Mallard Anesthesia Ventilator Machine

Mallard Medical
(a Subsidiary of AB Medical Technologies, Inc.)

Operational Instructions
&
Routine Maintenance

(M001 Rev. 07-01-26)

Models: 2800C-MRI & 2800CP-MRI
Large Animal Anesthesia Ventilator System
(For Veterinary Use Only)

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MEDICAL

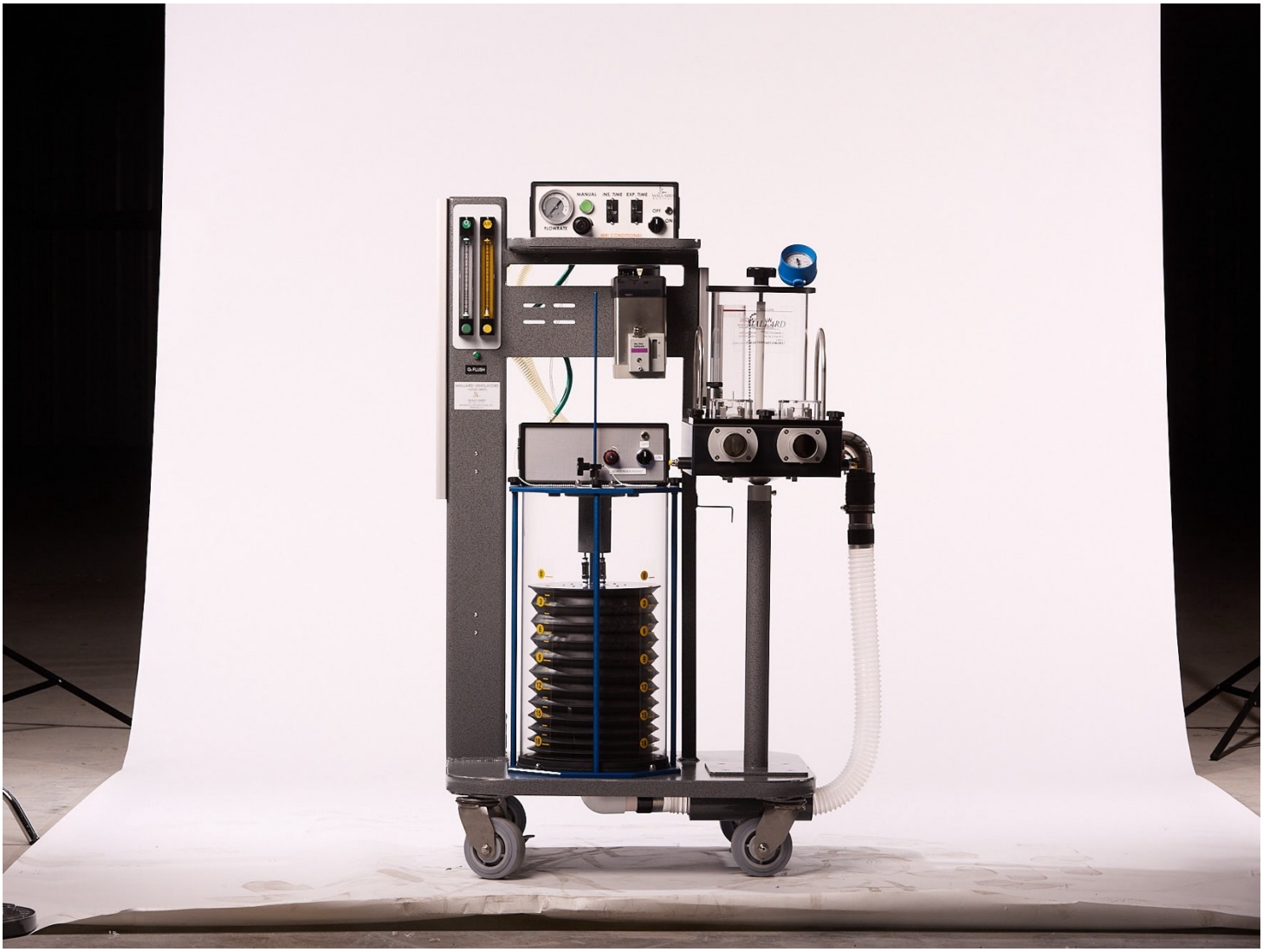
20272 Skypark Drive, Redding, CA 96002 Telephone: (530) 605-2522
www.mallardmedical.com Email: support@mallardmedical.com

Contents

The Model 2800C-MRI & 2800CP-MRI Anesthesia Ventilators are designed to comply with the following standards:

- American National Standards Institute, Z 79.7, Breathing Machines for Medical Use
- American Society for Testing and Materials, F29.03.02, Standard Specifications for Ventilators Intended for Use During Anesthesia.
- Compressed Gas Association Diameter, Index Safety System.

MODEL 2800C-MRI LARGE ANIMAL ANESTHESIA VENTILATOR SYSTEM



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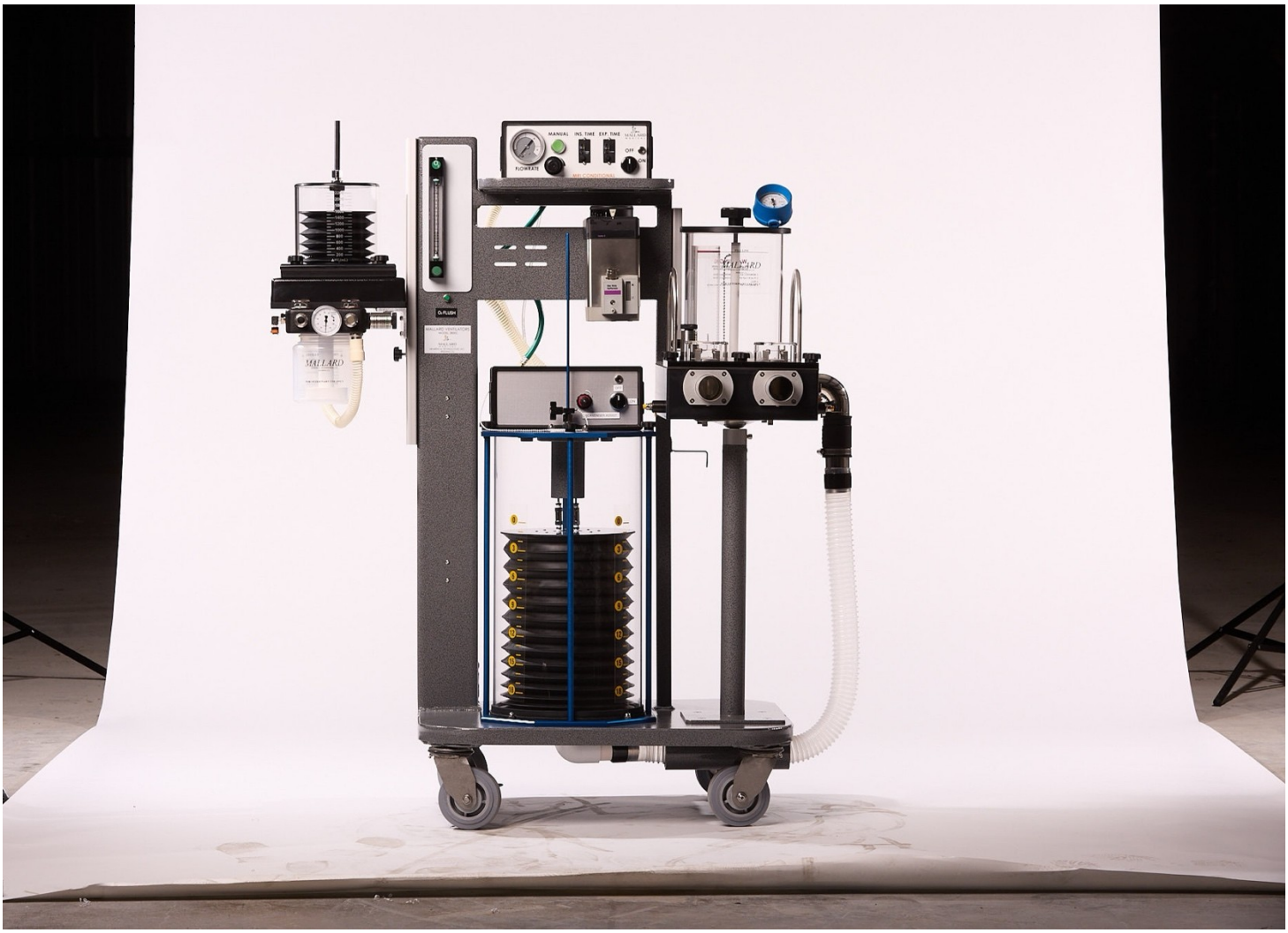
MODEL 2800CP-MRI LARGE & SMALL ANIMAL ANESTHESIA VENTILATOR SYSTEM



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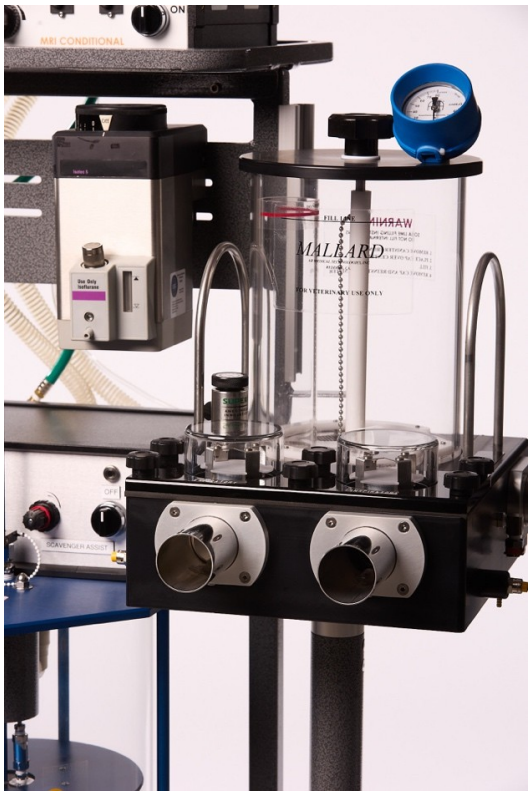
Absorber Circuit Cautions & Warnings



Cautions & Warnings:

Do not use alcohol as a cleaning agent

Do not over tighten center hold down rod

To open system for soda lime replacement, turn center knob counter-clockwise and remove knob and shaft. Remove top plate using care not to expose manometer to rough handling and/or moisture. DO NOT wash bottom surface of the absorber lid, water and soap will enter the manometer causing damage. DO NOT use any cleaning agent that has alcohol in it when washing the canister or valve cover.

Always remove soda canister from base to replenish soda lime. Cover center tube with white cap provided to prevent soda lime from entering this tube. Do not pour soda lime down the internal clear 2” diameter tube. Fill only to fill line on canister. Ensure the bottom of canister is clean and free of soda lime material before replacing canister. Align tab on bottom of canister with opening on block.

MODEL 2800C-MRI LARGE ANIMAL ANESTHESIA VENTILATOR Description:

1. Pneumatically controlled ventilator.
2. Expanded flow rate control for pediatric through large adult application 0 – 600 liters per minute.
3. Pneumatic gauge display of respiratory values and I:E ratios.
4. GCX mounting rails provide a practical solution for adding trays or monitors.
5. Mounting brackets on frame for hoses.
6. The ascending bellows system features an 18-liter capacity with markings in 1-liter increments on the canister.
7. Expanded base ensures great stability and offers ample space for accessories.
8. Two 5” locking wheels ensure the machine stays secure and stable during surgery.
9. Includes large animal absorber circuit.
10. Ultra capacity soda lime canister for removal of carbon dioxide.
11. Visible directional valves to easily observe inhalation and exhalation.
12. Patented advanced design gas balance valves.
13. Patient circuit pressure gauge.
14. Slotted holes positioned to accommodate up to two vaporizers (vaporizer’s sold separately, agent specific).
15. Oxygen flush button delivers 100% oxygen to absorber circuit.
16. Anesthetic flow meter (1-10 liters per minute) to vaporizer.
17. Large animal breathing circuit included.

Conformance of System

Before using this device in a clinical setting, it's crucial that all personnel carefully review and fully understand the instructions outlined in the manual.

The Mallard Model 2800C-MRI & 2800CP-MRI Anesthesia Ventilator is designed to perform as specified in the manual and accompanying labels, provided it is assembled, operated, maintained, and repaired strictly according to the included guidelines.

Do not attempt to assemble or operate this ventilator without first reading and fully grasping the instructions. Routine inspections, as detailed in the manual, are necessary to confirm proper functionality. A ventilator that is malfunctioning should not be used. For repairs, we recommend reaching out to the authorized Mallard distributor who supplied the device, or, if purchased directly, contacting Mallard Medical.

If the distributor does not provide a satisfactory response in a timely manner, please contact our home office in Redding, California, U.S.A. Repairs must follow the factory's written guidelines and modifications are not permitted without prior written approval from the manufacturer. Any issues resulting from improper usage, insufficient maintenance, unauthorized repairs, or unapproved alterations will be the user's responsibility.

Warning

When a patient is connected to a ventilator, continuous monitoring by qualified personnel is essential. While ventilators equipped with built-in or additional alarm systems provide alerts, they cannot guarantee detection of every potential malfunction in the ventilator or patient system. Furthermore, certain issues may demand immediate intervention.

Model 2800C-MRI & 2800CP-MRI Flowrate Control

This gauge and black control knob are located on the left side of the controller enclosure on the top shelf. Note that this knob may be in the locked position. Be sure it is pulled out prior to adjusting. This controls the driving gas flowrate from the controller to the bellows canister, which determines how hard/fast the bellows shall compress. The upper limit regarding the maximum setting of the gauge is determined by the maximum line pressure coming into the back of the cart. At 60 psi the inlet pressure on the dial indicator will be within the “M” or medium range. For larger patients, it is simply a matter of increasing the line pressure. The maximum rating is approximately 100 psi; the dial indicator will be in the “H” or High range.

We suggest having incoming psi at a minimum of 60.

VERY IMPORTANT:

Please note that after the maximum dial setting is achieved, you are still able to turn the flowrate control in the increase direction but by continuing to turn the flowrate control knob, this will cause permanent damage to the flowrate valve over time.

As with all pneumatic devices, it is important that your gas supply source has sufficient volume at any given pressure setting. With maximum setting on the ventilator, a pressure drop of less than 8 psi should be observed when the ventilator cycles on. There is a psi gauge located on the back of the unit to view this.

Description of Ventilator Controls & Displays

ON/OFF CONTROL

The ON/OFF is located on the front panel of the control console. This two-position rotary selector allows for the selection of OFF and ON.

INSPIRATORY TIME .1 TO 3 SECONDS

The inspiratory timer is located on the front panel and is labeled INS. TIME. It is a pneumatic timer with a mechanical dial display calibrated in tenths of a second (SECONDS × 0.1). Rotate the adjustment knob below the display window until the desired value appears; a displayed value of 15, for example, corresponds to an inspiratory time of 1.5 seconds. Inspiratory cycling can be confirmed visually by observing the compression of the bellows during each inspiratory phase.

Expiratory Timer 2 to 30 Seconds

The expiratory timer is located to the right of the inspiratory timer and is labeled EXP. TIME. It is a pneumatic timer with a mechanical dial display calibrated in whole seconds. Rotate the adjustment knob below the display window until the desired value appears. The expiratory time determines the interval between breaths and, together with the inspiratory time, establishes the respiratory rate.

Respiratory Rate

The MRI 2800 & 2800CP does not have a direct respiratory rate control. The respiratory rate is determined by the combined inspiratory and expiratory times:

Respiratory Rate (BPM) = 60 ÷ (Inspiratory Time + Expiratory Time)

For example, an inspiratory time of 1.5 seconds and an expiratory time of 2.5 seconds produces a respiratory rate of 15 breaths per minute.

I:E RATIO DISPLAY

The MRI 2800 & 2800CP does not display the I:E ratio. It is set directly by the operator through the selection of inspiratory and expiratory times. The inspiratory time is given as a value of one, and the expiratory time is shown relative to it; an inspiratory time of 1.0 second with an expiratory time of 1.5 seconds yields an I:E ratio of 1:1.5. Inverse I:E ratios (inspiratory time exceeding expiratory time) should not be used unless clinically indicated and directed by the attending veterinarian.

INSPIRATORY FLOW RATE

The inspiratory flow rate control is the 1" (2.54 cm) diameter black control knob located below and slightly to the left of the green manual push button control. By turning it clockwise, the flow rate to the patient will increase from minimum to maximum. Be sure the knob is pulled out / unlocked before turning to adjust. The 2¾" (6.985 cm) diameter display gauge, located to the left and above this control, indicates the level of flow being delivered to the patient. The face of this gauge has low, medium, and high selection.

The maximum flowrate selectivity is limited by the maximum PSI at the ventilation inlet as indicated on the gauge on the back of the cart. Overturning and continuing to turn the flowrate control up after the needle has stopped will cause damage to it over time if done repeatably.

In other words, once the needle stops, do not turn the flowrate up anymore before increasing the pressure on the back of the cart. We designate 60 PSI minimum but if you have a larger patient you may need to turn your incoming pressure up higher which will then allow you to turn up your flowrate control higher.

MANUAL BREATH PUSH BUTTON

Located on the front left side of the control console, this green push button may be used to develop inspiratory pressure whenever the gas supply is activated. The inspiratory pressure developed will be limited by the setting of the pressure relief valve. Inspiration will occur as long as the button is pushed and the bellows is descending. Do not continue to press once the bellows is fully descended.

As a safety feature, in the event of a loss of driving-gas pressure or pneumatic control failure, the manual breath push button can be used to provide mechanical ventilation for the patient for the duration of the surgery.

SAFETY PRESSURE RELIEF VALVE

This overpressure valve is located on the back of the control console and is factory set at 80 cm H_2O. This is the maximum amount of pressure developed within the patient breathing system. It is fully adjustable by inserting a 5/32" (0.396 cm) hex driver into the center of the relief valve. By turning clockwise, you increase pressure; by turning counterclockwise, you lower pressure.

EXHALATION VALVE ASSEMBLY

Located inside the control console, the exhalation valve operates automatically. During the inspiratory phase, it will be pneumatically closed to provide positive gas flow to the bellows chamber. During the expiratory phase, it will be pneumatically opened to vent positive pressure from the bellows chamber.

Excess anesthesia gases being vented from the patient breathing circuit will exit via the scavenger port. The gas scavenger tubing should be connected at this port. The gas scavenger system should create a slight sub ambient pressure at this port to effectively remove excess gases from the room. The vacuum should be about -5cm H_2O or slightly less to sufficiently evacuate excess scavenger gas.

Scavenger Assist

This feature is located in the enclosure on top of the bellows canister and provides additional gas scavenging if required.

If your room scavenger system is functioning properly when connected to the scavenger port, leave the system turned off.

If the machine must be taken to an area where there is no scavenger system, this feature will assist in removing excess anesthesia gas from the operating room. Attach a hose to the scavenger port and direct it out of the room to the outdoors. Turn on the master control and dial a very slight amount of flow—just enough to feel flow at the distal end of the hose. Excess flow will only waste driving gas.

This function is not needed in the presence of a properly operating external scavenger system.

Set-Up & Operation

SPONTANEOUS VENTILATION

The Mallard Model 2800-MRI & 2800CP-MRI Ventilator System will accommodate patient-initiated breathing during all modes of operation. The inverted bellows will augment the patient's inspiratory effort. As the patient begins to expire, the bellows will rise, allowing the patient's tidal volume to be observed directly from the volume indicator on the canister. Hypopnea or apnea will be observed as limited or absent movement of the bellows.

INSPIRATORY TIME AND RESPIRATORY RATE

These two pneumatic timers regulate the length of inspiration and the interval between breaths. Inspiratory time is selectable from [0.1 to 3] seconds; the INS. TIME dial is calibrated in tenths of a second (SECONDS × 0.1). Expiratory time is selectable from [2 to 30] seconds; the EXP. TIME dial is calibrated in whole seconds. Each value is displayed in a mechanical dial window and adjusted by the control knob located directly below it.

Together, these two settings determine the respiratory rate: Respiratory Rate (BPM) = 60 ÷ (Inspiratory Time + Expiratory Time). The I:E ratio is likewise set directly by the operator through the selection of these two times. An inspiratory time longer than the expiratory time produces an inverse I:E ratio; the 2800-MRI & 2800CP-MRI does not electronically limit or indicate inverse ratios, and they should not be used unless clinically indicated.

Monitoring Ventilator Function

The Mallard Model 2800C-MRI & 2800CP-MRI is a fully pneumatic ventilator and contains no electronic visual or audible alerts. The clinician monitors ventilator function by direct observation:

Cycling is confirmed by the rhythmic descent and rise of the bellows at the set rate. A failure to cycle is immediately evident as an absence of bellows movement; mechanical ventilation may then be provided using the green manual breath push button, provided supply gas pressure is maintained.

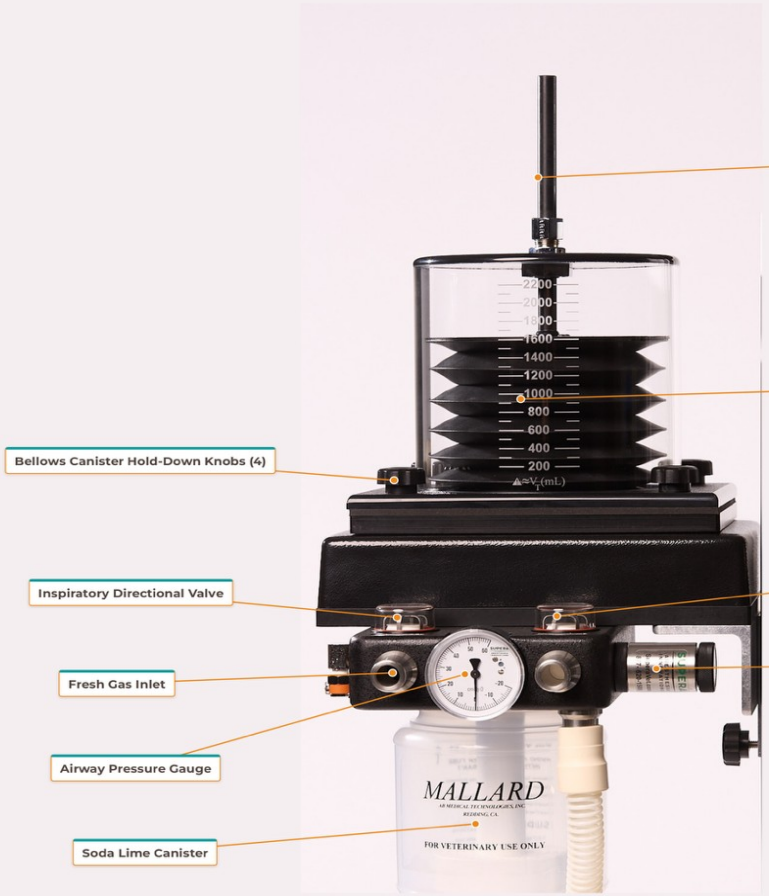
Supply pressure should be verified on the supply pressure gauge before and periodically during clinical application. A drop in supply pressure will reduce the delivered tidal volume, observable as reduced bellows excursion against the tidal volume scale.

In the event of a disconnection within the patient breathing circuit, the bellows will fall to its baseline position and remain there. This provides a definite indication that a tidal volume is not being delivered to the patient. Because the 2800C-MRI & 2800CP-MRI has no low-pressure or disconnect alarm, continuous direct observation of the bellows and the use of independent patient monitoring appropriate to the MR environment are required.

PEDIATRIC BELLOWS ASSEMBLY (PBA)
2800CP-MRI Models Only

Patients down to 5 kg can receive inhalation anesthesia with mechanical ventilation using the Model 2800CP-MRI, Large Animal Anesthesia Ventilator System.

Pediatric Bellows Assembly



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Pediatric Bellows Assembly (PBA) Changeover

Converting from the large-animal absorber circuit

1 Exhalation Valve Drive Line

Disconnect the **1/8" (0.32 cm)** exhalation valve drive line from the top-left corner of the back of the lower box. When changing over to the PBA, remove it from the lower box and reinstall it in the **bottom-left corner of the PBA**.

2 Fresh Gas Hose

Disconnect the orange color-coded **1/4" (0.64 cm)** black hose from the large-animal absorber circuit, next to the chrome elbow. Connect this bayonet fitting to the **fresh gas inlet** on the PBA small-animal absorber block — the orange mating connector on the outer edge.

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Pediatric Bellows Assembly (PBA) With Absorber Circuit Instructions 2800CP-MRI Models Only

This assembly allows for smaller patients down to 5 kg to receive inhalation anesthesia with mechanical ventilation.

1. The PBA, which comes with a 2800CP-MRI and may also be mounted directly on the Model 2800C-MRI.
2. When standing at the back of the machine and switching over from large animal to small animal PBA ventilator, disconnect the 1/8" (0.3175 cm) exhalation valve drive line from the top left corner of the back of the lower box. When changing over to the PBA, remove it from the lower box and install it in the bottom left corner of the PBA.
3. Disconnect the orange color-coded 1/4" (0.635 cm) black hose from the large animal absorber circuit next to the chrome elbow. Connect this bayonet fitting to the fresh gas inlet on the pediatric bellows assembly (PBA) small animal absorber block on the outer edge orange mating connector.
4. **Lastly, make sure your large animal bellows are all the way down before switching to the PBA side. If not, this will deform or could even damage your large animal bellows over time.**

Once you have completed the series of steps from above, inhalation anesthesia will now be provided from the vaporizer and flowmeter and mechanical ventilation will still be provided by the main control system.

For mechanical ventilation of smaller patients, use lower inspiratory times and higher respiratory rates. Set the flowrate control into the low range. During use of the pediatric bellows assembly (PBA), you will observe a slight movement of the large 18-liter bellows as the ventilator cycles on. This is normal function.

Tidal volume may be preselected by the adjustment of the black rod that extends vertically upward from the bellows canister on the PBA.

For gas scavenging, connect the scavenger hose to the scavenger port on the back. Always ensure the gas balance valve (pop-off valve) located on the front left side of the absorber block is closed. If the PBA were to be used as a gas machine only, without mechanical ventilation and the use of a rebreathing valve, this gas balance valve (pop-off valve) would be used.

Ensure that the patient breathing circuit is leak-free. The inspiratory and expiratory phases of respiration may be observed by viewing the corresponding directional valves (inhalation and exhalation valves).

TIDAL VOLUME

The recommended setting is 8–9 ml per pound of body weight. To accomplish this, begin by limiting the upward expansion of the bellows, which allows the clinician to select the appropriate volume of anesthesia gas to be delivered to the patient's airway.

Begin by loosening the chrome nut (turning in a counterclockwise direction) located on the top of the canister. The black 1/2" (1.27 cm) diameter tube can now be moved in a vertical manner. Position the bottom edge of this tidal volume rode to the level of tidal volume desired as indicated on the canister.

Adult Bellows: Included	0 to 2,200 ml
Optional 0-300 ml Pediatric Bellows:	0 to 300 ml
Optional 3 Liter Bellows:	0 to 3,400 ml

GAS BALANCE SYSTEM

This system functions in conjunction with the tidal volume rod height setting. As described above, the vertical ½" diameter adjustable tube limits the upward expansion of the bellows. This is accomplished by the opening of an umbrella valve located in the center of the bellows. The excess anesthetic gas is vented from inside the bellows and directed to the gas scavenger port

EXHALATION VALVE ASSEMBLY

Located inside the control console, the exhalation valve operates automatically. During the inspiratory phase, it is pneumatically closed to provide positive gas flow to the bellows chamber. During the expiratory phase, it is pneumatically opened to vent positive pressure from the bellows chamber.

Excess anesthesia gases vented from the patient breathing circuit exit via the scavenger port. The gas scavenger tubing should be connected at this port. The gas scavenger system should create a slight sub-ambient pressure at this port to effectively remove excess gases from the room. The vacuum should be approximately −5 cm H_2O or slightly less to sufficiently evacuate excess scavenged gas.

SPONTANEOUS VENTILATION

The PBA will accommodate patient-initiated breathing during all modes of operation. The inverted bellows will augment the patient's inspiratory phase effort. By observing the bellows movement, the patient's tidal volume may be read directly from the volume indicator on the canister. Hypopnea or apnea will be observed due to limited or lack of movement of the bellows.

Pre-Use Performance Verification

Prior to clinical application, it is essential that the Performance Verification Procedure be performed to ensure the system integrity of this device.

This device requires a pneumatic interface. The clinician or operator should ensure that both the supply source and patient interface pneumatic connections are intact and comply with existing medical center safety codes.

This verification must be recorded and documented by the person performing the Performance Verification Procedure.

Performance Verification Procedure

These procedures must be performed prior to clinical application on a regular basis.

1. Assemble the Mallard unit with an absorber circuit and a precision vaporizer.
2. Connect the system to an oxygen supply source of at least 60 psi.
3. Verify that the flow rate indicator gauge displays the supply source pressure. The “M” and “H” markings represent a range of 55 psi to 100 psi. Turn the flow rate control knob fully clockwise for maximum flow rate. Note: Stop turning the flow rate control knob once the needle stops. If you continue to turn the knob, this could damage the regulator over time.
4. At the endotracheal tube adapter, seal off the breathing circuit and connect it to an anesthesia bag with a 15- to 20-liter capacity.
5. Establish a complete leak-free circuit.
6. With an inflow of 3 liters per minute, the bellows should rise gradually. Upon reaching the 0 mark on the bellows canister, the bellows will stop rising. The circuit pressure should stabilize at 4 to 6 cm H_2O.
7. Depress the manual breath button on the ventilator. This should compress the bellows and increase the circuit pressure.
8. Ensure the driving-gas supply is properly connected.
9. Verify the pneumatic gauges for inspiratory time, expiratory rate.
10. Turn the master control to the ON position and confirm that the ventilator is cycling the bellows down and then up each cycle.
11. Using an appropriate gas analyzer, verify that the precision vaporizer is performing according to the manufacturer’s specifications. Follow the vaporizer manufacturer’s recommendations for function testing and service requirements.
12. Confirm that the soda lime in the absorber canister is fresh and capable of adequately absorbing CO_2. Follow the absorber circuit manufacturer’s recommendations for clinical application, function testing, and service requirements.
13. An oxygen analyzer with alarm systems should be used at all times during clinical applications. Monitor the FiO_2 on the inspiratory limb of the mainstream breathing hose.
14. Our models do not provide for physiological monitoring. Appropriate monitoring should be used.

A ventilator which does not meet the criteria of the preceding Performance Verification Procedure should not be used until repairs have been made and the unit has been rechecked using this procedure to determine that it is functioning according to specifications.

Every unit sold has been thoroughly function tested several times before being sold. Please make sure you have inspected the entire unit upon delivery to determine if it has been damaged in shipping and report any such damages to the factory immediately before using.

Please report to:

- support@mallardmedical.com
- (530) 605-2522
- Send pictures, videos, etc.

Cleaning, Disinfecting & Sterilization
Routine Maintenance

This ventilator and the associated patient circuit are shipped clean but NOT in a sterile condition. Clean the components as required by your own sterilization practices & standards.

Recommendations for disinfecting used components:

1. White vinegar and water. One-part white vinegar (available at grocery store) with four parts water.

2. For deeper cleaning and disinfecting in special cases, use Cidex OPA High-Level Disinfectant, Rapicide OPA/28 High-Level Disinfectant, or MaxiCide OPA 28 High-Level Disinfectant.

Avoid using phenols, alcohols or harsh abrasives.

Caution

Parts sterilized with ethylene oxide must be properly aerated to dissipate the residual toxic gas absorbed by the material.

Follow the sterilizer manufacturer's recommendations for the specific aeration periods required.

Cleaning & Disinfecting the Bellows

A key advantage of the Model 2800C-MRI and 2800CP-MRI is the ability to clean and disinfect the bellows without disassembling them.

1. Detach the breathing circuit and set it aside.
2. Disconnect the black coupler and hose from the absorber elbow, then place them on the cart base.
3. Raise the bellows rod to the 10-liter mark and secure it with the rod clamp.
4. Hold the hose with the black coupler in one hand.
5. Pour 5 liters of diluted white vinegar (1 part white vinegar to 4 parts water) into the hose while holding it. Reattach the black coupler and hose to the absorber elbow.
6. Unclamp the bellows, then gently move the blue bellows rod up and down to evenly coat the interior surfaces with the solution.
7. Clamp the bellows at approximately the 12-liter mark and let the solution sit in the bellows and hose for about 20 minutes to ensure proper disinfection.
8. After 20 minutes, drain the vinegar solution completely by removing the black hose coupler from the absorber elbow and directing it toward a floor drain. Add 5 gallons of clean water to rinse thoroughly, then drain the water by positioning the hose and coupler toward the floor drain again.
9. Once fully drained, raise the bellows rod and secure it to allow drying. For best results, clamp it so the bellows remains between the 6-9 liter position. DO NOT Clamp the bellows rod so that the gas balance valves needles are open at the top position.
10. Before the coupler that goes to the absorber elbow is installed, wipe excess moisture off of the elbow pipe and the coupler so that moisture is not trapped between the pipe and the coupler.

Recommendations for cleaning and disinfecting the bellows:

- **White Vinegar and Water:** One part white vinegar with four parts water. (Available at grocery stores.)

Cautions and Warnings

The Mallard 2800C-MRI & 2800CP-MRI Anesthesia Ventilator is a restricted medical device intended for use only by qualified personnel under the direction of a qualified veterinarian.

Personnel operating this equipment are responsible for reading and thoroughly understanding all product documentation provided. Statements throughout the product documentation have special significance as follows:

Summary of Warnings and Cautions

Warning

Whenever a patient is connected to the ventilator, constant attendance by qualified personnel is required. The use of a ventilator with built-in alarm systems or additional alarm systems does not give absolute assurance of warning for every type of malfunction that may occur with the ventilator/patient system. In addition, some problems may require immediate attention.

Warning

Oxygen vigorously accelerates combustion. To avoid an explosion hazard, do not use any oxygen instruments or other equipment that may have been exposed to oil or grease contamination.

Caution

To ensure that the Mallard Model 2800C-MRI & 2800CP-MRI Anesthesia Ventilator continues to perform to all design specifications, the complete Performance Verification Procedure must be performed at least once a month by qualified service personnel.

Warning

Breathing circuit components provided by the manufacturer are shipped in a clean but not sterile condition. Refer to the “Cleaning and Sterilization” section of this manual for guidelines on the sterilization and/or decontamination of breathing circuit components from the manufacturer.

Warning

The detailed procedures of cleaning and sterilization are provided for the components, but the effectiveness for any microbiological situation is the responsibility of the user.

Warning

Only use replacement parts provided or approved by the manufacturer.

Warning

Always monitor oxygen concentration with an accurate oxygen analyzer with high and low FiO_2 alarms to be assured that the desired FiO_2 is being delivered to the patient.

Caution

Ethylene oxide is toxic. Parts thus sterilized must be properly aerated to dissipate the residual toxic gas absorbed by the material. Follow the sterilizer manufacturer's recommendations for the specific aeration periods required.

Warning

The Mallard Model 2800C-MRI & 2800CP-MRI Anesthesia Ventilator should not be used in the presence of flammable anesthetic gases.

Service Policy

A Mallard Anesthesia Ventilator that does not meet the criteria of the Performance Verification Procedure should not be used until repairs have been made and the unit has been rechecked using this procedure to determine that it is functioning according to specification.

To ensure safety and reliability, we recommend that any service of a Mallard Model 2800C-MRI or 2800CP-MRI Anesthesia Ventilator be performed by an Authorized Mallard Service Representative. Authorized service is available directly from the home office of Mallard products, in Redding, California.

Phone: (530) 605-2522

Email: support@mallardmedical.com

Routine maintenance, as defined by this manual, may be accomplished by competent individuals within your medical facility. Parts designated in this manual should be replaced only with parts manufactured or sold specifically for the Mallard Anesthesia Ventilator.

If it is necessary to send a component to the home office for service, it should be adequately packaged. Components returned to the home office for repair (except where our warranty applies) will be repaired at the current list prices for replacement parts, plus a reasonable labor charge.

Product Warranty

AB Medical Technologies, Inc. (forthwith referred to as AB) warrants this product to meet the published specifications and to be free from defects in material and workmanship under normal use for a period of one (1) year from date of purchase. THE FOREGOING IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS, IMPLIED OR STATUTORY, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY.

The sole liability of AB under this warranty is limited to replacing, repairing, or issuing credit at the discretion of AB for the products, equipment or parts which fail to meet the published specifications, or which become defective during the warranty period, and which are, upon examination by AB found not to meet the published specifications or which become defective in material or workmanship. AB's limited liability, stated above, will not apply unless the following provisions are strictly complied with:

(a) AB is promptly notified, in writing, upon discovery of the failure of said product or equipment to meet the published specifications or of defects in material or workmanship.

(b) The defective product, equipment or part thereof is returned to AB, transportation charges prepaid by the buyer.

(c) The defective part is received by AB for examination no later than one (1) month following the expiration of the warranty period and provided.

(d) That examination by AB of said product, equipment or part shall disclose to AB's satisfaction that such defect has not been caused by improper usage, accident, neglect, alteration, abuse, improper installation, or unauthorized repair.

Products, equipment, or parts replaced under this warranty are warranted only through the terms of the original warranty. AB neither assumes nor authorizes any other person or entity to assume for it any other warranty, obligation, or liability in connection with its products or equipment whatsoever, and this warranty can only be changed in writing by a duly authorized representative of AB.

AB makes no representations or warranties whatsoever as to the fitness or usefulness of the products or equipment manufactured by it for any medical treatment, physical condition, or other purpose whatsoever. In no event shall AB be liable for personal injury, property damage or any special or consequential damages to any buyer, user or any other person whomsoever, including, but not limited to, loss of profits, loss of use of the product or equipment, or for damages of any other kind whatsoever based on a claim for breach of warranty other than a refund of the purchase price of any defective product or equipment.

Any authorization for repair or alteration by buyer must be in writing from AB to prevent voiding of this warranty. In the event AB or its representatives render any technical advice or service of any kind to buyer or anyone else in connection with the equipment or products covered by this warranty, AB's liability for such advice or service is limited to the value of the service or advice provided.

Warranty Enactment Form

Model:

Serial Number:

Where is this equipment to be used?

_____

Institution:

_____

Street Address: Phone:

_____

City: State: Zip Code:

_____

Department:

_____

Supervisor:

_____

When received, did the device work properly?

Comments:

_____
_____
_____
_____
_____

Authorized Signature:

_____

Title:_____ Date:_____

Please send or email this form to:

AB MEDICAL TECHNOLOGIES, INC.
20272 SKYPARK DRIVE
REDDING CA 96002

support@mallardmedical.com

Trouble-shooting Guide

Bellows not returning to selected volume during the expiratory phase	Leak within the patient breathing system Endotracheal tube cuff not inflated properly Lack of flow from anesthesia machine Overpressure valve on anesthesia machine is venting gas	Eliminate leak Inflate cuff properly Ensure adequate flow from anesthesia machine
Tidal volume delivered to patient is low	Same as above	Same as above
No flow being generated from ventilator	Flowrate control turned off	Turn flowrate control on
Flow rate too low to deliver required volume	Flowrate control set too low	Increase flowrate setting to deliver desired tidal volume
Flow rate too high for laminar flow	Flowrate control set too high	Decrease flowrate setting to establish more laminar flow
Unable to generate sufficient inspiratory pressure	Leaks in patient breathing circuit Leaks in exhalation valve	Correct leaks
ON/OFF control not functional	Driving-gas supply not connected or unpressurized Supply line obstructed or kinked Regulator or control valve malfunction Damage to ventilator Malfunction of pneumatic control component	Verify driving-gas supply is connected and pressurized to at least 60 PSI Turn on Inspect the supply line and inlet for obstruction Inspect the driving-gas supply line and connections at the inlet Examine and correct physical abuse to pneumatics A qualified technician needs to test the pneumatic control system Contact factory
Manual inspiratory control nonfunctional	Inlet pressure line disconnected	Reconnect pressure line
Low flowrate from ventilator	Leak within the pneumatic system	Examine pneumatics, correct leak
Bellow is low on volume	Disconnection of patient's breathing circuit	Reconnect patient's breathing circuit and fill bellows with flush valve.

This troubleshooting guide is coordinated with the Performance Verification Procedure. If a Mallard Model 2800C-MRI or 2800CP-MRI Anesthesia Ventilator does not meet a particular specification during the performance verification, refer to the appropriate section of this troubleshooting guide to determine what should be done.

Assure the supply source to the Model 2800C-MRI or 2800CP-MRI is 60 PSI.

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