

Anexa nr.1 la Formularul Specificații tehnice

Aparat de anestezie inhalatorie pentru animale mici

Specificația tehnică solicitată	Specificația tehnică oferită R630 (RWD Life Science Co., Ltd / China)
<p>Specificații gaze: Alimentare gaz: O₂, N₂O: 0.28 – 0.6 Mpa Forme de unda: P-t, F-t Debitmetru: O₂: 0-1 L/min; 1-10 L/min: N₂O:0-1 L/min; 1-10 L/min Sistem gaz: alarma O₂ insuficient sistem securitate Hipoxie O₂ flush: 35-75L/min Mod de lucru: Închis, Semi-închis, Semi-deschis Mod control: acționare pneumatică și control electronic Mod de operare: Man./ Vent Valva de siguranță: ≤ 8kpa Specificații ventilator : Tip pacient: animale de companie Moduri ventilare: IPPV, Manual Setări: taste Volum tidal: 0-1600ml Frecvența de ventilare: 4-100 bmp Raport I/E: 4:1 - 1:8 Control presiune: 5-60 cm H₂O Ppeep: 0-20 cm H₂O Monitorizare: afisaj ecran LED presiune: Ppeak, Pplat, Pmean volum: VT, MV respirație Alarma presiune: limita de sus/jos Paw eroare alimentare presiune scăzută alimentare cu O₂ Alarma silențioasă: ≤120s Vaporizator: Unitatea poate avea: doua vaporizatoare Tip de agent: halotan, enfluran, isofluran, sevofluran Alimentare: Alimentare: 100-240 AC 50-60 Hz Consum: ≤50W</p>	<p>Specificații gaze: Alimentare gaz: O₂, N₂O, Aer: 0.28 – 0.6 Mpa Forme de unda: P-t, F-t Debitmetru: O₂: 1-4 L/min; N₂O:0-4 L/min; 1-10 L/min Sistem gaz: alarma O₂ insuficient sistem securitate Hipoxie O₂ flush: 35-75L/min Mod control: acționare pneumatică și control electronic Mod de operare: Man./ Vent Valva de siguranță: ≤ 8kpa Specificații ventilator : Tip pacient: animale de companie Moduri ventilare: VCV/PIPCV/APNEA Volum tidal: 20-1500ml Frecvența de ventilare: 2-60 bmp Raport I/E: 1 : 1.1-1 : 4.0(adjustable) Control presiune: 5-35 cm H₂O Ppeep: 0-20 cm H₂O Alarma presiune: limita de suPs/jos Paw eroare alimentare presiune scăzută alimentare cu O₂ Vaporizator: Unitatea poate avea: doua vaporizatoare Tip de agent: isofluran, sevofluran Alimentare: Alimentare: 100-240 AC 50-60 Hz Consum: <50W</p>

R630 Dual-drug Veterinary Anesthesia Machine

New Dual-drug Veterinary Anesthesia Machine based on the veterinary clinic, which is suitable for clinical anesthesia of dogs, cats, pigs, monkeys, rodents, reptiles, birds, etc.



Easy-fill



Non-return



Dual-drug available



One Machine, Two Choices

Different cases use different anesthetic to improve the quality of anesthesia.



No anesthetic mixing

There is "Non-return" parallel structure to avoid anesthetic mixing.



No leakage and no wrong filling

The way to fill the vaporizer is Easy Fill to ensure there is no anesthetic leakage and wrong anesthetic filling.



Old vaporizer friendly

Support the reuse of old vaporizer and save the cost of customers.
Environmental protection



Minimal operation

Quick occlusion of APL valve, circuit switch, rail-mounted CO2 absorber.



Healthy and environment-friendly

High quality filter can absorb exhaust gas efficiently to avoid pollution.

Specification

Item	Specification
Vaporizer	Output concentration: 0~5% (Iso) ; 0~8% (Sevo) Working temperature: 10~35°C Volume>120ML
Flowmeter	0.1-4L/min

Item	Specification
Breathing bag	0.5L、1L、2L
Absorber	2.1L
Re-breathing circuit	Low air resistance limbo breathing circuit, 1.5m
Non-rebreathing circuit	Mapleson F-type non-rebreathing circuit

RWD Life Science Co.,Ltd

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RWD Life Science Inc.

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One Machine  Choices



R630

Dual-drug Veterinary Anesthesia Machine

12mm

RWD Vet Anesthesia, Easy & Safe



R419

Intelligent animal ventilator

RWD



Easy Ventilation



Easier operation for veterinarian, the reference data can be calculated when inputting animals weight.



User-defined parameters can be stored and retrieved any time.



APNEA mode available, do not interfere patient spontaneous breathing.



Optional PEEP function, which can solve low SpO₂ problem for veterinarian during Surgery



Identifying and alarming the suffocation state, monitoring the respiratory during whole process.



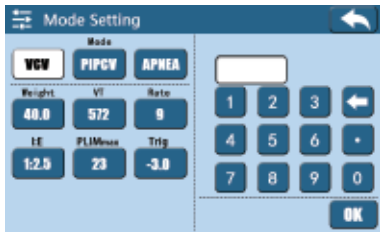
Touch screen and 75° visual operation surface design, user-friendly interaction.

RWD Vet Anesthesia, Easy & Safe

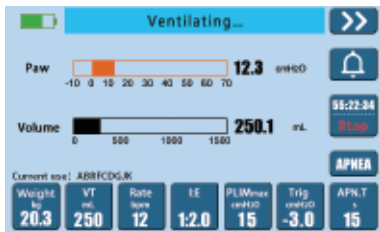
R419 Intelligent animal ventilator

R419 intelligent animal ventilator as mechanical ventilation device, which is completely according with veterinary clinical practice. There are 3 modes of operation, including VCV, PIPCV and APNEA, to meet multiple clinical applications.

Interfaces



Parameter setting



Ventilation interface

Working modes

Volume Control Ventilation (VCV)

Taking the tidal volume (VT) as a reference, the process of inhalation will be completed when the animal inhale gas volume has reached the set value.

Pressure Control Ventilation (PIPCV)

Taking the peak inspiratory pressure (PIP) as a reference, the process of inhalation will be completed when the PIP of animal reach the preset value.

APNEA

Allow the animal to maintain autonomous respiration. And the ventilator will immediately starts up mechanical ventilation as pre-set when the animal was detected to have no breathing or weak breathing. The mechanical ventilation will stop when the animal recovery spontaneous respiration.

Specification

Item	Specification
Dimension	253mm×224mm×112mm
Weight	3.22kg
Respiratory rate	2-60bpm
I:E	1:1.0-1:4.0
Tidal volume	20-1500 ml
Peak inspiratory pressure	5-35 cmH ₂ O
Trigger pressure	-9.0 ~ -1.0cmH ₂ O
Patient weight range	2.0-100.0 kg
Touch screen	5 inch, 800*480



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RWD



**R630 Double Vaporizer
Animal Anesthesia Machine**

User Manual

V1.0

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Relevant electrical equipments in line with national standards;

The instrument is operated according to the instruction manual.

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1-Introduction

1.1 Overview

First of all, sincerely thanks for selecting the R630 animal anesthesia machine made by RWD Life Science.

Please read this instruction manual and all other auxiliary materials carefully before installing and using the product, it will be helpful to work with it better.

RWD has been always dedicated to improving the product function and the service quality, and will reserve the rights to revise the products itself and contents described in the instruction manual at any time without notice in advance.

If you find the practical situations about the supplied goods do not agree with the contents described in the manual, or have any questions or ideas about our products and service, welcome to contact us. For latest information, please visit our web site (<http://www.rwdstco.com/>) or contact us immediately.



This anesthesia system should be only used for veterinary clinical and research, NOT used for human clinical.

1.2 Safety

Operation of anesthesia system involves oxygen gas pressure and the use of potentially hazardous materials. In order to prevent injury to animals or operators and damage to the anesthesia system, please read *Section 2 –Safety* carefully before performing any of the procedures contained in this manual. If you have any safety questions or comments, please contact us for support.



This veterinary anesthesia system should only be operated by veterinary professionals qualified to administer anesthesia.

1.3 Product features

- Standard closed circuit breathing loop design;
- Double vaporizer design, users can quickly switch between sevoflurane and isoflurane as demand;
- Applicable to cats, dogs, monkeys, pigs and other animals of 100kg weight or less;
- Two options available: semi- open and close anesthesia modes;
- The oxygen flow meter adjustable ranges from 0.1 to 4 L/min;
- With oxygen flush function to replace the system with pure oxygen at a speed of 10L/min;
- With APL automatic pressure relief and occlusion valve features to protect animal from damage caused by excessive pressure;

- CO₂ absorber canister (2100 ml) is installed in the front part of the machine that is easy to observe and disassemble for changing;
- The concentration of anesthetic gas from the vaporizer can be adjusted from 0 to 5 % (Isoflurane) and 0 to 8% (Sevoflurane);
- Dual-channel flowmeter is optional;
- Compact and easy to clean;

1.4 Facility requirements

Table 1-1 provides the facility requirements necessary to ensure reliable operation and safety of the anesthesia system.


Table 1-1 Facility Requirements

Characteristic	Specification
Working area	Large enough to accommodate the anesthesia system.
Environment	Storage temperature: -10 - 55 °C
	Operating temperature: 10-35 °C
	Relative humidity: 5-90 % RH, non-condensing

1.5 System standard features



Figure 1-2 Device body of R630

No.	Parts	Description
1	Main support	Solid metal support for assembling of following component.
2	O2 flowmeter	Control the oxygen flow rate. Turn the O2 flowmeter control valve to regulate the oxygen flow between 0.1~4 L/min. Another flowmeter assembly can be added for constructing a dual-flowmeter system.
3	Vaporizer switch	Pull the circuit switch to the direction of A , the available vaporizer is A. Pull the circuit switch to the direction of B , the available vaporizer is B.
4	Handle	Used for control to move the device
5	Breathing circuit blocking plug	Used for placing the endotracheal tube/ mask connector. Meanwhile the plug blocks the breathing circuit, it's useful for system leak detection, adjusting system pressure and flushing circuit.
6	O2 flush button	Press to deliver the oxygen directly to breathing circuit. It is generally used to flush the anesthetic gas in system or in emergency.
7	Pressure gauge	Measures and displays the pressure of gas mixture in breathing circuit.
8	Circuit switch	Pull the circuit switch to the direction of the RB , the available circuit of system is rebreathing circuit (turn off the thumb switch in the non-rebreathing circuit to avoid waste gas running into the circuit). Pull the circuit switch to the direction of the NRB , the available circuit of system is non-rebreathing circuit (turn off the APL valve to avoid waste gas running into the rebreathing circuit).
9	Non-rebreathing circuit port	Used for connecting to a non-rebreathing circuit, which is generally applicable to animals below 7 kg.
10	Vaporizer	<p>It converts a liquid anesthetic agent into a vapor which is added to oxygen. The anesthetic vapor is measured in volume percent (vol %). A dial on top of the vaporizer allows the operator to select the amount of vapor administered to the animal. We suggest that connect with RWD regularly to calibrate.</p> <p>The vaporizer is the most complicated and expensive part of the anesthesia system. More attention should be paid to its maintenance and operation.</p> <p> Please use the correct anesthetic agent following the tag on the vaporizer. The misuse may cause the damage to the equipment and animal.</p>

No.	Parts	Description
11	APL valve	Operator can determine the inspiratory pressure for ventilating the animal by adjusting the APL valve while observing the system's pressure gauge. The more the APL valve is closed, the higher the pressure will be. When the pressure of gas mixture exceeds the setting, the gas will be expired through APL valve to keep the pressure stable. Usually, the outlet of the valve is connected to a gas filter canister. In case of emergency, press the knob on the valve to close it immediately.
12	Inspiration & expiration valve module	The one-way valve is made up with floatable discs and nickel-plated brass valve to control gas flow direction to form gas circulation in system. It makes sure the animal will not inhale the gas just exhaled. The floatable discs go up and down as animal breaths, and operator can confirm the respiratory status with the floatable discs.
13	Breathing bag mount	Used for connecting to a breathing bag.
14	Rebreathing circuit port	Used for connecting to a rebreathing circuit, which is generally applicable to animals over 7 kg.
15	CO ₂ absorber canister	The absorbent canister is filled with a granular carbon dioxide absorbent material eg. calcium lime. It uses a coaxial gas flow path to provide for more efficient use of absorbent, while reducing flow resistance. The chemical reaction that takes place in the canister creates heat and humidity, which is added to the delivery of anesthesia to the animal.

2-Safety

2.1 Overview

This section provides basic safety information necessary for operating your R630 anesthesia system. Please contact us for more support if you have any questions or comments.

2.2 Intended use

The anesthesia system is intended for veterinary use only. All the operation and maintenance should follow the instructions of this manual.

Misuse of your system may result in injury to animals and operators or damage to property.

Misuse includes:

- Using inappropriate gas and anesthetic agents
- Making unauthorized modifications to the equipment
- Operating the system using gas pressure exceeding maximum ratings



Anesthesia systems should only be operated by veterinary professionals qualified to administer anesthesia to animals.

2.3 Description of safety symbols

The following types of symbols are included in this manual with notes that alert the reader to potential hazards.



Personal Safety Warning. This symbol appears in a shaded text block to warn you about actions that could cause personal injury or death.



Property Damage Caution. This symbol appears in a shaded text block to warn you about actions that could cause damage to the system or the facility.

2.4 Basic safety precautions and practices

This section provides requirements necessary to ensure safe and reliable operation of your R630 anesthesia system.

2.4.1 Animal and operator safety

- Always keep a backup anesthesia delivery plan in case of an emergency occur.
- Any person responsible for the installation or operation of the system should be thoroughly familiar with this operator's manual.
- To ensure proper function of your system, perform a pre-use checkout procedure in accordance with *Section 4 – System setup* and *Section 5 – Operation*.
- The system must always be attended by a veterinarian or trained anesthesia technician.
- After guarantee period, annual service inspections to ensure proper operation is

recommended. Only RWD-certified technicians should be permitted to service the system or replace internal parts.

- Keep open flames and combustibles (e.g., ether and acetone) away from the anesthesia system.
- Do not place any heavy things on the anesthesia system.
- Make sure that the oxygen hose does not cross walkways and aisles. This may present a tripping hazard.
- Wearing personal protective equipments is suggested.
- Make sure the oxygen hose is securely connected to the system before starting a procedure.
- Make sure that any exhaled gas containing anesthetic is recovered or vented outside of the operating room. A waste gas evacuation system must be used.
- RWD recommends the use of an electrocardiograph, and equipment capable of monitoring the animal's pulse, oxygen (O₂) saturation, carbon dioxide (CO₂) level, and anesthetic agent level at all times when operating the system.
- Remove the system from service if any indications of improper function exist.
- Never pour water or any other fluids into the anesthetic vaporizer. Fill vaporizer only with the anesthetic agent for which it is designed.
- Avoid use of oil or grease on any anesthesia or respiratory equipment where oxygen is used. An explosion may occur.

2.4.2 Preventing system and facility damage

- Immediately contain and clean up spilled anesthetic.
- Isoflurane is very caustic and may dull the paint finish of the system if spillage occurs. If spillage should occur, allow it to evaporate. Do not attempt to wipe it with a cloth.
- Do not place heavy on top of the anesthesia equipment.
- Follow all recommended system maintenance procedures specified in *Section 7 – Maintenance*.
- Keep appropriate distance from the wall to ensure a stable gas supply.

2.4.3 Facility environment health

- Immediately contain and clean up any spilled anesthetic agent.
- If the system is used in a confined space, ensure that there is adequate ventilation.
- Dispose of any hazardous materials and items contaminated with hazardous materials should be in accordance with local regulations.

2.5 System malfunction

If your system does not operate properly, refer to *Section 6 – Troubleshooting* which includes descriptions, possible causes, and suggested solutions.

3-Unpacking and assembling

3.1 Overview

This section provides the unpacking and assembling procedure for your R630 anesthesia system.

3.2 Unpacking the system

Your system is shipped in boxes that have been carefully packed at the factory for safe delivery of the system to you. When you receive your system, please do the following:

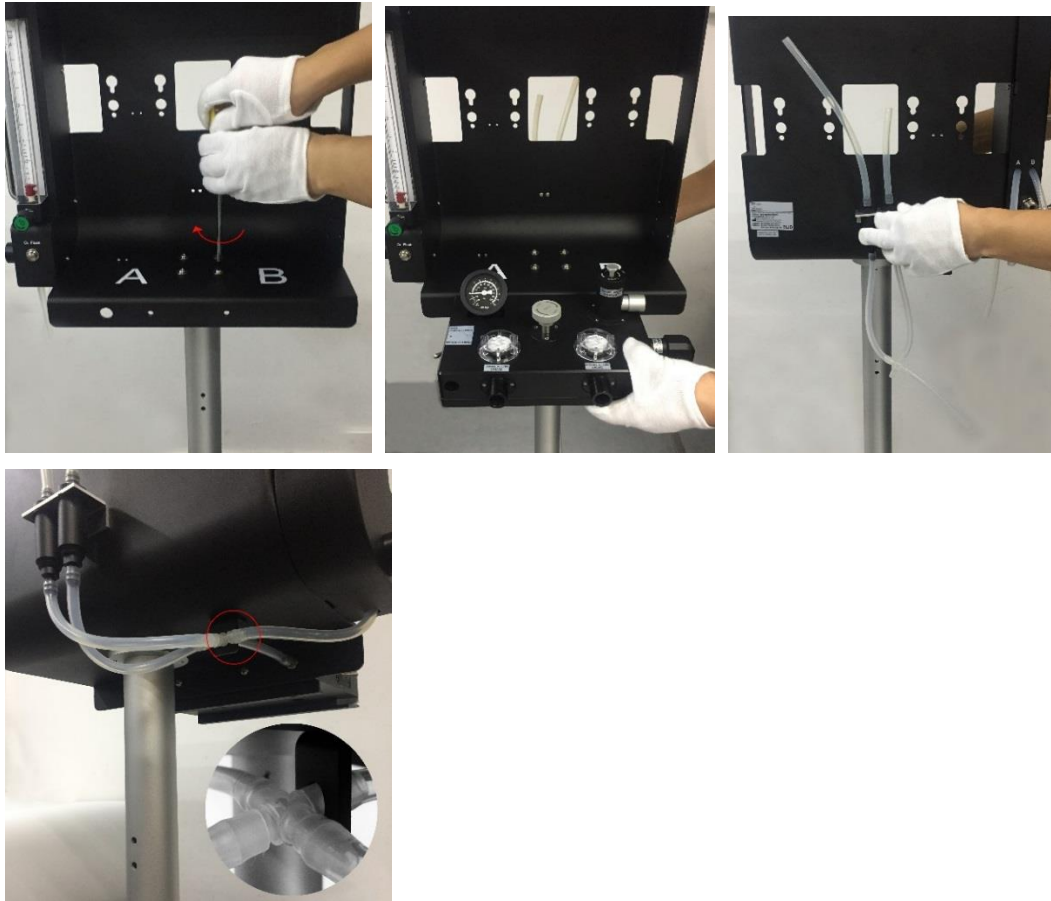
- Check the shipping documents to ensure that all boxes have been received.
- Examine the shipping boxes for damage. Immediately make a damage claim to the carrier if there is serious damage and contact RWD. Taking photos is suggested for keeping the evidence.
- Carefully open each box and remove each individual component. Save all boxes and packing materials for future shipments.
- Check the packing list or invoice to ensure all ordered components ordered are included.
In case there is any doubt or need any help, contact RWD or local dealer immediately.

3.3 Assembling the system

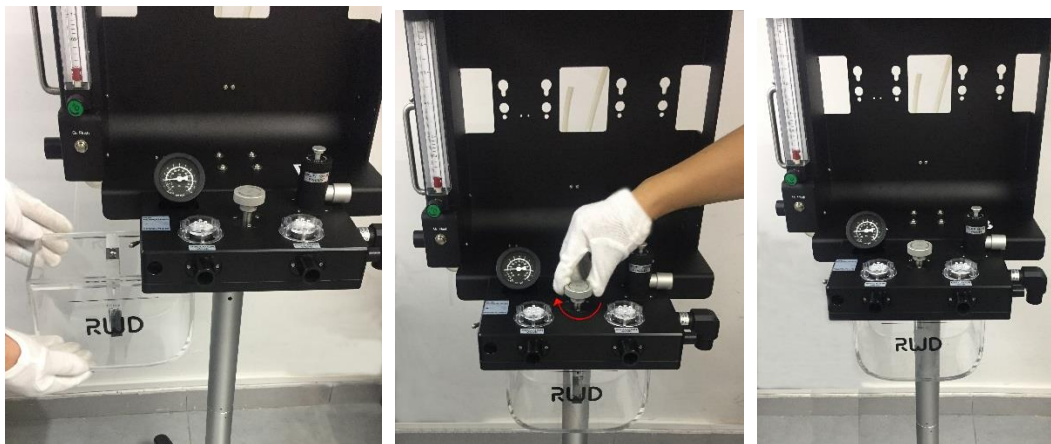
3.3.1 Assembling base



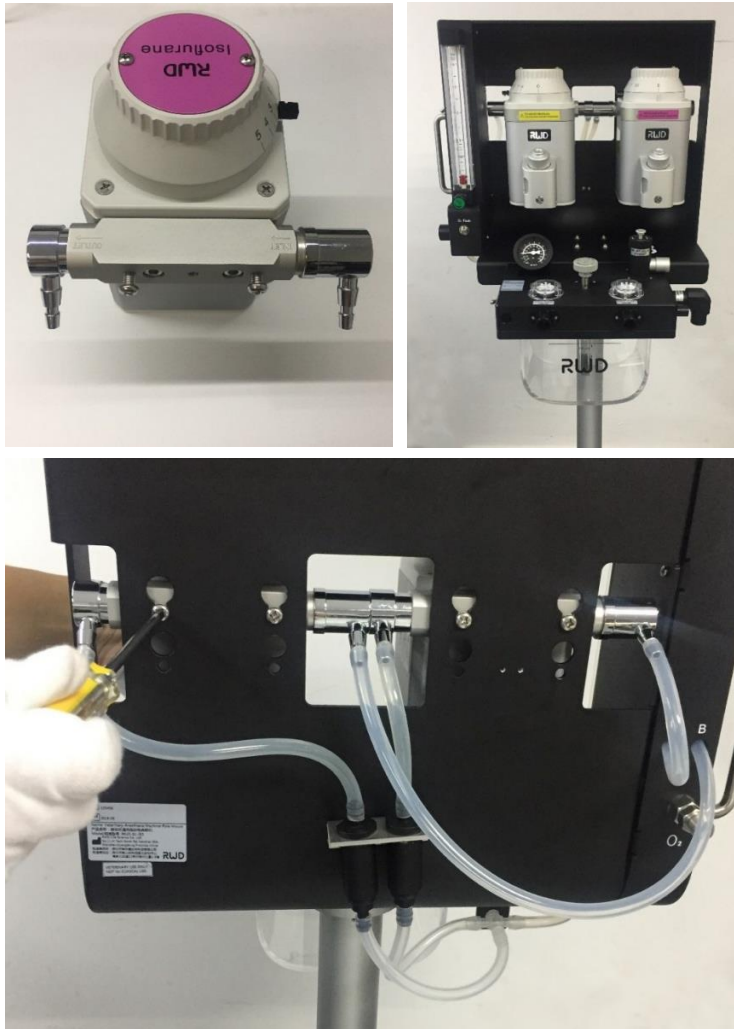
3.3.2 Assembling main support



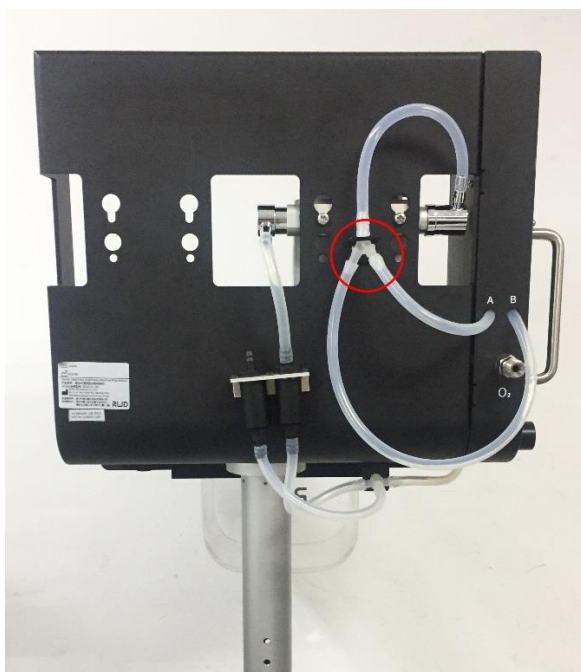
3.3.3 Assembling CO₂ absorber canister (Push the canister to the end of the track)



3.3.4 Assembling vaporizer



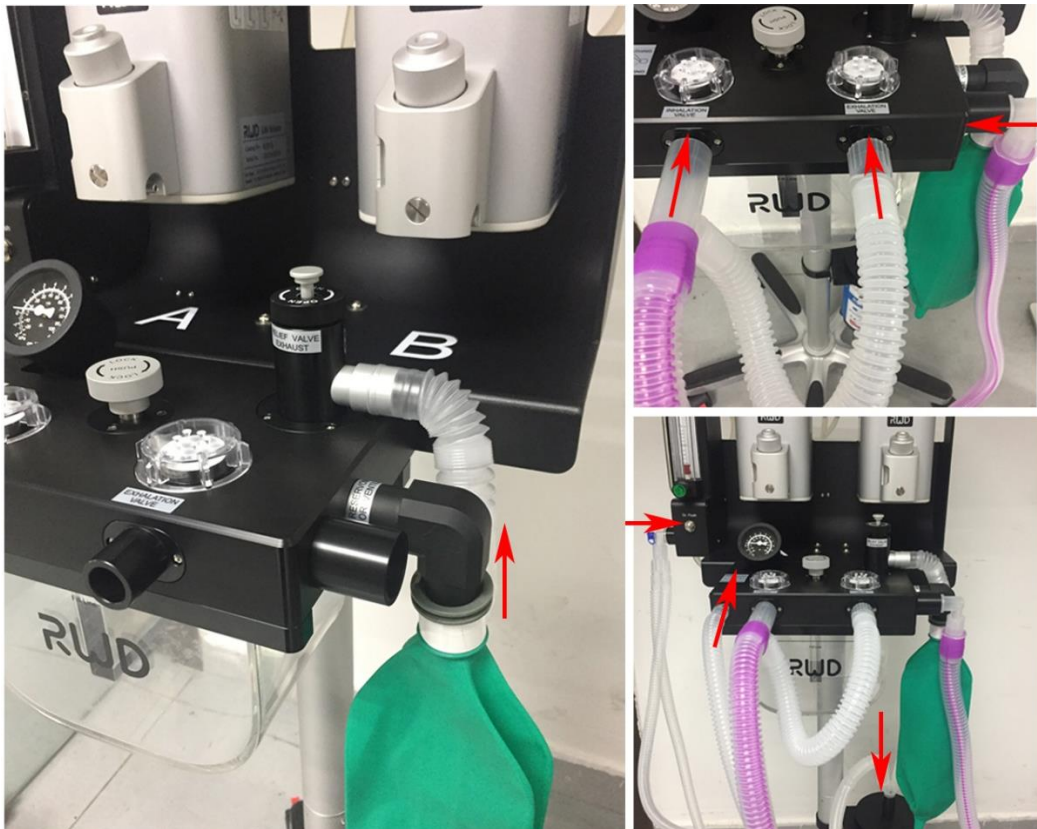
The R630 can also be used as a single vaporizer anesthesia machine, Please refer to the following figure for piping connection.



3.3.5 Assembling monitor tray and gas filter canister



3.3.6 Assembling breathing bag, rebreathing circuit and non-rebreathing circuit



4-System setup

4.1 Overview

This section provides the setup procedures required to prepare your R630 anesthesia system for veterinary surgical procedures.

4.2 Materials and supplies

- Oxygen supply source
- Connection tube for oxygen source and flowmeter
- Animal breathing circuit
- Breathing bag
- CO₂ absorbent
- Anesthetic agent
- Wrench for tightening oxygen supply fitting

4.3 Initial system preparation

4.3.1 Setting up the system

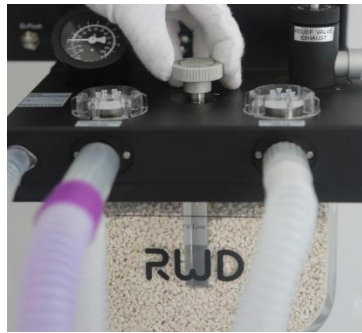
- 1) Position the system in the area where it will be used.
- 2) Fill the CO₂ absorber canister with absorbent as follows:
 - Loosen the fixing knob and remove the absorber.



- Fill the absorbent canister with CO₂ absorbent. Do not exceed the maximum capacity scale



- Reinstall the absorbent canister and tighten the knob.



3) System leak checking

Three time of check are required: vaporizer A and rebreathing circuit, vaporizer A and non-rebreathing circuit, vaporizer B rebreathing circuit or non-rebreathing circuit. This manual introduces the method of leak check by taking vaporizer A and rebreathing circuit as example.



Anesthesia system must be operated with no leaks, please check system according to the following steps.

- Close all the open end of anesthesia system.
- Make sure volume percent dial is on the anesthetic vaporizer to the zero (0) position.



- Close the APL valve completely by clockwise rotating regulator.



- Open oxygen source and adjust the pressure to below 0.5MPa.
- Turn on the oxygen flowmeter control valve, increase the flow rate up to 1 L/min. The system pressure will increase with oxygen flowed into system. Operator can also increase the pressure by pressing oxygen flush button. Turn off the flowmeter control valve when the needle of pressure gauge goes up to about 30 cmH₂O.



- Observe the needle of pressure gauge, there is no leak in the system if the needle drops down within 2cmH₂O in 10s. On the other hand, system leaks if the needle drops down more than 2cmH₂O in 10s, operator needs to check all the connection in the system. In case there is any doubt or need any help, contact RWD or local dealer immediately.

4.3.2 Filling the anesthetic vaporizer

User choose different vaporizer, the anesthetic filling method is also different. RWD supply two kinds of filling type vaporizer-Pour Fill and Easy Fill.



Make sure to pour the correct anesthetic agent into the filler port. Filling with the incorrect anesthetic agent could cause serious injury or death to the animal.



If anesthetic agent spills on system surfaces, allow it to evaporate. Rubbing spilled anesthetic agent with a cloth may damage the system finish.

4.3.2.1 Easy Fill

- 1) Turn and remove the sealing cap of the vaporizer. Check the black sealing ring.



- 2) Mount an adaptor onto the isoflurane bottle, insert into filler port along the groove, and press it in the end.



- 3) Observe the agent level sight glass on the vaporizer. Keep the agent level inside the tube between the two marks.



- 4) Tighten the sealing cap.



5- Operation

5.1 Overview

This section provides the procedures and information needed to successfully operate your R630 anesthesia system.



Only trained veterinary professionals should operate the anesthesia system.

5.2 Pre-use checkout

Perform the pre-use checkout procedure before each use of your anesthesia system as follows:

- Ensure anesthetic agent is filled into the vaporizer.
- Make sure the vaporizer volume-percent dial is set to zero (0).
- Confirm that the absorbent has not expired.
- Ensure the oxygen source is connected with anesthesia system closely.
- Ensure the pressure of oxygen supply is between 40-50 psi and it is enough during the complete experiment.
- Make sure the O₂ control valve works properly.
- Make sure the chosen of vaporizer and circuit are both right.
- Confirm that the breathing circuit is clear and clean and check the ventilation and cleanliness of the experimental environment.

5.3 Anesthesia procedure

- 1) Wear anesthesia mask or do endotracheal intubation for animal after anesthesia induction;
- 2) Turn the O₂ control valve counterclockwise and observe the position of float to set a suitable flow rate.



-
- 3) Press the dial lock key and turn the dial to set the concentration value. Pressing of dial lock key is necessary only when the concentration is set from position "0".



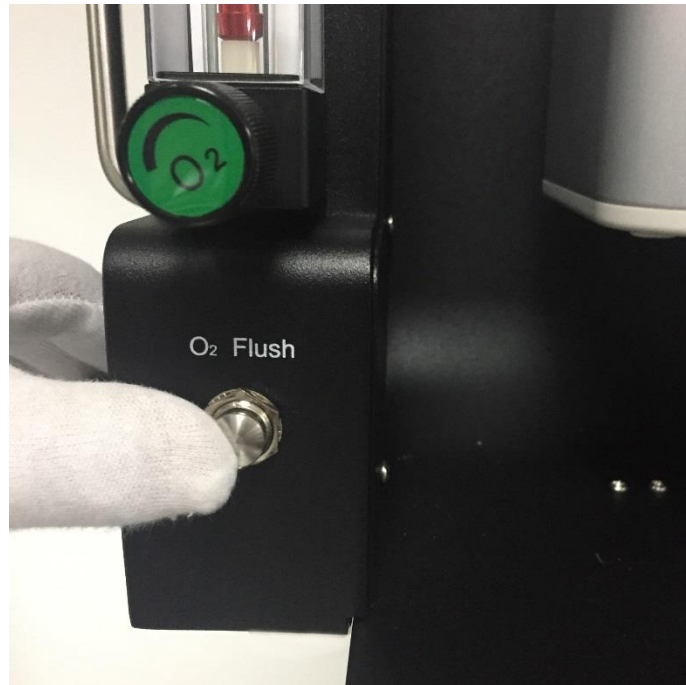
- 4) Connect breathing circuit to endotracheal tube or anesthesia mask, and provide anesthetic gas to animal. Operator can change the anesthesia depth by changing the concentration of anesthetic gas during surgery.

5.4 Using the oxygen flush button

If the animal needs high concentrations of oxygen instantaneously, operator can activate the oxygen flush button. Once activated, the flow meter and anesthetic vaporizer are bypassed and oxygen is administered to the patient without anesthetics. As soon as the oxygen flush button is released, the preset anesthesia mixture will again be administered.



Use caution on the pressure gauge while using to avoid overpressure.



5.5 Using the rebreathing circuit and non-rebreathing circuit

Pull the circuit switch to the direction of the RB, the available circuit of system is rebreathing circuit (turn off the switch in the non-rebreathing circuit to avoid waste gas running into the circuit).

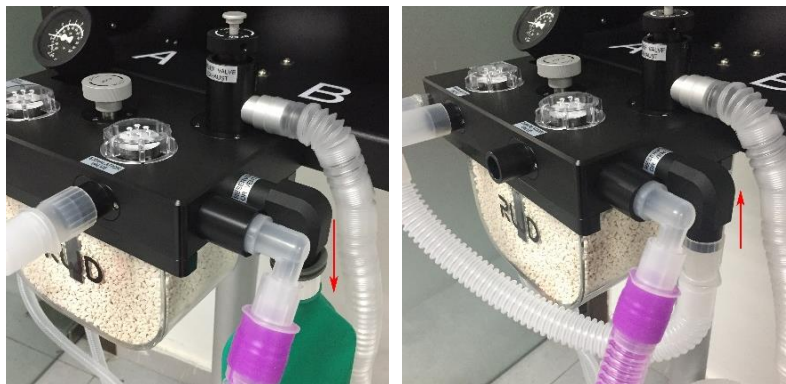
Pull the circuit switch to the direction of the NRB, the available circuit of system is non-rebreathing circuit (turn off the APL valve to avoid waste gas running into the rebreathing circuit).

5.6 Adjusting the highest pressure in system

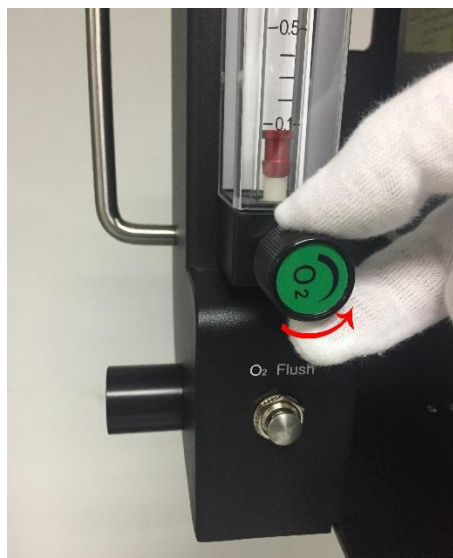
- Turn the APL valve counterclockwise to completely open, make sure the needle of pressure gauge has dropped down to zero;



- Remove the breathing bag, and connect the exhaled port of rebreathing circuit to breathing bag mount;



- Turn on the oxygen flowmeter control valve, increase the flow rate up to 1 L/min. The system pressure will increase with oxygen flowed into system.



- Turn the the APL valve clockwise to increase system pressure, and pay attention to the needle of pressure gauge. Stop rotating until it reaches a appropriate pressure, which is recommended not to be over 20 cmH₂O;



- Turn off the flowmeter, and reconnect the breathing bag and rebreathing circuit.



5.7 Post-anesthesia procedure

Once the anesthesia procedure is completed, perform the following steps in order:

- 1) Turn OFF the vaporizer by turning the volume-percent dial clockwise to zero (0).
- 2) Remove breathing circuit from endotracheal tube or mask, and put the connector onto the plug on the main support of anesthesia system.
- 3) Press the oxygen flush button for 2-3 seconds and squeeze the breathing bag to purge the system of anesthetic gas and carbon dioxide.
- 4) Cut off the oxygen supply source.
- 5) Open the APL valve by turning it counterclockwise.
- 6) Record the used time of absorbent in the CO₂ absorber canister. If the total time is over 10 h, change the absorbent as described in *Section 4 – System Setup*.
- 7) If the system will be vacant for a long time, drain the anesthetic agent inside the vaporizer as described in *Section 7 – Maintenance*.
- 8) Thoroughly clean the anesthesia system as described in *Section 7 – Maintenance*.

6- Troubleshooting

6.1 Overview

This section will help you determine the origin of common problems/alarms you may experience with your R630 anesthesia system and recommended corrective actions. If you experience problems are not listed in this section, or continue experiencing the problem after trying the suggested corrective actions, please contact RWD or your local dealer for support.

6.2 Safety

Some troubleshooting procedures may involve the use of hazardous materials and contact with biological hazards. Always follow all applicable local regulations and the material manufacturer's Material Safety Data Sheet (MSDS) recommendations. During the procedure, basic personal protective is necessary, such as wearing gloves, mask and eye protection.

6.3 Machine status

Unless otherwise specified, the anesthesia system may be connected to gas supplies during the performance of the troubleshooting procedures described in this manual. Make sure the gas supplies and vaporizer are turned off before the procedure.

6.4 Record keeping

A record of problems and their resolution should be kept. Such records should include the date, the nature of the problem encountered, and the actions that resolved the problem.

6.5 Problem – Solution matrix

Table 6-1 contains problems that may occur during operation of your R630 anesthesia system and their corrective actions. If you continue experiencing a problem after trying the suggested corrective actions, please contact RWD or local dealer for support.

Table 6-1 R630 anesthesia system: Problem – Solution Matrix

No.	Problem	Cause	Solution
1	No or low anesthetic vapor output	a. Vaporizer is functioning properly, but machine output is not getting to animal	Check breathing system components for leaks, tears, holes. Ensure the mask/endotracheal tube makes a good seal with the animal.
		b. Anesthetic agent reservoir is empty	Fill the reservoir with appropriate anesthetic agent.
		c. Vaporizer is turned off	Press the dial lock key on the vaporizer and adjust the dial to the desired volume-percent of anesthetic.
		d. Leak around the vaporizer filler	Make sure the sealing cap on the vaporizer is fully closed.
		e. Vaporizer malfunction – internal fault	Contact RWD or local dealer for servicing.
2	APL valve knob is hard to turn	APL valve threads require cleaning	Contact RWD or local dealer for servicing.
3	Needle on system pressure gauge is stuck and does not move	Mechanical damage	Replace pressure gauge. Contact RWD or local dealer for servicing.
4	Needle on system pressure gauge indicates a negative pressure	Inadequate fresh gas flow	Increase fresh gas flow rates.

Table 6-1 R630 anesthesia system: Problem – Solution


No.	Problem	Cause	Solution
5	Animal sleep level is too light	a. Vaporizer is empty	Fill vaporizer with the appropriate anesthetic agent.  Do not fill anesthetic agent when the device is in use.
		b. Anesthetic concentration is set too low	Adjust the dial to increase the volume-percent of anesthetic.
		c. Leak in animal breathing circuit	Check breathing system components for leaks, tears, holes, etc. Ensure the mask/endotracheal tube makes a good seal with the animal.
		d. Excessive CO2 build-up	1. Check CO2 absorbent and replace if necessary. 2. Check proper function of inspiration and expiration valves.
		e. Leak around the vaporizer filler	Make sure the sealing cap on the vaporizer is fully closed.
6	Animal sleep level is too deep	a. Anesthetic concentration is set too high	Adjust the dial to reduce the volume-percent of anesthetic.
		b. Vaporizer malfunction	Contact RWD or local dealer for servicing.
7	Breathing bag is overly distended	a. APL valve is closed	Open the APL valve.
		c. The outlet port of APL valve is clogged	Check and clean the outlet port of APL valve.
8	Gas is flowing , but breathing bag does not inflate	a. Breathing bag is punctured	Renew the breathing bag.
9	Gas flow is leaving through expiration port when squeezing breathing bag.	One way valve inside is broken	Contact RWD or local dealer for servicing.

Table 6-1 R630 anesthesia system: Problem – Solution Matrix (continued)

No.	Problem	Cause	Solution
10	No gas flow	a. Facility or cylinder gas supply valve is closed	Open gas supply valve.
		b. Gas cylinder is empty	Replace empty gas cylinder.
		c. Gas supply hose is disconnected	1. Ensure gas supply hose is connected to the cylinder or facility gas system. 2. Ensure the gas supply hose is securely connected to the anesthesia system.
		d. Oxygen flow control turned off	Turn the flowmeter valve knob counterclockwise to increase the oxygen flow rate.
		e. Gas supply regulator malfunction	Connect the system to an alternate oxygen supply.
11	Gas flow is not sufficient	a. Oxygen flow is set too low	Turn the flowmeter valve knob counterclockwise to increase the oxygen flow rate.
		b. Leak around vaporizer inlet port	1. Make sure the sealing cap at the inlet port is fully closed. 2. Verify that inlet port is not obstructed by animal hair, etc.
		c. Leak in animal breathing circuit	Check all hoses connections, particularly around mask or endotracheal tube.
		d. CO ₂ absorbent canister is leaking	1. Shut down the anesthesia system. 2. Remove the absorbent canister. 3. Remove any absorbent granules that are lodged between the canister and sealing gasket. 4. Reassemble the vaporizer.
12	Oxygen flush button	Valve inside malfunctions	The valve requires cleaning or replacement. Contact RWD or local dealer
13	Float in oxygen flowmeter sticks	Dirty flow tube	Flow tube needs cleaning.
14	Oxygen flow control valve knob is hard	Dirty or damaged needle valve	Flow valve needs cleaning or replacement. Contact RWD or local dealer for servicing.
15	Oxygen flow failure	Internal fault	Contact RWD or local dealer for servicing.
16	Audible leakage around oxygen hose connector	a. Loose oxygen hose connection	Tighten the connection with a crescent wrench.
		b. Tube does not fit.	Replace the tube.

7- Maintenance

7.1 Overview

This section provides the maintenance procedures to keep your R630 anesthesia system in good operating condition.

7.2 Safety

Some maintenance procedures may involve the use of hazardous materials and contact with biological hazards. Always follow all applicable local regulations and the material manufacturer's Material Safety Data Sheet (MSDS) recommendations. During the procedure, basic personal protective is necessary, such as wearing gloves, mask and eye protection.

7.3 Annual inspection

RWD recommends that your R630 anesthesia system be inspected annually for proper function. Contact RWD or your local dealer for service.

7.4 Machine status

Unless otherwise specified, the anesthesia system may be connected to gas supplies during the performance of the maintenance procedures described in this manual. However, make sure the oxygen supply is OFF and the vaporizer is set to zero volume-percent.

7.5 Record keeping

A record of system service and maintenance should be kept. Such records should include service and maintenance dates, part numbers of any replaced parts, dates when consumables are replenished, and other pertinent data.

7.6 Parts and materials

Contact RWD or your local dealer if parts or materials are needed during the maintenance.

7.7 Cleaning the equipment



Maintenance of the anesthesia system involves possible contact with biological and chemical hazards. Wear gloves, mask, and eye protection during all cleaning

7.7.1 Required materials and supplies

- Germicidal cleaner
- CO₂ absorbent material
- Water and clean cloth

- Personal Protective Equipment (masks, eye protection, gloves, etc.)

7.7.2 Weekly maintenance

1. Wipe all surfaces of the system with a cloth dampened with germicidal cleaning solution.
2. Remove hair, dust, and debris from all vaporizer surfaces; especially around the volume-percent dial and the anesthetic fill port.
3. Check the CO₂ absorber canister for exhausted absorbent. If its total use time is over 10 h, replace it as follows:
 - a. Remove the canister from the bottom of the machine and shake out the spent absorbent.



Do not bang the edge of the canister on any surface. This may damage the sealing surfaces.

- b. Wash the canister in warm water, and dry thoroughly.
 - c. Wipe the canister gasket, located on the underside of the machine, with a clean cloth dampened with germicidal cleaner. Make sure there is no absorbent residue remaining on the gasket surface.
 - d. Fill the canister with fresh CO₂ absorbent material to within 2-3 cm of the top edge.
 - e. Reinstall the canister firmly.
4. Perform a pre-use checkout as specified in *Section 5 – Operation*.
 5. Check the cleanliness of the oxygen supply.
 6. Check anesthesia system leaks as specified in *Section 4 – System setup*.

7.7.3 Draining the vaporizer

If the system will be vacant for a long time, drain the anesthetic agent inside the vaporizer.



- ◆ Perform this procedure in a well-ventilated location.
- ◆ Refer to the anesthetic agent manufacturer's MSDS for required personal protective equipment and handling and disposal of waste anesthetic agent.
- ◆ Do not mix the anesthetic agent with other liquid.



Do not wipe spilled anesthetic agent from any painted surfaces or the finish may be damaged. Allow the anesthetic to evaporate.

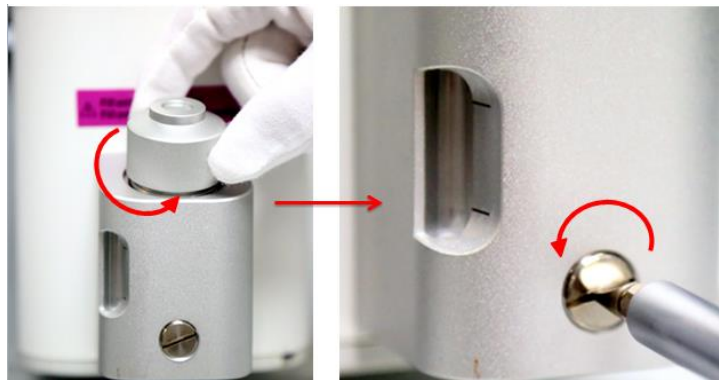
- 1) Make sure the oxygen supply is OFF and vaporizer is set to zero.



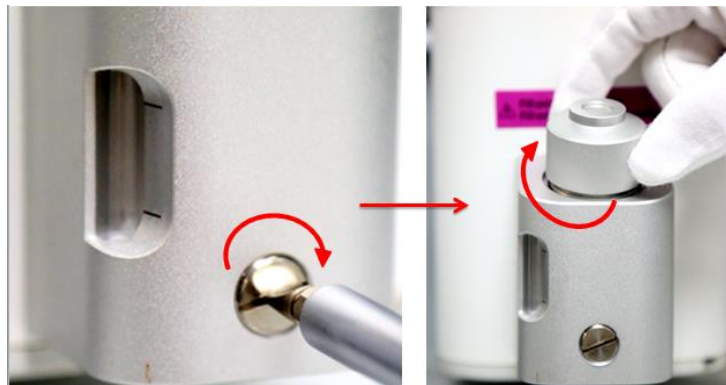
- 2) Make sure the anesthesia system is in a well-ventilated area.
- 3) Attach a drain tube to the drain port. Place the other end of the tube in a receptacle to catch the drained anesthetic agent.



- 4) Loosen the sealing cap, then loosen the bottom screw with a screwdriver to make the anesthetic agent flow naturally.



- 5) When the anesthetic agent stops draining from the vaporizer, tighten the bottom screw and sealing cap.



- 6) Remove the drain tube and deal with the waste anesthetic agent according to the regulations.

8-Product information

8.1 Overview

This section provides the warranty information, features and specifications of R630 anesthesia system.

8.2 Product warranty

This warranty is only applicable to those new products purchased from RWD or dealers authorized by RWD, as well as the first person to whom it extends.

8.3 Product specifications

Material	Mainly aluminum alloy	
Working condition	Temperature: 10 ~ 35°C	Humidity: 5 ~90 %HR
Storage condition	Temperature: -10 ~ 55°C	Humidity: 5 ~ 90 %HR
Oxygen flow rate	0.2~10 L/min, 0.2~8 L/min when concentration >4 %	
Oxygen grade	Medical grade	
Concentration range	Isoflurane: 0.5~5 %(v/v), Sevofluran: 0.5~8 %(v/v)	
Settable concentration point	Isoflurane: 0 ~ 0.5 ~ 1.0 ~ 1.5 ~ 2.0 ~ 2.5 ~ 3.0 ~ 3.5 ~ 4.0 ~ 4.5 ~ 5.0 %(v/v) Sevofluran: 0 ~ 0.5 ~ 1.0 ~ 2.0 ~ 3.0 ~ 4.0 ~ 5.0 ~ 6.0 ~ 7.0 ~ 8.0%(v/v)	
Perfusion volume of anesthetic agent	The recommend volume is 100 mL, as the volume between max and min visible liquid level is about 120 mL.	
Consumption of anesthetic agent	About 3 × oxygen flow rate (L/min) × set concentration value(% (v/v)) e.g. When the isoflurane concentration is set at 2 % and the oxygen flow rate is set at 600 mL/min, a bottle of isoflurane of 100 mL could be consumed for about 28 hours.	
Loss of anesthetic agent	22°C , dial at 0 % , < 0.5 mL/24h.	
Max pressure load	50 kPa	
Max inclined angle	30 °	

9-Useful information

9.1 Overview

This section provides information that may be helpful to the users of R630 anesthesia systems.

9.2 Pressure equivalents

1 atm = 1033 cmH₂O = 760 mmHg = 760 Torr = 1013 mb = 14.7 psi

1 psi = 70.3 cmH₂O = 51.7 mmHg = 68.9 mb = 6.9 kPa

1 mmHg = 1.36 cmH₂O = 1.33 mb

1 cmH₂O = 0.736 mmHg = 0.981 mb

9.3 Pressure unit conversions

Table 9-1 Pressure unit conversions

Unit	psi	inchH ₂ O	kPa	millibar	cmH ₂ O	mmHg
psi		27.680	6.8947	68.947	70.308	51.715
inch H ₂ O	3.6127x10 ⁻²		0.2491	2.491	2.5400	1.8683
kPa	0.14504	4.0147		10.000	10.1973	7.5006
millibar	0.01450	0.40147	0.100		1.01973	0.75006
cmH ₂ O	1.4223x10 ⁻²	0.3937	0.09806	0.9806		0.7355
mmHg	1.9337x10 ⁻²	0.53525	0.13332	1.3332	1.3595	

9.4 Minimum alveolar concentration (MAC) anesthetic levels

Table 9-2 MAC levels

Animal	Halothane	Isoflurane	Sevoflurane
Cat	1.19	1.63	2.58
Dog	0.87	1.3	2.34



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RWD



R419 Intelligent Animal Ventilator

User Manual

A

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1-Introduction

1.1 Overview

Thank you first for choosing the R419 Intelligent Animal Ventilator produced by the RWD Life Science Co., Ltd (hereinafter referred to as the RWD)!

For better use of this product, please read the supplied instructions carefully before the initial installation and use of this product.

RWD Life Science Co., Ltd. is endeavored to improve the product function and service quality. RWD reserves the right to change or alter the contents of user manual without prior notice.

If you would like the latest product information, you are welcome to call us or visit our website (<http://www.rwdstco.com/>). If you find any discrepancy between the instruments and this manual during the practical use of our product, or if you have any questions or suggestions, you are welcome to contact us.

1.2 Safety

In order to avoid the harm to the experimental animal or operator and the damages to the ventilator, please refer to Chapter “2-System Safety”.

If you have any questions or suggestions related to safety, please contact our company for after-sales service support.



This device is only used for clinical or scientific research of animals and is not allowed to be used on humans!



The Intelligent Animal Ventilator should only be operated by trained personnel.

1.3 Product Features

- The appearance is simple, light and elegantly colored, compact layout, and an overall small size. It can be equipped with a respiratory anesthesia machine bracket, which is flexible and convenient to operate;
- Three modes are available: Volume Control Mode (VCV), Pressure Control Mode (PIP-CV), and Apnea Mode (APNEA);
- Equipped with two different sized bellows (300 ml and 1500 ml) suitable for animals weighing less than 100kg;
- Display specifications: 5-inch LCD color display is simple, intuitive, and easy to operate, with real-time readings of monitored data;
- Intelligent input: imports the commonly used animal breathing parameters into the database, input the weight, and it automatically outputs the recommended breathing parameter values;
- Breathing parameter storage and recall;
- Real-time display of breathing-related curve parameters, which is intuitive and

visual;

- Auditory alarm, with text message prompts, improving human-machine interaction, and reducing human error;
- It is powered by an internal rechargeable battery and will run for more than 4 hours while unplugged.

1.4 Introduction of device's main components



Fig 1

No.	Parts	Description
1	Bellows cover	To isolate fresh gas from driving gas
2	Folded bag	Inputs fresh oxygen and anesthetic gas into the lungs of the animal
3	Base	To connect device and bellows
4	Display screen	To display device operation information and set parameters
5	Battery indicator	When powered by the battery, this indicator will be on.
6	External power indicator	After the equipment is connected to an external power source, this indicator will be on.
7	INSP.HOLD Button	Refers to inspiration hold button. An inspiration will be held while this button is pressed.
8	Power switch button	Press button and hold for 1 second to start the equipment. When you hear the equipment prompt tone, the equipment is turned on, and will enter the self-calibration interface. Pressing the button for 3 seconds will off the equipment.



Fig 2

No.	Components	Description
1	Fresh gas port	To anaesthesia machine
2	anaesthetic wastes exhaust port	To gas filtration tank
3	17mm port	To the port of the driving gas
4	Port of gas source	Oxygen source (or air)
5	Port of pressure sensor	To 22mm port
6	Air outlet	Discharge waste gas of the driving gas
7	Port of the driving gas	To 17mm port
8	Power adapter interface	Power input port

1.5 Specification

Specification	Description
Dimension	253mm×224mm×112mm
Weight	3.22kg
Respiratory rate	2~60 bpm
I:E	1:1.0~1:4.0
Tidal volume	20~1500ml
Peak inspiratory pressure	5~35 cmH ₂ O
Trigger pressure	-9.0 ~ -1.0 cmH ₂ O
Patient weight range	≤100.0kg
Touch screen	5 inch, 800 × 480

2-System Safety

2.1 Safety Instructions

For safety, please pay attention to the following items:

- Please read the user's manual carefully.
- Operating conditions of R419 Intelligent Animal Veterinary Ventilator:
Temperature: 0°C ~ 40°C, humidity: 15% ~ 95% (non-condensing), atmospheric pressure: 70kPa ~ 110kPa
- Storage conditions of R419 Intelligent Animal Veterinary Ventilator:
Temperature: -20°C ~ 45°C, relative humidity : ≤95%, atmospheric pressure: 70kPa ~ 110kPa



Warning:

When high pressure oxygen meets combustible materials (lubricating grease, motor oil, alcohol, etc.), it may cause an explosion:

- Keep the equipment and all connections absolutely free of oil and grease.
- It is strictly forbidden to smoke near the ventilator and/or ignite an open flame.
- When installing and replacing the oxygen cylinder, use your hand as much as possible to tighten all the connections on the oxygen cylinder and pressure relief valve. If you need to use tools, do not use excessive force, it may cause damage to the threads and sealing materials and may result in gas leakage.
- Take measures to prevent the oxygen cylinder from tipping over. If the oxygen cylinder falls over, the pressure relief valve may be damaged and cause an explosion.



Important:

- Always open the pressure relief valve on the oxygen cylinder slowly to prevent the surge of pressure from impacting the valve fittings inside the ventilator.
- Always check the pressure of the oxygen cylinder. Do not completely exhaust the oxygen in it, humidity in the surrounding air may invade it and cause parts to rust.



Attention:

- Animals and the ventilator must be continuously observed during use.
- The breathing circuit interconnected with the anesthesia machine needs to be remain unobstructed and easy to observe. Avoid operations that may result in covering or affecting their function (e.g. improper location of the animal).
- A large number of quality assurance measures have been taken in the development of the equipment software, and the risk due to software defects is minimal.
- Take measures to protect the rubber components from ultraviolet light and prolonged direct sunlight, to avoid embrittlement of these parts.

2.2 Cautions

- Before operating this equipment, the operator should meticulously read this user's manual and fully understand its contents.
- Before using this equipment, please carefully check all connectors to ensure adequate

- gas-tightness and to avoid any leakage.
- Equipment malfunctions caused by improper cleaning, maintenance or operation will be considered the user's responsibility.
 - If someone disassembles the equipment's main body without authorization, RWD shall stop providing any quality assurance or technical maintenance service to this equipment. If the user has any technical questions, please contact the authorized person or the RWD for support.



Risk of electric shock: Laypeople are prohibited from removing the cover or panel of the equipment and removing the built-in rechargeable battery.



DANGER: The use of flammable or explosive gases as a gas source for the equipment is prohibited.

2.3 Safety Instructions

The use of this equipment is limited to persons with relevant expertise in respiration and anaesthesia or persons trained by the manufacturer.

Keep the equipment away from water, with good ventilation and relatively consistent air pressure, temperature and humidity. It should not be exposed to direct sunlight or places with gases or chemicals that are corrosive, flammable or explosive. During placement or handling of the equipment, operators should prevent the equipment from being inclined, vibrated or squeezed. Pay attention to the voltage, current and frequency of the connected power source, and make sure that the grounding terminal is normal. Avoid overloading the equipment.



Warning!!!

The R419 Intelligent Animal Veterinary Ventilator should self-calibrate when started. If self-calibration cannot be done, it means there may be some kind of circuit breakdown or internal pipe leakage. In that case the user should turn off the equipment power and make sure the gas source pressure is between 41-87 psi, the breathing circuit connection is correct, and the flow rate of the anesthesia machine is appropriate (note that the breathing circuit is connected to the breathing bag at this time, and the evaporating tank of the anesthesia machine is closed). Then, turn on the equipment for self-calibration after the folded bag in the bellows of the ventilator rises to the top of the bellows. If self-calibration fails again, please contact your supplier or the RWD after-sales service department for further support.

Warning!

It is forbidden to use the oxygen flush button on the anesthesia machine during the inspiration phase of the breathing cycle. It may cause severe lung rupture in the animal. During the inspiration phase, the drain valve in the control unit is closed, so the oxygen flow is added to the breathing machine's air supply flow, and the only direction of the airflow is to the lungs of the experimental animal.

2.4 Warranty

- The warranty of this equipment starts from the day it leaves the factory. If the equipment cannot be used normally due to problems such as materials and/or process defects, the company undertakes after-sales service such as maintenance and/or part replacement.

- Any damage caused by improper use is not covered by the warranty. If repair or replacement of parts is required, the cost will be borne by the user.
- If the equipment that has been returned for repair has been dismantled without the authorization of RWD before arriving at RWD, the company does not provide after-sales service such as warranty, free maintenance or parts replacement.
- The warranty statement (including its restrictions) is exclusively issued by RWD and covers all other warranties.

3-Unpacking and Assembly

- 1) Inspect the packing for any signs of damage that may have occurred during shipping, if damage has occurred, make a damage claim to the carrier and contact with RWD or your local dealer immediately.
- 2) Remove all components from the shipping carton. Save all boxes and packing materials for future shipments.
- 3) Check the packing list to ensure all components ordered are included. If there is any doubt or you need help, contact RWD or your local dealer immediately.

Packing list:

- Device body -----1
- 300ml Bellows and bellows cover -----1
- 1500 ml Bellows and bellows cover ----- 1
- 1.2 m Bellows pipe ----- 1
(For connecting ventilators and gas filter cans)
- 0.9m Reusable threaded pipe ----- 1
(Used to connect anesthesia machines and ventilators, can be steam sterilized)
- Airway pressure connection pipe - Luer-22mm connector ----- 1
- Rubber booster tube (ID: 15mm) -----1
- 30-22mm Bellows joint -----1
- Power cable----- 1
Power Adapter ----- 1
- Warranty card -----1
- User manual ----- 1

Note: If your order contains other gadgets, it may also be packed at the same time. Please refer to the waybill.

3.1 Notice for Use

Before using this equipment, please make sure to read the user’s manual carefully!

This equipment is designed to perform the functions referred to in this manual. Please use and operate the equipment according to the relevant instructions in the manual. This equipment should be checked and maintained periodically to ensure its reliable operation.

It is suggested you stop the use of the equipment and change the parts produced by our company or the companies authorized by our company, if the following situations occur to any component: Damage to all or part of the equipment, excessive wear, service life termination caused by contamination or other reasons.

Use of any equipment that has stopped functioning normally should be stopped immediately. The user should not change the equipment in any form. It is the responsibility of the user if the equipment is not used in accordance with our company’s user’s manual, or if the user changes or makes unauthorized repairs to the equipment, or if said changes or repairs results in damages to experimental animals or properties (including the equipment itself).

3.2 Installation

- i. Check that the control host (main body) is intact and all interfaces on the rear panel, to ensure that the air supply port (SUPPLYGAS), the driving gas port (DRIVING GAS), and the exhaust port (EXHAUST) are not blocked;
- ii. Check that the bellows and bellows cover are intact and that there is no debris inside bellows;
- iii. Install the bellows and bellows cover. Make sure the corrugated sheath at the bottom of the bellows around the mounting ring of the control host, gently holds the outer edge

of the bellows disc (top of the bellows), lift it up and down, and repeat several times to smooth out the ripples on the bellows. Then replace the bellows cover and gently press and rotate the bellows cover clockwise until it snaps into the bayonet at the base. The bellows and bellows cover are now installed.

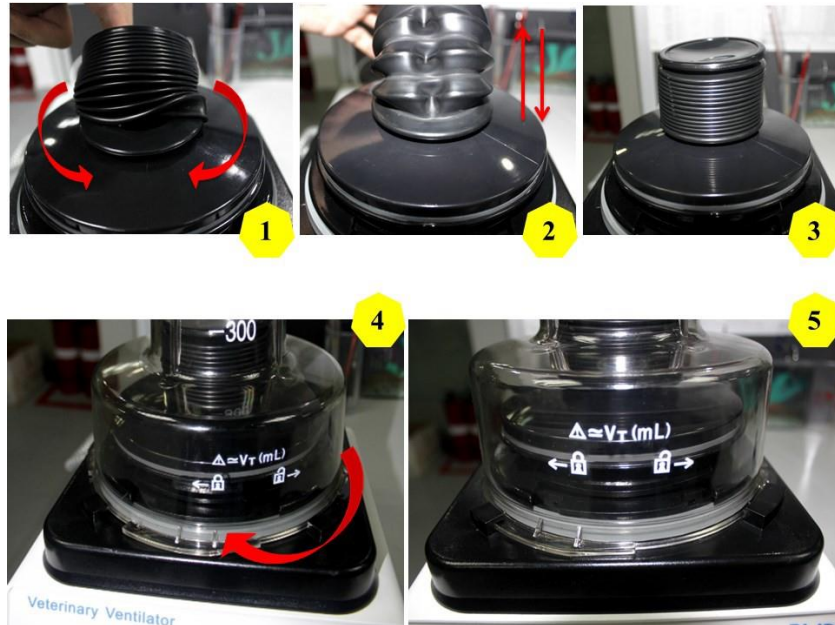


Fig 3

- iv. Connect the pipes of the driving gas. Use a rubber boosting tube to connect the 17mm port of the bellows base to the driving gas port (DRIVING GAS) on the control unit;



Fig 4

- v. Install the breathing circuit port. Connect the airway pressure connection pipe (Luer taper) on the side of the airway pressure connection pipe - Luer -22mm connector to the port of pressure sensor (PRESSURE TRANSDUCER) of the control unit, tighten it, and then install the 22mm connector (transparent) onto the 22mm port of the bellows base;



Fig 5

- vi. Connect the ventilator to the anesthesia system. Remove the breathing bag from the anesthesia machine and connect the 22mm port on the bellows base to the breathing bag interface of the anesthesia machine with a threaded pipe;



Fig 6

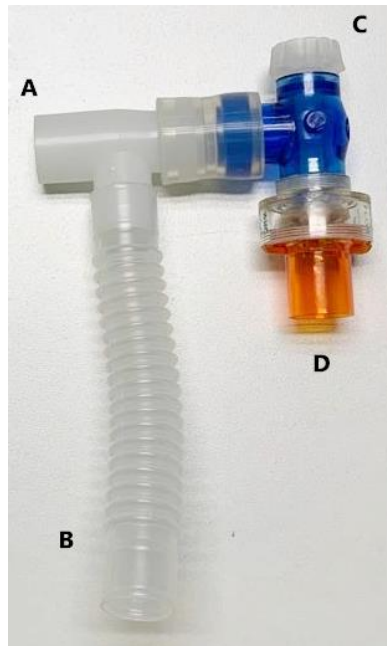
- vii. Connect the ventilator to the gas recovery system. Connect the 22mm bellows connector to the 30mm port on the bellows base and connect to the gas filtering tank using the bellows.



Fig 7

- viii. Connect the gas supply system. Use an oxygen tube and a three-way valve to connect the pressure relief valve of oxygen cylinder (gas output pressure should range from 41 to 87psi) to the air supply port (SUPPLY GAS) on the ventilator. The other outlet of three-way valve is connected to the air interface of the anesthesia system.

3.3 Mechanical Ventilation PEEP Valve (Optional configuration)



PEEP (Positive Expiratory End Pressure) valve is a popular device for ventilators. With PEEP, the ventilator can effectively control the Positive end-expiratory Pressure of the patient. This product is uni-directional PEEP valve. The airflow direction is the same as the expiratory direction, and the PEEP pressure varies with the position. PEEP pressures can be monitored during use.

- ◆ Adjustable pressure range: 3~20cmH₂O
- ◆ Clearly marked flow direction arrows
- ◆ Transparent
- ◆ Material: polycarbonate, polypropylene, silica rubber, stainless steel
- ◆ Packing method: individually

PEEP valve connection mode shown as below:



Interface B of PEEP valve is connected to the exhaust port of the ventilator, interface A is connected to port 30mm on the bellows base, and interface D in orange is installed

and connected to the exhaust pipe downward in the direction shown.

User can adjust the PEEP pressure by rotating the knob C. See the pressure-time

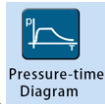
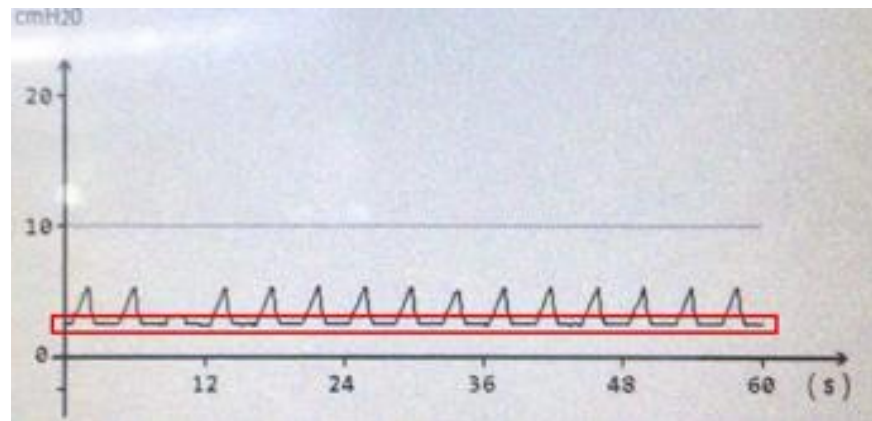


diagram in the sub-main interface described in section 4.1. Click the icon to enter the following interface, simulate animal lungs with a breathing bag, and make the mechanical ventilation enabled, the PEEP pressure can be observed on the pressure-time diagram page.



The regular steady state pressure in the pressure-time diagram is PEEP pressure, see as the position marked with the red frame, the PEEP pressure in the diagram is about 3cmH₂O.

4-Operating Instruction

4.1 Power-On self-calibration/test

- 1) Connect the gas source pipes of the anesthesia machine and the R419 intelligent ventilator, turn on the gas source switch, adjust the pressure output of the decompression meter to 50 psi (0.344 MPa recommended value), and confirm that the volatilization tank switch of anesthesia machine is adjusted to “0” position;
- 2) Connect the breathing circuit according to Section 3.2, open the anesthesia machine flowmeter, and adjust the flow rate to about 1 L/min. When the folded bag of R419 Veterinary Ventilator bellows rises to the top of the transparent cover, press and hold the power switch for 1 second to start the equipment. The equipment will give a click sound and enter the self-calibration interface. Self-calibration will test the power source voltage, battery voltage, air source pressure, airway pressure and sensor.

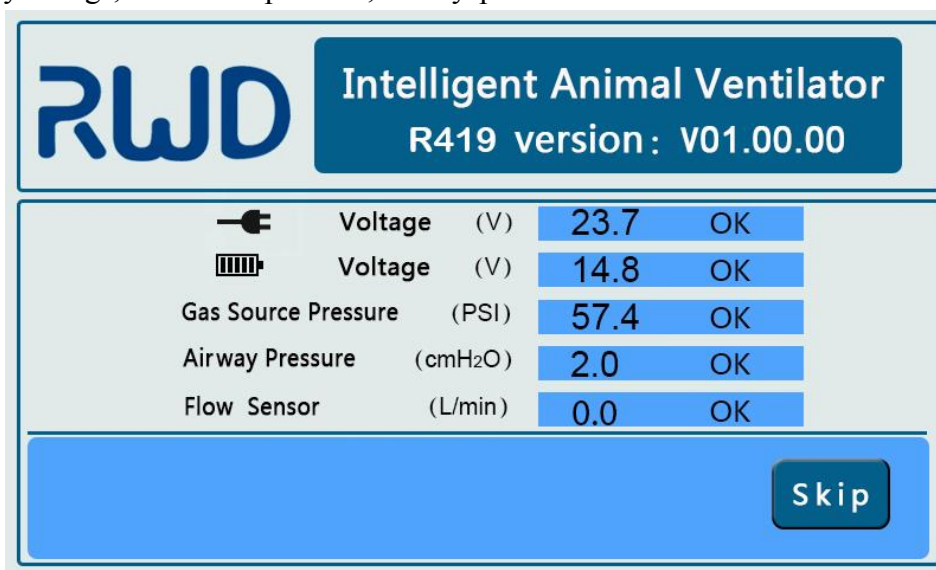


Fig 8

- 3) After the self-calibration passes, the interface automatically enters the main interface after 3 seconds;

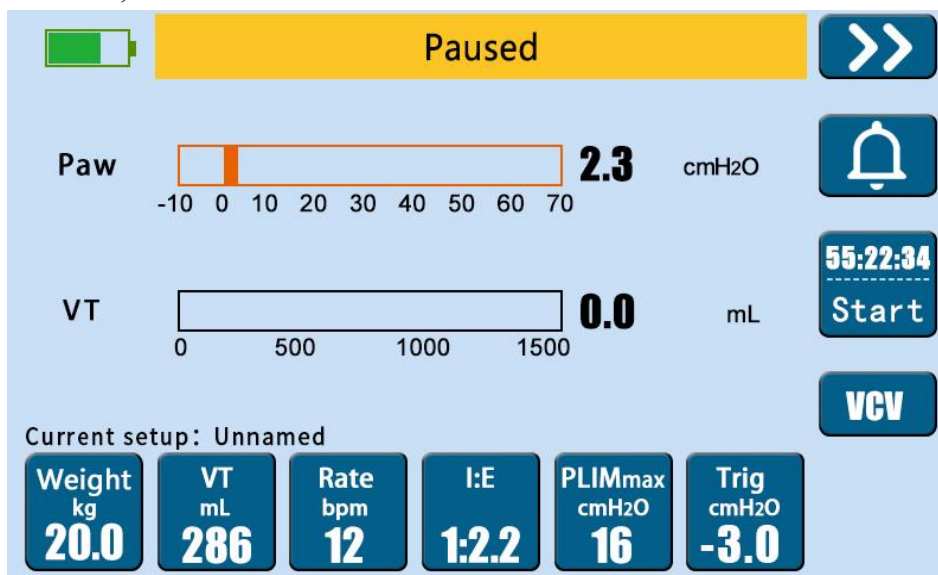


Fig 9

After the R419 Intelligent Animal Veterinary Ventilator enters the main interface, users can set the breathing parameters such as the inspiration/ expiration ratio and airway pressure upper limit alarm. Press **>>** to enter sub-main interface for setting the system parameters, shown as below.

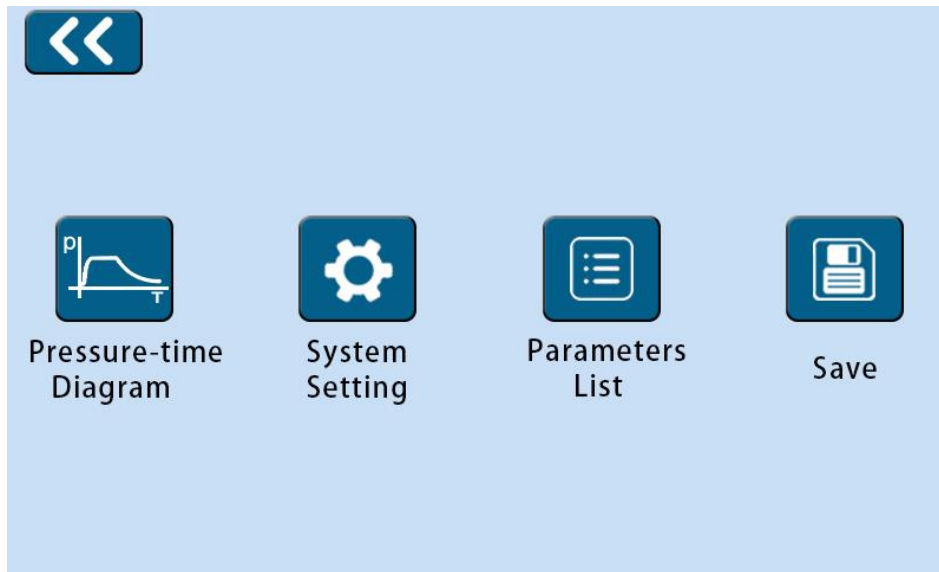


Fig 10

4.2 Leakage Detecting

Operation method:

After connecting the ventilator to anesthesia machine, adjust the flowmeter to 0.3L/min, adjust

the upper pressure limit **PLIM_{max} cmH₂O 16** displayed on the main interface of the ventilator to 30cmH₂O, click to start, after several breathing cycles, the real-time tidal volume (VT) reaches the set value, then press the HOLD button until the airway pressure value rises or falls slowly. Rising means the air tightness is good. If it is falling, no more than 3 cmH₂O within 10 seconds, the air-tightness is still considered adequate. If the drop in pressure exceeds these values, there may be a problem with air leakage or tube circuitry. After having checked that the tube is tightly connected, and the airway pressure still drops more than 3 cmH₂O in less than 10 seconds, then there is a leak in the ventilator. It is recommended that the user follows the above steps to regularly check the ventilator, to avoid affecting its operation.

4.3 Mode Setting

Click any mode to enter the parameter editing interface. Click on the parameter editing interface to select any ventilation mode.

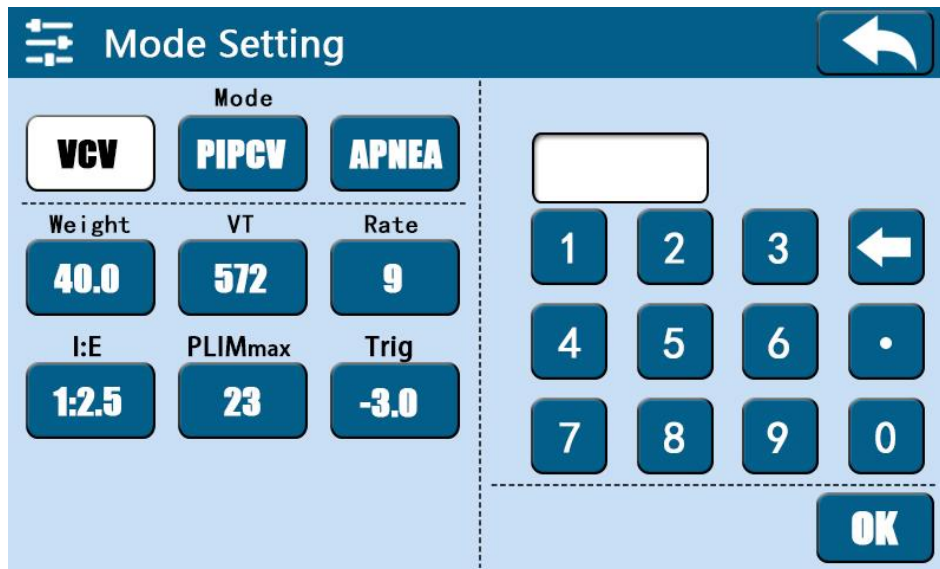


Fig 11

Volume Control Mode (VCV): With tidal volume (VT) as the reference standard, the inspiration process is complete when the volume of gas inhaled by the animal reaches the set tidal volume;

Pressure Control Mode (PIP-CV): With peak inspiratory pressure (PIP) as the reference standard, the inspiration process is complete when the gas inhaled by the animal reaches the set peak inspiration pressure;

Apnea Mode (APNEA): Selecting this mode will allow the animal to spontaneously breath; when the animal does not breath for a pre-set period of time, the air supply starts immediately, and delivers the pre-set assisted ventilation. This process will cease when the animal begins to spontaneously breath again. If the user observes that the animal has begun to spontaneously breath, and assisted ventilation is no longer necessary, the user can stop the ventilator and end assisted ventilation.

4.4 Weight Setting

After selecting this mode, enter the animal's weight. The system automatically matches the recommended parameters in accordance with the entered weight. The adjustment range of the weight input is 2.0~100.0 kg, and the input step is 0.1 kg.

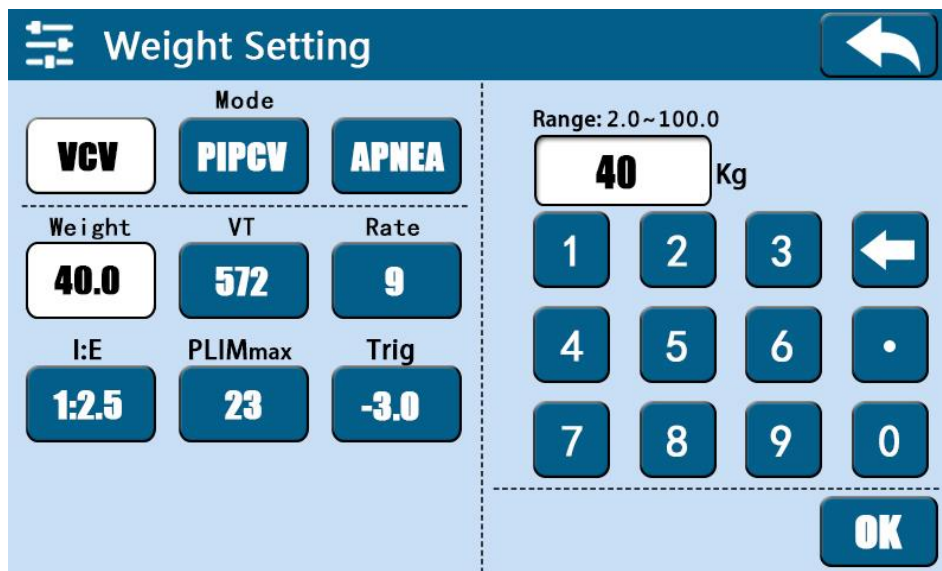


Fig 12

4.5 Setting of Breathing Parameters

Users can also enter other parameters according to need:

VT: During ventilation, the inspiratory volume is controlled in real time with reference to the set tidal volume (VCV). When the tidal volume setting is reached, the inspiration is over. The adjustment range of tidal volume is 20 ~1500 mL.

Flow: The device ventilation mode is selected as PIP-CV. The intelligent input automatically matches the flow rate. The user can also adjust the ventilation speed of the flow control device. The flow adjustment range is 1~85L/min.

Rate: When the breathing rate controls ventilation, the equipment breathes according to the set breathing rate, and the breathing rate can be adjusted within a range from 2 to 60 bpm.

PIP: The equipment ventilation mode is selected as PIP-CV. Refer to the set PIP to control the airway pressure in real time during the inspiration. When the peak inspiratory pressure setting value is reached, the gas supply ends. The PIP adjustment range is 5~35 cmH₂O.

I:E: In VCV/APNEA ventilation mode, the equipment controls ventilation according to the set inspiration/ expiration ratio. The parameter range of the inspiration/ expiration ratio is 1:1.0~1:4.0.


PLIMmax: When ventilation is performed in VCV/APNEA mode, the inspiration volume during inspiration, is controlled in real time in reference to the set tidal volume. When the tidal volume pre-set value is reached, the inspiration is complete, and the upper pressure limit is used as the airway pressure during inspiration for over-pressure protection with real-time monitoring in the animal VCV mode. When the airway pressure reaches the upper pressure limit, and the inspiration volume does not reach the set tidal volume, the ventilator sounds an alarm and automatically adjusts and enters the exhalation state in advance. The upper limit of the maximum pressure is 10~60 cmH₂O.

Trig: The trigger pressure adjustment range in VCV/PIP-CV/APNEA mode is -9~ -1 cmH₂O, the adjustment step length is 1 cmH₂O. Adjusting to 0 will turn off the trigger pressure setting, and OFF will be displayed. Ventilation is completely controlled by the ventilator; APNEA mode prohibits the trigger pressure from being off and the parameter cannot be set to 0.

APN.T: 'Waiting time' is the time from when a complete spontaneous breath is taken in

APNEA mode, to the start of the next inhalation, referring to the time point when the trigger pressure is reached by the last spontaneous breath. After the set waiting time is reached, the ventilation control will start, and the waiting time adjustment range is 15~30 seconds.

The real waiting time must be greater than or equal to the set waiting time.

 Note: In VCV/APNEA mode, when any one of the three parameters of tidal volume, breathing rate and/or inspiration/ expiration ratio is set, the system's total flow range in real time must be within 1~85L/min, otherwise the system will display a prompt message, and the parameters will not be available.

4.6 Add, Call, Delete and Adjust Parameters

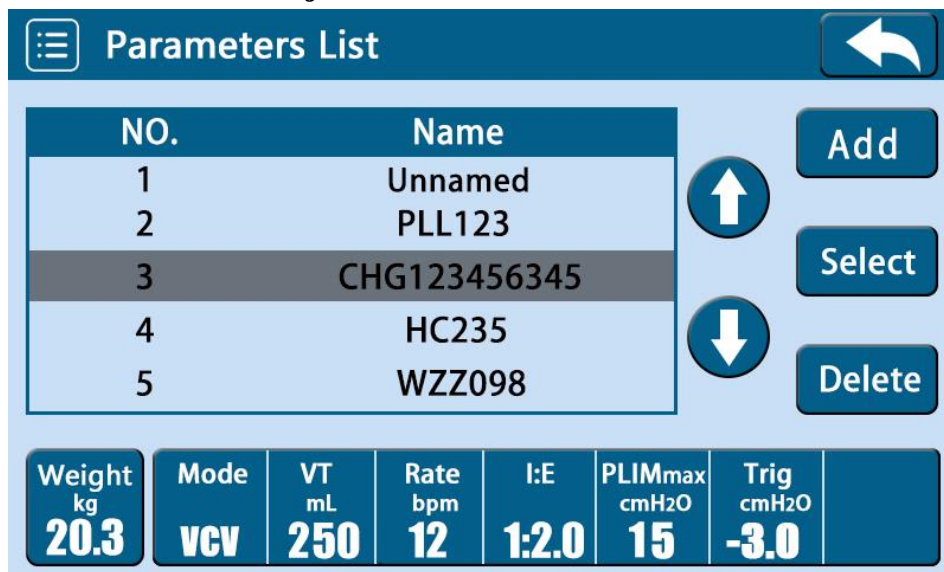


Fig 13

4.6.1 Add Parameters

- 1) Click the [New] button to enter the new interface for naming. After naming is complete, click "OK" to enter the parameter editing interface, or click [Return] to go back to the parameter list interface;
- 2) Enter the parameter editing interface, a default intelligent parameter group including a weight of 20 kg will display. Confirm whether to adjust each parameter according to need. Click [OK] to enter the parameter list interface. The [Parameters List] has one new name in the parameter group; click "Return" to enter the parameter list interface. The newly named parameter is at the back part of the group list in the parameter list interface, but the parameter value still maintains the default value of 20kg intelligent input; the shading is located on the new parameter group by default;
- 3) When the parameter list interface has saved 20 parameter groups, click the [New] button, and the pop-up prompt "The 20 sets of parameters have been saved, please delete some for new ones!", will display, then click the [OK] button to exit the pop-up box.

4.6.2 Call Parameters

- 1) Click a parameter number in the naming area of the [Parameter List] interface to pre-select this parameter group, and click the [Select] button to select this parameter group in the main interface;

- 2) If other parameters are selected when the equipment is in the process of ventilation, the current breathing cycle will not be forcibly interrupted. The selected procedures are performed after the current breathing cycle ends;

4.6.3 Delete Parameters

- 1) Click a parameter number in the naming area of the [Parameter List] interface to pre-select this parameter group. You can check this parameter group in the parameter display area;
- 2) Click “Delete” to delete the parameter group, and the prompt box “Are you sure you want to delete these parameters?” will display. Click [Yes] to delete, and the next parameter group in line will be moved up into its place, but the shading position will remain unchanged. After deleting the last parameter group, the check box will move up; click [No] to return to the [Parameter List] interface;

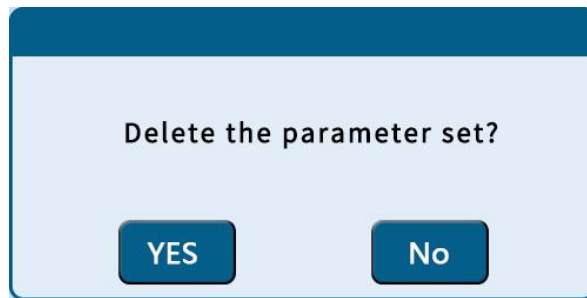


Fig 14

- 3) After deleting the last named parameter group in the parameter list interface, the [Delete] button is disabled;
- 4) The “Unnamed” parameter group cannot be deleted, it is optional, and the [Delete] button is disabled;
- 5) The main interface uses the parameter group ABC, the parameter list interface pre-deletes the parameter group, and displays the prompt "It is in use and cannot be deleted" Click the OK button to exit the pop-up box;

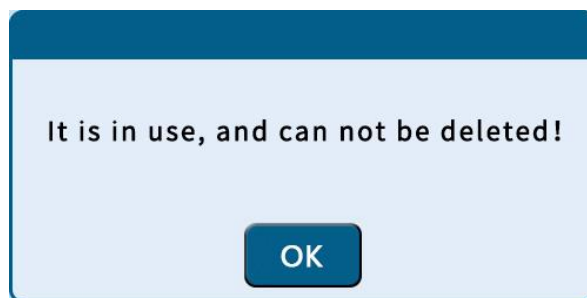


Fig 15

4.6.4 Adjust Parameters

- 1) Parameter list interface: Click the parameter to adjust, confirm the adjustment and return to the parameter list interface; the parameter will change under the same name;
- 2) Main interface: Click on the parameter to adjust, confirm the adjustment and return to the main interface. After the parameter has been adjusted, it will temporarily be stored as [unnamed]. The previously unnamed cached parameters are replaced with the most recently adjusted parameters. The parameters named before adjustment and stored in the [Parameter List] interface will not be affected;

- 3) After adjusting the parameters during ventilation, the newly adjusted parameters will be executed during the next inspiration phase, and the current breathing cycle will not forcibly interrupted.

4.7 System Setting

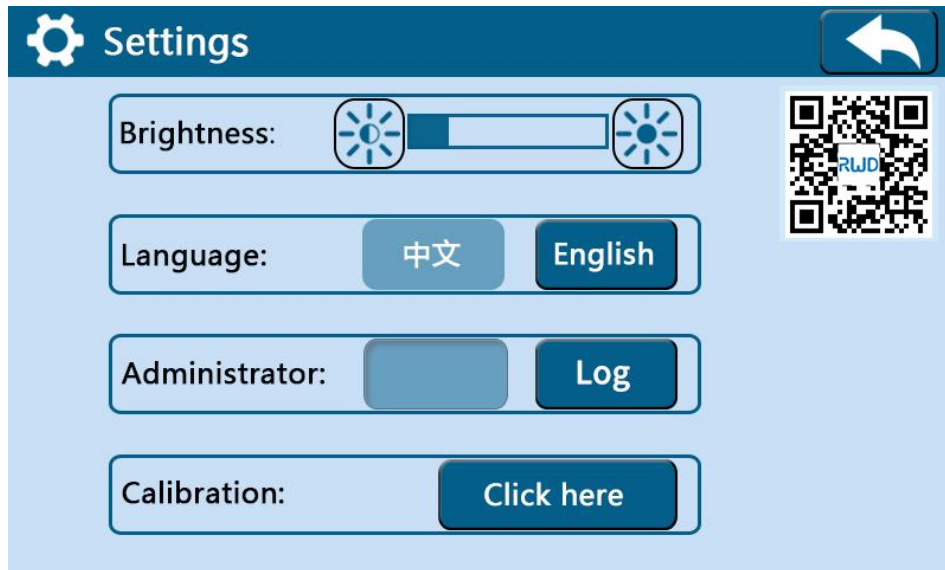




Fig 16


4.7.1 Brightness Control

- 1) Click  &  to adjust the backlight brightness.
- 2) When the device is powered by the internal battery, the current display brightness will be 80% of the set brightness;
- 3) The brightness of the equipment when switched on will be consistent with the brightness before the last shutdown;

4.7.2 Chinese-English shift

- 1) Click **【中文】** to switch the system language to Chinese, or [English] to switch the system language to English.

4.7.3 Calibration

- 1) Click  to enter the interface as shown in the figure below (**Note: be sure to unplug the threaded pipe shown in Figure 18 before calibration**), and click the “Clear” button on the right side of “Airway Pressure sensor”. (We recommended this to be cleared monthly)

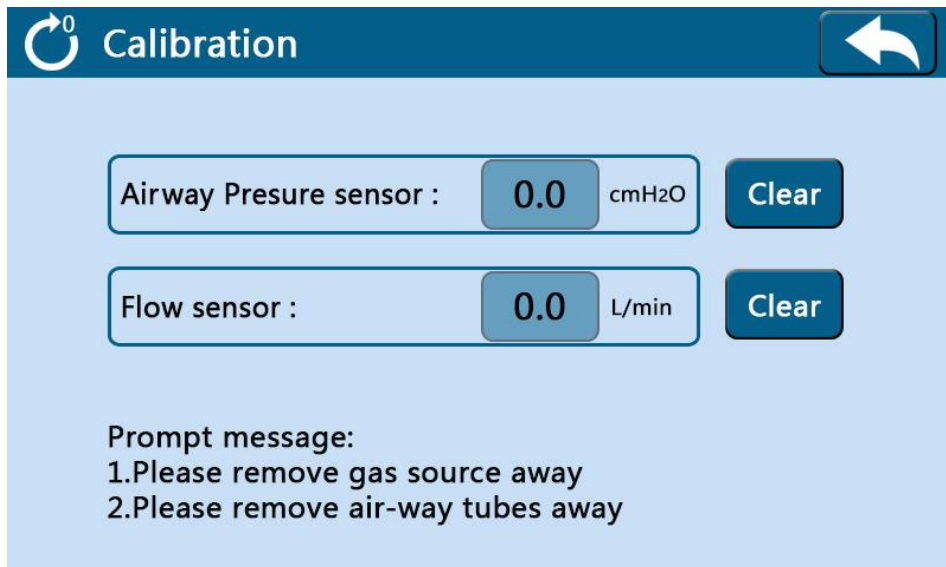


Fig 17



Fig 18

4.8 Alarm Information and Processing

4.8.1 Alarm Prompt of High Airway Pressure

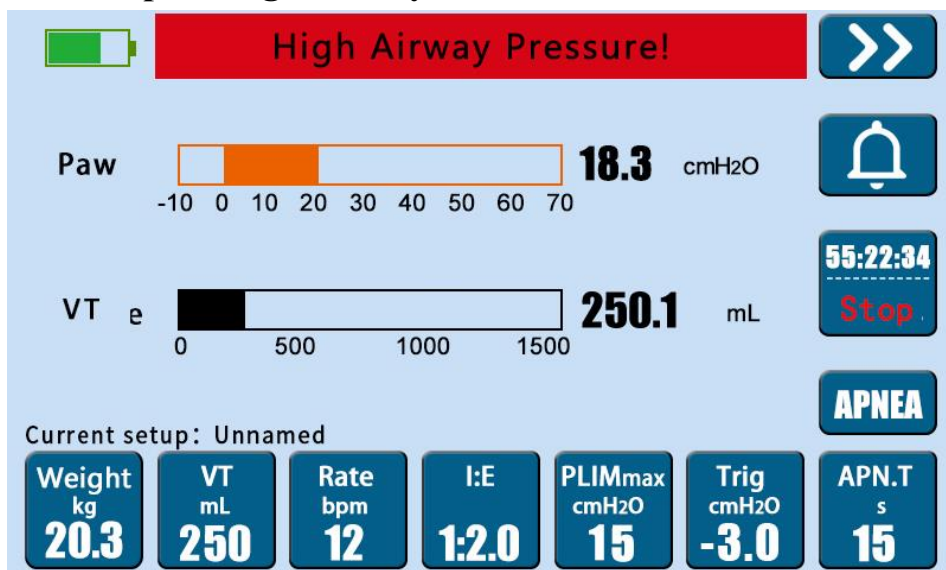


Fig 19

- a. The information bar shows "High Airway Pressure!" indicating that the airway pressure is excessive. A continuous auditory alarm "beep" will sound. At this point, the ventilator will automatically end ventilation, keeping the airway pressure value within the set value range, and it will then enter the ventilation cycle. When the airway pressure returns to the set value range, this alarm message and status will be automatically cancelled. When an alarm occurs, check the breathing circuit immediately to confirm that it is connected correctly, the tidal volume is correct, and confirm whether the set Maximum Pressure Limit (PLIMmax) is suitable for the animal or the animal's current state.
- b. When the airway pressure is too low, the device starts to sound an alarm. If the current airway pressure is lower than 2 cmH₂O, check the breathing circuit immediately to see whether the breathing circuit is damaged or leaking. The flowmeter of the anesthesia machine is normally open.
- c. This alarm message can appear in both states of "standby or normal operation".
To find the cause of the leak:
 1. Prepare a soapy water solution with a perfume-free soap.
 2. Use this solution to wet all threaded connectors and hose connectors. Bubbles will form where there are leaks in the system.
 3. Remove the pressure from the system: to do this the oxygen cylinder must be turned off. Turn the host (main body of equipment) on for a while until the pressure gauge on the oxygen cylinder reads "0". Then shut down the host again.
 4. If there is a leak, replace the damaged part.
 5. Then recheck for air tightness and leaks.
 6. If the leak cannot be eliminated, it must be repaired.



Note: Before the ventilator is used again, be sure to have a professional physician set the appropriate airway pressure according to the animal. If the VT setting value is too low, the animal will not be able to inhale sufficiently. If the VT setting value is too high, the animal's chest and lungs will over-inflate, causing chest and lung injury.

It is recommended to operate this equipment under the guidance of a physician, pre-set the approximate airway pressure value, observe the animal's chest and lung undulation and blood oxygen saturation, blood gas and other breathing parameters, and that those values are within the ideal range. If there is a deviation, then make a subtle adjustments.

4.8.2 Alarm Prompt of "High / Low Gas Source Pressure"

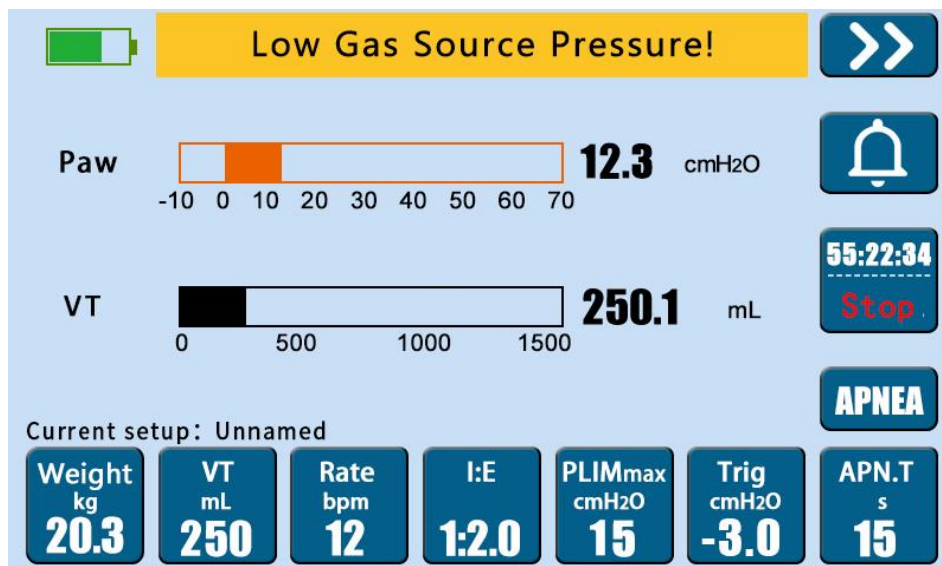


Fig 20

- b. The information bar displays “Low Gas Source Pressure!” and “High Gas Source Pressure!”, accompanied by a continuous alarm sound, indicating that the air supply pressure is too low/high! Please check the oxygen cylinder or the central air supply source immediately, confirm that the air supply connection is properly connected, and the joint is not loose or leaking, and adjust the output pressure of the oxygen cylinder relief valve or the central air supply source to 41 ~87psi, and make sure the cylinder pressure is not less than 50bar (about 5MPa) to ensure sufficient working time.
- c. This alarm message can appear in both states of “standby” or “normal” operation



Note: Please slowly open the gas valve of the oxygen cylinder. The cylinder pressure can now be viewed on the pressure gauge of the pressure relief valve. For example, a 200 bar reading indicates that the cylinder is sufficient, and a 100 bar reading indicates that only half of the cylinder is available.



Note: When the cylinder pressure is less than 50 bar, the oxygen cylinder should be replaced to ensure sufficient working time. After turning on the gas valve on the oxygen cylinder, turn it off again and observe the pressure gauge indicator on the pressure relief valve. If the pointer position remains the same, the system is airtight. If the pointer continues to drop, there is a leak.

4.8.3 Alarm Prompt of “Low Flow”

- a. The information bar shows “Low Flow”, accompanied by a continuous auditory alarm. During the PIP-CV ventilation mode, if a lower [Flow] and a higher [PIP] were set, it may cause the entire breathing circuit to inhale for a long time, unable to reach the set PIP. Please immediately check that the [Flow] and [PIP] settings are appropriate for the current ventilation mode.

4.8.4 Alarm Prompt of Breathing Tubes Blocked

- a. The information bar displays “Tubes Blocked!” with an auditory alarm. At this point, the folded bag of ventilator bellows collapses to the bottom, and the ventilator will

forcibly compress the folded bag of bellows to output gas, which is abnormal.

The ventilator will be automatically held now, please check the breathing circuit immediately, and confirm that the breathing circuit is connected correctly, including if it is falling off or loose. Check whether the anesthesia breathing pipe is blocked or bent, and if the flow meter of anesthesia machine correctly adjusts the output of gas flow.

Before running the equipment again, be sure to raise the folded bag of ventilator bellows to the top of the bellows!

- b. This alarm message appears in the "normal operation" state.



Warning: Do not operate when the folded bag of ventilator bellows does not rise to the top of the bellows! Running in this state for a long time may cause damage to the equipment.

4.8.5 Alarm prompt of is Low Battery

- a. When the battery capacity status is displayed as 0, the message bar displays “Low Battery!”, accompanied by a continuous auditory alarm, the capacity graph will flash. The equipment will automatically shut down after 15 minutes!
- b. This alarm message can appear in both states of “standby” or “normal” operation.
- c. Note: The battery will work normally for about 4 hours after being fully charged, but the backup battery should only be used for a sudden power failure or emergency. If there is a sudden power failure, please complete the current operation or use for a limited time.



Attention:

1. Indicates the battery capacity status, which is displayed in 5 levels;
2. It will flash red when the battery capacity is less than 1 grid and no external power source is connected.
3. When the equipment is in the non-self-calibration interface and the power capacity is 0 grid and no external power is connected, the equipment will automatically shut down after 15 minutes of operation!
4. When the equipment is in the self-calibration interface and the battery capacity is 0 grid and the equipment does not enter the main interface, the equipment will turn off for safety after 3 minutes of standby!

4.8.6 Alarm Prompt of Over-temperature

- a. The information bar shows “High Temperature!” and accompanied by an auditory alarm.
- b. When the temperature of the chip is restored to 58 °C or below, the alarm will stop.

4.8.7 Alarm prompts for Circuit abnormality

- a. The information bar shows "Electric Circuit Fault!" The current interface parameters are all stopped, and the air supply is stopped.
- b. The alarm continues and the interface remains in the running state. The user can click the [Stop] button to confirm the current alarm. The system will recognize the action and interrupt the alarm tone.

4.8.8 Message Prompt of “Inspiration hold”

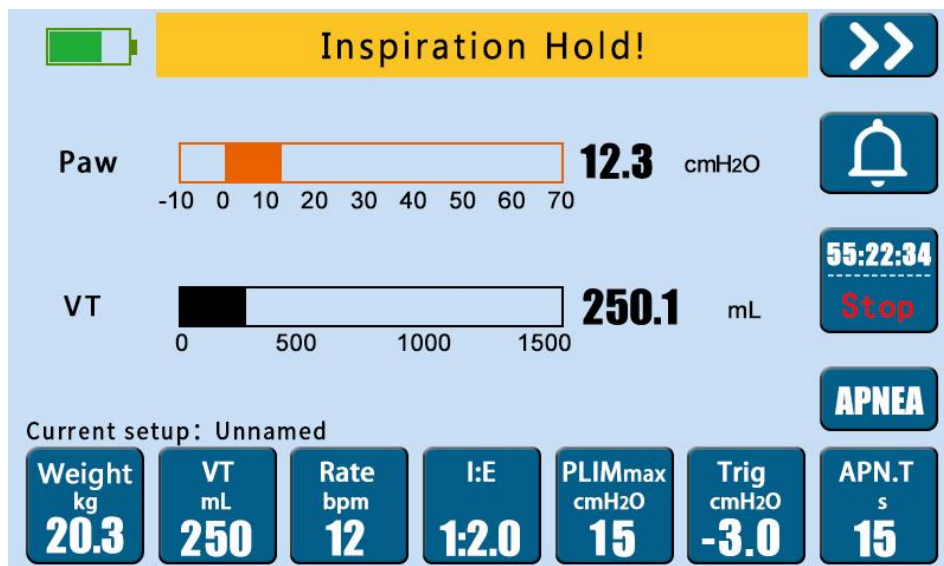


Fig 21

- a. During normal operation (VCV/PIP-CV mode), if you need to perform an inspiration hold, press and hold the INSP.HOLD button. After the ventilator completes the current breathing cycle, it will hold the inspiration in the next breathing cycle. At this time, the folded bag of ventilator bellows will stop at the set tidal volume/PIP output position, allowing the animal to fill the chest to the desired pressure and maintain pressure without exhaling, until the button is released.
- b. During the inspiration hold, the message bar displays “Inspiration Hold!” indicating that the inspiration is paused! It is accompanied with an auditory alarm.
- c. This message appears in the "normal work" state.



Note: Do not over-expand the lungs of the animal. Excessive lung expansion can cause damage to the lungs! It is recommended to pre-set an appropriate PIP value before applying an inspiration hold and to complete the hold in the shortest time.

5-Cleaning and Maintenance

5.1 Product Cleaning

The majority of the ventilator is not in direct contact with anesthetic gases, so only a dry cloth is required for cleaning. Cleaning the surface of the ventilator: The surface can be wiped with a clean, soft, damp cloth. Neutral cleaning agents can be used to remove stubborn stains.

Warning!

Use only water and a neutral detergent to clean the bellows and bellows cover. Wipe with a soft cloth. Do not use a rough cloth or a scented cleaning agent. Be careful not to use ethanol for cleaning.

Cleaning the bellows cover: Rotate the bellows cover counterclockwise until the buckle is completely exposed (this step requires a large external force due to the action of the sealing ring), and lift the bellows cover vertically. Since the bellows cover is not in direct contact with anesthetic gases, it is only necessary to wipe it with a clean, damp cloth, or dip in a neutral detergent and rinse with water. High temperature steam cannot be used to sterilize the bellows cover. High temperature steam will cause the bellows cover to deform to the point of being unusable. **Be careful not to use ethanol for cleaning.**

5.2 Battery Maintenance

5.2.1 Battery Performance Maintenance

During battery use, it should be optimized periodically to maintain its service life. It is recommended to perform a maintenance on the battery every 3 months of storage. Please follow the steps below:

- 1) Take out the equipment and stabilize it for 2 hours or more at room temperature of 5 °C ~ 30 °C;
- 2) Turn on the external power source and charge the battery for 6~8 hours;
- 3) Reposition the equipment.

5.2.2. Check battery performance

Battery performance may decrease over time. Under normal circumstances, a fully charged battery will work for 4 hours. If the battery's power supply is less than 4 hours, consider replacing the battery or contact the after-sales personnel.

Note: The service life of the battery depends on the frequency and time of use. If the battery is properly maintained and stored, the service life of the lithium battery is about 3 years. Improper usage may shorten battery life. We recommend replacing the lithium battery every 3 years.

5.3 Recycling Batteries

If the battery is significantly damaged, or if the battery capacity is exhausted, replace it and recycle it properly. When disposing of used batteries, the corresponding regulations should be followed.

Warning!

Do not disassemble the battery, put it into fire, or short-circuit it. Burning, exploding, or leaking batteries can cause personal injury.

6-Troubleshooting

If there are other malfunctions in the ventilator, please refer to the “Troubleshooting Table” for potential solutions. If the fault still cannot be eliminated, please contact the relevant RWD personnel.

Fault description	Possible cause	Methods for Troubleshooting
When the ventilator is running, the sound of the valve tapping can be heard but it is not working, and the ventilator makes a buzzing sound when the animal is breaths.	1) No gas supply pressure 2) The inspiration adjustment knob is set at the minimum value 3) The air pressure at the input of the ventilator is excessively low	a. Check if the air supply line is folded or blocked. b. Insufficient air source pressure c. Adjust the inspiration capacity d. The gas source supply of the anesthesia machine does not meet the flow requirements, and a new gas supply source is required.
When the ventilator is turned on, the power indicator (green light) does not light up.	The power source is not connected	a. Plug in a suitable power socket b. Check the output c. Check the fuse
When the battery power is turned on, the battery indicator (green light) does not light up.	Battery failure	Contact the personnel of RWD
The ventilator sounds normal, but the tidal volume indication is incorrect.	There is a problem inside the ventilator	Contact the personnel of RWD
Bellows is separated from the mounting ring	The lower part of the bellows is damaged or not installed securely	Use a new bellows or reconnect
The ventilator operates normally, but the bellows are not filling	1)The breathing system leaks 2)Insufficient gas supply to the anesthesia machine system 3) The bellows are damaged 4)The bellows are not fully connected to the mounting ring 5)Anesthesia machine’s safety valve is not completely closed	a. Check and update the pipeline b.Increase the Oxygen Flow of the anesthesia system c. Replace the bellows with a new one d.Reconnect the bellows to the mounting ring e. Check the safety valve of the anesthesia machine system and turn it off completely f.Check if all pipe and pipe connections for gas leaks
The device cannot be turned on after pressing the power switch	1) The power cord is not connected 2) The battery capacity is low 3)The power button is damaged	a. Check the connection of the power cord b. Contact the personnel of RWD

7-Return to factory for repair

It is forbidden to return the ventilator or related components to the company without authorization. Please contact RWD personnel to obtain the authorization before returning equipment or components.

If the equipment needs to be returned to the factory, please prepare and provide the following information:

- a) Serial number and user manual of equipment
- b) Problem description, return reason and request
- c) Contact information of the relevant personnel of your company (telephone and detailed address)
- d) If the equipment returned for repair involves fee issues, please provide the contact information (phone and detailed address) of a person authorized to make payments for your company.



Note: Please properly pack the equipment and components to be repaired so as to avoid secondary damage during transportation!

8-After-sale service

RWD Life Science Co., Ltd is headquartered in Nanshan District High-tech Park, Shenzhen. Since its establishment in 2002, it has always been committed to providing customers with high-quality services. Pursuing customer satisfaction is our consistent goal. The company has a strong after-sales service team and insists on providing customers with 24/7 service.

The company also has offices in 31 provinces and cities including Guangzhou, Shanghai, Chengdu, Nanjing, Hangzhou, Kunming, Xi'an, Taiyuan and Shandong. It has set up an after-sales service center in Beijing, and will establish after-sales service centers in other cities such as Shanghai, covering more cities. This initiative will respond quickly to customer service needs, minimizing losses caused by equipment failures.

In the meanwhile, passing through the unremitting endeavor of years, we have also established a friendly partnership with distributors across the country, created a national comprehensive after-sales service system, and maintained long-term stable cooperative relations with new and regular customers.

9-Technical parameters

Appendix 1. PIP-CV Parameter Setting Reference

WEIGHT (kg)	Freq (bpm)	Max airway pressure (cmH ₂ O)	Trig (cmH ₂ O)	Recommended flow
2	18	10	-2	2
2.5	18	10	-2	2
3	18	12	-2	2
3.5	18	12	-2	3
4	18	12	-2	3
4.5	18	12	-2	4
5	18	12	-2	4
5.5	12	12	-2	3
6	12	12	-2	3
6.5	12	12	-2	4
7	12	12	-2	4
7.5	12	12	-2	4
8	12	12	-2	4
8.5	12	12	-2	5
9	12	12	-2	5
9.5	12	12	-2	5
10	12	12	-2	6
11	12	13	-3	6
12	12	13	-3	7
13	12	13	-3	7
14	12	13	-3	8
15	12	13	-3	8
16	12	13	-3	9
17	12	13	-3	9
18	12	13	-3	10
19	12	13	-3	10
20	12	13	-3	11
21	12	16	-3	12
22	12	16	-3	12
23	12	16	-3	13
24	12	16	-3	13
25	12	16	-3	14
26	12	16	-3	14
27	12	16	-3	15
28	12	16	-3	15
29	12	16	-3	16

WEIGHT (kg)	Freq (bpm)	Max airway pressure (cmH ₂ O)	Trig (cmH ₂ O)	Recommended flow
30	12	16	-3	17
31	9	16	-3	14
32	9	16	-3	14
33	9	16	-3	15
34	9	16	-3	15
35	9	16	-3	16
36	9	18	-3	16
37	9	18	-3	17
38	9	18	-3	17
39	9	18	-3	18
40	9	18	-3	18
41	9	18	-3	19
42	9	18	-3	19
43	9	18	-3	19
44	9	18	-3	20
45	9	18	-3	20
46	9	18	-3	21
47	9	18	-3	21
48	9	18	-3	22
49	9	18	-3	22
50	9	18	-3	23
51	9	18	-3	23
52	9	18	-3	23
53	9	18	-3	23
54	9	20	-3	24
55	9	20	-3	24
56	9	20	-3	24
57	9	20	-3	25
58	9	20	-3	25
59	9	20	-3	26
60	9	20	-3	26
61	9	22	-3	26
62	9	22	-3	27
63	9	22	-3	27
64	9	22	-3	27
65	9	22	-3	28
66	9	22	-3	28
67	9	22	-3	28
68	9	22	-3	29

WEIGHT (kg)	Freq (bpm)	Max airway pressure (cmH ₂ O)	Trig (cmH ₂ O)	Recommended flow
69	9	22	-3	29
70	9	22	-3	29
71	9	22	-3	30
72	9	22	-3	30
73	9	22	-3	30
74	9	22	-3	31
75	9	22	-3	31
76	9	22	-3	31
77	9	22	-3	32
78	9	22	-3	32
79	9	22	-3	32
80	9	22	-3	33
81	9	22	-3	33
82	9	22	-3	34
83	9	22	-3	34
84	9	22	-3	34
85	9	22	-3	35
86	9	22	-3	35
87	9	22	-3	35
88	9	22	-3	36
89	9	22	-3	36
90	9	22	-3	36
91	9	22	-3	37
92	9	22	-3	37
93	9	22	-3	37
94	9	22	-3	38
95	9	22	-3	38
96	9	22	-3	38
97	9	22	-3	39
98	9	22	-3	39
99	9	22	-3	39
100	9	22	-3	40

Appendix 2. VCV Mode Breathing Parameter Setting Reference

WEIGHT (kg)	Freq (bpm)	airway pressure limit (cmH ₂ O)	Trig (cmH ₂ O)	I:E ratio	standard VT	measured VT
2	18	13	-2	1: 2	14.3	29
2.5	18	13	-2	1: 2	14.3	36
3	18	15	-2	1: 2	14.3	43
3.5	18	15	-2	1: 2	14.3	50
4	18	15	-2	1: 2	14.3	57
4.5	18	15	-2	1: 2	14.3	64
5	18	15	-2	1: 2	14.3	72
5.5	12	15	-2	1: 2.2	14.3	79
6	12	15	-2	1: 2.2	14.3	86
6.5	12	15	-2	1: 2.2	14.3	93
7	12	15	-2	1: 2.2	14.3	100
7.5	12	15	-2	1: 2.2	14.3	107
8	12	15	-2	1: 2.2	14.3	114
8.5	12	15	-2	1: 2.2	14.3	122
9	12	15	-2	1: 2.2	14.3	129
9.5	12	15	-2	1: 2.2	14.3	136
10	12	15	-2	1: 2.2	14.3	143
11	12	16	-3	1: 2.2	14.3	157
12	12	16	-3	1: 2.2	14.3	172
13	12	16	-3	1: 2.2	14.3	186
14	12	16	-3	1: 2.2	14.3	200
15	12	16	-3	1: 2.2	14.3	215
16	12	16	-3	1: 2.2	14.3	229
17	12	16	-3	1: 2.2	14.3	243
18	12	16	-3	1: 2.2	14.3	257
19	12	16	-3	1: 2.2	14.3	272
20	12	16	-3	1: 2.2	14.3	286
21	12	20	-3	1: 2.2	14.3	300
22	12	20	-3	1: 2.2	14.3	315
23	12	20	-3	1: 2.2	14.3	329
24	12	20	-3	1: 2.2	14.3	343
25	12	20	-3	1: 2.2	14.3	358
26	12	20	-3	1: 2.2	14.3	372
27	12	20	-3	1: 2.2	14.3	386

WEIGHT (kg)	Freq (bpm)	airway pressure limit (cmH ₂ O)	Trig (cmH ₂ O)	I:E ratio	standard VT	measured VT
28	12	20	-3	1: 2.2	14.3	400
29	12	20	-3	1: 2.2	14.3	415
30	12	20	-3	1: 2.2	14.3	429
31	9	20	-3	1: 2.5	14.3	443
32	9	20	-3	1: 2.5	14.3	458
33	9	20	-3	1: 2.5	14.3	472
34	9	20	-3	1: 2.5	14.3	486
35	9	20	-3	1: 2.5	14.3	501
36	9	23	-3	1: 2.5	14.3	515
37	9	23	-3	1: 2.5	14.3	529
38	9	23	-3	1: 2.5	14.3	543
39	9	23	-3	1: 2.5	14.3	558
40	9	23	-3	1: 2.5	14.3	572
41	9	23	-3	1: 2.5	14.3	586
42	9	23	-3	1: 2.5	14.3	601
43	9	23	-3	1: 2.5	14.3	615
44	9	23	-3	1: 2.5	14.3	629
45	9	23	-3	1: 2.5	14.3	644
46	9	23	-3	1: 2.5	14.3	658
47	9	23	-3	1: 2.5	14.3	672
48	9	23	-3	1: 2.5	14.3	686
49	9	23	-3	1: 2.5	14.3	701
50	9	23	-3	1: 2.5	14.3	715
51	9	23	-3	1: 2.5	11	721
52	9	23	-3	1: 2.5	11	732
53	9	23	-3	1: 2.5	11	743
54	9	25	-3	1: 2.5	11	754
55	9	25	-3	1: 2.5	11	765
56	9	25	-3	1: 2.5	11	776
57	9	25	-3	1: 2.5	11	787
58	9	25	-3	1: 2.5	11	798
59	9	25	-3	1: 2.5	11	809
60	9	25	-3	1: 2.5	11	820
61	9	28	-3	1: 2.5	11	831

WEIGHT (kg)	Freq (bpm)	airway pressure limit (cmH ₂ O)	Trig (cmH ₂ O)	I:E ratio	standard VT	measured VT
62	9	28	-3	1: 2.5	11	842
63	9	28	-3	1: 2.5	11	853
64	9	28	-3	1: 2.5	11	864
65	9	28	-3	1: 2.5	11	875
66	9	28	-3	1: 2.5	11	886
67	9	28	-3	1: 2.5	11	897
68	9	28	-3	1: 2.5	11	908
69	9	28	-3	1: 2.5	11	919
70	9	28	-3	1: 2.5	11	930
71	9	28	-3	1: 2.5	11	941
72	9	28	-3	1: 2.5	11	952
73	9	28	-3	1: 2.5	11	963
74	9	28	-3	1: 2.5	11	974
75	9	28	-3	1: 2.5	11	985
76	9	28	-3	1: 2.5	11	996
77	9	28	-3	1: 2.5	11	1007
78	9	28	-3	1: 2.5	11	1018
79	9	28	-3	1: 2.5	11	1029
80	9	28	-3	1: 2.5	11	1040
81	9	28	-3	1: 2.5	11	1051
82	9	28	-3	1: 2.5	11	1062
83	9	28	-3	1: 2.5	11	1073
84	9	28	-3	1: 2.5	11	1084
85	9	28	-3	1: 2.5	11	1095
86	9	28	-3	1: 2.5	11	1106
87	9	28	-3	1: 2.5	11	1117
88	9	28	-3	1: 2.5	11	1128
89	9	28	-3	1: 2.5	11	1139
90	9	28	-3	1: 2.5	11	1150
91	9	28	-3	1: 2.5	11	1161
92	9	28	-3	1: 2.5	11	1172
93	9	28	-3	1: 2.5	11	1183
94	9	28	-3	1: 2.5	11	1194

WEIGHT (kg)	Freq (bpm)	airway pressure limit (cmH ₂ O)	Trig (cmH ₂ O)	I:E ratio	standard VT	measured VT
95	9	28	-3	1: 2.5	11	1205
96	9	28	-3	1: 2.5	11	1216
97	9	28	-3	1: 2.5	11	1227
98	9	28	-3	1: 2.5	11	1238
99	9	28	-3	1: 2.5	11	1249
100	9	28	-3	1: 2.5	11	1260

Appendix 3. APNEA mode breathing parameter setting reference

WEIGHT (kg)	Freq (bpm)	airway pressure limit (cmH ₂ O)	Trig (cmH ₂ O)	I:E ratio	standard VT	measured VT	apnea time (s)
2	18	13	-2	1: 2	14.3	29	15
2.5	18	13	-2	1: 2	14.3	36	15
3	18	15	-2	1: 2	14.3	43	15
3.5	18	15	-2	1: 2	14.3	50	15
4	18	15	-2	1: 2	14.3	57	15
4.5	18	15	-2	1: 2	14.3	64	15
5	18	15	-2	1: 2	14.3	72	15
5.5	12	15	-2	1: 2.2	14.3	79	15
6	12	15	-2	1: 2.2	14.3	86	15
6.5	12	15	-2	1: 2.2	14.3	93	15
7	12	15	-2	1: 2.2	14.3	100	15
7.5	12	15	-2	1: 2.2	14.3	107	15
8	12	15	-2	1: 2.2	14.3	114	15
8.5	12	15	-2	1: 2.2	14.3	122	15
9	12	15	-2	1: 2.2	14.3	129	15
9.5	12	15	-2	1: 2.2	14.3	136	15
10	12	15	-2	1: 2.2	14.3	143	15
11	12	16	-3	1: 2.2	14.3	157	15
12	12	16	-3	1: 2.2	14.3	172	15
13	12	16	-3	1: 2.2	14.3	186	15
14	12	16	-3	1: 2.2	14.3	200	15
15	12	16	-3	1: 2.2	14.3	215	15
16	12	16	-3	1: 2.2	14.3	229	15
17	12	16	-3	1: 2.2	14.3	243	15
18	12	16	-3	1: 2.2	14.3	257	15
19	12	16	-3	1: 2.2	14.3	272	15
20	12	16	-3	1: 2.2	14.3	286	15
21	12	20	-3	1: 2.2	14.3	300	15
22	12	20	-3	1: 2.2	14.3	315	15
23	12	20	-3	1: 2.2	14.3	329	15
24	12	20	-3	1: 2.2	14.3	343	15
25	12	20	-3	1: 2.2	14.3	358	15
26	12	20	-3	1: 2.2	14.3	372	15
27	12	20	-3	1: 2.2	14.3	386	15
28	12	20	-3	1: 2.2	14.3	400	15
29	12	20	-3	1: 2.2	14.3	415	15
30	12	20	-3	1: 2.2	14.3	429	15
31	9	20	-3	1: 2.5	14.3	443	15

WEIGHT (kg)	Freq (bpm)	airway pressure limit (cmH ₂ O)	Trig (cmH ₂ O)	I:E ratio	standard VT	measured VT	apnea time (s)
32	9	20	-3	1: 2.5	14.3	458	15
33	9	20	-3	1: 2.5	14.3	472	15
34	9	20	-3	1: 2.5	14.3	486	15
35	9	20	-3	1: 2.5	14.3	501	15
36	9	23	-3	1: 2.5	14.3	515	15
37	9	23	-3	1: 2.5	14.3	529	15
38	9	23	-3	1: 2.5	14.3	543	15
39	9	23	-3	1: 2.5	14.3	558	15
40	9	23	-3	1: 2.5	14.3	572	15
41	9	23	-3	1: 2.5	14.3	586	15
42	9	23	-3	1: 2.5	14.3	601	15
43	9	23	-3	1: 2.5	14.3	615	15
44	9	23	-3	1: 2.5	14.3	629	15
45	9	23	-3	1: 2.5	14.3	644	15
46	9	23	-3	1: 2.5	14.3	658	15
47	9	23	-3	1: 2.5	14.3	672	15
48	9	23	-3	1: 2.5	14.3	686	15
49	9	23	-3	1: 2.5	14.3	701	15
50	9	23	-3	1: 2.5	14.3	715	15
51	9	23	-3	1: 2.5	11	721	15
52	9	23	-3	1: 2.5	11	732	15
53	9	23	-3	1: 2.5	11	743	15
54	9	25	-3	1: 2.5	11	754	15
55	9	25	-3	1: 2.5	11	765	15
56	9	25	-3	1: 2.5	11	776	15
57	9	25	-3	1: 2.5	11	787	15
58	9	25	-3	1: 2.5	11	798	15
59	9	25	-3	1: 2.5	11	809	15
60	9	25	-3	1: 2.5	11	820	15
61	9	28	-3	1: 2.5	11	831	15
62	9	28	-3	1: 2.5	11	842	15
63	9	28	-3	1: 2.5	11	853	15
64	9	28	-3	1: 2.5	11	864	15
65	9	28	-3	1: 2.5	11	875	15
66	9	28	-3	1: 2.5	11	886	15
67	9	28	-3	1: 2.5	11	897	15
68	9	28	-3	1: 2.5	11	908	15
69	9	28	-3	1: 2.5	11	919	15
70	9	28	-3	1: 2.5	11	930	15

WEIGHT (kg)	Freq (bpm)	airway pressure limit (cmH ₂ O)	Trig (cmH ₂ O)	I:E ratio	standard VT	measured VT	apnea time (s)
71	9	28	-3	1: 2.5	11	941	15
72	9	28	-3	1: 2.5	11	952	15
73	9	28	-3	1: 2.5	11	963	15
74	9	28	-3	1: 2.5	11	974	15
75	9	28	-3	1: 2.5	11	985	15
76	9	28	-3	1: 2.5	11	996	15
77	9	28	-3	1: 2.5	11	1007	15
78	9	28	-3	1: 2.5	11	1018	15
79	9	28	-3	1: 2.5	11	1029	15
80	9	28	-3	1: 2.5	11	1040	15
81	9	28	-3	1: 2.5	11	1051	15
82	9	28	-3	1: 2.5	11	1062	15
83	9	28	-3	1: 2.5	11	1073	15
84	9	28	-3	1: 2.5	11	1084	15
85	9	28	-3	1: 2.5	11	1095	15
86	9	28	-3	1: 2.5	11	1106	15
87	9	28	-3	1: 2.5	11	1117	15
88	9	28	-3	1: 2.5	11	1128	15
89	9	28	-3	1: 2.5	11	1139	15
90	9	28	-3	1: 2.5	11	1150	15
91	9	28	-3	1: 2.5	11	1161	15
92	9	28	-3	1: 2.5	11	1172	15
93	9	28	-3	1: 2.5	11	1183	15
94	9	28	-3	1: 2.5	11	1194	15
95	9	28	-3	1: 2.5	11	1205	15
96	9	28	-3	1: 2.5	11	1216	15
97	9	28	-3	1: 2.5	11	1227	15
98	9	28	-3	1: 2.5	11	1238	15
99	9	28	-3	1: 2.5	11	1249	15
100	9	28	-3	1: 2.5	11	1260	15



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Verification of Compliance

Reference No. : NTS1909379

Report No. : NTS1909379S

Applicant : RWD Life Science Co., Ltd.

1st-2nd Floor, ROBETA Building, No. 1 Qimin Road, Song Ping Shan Area, Science & Industry Park North, Nan Shan District, Shenzhen, P.R.China 518057

Manufacture : RWD Life Science Co., Ltd.

1st-2nd Floor, ROBETA Building, No. 1 Qimin Road, Song Ping Shan Area, Science & Industry Park North, Nan Shan District, Shenzhen, P.R.China 518057

Product : Veterinary Anesthesia Machine - Pole Mount

Model No. : R620-S1-IEC, R620-S1-IES, R620-S1-IPC, R620-S1-IPS, R620-S1-SEC, R620-S1-SPC, R620-S1-SES, R620-S1-SPS

Trade Mark : RWD

The submitted sample of the above equipment has been tested for CE marking according to the following European Directives:

Medical devices Directive: 93/42/EEC

Standard(s) used for showing compliance with the essential requirements in the specified directive(s):

Test Standards EN 60601-1: 2006+A11: 2011+A1: 2013+A12: 2014

The statement is based on a single evaluation of one sample of above mentioned products. It does not imply an assessment of the whole production.

The manufacture should ensure that all products in series production are in conformity with the product sample detailed in this report. The applicant should hold the whole technical report at disposal of the competent all the right.

Signed for and on behalf of
NOWD Testing Services Co., Ltd.



Somnus

Technical Manager

Date: October 21, 2019



萬泰認證

CERTIFICATE OF REGISTRATION

This is to certify that the Management System established by

RWD Life Science Co.,Ltd.

Registration Address:No.1901, Building 9A, Vanke Cloud City III, C Area Liuxin 4 Street, Xili Community, Xili Sub-district, Nanshan District, Shenzhen City, Guangdong Province, P.R.China

Audit Address:9/19/20F, Building 7A, Vanke Cloud City III, C Area Liuxin 4 Street, Xili Community, Xili Sub-district, Nanshan District, Shenzhen City, Guangdong Province, P.R.China

Sub site: Room201 2F, 105 1F,B Building, Kaixinda Science Park, No.49, Zhoushi road, Shiyuan Sub-district, Bao'an District, Shenzhen City, Guangdong Province, P.R.China

Unified Social Credit Code: 91440300745160762A

Has been assessed to comply with the requirements of the international standard

GB/T 19001-2016idt ISO9001:2015

Scope of certification

R&D, Production and sales of instruments for animal experiments

NO: 15/22Q7133R10 DATE OF ISSUE: May,13, 2022 VALID UNTIL: May,12, 2025

The Certificate Information Can be Obtained by Visiting <http://www.cnca.gov.cn>.



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First Surveillance	Second Surveillance	Third Surveillance
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Wangxiaodong

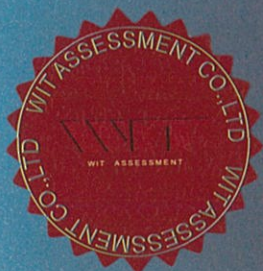
General Manager, WangXiaoDong

The surveillance audit shall be conducted at least once each year within the validity of registration certificate, and the interval between two surveillance audits shall not exceed 12 months.

The certification organization must conduct surveillance audit regularly and the registration certificate continues effective after the eligible surveillance audit.

The compliance label will be attached to this registration certificate after the eligible surveillance audit.

Every certificate, which the certification scope within the required of administrative license or national mandatory certification requirements will become invalid when the license or mandatory certification lose effectiveness



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