


Important Notice

1、Do not install and use the gas detector until you read and completely understand this operating manual. It contains operating and maintenance procedures to ensure proper detector function.

2、Do functional test before formal use, to make sure correct wiring, the probe and host working well. You' d better do the test at the known possible critical period of leaking such as pre-construction.

3、For your safety, it is required to inspect and maintain the detector periodically(less than six months).

About The Contract

The detector should be used in accordance with the instructions in this mark , otherwise the equipment may be badly damaged.

Caution
It should be read carefully, preventing you from missing important information and causing unnecessary trouble.

If you have any problem in the process of installation and use, please contact us 010-51292816、82419702/03/06/07.

一、 Introduction

CGD -I series gas detector (hereinafter referred to as the detector) is our company independent development of the probe, which can be widely used in petroleum chemical industry, fire protection, environmental protection, scientific research production, storage, use, indoor and outdoor easy leakage gas for the dangerous places.

CGD -I series gas detector can be divided into CGD-I (display) series, CGD-I (non-display) series. Display series also can be divided into LCD display (CGD-I-1) and digitron display (CGD-I-D).

The signal output ways include 4 ~ 20 mA current signal, bus communication system (RS485) digital signal and switch quantity output signal, depending on the type, detector can be controlled with the corresponding adapter host for signal transmission. It can real-time display gas concentration ($\times 10^{-6}$ or % LEL), set high/low limited alarm values, calibrate, realize monitoring probe all actions by the host, for you to provide production safety, strong operability of the services. Adaptive control host: JH - 1, JH - 2, JH - 4, JH - 8, JH - 16, JH - 99.

Key features:

- signal output: 4 ~ 20 mA current signal/ RS485 digital signal/ switch quantity output signal (optional)
- Explosion-proof enclosure, can be used in dangerous places
- Good long-term stability, small zero drift
- Good repeatability and high reliability

二、 Technical Indicators

Item	Description
Power	DC24V
Measuring mode	diffusion
Accuracy	$\pm 3\%FS$ (combustible gas)
Power Consumption	$<3.5W$ (combustible gas)/ $0.5W$ (toxic gas)
Reaction time	$\leq 30s$ (combustible gas)/ $\leq 60s$ (toxic gas)
Transmission distance	$<1000m$ (add signal enhancer when $>1000m$)
Transmission mode	shield cable
Installation mode	wall mounted/ pipeline mounted
Environmental Humidity	10%–95% RH (Non – Condensing)
EX Rating	Exd II CT6Gb
Shell material	die-casting aluminum
Electrical interface	M20*1.5

三、 Key Component

The key components of CGD-I series gas detectors include shell, sensor and circuit board.

四、Basic Principle

4.1 Electrochemical gas detector

When the measured gas diffuses through a permeable membrane into the sensor, a redox occurs in the sensor, converting chemical energy into electrical energy and outputting it in a microcurrent, linear proportional to the concentration of the measured gas.

4.2 Combustible gas detector

The gas detector adopts the principle of catalytic combustion type, uses heating element to measure combustible gas in the surface of the sensor giving off heat when the combustion reacts. That is to say, the combustion makes platinum silk temperature rising, coil resistance increasing. Measurement the size of the platinum wire resistance can know the concentration of the combustible gas.

4.3 Semiconductor gas detector

When a semiconductor sensor is in contact with the measured gas, the resistance of the semiconductor changes proportionally with the gas concentration, and the target gas is detected by this characteristic.

4.4 Infrared gas detector

Infrared gas detector is a kind of gas sensor device, based on selective absorption characteristic of the near infrared spectrum of different gas molecules, using the relationship between gas concentration and absorption intensity (Johann Heinrich Lambert-Beer law) to identify gas components and determine their concentration.

4.5 Photoionization gas detector (PID)

The PID gas sensor uses a photoionization detector to ionize and identify specific volatile organic compounds, it has many characteristics like high precision, small destructiveness, fast response and long service life. It can be widely used in chemical industry, transportation, military, aerospace and other fields.

五、Product overview

5.1 CGD-I-2 toxic gas detector (non-display)



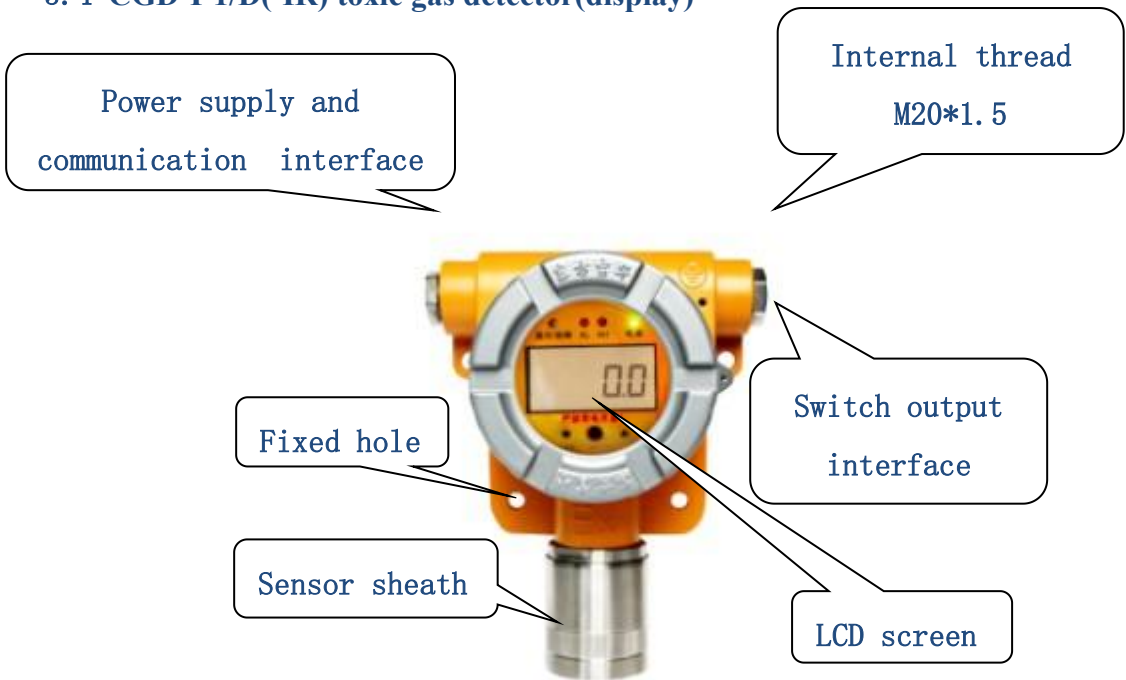
5.2 CGD-I-2EX combustible gas (non-display)



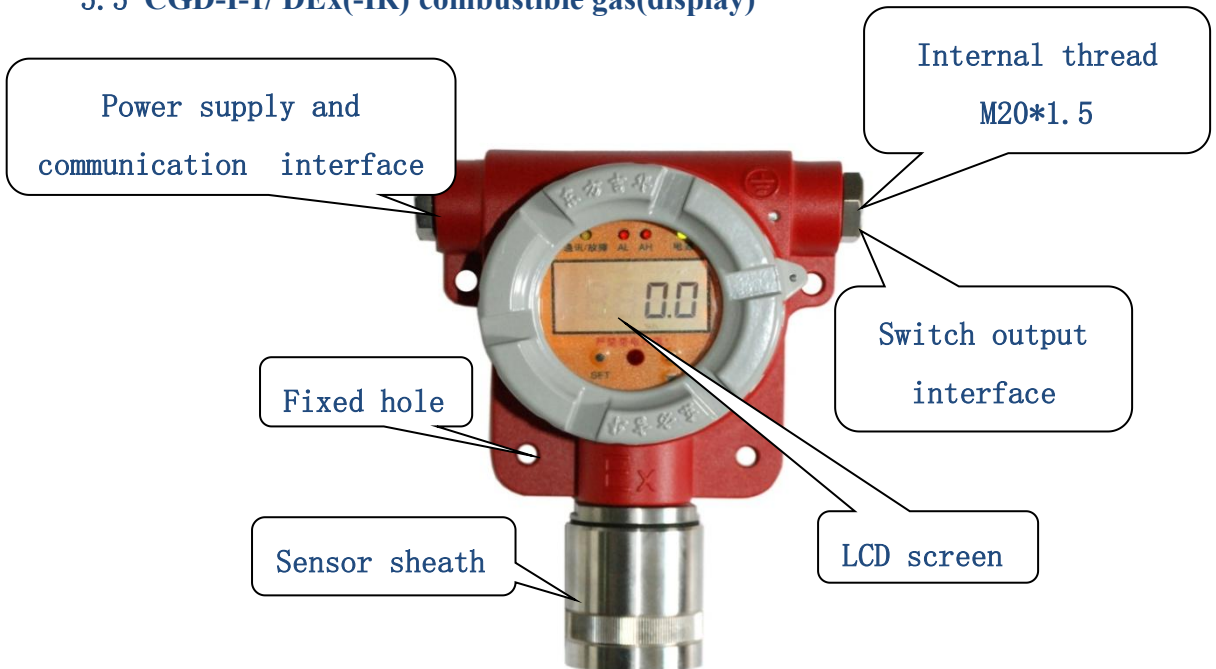
5.3 CGD-I-K (non-display)



5.4 CGD-I-1/D(-IR) toxic gas detector(display)



5.5 CGD-I-1/ DEx(-IR) combustible gas(display)



六、 Installation



Installation place and principles

CGD - I series detectors are explosion-proof products, can be installed in chemical production workshop and other places which may have a gas leak.

Caution
Sampling method of the detector is diffusion type; it should be installed in the location where the target gas can be most possibly detected.

6.1 Installation principles

1、Should comply with the law of the People's Republic of China on explosive dangerous location electrical safety regulations and GB50493-2009 "petroleum and chemical combustible gas and toxic gas detection alarm design code.

2、Need shell connection, and must tight the cable after completion of joint.

3、When installing the detector ,user should make sure sensor sheath be down, otherwise it will have a bad effect on the detector because of external medium.

4、The detector can't be sprayed, and painted. If users want to spray where to install detector, you shall ensure that the detector

flame-proof is not glued on paint, because monitoring for paint will prevent the gas diffusion into the sensor, affecting the test results.

5、Detector should try to avoid work under severe water environment or directly under the rain, thunder and lightning.

6、Users should choose valve, the pipeline interface, near the outlet such as easy to leak to install the detector, as near as possible, but do not affect other equipment operation, avoid high temperature and high humidity environment at the same time, avoid external influence, such as splashing water, oil, and the possibility of mechanical damage. At the same time, users should consider to facilitate subsequent maintenance and calibration.

6.2 Installation notes

Caution
<p>1: the detector can be installed by wall mounted or pipeline mounted, ensure that installation is firm and reliable.</p> <p>2: the detector sensor should be fixed down , after correct connection, users should fully cover the shell, in order to achieve the explosion-proof requirements. Up to install sensors will be immersed in water or other liquid, which will damage the detector.</p>

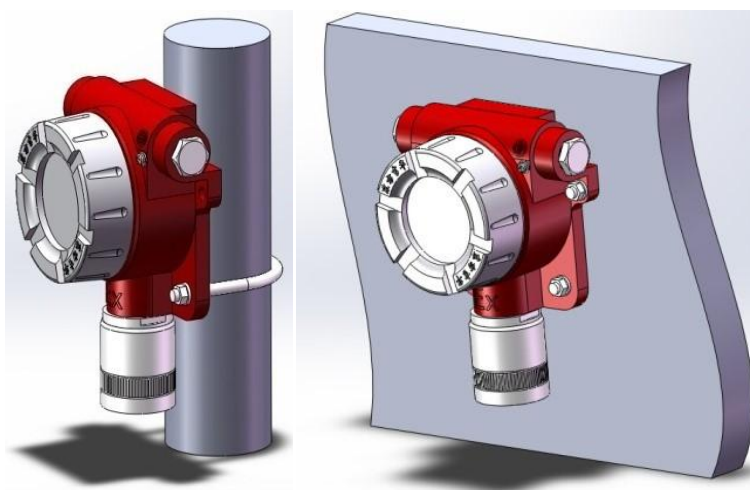
6.3 Installation mode

A: Wall mounted

Connect mounting bracket with detector by $\phi 6 \times 30$ mm bolt ; Fixed two $\phi 6 \sim 8$ mm bolts on the wall, according to the size chart to determine distance, add plain washers, spring washers, nut in turn and tighten it.

B: Pipeline mounted

Install and fix the detector on the tube (horizontal tube or vertical tube). Caution that sensor and contact of the gas down to install. (see chart)





Caution

The installation position of the detector has an important effect on the detection result, so the following factors should be considered when determining the installation position:

- 1: gas leak location;
- 2: the proportion of the measured gas;
- 3: the impact of the surrounding buildings;
- 4: the effect of wind direction;
- 5: weather conditions all the year round;
- 6: the location of doors and windows, etc.

The following recommendations are available for user reference:

- The indoor installation, probe detection radius within 1m, outdoor installation, detection radius within 2m
- The position of the probe should be under the direction of the leak;
- According to the proportion of gas and air measured to determine the installation height, if gas is heavier than air, please install the probe at 30cm distance above the ground. On the contrary, a probe is installed 30cm below the ceiling.
- according to drain leakage frequency and retention time, the new and old degree of production equipment, to select quantities of the probe , in order to achieve the best installation effect.
- The probe should keep a proper distance with the possible leak place.

6.4 Installation steps

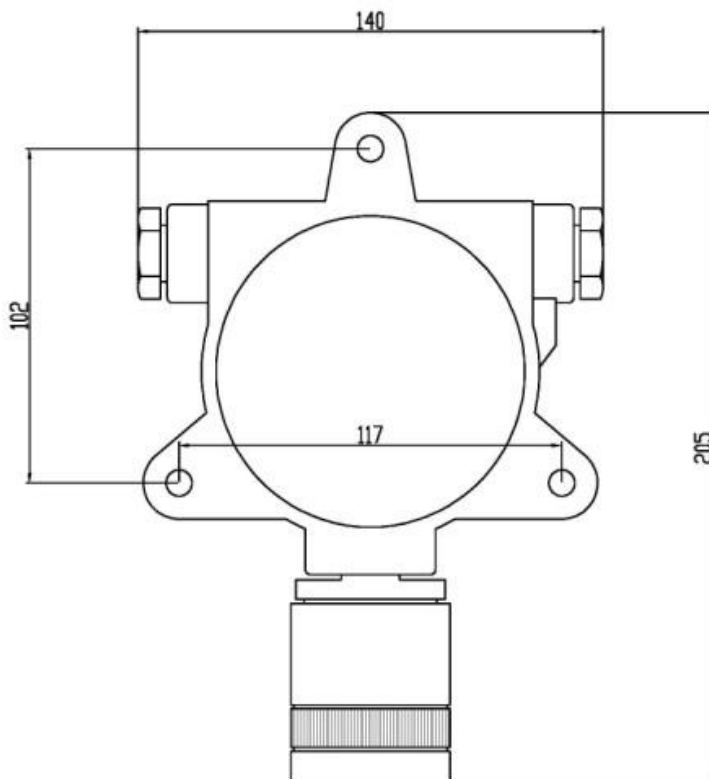
- ①Put the line in the tube at the detector scene (Caution that the line should be led into the detector, in order to wiring);
- ②Refer to the wiring diagram of the detector;
- ③According to the installation method, please install the detector on base plate.
- ④ According to the corresponding installation diagram, please install the base plate on the wall or tube.

Caution

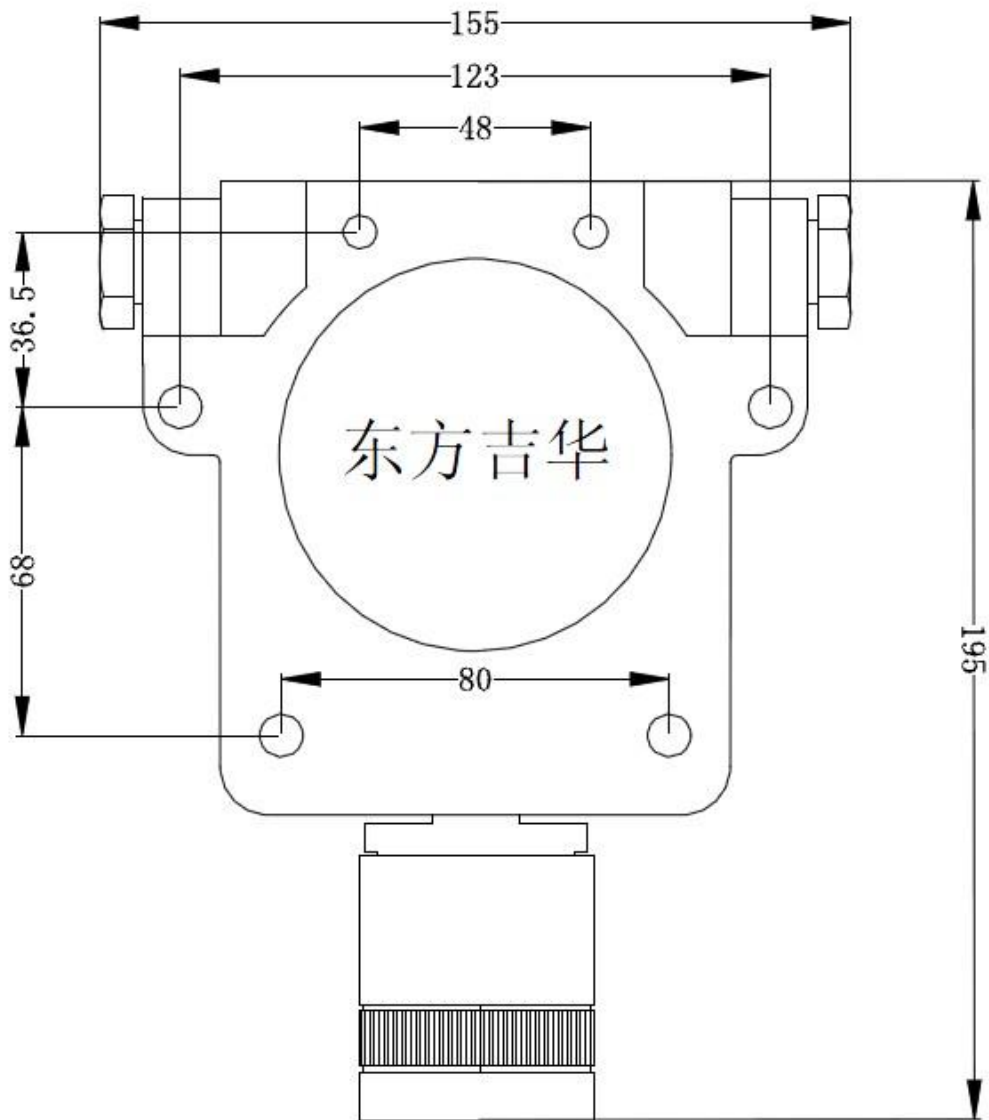
The connecting line interface of the detector must be insulated.

6.5 Installation size

6.5.1 CGD-I-2/K (unit: mm)



6.5.2 CGD-I-1/D(-IR)



Unit: mm

七、Terminal Connections

7.1 CGD-I (non-display) detector

1、CGD-I-2Ex :



+24V	GND	OUT (4mA~20mA)
red	black	blue

Caution: “GND” terminal is the public negative for power and signal.

After fixing the detector, unload the upper cover, introduce a cable from import, take off the thread, and access terminals according to the positive and negative polarity.

2、CGD-I-2 (non-display) toxic gas detector :



+24V	S (4mA~20mA)
red	blue

After fixing the detector, unload the upper cover, introduce a cable from import, take off the thread, and access terminals according to the positive and negative polarity.

If users install the host and detector at the same time, the host superscript “+ 24V” terminal is connected with detector superscript “+ 24V” terminal, host superscript “GND” terminal is connected with detector superscript “GND”, host superscript “in ” terminal is connected with detector superscript “S/OUT ” terminal. Cable respectively penetrates into the lock tight with nuts, flat washers and rubber ring and reintroduction into the inlet port, then connect

according to the above method, confirm that the connection is firm, leave proper length of cable inside the shell, then lock nut, and tighten upper cover. For safety and reducing interference, cable and shielding layer should be grounding, signal transmission cable, the shorter the better, should be protected by pipe as much as possible.

7.2 CGD-I-1/D(-IR) (display) gas detector

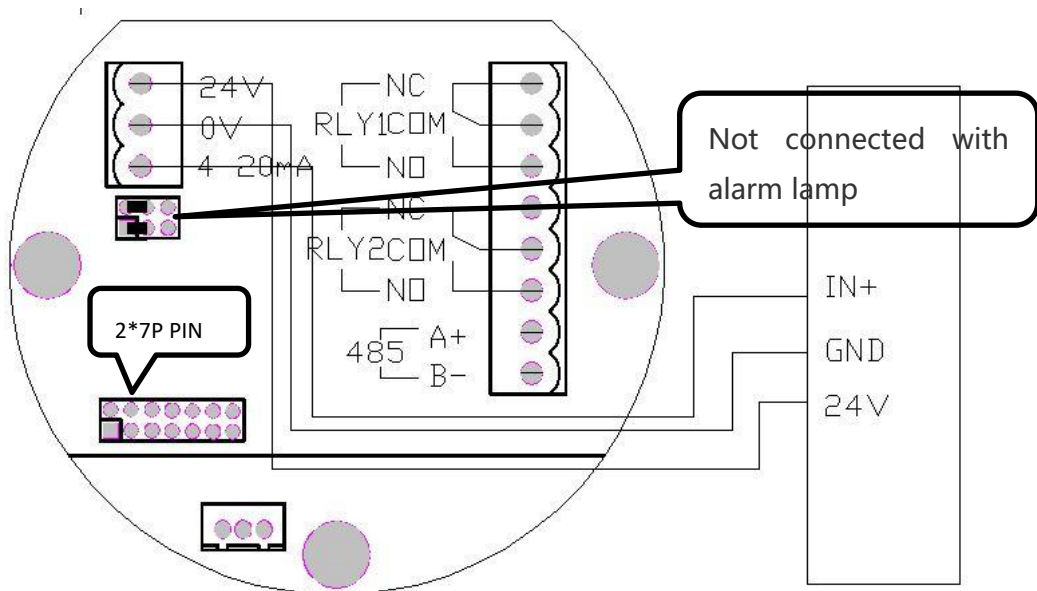


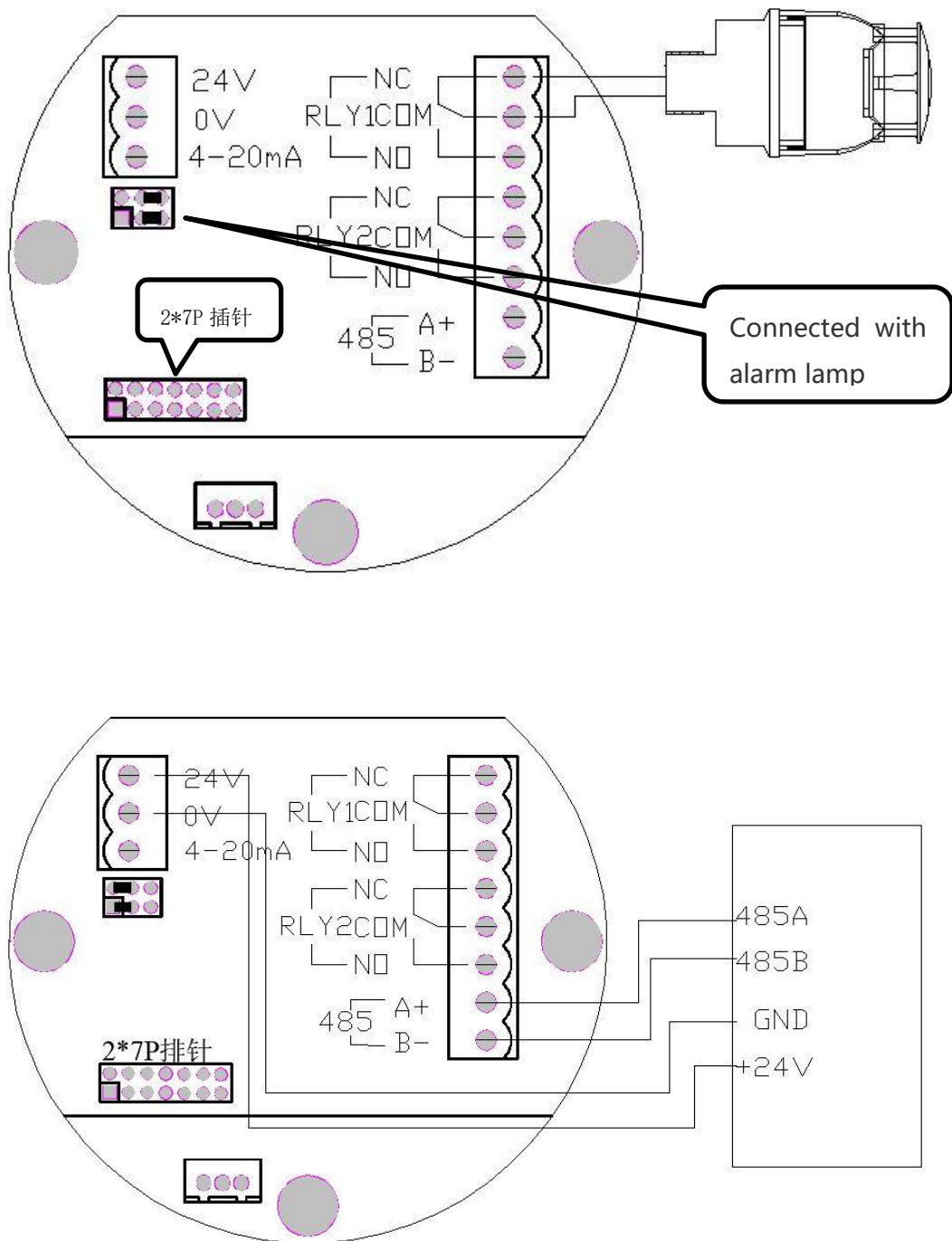
When connecting the wire, users should cut off power supply, the detector's power supply voltage cannot exceed the limit (DC 30V).

Caution

Detector terminal allows maximum wire diameter 7.5mm

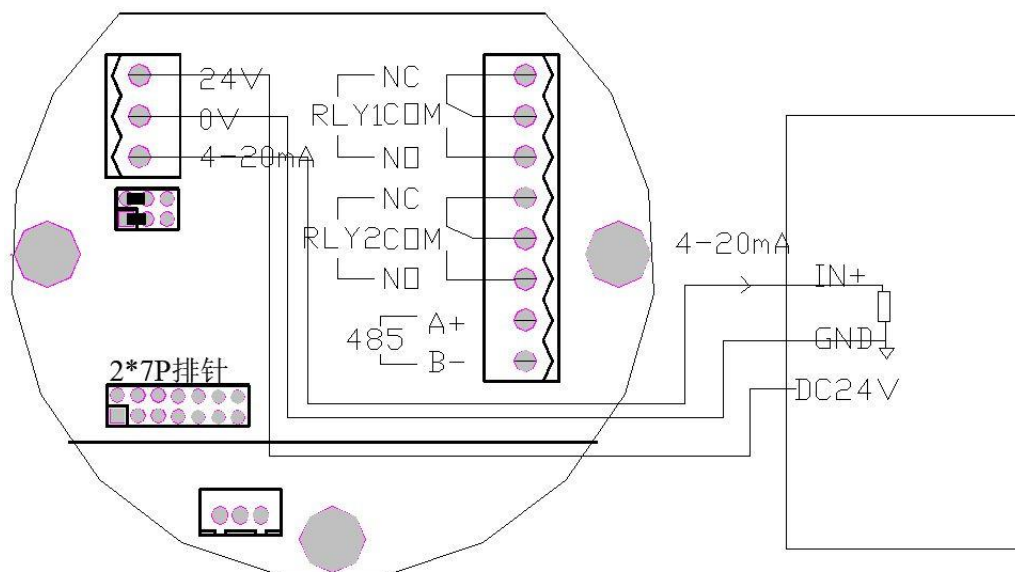
Wiring from detector (CGD-I-1/D) to controller (JH) 4mA-20mA:





Wiring from detector (CGD-I-1/D) to controller (JH) 485:

Wiring from detector (CGD-I-1/D) to DCS:



Caution

When the two-wire detector is connected to DCS or PLC, it should be connected to the active interface of DCS or Plc.

When the three-wire detector is connected to DCS or PLC, it should be connected to the passive interface of DCS or Plc, and supply the probe with 24V power, DCS or PLC share common ground with 24V power.

Chart1: Terminal block function

Marking	Description	Marking	Description
24V	+VE Supply (18~30VDC)	RLY1 - NC	Relay1-Normally Closed
0V	-VE Supply (0VDC)	RLY1 - COM	Relay1-Common
4-20mA	Current Output Signal	RLY1 - NO	Relay1-Normally Open
-----	-----	RLY2 - NC	Relay2-Normally Closed
485 - A+	RS485 +	RLY2 - COM	Relay2-Common
485 - B-	RS485 -	RLY2 - NO	Relay2-Normally Open

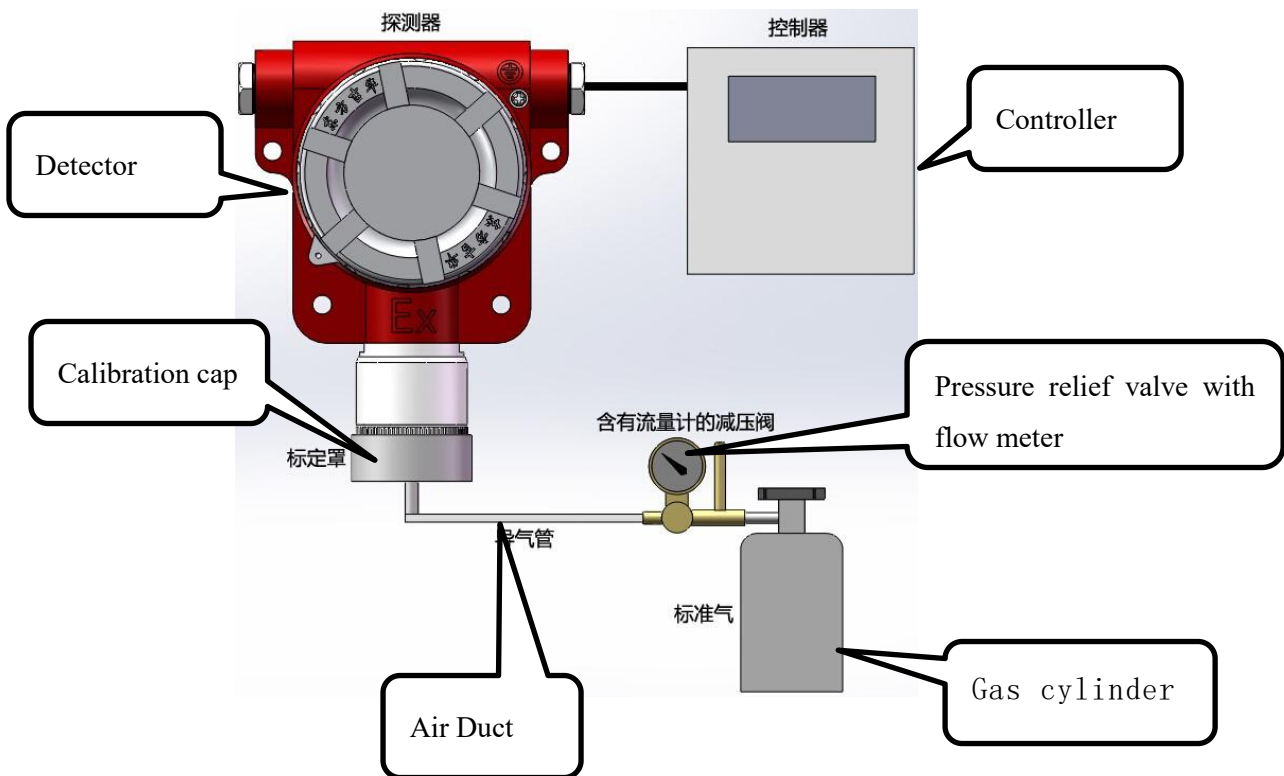
7.3 CGD-I-K gas detector (switching output)



+	-	NO	NC	C
24V+	24V-	Normally Open	Normally Closed	Common

八、Calibration

We recommend that gas detectors are tested and re-calibrated on a six monthly basis, or according to site practice.



8.1 Preparation

- Ensure that there are no detected gases or other high concentration gases in the environment;
- Check that all electrical connections are terminated correctly;
- Check the power supply voltage is normal;

- Before initial calibration allow the detector to stabilize for 30 minutes after applying power.

8.2 Zero Calibration

8.2.1 CGD-I (non-display)

Put the detector in the clean air, connect the alarm controller and electrify it. After the detector is stabilized for half an hour, open the cover, adjust the potentiometer with "p 2" or "w 2" with a screwdriver, making the alarm controller show "0.0" or "0" .

8.2.2 CGD-I-1/D (display)

- 1、Make sure the scene without the gas being measured
- 2、Press "SET", the display will show first configuration mode menu" C109"
- 3、Hold the magnet over the ("▲") switch for some time until the display changes to "C888", then press "SET", the display will change to "0"
- 4、Hold the magnet over the ("▲") switch for one second and remove, make the display change to "1"
- 5、Press "set" to enter "1" point inside, the display show signal voltage corresponding to the code value (to 0.4 V source code value is about 4000),
- 6、If it shows a stable reading, press "SET" for confirmation and exit the zero calibration menu, now display shows "1", hold the magnet over the ("▼") switch for one second and remove, make the display change to "0" , press "SET" for confirmation and exit the zero calibration menu, now display shows "-End" , after one

second, “-End” will disappear, and detector enters into normal test condition.

8.3 Span Calibration

8.3.1 CGD-I (non-display)

Put the detector in the clean air, connect the alarm controller and electrify it. After the detector is stabilized for half an hour, open the cover, adjust the potentiometer with “p 1” or “w 1” with a screwdriver, making the alarm controller show span gas concentration.

8.3.2 CGD-I-1/D (display)

In the factory, we have the default span calibration point, you can use the “set” button to enter “C666” to view and modify the calibration point values.

1. Prepare calibration gas, the concentration value is consistent with the span calibration point value which has been set.
2. Press “SET”, the display shows “C109”, hold the magnet over the (“▲”) switch for some time until the display changes to “C888”, then press “SET”, the display will change to “0”.
3. Hold the magnet over the (“▲”) switch for one second and remove, make the display change to “2”

4. Press "set" to enter "2" point inside, the display shows code value.
5. Apply the span gas to the sensor until the current display code value has not significantly change, press "SET" for confirmation.
6. Press "▼", adjust "2" to "0", press "SET" for confirmation and exit the span calibration menu, now display shows "-End", after one second, "-End" will disappear, and detector enters into normal test condition.
7. If the span calibration is successful, the reading is consistent with the span calibration point value which has been set in C666.
8. Promptly switch off the calibration span gas, make sure the detector returns to zero in the clean air.

8.4 Setting of alarm point

8.4.1 CGD-I (non-display)

We have set the alarm point of the detector in the JH controller in factory, if you want to modify the alarm point, please refer to controller instruction and finish it on the controller.

8.4.2 CGD-I-1/D (display)

This type has lower alarm and higher alarm, we have set it in factory. If you want to modify the alarm point, please

press “ SET” , change “C109” to “C128” , then press “SET” , the display shows lower alarm we have set, you can

modify it through “▼ ” or “▲” ,and press “SET” for confirmation. Press “SET” again, the display shows higher alarm, repeat the above steps.

九、Warranty statement

All products are designed and manufactured to the latest internationally recognized standards. Before delivery we have strict calibration and inspection for the products.

We warrant our products against defective parts and workmanship and will repair or replace any instruments which are or may become defective under proper use within 12 months from date of shipment from JiHua, but the following situation is beyond the scope of free warranty:

1. Negligence, accident, disaster, improper use and installation.
2. Disassemble and modify the product without authorization
3. Damage caused by the transportation
4. Existing technology has failed to find materials, design or manufacturing issues.

十、Liability limited

Product quality assurance is based on the following situation: the user's purchase has decided the suitability of the product; All products are carefully inspected when users buy, and have not found any defects; Users through training or certification, do not replace any component parts of this product without authorization, maintain the product in strict accordance with the instruction manual.

In no event will Jihua be liable for any incidental damages, consequential damages, special damages, punitive damages, statutory damages, indirect damages, loss of profits, loss of revenues, or loss of use, even if informed of the possibility of such damages.

十一、Faults and maintenance

Fault	Cause of fault	Handling method
Deviation from the actual readings	variations in sensitivity	Re-calibration
	Sensor is expired	Replace sensor
No response	signal lines are not connected well	Re-connect
	Sensor function is damaged	Return factory to repair

Product Instructions

Detector fault	Sensor is damaged	Replace sensor
	Short circuit or open circuit	Check and maintenance sensor
	Poisoning caused by high concentration of gas	Re-calibration
	Low ZERO point (display "LL")	Re-calibrate ZERO
	Over Range (display "HH")	Check the input signal wiring
Unstable readings	Air flow disturbance in calibration	Re-calibration
	Sensor is expired	Replace the sensor
	Circuit fault	Return factory to repair

Appendix

Appendix 1 CGD-I-2 (non-display) factory settings

GAS name	Type	Detection principle	Range	Lower alarm	Higher alarm	Wiring	Operational life
EX	CGD-I-2Ex	Catalytic combustion	0~100%LEL	10%LEL	50%LEL	Three-wire	Three years
CO	CGD-I-2CO	ECC	0~1000/2000 μmol/mol	24μmol/mol	160μmol/mol	Two-wire	Two years
NH3	CGD-I-2NH ₃	ECC	0~100/200/1000 μmol/mol	15μmol/mol	30μmol/mol	Two-wire	Two years
H2S	CGD-I-2H ₂ S	ECC	0~100/200/1000 μmol/mol	10μmol/mol	20μmol/mol	Two-wire	Two years
CL2	CGD-I-2Cl ₂	ECC	0~20/50 μmol/mol	1.5μmol/mol	3μmol/mol	Two-wire	Two years
HCL	CGD-I-2HCl	ECC	0~20 μmol/mol	1.5μmol/mol	3μmol/mol	Two-wire	Two years
H2	CGD-I-2H ₂	ECC	0~1000 μmol/mol	50μmol/mol	100μmol/mol	Two-wire	Two years
O2	CGD-I-2O ₂	ECC	0~25/30%VOL	<19.0%VOL	>23%VOL	Two-wire	Two years
CLO2	CGD-I-2ClO ₂	ECC	0~20/50 μmol/mol	1.5μmol/mol	3μmol/mol	Two-wire	Two years
SO2	CGD-I-2SO ₂	ECC	0~20 μmol/mol	1.5μmol/mol	3μmol/mol	Two-wire	Two years

Appendix 2 CGD-I-1/D (display) factory settings

GAS name	Type	Detection principle	Range	Lower alarm	Higher alarm	Wiring	Operational life
EX	CGD-I-1Ex(-IR)	Catalytic combustion /IR	0~100%LEL	10%LEL	50%LEL	Three/Four-wire	Three years
CO	CGD-I-1CO	ECC	0~1000/2000 μmol/mol	24μmol/mol	160μmol/mol	Three/Four-wire	Two years
NH3	CGD-I-1NH ₃	ECC	0~100/200/1000 μmol/mol	15μmol/mol	30μmol/mol	Three/Four-wire	Two years
H2S	CGD-I-1H ₂ S	ECC	0~100/200/1000 μmol/mol	10μmol/mol	20μmol/mol	Three/Four-wire	Two years
CL2	CGD-I-1Cl ₂	ECC	0~20/50 μmol/mol	1.5μmol/mol	3μmol/mol	Three/Four-wire	Two years
HCL	CGD-I-1HCl	ECC	0~20 μmol/mol	1.5μmol/mol	3μmol/mol	Three/Four-wire	Two years
H2	CGD-I-1H ₂	ECC	0~1000 μmol/mol	50μmol/mol	100μmol/mol	Three/Four-wire	Two years
O2	CGD-I-1O ₂	ECC	0~25/30%VOL	<19.0%VOL	>23%VOL	Three/Four-wire	Two years
CLO2	CGD-I-1ClO ₂	ECC	0~20/50 μmol/mol	1.5μmol/mol	3μmol/mol	Three/Four-wire	Two years
SO2	CGD-I-1SO ₂	ECC	0~20 μmol/mol	1.5μmol/mol	3μmol/mol	Three/Four-wire	Two years
ETO	CGD-I-1ETO	ECC	0~100/200 μmol/mol	10μmol/mol	20μmol/mol	Three/Four-wire	Two years
C7H8	CGD-I-1C ₇ H ₈	PID	0~200/500 μmol/mol	50μmol/mol	100μmol/mol	Three/Four-wire	Two years
C2H2	CGD-I-1C ₂ H ₂	ECC	0~200/500 μmol/mol	50μmol/mol	100μmol/mol	Three/Four-wire	Two years
CH4O	CGD-I-1CH ₄ O	Semiconductor	0~200/500 μmol/mol	50μmol/mol	100μmol/mol	Three/Four-wire	Two years
C2H6O	CGD-I-1C ₂ H ₅ OH	ECC	0~200 μmol/mol	50μmol/mol	100μmol/mol	Three/Four-wire	Two years
VOC	CGD-I-1VOC	Semiconductor/PID	0~200/500 μmol/mol	-	-	Three/Four-wire	Two years
CO2	CGD-I-CO ₂ -IR	IR	0~2000/5000 μmol/mol 0~100%VOL			Three/Four-wire	Five years

4-20MA: Three-wire, 485 : Four-wire

Appendix 3 Warranty card

type		number	
Purchase date		Warranty period	One year
Customer information	Name: Address: Zip code: Contact: Tel:		
	Repair date	Fault condition	serviceman
1			
2			
3			