AM70 Veterinary Anesthesia Machine
User Manual

Content

Illustration

Thank you for purchasing the AM70 Veterinary Anesthesia Machine.

Before using the product, please carefully read the content of this user manual in order to use the product correctly.

After reading, please keep this user manual properly so that it can be consulted at any time when needed.

Product Name:	Anesthesia Machine
Model and specification:	AM70
Structure and composition:	This product is composed of an anesthesia machine, a vaporizer, a trolley, a breathing circuit, and accessories.
Applicable scope:	This anesthesia machine is used to provide inhalation anesthesia and respiratory support during animal anesthesia.
Name of production enterprise:	Shenzhen melevet Medical Ltd., Co.
Production address:	502, Building 4, Baoshu Industrial Park, Bao'an District, Shenzhen, Guangdong，China
Production date:	See the nameplate on the rear cover of the product
Compilation date of the instruction manual:	2023-09

Intellectual property

Declaration

melevet has the final right to interpret this user manual.

- ✧ Only when all the following requirements are met, melevet is responsible for the safety, reliability, and performance of the product, namely:
- ✧ Assembly operations, expansion, readjustment, improvement, and repair are all carried out by professionals recognized by melevet;
- ✧ All components involved in repair and replacement, as well as accessories and consumables used in conjunction with them, are original (original) or approved by melevet;
- ✧ The relevant electrical equipment complies with national standards and the requirements of this user manual;
- ✧ Follow this user manual for product operation.

Warranty and repair services

The warranty period of the purchased product is subject to the sales contract.

Consumables: refer to disposable consumables that need to be replaced after each use or vulnerable materials that need to be replaced regularly. Consumables do not have a warranty.

The warranty period starts from the "installation date" filled in on the "Equipment Warranty Card" accompanying the product, and the "Equipment Warranty Card" is the only voucher for calculating the warranty period. In order to protect your rights and interests, please fill out the warranty card after the installation of the equipment is completed, and provide the second copy of the warranty ("retained by melevet") to the installation personnel or mail it back to melvet's user service department.

Please note that the following situations will not be covered by the warranty:

1. The customer fails to fill out and return the warranty card within 30 days after the installation acceptance is completed;

2. The equipment serial number provided by the customer is incorrect (our company confirms whether warranty is provided based on the equipment serial number).

During the warranty period, all products can enjoy free after-sales service; But please be aware that even during the warranty period, if the product needs to be repaired due to the following reasons, melevet will implement a fee based repair service, and you will need to pay the repair fee and accessory fee:

- Artificial damage;
- Improper use;
- Irresistible natural disasters;
- Replace or use components or accessories that are not approved by melevet or have them repaired by personnel authorized by melevet;
- Other faults not caused by the product itself.

If the instrument malfunctions due to the use of consumables not approved by melevet, it is not within the scope of melevet's maintenance services.

After the warranty period expires, melevet can continue to provide paid repair services.

If you do not pay or delay in paying the repair service fees, melevet will temporarily suspend the repair service until you make the payment.

We strongly recommend that you use this product in accordance with this manual and under the conditions and environment specified in this manual.

After sales service

Company name: Shenzhen melevet Medical Co., Ltd.

Address: 502, Building 4, Baoshu Industrial Park, Bao'an District, Shenzhen, Guangdong， China

Postal code: 518000

Website: www.melevet.com

Tel: 0755-26692869

Foreword

Illustration

This manual provides a detailed introduction to the purpose, functions, and operation of the product. Before using this product, please carefully read and understand the content of this manual to ensure the correct use of this product and ensure the safety of animals and operators.
This manual introduces this product according to the most complete configuration, so some of the content may not be applicable to the purchased product. If you have any questions, please contact our company.
Please place this manual near the product so that it can be easily and promptly obtained when needed.

Applicable object

This manual is only applicable to anesthesiologists who have received professional training.

Diagram

All illustrations provided in this manual are for reference only, and the settings or data in the illustrations may not be completely consistent with the actual display seen on the product.

Convention

- Refers to the cited chapter.
- →：This symbol is used to represent the steps during the operation.

1.0 Safety

1.1 Safety Information

Warning—Prompting potential hazards or unsafe operations, if not avoided, may result in death or serious personal injury or property damage.

Caution—Prompting potential hazards or unsafe operations, if not avoided, may result in minor personal injury, product malfunction, damage, or property damage.

Attention—Emphasize important precautions, provide explanations or explanations to better use this product.

1.1.1 Warning

Warning: Do not operate the anesthesia machine before reading this manual.
Warning: Before operation, ensure that the machine, connecting wires, and accessories can operate normally and safely.
Warning: This machine can only be connected to a power outlet with protective grounding. If the power outlet is not connected to a grounding wire, please do not use this outlet or use the internal battery power supply of the machine for operation.
Warning: Please use AC power supply in a timely manner before the battery runs out of power.
Warning: Do not use this machine in an environment with flammable or explosive materials to prevent fire or explosion.
Warning: Do not open the casing of the machine, otherwise there may be a risk of electric shock. Repairs or upgrades to the machine can only be carried out by maintenance personnel trained and authorized by our company.
Warning: Users should set the alarm volume and limit based on the actual situation of animals. We cannot rely solely on sound alarm systems for animal monitoring. Adjusting the alarm sound to a lower volume may cause danger to animals. Users should closely monitor the actual clinical condition of animals.
Warning: Do not turn off fresh air flow before turning off the anesthesia evaporator. The anesthesia evaporator cannot be turned on without fresh air flow. Otherwise, high concentrations of anesthetic vapors can enter machine pipelines and surrounding air, causing harm to people and objects.
Warning: Please disconnect the power supply before repairing this machine.
Warning: Before moving the anesthesia machine, please remove the items on the top plate and bracket to prevent the machine from tipping over.
Warning: When there is a leak in the respiratory system, the anesthesia machine cannot be used.
Warning: Check the specifications of the passive AGSS processing system and anesthesia machine to ensure compatibility and prevent mismatches in the processing system.
Warning: Using incorrect connectors may cause danger. Please ensure that all components use the correct connectors.
Warning: Disposable respiratory hoses, sodium lime, and other disposable items may be considered to have potential biological hazards and should not be reused. When handling these

items, the relevant regulations of the hospital and local authorities on pollutants and biological hazards should be followed.

Warning: It is prohibited to use the top plate to push and lift the machine. Please use a handle.

Warning: Failure to disinfect the anesthesia machine in a timely manner after use poses a risk of cross infection. Do not maintain or maintain the machine when animals are using it.

Warning: Do not come into contact with animals while touching the input and output ports of the machine.

1.1.2 Caution

Caution: To ensure animal safety, please use the attachments specified in this manual.

Caution: When the machine and its accessories are about to exceed their service life, they must be disposed of in accordance with relevant local regulations or hospital regulations.

Caution: Electromagnetic fields can affect the performance of this machine, so other machines used near this machine must comply with the corresponding EMC requirements. Mobile phones, X-rays, or MRI machines are all possible sources of interference as they emit high intensity electromagnetic radiation.

Caution: This system can operate correctly under the interference level indicated in this manual. If the interference level is higher than this level, it may cause an alarm and may cause mechanical ventilation to stop. Please note to avoid false alarms in the system caused by high intensity electric fields.

Caution: Before connecting the machine to the power supply, please confirm that the voltage and frequency of the power supply comply with the requirements specified on the machine label or in this manual.

Caution: Please install or transfer the machine properly to prevent it from falling, colliding, being damaged by strong vibrations or other mechanical external forces.

Caution: When equipped with a trolley, the anesthesia machine should be placed on a horizontal plane. Do not hang objects on both sides of the anesthesia machine to avoid the risk of tipping.

Caution: Please effectively secure the machine placed on the top cover to avoid accidental sliding and hazards.

Caution: It is necessary to prevent or avoid using and storing the air source hose assembly in environments such as ultraviolet radiation, oxidants, high temperatures, and humidity, in order to prevent the pressure release inside the air source hose assembly from aging and causing harm to people, animals, and objects.

Caution: This machine is not suitable for magnetic resonance (MRI) environments.

Caution: Please use a random power cord. If replacement is required, only power cords that meet the specifications can be used.

Caution: Failure to lock the casters may result in unexpected movement. The casters should be locked during the use of this machine.

Caution: The flow control knob should be slowly rotated. To avoid damaging the control valve, do not rotate the flow control knob when the flow meter reading exceeds the range

1.1.3 Attention

Attention: Please install the machine in a location that is easy to observe, operate, and maintain. Please observe the relevant information of the anesthesia machine within 4 meters from the front panel of the anesthesia machine.

Attention: Please place this manual near the machine so that it can be easily and promptly obtained when needed.

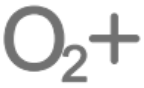
Attention: This manual introduces this product according to the most complete configuration, and the purchased product may not have certain configurations or functions.

Note: The battery of this device is not a user repairable component. Only authorized repair representatives can replace batteries. If the system is not in use for a long time, please contact our company's technical support to disconnect the battery power. Please comply with local regulations when handling batteries. When the battery reaches its service life, please handle it according to local regulations.

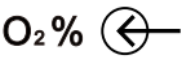
Note: Some alarm settings of this machine cannot be changed by the user.

Attention: Before transporting the anesthesia machine, please remove all external connecting devices from the machine.

1.2 Equipment symbols

Symbol	Describe	Symbol	Describe
	Attention! Refer to random files		Application part of BF type defibrillation prevention and defibrillation
	Oxygen source interface		Oxygen flow meter
	Manual ventilation		Mechanical ventilation
	Network interface		USB
	Video output HDMI interface		Mute logo
	Flow meter knob, rotate counterclockwise to increase flow rate		Quick oxygenation button

	ACGO Switch		Turn the APL pressure adjustment knob clockwise to increase the set pressure
	Aspiration interface		Expiratory interface
	Reservoir interface		ACGO interface
MIN	Minimum value	MAX	Maximum value
10 kg MAX 22 lbs MAX	Maximum load-bearing value	— MAX —	Maximum value of lime filling
	Locking and unlocking of sodium lime tank	AGSS	Exhaust emission port
IPX1	Ingress protection level	SN	Serial number
	Manufacturing date		Avoid getting wet
	Up		Atmospheric pressure limit
	Humidity limit		Temperature limit
	Fragile and easy to handle		Stacking layer limit
	Power switch		Battery indicator
	AC power supply		Mute button

	Alarm settings		Trend button
	Menu Buttons		Inhalation hold button
	battery charging		Carbon dioxide or anesthesia module interface
	Not suitable for magnetic resonance (MRI) environments		Standby button
	Air flow meter		Air source interface
	Oxygen battery cable interface		

This product contains certain harmful substances and can be used with confidence during its environmentally friendly use period. If the environmentally friendly use period is exceeded, it should enter the recycling system. The environmentally friendly use period of this product is 20 years.

2.0 Overview

2.1 System Overview

Please refer to the "3.0 Installation Guide" in this manual to install the anesthesia machine.

2.1.1 Intended use

This anesthesia machine is used to provide inhalation anesthesia and respiratory support during animal anesthesia.

Warning: The user of this anesthesia machine should be a full-time anesthesiologist and have received training on the use of anesthesia machines.

Warning: This anesthesia machine cannot be used in magnetic resonance imaging (MRI) environments

2.1.2 Contraindications

Unknown

2.1.3 Description

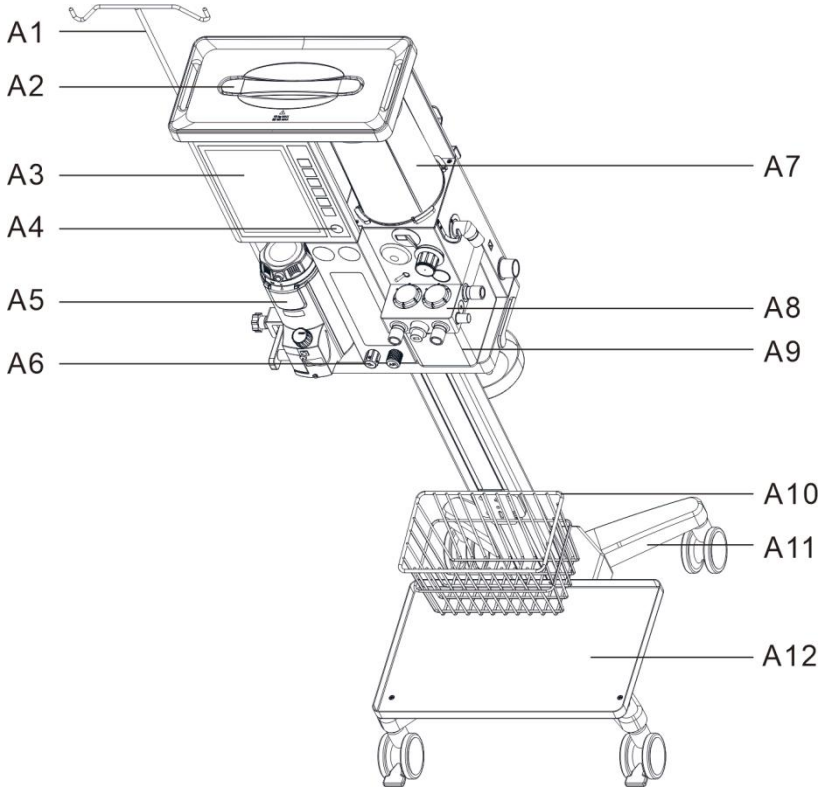
This product is composed of anesthesia machine, anesthesia ventilator, anesthesia gas delivery system, vaporizer, anesthesia respiratory system, trolley, respiratory pipeline, and accessories

This anesthesia machine provides the following ventilation modes:

- Capacity support ventilation mode (VS)
- Volume control ventilation mode (VCV)
- Pressure controlled ventilation mode (PCV)
- Synchronous intermittent command ventilation mode (SIMV)
- Manual ventilation mode
- Non circulating ventilation mode

2.2 Device view

2.2.1 Front side view of the host(Dual gas sources)



2-1 Front side view of the machine

Serial	Part	Description
A1	Infusion bag bracket	Used for hanging infusion bags
A2	Handle	Push or lift the machine.
A3	Display screen	The system interface of the ventilator is displayed, and settings can be selected or changed by touching.
A4	On/Off button	Used to turn the system on or off.
A5	Vaporizer	A device that can effectively output anesthetic concentration. Each vaporizer is suitable for specific anesthetics.
A6	Oxygen flow meter	Adjusting and displaying the oxygen flow rate
A7	Air box and base	Install the bellows and components
A8	Respiratory circuit	Used for installing respiratory circuits and components
A9	C02 absorber	A container used for filling sodium lime to absorb CO2.

	canister	
A10	storage basket	Used for placing storage ports
A11	Trolley	Used to support equipment.
A12	Oxygen concentrator platform	Used to place the oxygen concentrator.

Table 2-1 List of components in front side view of the host(Dual gas sources)

2.2.2 Front side view of the host(Single gas source)

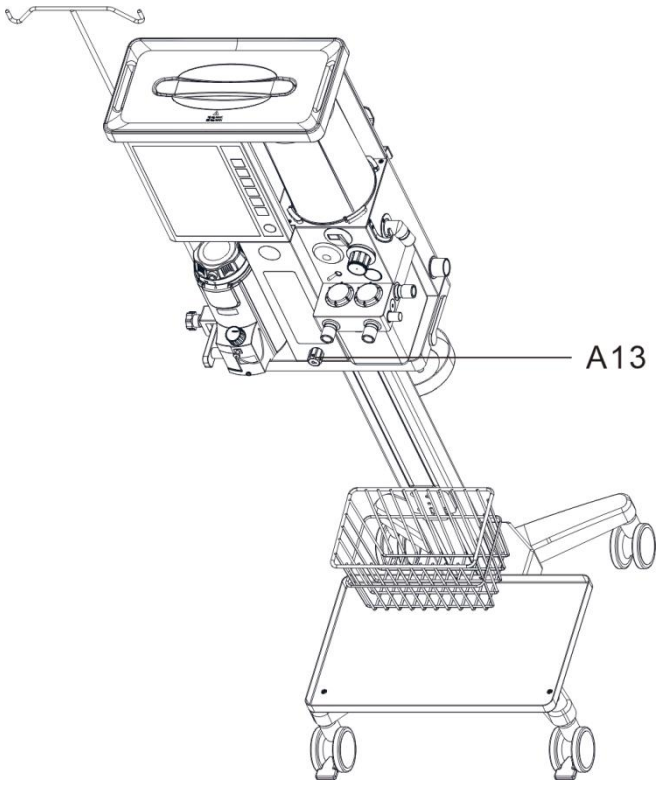
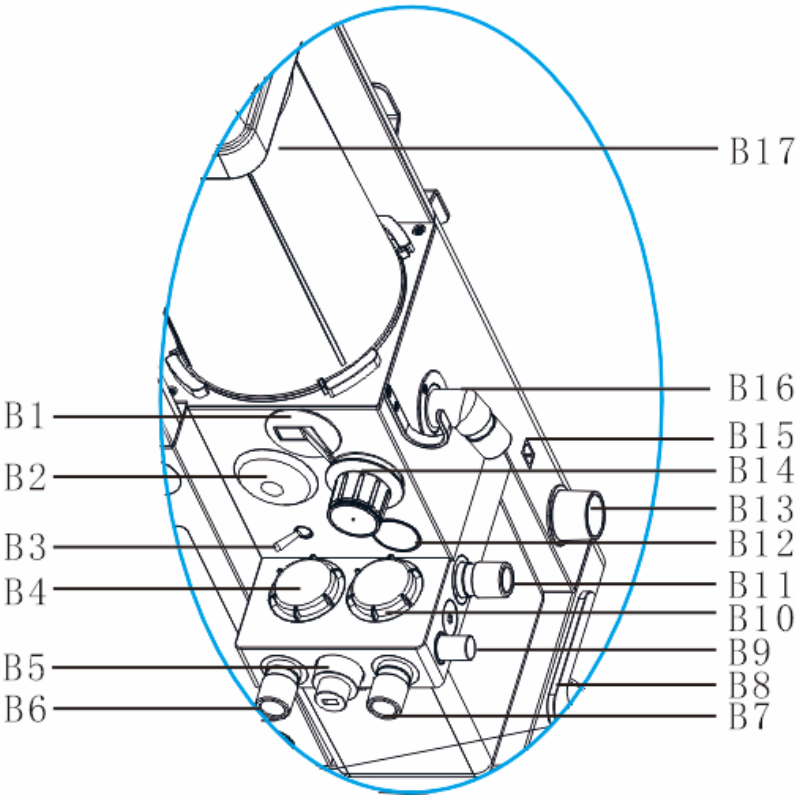


Table 2-1 List of components in front side view of the host(Single gas sources)

Serial	Part	Description
A13	Single oxygen flow meter	Adjusting and displaying oxygen flow rate。

表 2-2 List of components in front side view of the host(Single gas sources)

2.2.3 Breathing circuit view



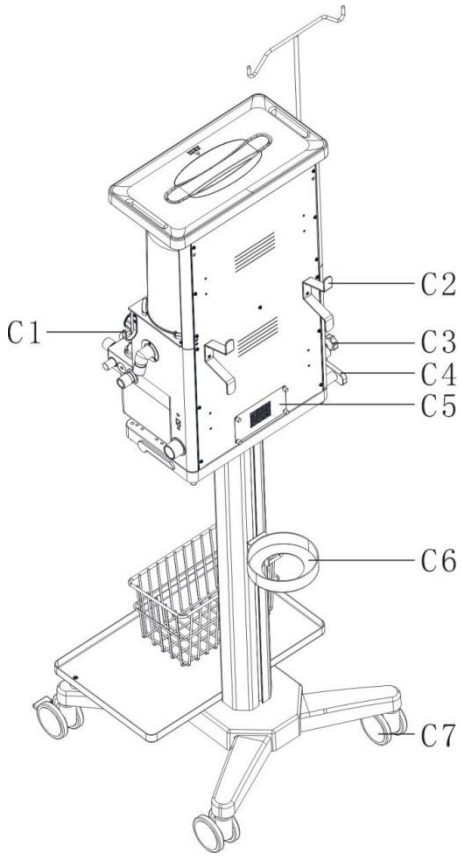
Picture2-3 Breathing circuit view

Serial	Component	Describe
B1	Manual machine controlled valve	Used for switching devices from manual mode to machine control mode.
B2	Airway pressure gauge	Indicates airway pressure.
B3	ACGO switch	Used to turn on/off the ACGO function. Used to output fresh gas through the ACGO interface.
B4	Observation window for suction check valve	The status of the suction check valve can be observed from outside the equipment.
B5	Oxygen battery	Used for measuring oxygen concentration
B6	Aspiration interface	Suction branch connector.
B7	Expiratory interface	Expiratory branch connector.
B8	Lock and unlock handle for sodium lime tank	Used to control the installation of sodium lime tanks.
B9	Test plug	When testing for leaks, it is used to connect the outlet end of the breathing pipeline.
B10	Observation window	The status of the exhalation check valve can be observed

	for exhalation one-way valve	from outside the device.
B11	ACGO port	Used to connect an open breathing line.
B12	Flush	Provide a fixed flow rate of oxygen to the inhalation branch of the respiratory system. **Attention:** When testing and pressing the fast oxygenation button, please ensure that the connection to the animal has been disconnected.
B13	AGSS port	Used for exhaust emissions.
B14	APL Valve	A rotary pressure regulating valve used to set the pressure limit of the respiratory system during manual ventilation. The scale above represents the approximate pressure. Rotating the APL valve clockwise will increase the pressure limit, while rotating counterclockwise will decrease the pressure limit. After pressing the APL valve, the limiting pressure will increase by about 30cmH2O from the original level, and when released, it will return to the original set pressure.
B15	Oxygen battery cable interface	Used to connect oxygen battery cables
B16	Breathing bag port	Used to connect the breathing bag.
B17	Bellows	Gas used for respiratory system separation from driving gas. **Note:** The bellows is a transparent component with a scale mark on it. These scale lines are for reference only and should read the tidal volume from the system interface. The delivered tidal volume is the sum of the bellows displacement and fresh gas flow rate.

Table 2-3 Respiratory circuit view component list

2.2.4 Rear view of the machine (equipped with a trolley)

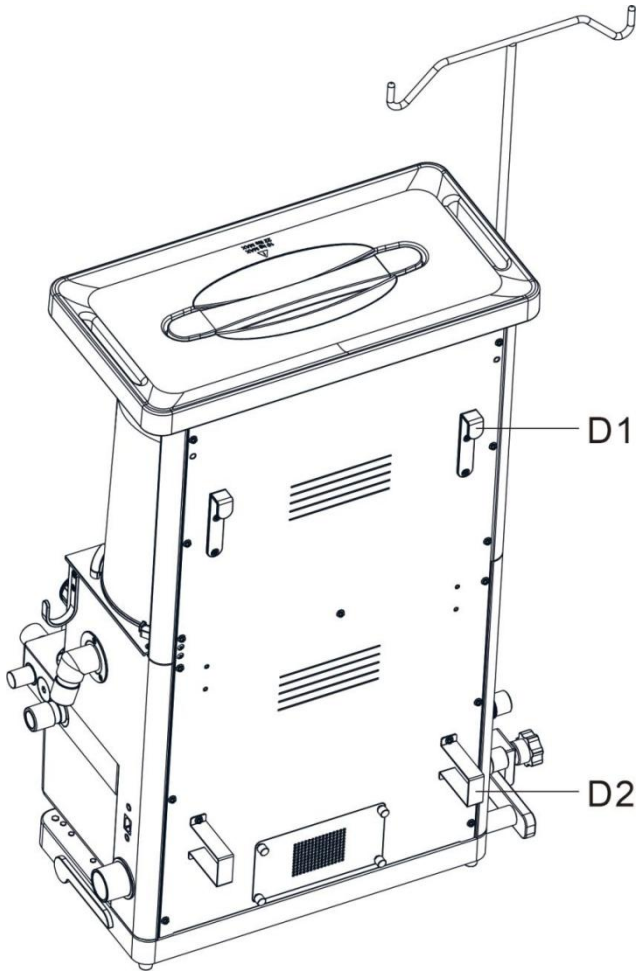


2-4 Rear view of the machine(Equipped with a trolley)

Serial	Part	Description
C1	Hook	Used for hanging respiratory pipes or other accessories.
C2	Winding hook	Used for hanging air supply pipes and power cords **Note:** When moving the machine, it is necessary to wrap the air supply pipe and power cord onto the winding hook to prevent accidental overturning of the machine.
C3	Infusion rod locking nut	Used to lock the infusion rod
C4	Handle	Used for pushing and pulling machines
C5	Turbine intake port cover	Used to update the turbine dust screen and filter element, which can be manually disassembled.
C6	Waste gas canister bracket	Can install waste gas canister.
C7	Casters	The machine can be moved through casters, with brakes on all four casters.

Table 2-4 List of components in the rear view of the machine(Equipped with a trolley)

2.2.5 Rear view of the machine (on the wall)

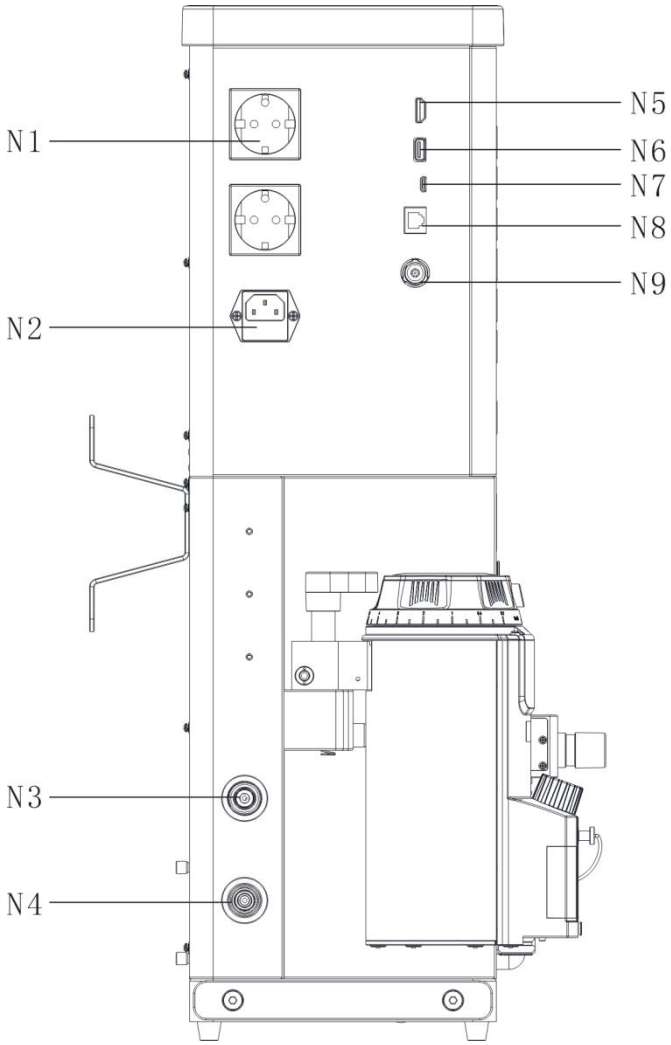


2-5 Rear view of the machine (on the wall)

Serial	Part	Description
D1	Host wall hook	When used for hanging the host on the wall, it should be hung on the wall bracket.
D2	Host wall support pad	When used for hanging the host on the wall, support the host so that it is perpendicular to the wall.

2-5 Rear view of the host (upper wall) component list

2.2.6 Left side view of the host



2-5 Left side view of the host

Serial	Part	Description
N1	Auxiliary output socket	Used to provide external power interface。
N2	AC inlet	Used for connecting AC power。
N3	Oxygen source input port	Used to connect an oxygen source。
N4	Air source input port	Used to connect air sources.
N5	HDMI interface	Used for video output HDMI interface。
N6	USB	USB interface。
N7	Type-c	Type-c interface。
N8	Network interface	Used to connect to the network。
N9	CO2/AG interface	Used to connect CO2 or AG modules。

2-6 Left side view of the host component list

3.0 Installation guide

Warning: Disposable respiratory hoses, sodium lime, and other disposable items may be considered to have potential biological hazards and should not be reused. When handling these items, the relevant regulations of the hospital and local authorities on pollutants and biological hazards should be followed.

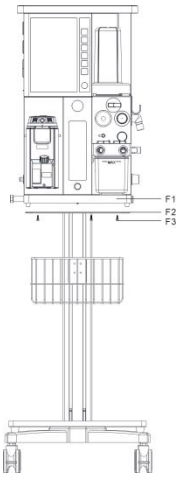
Attention: This manual introduces this product according to the most complete configuration, and the purchased product may not have certain configurations or functions.

Explanation: If the component numbers in all figures in this chapter appear in the previous chapter, they will be the same as the numbers and names in the previous chapter.

3.1 Trolley Installation Guidelines

If selecting a trolley, please refer to the "random file" inside the trolley packaging box to install the trolley.

3.2 Install the anesthesia machine on the trolley



3-2 The anesthesia machine is installed on the trolley as shown in the picture above

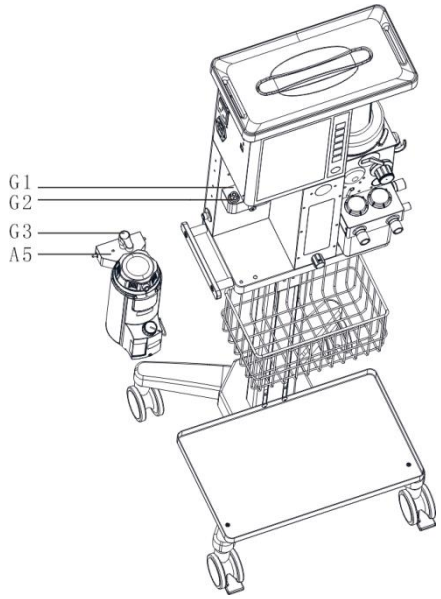
Serial	Name
F1	Anesthesia machine
F2	Trolley support plane
F3	Locking screw

(1) Place the anesthesia machine on the support plane of the trolley and align it with the mounting screw holes.

(2) Screw the locking screw upwards from the lower part of the support surface of the trolley into the anesthesia machine and tighten the locking screw.

(3) After installation, refer to Figure 2-1.

3.3 Installation of anesthesia evaporator to anesthesia machine



3-3 Installation of vaporizer to anesthesia machine diagram

Serial	Name
G1	Vaporizer base
G1	Connector
G2	Locking knob
A5	Vaporizer

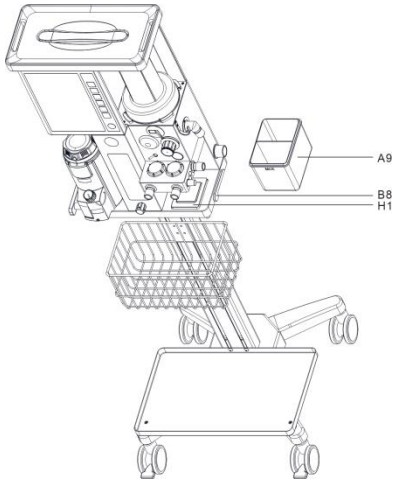
(1) Align the installation hole of the vaporizer with the connection head of the vaporizer base, and then install the vaporizer onto the bottom of the vaporizer.

(2) Turn the locking knob on the top of the vaporizer clockwise at an angle of 90 degrees. Lock the vaporizer.

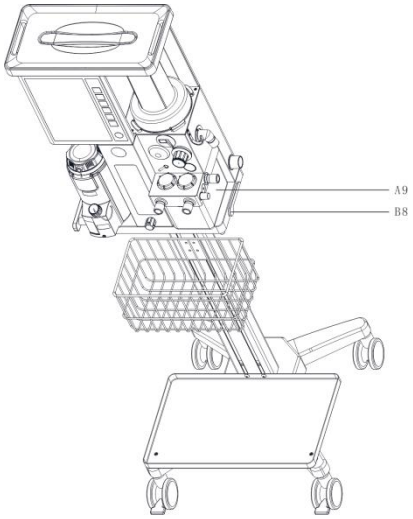
(3) After installation, refer to Figure 2-1.

3.4 Installation and disassembly of C02 absorber canister

The views of C02 absorber canister before and after installation are as follows:



3-4-1 Schematic diagram of C02 absorber canister installation



3-4-2 Schematic diagram of C02 absorber canister installation

Serial	Parts	Description
A9	C02 absorber canister	A container used for filling sodium lime to absorb CO2.
B8	Lock and unlock handle for C02 absorber canister	Used to control the installation of sodium lime tanks.
H1	The canister support	When rotating the dismantling and twisting of the canister, the supporting components will rise or fall.

3.4.1 Installation of C02 absorber canister

(1) Ensure that C02 absorber canister is filled with qualified sodium lime, and the filling amount should not exceed the MAX marking line.

(2) Ensure that the lock and unlock handle of the sodium lime tank is in the vertical position as shown in Figure 3-4-1.

(3) Place the sodium lime tank on the support of C02 absorber canister, ensuring that it is placed in the positioning center.

(4) Rotate the lock and unlock handle of C02 absorber canister clockwise to the horizontal position shown in Figure 3-4-2.

(5) The installation of C02 absorber canister is completed, as shown in Figure 3-4-2.

3.4.2 Disassembly of C02 absorber canister

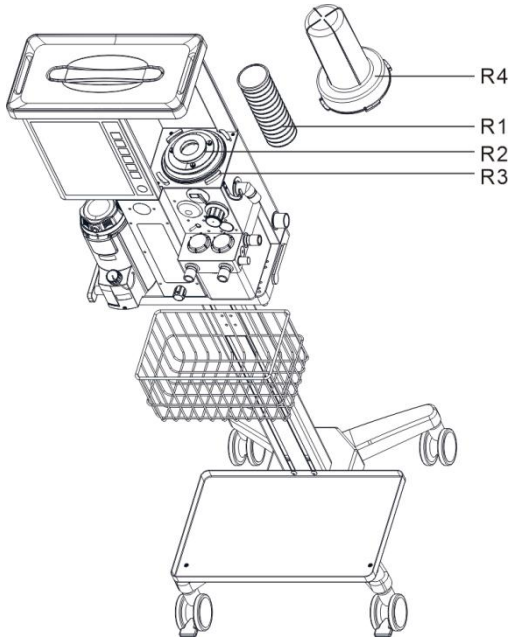
The disassembly of sodium lime tank also refers to the replacement of C02 absorber canister, and the operating steps are as follows:

(1) Before disassembling C02 absorber canister, see Figure 3-4-2.

(2) Lock the unlocking handle of C02 absorber canister and rotate it counterclockwise to the vertical position, as shown in Figure 3-4-1.
(3) Remove the C02 absorber canister.
(4) Pour out the used sodium lime from C02 absorber canister (when handling sodium lime, relevant hospital and local regulations on pollutants and biological hazards should be followed).
(5) After the disassembly of C02 absorber canister is completed, if you need to continue using the equipment or before the next use of the equipment, please follow 3.4.1 to install C02 absorber canister.

3.5 Installation and disassembly of bellows cover and bellows

The schematic diagram of the bellows cover and bellows cover before installation is as follows. Please refer to Figure 2-1 for the schematic diagram after installation.



3-5 Schematic diagram of children's bellows cover and bellows before installation

Serial	Part	Description
R1	Small bellows	The movable component drives the gas compression folding bag to achieve machine control mode.
R2	Bellows installation parts	Used for installing bellows
R3	Bellows cover installation slot	Used for installing bellows cover
R4	Small bellows housing	Gas used for respiratory system separation from driving gas.

3.5.1 Installation of small bellows cover and bellows

(1) Place the bottom of the bellows outside the circular plane of the bellows installation component, and organize the entire set in a consistent manner.

(2) Stagger the four ears at the bottom of bellows cover with the installation slots of the cover. At the same time, press cover to the lowest position, rotate the cover counterclockwise, and pay attention to the scale silk screen on the cover at the forefront of the equipment. At this point, the installation of the bellows and folding bag is complete.

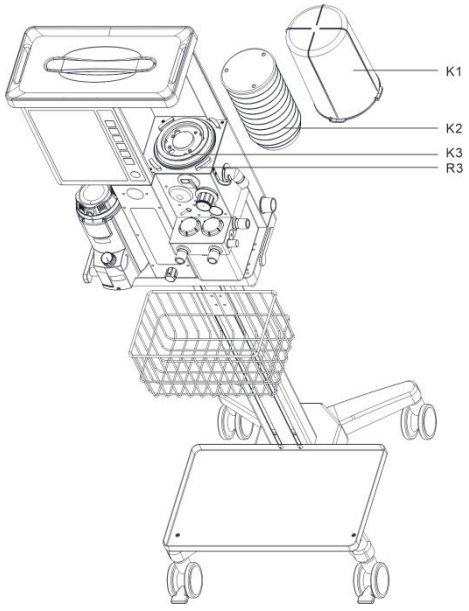
3.5.2 Dismantling of small bellows cover and bellows

(1) Rotate the small bellows cover out of the slot in a clockwise direction and remove the bellows

(2) Remove the small bellows.

(3) After disassembly, if you need to continue using the device or before the next use of the device, please install a small bellows cover and bellows. Repeat operation 3.5.1.

3.6 Installation and disassembly of large bellows cover and bellows



3-6 Schematic diagram of large bellows cover and bellows before installation

Serial	Parts	Description
K1	Large bellows housing	Gas used for respiratory system separation from driving gas.
K2	Large bellows	The movable component drives the gas compression folding bag to achieve machine control mode.
K3	Installation part of large	Used for installing bellows.

	bellows	
R3	Bellows installation slot	Used for installing bellows.

3.6.1 Installation of large bellows cover and bellows

(1) Confirm if there is a small bellows cover installation component on the bellows seat. If not, proceed to the next step. If so, fold off the small bellows installation component

(2) Place the bottom fold of the large bellows cover outside the circular plane of the installation part of the large bellows, and organize the entire set to be consistent.

(3) Stagger the four ears at the bottom of the large bellow cover with the installation slots of the bellow cover. At the same time, press the bellow cover to the lowest position, rotate the air box counterclockwise, and pay attention to the scale silk screen on the air box at the forefront of the equipment. At this point, the installation of the bellows and bellow cover is complete.

3.6.2 Dismantling of large bellows cover and bellows

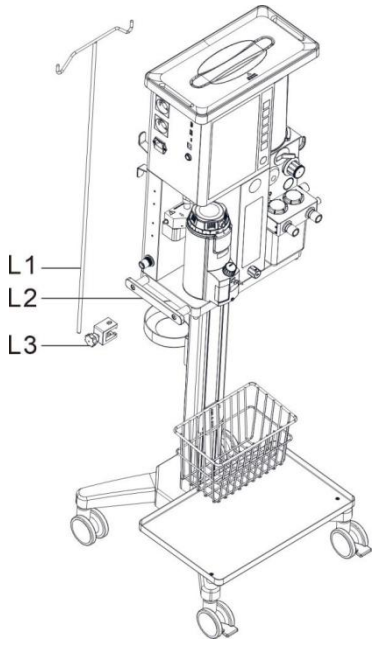
(1) Rotate the large bellow cover clockwise out of the slot and remove the air box.

(2) Remove the large bellows.

(3) After disassembly, if you need to continue using the device or before the next use of the device, please install several large boxes and folding bags. Repeat operation 3.6.1.

3.7 Infusion pole installation

The installation of the infusion pole is shown in the following figure:



3-7 Installation diagram of infusion pole

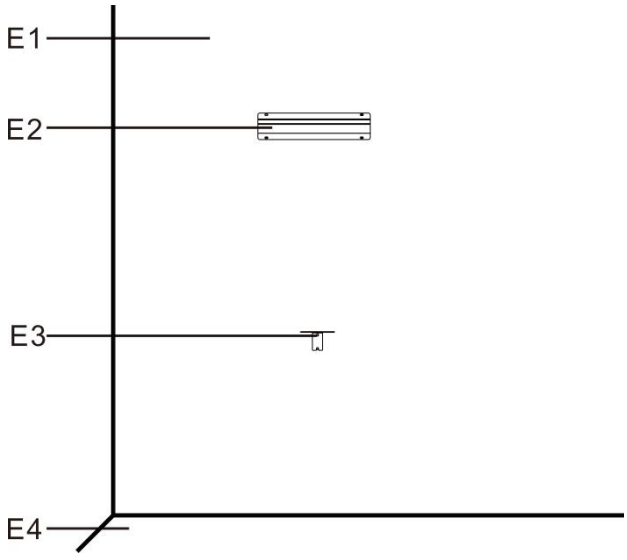
Serial	Parts	Description
L1	Infusion pole	Used for hanging infusion bags。
L2	Handle rod	Components used to fix infusion rods。
L3	Locking structure of infusion rod	Used to lock the infusion rod

Installation instructions for infusion poles：

1. Loosen the nut of the locking structure of the infusion rod and insert it into the handle rod to the middle position。
2. Insert the infusion rod into the vertical hole of the pot tight structure of the infusion rod from above, with the infusion rod on the right side of the handle rod。
3. Tighten the locking nut of the Huai River transmission rod locking structure。

3.8 Installation of anesthesia machine on the wall

The installation of wall brackets is shown in the following figure:



3-8 Wall bracket view

Serial	Parts	Description
E1	Metope	Used to install the wall bracket of the host.
E2	Host wall bracket	When used for hanging the host on the wall, hang the host.
E3	Exhaust gas absorption tank bracket	Used for placement of waste gas collection tanks
E4	Ground	Ground

3-8 Wall bracket view parts list

Explanation:

To facilitate the removal of the waste gas filter canister. The two fixing screw holes of the gas filter canister bracket, with the recommended vertical distance between the upper screw hole

and the wall bracket of the machine being 500mm.

Installation of anesthesia machine on the wall

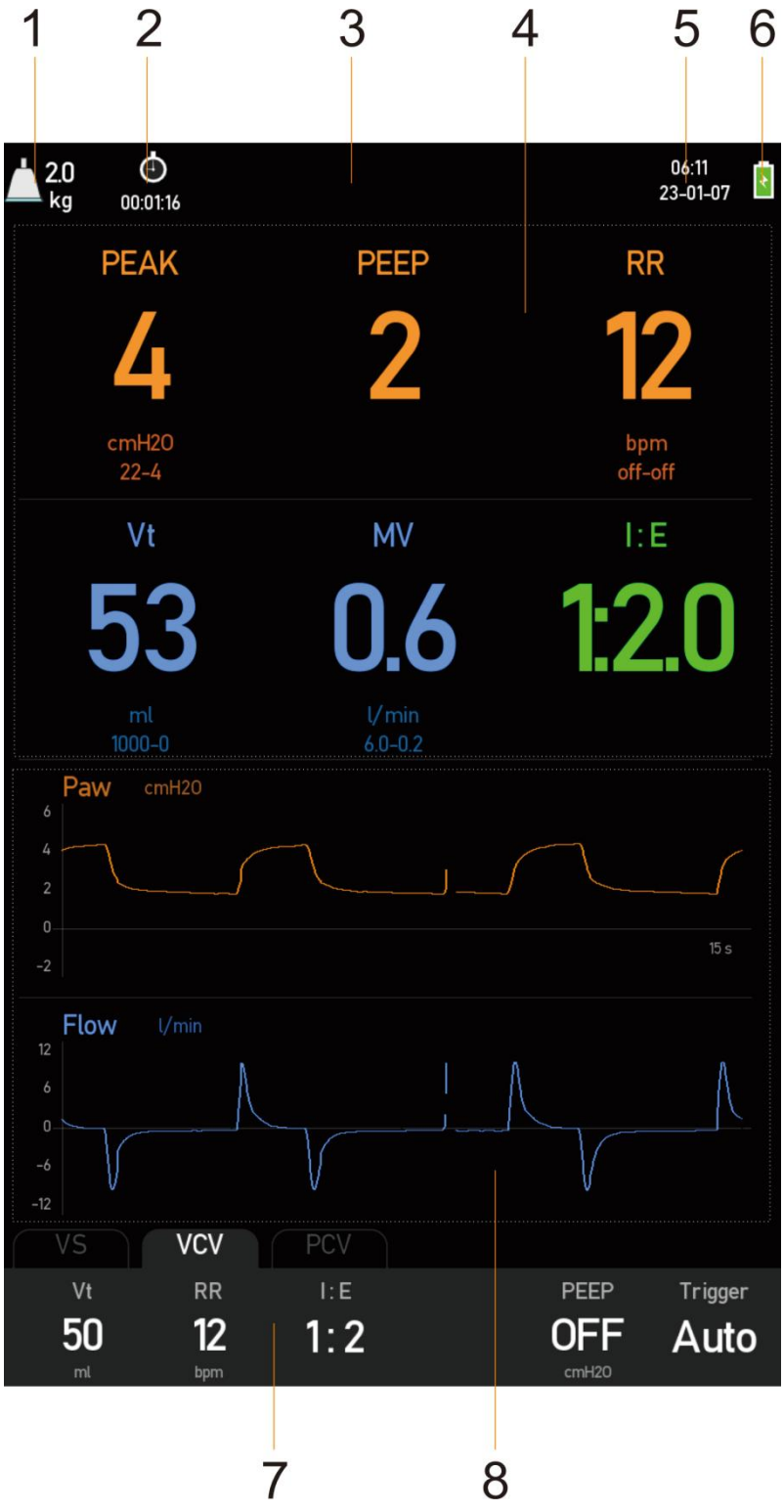
1. Hang the wall hook on the back of the anesthesia machine shown in Figure 2-4 (with the wall accessories installed) in the installation slot of the wall bracket on the main machine shown in Figure 3-6.
2. Install the anesthesia filter canister on the filter canister bracket as shown in Figure 3-6.
3. Connect the anesthesia filter canister pipeline.

3.9 CO2/AG module installation

Insert the socket tolerance of the CO2 or AG module into the CO2/AG interface (N9) in Figure 2-6 and complete the installation

4.0 System interface and basic settings

4.1 System main interface

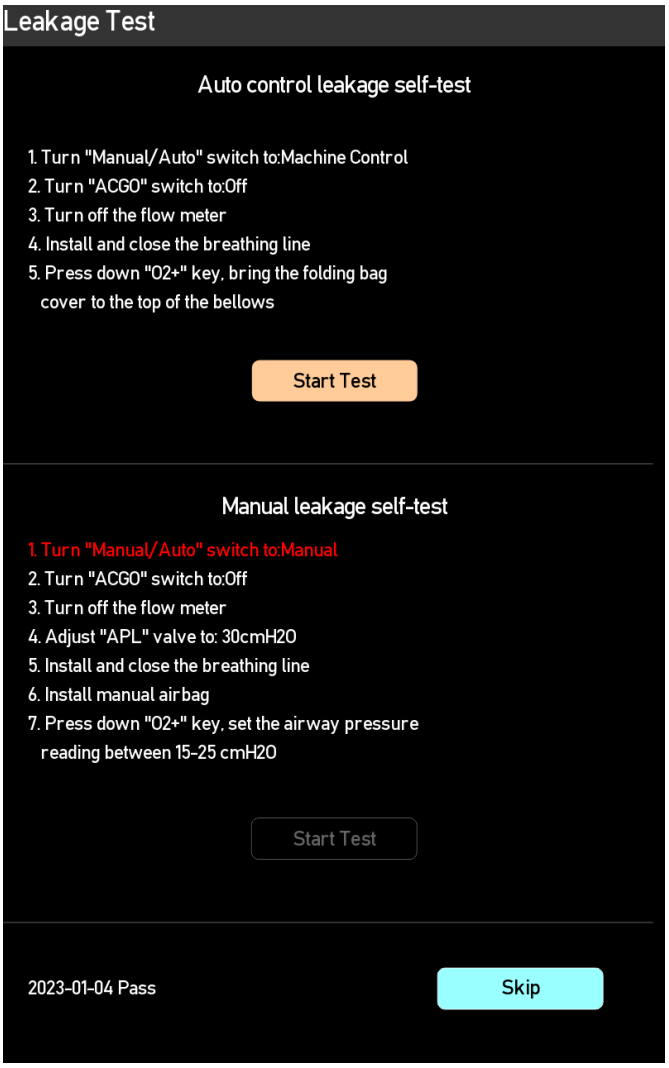


4-1 System interface

Serial	System interface	Description
1	Animal ventilation pipe connection type and weight	Display the type of animal ventilation pipe connection and body weight
2	timer	Display the timing time, with options to start, stop, or reset the timer
3	Alarm information area	Display the current alarm information, including physiological alarm, technical alarm, and prompt information.
4	Parameter display area	Display monitoring parameters.
5	System time zone	Display the current system time.
6	Battery status icon area	Display the current power status used by the system.
7	Waveform display area	Display waveform.
8	Ventilation mode and parameter setting area	Display the ventilation mode setting button and corresponding parameters.

4-1 System main interface

4.2 Leakage test interface

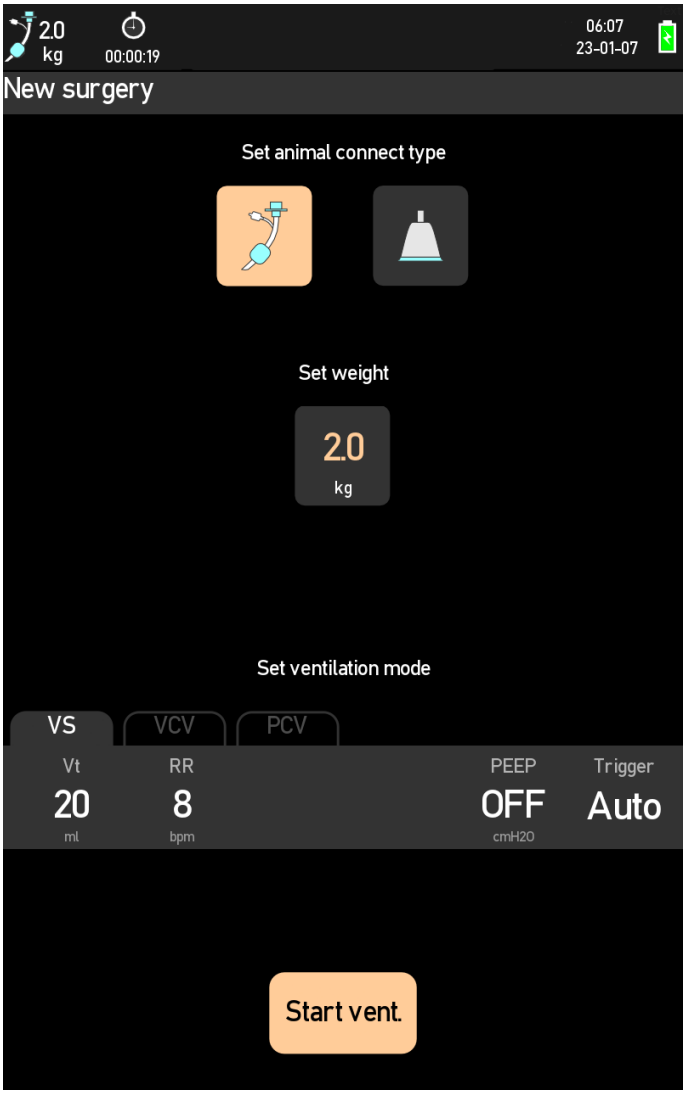


4-2 Leakage self inspection interface

The leakage testing interface can be operated according to the prompts in the figure above, for machine controlled leakage self check and manual leakage self check. If the machine is turned on and both the machine controlled and manual leakage self check pass, it will automatically enter the new surgical interface. If you enter the leak self-test interface for leak testing on the standby interface, both the machine control and manual leak self-test will pass and automatically enter the standby interface.

If there is no need to perform a leak self test, press the 'skip' button. Then enter the new surgical interface (power on to enter leak self test) or the standby interface (standby to enter leak self test).

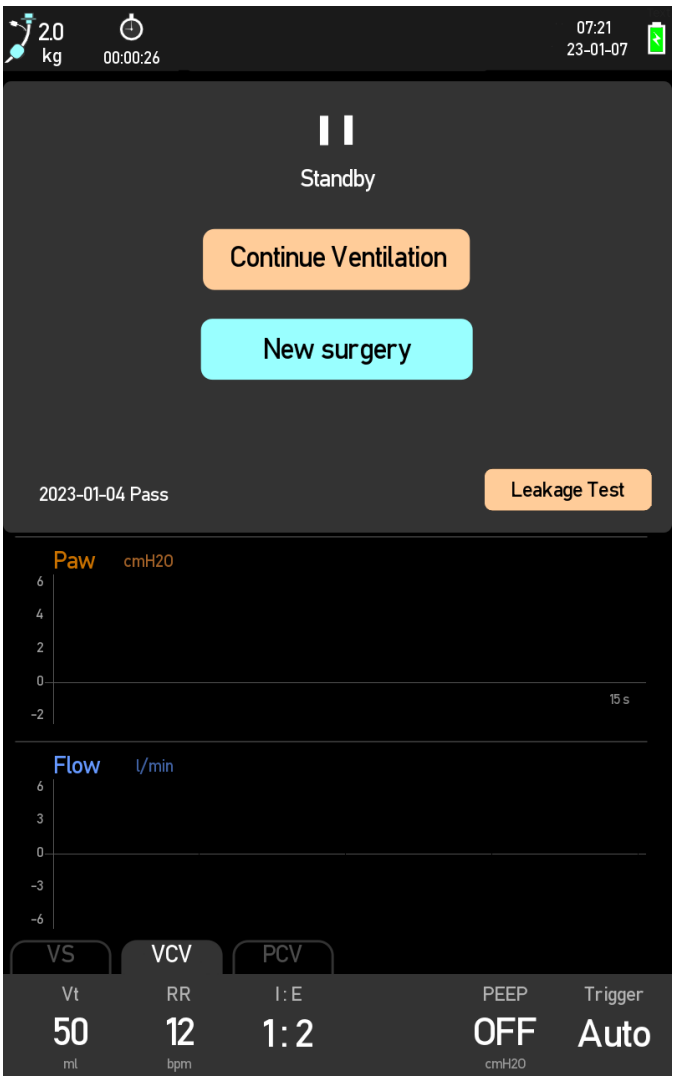
4.3 New surgical interface



4-3 New surgical interface

The new surgical interface can set weight parameters, and the system will automatically generate machine controlled ventilation parameters such as tidal volume based on the weight parameters. If parameters need to be adjusted, users can adjust various ventilation parameters according to clinical needs on this interface.

4.4 Home screen



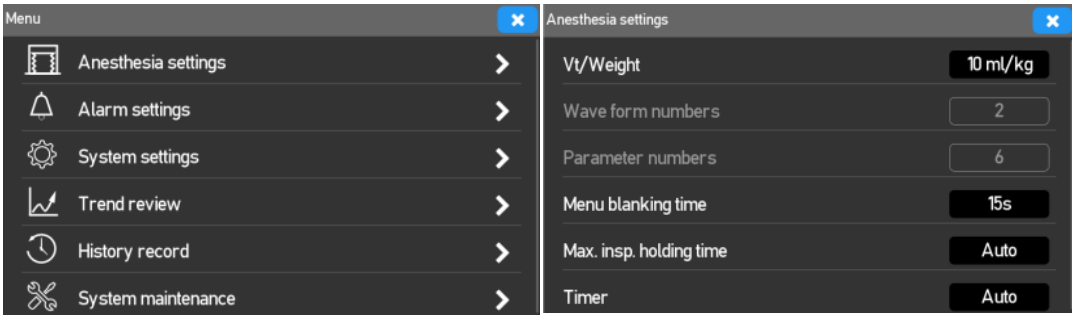
4-4 Homescreen

Press the standby button to enter the standby interface. Standby interface: You can choose to continue ventilation, undergo new surgery, or enter leak detection. You can choose the ventilation mode and ventilation parameters in each mode. After confirmation, the parameters take effect and are in a standby state. If you choose to continue ventilation, you can proceed with ventilation according to the set parameters.

4.5 Basic settings of anesthesia machine

Select the "MENU" button to quickly enter the "Main Menu" interface.

4.5.1 Anesthesia settings

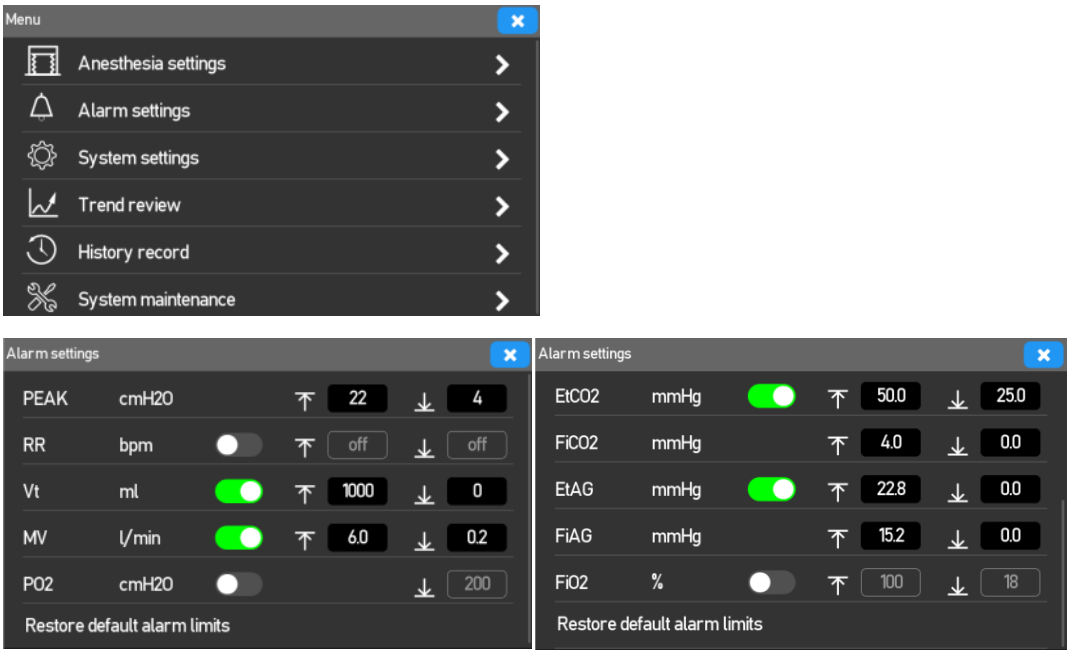


4-5-1 Anesthesia settings

System interface	Describe
Anesthesia settings	Anesthesia machine settings
Tidal volume coefficient	Set the ratio coefficient between tidal volume and body weight
Number of waveforms	Set the number of waveforms
Number of parameters	Set the number of parameters
Menu blanking time	Set menu blanking time
Maximum inspiratory holding time	Set inspiratory holding time
timer	Set Timer

Table 4-5-1 Anesthesia settings

4.5.2 Alarm settings



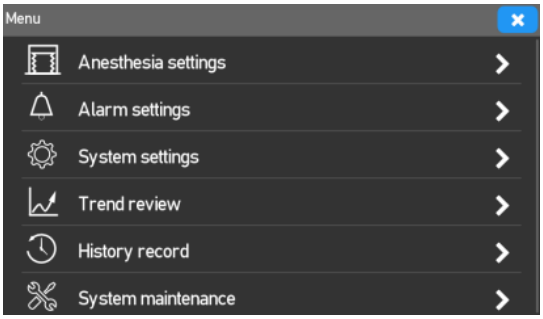
4-5-2 Alarm settings

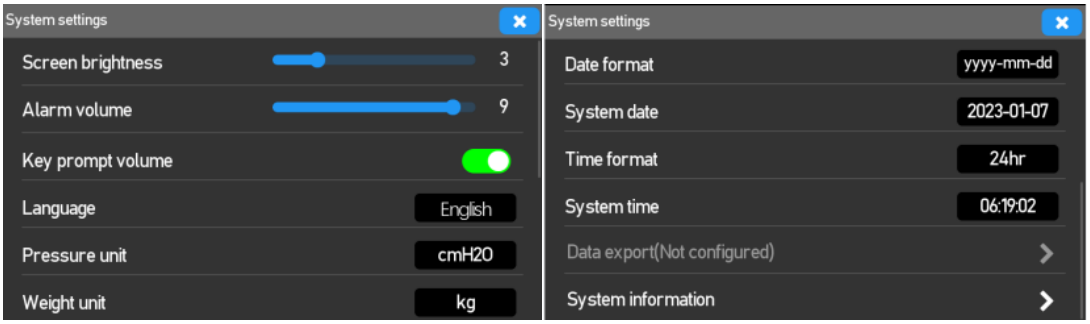
System interface	Describe
Alarm settings	Alarm upper and lower limit settings

Peak pressure	Set the upper and lower alarm limits for airway peak pressure
Frequency	Set the alarm upper and lower limits for frequency
Tidal volume	Set the alarm upper and lower limits for tidal volume
Minute ventilation	Set the alarm upper and lower limits for minute ventilation volume
Oxygen input pressure	Set the alarm lower limit for oxygen input pressure
EtCO2	Set the upper and lower limits of EtCO2
FiCO2	Set the upper and lower limits of FiCO2
EtAG	Set the upper and lower limits of the alarm for end of EtAG
FiAG	Set the upper and lower limits of the alarm for end of FiAG
oxygen concentration	Set the alarm upper and lower limits for oxygen concentration

Table 4-5-2 Alarm settings

4.5.3 System settings





4-5-3 System settings

System interface	Describe
System settings	System settings
Screen brightness	Set screen brightness
Alarm volume	Set alarm volume
Key prompt tone	Set button prompt tone
Language	Set Language
Pressure unit	Set pressure units
Body weight unit	Set weight units

Date Format	Set Date Format
System time	Set system time
Data export	Data export items
System information	Viewing System Information

Table 4-5-3 System settings

4.5.4 Trend Review

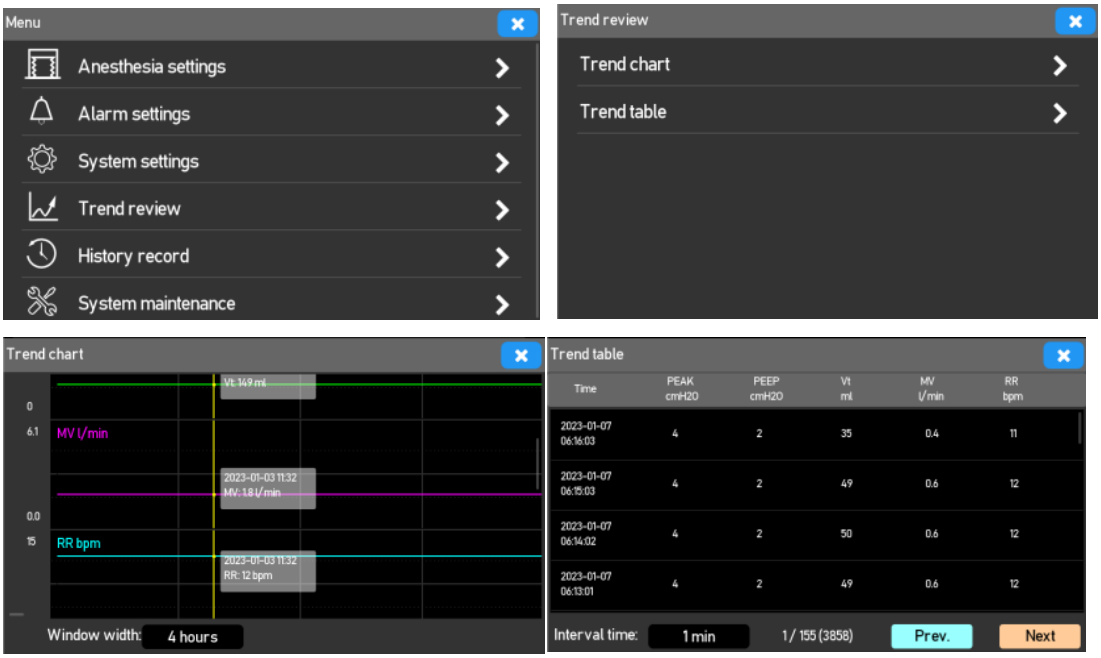


Table 4-2-4 Trend Review

Trend chart and trend table, which can view historical data

4.5.5 History

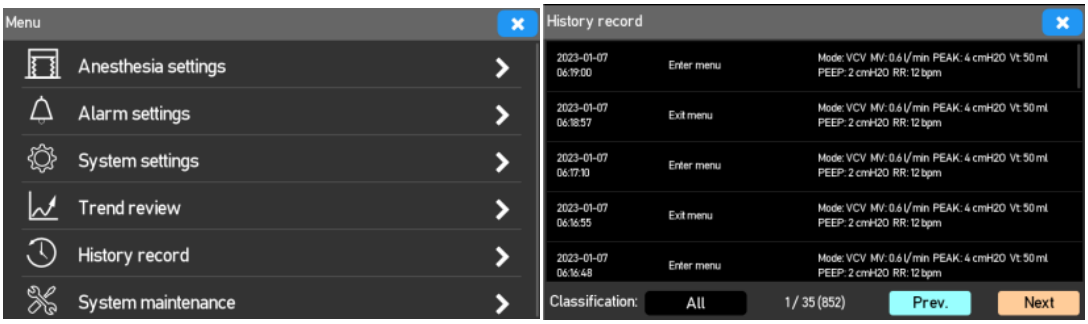
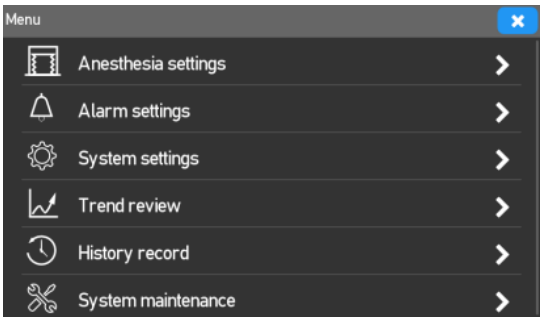


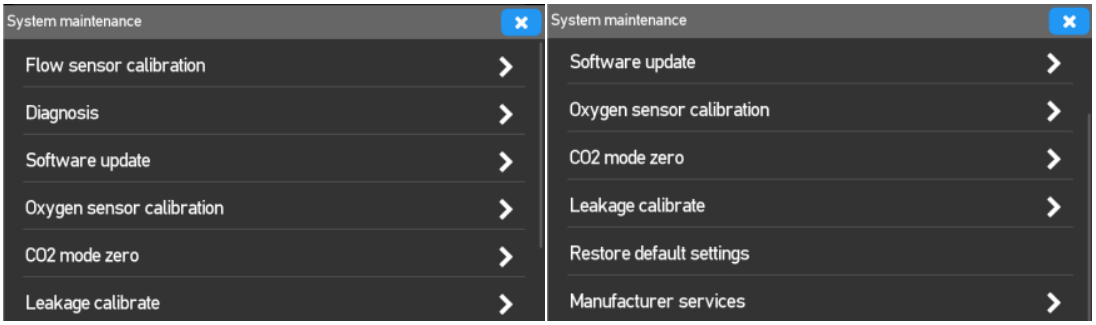
Table 4-2-5 History

Historical records of alarm information and operation information, allowing for viewing of alarm and operation information.

4.5.6 System maintenance

System maintenance, only accessible from the standby interface. The secondary menu for system maintenance requires a password to access flow sensor calibration, diagnosis, software upgrades, Oxygen sensor calibration, Leakage calibrate and Manufacturer services.





4-5-6 System maintenance

System interface	Describe
System maintenance	System maintenance
Flow sensor calibration	Enter the Flow sensor calibration interface
Diagnosis	Enter the diagnostic interface
Software upgrade	Enter the software upgrade interface
Oxygen sensor calibration	Enter the Oxygen sensor calibration interface
CO2 mode zero	Enter the CO2 mode zero interface
Leakage calibrate	Enter the Leakage calibrate interface
Restore default settings	Restore system default parameters
Manufacture services	Enter the Manufacture services interface

Table 4-5-6 System maintenance

4.5.6.1 Restore default settings

To restore the default settings, click on the text 'Restore Default Settings'.

5.0 Test before operation

5.1 Pre operation testing requirements

Perform pre operational testing on this anesthesia machine according to the test intervals listed below. Please refer to the specific steps or precautions in this manual.

Pre operational testing should be conducted in the following situations:

✧ Before using this device on each animal

- System inspection
- Power on self-test
- Leakage test
- Power failure alarm test
- Gas supply pipeline testing
- Basic ventilation test
- Evaporator testing
- Respiratory system testing
- Alarm testing
- Check AGSS
- Check the anesthesia absorption tank
- Pre operative examination

✧ After repairing or maintaining the anesthesia machine

- System inspection
- Power on self-test
- Gas supply pipeline testing
- Respiratory system testing
- Check AGSS
- Pre operative examination

Attention: Before using this machine, please read this manual and understand the operation and maintenance of each component.

Attention: If the pre operation test fails, do not use this machine. Please contact our company's technical support.

5.2 Pre operation checklist

Warning: To ensure the normal operation of the machine and the safety of users and animals, please follow all examination procedures established by the hospital before administering anesthesia to the animals.

- Before operating the anesthesia machine for the first time every day, the following operations should be performed:

1. Check the machine for damage or dangerous situations. Ensure that all necessary equipment and items are prepared, such as drugs, carbon dioxide absorbers (not depleted).

2. Check that the pressure of the central gas supply is within the specified range of the input pressure of the gas source (i.e. 280-600kPa/40-87psi).

3. Check if the evaporator is filled with sufficient anesthesia. Check if the dosing port of the evaporator is tightly closed.

4. For anesthesia absorption tanks, check if their weight gain exceeds the claimed weight gain range.

5. Connect the breathing circuit to the air bag and visually inspect the operation of the one-way valve.

6. Check ventilation in standby, manual, and mechanical modes.

7. Verify the monitoring function and check for alarms.

- Before each anesthesia, the following operations should be performed:

1. Connect the anesthesia machine to an AC power source, turn on the power switch, and verify whether the anesthesia machine is powered by an AC power source. Follow the prompts on the screen to complete the anesthesia machine power on self check.
2. Check if the evaporator is filled with sufficient anesthesia, and check if the anesthesia absorption tank is overweight.
3. If using central gas supply or gas cylinder gas supply, check that the O2 pressure is

within the specified range (i.e. 280-600kPa/40-87psi).

- After replacing the CO2 absorber or breathing pipeline, the following operations should be carried out:
  1. Leakage test

5.3 Inspection system

During the system inspection process, ensure that the following requirements are met:

1. he equipment is connected correctly and intact.
2. Check the system:
   a. Check if the flow meter, evaporator, pressure gauge, and gas supply pipeline are damaged.
   b. Is the respiratory system intact and equipped with sufficient carbon dioxide absorbers.
3. Check others:
   a. Is the flow control valve closed.
   b. Is the evaporator turned off.
   c. Has the evaporator been adequately dosed
4. All components are connected correctly
5. The respiratory system is connected correctly and the respiratory pipeline is intact.
6. The gas supply system is connected and the pressure is normal.
7. The required emergency equipment is in place and in good condition.
8. Check the color of the sodium lime in the absorber. If the color changes significantly, please replace the sodium lime immediately.
9. Suitable anesthetic and emergency drugs are available.
10. The casters are not damaged or loose, and they are locked, so the anesthesia machine cannot be moved.
11. Ensure that the respiratory system is in place.
12. When the power cord is connected to an AC power source, the AC power indicator light should light up. If the indicator light is not on, it indicates that the system has no power supply.
13. The anesthesia machine is turned on and off normally.
14. Check if the quick oxygen charging button is working properly.

5.4 Power on self test

1. When the system is powered on, a self check will be conducted to ensure that the alarm system (alarm speaker) and hardware board are working properly.
2. After passing the power on self test, it will automatically enter the system self test interface. If the self test fails, a prompt for the failed item will appear on the screen.
3. Continue operating or troubleshooting based on the self inspection results.

5.5 Leakage test

5.5.1 Manual leak self check

1. Start testing

Power on from the system: If the system is currently powered on, the system will initiate a self test, and after the self test is completed, it will enter the leakage testing interface. Select manual leak self test.

From the standby interface, select the "Leakage Test" button to enter manual leakage testing.

2. Follow the interface prompts to operate.

5.5.2 Machine control leakage self check

1. Start testing

Power on from the system: If the system is currently powered on, the system will initiate a self test, and after the self test is completed, it will enter the leakage testing interface. Select machine controlled leak self check.

From the standby interface, select the "Leakage Test" button to enter the machine control leakage test.

2. Follow the interface prompts to operate.

Attention: The "log" label of this system records the recent results of automatic circuit leakage testing, including whether the test passed, failed, or skipped. To obtain this information, press Menu to enter the main menu, select History record, and view the logs.

Attention: During the testing process, if there is a "replace air filter" issue, please replace the air filter in a timely manner.

Attention: After manual leak testing, turn the APL valve knob to the minimum or desired scale position

5.6 Power failure alarm test

1. Press ⏻ Button start system
2. Cut off AC power supply
3. ”Ensure that the AC indicator light is off and the system prompts' Battery in use '
4. Reconnect the AC power supply
5. Ensure that the AC indicator light is on and the screen prompt 'Battery in use' disappears.
6. Press again ⏻ Button to shut down the system

5.7 Gas supply pipeline testing

1. Connect oxygen to the air source interface of the anesthesia machine and turn on the switch.

2. Adjust the flow control knob to adjust the flow control to the middle level of the measurement range.

3. Ensure that the pressure indication of the gas source pressure gauge is within the range of 280-600kPa (when connecting to the oxygen concentrator, the pressure indication should be consistent with the output pressure of the oxygen concentrator).

4. Cut off the air supply to the oxygen source interface.

5. Ensure that the indicated value of the air supply pressure gauge returns to the "0" position.

5.8 Basic bump test

1. Install the respiratory circuit and breathing bag
2. Connect the simulated lung or air sac to the Y-shaped head of the respiratory circuit at the animal end
3. Set the oxygen flow rate to 1L/min
4. Select PCV and start ventilation
5. Set the ventilator parameters as follows:

Anesthesia machine parameters	Anesthesia machine parameter settings
Ventilation mode	PCV
Inspiratory pressure	10cmH2O
Respiratory rate	25
Respiratory ratio	1:2
Positive end-expiratory pressure	OFF
trigger	Auto

6. Verify that the animal end of the Y-shaped connector of the respiratory circuit simulates the inflation and deflation of the lung or air bag, and verify that the peak pressure and airway pressure displayed on the screen are consistent with the inspiratory pressure setting.

5.9 Respiratory system testing

Warning: If there are foreign objects in the respiratory system, they can block the flow of gas to animals, which may lead to death or injury accidents. Please ensure that there are no test plugs or other foreign objects present in the respiratory system.

Warning: Do not use test plugs that are too small and can easily fall into the respiratory system. Please use the machine's test plug.

1. Ensure that the respiratory system is intact and connected correctly.
2. Ensure that the one-way valve on the respiratory system is working properly.
   a. If the suction check valve opens during inhalation and closes immediately at the beginning of exhalation, it indicates that the suction check valve is working properly.
   b. If the exhalation check valve opens during exhalation and closes immediately at the beginning of inhalation, it indicates that the exhalation check valve is working properly.

5.9.1 Bellows testing

1. Set the system to standby mode
2. Ensure that the manual/machine control switch is set to the machine control position
3. Rotate the flow control knob to set all gas flow rates to minimum
4. Insert the Y-shaped tee on the breathing pipeline into the leak test plug of the breathing system and block the outlet of the Y-shaped tee
5. Press the quick oxygenation button to fill the bellows, causing the bellows folding bag

to rise to the top

6. Ensure that the pressure on the airway pressure gauge cannot rise above 15cmH2O
7. The folding bag of the bellows should not fall. If it falls, it indicates that the bellows is leaking air. Please reinstall the air box.

5.9.2 APL Valve test

1. Set the system to standby mode
2. Ensure that the manual/machine control switch is set to the manual position
3. Connect the airbag to the airbag interface.
4. Connect the Y-shaped head on the breathing pipeline in the breathing circuit to the test plug
5. Adjust the control knob of the APL valve to ensure that the pressure of the APL valve is at 30cmH2O
6. Set the flow rate of the oxygen flow meter to 3L/min, such as when the airbag is fully charged.
7. Ensure that the reading on the airway pressure gauge is within the range of 20-40cmH2O.
8. After the airway pressure gauge stabilizes, continue to press the APL valve. Simultaneously observing the reading of the airway pressure gauge, it can reach 40-80cmH2O.
9. Adjust the control knob of the APL valve to minimize the opening pressure of the APL valve (MIN position).
10. Ensure that the reading on the airway pressure gauge does not exceed 10cmH2O
11. Rotate the flow control knob of the oxygen flow meter to set the O2 flow rate to the minimum (turn off the flow meter), and confirm that the reading on the airway pressure gauge will not drop below 0.

5.10 Alarm testing

After the anesthesia machine is turned on and started, it will automatically perform a self check, emit a "beep" sound, display the system startup interface, and then automatically start the system self check. After the system self check is completed, it will enter the leak test interface. This indicates that the audible alarm indicator has started working normally.

Preparation before alarm testing:

1. Connect the simulated lung or airbag to the animal end interface of the Y-joint.
2. Set the manual/machine control switch to the machine control position.

3. Press ⏻ the button to start the system
4. Set the system to standby mode.
5. Set the anesthesia machine control parameters as follows:

Anesthesia machine parameters	**Anesthesia machine parameter settings**
Ventilation mode	VCV
Tidal volume	50ml
Respiratory rate	20
Respiratory ratio	1:2
Positive end-expiratory pressure	OFF
Trigger	Auto

6. Press the quick oxygenation button to raise the folding bag inside the bellows to the top of the bellows.
7. Rotate the O2 flow control knob to set the O2 flow rate to 0.5~1L/min
8. Press the "Start Ventilation" button to exit the anesthesia machine from standby mode and enter working mode.
9. Ensure that:

•The monitoring parameter data of the ventilator displays normally.

•The normal periodic rise and fall of the folding capsule in the bellows during mechanical ventilation

5.10.1 Continuous high airway pressure alarm test

1. Connect the airbag to the interface of the respiratory system airbag.
2. Rotate the O2 flow control knob to set the O2 flow to the lowest state.
3. Adjust the APL valve control knob to set the APL valve at 30cmH2O
4. Set the manual/machine control switch to the manual position.
5. After continuously pressing the fast oxygenation button for about 15 minutes, ensure that the screen displays the "sustained airway pressure too high" alarm.
6. Open the patient end outlet and ensure that the "sustained airway pressure too high" alarm on the screen is cleared.

5.10.2 Paw Excessive alarm

1. Set the manual/machine control switch to the machine control position.
2. Enter the "Alarm Limit" setting.
3. Set the "low limit" of Paw to 2cmH2O
4. Remove the airbag from the patient end interface of the Y-shaped connector.

5. Wait for 20 seconds and observe the alarm prompt area on the screen to ensure that the "Paw too low" alarm appears on the screen.
6. Connect the airbag to the airbag interface on the respiratory system.
7. Ensure that the "Paw too low" alarm on the screen disappears.

5.10.3 Paw Low alarm

1. Set the manual/machine control switch to the machine control position.
2. Enter the "Alarm Limit" setting.
3. Set the "low limit" of Paw to 2cmH2O and the "high limit" of Paw to 5cmH2O.
4. Ensure that the screen displays a "Paw too high" alarm.
5. Set the "high limit" of Paw to 40cmH2O
6. Ensure that the "Paw too low" alarm on the screen disappears.

5.10.4 Vt Excessive alarm

1. Set the manual/machine control switch to the machine control position
2. Enter the "Alarm Limit" setting.
3. Set the "high limit" of Vt to 50ml and the "low limit" to off
4. Connect the Y-shaped head between the airbag and the respiratory circuit, and set the value of Vt to 100ml during VCV mode ventilation.
5. Wait for 20 seconds and observe the screen alarm prompt area to ensure that the "Vt too high" alarm appears on the screen.
6. Set the "high limit" of Vt to 200ml
7. Ensure that the "Vt too high" alarm on the screen disappears

5.10.5 Vt Low alarm

1. Set the manual/machine control switch to the machine control position.
2. Set the "low limit" of Vt to 50ml.
3. Set the "low limit" of Vt to 50ml.
4. Connect the Y-shaped head between the airbag and the respiratory circuit, and set the value of Vt to 30ml during VCV mode ventilation.
5. Wait for 20 seconds and observe the screen alarm prompt area to ensure that the "Vt too low" alarm appears on the screen.
6. Set the "high limit" of Vt to 5ml
7. Ensure that the "Vt too low" alarm on the screen disappears

5.10.6 Preoperative Preparation

1. Ensure that the relevant parameters and alarms of the anesthesia machine are set to the applicable clinical level.

2. Ensure that the system is in standby mode.
3. Ensure that airway pressure maintenance equipment/manual ventilation and tracheal intubation equipment, as well as applicable anesthesia and emergency drugs, are in place.
4. Set the manual/machine control switch to the manual position
5. Connect the breathing bag to the breathing bag port.
6. Turn off the vaporizer
7. Twist the APL valve to the MIN position to fully open the APL valve.
8. Ensure that the respiratory system is connected correctly and intact.

6.0 Operation

6.1 Starting system

1. Insert the power cord into the power outlet and ensure that the AC indicator light is on.
2. Press ⏻ the button, the light will turn on, and the device will turn on.
3. The screen displays the startup screen and then goes out. It lights up again to display the startup screen, and the system emits a speaker self check sound once.
4. The screen displays a self check progress bar, and then enters the system self check interface for leak testing.
5. Complete the leak test.

Attention: During the start-up process of the anesthesia machine, the system detects whether the sound alarm function is normal. If normal, the speaker emits a self checking sound. If not, please do not use this device and contact our technical support immediately.

6.2 Oxygen flow setting

1. Connect the oxygen source and ensure that there is sufficient pressure in the source.
2. The oxygen flow rate in fresh gas can be controlled through the oxygen flow meter knob, and the flow meter displays the flow rate value of oxygen in fresh gas.

6.3 Setting the vaporizer

Press and rotate the concentration control knob on the evaporator to set the concentration of the anesthetic to the appropriate position.

Attention: The atmospheric pressure may differ from the calibrated pressure of the anesthesia evaporator, which may lead to inaccurate output of the anesthetic. During the use of anesthetics, the operator should continuously monitor the concentration of the anesthetic to determine whether the output concentration is accurate.

Attention: When the evaporator is turned on, sudden pulling or tilting greater than 30 º can cause incorrect concentration.

Attention: If the vaporizer will not be used again within 6 months, the anesthetic in the evaporator needs to be discharged.

Attention: Before operation, it is necessary to check the level of anesthesia in the evaporator. If the level of anesthesia is below the min line, anesthesia needs to be added.

6.3.1 Adding anesthetics

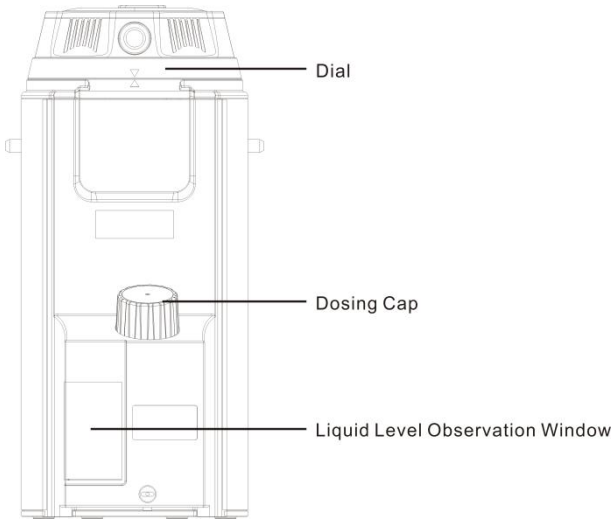
Before adding anesthetics, the following items need to be checked:

1. Check if the vaporizer is damaged.
2. Keep the dial in the "0" position.
3. Pay attention to the expiration date of the anesthetic.
4. For the first time adding anesthesia to the evaporator, wait for 15 minutes until the core inside reaches saturation.

Warning: Only specified anesthetics can be added to the evaporator. Before use, please check the name and color identification of the anesthetics on the evaporator and anesthetics bottle. Isoflurane is purple, sevoflurane is yellow, and enflurane is orange.

Warning: If the wrong anesthetic or other substance is added to the evaporator, immediately suspend use to prevent health hazards. If the above situation occurs, mark the anesthesia evaporator and contact the seller for repair.

Pour-Fill Dosing method



1. Set the dial to the "0" position.
2. Slowly unscrew the dosing device cover counterclockwise to slowly release the pressure inside the evaporator.

3. Unscrew the cap of the anesthetic bottle and slowly inject the anesthetic into the receiving device of the doser.
4. When adding medication, check the injection level from the window. The height of the medication should not exceed the maximum liquid level mark, otherwise it may cause output concentration errors and other situations to occur. If the maximum liquid level mark has been exceeded, the anesthetic will overflow through the overflow hole and excess liquid needs to be discharged (see "Discharging Anesthetics" on page 22) until the liquid level of the liquid drops below the maximum mark.
5. Tighten the dosing device cover clockwise. If this operation is not correct, the next time the evaporator is turned on, it may cause fresh gas and anesthetic to overflow.

Warning: If the vaporizer does not return to the "0" position, a large amount of anesthetic may evaporate and overflow.

Caution: After rotating the dial to the "0" position, please wait for at least 5 seconds before turning on the anesthesia vaporizer to balance the pressure and prevent the overflow of fresh gas and anesthesia vapor.

6.3.2 Discharge anesthetics

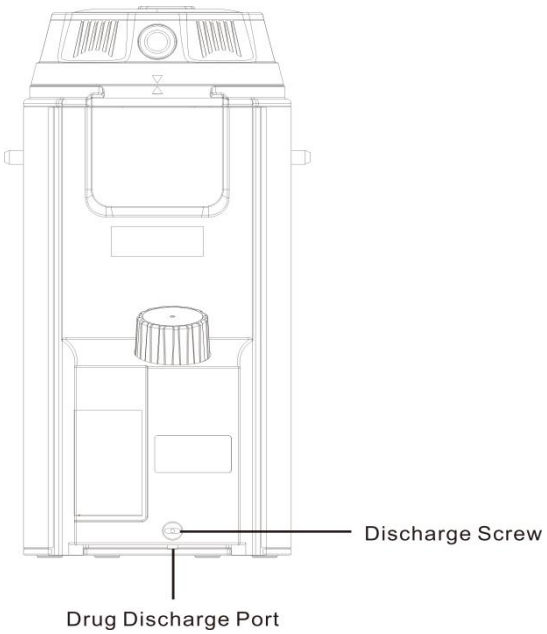
Warning: The discharged anesthetic must be treated, stored, or discarded as a drug, otherwise it may lead to misuse of the anesthetic.

Warning: After the evaporator is discharged, please tighten the lid and knob of the dosing device, otherwise there may be an overflow of anesthetic when the evaporator is turned on the next time.

Warning: The anesthetic discharged from the evaporator cannot be reused.

Warning: When discharging the vaporizer, do not fill the anesthetic bottle too full, otherwise it may cause the anesthetic to overflow.

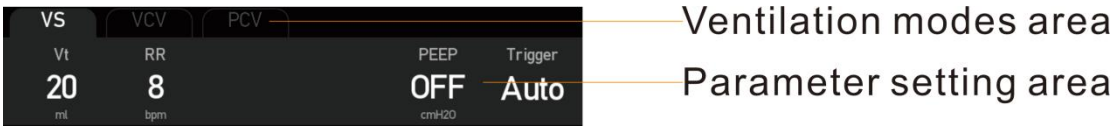
Pour-fill Discharge method



1. Set the dial to the "0" position.
2. Take the correct anesthetic bottle and place it under the discharge port at the bottom of the dosing system.
3. Slowly rotate counterclockwise to open the dosing device cover.
4. . Discharge the anesthetic until it is not visible in the window and no anesthetic continues to flow into the bottle. If necessary, turn off the dosing knob in a timely manner and continue to discharge with another anesthetic bottle.
5. After the anesthetic is emptied, turn off the dispensing knob clockwise, cover the anesthetic bottle cap, and tighten the dispenser cap.

6.4 Set ventilation mode

6.4.1 Ventilation mode and parameter settings



6-4-1 Ventilation mode and parameter settings

The setting method for ventilation mode is as follows:

For example, changing the ventilation mode to VS:

1. In the ventilation mode area, select ventilation VS through the manual touch screen. The following picture box appears.

2. Press the button  in the Change Work Mode dialog box to confirm.

3. If you need to cancel, press the button  to cancel

The setting method for ventilation parameters is as follows:

1. In the parameter setting area, select the ventilation parameters that need to be set.
2. Click on the ventilation parameters that need to be set through manual touch screen, and enter the modified parameters in the pop-up digital keypad.
3. Press the button  in the Change Working Parameters dialog box to confirm.
4. If you need to cancel, press the button  to cancel

6.4.2 Capacity support ventilation mode(VS)

When the VS mode detects that the animal's inspiratory effort reaches the preset inspiratory trigger level, the system initiates a volume support ventilation. This mode adjusts the level of pressure support based on the animal's respiratory effort, ensuring a preset tidal volume for the animal.

In this mode, the length of the inspiratory and expiratory phases is completely controlled by the animal itself. When the system detects that the animal continues to lack effective inhalation

triggering action and the time exceeds the set minimum respiratory rate, it will trigger a machine controlled air supply.

The first ventilation in VS mode is an experimental ventilation mode, which will deliver air according to the default pressure level. Subsequent ventilation cycles will use this pressure level as the adjustment object for feedback control of tidal volume.

Set VS mode:

1. Select "VS" on the main interface.
2. Check that all VS parameters are set to appropriate values,and if necessary, adjust the parameters on the touch screen.
3. Confirm settings

Attention: Before activating the new mechanical ventilation mode, ensure that all relevant parameters are set to appropriate values.

VS parameters: tidal volume, minimum respiratory rate, positive end expiratory pressure, and triggering.

Attention: Adjusting a certain parameter must be confirmed before adjusting other parameters. If you want to restore to the previous value, you need to reset it.

6.4.3 Capacity controlled ventilation mode(VCV)

VCV is a pressure control mode aimed at capacity.
In VCV mode, each mechanical ventilation sends a certain tidal volume of gas into the animal's lungs. In this mode, volume control will be carried out through pressure controlled ventilation. This mode maintains a low pressure level as much as possible during the inhalation phase, while ensuring that the delivery volume is equal to the preset tidal volume. The level of pressure control will vary depending on the tidal volume setting and the resistance and compliance of the animal's lungs. Each time the machine adjusts the pressure increase, there is a limit, and the maximum pressure does not exceed the pressure alarm limit of -5cmH2O

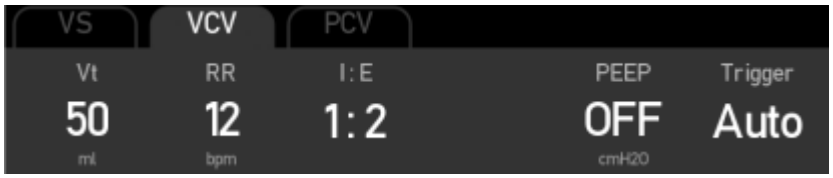
In VCV mode, when an animal's autonomous breathing is detected, an air supply is triggered.

In order to ensure the delivery of the set capacity, the anesthesia machine adjusts the pressure control level of the next cycle based on the measured tidal volume inhaled in the previous cycle, dynamically compensates for the compliance of the ventilation system and the loss of tidal volume caused by micro leaks in the system, and eliminates the influence of fresh gas during the week. This is the tidal volume compensation function.

Set VCV mode:

1. Select "VCV" on the main interface.
2. Check that all VCV parameters are set to appropriate values. If necessary, adjust the parameters on the touch screen.
3. Confirm the settings.

VCV parameters: tidal volume, respiratory rate, inspiratory to expiratory ratio, positive end expiratory pressure, and triggering.



6.4.4 Pressure controlled ventilation mode(PCV)

In PVC mode, each mechanical ventilation will quickly bring the airway pressure to the preset pressure control level. Then, the system will dynamically adjust the supply flow rate within an appropriate range through a closed-loop feedback system based on the set value of the pressure control level and changes in animal compliance or resistance, maintaining the airway pressure constant at the control target until the end of the inhalation time and turning to exhalation. The tidal volume transported in PCV mode will vary depending on the compliance and airway resistance of different animal lungs.

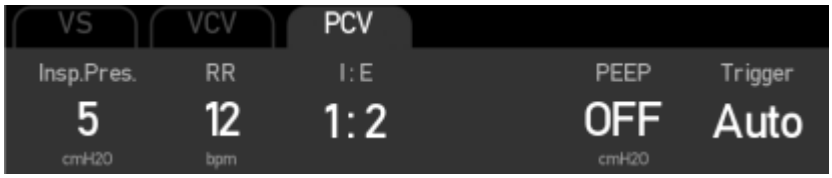
In PVC mode, when an animal's autonomous breathing is detected, an air supply is triggered.

In PCV mode, it is also possible to choose to set positive end-expiratory pressure to improve end-expiratory CO2 excretion and increase oxygenation during breathing.

Set PCV mode:

1. Select "PCV" on the main interface.
2. Check that all PCV parameters are set to appropriate values. If necessary, adjust the parameters on the touch screen.
3. Confirm the settings.

PCV parameters: including inspiratory pressure, respiratory frequency, inspiratory to expiratory ratio, positive end expiratory pressure, and triggering.



6.4.5 Synchronous intermittent command ventilation mode (SIMV)

The SIMV mode is a mode in which periodic pressure regulation volume control ventilation is delivered to animals at predetermined intervals. In SIMV mode, the breathing opportunity waits for the animal's next inhalation at a specified time interval. The inspiratory triggering level can be selected from flow rate triggering, pressure triggering, or automatic triggering. If the inspiratory triggering level is reached within the waiting time for triggering (referred to as synchronous triggering window), the set tidal volume and inspiratory time are used to synchronously transport pressure adjustment capacity to control ventilation. By triggering autonomous breathing outside the window, stress support can be obtained.

If the inspiratory trigger level is reached outside the trigger window of SIMV mode, the anesthesia machine will deliver pressure to support ventilation according to the set support pressure.

Set PCV mode:

1. Select "SIMV" on the main interface.
2. Check that all SIMV parameters are set to appropriate values. If necessary, adjust the parameters on the touch screen.
3. Confirm the settings.

PCV parameters: tidal volume, respiratory rate, inspiratory time, support pressure, positive end expiratory pressure, and triggering.

6.4.6 Manual ventilation mode

1. Manual ventilation mode is a working mode used to manually ventilate or allow animals to breathe autonomously. To use manual mode, you must first set the APL valve to the required pressure value, and then use the manual/mechanical switch on the breathing system to enter and exit manual mode. If necessary, press the quick oxygenation button to inflate the airbag.
2. Rotate the APL valve control knob to adjust the pressure in the respiratory system to a suitable range.

3. Set the manual/machine control switch to the manual position
4. If necessary, press the quick oxygenation button "O2+" to inflate the airbag.
5. In manual ventilation, the APL valve is used to regulate the peak pressure in the respiratory system and the amount of gas in the storage bag. When the pressure of the respiratory system rises to the pressure limit set by the APL valve, the APL valve will be opened to release excess gas in the respiratory system.

Attention: During the use of this machine on animals, it should be ensured that the manual ventilation mode is always available.

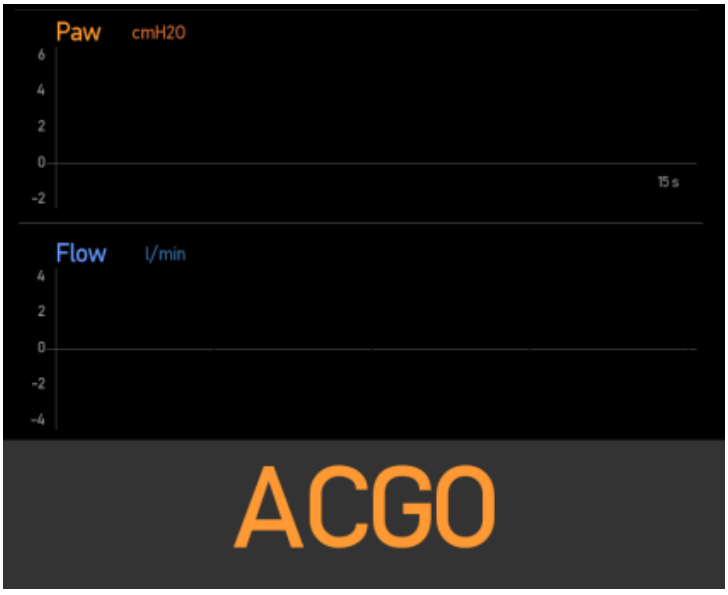
Attention: If mechanical ventilation fails, it can be adjusted to manual ventilation mode to continue ventilation.

Attention: If the APL valve is adjusted during manual ventilation mode, please adjust the APL valve to the minimum scale after the surgery is completed

6.4.7 ACGO

When ACGO is turned on, the system is in ACGO mode. If the current ventilation mode is VS, the system enters ACGO mode after turning on ACGO. Without changing the ventilation mode, when exiting ACGO mode, the system defaults to VS mode.

When in ACGO mode, the interface will display a prompt as shown in the following figure:



6.5 Inspiratory retention

Inhalation retention refers to artificially extending the inhalation time of an animal to prevent it from exhaling for a certain period of time.

In the button area, continue to press the "Insp. Hold" button, the anesthesia machine will activate the inhalation hold function, and the system will prompt "Inhalation hold in progress". After releasing the "Insp. Hold" button, the anesthesia machine terminates the inhalation hold function. For animals weighing less than 3KG, if the effective stage of inhalation retention exceeds 5S, the inhalation retention function will terminate. For animals weighing 3KG or more, if the effective stage of inhalation retention exceeds 30s, the inhalation retention function will terminate.

Attention: The suction hold function can only be used in machine controlled ventilation mode, manual ventilation, ACGO, and standby mode, and is not available.

6.6 Ventilation parameters

Set parameters	**Introduction**
Tidal volume	The volume of gas that an animal inhales or exhales during resting breathing
Inspiratory pressure	The suction pressure in pressure control mode is the absolute value relative to the positive end expiratory pressure.
Respiratory rate	Machine controlled breathing rate within 1 minute
Respiratory ratio	The ratio of inhalation time to exhalation time
Positive end-expiratory pressure	End expiratory pressure
Minimum respiratory rate	The breathing cycle time of an animal exceeding the minimum breathing rate will be forced to initiate a controlled air supply.
Support pressure	The relative value of relative terminal positive pressure
trigger	This includes automatic triggering, flow rate triggering, and pressure triggering. For flow rate triggering and pressure triggering, if the machine detects this triggering level, it begins to enter the suction triggering stage.
Monitoring parameters	**Introduce**
Tidal volume	The tidal volume exhaled during a cycle.
Airway peak pressure	The maximum pressure value during a breathing cycle or fixed time.
Positive end-expiratory pressure	End expiratory pressure

Respiratory rate	The number of breaths monitored within 1 minute.
Aspiration to exhalation ratio	Ratio of inspiratory time to expiratory time
Minute ventilation volume	Accumulated exhaled tidal volume within one minute
oxygen concentration	Inspired oxygen fraction
CCO2 concentration	Inhalation and exhalation of CO2 concentration
AG concentration	Inhalation and exhalation of anesthesia gas concentration

Table 6-6 Ventilation parameters

6.7 Entering standby mode

Select the "Standby" button, confirm, and enter the standby interface.

Warning: Entering standby mode will stop ventilation and parameter monitoring. If the animal needs continuous ventilation, do not choose standby mode.

6.8 Shut down the system

Please select the ⏻ button in standby mode to turn off the anesthesia machine system.

7.0 Alarm

7.1 Overview

Alarm refers to the prompt given by the anesthesia machine to medical staff through sound or other means when an animal undergoing use undergoes abnormal changes in vital signs, or when the anesthesia machine itself malfunctions, which prevents the smooth use of the anesthesia machine on the animal.

Attention: When the device is turned on, the system will detect whether the alarm sound function is normal. Under normal circumstances, the device will emit a "beep" alarm sound. If the sound function is not normal, please do not use the device and immediately contact our company's technical support.

Attention: When multiple alarms with different priorities occur simultaneously, the device will perform visual and audible alarms based on the highest priority alarm among all current alarms.

Attention: When multiple alarms of the same level occur simultaneously, the alarm information is displayed in the order of alarm occurrence.

Attention: When the power outage of this device does not exceed 30 seconds, it will be turned on again and the alarm settings will be restored to the state before the power outage

7.2 Alarm Type

According to the nature of the alarm, the alarms of this anesthesia machine can be divided into physiological alarms, technical alarms, and prompt messages. These alarm information will be displayed in the alarm information area at the top of the screen.

- Physiological alarm:

The monitored gas parameters or patient physiological parameters exceed a specific range

- Technical alarm:

Due to human operation or technical barriers in the use of the machine, or due to the malfunction of the machine itself, accurate animal monitoring cannot be carried out.

- Reminder information:

Reminder information does not belong to alarms, it refers to the display of information related to the system status by anesthesia opportunities, in addition to physiological and technical alarms, which do not involve the vital signs of animals.

7.3 Alarm level

According to the severity of the alarm, the alarms of this anesthesia machine can be divided into high priority alarms, medium priority alarms, and low priority alarms.

7.4 Alarm signal

When an alarm occurs, the alarm signal can be obtained through auditory or visual means:

- Sound alarm
- Alarm information
- Parameter flashing

7.4.1 Audible alarm

Audible alarm refers to the use of different sound characteristics by anesthesia machines to prompt different levels of alarms when an alarm occurs.

- High priority alarm: Broadcast the sound of a high priority alarm.
- Medium priority alarm: Broadcast the sound of the medium priority alarm.
- Low priority alarm: Broadcast a low priority alarm sound.

7.4.2 Alarm Information

Alarm information refers to the display of corresponding alarm information in the alarm information area of the anesthesia machine when an alarm occurs. The system uses different background colors to distinguish the level of alarm information:

- Advanced alarm: red
- Intermediate alarm: yellow
- Low level alarm: blue-green

7.5 Set alarm volume

Select the "Menu" button, select "System settings", and adjust the "System volume" by sliding it left and right to adjust the alarm volume. The range is from 0 to 10 levels. If there are currently no alarms, the system will play a low-level alarm sound based on the alarm volume you set when adjusting the volume.

Warning: During the use of equipment, it is not necessary to rely solely on auditory alarms. Adjusting the alarm sound to a low level may cause danger to animals. Users should closely monitor the actual clinical condition of animals

Warning: The A-weighted sound pressure level of the auditory alarm signal shall not be less than 45dB and not more than 85dB

7.6 Set alarm limit

Attention: When the parameter value is above the alarm high limit or below the alarm low limit, an alarm will be triggered.

Attention: During the use of the equipment, it is important to regularly pay attention

to whether the parameter alarm limit is set to an appropriate value.

Attention: When the system power supply is interrupted for no more than 60 seconds and the machine restarts, the alarm settings and other settings before the power loss can be automatically restored. When the system power supply is interrupted for more than 60 seconds and the machine restarts, please recheck the alarm settings and other settings to see if they are reasonable.

Attention: Setting the alarm limit to the limit value will render the alarm system ineffective.

Select the "Alarm Settings" button, press this button to enter the alarm limit setting interface, where you can set the alarm lower and upper limits of the parameters that need to be modified.

7.7 Alarm sound paused

7.7.1 Set alarm sound pause

Press "Alarm Pause" to enter the alarm sound pause state. The sound pause time is 120s, and the current alarm sound can be turned off.

Warning: During the pause of the alarm sound, please pay close attention to the animals and anesthesia machines to ensure that the alarm information is not ignored. If the alarm condition persists without taking corresponding measures, it may cause harm to animals or machines.

Attention: When the alarm sound is paused, except for the sound alarm, other alarm methods work normally.

Attention: In the alarm sound pause state, if a new alarm occurs, the alarm sound remains in the pause state.

Attention: After the 120S countdown is completed, the system will release the current alarm sound pause state and resume the sound alarm.

7.7.2 Cancel alarm sound pause

In the alarm sound pause state, press the "Alarm Pause" button to release the current alarm sound pause state and restore the sound alarm. At the same time, the alarm sound pause icon on the screen disappears.

7.8 Current alarm

When there is an active alarm in the system, select the alarm information area to view the current alarm information and alarm level in the open current alarm menu.

7.9 Alarm response measures

When the anesthesia machine alarms, please refer to the following steps to take corresponding measures:

1. Check the condition of the animals.
2. Confirm the parameters or types of alarms being triggered.
3. Identify the cause of the alarm.
4. Reason for disarming the alarm.
5. Check if the alarm is eliminated

Please refer to "Alarm Information" for specific handling measures for various types of alarms.

Warning: To prevent harm to animals, when the alarm is activated, check if the animals have sufficient ventilation, identify and handle the cause of the alarm. Only readjust the alarm limit when the alarm setting is inappropriate for the situation at that time.

Caution: If the alarm persists without obvious reasons, please contact our company's technical support.

8.0 Maintenance

8.1 Maintenance schedule

This schedule specifies the minimum maintenance frequency based on the typical usage of 2000 hours per year. If the actual usage time is longer than the typical situation, the maintenance work of the equipment should be more frequent.

Attention: When cleaning and installing, please check the parts and sealing rings for damage, and replace and repair them if necessary.

Minimum maintenance frequency	**Maintenance**
Every day	Check the weight of the anesthesia absorption tank; Check the rapid oxygen supply function to ensure normal use; Use a soft cloth, mild soap or water to clean the surface of the anesthesia machine and the sodium lime tank.
Weekly	Check if the sealing ring of the suction/exhalation valve is damaged; Check the valve in the suction/exhalation valve for damage.
Every two weeks	Evacuate the vaporizer
Every three years	Please contact our company's technical support for replacement of the built-in lithium-ion battery.
On demand	If the color of the absorbent changes, please replace the absorbent in the sodium lime absorption tank. If the transmission system hose is damaged, please replace it. If the air supply hose assembly is damaged, please replace it. If the pressure relief pressure deviation of the APL valve is too large, please replace the APL valve. If the turbine filter is clogged, please replace the turbine filter.

Table 8-1 Maintenance schedule

8.2 Electrical safety testing

Attention: Electrical safety checks should be conducted after completing repairs or routine maintenance. Before conducting electrical safety inspection and testing, all covers, panels, and screws should be installed correctly.

Attention: It is recommended to entrust professional institutions or manufacturers for electrical safety testing. It is recommended to conduct an electrical safety test once a year.

1. Conduct grounding impedance test（protective earth resistance）

(1) Connect the two probes of the test grounding impedance of the safety analyzer to

the protective grounding terminal and screw of the AC power supply.

(2) Conduct grounding impedance test with a test current of 25A

(3) Verify that the impedance value exceeds 0.1 ohms (100 ohms) but is less than 0.2 ohms (200 ohms). Remove the AC power cord and connect the probe from the protective grounding terminal originally connected to the AC power cord to the protective grounding terminal of the power socket. Repeat steps (1) to (3)

2. Conduct an earth leakage current test under the following conditions:

3. Verify that the maximum leakage current does not exceed 500uA (0.5mA) for the first two cases and 1000uA (1mA) for the last two cases

Attention: Please use certified safety analyzers (such as UL, CSA, or AAMI) and conduct relevant tests according to their operating instructions.

8.3 Disinfection and cleaning methods

Warning: When cleaning and disinfecting, please ensure the applicability of the cleaning and disinfection methods to each component and ensure the correctness of the cleaning and disinfection methods.

Warning: All liquids should be placed away from electronic components. Do not allow liquid to seep into the equipment casing.

Attention: Please clean and disinfect this device as needed before first use. Please refer to this chapter for the cleaning and disinfection methods.

Attention: Do not use abrasive cleaning agents (such as steel wool, silver polish, or cleaning agents). The pH value of the cleaning solution must be between 7.0 and 10.5.

Attention: Do not allow liquid to seep into the equipment casing.

Attention: To prevent equipment damage, if there are any issues with the cleaning agent, please refer to the data provided by the manufacturer.

Name	Category
clean water	detergent
Soap water (pH 7.0~10.5)	detergent
Alcohol (75%)	Intermediate-efficacy disinfectant
Ultraviolet rays	/

Table 5-2 Cleaners and disinfectants

8.3.1 Wipe

- When cleaning the surface of the anesthesia machine, please use a damp cloth soaked in weakly alkaline detergent (water, soap water with a pH value of 7.0~10.5) to wipe the surface of the anesthesia machine casing. When disinfecting the surface of the anesthesia machine, please use a damp cloth

soaked in a medium effective disinfectant (75% alcohol) solution to wipe the surface of the anesthesia machine casing.

- After the shell is cleaned or disinfected, use a dry, lint free cloth to remove residual cleaning or disinfectant solution.

Warning: Liquid infiltration into control components can damage equipment or cause personal injury. During the cleaning or disinfection process of the casing, please ensure that no liquid enters the control components and always disconnect the equipment and AC power supply. Ensure that the relevant components after cleaning or disinfection are completely dry before reconnecting the AC power supply.

Caution: The display screen can only be cleaned with a dry, soft, lint free cloth and cannot be cleaned with liquids.

8.3.2 UV lamp irradiation

- When disinfecting the surface of the anesthesia machine with ultraviolet radiation, place the anesthesia machine at a distance of 1 meter under a 30W ultraviolet lamp for irradiation, and the irradiation time should not be less than 60 minutes.

Caution: Ultraviolet radiation can cause damage to the human body. Please do not stay indoors during the exposure period.

9.0 Annex

Warning: **Only use the accessories specified in this chapter, using other accessories may cause equipment malfunction.**

Warning: **Disposable attachments can only be used once, and repeated use may lead to performance degradation or cross infection.**

Warning: **If there are signs of damage to the accessory packaging or accessories, please do not use the accessory.**

Warning: **When the equipment and its accessories reach their service life, they must be disposed of in accordance with the guidelines for managing the handling of products and local regulations for contaminated and biohazardous materials.**

9.1 Attachment List

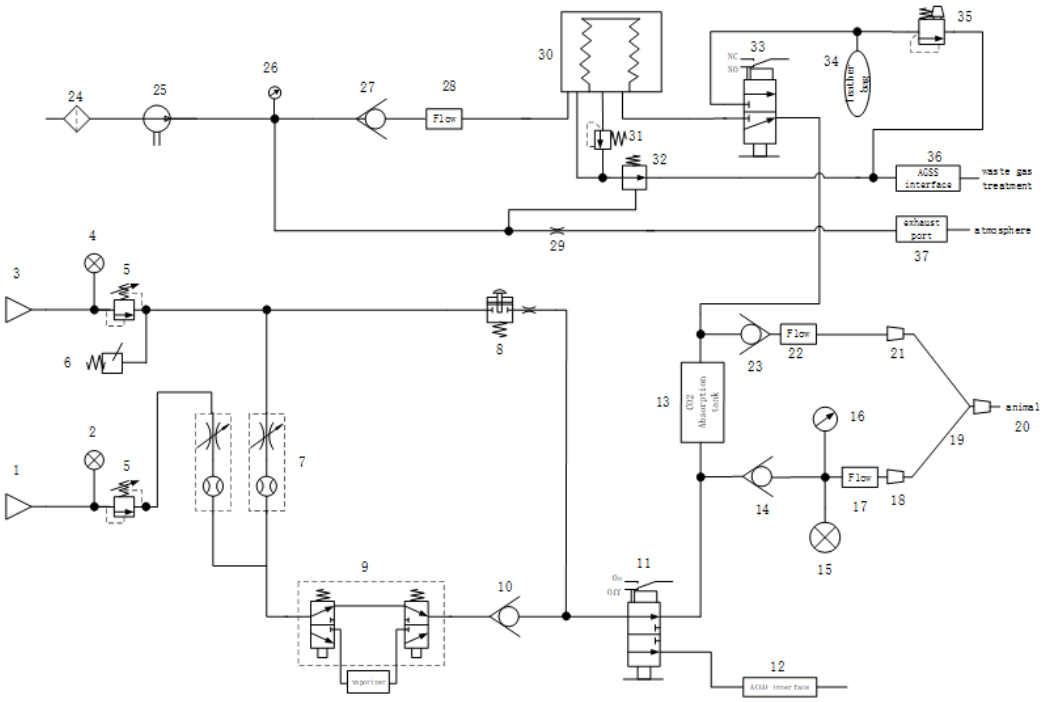
Attention: This manual introduces this product according to the most complete configuration, and the purchased product may not have certain configurations or functions.

material code	Name	Specifications
13-000003-00	Power cord national standard character left bend 3M	Power cord Chinese standard character left bend 3M, 3 * 1 square meter
38-000093-00	Isoflurane vaporizer Pour-fill	Isoflurane vaporizer Pour-fill
38-000135-00	Isoflurane vaporizer Key-Fill	Isoflurane vaporizer Key-Fill
38-000137-00	Isoflurane vaporizer Easy-Fill	Isoflurane vaporizer Easy-Fill
38-000139-00	Enflurane vaporizer Pour-Fill	Enflurane vaporizer Pour-Fill
38-000141-00	Enflurane vaporizer Key-Fill	Enflurane vaporizer Key-Fill
38-000143-00	Enflurane vaporizer Easy-Fill	Enflurane vaporizer Easy-Fill
38-000145-00	Sevoflurane vaporizer Pour-Fill	Sevoflurane vaporizer Pour-Fill
38-000147-00	Sevoflurane vaporizer Key-Fill	Sevoflurane vaporizer Key-Fill
38-000149-00	Sevoflurane vaporizer Easy-Fill	Sevoflurane vaporizer Easy-Fill
38-000151-00	Sevoflurane vaporizer Quik-Fil	Sevoflurane vaporizer Quik-Fil
38-000059-00	Oxygen source software 5 (national standard)	One end NIST connector and one end pressure reducing valve ball head (3m), national standard blue
38-000061-00	Y-shaped breathing tube	Y-shaped breathing tube 15mm (children), 1.5M
37-000083-00	Waste gas recovery pipe	22 inner straight end, 22 inner right angle joint tube (50cm expandable tube)
38-000071-00	A set of leather bags	One 3L/2L/1L/0.5L each
65-000005-00	Trolley	Four wheel brakes
36-000079-00	Air source oxygen pressure reducing valve	YQY-12

38-000081-00	One set of tracheal intubation	2mm~10mm (17 specifications in total)
38-000067-00	Anesthesia gas filter canister	22 Outer cone joint recycling tank
24-000133-00	AM70- Air box (300ml) (silk screen)	Small animal bellows 300ml
25-000157-00	AM70 Small Animal Folding Bag (300ml)	Small animal folding pouch 300ml
24-000119-00	Folding bag (300ml) lining	
24-000121-00	Folding bag (300ml) external fixing part	
37-000159-00	Small Animal Folding Bag Installation Assembly	

A.0 Working principle

A.1 System Gas Circuit Diagram



Picture A-1 System Gas Circuit Diagram

Serial	Name	Serial	Name
1	Air source inlet joint	20	Animal end
2	Air source pressure gauge	21	Expiratory interface
3	Oxygen source inlet connector	22	Expiratory flow sensor
4	Oxygen source pressure gauge	23	Expiratory one-way valve
5	Pressure relief valve （0.8Mpa）	24	Turbine inlet filter element
6	Pressure Switch	25	turbine
7	Oxygen flow meter	26	Pressure sensor
8	Flush	27	Turbine check valve
9	Vaporizer base	28	flow sensor
10	One-way valve	29	Air resistance
11	ACGO switching valve	30	Bellows
12	ACGO Port	31	POP-OFF valve
13	Sodium lime tank	32	exhalation valve
14	Suction check valve	33	Manual/machine controlled

			switch
15	Airway pressure gauge	34	Breathing bags
16	Pressure sensor	35	APL Valve
17	Suction flow sensor	36	AGSS Port
18	Aspiration interface	37	PEEP exhaust port
19	Y breathing circuit		

Table A-1System Gas Circuit Diagram Component List

A.2 Air circuit system structure

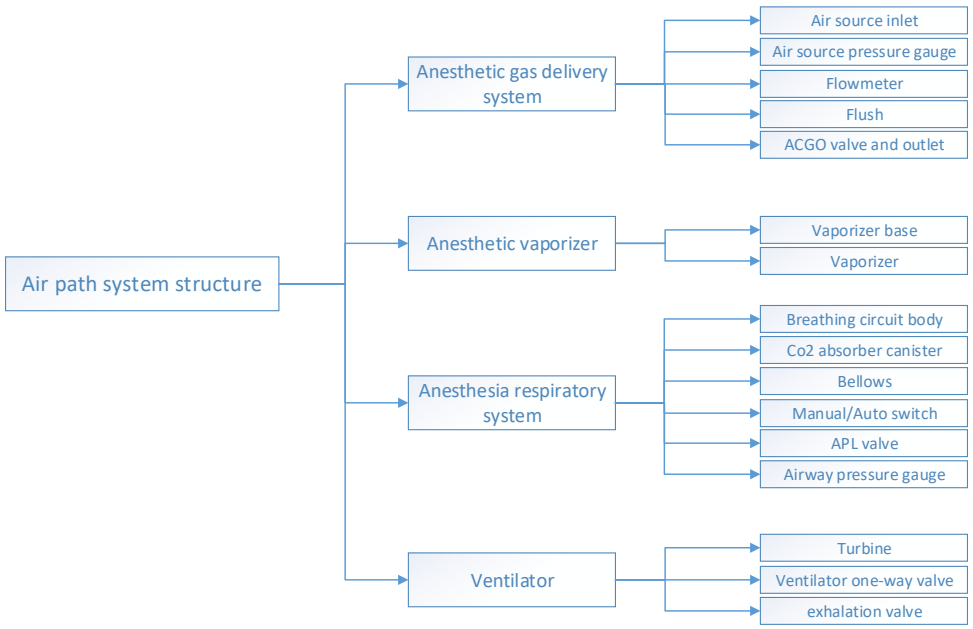
The gas circuit system of this anesthesia machine can be divided into anesthesia gas delivery system, anesthesia evaporator, anesthesia respiratory system, and anesthesia ventilator according to their functions.

The anesthesia gas delivery system gas circuit is used to generate fresh gas (a mixture of oxygen and anesthesia gas), including fast oxygen supply gas.

The anesthesia evaporator provides a controllable concentration of anesthesia gas, supporting enflurane, isoflurane, and sevoflurane.

The anesthesia respiratory system provides a closed loop for anesthesia gas, and the CO2 in the exhaled gas of animals can be absorbed during the inhalation phase, allowing the exhaled gas to be circulated for inhalation. The respiratory system can choose between manual ventilation and mechanical ventilation modes by switching the manual machine control switch. The manual machine control switch has an inductive electrical signal, and the position of the manual machine control can be monitored by the host system.

The airway of the anesthesia ventilator mainly provides the corresponding driving mechanism for the animal's respiratory process.



B.0 Product specifications

B.1 Safety specifications

Anti electric shock type	Class I equipment, internal power supply equipment. When there are doubts about the integrity of the external protective grounding of the equipment or the protective grounding wire, the equipment must be powered by an internal battery instead.
Anti electric shock level	BF type application part
Ingress protection level	IPX1
Disinfection and sterilization methods	Equipment recommended by the manufacturer for disinfection and sterilization methods
Explosion protection level	Do not provide explosion protection (ordinary equipment) and do not use flammable anesthetics
Movement level	Desktop or mobile device (optional trolley)

Table B-1 Safety specifications

B.2 Environmental Specifications

The main machine			
Project	Temperature （℃）	Relative humidity (non condensing)	Atmospheric pressure (kpa)
Work environment	10~40	15%~95%	70~106.7
Environment	-20~60	10%~95%	50~106.7

Table B-2 Environmental Specifications

B.3 Power specifications

External AC power supply	
INPUT VOLTAGE	100V-240V
Input frequency	50Hz/60Hz
INTERNAL BATTERY	
Number of batteries	1 unit
Battery type	Lithium Ion Battery
Rated battery voltage	14.8V
Rated battery capacity	5000mAh
Minimum battery power supply time	5 hours (using a fully charged new battery under standard operating conditions)

Auxiliary output	
Number of auxiliary outputs	2
Output specifications for transmission assistance	100V-240V/1.8A~0.9A，50Hz/60Hz

Table B-3 Power specifications

B.4 Physical specifications

Overall Dimension	
Dimensions	Overall volume (excluding trolley, waste gas recovery tank, and accessories), H X W X T: H 660mm, W 421mm, D 274mm (± 20mm) Overall volume (excluding waste gas recovery tank, including trolley and accessories), H X W X T: H 1500mm, W 487mm, D 537mm (± 20mm)
Standard configuration weight	≤ 23kg, (excluding trolley and waste gas recovery tank, including accessories) ≤ 29kg, (including anesthesia evaporator, accessories, waste gas recovery tank, excluding trolley)
Maximum configuration weight	≤ 38kg, (including trolley, accessories, waste gas recovery tank, air source pressure reducing valve)
Casters	
Casters	Four, all four casters with brakes.
Display screen	
Size	10.1 inches, touch screen
Resolution ratio	1280X800
Brightness	Adjustable
Audio indication	
Speaker	Key prompt sound, alarm sound, supporting 0-10 level volume adjustment
Port	
HDMI Port	High Definition Multimedia Interface
USB-A Port	Support for exporting data and upgrading USB software through USB flash drives
TypeC Port	Native operating system import interface
Internet Port	Support connection with PC to achieve software upgrades

CO2/AG interface	Connecting CO2 or AG modules

Table B-4 Physical specifications

B.5 Air circuit system specifications

Air source	
Gas Type	Oxygen
Air source pressure range	280-600kpa/40-87psi
Port type	NIST
flowmeter	
Flowmeter setting range	0-4L/min

Table B-5 Air circuit system specifications

B.6 Respiratory system specifications

Port	
Breathing bag port	Coaxial 22mm (outer)/15mm (inner) conical joint
Aspiration interface	Coaxial 22mm (outer)/15mm (inner) conical joint
Expiratory interface	Coaxial 22mm (outer)/15mm (inner) conical joint
ACGO interface	Coaxial 22mm (outer)/15mm (inner) conical joint
exhaust port	30mm outer cone joint
Airway pressure gauge	
Range	-20cmH2O~100cmH2O
APL valve	
Range	0~70cmH2O

Table B-6 Respiratory system specifications

B.7 Ventilator specifications

Ventilator specifications	
Driving method	turbine
Ventilator control parameters	
Parameter	Setting Range
Tidal volume (Vt)	5ml-1500ml
Inspiratory pressure (Pinsp)	5cmH2O-50cmH2O
Support pressure (△ Psuppl)	3cmH2O-50cmH2O
Positive end expiratory pressure (PEEP)	OFF,3cmH2O-30cmH2O

Respiratory Rate (RR)	2bpm-60bpm
Min RR	2bpm-60bpm
Respiratory ratio (I: E)	4：1-1：8
Inspiratory time (Tinsp)	0.2S-10.0S
Trigger pressure (P-Trig)	-20cmH2O~-0.2cmH2O
Trigger flow rate (F-Trig) in BTPS state	0.2L/min-15L/min
Ventilator monitoring parameters	
Parameter	Monitoring scope
Tidal volume (Vt)	0ml-3000ml
Minute ventilation volume (MV)	0L/min-100L/min
Peak Airway Pressure (PEAK)	-20cmH2O~100cmH2O
Positive end expiratory pressure (PEEP)	0cmH2O-70cmH2O
Respiratory Rate (RR)	0bpm-120bpm
Respiratory ratio (I: E)	20:1-1:20

Table B-7 Ventilator specifications

B.8 Respirator accuracy

Ventilator control accuracy	
Tidal volume (Vt)	<75ml: ± 10ml, ≥ 75ml: ± 20ml or ± 10% of the set value, whichever is greater.
Inspiratory pressure (Pinsp)	± 3cmH2O or ± 8% of the set value, whichever is greater.
Support pressure (△ Psuppl)	± 3cmH2O or ± 8% of the set value, whichever is greater.
Positive end expiratory pressure (PEEP)	OFF: ≤ 4cmH2O, 3cmH2O-30cmH2O: ± 3cmH2O or ± 10% of the set value, whichever is greater.
Respiratory Rate (RR)	± 1bpm or ± 10% of the set value, whichever is greater.
Min RR	± 1bpm or ± 10% of the set value, whichever is greater.
Respiratory ratio (I: E)	2: Within the range of 1 to 1:4: ± 10% of the set value, and within other ranges: ± 25% of the set value.
Inspiratory time (Tinsp)	±0.2S
Monitoring accuracy of ventilator	
Tidal volume (Vt)	<75ml: ± 10ml, ≥ 75ml: ± 20ml or ± 10% of the actual reading, whichever is greater.
Minute ventilation volume (MV)	± 1L/min or ± 15% of actual reading, whichever is

	greater.
Peak Airway Pressure (PEAK)	± 3cmH2O or ± 8% of actual reading, whichever is greater.
Positive end expiratory pressure (PEEP)	± 3cmH2O or ± 10% of actual reading, whichever is greater.
Respiratory Rate (RR)	± 1bpm or ± 5% of the set value, whichever is greater.
Respiratory ratio (I: E)	± 10% of the actual reading.

Table B-8 Respirator accuracy

B.9 Anesthesia vaporizer

Vaporizer	
Evaporator type (dosing method）	Isoflurane（Pour-Fill，Key-Fill，Easy-Fill） Enflurane（Pour-Fill，Key-Fill，Easy-Fill） Sevoflurane（Pour-Fill，Key-Fill，Easy-Fill，Quik-Fil）
weight	Empty: 4kg ± 0.3kg Full medication state: 5kg ± 0.3kg
Capacity	Core drying: 300ml~360ml Core wetting: 240ml~300ml Between the maximum and minimum tick marks: 200ml~260ml
Concentration range	Isoflurane: 0-5vol,% Anflurane: 0-5vol,% Heptaflurane: 0-8vol,%
Concentration accuracy	± 0.25vol,% or ± 20% of the set value, whichever is greater

Table B-9 Anesthesia vaporizer

B.10 CO2 module

Can be configured with mainstream CO2 modules or bypass CO2 modules：

CO2 module parameters：	
CCO2 measurement range and resolution	0mmHg~150mmHg(0~19.7%,0~20kpa),0.1mmHg(0.1%,0.1kpa)
CO2 measurement accuracy	0-40mmHg：±2 mmHg
	41- 70 mmHg：±5% of reading
	71 – 100mmHg：±8% of reading
	101-150mmHg：±10% of reading

CO2 alarm setting：				
Parameter	Setting Range	Adjusting step size	Default value	Notes
EtCO2 upper Alarm limit	OFF,2~99mm Hg	1mmHg	50mmHg	The upper limit is greater than the lower limit by 2mm Hg
EtCO2 lower Alarm limit	OFF,0~97mm Hg		25mmHg	
FiCO2 upper Alarm limit	OFF,1~99mm Hg		4mmHg	
Sample Rate：	50±10ml/min			
Pour：Can be configured with mainstream CO2 modules or bypass CO2 modules				

B-10 CO2 module

B.11 AG module

Mainstream AG module parameters/bypass AG module parameters：			
Parameter	Measuring range	Accuracy	Notes
O2	0~100Vol%	±(2.5Vol%+2.5%rel.)	
CO2	0~13.6Vol%	±(0.43Vol%+8%rel.)	
N2O	0~100Vol%	±(2Vol%+8%rel.)	
Halothane	0~8.5Vol%	±(0.2Vol%+15%rel.)	
Isoflurane	0~8.5Vol%	±(0.2Vol%+15%rel.)	
Enflurane	0~10Vol%	±(0.2Vol%+15%rel.)	
Sevoflurane	0~10Vol%	±(0.2Vol%+15%rel.)	
Desflurane	0~20Vol%	±(0.2Vol%+15%rel.)	

Mainstream AG module parameters/bypass AG module alarm settings：				
Parameter	Setting Range	Adjusting step size	Default value	Notes
O2 alarm upper limit	OFF, lower limit+2~105	1%	OFF	
O2 alarm lower limit	18~upper limit-2	1%	18%	
EtCO2 alarm	OFF,2~99mmHg	1mmHg	50mmHg	

upper limit				
EtCO2 alarm lower limit	OFF,0~97mmHg	1mmHg	25mmHg	
FiCO2 alarm upper limit	OFF,1~99mmHg	1mmHg	4mmHg	
EtN2O alarm upper limit	2~100%	1%	55%	
EtN2O alarm lower limit	0~upper limit-2	1%	0	
FiN2O alarm upper limit	2~100%	1%	53%	
FiN2O alarm lower limit	0~upper limit-2%	1%	0	
EtHalothane alarm upper limit	1.0~5.0%	0.1%	3%	
EtHalothane alarm lower limit	0~upper limit-1%	0.1%	0	
FiHalothane alarm upper limit	1.0~5.0%	0.1%	2.0%	
FiHalothane alarm lower limit	0~upper limit-1%	0.1%	0	
EtIsoflurane alarm upper limit	1.0~5.0%	0.1%	3%	
EtIsoflurane alarm lower limit	0~upper limit-1%	0.1%	0	
FiIsoflurane alarm upper	1.0~5.0%	0.1%	2.0%	

limit				
FiIsoflurane alarm lower limit	0~upper limit-1%	0.1%	0	
EtInflurane alarm upper limit	1.0~5.0%	0.1%	3%	
EtInflurane alarm lower limit	0~upper limit-1%	0.1%	0	
FiInflurane alarm upper limit	1.0~5.0%	0.1%	2.0%	
FiInflurane alarm lower limit	0~upper limit-1%	0.1%	0	
EtSevoflurane alarm upper limit	1.0~8.0%	0.1%	6%	
EtSevoflurane alarm lower limit	0~upper limit-1%	0.1%	0	
FiSevoflurane alarm upper limit	1.0~8.0%	0.1%	5.0%	
FiSevoflurane alarm lower limit	0~upper limit-1%	0.1%	0	
EtDesflurane alarm upper limit	1.0~18.0%	0.1%	8.0%	
EtDeflurane alarm lower	0~upper limit-1%	0.1%	0	

limit				
FiDesflurane alarm upper limit	1.0~18.0%	0.1%	6.0%	
FiDesflurane alarm lower limit	0~upper limit-1%	0.1%	0	

B-11 AG module

B.12 Oxygen battery

Oxygen battery parameters：				
Measurement range and resolution of oxygen batteries	0-100%,0.1mmHg(0.1%,0.1kpa)，1%			
Measurement accuracy of oxygen batteries	±3%			
Oxygen battery alarm setting：				
Parameter	Setting Range	Adjusting step size	Default value	Notes
Oxygen battery alarm upper limit	OFF,lower limit+2~105	1%	OFF	
Oxygen battery alarm lower limit	18~upper limit-2	1%	18%	

B.13 Passive AGSS

Passive AGSS	
Interface type	30mm conical joint (outer)
Exhaust gas recovery tank bracket	
Support configuration	80mm diameter waste gas recovery tank
Max load	1kg

B-13 AGSS

C.0 Alarm Information

This chapter lists physiological alarms, technical alarms, and prompt information:

Note that in this chapter, the alarm levels are: H for Advanced, M for Intermediate, and L for Low

For each alarm message, corresponding countermeasures are listed. If the problem persists after following the countermeasures, please contact the maintenance personnel.

C.1 Physiological Alarm

Alarm Information	Alarm level	Reasons and countermeasures
Suffocate	M	Reason: No breathing was detected during the suffocation period. Countermeasure: 1. Check if the breathing circuit is leaking or disconnected. 2. Check if the manual/machine control switch position is correct.
Suffocate>2min	H	Reason: No breathing was detected within the last 120 seconds Countermeasure: 1. Check if ventilation has been activated. 2. Check if the breathing circuit is leaking or disconnected. 3. Check if the manual machine control switch position is correct. 4. Please use manual assistance for breathing.
Pressure too high	H	Reason: Airway pressure ≥ alarm high limit setting value Countermeasure: 1. Check the alarm limit: peak voltage high limit. 2. Check ventilation settings: inspiratory pressure, tidal volume, positive end expiratory pressure, etc. 3. Check if the breathing circuit is blocked or twisted.
Pressure too low	H	Reason: Airway pressure<Paw alarm low limit setting for 20 seconds Countermeasure: 1. Check the alarm limit: peak voltage high limit. 2. Check ventilation settings: inspiratory pressure, tidal volume, positive end expiratory pressure, etc. 3. Check if the breathing circuit is leaking or disconnected.
Pressure limit	L	Reason: Airway pressure ≥ limiting pressure Countermeasure: 1. Increase the pressure limit. 2.

		Reduce the tidal volume. 3. Lower your breathing rate.
High minute ventilation volume	M	Reason: Minute ventilation volume>alarm high limit setting value Countermeasure: 1. Check the alarm limit: the minute ventilation volume is low. 2. Check ventilation settings: inspiratory pressure, tidal volume, positive end expiratory pressure, etc.
Low minute ventilation volume	M	Reason: Minute ventilation volume<alarm low limit setting value Countermeasure: 1. Check the alarm limit: the minute ventilation volume is high. 2. Check ventilation settings: inspiratory pressure, tidal volume, positive end expiratory pressure, etc
Continuous high airway pressure	H	Reason: Paw in the respiratory circuit exceeds the continuous high airway pressure alarm limit for 15 seconds. Countermeasure: 1. When in manual mode, check the APL valve setting. 2. Check if the breathing circuit or AGSS is blocked.
Airway negative pressure	H	Reason: Airway pressure<-10 cmH2O for 1 second.Countermeasure: 1. Check for automatic breathing. If there is an active AGSS, please check if the active AGSS is malfunctioning.
Excessive tidal volume	M	Reason: Tidal volume>alarm high limit setting value Countermeasure: 1. Check the alarm limit: high limit of tidal volume. 2. Check ventilation settings: suction pressure, tidal volume, etc.
Low tidal volume	M	Reason: Tidal volume>alarm low limit setting value. Countermeasure: 1. Check the alarm limit: low tidal volume limit. 2. Check ventilation settings: suction pressure, tidal volume, etc. 3. Check the breathing circuit for leaks or blockages.
Excessive respiratory rate	L	Reason: Respiratory rate>alarm high limit setting value. Countermeasure: 1. Check the alarm limit: high respiratory rate limit. 2. Check ventilation settings: respiratory rate, flow rate/pressure triggering, etc. 3. Check the breathing circuit for leaks or blockages.
Low respiratory rate	L	Reason: Respiratory rate<alarm high limit setting value.

		Countermeasure: 1. Check the alarm limit: lower respiratory rate limit. 2. Check ventilation settings: respiratory rate, flow rate/pressure triggering, etc.
Excessive oxygen concentration	M	Reason: Oxygen concentration>alarm high limit setting value Countermeasure: 1. Reduce oxygen flow rate. 2. Increase the alarm high limit setting value
Low oxygen concentration	H	Reason: Oxygen concentration<alarm high limit setting value Countermeasure: 1. Increase oxygen flow rate. 2. Lower the alarm high limit setting value
EtCO2 Too high	M	Reason:EtCO2> Alarm high limit setting value Countermeasure: 1.Check alarm limits：EtCO2 high limit。 2.Check if it is necessary to replace the sodium lime in the CO2 absorber。
EtCO2 Too low	M	Reason:EtCO2<Alarm low limit setting value Countermeasure: 1.Check alarm limits：EtCO2 lower limit。 2.Check if the sampling pipeline has fallen off。
FiCO2 Too high	M	Reason:FiCO2> Alarm high limit setting value Countermeasure: 1.Check alarm limits：FiCO2 high limit。 2.Check if it is necessary to replace the sodium lime in the CO2 absorber。
CO2 suffocation	H	Reason:No breathing detected and suffocation time≥ Asphyxiation alarm time Countermeasure: 1.Check if ventilation has been activated。 2.Check if the sampling tube is correctly connected to the breathing circuit。 3.Check the breathing ability of animals。
EtN2O Too high	M	Reason:EtNO2> Alarm high limit setting value Countermeasure: 1.Check alarm limits：EtNO2 high limit。
EtN2O Too low	M	Reason:EtNO2< Alarm low limit setting value Countermeasure: 1.Check alarm limits：EtNO2 lower limit。
FiN2O Too high	M	Reason:FiNO2> Alarm high limit setting value Countermeasure: 1.Check alarm limits：FiNO2 high limit。
FiN2O Too low	M	Reason:FiNO2< Alarm low limit setting value Countermeasure: 1.Check alarm limits：FiNO2 lower

		limit。
EtHalothane Too high	M	Reason:EtHalothane> Alarm high limit setting value Countermeasure: 1.Check alarm limits：EtHalothane high limit。
EtHalothane Too low	M	Reason:EtHalothane< Alarm low limit setting value Countermeasure: 1.Check alarm limits：EtHalothane lower limit。
FiHalothane Too high	M	Reason:FiHalothane> Alarm high limit setting value Countermeasure: 1.Check alarm limits：FiHalothane high limit。
FiHalothane Too low	M	Reason:FiHalothane< Alarm low limit setting value Countermeasure: 1.Check alarm limits：FiHalothane lower limit。
EtIsoflurane Too high	M	Reason:EtIsoflurane> Alarm high limit setting value Countermeasure: 1.Check alarm limits：EtIsoflurane high limit。
EtIsoflurane Too low	M	Reason:EtIsoflurane< Alarm low limit setting value Countermeasure: 1.Check alarm limits：EtIsoflurane lower limit。
FiIsoflurane Too high	M	Reason:FiIsoflurane> Alarm high limit setting value Countermeasure: 1.Check alarm limits：FiIsoflurane high limit。
FiIsoflurane Too low	M	Reason:FiIsoflurane< Alarm low limit setting value Countermeasure: 1.Check alarm limits：FiIsoflurane lower limit。
EtEnflurane Too high	M	Reason:EtEnflurane> Alarm high limit setting value Countermeasure: 1.Check alarm limits：EtEnflurane high limit。
EtEnflurane Too low	M	Reason:EtEnflurane< Alarm low limit setting value Countermeasure: 1.Check alarm limits：EtEnflurane lower limit。
FiEnflurane Too high	M	Reason:FiEnflurane> Alarm high limit setting value Countermeasure: 1.Check alarm limits：FiEnflurane high limit。
FiEnflurane Too low	M	Reason:FiEnflurane< Alarm low limit setting value Countermeasure: 1.Check alarm limits：FiEnflurane lower limit。
EtSevoflurane Too high	M	Reason:EtSevoflurane> Alarm high limit setting value Countermeasure: 1.Check alarm limits：EtSevoflurane high limit。
EtSevoflurane Too low	M	Reason:EtSevoflurane< Alarm low limit setting value Countermeasure: 1.Check alarm limits：EtSevoflurane lower limit。
FiSevoflurane Too	M	Reason:FiSevoflurane> Alarm high limit setting value

high		Countermeasure: 1.Check alarm limits：FiSevoflurane high limit。
FiSevoflurane Too low	M	Reason:FiSevoflurane< Alarm low limit setting value Countermeasure: 1.Check alarm limits 限：FiSevoflurane lower limit。
EtDesflurane Too high	M	Reason:EtDesflurane> Alarm high limit setting value Countermeasure: 1.Check alarm limits：EtDesflurane high limit。
EtDesflurane Too low	M	Reason:EtDesflurane< Alarm low limit setting value Countermeasure: 1.Check alarm limits：EtDesflurane lower limit。
FiDesflurane Too high	M	Reason:FiDesflurane> Alarm high limit setting value Countermeasure: 1.Check alarm limits：FiDesflurane high limit。
FiDesflurane Too low	M	Reason:FiDesflurane< Alarm low limit setting value Countermeasure: 1.Check alarm limits：FiDesflurane lower limit。

Table C-1 Physiological Alarm

C.2 Technical Alarm

Alarm Information	**Alarm level**	**Reasons and countermeasures**
Joint version error	H	Reason: The current software version number does not match the federated version file Countermeasure: Please contact our company's technical support.
Joint version number: timeout	H	Reason: Unable to obtain self test results due to internal communication error Countermeasure: Please contact our company's technical support.
Driver board self check error	H	Reason: 1. Board self check error. 2. After powering on, the CPU board cannot communicate with the driver board. Countermeasure: 1. Repeat the test. If the problem persists, please contact our company's technical support.
Driver board self check: timeout	H	Reason: Due to an internal communication error, the self test result cannot be obtained. Countermeasure: 1. Repeat the test. If the problem persists, please contact our company's technical support.
Driver board voltage error	H	Reason: Driver board voltage error Countermeasure: 1. Repeat the test.

		2. If the problem persists, please contact our company's technical support
Driver board initialization error	H	Reason: After power on, the CPU board cannot send parameter settings to the driver board Countermeasure: 1. Repeat the test. 2. If the problem persists, please contact our company's technical support
Driver board initialization: timeout	H	Reason: Unable to obtain self test results due to internal communication error Countermeasure: 1. Repeat the test. 2. If the problem persists, please contact our company's technical support
Power board voltage error	H	Reason: Power board voltage error Countermeasure: 1. Repeat the test. 2. If the problem persists, please contact our company's technical support
Button board self check error	H	Reason: Button board self check error Countermeasure: 1. Repeat the test. 2. If the problem persists, please contact our company's technical support
Button board self check: timeout	H	Reason: Due to an internal communication error, the self-test results of the keypad cannot be obtained Countermeasure: 1. Repeat the test. 2. If the problem persists, please contact our company's technical support
Please calibrate the flow sensor	M	Reason: Last calibration failure of the flow sensor or significant drift of the flow sensor Countermeasure: 1. Please use manual/autonomous assistance to help the patient breathe. 2. Calibrate the flow sensor.
Please check the flow sensor	H	Reason: Expired tidal volume>inhaled tidal volume for 6 consecutive cycles Countermeasure: Please check the flow sensor
Flow sensor malfunction	L	Reason: The flow rate of the ventilator exceeds the range. Countermeasure: 1. Repeat the test. If the problem persists, please contact our company's technical support.
Calibrating pressure sensors	L	Reason: 1. Calibration table not found in EEPROM. 2. The checksum of the calibration table does not match. Countermeasure: Please contact our company's technical support to perform pressure calibration.

Only manual	M	Reason: 1. The POST test failed and the result was' manual only ' Countermeasure: 1. Repeat the test. 2. If the problem persists, please contact our company's technical support
Mechanical ventilation mode not available	H	Reason: POST test failed, system in mechanical ventilation mode unavailable Countermeasure: 1. Repeat the test. 2. If the problem persists, please contact our company's technical support
Real time clock needs to be reset	H	Reason: The battery is out of charge or damaged, and has not been connected to AC power for a long time. Countermeasure: Please contact our company's technical support
Low battery	H	Reason: Low battery voltage Countermeasure: 1. Check the power supply. 2. Connect AC power immediately
Battery depleted, system shutdown	H	Reason: Low battery voltage Countermeasure: 1. Check the power supply. 2. Connect AC power immediately
Battery not found	M	Reason: No battery found Countermeasure: Please contact our company's technical support
Tidal volume not achieved	L	Reason: The tidal volume did not reach the set value of tidal volume in capacity mode Countermeasure: 1. Check ventilation settings: suction pressure, support pressure, positive end expiratory pressure, etc. 2. Check the breathing circuit for leaks or blockages. 3. Eliminate the "airway pressure too high" alarm.
Inhalation pressure not achieved	L	Reason: The peak pressure did not reach the suction pressure setting in pressure mode Countermeasure: 1. Check ventilation settings: suction pressure, support pressure, positive end expiratory pressure, etc. 2. Check for leaks in the breathing system. 3. Eliminate the "airway pressure too high" alarm
Pressure monitoring channel failure	M	Reason: 1. The monitoring value of the PEEP sensor or pressure sensor is out of range. 2. The zero point of the PEEP sensor or pressure sensor is abnormal. Countermeasure: Please contact our company's technical support.
Circuit leakage	H	Reason: 1. Circuit leakage.

		2. The patient is not connected. Countermeasure: Check if the breathing circuit is leaking or disconnected
Drive board communication stopped	H	Reason: Lost communication with CPU board for 10 seconds Countermeasure: Please contact our company's technical support
Calibrating pressure sensors	L	Reason: 1. Calibration table not found in EEPROM. 2. The checksum of the calibration table does not match. Countermeasure: Please contact our company's technical support to perform pressure calibration
Oxygen battery not connected	L	Reason: The oxygen sensor is not connected to the cable or has poor connection Countermeasure: Reconnect and confirm that the oxygen sensor and cable are properly connected
Please calibrate the oxygen sensor	M	Reason: Last calibration failure of the oxygen sensor or oxygen concentration monitoring exceeding the valid range Countermeasure: 1. Observe if the sensor reading is 21% when placed in indoor air. 2. Recalibrate or replace the oxygen sensor
Replace the oxygen sensor	M	Reason: Oxygen sensor malfunction Countermeasure: Please replace the oxygen sensor
Insufficient oxygen supply pressure	H	Reason: Insufficient oxygen supply pressure Countermeasure: 1. If there is an air source connected, manual/autonomous assistance can be used to help the patient breathe. 2. Ensure that sufficient pressure O2 air source is connected
Ventilator power supply error	H	Reason: 24V power supply error Countermeasure: 1. Unreliable monitoring, please use manual/autonomous assistance for patient breathing 2. Please contact our company's technical support
Zero calibration valve failure	M	Reason: Three way valve connection or control failure. Countermeasure: 1. The machine is available, but the monitoring is unreliable. 2. If necessary, please use manual/autonomous assistance to help the patient breathe. 3. Please contact our company's technical support
Replace the turbine filter	L	Reason: The turbine filter is blocked and the gas resistance increases. Countermeasure: 1. Replace the turbine filter. 2. Please contact our company's technical support
High turbine	H	Reason: The turbine temperature exceeds a certain

temperature		threshold. Countermeasure: 1. Check whether the operating environment temperature of the machine exceeds the maximum operating temperature claimed by the manufacturer. 2. Please contact our company's technical support
Turbine temperature sensor malfunction	M	Reason: Turbine temperature sensor malfunction. Countermeasure: 1. Please contact our company's technical support.
Turbine failure	H	Reason: The turbine has malfunctioned. Countermeasure: 1. Please contact our company's technical support.
Turbine temperature too high	H	Reason: The turbine temperature is too high. Countermeasure: 1. Start manual ventilation in emergency situations. 2. Stop using mechanical ventilation until the turbine temperature drops and the alarm message disappears. 3. If the problem persists, please contact our company's technical support
Abnormal communication between the driver board and the main control board	H	Reason: The ventilator module cannot communicate normally with the main system Countermeasure: 1. Unreliable monitoring, please use manual/autonomous assistance for patient breathing. 2. Please contact our company's technical support
System abnormal interruption	M	Reason: Software abnormal reset Countermeasure: 1. Please restart the anesthesia machine. 2. If there are still problems, please contact our company's technical support
Internal ADC failure	H	Reason: Internal ADC issues Countermeasure: Please contact our company's technical support
External ADC failure	H	Reason: External DAC issues: Countermeasure: Please contact our company's technical support
External watchdog failure	H	Reason: The external watchdog was burnt out and malfunctioned Countermeasure: Please contact our company's technical support
CPU system abnormal interrupt	H	Reason: Hardware or software issues Countermeasure: Please contact our company's technical support
CPU temperature abnormality	M	Reason: CPU temperature too high Countermeasure: Please contact our company's technical support

Scale failure	L	Reason: The weighing device has malfunctioned Countermeasure: Please contact our company's technical support
Storage failure	L	Reason: Data service disconnected for 60 seconds Countermeasure: Please contact our company's technical support
Fresh gas not turned on	M	Reason: No fresh gas flow detected in non standby mode。 Countermeasure: Adjust the flow meter knob to turn on fresh gas
CO2 module malfunction	H	Reason: 1.CO2 module communication stop。 Countermeasure: Please contact our company's technical support
CO2 module temperature too high	L	Reason: 1.CO2 sensor temperature above 63 degrees Celsius。 Countermeasure: Please contact our company's technical support
CO2 sampling gas path blockage	L	Reason: 1.Sampling tube blockage。 Countermeasure: 1.Check if the sampling tube is blocked。 2.Replacing the sampling tube。 3.If the problem still exists， Please contact our company's technical support
EtCO2 measurement exceeds the limit	L	Reason: 1.The monitoring value exceeds the measurement range。 Countermeasure: Please contact our company's technical support
FiCO2 measurement exceeds the limit	L	Reason: 1.The monitoring value exceeds the measurement range。 Countermeasure: Please contact our company's technical support
CO2 zero calibration failed	L	Reason: 1.CO2 module malfunction。 Countermeasure: Please contact our company's technical support
CO2 self check error	L	Reason: 1.CO2 self check error。 Countermeasure: Please contact our company's technical support
CO2 self check: timeout	L	Reason: 1.Internal communication error, unable to obtain self check results。 Countermeasure: Please contact our company's technical support
AG module malfunction	H	Reason: 1.AG module communication stopped。 Countermeasure: Please contact our company's technical support

AG module temperature too high	L	Reason: 1.AG sensor temperature above 63 degrees Celsius。 Countermeasure: Please contact our company's technical support
AG module sampling air path blockage	L	Reason: 1.Sampling tube blockage。 Countermeasure: 1.Check if the sampling tube is blocked。 2.Replacing the sampling tube。 3.If the problem still exists， Please contact our company's technical support
AG module zero calibration failed	L	Reason: 1.AG module malfunction。 Countermeasure: Please contact our company's technical support
AG module self check error	L	Reason: 1.AG self check error。 Countermeasure: Please contact our company's technical support
AG module self check: timeout	L	Reason: 1.Internal communication error, unable to obtain self check results。 Countermeasure: Please contact our company's technical support

Table C-2 PHYSIOLOGICAL ALARM

C.3 Reminder Information

Reminder Information	Illustration
Capacity and suffocation alarms are turned off	Reason: When the "alarm" is set to "off" in manual mode, this message will appear Countermeasure: None
CO2 capacity and CO2 suffocation alarms have been turned off	Reason:When the "alarm" is set to "off" in manual mode, this message will appear Countermeasure: None
Manual ventilation	Reason: Currently undergoing manual ventilation Countermeasure: None
ACGO Open	Reason: The current ACGO switch is on Countermeasure: None
Failed to save configuration	Reason: This message will appear when there is an error saving the user configuration Countermeasure: None
Demo mode - clinical use prohibited	Reason: This message will appear when the machine is operating in demonstration mode Countermeasure: None
Reboot the main control board	Reason: This message will appear when the main control board restarts abnormally

	Countermeasure: None
Driver board restart	Reason: This message will appear when the driver board restarts abnormally Countermeasure: None
Backup ventilation	Reason: This message will appear when backup ventilation is triggered in VS ventilation mode Countermeasure: Check ventilation
Replace the anesthesia absorption tank	Reason: This prompt message appears when the weight gain of the anesthetic absorption tank exceeds the alarm limit set by the user Countermeasure: Replace the anesthesia absorption tank
Weigher cable not connected	Reason: The weighing device cable connection was not identified, and this prompt message appears Countermeasure: Connect the weighing device cable
Fresh gas not turned off	Reason: In standby mode, this prompt message appears when the air source is connected and the flow meter is not adjusted to zero. Countermeasure: Turn off the flow meter
Battery in use	Reason: AC power failure Countermeasure: Connect AC power supply
CO2 is being calibrated to zero	Reason:CO2 module is being zeroed。 Countermeasure:None
AG module is zeroing	Reason:AG module is zeroing。 Countermeasure:None

Table C-3 Reminder Information

D.0 Default Parameters

This chapter lists some of the most important default parameters of the anesthesia machine. Users cannot change the manufacturer settings. To restore the anesthesia machine to the default manufacturer settings, please click: Menu: System Settings: Restore Default Parameters.

D.1 Ventilation parameters

Project	Default value
Weight	2KG
Tidal volume	20ml
Tidal volume coefficient	10ml/KG
Minimum respiratory rate	8bpm
Positive end-expiratory pressure	off
Respiratory rate	12
I/E	1：2
Suction pressure	5cmH2O
Inspiratory time	1.0S
Support pressure	5cmH2O
Inspiratory trigger level	Auto

Table D-1 Ventilation parameters

D.2 System settings

Project	Default value
Main menu: Anesthesia settings: Tidal volume coefficient	2KG
Main menu: System settings: Screen brightness	3
Main menu: System settings: Alarm volume	5
Main menu: System settings: Key prompt tone	Open
Main menu: System settings: Language	Chinese language
Main menu: System settings: Pressure units	cmH2O
Main menu: System settings: Weight units	KG
Main menu: System settings: Date format	yyyy-mm-dd
Main menu: System settings: System date	Current date

Main menu: System settings: Time format	24hr
Main menu: System settings: System time	Current time

Table D-2 System settings

D.3 Alarm limit

Project	Default value
Alarm setting: Peak voltage upper limit	22cmH2O
Alarm setting: Peak voltage lower limit	4cmH2O
Alarm settings: frequency upper limit	OFF
Alarm setting: lower frequency limit	OFF
Alarm setting: Upper limit of tidal volume	1000ml
Alarm setting: lower limit of tidal volume	0
Alarm setting: upper limit of minute ventilation volume	6.0L/min
Alarm setting: Minute ventilation lower limit	0.2L/min
Alarm setting: Lower limit of oxygen input pressure	200kpa
Alarm setting：EtCO2 upper limit	50mmHg
Alarm setting：EtCO2 lower limit	25mmHg
Alarm setting：FiCO2 upper limit	4mmHg
Alarm setting：FiCO2 lower limit	0mmHg
Alarm setting：oxygen concentration upper limit	105%
Alarm setting：oxygen concentration lower limit	18%
Alarm setting：EtAG	见 B11
Alarm setting：FiAG	见 B11

Table D-3 Alarm limit

D.4 Alarm default switch state

Project	Default value
Alarm settings: peak voltage	On, unable to close
Alarm settings: frequency	Close
Alarm setting: Tidal volume	Open
Alarm setting: Minute ventilation volume	Open
Alarm setting: Oxygen input pressure	Open
Alarm setting：CO2	Open
Alarm setting：AG	Open
Alarm setting：oxygen concentration	Close

Table D-3 Alarm default switch state

E.0 EMC

Attention: The AM70 anesthesia machine meets the electromagnetic compatibility requirements of IEC60601-1-2:2014 standard.

Attention: Users should install and use according to the electromagnetic compatibility information provided in the accompanying documents.

Attention: Portable and mobile RF communication devices may affect the performance of the AM70 anesthesia machine. Please avoid strong electromagnetic interference when using them. For example, close to mobile phones, microwave ovens, etc.

Attention: The guidelines and manufacturer's declaration are detailed in the attachment.

Warning: Even if other devices meet the emission requirements of corresponding national standards, the AM70 anesthesia machine may still be interfered with by other devices.

Warning: Even if other devices meet the emission requirements of corresponding national standards, the AM70 anesthesia machine may still be interfered with by other devices.

Warning: Except for cables sold as spare parts for internal components by manufacturers of AM70 anesthesia machines, the use of accessories and cables outside of regulations may result in an increase in AM70 anesthesia machine emissions or a decrease in anti-interference.

Warning: When the AM70 anesthesia machine is operated below the minimum or minimum value of the patient's physiological signal, it may lead to inaccurate consequences. The minimum or minimum amplitude of the physiological signal can be found in the product specifications section.

Cable information:

Serial Number	Name	Length（m）	Whether to block or not	Notes
1	Power cord	3 m	No	/

Table D-1 Cable information

Guidelines and manufacturer's declaration - Electromagnetic emissions:

The AM70 anesthesia machine is expected to be used in the electromagnetic environment specified below, and the purchaser or user should ensure that it is used in this electromagnetic environment.

Launch test	Compliance	Electromagnetic Environment - Guidelines
CISPR11 RF emission	1 Group	The AM70 anesthesia machine only uses RF energy for its internal functions. Therefore, its RF emission is very low and the possibility of interference with accessory electronic devices is very low.
CISPR11 RF emission	B type	The AM70 anesthesia machine is suitable for use in all measures, including household measures and direct connection to the public low-voltage power supply network of residential homes.
EN61000-3-2 Harmonic emission	A type	
EN61000-3-3 Voltage fluctuation/flicker emission	Compliance	

Table D-2 Guidelines and Manufacturer's Declaration - Electromagnetic Emissions

Guidelines and manufacturer's declaration - Electromagnetic immunity:

AM70 The anesthesia machine is expected to be used in the electromagnetic environment specified below, and the purchaser or user should ensure that it is used in this electromagnetic environment.

Immunity test	IEC60601 Test Level	Compliance level	Electromagnetic Environment - Guidelines
Electrostatic Discharge (ESD) IEC61000-4-2	± 8kV contact discharge ± 15kV air discharge	± 8kV contact discharge ± 15kV air discharge	The ground should be made of wood, concrete, or ceramic tiles. If the ground is covered with synthetic materials, the relative temperature should be at least 30%.
Electric fast transient pulse group IEC61000-4-4	± 2kV to power line ± 1kV for input/output lines	± 2kV to power line ± 1kV for input/output lines	The network power supply should have the quality used in typical commercial or hospital environments
Surge IEC61000-4-5	± 1kV differential mode voltage	± 1kV differential mode voltage	The network power supply should have the quality used in typical commercial or hospital

	± 2kV common mode voltage	± 2kV common mode voltage	environments.
Voltage dips, short interruptions, and voltage changes on the power input line IEC61000-4-11	0% UT for 0.5 cycles 0% UT for 1 cycle 70% UT, continuous 25 (50Hz)/30 (60Hz) cycles 0% UT for 250 (50Hz)/300 (60Hz) cycles	0% UT for 0.5 cycles 0% UT for 1 cycle 70% UT, continuous 25 (50Hz)/30 (60Hz) cycles 0% UT for 250 (50Hz)/300 (60Hz) cycles	The network power supply should have the quality used in typical commercial or hospital environments. If users of the AM70 anesthesia machine need to operate continuously during power outages, it is recommended to use an uninterruptible power supply or battery power supply for the AM70 anesthesia machine.
Power Frequency Magnetic Field (50/60Hz) IEC61000-4-8	30A/m	30A/m	The power frequency magnetic field should have the horizontal characteristics of the power frequency magnetic field in typical commercial or hospital environments.

Note: UT refers to the AC network voltage before applying the test voltage

Table D-3 Guidelines and Manufacturer's Declaration - Electromagnetic Immunity

Guidelines and manufacturer's declaration - Electromagnetic immunity:

AM70 The anesthesia machine is expected to be used in the electromagnetic environment specified below, and the purchaser or user should ensure that it is used in this electromagnetic environment.

Immunity test	**IEC60601 Test Level**	**Compliance level**	**Electromagnetic Environment - Guidelines**
RF conducted immunity IEC61000-4-6	3V (effective value) 150kHz~80MHz (Except for	3V (effective value)	Portable and mobile RF communication devices should not be used closer to any part of the AM70 anesthesia machine than recommended, including cables. The distance is calculated by the formula corresponding to the transmitter frequency. Recommended isolation

	engineering medical frequency band-a) 6V (effective value) 150kHz~80MHz (Except for engineering medical frequency band a)	6V (effective value)	distance: D=1.2X √ P D=1.2X √ P D=1.2X √ P 80MHz~800MHz D=2.3X √ P 800MHz~2.5GHz
RF conducted immunity IEC61000-4-3	10V/m (effective value) 80MHz~2.5GHz	10V/m (effective value)	In the equation: P - Based on the maximum rated output power of the transmitter provided by the transmitter manufacturer, in watts (W);
RF wireless communication equipment immunity to nearby fields IEC61000-4-3	27V/m 380~390MHz 28V/m 430~470MHz 800~960MHz 1700~1990MHz 2400~2570MHz 9V/m 704~787Mhz 5100~5800MHz	27V/m 28V/m 9V/m	D - Recommended isolation distance, in meters (m) In units of - b. The field strength of a fixed RF transmitter is determined by surveying the electromagnetic field - c, and should be lower than the corresponding level in each frequency range - d. Interference may occur near devices marked with the following symbols.

Attention: At the frequencies of 80MHz and 800MHz, formulas for higher frequency bands are used.

Attention: These guidelines may not be suitable for all situations, as electromagnetic propagation is influenced by absorption and reflection from buildings, objects, and the human body.

a--The engineering and medical frequency bands between 150kHz and 80MHz refer to 6.765MHz to 6.795MHz, 13.553MHz to 13.567MHz, 26.957MHz to 27.283MHz, and 40.66MHz to 40.70MHz.

b--The coincidence level in the engineering and medical frequency band between 150kHz and

80MHz, as well as in the frequency range of 80MHz to 2.5GHz, is used to reduce the possibility of interference caused by mobile/portable communication devices accidentally brought into the patient's area. For this purpose, an additional factor of 10/3 is used to calculate the recommended isolation distance of the transmitter within these frequency ranges.

c--Fixed transmitters, such as base stations for wireless (cellular/cordless) telephones and ground mobile radios, amateur radios, AM and FM radio broadcasts, and television broadcasts, cannot accurately predict their field strengths in theory. To evaluate the electromagnetic environment of fixed RF transmitters, consideration should be given to the investigation of electromagnetic sites. If the measured field strength of the AM70 anesthesia machine is higher than the applicable RF coincidence level mentioned above, the AM70 anesthesia machine should be observed to verify its normal operation. If abnormal performance is observed, additional measures may be necessary, such as readjusting the direction or position of AM70 anesthesia

d--In the entire frequency range of 150kHz to 80MHz, the field strength should be less than 3V/m

Table D-4 Guidelines and Manufacturer's Declaration - Electromagnetic Immunity

Recommended distance between portable and mobile RF communication devices and AM70 anesthesia machine:

The AM70 anesthesia machine is expected to be used in electromagnetic environments with radiation RF interference and control. Based on the maximum output power of communication devices, buyers or users of AM70 anesthesia machines can prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communication devices (transmitters) and AM70 anesthesia machines as recommended below.

Rated maximum output power of transmitter/W	**Isolation distance corresponding to different frequencies of the transmitter/m**			
	150kHz~80MHz (Except for engineering and medical frequency bands)d=1.2X√P	150kHz~80MHz (Except for engineering and medical frequency bands) d=1.2X√P	80MHz~800MHz d=1.2X√P	800MHz~2.5GHz d=2.3X√P
0.01	0.12	0.12	0.12	0.23
0.1	0.38	0.38	0.38	0.73
1	1.2	1.2	1.2	2.3
10	3.8	3.8	3.8	7.3
100	12	12	12	23

Table D-5 Guidelines and Manufacturer's Declaration - Electromagnetic Immunity

For the rated maximum output power of transmitters not listed in the above table, it is recommended to isolate the distance d in meters (m), which can be determined using the formula in the corresponding transmitter frequency column. Here, P is the maximum output rated power of the transmitter provided by the transmitter manufacturer, in watts (W).

Attention: At the frequencies of 80MHz and 800MHz, formulas for higher frequency bands are used.

Attention: These guidelines may not be suitable for all situations, as electromagnetic propagation is influenced by absorption and reflection from buildings, objects, and the human body.

Under the test conditions specified in YY0505 and YY0601 standards, these basic performance indicators were checked: tidal volume monitoring accuracy, and airway pressure monitoring accuracy.