

Medical Gas Manifold Operation Manual



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1. Introduction

This operation manual will provide installation, operation and basic maintenance instructions for the medical gas manifold. This manual applies to our gas manifold system. Before starting the manifold, the user must read the following content.

Operators of this product should have relevant knowledge of the manifold system and be able to identify and avoid related potential threats. Improper operation will cause injury and serious accidents. Before installing and operating this unit, users should understand the structure, operation procedures and hazards of the manifold. If you have any questions about operation, safety, maintenance, etc., please contact us.

2. System Overview

The medical gas manifold can provide a stable output pressure, one for use and one for backup; when the pressure of one gas source drops to the predetermined minimum value, the control system can automatically switch to the other, alternately supplying gas to achieve uninterrupted supply of medical gas.

The medical gas manifold converts the pressure values of the cylinders, dewar tanks, liquid oxygen and other monitoring points on the left and right sides into electrical signals through sensors, cables, etc., and inputs them into the manifold central control system. The control system displays the data of each monitoring point on the display panel. According to the logical operation of the control system, when the data of the detection point is abnormal, the alarm system will send out an audible and visual alarm and automatically switch to the other side, and record the alarm data for viewing. The equipment control system also provides a 485 interface for easy docking with other compatible monitoring panels.

3. Safety guidance

Operators should read this manual carefully before installing, wiring, starting, operating, adjusting and maintaining the system.

Operators should use common sense safety precautions, good workmanship practices and follow any relevant local safety precautions.

This manual contains information that is very important to know and understand. For safety and to prevent equipment problems, pay special attention to the following information:

- Before starting any installation or maintenance procedure, all power to the equipment must be disconnected and a pre-power-on inspection performed.
- All electrical procedures must comply with all national, state and local codes and requirements.
- All wiring should be connected by a certified electrician.

4. Product Introduction

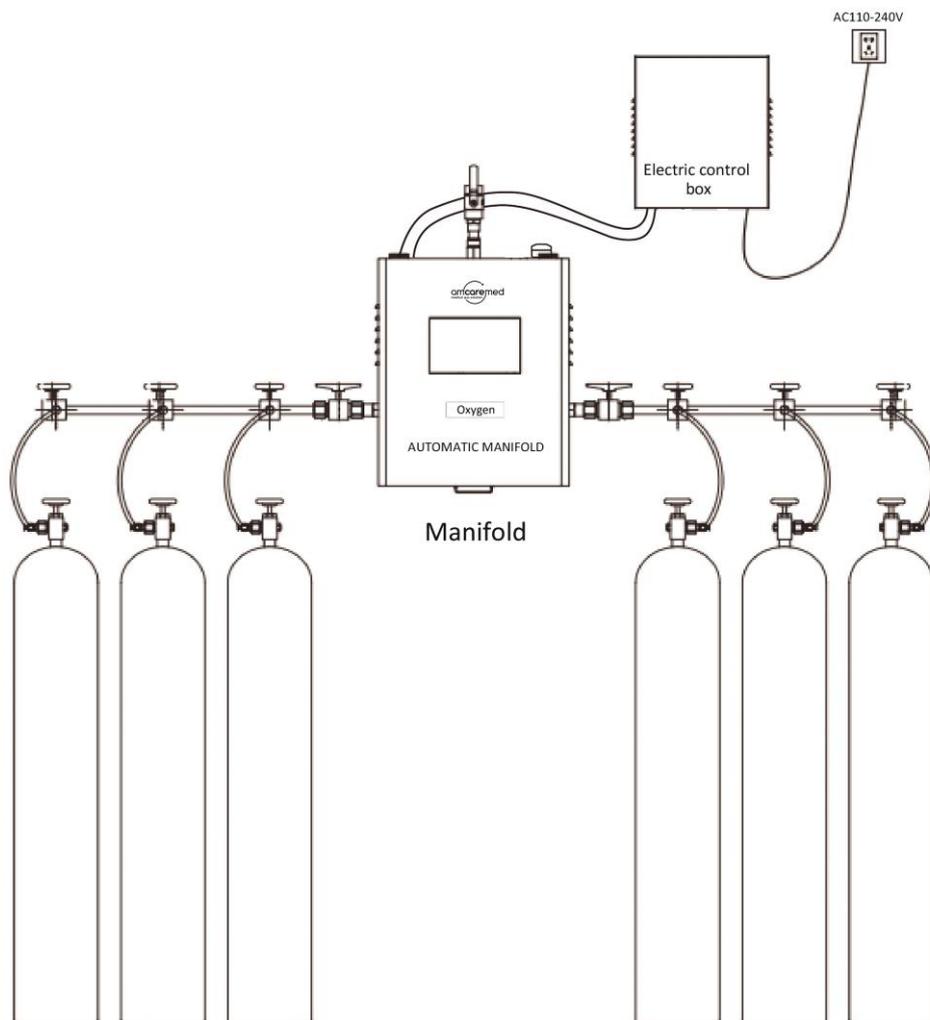
4.1 Configuration Instructions

The monitoring part of the medical gas manifold consists of the display panel, control circuit, and sensor.

The medical gas manifold can be used for oxygen O, liquid oxygen LQO, air A, nitrogen N, nitrous oxide X, carbon dioxide C, argon Ar and other gases. The medical gas manifold collects gas pressure and alarm signals on the left and right sides and the output end, and can simultaneously convert abnormal information into sound and light alarms and automatically switch; the equipment communication information is standard Modbus RTU 485 communication protocol can send device information to the upper-level monitoring platform system for remote control.

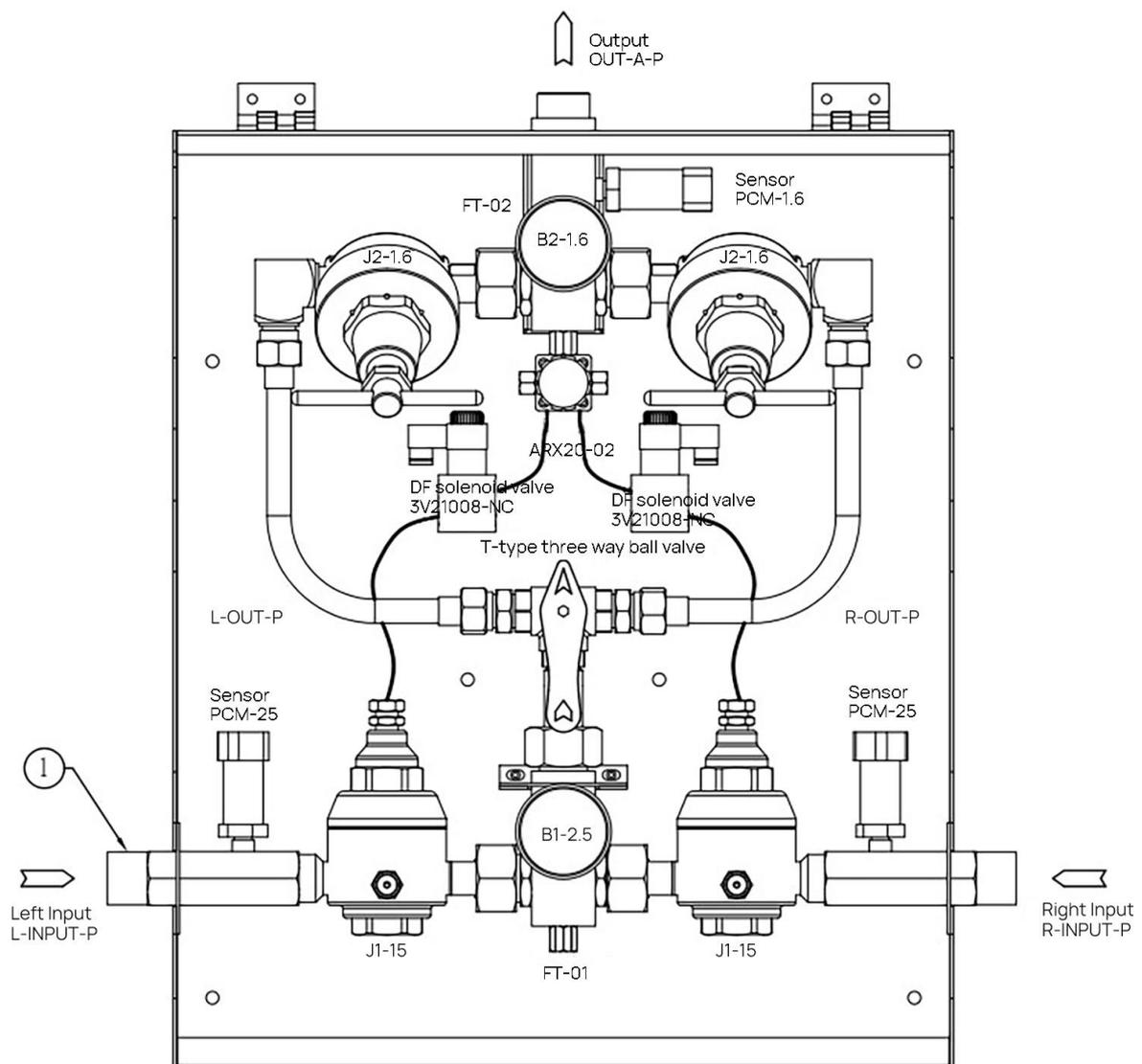
4.2 Component Introduction

Product connection instructions (see the figure below)



- * The power cord of the electric control box is plugged into a five-hole socket, and the electric control box can be used in a wide voltage range of AC110V~240V
- * The electric control box and the manifold body are connected by 2 aviation plug cables
- * Aviation plug cables with different core numbers have different equipment functions, avoiding errors and having fool-proof design
- * The aviation plugs are male and female with different numbers of cores. Aviation plugs with the same number of cores can be plugged in together.

4.3 Product Description (see the figure below)



Code	Model Name	Working status	Remark
PCM-25	Pressure transmitter	Monitoring gas 0~25Mpa	One on the left and one on the right

J1-15	First stage pressure reducer	Set it up and don't adjust it at will	Diameter ϕ 12 Maximum flow rate 15MPa; one on each side
FT-01	One-stage switching valve body	Switch between left and right sides	Diameter ϕ 15 Maximum flow rate 1.6MPa
B1-2.5	Pressure gauge	Monitor gas pressure after first-stage decompression	Range 25 bar
QF-T	T -type three-way ball valve	Switch direction left and right	Copper H59-1, homemade
L-OUT-P	Left output pipe	Output left gas pressure	Copper, homemade
R-OUT-P	Right output pipe	Output right gas pressure	Copper, homemade
J2-1.6	Secondary pressure reducer	Already set, adjustable according to needs	Diameter ϕ 12 Maximum flow rate 1.6MPa; one on each side
ARX20	Pressure regulating valve	Adjustable gas pressure, stable pressure	SMC precision pressure regulating valve
DF-3V21008-NC	Solenoid valve	DC24V two-position three-way, normally closed	Diameter ϕ 4, energy saving and no heat; one on each side
B2-1.6	Pressure gauge	Monitor gas pressure after secondary decompression	Measuring range 1.6Mpa, accuracy 1.6
FT-02	Two-stage switching valve body	Switch between left and right sides	Diameter ϕ 15 Maximum flow rate 1.6MPa
PCM-1.6	Pressure transmitter	Monitoring gas 0~1.6Mpa	Left and right combined gas pressure
L-INPUT-P	Left Input	Connecting manifold ramp	Can be connected to manifold 1 to 10 cylinders, pre-filtration
R-INPUT-P	Right input	Connecting manifold ramp	Can be connected to manifold 1 to 10 cylinders, pre-filtration
OUT-AP	Output	Connect to the main gas supply system	The outlet connector can be customized according to the specifications of the external main pipeline

5. Receiving inspection

Upon receipt of your medical gas manifold, inspect it immediately for any damage that may have occurred during shipping.

Repair or replace damaged items before use. The nameplate should be checked to verify that the model and voltage are correct.

WARNING: Do not operate the device if it has been damaged during transportation, handling, or use.

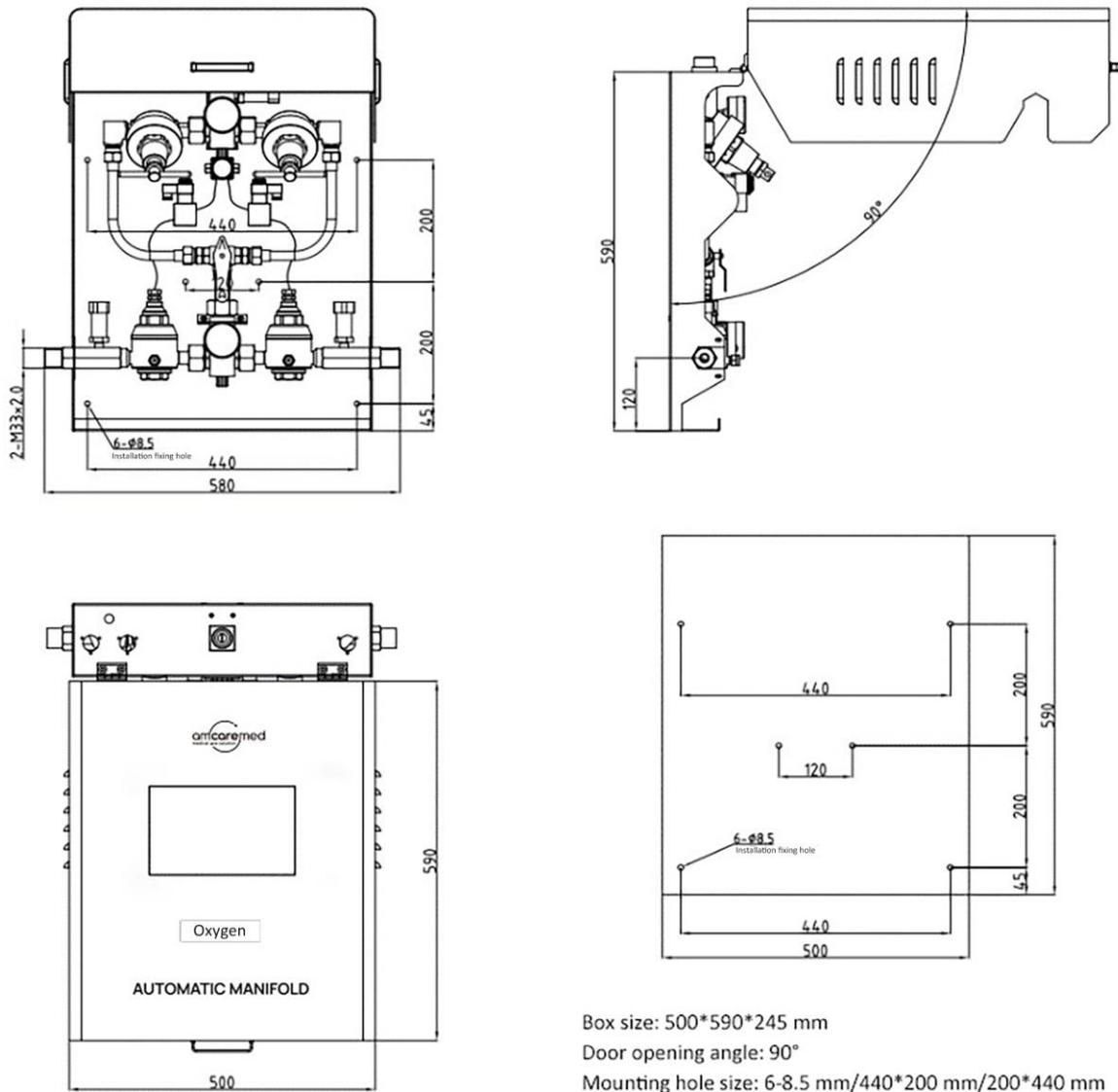
Damage may cause an unsafe condition and result in personal injury or loss.

6. Installation

6.1 Power distribution requirements

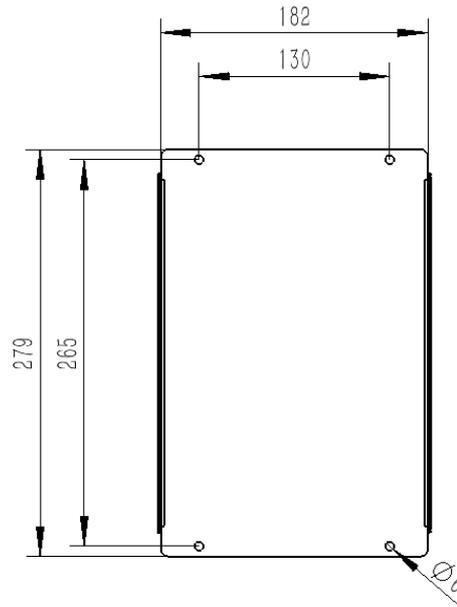
For the convenience of debugging or safety, the manifold needs an independent AV220v power supply circuit, which should not be shared with other gas equipment. The independent circuit is taken from the distribution box inside the station building. There should be an emergency backup power supply.

6.2 Main body installation dimensions



Main installation dimensions (see above)

6.3 Installation dimensions of electric control box



Electric control box installation dimensions (see above)

6.4 Wall-mounted installation (manifold body and electric control box)

6.4.1 Unpack the wooden box and take out the manifold body and the electric control box.

6.4.2 Carefully read the installation hole dimension drawing of the manifold body and the electric control box (see product installation hole location drawing).

6.4.3 The recommended installation height of the manifold body is 130 to 150 cm from the ground. The electric control box is arranged on the left or right side of the manifold body according to the requirements of the station building, and the height is based on the actual site height.

6.4.4 Place the manifold body and the electric control box at the appropriate position on the wall and then draw lines to determine the punching positions, or directly draw lines on the wall according to the hole size in above figure.

6.4.5 Install the manifold body. The expansion screws used are 8mm in diameter, 6 in total. Use this configuration to drill a wall hole and fix the busbar body to the wall. The rubber plugs used are 6mm in diameter, and the self-tapping screws are M4×25. Drill holes in the wall and fix the alarm to the wall according to this configuration.

6.4.6 The manifold connecting the cylinder is an external device and its installation steps are not included. For specific installation and connection steps, please refer to the installation instructions of the manifold.

6.4.7 Lead and connect wires according to actual construction requirements, separate wire holes for strong and weak wires according to specifications, and connect the lines after careful inspection.

7. Run

Before starting the manifold, the operator must read this manual carefully, strictly abide by all relevant safety regulations, including the relevant contents described in this manual, and master the relevant characteristics and operating methods of the manifold.

The medical gas manifold is used for the central gas supply equipment in the station. When the pressure of the medical gas outlet pipeline is higher or lower than the set value, the system will give an alarm prompt, and if the cylinder on the other side has a suitable pressure, it will automatically switch to the other side to remind the management personnel to replace or repair it in time. At this time, the alarm will sound and light alarm prompts. If the sensor fails, it will automatically switch to the cylinder on the other side, and the alarm will give a continuous alarm.

When the equipment alarm occurs, the operator can press the "Mute" button, and the system will stop beeping. If the fault is not resolved within 15 minutes (the maximum setting range is 50 minutes), the alarm system will continue to emit sound and light alarms until it returns to normal.

7.1. Startup and inspection

Connect the medical gas manifold to the power supply.

Observe the following:

- Connect the power supply and turn on the switch, the screen lights up.
- The display module warms up for five seconds. There are no audible or visual alarms during the warm-up period. After the warm-up period, any active alarms will activate the audible or visual alarm.

Press the "Mute Key" to silence the alarm.

High-pressure cylinders are connected on both sides to pressurize the pipeline systems on both sides.

Observe the following:

- The display module shows the actual line pressure.
- If the line pressure of the display module exceeds the set pressure, the low pressure indicator will turn red. If it is lower than the set pressure, the over pressure indicator will turn red.

8. Control system

8.1 Control System Overview

Medical gas manifold control system is based on air sensors. Each gas control system has a color touch screen that can adjust alarm set points during use; monitor system faults; monitor the pressure value of the manifold system and the operating status and remaining operating time of each cylinder.

8.2 Electric control cabinet interface

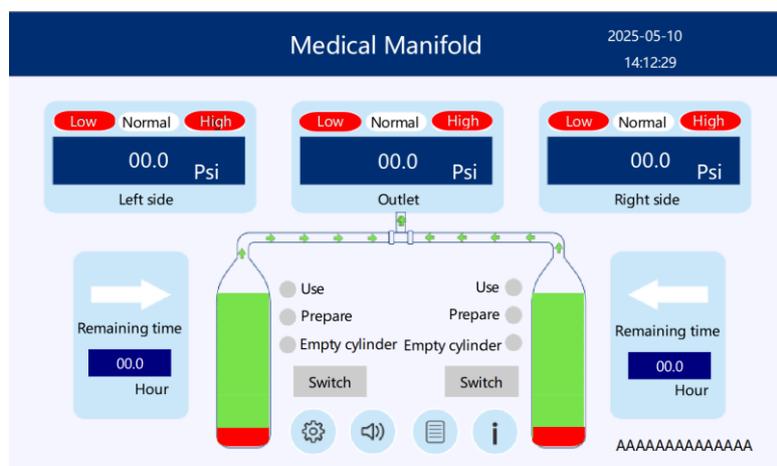


1. Display screen: Displays the working status and fault monitoring of the gas manifold control system, and is used to change different settings of the gas manifold control system

2. Buzzer: emits red light and sound when the gas pressure is too low or the system fails

8.3 Touch Screen Interface

Main Interface



Operation Mode

- If the manifold is in normal condition, Normal will be displayed on the top, and the screen will show the left and right input gas pressures, as well as the outlet pressure in units of Psi/Bar/ Mpa .
- If the left cylinder is filled with gas, the Use button on the left will display green. If the Empty cylinder button displays red, it indicates that you need to replace the cylinder. If the Prepare button on the left displays green, it indicates that the gas pressure is normal and ready for use. The same applies to the right side.
- The arrows in the pipe simulate the gas outlet path, and the green color shows the remaining gas ratio in the cylinder.
- The Remaining time on the left indicates the estimated remaining usable time. This time is for reference only. After the user has used up the cylinder and then calculate the estimated usage time based on the user's usage habits through the system.

System Status

- If the system is operating normally, no alarm will be displayed.
- If the cylinder pressure is too high, “High” will be displayed; if the pressure is low, “Low” will be displayed and the cylinder needs to be replaced.

Remaining life of cylinder

The remaining usage time of the cylinder is calculated in hours.

Sound and light alarm off

When an alarm occurs, the sound and light alarm will sound and flash. Click the icon to  pause the sound and light alarm within the set time.

Pressure setting interface



You can enter the Pressure setting interface by clicking the icon on the right side of the  main screen. To enter this interface, you need to enter the permission password 123456 in the password interface.

- Left-side full cylinder pressure : Left-side overpressure . When the inlet pressure is greater than this set value, only an alarm will be triggered.

Unit: Psi /Bar/ Mpa .

- Left-side cylinder exchange pressure : Left-side cylinder exchange pressure . When the inlet pressure is lower than the set value, it will automatically switch to the other side. Unit: Psi /Bar/ Mpa .
- Right-side full cylinder pressure t: Right-side overpressure . When the intake pressure is greater than this set value , an alarm will be issued . The unit is Psi/Bar/Mpa .
- Right-side cylinder exchange pressure : Right-side cylinder exchange pressure . When the intake pressure is lower than this set value , it will automatically switch to the other side . Unit: Psi/Bar/Mpa .
- Maximum output pressure: Set the outlet overpressure , unit Psi/Bar/Mpa, alarm only.
- Minimum output pressure : Set the lower limit pressure of the outlet , unit Psi/Bar/Mpa, alarm only.

Local setting interface

Enter the time setting interface by clicking the "Local setting" button on the setting interface.

The screenshot shows a 'Local setting' dialog box with the following fields:

- Date: 0000 Year 00 Month 00 Day
- Time: 00 Hour 00 Minute 00 Second
- Silent interval: 000 Minute
- Local address: 000
- Installation area: AAAAAAAAAAAAAA

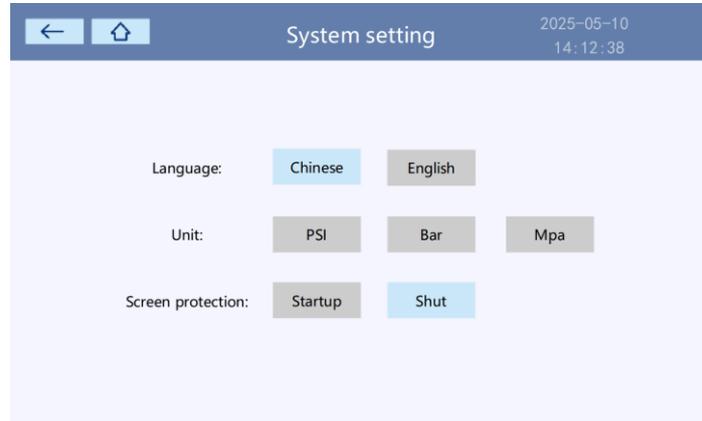
Buttons: Save, Cancel

Enter the local time in the year, month, day, hour, minute, second and other input boxes. Click OK to complete the time setting. You can see the set local time in the upper right corner of the main interface.

- Silent interval : Set the silent time when an alarm occurs.
- Local address : Set 485 slave address: 1-255.
- Installation area: Enter a name, which will be displayed simultaneously in the lower right corner of the homepage, with a maximum of 14 characters.

System settings interface

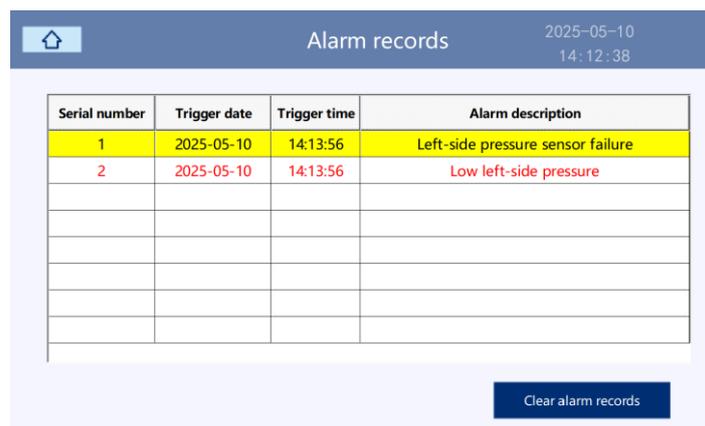
The system setting interface by clicking the " System setting " button on the setting interface.



- Language: Language selection.
 - Unit: Gas pressure unit selection , you can choose Psi , Bar , Mpa .
 - Screen protection: Turn the screen protection on or off . When it is turned on , the screen will automatically turn off after a delay to extend the screen life and save energy.

Alarm records interface

You can enter the alarm records interface by clicking the icon on the right side of the  main screen.



- You can view the specific time when the alarm was generated and the specific description of the alarm, with the latest alarm displayed at the top.
- Click the “Clear Alarm Record” button in the lower right corner to clear the alarm record.

Company information interface

You can enter the company information interface by clicking the icon on the right side of the  main screen.



- View company name, address, phone number, email address and other information

9. System maintenance and repair

9.1 Notes

1. When the pressure gauge is greater than 1.3 MPa, or the safety valve is exhausted, immediately close the gas supply, open another gas supply, and then deal with the fault. Open the valve after eliminating the fault.
2. Pay attention to oil-free protection of pressure transmitters and pressure gauges and perform regular maintenance.
3. Oil is strictly prohibited in the equipment and open flames are not allowed around the box.
4. All accessories and equipment in the gas supply system should be oil-free, and there should be a dedicated person to be responsible for their storage and maintenance.
5. The appearance of this product is subject to change due to technological innovation without prior notice.

9.2 Safe Use Rules

1. Personnel engaged in the inspection, maintenance and operation of gas pipelines and equipment must understand the nature of gas, master the pipeline network process, and pass examinations on safety technology, operation and inspection rules before they can work independently.
2. The gas used in the gas cylinder group should meet the national standards . When industrial gas is used instead of medical gas, it should be tested and approved by the relevant departments.

3. The valve must be operated slowly. If gas leakage is found in the valve, the fault should be eliminated before use.
4. Various valves, sealing materials, instruments and equipment used in the gas pipeline network must be approved by professional departments before they can be used in the gas system. Instruments should be marked with the "oil-free" mark.
5. It is strictly prohibited to use open flames in the gas cylinder room of the central gas supply station or near liquid and gas tanks.
6. The grounding device of the gas pipeline should be checked once before the rainy season every year, and the grounding resistance should comply with YYO186-94 or relevant national standards.
7. All equipment should be operated without the use of oil or wearing oily gloves.
8. The medical center gas supply system is managed and maintained by a dedicated person.
9. Perform regular maintenance according to the "Operation, Use and Maintenance Regulations" and equipment instructions.

9.3 Safe use of manifold reducer

Medical gas manifold centralized gas supply is the most commonly used gas supply method in hospitals. Since the manifold is directly connected to the high-pressure gas cylinder, operators must master the following safe use and maintenance knowledge of the manifold:

1. To open the cylinder valve, slowly open the stop valve in front of the pressure reducer. The high-pressure pressure gauge indicates the input pressure of the gas cylinder. Then turn the pressure reducer adjusting screw clockwise. At this time, the low-pressure pressure gauge indicates the output pressure. When supplying gas to the pressure reducer, avoid opening the stop valve suddenly to avoid impacting the pressure reducer and causing it to malfunction.
2. When stopping the gas supply, just loosen the pressure regulating screw of the pressure reducer to make the output pressure of the low-pressure pressure gauge zero, and then close the stop valve.
3. The low-pressure chamber of the pressure reducer is equipped with a safety valve. When the pressure exceeds the permissible value, it will automatically open to exhaust. When the pressure drops to the permissible value, it will automatically close. Do not pull the safety valve at ordinary times.

4. During installation, care should be taken to ensure cleanliness and avoid any debris entering the reducer. A 100um filter element is built into the gas inlet of the reducer to prevent debris and dust from entering. Avoid direct flow, slow pressurization and blockage of the reducer.
5. When gas leakage is found in the connection part, it is usually caused by the thread not being tight enough or the sealing gasket being damaged. The nut should be tightened appropriately or the sealing gasket should be replaced.
6. If the pressure reducer is found to be damaged or leaking, or the pressure of the low-pressure gauge continues to rise, or the pressure of the pressure gauge cannot return to zero, it should be repaired or replaced in time.
7. The manifold should use one medium as specified and should not be mixed to avoid danger.
8. The manifold must be kept away from grease or oil to avoid explosion.
9. The manifold shall not inflate the gas cylinder in the reverse direction.
10. After the manifold is put into use, daily maintenance should be carried out and the pipe fittings should be tapped carefully. During normal use, the pressure gauge must be tested every year.
11. Do not install the manifold in places with corrosive media.
12. Manifolds that have been in use for more than three years should be thoroughly inspected by a professional unit and key components replaced to ensure safe use.

10. Troubleshooting

Fault phenomenon	Possible causes	Countermeasures
1. The touch screen does not light up	a. The input power is not connected. b. The switch power supply is burned out. c. The AC line is not connected. d. The power line between the power supply and the control module. e. The power supply component is faulty .	a. Check the AC power supply. b. Replace the switching power supply with the same specification . c. Check the AC power inlet wiring of the power supply terminal. d. Check the connection at each end to see if the aviation plug has poor contact . Reconnect if necessary. e. Test whether the power supply of the voltage module meets the standard. If not, replace the power supply component.

Fault phenomenon	Possible causes	Countermeasures
2. The audio alarm is constant and cannot be muted by the mute button on the touch screen.	a. Display module failure .	a. Replace the display screen.
3. When the fault alarm is prompted, the alarm has no sound or light feedback.	a. Sound and light alarm failure and damage.	a. Replace the sound and light alarm.
4. When the digital display shows that the pressure is within the normal range, there is a high or low pressure alarm prompt .	a. The alarm set point has not been set or changed . b. The display module is faulty .	a. Check the parameter settings for high and low pressure alarm settings . If incorrect, reset the low and/or high pressure alarm set points. Refer to the setup instructions. b. Change the display.
5. The display screen does not show pressure data, and the sound and light alarm sounds continuously.	a. The sensor line is disconnected or the polarity of the line is reversed. c. The sensor module is faulty .	a. Correct the sensor wiring. If the sensor is remotely mounted, verify the continuity of the field wiring and the polarity of the connections from the sensor to the control module. b. Replace the faulty sensor module with a good sensor module

11. Service and Warranty

1. This product is strictly inspected by the company's internal warehouse. If a transportation accident occurs or it is caused by our company's fault, our company can repair or replace it free of charge.
2. The warranty period is 2 years from the date of purchase.
3. The contents of this article are subject to change without prior notice.