User Guide and Operating Manual

Table Top
Laboratory Animal Anesthesia System
901806

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Mobile
Laboratory Animal Anesthesia System
901807 / 901809

VETEQUIP
INHALATION ANESTHESIA SYSTEMS

VetEquip, Inc. - Pleasanton, California USA

080601 - Rev. A

Theory of Operation

An inhalation anesthesia system is designed to do the following:

1. Change a liquid anesthetic agent into a vapor.
2. Deliver that vapor to the patient in a precisely measurable amount.
3. Sustain the patient by delivering a metabolic gas in addition to the anesthetic vapor.
4. Capture all waste gas.
5. Channel the waste gas to an evacuation system such as an activated charcoal canister or a scavenging interface.

Table Top Laboratory Animal Anesthesia System

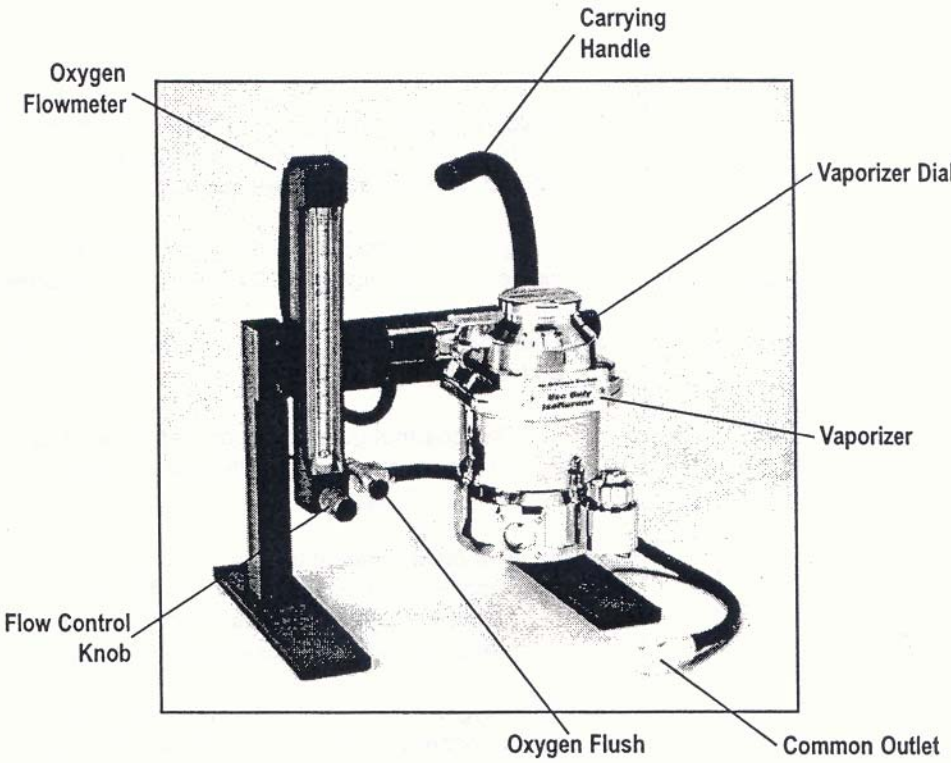

Table-Top Laboratory Animal Anesthesia System (LAAS)
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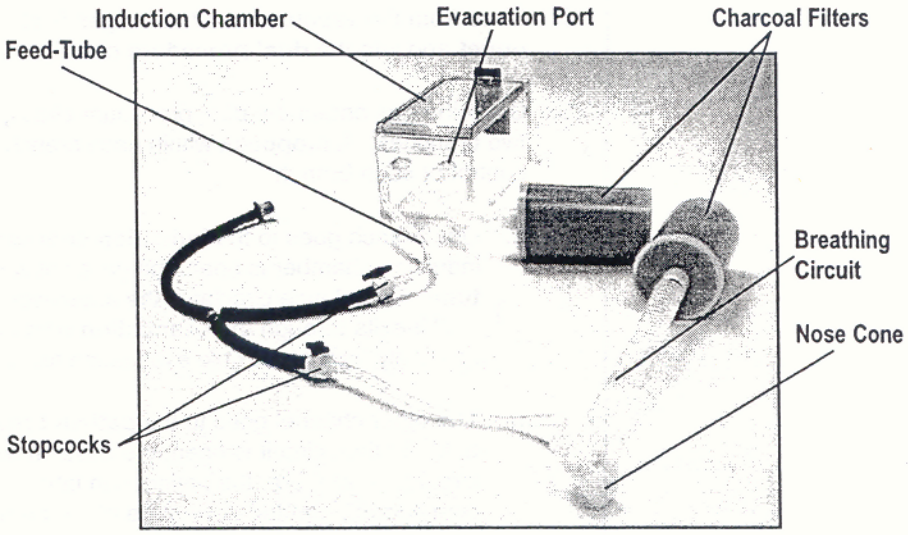
Dual Breathing Circuit



Dual-Delivery Breathing Circuit
Included with all Laboratory Animal Anesthesia Systems
991011

Operational Flowchart

1. Oxygen flows from a **pressurized tank** that may be located on the anesthesia machine, in the room with the anesthesia machine or in a remote area with the oxygen being piped through the walls.

2. A **regulator** is attached to the supply tank and reduces the pressure of the oxygen from as high as 2200 PSI down to a useable 55 PSI.

3. The oxygen flow reaches the anesthesia machine through the DISS connection and is then plumbed into two channels:

   a. One channel goes to the oxygen **flowmeter**. By using the **flow control knob** on the flowmeter, you further reduce the 55 PSI to a flow measured in liters per minute (lpm).

   b. The other channel goes to the **oxygen flush valve**. In the normal (closed) position, the flush valve has no flow through it. When the flush button is pushed, the oxygen flows directly into the patient circuit at a rate of approximately 40 lpm. This oxygen does not pass through the vaporizer.

4. The oxygen flow from the flowmeter is delivered to the inlet of the **vaporizer**. If the vaporizer is in the "OFF" position, the oxygen flows across the vaporizer without picking up any anesthetic agent. If the **vaporizer dial** is turned to any position other than "OFF", vaporized anesthetic agent is delivered through the outlet of the vaporizer to the patient circuit. The vaporizer dial is adjusted by the operator and determines the amount of anesthetic agent vapor that will be added to the oxygen flow. The amount is measured as a percentage of the total flow and can be varied from 0-5%.

5. Lines from the vaporizer and the oxygen flush valve merge through the **common outlet** and into the **dual procedure circuit**.

6. Once the gas enters the dual procedure circuit, it is bifurcated by a Y-fitting into two branches. A **stopcock** within each branch of the circuit provides independent control of each branch.

   a. One branch goes to the **induction chamber**. When the stopcock to the induction chamber is open, the gases flow into the chamber through the **feed-tube**. Turbulence circulates the anesthetic gases throughout the chamber until it exits through the **evacuation port** on the induction chamber, flowing passively through flexible evacuation tubing and into a **charcoal filter**.

   b. The other channel goes to the **patient breathing circuit**. When the stopcock to the patient circuit is open, the gases flow to the **nose cone** of the breathing circuit. From there, the patient can inhale and exhale. The gases then continue through the down-tube of the breathing circuit and into a second charcoal filter.

Use Protocol

Every facility should have in place an inhalation anesthesia protocol / SOP. The following is an outline from which you can begin to create your own. If you need assistance writing your protocol, please call us at 800-466-6463.

1. After checking to ensure your oxygen supply tank(s) is/are open and that you have sufficient gas pressure in the line(s) from the tank(s); assemble your system and check all connections for possible oxygen leaks.

   Oxygen tank to regulator (If oxygen is supplied from a free-standing tank). If any hissing is detected, check the condition of the gasket between the tank and regulator (E-cylinder only) and tighten the regulator on to the tank.

   Machine to dual delivery system. This common outlet port is a friction-fit connection. Ensure connections made are leak-free.

   Dual delivery system to nose cone and chamber connection. These are friction-fit connections. Ensure connections made are leak-free.

   Breathing elbow down tube and chamber outlet port to charcoal filters. Push tubing on as tightly as possible and ensure filters are lying on their sides. Standing filters on end impedes the airflow out the bottom of canister, renders the filter useless and causes back pressure in the breathing circuit.

2. If required, fill the vaporizer with the appropriate liquid agent, according to instructions in the vaporizer manual.
3. Open the stopcock in the chamber tubing line.
4. Close the stopcock in the nose cone line.
5. Turn the oxygen flowmeter to at least one (1) liter per minute (lpm).
6. Place animal #1 in the induction chamber and secure the lid.

WARNING

The chamber is airtight. If the oxygen flowmeter on the machine is turned off, there will be NO AIRFLOW into the chamber.

NEVER leave animals in the chamber without an oxygen flow.

NOTE

You may place as many animals in the chamber as will fit comfortably.

Use Protocol

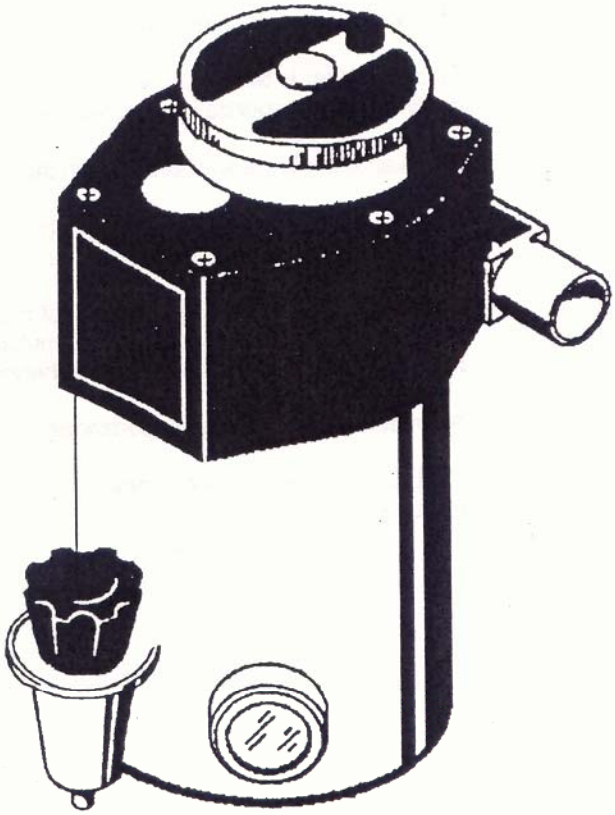
7. Turn the vaporizer dial to 2-2½%. Animal #1 should begin to lose consciousness within 2 minutes.
8. When Animal #1 has no response to rocking/jiggling the chamber, push the oxygen flush button for 10 to 15 seconds (for 2 liter chamber) to evacuate all anesthesia-saturated gas from the chamber.

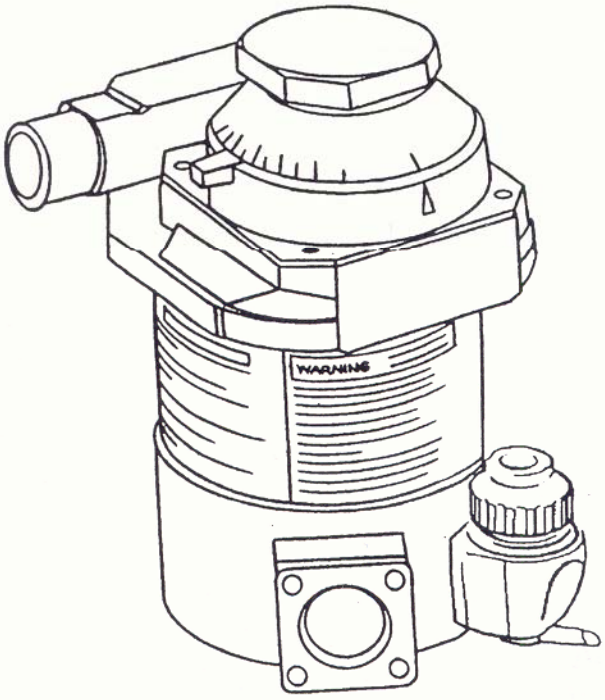
   NOTE
   The brief oxygen flush evacuations of the chamber should not awaken already anesthetized animals.

   If the stopcock to the nose cone/mask is *open* when the oxygen flush button is depressed, the resulting oxygen pressure through the nose cone may push that animal's nose out of the nose cone. Always close the stopcock to the nose cone mask before using oxygen flush.

9. Close the stopcock in the chamber tubing line, then immediately open the chamber and remove Animal #1.
10. Place Animal #1's nose in the nose cone and open the stopcock in the nose cone line.
11. Place Animal #2 in the chamber and open the stopcock in the chamber tubing line.
12. When the procedure on Animal #1 is complete, close the stopcock in the nose cone line and place Animal #1 in a recovery unit. That animal will begin to awaken in approximately 2 minutes.
13. Repeat steps 8 through 12 with Animal #2, and all remaining models, until all procedures have been completed.
14. Turn the vaporizer dial to the "OFF" position.
15. Turn off the oxygen flowmeter.
16. If a freestanding oxygen tank is used, turn off the oxygen at the tank.
17. Clean and sanitize the chamber and nose cone/mask as outlined in your procedure area cleaning protocols.

Operating Instructions & Maintenance Guidelines for Precision Vaporizers





VETEQUIP

Description

General

This vaporizer is designed for 'out of circuit' use in continuous flow techniques of inhalation anesthesia.

This vaporizer is temperature and flow compensated so that the output remains relatively constant despite cooling due to vaporization and variations in inlet flow (see - Performance section).

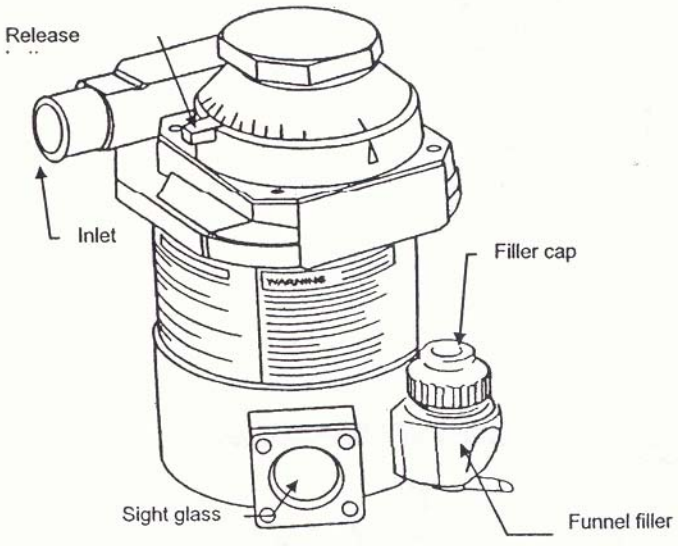
This vaporizer is clearly labeled with the name of the anesthetic agent for which it is designed.

A single control dial with a concentration scale calibrated in % of anesthetic agent vapor per total volume (v/v) is employed to set the desired concentration of the anesthetic agent.

To prevent accidental displacement of the control dial from the 'OFF' position to 'ON', a release button is incorporated in the dial assembly. Simultaneous depression of the release button and counter-clockwise rotation of the dial is necessary to achieve an 'ON' setting.

An inlet filter protects the vaporizer against particulate contamination.

Calibrated vaporizers are adaptable for use on many types of anesthesia machines and are available with either a funnel or key-fill system.



Cyprane style vaporizer
Funnel filler system

Release

Operating Instructions

OBSERVE ALL WARNINGS AND INSTRUCTIONS IN THIS MANUAL.

Turning On

1. To turn the vaporizer 'ON', depress the control dial release button, and simultaneously turn control dial counter-clockwise to desired concentration.

NOTE: To avoid the inadvertent delivery of small concentrations the control dial should be turned to 'OFF' when the vaporizer is not in use.

Filling and Draining

WARNING - DO NOT FILL VAPORIZER WITH ANY AGENT OTHER THAN THE ONE SPECIFIED ON THE FRONT LABEL. THE VAPORIZER IS DESIGNED FOR THAT AGENT ONLY. ANY OTHER AGENT THAN THAT SPECIFIED CAN PROVE TO BE DANGEROUS TO A PATIENT.

WARNING - DO NOT FILL VAPORIZER UNLESS THE CONTROL DIAL IS IN THE 'OFF' POSITION.

WARNING - DO NOT TURN THE DIAL 'ON' DURING FILLING OR ATTEMPT TO FILL BEYOND THE 'FULL' MARK.

WARNING - DO NOT DRAIN THE AGENT INTO ANY CONTAINER OTHER THAN A PROPERLY MARKED CONTAINER.

Periodically check the agent level. The vaporizer should be refilled at appropriate intervals. The vaporizer will function satisfactorily as long as there is agent visible in the sight glass.

The vaporizer should be filled and used in an upright position. Small deviations from the upright position will not affect the output or the safety of the vaporizer. Because the agent depth is shallow in relation to the diameter of the vaporizing chamber, more frequent checks of the agent levels should be carried out when small deviations from the upright position occur. This will avoid obtaining a misleading impression of the amount of agent in the vaporizer.

At intervals - ideally not exceeding two weeks - the vaporizer should be drained into an appropriately marked container when the agent level is low and the agent discarded. Less frequent intervals may be used when the anesthetic agent (e.g. Isoflurane) does not contain additives or stabilizing agents.

Warnings

DO NOT FILL THE VAPORIZER WITH ANY ANESTHETIC AGENT OTHER THAN THE ONE SPECIFIED ON THE FRONT LABEL. THE VAPORIZER IS DESIGNED FOR THAT AGENT ONLY. ANY OTHER AGENT THAN THAT SPECIFIED CAN PROVE TO BE DANGEROUS TO A PATIENT.

IF A VAPORIZER IS FILLED WITH THE WRONG AGENT, DRAINING WILL NOT ELIMINATE THE AGENT SINCE SOME OF THE AGENT WILL HAVE BEEN ABSORBED INTO THE WICK. THE WICK MUST BE THOROUGHLY CLEANED AND DRIED. THIS PROCEDURE MUST BE PERFORMED AT AN AUTHORIZED SERVICE CENTER.

DO NOT CARRY THE VAPORIZER BY THE CONTROL DIAL.

DO NOT MODIFY, TAMPER WITH, OR DISASSEMBLE THE VAPORIZER. THERE IS A POTENTIAL DANGER OF DAMAGING THE VAPORIZER AND ALTERING THE CALIBRATION ACCURACY.

DO NOT IMMERSE THE VAPORIZER IN ANY LIQUID, INCLUDING WATER.

DO NOT STERILIZE THE VAPORIZER.

DO NOT DRAIN THE ANESTHETIC AGENT INTO ANY CONTAINER OTHER THAN A PROPERLY MARKED CONTAINER.

INCOMPLETE SEALING OF THE FILL CAP WILL RESULT IN LOSS OF GASES.

DO NOT FILL THE VAPORIZER UNLESS THE CONTROL DIAL IS IN THE 'OFF' POSITION.

DO NOT TURN THE DIAL 'ON' DURING FILLING OR ATTEMPT TO FILL BEYOND THE 'FULL' MARK.

KEEP THE VAPORIZER UPRIGHT AT ALL TIMES.

NEVER TILT A CALIBRATED VAPORIZER BEYOND 45 DEGREES WHEN CHARGED. DANGEROUS OVERDOSE MAY RESULT DURING SUBSEQUENT USE. THIS CONDITION CAN BE DETECTED BY CALIBRATION VERIFICATION ONLY.

DO NOT CONNECT THE VAPORIZER DIRECTLY INTO THE PATIENT BREATHING CIRCUIT.

DO NOT TURN ON TWO VAPORIZERS AT THE SAME TIME.

DO NOT PUT WATER OR ANY OTHER SOLVENT IN A VAPORIZER

DUE TO THE WICK'S CAPACITY TO ABSORB AGENT, THE VAPORIZER WILL CONTINUE TO DELIVER THE SET CONCENTRATION FOR A CONSIDERABLE PERIOD OF TIME EVEN IF NO LIQUID LEVEL CAN BE VIEWED THROUGH THE SIGHT WINDOW. HOWEVER, DO NOT USE A VAPORIZER IN THIS CONDITION ON A PATIENT.

FLUSH FLOWS THROUGH AN OPEN VAPORIZER MAY RESULT IN UNWANTED CONCENTRATIONS OF ANESTHETIC AGENT.

DO NOT IGNORE MAINTENANCE OF YOUR VAPORIZER. AN ANNUAL CALIBRATION RECERTIFICATION IS HIGHLY RECOMMENDED BY THE MANUFACTURER.