

Kent Scientific
VetFlo™
Traditional Anesthesia System
Operating Manual



Kent Scientific
CORPORATION

CONTENTS

Introduction	1
Precautions	1.1
User Responsibility	1.2
Servicing	1.3
Description	2
General	2.1
The Dial Control	2.2
Specifications	3
Resistance to Gas Flow	3.1
Liquid Capacity	3.2
Weight and Dimensions	3.3
Temperature Range	3.4
Principle of Operation	4
Installation	5
Mounting the Vaporizer	5.1
Operating Instructions	6
Turning the Vaporizer “ON”	6.1
Filling and Draining	6.2
A) General	
B) Screw Cap Filler - Filling Procedure	
Screw Cap Filler - Draining Procedure	



C) Keyed Filler - Filling Procedure

Keyed Filler - Draining Procedure

Checking the Calibration	7
Maintenance	8
Schedule	8.1
Cleaning	8.2
Repairs	8.3
Warranty	9
Illustrations	
Fig 1. Kent Scientific VetFlo Vaporizers	
Fig 2. Turning the Vaporizer “ON”	
Fig 3. Filling and Draining – Screw Cap Filler	
Fig 4. Keyed Filler Components	

1.0 Introduction

1.1 Precautions

1 A number of Warnings  and Cautions , and Notes are used throughout this Operation and Maintenance (O&M) Manual. These draw attention to possible hazards and/or adverse conditions that may occur if the instructions provided are not strictly observed. Warnings are used to draw attention to a condition that can endanger either the patient or the operator and can result in damage to the equipment.

Special attention must be made to each Warning and Caution as it appears in the manual.

2 The Kent Scientific VetFlo is designed for use with one anesthetic agent only, which is that named on the vaporizer. Incorrect dosage may result if the wrong drug is used in this vaporizer. National and international standards are provided for by the keyed filler version of this vaporizer.

3 The Kent Scientific VetFlo must be secured in the upright position before it is connected to a patient. Excess dosage may be delivered if the vaporizer is moved suddenly during use.

4 When the Kent Scientific VetFlo is filled with anesthetic agent, the dial control MUST be set at “OFF”, when not in use and/or during transportation. The vaporizer must be secured in the upright position for a minimum of 10 minutes before it is connected to a patient or a breathing system. Excess dosage may be delivered if adequate time is not allowed for the liquid agent to return to its normal level. If the vaporizer has been transported with the dial control set at any position other than “OFF”, or was transported other than in an upright position, it must be flushed at 4 liters/minute for a minimum of 2 minutes to prevent incorrect dosage. If the vaporizer has been dropped, it MUST be returned to Kent Scientific for functional checks.

5 Anesthetic agents are drugs; to prevent the hazard of prolonged inhalation of trace concentrations from the atmosphere, great care must be taken to avoid spilling of any agent during filling or draining. Patient exhaled anesthetic gases should be extracted from the operating theater by an approved anesthetic gas scavenging system.

6 The dial control MUST be set at “OFF” during all filling and draining operations. The delivered concentration will be incorrect if the filler port is open during use. To prevent overfilling, the vaporizer MUST be secured in the upright position during the filling process.

1.2 User Responsibility

The Kent Scientific VetFlo must be checked periodically. It must be operated and maintained in accordance with the instructions provided. A defective vaporizer must not be used. Components, which are damaged, worn, distorted, broken, contaminated or missing must be replaced immediately.

1.3 Servicing

The Kent Scientific VetFlo must only be serviced by qualified service personnel. The contents of this manual are not binding. If any significant difference is found between the product and this manual, please contact Kent Scientific for further information.

Kent Scientific recommends that the vaporizer should be serviced at intervals not exceeding 12 months.

Qualified service personnel and genuine spare parts must be used for all servicing and repair requirements. Kent Scientific will otherwise not assume responsibility for the materials used, the work performed, or any possible consequences of the same.

7 During use, frequently check that the liquid level is between the minimum and maximum marks on the sight glass level indicator. Refill the vaporizer before the liquid level reaches the minimum mark ▼ in the level indicator.

8 The Kent Scientific VetFlo may cease to function correctly if it is exposed to excessive temperature. Always store the vaporizer at temperatures between 5°F and 122°F (-20°C and 50°C).

9 Anesthetic agents must be treated as pharmaceutical products; to avoid contamination, liquid agent must NEVER be drained into an open container and/ or re-used. The liquid must ALWAYS be disposed of as a hazardous chemical.

10 The Kent Scientific VetFlo must NEVER be modified, dismantled, calibrated or serviced by unauthorized personnel. The calibrated vaporizer MUST be serviced at an approved Service Center.

11 The Kent Scientific VetFlo MUST be connected so that the flow of the gas to the patient is as indicated by the arrows on the device. The delivered concentration will be incorrect if the flow is reversed.

12 The Kent Scientific VetFlo has a relatively high resistance and must not be incorporated in a breathing system downstream of the common gas outlet.

13 Before use, ALL connections must be checked for leaks and functional tests MUST be performed as described in the anesthetic machine User Manual.

2 Description

2.1 General

When communicating with Kent Scientific, please quote the model and serial number of the vaporizer, along with the approximate year of purchase. If the unit is being returned for repair, indicate the nature of the fault or the work required to be undertaken.

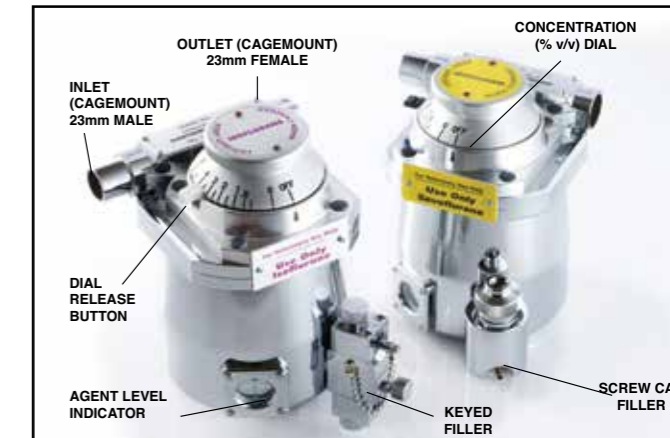
WARNING: This manual and all its associated documentation must be studied thoroughly before any attempt is made to install, operate or maintain any part of the Kent Scientific VetFlo. Failure to do so may result in patient injury.

The Kent Scientific VetFlo is designed for “out of circuit” use in continuous flow techniques of inhalation anesthesia.

The Kent Scientific VetFlo is temperature and flow compensated so that its output remains relatively constant despite cooling due to the vaporization and variations in inlet flow.

The Kent Scientific VetFlo is labeled to show the name of the anesthetic agent for which it is designed and calibrated.

Fig. 1. Kent Scientific VetFlo



2.2 The Dial Control

To set the desired concentration of anesthetic agent, a single Dial Control with a concentration scale calibrated in % of anesthetic agent vapor per volume (v/v) is used. This Dial Control incorporates a release button (see Fig 1) to help prevent accidental rotation of the dial from the “OFF” to the “ON” position. A counter-clockwise rotation of the dial and simultaneous depression of the release button is required to set the vaporizer to the on position.

CAUTION: Turn the vaporizer dial control to “OFF” when not in use.

3 Specifications

The Kent Scientific VetFlo is calibrated at 70°F (21°C). The variation in output with temperature, flowrate and duration of use is small, and the variation of output when used with Intermittent Positive Pressure Ventilation is negligible.

3.1 Resistance to Gas Flow

5 cm. H2O at the "OFF" setting at 5 liters/min O2.

21.29 cm. H2O when delivering vapor at 5 liters/min O2 at 70°F (21°C).

3.2 Liquid Capacity

Amount of anesthetic agent to fully charge the vaporizer = 150 milliliters (nominal).

Amount retained by wick system ≈ 50 milliliters (nominal).

3.3 Weight and Dimensions

Weight: 7.7 lbs. (3.50 kg.)
Height: 8.07 in. (205 mm)
Depth: 5.5 in. (140 mm)
Width: 5.3 in. (135 mm) } nominal

3.4 Temperature Range

The Kent Scientific VetFlo is designed to operate at temperatures between 59°F (15°C) and 96.8°F (36°C).

4 Principle of Operation

When in the "OFF" position, the rotary valve (within the dial control) makes a direct link between the inlet and outlet of the vaporizer. When the dial control is turned to "ON", the carrier gas is split into two streams, respectively designated "bypass" and "vaporizing chamber flow".

The amount of anesthetic agent picked up in the vaporizing stream varies, due either to variation in room temperature or the cooling that takes place as the agent is vaporized. Each variation causes changes in the effective vapor pressures of the anesthetic agent, therefore, unless some form of compensation device is used, the output of the vaporizer for any given flow and dial setting would change with changes in temperature.

The Kent Scientific VetFlo incorporates a temperature-compensating device (thermostat) that utilizes a bi-metallic strip that deflects according to temperature in order to control the proportion of carrier gas entering the vaporizing chamber.

If the temperature of the Kent Scientific VetFlo decreases, the thermostat closes and more carrier gas is admitted into the vaporizing chamber. If the temperature of the vaporizer increases, the thermostat opens and less carrier gas is admitted into the vaporizing chamber. In this way, the output of the vaporizer remains constant under conditions of changing temperature within the range specified.

5 Installation

Warning: Keep the Kent Scientific VetFlo upright at all times. Do not carry the vaporiser by holding the dial control.

Warning: To help minimize cross-contamination of anesthetic agents, only one Kent Scientific VetFlo should be fitted to an anesthetic machine at any one time.

The Kent Scientific VetFlo must always be mounted between the flowmetering unit and the patient breathing circuit, but upstream of any absorber or humidifier.

Check the integrity of the fittings to ensure that they are leak tight. If in doubt, seek advice from the manufacturer of the equipment to which the vaporizer is attached.

5.1 Mounting the Vaporizer

Unless otherwise specified, all Kent Scientific VetFlos are supplied as standard with 23mm Cagemount fitting inlet

and outlet ports. Cagemount fitted vaporizers normally have the standard 23mm tapered ports: male (inlet) on the left and female (outlet) on the right when viewed from the front. There are two M6 threaded holes at the rear of the vaporizer, which are utilized to secure the vaporizer onto the backbar of the anesthesia machine using appropriate M6 studs and spacers.

- (i) Lightly smear the tapers with an oxygen-safe grease such as Fomblin UT18.
- (ii) Push the gas tubing fully onto appropriate tapers and fully tighten the vaporiser securing nuts.

Warning: Ensure that all connections are gas tight before using the machine.

Warning: Before use, ALL connections must be checked for leaks and functional tests MUST be performed as described in the anaesthetic machine User Manual.

Warning: As there is no interlock fitted to DRE VP3 calibrated vaporisers, only one vaporiser should be connected at any one time, thus assisting with the prevention of cross-contamination of anaesthetic agents.

6 Operating Instructions

Warning: Ensure that the Kent Scientific VetFlo is upright at all times.



6.1 Filling and Draining

A General

Warning: Do not fill the vaporizer with any agent other than the one specified on the front label. The vaporizer is designed for that agent only. Any agent other than the one specified can prove to be dangerous to the patient.

Warning: Do not fill the vaporizer unless the dial control is in the “OFF” position.

Warning: Do not turn the dial “ON” during filling, or attempt to fill the vaporizer beyond the full mark.

Warning: Do not drain the agent into any container other than a properly marked container.

Warning: Periodically check the agent level. The VetFlo must be filled at appropriate intervals. The vaporizer functions satisfactorily as long as the agent is above the minimum level mark ▼ on the agent level indicator.

Warning: The Kent Scientific VetFlo must be filled and used in an upright position.

B Screw Cap Filler – Filling Procedure

Caution: The vaporizer may be pressurized. Turn the screw cap slowly when filling or draining vaporizers which are filled with screw cap fillers.

- (i) Ensure that the Dial is in the “OFF” position. Remove the screw cap by turning it counter-clockwise.
- (ii) Check that the agent to be used is the same as that specified on the front of the vaporizer. Pour the agent slowly into the filler opening, observing the agent level through the agent level indicator.

Note: If the vaporizer was dry before filling, the level will decrease as the wicks absorb the agent.

- (iii) When the agent level reaches the maximum level mark ▲ on the agent level indicator, the vaporizer is full. Replace the screw cap by turning it clockwise. To prevent leakage, ensure that the screw cap is fully tightened.



Fig 3. Filling and Draining – Screw Cap Filler

Screw Cap Filler – Draining Procedure

Warning: After draining the DRE VP3 calibrated vaporizer, fully tighten the drain plug before replacing the screw cap.

Remove the screw cap to reveal the drain plug. Invert the screw cap and use the slot in the top to unscrew the drain plug DO NOT remove the drain plug. Drain the agent into a properly marked container for disposal.

C Keyed Filler – Filling Procedure

The filling system consists of three keyed elements, as follows:

- the anesthetic agent bottle collar
 - the bottle adapter
 - the filling/draining unit fitted to the vaporizer
- (i) Remove the cap and seal from the anesthetic bottle. Check that the bottleneck is not chipped or damaged. Fit the keyways of the bottle adapter to the keys of the bottle collar. Screw them together until fully tightened. The bottle is then ready for filling the vaporizer.

Note: Only the correct agent-specific adapter can be fitted into the matching filler socket.

Caution: The vaporizer may be pressurized. Turn the top retaining screw slowly when removing the dummy filler plug on vaporizers fitted with keyed fillers.

- (ii) Ensure that the dial control is set to the “OFF” position. Turn the top retaining screw on the filler unit counter-clockwise and withdraw the dummy filler plug.

- (iii) Hold the bottle upright below the filler socket and bend the adapter so that its end is horizontal and the two holes in the adapter are facing downwards. Insert the adapter into the filler socket.
- (iv) After insertion, turn the top retaining screw clockwise to tighten it and seal the filler adapter in the filler socket.
- (v) Raise the bottle above the level of the filler socket avoiding kinking the adapter tube. A steady stream of bubbles should emerge from the adapter inner tube within two seconds. If this does not occur, remove the bottle and adapter from the vaporizer and remove the adapter from the bottle. Carefully shake the adapter two or three times to clear the tube, then repeat instructions from Section C.
- (vi) When the vaporizer is filled to the maximum level mark \blacktriangle in the agent level indicator, lower the bottle below the level of the filler socket and wait for five seconds to allow any agent in the adapter to drain back into the bottle, then unscrew the top retaining screw and remove the adapter from the filler. If there is any excess liquid agent, allow this to escape from the filler socket completely, then insert and fully tighten the dummy filler plug to prevent gas from escaping through the filler.

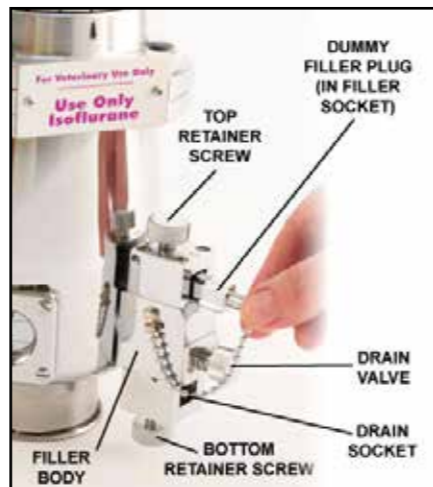


Fig 4. Keyed Filler Components



Keyed Filler – Draining Procedure

- (i) Fit the bottle adapter to an empty bottle. Insert the bottle adapter with its two holes facing upwards into the drain socket. Tighten the bottom retaining screw.

Note: Only the correct agent-specific adapter can be fitted into the matching drain socket.

Caution: The vaporizer may be pressurized. Unscrew the top retaining screw slowly.

The Kent Scientific VetFlo is now ready for use.

Note: If the vaporizer was dry before filling, the level will decrease slightly as the wicks absorb the agent.

- (ii) Ensure that the dial control is in the “OFF” position. Ensure that the bottle is below the level of the drain socket and the tube is not kinked. For draining purposes (and to allow air to vent) unscrew the top retaining screw and remove the dummy filler plug from the filler socket.
- (iii) Open the drain valve by turning it counter-clockwise. Allow the vaporizer to drain.
- (iv) If it is not possible to complete the draining process, close the drain valve, loosen the bottom retaining screw, then remove the bottle and adapter from the vaporiser and remove the adapter from the bottle. Carefully shake the adapter two or three times to clear the tube, then reassemble and repeat instructions from paragraph 1.
- (v) When draining is complete, close the drain valve (clockwise), loosen the bottom retaining screw and remove the bottle and adapter. Replace the dummy filler plug into the filler socket and fully tighten the top retaining screw in a clockwise direction.

7 Checking the Calibration

The performance of the Kent Scientific VetFlo Traditional Anesthesia Systems which are in clinical use is monitored by observing patient signs and consumption of anesthetic agent. Some users may, however, wish to employ analyzers to determine whether any abnormalities of performance have developed.

For field checking of the state of calibration, many techniques and analyzers are available. Kent Scientific does not recommend any one technique or analyzer, but account must be taken of errors of use and calibration of analyzers. The reliability of both must be realistically considered.

8 Maintenance



Warning: Do not modify, tamper with or disassemble the Kent Scientific VetFlo. If the vaporizer is modified in any way there could be possible danger of damaging the unit and altering the accuracy of graduation.



Warning: Do not immerse the Kent Scientific VetFlo in any liquid, including water.



Warning: Do not sterilize the Kent Scientific VetFlo.

Observation of the instructions provided, regular servicing and normal professional vigilance is normally all that is required to maintain the Kent Scientific VetFlo in a safe working condition.

8.1 Schedule

It is recommended that Kent Scientific VetFlos are serviced every 12 months.

Recommended service includes the following:

- (i) Complete disassembly of the vaporizer and its components.
- (ii) Thorough cleaning.
- (iii) Inspection for damage and wear.
- (iv) Renewal of wicks, seals and any damaged, worn or outdated components.
- (v) Lubrication where necessary.
- (vi) Checking the delivered vapor concentration under closely defined conditions at different temperatures and flows with re-calibration or adjustment where necessary.

8.2 Cleaning



Warning: Do not put water or another solvent in the Kent Scientific VetFlo. A vaporizer should be filled with the specified anesthetic agent only.

Clean the exterior of the Kent Scientific VetFlo with a damp cloth.

Never allow cleaning agents to accumulate in the filler or gas inlet and outlet ports, or around the dial control.

8.3 Repairs

Repairs should only be carried out by Kent Scientific or its authorized Service Representatives.

9 Warranty

Such warranties are extended only with respect to the purchase of this product direct from Kent Scientific Corporation or an authorized dealers as new merchandise and are extended to the first buyer thereof, other than for the purpose of resale. For a period of three (3) years from the date of original delivery to the first buyer or to buyers order, this product is warranted against functional defects in materials and workmanship and to conform to the description of the product contained in the Operation and Maintenance Manual and accompanying labels and inserts, provided that the same is operated under conditions of normal use, that regular periodic maintenance is performed and that replacements and repairs are made in accordance with the instructions provided. This same warranty is made for a period of thirty (30) days with respect to expendable parts. The foregoing warranties shall not apply if the product has been repaired or serviced other than by Kent Scientific's authorized service facilities, or other than in accordance with the written instructions

provided by Kent Scientific, or altered by anyone other than Kent Scientific authorized service facilities, or if the product has been subject to abuse, misuse, negligence or accident. Kent Scientific's sole and exclusive obligation and the buyer's sole and exclusive remedy under the above warranties are limited to repairing or replacing free of charge, at Kent Scientific's option, a product which is confirmed as being defective by Kent Scientific following the buyer's notification to Kent Scientific in accordance with the instructions contained in the Servicing Section of the Operation and Maintenance Manual, not later than seven (7) days after the expiration date of the applicable warranty. Kent Scientific shall not be otherwise liable for any damages including but not limited to incidental damages, consequential damages or special damages. There are no express or implied warranties, which extend beyond the warranties herein above, set forth. Kent Scientific makes no warranty of merchantability or fitness for a particular purpose with respect to the product or parts thereof.



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