Notice to Users

Dear users:

Thank you for purchasing the gas detector from Eyeless Technology!

Please read this instruction manual carefully before using this product.

Please keep this instruction manual properly after reading so that you can refer to it anytime when needed.

It is our great honor to have you as our user. In order to help you master the use of Wuyanjie Technology's gas detector as soon as possible, we have specially written this manual for you. We strive to make the product manual comprehensive and concise. From it, you can get some knowledge about the operation methods, installation steps and common troubleshooting of our detector. We strongly recommend that you read it carefully before using this product, which will help you use this product better. Shenzhen Wuyanjie Technology Co., Ltd. will not be responsible for any losses caused by your failure to operate the detector according to the requirements of this manual.

We have tried our best to avoid human errors and ensure that the information provided in this manual is correct and reliable, but we cannot fully guarantee that there will be no errors that have not been discovered or checked before printing, and no omissions in the printing, binding, distribution and other links that we cannot control. Please understand!

Sometimes, in order to improve the performance and reliability of components and the entire machine, we may make some small adjustments to the hardware or software configuration of the product. This may cause some inconsistencies between the actual situation of the machine and the instructions, but this will not substantially affect your use of the machine. Please note.

In order to ensure that you can enjoy the comprehensive after-sales service provided by Wuyanjie Technology in a timely manner, please register your product information in a timely manner.

Copyright

Statement

Shenzhen Wuyanjie Technology Co., Ltd. (hereinafter referred to as "Wuyanjie Technology") makes no warranty of any kind, including (but not limited to) the implied warranty of merchantability and fitness for a particular purpose. Wuyanjie Technology is not responsible for errors (installation errors, operating errors) contained in this information, or incidental or indirect damages caused by the provision, actual performance and use of this manual.

As Wuyanjie Technology will continue to improve and upgrade its products and equipment, the configuration and performance of subsequent models will change without further notice.

Manufacturer's Responsibilities

No Eyes Technology only considers itself responsible for the safety, reliability and performance of the equipment in the following circumstances, namely:

- Assembly operations, commissioning, performance improvements and repairs are all performed by personnel approved by No Eyes Technology;
- The relevant electrical equipment complies with national standards;
- Use the device according to the operating instructions.

Notice:

1. All operators who operate and test our factory instruments must read the instruction manual carefully before operation. Our instruments can only work properly when operated in accordance with our instructions.

2. The use of our company's instruments must be carried out in accordance with the procedures specified in the manual. The maintenance and replacement of parts of the instruments must be completed using accessories provided by our company and trained personnel.

3. If the user disassembles the instrument to repair or replace parts without following the above instructions, the reliability of the instrument shall be the responsibility of the operator. At the same time, the company will no longer be responsible for the warranty.

4. The explosion-proof plate or waterproof breathable mold part of the instrument sensor should be cleaned or replaced regularly, otherwise dust and impurities will clog the protective holes and affect the sensitivity of the detection.

5. The use of our company's instruments must also comply with the laws and regulations of relevant domestic departments and factory instrument management.

6. The instrument needs to be calibrated at least once every six months; however, due to the characteristics of some sensors, it is recommended to calibrate the instrument every three months.

7. The sensor is a sensitive component. Therefore, if there is a lot of oil smoke, water, dust and other substances in the target environment to be measured, please perform corresponding filtering pretreatment before connecting to the instrument for detection, otherwise the sensor may be easily damaged.

8. For instruments using electrochemical sensors, do not expose the machine to a high concentration target gas environment (except oxygen) for a long time, otherwise it may easily cause sensor poisoning or shorten its life.

9. When calibrating pipeline instruments and performing gas detection, the flow rate should be controlled between 160 and 250 ml/min as much as possible, otherwise it will lead to unstable or inaccurate values.

TABLE OF CONTENTS

1. Basic principles and uses:

ES10H online gas detector (hereinafter referred to as the detector) collects the corresponding gas concentration through the sensor, converts the target gas concentration into the corresponding current or voltage signal, transmits it to the signal acquisition and processing circuit for filtering and amplification, and then performs AD analog-to-digital conversion, and finally sends it to the CPU unit for various calculations, and finally obtains the gas concentration to be measured, and displays the calculation results and controls the corresponding unit modules to realize the output and control of various signals.

This detector adopts OLED display design, which is intuitive and clear at a glance. The circuit board adopts four-layer board wiring, simple process, and flameproof design; the output signal can be selected from 4~20 mA , RS-485 , and three-way relay output; it can be conveniently combined with DCS, PLC and the company's independently developed ES90C series alarm host and central station software to form a safety protection system; the detection sensitivity is high, the response speed is fast, the anti-interference ability is strong, the performance is stable and reliable, and the excellent signal processing algorithm makes the product at the leading level at home and abroad.

It can be widely used in metallurgy, petroleum, chemical industry, mining, coking, municipal administration, environmental protection, pharmaceuticals, electric power, shipping, sewage treatment, laboratories, scientific research institutes and other places that need to continuously detect flammable, explosive, toxic and harmful gases.

1.1 Appearance Pictures

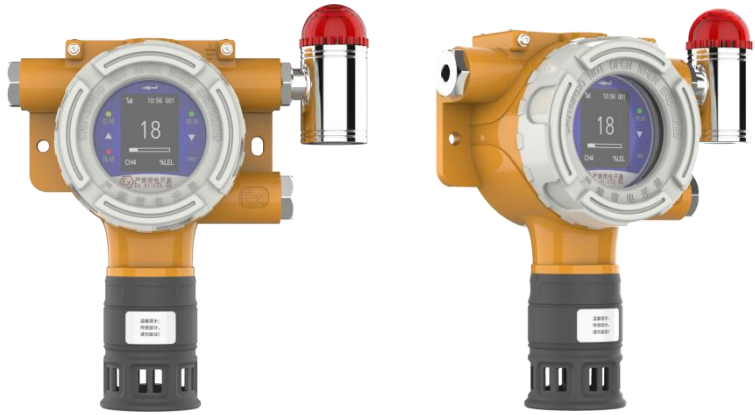


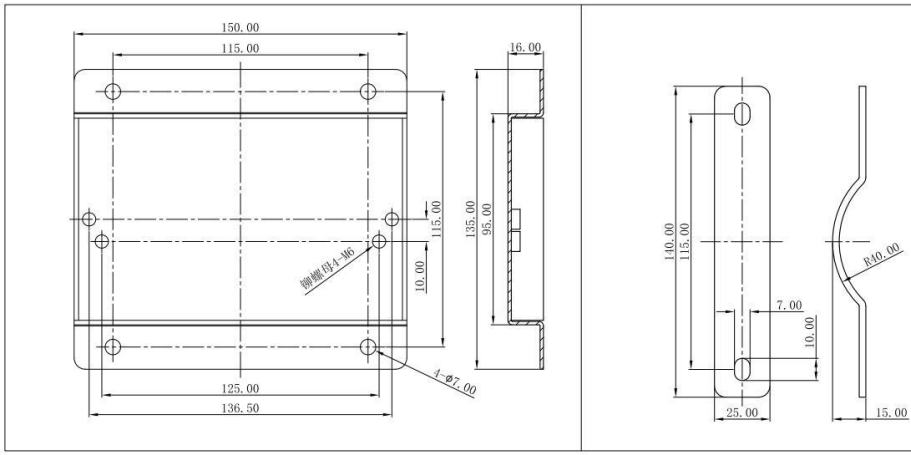
Figure 1.0 Product appearance picture

1.2 Safety Instructions

- High or low oxygen levels in the atmosphere can affect the readings of the combustible gas sensor.
- Sudden changes in atmospheric pressure may affect the oxygen sensor readings.
- The vapor of silicone compounds can damage catalytic combustion sensors. Please ensure that such substances are not present in the operating environment.
- During use, please keep the air inlet of the sensor clean. Blockage of the air inlet may cause the detector to read too low.
- To ensure the safe and reliable use of this detector , please do not disassemble it by yourself.
- Do not store the detector in a high temperature, humid or strong static environment.
- Do not use any corrosive liquids to clean the machine parts.
- The casing should be reliably grounded.
- Users are not allowed to replace parts of this product on their own, and should work with the manufacturer to resolve faults that occur during operation to prevent damage from occurring.

- The installation, use and maintenance of the product should comply with the product manual, GB3836.13-2021 " Repair, inspection, restoration and modification of equipment for explosive atmospheres Part 13", GB3836.15-2017 " GBT 3836.15-2017 Design, selection and installation of electrical installations for explosive atmospheres Part 15 (except coal mines)", GB3836.16-2017 " Explosive atmospheres Part 16: Inspection and maintenance of electrical installations (except coal mines) " and GB50257-2014 " Electrical equipment installation engineering construction and acceptance code for electrical installations in explosion and fire hazardous atmospheres" and other relevant regulations.

2.Installation Method



安装支架　　管廊抱箍

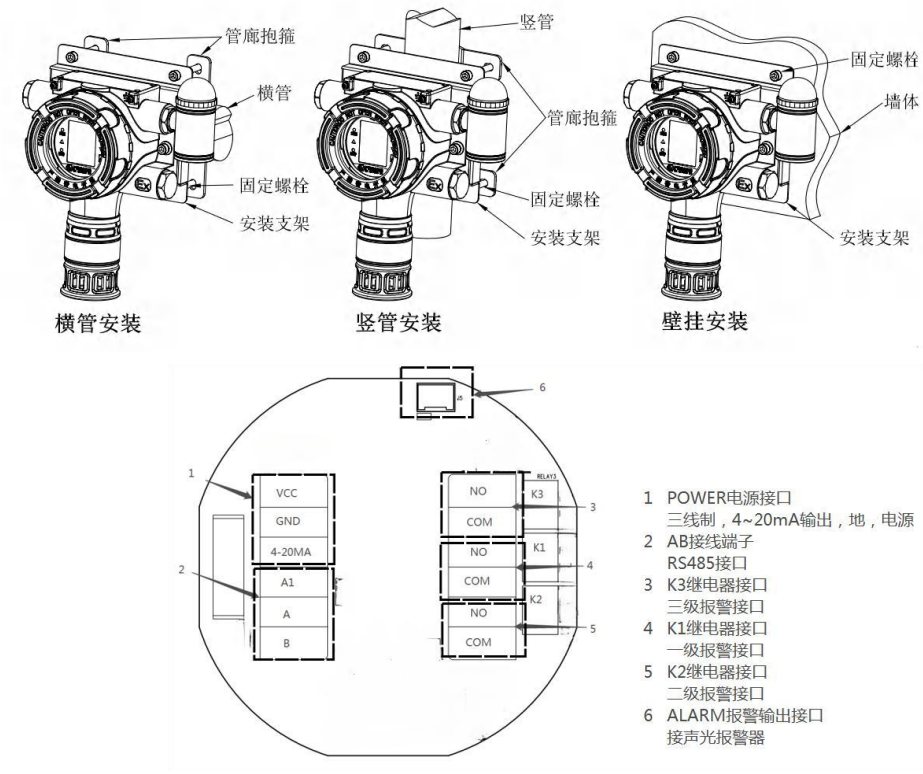


Figure 2.2 Internal wiring diagram

2.0 Internal wiring:

Figure 2.2 is the internal circuit board wiring diagram :

1、 " POWER " power supply and 4~20mA output interface: " 4~20mA " is the 4~20mA signal output terminal, " VDD " is the positive pole of 24V power supply, and " GND " is the negative pole of 24V power supply;

2、 “ RS485 ” is the RS-485 communication interface: “ A ” and “ B ” are RS-485 signal A and signal B respectively.

3、 " K3 " passive relay output: three-level alarm interface. When a fault signal is detected, relay K3 will operate to control the fan or other corresponding equipment.

4、 " K1 " passive relay output: an alarm interface. When the signal exceeds the secondary alarm value, relay K1 will operate to control the fan or other corresponding equipment.

5、 " K2 " passive relay output: secondary alarm interface. When the signal exceeds the secondary alarm value, relay K2 will operate to control the fan or other corresponding equipment.

2.1. Select the installation location:

The installation location of this instrument is crucial to achieve the best detection effect. When determining the location, the following factors need to be considered comprehensively: such as the density of the gas leak point, the specific gravity of the gas being measured, the surrounding buildings, the wind direction and the annual weather, etc. Indoors, the location of doors and windows must also be considered.

The following suggestions are for user reference:

- The installation height should be determined based on the specific gravity of the measured gas and air. If it is heavier than air, the installation height should be 0.3~0.6m from the ground. If it is lighter than air, the installation height should be 0.5~2m higher than the release source.
- The instrument should maintain an appropriate distance from the gas leakage point being measured. If it is too close, the reaction speed will be too fast. If the leakage is frequent, it will lead to too much alarm data, or the alarm state will be in a long-term state and paralyze people; if it is too far, the reaction speed will be too slow, or even no reaction.
- The instrument should be installed upwind of the leak point.
- When installed indoors, if the leak source is outdoors, the instrument should be installed at the air inlet.
- The number of instruments should be selected based on the possible leakage points of the gas being measured, the frequency of personnel presence and the length of their stay, in order to achieve the best effect.

- The instrument must be protected from radiation from high-temperature heat sources. Too high or too low a temperature will affect the performance and life of the sensor.

Note:

For more specific instructions, please refer to: GBT 50493-2019 " Petrochemical Combustible Gas and Toxic Gas Detection Alarm Design Standard "

2.2. Select the installation type:

- Wall-mounted: This installation method is often chosen for normal indoor testing. Connect the mounting bracket and the detector with bolts.
- Pipe-mounted: This installation method is used in pipeline environments
- Flow-through type: This installation method is selected in some special environments (such as flues, negative pressure pipes, etc.).

2.3 Wiring Instructions

All wiring complies with relevant national standards and industry standards and regulations. DC signal lines and AC power lines cannot be in the same shielded cable. The detector is reliably connected to the ground through pipes, brackets and grounding cables. For RS485 communication detectors, the two communication signal lines RS485-
A and RS485-B should use a single twisted pair shielded cable to ensure longer and more accurate signal transmission.

Wiring method:

- Rotate the upper cover counterclockwise to open the upper cover of the detector housing.
- Pull out the top circuit module upwards. The top and bottom modules are connected via a 16 - pin header .
- The bottom control board is exposed, and its interface is shown in Figure 2.2 Internal wiring block diagram .
- Insert the power cable and signal cable into the shell from the left side plug of the lower cover.

- According to design or actual needs, insert the power cord and signal cord into the corresponding terminals and secure them.

Notice:

In explosive hazardous places, users must configure filler-type cable entry devices that have obtained explosion-proof certificates and have explosion-proof marks of Exd IIC Gb/Ex Td A21 IP65 to ensure that they comply with national regulations for cable entry devices.

To ensure the safe use of the detector, please make sure that the detector casing is reliably connected to the ground.

3. Function introduction :

3.1. Boot interface

Figure 3.1-4 boot interface

After power-on, the boot screen is displayed first. The boot process steps are as follows:

1. Boot interface ;
2. Sensor information interface;
3. Sensor preheating interface ;
4. After preheating is completed, the interface is displayed normally ;

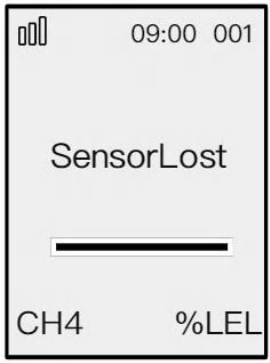


Figure 3.5 Fault interface

After the sensor is preheated, if the display screen prompts SensorLost, it means that the sensor is lost or faulty, indicating that the machine is faulty. Please repair it in time.

Note:

Before entering the standard measurement interface, if you need to skip the preheating process, you can press the OK button during the preheating process (but this is not recommended). Skipping the preheating time may cause unstable values.

3.2, Settings interface

To enter the settings interface, you need to enter the password 0001.

The setting interface includes: time setting →alarm setting →relay setting →sensor setting →sensor calibration →current calibration →communication setting →system setting →factory setting →self-test function →about device →exit menu .

3.2.1、 Time setting interface:

Time setting, after entering from the menu bar, select time setting and press OK to enter the time setting interface. In this interface, you can set the time year, month, day, hour, minute and second. The time can be displayed in the standard measurement interface or not.

Use the up, down, left, and right keys on the remote control to select the setting item, press the OK key to select the data to be modified, select Confirm and press the OK key to save the setting item. If you do not want to save, press ESC to exit the time setting interface.

Figure 3.6 Time setting interface

3.2.2 Alarm setting interface:

Alarm settings, after entering from the menu bar, select Alarm settings and press the OK button to enter the channel selection interface, select channel 1 and press the OK button to enter the alarm settings interface. This interface can set the alarm type, high and low alarms.

Figure 3. 7 Alarm setting interface

3.2.3, Relay setting interface:

Relay settings, after entering from the menu bar, select relay settings and press OK to enter the relay settings interface, in this interface you can set relay 1, relay 2, relay 3. Relay 1 defaults to low alarm, low alarm and high alarm are optional; relay 2 defaults to high alarm, low alarm and high alarm are optional; relay 3 defaults to fault, low alarm and high alarm fault are optional. All relay output forms are programmable in level and pulse.

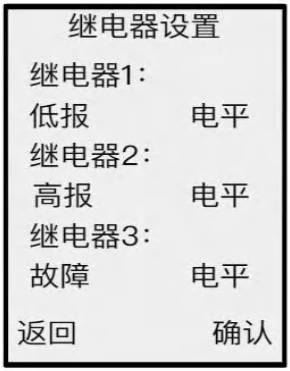


Figure 3. 8 -relay setting interface

3.2.4, Sensor setting interface:

Factory settings interface.

3.2.5. Sensor calibration interface:

Sensor calibration, after entering from the menu bar, select sensor calibration and press OK , enter the password 88 to enter the sensor calibration interface, this interface can be used for zero point calibration.

Figure 3. 9-sensor calibration interface

3.2.6. Current calibration interface:

Current calibration, after entering from the menu bar, select current calibration and press OK to enter the current calibration interface. This interface can set 4mA current calibration and 20mA current calibration. Use the up, down, left, and right keys on the remote control to select calibration, press the OK key when the cursor flashes, adjust the value on the remote control, press OK to complete the value setting, select Confirm and press OK to save the setting item, select Return to not save the setting item and exit the current calibration interface.

Figure 3. 10 Current calibration interface

3.2.7, Communication settings interface:

Communication settings, after entering from the menu bar, select Communication settings and press OK to enter the communication settings interface, on this interface you can set the address, baud rate, and check.

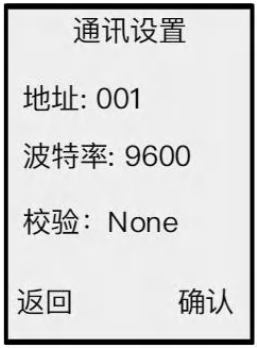


Figure 3.11 Communication settings interface

3.2. 8. System settings interface:

System settings, after entering from the menu bar, select system settings and press OK, enter the password 1088 to enter the system settings interface, this interface can set the channel, menu, language, protocol, power on, air pump, expansion board. When setting, when the cursor is flashing, make the corresponding settings.

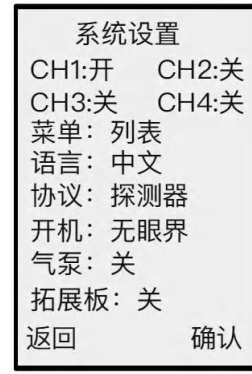


Figure 3.12 System settings interface

3.2. 9. Factory settings interface:

Factory settings: After entering from the menu bar, select Factory settings and press OK, enter the password 0088 to enter the factory settings interface, and restore the factory settings for the corresponding channel.

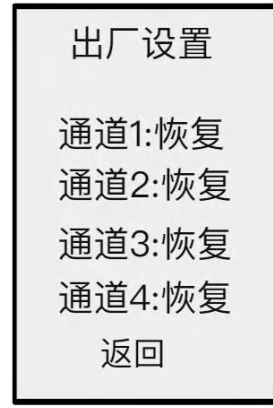


Figure 3.13 Factory settings interface

3.2.9 , Self -test function interface:

System settings, after entering from the menu bar, select the self-test function and press the OK button to enter the self-test function interface. The test items include normal, low report, high report, fault, and white screen display.

Figure 3.14 Self-test function setting interface

3.2. 10. About the device interface:

System Settings, after entering from the menu bar, select the About Device function and press OK to enter the About Device interface, which displays the corresponding software version, hardware version and sensor software version. Press ESC to exit the interface.

Figure 3.15 About the device interface

4. Basic calibration method

The product has been calibrated (calibrated) as required before leaving the factory. If the user has the conditions for calibration, he can calibrate it regularly during use according to the instructions;

if the conditions are not met, he can go to the relevant measurement department or mail the product to our company for paid calibration.

To ensure the measurement accuracy of the probe, the normal calibration period of the instrument is 3-6 months. If the measured gas is often in a high concentration in the use environment, the calibration period can be shortened appropriately. To ensure the measurement accuracy of the instrument, calibration should be performed regularly during use and corresponding records should be made.

4.1 Zero point calibration

The detector is fed with a standard gas with a concentration of 0 ppm, usually clean air (without target gas).

) is the zero point, and some gases (such as oxygen, carbon dioxide, etc.) use pure nitrogen as the zero point;

4.2 Span calibration

First, decompress the standard gas and pass it through the flowmeter, control the flow rate at 160-300ml / min, and then connect it to the gas chamber of the detector through a catheter (refer to the calibration diagram in Figure 4.0); select the menu to enter the calibration gas concentration setting interface, set the calibration gas concentration, and set the value to the same as the concentration value marked on the calibration gas bottle; *then enter the span calibration interface, short press the M key to make SET PEAK flash, and when the value is stable (no longer rising or falling), press the OK key.*

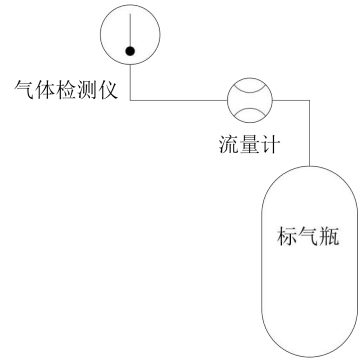


Figure 4.0 Calibration diagram

5. How to use the remote control

Figure 5.0 Remote control appearance

The remote control is only for ES10 series models with display. The remote control operation is mainly for detectors with display installed in flammable and explosive environments, harsh environments with a lot of oil smoke and dust, or some places where it is inconvenient to open the cover for operation. It allows the remote control to operate the detector without removing the upper cover, and to set and view parameters of the detector, avoiding the risk of fire caused by removing the upper cover or causing dust and impurities to enter the instrument.

OK " button on the remote control to enter the parameter setting interface. After entering the parameter setting interface, press the "〈 " and " 〉 " keys to

switch to the previous and next parameter setting interfaces. Press the " OK " button to enter the parameter setting state. Use the " 〈 " and " 〉 " keys to move the digit to be modified left and right . Press the OK button to confirm the modification . Use the " ∧″ and ″∨″ keys to increase and decrease the value of the digit to be modified. Press the ″OK″ button to confirm the modification. Press ″ESC″ to exit the setting interface .

The remote control uses two replaceable AAA batteries. Due to transportation reasons, batteries are not included in the factory by default.

6. Precautions for use and maintenance of sensors

A gas sensor is a device that converts gas concentration information into weak electrical signals. It is the core of a gas detector. At the same time, the sensor is very sensitive and fragile and needs to be used and protected carefully, otherwise it will cause performance degradation or damage. Therefore, the sensor is a consumable product and the following matters should be paid attention to during use:

1. The operating temperature of most electrochemical sensors is -20℃ ～+50℃, the operating temperature of infrared sensors is -40℃ ～+70℃, and the working humidity is 10～95 %RH (non-condensing). The operating environment of special sensors depends on the specific model.
2. Ensure that the gas flowing into the sensor chamber does not contain impurities or stains such as moisture and oil that are easily attached to the sensor surface and cause the sensor to fail or be damaged.
3. It is recommended that the sensor be calibrated once every three months, depending on the site environment, such as whether there is often a large or small amount of target detection gas in the site environment.
4. The service life of electrochemical sensors is about 2 years, the service life of infrared sensors is about 3 years, and the service life of special sensors depends on the specific model and the on-site environment, such as whether the on-site ambient temperature is too high or too low.

5. Do not unplug or plug the sensor while it is powered on, and do not knock or drop it. The warranty terms are subject to the sensor manufacturer's standards. No warranty will be provided if it is damaged by human factors or used improperly.

Note:

Please purchase replacement sensors from our company. Purchasing and replacing sensors that are not approved by our company on your own may cause the instrument's functional performance to fail to meet the design requirements, or even cause damage to the sensor or the machine. Our company is not responsible for the losses caused by this.

VII. After-sales service information

7.1 Warranty Description:

Before the products leave the factory, our company has calibrated and strictly inspected the products as required. We promise that the products comply with relevant national and industry standards and regulations.

All customers who purchase our instruments enjoy a 12-month warranty period. Users should follow the instructions during use. Damage to the instrument due to improper use or poor working environment is not covered by the warranty. If the instrument cannot work properly due to quality problems, our company will repair or replace it for free. After one year, the cost of production will be charged.

The user should keep the factory certificate properly. The warranty period is based on the date on the certificate. Please attach the factory certificate when returning the product for repair.

7.2 Manufacturer after-sales service contact information:

After-sales service unit : Shenzhen Wuyanjie Technology Co., Ltd.

If you have any questions during use, please contact us immediately

Recipient : Customer Service Department of Shenzhen Wuyanjie Technology Co., Ltd.

Address : 17G, Kechuang Building, Quanzhi Technology Innovation Park, Houting

Shasong Road, Shajing Street, Bao'an District, Shenzhen

Appendix I Product Specifications

name	describe
Product	ES10 H Online Gas Detector
Detection	Catalytic combustion, infrared detection, electrochemistry,
Display	OLED display
Display	%VOL, %LEL, ppm, mg/m3
Backlight	Black background, white text display
Alarm	Sound and light alarm, relay output alarm
Accuracy:	≤±3%FS
Warm-up	≤ 9 0 sec
Output	Depends on the actual site environment requirements, the maximum
	1 channel 4~20mA current signal output
	1 RS-485 signal output, standard ModBus RTU (optional function)
	1 channel sound and light alarm output
Relay:	Three groups of passive relays , 24VDC 2 A
Main	Housing: Die-cast aluminum
Material:	Air chamber: hard anodized aluminum
Installat	Wall-mounted pipe integrated
Operating	-40℃～+70℃ (flammable); -20℃～+50℃ (toxic)
Operating	10%～95%RH(no condensation)
Operating	24VDC (normal operating voltage range: 12 ~ 30VDC)
Power	<2.5W (combustible gas); <1.5W (toxic gas)
Work	86~106KPa
size:	209 mm*1 99 mm* 86 mm (height*width*thickness)
weight:	About 2.1 Kg
Explosion	Exd IIC T6 Gb (flammable gas), Exd ib IIC T6 Gb (toxic gas)
Protectio	IP66
Implement	GB15322.1-2019, GB3836.1-2021, GB3836.2-2021, GB3836.4-2021,
ation	GB12358-2006