Pureline®

OXYGEN CONCENTRATORS

M6000 & M6100
Operators Manual

Model M6000
*Shown with optional vaporizer

Model M6100
*Shown with optional vaporizer

SUPERA | ANESTHESIA INNOVATIONS

For Veterinary Use Only

Examination and Preparation for Use

Thank you for ordering an Supera Anesthesia Innovations anesthesia machine!

We are delighted to have you as a Supera Anesthesia Innovations customer and want you to be completely satisfied with your purchase. Please inspect the contents of your order to see if everything is as you expected. Should anything not be exactly right or if anything was damaged in shipping, please contact your sales representative right away for help.

Our goal is to make your new anesthesia machine as easy to use and care for as possible.

This device is meant to be operated under the normal supervision and control of a veterinarian trained in its use. However, you need to know more about this device than just how to operate it.

Please read this manual in its entirety before using the anesthesia machine.

If you have any comments or questions, we welcome the opportunity to address them.

Please contact us directly at 877–620–1500.

Thank you!

Brian Lawson
President,
Supera Anesthesia Innovations

Proudly Designed and Made In Oregon, USA

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Machine Assembly

*** NOTE: THIS REQUIRES TWO PEOPLE TO SAFELY ASSEMBLE ***

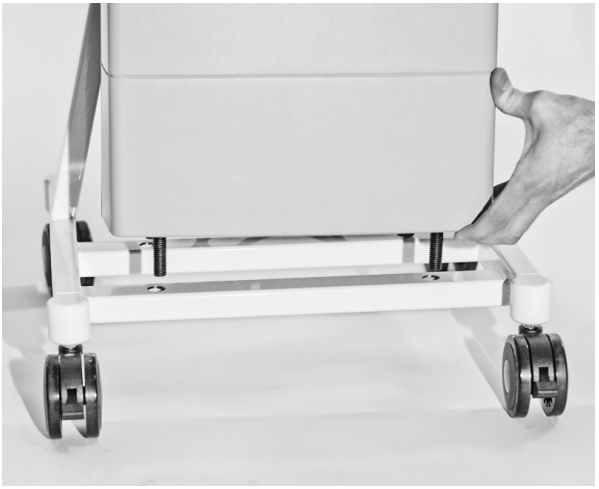
1. Carefully unpack the top assembly and frame from the box

2. Align the top to the frame as shown.

NOTE: The frames base has two cross bars with holes in them for mounting the concentrator. That is the front of the frame.

3. Assemble the top assembly with the frame by installing the two 1/4-20 X 1 3/4” long screws and washers provided.

4. Tighten both screws with the 3/16” allen wrench provided VERY tightly.



1. Remove the oxygen concentrator from the box and guide the four threaded post into the frame

2. Install and tighten the nuts.

**** DO NOT OVER TIGHTEN THE NUTS, SNUG FIT IS ALL THAT IS NEEDED ****

1. Attach the green hose to the threaded fitting.

**** DO NOT OVER TIGHTEN ****

Model M6100 non-rebreathing anesthesia machine

Includes a stainless steel storage tray and 3/8” post bulkheads for mounting accessories (i.e. I.V. poles, multi-port manifolds, etc)

Pureline®
OXYGEN CONCENTRATORS

USER'S GUIDE
OC4000
OXYGEN CONCENTRATOR FOR VETERINARY USE ONLY

GLOSSARY OF SYMBOLS

I : ON (power switched on)

O : OFF (power switched off)

: Class II protection

: Do not expose to open flames

: Do not use oil or grease

: Technical information

: Consult the accompanying documents

: Keep in the vertical position

: Fragile - handle with care

: Oxygen concentration warning light

GENERAL SAFETY GUIDELINES

Only persons who have read and understood this entire manual should be allowed to operate the O2 concentrator

The WARNINGS below indicate a potential hazardous situation. If conditions are not avoided a situation could occur that results in serious injury or death.

- Oxygen is not a flammable gas, but it accelerates the combustion of materials. Do not use in explosive atmosphere. To avoid risk of fire and explosion the concentrator should be kept away from Flames, Heat sources, Incandescent sources, Smoking Materials, Matches, Oil, Grease, Solvents, Aerosols, etc.
- Use of other accessories not described in this User's Guide are not recommended.
-
- No modification to the equipment is allowed.
- Device must have power to operate. In the event of power loss and for continued operation a backup source is recommended.
- DO NOT disassemble due to danger of electrical shock. Refer servicing to qualified service personnel.

The CAUTIONS below indicate a potentially hazardous situation. If conditions are not avoided a situation could occur that results in property damage or minor injury or both.

- Use the power cord provided, and check that the electrical characteristics of the power socket used match those indicated on the manufacturer's plate on the rear panel of the device.
- We recommend against the use of extension cords and adapters, as they are potential sources of sparks and fire.
- The concentrator has an audible alarm to warn the user of problems. In order that the alarm may be heard, the maximum distance that the user can move away from it must be determined to suit the surrounding noise level.
- Do not use in a specifically magnetic environment (MRI, X-ray, etc.). May cause device malfunction.
- This unit may be equipped with a polarized plug. That is one blade wider than the other. If it does not fit into the outlet, reverse the plug. If it still does not fit, contact a qualified electrician. Do not defeat this safety feature.

CONFORMITY WITH IEC60601-1 (2nd Edition)

"The manufacturer, assembler, installer or distributor are not considered to be responsible themselves for the consequences on the safety, reliability and characteristics of a device unless the:

- Assembly, fitting, extensions, adjustments, modifications or repairs have been performed by persons authorized by the party in question.
- Electrical installation of the corresponding premises complies with local electrical codes. (e.g. IEC / NEC).
- Device is used in accordance with the instructions for use.

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

1.1 METHOD FOR WASTE DISPOSAL

All waste from the device (Patient Circut, Filters, Etc.) must be disposed of using methods appropriate to the civil authority of the location where disposed.

2.0 METHOD FOR DISPOSING OF DEVICE

This device has been supplied by an environmentally aware manufacturer. A majority of the parts in the device are recyclable.

Follow local governing ordinances and recycling plans regarding disposal of the device or components normally used in operation. Any accessories not original to the device must be disposed of in accordance with the individual product markings for disposal.

1. UNPACKING and PACKAGING

The Oxygen Concentrator is packaged to protect the device from damage while being transported and stored. Check for damage to the packaging. After device is removed from the package inspect for damage. If damage is detected please contact your equipment provider. Operating environmental condition guidelines are discussed later in another section of this User's Guide.

2.1. Front panel (Fig. 2.1)

1 - **I**/0 (ON/OFF) switch
2 - Indicator lights
3 - Oxygen product outlet
4 - Circuit breaker
5 - Pre-set flow meter (non-adjustable)

3.1 Turning on device

a. Plug the power cable into a power outlet (Fig. 3.3) of the correct voltage and frequency as defined on the manufacturer's technical label (Fig 2.2)

115V (Fig 3.3)

b. Press the power switch **(I/0)** (item 1 in Fig.2.1) to the ON position **(I)**. The green indicator light flashes until concentration is achieved.

IMPORTAINT!

TURN THE ANESTHESIA MACHINES OXYGEN FLOW METER ON TO A MINUMUM FLOW RATE OF 0.25 LPM

A "NO FLOW" ALARM MAY SOUND IF THE FLOW METER ISN'T OPEN

3.2 Turning off device

At the end of the usage, press the **I/**0 Switch to place it in the 0 (OFF) position to stop the device. The oxygen enriched air flow continues for approximately one minute after the device is stopped.

4. CLEANING - MAINTENANCE

Only the outside of the concentrator is to be cleaned. Use a damp sponge or cloth with water only.

Acetone, solvents or any other inflammable products must not be used.
Do not use abrasive powders.

FILTERS - IMPORTAINT!

Fine Filter (#1 fig. 4.1)
and Cabinet Filter Cleaning (#2)

The cabinet filter (#2 Fig.4.1) must be cleaned in warm water and household detergent weekly or after approximately 100 hours of use. Dry before reinstalling. More frequent cleaning is recommended in dusty environments.

Cabinet filter: p/n OC4000-1

The fine intake filter should be replaced annually or every 2000 hours of use. More frequently dusty /dirty environments.

Fine filter p/n OC4000-2

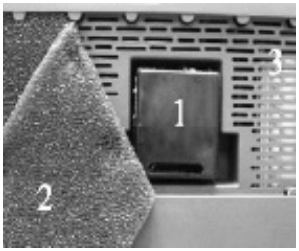


Fig. 4.1

1. Filter / Silencer
2. Cabinet filter
3. Ventilation grill

Note: Shown with grate removed

4.3. Maintenance

NO INTERNAL MAINTENANCE IS REQUIRED OR SHOULD BE PERFORMED.

OPENING THE CASE WILL VOID THE WARRANTY.

5. USEFUL INFORMATION

5.1. Accessories and spare parts

The accessories used with the O2 concentrator must:

- be oxygen compatible.
- be biocompatible.

The connectors, tubes must be designed for oxygen usage.

5.2. Materials in direct or indirect contact with the product output

Concentrator casing	ABS
Power Cord	PVC
Cabinet Air Filter	Polyester
I/0 (On/Off) switch	Nylon
Casters	Nylon
Oxygen product outlet	Aluminum
Printed labels	Polycarbonate
Pipe/Tubing	Aluminium, PVC, polyurethane or silicone

5.3. Operating principle

The compressor sends filtered room air to a solenoid valve, which allows compressed air to pass to the column in production. The columns contain a molecular sieve, whose function is to adsorb the nitrogen and thus allow oxygen to pass. The oxygen enriched product is then directed through a pressure reducing valve continuing to the oxygen product outlet fitting. During this time, the column which is being "regenerated" is connected to the ambient air and flow of oxygen enriched product is passed through it (from the column "in production"). In this way, when one column is in production, the other is in a nitrogen desorption or "regeneration" phase. The oxygen enriched product finally passes through a final product filter located prior to the oxygen outlet fitting.

5.4. Alarms - Safety devices - Indications

5.4.1. Alarms

- No voltage detection

In the event of a loss of mains power, an intermittent audible alarm is activated and the green light turns off. Test alarm by actuating the I/0 (ON/OFF) switch when the power cord is not plugged into the wall outlet.

- Process fault

In the case of a process fault, a visible and audible alarm is activated (continuous red light or lighted alarm and audible alarm).

- Oxygen Concentration

If the oxygen concentration level falls below the required range the red light comes on and the green light goes out. After a 15 minute delay the audible alarm will sound.

5.4.2. Safety devices

- Compressor motor

Thermal safety is ensured by a thermal switch situated in the motor winding (145 ± 5 °C).

- Electrical protection

A 5 amp circuit breaker is incorporated into the front cabinet of all models.

Class II devices with insulated casings (EN60601-1 standard)

- Safety valve

This is fitted on the compressor outlet and is calibrated to 2.7 bar (40 psig).

5.4.3 Indicators

- The green indicator light (Fig.5.1) indicates that power is applied to the device. When first turned on the indicator will flash until correct oxygen concentration is achieved. At that time the green indicator will remain illuminated and the device is ready to provide oxygen enriched air to the patient.

5.4.3 Indicators (continued)

- The red indicator warns of a process fault. One event that can cause the red indicator to be illuminated is low oxygen concentration. The low oxygen concentration red indicator will light when oxygen concentration falls below a predetermined set point. Another event that will cause the red indicator to light is a blocked oxygen flow. In this case the green indicator and red indicator will be illuminated simultaneously.

5. 5. OCSI (oxygen concentration status indication module) function

5.5.1. Operating principle

The oxygen monitor (Item 2 Fig 2.1) is an electronic module capable of checking the effective oxygen concentration supplied by the concentrator.

The oxygen monitor measures the concentration and activates an audible and visual alarm if it falls below the alarm set point percentage.

(Refer to Section 5.4 for information on the operation of the indicators and alarms for the OCSI function)

(Fig. 5.1)

5.5.4 Maintenance of the Device Alarms

No special maintenance is required. The alarm set-point is factory set and the setting cannot be adjusted. All models are set at 84%.

The equipment supplier verifies that the device is still operating correctly when the routine checks are performed.

5.6. Technical characteristics

Dimensions:
LxWxH: 36 x 23 x 58.5 cm (14 x 9 x 23 in.)

Caster diameter: 3.8 cm (1.5 in.).

Weight: 14.5 kg. (32 lbs) varies by model.

Noise level conforms to ISO 8359 Standards.

Oxygen Concentration - USP93%

- at 2 l/min: >90%.
- at 5 l/min: 90%. (+6.5%/-3%)

(Values at 21°C and at one atmosphere pressure).

Maximum flow: 5 lpm.
The variation of the maximum flow does not exceed ± 10 % of the indicated value when a back pressure of 7 kPa (1 psig) is applied to the output of the device. The maximum outlet pressure is 50 kPa (7 psig).

Electrical power supply:

Rating:	115/230V 60Hz	230V 50Hz
Average Power:	330W(avg)	300 W(avg)
Protection Class:	Class II	Class II
Mains Protection:	5A	5A

Filters:
At the rear of the device: a cabinet air filter.
At the compressor input: an inlet air filter, 5 µm, located behind the cabinet air filter.

Air circulation
A tubeaxial fan cools the compressor compartment.

Environmental limit conditions
The performances of the device (especially the oxygen concentration) are quoted at 21°C (70°F) and one atmosphere. They may change with temperature and altitude.

- The device must be stored, transported and used in the vertical position only.
- Ambient temperature of between 5°C and 40°C (40°F to 104°F) operation.
- Storage temperature from -20°C to 60°C (-4°F to 140°F).
- Relative humidity of between 15% and 95% operation and storage, both non-condensing.
- Altitude(21°C): Up to 2,286m (7,500ft) without degradation; Consult your equipment provider for further information regarding 2,286m to 4000m (7500 to 13000 ft)
- Complies with EN60601-1 standard; spilling a glass of water.

5.7. Standards

EN 60601-1[UL60601-1:2003],
CAN/CSA-C22.2 No.601.1-M90 w/A1&A2:
Electrical Safety- Medical Devices.

EN60601-1-2:2001
Electromagnetic Compatibility

PREVENTIVE MAINTENANCE

a. Wash cabinet filter weekly.
b. Replace filter every 2000 hours or more often depending on environment.
c. Check oxygen concentration every 15,000 hours or 3 years of operation to verify the continuing OCSI function.

Use original parts only

Contact Supera Anesthesia Innovations for additiional information

877-620-1500

5.8. Troubleshooting.

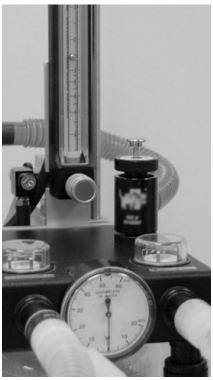
Observations	Possible Causes	Solutions
The **I**/0 (ON/OFF) button is in the **"I"** (ON) position but the device does not operate. The audible alarm sounds intermittently.	Power cord is not correctly plugged into the wall outlet. Power failure.	Check the cable connection. Check the circuit breaker (5) on the front of the unit; Reset if necessary.
Red light remains lighted.	Oxygen concentration is too low.	Contact your equipment supplier.
The alarm test does not work. See 5.4.1.	Capacitor is not charged Internal electrical fault.	Backup capacitor has discharged operate unit for approximately 10 minutes and retest Contact your equipment supplier.
The compressor operates and the **I**/0 (ON/OFF) button is in the **"I"** (ON) position but the green indicator is not lighted.	Faulty indicator.	Contact your equipment supplier.
The **I**/0 (ON/OFF) button is in the **"I"** (ON) position but there is no flow. The audible alarm sounds continuously.	Pneumatic connection broken or other pressure problem.	Stop the device by pressing the **I**/0 (ON/OFF) button and contact your equipment supplier.
The **I**/0 (ON/OFF) button is in the **"I"** (ON) position, the compressor is operating and there is a flow but the audible alarm sounds continuously.	Internal electrical fault. Pneumatic circuit fault.	Stop the device and contact your equipment supplier.
The compressor stops in mid-cycle, then starts again after a few minutes.	Dirty Filters, blockage Fan is not working.	Clean cabinet filter. Restart. Clear blockage. Restart Reset circuit breaker. If the device does not start, contact your equipment supplier.

Maintenance Items

Cabinet Air Filter:	**Ref: OC4000-1;**	**Wash weekly; Replace as needed.**
Inlet Air Filter:	**Ref: OC4000-2;**	**Replace minimum every 2000 hours (depending on environment)**

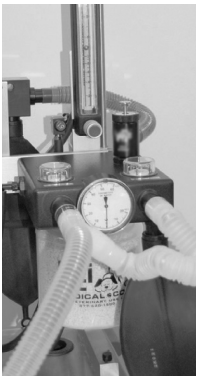
Anesthesia Machine Operation
&
Optional Accessories

Safety Pop Off Valve



Normal Operation
Screw-down pop-off valve open with push-button valve up

In this position the breathing circuit is fully open. The manometer should read "0" with slight fluctuations during respiration. Squeezing the rebreathing bag should not create pressure in the breathing circuit.



User Error Safety (pop off valve left closed)
Screw-down pop-off valve closed with push-button valve open

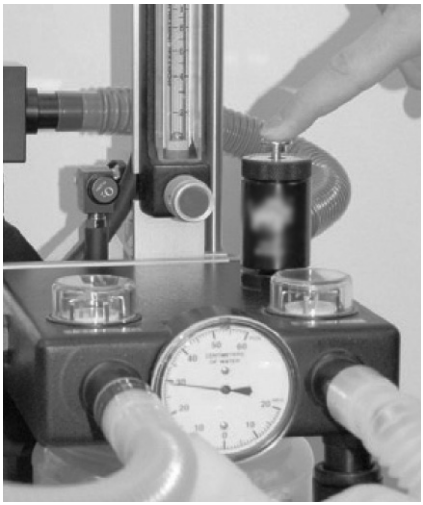
In this position the breathing circuit is partially closed but will leak at 0.5 cm H2O. This will not cause injury to the patient, however depressing the push-button valve to ventilate the patient would allow excessive pressure and could injure the patient.

This setting is designed to prevent patient deaths associated with leaving the pop-off valve closed but it is not recommended for normal operation.

Manual Ventilation
Screw-down pop-off valve open with push-button valve depressed.

In this position the breathing circuit is closed but will leak at pressures of 20-25 cm H2O. This allows enough pressure to manually ventilate the patient without risking excessive pressure (which can cause pulmonary damage and death).

Machine Leak Test



1. Close pop off valve (turn knob clockwise)

2. Depress plunger valve in the center and hold

3. Plug the end of the rebreathing hose

4. Add pressure to the system until the manometer reads 30 cmH20

Hold the pressure for ten seconds. If it doesn't drop faster than 1 cm H2O per second, the machine is sealed enough for use.

If it does drop faster, check your rebreathing bags and hoses for leaks. Glass cleaner works well for this. Make sure the canister and clear valve domes are tight

Auxiliary & Main Oxygen Switch

MAIN Switch Position

With the switch in the “MAIN” position the supply of oxygen to the anesthesia machine comes directly from the oxygen concentrator.

NOTE: It does not fill the “E” tank.

AUXILARY Switch Position

With the switch in the “AUX” position, the supply of oxygen to the anesthesia machine comes from “E” tank on the back of the machine or another source using the “E” tank adapter (p/n OC6050)

To use the “E” tank as a souce for oxygen, it must be turned on by rotating the valve on top of the tank counter-clockwise ***SLOWLY*** to open.

NOTE: The “E” tank must be filled (about 2100 psi) by your local oxygen supply company. The concentrator does NOT fill the tank.

Accessories

I.V. Pole (included)

Shown with optional universal control arm for Bain circuits

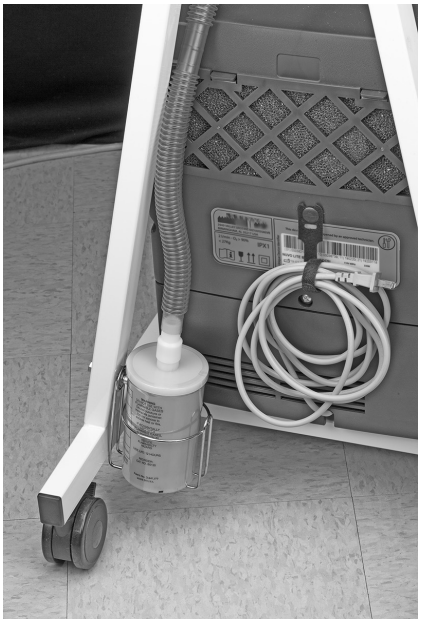
P/N MA2013 safety pop off valve (shown)

P/N MA2012 Regular pop off valve (not shown)

Features & Accessories

Bag & circuit organizer

Optional F-Air evacuation kit
P/N EVC555



Waste Gase Evacuation

Optional waste gas interface valve
P/N EVC630 for use with fan based evacuation systems like our p/n/ EVC3000

Optional waste gas interface valve
P/N EVC629 for use with vacuum pump based evacuation systems like our p/n/ EVC3100

Circuits

CIR518 - Non-Rebreathing Modified Jackson-Rees

The Non–rebreathing system connects to the common gas outlet of the anesthesia machine.

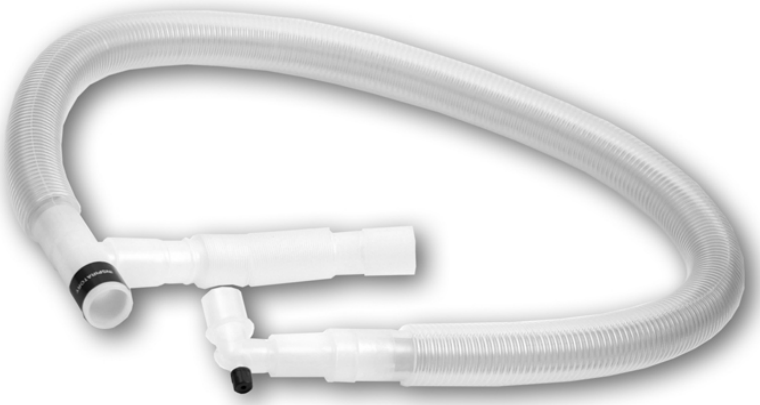
1. Disconnect the common gas outlet from the rebreathing head. (quick disconnect fittings)

2. Plug the 15mm male connector from the non–rebreathing system into the common gas outlet of the anesthesia machine.

3. Connect the blue exhaust port on the bag of the non–rebreathing system to the 19mm blue evacuation tubing connected to the waste gas interface device or to any other waste gas evacuation device (outside air, F–air canister, etc.)

Circuits

CIR529 & CIR529P Rebreathing Unilimb circuits



Unilimb design removes clutter and disorder from the anesthesia field. Patients exhaled breath acts as a thermal wrap to maintain the temperature and humidity of inspired gases. The swivel connector at the patient end eliminates kinking of the tubing.

This circuit attaches to the “Inhalation” and “Exhalation” ports on the rebreathing head (CO_2 Absorber)

P/N CIR529 Adult (blue inner tube)
Recommended for Patients weighing above 20kg

P/N CIR529P Pediatric (Pink or Green inner tube)
Recommended for Patients weighing under 20kg

MAINTENANCE

Anesthesia Machine

The Supera Anesthesia Innovations anesthesia machine should be serviced by a certified technician. Only certified service companies will have the factory specifications and access to original replacement parts.

Annual Preventative Maintenance Service
Service will include:
Pre–service low and high pressure test. Inspection and replacement of hoses, gaskets and seals as needed. Measure pressure relief valve resistance. Inspect unidirectional valves. Inspection of evacuation system. Inspection of oxygen system. Verification of vaporizer concentration output. Final low and high pressure test.

Contact Supera for a list of certified service companies.

Daily Inspection - Leak Test
Before each use check for pressure leaks in the machine. Also make certain the waste gas evacuation system is working properly.

Oxygen Concentrator
*See the operators manual that came with the concentrator.

Your machine includes an oxygen concentrator and the filters must be kept clean for proper operation.

There are two filters to monitor.

1. Coarse filter on the back of the machine. This can be washed with mild soap and water. DO NOT INSTALL UNTIL 100% DRY

2. Fine particle filter under the course filter. Replace during the annual PMS of the anesthesia machine. This is a replacement only filter.
Contact Supera for replacement. 877-620-1500

Failure to monitor the condition of the filters will void the warranty.

Warranty / Return Policy

Supera Anesthesia Innovations is proud to offer our customers the best warranty in the veterinary industry—a full ten years on the anesthesia machine and three years on the oxygen concentrator.

Supera LLC Limited Warranty

Supera LLC guarantees its products to be free of defects in design, materials, and workmanship from the date of purchase, ten years on the anesthesia machine and three years on the oxygen concentrator.

The Supera LLC Limited Warranty covers parts and construction of all products manufactured by Supera LLC in its USA manufacturing facility. If we find that a Supera machine does not operate as stated in the instructions and specifications that come with the product due to defects in design, materials, or workmanship, Supera will repair the unit or replace it with one of equal or greater value at no charge to the customer.

Specific Exclusions from this Warranty

The Supera Limited Warranty does not cover—and Supera LLC shall not be liable for—the following: (1) repairs and replacements required because of misuse, abuse, negligence, alteration, accident, freight damage, or tampering; (2) products that are not installed, used, and properly cleaned as required in the Supera LLC "Installation" and/or "Installation/Operation" manual applicable for the product; (3) products considered to be of a consumable nature such as rubber or plastic goods (4) accessories or parts not manufactured by Supera Anesthesia Innovations; (5) specially manufactured products; (6) damage caused by animals; (7) charges by anyone (including Supera Anesthesia Innovations authorized dealers) for adjustments, repairs, replacement parts, installation, or other work performed upon or in connection with such products which is not expressly authorized in writing in advance by Supera LLC; (8) products manufactured by other companies and resold by Supera LLC. This includes medical gas products. Any warranties on these items are controlled directly by the manufacturer of these items to the original purchaser. Information on these manufacturer's warranties will be enclosed with the applicable products. In addition, Supera LLC will furnish copies of any of the warranties controlled by any such manufacturers upon request.

For Warranty Service

Please contact Supera Customer Service at 877-620-1500 (toll-free in the USA) or +1 503 723 5068 (for local and International calls) or e-mail us at info@superavet.com.

One of our customer service representatives will be able to answer your questions and provide information on having your machine serviced under warranty by an authorized Supera technician or by returning the unit to Supera for warranty service.

SHIPPING POLICIES

1. Do Not Sign The Bill Of Lading Until You Have Inspected The Box Or Crate

2. Examine the box AS it is delivered and BEFORE the truck/driver leaves.

3. If there is any evidence of damage when it arrives, note it in detail with the phrase “possible concealed damage” on the bill of lading and immediately call the office for instructions before the truck/driver leaves if at all possible.

4. If there is obvious damage such as a hole in the box, a crushed box, etc., Refuse the shipment. The product will then go back to the freight company’s terminal where they are entirely responsible.

5. Open and inspect your product as soon as possible. DO NOT WAIT.

6. If you find damage, take as many photographs of everything as soon as you can and e-mail them to CS@superavet.com

7. Note: unless the following procedures are followed correctly and we are notified within ten (10) days, SUPERA LLC cannot accept any responsibility for the problems that may ensue.

DO NOT RETURN ANY DAMAGED GOODS TO SUPERA LLC WITHOUT PRIOR AUTHORIZATION OF SUPERA LLC AND THE CARRIER.

KEEP ALL PACKAGING!

DO NOT RETURN ANY DAMAGED ITEMS UNTIL SHIPPING INSTRUCTIONS ARE RECEIVED.

ALL CLAIMS MUST BE FILED WITHIN TEN (10) DAYS OF RECEIPT OF GOODS.

IF YOU HAVE ANY QUESTIONS CONTACT SUPERA DIRECTLY AT 503-723-5068.

DOCUMENTATION

Date purchased:

Purchased from:

Machine serial number:

Vaporizer serial number:

Machine service information

Service Date:
Service information:

Service Date:
Service information:

Service Date:
Service information:

Pureline®
OXYGEN CONCENTRATORS

SUPERA | ANESTHESIA INNOVATIONS

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