DeVilbiss HEALTHCARE

DeVilbiss iFill® Personal Oxygen Station
Service Manual

DANGER – NO SMOKING

Model 535D
Model 535I

CAUTION-*Federal (U.S.A.) law restricts this device to sale by or on the order of a physician.*

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INTRODUCTION

This service manual was designed to provide DeVilbiss Healthcare qualified service technicians and homecare providers with the proper maintenance, service, safety, and repair procedures for the DeVilbiss iFill Personal Oxygen Station.

Read and understand all the information contained in this service manual before attempting to operate or perform any maintenance on the oxygen station.

iFill is a stand-alone oxygen cylinder filling station that produces highly concentrated oxygen for therapeutic applications. Because of the stand-alone feature, iFill can be used in conjunction with any concentrator.

NOTE– *DeVilbiss reserves the right to alter or change the design of the DeVilbiss iFill Personal Oxygen Station series. Hence, slight differences in construction or components may exist between the unit in hand and what is described in this manual.*

IEC SYMBOLS

	Attention, consult instruction guide		Type BF applied part
	AC current		Double Insulated
	Electric Shock Hazard. Do Not Open		Danger-No Smoking
	This device contains electrical and/or electronic equipment that must be recycled per EU Directive 2012/19/EU-Waste Electrical & Electronic Equipment		

IMPORTANT SAFEGUARDS

When using electrical products, especially when children are present, basic safety precautions should always be followed. Read all instructions before using. Important information is highlighted by these terms:

DANGER **Urgent safety information for hazards that will cause serious injury or death.**

WARNING **Important safety information for hazards that might cause serious injury.**

CAUTION *Information for preventing damage to the product.*

NOTE *Information to which you should pay special attention.*

Important safeguards are indicated throughout this service manual; pay special attention to all safety information.

READ ALL INSTRUCTIONS BEFORE SERVICING.

GENERAL DANGERS & WARNINGS

In order to ensure the safe installation, assembly, and operation of the personal oxygen station, these instructions must be followed:

DANGER-NO SMOKING 

- **DANGER-Electric Shock Hazard. If service is required, it should be done by a DeVilbiss Healthcare provider or authorized service center.**
- **DANGER-Fire Hazard. Do not lubricate. Do not allow grease or oil from your hands or other source to come into contact with the regulator or cylinder valve connection. These solutions may be flammable and cause injury.**
- **DANGER-Keep the personal oxygen station at least 5 feet (1.6 m) from hot, sparking objects or naked sources of flame. Position your unit at least 6 inches (16 cm) from walls, draperies, or any other object that might prevent the proper flow of air in and out of your oxygen station. The oxygen station should be located so as to avoid pollutants or fumes.**
- **DANGER-Oxygen causes rapid burning. Do not smoke while your personal oxygen station is operating, or when you are near a person utilizing oxygen therapy. Keep the oxygen station at least 5 feet (1.6 m) from hot, sparking objects or naked sources of flame.**
- **DANGER-Do not lay the cannula down while the cylinder is delivering oxygen. High concentrations of oxygen can cause rapid burning.**

WARNING

- **Do not install, assemble, or operate this equipment without first reading and understanding the instruction guide and the oxygen cylinder instruction guide and warning label. If you are unable to understand the warnings, cautions, and instructions, contact DeVilbiss before attempting to install or use this equipment - otherwise, injury or damage may occur.**
- **The use of this device is limited to an oxygen patient. Cylinders must be used only by an oxygen patient and are not to be distributed to any other individual for any purpose.**
- **Do not use parts, accessories, or adapters other than those authorized by DeVilbiss Healthcare.**
- **NEVER block the air openings of the product or place it on a soft surface, such as a bed or couch, where the air opening may be blocked. Keep the openings free from lint, hair and the like.**
- **If the oxygen station has a damaged cord or plug, if it is not working properly, if it has been dropped or damaged, or if it has been submersed in water, do not use. A qualified technician should examine and perform repairs as needed.**
- **If any leakage of the oxygen cylinder is detected, do not attempt to use the cylinder. Turn the rotary selector on the regulator to "OFF." If leakage persists, place the cylinder outdoors. Contact DeVilbiss concerning questions pertaining to servicing or replacing cylinder.**
- **The personal oxygen station is equipped with a High Pressure Relief Valve to ensure the user's safety. When activated, this safety feature will make an extremely loud noise. If this noise occurs, turn the unit off and refer to Troubleshooting section of this manual.**
- **Children should always be supervised around the personal oxygen station. Failure to do so may result in damage to the unit or personal injury.**
- **Improper use of the power cord and plugs can cause a burn, fire, or other electric shock hazards. Do not use the unit if the power cord is damaged.**

WARNING - HANDLING WARNINGS

- **Before moving or repositioning the personal oxygen station, always disconnect the AC power cord. Failure to do so may result in damage to the unit or personal injury.**
- **Use extreme care when handling and filling an oxygen cylinder. Full oxygen cylinders are under pressure and can become a projectile if dropped or mishandled.**
- **Never transport the oxygen station with a cylinder connected to it. Injury or damage can occur.**

WARNING - STORAGE AND HANDLING

- **Do not place oxygen cylinders in unventilated spaces such as car trunks. Excessive heat can make the relief valve suddenly and quickly discharge the cylinder contents, possibly making it a projectile and greatly increasing the oxygen level in unventilated spaces.**
- **Do not leave oxygen cylinders in the cabs of vehicles without ventilation. If a cylinder leaks, a spark could start a fire causing serious injury or death.**
- **Remove cylinders from the vehicle when the destination is reached.**
- **Be sure to secure cylinders from movement during transport.**

WARNING - SERVICE WARNINGS

- **Disconnect the power cord from the wall outlet before attempting repairs on the unit. Extra care should be taken if it is necessary to operate the unit with the cover removed.**
- **Do not use oils, greases, or any petroleum-based solvents/cleaners on or near the unit. Use only materials that are compatible with oxygen.**
- **Electric Shock Hazard. When replacing the capacitor, do not touch the terminals or allow metal objects to come in contact with the terminals on the capacitor. The capacitor may hold a charge for several days after the unit is turned off. The capacitor is located next to the cooling fan.**

CAUTIONS & NOTES

CAUTION– *Federal law restricts this device to sale by or on the order of a physician.*

NOTE– *Do not connect to an electrical outlet controlled by a wall switch. No other appliances should be plugged into the wall outlet.*

NOTE– *The plug on the 535D DeVilbiss iFill Personal Oxygen Station has one blade wider than the other. To reduce the risk of electric shock, this plug is intended to fit in a wall outlet only one way. Do not attempt to defeat this safety feature.*

NOTE– *DeVilbiss recommends leaving a full cylinder of oxygen with the patient AFTER setting up the personal oxygen station.*

INITIAL INSPECTION

It is suggested that an initial inspection be performed upon receiving the iFill personal oxygen station.

1. After removing the oxygen station from the carton, examine it for any external damage. If shipping damage has occurred, contact the DeVilbiss Customer Service Department at 1-800-338-1988 or 1-814-443-4881 for specific instructions. Save the carton for possible later return; note the position of the unit and placement of the packing material.
2. Check to make sure both of the cabinet air filters are in place.
3. Plug the unit into an electrical outlet. The audible alert will sound momentarily and the indicator panel lights will flash on and then off. The standby light will remain on indicating the unit is ready for use.
4. Attach an empty iFill cylinder to the oxygen station (be sure rotary selector is "Off."
5. Push the start/stop switch on the control panel to start the unit. After a few minutes, the iFill unit will begin filling the cylinder.
6. Allow the filling process to continue for at least 20 minutes.
7. Turn the unit off and remove the cylinder.
8. Use an analyzer to check the oxygen concentration from the cylinder. It should be 93% +/- 3%.

NOTE– *If cylinder has a PulseDose® regulator attached, turn knob to the continuous flow setting to check concentration level. Cylinders having a continuous flow regulator attached should be adjusted to 2 LPM to test concentration percentage.*

NOTE– *If the unit fails to operate properly or if it is damaged, contact the DeVilbiss Customer Service Department at 1-800-338-1988 or 1-814-443-4881; International 49-621-178-98-230 for information.*

PATIENT SETUP

NOTE– *Before operating the DeVilbiss iFill Personal Oxygen Station for the first time, locate the device where desired.*

Choosing A Location

WARNING

The personal oxygen station should be at least six (6) inches away from walls, draperies, or furniture to ensure sufficient airflow.

Avoid placing the oxygen station next to heaters, radiators, or hot air registers. It should be kept at least 5 feet (1.6m) away from hot, sparking objects or naked sources of flame.

Do not use in a closet.

Do not use in an area where the air may be contaminated with carbon monoxide as this may shorten the life of the unit (i.e. near running gasoline engine, furnace, or heater).

Transporting iFill Oxygen Station

WARNING

NEVER transport the Personal Oxygen Station with a cylinder connected to or stored on it, otherwise injury or damage can occur.

CAUTION–*When transporting the DeVilbiss iFill Personal Oxygen Station, be careful not to bump the unit or the connectors into obstacles. Otherwise damage to the oxygen station may occur.*

There are three (3) methods to safely transport the DeVilbiss iFill Personal Oxygen Station:

1. Pull or push the unit on its casters using the front handle. Travel in a line oriented front to back to avoid tipping. Stop the unit to change direction.
2. Carry the unit using the front and rear handles simultaneously.
3. Carry the unit using the front handle and the recess located under the rear of the base.

DeVilbiss iFill Oxygen Station Operation Checklist

NOTE– *Each time the Oxygen Station is used to fill a cylinder, complete the following steps:*

1. Check the Hydrostatic Test Date.

NOTE– *All US DOT marked iFill cylinders must undergo requalification testing every 5 years. Cylinders that are pi "π" marked, which is the official stamp mark required by the Transportable Pressure Equipment Directive (TPED) certifying that the gas cylinder conforms to RID/ADR for use throughout the European Union, will require recertification within 10 years as defined per Annex B of DIN EN 1802:2002.*

Recertification testing of cylinders must be done by a certified testing facility.

NOTE– *Do not fill oxygen cylinders that have not been tested in the past five (5) years or ten (10) years, whichever is applicable.*

2. Perform the prefill inspection on the cylinder by following iFill Oxygen Cylinder External Examination below.

WARNING

ONLY use cylinders that have the DeVilbiss iFill Personal Oxygen Station fill connection.

All cylinders must be inspected before attempting to fill - otherwise injury or damage may occur.

iFill Oxygen Cylinder External Examination

1. Examine the outside of the cylinder for the following conditions, and replace the cylinder if they exist:
   a. Dents or dings
   b. Arc Burns
   c. Oil or Grease
   d. Any other signs of damage that might cause a cylinder to be unacceptable or unsafe for use.
2. Examine the cylinder for evidence of fire or thermal damage. Evidence includes charring or blistering of the paint or other protective coating or heat sensitive indicator. If fire or thermal damage is found, replace the cylinder.
3. Inspect the oxygen fill connector for the following:
   a. Debris, oil or grease
   b. Noticeable signs of damage
   c. Signs of corrosion inside the valve
   d. Signs of excessive heat or fire damage

Do not use oxygen cylinder if any of the above are found.

OPERATING INSTRUCTIONS

Connecting The iFill Oxygen Cylinder To The DeVilbiss iFill Personal Oxygen Station

DANGER

Fire Hazard. Do not lubricate. Do not allow grease or oil from your hands or other source to come into contact with the regulator or cylinder valve connection. These solutions may be flammable and cause injury.

WARNING

Do not modify ANY connections on the personal oxygen station. NEVER use tools of any kind to connect/disconnect the cylinder and the oxygen station. Severe injury and/or damage may occur.

Do not drop oxygen cylinders. Use two (2) hands when handling/transporting oxygen cylinders. Otherwise, injury or damage may occur.

NOTE– *Refer to the General Dangers & Warnings and the Handling Warnings in this manual.*

1. Plug the power cord into the wall outlet.
2. Set the rotary selector on the cylinder to “OFF.”
3. Remove the oxygen fill connector cover from the fill connector.
4. Position the cylinder over the cradle while aligning the nipple connector on the oxygen cylinder with the fill connector. Press until cylinder “clicks” into place. NOTE– When using the smaller M4 or M6 size cylinders, it is necessary to place the oxygen fill connector cover/cylinder adapter in the cradle to help support the cylinder. When using the larger ML6, C, D, or E cylinders, the oxygen fill connector cover/cylinder adapter is not necessary and can be allowed to hang over the side.

Filling The iFill Oxygen Cylinder

NOTE– *Do not use cylinder while filling.*

NOTE– *Refer to the General Dangers & Warnings and the Handling Warnings in this manual.*

1. Make sure the personal oxygen station is plugged in.
2. Make sure the cylinder is securely connected to the oxygen station. Refer to Connecting The iFill Oxygen Cylinder To The DeVilbiss iFill Personal Oxygen Station.
3. Push the start/stop switch on the control panel.
4. The following sequence of events should occur:
   a. The FILLING (green) light will illuminate while the cylinder is filling (refer to iFill Oxygen Cylinder Fill Times).
   b. The FULL (green) light will illuminate when the cylinder is full. Proceed to Removing the iFill Oxygen Cylinder.

NOTE– *If the Service (RED) light and audible alert are on, proceed to Troubleshooting in this service manual.*

Removing The iFill Oxygen Cylinder

WARNING

Do not modify any connections on the personal oxygen station. Never lubricate the connections. Never use tools of any kind to connect/disconnect the oxygen cylinder and the oxygen station. Otherwise, severe injury and/or damage may occur.

Use extreme care when handling and filling an oxygen cylinder. Full oxygen cylinders are under pressure and can become a projectile if dropped or mishandled.

NOTE– *Refer to the General Dangers & Warnings and the Handling Warnings in this manual.*

1. Remove the full oxygen cylinder by pushing down on the fill port collar located under the cylinder nipple connector while using your other hand to steady the cylinder.
2. Lift up on the cylinder to remove from the oxygen fill connector. The green Standby light will turn on after a short delay.
3. Oxygen will escape from the fill connector for a short time after the cylinder has been removed. This may be accompanied by a “pop” with a rush of air. This is normal.
4. Perform one (1) of the following steps:
   a. If desired, fill another oxygen cylinder. Refer to the DeVilbiss iFill Personal Oxygen Station Operation Checklist.
   b. Place the oxygen fill connector cover onto the fill connector.

NOTE– *The oxygen fill connector cover should always be used whenever cylinders are not being filled.*

Setting The iFill Oxygen Cylinder Rotary Selector To The Prescribed Setting

1. Attach the nasal cannula to the cannula fitting of the iFill oxygen cylinder. **NOTE**– *If it is an international cylinder, open the cylinder valve first.*
2. Turn the rotary selector to the L/min. setting prescribed by your physician.

WARNING

Changing the L/min. setting on the rotary selector will affect the dose of oxygen delivered, DO NOT readjust the L/min. setting unless directed by your physician.

3. To turn the flow of oxygen off, turn the rotary selector counterclockwise to the “OFF” position.

INDICATOR LIGHT EXPLANATION

Indicator Light Color	Oxygen Station Status	Effect
None	Oxygen station is unplugged.	None
Standby (green)	Oxygen station is ready to begin filling cylinders.	Cylinder filling not started
Filling (green)	Oxygen station is on and cylinder is filling.	Cylinder is filling
Full (green)	Cylinder is full.	Remove cylinder
Service (red) and Audible Alert	Oxygen station is on but cylinder is not filling due to internal failure.	Service is required.

ALERT SYSTEM

The DeVilbiss iFill Personal Oxygen Station alert system will detect unit component failure. This system is comprised of both visible and audible alerts which signal the patient if a malfunction should occur.

The visible alert located on the top indicator light panel reads “Service.” When the red indicator light illuminates and the audible alert sounds a problem has occurred and service is required. Refer to the Troubleshooting section of this manual.

ROUTINE PATIENT MAINTENANCE

A. **Cabinet air filters**: clean weekly; wash in warm soapy water and rinse thoroughly. Allow filters to air dry before reinstallation.

WARNING

Do not apply liquid directly to the cabinet. Do not utilize any petroleum-based solvents or cleaning agents.

Do not apply lubricants to fittings.

B. **Exterior cabinet**: clean by using a damp cloth or sponge with a mild household cleaner and wipe it dry. Only if necessary, wipe the coupler with a clean, dry, lint-free cloth.

C. **Cylinders**: clean the cylinders periodically by wiping with a dry, lint-free cloth. Do not clean with a solvent based cleaning solution. Avoid getting fluids or debris such as sand or dirt inside the oxygen cylinder and/or oxygen connector.

PERIODIC HOMECARE PROVIDER PREVENTATIVE MAINTENANCE

A. Change extended life intake filter within 8,760 hours.

B. Check oxygen concentration of a system-filled cylinder with an oxygen analyzer every two years. Refer to steps 4 - 8 listed under Initial Inspection.

C. Check audible alert and indicator lights every two years.

D. Change final bacteria filter within 17,520 hours.

NOTE– *This PM Schedule reflects:*

- 1,000 hour usage equal to one year based on M6 size cylinder use
- A normal, clean operating environment

The homecare provider is responsible for:

- Determining the condition of the iFill operating environment
- Determining a preventative maintenance interval frequency (not to exceed the schedule stated above) which takes into consideration the specific operating environment.

BETWEEN PATIENT MAINTENANCE

A. Clean or replace the cabinet air filters.

B. Clean the station cabinet and cylinders.

C. Check the oxygen concentration of the system. Refer to steps 4 - 8 listed under Initial Inspection.

PRODUCT DESCRIPTION

The DeVilbiss iFill Personal Oxygen Station uses a dual-pressure head compressor to simultaneously power a pressure swing adsorption oxygen generation system and a pneumatic pressure intensifier. It is designed to provide supplemental oxygen to fill portable cylinders for ambulatory use.

Oxygen cylinders are attached to the iFill unit with a coupler and cylinder nipple set. The application-specific coupler helps to insure that other cylinders cannot inadvertently be connected to the iFill system.

The iFill station is designed to fill various sizes of portable oxygen cylinders. Cylinders are available with an integrated oxygen conserving device or continuous flow regulator mounted on top.

An onboard Oxygen Sensing Device (DeVilbiss OSD®) monitors the oxygen concentration level to insure that it remains within specification (93% ± 3%).

SYSTEM OPERATION

The iFill's dual-pressure head compressor draws in room air through air filters to power the oxygen generation system and the pressure intensifier. The output of one of the compressor heads is routed to a rotary valve. The valve directs the flow of compressed air to a pair of sieve beds in the unit in a timed sequence that is controlled by a PC board. As air passes through the beds, nitrogen is separated from the air stream which results in higher concentrations of oxygen exiting the bed. As one bed is being pressurized, the other bed is depressurized allowing the nitrogen to be discharged from the unit through an exhaust muffler connected to the rotary valve. Oxygen from the pressurized bed is directed through a check valve to an accumulator tank.

When the iFill Personal Oxygen Station is first turned on to begin filling a cylinder, the three-way valve is held energized routing all oxygen from the accumulator tank through the final bacteria filter to the Oxygen Sensing Device (OSD) until the required purity is achieved (approximately 4 minutes). This period when the unit is running but not filling a cylinder is referred to as the warm up mode. Once the oxygen purity is reached, the three-way valve deenergizes routing all oxygen from the accumulator tank and final bacteria filter to the inlet of the intensifier. The intensifier accepts the low pressure oxygen and boosts the pressure of the gas to approximately 2000 PSI for filling portable oxygen cylinders.

This is done by using the second compressor head to supply compressed air to drive the two-stage intensifier. The intensifier's main body or power cylinder houses the drive piston which in turn "drives" the pistons that are located in the 1st and 2nd stage respectively. The flow of the compressed air to the intensifier is controlled with a four-way valve. After being used to compress the oxygen, the exhaust air from the power cylinder is routed back to the intake of the compressor to help reduce the overall energy consumption of the filling station.

Oxygen is supplied to the intensifier at a pressure of 30 to 45 psi. It enters the 1st stage cylinder through an inlet check valve and is pressurized to approximately 200 to 500 psi. This pressure will vary based on what part of the filling cycle it is on. The oxygen then passes through the outlet check valve and is transferred through the inter-stage tube to the 2nd stage cylinder. It enters the 2nd stage through another inlet check valve where it is pressurized further. The 2nd stage pressure will also vary according to the filling cycle. Oxygen passes through the 2nd stage outlet check valve and enters the portable cylinder attached to the fill connector.

The cylinder pressure will continue to increase until it reaches approximately 2000 psi. When the cylinder is filled, the iFill station will automatically turn off and the indicator panel light will show full.

A pneumatic diagram of the system is shown in Figure 21.

TROUBLESHOOTING AIDS

Normal Unit Operation & Problem Solving Tips:

IMPORTANT: You must understand the following Normal Operation before attempting to troubleshoot the 535 iFill.

1. When the unit is plugged in, all control panel lights illuminate briefly and the audible alert sounds a short beep. The standby light remains on.
2. After attaching a cylinder to the quick connect coupler and pressing the start button, the standby light goes out and the filling light comes on.
3. The fan, rotary valve, and four-way valve operate continuously for 10 seconds, but the compressor remains off.
4. After 10 seconds the compressor comes on and the oxygen generating system and intensifier begin to operate. During this time the three-way valve routes all oxygen from the accumulator tank to the main PC board's Oxygen Sensing Device (OSD) at a flow of 2.5 to 3 LPM.
5. When the OSD senses 91% oxygen, normally within 3 to 4 minutes, the three-way valve routes all oxygen from the accumulator tank to the intensifier, which begins filling the cylinder.
   NOTE–Throughout the normal filling cycle, the three-way valve will cycle every 24 seconds to send a small sample of gas to the OSD to verify a minimum purity of 90%. If the OSD senses less that 90% purity, the unit reenters the warm up mode.
6. When the cylinder is filled to approximately 2,000 PSIG, the unit stops and the full light illuminates. The fan continues to run for several minutes to cool down the unit; then stops and completes the fill cycle.

Equipment:

- **Spare Light Control Panel:** Plugs into the main PC board allowing full access to the unit when the covers are removed.
- **Spare Parts**: Installed to verify faulty components
- **Flow Test Fixture**: Connect to the three-way valve top metal fitting to assist in isolating problems.

- **Small Magnet:** Placed on the intensifier center drive section to visually indicate intensifier operation.

  NOTE–*The intensifier's piston travels up and down to within ¾" of the top and bottom of the drive section. If the piston (magnet) stops or takes longer than 9 seconds to travel one way, the unit will shut off and alarm.*

  NOTE–*Always remove the magnet after troubleshooting and repair.*
- **Stopwatch or watch with a second hand**

Do First:

- Visually inspect unit for physical damage
- Secure any loose wire and tubing connections

  NOTE–*The tubing from the three-way valve must be connected to the top port of the OSD or random shut down occurs that is difficult to troubleshoot.*
- Warm up the unit and duplicate the problem twice.

  NOTE–*A cold unit, or one that has just been plugged in, will alarm and react differently which may make troubleshooting more difficult.*

Knowledge:

- Become familiar with the names and locations for all components
- If the oxygen purity does not come up to specification (91%) during a continuous 11 minute run in warm up, the unit will shut off and alarm.
- After the first 70 seconds from startup, if the flow to the OSD is below 1.5 lpm, the unit will shut off and alarm.
- If the intensifier has a leak or the oxygen concentrator portion of the unit is not performing correctly, the unit may constantly transition in and out of the warm up mode causing extended fill times.

  NOTE–*Occasionally the unit will go back into warm up mode for a short period during the early portion of a cylinder filling cycle. This is most common when filling an empty cylinder.*
  - o To troubleshoot, use a flow test fixture that allows a maximum flow of 3 lpm. Remove the tubing from the top metal fitting of the three-way valve and install the tubing from the flow test fixture in its place.
  - o If the unit no longer transitions in/out of warm up, either the tubing to the intensifier is leaking or the intensifier itself is faulty.

    NOTE–*The three-way valve will make a clicking sound every 24 seconds indicating the unit is in its normal fill cycle. This clicking sound will not be heard during the warm up mode.*
  - o If the unit continues to transition in/out of warm up, the concentrator portion is not performing correctly. Check for leaks, faulty sieve beds, faulty rotary valve, etc.
- If the unit is running and not constantly transitioning in and out of warm up mode, but does not fill a cylinder, the problem is the intensifier. Ensure that there are no system leaks and that the cylinder and regulator or conserver is not leaking.

NOTE–*After completing any repairs, ensure hour meter on the right cover is connected to the DC wire harness and the control panel ribbon connector is connected to the main PC board prior to installing the left cover.*

PERFORMANCE TEST:

Before returning to service, the iFill Station should be tested to ensure it is operating properly. This can be done by filling a cylinder and then testing the oxygen concentration from the cylinder. Refer to steps 4-8 listed under Initial Inspection. It is recommend that the cylinder be filled completely before testing concentration level. This will allow for verification of fill time for the repaired iFill station.

TROUBLESHOOTING CHART A

Problems During Initial Start Up
(From start up thru approximately 4 minutes run time.)

Symptom (initial through 4 minutes)	Possible Cause	Remedy
(#1) No control panel lights or audible alarm when unit first plugged in.	1. Circuit breaker tripped or faulty in 535D or fuse blown in 535I.	1. Reset or replace circuit breaker/replace fuse.
	2. No AC power at receptacle.	2. Check power source or use different receptacle.
	3. AC wire harness not connected to main PC board.	3. Connect AC wire harness.
	4. Light panel ribbon cable loose or not connected to the main PC board.	4. Reconnect ribbon cable to main PC board.
	5. Defective DC power supply board.	5. Replace DC power supply board.
	6. Defective light panel.	6. Replace light panel.
	7. Defective main PC board.	7. Replace main PC board.
(#2) When start button is pressed: - standby light stays on. - nothing happens.	1. No cylinder present or not snapped onto coupler.	1. Fully snap cylinder onto coupler.
	2. Coupler switch not connected to main PC board.	2. Connect coupler switch.
	3. Defective light panel start switch.	3. Replace light panel.
	4. Defective main PC board.	4. Replace main PC board.
	5. Defective intensifier coupler switch.	5. Replace intensifier.
(#3) When start button is pressed: - light panel standby light goes off and full light comes on instantly. - nothing happens.	1. DC wire harness disconnected at main PC board.	1. Reconnect DC wire harness at main PC board.
	2. Faulty main PC board.	2. Replace main PC board.
	3. Faulty DC wire harness.	3. Replace DC wire harness.
(#4) When start button is pressed: - the standby light goes off and filling light comes on. - fan does not run.	1. Fan wires not connected to main PC board.	1. Connect fan wires.
	2. Faulty fan wires or connector.	2. Repair or replace fan.
	3. Faulty fan.	3. Replace fan.
	4. Faulty main PC board.	4. Replace main PC board.
(#5) When start button is pressed: - the standby light goes off and filling light comes on. - the fan runs. - the rotary and four-way valves are cycling. - unit alarms after approximately 4 seconds.	1. DC wire harness not connected to rotary valve hall effect board.	1. Connect DC wire harness.
	2. Faulty main PC board.	2. Replace main PC board.
	3. Faulty rotary valve.	3. Replace rotary valve.
	4. Faulty DC wire harness.	4. Replace DC wire harness.
(#6) When start button is pressed: - the standby light goes off and filling light comes on. - the fan runs. - the rotary valve is not cycling, the four-way is. - unit alarms after approximately 4 seconds.	1. DC wire not connected to rotary valve motor.	1. Connect DC wire harness.
	2. Faulty main PC board.	2. Replace main PC board.
	3. Faulty rotary valve.	3. Replace rotary valve.
	4. Faulty DC wire harness.	4. Replace DC wire harness.
(#7) When start button is pressed: - the standby light goes off and filling light comes on. - the fan runs. - the rotary valve is cycling, the four-way is not. - after 10 seconds the compressor does not run. - the intensifier is not cycling - after 20 seconds the unit stops and alarms.	1. Four-way valve connector is not connected to DC wire harness.	1. Connect valve to DC wire harness.
	2. Faulty main PC board.	2. Replace main PC board.
	3. Faulty four-way valve.	3. Replace four-way valve.
	4. Faulty DC wire harness.	4. Replace wire harness.

TROUBLESHOOTING

Symptom (initial through 4 minutes)	Possible Cause	Remedy
(#8) When start button is pressed: - the standby light goes off and filling light comes on. - the fan runs. - the rotary and four-way valves are cycling. - after 10 seconds the compressor does not run. - after 20 seconds the unit stops and alarms.	1. Compressor not connected to AC wire harness.	1. Connect AC wire harness.
	2. Capacitor wire not connected.	2. Connect AC wire harness.
	3. Faulty capacitor.	3. Replace capacitor.
	4. Faulty main PC board.	4. Replace main PC board.
	5. Faulty compressor.	5. Replace compressor.
	6. Faulty AC wire harness.	6. Replace AC wire harness.
(#9) When start button is pressed: - the standby light goes off and filling light comes on. - the fan runs. - the rotary and four-way valves are cycling. - after 10 seconds the compressor runs. - the intensifier is not cycling. - after 20 seconds the unit stops and alarms.	1. Faulty compressor. (Verify faulty compressor by using duck bill pliers to pinch the tubing closed that comes from the compressor just below the small DC power supply board. If the compressor PR valve does not pop off immediately, replace the compressor)	1. Replace compressor.
	2. Faulty four-way valve.	2. Replace four-way valve.
	3. Faulty intensifier.	3. Replace intensifier.
(#10) When start button is pressed: - the standby light goes off and filling light comes on. - the fan runs. - the rotary and four-way valves are cycling. - after 10 seconds the compressor starts. - the intensifier is cycling. - after 70 seconds the unit stops and alarms.	1. Three-way valve not connected at main PC board.	1. Connect three-way valve wire harness.
	2. System air leak (compressor tubing, sieve beds, accumulator tank, bacteria filter, etc.).	2. Repair connection or leak.
	3. Tubing not connected between the 3-way valve and the top fitting of the OSD.	3. Connect tubing to top OSD fitting.
	4. Faulty three-way valve or occluded orifice in valve.	4. Replace three-way valve.
	5. Faulty main PC board.	5. Replace main PC board.
(#11) When start button is pressed: - the standby light goes off and filling light comes on. - the fan runs. - the rotary and four-way valves are cycling. - after 10 seconds the compressor starts. - compressor is struggling, PR valve may pop off. - intensifier does not cycle. - after 18-20 seconds the unit stops and alarms.	1. Intensifier hall effect board wires not connected.	1. Connect DC wire harness to intensifier hall effect board.
	2. Faulty main PC board.	2. Replace main PC board.
	3. Faulty DC wire harness.	3. Replace DC wire harness.
	4. Faulty intensifier.	4. Replace intensifier.
(#12) When start button is pressed: - the standby light goes off and filling light comes on. - the fan runs. - the rotary and four-way valves are cycling. - after 10 seconds the compressor starts. - unit stops and alarms just after compressor starts.	1. Tubing from three-way valve to OSD faulty (does not have small white muffler inside).	1. Install muffler in tubing between clamp and valve.
	2. Faulty main PC board.	2. Replace main PC board.

NOTE–*After completing any repairs, ensure Hour Meter on the right cover is connected to the DC wire harness and the Control Panel ribbon connector is connected to the main PC Board prior to installing the left cover. Also ensure magnet has been removed if used to troubleshoot.*

NOTE–*Before returning to service, the iFill Station should undergo a Performance Test to ensure it is operating properly (refer to page 9).*

TROUBLESHOOTING CHART B

Problems during fill cycle
(After unit running longer than approximately 4 minutes run time.)

Symptom (during fill - after 4 minutes)	Possible Cause	Remedy
(A) The unit runs for 11 minutes after start up then shuts off and alarms. - Note that if the OSD does not see 91% oxygen after 11 consecutive minutes the unit shuts off and alarms. - (If unit is in warm up mode the three-way click sound will not be heard every 24 seconds)	1. System air leak (compressor tubing, sieve beds, accumulator tank, bacteria filter, etc.).	1. Repair or replace as necessary.
	2. Faulty OSD on main PC board.	2. Replace main PC board.
	3. Faulty sieve beds.	3. Replace sieve beds.
	4. Faulty rotary valve.	4. Replace rotary valve.
	5. Faulty compressor (low output flow).	5. Replace compressor.
(B) The unit shuts off and alarms prior to filling a cylinder to 2,000 PSIG. - Verify unit did not go back into warm up mode for 11 consecutive minutes per (A) above. - The intensifier drive piston travels slowly and or does not travel fully as verified visually with magnet. - (Similar to start up Troubleshooting A, #9 but this usually occurs during cylinder filling at higher pressures)	1. System air leak (compressor or four-way valve tubing connections)	1. Repair or replace as necessary.
	2. Faulty four-way valve (internal leakage)	2. Replace four-way valve.
	3. Faulty compressor (verify faulty compressor by using duck bill pliers to pinch the tubing closed that comes from the compressor just below the small DC power supply board. If the compressor PR valve does not pop off immediately, replace the compressor)	3. Replace compressor.
	4. Faulty intensifier.	4. Replace intensifier.
(C) The unit shuts off and alarms prior to filling a cylinder to 2,000 PSIG. - The intensifier drive piston travels to the end and sits there until unit alarms. (See Troubleshooting A, #7)	1. DC wire harness not properly connected to Intensifier hall effect board.	1. Reconnect DC wire harness to intensifier hall effect board.
	2. Faulty or intermittent four-way valve.	2. Replace four-way valve.
	3. Faulty main PC board.	3. Replace main PC board.
	4. Faulty DC wire harness.	4. Replace DC wire harness.
	5. Faulty intensifier.	5. Replace intensifier.
(D) The unit runs for an extended period of time and does not fill a cylinder or complete a normal fill cycle. The unit does not alarm. - Verify unit does not constantly go in and out of warm up mode for several minutes at a time, but not for 11 consecutive minutes as in (A) above.	1. System air leak (compressor tubing, sieve beds, accumulator tank, bacteria filter, etc.).	1. Repair or replace as necessary.
	2. Faulty sieve beds.	2. Replace sieve beds.
	3. Faulty rotary valve.	3. Replace rotary valve.
	4. Faulty compressor (low output flow).	4. Replace compressor.
	5. Faulty intensifier.	5. Replace intensifier.

NOTE–*After completing any repairs, ensure Hour Meter on the right cover is connected to the DC wire harness and the Control Panel ribbon connector is connected to the main PC Board prior to installing the left cover. Also ensure magnet has been removed if used to troubleshoot.*

NOTE–*Before returning to service, the iFill Station should undergo a Performance Test to ensure it is operating properly (refer to page 9).*

PROPER REPAIR PROCEDURES

This section contains the proper procedures for testing, repairing and replacement of various components in the DeVilbiss iFill Personal Oxygen Station. The oxygen generating system components of the iFill station are very similar to ones in a concentrator; therefore some of the same tools can be used.

A service kit (part# 444-501) is available which contains gauges, tools and test instruments to aid personnel in properly servicing the iFill station. In addition, an oxygen analyzer (part# R217P62 or R218P12) is needed to periodically check the oxygen concentrations from an iFill cylinder.

NOTE– *Be sure to read all of the steps involved before beginning any of the procedures in this manual.*

NOTE– *After repairing or replacing a component, turn the iFill station on run a Performance Test to ensure it is operating properly (refer to page 9).*

NOTE– *When testing for leaks use a certified leak detection solution such as SWAGELOK, Snoop® or equivalent. Do not use solutions containing ethylene glycol.*

CAUTION– *Do not apply leak test solution to any part of the rotary valve or PC board assembly.*

CAUTION– *Use only DeVilbiss Healthcare replacement parts and accessories.*

WARNING

When servicing the DeVilbiss iFill station, be absolutely certain that the correct tools are used and that parts are free of oil and grease or any material not compatible with oxygen.

Electric shock hazard. The covers should only be removed by a qualified DeVilbiss Healthcare homecare provider.

Disconnect the power cord from the wall outlet before attempting repairs on the unit. Extra care should be taken if it is necessary to operate the unit with the covers removed.

COVER REMOVAL AND REPLACEMENT

To remove left cover (Figures 1 & 3):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Use a flat screwdriver to loosen the 1/4 turn fasteners that secure the cylinder cradle to the top of the unit. Remove cradle.
3. Use a Torx screwdriver with a size T-25 bit (or flat screwdriver) to remove the five screws that hold the left cover to the internal superstructure (three on top and two at bottom).
4. Lift and remove cover from unit.

To remove right cover (Figures 2, 3, &18):

1. Remove left cover first.
2. Carefully disconnect indicator panel ribbon cable from top of main PC board.
3. Disconnect hour meter electrical connector.
4. Remove the two screws from the bottom of right cover and then remove cover from unit.

To replace covers (Figures 18):

1. Replace right cover first by setting cover on station base.
2. Reconnect the indicator panel ribbon cable into the top of the main PC board.
3. Secure the two screws in the bottom of the right cover.
4. Reconnect the hour meter electrical connector.
5. Replace left cover on the station.
6. Secure the five screws that hold the left cover to the structure (three on top and two at bottom).
7. Replace cradle.
8. Secure cradle with 1/4 turn fasteners.

CAPACITOR

The capacitor enables the compressor to start and run by supplying voltage to the windings of the compressor motor. A defective capacitor may prevent the compressor from starting or cause it to run slower. The capacitor is located on the Plexiglas mounting platform above the compressor by the cooling fan.

WARNING

Electric Shock Hazard. When replacing the capacitor, do not touch the terminals or allow metal objects to come in contact with the terminals on the capacitor. The capacitor may hold a charge for several days after the unit is turned off.

To replace the capacitor (Figure 12):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Use needle-nose pliers to disconnect the two wires from capacitor terminals.
4. Cut the plastic cable ties holding the capacitor in place and remove capacitor.
5. Reconnect wires to new capacitor.
6. Install the new capacitor and secure with new cable ties.
7. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

CHECK VALVES

The check valves are located between the outlet of each sieve bed and the accumulator tank. During operation they alternately open and close allowing oxygen to pass through to the accumulator tank.

To replace check valves (Figure 10):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Remove the tubing from both ends of the check valve.
4. Reattach tubing to the ends of the new check valve. **NOTE**– *Make sure the outlet end of the check valve is pointing toward the accumulator tank.*
5. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

CIRCUIT BREAKER (535D)/FUSE (535I)

The circuit breaker or fuse is located in the lower rear of the unit. The circuit breaker fuse will activate should a major fault condition occur within the unit.

To replace circuit breaker (Figure 4A):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Remove compressor and mounting plate.
4. Disconnect wires from circuit breaker terminals.
5. Use a pair of duckbill pliers to squeeze the plastic locking tabs on the side of the circuit breaker while pushing it out of the hole in the base of the unit.
6. Install the new circuit breaker by pushing it through the hole until it locks into place.
7. Reconnect wires to terminals.
8. Replace compressor and mounting plate.
9. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

To replace fuse (Figure 4B):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Use a small screwdriver to remove the fuse drawer located in the IEC connector.
3. Remove the defective fuse and replace with a new fuse
4. Replace the fuse drawer into the IEC connector.

COMPRESSOR

A DeVilbiss GSE dual-pressure head compressor is used to power the oxygen generating element of the iFill station. It is located in the base of the unit beneath the Plexiglas platform and secured to a mounting plate with four silicone motor mounts.

NOTE– *An internal thermo-protective device will activate and shut the compressor off if it overheats. It will take several minutes to reset before the compressor can be restarted.*

NOTE– *A pressure relief (PR) valve is attached to each of the pressure heads to prevent high pressure build-up in the system should a component malfunction occur.*

To replace the compressor (Figure 13):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Disconnect the compressor electrical connector.
4. Loosen the ladder clamps and remove the tubing from all four compressor fittings (two intake fittings and two exhaust fittings).
5. Use a Torx screwdriver with a size T-25 bit (or flat screwdriver) to remove the two screws from the back of the compressor mounting plate.
6. Remove the two mounting plate support brackets by loosening the screws (four total) from the top and bottom of each bracket. **NOTE**–*The top of the support brackets is secured to the underside of the Plexiglas mounting platform and the bottom attaches to the compressor mounting plate.*
7. Carefully lift the compressor and mounting plate out of the iFill base.
8. Turn the compressor upside down so that it is resting on the heads.
9. Remove the four compressor motor mount hex nuts and mounting plate.
10. Unscrew the studded motor mounts from the compressor feet by hand.
11. Inspect the motor mounts and replace if damaged.
12. Install motor mounts on replacement compressor and reattach the mounting plate using the four hex nuts.
13. Position compressor and mounting plate in base and secure with two screws at the back of the plate.
14. Reinstall support brackets and secure with screws at the top and bottom.
15. Reattach the tubing to the four compressor fittings and secure with ladder clamps.
16. Reconnect the compressor electrical connector.
17. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

To rebuild compressor:

The top end of the compressor may be rebuilt using Compressor Service Kit part number 515ADZ-643. Follow the steps below to rebuild the compressor:

1. Remove compressor from base of iFill station. Refer to Compressor Replacement instructions above for removal.

To inspect and/or replace internal components:

1. Remove the eight screws that hold the compressor heads in place. **NOTE–***When removing the heads, be sure to keep each head and its components with the correct compressor side.*
2. Check for proper placement of or damage to the gaskets on the bottom of the compressor heads. Replace if damaged.
3. Remove reed valve plates. A reed valve is located on each side of the valve plate.
4. The compressor reed valves should be flush with the valve plate. If the valve is broken or not flush with the valve plate or foreign matter is detected inside the head, clean or replace the compressor reed valves.

To replace the compressor reed valves:

a. Remove the screw holding the compressor reed valves in position on the valve plate and discard the used reed valves.
b. Position the new reed valves so that they are centered and completely cover the holes in the valve plate.
c. Place the metal retainer on the reed valves and secure with the reed valve screw.

5. Check for proper placement of or damage to the rubber o-ring on the bottom of the valve plate. Replace if damaged.
6. Remove piston sleeves by pulling upward and inspect cup seal on pistons. Replace if badly worn or damaged.

To replace cup seal:

a. Remove rod screw from top of piston.
b. Remove the cup retainer plate.

c. Discard defective cup seal.
d. Place new cup seal into position.
e. Replace cup retainer plate.
f. Secure with screws.

7. Reposition sleeve on piston. **NOTE**– *In some cases, it may be easier to position sleeve on piston before installing a new cup seal and retainer plate.*
8. Place valve plates on the compressor so that heads of reed valve screws are aligned with the indentation in top of pistons.
9. Install the compressor heads so that the holes in the heads are aligned with the holes in the compressor housing.
10. Secure compressor heads with the screws.

COOLING FAN

The cooling fan provides a constant air flow to cool the compressor. A defective fan may cause the compressor's internal thermo-protective device to activate and shut the compressor off. Should this occur, it will require several minutes for the thermo-protective device to reset. The fan is located on the Plexiglas mounting platform above the compressor.

To replace cooling fan (Figure 12):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Disconnect the fan electrical connector from main PC board.
4. Use a Torx screwdriver with a size T-15 bit to remove the four retaining screws that secure the cooling fan to the Plexiglas mounting platform.
5. Remove the defective cooling fan and install the replacement fan using the four retaining screws. **NOTE**– *When installing the fan, be sure the air flow directional arrow on the side of the fan is pointing down toward the compressor.*
6. Reconnect the electrical connector to the main PC board.
7. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

FINAL BACTERIA FILTER

The final bacteria filter is used to filter the oxygen as it leaves the accumulator tank prior to entering the pressure intensifier. It is recommended that this filter be changed within 17,520 hours of unit operation. The filter is mounted on the vertical piece of metal superstructure in the center of the unit near the main PC board.

NOTE– *On early versions of the iFill station, this filter may be located in the base of the unit below the pressure intensifier.*

To replace the final bacteria filter (Figure 12):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Disconnect tubing from both ends of filter.
4. Cut the plastic cable tie holding the filter in place and remove filter.
5. Reconnect tubing to the replacement filter with arrow on filter pointing down and secure with cable tie.
6. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

FOUR-WAY VALVE

The four-way valve is mounted on the side of the intensifier and interconnects the intensifier with the compressor. During operation, the four-way valve controls air flow by directing compressed air to the intensifier and routing the exhaust air back to the compressor.

To replace the four-way valve (Figure 15):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Disconnect the four-way valve electrical connector.
4. Disconnect the tubing from the fittings at the bottom of the valve. Be sure to note the position of each piece of tubing before removing it from the valve.
5. Use a Torx screwdriver with a size T-27 bit to loosen the four retaining screws that secure the valve to the intensifier and then remove valve.
6. Install the two o-rings onto the new valve.
7. Install the new four-way valve using the four retaining screws.
8. Reconnect the tubing and electrical connector.
9. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

HOUR METER

The hour meter provides the total running hours of the iFill station. It is mounted in the right side cover behind the air filter.

To replace the hour meter (Figure 18):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Remove air filter from the right side cover.
4. Compress the four plastic locking tabs on the side of the hour meter and push the meter toward the outside of the cover to remove it.
5. Install new hour meter by compressing the four locking tabs while pushing the meter into the right side cover until it locks into place.
6. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

LONG-LIFE INTAKE FILTER

The long-life intake filter is under the cylinder cradle.

To replace the long-life intake filter (Figure 5):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Use a flat screwdriver to loosen both 1/4 turn fasteners by turning counterclockwise 1/4 turn then remove the cylinder cradle.

3. Reach into the iFill station and remove the long-life intake filter and discard.
4. Insert new long-life intake filter into the intake extension tube making sure the filer is centered in the opening.
5. Install the cylinder cradle (with fill connector cover facing forward) by turning the 1/4 turn fasteners in the clockwise direction.

OXYGEN SENSING DEVICE (OSD)

The onboard Oxygen Sensing Device (OSD) is mounted on the PC board and is responsible for monitoring the oxygen purity level being produced by the iFill station. At unit start-up, oxygen passes through the OSD and is exhausted; it does not enter the intensifier. After approximately four minutes when the oxygen has reached the proper purity level, the three-way valve shifts and will begin to direct the oxygen to the inlet of the pressure intensifier. During operation, the OSD continues to monitor the oxygen purity. If the concentration level falls below specification of 90% (93% ± 3 %) the main PC board causes the three-way valve to shift and prevent the oxygen from entering the intensifier.

1. The OSD is part of the Main PC board; refer to instructions on how to replace the PCB (Printed Circuit Board).

POWER CORD

To replace the power cord (Figures 4A &14): - 115 volt units only

NOTE–*230 volt units have a detachable power cord.*

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Remove compressor and mounting plate.
4. Disconnect the power cord electrical connector and then remove both wires (black & white) from connector housing.
5. Remove ferrite core from the end of power cord wires.
6. Loosen the power cord strain relief and push cord out of the hole in the base of the unit.
7. Insert a new power cord through the hole and secure with strain relief.
8. Reinsert wires into connector housing and reconnect the power cord connector to the unit wire harness.
9. Reinstall ferrite core.
10. Replace compressor and mounting plate.
11. Replace covers. **NOTE**–Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).

PRESSURE INTENSIFIER

The pneumatic pressure intensifier is located in the front part of the iFill station. The two stage intensifier utilizes a large drive piston in the power cylinder and smaller pistons in the 1st and 2nd stage cylinders to generate pressure. It receives low pressure oxygen from the accumulator tank and increases it to approximately 2000 PSI. The high pressure is used to fill portable oxygen cylinders attached to the fill connector.

CAUTION–*The pressure intensifier must be replaced in a clean room environment only. Tools must be kept oil free. Do not use lubricants.*

To replace the pressure intensifier (Figure 8):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Remove the four-way valve from the side of the intensifier. Refer to valve removal instructions.
4. Disconnect wires from terminals on pressure switch.
5. Disconnect cylinder detect switch electrical connector from main PC board.
6. Disconnect the wire harness connector from the small sensor hall effect board that is mounted on the side of the intensifier body.
7. Disconnect tubing from the oxygen inlet fitting at the bottom of intensifier.
8. Carefully rest the iFill station on its side and remove the hex nuts that secure the three intensifier mounts to the base of the unit. The intensifier can now be removed.
9. Unscrew the three mounts from the bottom of intensifier and install them on the replacement intensifier.
10. Reconnect the tubing to the oxygen inlet fitting at the bottom of the intensifier.
11. Position intensifier with mounts attached into the base of the iFill station and secure with hex nuts.
12. Reconnect all wires and electrical connectors.
13. Reinstall the four-way valve.
14. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

PCB (PRINTED CIRCUIT BOARD)

Main PC Board

The main printed circuit (PC) board is responsible for monitoring and controlling the DeVilbiss iFill oxygen station. In addition to the controlling circuitry, the audible alert and oxygen sensing device (OSD) are also located on the main PC board. The board is mounted on the vertical piece of metal superstructure that separates the oxygen generation system components from the pressure intensifier in the center of the unit.

To replace the main board (Figure 12):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Carefully disconnect tubing from the OSD.
4. Disconnect all electrical connections (6 connectors) from the board.
5. Use a Torx screwdriver with a size T-10 bit to remove the two retaining screws that secure the PC board to the metal superstructure.
6. Carefully remove board from the plastic stand-offs.
7. Mount new PC board on stand-offs and secure with screws.
8. Reconnect all electrical connectors and OSD tubing.
9. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

CAUTION–*Do not apply any force or flex the PC Board when connecting or disconnecting electronic or pneumatic components. Damage to the electronic assembly is possible.*

DC Power Supply PC Board

The DC power supply PC board supplies DC voltage to operate the main PC board. It is located on the Plexiglas mounting platform above the compressor.

To replace the power supply board (Figure 12):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Disconnect the two electrical connectors from the board.
4. Carefully remove board from the plastic stand-offs.
5. Install replacement board by pushing it down onto stand-offs until it locks into place.
6. Reconnect the electrical connectors.
7. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

CAUTION–*Do not apply any force or flex the PC Board when connecting or disconnecting electronic or pneumatic components. Damage to the electronic assembly is possible.*

ROTARY VALVE

The rotary valve is located at the bottom of the unit between the sieve beds. It alternately distributes compressed air to the sieve beds in a timed sequence. While one bed is being pressurized, the other bed is being exhausted through the valve. Exhaust gases go through the valve exhaust port and exit through the exhaust muffler.

To replace the rotary valve (Figures 15 & 17):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Remove the pressure intensifier first. Refer to Intensifier Removal instructions. **NOTE**–T*he four-way valve does not have to be removed from the intensifier when replacing the rotary valve; however, the electrical connector and tubing still need to be disconnected from the four-way valve.*
4. Cut cable tie holding rotary valve wire harness and disconnect harness from the valve.
5. Loosen speedy clamps and remove tubing from both sides of valve.
6. Loosen ladder clamp and remove tubing from the compressor exhaust fitting that is located closest to the PR valve on compressor.
7. Pull rotary valve forward slightly and then loosen ladder clamps and remove tubing from the two fittings on the backside of valve.
8. Reattach tubing to the same two fittings on the new rotary valve.
9. Reattach tubing to the compressor exhaust fitting.
10. Reattach tubing to fittings on both sides of valve.
11. Reconnect valve wire harness and secure with cable tie.
12. Reinstall the pressure intensifier.
13. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

SIEVE BEDS

The sieve beds are located in the front of the unit behind the pressure intensifier. They are alternately pressurized by the rotary valve and remove the nitrogen from the compressed air passing through them. The resulting high concentration of oxygen is supplied to the pressure intensifier.

NOTE–*Sieve beds should be ordered and changed in pairs.*

To replace the sieve beds (Figure 11):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Remove the pressure intensifier first. Refer to Intensifier Removal instructions. **NOTE**–*The four-way valve does not have to be removed from the intensifier when replacing the sieve beds; however, the electrical connector and tubing still need to be disconnected from the four-way valve.*
4. Disconnect the tubing from the top and bottom of each sieve bed.
5. Cut the plastic cable ties holding the sieve beds in place and remove the beds.
6. Install new beds and secure with new plastic cable ties.
7. Reconnect the tubing to the beds.
8. Reinstall the pressure intensifier.
9. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual)*.

CAUTION-*Do not use regenerated sieve material.*

THREE-WAY VALVE

The three-way valve is mounted on the vertical piece of metal superstructure in the center of the unit next to the main PC board. It is responsible for directing oxygen from the accumulator tank to the inlet of the pressure intensifier as well as to the oxygen sensing device (OSD). At unit start-up, the valve prevents oxygen from entering the intensifier. After approximately four minutes when the oxygen has reached the proper purity level, the three-way valve will begin to direct the oxygen to the inlet of the pressure intensifier.

To replace the three-way valve (Figure 12):

1. Ensure the iFill station is unplugged from the wall outlet.
2. Remove the left and right covers from the iFill station.
3. Disconnect the three-way valve electrical connector from the PC board.
4. Disconnect the three pieces of tubing from the valve.
5. Use a Torx screwdriver with a size T-10 bit to remove the two retaining screws that secure the three-way valve to the metal superstructure and remove valve.
6. Install the replacement valve using the retaining screws.
7. Reconnect the three pieces of tubing and electrical connector.
8. Replace covers. **NOTE**–*Be sure to reattach indicator panel ribbon connector and hour meter electrical connector (refer to Cover Removal and Replacement in this manual).*

FIGURES, DIAGRAMS, AND VIEWS INDEX

EXTERIOR VIEWS

The following figures show the exterior of the DeVilbiss iFill Personal Oxygen Station.

The following figures show the DeVilbiss iFill Personal Oxygen Station and the Cylinders.

INTERIOR VIEWS

The following figures show the interior of the DeVilbiss iFill Personal Oxygen Station.

DIAGRAMS

FIGURE 1 - EXTERIOR, LEFT SIDE VIEW

FIGURE 2 - EXTERIOR, RIGHT SIDE VIEW

NOTE-Strain relief and power cord are 115V unit only.

FIGURE 3 - EXTERIOR, TOP VIEW

FIGURE 4A-EXTERIOR, LOWER REAR VIEW (535D)

FIGURE 4B - EXTERIOR, LOWER REAR VIEW (535I)

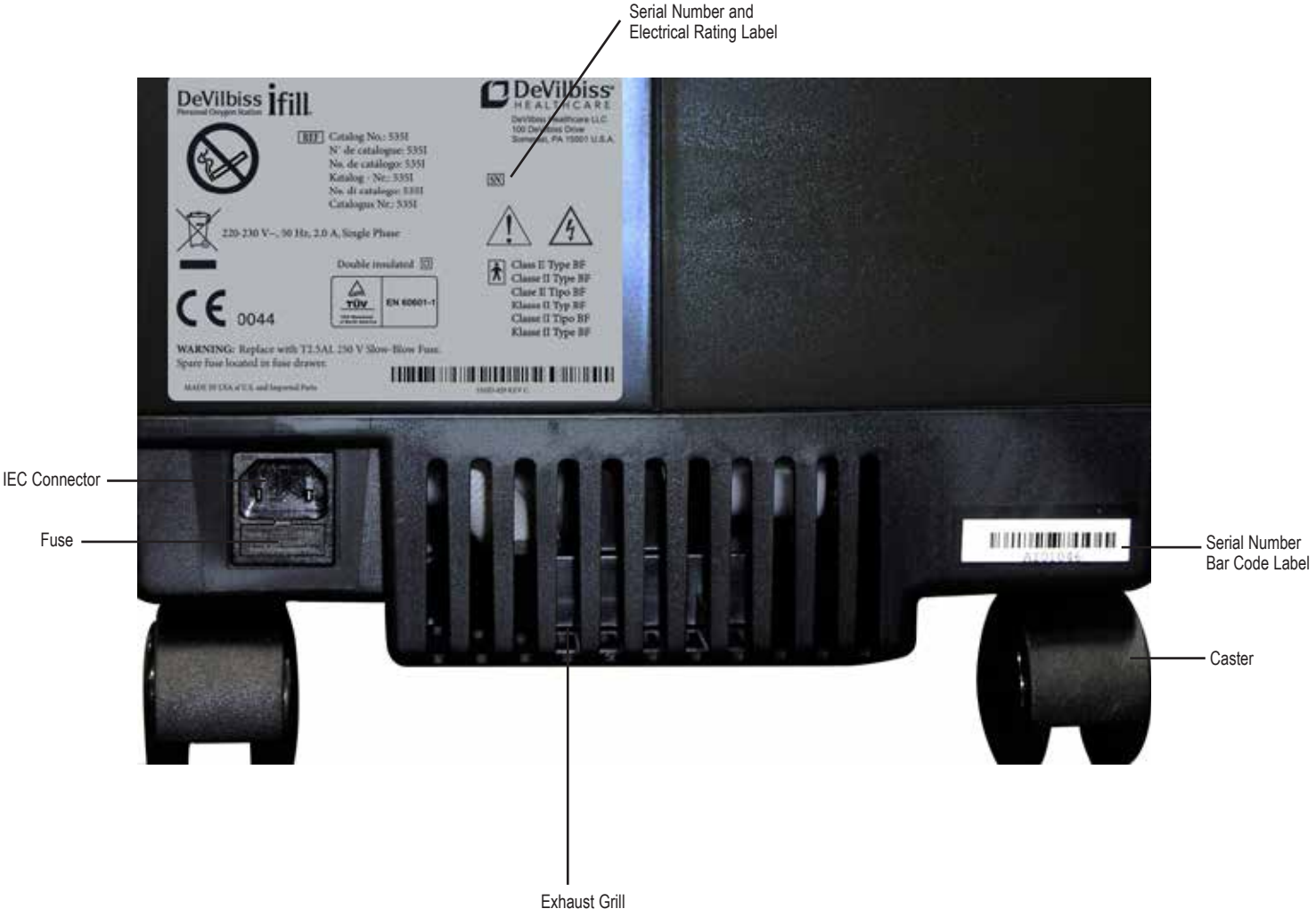
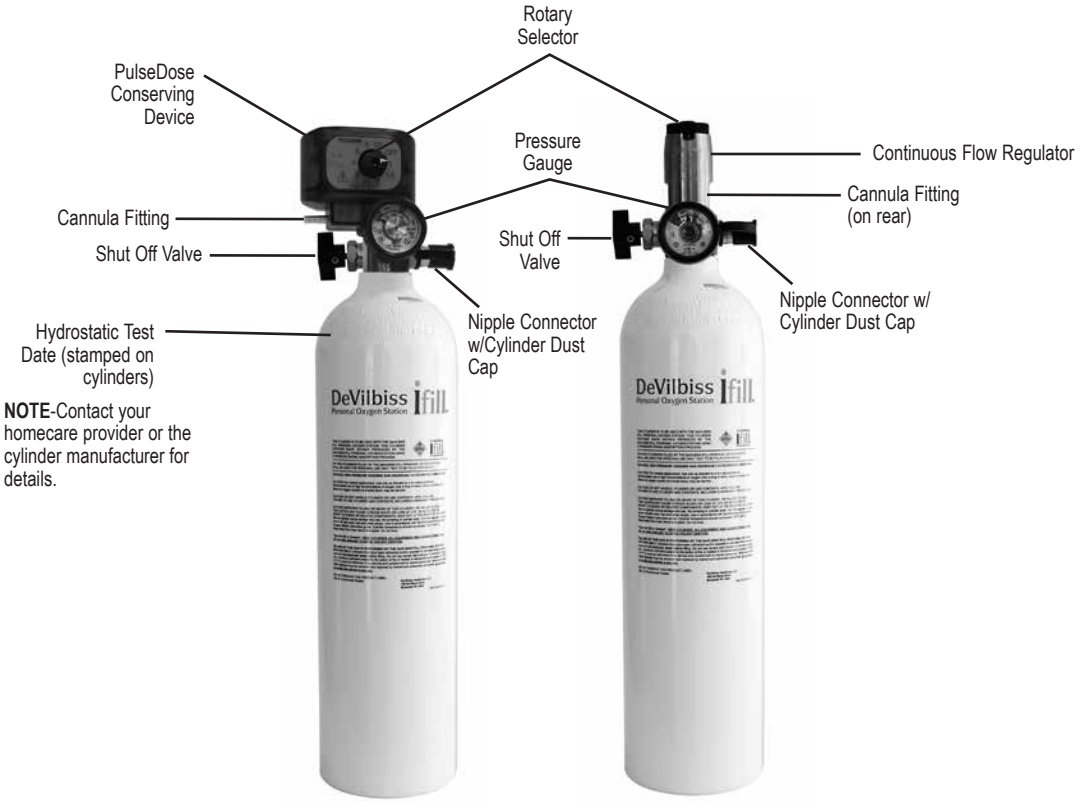


FIGURE 5 - EXTERIOR, TOP VIEW - CRADLE REMOVED

FIGURE 6 - EXTERIOR, CYLINDER ATTACHED TO FILL CONNECTOR

FIGURE 7 - EXTERIOR, IFILL CYLINDERS W/CONSERVING DEVICE & CONTINUOUS FLOW REGULATOR



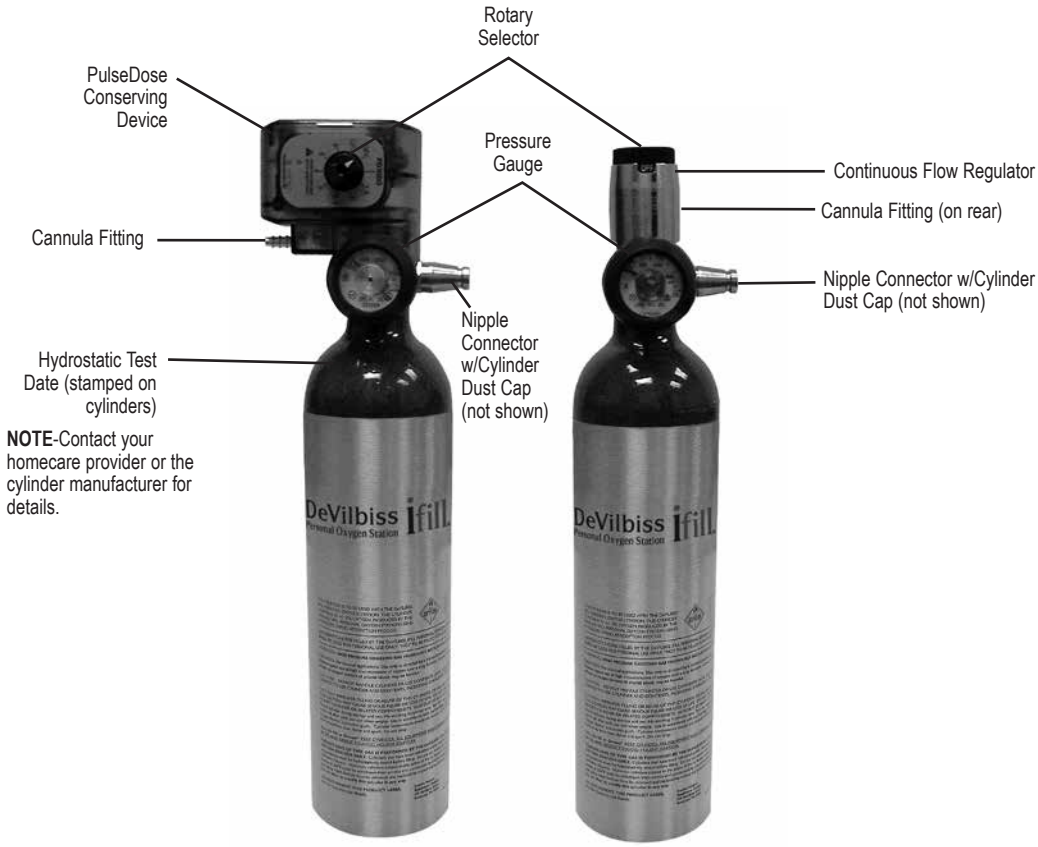


FIGURE 8 - INTERIOR, FRONT VIEW - PRESSURE INTENSIFIER

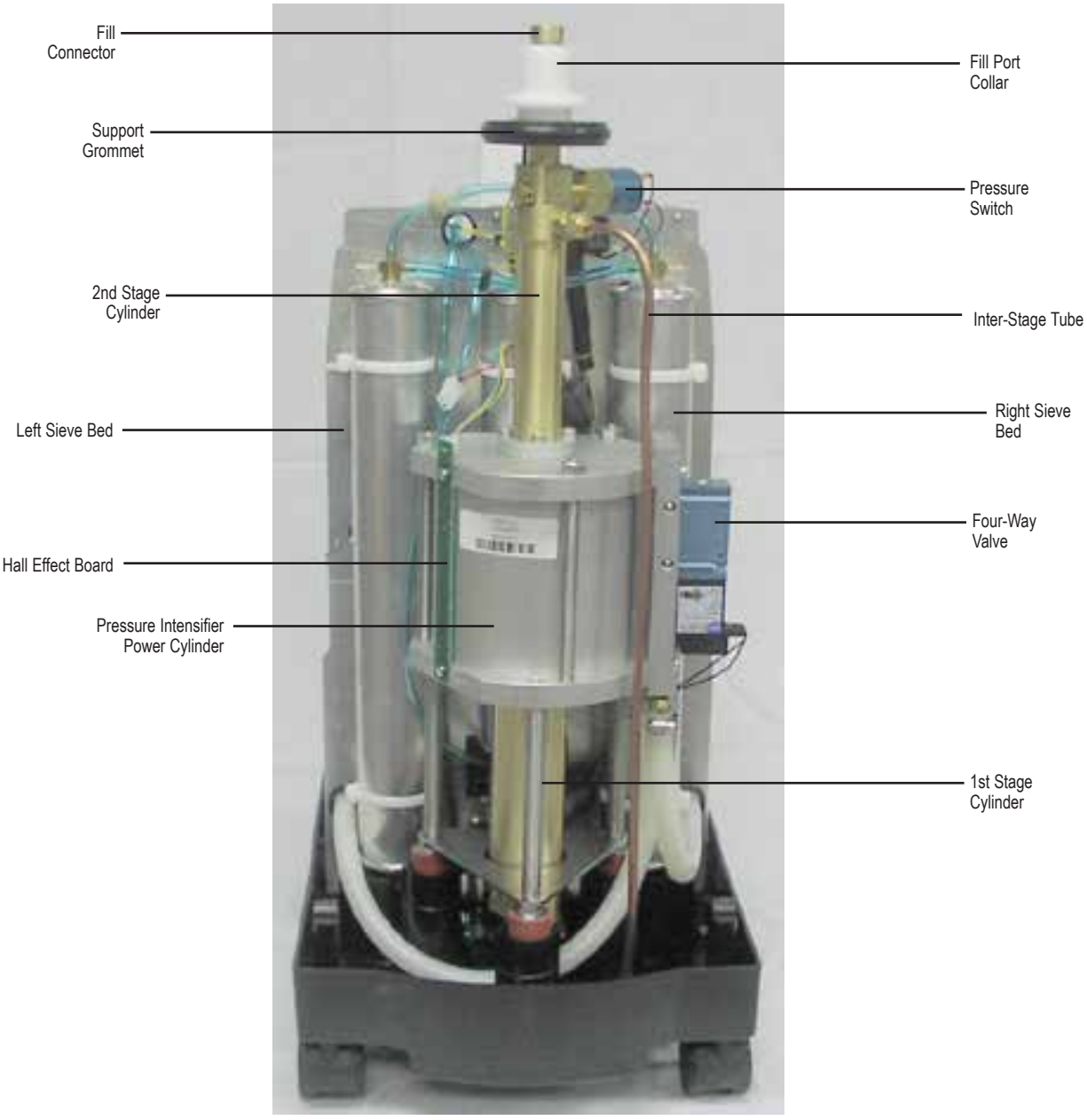


FIGURE 9 - INTERIOR, RIGHT SIDE VIEW

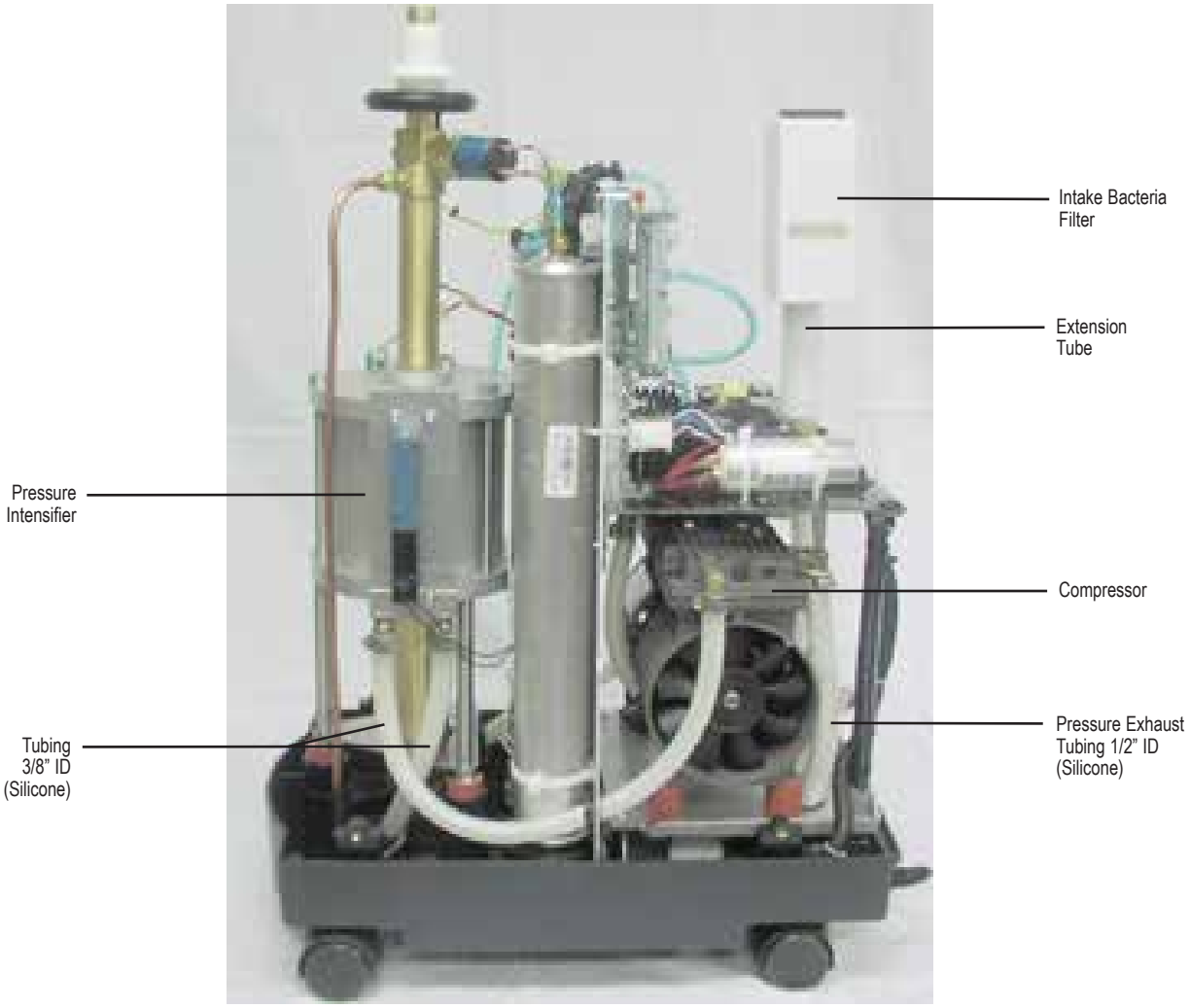


FIGURE 10 - INTERIOR, TOP VIEW - CHECK VALVES AND ORIFICE

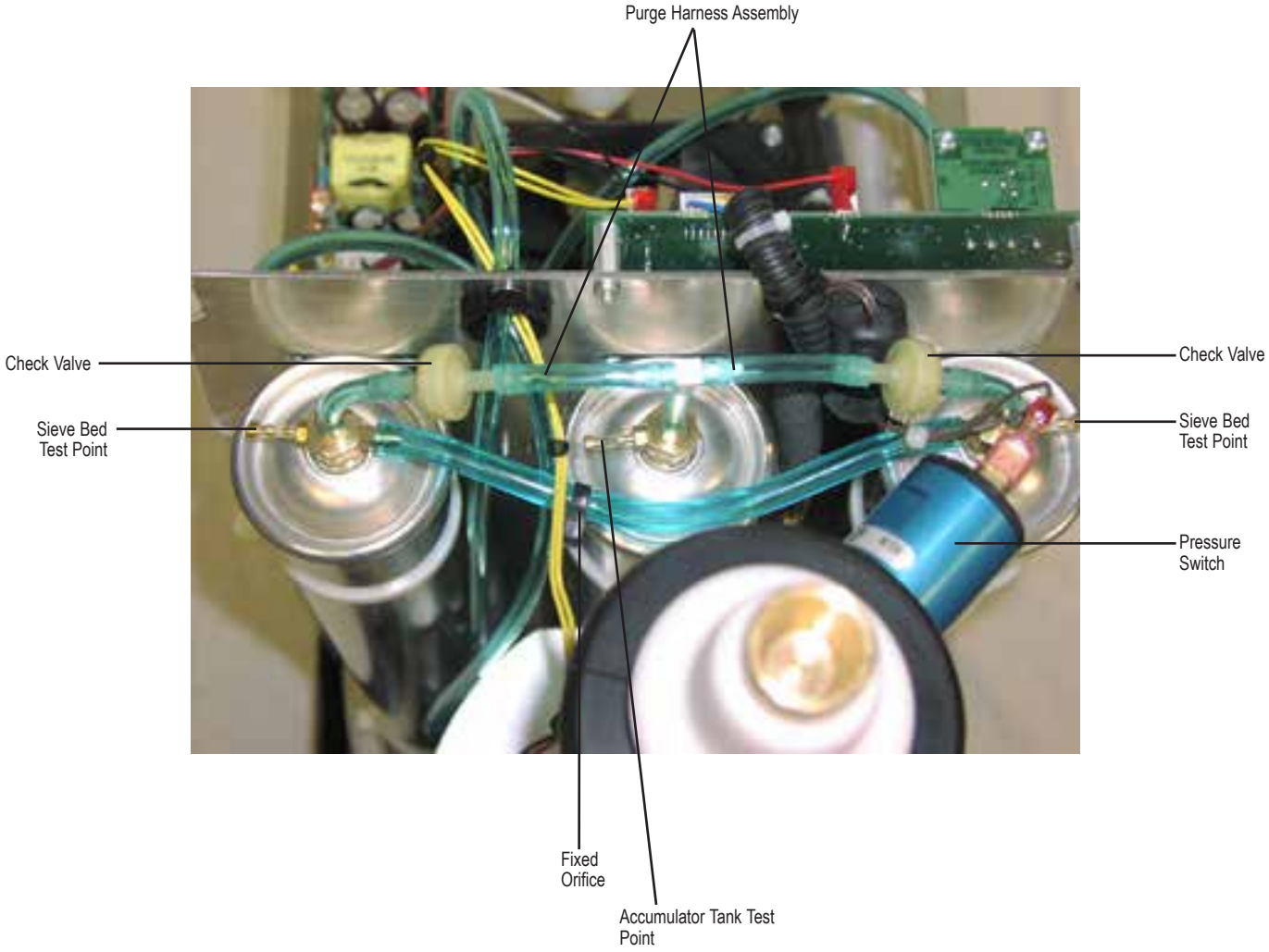


FIGURE 11 - INTERIOR, BEDS AND ACCUMULATOR TANK

FIGURE 12 - INTERIOR, REAR TOP VIEW

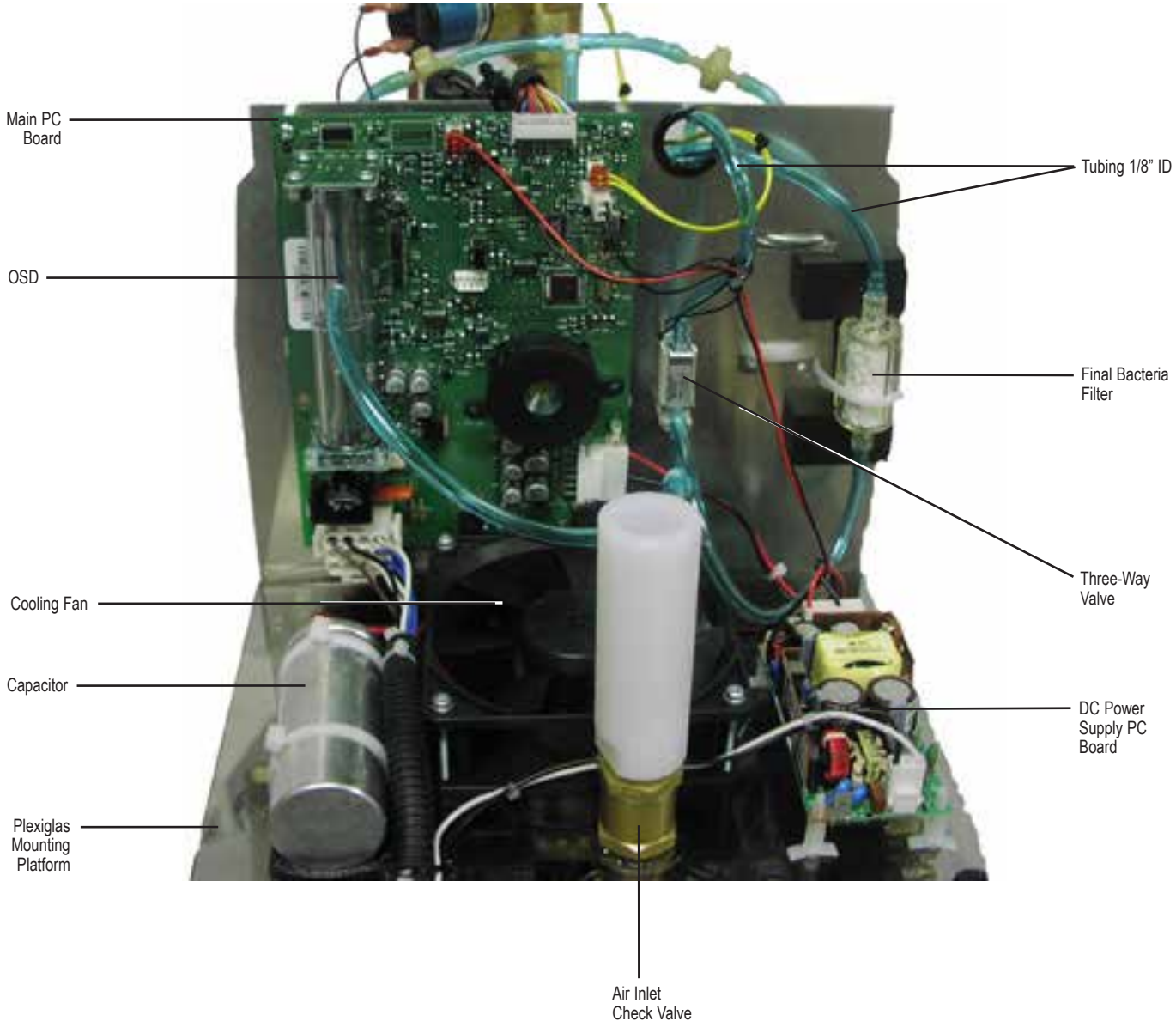


FIGURE 13 - INTERIOR, COMPRESSOR

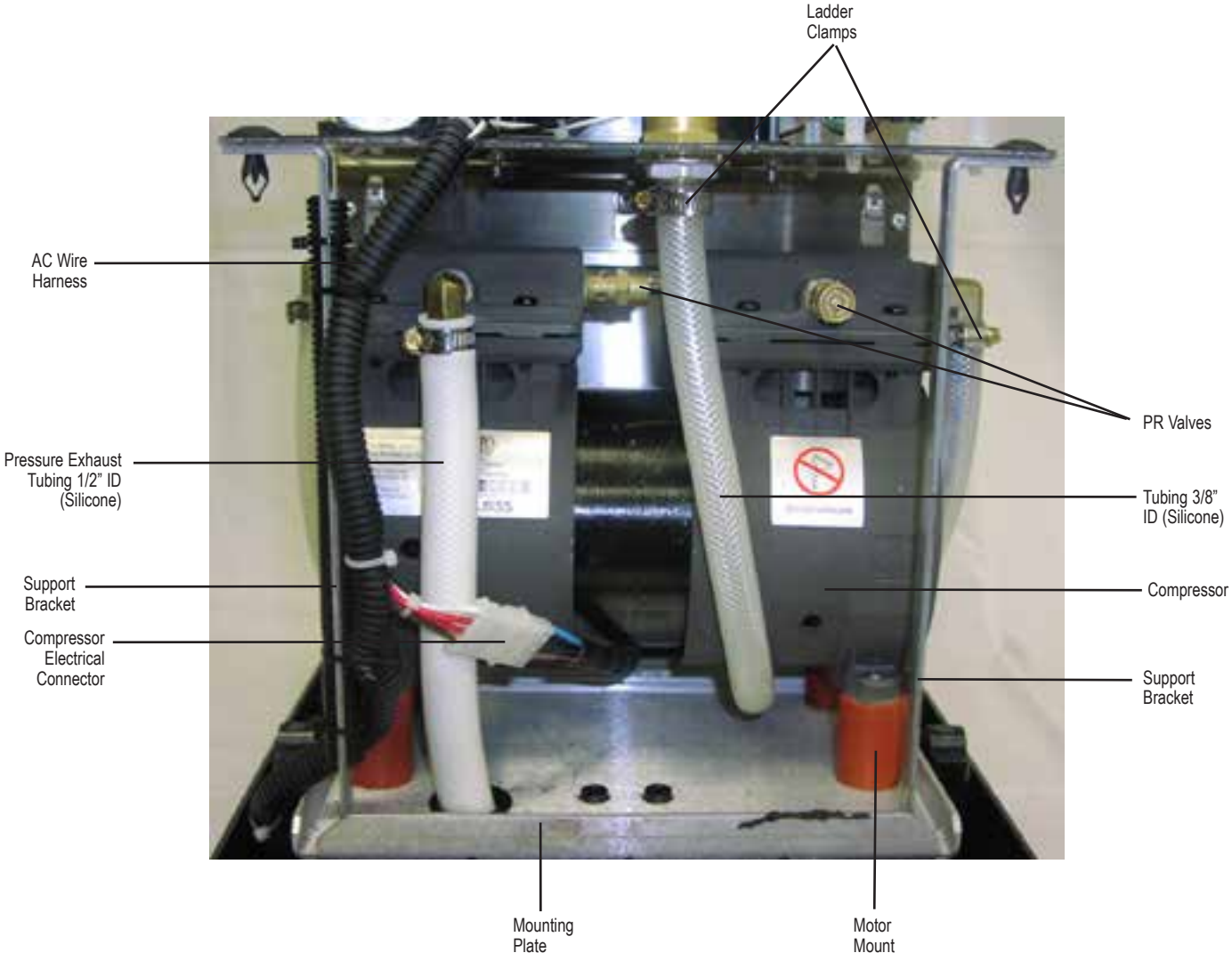


FIGURE 14 - INTERIOR, REAR LOWER VIEW EXHAUST MUFFLER & HARNESS (535D)

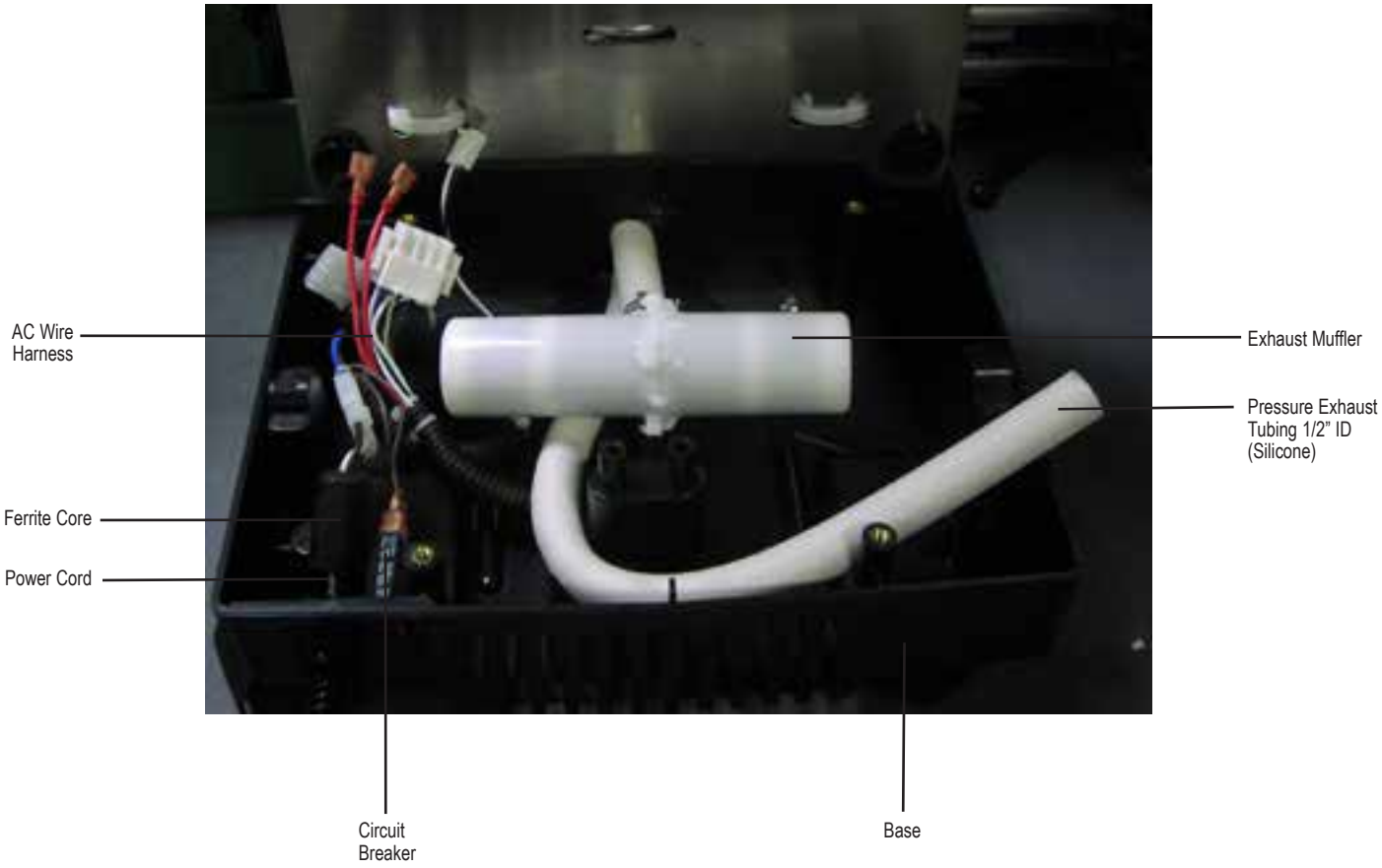


FIGURE 15 - INTERIOR, FOUR-WAY AND ROTARY VALVES

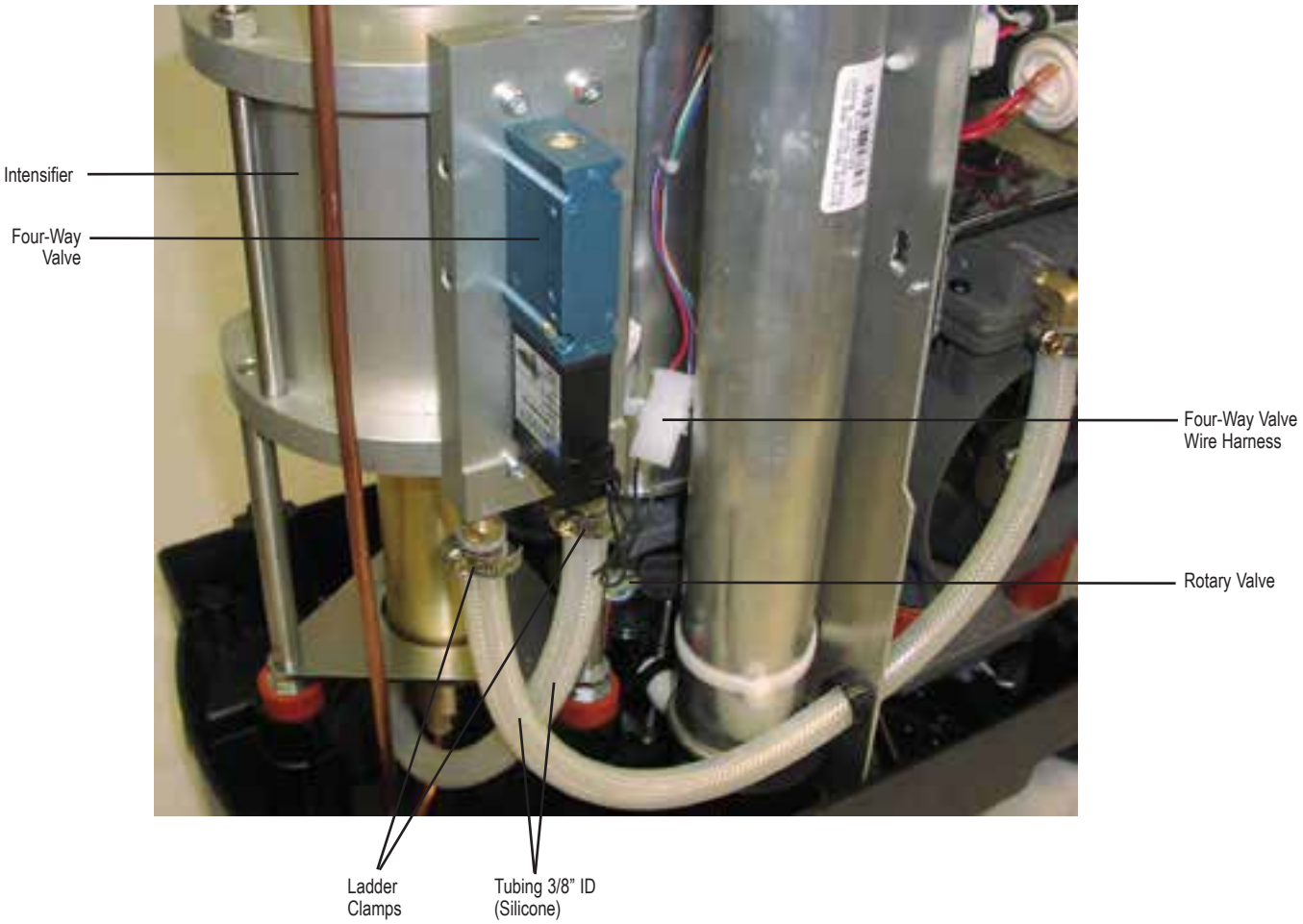


FIGURE 16 - INTERIOR, BOTTOM OF INTENSIFIER

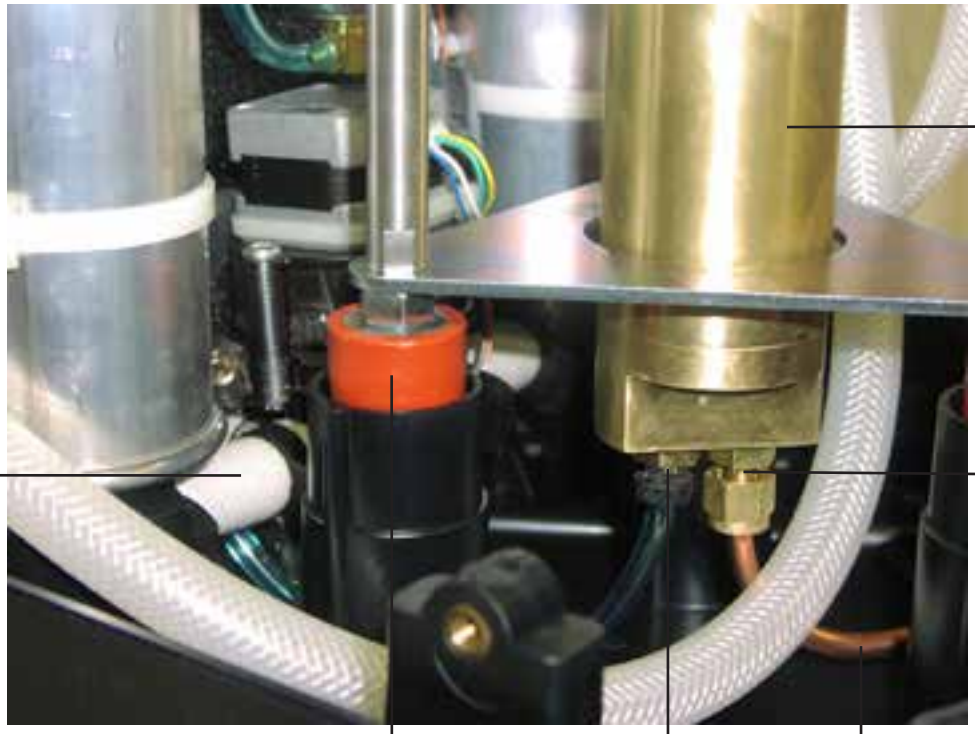


FIGURE 17 - INTERIOR, FRONT LOWER VIEW INTENSIFIER REMOVED

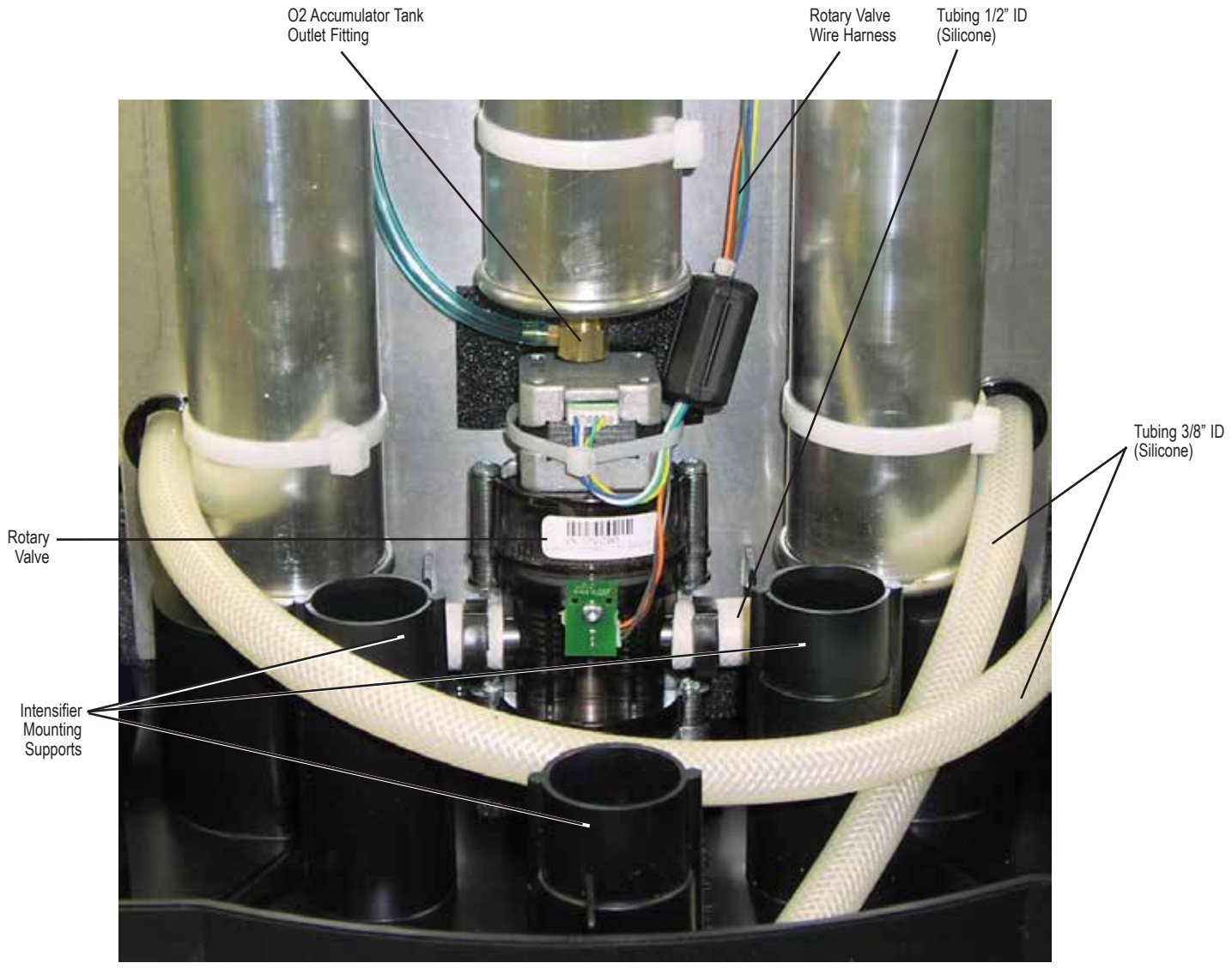


FIGURE 18- INTERIOR, INSIDE VIEW OF RIGHT COVER

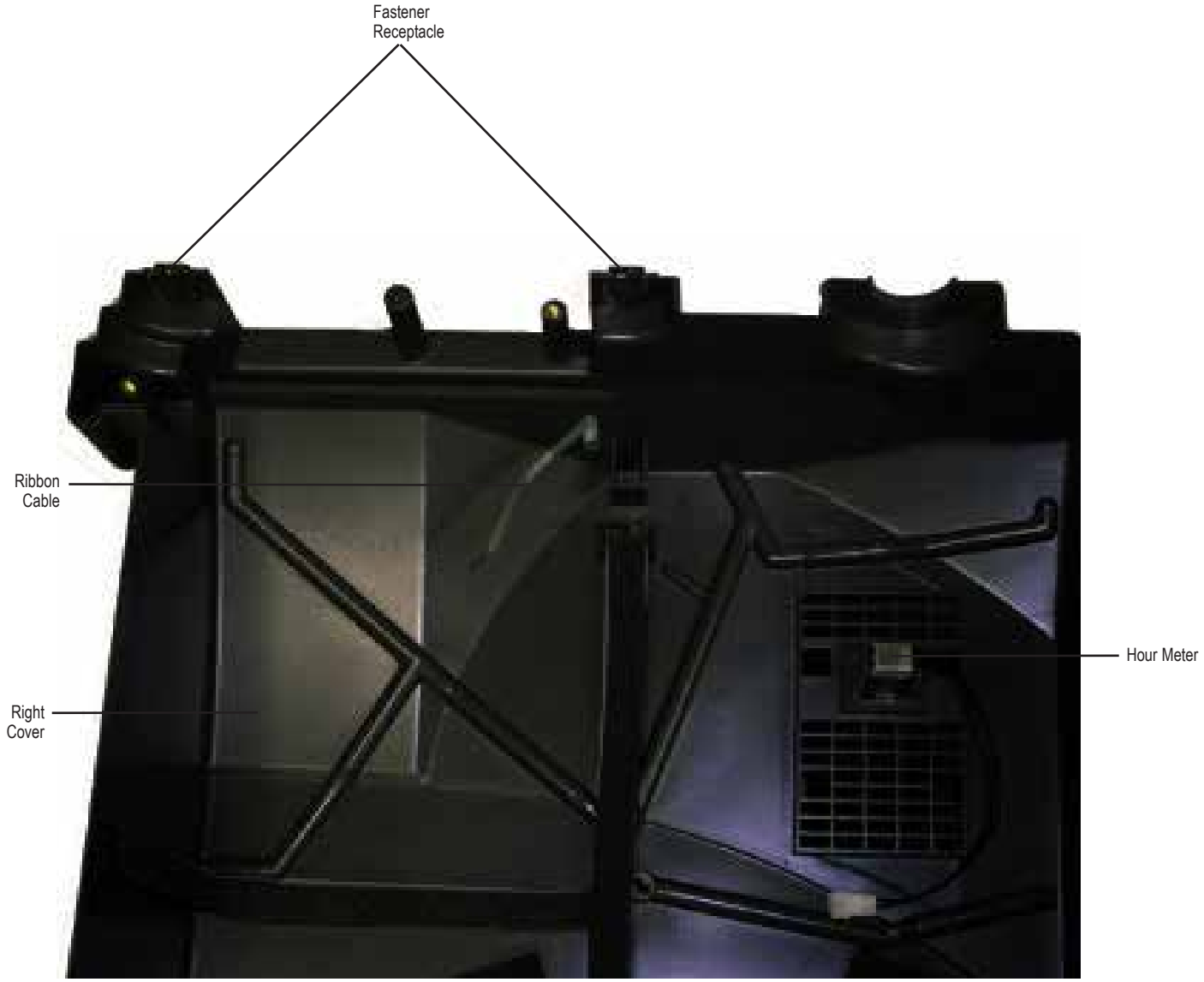


FIGURE 19 - INTERIOR, LEFT SIDE VIEW

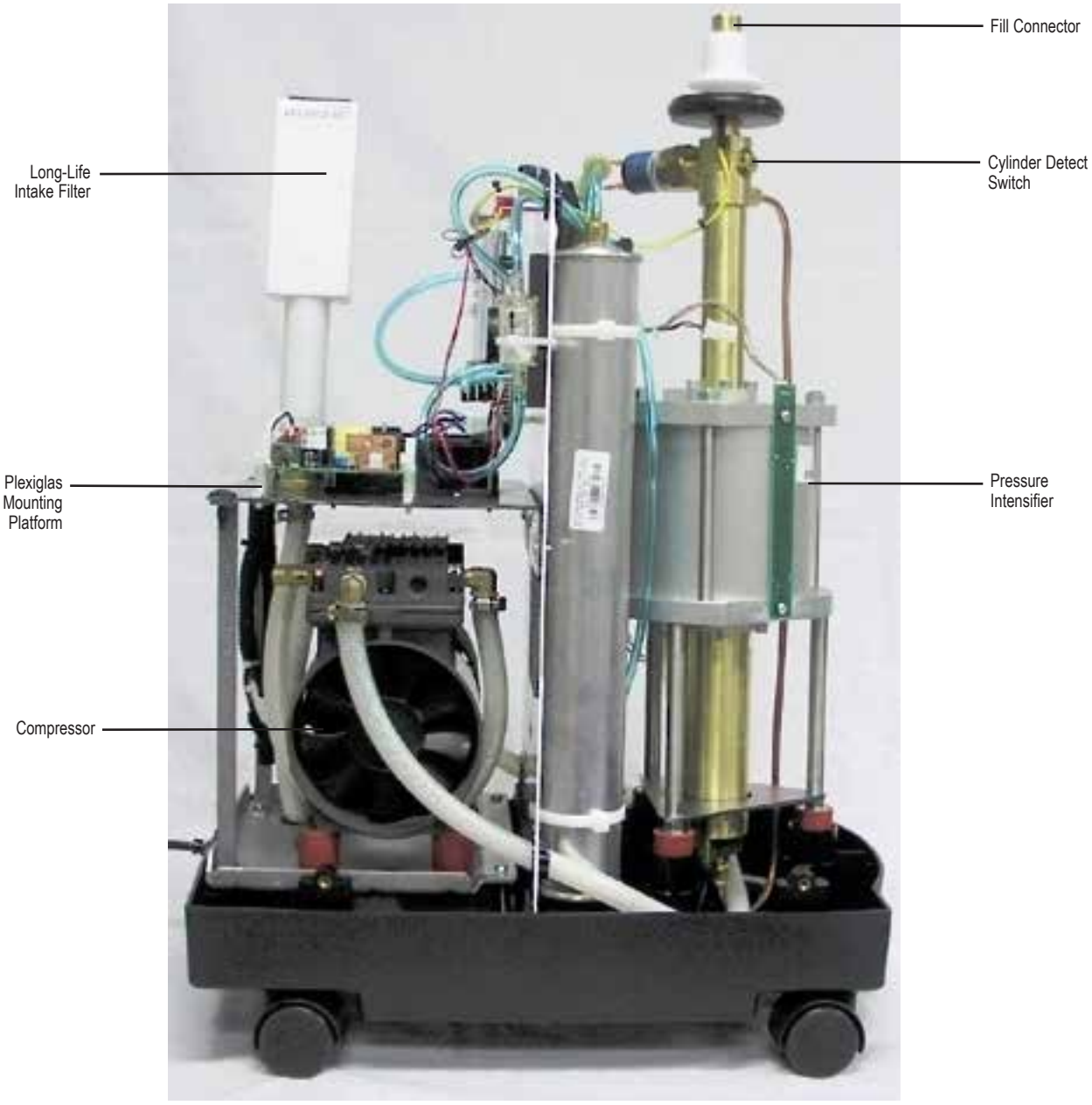


FIGURE 20 - INTERIOR, INTERNAL REAR VIEW

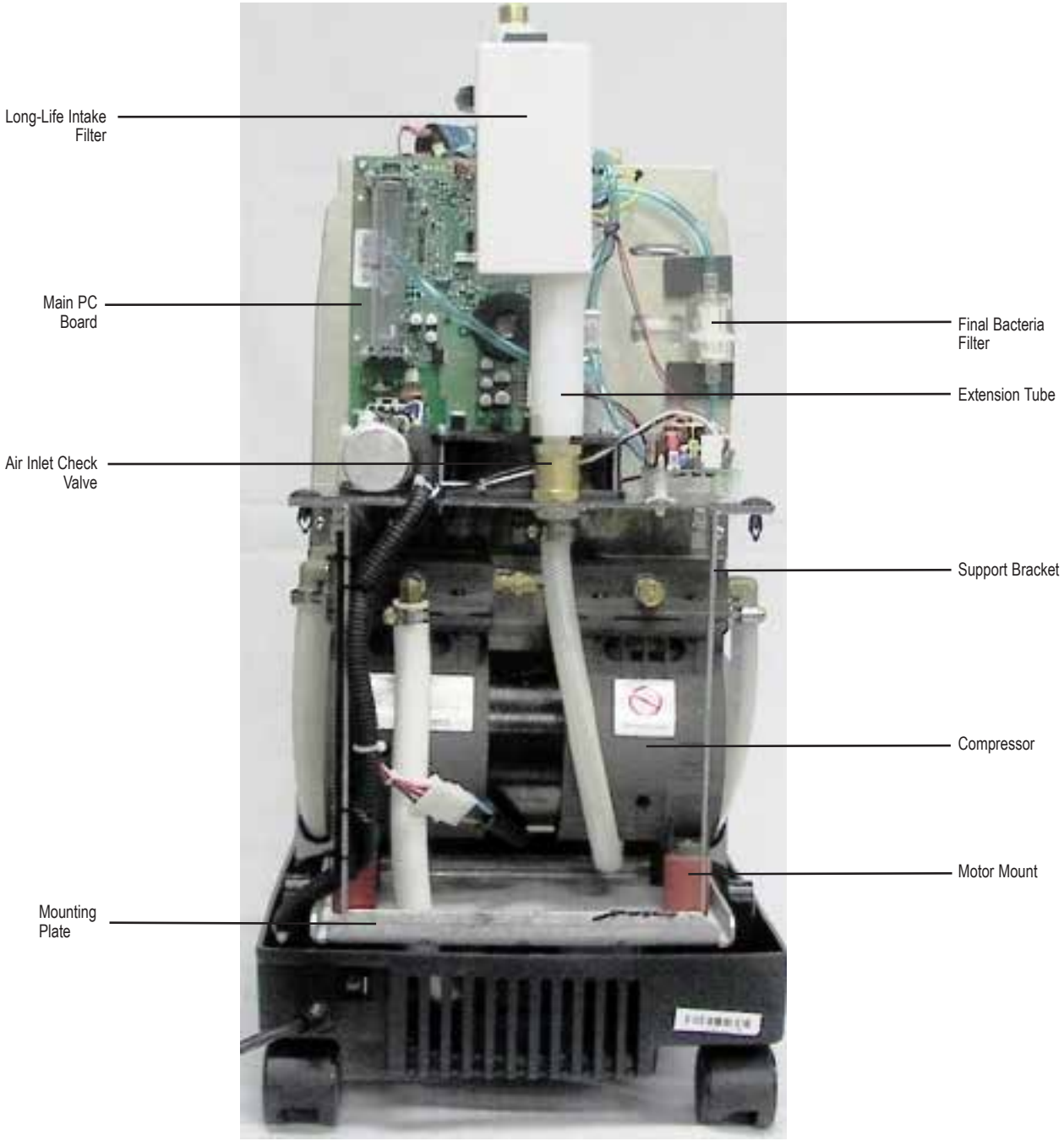


FIGURE 21 - PNEUMATIC DIAGRAM

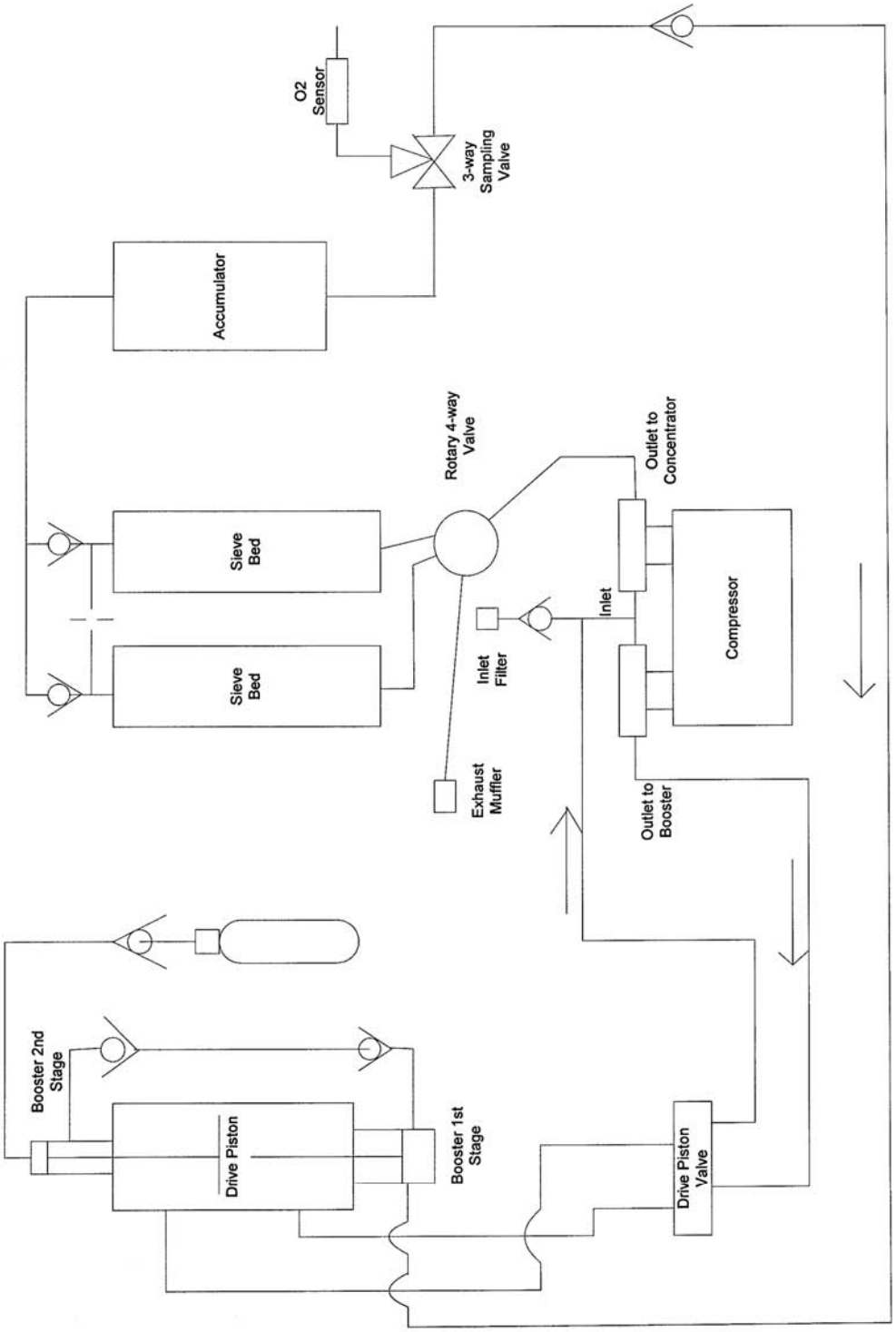
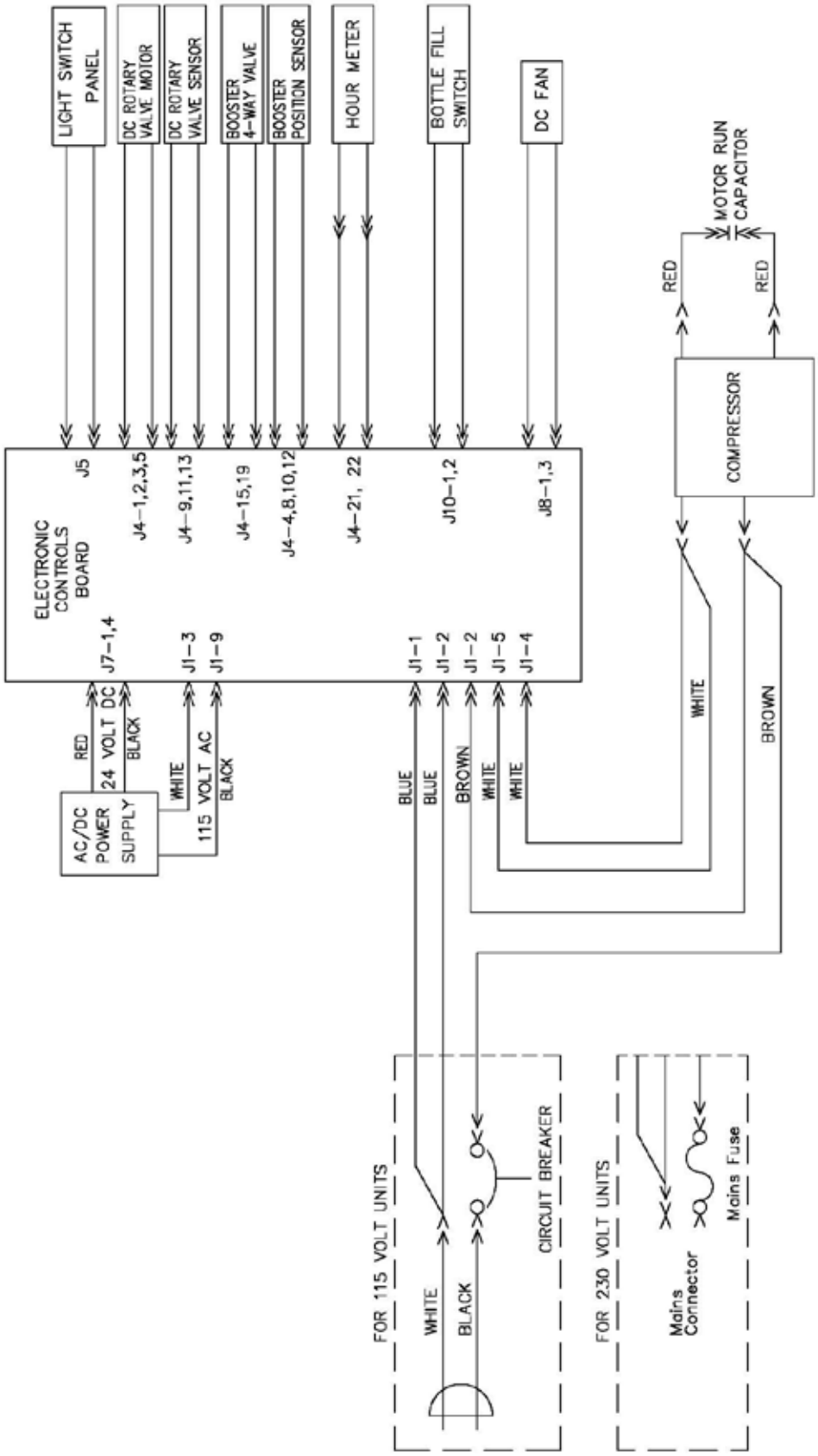


FIGURE 22 - WIRING DIAGRAM



ORDERING INFORMATION

When ordering components, instruction guides, or service manuals the following must be provided:

- Unit Catalog Number
- Unit Serial Number
- Part Number
- Quantity Required

DeVilbiss iFill Station Instruction Guide 535D—part # A-535D
English/Spanish/French

DeVilbiss iFill Cylinder Instruction Guide—part # A-535-CYL
English/Spanish/French

DeVilbiss iFill Station Instruction Guide 535I—part # SE-535I
English/Spanish/French/German/Italian/Dutch/Swedish/Finnish/Danish/Norwegian/Greek

DeVilbiss iFill Cylinder Instruction Guide—part # SE-535-CYL
English/Spanish/French/German/Italian/Dutch/Swedish/Finnish/Danish/Norwegian/Greek

DeVilbiss iFill Station Service Manual—part # LT-1929
English

DeVilbiss iFill Station Service Manual—part # LT-1929-FR
French

DeVilbiss iFill Station Service Manual—part # LT-1929-DE
German

Orders may be placed by calling:

- Customer Service 800-338-1988
- Warranty parts - U.S.A. 800-338-1988
- International Department 814-443-4881
- Europe +49-(0)-621-178-98-0

PARTS RETURN AND ORDERING POLICY

ALL DEFECTIVE COMPONENTS THAT ARE STILL UNDER WARRANTY MUST BE RETURNED TO THE FACTORY IN SOMERSET, PA WITHIN 30 DAYS AFTER SHIPMENT OF THE NEW COMPONENTS. IF THE COMPONENTS ARE NOT RECEIVED WITHIN THIS PERIOD, AN INVOICE WILL BE ISSUED TO YOUR ACCOUNT.

REBUILT EXCHANGE PARTS PRICING IS AVAILABLE ONLY WITH THE RETURN OF DEFECTIVE PARTS WITHIN 30 DAYS. COMPONENTS WILL THEN BE BILLED AT THE REBUILT COST; THERE WILL BE A CHARGE FOR SHIPPING. IF THE DEFECTIVE COMPONENT IS NOT RECEIVED WITHIN 30 DAYS, THEN A NEW COMPONENT INVOICE WILL BE ISSUED TO YOUR ACCOUNT. COMPONENTS THAT ARE OUT OF WARRANTY AND NOT ON A REBUILT/EXCHANGE PROGRAM DO NOT HAVE TO BE RETURNED TO THE FACTORY.

Before returning parts or units to the factory, call the DeVilbiss Healthcare Customer Service Department (800-338-1988 or 814-443-4881) to obtain a return authorization number. Include in the package a note indicating the return authorization number along with your company name, address, phone number, and account number. The return authorization number should also be written on the outside of the package.

To expedite your order for warranty or non-warranty parts, the following information should be given to the representative:

- Catalog number
- Serial number
- Hour meter reading for iFill
- Account number
- Company name and address
- Description of problem

PARTS LIST

Tools and Accessories	
Oxygen Analyzer	R217P62 or R218P12
Test Magnets	535D-618

Components	535D	535I
Accumulator Tank	535D-601	535D-601
Bracket Support	535D-633	535D-633
Cabinet Parts		
• Base	535D-607	535I-607
• Cradle/Bottle Holder Assembly	535D-608	535D-608
• Fill Connector Cover	535D-606	535D-606
• Left Cover	535D-612	535D-612
• Right Cover	535D-613	535D-613
Cable Tie, (Sieve Beds) (4 each)	505DZ-617	505DZ-617
Capacitor, Motor Start/Run	535D-616	MC44I-626
Carton w/ Shipping Inserts	535D-603	535D-603
Caster, Non-locking (4 each)	501DZ-603	501DZ-603
Check Valves		
• Bed Check Valve (2 per package)	PVO2D-607	PVO2D-607
• Inlet Check Valve	535DD-608	535DD-608
• Purge Harness Assembly	535D-602	535D-602
Circuit Breaker	515DZ-615	See Fuse
Cooling Fan	535D-634	535D-634
Compressor	535D-604	535I-604
Compressor Rebuild Kit	515ADZ-643	515ADZ-643
Compressor Mounting Plate	535D-614	535D-614
Dust Cap (for cylinder nipple)	PD1000A-627	PD1000A-627
Exhaust Muffler	515A-705	515A-705
Fasteners 1/4 Turn		
• Stud (Cradle screw)	535D-610	535D-610
• Retainer (Washer)	535D-611	535D-611
• Receptacle (Stud holder)	535D-609	535D-609
Filters		
• Cabinet Air Inlet Filter (6 pack)	535D-605	535D-605
• Long-Life Intake Filter	515DZ-605	515DZ-605
• Final Bacteria Filter	535D-615	535D-615
Fuse Package 2.5 Amp	see Circuit Breaker	535I-615
Grommet	535D-632	535D-632
Hoses		
1/8” ID (Blue) (4’ Lg)	444-554	444-554
3/8” ID (Silicone) (4’ Lg)	535D-619	535D-619
1/2” ID (Silicone) (2’ Lg)	505DZ-634	505DZ-634
Hose Clamps		
• Plastic (1/2” ID Hoses) (20 each)	444-538	444-538
• Ladder Clamp (1/2” ID Hoses) (1 each)	444-566	444-566

Components	535D	535I
Hour Meter	PV5LD-617	PV5LD-617
Labels		
• Indicator LED Panel Label	535D-620	535D-620
• Instruction Label	535D-626	535D-626
Mounts		
• Compressor Mounts (4 each w/4 nuts)	505IZ-609	505IZ-609
• Intensifier Mounts	535D-627	535D-627
Nut (Compressor Mounting) (4 each)	303DZ-630	303DZ-630
PC Boards		
• Main PC Board	535D-622	535D-622
• DC Power Supply PC Board	535D-621	535D-621
Power Cord	PV5LD-618	N/A
Power Cord Strain Relief	505DZ-645	N/A
Pressure Intensifier	535D-628	535D-628
Screws (Cover) (6 pack)	303DZ-628	303DZ-628
Screw Rivet	535D-635	535D-635
Sieve Bed (1 each)	501DZ-619	501DZ-619
Valves		
• Four-Way	535D-629	535D-629
• Rotary	535D-630	535D-630
• Three-Way	535D-631	535D-631
Wire Harnesses		
• AC Wire Harness	535D-623	535I-623
• DC Harness	535D-625	535D-625
• Board Interconnect Harness	535D-624	535D-624

SPECIFICATIONS

DeVilbiss iFill Personal Oxygen Station

Operating Temperature: ..... 41º to 95ºF (5º to 35ºC)

Operating Humidity Range: ..... 15 to 95% R.H. non-condensing

Operating Altitude: ..... 0 to 6,562 Feet (0 to 2,000 Meters)

Storage Temperature Range: ..... -40ºF to +140ºF (-40ºC to +60ºC)

Storage Humidity Range: ..... 10 to 95% non-condensing

Electrical Rating:

535D ..... 115V~ 60Hz 4.1 Amps

535I ..... 230V~ 50Hz 2.0 Amps; 220V~ 60Hz 2.7 Amps

Operating Voltage Range:

535D ..... 97 – 132V~ 60HZ

535I ..... 187 – 264V~ 50/60Hz

Power Range (when filling M6 cylinder):

535D ..... 400 Watts Average @ 115V~ 60 Hz

535I ..... 400 Watts Average @ 230V~ 50 Hz

Oxygen Purity: ..... 93% O2 ± 3%

Dimensions: (including casters) w/o cylinder ..... 12.25”W x 28.5”H x 22.5”D

Weight: ..... 66 lbs

Shipping Weight: ..... 76 lbs

This unit is classified as nonprotected (ordinary equipment) per EN60601-1 ..... IPX0

Approvals:

535D ..... CAN/CSA-C22.2 60601.1-M90 - CSA

535I (50Hz only) ..... EN60601-1 - TUV

Specifications subject to change without notice.

iFill Oxygen Cylinder typical Fill Times

NOTE– *All filling times are approximate and may vary depending on altitude and environmental conditions.*

Typical cylinder fill time from empty to 2,000 +/- 200 psig are as follows:

M4 (0.7 L)	60 Minutes
M6 (1.0 L)	75 Minutes
ML6 (1.2 L)	90 Minutes
C (1.8 L)	130 Minutes
D (2.9 L)	215 Minutes
E (4.7 L)	350 Minutes

NOTE- *Degradation of performance may occur if unit is operated outside of specified operating parameters.*

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LT-1929 Rev. D