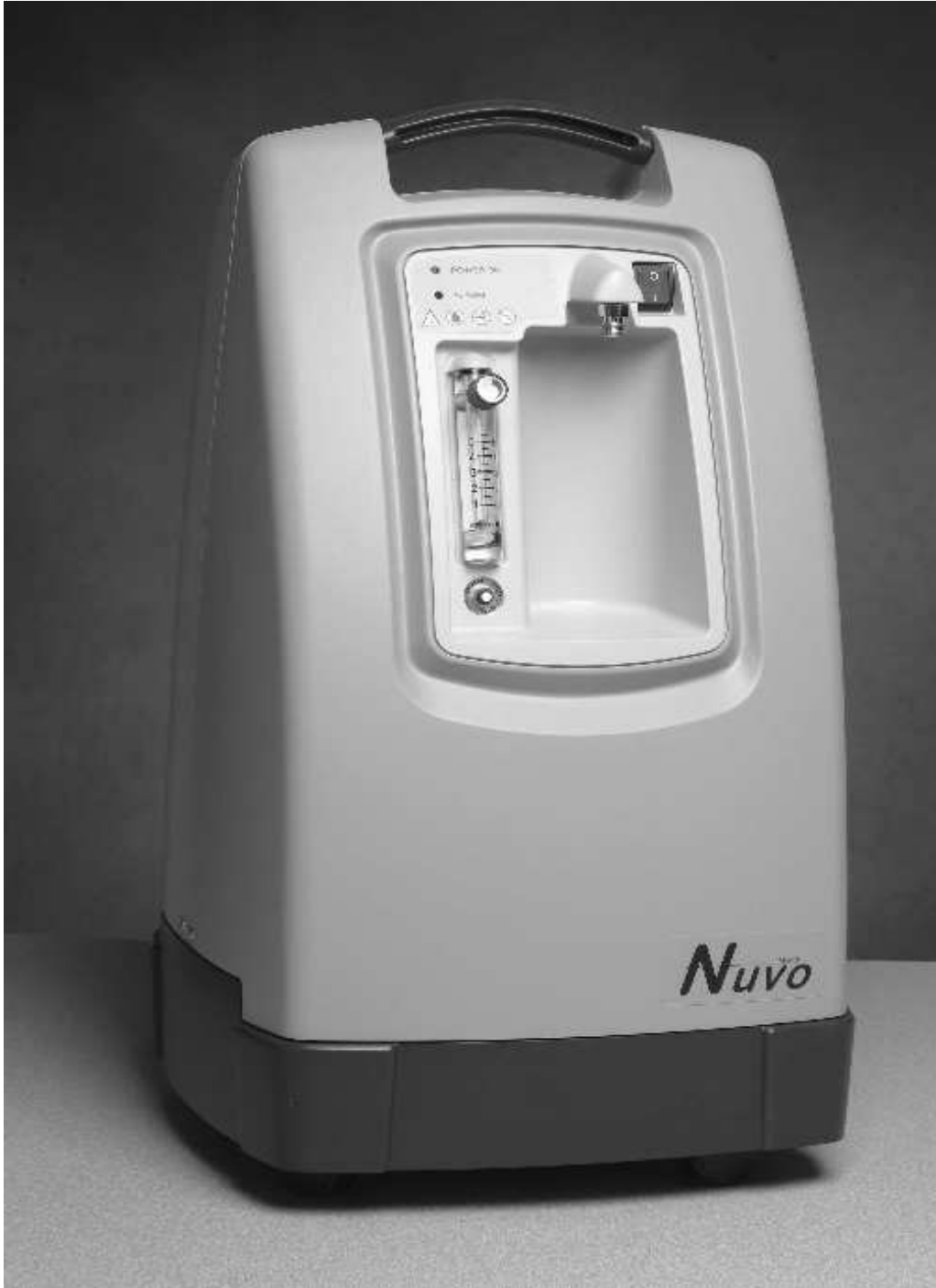


**Nidek Medical Products, Inc®
Mark5 Nuvo® [M5C5] Oxygen
Concentrator Service Manual**



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General Safety Instructions

Production and use of oxygen

Oxygen is not a flammable gas, but accelerates the combustion of materials. To prevent fire risks, the **MARK5 NUVO**® should be kept away from flames, incandescent sources or sources of heat (cigarettes) and combustible products such as oil, grease, solvents, aerosols, etc.

Do not use in an explosive atmosphere.

Prevent oxygen from accumulating on upholstered seats or any other fabric. If the concentrator operates without being administered to a patient, locate it so that the flow of gas generated is dissipated into the air.

Locate the equipment in a free space (filter to the rear and below) which is well ventilated and free of fumes or atmospheric pollution.

Use and Maintenance of the Device

Use the electric cable provided and check that the voltage of the mains socket used complies with the electrical characteristics of the appliance indicated on the manufacturers plate on the rear of the appliance.

Do not use an extension cord or multiple sockets which can create sparks and therefore pose a fire risk.

Use of the **MARK5 NUVO**® must be restricted solely to oxygen therapy on medical prescription in compliance with the daily rate and duration.

Use in other circumstances may represent a hazard to patient health.

Do not use in a specifically magnetic environment (MRI, etc.).

The **MARK5 Nuvo**® has an audible alarm intended to warn the user of any problems. The user must determine the maximum distance away from the Nuvo®, based on the on the sound levels in the environment, to ensure that the alarm is always audible.

Standards & Regulations

In compliance with UL60601-1 [EN60601-1] (para 6.82.b):

“The manufacturer, assembler, installer or importer are not considered to be responsible for consequences or the safety, reliability and characteristics of a device unless,

- the assembly, extensions, adjustments modifications or repairs have been performed by persons authorized by the manufacturer,

- the electrical installation of the corresponding premises complies with appropriate regulations and codes,
- the device is used in accordance with the instructions for its use.

If the replacement parts used for periodic servicing by an approved technician do not comply with the manufacturer's specifications, the manufacturer is absolved of all liability in the event of an incident.

Do not open the equipment when it is powered on: risk of electrocution.

This device complies with the requirements of the FDA Quality System Regulation and EU Directive 93/42/EEC, but its operation may be affected by the use in the surrounding area of appliances such as diathermy, high frequency electro-surgical instruments, defibrillators, short wave treatment appliances, cell-phones, CB devices and other portables, microwave ovens, induction hot plates or remote control toys, and more generally, by electromagnetic interference exceeding the levels specified in standard IEC(EN) 60601-1-2.

1.0 Introduction

1.1 Home Service Provider Responsibility

All Home Service Providers of the Nidek Medical Mark5 Nuvo® Oxygen Concentrator must assume responsibilities for handling, operational check-out, patient instruction, and maintenance. These responsibilities are outlined below and throughout this manual.

WARNING

Mark5 Nuvo units must not be used for or with any life-supporting or life sustaining applications. Patients unable to communicate discomfort while using this device may require additional monitoring. Advise patients to immediately notify their Home Service Provider(s) and/or physician(s) in case of an alarm or any discomfort.

As a Home Service Provider, you must do all of the following:

- Inspect the condition of each Mark5 Nuvo® unit immediately upon delivery to your business location. Note any sign of damage, external or internal, on the delivery receipt, and report it directly to both the freight company and Nidek Medical Products, Inc. immediately.
- Check the operation of each Mark5 Nuvo® before delivery to a patient. Always operate the unit for a reasonable length of time and check that the oxygen concentration level is within specifications as referred to in Section 2.4. Test the battery and power disconnect alarm as described in Section 2.3 of this manual.

- Deliver Mark5 Nuvo® units only to patients authorized by a physician's prescription. The Mark5 Nuvo® must not be used as a life-supporting or life sustaining device. A backup supply of oxygen must be available.
- Instruct patients how to use the Mark5 Nuvo® in conjunction with the Patient Manual.
- Instruct patients to notify their physicians and/or Home Service Providers if they experience any signs of discomfort.
- Instruct each patient how to perform routine maintenance of the cabinet air filter and how to check the alarm system battery. (Refer to Section 3.2.)
Be available to service each patient at any time. Maintain the Mark5 Nuvo® in accordance with Section 4.0.

Repair components and replace parts only as outlined in this manual. Use only Nidek Medical parts for replacement in Mark5 Nuvo® Oxygen Concentrators.

- Refer to the Mark5 Nuvo® Product Warranty if parts replacement is required within the warranty period.

1.2 Important Notice and Symbol Explanations

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

WARNING:	Describes a hazard or unsafe practice that can result in severe bodily injury or death.
CAUTION:	Describes a hazard or unsafe practice that can result in minor bodily injury or property damage.
NOTE:	Provides information important enough to emphasize or repeat.

The following harmonized symbols (pictograms), used for non-English language countries, will be located on the exterior of the Mark5 Nuvo® unit:



Read the accompanying documents; particularly the patient operating guide.



Store, ship and use the device in an upright condition.



No smoking within five feet of this device, oxygen-carrying tubing, or accessories.



Indicates an alarm signal.



Do not use any oil or grease on or near the device

1.3 Functional Specifications

Dimensions: 15.5 in. long, 15.6 in. wide, 27.8 in. tall
(394 mm long, 396 mm wide, 706 mm high)

Weight: 50 to 54 lb (22.5 to 24.5 kg) depending on sound attenuation;

Electrical 120 VAC, 60 Hz, 4 amps, 410 watts
Requirements: 220 VAC, 50 Hz, 2 amps, 420 watts

Capacity: 5 liters per minute at 90% oxygen
(Based on 70°F [21°C] at sea level)

Accuracy: Flow meter $\pm 5\%$ full scale. (Based on pre-calibrated analysis.)

Concentration: 1 - 3 liters per minute at 95% + 0.5 / - 3%
4 liters per minute at 92% + 3.5 / - 3%
5 liters per minute at 90% + 5.5 / - 3%

Response Time: Acceptable concentration is normally achieved in about 90 seconds; allow 5 minutes to attain full concentration.

Positioning: Operate the unit in an upright position, maintaining at least six inches of open space on all sides for ventilation.

2.0 Operational Check and Concentration Test

2.1 Description of Operation

Air enters the Mark5 Nuvo® Oxygen Concentrator through an external cooling air intake filter. This filtered air enters the compressor via a suction resonator and fine filter, which quiets the suction sounds made by the compressor. Pressurized air then exits the compressor and passes through a heat exchanger into an air tank. The heat exchanger reduces the temperature of the compressed air and the air tank stores air when feed is interrupted. Next, a rotary poppet feed valve directs the air into one of two sieve beds that contain molecular sieve. The special characteristic property of molecular sieve is that it physically attracts (adsorbs) nitrogen when air passes through this material, thus enabling the production of high purity oxygen.

There are two sieve beds or adsorbent columns; while one produces high purity oxygen, the other is purged of the nitrogen it adsorbed (collected) while it was producing oxygen. Each column produces oxygen for approximately four seconds and delivers it to the product storage volume in the end of the column. Oxygen exits the adsorbent column through a pressure regulator, flow control valve, flow meter, and final product filter. The flow control valve, which is part of the flow meter, controls the flow rate of oxygen delivered to the patient. The Mark5 Nuvo® unit
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delivers up to 95% oxygen concentration at flow rates from 1 to 5 l/min. The remaining constituents of the product gas stream are nitrogen and argon, both of which are part of the air we breathe, are inert and are completely safe.

2.2 Operational Check

Nidek Medical runs each device through a burn in period and tests every Mark5 Nuvo® Oxygen Concentrator thoroughly after manufacture before releasing for shipment. As the home service provider, it is your responsibility to perform the following test to ensure that no damage occurred in shipping or handling.

1. Open and inspect all concentrator cartons upon receipt. Unpack each unit and remove it from its carton. Inspect the unit itself for damage. If the exterior of the carton is damaged, or the unit itself is damaged, note it on the freight bill signed by the driver.
 - Before plugging the unit into the wall outlet, actuate the I/O (ON/OFF) switch to the I (ON) position and note that the audible alarm sounds continuously. (See Section 2.3). Move the switch to the 0 (OFF) position.
2. Plug in the power cord of the unit, and set the I/O (ON/OFF) switch to the I (ON) position. Check to see that the following occurs:
 - The compressor runs, listen for the sound.
 - Exhaust air flows out of the bottom of the unit.
 - OPTIONAL for Units Equipped with Oxygen Concentration Status Indicator (OCSI): The OCSI green light remains off until the oxygen concentration reaches $85\% \pm 3\%$ ($82\% \pm 2\%$ for 50 Hz units) (approximately two minutes).
3. Turn the flow meter adjustment knob counterclockwise until it stops (wide open). The flow meter should register in excess of 5.5 liters/min. If not, refer to Section 5.8 to adjust the product regulator.
4. Perform an oxygen concentration test, as described in Section 2.4.

2.3 Alarm System

The Mark5 Nuvo® Oxygen Concentrator is equipped with a battery-powered alarm system, which sounds a continuous and loud alarm when a power failure occurs or when one or more cycle variables are not within specification. It sounds an alarm if the high or low pressure indicators are activated or if the optional OCSI detects lower than predetermined levels of oxygen concentration. The alarm remains on until you correct the alarm condition or you set the I/O (ON/OFF) switch to the 0 (OFF) position. Refer to Section 6.0 for a list of probable alarm causes,

2.3.1 Battery Test

The Mark5 Nuvo® battery can be checked by observing that the continuous alarm sounds when the I/O (ON/OFF) switch is moved to the I (ON) position when the unit is unplugged from the wall outlet.

2.3.2 Power Failure Alarm Test

To test the power failure alarm, perform the following actions:

Unplug the power cord from the wall outlet, and set the I/O (ON/OFF) switch to the I (ON) position.

This should immediately activate the audible alarm. If it does not, refer to the troubleshooting chart in Section 6.0 of this manual.

2.4 Oxygen Concentration Test and Specification

To ensure that the output of oxygen from the device is within specification, you must perform an oxygen concentration test. Test the unit upon delivery to a patient and at periodic intervals. Home Service Providers, based on their expertise and documentation, may establish and implement their own plans for checking oxygen concentration. The interval established may be longer or shorter than 90 days, which is Nidek Medical's default time period for providers who do not choose to establish their own plan.

1. If an oxygen humidifier bottle is used, remove it from the oxygen outlet.
2. Connect a calibrated oxygen concentration analyzer to the oxygen outlet.
3. Set the I/O (ON/OFF) power switch to the I (ON) position. (It takes approximately five minutes for the oxygen concentration to stabilize.) Take oxygen concentration readings over a period of several minutes to reduce any cyclic variations
4. Verify that the product flow rate delivered by the unit matches the patient's prescription and does not exceed the capacity of the unit.
5. Disconnect the oxygen analyzer, and reconnect the humidifier bottle (if used) and any other equipment / accessories that may be required.
6. Adjust the flow meter adjustment knob to the prescribed flow rate.

NOTE

Do not measure oxygen concentration output after the product stream passes through a humidifier bottle, erroneous readings will result and your oxygen concentration measuring device might be damaged.

Nidek Medical Mark5 Nuvo® Concentration Specifications

<u>Liter Flow</u>	<u>Specification</u>	<u>Within Specification</u>
1 to 3 l/min	95% + 0.5 / - 3%	92% or higher
4 l/min	92% + 3.5 / - 3%	89% or higher
5 l/min	90% + 5.5 / - 3%	87% or higher

3.0 Patient Instructions

3.1 General Instructions

It is important that patients thoroughly understand how to operate the Nidek Medical Mark5 Nuvo® unit. This enables proper treatment as prescribed by a qualified, licensed physician. You must explain that the purpose of this therapy is to alleviate symptoms. If patients experience any discomfort or the unit alarms, they must notify their Home Service Provider and/or physician immediately. You, as the Home Service Provider, are responsible to see that each patient receives the Patient Manual. Explain each step in the operation of the unit to the patient in reference to this manual.

3.2 Routine Maintenance by the Patient

To ensure accurate output and efficient operation of the unit, the patient must perform two simple routine maintenance tasks:

- Clean the cabinet air filter
- Check the alarm system battery

3.2.1 Cleaning the Cabinet Air Filter

NOTE:

The patient must clean this filter weekly, as described below. The filter may require daily cleaning if the Mark5 Nuvo® unit operates in a harsh environment such as a house heated by wood, kerosene, or oil, or one with excessive cigarette smoke.

-
- 1 Remove the dirty cabinet air filter from the back of the Mark5 Nuvo® unit.
-
- 2 Wash the dirty filter in warm water with household detergent, and rinse.
-
- 3 Use a soft absorbent towel to remove excess water.
-
- 4 Reinstall the clean air filter on the grille in the back of the unit.
-

3.2.2 Checking the Alarm System Battery

See Procedure described in Paragraph 2.3.1

4.0 Home Service Provider Maintenance

4.1 Routine Maintenance

The Mark5 Nuvo® unit has two filters and a 9-volt battery that require scheduled maintenance and replacement.

To ensure that the output of oxygen from the unit is within specification, you must perform an oxygen concentration test. Test the unit upon delivery to a patient and at periodic intervals. Home Service Providers, based on their expertise and documentation, may establish and implement their own practices for checking oxygen concentration. Consult Nidek Medical's Service and Maintenance Log (A-15) for the recommended intervals for testing.

Nidek Medical does not require preventive maintenance on the concentrator. You do not need to perform any maintenance as long as the Mark5 Nuvo® unit remains within specifications at the prescribed flow rate. (Refer to Section 2.4)

Cabinet Air Filter

The external cabinet air filter is located on the back of the unit, You can easily remove it by hand. Instruct the patient to clean this filter weekly. (Refer to Section 3.2.1.)

NOTE

The filter may require more frequent cleaning if the Mark5 Nuvo® unit operates in a harsh environment such as a house heated by wood, kerosene, or oil, or one with excessive cooking, cigarette smoke or atmospheric dust.

4.1.2 Final Product Filter Replacement

The final product filter does not require periodic replacement; it needs to be replaced only if it restricts oxygen flow. It is suggested that it be replaced whenever the sieve module is repaired or replaced and after the compressor is rebuilt.

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the cabinet back to locate the final product filter.

NOTE: Observe the position of the filter before removal.

3. Separate the silicone tubing from both sides of the filter.
4. Install the new filter with the inlet side in the same position as before. Push the tubing together so that it overlaps the barbs of the final product filter

- connections.
5. Record information about the final product filter replacement in Appendix 15 of this manual and online at www.nidekmedical.com under the 'Maintenance Log' tab.
 6. Reinstall the cabinet back.

4.1.3 Inlet Air Filter Replacement

The inlet air filter requires inspection at each patient visit. The filter should be replaced annually, or more often depending on environment.

1. Set the unit I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the rear cabinet access panel to locate the inlet air filter.
3. Remove filter from the unit, and replace with a new filter.
4. Record information about the filter replacement in Appendix 15 of this manual and online at www.nidekmedical.com under the 'Maintenance Log' tab.
5. Reinstall the access panel.

4.1.4 Battery Replacement

Each time the standard Mark5 Nuvo® unit is turned on, the alarm must sound loudly for approximately five seconds to indicate a good battery. An alarm that does anything other than sound loudly for five seconds indicates a weak battery and requires replacement. For units with OCSI, actuate the switch with the power cord unplugged to test the battery.

To replace the battery, take the following steps:

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the access panel in the cabinet back.
3. Pull the battery from the mounting slot and remove the connection wires.
4. Attach the new battery to the connector and reinsert it into the mounting slot.
5. Set the I/O (ON/OFF) switch to the I (ON) position to test the alarm.
6. Record the battery replacement information in Appendix 15 of this manual and online at www.nidekmedical.com under the 'Maintenance Log' tab.
7. Reinstall the access panel.

4.1.5 Wick Replacement

The wick is installed in the process air stream of the unit, connected to the air tank, to assist with removal of moisture from the air. This helps prevent premature contamination of the sieve beds, particularly in humid climates. The wick should be replaced at each compressor service / module replacement; it is suggested that more frequent replacement be done in very humid climates. The wick is located in a bushing located just to the right of the gearmotor. It is installed in a quick release fitting. Pull the fitting from the bushing by hand – it may require several pounds of force, remove the wick and install a new one in its place. Re-insert the wick end and fitting into the bushing so the wick is totally below the base plate surface.

4.1.6 Recording Maintenance

As the Home Service Provider, it is suggested that you record all routine maintenance and repairs performed on the Mark5 Nuvo® unit, including hours and dates of service in Appendix 15 of this manual and online at www.nidekmedical.com under the 'Maintenance Log' tab.

4.2 Cleaning and Infection Control

With the growing concern about possible cross infection from home oxygen equipment (i.e.. oxygen concentrators) from one home care patient to another, appropriate cautions should be exercised.

The organisms of most concern are M. Tuberculosis, HIV, and Viral Hepatitis. These are potentially pathogenic.

Tuberculosis can survive outside of the human body, but its mode of transmission is by droplet nuclei. When infected individuals cough, they release droplet nuclei into the air, and these carry the Tuberculosis organism. Another person may breathe in these droplet nuclei, but prolonged exposure to the infected person is usually necessary for infection to occur.

HIV and Viral Hepatitis are both viruses, which are not living cells themselves but which can duplicate when in a living "host" cell. Both of these organisms are usually passed on by person-to-person contact, and both need to be in the human body to survive. Once outside the body, viruses can survive for only a short period of time.

4.2.1 Preparing for New Patient Use

When you remove the Mark5 Nuvo® from a patient's home, always dispose of the used nasal cannula and humidifier bottle. Clean the exterior of the Mark5 Nuvo® with a soapy water solution or commercial detergent cleaner to remove any gross debris, organic or otherwise. Be careful not to get any liquid into the interior of the unit.

Next, clean the exterior with either a common chemical disinfectant or a bleach solution* and allow it to air dry. For the bleach solution, wear eye and skin protection to prevent exposure to the chlorine. Retest the Mark5 Nuvo® before you return it to your inventory.

Replace the cabinet air filter between each patient's use or clean with warm soapy water if it is in good condition. Clean this filter at least once per week or more frequently if operated in a dusty environment.

*Make the bleach solution a 1:100 dilution of 5.25% sodium hypochlorite. Mix one part household bleach (e.g. Clorox) with 99 parts cold tap water. To measure the

solution easily, take 1/4 cup of household bleach, and mix it with a gallon of cold tap water. Allow the mixture to sit on potentially contaminated surfaces for 10 minutes.

5.0 Service

5.1 Components

The design of the Nidek Medical Mark5 Nuvo® Oxygen Concentrator allows for easy access and removal of most components. This allows you to perform scheduled maintenance, repair, and replacement of parts with minimal time and effort. The inlet air filter and battery are conveniently located inside the small access panel in the cabinet back.

CAUTION:

For your safety, be sure to set the I/O (ON/OFF) switch to the 0 (OFF) position and unplug the power cord before you service the Mark5 Nuvo® Oxygen Concentrator.

NOTE: Record all scheduled maintenance. (Refer to Section 4.1.6.)

5.2 Cabinet Removal

5.2.1 Removing Cabinet Back

To remove the cabinet back, remove two screws near the base (one on each side) and two inset screws at the top just under the handle.

5.2.2 Removing Cabinet Front

To remove the cabinet front, remove two screws near the base (one on each side) adjacent to the rear cabinet screws and two inset screws at the top just under the handle. It is necessary to remove the cabinet back to access the top screws.

5.2.3 Removing Control Panel

Eight screws hold the control panel in place; the front cover must be removed to access these screws. It is necessary to remove the electrical wiring and pneumatic tubing to fully release the control panel.

5.2.4 Main Structure

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

5.2.5 Caster Replacement

The casters are a push in type that does not require any fastener. Lay the device on its back to access the casters from the bottom. Pull them straight out away from the bottom.

5.3 Compressor

The compressor is the pump within the oxygen concentrator that supplies air to the separation process performed by the sieve beds. The pressure generated by the compressor forces oxygen to flow out of the top of the sieve columns.

The compressor is the likely cause of two potential specific problems:

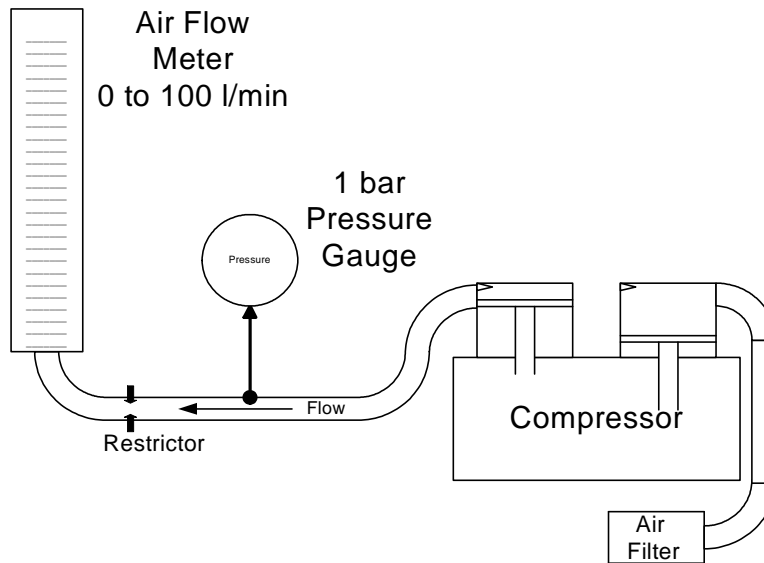
- a. An insufficient amount of air is supplied to the process, and
- b. An excessive sound level.

- **Air Supply**

Compressor output refers to how much compressed air the compressor can produce. This depends upon the model of the compressor, length of stroke, piston diameter, speed of rotation and condition of seals. The cup seals form the seal between the piston and the cylinder wall. As the cup seals wear, the output begins to gradually decrease. This reduction in compressor output results in less air, and thus less oxygen, entering the sieve beds. Therefore, the production of oxygen decreases.

Because this drop in oxygen production occurs over a long period of time, preventive maintenance on the compressor is not required.

You can continue a patient's therapy on the Mark5 Nuvo® unit as long as the oxygen concentration level at the prescribed liter flow rate is within Nidek Medical's specification limits. Refer to Section 2.4.



- Sound Level

The sound level is largely determined by the condition of the compressor's bearings.

There are four bearings located within the compressor that allow the inner components of the compressor to rotate. If the bearings wear to the point that they become loose and noisy, the compressor becomes noticeably loud and needs servicing. The life of a compressor is determined primarily by its operating temperature. It is extremely important that the cabinet air filters are cleaned and replaced as required.

5.3.1 Compressor Replacement

Remove Compressor Assembly

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

1. Set the unit's I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the cabinet back and front.
3. Disconnect the suction tube.
4. Disconnect the two compressor power cable leads and the two leads to the capacitor at the inline connector.
5. Remove the three screws that connect the compressor plate to the base of the unit, lift and slide out the compressor assembly.
6. Remove compressor from the plate by removing the four compressor bolts.
7. Remove tie wrap from compressor plate wiring harness.
8. Remove the heat exchanger tubing and fittings.

Compressor Assembly Installation

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

1. Perform the compressor removal procedure in reverse order.
2. Leak test all connections.

5.3.2 Capacitor Replacement

The capacitor helps the compressor to start and run more efficiently. If the compressor cannot start, the capacitor may be defective and require replacement. The capacitor should be replaced at each compressor service / module replacement. To replace the capacitor, take the following steps:

1. Set the unit's I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the rear and front cabinets.
3. Disconnect the two leads to the capacitor and remove the nut from the mounting screw.
4. Remove the nut and washer below the capacitor.
5. To install the new capacitor, connect the leads and replace the capacitor and associated hardware.

5.4 Process Control Valve

The Mark5 Nuvo® uses a gearmotor powered rotary cam-operated poppet valve assembly to control the air separation process. There is a feed port that connects to the air tank and an exhaust port that connects to the exhaust muffler. There are three possible valve states as follows:

1. Air feed connected to sieve bed A and exhaust connected to sieve bed B.
2. Air feed connected to sieve bed B and exhaust connected to sieve bed A.
3. Both ports closed; this is a very short time period during which air pressure builds in the air tank.

The control valve of the Mark5 Nuvo® unit requires no scheduled maintenance. If a valve does not function as required, it is best to replace the complete sieve module as it is probable that one or both of the beds has been damaged.

5.5 Sieve Bed Replacement

CAUTION:

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

NOTE

If replacement is necessary, you must replace both sieve beds at the same time. It is recommended to replace the sieve beds and control valve module as a complete assembly.

5.5.1 Sieve Bed Removal

1. Set the unit's I/O (ON/OFF) switch to the 0 (OFF) position and unplug the power cord.
2. Remove the cabinet back.
3. Disconnect the 1/4-inch product tube from the top of one of the beds.
4. Remove the 4 tie-wraps (2 from each sieve bed). Note their position and orientation.
5. Remove two "Z" brackets; one from the top of each of the sieve beds.
6. Lift the module up and out of the base plate cradle.
7. Unplug the valve gearmotor electrical leads at the in-line connections.
8. Manipulate the module so that the black exhaust hose can be removed from the fitting on the valve.
9. Loosen the hose clamp and remove the black feed hose from the fitting on the valve.

5.5.2 Sieve Bed Installation

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

To check for leaks, take the following steps:

1. Plug in the unit.
2. Set the unit's I/O (ON/OFF) switch to I (ON) for three minutes with the flowmeter closed to pressurize the system.
3. Apply soapy water around the hose connections at the valve and the air tank; check for leaks.

Caution: There is an electrical shock hazard with the Power ON. Be careful that no water contacts any of the electrical connections.

NOTE

Even small leaks can affect concentrator performance and can cause contamination of the sieve. Careful leak testing is important.

5.6 Cabinet Fan Replacement

The cabinet fan for the Mark5 Nuvo® is located under the compressor. Refer to the troubleshooting chart in Section 6.0 of this manual for instances where replacement of the fan may be required.

To replace the cabinet fan in the Mark5 Nuvo® unit, take the following steps:

1. Set the unit's I/O (ON/OFF) switch to the 0 (OFF) position and unplug the

- power cord.
2. Remove the front and back cabinets.
 3. Follow the procedure in 5.3.1 to remove the compressor assembly.
 4. Disconnect the fan leads.
 5. Position the new cabinet fan so that the air flow arrow points toward the bottom and the electrical connections. Be sure that the electrical wires do not interfere with the rotation of the fan.
 6. Connect the fan leads and place the fan on the mounting pins.
 7. Replace compressor assembly.
 8. Reinstall the front and back cabinets.

5.7 Circuit Board Replacement

The printed circuit board controls the alarm system functions.

Consult the troubleshooting chart in Section 6.0 to determine when to replace the printed circuit board.

CAUTION

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

- Handle the PCB by the edges only.
- Work on a grounded ESD mat.
- Wear a grounded wrist strap.
- Store PCB in anti-static bags only.

5.7.1 Circuit Board Removal (Note that the Circuit Board on the OCSI unit is different to the Circuit Board on the standard unit.)

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the front and cabinet backs.
3. Remove the control panel to which the circuit board is attached.
4. Disconnect the 7-pin connector from the circuit board.
5. Disconnect tubing from each end of the black sensor tube on the OCSI unit, noting their position and orientation.
6. **Non OCSI units:** Cut tie-wrap and remove pressure sensor line.
7. Remove three screws that attach the board to the control panel.
8. Remove the circuit board.

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

5.7.2 Circuit Board Installation

1. Locate the circuit board to line up the attachment points.
2. Install the three mounting screws.
3. Reinstall the tubing to each end of the black sensor tube as it was before.
4. **Non OCSI unit:** Reinstall the pressure sensor line and tie-wrap.
5. Plug in the 7-pin connector.
6. Reinstall the control panel and the front and cabinet backs.

5.8 Product Regulator Check and Setting

The product regulator enables you to set the maximum flow of oxygen output by the Mark5 Nuvo® unit. To check for proper adjustment of the product regulator, take the following steps:

1. Set the I/O (ON/OFF) switch to the I (ON) position.
2. Allow the unit to run for a few minutes.
3. Connect a pressure gauge directly to the patient outlet.
4. The pressure should read $7 \pm 10\%$ psig ($50 \pm 10\%$ kPa).
5. Adjust the regulator if necessary. Turn the knob clockwise to increase the output pressure. (Requires a 5/32 hex wrench)
6. Reinstall the cabinet front and cabinet backs.

5.8.1 Product Regulator Cleaning or Rebuilding

Clean or rebuild the product regulator if the flow meter ball fluctuates more than 1/4 of a liter or if the regulator cannot be adjusted.

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord,
2. Remove the front and rear cabinets.
3. Use large pliers to unscrew the mounting nut of the product regulator. Remove from the main structure.
4. Adjust the product regulator fully counterclockwise to unload the spring. This makes disassembly and reassembly easier.
5. Remove the diaphragm. (Clean or replace it.)
6. Use a hex-head screwdriver to unscrew the diaphragm stem guide located in the center of the regulator body to gain access to the seat,
7. Remove the seat. Be careful not to lose the spring located behind the seat.
8. Replace the seat or clean by blowing clean air on and around it.
9. With the spring behind the seat, screw the diaphragm stem guide back into the body of the regulator. (Do not over tighten.)
10. Install a clean or replacement diaphragm.
11. Put the large spring and slip ring into the bonnet, and screw the bonnet onto the regulator body.
12. Reinstall the regulator, mounting it securely to the main structure.
13. Reset the product regulator as described in Section 5.8.1.

5.9 High or Low Pressure Switch Replacement (Standard Unit, Non OCSI only)

The high and low pressure alarms are activated by a pressure transducer located on the circuit board adjacent to the mains switch.

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the back and front cabinets and the control panel.
3. Disconnect the 7 pin connector from the circuit board.
4. Disconnect tubing from pressure sensor by cutting tie-wrap.
5. Remove the circuit board and replace with a new one.
6. Test the alarm system, as described in Section 2.3.
7. Reinstall the control panel and the front and back cabinets.

5.10 Circuit Breaker Replacement

5-10.1 Circuit Breaker Removal

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the cabinet front.
3. Disconnect the circuit breaker leads.
4. Unscrew the circuit breaker while you apply pressure to the circuit breaker retaining ring.

5.10.2 Circuit Breaker Installation

Follow the removal procedure for the circuit breaker in reverse order to install the new circuit breaker.

5.11 I/O (ON/OFF) Power Switch Replacement

5.11.1 I/O (ON/OFF) Power Switch Removal

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position and unplug the power cord.
2. Remove both the front and back covers.
3. Unscrew the eight Phillips-head screws that hold the control panel to the main structure.
4. Disconnect the I/O (ON/OFF) switch leads from the back of the switch being careful to note the position of each.
5. Push on the back of the power switch, while holding in its four retaining tabs, and remove the switch through the front of the control panel.

5.11.2 I/O (ON/OFF) Power Switch Installation

Follow the removal procedure for the I/O (ON/OFF) power switch in reverse order to install a new power switch.

5.12 Buzzer Replacement

The buzzer is a fixed component on the circuit board and is not individually replaceable.

5.13 Hour Meter Replacement

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the cabinet back.
3. Disconnect the hour meter leads.
4. Push hour meter mounting tabs inward from the hour meter.
5. Remove the hour meter from the main structure.
6. Install the new hour meter into its mounting location, and push the mounting tabs outward to secure hour meter. Make sure that the hour meter is mounted right side up.
7. Reconnect the hour meter leads.
8. Reinstall the cabinet back.

5.14 Flow Meter Replacement

5.14.1 Flow Meter Removal

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the cabinet back and front and then the control panel. Ref. 5.2.3. On units with OCSI, it is necessary to also first remove the circuit board.
3. Remove the 3/8-inch silicone oxygen tubing from the flow meter fittings.
4. Unscrew the flow meter nuts with a wrench.
5. Remove the flow meter through the control panel.

5.14.2 Flow Meter Installation

To install a new flow meter, follow the flow meter removal procedure in reverse order. Then perform a leak test on the connections.

5.15 Power Cord Replacement

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position and unplug the power cord.
2. Remove the cabinet back and front.
3. Slide the power cord strain relief reinforcement upwards to remove it from the mounting location at the rear of the base.
4. Disconnect the power cord leads from the terminal quick connects.
5. Connect the leads on the new power cord at the terminal quick connects.
6. Reinstall the power cord strain relief into the base of the unit.
7. Reconnect the front and cabinet backs.

6.0 Troubleshooting

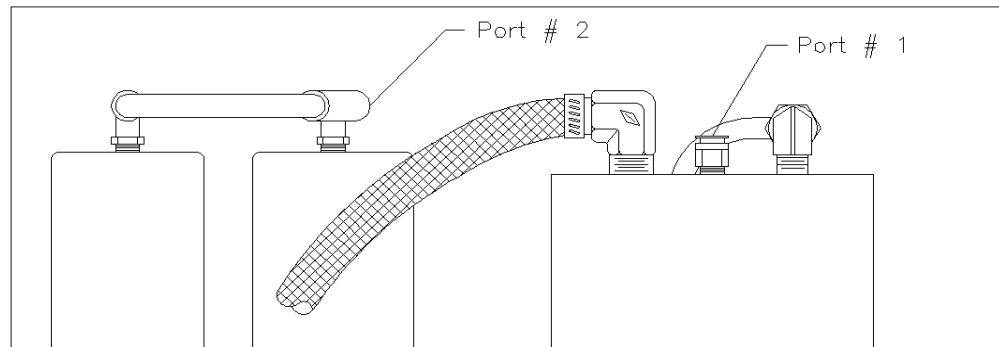
6.1 Air Pressure Test (P1)

Testing the operating pressure is a useful diagnostic tool when a concentrator has low purity and requires servicing. Units functioning normally do not require operating tests.

Use the following procedure to test the operating pressure of the unit.

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the cabinet rear.
3. Remove the test port plug at the top of the air tank.
4. Connect the pressure test gauge to the test port.
5. Plug in the power cord, and set the I/O (ON/OFF) power switch to the ON position. Set the flow meter to 5 l/min, and allow the unit to run at least five minutes.
6. Observe the maximum and minimum readings on the pressure test gauge.
7. The maximum reading should not exceed 34 psig (235 kPa). The minimum reading should not be less than 16 psig (110 kPa).

NOTE: When you turn the unit on, it will take several minutes to reach normal operating pressures.



6.1.1 High Operating Air Pressure

Higher than normal operating pressure may indicate any of the following:

- ▶ A restrictive exhaust muffler, which does not allow the waste (purge) gas to exit the system freely.

Operate the unit with the exhaust muffler disconnected to see if the operating pressure returns to normal.

- ▶ An improperly operating control valve, confirm that the control valve is turning at 4 rpm. Time the exhaust pulse at 7.5 seconds.
- ▶ Contaminated sieve beds. Change the sieve beds.

6.1.2 Low Operating Air Pressure

Lower than normal operating pressure may indicate any of the following:

- ▶ A restriction in the suction resonator or inlet air filter, which limits the amount of room air available to the compressor. Disconnect the suction tube at the compressor, and allow the unit to operate without the suction resonator to see if normal operating pressure returns.
- ▶ An improperly operating control valve. Confirm that the control valve does not have a leak.
- ▶ A leak in the unit, which allows system pressure to escape. Leak test the unit.
- ▶ A compressor with reduced output.

Ensure that the concentration level at the desired liter flow is within specifications listed in section 2.4. If it is below specifications, replace or repair the compressor.

6.2 Product Pressure Test (P2)

Testing the product pressure is a useful diagnostic tool when a concentrator has low purity and requires servicing. Units functioning normally do not require operating tests.

Use the following procedure to test the product pressure of the unit.

1. Set the I/O (ON/OFF) switch to the 0 (OFF) position, and unplug the power cord.
2. Remove the cabinet rear.
3. Remove the test port plug from the tee at the top of the sieve bed.
4. **Note:** The standard unit without OCSI does not have a test port; use the pressure sensor tube as the test connection.
5. Connect the pressure test gauge to the P2 test port.
6. Plug in the power cord, and set the I/O (ON/OFF) power switch to the *ON* position. Set the flow meter to 5 l/min, and allow the unit to run at least five minutes.
7. Observe the maximum and minimum readings on the pressure test gauge. The maximum reading should not exceed 16 psig (110 kPa). The minimum reading should not be less than 9 psig (62 kPa).

6.2.1 Low Product Pressure

Lower than normal operating pressure may indicate any of the following:

- ▶ An inlet air filter that limits the amount of room air available to the compressor. Disconnect the suction tube at the compressor, and allow the unit to operate without the suction resonator to see if normal operating

pressure returns.

- ▶ An improperly operating control valve. Confirm that the control valve does not have a leak.
- ▶ A leak in the unit, which allows system pressure to escape. Leak test the unit.
- ▶ A compressor with reduced output. Ensure that the concentration level at the desired liter flow is within specifications listed in Section 2.4. If it is below specification, replace or repair the compressor.

6.2.2 High Product Pressure

Higher than normal operating pressure may indicate any of the following:

- ▶ A restrictive exhaust muffler, which does not allow the waste (purge) gas to exit the system freely.
- ▶ Operate the unit with the exhaust muffler disconnected to see if the operating pressure returns to normal.
- ▶ Check exhaust muffler and hoses for any restrictions.
- ▶ An improperly operating control valve, confirm that the control valve is turning at 4 rpm. Time the exhaust pulse at 7.5 seconds.
- ▶ Contaminated sieve beds. Change the sieve beds.

6.3 General Troubleshooting

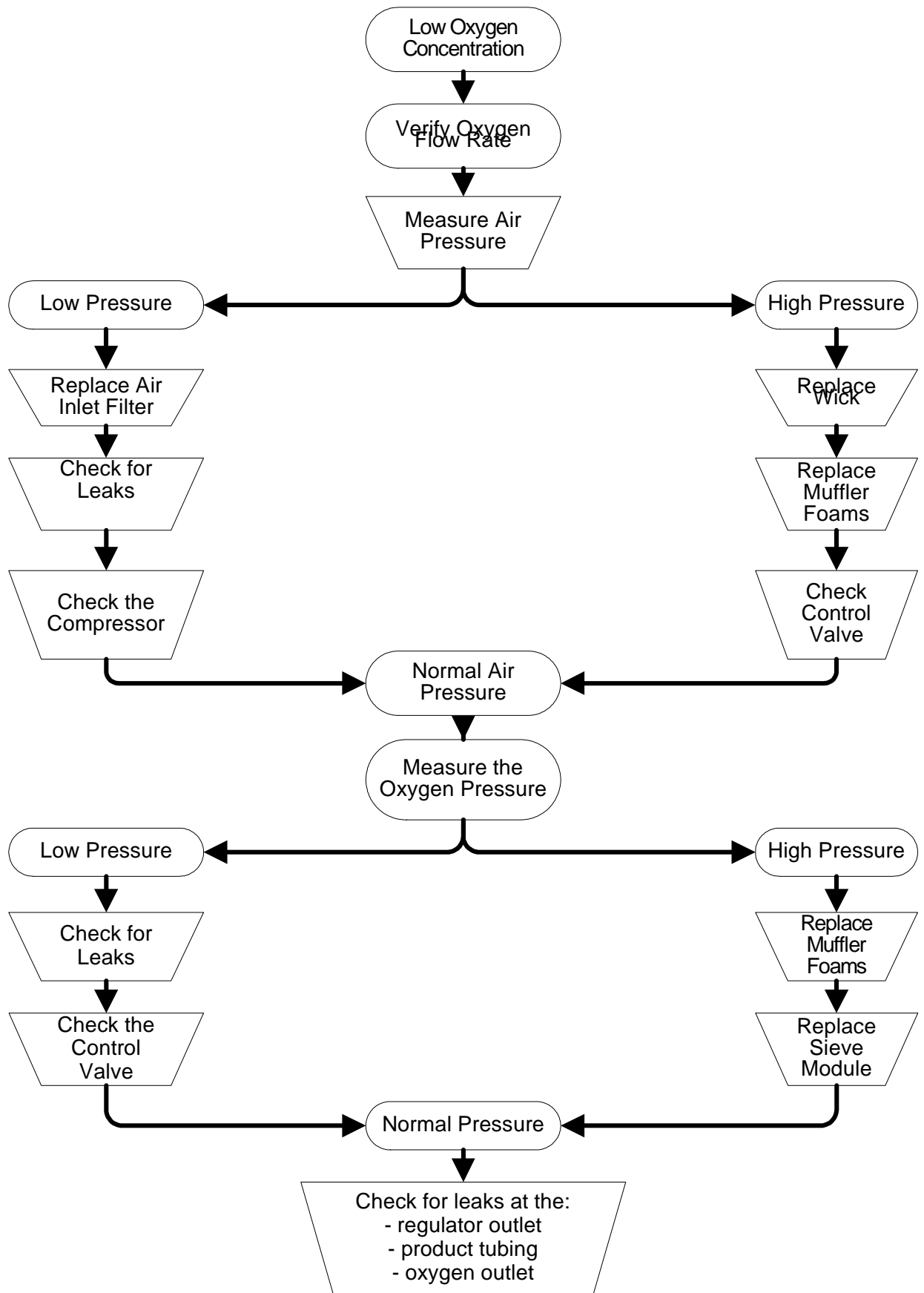
Before reviewing the troubleshooting chart, the following steps may be useful to isolate any malfunctions:

1. Turn the concentrator on. If unit does not turn on, refer to troubleshooting chart.
2. Make sure all filters are clean.
3. Turn flow meter completely open, up to the highest setting. The ball should rest at the top of the scale. If setting is not greater than 5.5 l/min, adjust regulator so that the ball level exceeds 5.5 l/min with the flow meter completely open.
4. Connect test pressure gauge to the outlet fitting of the unit. The pressure should read approximately 7 psig (50 kPa).
5. Connect test pressure gauge to the P1 test port on the air tank. The pressure should be cycling between approximately 16 and 34 psig (110 and 235 kPa).
6. Make sure the unit is cycling properly by observing the pressure gauge cycle

between a high and a low pressure. If the unit is not cycling properly, refer to troubleshooting chart.

7. Make sure that the unit is leak free by testing all tubing connections and fittings with leak testing solution. Protect circuit board from solution and start leak test at the heat exchanger, following the air flow through the unit to the oxygen outlet. Repair all leaks by tightening connections and fittings.
8. Set the concentrator at 5 l/min and connect pressure test gauge to P2 at the top of the sieve beds. Determine pressure parameters by observing high and low pressure points on the gauge. It should cycle between approximately 9 psig and 16 psig (62 to 110 kPa). If pressures are high or low, refer to the troubleshooting chart.
9. Review troubleshooting chart to isolate and repair any other malfunctions.

The following diagnostic flow chart will help to isolate potential problems.



6.4 Troubleshooting Chart

Problem	Probable Cause	Solution
Compressor does not run.	No power to unit.	Check wall outlet for power.
Constant audible alarm with I/O (ON/OFF) power switch in ON position.	Unit circuit breaker tripped or faulty.	Reset or replace circuit breaker.
	Faulty electrical connections. Defective circuit board.	Check electrical connections.
	Defective I/O (ON/OFF) power switch.	Check power switch. Replace I/O (ON/OFF) power switch.
Compressor runs with intermittent alarm. Concentration at 5 L/MIN is within specifications.	Defective high or low pressure switch. Kinked tubing.	Replace and retest pressure switch. Check tubing that joins the tops of the sieve beds.
Compressor shuts down intermittently,	Restricted air flow through unit.	Clean inlet air filter, or remove obstruction.
	Unit overheating due to improper location.	Locate unit away from heating source, providing adequate ventilation on all sides.
	Defective cabinet fan.	Replace cabinet fan.
Compressor does not start. I/O (ON/OFF) power switch in ON position, intermittent alarm, and cabinet fan turns.	Extreme cold start.	Allow unit to reach room temperature.
	Compressor thermally cut off due to excessive heat. NOTE: It will not restart unit it cools down,	Blocked air intake or defective cabinet fan/clear obstruction, or replace cabinet fan.
	Defective capacitor.	Replace capacitor.
	Faulty electrical connection for compressor.	Check electrical connections for compressor.
Compressor runs with intermittent low pressure alarm and low oxygen concentration.	Leak	Leak test and repair leak.

Problem	Probable Cause	Solution
Compressor runs with intermittent high pressure alarm and low oxygen concentration.	Defective sieve beds.	Replace sieve beds.
	Restriction in exhaust muffler.	Replace or clean muffler.
	Defective gearmotor / valve.	Replace sieve module.
Compressor relief valve releases (popping sound).	Defective gearmotor.	Replace sieve module.
	Defective control valve.	Replace sieve module.
	Contaminated sieve beds.	Replace sieve module.
	Defective relief valve.	Replace relief valve.
Constant alarm with I/O (ON/OFF) switch in ON position. Circuit breaker repeatedly trips.	Defective circuit breaker.	Replace circuit breaker.
	Defective capacitor.	Replace capacitor.
	Defective compressor.	Replace compressor.
	Defective circuit board.	Replace circuit board.
	Faulty electrical connection.	Repair electrical connection.
Alarm does not sound.	Dead battery.	Replace battery.
	Incorrectly installed battery.	Reinstall battery with correct polarity.
	Faulty electrical connection.	Repair electrical connection.
	Defective I/O (ON/OFF) switch.	Replace I/O (ON/OFF) switch.
	Defective buzzer.	Replace board.
	Defective pressure sensor.	Replace and test control board.
Flow meter fluctuates.	Improperly set or faulty product regulator.	Check regulator setting/clean, repair, or replace regulator.
	Leak.	Leak test.
	Worn compressor.	Replace compressor
	Defective flow meter.	Replace flow meter.
	Kinked tubing	Check tubing that connects the top of the sieve beds.

Problem	Probable Cause	Solution
Cabinet fan does not turn.	Defective cabinet fan.	Replace cabinet fan.
	Defective electrical connections.	Check electrical connections.
Limited or low flow.	Restriction in humidifier or tubing.	Replace humidifier or tubing.
	Product regulator set too low.	Adjust regulator setting.
	Leak.	Leak test and repair leak.
	Weak compressor.	Check system pressure, and rebuild or exchange compressor.
	Air flow obstruction.	Check filter, suction resonator, and suction tube for obstruction.
Low concentration.	Compressor inlet air filter is dirty or partially blocked.	Replace inlet air filter.
	System leak	Leak test and repair leak.
	Faulty compressor	Check system pressure, and rebuild or replace compressor.
	Unit temperature too high,	Blocked air intake or defective cabinet filter.
	Contaminated sieve beds.	Check that P1 and P2 pressures are within range. Replace sieve module.
	Defective rotary valve.	Repair or replace sieve module.
	Restriction in exhaust muffler,	Replace or clean exhaust muffler.
Restriction in suction resonator.	Check suction resonator and suction tube for obstruction and remove.	

6.5 Tool Kit and Pressure Test Gauge

The tools needed for you to properly service the Mark5 Nuvo® unit are listed below:

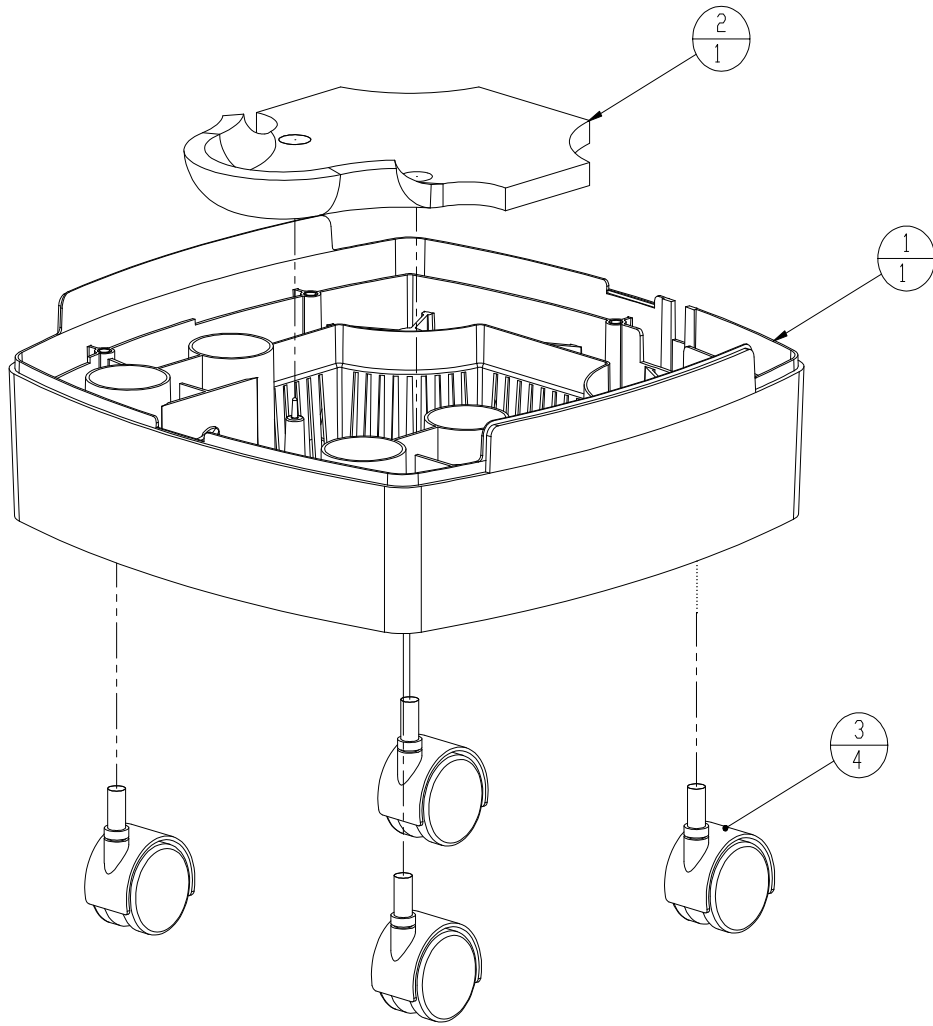
- ▶ Requires no special tools; generally available tools including common pliers, channel lock, wire cutters, needle-nose pliers, slotted-head screwdriver, long Phillips head screwdriver, 8-inch adjustable wrench, 7/16-inch socket, 7/16-inch combination wrench, 5/8-inch combination wrench and 3/8-inch combination wrench.
- ▶ For convenience, it is desirable to have a battery operated drill motor available to remove and install screws.
- ▶ An accurate pressure test gauge to take both high and low pressure readings on the Mark5 Nuvo® unit should be kept available at all times. This gauge connects to the pressure test ports on top of the air tank and on top of the sieve bed.

Appendices

Exploded Drawings

Base Assembly	A-1, A-1.1
Main Structure Assembly	A-2, A-3
Pressure Regulator Assembly	A-4
Compressor Assembly	A-5, A-5.1
Control Panel Assembly	A-6, A-6.1, A-7, A-7.1, A-8, A-9
Air Tank Assembly	A-10, A-10.1
Front Cabinet Assembly	A-11, A-11.1
Rear Cabinet Assembly	A-12, A-12.1
Sieve Module	A-13

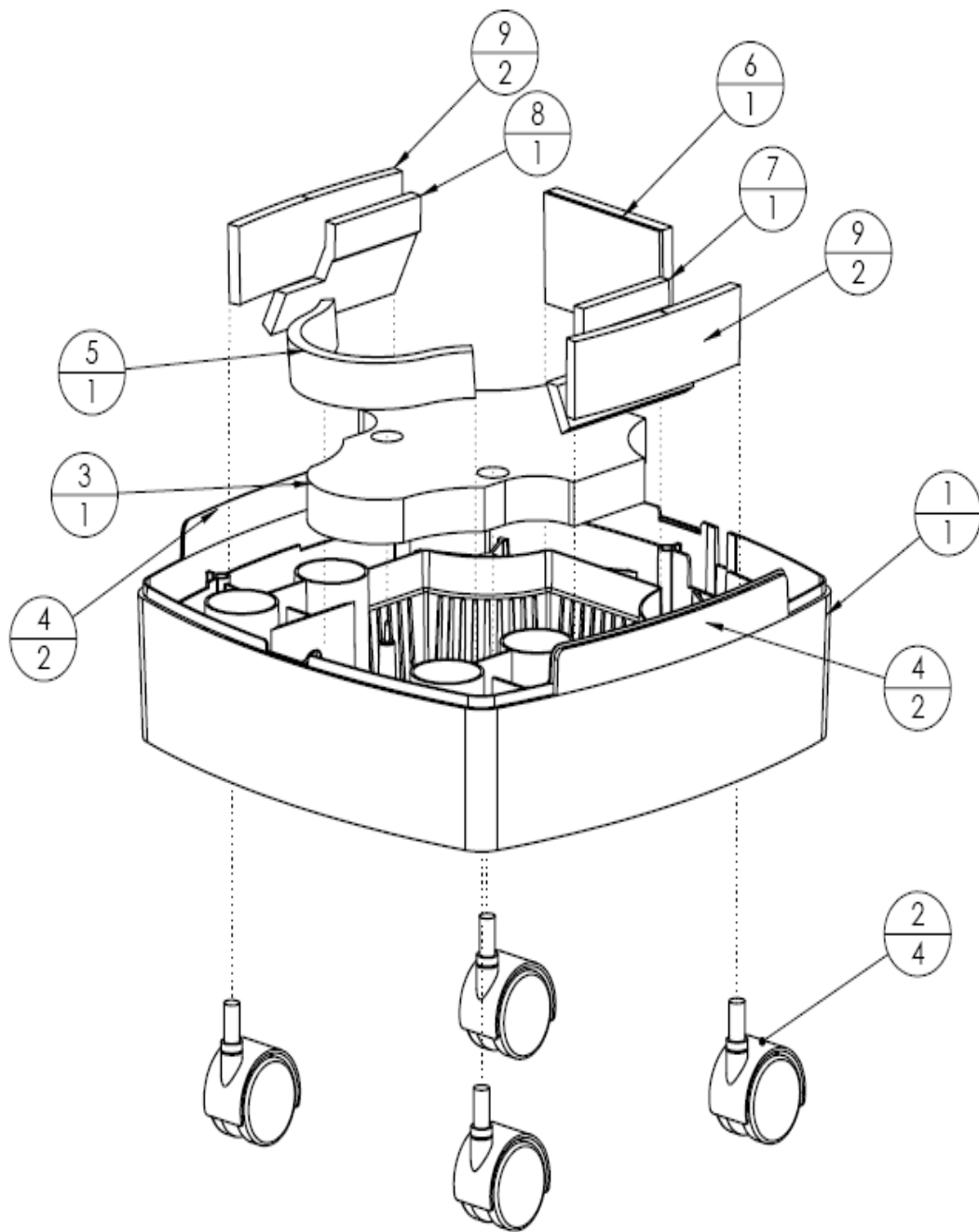
Refer to Thomas Compressor Manual (FSM 0159 Rev A dtd 07/04 for compressor rebuild procedures. Call Nidek Medical customer service to obtain a pdf file copy.



A-1 BASE ASSEMBLY

NUVO 0100-0300 REV A

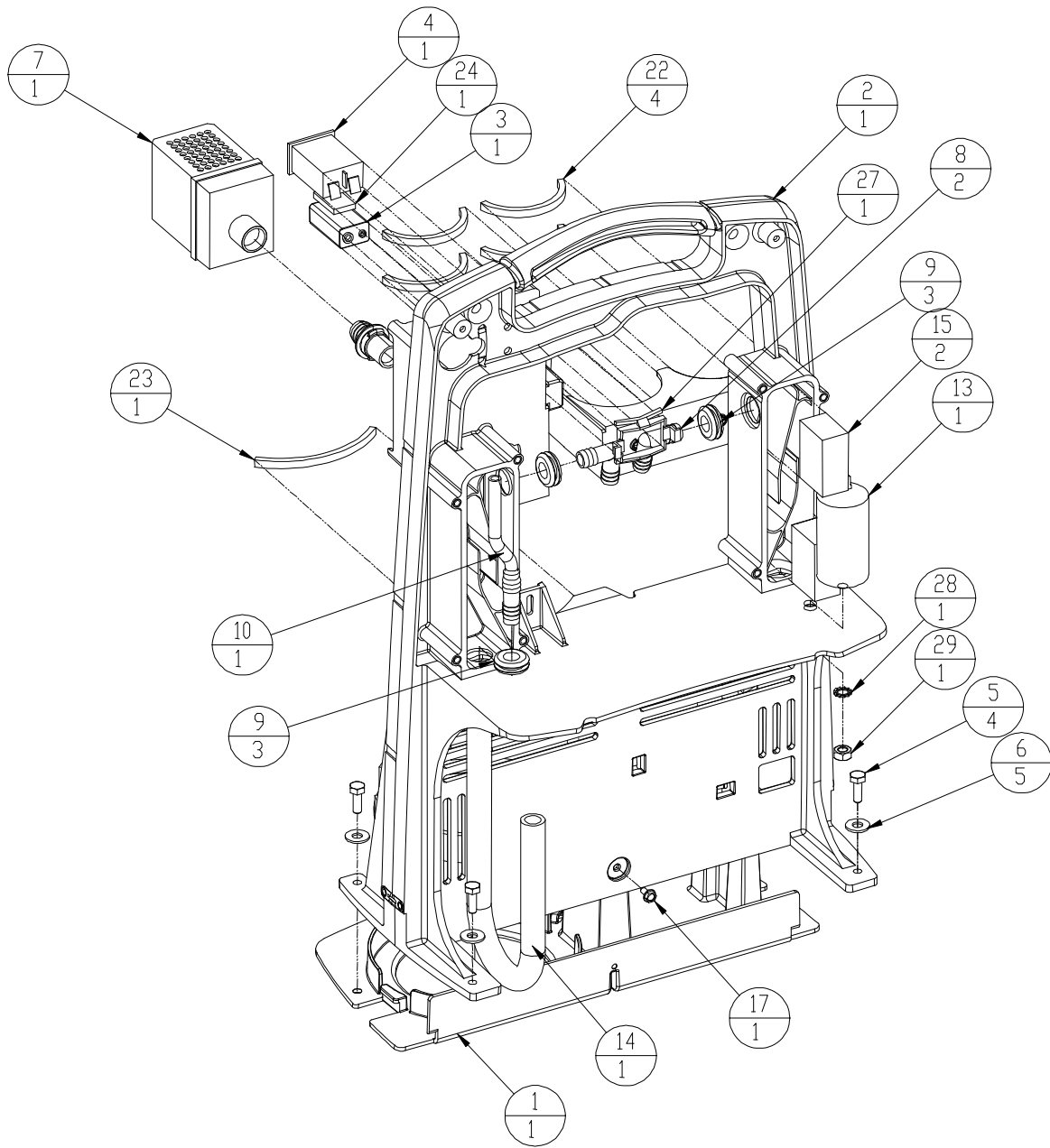
NOTE: USE THIS DRAWING ON UNITS EARLIER THAN SERIAL # 062-11663



A-1.1 BASE ASSEMBLY

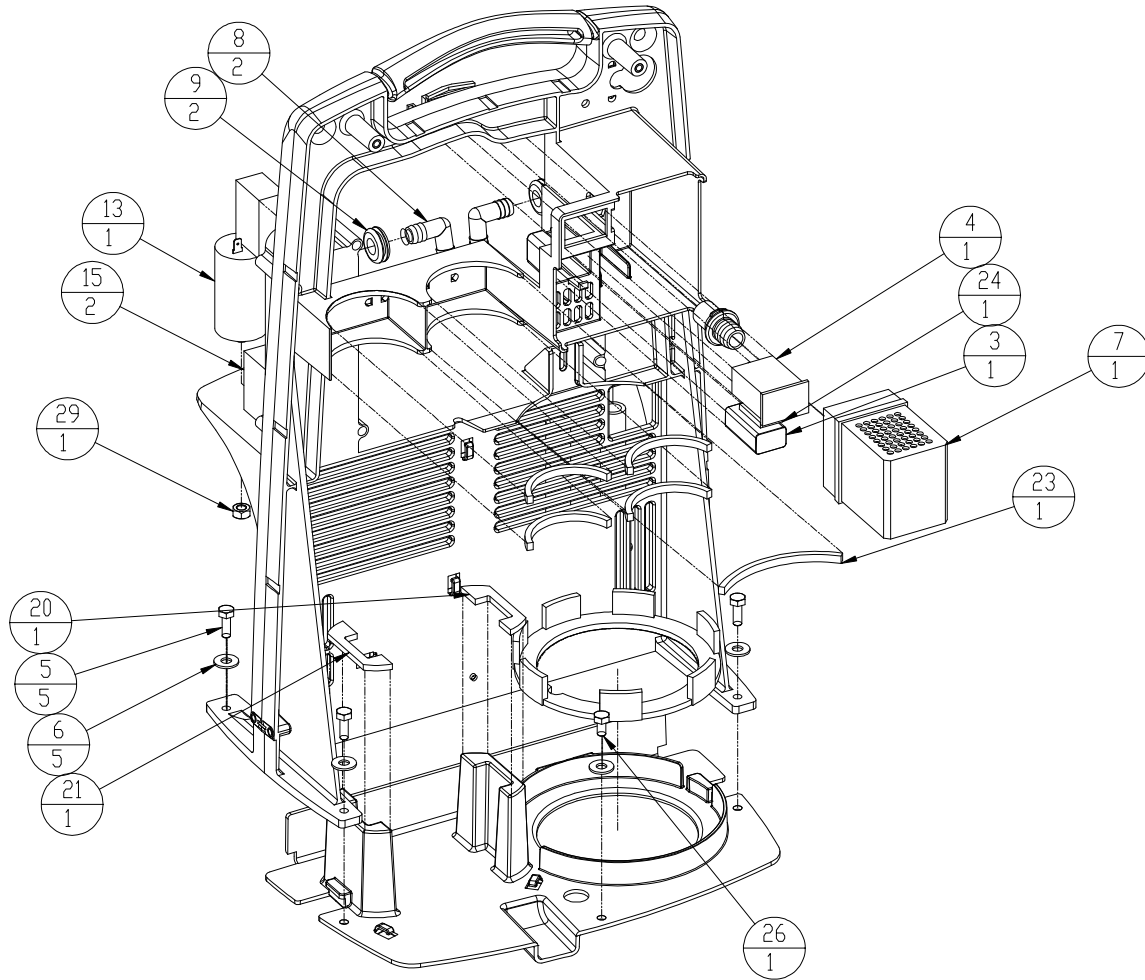
Nuvo 0100-0300Q Rev B

NOTE: USE THIS DRAWING ON UNITS AFTER SERIAL # 062-11663



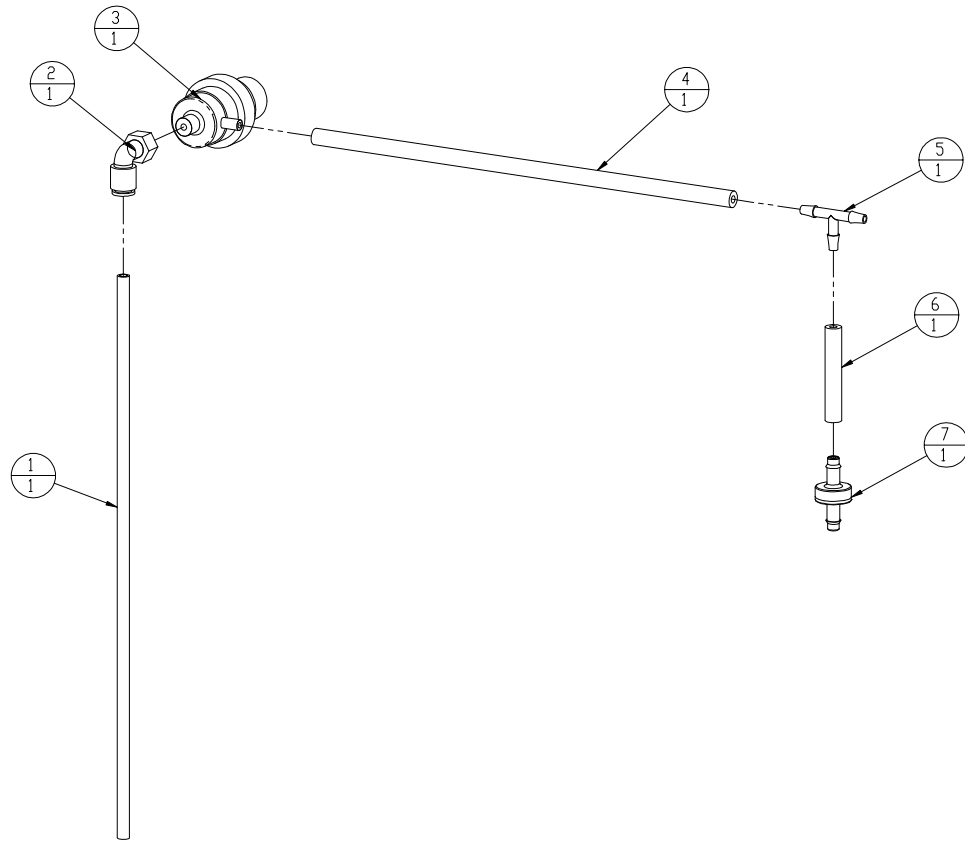
**A-2 MAIN STRUCTURE ASSEMBLY
FRONT VIEW**

NUVO 0140-0300 REV C



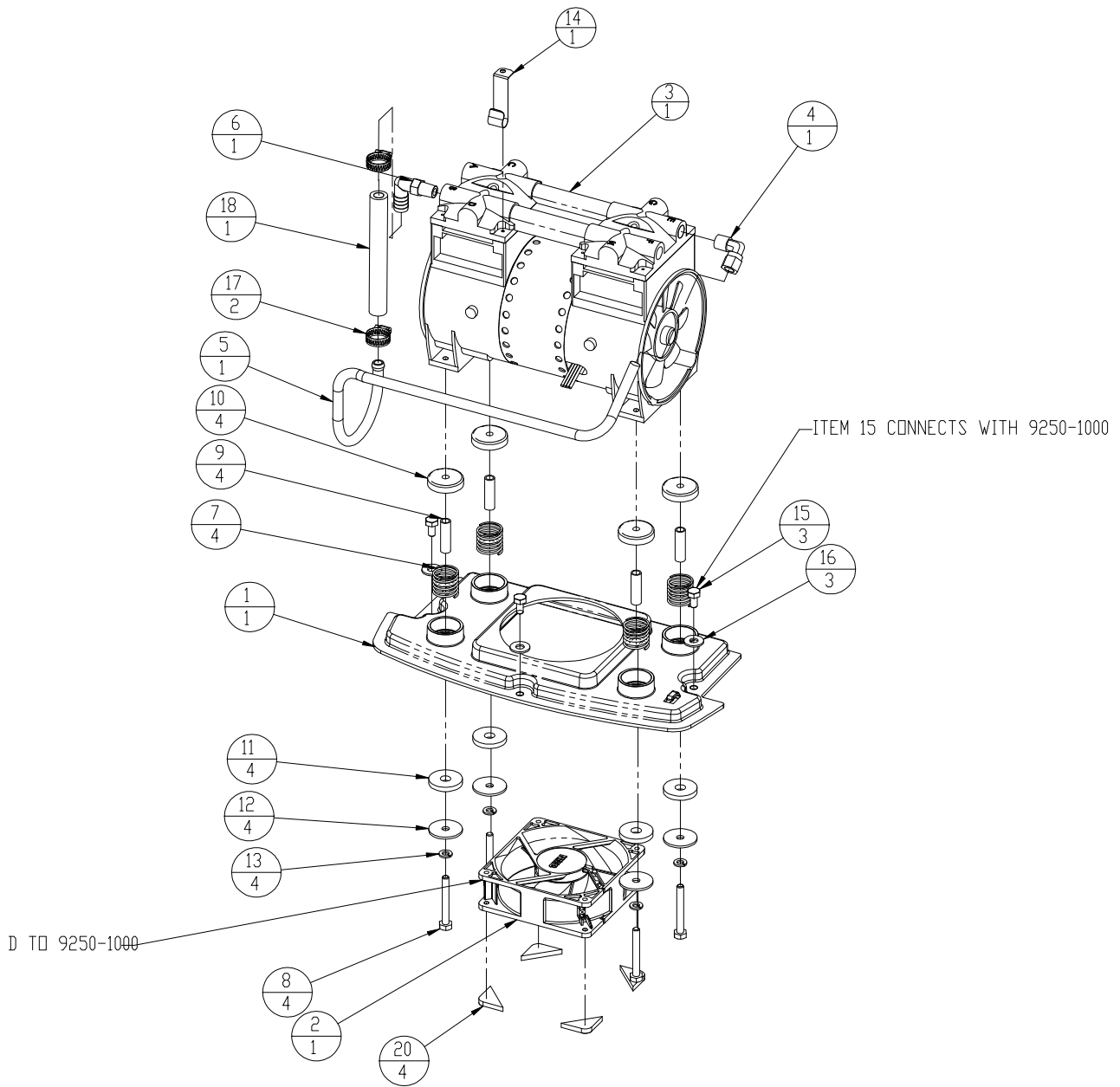
**A-3 MAIN STRUCTURE ASSEMBLY
REAR VIEW**

NUVO 0140-0300 REV C



A-4 REGULATOR ASSEMBLY

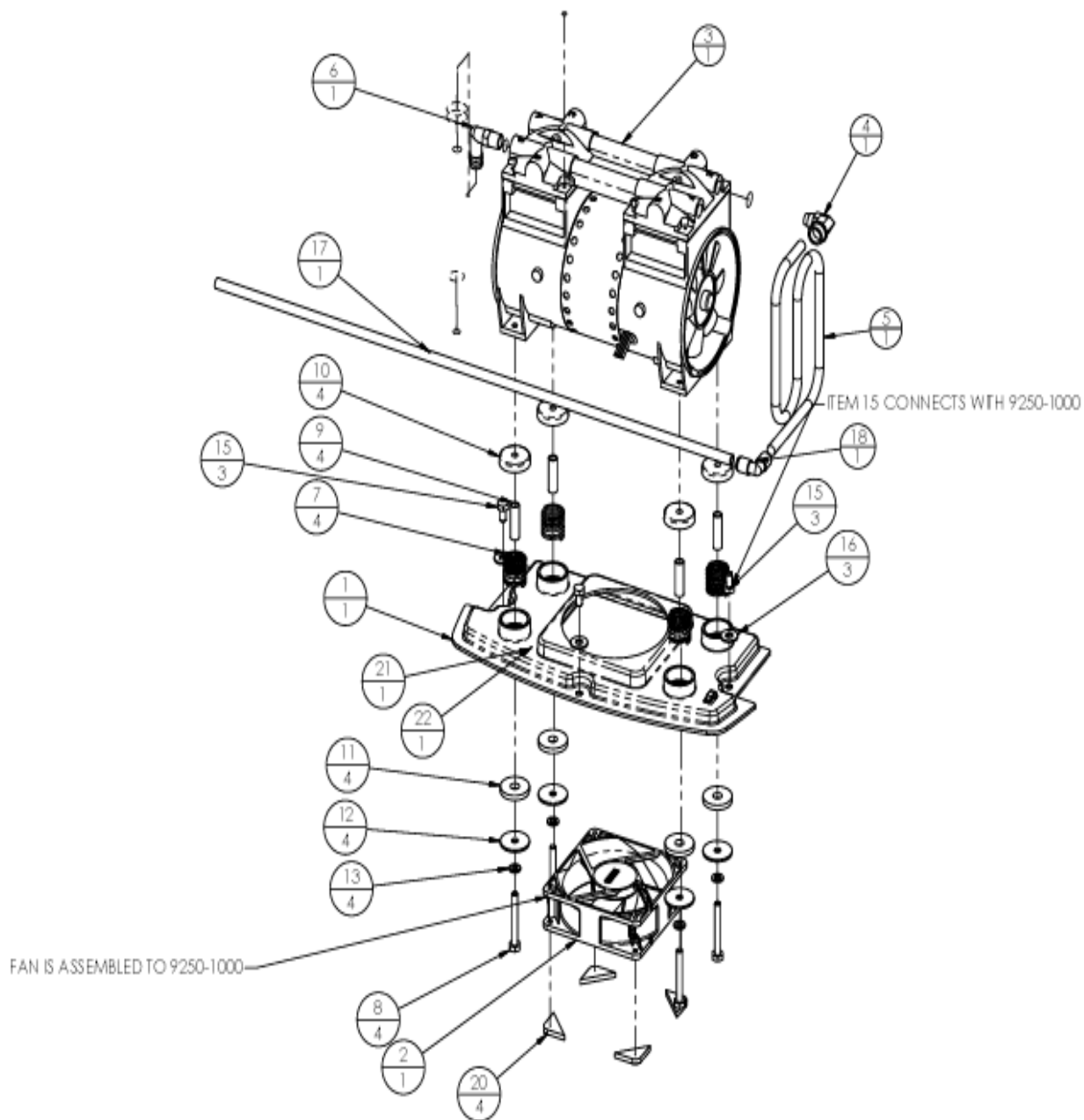
NUVO 0160-0300 REV A



A-5 COMPRESSOR ASSEMBLY

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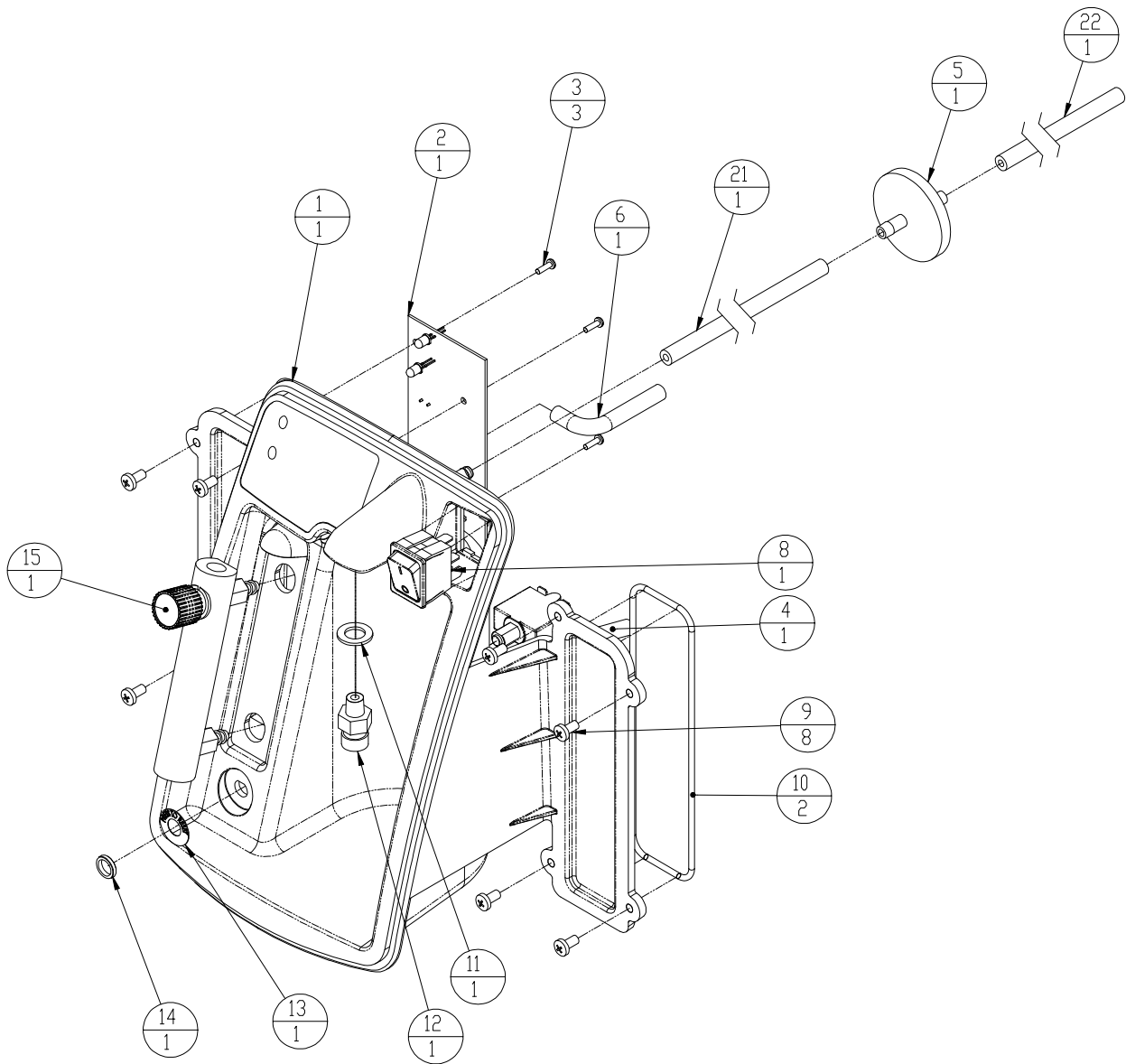
Nuvo 0200-0300 Rev. A



A-5.1 COMPRESSOR ASSEMBLY

NOTE: USE THIS DRAWING ON UNITS AFTER SERIAL # 062-11663

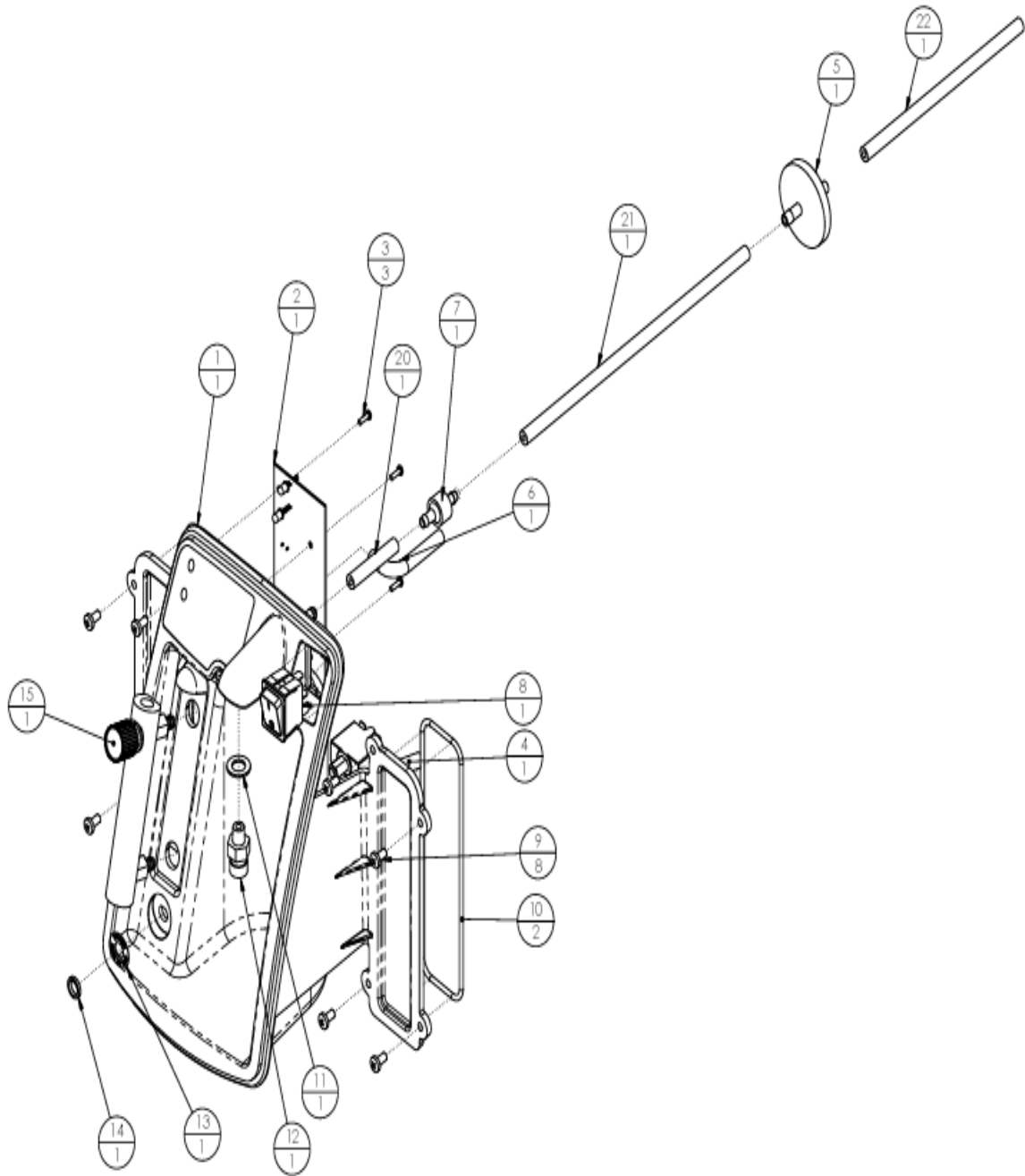
Nuvo 0200-0350 Rev. B



**A-6 CONTROL PANEL ASSEMBLY
UNIT WITH OCSI
FRONT VIEW**

NOTE: USE THIS DRAWING ON UNITS EARLIER THAN SERIAL # 062-11663

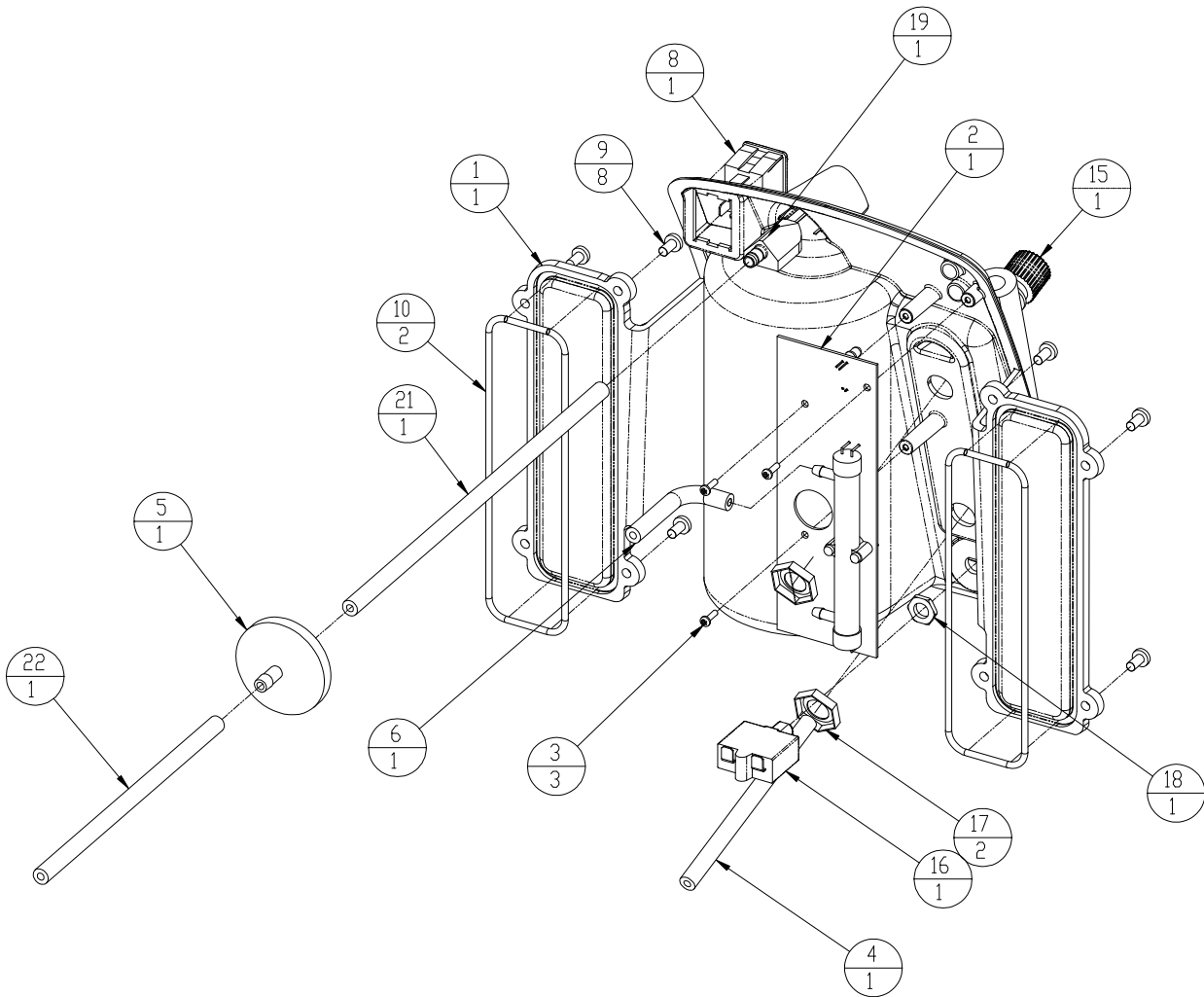
Nuvo 0300-0330 Rev. A



**A-6.1 CONTROL PANEL ASSEMBLY
UNIT WITHOUT OCSI
FRONT VIEW**

NOTE: USE THIS DRAWING ON UNITS AFTER SERIAL # 062-11663

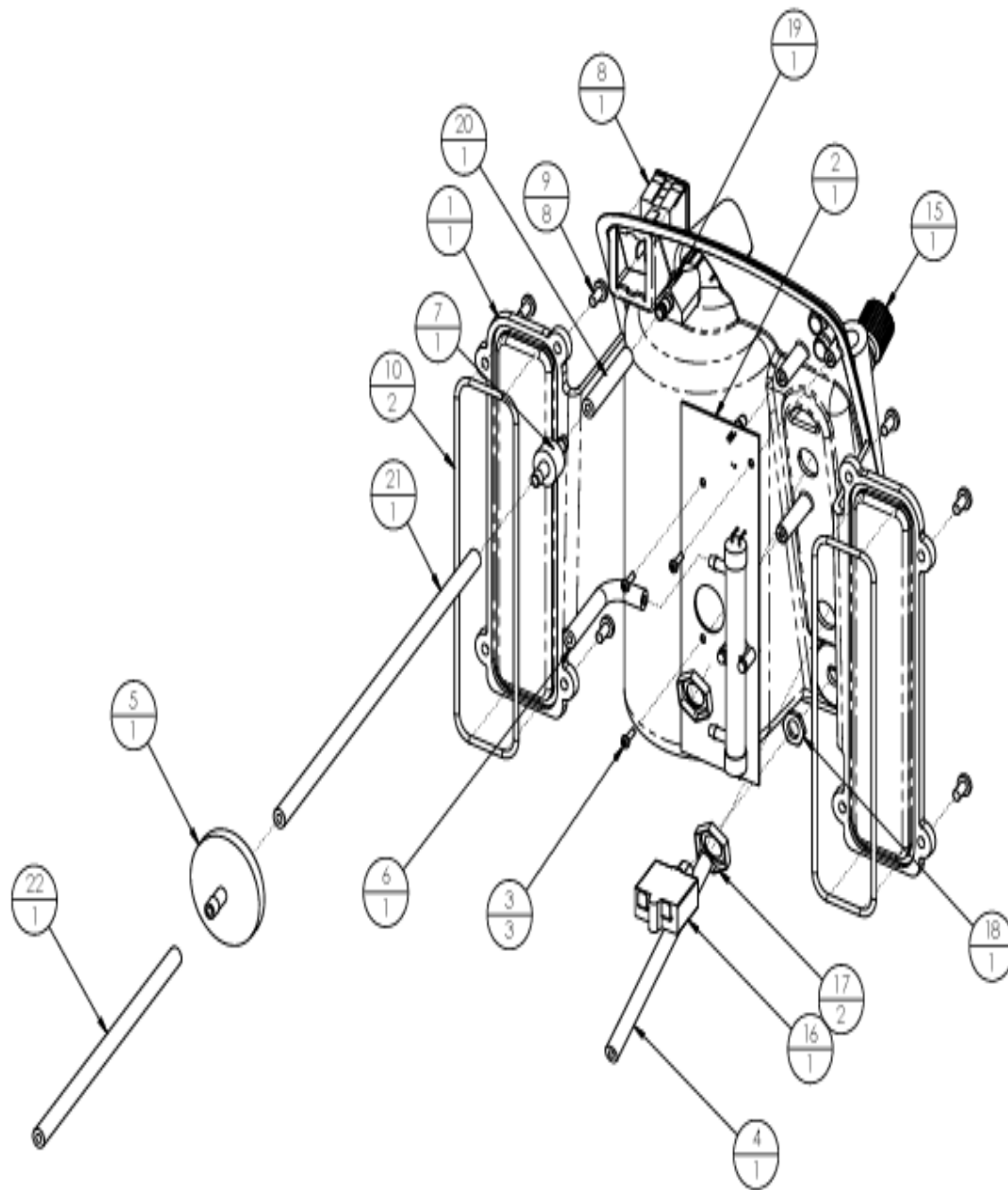
Nuvo 0300-0300 Rev. B



**A-7 CONTROL PANEL ASSEMBLY
UNIT WITH OCSI
REAR VIEW**

NOTE: USE THIS DRAWING ON UNITS EARLIER THAN SERIAL # 062-11663

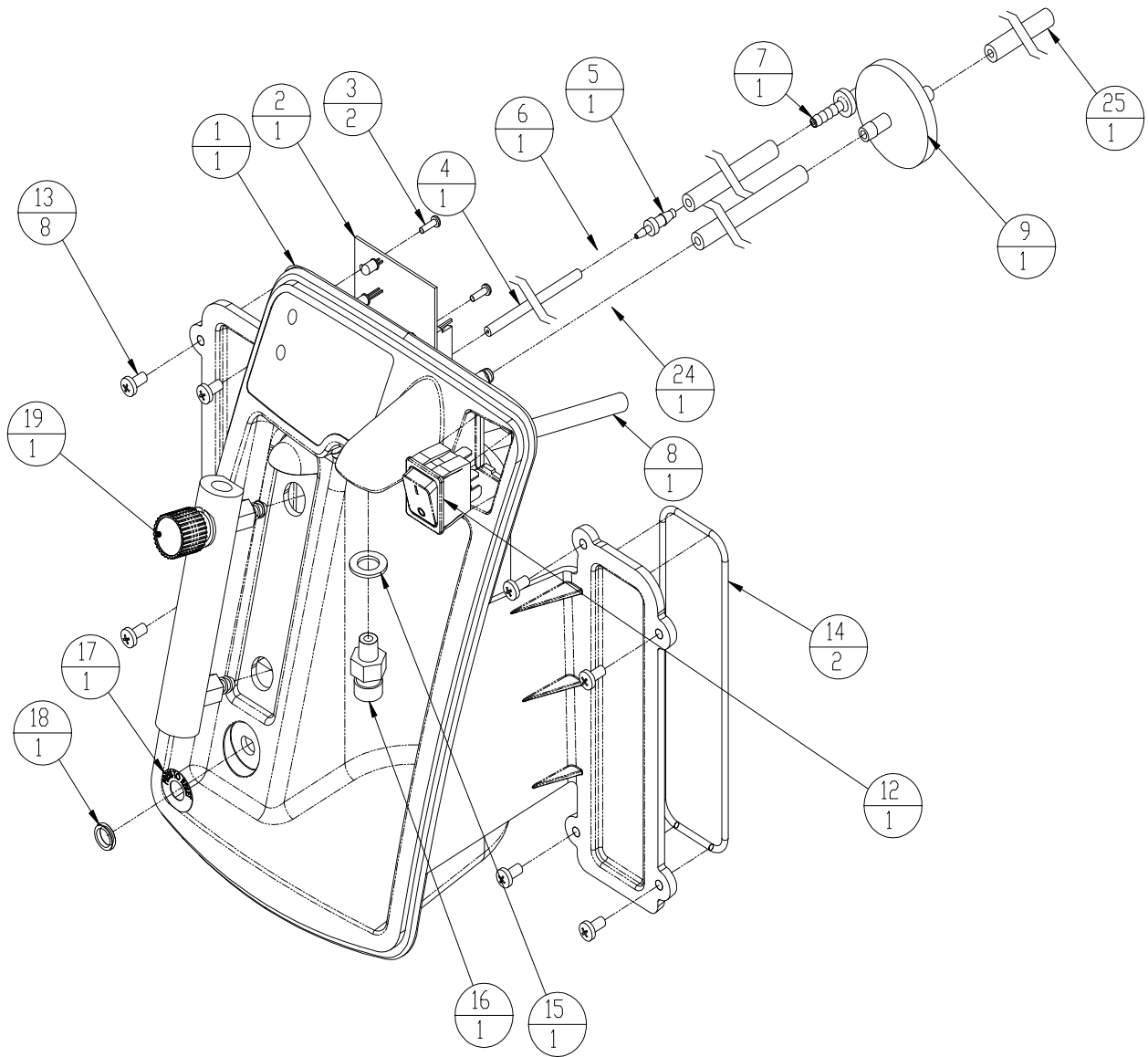
Nuvo 0300-0330 Rev. A



**A-7.1 CONTROL PANEL ASSEMBLY
UNIT WITH OCSI
REAR VIEW**

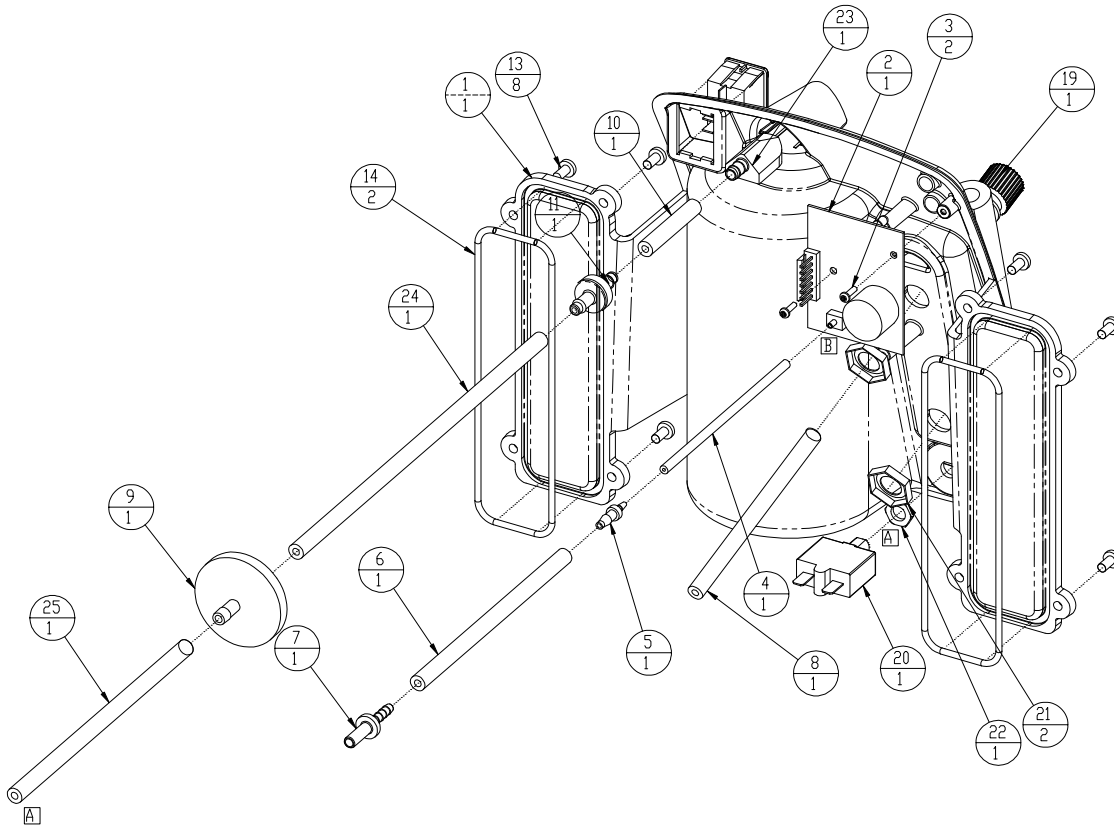
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NUVO 0300-0330 REV. B



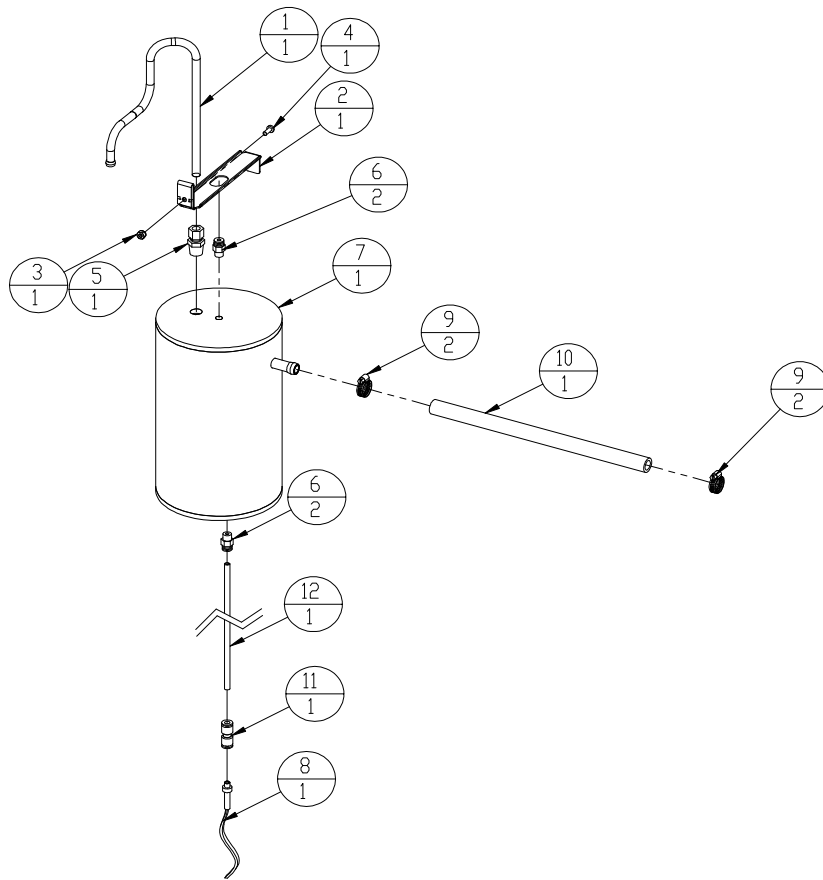
**A-8 CONTROL PANEL ASSEMBLY
STANDARD UNIT WITHOUT OCSI
FRONT VIEW**

NUVO 0300-0300 Rev A



**A-9 CONTROL PANEL ASSEMBLY
STANDARD UNIT WITHOUT OCSI
REAR VIEW**

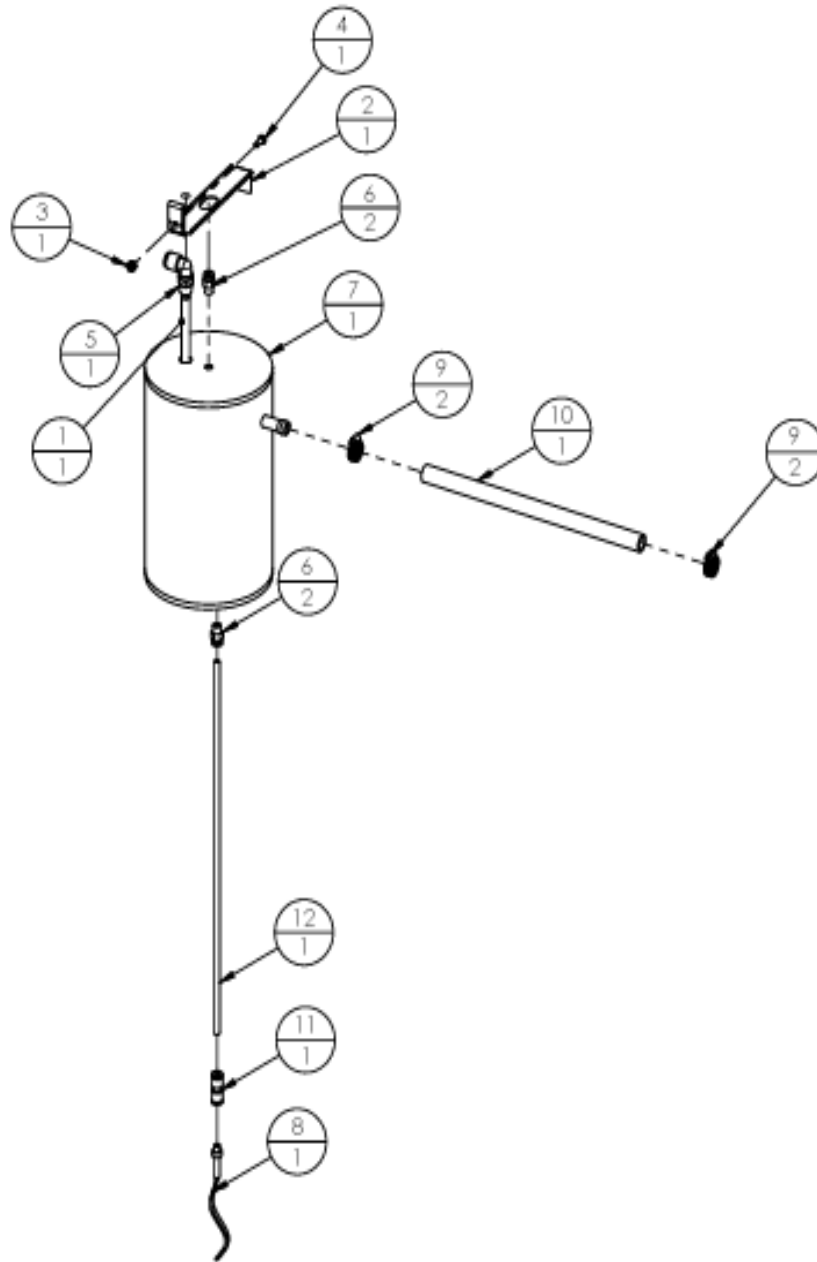
NUVO 0300-0300 Rev A



A-10 AIR TANK ASSEMBLY

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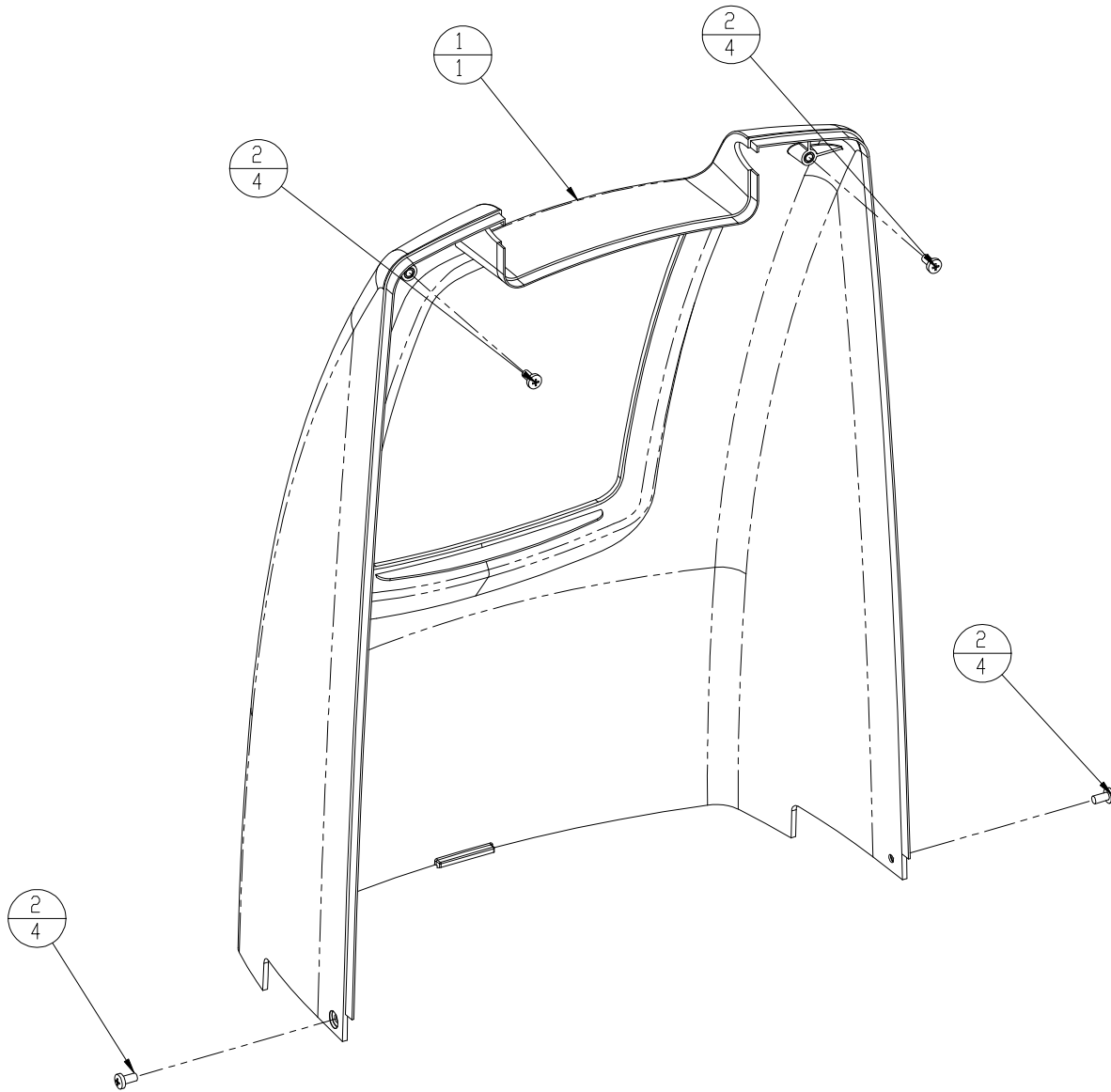
NUVO 0350-0300 REV. B



A-10.1 AIR TANK ASSEMBLY

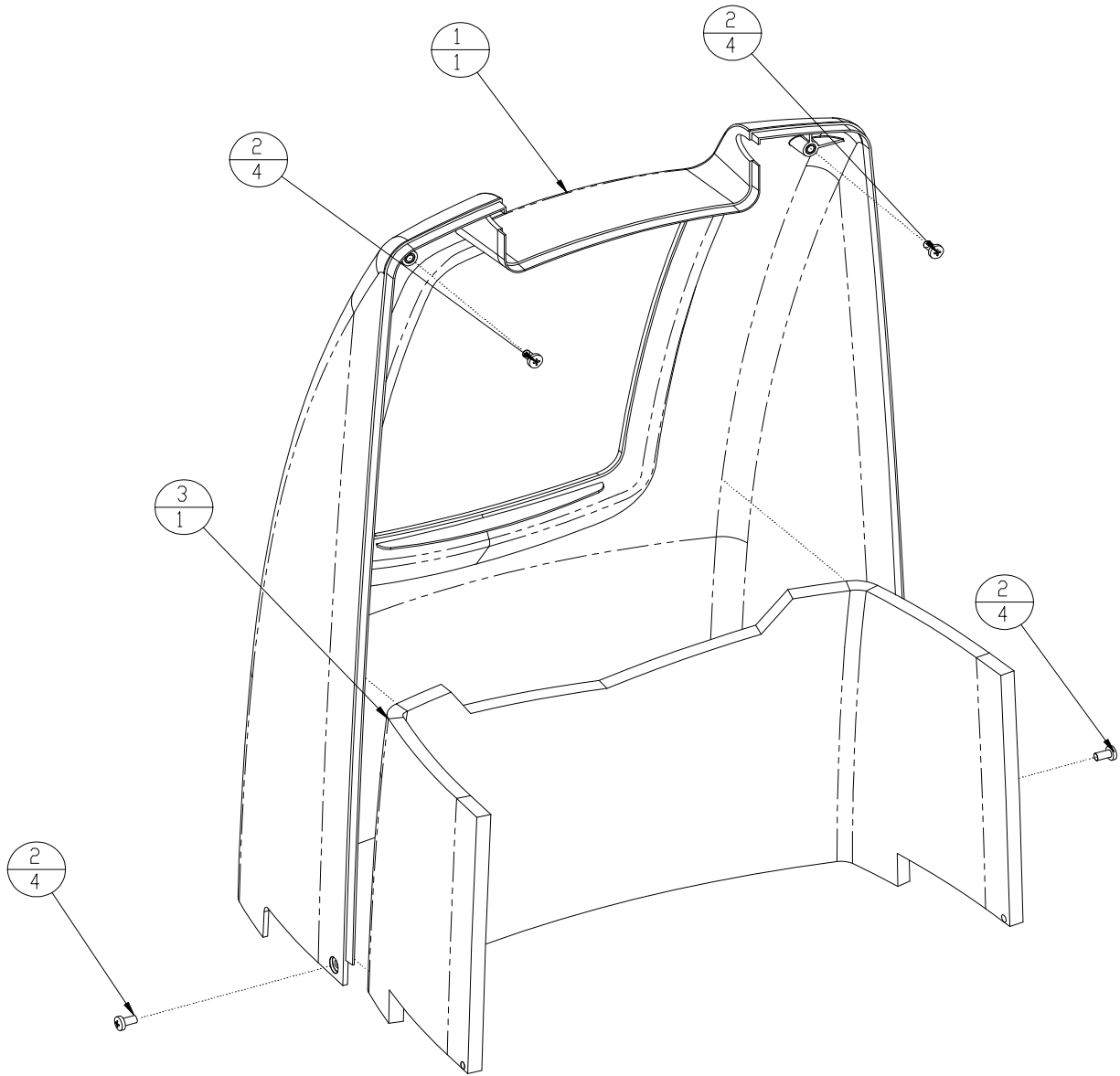
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NUVO 0350-0300 REV. B



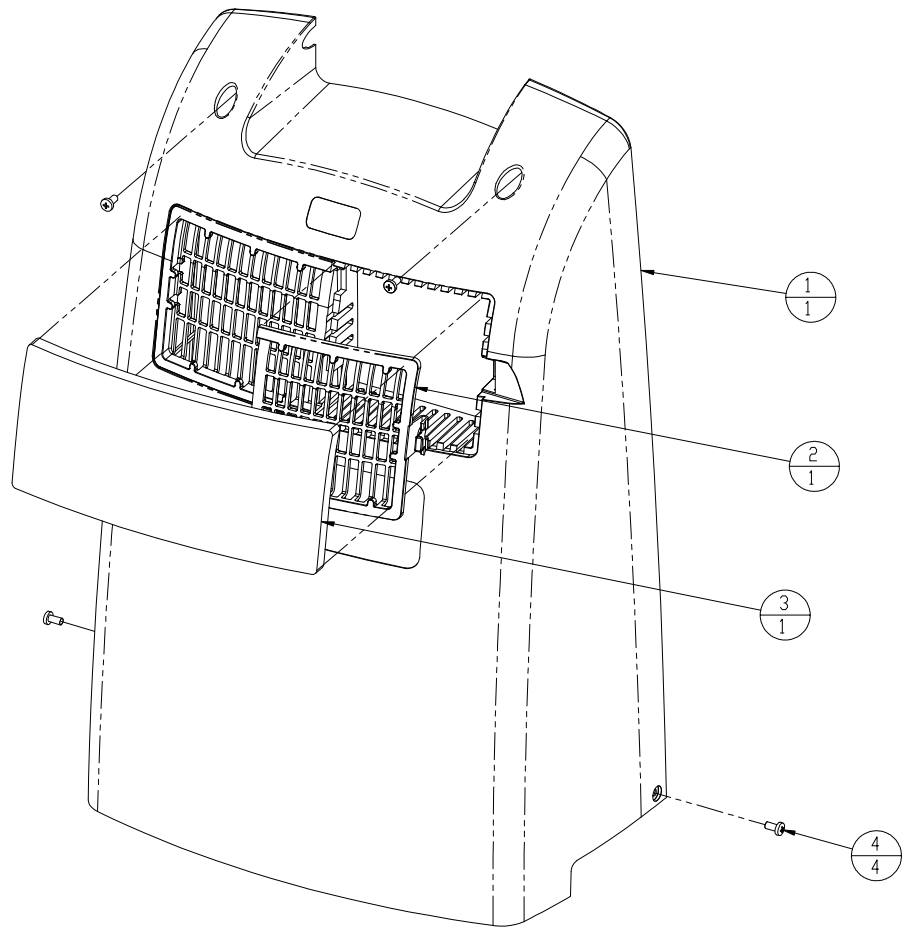
A-11 FRONT CABINET ASSEMBLY

Nuvo 0500-0300 Rev. A



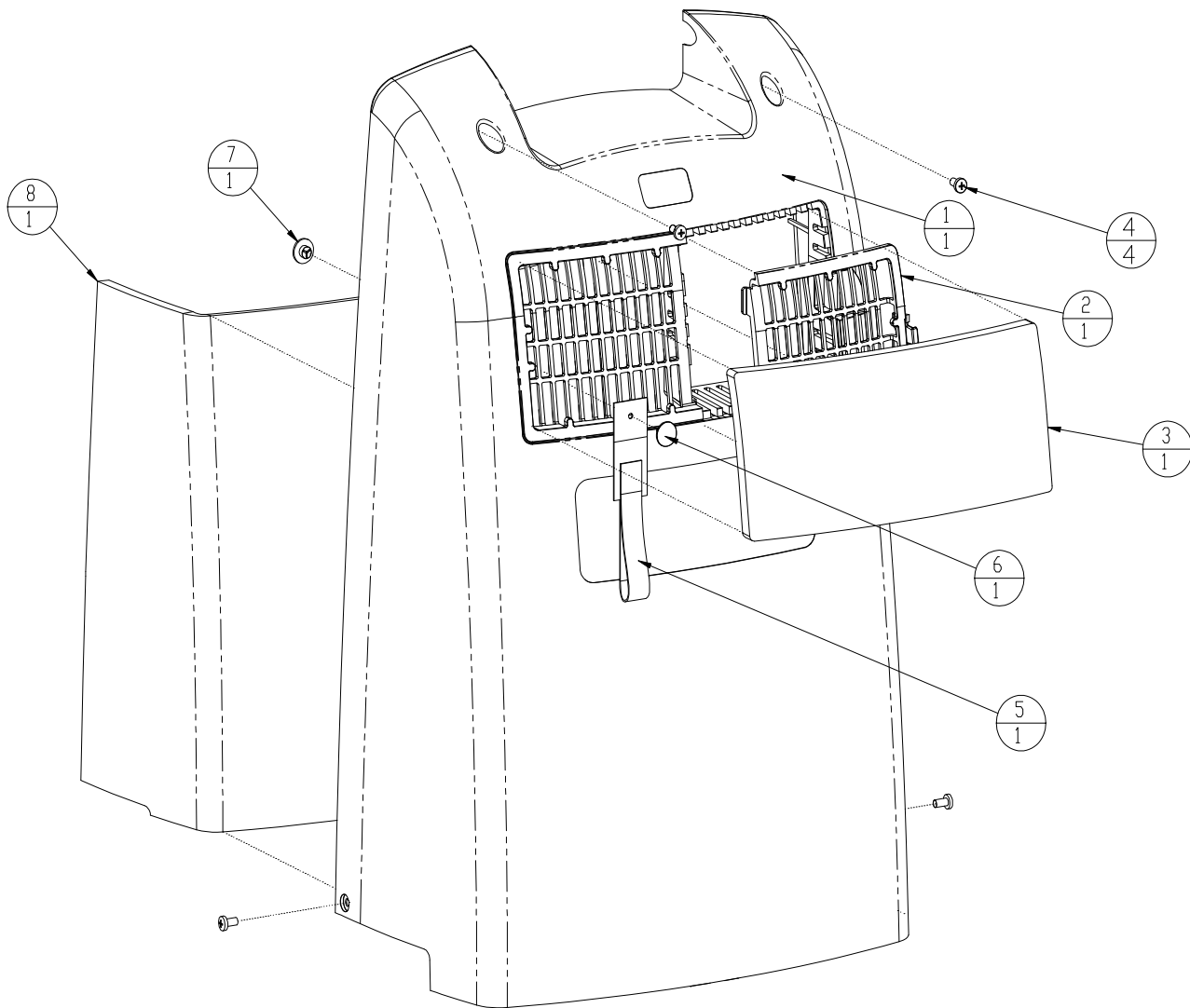
A-11.1 FRONT CABINET ASSEMBLY

Nuvo 0500-0300 Rev. B



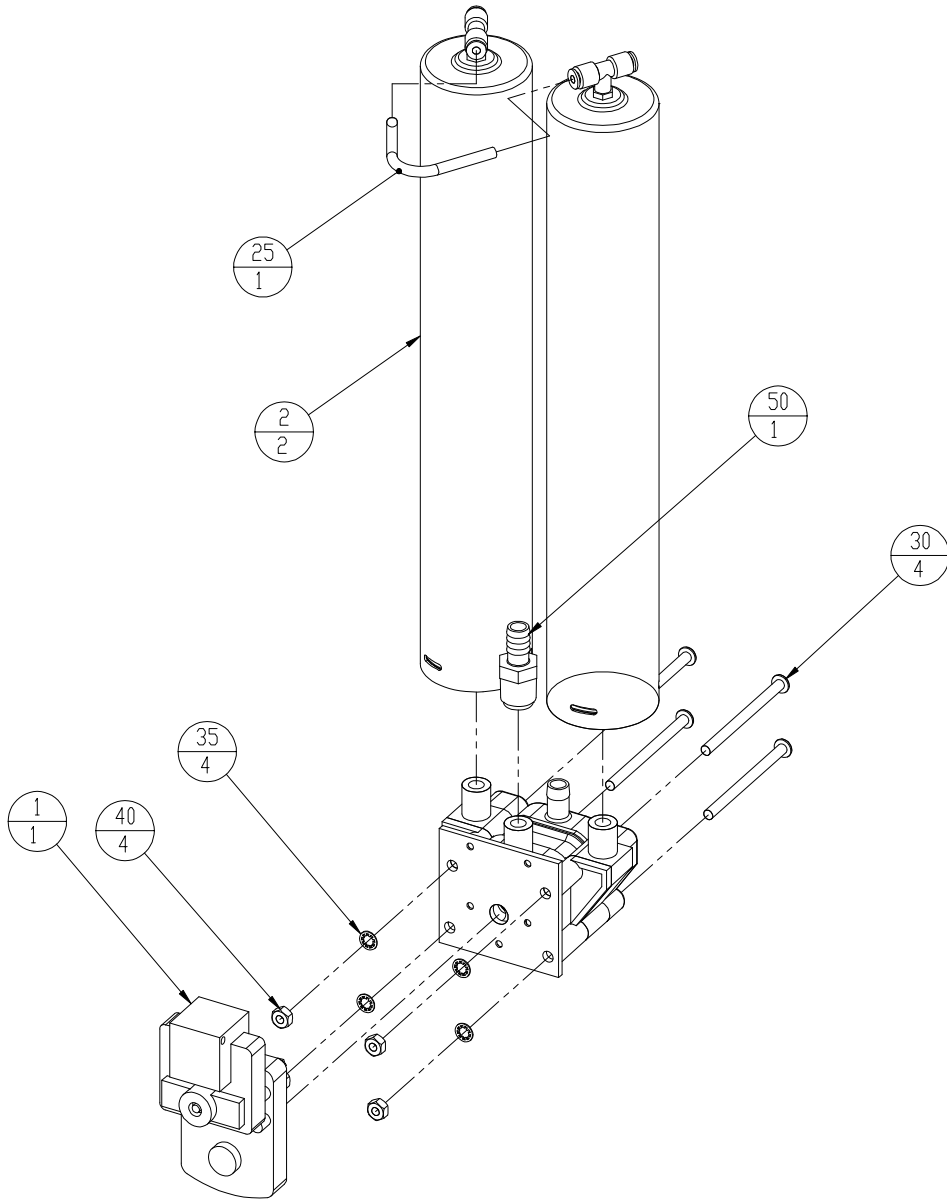
A-12 REAR CABINET ASSEMBLY

NUVO 0550-0300 REV A



A-12.1 REAR CABINET ASSEMBLY

Nuvo 0550-0300 Rev. B



A-13 SIEVE MODULE ASSEMBLY

NUVO 0600-0300 Rev A

REPLACEMENT PARTS LISTING

Item numbers reference call-out bubbles on the illustrations

Item	Part Number	Description	Qty	UOM
BASE ASSEMBLY				
1	9250-1000	BASE, NUVO	1	EA
2	8300-8068	CASTER	4	EA
3	9250-1066	FOAM,BASE ASSY.	1	EA
MAIN STRUCTURE ASSEMBLY				
1	9250-1003	BASE, PLATE NUVO	1	EA
2	9250-1004	STRUCTURE,MAIN NUVO	1	EA
3	7206-0027	BATTERY, 9 VOLT	1	EA
4	9250-1017	HOURMETER,UNV SNAP-IN	1	EA
5	9250-1047	BOLT, 1/4 -20 X 3/4" LG.GRADE2	4	EA
6	9250-1020	WASHER,FLAT 1/4"	5	EA
7	9250-1028	FILTER, AIR INLET	1	EA
8	6814-9228	ELBOW, 1/2 DOUBLE BARB, NYLON	2	EA
9	9250-1030	GOMMET,RUBBER	3	EA
10	9250-1069A	TUBE,ASSY.SOUND INLET	1	EA
11	9250-1500	HARNESS,WIRING 115 VOLT	1	EA
11a	9250-1510	HARNESS, WIRING 230 VOLT	1	EA
12	9250-1059	CONNECTOR,MOLDED INLET	1	EA
13	9250-1022	CAPACITOR,15UF W/STUD MOUNT	1	EA
14	9250-1027	HOSE,PREFORMED CLEAR	1	EA
15	9250-1051	FOAM, EXHAUST MUFFLER	2	EA
16	7854-6065	HOSE 1/2"IDX .728"OD X 14.5" L	1	EA
17	9250-1046	SCREW 10 X..5"LG HEX WASHER	1	EA
18	9250-1062	TIE WRAP, 14" LONG	2	EA
19	9250-1102	FOAM,KIT VIBRATION	1	EA
25	9030-6008	TIE, WRAP 4~	5	EA
26	9250-1058	BOLT, 1/4 -20 X .5" LG.	1	EA
REGULATOR ASSEMBLY				
1	9250-1043	HOSE, 1/4 OD X 7" LG	1	EA
2	6814-9221	ELBOW , 1/8 NPTF X 1/4 ODT	1	EA
3	9250-1060	REGULATOR,2 PORT FREEDOM	1	EA
4	7854-6054	HOSE 5/32 X 11/32 X 10"LG SIL	1	EA
5	6491-1008	TEE NYLON 3/16 HOSE BARB	1	EA
6	7854-6052	HOSE 5/32 X 11/32 X 2 LG SILIC	1	EA
7	6956-9674	VALVE CHECK ¼ HOSE MPC A 975	1	EA

COMPRESSOR ASSEMBLY

1	9250-1018	PLATE, COMPRESSOR	1	EA
2	9250-1023	FAN, MUFFIN 110 VOLT	1	EA
2a	9250-1024	FAN, MUFFIN 230 VOLT	1	EA
3	7355-3638	COMPRESSOR 2660 110V	1	EA
3a	7355-3639	COMPRESSOR 2660 230V	1	EA
4	9250-1052	FITTING,BRASS 1/4"NPX3/8" TUBE	1	EA
5	9250-1094	TUBE,HEAT EXCH. 3/8" O.D.	1	EA
6	6191-5003	ELBOW, NYL 1/4 NPT X 1/2 HOSE	1	EA
7	9250-1016	SPRING,COMPRESSOR VIBRATION	4	EA
8	9250-1105	BOLT,1/4"X20X2"LGGRADE 2	4	EA
9	9250-1111	SLEEVE,1/4"ID X 1.29"LG	4	EA
10	9250-1112	CAP,COMP. SPR. TOP	4	EA
12	9250-1109	WASHER,FLAT .25"ID X 1.25"OD	4	EA
13	9250-1110	WASHER,LOCK 1/4" ID.	4	EA
14	9250-1049	BRACKET, EXH.TUBE COMP.	1	EA
15	9250-1058	BOLT, 1/4 -20 X .5" LG.GRADE2	3	EA
16	9250-1020	WASHER,FLAT 1/4"	3	EA
17	9250-1029	CLAMP, HOSE NYLON.538"-.608"ID	2	EA
18	9250-1115	HOSE 3/8 ID X .375"X.575"X5.0"	1	EA
19	9250-1064	BUMPER, .5'DIAX .06 THK. BLACK	4	EA
99	9030-6008	TIE, WRAP 4~	1	EA

CONTROL PANEL ASSEMBLY (OCSI MODEL)

1	9250-1005	PANEL,CONTROL	1	EA
2	9250-1080	BOARD, OCSI MODULE	1	EA
3	9250-1045	SCREW,PLASTITE#4X3/8" PAN.HD	2	EA
4	9250-1041	HOSE 5/32 X 11/32 X 5 LONG SIL	1	EA
5	7631-1053	FILTER, BACTERIAL MK-5	1	EA
6	7854-6051	HOSE 5/32 X 11/32 X 3 LONG SIL	1	EA
7	6956-9674	VALVE CHECK 1/4 HOSE MPC A 975	1	EA
8	9250-1012	SWITCH,POWER 110 VOLT	1	EA
8a	9250-1013	SWITCH,POWER 230 VOLT	1	EA
5	6491-1007	ADAPTER 5/32 X 3/32 HOSE BARB	1	EA
6	7854-6050	HOSE 5/32 X 11/32 X 6 LONG SIL	1	EA
7	6491-1006	ADAPTER 1/4 ODT X 3/16 HOSE	1	EA
9	9250-1050	SCREW, 10-32 X 3/8 PAN HD.PHIL	8	EA
10	9250-1040	O-RING, 5.0" ID X .125THICK	2	EA
11	9250-1048	WASHER,NYLON .44"IDX.75"X.062"	1	EA
12	9007-6G32	HUMIDIFIER FITTING DISS	1	EA
13	9250-1039	COVER,PRESS TO RESET 3/8"	1	EA
15	9250-1009	FLOWMETER, 0-5 LPM	1	EA
16	9250-1011	BREAKER,CIRCUIT 10 AMP	1	EA
16a	9250-1010	BREAKER, CIRCUIT 5 AMP	1	EA

18	9250-1038	NUT,HEX ,NICKEL 3/8"-27	1	EA
19	9250-1021	HUMIDIFIER BLOCK	1	EA
20	7854-6052	HOSE 5/32 X 11/32 X 2 LG SILIC	1	EA
21	7854-6054	HOSE 5/32 X 11/32 X 10"LG SIL	1	EA
22	7854-6055	HOSE 5/32 X 11/32 X 7"LG SIL	1	EA

CONTROL PANEL ASSEMBLY (STD – NON OCSI)

1	9250-1005	PANEL,CONTROL	1	EA
2	9250-1090	BOARD, STD NON-OCSI	1	EA
3	9250-1045	SCREW,PLASTITE#4X3/8" PAN.HD	2	EA
4	7854-6048	HOSE 1/16 X 3/16 X 5 LONG SILI	1	EA
5	6491-1007	ADAPTER 5/32 X 3/32 HOSE BARB	1	EA
6	7854-6050	HOSE 5/32 X 11/32 X 6 LONG SIL	1	EA
7	6491-1006	ADAPTER 1/4 ODT X 3/16 HOSE	1	EA
8	9250-1041	HOSE 5/32 X 11/32 X 5 LONG SIL	1	EA
9	7631-1053	FILTER, BACTERIAL MK-5	1	EA
10	7854-6052	HOSE 5/32 X 11/32 X 2 LG SILIC	1	EA
11	6956-9674	VALVE CHECK 1/4 HOSE MPC A 975	1	EA
12	9250-1012	SWITCH,POWER 110 VOLT	1	EA
12a	9250-1013	SWITCH,POWER 230 VOLT	1	EA
13	9250-1050	SCREW, 10-32 X 3/8 PAN HD.PHIL	8	EA
14	9250-1040	O-RING, 5.0" ID X .125THICK	2	EA
15	9250-1048	WASHER,NYLON .44"IDX.75"X.062"	1	EA
16	9007-6G32	HUMIDIFIER FITTING DISS	1	EA
17	9250-1039	COVER,PRESS TO RESET 3/8"	1	EA
19	9250-1009	FLOWMETER, 0-5 LPM	1	EA
20	9250-1011	BREAKER,CIRCUIT 10 AMP	1	EA
20a	9250-1010	BREAKER, CIRCUIT 5 AMP	1	EA
22	9250-1038	NUT,HEX ,NICKEL 3/8"-27	1	EA
23	9250-1021	HUMIDIFIER BLOCK	1	EA
24	7854-6054	HOSE 5/32 X 11/32 X 10"LG SIL	1	EA
25	7854-6055	HOSE 5/32 X 11/32 X 7"LG SIL	1	EA
99	9030-6008	TIE, WRAP 4~	1	EA

AIR TANK ASSY,NUVO

1	9250-1031	TUBE,AIR TANK ALUM 3/8"	1	EA
2	9250-1019	BRACKET,AIR TANK	1	EA
3	6134-0916	SCREW,10-32 X 1/2~ RD PHILLIPS	1	EA
4	9250-1037	NUT,10-32 ,LOCKNYLON INSERT	1	EA
5	9250-1056	FITTING,BRASS AIR TANK	1	EA
6	7355-4775	CONNECTOR, STRAIGHT 1/8~MNPT X	2	EA
7	9250-1055	TANK, AIR 6"O.D. X 10" LG	1	EA
8	9007-4G25	WICK ASSY.	1	EA
9	9250-1026	CLAMP, HOSE NYLON.67"-.78"ID	2	EA

10	9250-1053	HOSE 1/2"ID X 3/4"OD X 10.125"	1	EA
11	9200-1006	FITTING, QUICK DISCONNECT	1	EA
12	9200-1612	HOSE, 1/4 OD X 18 LG	1	EA

POWER CORD ASSEMBLY

1	9250-1311	CORD,POWER CONC (US)	1	EA
1A	9250-1330	CORD,POWER CONC (Europe)		

CABINET FRONTASSEMBLY

1	9250-1002	CABINET,FRONT NUVO	1	EA
2	9250-1050	SCREW, 10-32 X 3/8 PAN HD.PHIL	4	EA

CABINET BACK ASSEMBLY

1	9250-1001	CABINET,BACK NUVO	1	EA
2	9250-1006	DOOR,ACCESS NUVO	1	EA
3	9250-1025	FILTER,CABINET INLET	1	EA
4	9250-1050	SCREW, 10-32 X 3/8 PAN HD.PHIL	4	EA

MODULE ASSEMBLY

1	9250-8005	MODULE 115 V 60 HZ NEW	1	EA
2	9022-8G06	MODULE 125 V 60 HZ REBUILT	1	EA
1A	9250-8008	MODULE 230 V 50 HZ NEW	1	EA
2A	9022-8G07	MODULE 230 V 50 HZ , REBUILT	1	EA

LABELS

1	9250-1076	LABEL,FRONT STD.	1	EA
1A	9250-1078	LABEL, FRONT W/OCSI	1	EA
2	9250-1070	LABEL FRONT "NUVO"	1	EA
3	9250-1071	LABEL,TOP WARNING ICON	1	EA
4	9250-1075	LABEL BACK 115/60	1	EA
4A	9250-1077	LABEL BACK CE	1	EA
7	2010-2224F	OPERATING GUIDE, STD NUVO	1	EA
7A	2010-2224CE	OPERATING GUIDE, CE MODEL	1	EA

SHIPPING MATERIAL

1	9250-1600	CARTON, CONCENTRATOR NUVO	1	EA
2	9250-1601	PACK, BOX TOP	1	EA
3	9250-1602	PACK, BOX BOTTOM	1	EA

ACCESSORIES

1	9012-8780	CANNULA W/7 FT TUBING	1	EA
2	9012-8781	TUBING EXTENSION 25 FT	1	EA
3	9012-8774	HUMIDIFIER 350 CC	1	EA
4	9012-8783	HOSE CONNECTOR	1	EA
5	9012-8785	ADAPTER DISS TO HOSE	1	EA

Nidek Medical Oxygen Concentrator Service and Maintenance Log

Model Number _____

Serial Number _____

Initial Inspection

1. Upon receipt, check the unit for shipping damage. Notify shipping company if damaged.
2. Verify that cabinet air filter and the inlet air filter are in place.
3. Plug the unit into an electrical outlet, turn the unit 'ON,' and check the audible/visual alarms.
4. Set the flow meter/flow control at the maximum recommended flow rate and allow the unit to run for 15 minutes.
5. Using a calibrated oxygen analyzer, verify concentration is greater than 87 percent.

Routine Service Check

Perform routine servicing as shown in the chart below. Record the activities performed in the log provided on the following page.

1. Record the elapsed usage time in hours.
2. Check oxygen concentration with a calibrated oxygen analyzer.
3. Verify audible alarm and indicator light functions between patients and every two years.
4. Inspect filters and replace as necessary.

Between-Patient Maintenance

1. Remove oxygen tubing, cannula, and humidifier bottle and discard.
2. Wash or replace the humidifier tubing if used.
3. Wash or replace the cabinet air filter.
4. Clean the concentrator cabinet.
5. Check oxygen concentration and flow. If the unit performs within specification, the final product filter does not need to be replaced between patients.

Patient/Caregiver Maintenance

1. Inspect the Oxygen tubing, cannula, and humidifier bottle - clean as needed according to manufacturer's instructions.
2. Wash the cabinet air filter weekly with a mild detergent solution. Dry before reinstalling onto the device.

The routine service intervals shown below depend on the conditions in which the devices are used. They reflect the **minimum recommendation** when operated in a clean environment. As conditions can vary widely, the homecare provider or patient caregiver is responsible to determine:

- the character of the environment in which the concentrator is to operate.
- a maintenance schedule with intervals based on the environment in which the unit is operating/functioning.

Standard Servicing Intervals are shown below. Intervals used by the homecare service provider and/or patient caregiver should be more frequent when conditions of usage dictate.

Nidek Medical Oxygen Concentrator Routine Service Intervals				
Check Percent Oxygen Concentration	Cabinet Air Filter	Inlet Air Filter	Final Product Filter	Capacitor
OCSI Models: Every 15,000 hours or 3 years. Std Models: Every 5,000 hours or 1 year.	Wash the filter each week in a mild detergent solution. Dry before reinstalling.	Inspect at each patient visit. Replace annually, or more often depending on environment.	Replace at each compressor service / module replacement.	Replace at each compressor service / module replacement.

Please maintain a log of all maintenance activities performed on this unit.

Serial Number _____ Model _____

Date	Hours	% O2	Alarms Check	Additional Information (Work Done, Filter Changes, Comments, etc)
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Inspection Prior to Putting Into Service

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In-Service Checks

**Medical device regulations require users and service personnel to notify manufacturers of any incidents that, if repeated, could cause injury to any person.
 email: info@nidekmedical.com
 Please update maintenance log information upon each service at www.nidekmedical.com under the 'Maintenance Log' tab.**