



*The pictures are for reference only,
please refer to the actual product.

Fixed Gas Detector User Manual

V1.0

1. Foreword

You are welcome to use the instrument of this product, and hope that this manual will bring you convenience when you use the instrument. If you find any unclear, wrong or excessively lengthy place in this manual, please contact the agent or after-sales service department in time.

Before you perform any operation on this instrument, please read this operation manual carefully, and keep the manual properly so that you can refer to it in time for help in the future.

It is forbidden to disseminate all the contents of this manual without permission; this manual only provides relevant information.

The company is committed to continuous improvement of product performance, and the company reserves the right to improve any content in the manual without prior notice.

Please refer to the actual product for the color and style of the product and product.

2. Please read carefully before using

Anyone who may use, maintain or repair the instrument should read this operating manual carefully and only follow the operating manual to achieve the design level. Otherwise the instrument will not work properly and will cause malfunction and damage to the instrument.

3. Warning

- Before using the instrument, please read the product manual carefully.
- It is strictly forbidden to open the cover when the power is on at the scene.
- It is strictly forbidden to replace the sensor with power on.
- The installation, debugging, setting and other operations must be carried out by professionals.
- Gas calibration inspection should be carried out regularly, and the sensors that have exceeded the valid period of use and have faults should be replaced in time.
- It is strictly forbidden to input gas with a gas concentration higher than the measuring range to impact the sensor.
- Prevent the instrument from falling from a high place or subject to severe shocks.
- It is strictly forbidden to expose the instrument to a high-concentration corrosive gas environment to work for a long time to prevent damage to the sensor.
- It is strictly forbidden to use it under high temperature and high humidity. If

the humidity is high, it must be equipped with a filter dehumidification device.

- Users are not allowed to repair or replace parts without authorization.
- Man-made damage is not covered by the warranty.
- It is not allowed to change the components or structures that affect the explosion-proof performance at will, so as not to affect the explosion-proof performance.

4. Attentions

- Electricity safety: Ensure that the instrument shell is properly grounded.
- For safety reasons, this product can only be operated and maintained by professionals, and this manual must be fully read and understood before operation and maintenance.
- Because the instrument is a bit heavy, at least two people are required when installing it, pay attention to it, and carry it carefully. Otherwise, it may cause physical injury.
- When carrying the instrument, please wear gloves, otherwise it may cause injury.
- During the installation process, be careful not to allow wire heads or other debris to enter the left channel port of the instrument, otherwise it may cause fire, malfunction, or malfunction.

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6. Product Description

This detector is a fixed diffusion type detector which can be used in complex working environments such as organic exhaust emissions, petrochemical industry, flue gas pipelines, and university laboratories.

7. Product features

- 2.4-inch high-definition color screen, wide viewing angle, low power consumption
- 4-20mA current signal, RS485 digital signal, 1 set of relay signal output
- Infrared remote control (and), convenient and quick
- Supports multiple gas units switch

8. Attachment configuration list

Standard accessories:

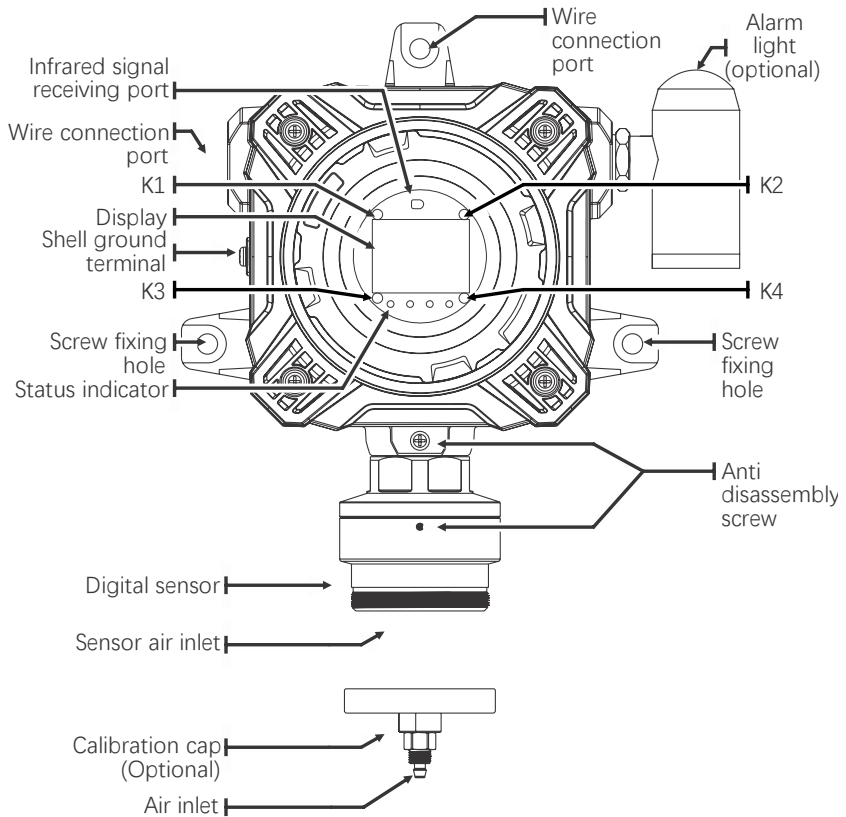
1. One gas detector
2. One infrared Ray controller
3. One magnetic wand
4. One user manual
5. One Certificate of conformity & Warranty card
6. One package box

Optional accessories:

1. Switch power supply
2. Alarm light
3. High temperature probe
4. Mounting brackets
5. Power adapter (24V DC)
6. Calibration cap
7. Others

9. Instrument installation

9.1. Product structure



*K1、K2、K3、K4: Operating area of magnetic wand.

9.2. Installation instructions

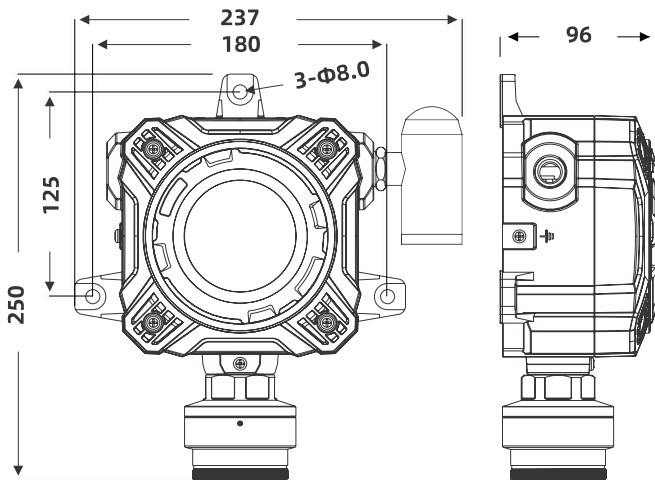
9.2.1. Avoids the following environmental influences

- Environment temperature over device working temperature range.
- Environment humidity over device working humidity range.
- Environment pressure over device working pressure range
- High wind speed.
- Mechanical vibration.
- Strong electromagnetic radiation environment.
- high voltage environment.
- Electricity leakage.

9.2.2. Installation size

The upper and lower spacing of the three fixed holes of the instrument and the size of the device are as shown in the figure below.

The left side is the wiring area, and the right side is the alarm.



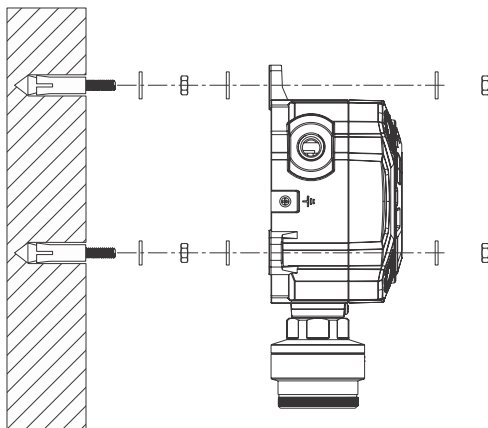
*As shown in the figure, the housing grounding mark "⏏", the instrument must be properly grounded to avoid personal safety accidents or instrument damage caused by leakage or static electricity.

9.2.3. Installation types

Wall-mounted: This installation method is often selected for normal indoor inspection. According to the size of the hole of the detector (above), fix three 6mm expansion bolts on the wall, fix them with screws, nuts and spring washers, and then use 6x30mm nuts and spring washers to fix the expansion bolts on the wall, as shown.

Note: The installation location must be well grounded or insulated. Leakage of electricity may cause the detector to work abnormally.

*Other installation methods such as horizontal pipe, vertical pipe can be adjusted according to site conditions.



9.2.4. Sampling point (Installation point) selection

The sampling point should be close to the leak source within a distance of 1 m or the area where workers stay.

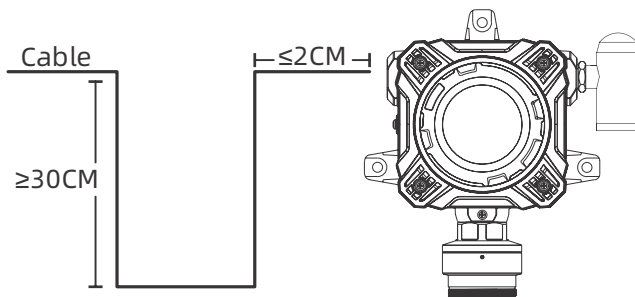
To detect toxic gases lighter than the air index, the sampling point should be installed above the use environment, and the smaller the detection point, the higher.

To detect harmful gases heavier than the air index, the sampling point should be installed below the operating environment.

Commonly, gas weight is similar to air, their sampling point installation height should be 1.5 meters above the ground.

9.2.5. Wire connection instructions

In outdoor areas with a lot of dust, rain or water mist, dust-proof, moisture-proof and rain-proof treatment (such as installing a rain cover) is required, and the wiring is recommended as shown in the picture below, which can prevent rain from pouring back and affect the internal circuit board of the instrument.



Warning: The wire connection must be operated by professionals, otherwise it may cause electric shock or damage the instrument.

*Note: During the wire connection process, it is forbidden to power on.

9.2.5.1. Cable selection:

RS485 transmission cable: Please use shielded twisted pair cable, the theoretical maximum transmission distance is about 1200m, and the actual transmission distance is less than the theoretical value. If long-distance transmission is required, signal transmission repeaters can be used, but no more than 8 repeaters on one wire (repeaters need to be purchased separately).

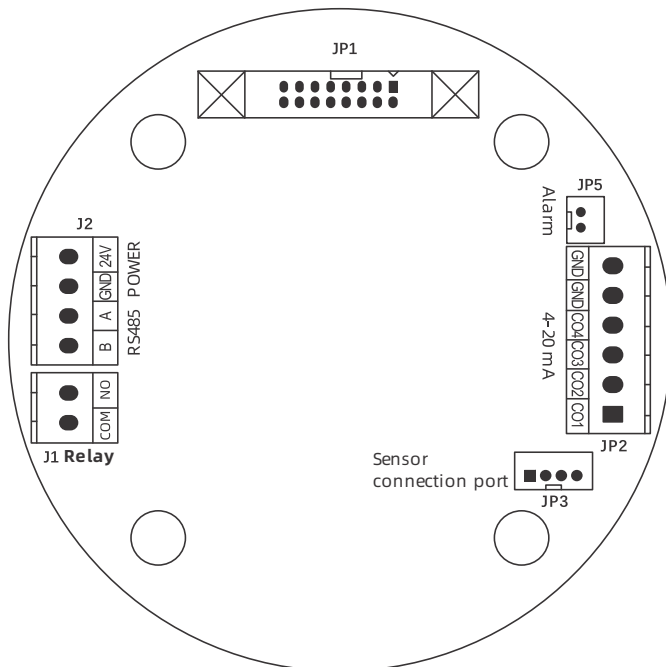
4-20mA transmission cable: Please use shielded cable with a core diameter of 0.75mm or more.

*The transmission distance of 4-20mA is determined by the load resistance. The maximum load of this detector is 500Ω (when powered by 24V). The load resistance includes the input resistance of the control system (controller, PLC, DCS, etc.) and the internal resistance of the cable. Under the condition that the input resistance of the control system remains unchanged, the transmission distance is calculated with reference to the following formula:

$$\text{Reference distance} = (500 - R_c) \div R_m$$

* R_c -input resistance of control system, R_m -resistivity of transmission cable.

9.2.5.2. Wiring interface



J1 on left is the relay control interface: COM (common end), NO (normally open end).

J2 terminal on left, the interfaces from top to bottom are: 24V (DC power-positive), GND (power ground), A (RS485A-positive end), B (RS485B-negative end).

JP5 Alarm light interface

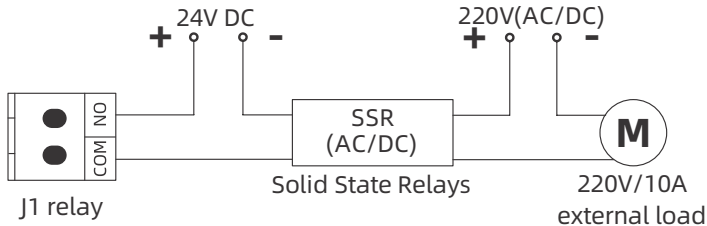
JP2 terminal on right is the 4-20mA interface

JP3 terminal on right is the digital

probe interface, from top to bottom are: GND (power ground), followed by sensor channels COM4, COM3, COM2, COM1.

9.2.5.3. Application example

At the site, the detector detects harmful gas and reaches the alarm value. The detector screen and indicator lights prompt an alarm, and if an optional alarm light is installed, there will be an audible and visual alarm. At this time, the normally open end of the relay closes the circuit, (as shown in the figure below), which can drive the fan for ventilation or drive the alarm system.



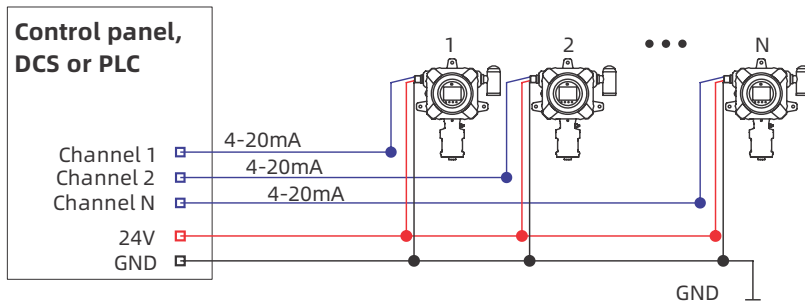
Warning: When the instrument alarms, you must leave the workplace as soon as possible. Otherwise, serious personal injury or personal injury may be caused.

Please re-calibrate and check the detector afterwards to avoid the expansion of equipment errors and cause false alarms.

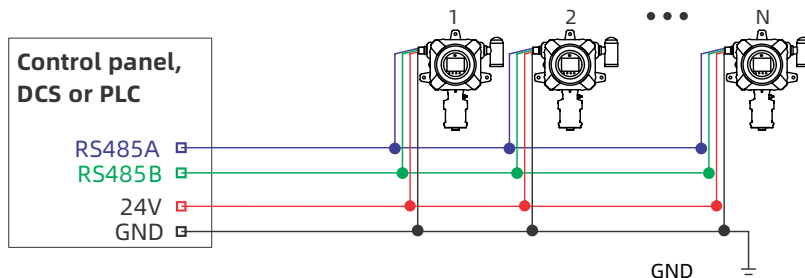
9.2.5.4. Connection diagram of multiple instruments

4-20mA current signal output mode and RS485 digital signal output mode are different in wiring; the following example power supply connection mode is for reference only, and the power supply mode can be selected according to the actual situation during installation.

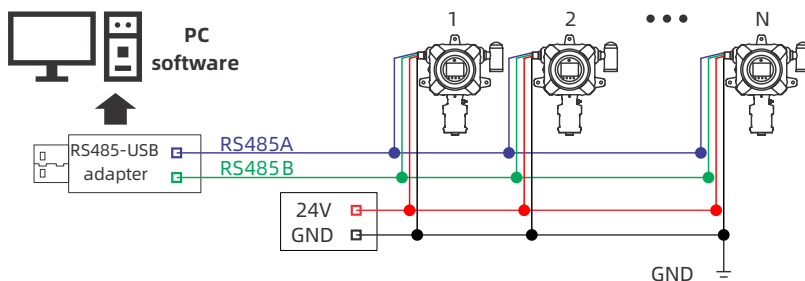
A. 4-20mA current signal output connection mode. (must be grounded together)



B. RS485 digital signal output connection mode 1. (can be independently grounded)



C. RS485 digital signal output connection mode 2. (can be independently grounded)



10. Operation

10.1. Remote controller

Note: When using, please aim at the infrared receiving port above the display screen to operate. The instrument is equipped with a remote controller with a total of 11 buttons, as the picture shows.

Key	Function
MENU	Enter the menu
 Mute	Turn off the sound
PUMP	-
BACK	Cancel/Return/Unit
OK	Confirm
↑	Shift Up
↓	Shift Down
←	Shift left
→	Shift Up right
+	Plus
-	Minus

1. MENU key: enter the menu (in the detection interface).
2. Mute key: Turn off the alarm sound of the instrument (in the detection interface).
3. Back key: cancel; return to the previous menu or detection interface, Double-click the BACK button on the detection interface to switch the unit (only $\mu\text{mol/mol}$ and PPM).
4. OK key: confirm; enter the next level menu.
5. Up key: Move the cursor up.
6. Down key: Move the cursor down.
7. Left key: move the cursor to the left; select the position to modify the data.
8. Right key: move the cursor to the right; choose to modify the data position.
9. Add key: increase the value.
10. Minus key: decrease the value.

10.2. Magnetic wand

The thin end of the magnetic wand is the operation end, which can be triggered near the K1~K4 positions at the four corners of the screen.

K1: In the detection interface, enter the menu; In the function menu, enter and confirm the operation.

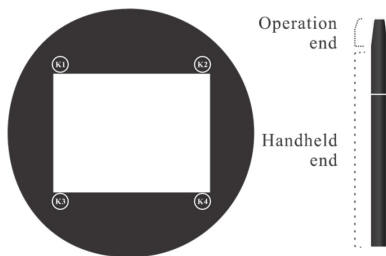
K2: In the function menu, cancel the operation and return to the superior.

K3: In the main menu, switch to the left menu; Switch up in the function list; In the numerical operation interface, switch the operation position (cursor).

K4: In the main menu, switch to the right menu; Switch down in the function list ; In the numerical operation interface, add numerical values.

In the function list, it is equivalent to pressing the down key to switch down; In the numerical operation interface, it is equivalent to adding keys and adding numerical values;

Note: Both remote controller operation and magnetic wand operation have the same operating effect. Please select one operation.

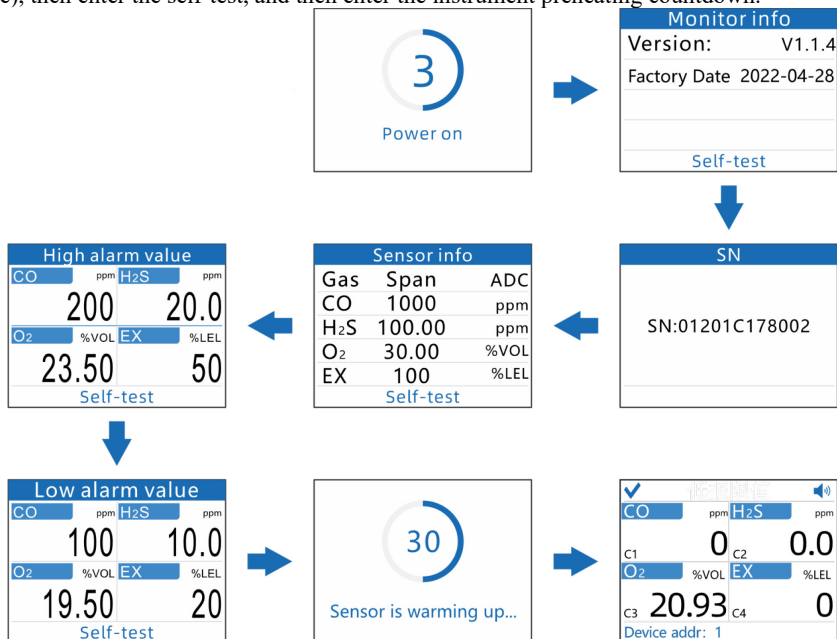


10.3. Power On/Off

10.3.1. Power On

1. In the power-off state, check whether the power cord on the left side of the instrument is in good condition and has no foreign objects.
2. When connect with the power, the instrument power on.

When the instrument power on, it will initially display "Power On" (if it cannot be displayed normally, the instrument may be faulty, please contact the agent or after-sales service department at that time), then enter the self-test, and then enter the instrument preheating countdown.



After the startup is complete, the reading and various function icons will be displayed on the screen.

10.3.2. Power Off

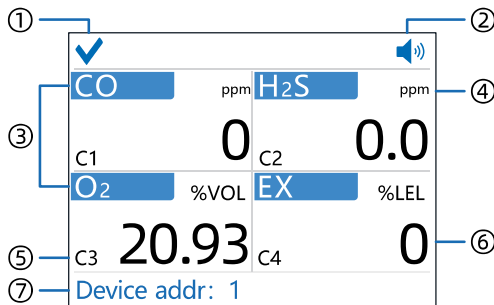
In the normal measurement state or when there is power, just disconnect the power.

11. Functions

11.1. User Interface

Note: Both remote controller operation and magnetic wand operation have the same operating effect. Please select one operation.

11.1.1. Detection interface description



The detection interface on the instrument displays the sensor type, indication and other functional status information.

The top are: self-test status (passed "√", failed "×"), alarm (on-blue; off-gray)

1. Self-test status: blue √ self-test is successful and the device is normal; gray X means the device is abnormal in self-test, please contact the manufacturer.
2. Sound status (Optional): blue on, gray off. It's the optional function. If detector with alarm light, then have this function.
3. Gas name: The name of the gas type is in the blue box.
4. Gas unit: Small black characters are gas units.
5. Channel number: Corresponding to output 4-20mA interface CO1, CO2, CO3, CO4.
6. Concentration reading: The black characters are the gas concentration readings.
7. Address number: detector address

When the following screen appears, please check the device.

Loss of signal: The detector is not connected or has poor contact. After the reconnection is correct, the interface still appears, please contact the manufacturer.



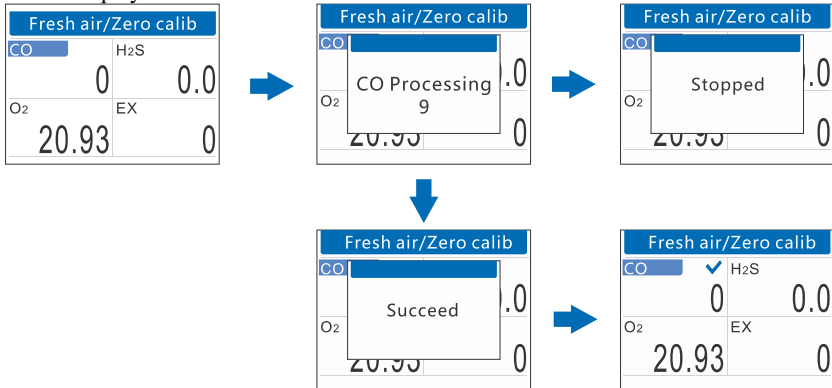
11.1.2. Main menu interface operation

When operating the "K1" (MENU key) on the gas detection interface, the instrument enters the main menu interface; Operate the "K2" (Back key) on the main menu interface to return to the gas detection interface. On the main menu interface, operate "K3" (Left key) to switch options to the left, and "K4" (Right key) to switch options to the right.

11.2. Calibration

11.2.1. Fresh air/zero calibration

On the fresh air/zero calibration interface, operate "K3" or "K4" (left or Right key) to select the gas to be calibrated. Operate "K1" (OK key) to enter the calibration state, followed by a thirty second countdown. During the calibration countdown period, operate "K2" (Back key) to cancel the zero calibration and display "Terminated".



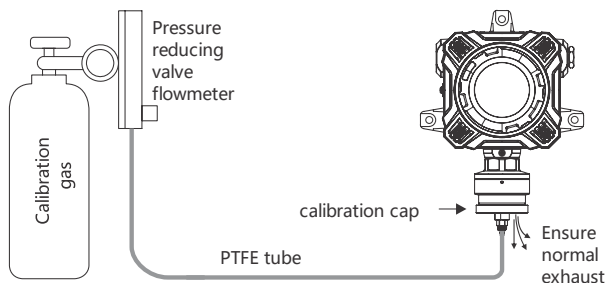
*In the "Fresh Air/Zero Calibration" menu, you can operate the "K2" (Back key) to return to the previous menu level.

Notice:

- For gases originally existing in the air (such as carbon dioxide, oxygen, nitrogen), the instrument is calibrated as 450PPM for carbon dioxide; 20.93% VOL for oxygen; 78.1% VOL for nitrogen.
- Before do this operation, it is recommended to start up and warm up for 10~20 minutes.
- When performing this operation, please turn on the instrument and place it in pure air for 3-5 minutes, and wait for the value to stabilize before proceeding, otherwise the displayed data will be inaccurate.

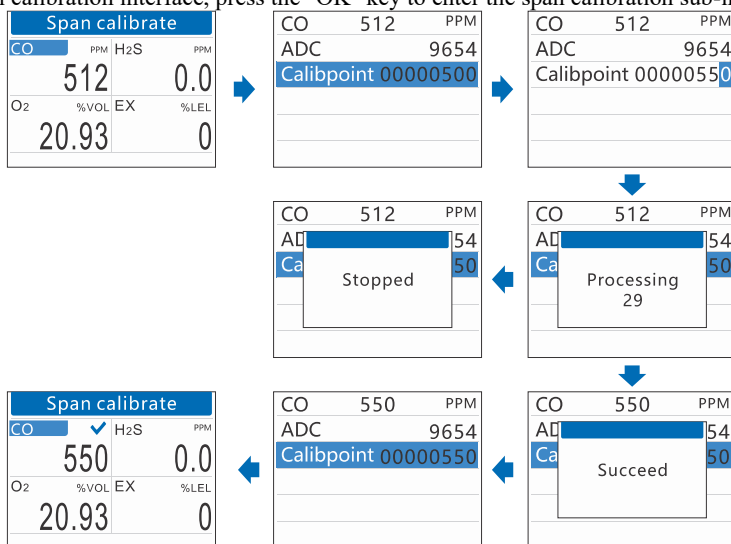
11.2.2. Span Calibration

The designed flow rate of this detector is 0.3L/min. Connect the instrument to the standard gas cylinder. During ventilation, ensure that the exhaust hole of the calibration cap (Optional) is properly vented.



Attention: After completing the calibration, please remove the calibration cap during normal use.

In the span calibration interface, press the "OK" key to enter the span calibration sub-interface.



There is an option in the span calibration sub-interface. At the same time, the gas type, real-time concentration value, unit and ADC value are displayed at the top.

The span calibration process is as follows (the following example assumes that the calibration gas is 550ppm CO):

After the instrument is turned on and enters the span calibration interface, connect a calibration gas with a known concentration to the instrument through a PTFE tube.

According to the actually used calibration gas concentration value (550PPM). Operate "K3" (Left key) to move the cursor and "K4" (add key) to increment the value, and modify the right value (set value) to be the same as the calibration gas (550ppm) used

Open the calibration gas valve, and input the calibration gas to the instrument at a flow rate of more than 0.3L/min. After the real-time concentration (upper middle) displayed on the instrument is basically stable (about 1-3 minutes, different gas sensors have different stable times), operate "K1" (OK key) to start the calibration. Then the instrument enters the 9-second countdown for calibration,

the calibration operation is completed after the screen displays "success".

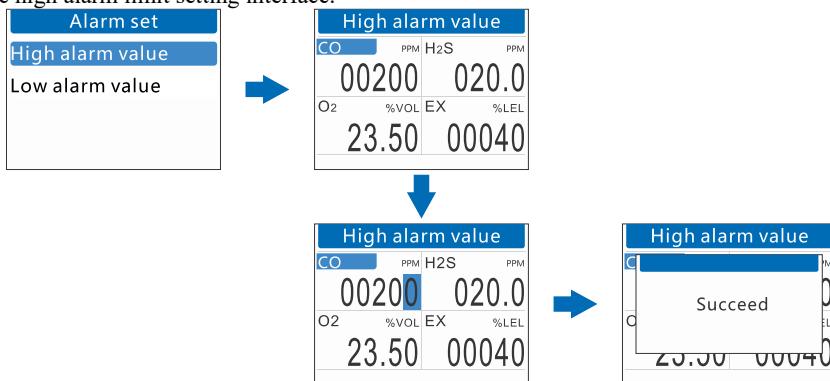
Notice:

1. During the calibration countdown period, the "K2" (Back key) can be operated to terminate the span calibration operation.
2. In the alarm set interface, operate "K3" (Left key) or "K4" (Right key) to move the cursor and select high or low alarm value settings.
3. First, operate the "K1" (OK key) to enter the numerical setting.
4. Continue operating "K3" (Left key) to switch the cursor, and "K4" (Plus key) to modify the value.
5. After entering the numerical value, operate the "K1" (OK key) to confirm the numerical setting.

11.3. Alarm set

11.3.1. High alarm value, low alarm value

There are 2 alarm values, high alarm value and low alarm value, take the high reporting limit as an example. In the alarm setting interface, press the "←" and "→" keys to move the cursor to select and enter the high alarm limit setting interface.



Alarm value set:

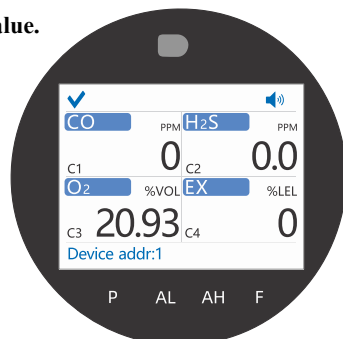
1. In the alarm set interface, operate "K3" (Left key) or "K4" (Right key) to move the cursor and select high or low alarm value settings.
2. First, operate the "K1" (OK key) to enter the numerical setting.
3. Continue operating "K3" (Left key) to switch the cursor, and "K4" (Plus key) to modify the value.
4. After entering the numerical value, operate the "K1" (OK key) to confirm the numerical setting.

Notice:

- The high alarm value cannot be lower than the low alarm value.
- The low alarm value or the high alarm value cannot be higher than the range.

*Indicator status:

- Power: After power on, the green light is on.
- Low alarm: no low alarm, light is off; low alarm, red light is on.
- High alarm: no high alarm, light is off; high alarm, red light is on.
- Fault: no fault, no light; self-test fault, orange light on.

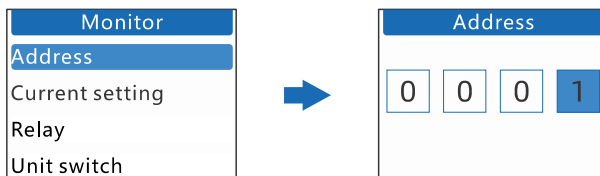


11.4. Monitor

11.4.1. Address

When connecting multiple instruments to the control panel, in order to distinguish the instruments, we need to set different address values for each instrument. In the monitor setting interface, operate "K3" or "K4" (Up and Down keys) to move the cursor and select "address", then operate "K1" (OK key) to enter the "address" setting interface; Operate the "K2" (Back key) in the submenu interface to return to the main menu interface.

Address setting:



- Operate "K3" (Left key) to move the cursor, and "K4" (Plus key) to modify the value.
- After entering the numerical values, operate the "K2" (Back key) to return to the upper menu and save the modified values.

In the "Address" menu, you can operate the "K2" (Back key) at any time to return to the previous menu level.

Note: There is only one address for each detector. Do not set the same value for multiple detectors. The effective address range is 001~200!

For example: two four-gas detectors.

Detector 1, the address is set to 001, then the channel C1 is 001, the channel C2 is 002, the channel C3 is 003, and the channel C4 is 004;

Detector 2, the address is set to 005, channel C1 is 005, channel C2 is 006, channel C3 is 007, and channel C4 is 008.

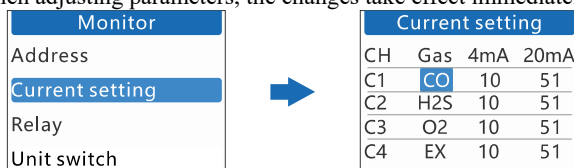
By analogy, the set address is determined by the channel quantity.

11.4.2. Current Setting

This function can fine tune and calibrate the CO1/CO2/CO3/CO4 channel of the output signal.

In the monitor setting interface, use "K3" or "K4" (Up and Down keys) to switch the option to "Current Setting", and "K1" (OK key) to enter the setting interface.

Please note that when adjusting parameters, the changes take effect immediately.



Output channel adjustment: Operate "K3" (Left key) to switch the cursor, and "K4" (Plus key) to adjust parameters. This setting is displayed and changed synchronously on the detection interface.

For example, when gas exchange occurs between C1 and C2 channels, upon returning to the detection interface, the corresponding channel displays for CO and H2S will also change to C2 and C1.

Current setting				
CH	Gas	4mA	20mA	
C1	CO	10	51	
C2	H2S	10	51	
C3	O2	10	51	
C4	EX	10	51	



Current setting				
CH	Gas	4mA	20mA	
C1	H2S	10	51	
C2	CO	10	51	
C3	O2	10	51	
C4	EX	10	51	



✓	CO	ppm	H2S	ppm
	C1	0	C1	0.0
	O2	%VOL	EX	%LEL
	C3	20.93	C4	0
Device addr: 1				

Current signal fine-tuning: Operate "K3" (Left key) to select the 4mA or 20mA option of the channel with connection error, connect the Multimeter for inspection and verification, and operate "K4" (Plus key) to adjust. After the displayed parameters of the Multimeter meet the requirements, operate "K2" (Back key) to exit the setting interface.

Current setting				
CH	Gas	4mA	20mA	
C1	CO	10	51	
C2	H2S	10	51	
C3	O2	10	51	
C4	EX	10	51	

Current setting				
CH	Gas	4mA	20mA	
C1	CO	10	55	
C2	H2S	10	51	
C3	O2	10	51	
C4	EX	10	51	

In the "Current Settings" menu, you can operate the "K2" (Back key) at any time to return to the previous menu level.

11.4.3. Relay

There are two options in the "Relay Settings" menu, namely "General" and "Backlash". Use "K3" or "K4" (Up and Down keys) to switch and select the setting options. After selecting them, operate "K1" (OK key) to complete the settings.

In the "Relay Settings" menu, you can operate the "K2" (Back key) at any time to return to the previous menu level.

Monitor	
Address	
Current setting	
Relay	
Unit switch	



Relay	
General	●
Backlash	



Relay	
General	
Backlash	●

General: The detector changes from normal to alarm state, and the relay control interface is normally closed or normally open; the detector changes from alarm to normal state, and the relay control interface is normally open or normally closed.

Example: When the detector alarms (low or high alarm), the relay normally open and interface closes the circuit to drive the ventilation system or the alarm system to remind the operator; when the detector returns to normal state, the relay normally open and interface returns to the open circuit state and closes the ventilation system or alarm system.

Backlash: The detector triggers the high alarm state, and the relay control interface is normally closed or normally open; when the detector returns to the normal state from the high alarm, the relay control interface is normally open or normally closed.

For example: when the detector triggers a high alarm, the normally open port of the relay closes the circuit to drive the ventilation system or alarm system to remind the operator; the detector returns to the normal state, the normally open port of the relay returns to the open state, and the ventilation system or alarm system is turned off.

*Specific applications need to take into account the characteristics of special gases such as oxygen.

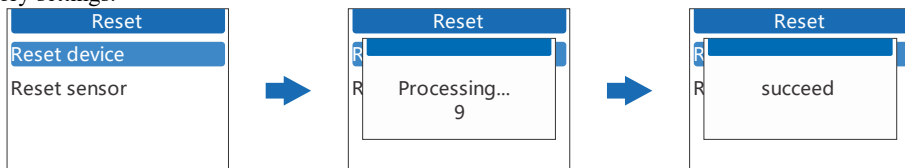
11.4.4. Unit switch

This instrument supports unit switching and automatic numerical conversion.

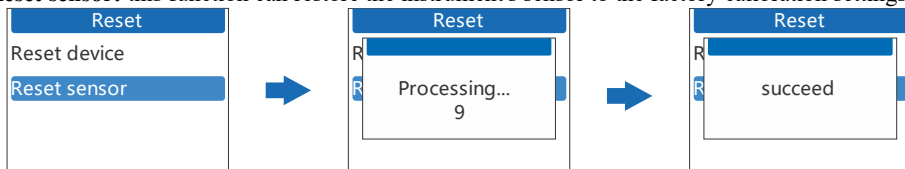
Example: When using conventional four gases, CO and H₂S channels support $\mu\text{mol/mol}$, ppm, mg/m^3 switch.

11.4.5. Reset

Reset device: This function can restore all settings (except the sensor calibration parameters) to the factory settings.



Reset sensor: this function can restore the instrument's sensor to the factory calibration settings.



Reset operation:

First, operate "K3" (up key) to move the cursor to select the corresponding function, and then operate "K1" (OK key) to confirm the selection of reset

During the countdown, a 10 second countdown will be displayed, and operating the "K2" (Back key) during the countdown process can terminate the reset setting.

In the "Reset" interface, you can operate the "K2" (Back key) to return to the previous menu level.

Note: The reset operation is irreversible. After reset, the parameters set by user will be cleared and can't be restored. Please use it carefully.

11.4.6. Protocol Switch

Please note: The default is "New Protocol", please do not make any changes.

11.4.7. Language Setting

The instrument supports both Chinese and English Language.

Operate "K3" or "K4" (Up and Down keys) to move the cursor to select the corresponding function, and then operate "K1" (OK key) to confirm the selection. In the "Language Settings" interface, you can operate the "K2" (Back key) at any time to return to the previous menu level.

In the "Language Settings" interface, you can use the Back key at any time to return to the previous menu level.

11.4.8. Output Mode

The [Output mode] of the instrument can be switched between "RS485" and "cloud platform".

RS485 mode: used to connect the Gas Control Panel (For example, YT-1600H) and PC software.

Cloud platform: used to connect 4G-DTU communication.

11.5. Info

11.5.1. Monitor Info

Monitor info including Version and Date.

11.5.2. Sensor Info

Sensor info including gas type, measure range and ADC value.

11.5.3. Firmware Upgrade

Online upgrade requires operation through the PC software. Please refer to the relevant instructions for using PC software for details.

12. Common faults and solutions

Fault phenomenon	Possible cause of failure	Solution
Sensor failure	Over range used	Replace the sensor with a new one and use it properly
	Sensor loose	Please contact dealer or manufacturer for repair
	Use in non-detection environments	
	Personal operation error	
No response to detected gas	Circuit failure	Please calibrate in time
Display is not accurate	Sensor expired	
	Long-term uncalibrated	Calibrate or replace sensors in time
Zero calibration function not available	Too much sensor drift	
	Over range used	Please contact dealer or manufacturer for repair
When the instrument detects normally, the interface shows the full scale	Sensor failure	
Self-test failed	Sensor could not be found	1, Restart the instrument 2, Please contact dealer or manufacturer for repair

Please contact us when other faults occur.

13. Terms of Service

Warranty Commitment

The company promises that all the detectors delivered by the company will be calibrated with the relevant specific concentration of standard gas. After purchasing the company's products, users do not need to do span calibration without special circumstances, and the operation must be performed by professional technicians.

This commitment is only available for detector and does not include accessories.

Repair time

When your machine needs to be repaired, we will repair it for you within 7 valid working days after receiving your returned machine. In case of special circumstances, if the repair cannot be completed within 7 valid working days, our staff will call in advance to negotiate the repair date with you.

The aforementioned restoration dates do not include shipping time.

Limited Liability Warranty

After your product is repaired by our maintenance agency, you will continue to enjoy the promise of the original warranty period.

When you need warranty service, please present a valid warranty certificate, including warranty card and a invoice or purchase contract.

When the situation listed in the warranty description is not covered by the warranty, you can choose a paid maintenance services.

If the repaired parts exceed the free warranty period, please pay a certain repair service fee. The standard of the repair service fee is provided by our maintenance organization.

We have the right not to provide warranty service for product damage caused by the following circumstances:

1. Human-induced damage.
2. Damage caused by violation of operating regulations and requirements.
3. Damage caused by all natural disasters such as floods, fires, etc.
4. Damage caused by harsh use environment.
5. This product is repaired, altered, modified or disassembled by unauthorized service personnel.

14. Standards

IECEX Explosion-proof standard:

IEC 60079-0: 2017 Explosive atmospheres - Part 0: Equipment - General requirements

IEC 60079-1: 2014 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures “d”

ATEX Explosion-proof standard:

EN IEC 60079-0:2018

EN 60079-1:2014