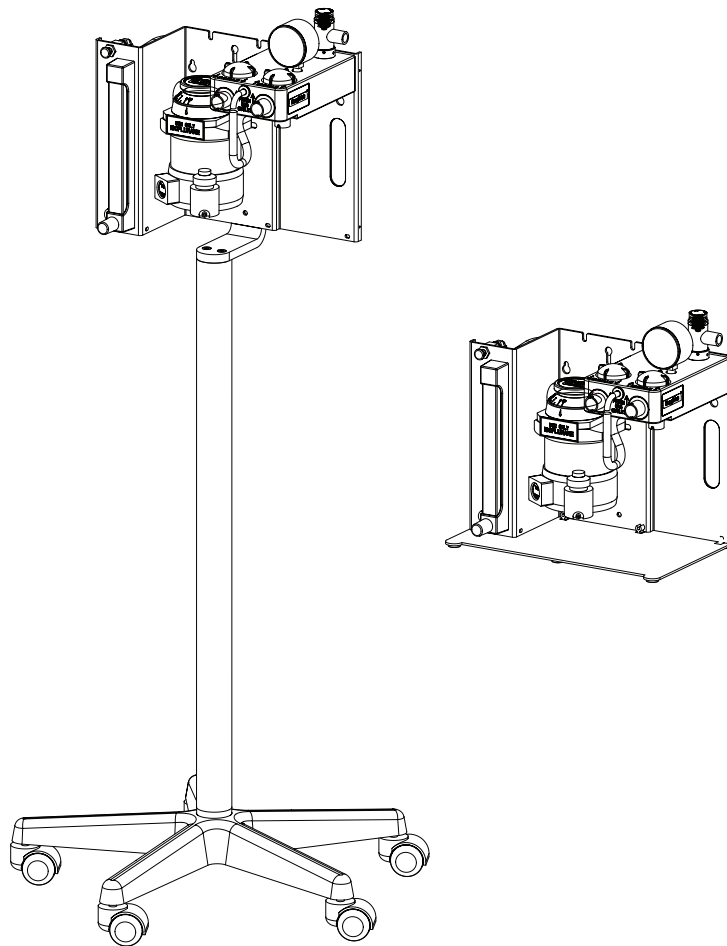


SurgiVetTM

**SurgiVet[®] Universal CDS 9000 Series
and MR Conditional CDS 9000 Series
Small Animal Anesthesia Machines
Operation Manual**



en English

Catalog Number WW V1932

Version 2, October 2009

© 2009 Smiths Medical family of companies. All rights reserved.

smiths medical

Table of Contents

Warranty and Service Information.....	i
Proprietary Notice	i
Warranty	i
Limited Warranty.....	i
Loaner Device (Domestic Sales Only).....	i
Disclaimer of Warranties.....	i
Conditions of Warranty.....	ii
Limitation of Remedies.....	ii
Warranty Procedure.....	ii
Chapter 1: Introduction.....	1-1
About this Manual.....	1-1
Definition of Symbols	1-1
Warnings.....	1-2
Cautions.....	1-3
Notes.....	1-3
MR Conditional Information for MR Conditional Anesthesia Machines.....	1-5
Test Summary	1-6
Chapter 2: Description of Controls and Features	2-1
Intended Use.....	2-1
Unpacking the Product and checking the shipment	2-1
Items Included With WWV9000 Series	2-1
Items Included With WWV9010 Series	2-2
Definition of parts	2-2
Chapter 3: Machine Operation	3-1
Set-up Diagram and Instructions.....	3-1
Getting Started.....	3-4
Attaching the Universal F-circuit.....	3-4
Attaching the Modified Jackson Rees (MJR) Circuit	3-5
Chapter 4: Routine Maintenance.....	4-1
Routine Maintenance.....	4-1
Waste Gas Scavenging System (not included)	4-1
Pressure Manometer.....	4-1
Long Term Storage.....	4-1
Daily Machine Checklist.....	4-2
Cleaning and Disinfecting.....	4-3
Patient circuits, hoses, and breathing bags.....	4-3
Machine surfaces	4-3
Absorber Canister	4-3
Inhalation/Exhalation Valves	4-3

Table of Contents

Pop-off Valve Removal and Cleaning	4-4
Flowmeter Removal and Cleaning	4-7
Minor Repairs	4-10
Needle Valve Adjustment	4-10
Needle Valve Replacement.....	4-11
Chapter 5: Troubleshooting	5-1
Troubleshooting Guide	5-1
Chapter 6: Supplies and Accessories	6-1
Chapter 7: Specifications	7-1
Performance Characteristics for all CDS 9000 Series Machines.....	7-1
Performance Characteristics for MR Conditional CDS 9000 Series Machines	7-1
Environment.....	7-1
Physical.....	7-1
Calibration.....	7-1

SurgiVet and the Smiths design mark are trademarks of the Smiths Medical family of companies. The symbol ® indicates the trademark is registered in the U.S. Patent and Trademark Office and certain other countries. All other names and marks mentioned are the trade names, trademarks or service marks of their respective owners.

This page is intentionally left blank.

Warranty and Service Information

Proprietary Notice

Information contained in this document is copyrighted by Smiths Medical PM, Inc. and may not be duplicated in full or part by any person without prior written approval of Smiths Medical PM, Inc. Its purpose is to provide the user with adequately detailed documentation to efficiently install, operate, maintain and order spare parts for the device supplied. All information contained in this document is believed to be current and accurate as of the date of publication or revision, but does not constitute a warranty.

Warranty

Limited Warranty

Smiths Medical PM, Inc. ("Seller") warrants to the original purchaser that the Product, not including applicable accessories, shall be free from defects in material and workmanship under normal use, if used in accordance with its labeling, for five (5) years from the date of shipment to the original purchaser. **(Note: Vaporizers, Gas Scavenging Systems and Alarms carry their own warranty. Please review associated operation manuals for warranty terms.)**

For plastic, rubber and consumable items, and consumable items, Smiths Medical PM, Inc. warrants only that each such part and item shall be free from defects in workmanship and materials from the date of shipment to the original purchaser.

Loaner Device (Domestic Sales Only)

Smiths Medical PM, Inc, will for the period of warranty make available at no charge, loaner devices (domestic sales only) if, in the opinion of Smiths Medical PM, Inc, the repair of the customer's device would require an unreasonable period of time to repair, and there is a suitable loaner available during the time of repair.

Smiths Medical PM, Inc may make available loaner devices, for a fee should it be requested while an out of warranty device is in for service.

Disclaimer of Warranties

THE FOREGOING EXPRESS WARRANTY, AS CONDITIONED AND LIMITED, IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Seller disclaims responsibility for the suitability of the Product for any particular medical treatment or for any medical complications resulting from the use of the Product. The disclaimer is dictated by the many elements which are beyond Seller's control, such as diagnosis of patient, conditions under which the Product may be used, handling of the Product after it leaves Seller's possession, execution of recommended instructions for use and others.

Conditions of Warranty

Seller's sole obligation under this warranty is to repair or replace, at its option, products that prove to be defective during the warranty period. This warranty is void if the Product has been altered, misused, damaged by neglect or accident, not properly maintained, or repaired by persons not authorized by Seller. Misuse includes, but is not limited to, use not in compliance with the labeling or use with accessories not manufactured by Seller. This warranty does not cover normal wear and tear and maintenance items.

This warranty is not assignable.

Limitation of Remedies

The original purchaser's exclusive remedy shall be, at Seller's sole option, the repair or replacement of the Product. **THIS IS THE EXCLUSIVE REMEDY. In no event will Seller's liability arising out of any cause whatsoever (whether such cause is based in contract, negligence, strict liability, tort or otherwise) exceed the price of the Product, and in no event shall Seller be responsible for consequential, incidental or special damages of any kind or nature whatsoever, including but not limited to, lost business, revenues, and profits.**

Warranty Procedure

Should it be necessary to return the Product and/or accessories for evaluation or repair, please contact Veterinary Clinical Support to obtain a Return Authorization (RA) Number. Please provide the serial number of all equipment that will be returned. Any equipment returned for evaluation or repair needs to be cleaned and decontaminated at your facility prior to being handled by our service technicians. For cleaning instructions, please refer to the appropriate section in the operations manual. **If equipment is returned without being cleaned and decontaminated, and in our opinion it represents a potential biological hazard, our service technicians reserve the right to withhold service until proper cleaning and decontamination have been completed by the sender.** Reference the return authorization number when returning your Product, freight and insurance prepaid, to:

Smiths Medical PM, Inc.	Veterinary Clinical Support
Attn: Repairs / return #	Telephone: 1-262-513-8500
N7W22025 Johnson Drive	Toll-Free: 1-888-745-6562 (USA only)
Waukesha, WI 53186	Fax: 1-262-542-0718
	Website: www.surgivet.com

Seller will not be responsible for unauthorized returns or for loss or damage to the Product during the return shipment. The repaired or replaced Product will be shipped, freight prepaid by Seller, to Purchaser.

To obtain warranty information outside the USA, contact your local distributor.

NOTE! Shipments received without a return number will be returned to sender.

Keep all original packing material, including any inserts. If you need to ship the device, use only the original packaging material, including inserts. Box and inserts should be in original condition. If original shipping material in good condition is not available, it should be purchased from Smiths Medical PM, Inc.

Damages occurring in transit in other than original shipping containers are the responsibility of the shipper. All costs incurred returning devices for repair are the responsibility of the shipper.








Chapter 1: Introduction

About this Manual

The Operation Manual provides installation, operation and maintenance instructions for trained veterinary health care professionals and other qualified users.

These instructions contain important information for safe use of the product. Read the entire contents of these Instructions For Use, including Warnings and Cautions, before using this anesthesia machine. Failure to properly follow warnings, cautions and instructions could result in death or serious injury to the patient.

Definition of Symbols

SYMBOL	DESCRIPTION
	Caution: Federal (USA) law restricts this device to sale by or on the order of a licensed veterinarian.
	Indicates the device is MR Conditional and can be used in an MR Environment. (WWV9000MR, WWV9001MR, WWV9010MR, and WWV9011MR)
	Attention, see instructions for use.
	Oxygen Flammable Compressed Gas Identification Label
	Nitrous Oxide Non-flammable, Oxidizer, Compressed Gas Identification Labels
 Collect separately	Disposal (EU Countries) Under the Waste Electrical and Electronic Equipment (WEEE) Directive 2006/96/EC and implementing regulations, all devices and service items within the scope of the Directive purchased new after August 13, 2005 must be sent for recycling when ultimately becoming waste. Devices and items must not be disposed of with general waste. If purchased before that date, they may also be sent for recycling if being replaced on a one-for-one, like-for-like basis (this varies depending on the country). Recycling instructions to customers using Smiths Medical products are published on the internet at: http://www.smiths-medical.com/recycle
	Disposal (other countries) When disposing of this device, its batteries or any of its accessories, ensure that any negative impact on the environment is minimized. Contact your local waste disposal service and use local recycling or disposal schemes. Separate any other parts of the equipment where arrangements can be made for their recovery; either by recycling or energy recovery. The main batteries are potentially harmful and will require separate disposal according to manufacturer's instructions or local regulations. Note: If applicable, EU, national or local regulations concerning waste disposal must take precedence over the above advice.

KEYWORD	DEFINITION
WARNING	Tells you about something that could hurt the patient or hurt the operator.
CAUTION	Tells you something that could damage the anesthesia machine.
NOTE	Tells you other important information.

Warnings

WARNING! This device is intended for use by persons trained in professional veterinary care. The operator must be thoroughly familiar with the information in this manual before using the equipment.

WARNING! Improper Setup, Use, or Maintenance of anesthetic agents and compressed gas in conjunction with this machine may result in serious injury or death.

WARNING! It is the Operator's responsibility to Pressure Test the anesthesia machine on a daily basis, before using the machine on a patient. Failure to do so may result in operator exposure to anesthetic agents and decreased level of anesthetic and oxygen delivered to the patient.

WARNING! It is the Operator's responsibility to supply and maintain an adequate waste gas removal system. Failure to do so may result in operator exposure to anesthetic agents.

WARNING! Failure to completely open the Pop-off Valve during Normal Operation may result in serious injury or death. Verify the Pop-off Valve is in the Open position before use. The pop-off valve should be kept in the open position at all times unless you are giving the patient a manual breath. Note: The Pop-Off Valve will be kept in the Closed Position when using a ventilator.

WARNING! The Pop-Off Valve will be in the closed position when received from the factory.

WARNING! Failure to let the vaporizer sit for 1 hour after initial filling before use may result in inconsistent patient anesthetic depth. This applies only to a vaporizer that is completely dry or has recently been serviced.

WARNING! The Universal F-circuit is a rebreathing circuit that should only be used with animals that weigh 7 kg (15 lbs) or greater.

WARNING! The Modified Jackson Rees (MJR) is a non-rebreathing circuit that is recommended for use on animals that weigh 7 kg (15 lbs) or less.

WARNING! Possible tipping hazard: Be sure to maintain a firm grip of the handle while moving this device.

Cautions

CAUTION! Follow local governing ordinances and recycling instructions regarding disposal and recycling of device components.

CAUTION! Overtightening the flowmeter knob can damage the needle valve and result in leakage or loss of oxygen flow into the flowmeter. Do not overtighten. When the ball is resting on the bottom of the stop in the flow tube, the flowmeter is OFF. There is no need to tighten any more.

CAUTION! Overtightening the absorber canister draw knob may cause damage to the machine and possibly result in leakage. Do not overtighten.

CAUTION! Do not apply compressed gas to the machine that is unregulated. Using compressed gas delivered in excess of 65 psi may damage the flowmeter, plumbing, and flush valve.

CAUTION! Do not overtighten the Pop-Off Valve.

CAUTION! Do not overtighten the oxygen hose on the back of the anesthesia machine as this may inadvertently loosen the fitting at the back of the flowmeter and may result in leakage. Always use 2 wrenches to tighten the DISS female hose connection to the machine. One (5/8 inch) to hold the DISS male and one (11/16 inch) to tighten the DISS female hose connection.

CAUTION! Before cleaning the Absorber Canister, remove all loose debris and dust. Applying water to carbon dioxide absorbent causes it to harden, making it difficult to remove.

Notes

NOTE! If the Anesthesia Head Assembly is able to spin on the pole, then the screw is not installed. Install the ¼ - 20 x 1½ Button Head Screw (32821B1).

NOTE! Vaporizer mounting hardware is not included with the machine.

NOTE! For certain styles of vaporizers, it may be necessary to attach the male and female end caps to the vaporizer first, before mounting it to the machine (see step 8 in Chapter 3 under Set up Diagram and Instructions).

NOTE! When mounting a Tech 4 Vaporizer to the machine, use the lower slot and position the vaporizer all the way to the right side (when looking at the front of the machine).

NOTE! A leak in the anesthesia machine may result if the threaded opening at the top of the absorber canister is not covered when filling with absorbent.

This page is intentionally left blank.

MR Conditional Information for MR Conditional Anesthesia Machines

REF WWV9000MR, WWV9001MR, WWV9010MR, and WWV9011MR

WARNING! Check entire anesthesia system and accessories with a high powered hand held magnet prior to entering the MR Environment.

WARNING! Only properly labeled devices are safe for use in MR Environments. If the device is not labeled with the MR Conditional symbol, do not use the device in an MR Environment. See Figures 1-1A and 1-1B below for correct labeling.

Symbol indicates this device is MR Conditional and can be used in an MR Environment.

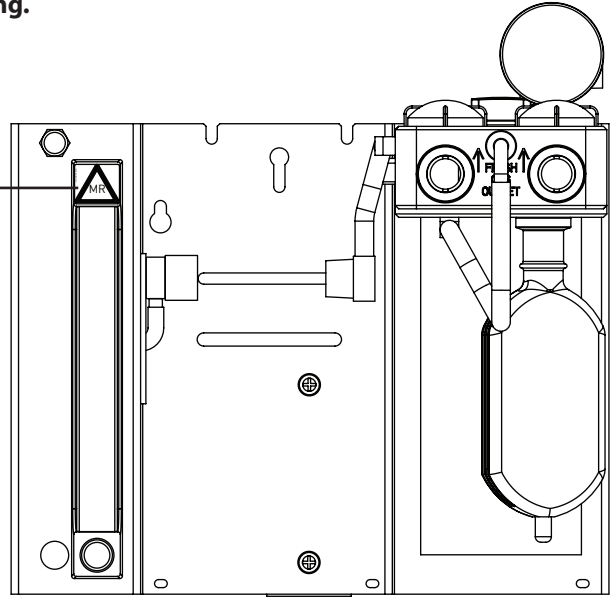


Figure 1-1A: MR Conditional Label (Front View)

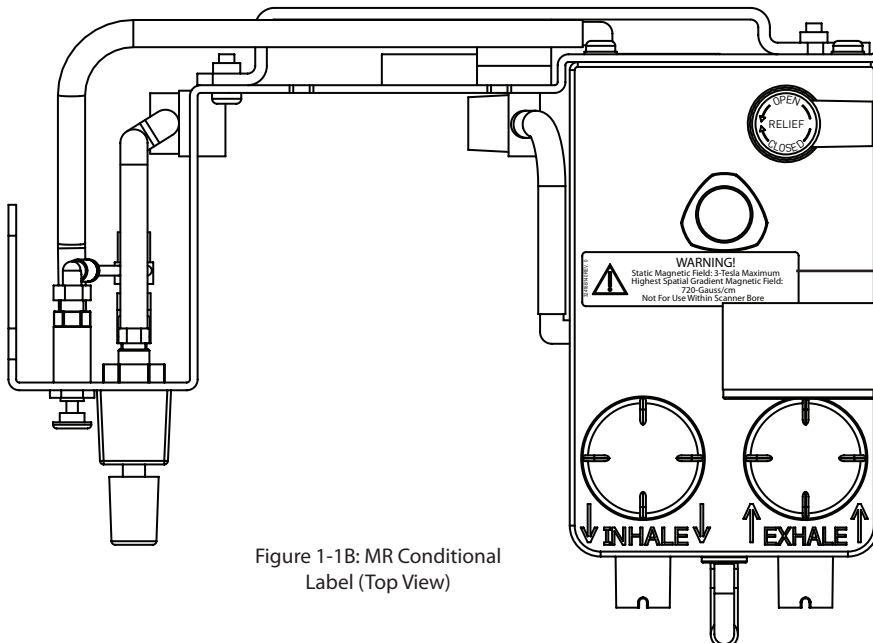


Figure 1-1B: MR Conditional Label (Top View)

Label indicates that this device can be used in an MR Environment of 3-Tesla or less. It can be used near the bore but not within the bore of the scanner.

The MR Conditional CDS 9000 Series Anesthesia Machines (Single or Dual O₂ Flowmeter) were tested by an independent agency at the University of Southern California located in Los Angeles. The MR Conditional CDS 9000 Series was first evaluated using a powerful hand-held magnet to determine the presence of ferromagnetic components. The machine was then introduced into a room with a 3-Tesla GE Healthcare Active Shielded Horizontal Scanner. The machine was assessed for Magnetic Field Interactions, Artifacts, Functional/Performance Testing and MRI Related Heating. The results are as follows:

- Magnetic Field Interactions: There were no “free movements” (i.e. no evidence of translational attraction, rotation, or alignment) seen for the MR Conditional CDS 9000 Series Anesthesia Machine with respect to exposure to the 3-Tesla MR System.
- Eddy currents were detected at the +3 level for the MR Conditional CDS 9000 Series with Single O₂ Flowmeter.
- Eddy currents were detected at the +4 level for the MR Conditional CDS 9000 Series with Dual O₂ Flowmeter.
- Artifacts: No artifacts were observed on MR images obtained using a T1-weighted spin echo pulse sequence.
- Functional/Performance Testing: Functional testing demonstrated that the MR Conditional CDS 9000 Series Anesthesia Machine (Single or Dual O₂ Flowmeter) is unaffected by the operation of the 3-Tesla MR System.
- MRI Related Heating: Since this product will not be inside of the MR system during its intended use, MRI-Related heating is not an issue and, as such, was not assessed.

Test Summary

Non-clinical testing demonstrated that the MR Conditional CDS 9000 Series Anesthesia Machine (Single or Dual O₂ Flowmeter) is MR Conditional and can be used in an MR Environment according to the following conditions:

- Static Magnetic Field of 3-Tesla or less.
- Highest Spatial Gradient Magnetic Field of 720-Gauss/cm or less.

WARNING! This device should not be used in a static magnetic field exceeding 3-Tesla.

WARNING! This product is intended for use inside of the MR Environment (e.g. in the MR System room close to the scanner). It should not be utilized directly inside of the MR System (e.g. inside of the bore of the scanner).

WARNING! Do not attach any vaporizer or any other accessories that are not MR conditional at 3-Tesla or less.

WARNING! This device, components or accessories should not be modified.

WARNING! This device should be positioned in an MR Environment such that gauges, scales, and fluid levels can be viewed from all operator positions.

WARNING! This device should only be serviced by Smiths Medical PM, Inc. or an authorized representative of Smiths Medical PM, Inc.

WARNING! Use only MR Conditional replacement parts approved by Smiths Medical PM, Inc. or an authorized representative of Smiths Medical PM, Inc.

WARNING! This device should be checked periodically for any loose fasteners.

WARNING! Do not disassemble anesthesia machine or vaporizer in the MR Environment.

Chapter 2: Description of Controls and Features

Intended Use

The SurgiVet® Universal CDS 9000 Anesthesia Machine (when used with a vaporizer) delivers anesthetic through a rebreathing or non-rebreathing system for small animal patients.

Unpacking the Product and checking the shipment

Carefully remove the SurgiVet® Universal CDS 9000 Anesthesia Machine and accessories from the shipping carton. Save the packing materials in the event that the SurgiVet® CDS 9000 Anesthesia Machine or accessories must be shipped or stored. Compare the packing list with the items received to make sure the shipment is complete.

Items Included With WWV9000 Series

- Universal CDS 9000 Anesthesia Head Assembly with Pole Mount Arm
- 32816B1 Draw Knob
- 32046B1 Absorber Canister
- 32028B6 2" Aluminum Pole
- V718701 Chrome Base with casters
- 32821B1 ¼ - 20 x 1½ Button Head Screw
- 32359B3 F-Circuit with 2 Liter Bag *
- V7309 Pop-Off Occlusion Valve
- 32359B6 Modified Jackson Rees with ½ Liter Bag *
- 32046A7 CO₂ Absorbent Refill Bag (2.2 lbs) *
- WWV1932 Operation Manual *

(Items with * are not pictured)

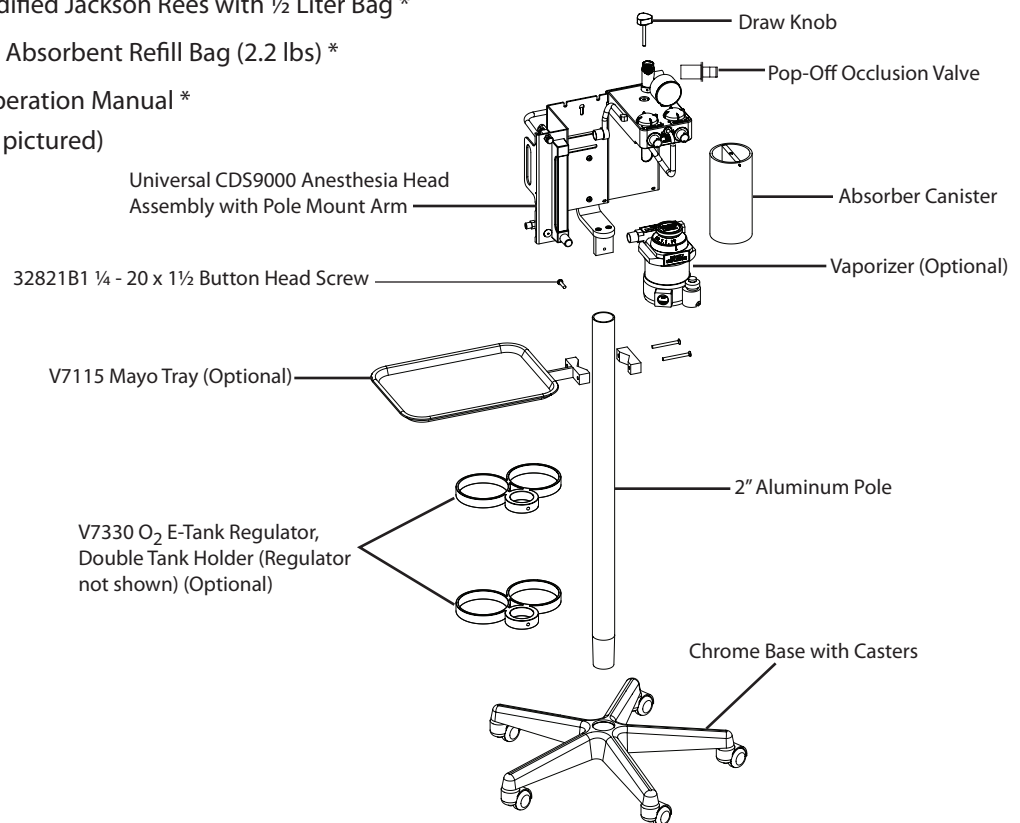


Figure 2-1: WWV9000 Series

Items Included With WWV9010 Series

- Universal CDS 9010 Table Top
- 32816B1 Draw Knob
- 32046B1 Absorber Canister
- 32359B3 F-Circuit with 2 Liter Bag *
- 32359B6 Modified Jackson Rees with ½ Liter Bag *
- V7309 Pop-Off Occlusion Valve
- 32046A7 CO₂ Absorbent Refill Bag (2.2 lbs) *
- Operation Manual *

(Items with * are not pictured)

NOTE! Items included with the WWV9010 series are similar to items shown in Figure 2-1.

Definition of parts

Flowmeter

Located to the left of the Vaporizer and Absorber System. The Flowmeter controls the delivery of oxygen into the breathing circuit. The standard Flowmeter reads from 200cc to 4 Liters Per Minute (other combinations and ranges are available).

Flush Valve

Located above the Flowmeter, this device is used to quickly deliver oxygen to the patient (bypasses the Vaporizer). It is also used to pressure test the anesthesia machine.

Female End Cap

Universal (23 mm taper) connection for most vaporizers, attaches to the Vaporizer Inlet.

Male End Cap

Universal (23 mm taper) connection for most vaporizers, attaches to the Vaporizer Outlet.

Pop-Off Valve

Located behind the Pressure Manometer. The Pop-Off Valve directs the waste anesthetic gas from the machine to a scavenging system. In the completely open position, the SurgiVet[®] Pop- Off Valve will release pressure at 2 cm H₂O, while maintaining a constant passive volume in the breathing bag.

NOTE! Do not overtighten the valve when closing.

Pressure Manometer

Located on top of the machine behind the exhalation valve. The manometer has two functions:

- Used during a pressure test of the anesthesia machine for leak detection.
- Provides a visual measurement of the patient airway pressure.

Inhalation Valve

Located on the front of the machine to the left of the Exhalation Valve. This valve opens to allow fresh anesthetic gas and oxygen delivery to the patient during inhalation. It also closes during exhalation.

Exhalation Valve

Located on the front of the machine to the right of the Inhalation Valve. This valve opens to allow exhaled gas to circulate through the absorber canister and closes during inhalation to prevent rebreathing of carbon dioxide.

Bag Port

Located below the Exhalation Valve. The Bag Port is used to connect a breathing bag or a ventilator hose.

Absorber Canister

Located behind and underneath the Inhalation/Exhalation Valves. It holds absorbent to remove carbon dioxide from the re-circulating anesthetic and oxygen.

Universal F-Circuit

Rebreathing circuit used for patients that weigh 7 kg (15 lbs) or more.

Modified Jackson Rees (MJR) Circuit

Non-rebreathing circuit used for patients that weigh less than 7 kg (15 lbs).

This page is intentionally left blank.

Chapter 3: Machine Operation

Set-up Diagram and Instructions

WARNING! Improper Setup, Use, or Maintenance of anesthetic agents and compressed gas in conjunction with this machine may result in serious injury or death.

CAUTION! Overtightening the absorber canister draw knob may cause damage to the machine and result in leakage. Do not overtighten.

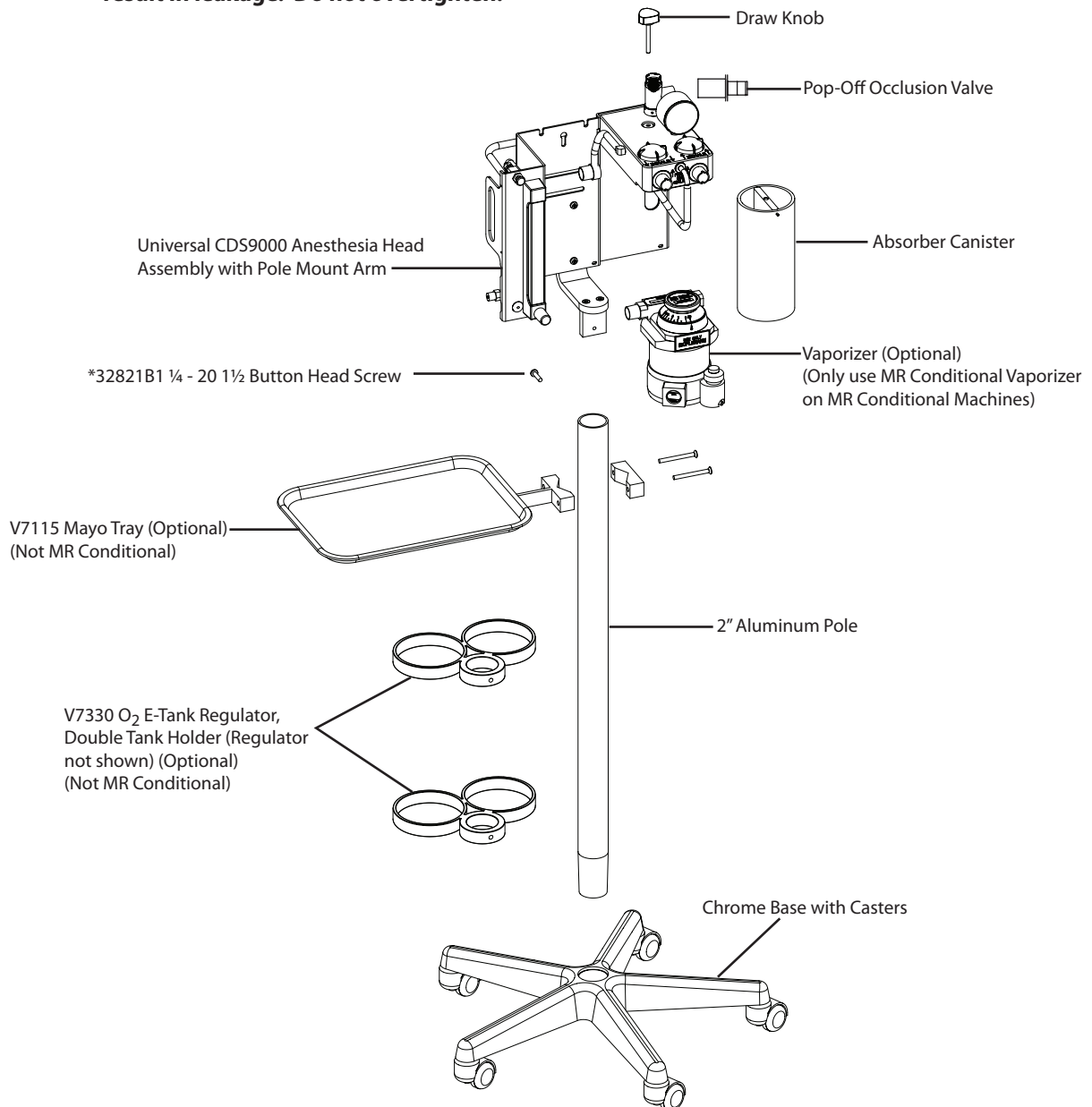


Figure 3-1: Machine Set-up

* This component may contain trace amounts of ferrous material.

WARNING! Use only MR Conditional replacement parts approved by Smiths Medical PM, Inc. or an authorized representative of Smiths Medical PM, Inc.

WARNING! Some optional accessories are not MR Conditional. Use only MR Conditional accessories. If the accessory is not labeled with MR Conditional symbol, do not use the accessory in an MR Environment. Only properly labeled accessories are safe for use in MR Environments. (See Figure 1-1 for correct labeling.)

Please contact Smiths Medical PM, Inc. Veterinary Clinical Support before attaching any accessories to your CDS9000 Series Anesthesia Machine.

To setup the machine:

1. Gather all parts from the shipping container.
2. Firmly insert casters into the base to ensure a balanced base (See Figure 3-1).
3. Insert the beveled (tapered) end of the 2" Aluminum Pole into the Base and press firmly to ensure stability.
4. All pole mounted optional accessories for the anesthesia machine should be installed at this time. Slide each accessory down over the pole and secure it in position before proceeding to the next step. Optional Accessories are as follows:
 - V7330 O2 E-Tank Regulator, Double Tank Holder
 - V7331 Universal Double E-Tank Monifold
 - V7261 E-Tank Stabilizer
 - V7115 Mayo Tray
 - V7260 SAV Universal Mounting Bracket
 - V7121 "Z" Bracket
 - V7122 Universal Vaporizer Mounting Bracket with end caps
 - V712201 Universal Vaporizer Mounting Bracket without end caps
5. Align the Pole Plug with the hole in the 2" aluminum pole. Install the machine head onto the pole. Install the 1/4 - 20 x 1 1/2 Button Head screw and tighten.
6. Cut the plastic zip tie and carefully release the chrome end caps with silicone tubing from the anesthesia machine bracket.
7. Attach the vaporizer to the anesthesia machine bracket using the screws provided (located on the back of the vaporizer manifold).

NOTE! Vaporizer mounting hardware is included with the purchase of the vaporizer only; it is not included with the purchase of the anesthesia machine due to the various styles of vaporizers that the machine accommodates.

**NOTE! The order of the vaporizer mounting hardware on the bolt is as follows:
Lock Washer---Flat Washer---Bracket (machine) ---Nylon Washer---Vaporizer**

NOTE! The nylon washer should be placed between the vaporizer manifold and the frame of the machine. This allows enough space to appropriately attach the male and female endcaps.

NOTE! It is not necessary to use a Nylon Washer for the Tech 4 Vaporizers

NOTE! For certain styles of vaporizers, it may be necessary to attach the male and female end caps to the vaporizer first, before mounting it to the machine (see step 8).

8. If you have not done so already, twist and pull the end caps apart and attach the end caps to the manifold of the vaporizer using a push and twist action. The male end cap goes on the outlet of the vaporizer (right side when looking at the front of the vaporizer) and the female end cap goes on the inlet of the vaporizer (left side when looking at the front of the vaporizer).
9. With the oxygen and the vaporizer turned off, you can now fill the vaporizer with the appropriate agent up to the maximum fill line. You will need to let the vaporizer sit for a minimum of 1 hour and then add more agent up to the maximum fill line. The wick inside the vaporizer is dry and will soak up the agent.

WARNING! Failure to let the vaporizer absorb agent for 1 hour after the initial fill and before use may result in inconsistent patient anesthetic depth.

10. Cover the threaded opening at the top of the absorber canister with your finger or a piece of tape and fill the absorber canister to about $\frac{1}{2}$ - 1" from the top.

NOTE! If absorbent gets down into the threaded opening at the top of the canister, it will cause a leak in the anesthesia machine.

11. Once the absorber canister is filled, locate the guide pin at the top front of the canister. Match the guide pin with the notch underneath the anesthesia machine block. Secure the canister in place using the draw knob.

CAUTION! Overtightening the absorber canister draw knob may cause damage to the canister and result in leakage. Do not overtighten.

12. Using a wrench, attach oxygen hose (not included) to the male threaded fitting (DISS male) on the back of the oxygen flowmeter. Attach the opposite end of the oxygen hose to an oxygen source (e-tank, h-tank, wall outlet, ceiling drop) that is regulated to 50-55psi.

CAUTION! Do not over tighten the oxygen hose on the back of the anesthesia machine as this may inadvertently loosen the fitting at the back of the flowmeter and may result in leakage.

CAUTION! Do not apply compressed gas to a machine that is unregulated. Using compressed gas delivered in excess of 65 psi may damage the flowmeter, plumbing and flush valve.

Getting Started

Check the machine to make sure it is operating normally and is leak free by performing a pressure test. A pressure test is recommended to be performed daily. See Daily Machine Checklist on page 4-2.

Attaching the Universal F-circuit

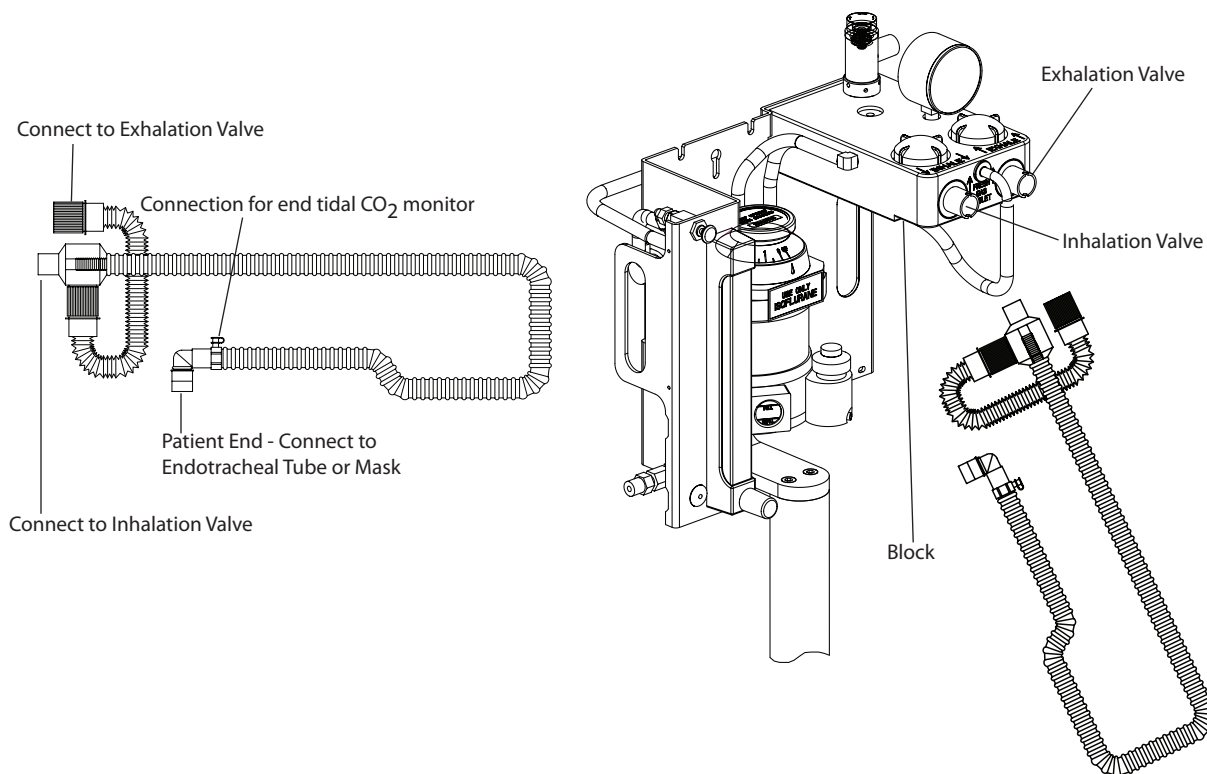


Figure 3-2: Attaching the 32359B3 Universal F-circuit

WARNING! The Universal F-circuit is a rebreathing circuit that should only be used with animals that weigh from 7 kg (15 lbs) or greater.

NOTE! When using the F-circuit, condensation will form in the outer tube. This will create warm fresh gas which is good for the patient.

1. Locate the inhalation/exhalation valves on the front of the block.
2. Attach the corrugated teal tube within the clear tube to the inhalation valve (left).
3. Attach the short clear corrugated tube to the exhalation valve (right).
4. Attach rebreathing bag to the bag port located underneath the exhalation valve.

Attaching the Modified Jackson Rees (MJR) Circuit

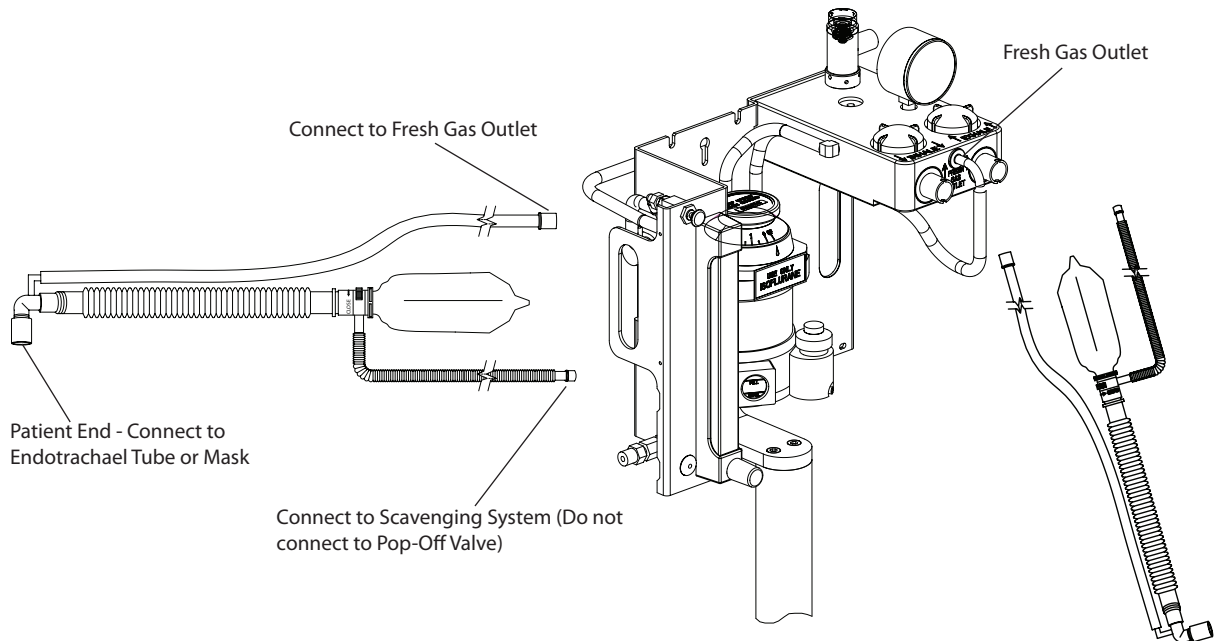


Figure 3-3: Attaching the 32359B6 Modified Jackson Rees (MJR) Circuit

WARNING! The MJR is a non-rebreathing circuit that should only be used on animals that weigh 7 kg (15 lbs) or less.

1. Locate the Fresh Gas Outlet located between the Inhalation and Exhalation valves. Remove the metal 15 mm elbow adapter from the block and let the adapter hang.
2. Remove the MJR from the bag and locate the smooth clear 72" tubing on the circuit.
3. Place the end of the smooth clear 72" tubing with the 15mm adapter, into the Fresh Gas Outlet. By doing so, you are bypassing the absorber, the inhalation/exhalation valves, the manometer, and the pop-off valve on the machine.

CAUTION! Do not press the adapter at the end of the smooth clear 72" tubing in too firmly or it may be difficult to remove, resulting in damage to the adapter or the Fresh Gas Outlet.

4. Place the ½ liter bag provided with the MJR circuit onto the corrugated clear tubing of the MJR below the section labeled 'Thumb Slide Valve - Open/Closed'. The Thumb Slide Valve located on the main housing acts as a Pop - Off valve.

WARNING! The Thumb Slide Valve should be kept in the open position at all times unless you are giving the patient a manual breath.

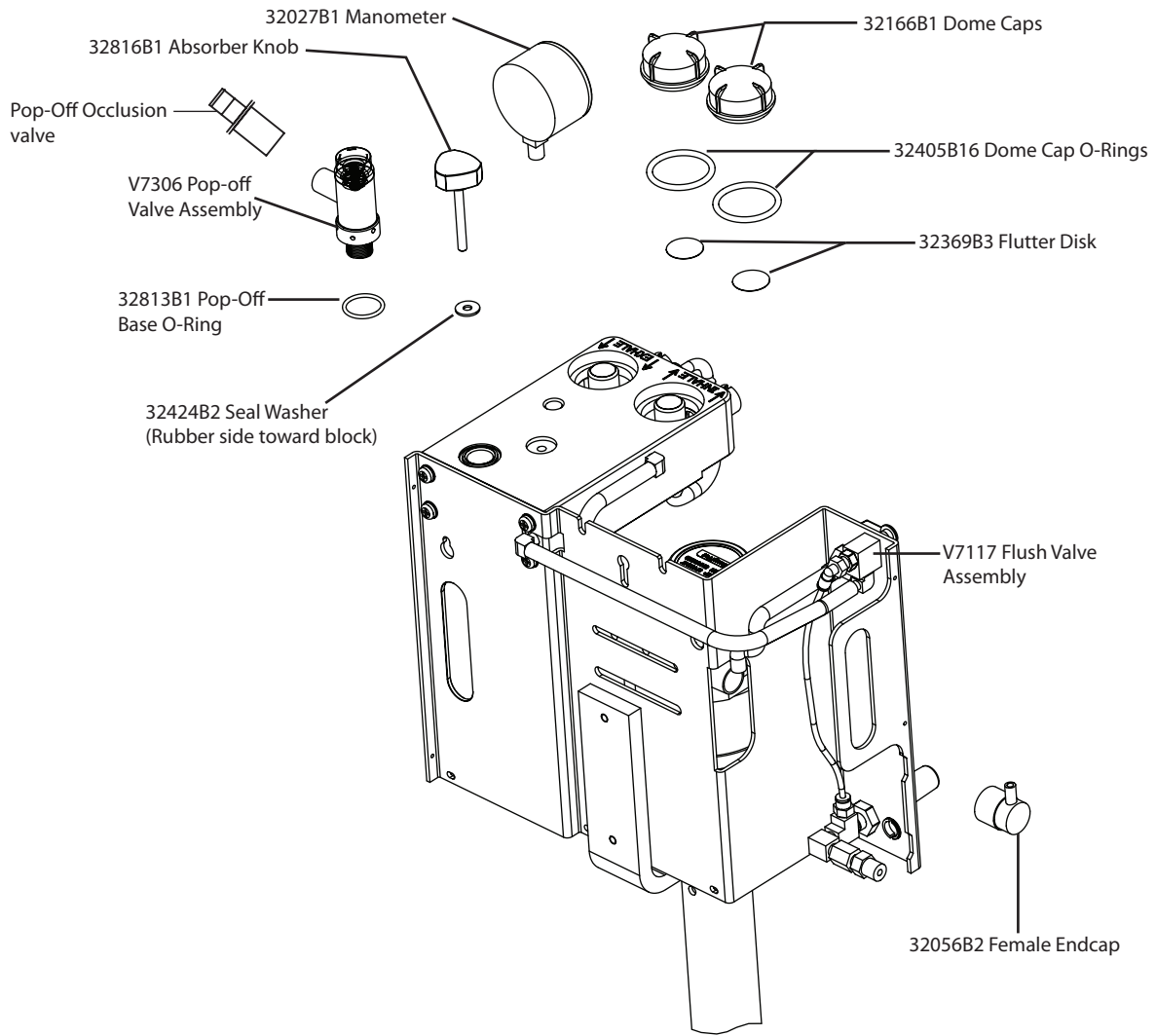


Figure 3.4: Machine Parts, View 1

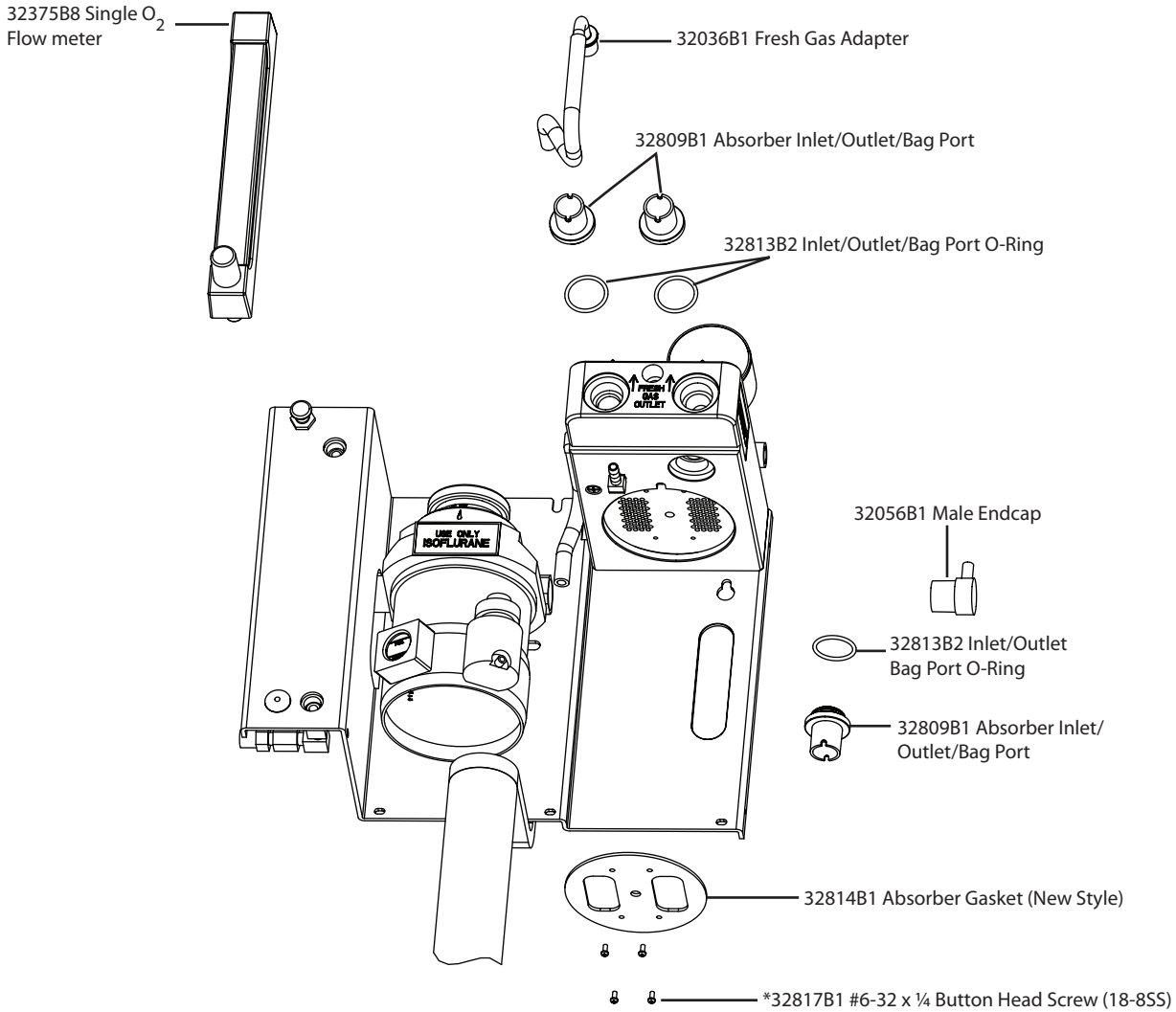


Figure 3.5: Machine Parts, View 2

* This component may contain trace amounts of ferrous material.

This page is intentionally left blank.

Chapter 4: Routine Maintenance

Routine Maintenance

ITEM	ACTION	INTER-VAL	PART NUMBER
Pressure Test	See Daily Machine Checklist	Daily	NA
Patient circuits, hoses, rebreathing bags	Clean, inspect for damage	Daily	Universal F-circuit - 32359B3 Modified Jackson Rees - 32359B6
Machine surfaces	Clean	Daily	NA
CO ₂ absorber canister	Clean. Change when 2/3 blue/purple	As needed	Absorber canister-32046B1
Inhalation/Exhalation Valves	Visually inspect	Daily	Dome cap-32166B1
Pop-off Valve	Ensure smooth opening/closing, can be cleaned	Daily	V7306
Gaskets (absorber and dome cap)	Visually inspect, clean	Weekly	Absorber gasket-32380B4 Dome cap gasket-32405B16
Flutter disks	Visually inspect for damage/curling, can be replaced	Weekly	32369B3
Manometer	Zero adjustment	As needed	32027B1
Flowmeter and Needle Valve	Ensure smooth flow and complete shut off. (Can be cleaned or replaced as needed)	Daily	Needle Valve-32413B2

Waste Gas Scavenging System (not included)

Following the manufacturer's recommendations, check that the scavenging system is properly connected, turned on and does not have too much draw (bag will be completely deflated if there is too much draw). Visually inspect all connections to ensure waste gas is not leaking into the operating environment.

WARNING! Waste Gas Anesthetic levels beyond 2 parts per million can cause health hazards.

Pressure Manometer

Visually inspect for proper alignment. Needle should be at the 0 mark. To adjust the manometer back to Zero, remove the plastic lens from the front of the manometer with a small flat headed screwdriver. There is an indentation in the cover to aid in removal. Adjust the needle using the screw located directly above and center on the zero mark.

Long Term Storage

Storage Facility:	Indoor
Temperature:	-1 to +48° C (30 to 120° F)
Relative Humidity:	10-95%, non-condensing
Periodic Inspection:	None required.
Special Procedures:	Store the SurgiVet® Universal CDS 9000 Anesthesia Machine in the original packing materials and shipping carton.

Daily Machine Checklist

1. Check that the anesthesia machine is connected to an oxygen supply that is turned on and has adequate supply at 50-55 psi.
2. Check that adequate supplies of other gases, if applicable, (nitrous oxide, air) are available and connected as appropriate.
3. Check the operation of the flowmeter(s). Check that each needle valve operates smoothly and that the ball moves freely within the tube.
4. Check that each vaporizer is adequately filled with respective agent.
5. Check the breathing circuit for proper configuration, secure connections.
6. Check that the scavenging system is properly connected/turned on and does not have too much draw (bag will be completely deflated if there is too much draw or suction).
7. If using a ventilator, ensure that it is correctly configured and tubing is securely attached.
8. Pressure test the machine.
 - a. Place bag and Universal F-circuit (rebreathing circuit) on the machine with pop-off valve closed.
 - b. Occlude the patient end of the circuit with finger and fill bag with the oxygen flush valve.

NOTE! The oxygen flowmeter should be turned off (the ball should be at the bottom of the Flowtube).

- c. Take pressure to 30 cm H₂O (centimeters of water) or until the bag is full.
- d. Allow pressure to stabilize.
- e. Pressure should not drop more than 5 cm H₂O (centimeters of water) in 10 seconds.

NOTE! If it does not hold pressure, dial in oxygen from the flowmeter to compensate for the leak. Use soapy water solution to locate the leak.

- f. Open pop-off valve and relieve pressure to 10 cm H₂O (centimeters of water).
- g. Dial in 300cc of oxygen on the flowmeter.
- h. Pressure should begin to rise slowly on the manometer.

9. Places to check for leaks:

- Inhalation and exhalation valves
- Around the absorber canister (check for granules in the threaded opening or under absorber gasket on machine head, cracking/chipping of canister)
- Fresh gas leading to absorber
- Pop-Off or relief valve
- Around the vaporizer
- Check for loose end caps on vaporizer
- Hole in bag or circuit hoses
- Cracked or deteriorated tubing

Cleaning and Disinfecting

CAUTION! Before cleaning Absorber Canister, remove all loose debris and dust. Applying water to carbon dioxide absorbent causes it to harden, making it difficult to remove.

Patient circuits, hoses, and breathing bags

Clean with dilute chlorhexidine type solution: 1 ounce (2 Tablespoons) per gallon of water. Hang circuits up to dry. Inspect circuits for any noticeable deterioration.

Machine surfaces

Clean with dilute chlorhexidine type solution: 1 ounce (2 Tablespoons) per gallon of water.

Absorber Canister

To remove the absorber canister, loosen the draw knob at the top of the aluminum block directly above the canister. After removing the canister, dispose of all particles and dust. Clean with mild soap and water and dry completely. Inspect for damage and replace if necessary. Wipe the gasket underneath the block with Isopropyl alcohol and dry completely before reassembly. Do not saturate gasket.

Inhalation/Exhalation Valves

Unscrew the plastic dome caps that rest on top of the inhalation/exhalation valves. Visually inspect the dome caps for cracks or worn areas that may leak. Visually inspect the plastic flutter disks for tears, signs of wear, or curling. Ensure the disk completely covers the valve opening. Visually inspect the gaskets for signs of wear or curling. Clean all components with mild soap and water, dry completely. Replacement dome caps, flutter disks, and gaskets are available.

Pop-off Valve Removal and Cleaning



Figure 4-1: Pop-Off Valve Removal (Supplies needed)

NOTE! Pop-Off Valve shown disassembled from the machine for clarity. It is not necessary to disassemble the Pop-Off Valve from the machine to perform this operation.

Supplies Needed:

- 5/64 Allen Wrench
- 70% Isopropyl Alcohol - not shown
- Soft Cloth
- Krytox® Lubricant
- Needle-Nosed Pliers - not shown

1. Loosen the small set screw located on the chrome body of the Pop-off Valve. (See Figure 4-2)



Figure 4-2: Loosen Set Screw on Pop-Off Valve



Figure 4-3: Unscrew Assembly from Body

2. Open the Pop-Off Valve to the fully open position (counterclockwise) and then turn 1/4 turn back (clockwise). Unscrew the top black portion of the Pop-off Valve and then unscrew the assembly from the body. (See Figure 4-3)

- Use a pair of thin needle-nosed pliers to remove the ball from inside of the body. Do not lose the ball!

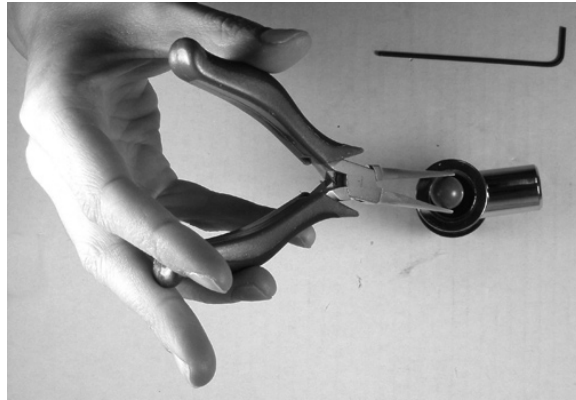


Figure 4-4: Remove Ball

- Place the ball on a soft cloth to avoid losing the ball.
- Use a soft clean cloth and 70% isopropyl alcohol to clean the ball. Ball must be completely dry before reassembling.
- Use a Q-Tip dipped in 70% isopropyl alcohol to clean the teflon o-ring located inside the chrome body.
- Apply a small amount of Krytox[®] lubricant to the threaded areas on the knob threads.

WARNING! Do not apply Krytox[®] to the inside of the Pop-off Valve. Doing so will cause the ball to stick and create a harmful increase in patient pressure.

- Insert ball and make sure that it rests on the teflon o-ring.
- Screw knob assembly back into the chrome body and tighten set-screw.
- Test movement of the Valve's knob by opening and closing completely several times. The knob should move smoothly.
- Open Pop-Off Valve completely.

WARNING! Failure to completely open the Pop-off Valve during Normal Operation may result in serious injury or death. Verify the Pop-off Valve is in the Open position before use.

- Test the relief function of the Pop-off Valve by flowing oxygen through the machine and partially occluding the breathing circuit. The breathing bag should fill and the manometer will build pressure to 2 cm H₂O and then release. Place your hand in front of the Pop-off Valve's outlet to confirm the release of oxygen. The manometer should return to zero.
- Close the Pop-Off Valve completely.
- Test the sealing function of the Pop-off Valve by performing a Pressure Test. If the Pop-Off Valve leaks between the Chrome Body and the Black Base, the o-ring will need to be replaced. If o-ring needs to be replaced, proceed to steps 15 - 21.

15. Loosen set screws (3) on the black base using a 5/64 inch Allen Wrench. (See Figure 4-5)

CAUTION! Do not completely remove the screws, doing so will expose ball bearings which can be lost easily.



Figure 4-5: Loosen Set Screws



Figure 4-6: Remove Chrome Body from Black Base

16. Slowly remove Chrome Body from Black Base. Be careful not to remove the 3 ball bearings located behind the set screws. (See Figure 4-6)

17. Replace the existing o-ring with a new o-ring (P/N 32405B18).



Figure 4-7: Replace O-Ring

18. Apply a thin film of Krytox to the new o-ring.

19. Install chrome body back into the black base.

20. Position Pop-Off as desired and tighten the 3 set screws using a 5/64 inch Allen Wrench.

21. Perform a pressure test to confirm that the o-ring is sealing properly. Contact Clinical Support if you have any questions.

Flowmeter Removal and Cleaning

NOTE! This procedure can also be used to replace the Flowtube.

NOTE! Visually inspect the flowmeter for movement of the float (ball) inside the tube. If the float (ball) sticks inside the tube, remove the tube and clean it.

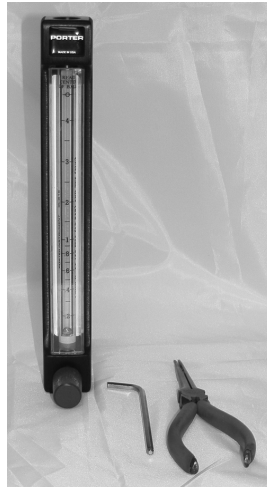


Figure 4-8: Flowmeter Removal Supplies

NOTE! Flowmeter shown disassembled from the machine for clarity. It is not necessary to disassemble the Flowmeter from the machine to perform this operation.

Supplies Needed:

- 5/32 Allen Wrench
- Isopropyl Alcohol
- Thin Needle Nosed Pliers
- Soft cloth

1. Make sure oxygen supply is turned off. Use the Flush Valve to deplete any remaining oxygen.
2. Remove the plastic lens cover on the flowmeter by pinching the sides in gently and pulling it out. (See Figure 4-9)

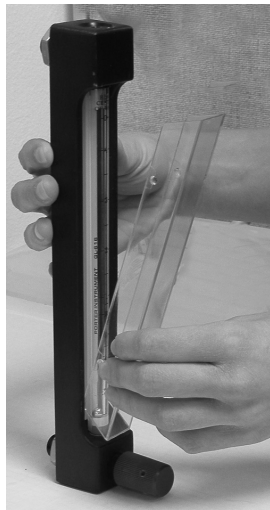


Figure 4-9: Remove Plastic Lens Cover



Figure 4-10: Loosen Nut on top of Flowmeter

3. While holding the Flowtube, use the 5/32 inch Allen wrench to loosen the nut on the very top of the flowmeter assembly. (See Figure 4-10)

- Carefully pull out the glass Flowtube.
- Use a pair of thin Needle Nosed Pliers to remove the stop. (See Figures 4-11 and 4-12)



Figure 4-11: Use a Needle Nosed Pliers

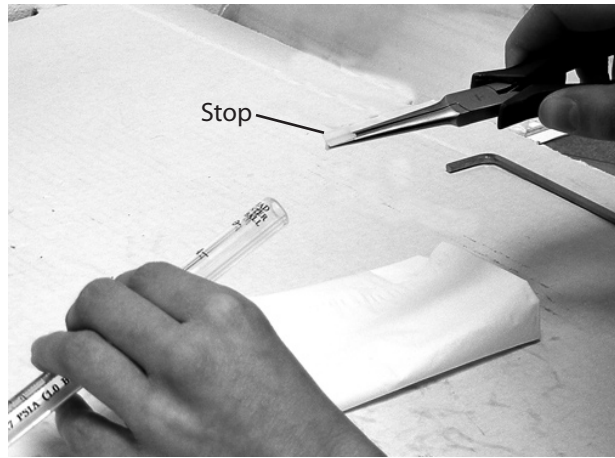


Figure 4-12: Remove the Stop

- Remove the ball from the tube and place it on a clean cloth.

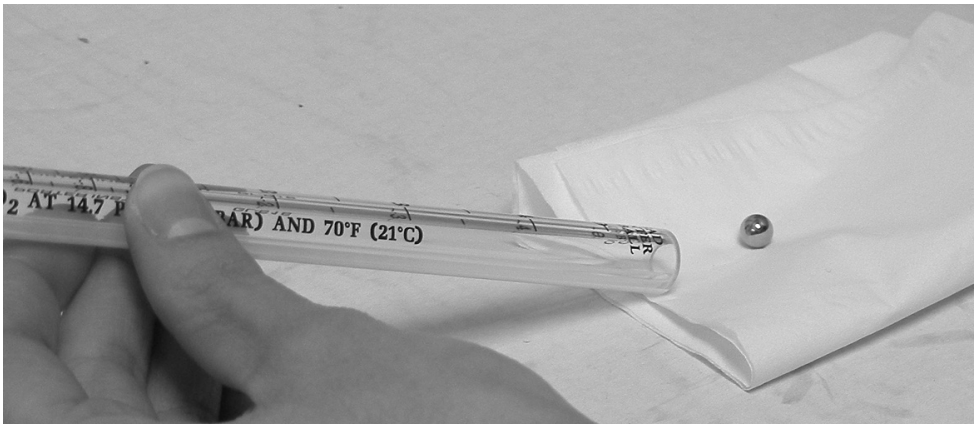


Figure 4-13: Remove the Ball

- Squirt Isopropyl Alcohol into the tube.
- Gently tip the tube back and forth, allowing the alcohol to flow throughout the tube several times.

NOTE! It may be necessary to clean flowtube with a plastic bristle brush or long Q-Tip.

- Pour alcohol out of tube and properly dispose of used alcohol.
- Allow Flowtube to dry for about 10 minutes.
- Clean ball with isopropyl alcohol.

12. Once Flowtube and ball are dry, install ball and stopper. Make sure stopper is slightly recessed for alignment guide.

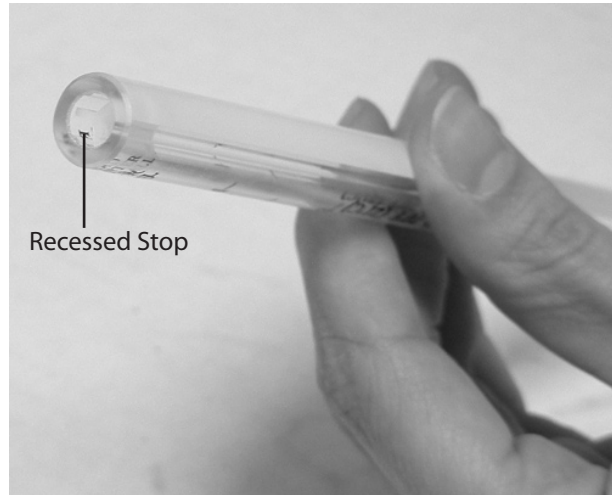


Figure 4-14: Recessed Stop

13. Install Flowtube assembly. Make sure Flowtube is centered on the alignment guide located inside the gaskets. (Top and Bottom)

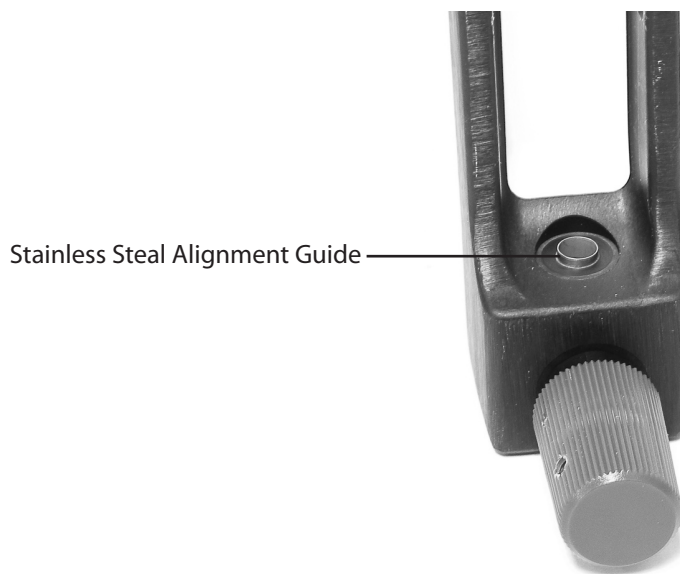


Figure 4-15: Stainless Steel Alignment Guide

14. While holding the Flowtube the entire time, center the Flowtube and tighten screw with 5/32" Allen Wrench. Make sure numbers are facing out toward you. Do not overtighten.
15. Replace plastic cover.
16. Turn oxygen on. Test Flowmeter by turning it fully On and then fully Off gradually. If the ball continues to stick in the tube, repeat steps 1-16 or contact Clinical Support.

Minor Repairs

Needle Valve Adjustment

Supplies Needed:

- 1/16 inch Allen Wrench

NOTE! Flowmeter shown disassembled from the machine for clarity. It is not necessary to disassemble the Flowmeter from the machine to perform this operation.

1. With needle valve still attached to the flowmeter, remove the top 2 set screws using a 1/16 inch Allen Wrench. (See Figure 4-16)
2. Loosen the lower 2 set screws using the same 1/16 inch Allen Wrench.



Figure 4-16: Loosen Set Screws in Knob

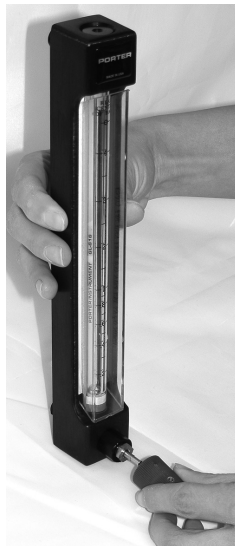


Figure 4-17: Pull Off Knob



Figure 4-18: Adjust Metal Rod

3. Pull off knob. (See Figure 4-17)
4. Turn on oxygen supply to anesthesia machine.
5. First try using your fingers to adjust metal rod to turn off flow in flowmeter. (See Figure 4-18) If this cannot be turned with fingers, use pliers taking care not to damage rod. Do not over tighten as you may damage needle valve.
6. Once ball is resting on the stop, put knob back onto needle valve. Push on fully and turn knob until it contacts the stopper. (See Figure 4-19)

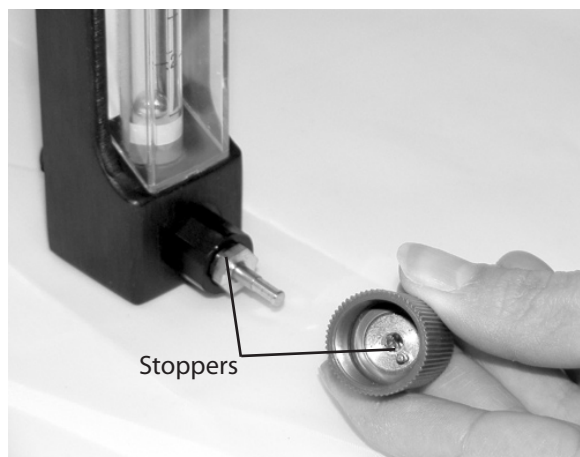


Figure 4-19: Put Knob Back Onto Needle Valve

7. Tighten the lower 2 set screws. Do not overtighten as you may strip them.
8. Install the other 2 set screws.
9. Turn on oxygen supply and test function of flowmeter by turning it Off and On gradually.

Needle Valve Replacement

Supplies Needed:

- 9/16" Open-End Wrench
- Needle Valve (32413B2)

NOTE! Flowmeter shown disassembled from the machine for clarity. It is not necessary to disassemble the Flowmeter from the machine to perform this operation.

1. Turn oxygen supply to the anesthesia machine OFF and deplete the system using the flush valve on the anesthesia machine.
2. Turn flowmeter knob counterclockwise until it stops (this will also remove any oxygen left in the system).
3. Place a 9/16" open-end wrench on the black aluminum portion of the needle valve assembly directly in front of the plastic knob. (See Figure 4-20)



Figure 4-20: Wrench Directly in Front of Plastic Knob



Figure 4-21: Remove Old Needle Valve Assembly

4. Turn wrench counterclockwise to remove the old needle valve assembly. (See Figure 4-21)
5. Turn the flow knob counterclockwise on the new needle valve assembly until it stops.
6. Insert the new needle valve assembly into the flowmeter and tighten with a 9/16" wrench. **Do not overtighten.**
7. Turn flow knob clockwise until it stops. This is the OFF position.

CAUTION! Do not overtighten the flow knob. This can cause damage to the needle valve.

8. Turn oxygen supply to the anesthesia machine ON and check the flowmeter for proper function.

CAUTION! When the ball is resting on the bottom of the stop in the flow tube, the flowmeter is OFF. There is no need to tighten any more.

This page is intentionally left blank.

Chapter 5: Troubleshooting

Troubleshooting Guide

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
No oxygen flow through oxygen flowmeter	<p>Empty oxygen tank.</p> <p>Oxygen tank is turned off.</p> <p>Defective Regulator.</p> <p>Oxygen hose is disconnected or loose.</p> <p>Damaged Needle Valve</p>	<p>Use full oxygen tank.</p> <p>Turn on oxygen tank.</p> <p>Press Flush Valve to see if machine is getting oxygen.</p> <p>Connect or tighten oxygen hose at machine and oxygen source.</p> <p>Replace Needle Valve.</p>
Machine fails Pressure Test on Daily Machine Checklist	Leak in anesthesia machine	<p>Check absorber canister.</p> <p>Check for loose granules underneath absorber gasket.</p> <p>Check that the vaporizer end caps are securely in place.</p> <p>Check for punctures around silicone hose connections.</p> <p>Check bag and circuit hoses.</p> <p>Check that the vaporizer fill cap is tight.</p>
Patient does not respond to anesthetic agent	<p>Leak in anesthesia machine.</p> <p>Not enough oxygen flow.</p> <p>No agent in vaporizer.</p> <p>Too much draw or vacuum coming from Active Waste Gas Scavenger.</p> <p>Vaporizer is due for service.</p>	<p>Perform Pressure Test on Daily Machine checklist.</p> <p>Increase oxygen flow to at least 1 LPM.</p> <p>Fill vaporizer with agent to the top fill line.</p> <p>Decrease draw or vacuum for Active Waste Gas Scavenger.</p> <p>Check service due date on side of vaporizer.</p>
Rebreathing bag does not inflate.	<p>Leak in anesthesia machine.</p> <p>Too much draw or vacuum coming from Active Waste Gas Scavenger</p>	<p>Perform Pressure Test on Daily Machine checklist.</p> <p>Decrease the amount of draw or vacuum for Active Waste Gas Scavenger.</p>

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Rebreathing bag over inflates (Pressure is over 5 cm H ₂ O)	Size of bag is inappropriate for the size patient it is being used on.	Check the size of the bag and change if needed.
	Pop-off valve is partially or completely closed or not functioning.	Open Pop-off valve all the way or Clean or replace Pop-off valve.
	Flow is obstructed passing through the Charcoal Canister.	Position charcoal canister so gas can pass through properly.
	Flush Valve is defective.	Check and replace Flush Valve if necessary.

If the SurgiVet[®] CDS 9000 Anesthesia Machine is still not functioning properly, contact Veterinary Clinical Support for help.

Smiths Medical PM, Inc.
 Attn: Repairs
 N7W22025 Johnson Drive
 Waukesha, WI 53186-1856

Telephone: 1-262-513-8500
 Toll-Free: 1-888-745-6562 (USA only)
 Fax: 1-262-542-0718

Chapter 6: Supplies and Accessories

CATALOG NUMBER	DESCRIPTION	QUANTITY
32027B1	Manometer	1
32369B3	Flutter Disc	2
32166B1	Dome Cap	2
32405B16	Dome Cap O-Ring	2
32046B1	Absorber Canister	1
32380B4	Absorber Canister Gasket	1
32816B1	Draw Knob w/Washer	1
32028B6	2" Chrome Pole	1
V7117	Flush Valve Assembly	1
32413B2	Needle Valve with Knob, O ₂	1

WARNING! Use only MR Conditional replacement parts approved by Smiths Medical PM, Inc. or an authorized representative of Smiths Medical PM, Inc.

NOTE! Warranties are subject to change, please contact Smiths Medical PM, Inc. for current warranty information.

For ordering information, contact Veterinary Clinical Support at the address or phone number below.

Smiths Medical PM, Inc.	Telephone: 1-262-513-8500
N7W22025 Johnson Drive	Toll-Free: 1-888-745-6562 (USA only)
Waukesha, WI 53186-1856	Fax: 1-262-542-0718

This page is intentionally left blank.

Chapter 7: Specifications

Performance Characteristics for all CDS 9000 Series Machines

Absorber Canister:	900 cc
Pop-Off Valve:	19 mm, relieves at 2 cm H ₂ O
Inhalation/ Exhalation Valves:	Tapered, 22 mm
Flowmeter:	0.2 to 4 LPM
Flush Valve:	10-15 LPM
Pressure Manometer:	60 cm H ₂ O
Oxygen Inlet:	DISS Male

Performance Characteristics for MR Conditional CDS 9000 Series Machines

Static Magnetic Field:	3-Tesla or less
Highest Spatial Gradient Magnetic Field:	720-Gauss/cm or less
Magnetic Field Interactions:	no free movements
Eddy Currents:	detected at +3 with single O ₂ flowmeter detected at +4 with dual O ₂ flowmeter
Artifacts:	none observed
Functional/Performance Testing:	unaffected by the operation of the 3-Tesla MR System
MR Related Heating:	Heating was not assessed as product will not be inside the MR system during intended use.

Environment

Temperature

Operating:	15 to 32 °C (60 to 90 °F)
Storage:	-1 to +48 °C (30 to 120 °F)


Physical

Dimensions	WWV9000	WWV9010
Height:	135.3 cm (53.25 in)	36.8 cm (14.5 in)
Depth:	66 cm (26 in)	26.7 cm (10.5 in)
Width:	66 cm (26 in)	36.2 cm (14.25 in)
Weight:	10.4 kg (23 lbs)	6.8 kg (15 lbs)

Calibration

Daily pressure test recommended.

This page is intentionally left blank.

 Manufactured By
Smiths Medical PM, Inc.
N7W22025 Johnson Drive
Waukesha, WI 53186-1856 USA
www.surgivet.com