only. Replace with Part Number 494694.
[3] Manufactured after March 10, 1999.
[4] For reference only. Replace with Part Number 494696.

6.3.29 Control Panel Label

ITEM	PART NUMBER	DESCRIPTION
1	492623	492a
2	492624	492a, with OCI
3	492809	590, with OCI
4	492810	590
5	493133	492a, FR/CAN
6	493134	492a, FR/CAN with OCI
7	493135	590, FR/CAN
8	493136	590, with OCI, FR/CAN
9	493551	590, Mexico
10	493552	590, Mexico, with OCI
11	494280	590, with OCI with Removable Sensor
12	494291	590, with OCI with Removable Sensor, Mexico
13	494292	590, with OCI with Removable Sensor, FR/CAN
14	494707	590, Left
15	494708	590, Right
16	494709	590, Left, Control/OCI PCB with Removable Sensor
17	494710	590, Right, Control/OCI PCB with Removable Sensor
18	494711	590, Right, FR/CAN
19	494712	590, Left, FR/CAN
20	494713	590, Left, FR/CAN, Control/OCI PCB with Removable Sensor
21	494714	590, Right, FR/CAN, Control/OCI PCB with Removable Sensor
22	494715	590, Right, Mexico, Control/OCI PCB with Removable Sensor
23	494716	590, Left, Mexico, Control/OCI PCB with Removable Sensor
24	494717	590, Left, Mexico
25	494718	590, Right, Mexico

6.3.30 Circuit Breaker Chart

PART NUMBER	AMPERE	CONCENTRATOR MODEL	COMPRESSOR
492196	5	492a (120V, 60 Hz)	Thomas
492437	6	590 (120V, 60 Hz) [1]	Thomas (Standard)
493531 [2]	8	590 (120V, 60 Hz) [3]	Thomas (High Efficiency)
493531 [2]	8	590 (120V, 60 Hz) [4]	Thomas (2639 Series)
493531 [2]	8	590 (120V, 60 Hz) [5]	Thomas (2650 Series)
493531 [2]	8	590 (120V, 60 Hz)	Gast

[1] Manufactured before April 26, 1993.
[2] Washers required (Part Number 493567).
[3] Manufactured after Nov. 12, 1992.
[4] Manufactured after May 1, 1996.
[5] Manufactured after Oct. 22, 1997.

Section 7

UNPACKING, INSTALLATION & REPACKING

7.1 UNPACKING

1. Examine the exterior of the shipping carton for damage. If the carton is damaged, or its contents are suspected of being damaged, photograph the damaged carton before the concentrator is unpacked and contact the carrier to request that the damage be inspected. Contact the shipping point immediately.
2. Place the shipping carton on a flat surface with the shipping arrows pointing upwards.

CAUTION: If staples were used to seal the shipping carton, take care when opening and removing the staples to prevent both personal injury and exterior cabinet damage.

3. Open the top flaps of the shipping carton and lay the carton on its side.
4. While holding the carton down with one hand, grasp the handle of the concentrator and slide the concentrator out of the carton.
5. Stand the concentrator upright on its casters.
6. Remove the plastic cap from the oxygen outlet.
7. Compare the packing slip attached to the carton's exterior with the shipment received. If any discrepancies exist, contact Mallinckrodt immediately at 1-800-496-2299.
8. Thoroughly inspect the exterior of the concentrator for damage.
9. Save all packing materials and the shipping carton for reuse.

NOTE: Contact Mallinckrodt at 1-800-496-2299 for a returned goods authorization (RGA) number if it is necessary to return a unit to the factory. Write the RGA number on the outside of the carton before shipping.

7.2 INSTALLATION

7.2.1 Operational Check Procedure

This section outlines the operational check procedure that should be performed after unpacking the concentrator and before its initial installation and use.

NOTE: The use of a properly calibrated oxygen analyzer is required during this procedure.

1. Ensure that the following filters are clean and securely in place. (Figure 7-1)

ITEM	LOCATION
Air Intake Filter	Right Side of the Concentrator
Compressor Inlet Extended Life Prefilter	Compressor Inlet Extended Life Prefilter Housing in Filter Compartment
Compressor Inlet HEPA Filter	Filter Compartment

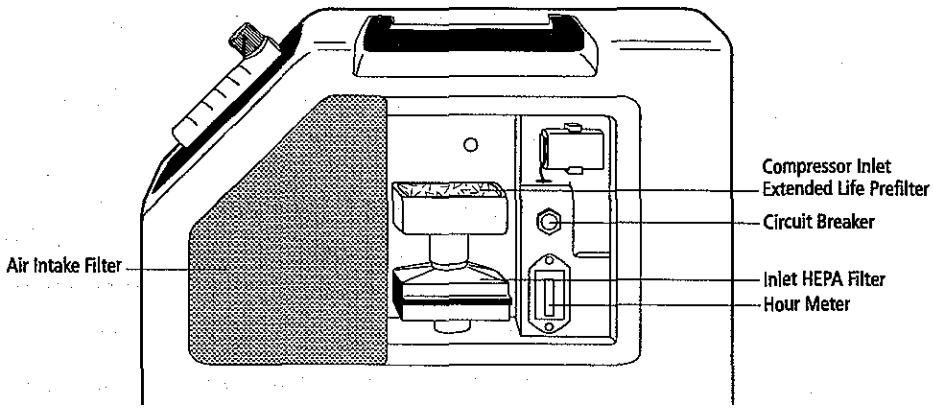


Figure 7-1: Right Side View

2. Verify that all internal pressure has been vented out of the canisters by turning the flowmeter knob fully counterclockwise and verifying the flowmeter ball indicates zero flow (Figure 7-2).

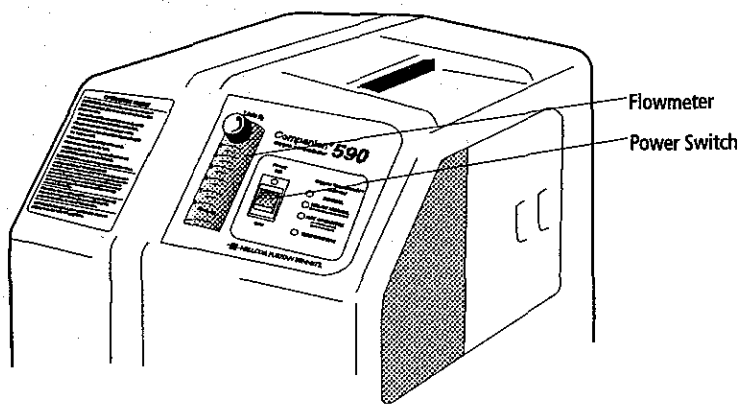


Figure 7-2: Front Panel

3. Connect the power cord to an AC outlet and set the POWER Switch to the ON position (Figure 7-2). An audible alarm should sound. If an audible alarm does not sound or is weak, refer to Section 4, Troubleshooting Guide.

4. Set the POWER Switch to the OFF position.

NOTE: If the concentrator has been exposed to temperatures below 40 °F (14 °C), allow the concentrator to reach ambient temperature (approximately 30 minutes) before setting the POWER Switch to the ON position.

5. Set the POWER Switch to the ON position and the flowmeter to its maximum setting. The audible alarm should sound for a maximum of one minute and then cease.

   If the alarm does not sound, or if the alarm continues to sound after one minute, see Performance Verification (Section 3).

6. Verify that the POWER Switch LED is illuminated (Figure 7-2). If the LED is not illuminated, see Performance Verification (Section 3).
7. Visually observe and note the number of hours displayed on the hour meter (Figure 7-1).
8. Allow the concentrator to run for approximately 20 minutes to stabilize before proceeding.
9. Connect a calibrated oxygen analyzer to the concentrator's oxygen outlet (Figure 7-3). Refer to the oxygen analyzer manufacturer's recommendations for proper connection procedures.

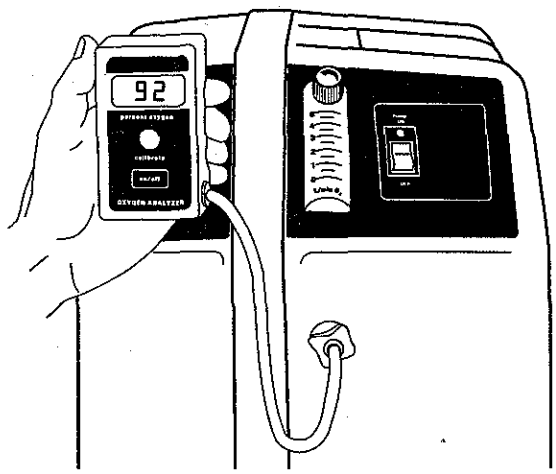


Figure 7-3: Oxygen Concentration Testing

10. Verify that the oxygen concentration is as follows:

CONCENTRATOR MODEL	OXYGEN CONCENTRATION
492a	95% ±3% at 1 L/min to 3 L/min
	92% ±3% at 4 L/min
590	95% ±3% at 1 L/min to 4 L/min
	90% ±3% at 5 L/min

If the oxygen concentration is not as specified, see Troubleshooting Instructions (Section 4).

11. If the concentrator is equipped with the optional Oxygen Concentration Indicator (OCI), verify that the green (NORMAL) LED is illuminated.
12. Ensure the airflow is emitted through the cooling air exhaust vents, located on the side opposite the air intake filter at the base of the concentrator (Figure 7-4).

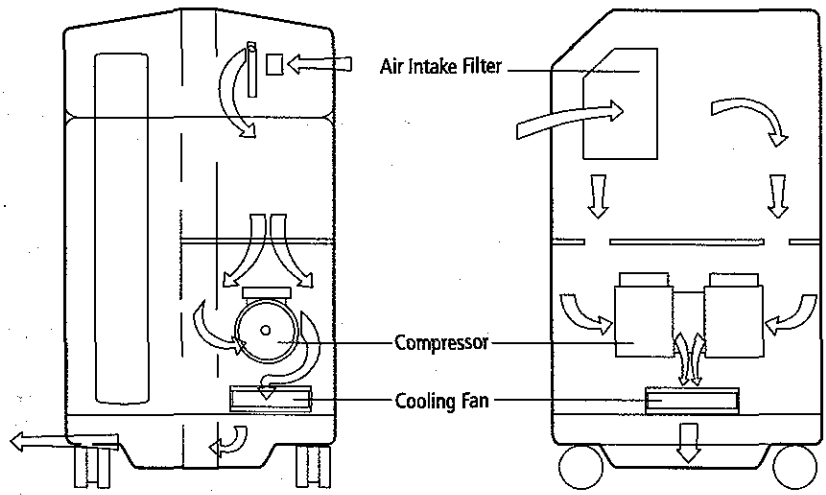


Figure 7-4: Cooling Air Flow

7.2.2 Operating Instructions

This section outlines the operating instructions that should be performed after completing the operational check procedure, as part of the installation of the concentrator.

NOTE: Detailed operating instructions are contained in the appropriate Patient Instruction Manual.

1. Ensure that the air intake filter is clean (Figure 7-1).
2. Position the concentrator near an appropriate AC outlet so the power cord can be connected to the AC outlet without using an extension cord.

WARNING

Oxygen greatly accelerates combustion. To prevent injury or death, keep the concentrator at least 5 ft. (1.5 m) away from any sources of heat, smokers, open flames, or electrical equipment that may spark or become heated during operation. Oil and grease are highly flammable. Do not allow them to come into contact with the concentrator.

CAUTION: Keep the air intake filter and cooling air exhaust vents at least 6 in. (15.2 cm) away from walls or draperies. Obstacles next to the concentrator may hinder room air from entering the concentrator.

3. Set the flowmeter control knob to the setting prescribed by the physician (Figure 7-2). Do not change the setting unless ordered by the physician.
4. If humidified oxygen has been prescribed by the physician, proceed as follows:
    a. Remove the humidifier adapter from the filter compartment located behind the removable side panel (Figure 7-5).

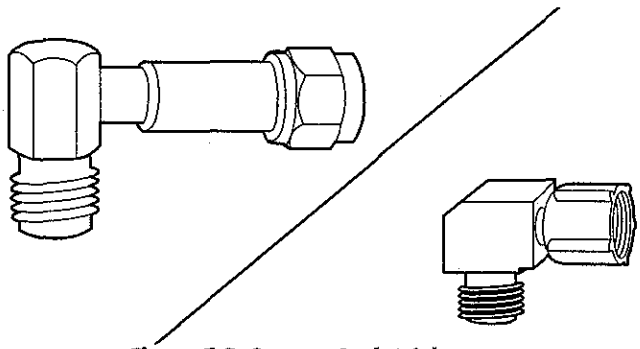


Figure 7-5: Oxygen Outlet Adapters

    b. Connect the humidifier adapter to a properly filled bubble humidifier (Figure 7-6).

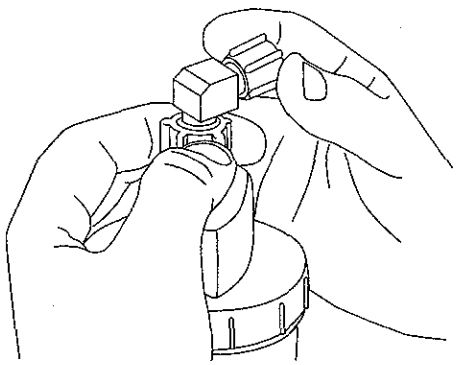


Figure 7-6: Humidifier Adapter Attachment

    c. Attach the humidifier and adapter to the oxygen outlet on the front of the concentrator (Figure 7-7).

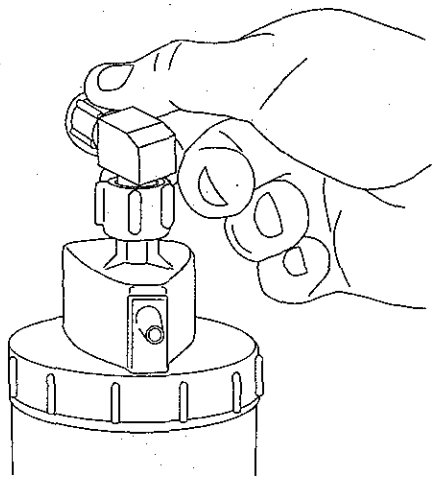


Figure 7-7: Humidifier Attachment

d. Connect the oxygen tubing to the humidifier outlet (Figure 7-8).

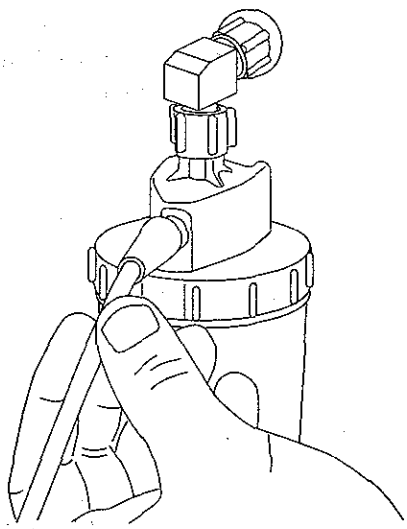


Figure 7-8: Oxygen Tubing Attachment to Humidifier

e. Proceed to instruction 6.

5. If humidified oxygen has not been prescribed by the physician, proceed as follows:

   a. Place the wing nut on the tail piece to form a tubing adapter. (Figure 7-9)

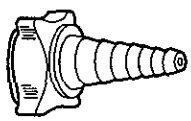


Figure 7-9: Oxygen Outlet Adapter

b. Connect the tubing adapter to the oxygen outlet on the front of the concentrator (Figure 7-10).

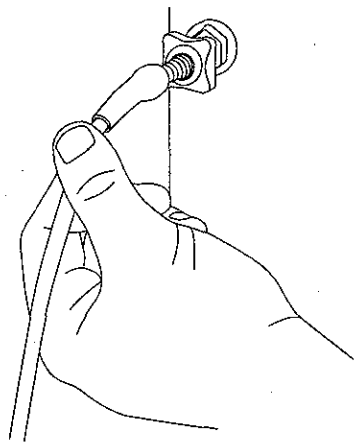


Figure 7-10: Oxygen Tubing Attachment to Adapter

c. Connect the oxygen tubing to the tubing adapter.

6. Connect the power cord to the AC outlet.

NOTE: If the concentrator has been exposed to temperatures below 40 °F (14 °C), allow the concentrator to reach room temperature (approximately 30 minutes) before setting the POWER Switch to the ON position.

7. Set the POWER Switch to the ON position. The audible alarm should sound for a maximum of one minute and then stop.
8. Allow the concentrator to run for approximately 20 minutes to stabilize before proceeding.

NOTE: If the concentrator is accidentally tipped over, the impact of hitting the floor may activate the PCB relay and the audible alarm may sound. If this occurs, return the concentrator to the upright position, set the POWER Switch to the OFF position, wait five seconds, and then set the POWER Switch to the ON position. The alarm should sound for a maximum of one minute and then stop.

7.3 REPACKING

CAUTION: Report any problems found during inspection to the freight carrier or contact the Oxygen Concentrator Division at 1-800-496-2299 for assistance if necessary.

1. Disconnect any fitting or accessory from the oxygen outlet.
2. Place the plastic cap on the oxygen outlet.
3. Wrap the power cord around the rear cord wrap.
4. Make certain that the side panel is securely in place (Figure 7-11).

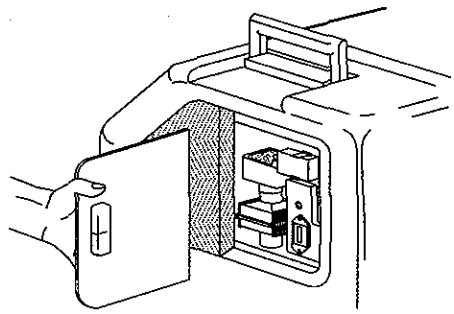


Figure 7-11: Side Panel

5. Place the concentrator inside the foam-lined shipping carton.
6. Close the two shorter carton flaps and then close the two longer carton flaps.
7. Secure the carton with packing tape.

Section 8

PERFORMANCE SPECIFICATIONS

This section lists the Companion 492a and 590 physical characteristics, environmental and electrical requirements, and pneumatic characteristics. In most cases the information on the following pages applies to both the 492a and 590. Any differences in characteristics or requirements between the two models are listed separately.

NOTE: Numeric values quoted in this section are nominal values used for descriptive purposes only. Due to atmospheric pressure changes and other factors, pressure characteristics may vary.

8.1 PHYSICAL CHARACTERISTICS

PARAMETER	MEASUREMENT/CONDITION	
Cabinet Size	Height	25.4 in. (64.5 cm)
	Width	12.5 in. (31.75 cm)
	Depth	16.5 in. (41.9 cm)
Assembly Weight	492a	57 lb (25.8 kg)
	590	59 lb (26.8 kg)
Shipping Container Size	Height	28.5 in. (72.4 cm)
	Width	14.6 in. (37.1 cm)
	Depth	19.5 in. (49.5 cm)
Shipping Weight	492a	65 lb (29.5 kg)
	590	67 lb (30.4 kg)
Noise Level		<55 dBA at 1 meter

8.1.1 Cabinet Construction

The cabinet is a hinged, molded case that opens for easy service. The case is equipped with a carrying handle and four casters.

8.1.2 Power Switch

The POWER Switch is a rocker or push-button type. Please refer to the appropriate section for servicing. When ON, the LED illuminates to indicate AC power.

8.1.3 Audible Alarm

When the POWER Switch is ON, the alarm sounds to indicate low pressure, which may be caused by cycle failure or power disconnect. In the case of an AC power outage, the audible alarm is powered internally by a 9V battery.

8.1.4 Oxygen Concentration Indicator (OCI)

Refer to Section 3.8 for information pertaining to OCI operation.

8.2 ENVIRONMENTAL REQUIREMENTS

PARAMETER	REQUIREMENT
Storage/Shipping Temperature	-40 °F to 158 °F (-40 °C to 70 °C)
Operating Temperature	50 °F to 110 °F (10 °C to 43 °C)
Stabilization Time	20 minutes minimum
Operating Altitude [1]	Up to 3,000 ft. (914 m) above sea level without degradation of performance

[1] Atmospheric pressure and system operating pressures at altitudes up to of 3,000 ft. (914 m) above sea level may decrease oxygen concentration levels.

8.3 ELECTRICAL REQUIREMENTS

POWER	VOLTAGE	FREQUENCY	OPERATING CURRENT (nominal)
492a	120V ±10V AC	60 Hz	2.9 A
590	120V ±10V AC	60 Hz	3.3 A

PARAMETER		REQUIREMENT
Consumption	492a	350 W average
	590	400 W average
Battery		9V long-life alkaline
Power Cord [2]		Double-insulated
Circuit Breaker		Time-Delay (see Section 6.3.3 for Circuit Breaker Chart)
Fuse	Control PCB	63 mA, 250V AC
	Control/OCI Combo PCB	100 mA, 250V AC
	Control/OCI PCB with Removable Sensor (P/N 500034)	200 mA, 250V AC
	Control/OCI PCB with Removable Sensor (P/N 494694)	160 mA, 115V AC

[2] Unit is Canadian Standard Association (CSA) certified as being Double-Insulated.

8.4 PNEUMATIC CHARACTERISTICS

PARAMETER		MEASUREMENT
Flow Rate	492a	0 L/min to 4 L/min with 0.25 L/min increments
	590	0 L/min to 5 L/min with 0.25 L/min increments
Oxygen Concentration [1]	492a	95% ±3% at 1 L/min to 3 L/min 92% ±3% at 4 L/min
	590	95% ±3% at 1 L/min to 4 L/min 90% ±3% at 5 L/min
Static Delivery Pressure		5 psi ±0.5 psi (34.5 kPa ±3.5 kPa)
System Operating Pressure		Cycles from approximately 15 psi to 30 psi (103.5 kPa to 207 kPa)

[1] Atmospheric pressure and system operating pressures at altitudes up to of 3,000 ft. (914 m) above sea level may decrease oxygen concentration levels.

Section 9

TECHNICAL SUPPLEMENT

This section features pneumatic and electrical schematics for the Companion 492a/590 Oxygen Concentrators.

494438 Rev. B

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Figure 9-2: Electrical System — Non-OCI

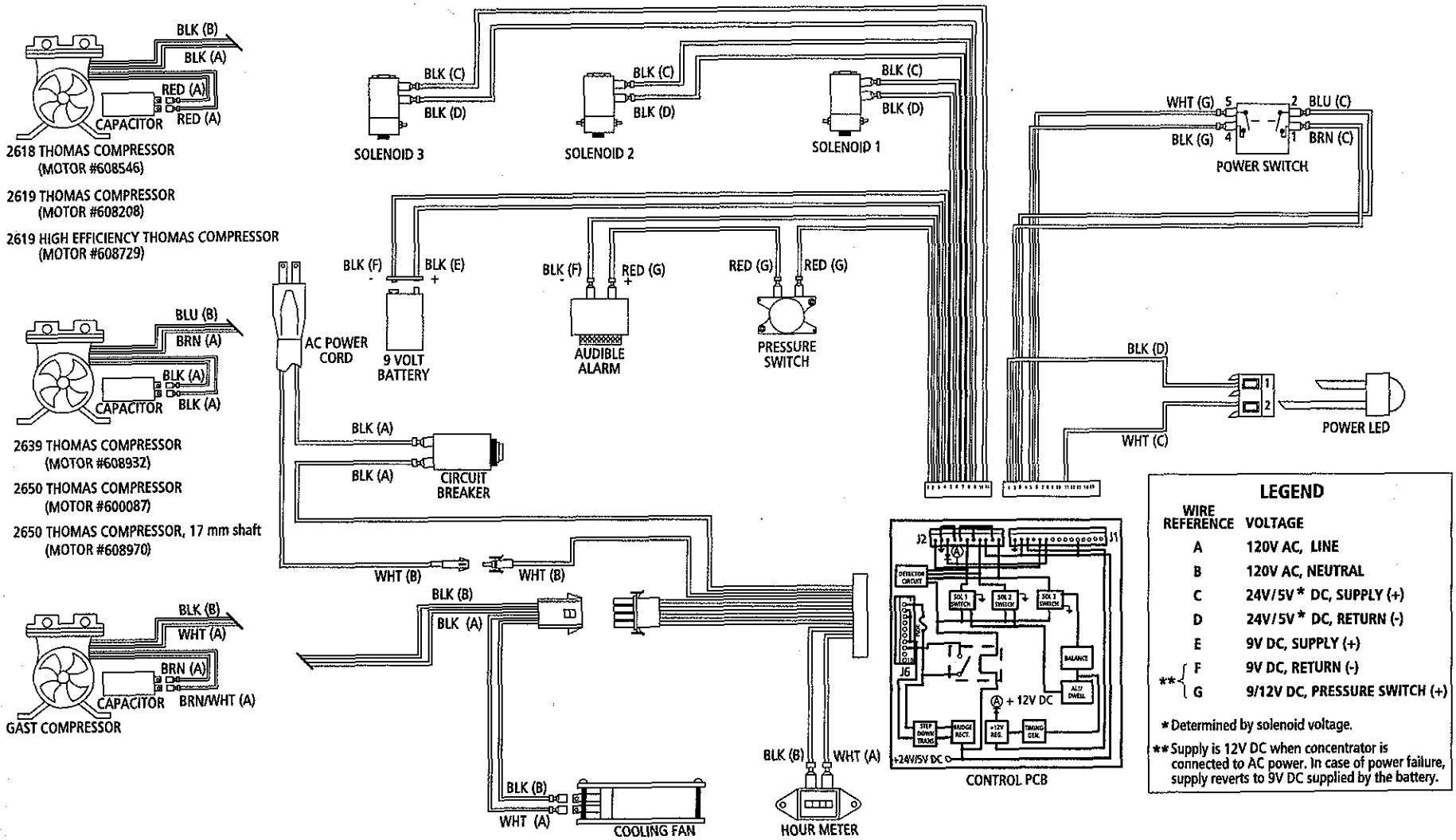

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Figure 9-3: Electrical System — OCI PCB

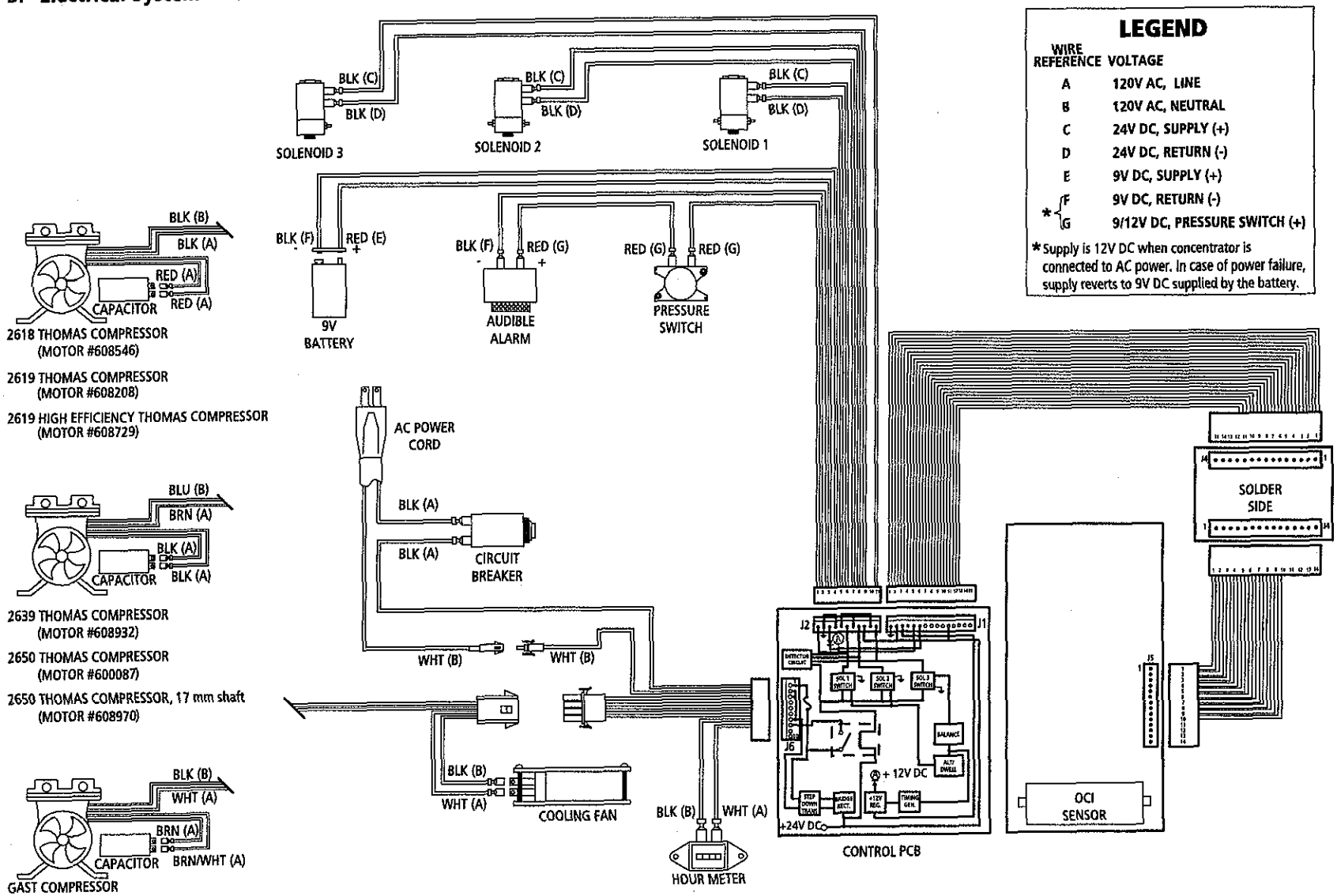

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Figure 9-4: Electrical System — Control/OCI Combo PCB

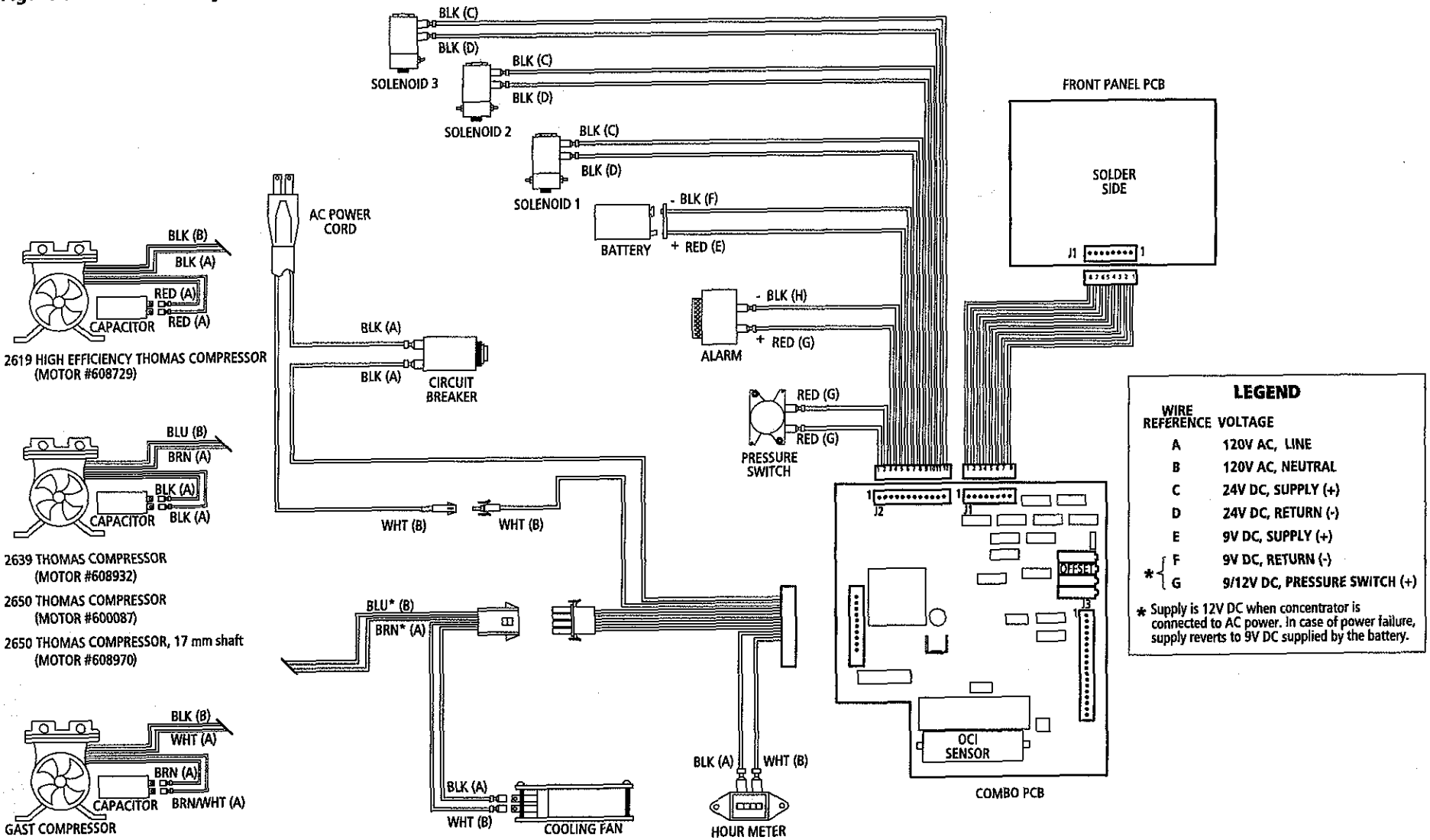

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Figure 9-5: Electrical System — Control/OCI PCB with Removable Sensor

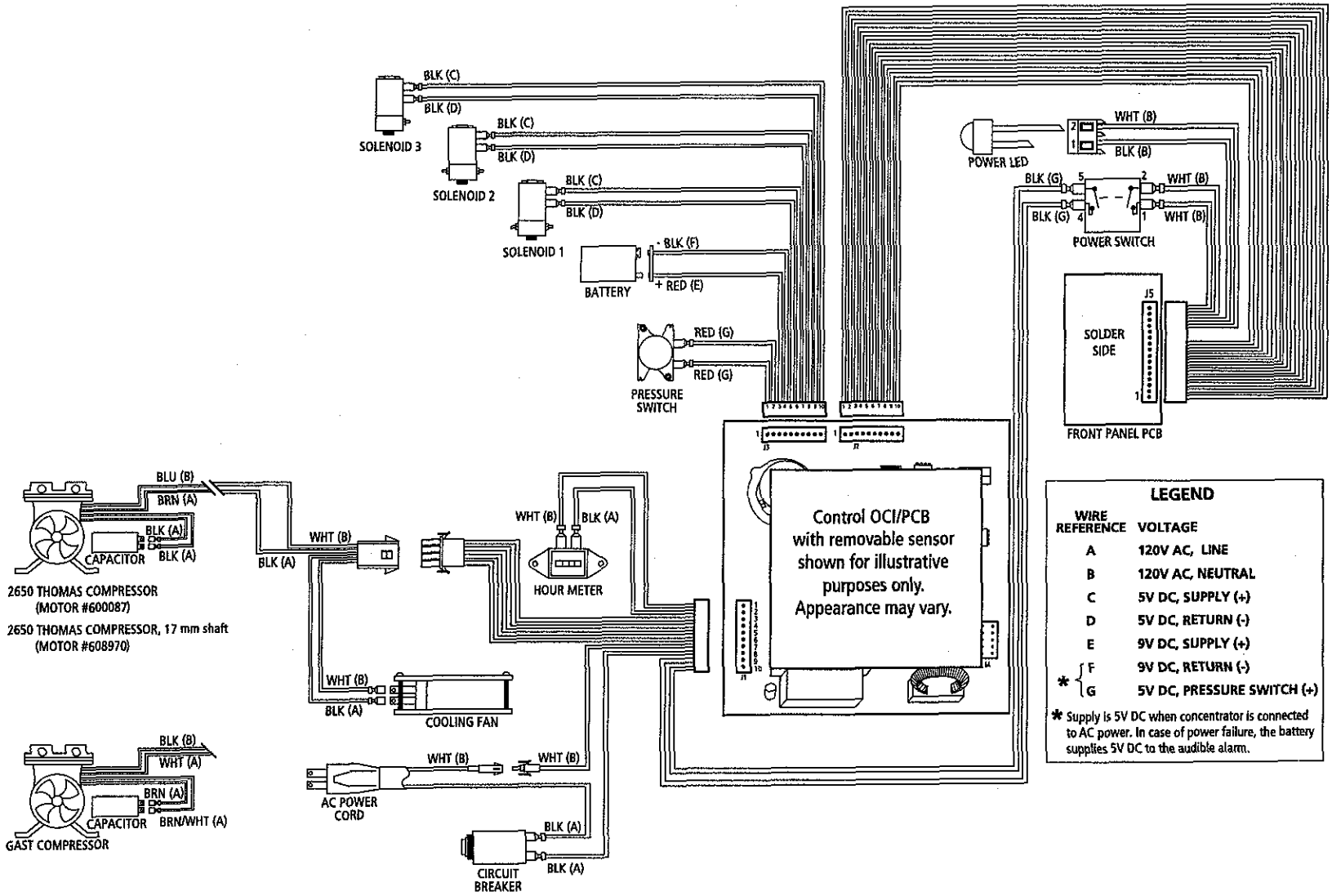

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Figure 9-6: Concentrating Cycle 1, Sieve Canister 1

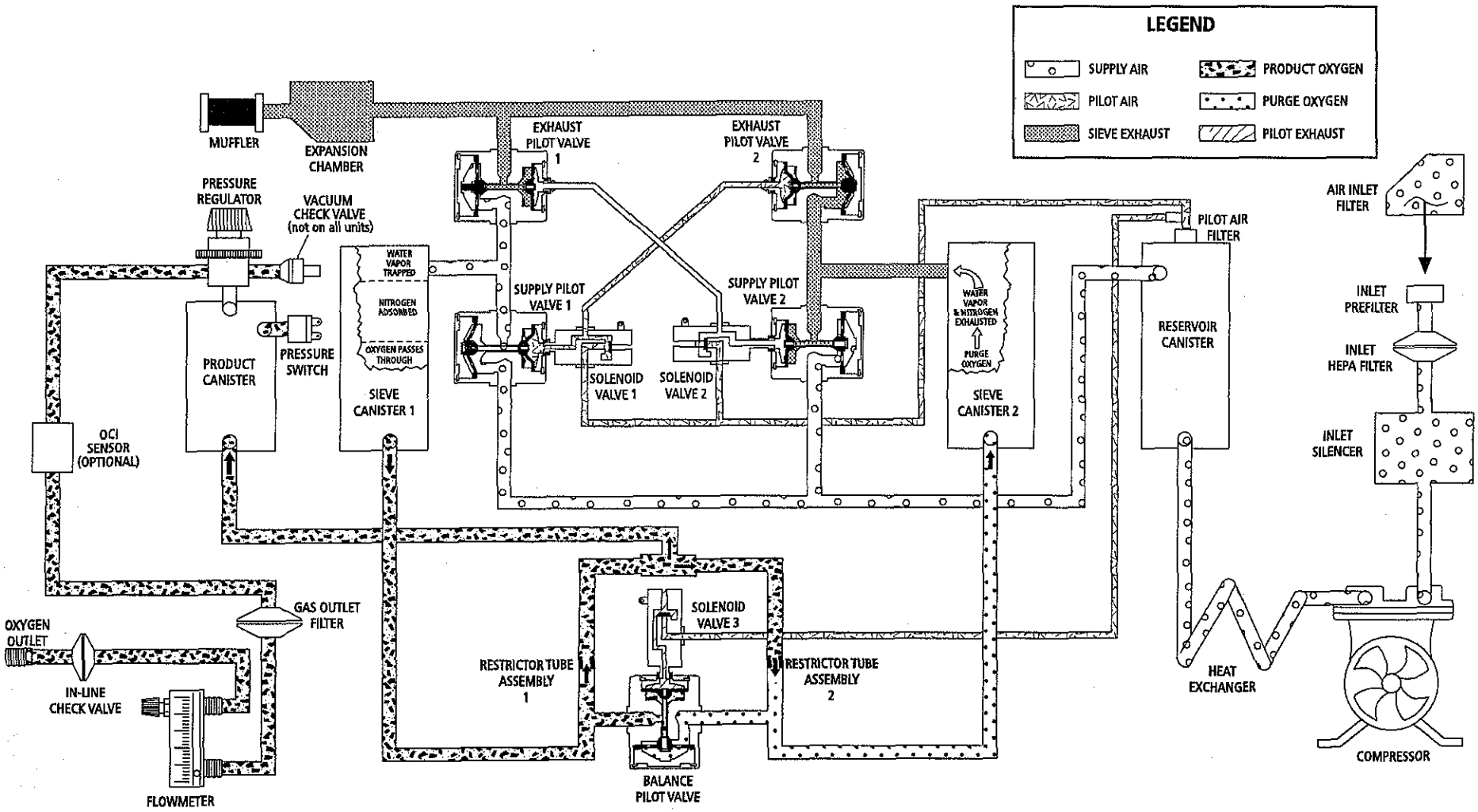

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Figure 9-7: Balance Cycle

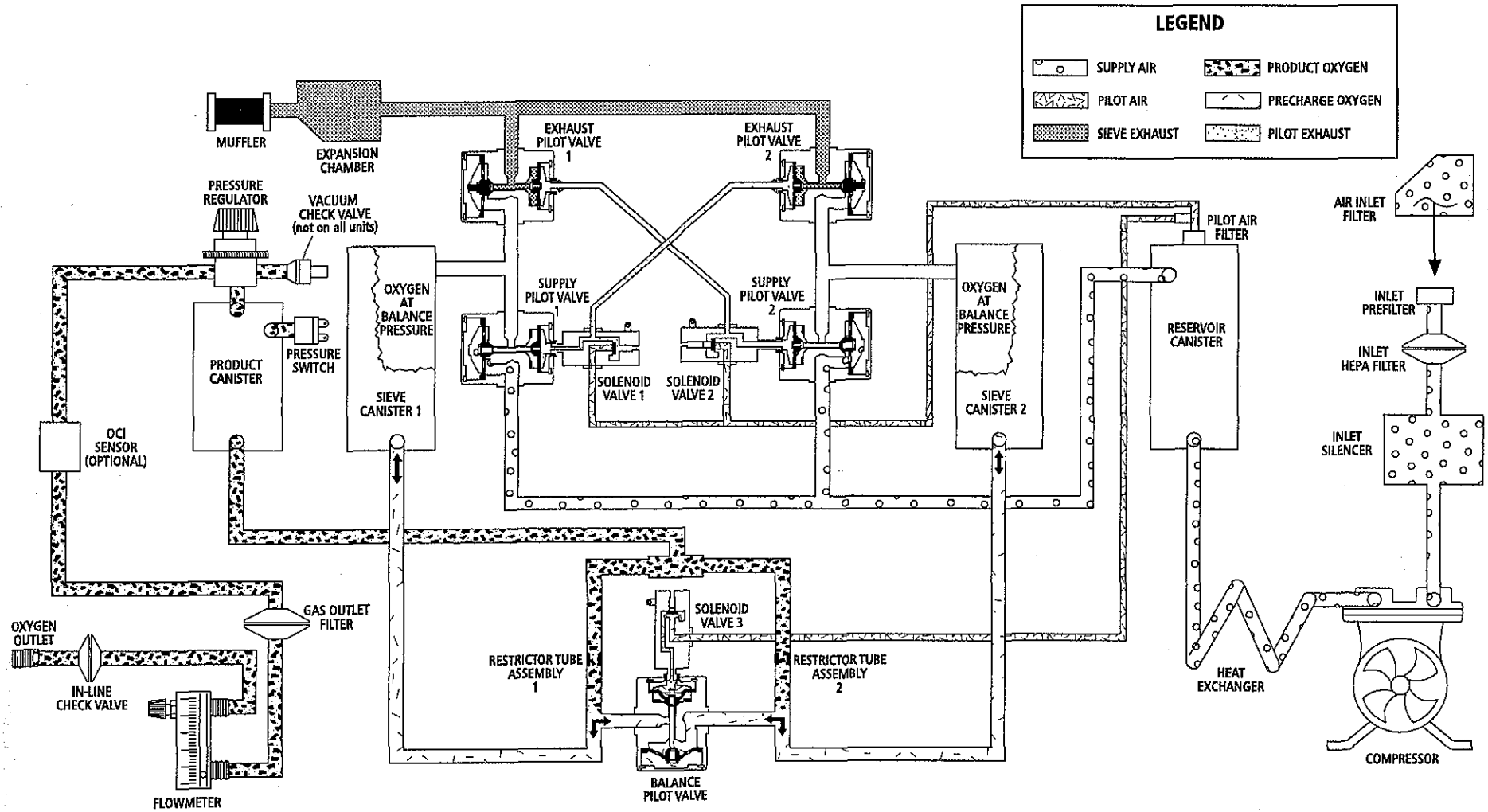

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Figure 9-8: Concentrating Cycle 2, Sieve Canister 2

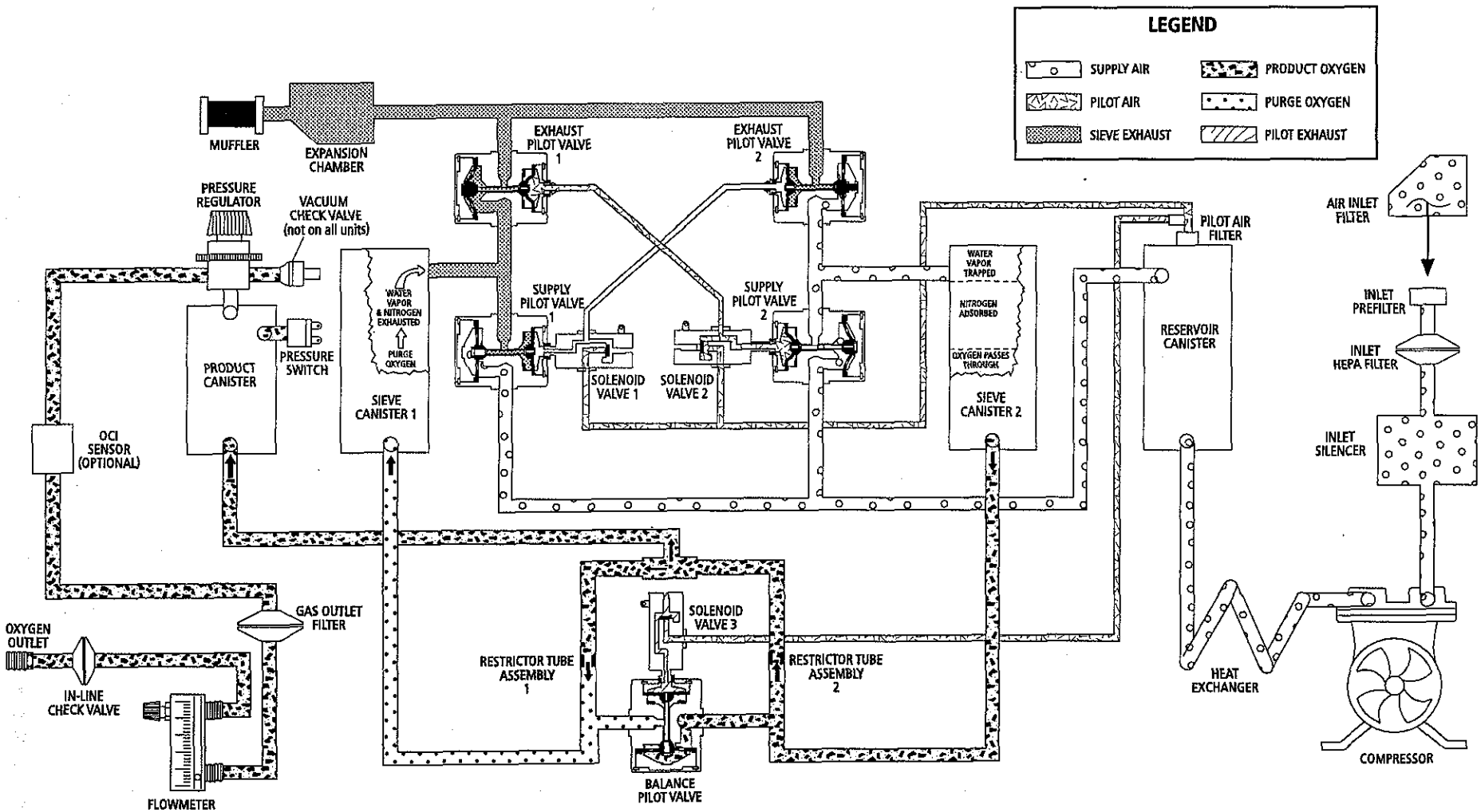

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Figure 9-9: Printed Circuit Boards

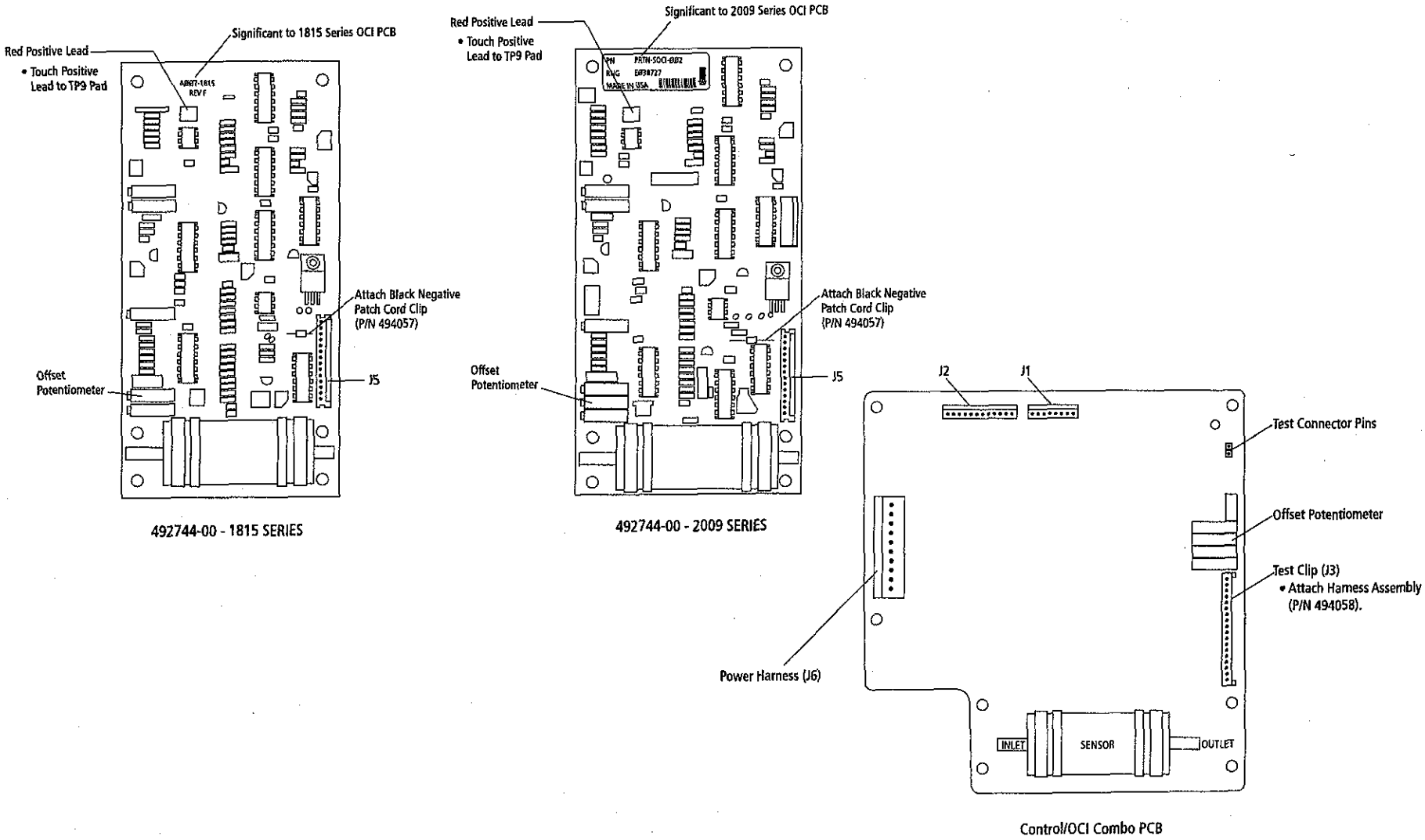

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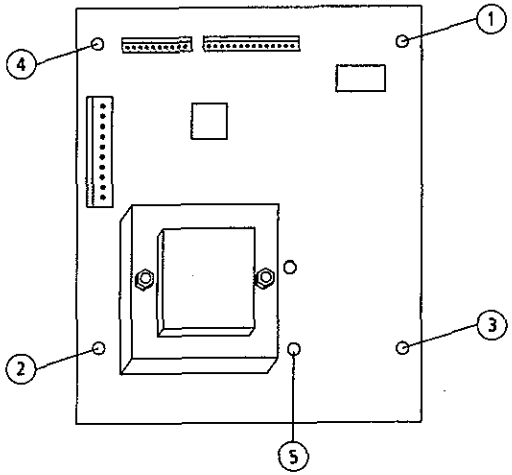
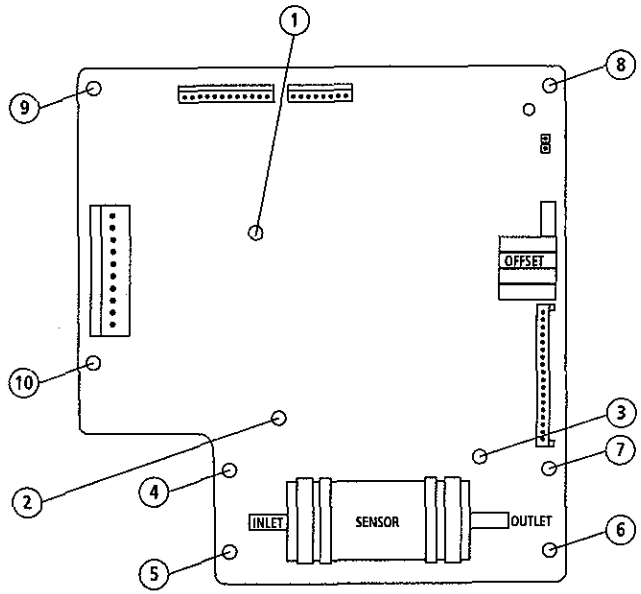
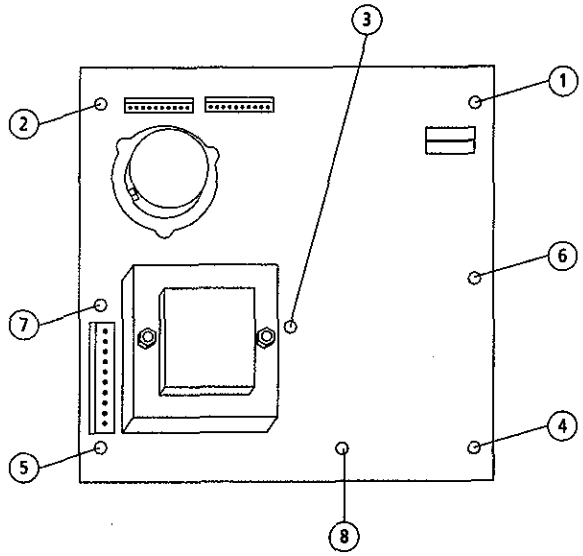
Figure 9-10: PCB Screw Sequences



Non-OCI Control PCB



Control/OCI Combo PCB



Control/OCI PCB with Removable Sensor

NOTE: For Control/OCI PCB with Removable Sensor (Figure 6-26, item **6B**), install only the first seven screws.

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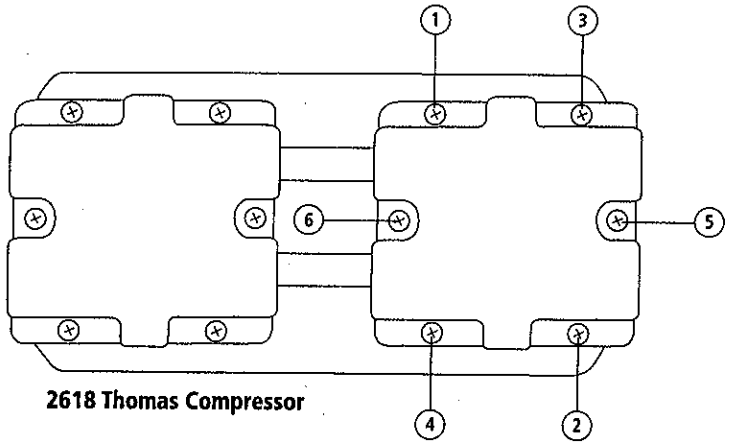
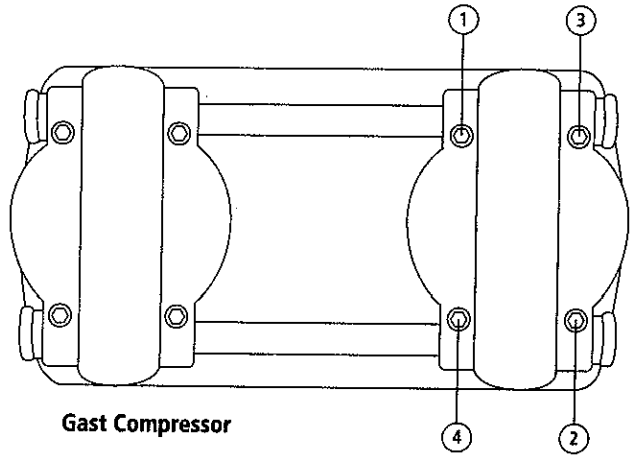
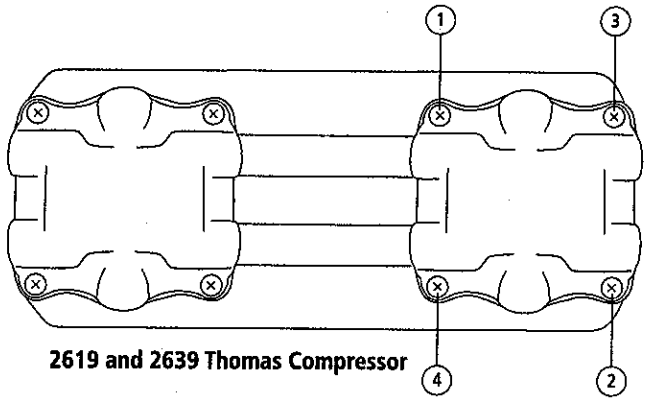
Figure 9-11: Compressor Head Screw Sequences



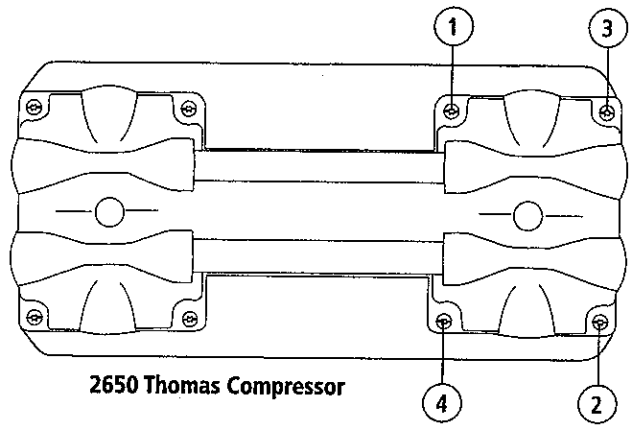
2618 Thomas Compressor



Gast Compressor



2619 and 2639 Thomas Compressor



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Section 10

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