VETLAND
Medical Sales & Services, LLC

e2

Oxygen Concentrator

Revised February 2018

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Standard Equipment

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INSPECT BOX FOR SHIPMENT DAMAGE!

*****Notify shipping company if a damage claim needs to be filed.**
Take pictures of the box and damaged items.
Retain box and all items as evidence.

Vetland Medical will assist in any way possible in the event of loss or damage to merchandise and any subsequent claim against the carrier, but the responsibility for reporting such loss or damage and filing any claims remains with the customer.

INSPECT BOX FOR SHIPMENT DAMAGE!

Shipping
All merchandise is sold FOB Louisville, Kentucky. The purchaser accepts these terms upon the issuance of a purchase order. Under the terms of FOB Louisville, Kentucky, all goods become the property of the customer upon Vetland Medical's delivery to its designated freight carrier. It is the responsibility of Vetland Medical to convey the goods to the carrier and provide a clean Bill of Landing (when applicable) or proof of shipment. The customer is responsible for transportation costs.

Vetland Medical will assist in any way possible in the event of loss or damage to merchandise and any subsequent claim against the carrier, but the responsibility for reporting such loss or damage and filing any claims remains with the customer.

Any shortages or errors in shipment of goods must be reported to Vetland Medical within two (2) weeks of date of shipment in order for corrective action to be taken.

All merchandise to be returned must have prior authorization by Vetland Medical. An authorization number will be issued by Vetland Medical. This number must appear on the label, packing slip and any other related documents. Goods received without authorization will be refused at Vetland Medical's receiving dock and returned at customer's expense.

***Notify shipping company if a damage claim needs to be filed. Take pictures of the box and damaged items. Retain box and all items as evidence.

Notice

Comments

As part of our continuing effort to maintain the highest standards of quality in our manuals, we ask for your comments on this manual's accuracy, organization, clarity and usefulness. Please send any comments by mail or e-mail to the address below:

Contact Us

Address:	Vetland Medical Sales & Services, L.L.C. 2601 Holloway Road Louisville, Kentucky 40299 USA
Phone:	1-502-671-1014
Toll Free Phone (USA):	1-866-476-0589
Fax:	1-502-671-1019
Email:	info@vetlandmedical.com
Website:	www.vetlandmedical.com

When contacting us, please provide the model name, serial number, purchasing date, when troutble occurred, and the service needed.

Preface

To ensure safe operation and long-term performance stability, it is essential that you fully understand the equipment functions, operation and maintenance before using the equipment.Please keep this manual in a safe place for easy retrieval.

To ensure operator and patient safety, use only parts and accessories that meet the manufacturers' requirements as recommended by Vetland Medical Sales & Services, L.L.C. Parts used which are not authorized by the manufacturer may cause damage to the product and may void the product warranty.

Exterior Components

Operating Principle

How e2 Works

The e2 draws in room air and separates oxygen from the air utilizing the Pressure Swing Absorption process.

The e2 compresses the medical grade oxygen to 60 PSI and stores the oxygen in a reservoir for supply on demand.

Once the reservoir pressure builds to 60 PSI, the compressor shuts down and enters Power Saving Mode.

As your device requires oxygen, the e2 supplies a regulated steady flow of oxygen at 50 PSI. As the reservoir is depleted, the compressor energizes and starts the process over.

An on-board processor controls valve timing, compressor and fan functions and start-up and shut-down routines. It also delivers temperature and pressure information to the display, provides automatic overtemperature protection, cycles the unit on and off at preset pressures, and displays total hours and liters produced. The processor also converts the output of an electrochemical oxygen sensor into a displayed reading of 22-96% oxygen purity. The processor utilizes a patent pending auto calibration routine to maintain accuracy throughout its life.

Thermal Protection:

A temperature sensor is attached to the compressor motor and an overtemperature set point at 170° F is programmed into the processor that prevents operation at temperatures that may damage the compressor or other components. This automatically turns the compressor off when overtemperature is sensed and the device then goes into normal shutdown procedure. e2 must be manually restarted after shutdown. Lack of cooling caused by a clogged filter is the most common cause of overheating.

Before Reading This Manual

Symbols are used in this manual to help users operate this product safely and appropriately and to prevent any risk to patients or damage to materials.

Please read and understand all warnings and precautions.

Safety Symbols

	**WARNING** WARNING is used to indicate the presence of a hazard which can cause severe personal injury, death or substantial property damage if the warning is ignored.
	**CAUTION** CAUTION is used to indicate the presence of a hazard which will or can cause minor personal injury or equipment damage if the caution is ignored.

Note Symbol

	**NOTE** NOTE is used to notify the user of installation, operation or maintenance information which is important but not hazard related.

Pre-Use Safety Precautions

Please review the following before using the system:

WARNING 	△ The e2 Oxygen Concentrator is intended only to provide oxygen supply. It must be used in conjunction with oxygen devices that confirm proper pressures, flows and oxygen concentrations are being achieved. △ Always provide flow regulation and flow metering for the oxygen outlet. △ Only qualified personnel should use the oxygen concentrator. Please read thisuser manual before use. △ A backup source of oxygen supply is highly recommended for continued operation in the event of power failure. △ Use of this product is prohibited during Magnetic Resonance Imaging (MRI). A fire may breakout from the induced current and the accuracy of the product and the MRI may be influenced by cross-interference. △ When the product is to be moved, make sure to turn it off and secure all electrical cords/cables and accessories for transport. Damaged cords or cables may cause fire or electric shock. △ All equipment should be checked regularly to ensure proper operation. △ Oxygen accelerates combustion, therefore do not use this device near any volatile agents, oils, grease, solvents or heat sources. △ Modifications to the device may damage the device or create an environment of risk. Modifications will void all warranties and shall not be attempted. △ The device shall only be serviced by a qualified, competent technician. △ Use only the 3-prong grounded power cord provided with the device. △ Clean removable filter routinely in order to keep device cool. Observe device temperature during normal operation. Higher than normal temperatures indicate filter occlusion or fan malfunction.

WARNING 	△ Do not operate e2 in a wet environment. △ In the event that you suspect the unit is not performing properly, discontinue use and contact technical support at Vetland Medical Sales & Services, L.L.C. △ This unit provides life sustaining oxygen but is not equipped to provide positive pressure ventilation alone, therefore it is not to be used in life support applications without first being connected to respiration equipment. △ Electrical Shock Hazard- Do not remove covers connected to appropriate power source while connected to live AC.
CAUTION 	○ The e2 oxygen concentrator's intended use is to supply oxygen to anesthetic machines utilizing flows up to 4 LPM. The e2 oxygen concentrator has the ability to produce beyond these flows however, extended use beyond the scope of intended purpose voids warranty protection. ○ When the e2 is floor mounted, take precautions to prevent tipping. Keep hoses and power cords away from foot traffic and secure the e2 handle to a wall hook or table leg to maintain upright position. ○ Place device in a dust-free environment that has adequate airflow for cooling. ○ Place unit in a safe manner, clear of obstructions. ○ Keep display visible so device status can be viewed during operation. ○ Only connect the oxygen outlet to devices that are designed for 45-65 PSI oxygen operation. Use hoses rated for 100 PSI oxygen service. ○ Do not operate e2 in an unattended manner. ○ Keep e2 in an upright position at all times. ○ Do not operate in a confined area. ○ Prior to operation, verify the air intake filter is clean of obstruction and is positioned properly (see cleaning of filter, page 15). ○ Damaged cords or cables may cause fire or electrical shock. ○ Internal connections should be inspected by a competent technician on a routine basis during normal service cycles. ○ Only manufacturer replacement parts shall be used for service or repair. ○ Set the power switch to the OFF position when unit is not in use.

Note Symbol 	☐ The e2 can be mounted on an existing E cylinder yoke. Make sure to fasten the Velcro restraining strap around the support pole. ☐ Operation beyond the intended scope of the e2 oxygen concentrator for extended periods is not recommended as compressor and sieve material degradation will be accelerated and void the warranty. (e2 may be operated at up to 20 liters per minute for short purge operation.) ☐ The Class B compressor (rated 130°C) is thermal overload protected. ☐ Moisture drastically degrades the sieve material life expectancy - Do NOT operate the unit in a high humidity environment. Do NOT allow moisture to enter the air intake filter. ☐ e2 specifications of performance are based on operation at sea level.

Installation
Unbox Safely

How to unbox safely:

Place carton as shown in Figure 1 with the arrows and logo label on the box oriented upward. Open the top flaps and remove the foam positioner. Remove the e2 as shown in Figure 2. Remove the accessory bag with the manual, power cord and oxygen hose (See Figure 3). Return all foam packing to carton and store for future shipping needs.

Figure 1

Figure 2

Figure 3

Mount Machine or Set on Floor

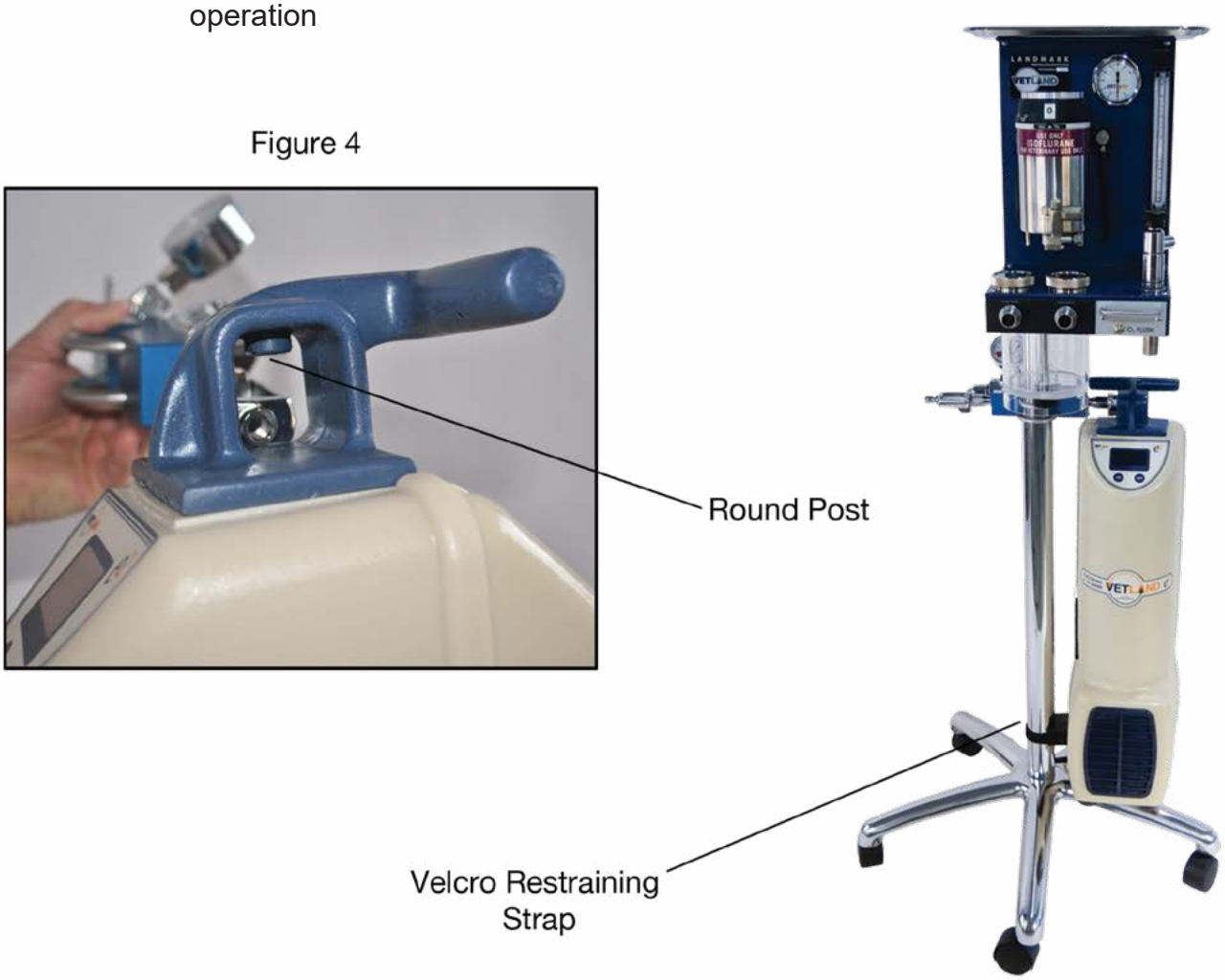
How to mount to machine or set on floor:

The e2 is designed to be mounted on an existing E cylinder yoke. Simply slip the yoke through the hole on the handle of the e2, settling the round post (on the underside of the e2 handle) through the hole in the yoke (See Figure 4). Make sure to fasten the Velcro restraining strap
around the support pole.
Note: There is no gas connection between the e2 and the tank manifold. The manifold is simply a hanger for the e2.

When e2 is floor mounted, take precautions to prevent tipping. Keep hoses and power cords away from foot traffic. It is recommended to secure the e2 handle to a wall hook or table leg to maintain upright position.

Place device in a dust-free environment that has adequate airflow for cooling. Keep display visible so device status can be viewed during operation

Figure 4



Connect Power and Oxygen Hose

How to connect power and oxygen hose:
(See Diagram Below)

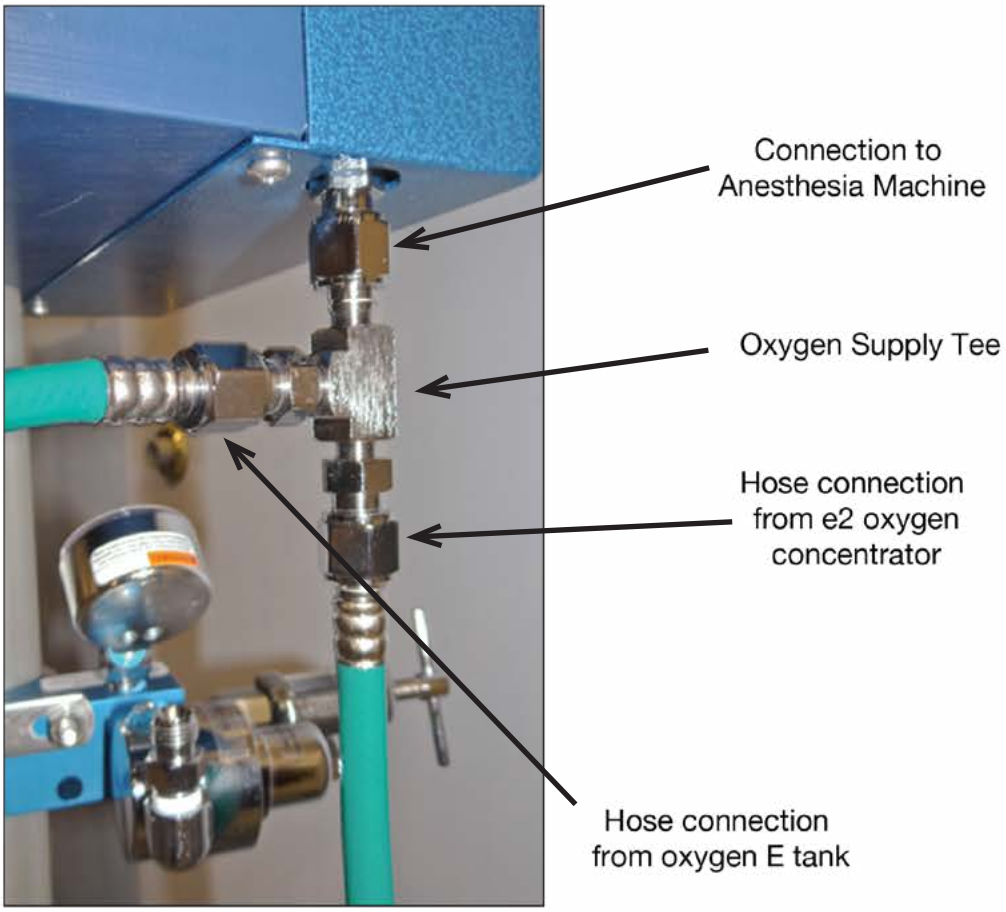
Use the three prong grounded cord supplied with the device. Be certain that the power supply is of the proper voltage, frequency and amperage for the device. (In USA, 120 VAC, 60 cycles per second, 10 amps)

In the USA, use DISS type oxygen fitting and hose for connection between e2 oxygen outlet (located at back of device) and receiving device. This hose connection must be wrench tight.

Only connect the oxygen outlet to devices that are designed for 45 to 65 PSI oxygen operation. Use hoses rated for 100 PSI oxygen service. When connecting in parallel to a regulated cylinder supply, always connect to the low pressure side of the regulator.

NEVER CONNECT THE HIGH PRESSURE UNREGULATED SIDE DIRECTLY TO A DEVICE OR THE e2.

Always provide flow regulation and flow metering downstream from the e2.



How to Power On

After all oxygen and electrical connections have been made and the device has been physically secured, the e2 is ready for operation.

1. Press the ON button (left side) until the display lights up with logo. (This takes a few seconds.) You will notice the cooling fan turns on.
2. The device is in “boot up” mode.
3. Auto calibration takes place and is indicated by 4 dots appearing on the screen.
   NOTE: e2 calibrates as needed and does not recalibrate each time it is started.
4. The display then shows total liters produced and hours operated.
5. The compressor is activated and the display indicates increasing pressure and oxygen purity. e2 automatically shuts the compressor off when the reservoir reaches 58 PSI and restarts at a reservoir pressure of 52 PSI during warm up.
6. Flow is not required, however it is advisable to set the flow on the anesthesia machine between 3-5 liters per minute for a few minutes to allow the device to warm up. This flow rate prevents the device from cycling on and off during the “warm up” period as the pressure in the vessel is achieved. Allowing flow will facilitate in oxygen percentage to rise quicker.
7. e2 is now ready for continuous operation. Become familiar with normal internal operating temperature(120°F - 150°F) so the need for filter cleaning can be anticipated. Observe pressure readings on the display (these are pressures in the internal reservoir upstream of the internal regulator, which is set at 50 PSI). The compressor unit should shut off at readings above 58 PSI and start up as the pressure drops to 52 PSI. Any reading below 40 PSI at 4 liters per minute flow indicates an external leak or other problem
8. To turn the device off, press the OFF button (right side) for 3 seconds. It will take several more seconds for the unit to cycle off and for the fan to shut off. Do NOT disconnect the power cord until the device has completed the shut down process and the screen is dark.
9. From the OFF mode, depressing ON and OFF buttons simultaneously places the e2 in Test Mode, where operational data is displayed. To exit Test Mode, hold down the OFF button to turn the machine off.

Note: The oxygen sensor is sensitive to being positioned vertically. Sometimes, especially if the device is shipped or stored in a horizontal position, the sensor will have to recover in order to give an accurate reading. Normally, a few minutes of operation will allow the sensor to resumer normal functioning.

Verify Before Use

Verify that there is no mechanical risk.
Verify all connections are secure.
Verify adequate pressures and concentrations have been achieved via the display window.
Verify there is a reserve oxygen supply in the event of power outage or malfunction.

Cleaning

Do NOT use alcohol, chlorine or oil based products to clean the unit. Use only mild detergent and damp cloth to clean the unit.
Keep the device and accessories away from any liquid.
Clean air filter by vacuuming accumulated dirt. Do NOT place a damp filter in the unit.

NOTE: Air enters the e2 concentrator via the air intake filter located on the back of the unit. The air intake filter removes particles from the air to protect the unit. As a result, the air intake filter must be cleaned of debris from time to time. Remove filter, brush out debris and vacuum off particles. You may wash with warm, soapy water - rinse and allow to thoroughly dry before reinstalling.
(See NOTE on page 10. Read: Moisture.)
Verify the air intake filter is clean and positioned correctly prior to operation.

Troubleshooting

Problem	Probable Cause	Solution
Unit does not power up	-AC fail -Cord disconnect -No AC at outlet -Internal circuit breaker has been activated	-Check power cord is properly attached to unit and to live AC outlet -Call technical support
My pressure will not rise above 50 and compressor does not shut off	-System has a leak -If the unit has more than 1000 hours operation or has been used in a dusty environment,the internal filter may require cleaning or replacement -Elevation is greater than 4,500 ft. above sea level.	-Operate at zero flow and note pressure reading on display after checking for leaks -Contact technical support with details -Exchange e2 with a high elevation programmed unit
My oxygen % is not reaching correct levels	-This may be caused by the oxygen sensor having been not in the upright (vertical) position. See NOTE on page 14. -Flows Supplied exceed e2 capabilities. See specifications of oxygen concentrations, page 22. -System has a leak. -Elevation is greater than 4,500 ft. above sea level.	-Operate at zero flow and note pressure reading on display after checking for leaks. -If your e2 has been operating normally for some time, check for leaks in hoses and connections. Your flow gauge may be indicating a lower flow than is being produced by the e2 due to leakage. Some degradation of the molecular sieve material is normal and will cause oxygen purity to decrease over time. Moisture absorption is the primary cause of sieve degradation and varies depending on local humidity conditions. A clogged internal filter may also cause reduced purity. Check the hour meter and total liters produced to determine if the sieve module is due for replacement. -Contact technical support with details. -Exchange e2 with a High Elevation programmed unit.

Troubleshooting (continued)

At higher flows, my oxygen concentration drops.	-This is normal operation for flows above 4 LPM	-See solutions statement on page 16 regarding expected O^2 purity at different flow rates and degradation of sieve material over time. -Also, see specifications/ oxygen concentration (page 22).
My unit shuts off after a few minutes of operation	-The temperature sensor safety is triggered due to occluded inlet fan filter	-See page 15, cleaning. -Clean the filter by removing it from the case and vacuuming off accumulated dirt. -Do not put damp filter in the e2 as this may cause the molecular sieve to fail. -Make sure fan is operating and the outlet vents are not restricted. -Call tech support if unable to resolve.
At higher flows, my supply pressure drops	-This is normal operation for flows above 4 LPM	-See specifications on Page 22.
My device is much louder now	-Internal muffler connection has been dislodged. -Compressor bearings are sealed and normally are serviceable for thousands of hours of operation. Occasionally, bearing wear will cause a change in sound level.	-Very sudden changes in noise levels should be referred to technical support.

Product Information
Warranty

Product Warranty

Vetland Medical Sales & Services, L.L.C.'s e2 oxygen concentrators are guaranteed to be free of defects for a period of one (1) year from the date of delivery. The compressor is provided a three (3) year warranty period from the date of delivery. Authorized warranty repairs shall include workmanship and material.

The following are exceptions to this warranty:

- Defects caused by abuse, misuse, mishandling or by modifications not authorized by Vetland Medical Sales & Services, L.L.C.
- Deficiencies caused by operations outside of published operating specifications. (See page 22)
- Rubber/plastic goods, hoses, power cord and consumable components and materials are warranted to be free of defects at time of delivery.

Any product which proves to be defective in workmanship or material will be replaced, credited or repaired at the discretion of Vetland Medical. Vetland Medical is not responsible for normal deterioration, wear and tear or abuse. In any case, Vetland will not be liable beyond the original selling price.

Application of this warranty is subject to the following conditions:

- Merchandise returned for warranty credit or replacement must have been purchased from Vetland within the specified warranty period or proof of installation within that time will be required.
- Vetland Medical must promptly be notified upon detection of the defective product or material.
- If the defective product of material cannot be repaired at the customer's site, it must be returned to Vetland. Shipping costs are the responsibility of the customer, both to and from Vetland Medical.
- Examination of the product or material by Vetland Medical must confirm that the defect is covered by the terms of this warranty.
- Notification of the defective product or material must be received by Vetland Medical no later than two (2) weeks following the expiration of this warranty.
- A Returned Goods Authorization number must be obtained from Vetland Medical and shall accompany any equipment being returned under this warranty. Refer to the Returned Goods Policy.

Returning Merchandise

The following are accepted reasons for return of merchandise:

- Defective goods.
- Customer order error.
- Vetland order or shipping error.

Goods returned are subject to the terms of any applicable warranty. Defective products will be accepted for return only during the warranty period and only when accompanied by a Returned Goods Authorization (RGA) number provided by Vetland. Goods to be returned due to customer's order error must have been received by the customer within thirty (30) days prior to the request for return. They must be received by Vetland Medical within thirty (30) days after the return authorization was issued. These goods must be returned unused in the original shipping container and are subject to a 20% restocking charge. The restocking charge will not be applied for defective goods or those shipped due to Vetland Medical's error.

The following merchandise is not eligible for return unless proven to be defective:

- Merchandise for which no Returned Goods Authorization (RGA) was issued by Vetland Medical Sales & Services, L.L.C.
- Merchandise specially ordered by or manufactured for the customer.
- Used merchandise or products not in the original container.
- Merchandise held over thirty (30) days from day of receipt by the customer.
- Merchandise which has been altered or abused.

Upon receipt of authorized returned goods, an inspection of the merchandise will be conducted and appropriate action will be taken.

Vetland Medical's decision regarding deposition of these goods is final. Vetland Medical products in need of factory repair do not require a return authorization.

All items to be returned should be shipped, prepaid to:

Vetland Medical Sales & Services, L.L.C.
2601 Holloway Road
Louisville, KY 40299 USA
Attn: Customer Service Department
Return Goods Authorization Number (when applicable)

The preceding information is the sole warranty provided by Vetland Medical. No other warranty expressed or implied is intended. Representatives of Vetland Medical or its agents are not authorized to modify the terms of this warranty without the signature of approval of Vetland Medical's current President.

Payment Terms

Merchandise is shipped prepaid or COD. FOB Louisville, Kentucky. Net 30 days to customers with established credit. Please contact the Customer Service Department concerning credit information.

Shipping

All merchandise is sold FOB Louisville, Kentucky. The purchaser accepts these terms upon the issuance of a purchase order. Under the terms of FOB Louisville, Kentucky, all goods become the property of the customer upon Vetland Medical's delivery to its designated freight carrier. It is the responsibility of Vetland Medical to convey the goods to the carrier and provide a clean Bill of Lading (when applicable) or proof of shipment. The customer is responsible for transportation costs.

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All merchandise to be returned must have prior authorization by Vetland Medical. An authorization number will be issued by Vetland Medical. This number must appear on the label, packing slip and any other related documents. Goods received without authorization will be refused at Vetland Medical's receiving dock and returned at customer's expense.

Returned Goods Policy

When requesting authorization to return merchandise, the following information should be provided:

- Customer purchase order number and date.
- Vetland Medial shipping date and method of shipment. (See packing slip or bill of lading.)
- Vetland's invoice date and number.
- Reason for return.

Limitation of Liability

All Vetland Medical products are ONLY to be used for VETERINARY purposes. Vetland Medical products are NOT designed to be used for human patients.

Vetland Medical's liability, whether arising out of or related to manufacture and sale of the goods, their installation, demonstration, sales representation, use, performance or otherwise, including any liability based upon Vetland Medical's Product Warranty is subject to and limited to the exclusive terms and conditions as forth above, whether based upon breach of warranty or any other cause of action whatsoever, regardless of any fault attributable to Vetland Medical, and regardless of the form of action (including without limitation, breach of warranty, negligence, strict liability or otherwise).

The stated Express Warranties are in lieu of all warranties, expressed or implied, including without limitation warranties of merchantability, fitness or any particular purpose or non-infringement.

Vetland Medical shall not be liable for, nor shall buyer be entitles to recover any special incidental or consequential damages, or for any liability incurred by buyer to any third party in any way arising out of or relating to the goods.

In the unlikely event of a disagreement, the place of venue is:
Louisville, KY 40299.

Product Specifications

Power Consumption	<400 watts	3.4 Amps (Power Supply UL Labeled)	
Compressor Range *[1]	35-65 PSI/regulated output pressure 50 PSI± 2 PSI (Compressor UL Labeled)		
High Elevation Operation	For every 1,000 feet increase in elevation, PSI will drop approximately 1 PSI		
Dimensions	Height: 29"	Width: 9"	Depth: 13"
Weight	34 pounds		
Noise	<40-48 dB		
Electrical	110-120 VAC	60 Hz	4 Amps
	3 prong polarized grounded plug (USA)		
Storage Temperature	-5° F - 110° F		
Operating Temperature	50° F - 95° F		
Operating Humidity *[2]	0 - 95%	Non-Condensing	
Oxygen Concentration *[2] *[3]	1-4 LPM	93%	±3%
	4-8 LPM	80-90% range	
	8+ LPM	70-80% range	
Oxygen Supply Pressure *[2] *[3]	1-4 LPM	50 PSI	
	4-8 LPM	40-50 PSI range	
	8+ LPM	30-40 PSI range	
Display/Alert	High Compressor Temperature set at 170° F		
	Oxygen Concentration		
	Oxygen Supply Pressure		
	Hours of Use		
	Accumulated Total Flow		

*[1] Based on atmospheric pressure of 14.7 PSI (sea level) at 70 ° F

*[2] Extended periods of usage beyond intended scope of 4 LPM flow will void the warranty.

*[3] Operating the unit outside the intended use specifications of temperature range, humidity range or flow range will negatively affect performance and may cause damage to the unit which voids the warranty.

Maintenance Schedule

Daily	Inspect & Clean Air Filter *Perform more often if in dusty environment or if operating temperature of compressor is exceeded
Every 2,500 Hours	Replace compressor top end (cups, O-rings) and compressor inlet filter
10,000 Hours or When Concentration Drops Below 85%	Replace sieve bed module and compressor complete kit (compressor cups, O-rings, eccentric bearings and compressor housing bearings)

Service Contact

Vetland Medical Sales & Services, LLC

2601 Holloway Road
Lousiville, KY 40299 USA

US Toll Free: 1-866-476-0589
Phone: 1-502-671-1014
Fax: 1-502-671-1019

Email: info@vetlandmedical.com
Web: www.vetlandmedical.com

Part Numbers

Hard Copy Ops Manual #595-1403

Air Filter #595-1404

4’ O^2 Hose #595-1405

O^2 Supply Tee #580-0745

E Tank Manifold #580-1270A

Compressor Top End Kit #595-1406

Compressor Complete Kit #595-1407

Sieve Bed Module Kit #595-1408

Complete Service Exchange #595-1407SE

Compressor Inlet Filter #595-1409

Manufactured in the USA for/by
Vetland Medical Sales & Services, LLC
Louisville, KY 40299 USA
222.vetlandmedical.com

Patent Pending