

Laser Methane Gas Detector User Guide



Thank you for purchasing the laser methane remote detector. In order to ensure safety and the best performance, please read this user's guide carefully before using the product and keep it for future reference.

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Safety instruction

Please read the safety instructions carefully before using the laser methane remote detector and pay the special attention to the safety warning.

Matters needing attention

1. The product is mainly used to detect dangerous areas of methane leakage. Please ensure to install and operate the product in accordance with the latest instructions to avoid hazards.
2. When installing the product, the selection, installation and maintenance of electrical equipment should strictly follow the rules for explosive environments. It is generally recommended to refer to BS EN 60079-14:2008 & IEC 60079-14:2007. BS EN 60079-29-2:2007 & IEC 60079-29-2:2007 and the local safety regulations of the country where it is used.
3. When the product is used in North America, please strictly comply with the national electrical standards.
4. Products installed in other areas, please strictly observe the local laws and regulations.
5. During use or maintenance, do not change the models, specifications and parameters of the product circuit and related components which are designed to comply with intrinsic safety rules.
6. The operator must be aware to activate the emergency mechanism if the detected methane concentration exceeds the alarm value.
7. When the operator charges the equipment, it must be carried out in a safe area. Charging in the environment with explosive gas is strictly prohibited!
8. Toxic or combustible gases may exist in the environment under test. Please refer to the material safety manual to make a warning board for warning.
9. Please do not punch holes in the shell or change the shape structure, so as not to damage the structure function.
10. In order to ensure the safety of the electrical system, the product is forbidden to be used in the environment with oxygen concentration greater than 21%.
11. Operate strictly according to the instruction. Non-professionals are not allowed to instrument without authorization.
12. Please do not open the product housing in the presence of explosive gas.
13. Avoid to heavily bump of product.
14. JJY150 laser methane remote detector belongs to laser products, the output laser beam optical power from the product is less than 20mW, belongs to CLASSIIIA class.
15. JJY150 remote laser methane detector belongs to laser products, indicating laser output



Safety instruction

Attention

1. Please use the components and accessories provided by the original factory during installation. If there is any problem, please contact the after-sales service to solve it in time.
2. In order to ensure the safety of equipment and personnel, only trained personnel can take care the installation, usage and regular maintenance.

Important note

1. Please install and operate and the equipment strictly following the user's manual. manufactor will be exempt from the liability for any loss caused by customers who failed follow the instructions in the user's manual.
2. Users should ensure that the installation and operation process strictly follow the instructions. If you encounter any problems, please consult the customer service department of manufactor in the first time.

3. The influence of the user environment on the materials of the product:

The housing of the remote laser methane detector JJY150 is made of aluminum or 316 stainless steel, which has good corrosion resistance.

The lens is made of coated K9 optical glass.

The user environment is not specified in the instructions of the product. If the customer has a special user environment, please consult the agent before purchase.

manufactor reserves the right to modify this document and the right of final interpretation, and will not notify any person or organization of the modification of this document. For problems not covered in this manual, please contact manufactor or your local agent directly.

1. Abstract

Manufacturer committed to the environment protection and safety monitoring, and dedicated to provide diversified on-site system integration solutions through a variety of data transmission mode, realize the control of field devices, data acquisition, data transmission, data storage, and other functions, Especially in gas leakage detection field, it launched a smart product Portable Laser Methane Remote Detector JJY150, hereinafter referred to as the remote detector.

The remote detector JJY150 is composed of a transmitter unit and a receiver unit, the two units are integrated in a compact housing. When it probes gas leakage in a remote area, the transmitter emits a laser beam to a distant reflector the area. While the laser beam passes through the possible leakage point in the area, the receiver receives the reflected light as the feedback signal for processing and calculation. Utilizing TDLAS (Tunable Diode Laser Absorption Spectroscopy) technology, JJY150 can accurately and instantaneously provide the cumulative methane concentration results in the area, and trigger the alarm if the methane concentration is above alarm level.

JJY150's signal processing unit is also integrated in an aluminum alloy housing along with transmitting unit, receiving unit. The measured methane concentration value displays on a LCD built on the housing. Test data can be communicated to other equipment by Bluetooth wireless output (optional). Testable methane concentration range is 0-100000PPM-M.

Note: The laser beam from JJY150 is invisible infrared light, but the pilot light is red visible light. Please do not look directly at it.

JJY150 is very sensitive. It responds to the leak methane gas in dangerous environment quickly and stably. It is easy to use, and the built-in narrowband filter can effectively prevent sunlight from interfering the signal.

JJY150 has its auto-ranging function which can automatically adjust the range according to the intensity of the received signal light.

1. Abstract

The manual consists of the followings:

- Installation and operation
- Maintenance
- Frequently Asked Questions

Safety warning

Warning

Dangerous and unsafe operation of the product can result in serious injury and loss of life!



Warning: Dangerous and unsafe operation of the product may cause personal injury or property loss. Please operate the product following the instructions in the manual to avoid unnecessary losses.

Note: The laser diode used in remote laser methane detector JJY150 is invisible near infrared light. The pilot light is visible red light. Do not look directly at it.

For more information not covered in this technical manual, please contact the supplier for consultation.

The relevant documents:

JJY150 Specification

Part No: 2019M001

JJY150 APP Operating instruction

Part No: 2019M002

2. Introduction of JJY150 laser methane remote detector

2.1 Overview

JJY150 is a remote sensing device for methane leakage detection made by manufacturer, which is mainly used in detection of methane gas leakage for natural gas, oil pipelines and urban gas pipeline.

- Just one button, easy to operate

The remote laser methane detector only has one button, which makes the operation extremely simple.

- Quick response time

The response time of the remote laser methane detector is 0.01s. It detects 200 times per second.

- Control module

The control module adopts the remote detector control system board independently designed by manufacturer, which is stable and reliable and easy to maintain. The remote detector displays methane concentration, temperature and pressure in real time.

- Laser diode

The laser diode employed the remote detector is a high power one which is specially designed by manufacturer.

- The housing of the remote detector

The housing of the remote detector is made of aluminum alloy and its surface is black oxidized and anti-corrosive. It is very important to select the test point when using. For example, it is ideal for use at the junction of gas pipeline or at the concentration of valves. This detector is suitable for methane leakage detection. The maximum concentration detectable by the remote detector is 4%•M in the confined space. The remote detector can also be stably mounted on the adjustable rack, suitable for the user to extend the function.

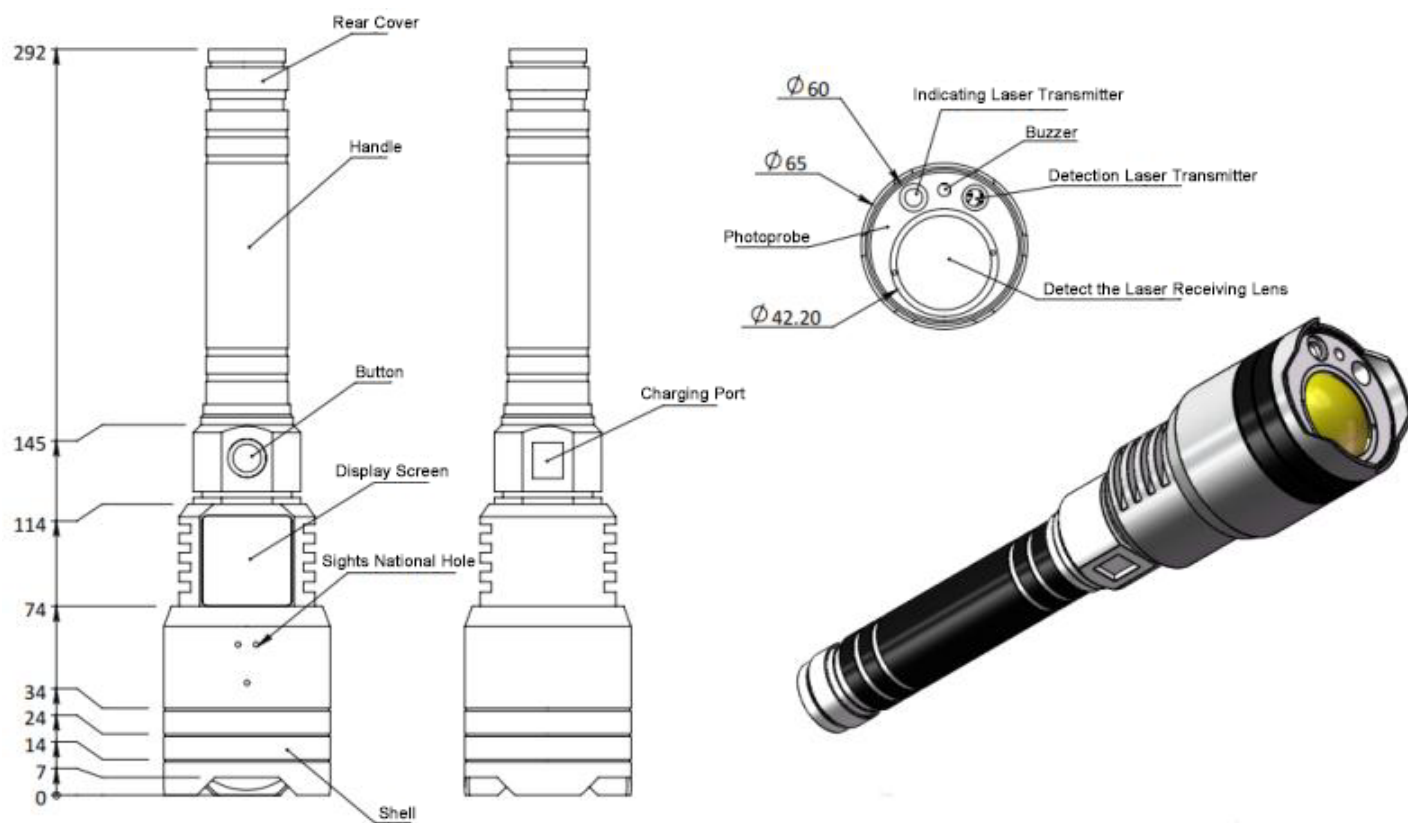
2.2 Features

- 1) The remote detector can be continuously used for 8 hours.
- 2) In shutdown state, standby time will last more than 60 days.
- 3) Protection class IP66, corrosion resistance, drop resistance
- 5) Easy to operate by using only one button.
- 6) Waterproof housing design, suitable for industrial site use.
- 7) The remote detector has a built-in Bluetooth module (optional), which can communicate with smart phone in real time.

2.3 Specifications

JJY150

parameter	The minimum	Typical values	The maximum	unit	note
Size	Length 292 * Diameter 60			mm	
Housing Material	Aluminium Alloy			--	
Surface Finish	Black Oxide			--	
Weight	--	780	--	g	
Waterproof Level	IP66			--	
Detection Distance	0.1	100	150	m	
Response Time	--	5	50	ms	
Methane Detection range	0	--	100000	ppm·m	
Storage Temperature	-40	--	70	°C	
Detectable Pressure	20		1200	Mbar	
Accuracy	(0-1000) ±50			ppm·m	
	(1000-100000)±20% of the actual value				
Laser Safety Grade	CLASS I			--	
Operational Voltage	6.5	7.2	8.4	V	
Power Consumption	1.5	2	2.5	W	
Starting Current	--	1	--	A	
Explosion-Proof	Meet Exib IIC T4 Gb				
Intrinsic Safety	Uo: 8.4V Io: 1.2A				
The work environment					
Operational Temperature	-20	--	50	°C	
Operational Humidity	--	--	98 (No condensation)	%RH	
Operational Pressure	68	--	115	Kpa	



2.4 Functions

The core of the JJY150's transmitter is a high power and high-precision laser made by manufacturer(.. The laser beam is emitted from a collimator which ensures the spot diameter is less than 15cm beyond 150M. The emitted laser beam is strong enough, to reduce the interference of sunlight to the received optical signal and improve the signal-to-noise ratio. The front window of the transmitter and receiver has a specially coated filter to get rid of from the sunlight and other stray light.

The receiver collects the reflected optical signal at a specific infrared wavelength and compares it with the transmitted optical signal. According to the concentration of methane in the tested environment, the optical signal will be absorbed proportionally. Therefore by comparison the absorption will be obtained and then the methane concentration value of the tested e area can be calculated and calibrated by considering the ambient temperature and pressure.

The receiver used in JJY150 is a 1mm photo detector designed and packaged by manufacturer(.. It works over a wide temperature range and has a filter to get rid of sunlight and other infrared interference. The high stability of the receiver improves the overall performance of the JJY150.

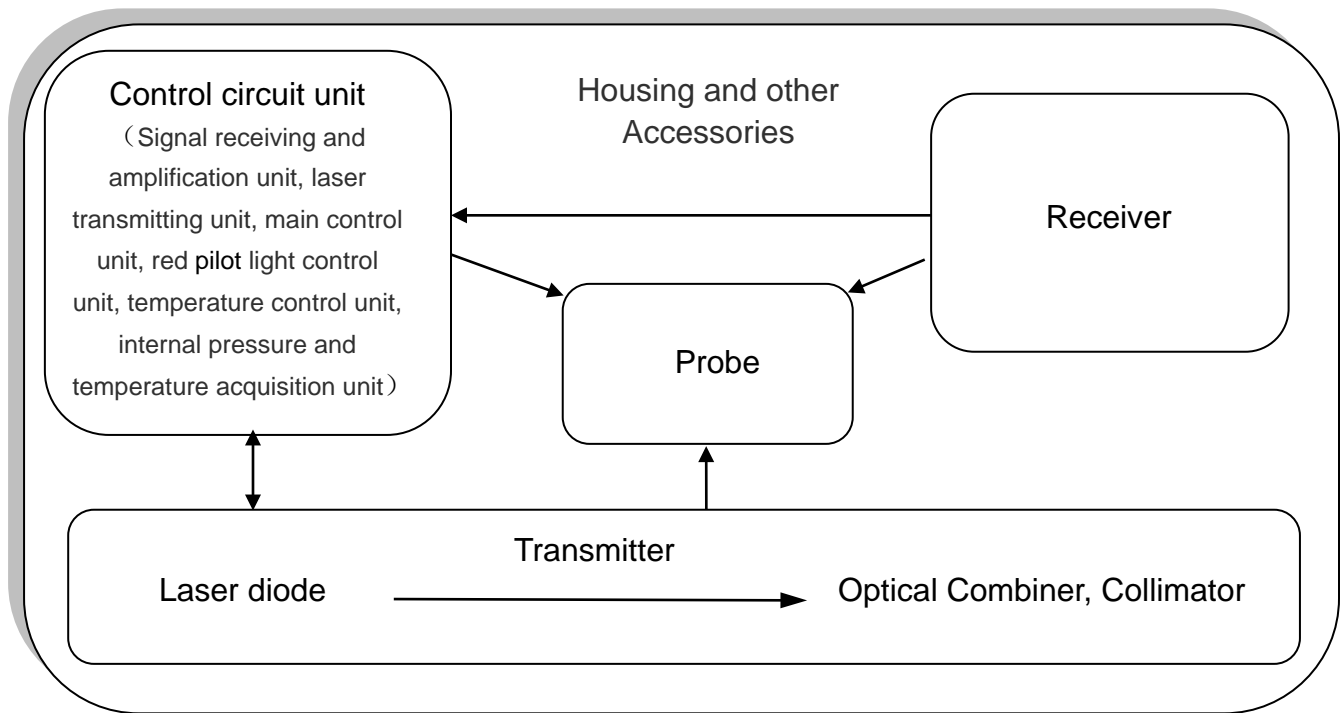
The receiver unit includes a signal receiving circuit, an amplifying circuit, a signal processing circuit, etc. The central processor adopts a dual-core processor, one of which is a DSP processor for floating point operation. Therefore it can quickly and accurately get the methane concentration. The other processor is used for the whole system function control, status detection, communication, etc.

The methane concentration range detectable by JJY150 is 0-40000ppm • M, the pressure range is 0-1200mbar, and the temperature sensor detection range is -40-70 °C.

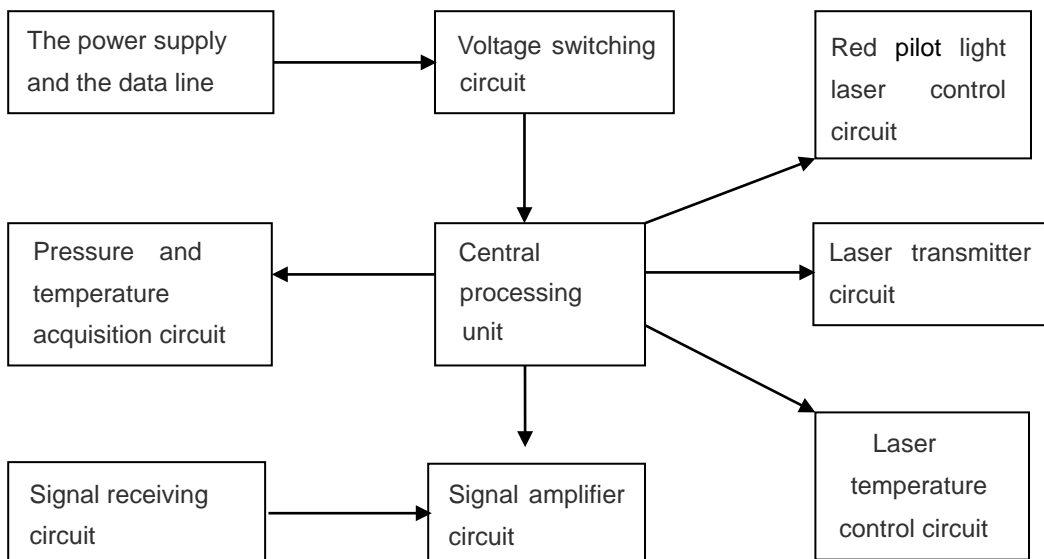
Note: The lase diode r used by JJY150 is infrared invisible light. The pilot light is red visible light. Do not look directly at it.

Functional Block diagram of the remote detector

The remote detector is composed of control circuit control, optical transmitter unit and receiver unit. The above units are combined as a probe fixed in a housing .

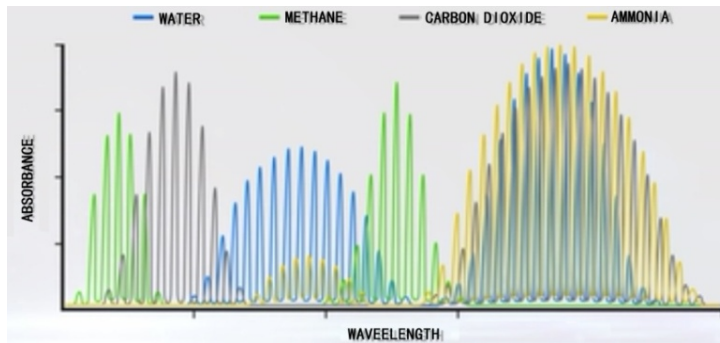


Schematic diagram of control circuit unit

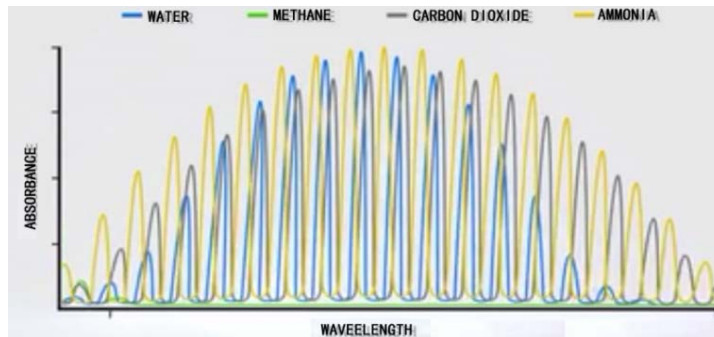


2.5 Fundamentals of laser methane detection

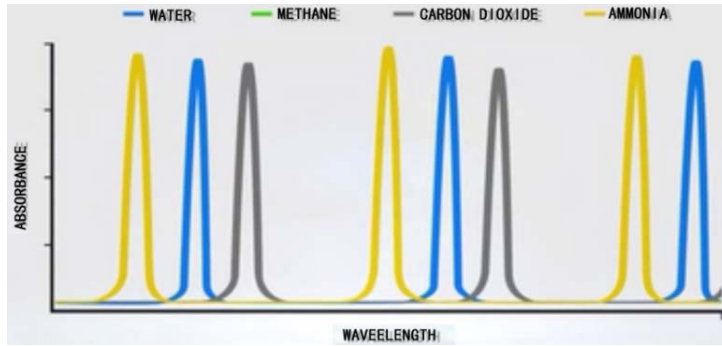
In the whole spectral range, there are various gases, and each of them has its own specific absorption at specific wavelengths. However, at the same time, water vapor, carbon dioxide, ammonia in the atmosphere will interfere with the absorption of other gases. When using absorption spectroscopy to detect a specified gas, in order to get rid of interference of other gases such as water vapor, carbon dioxide, ammonia and so on, the light source needs to be of narrow line width in wavelength range.



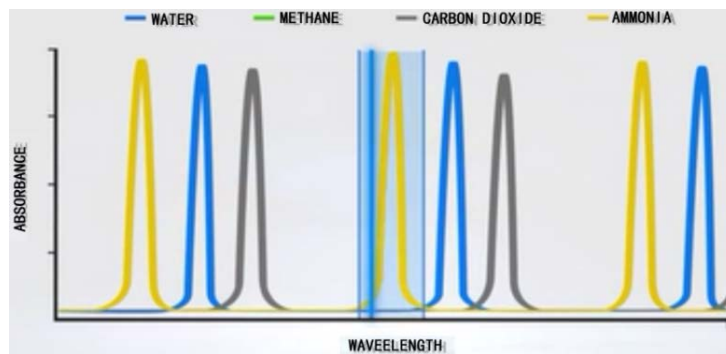
Infrared range, there is less interference as compare to visible range, but also there is interference which will greatly affect detection of specified gas by absorption spectroscopy if the line width of probing light source is not narrow enough.



So far costly sophisticated filter is used for the infrared lamp to obtain a relatively narrow line width (about 3-10nm) for the application of absorption spectroscopy. But it is still disturbed by the absorption of ambient gases.



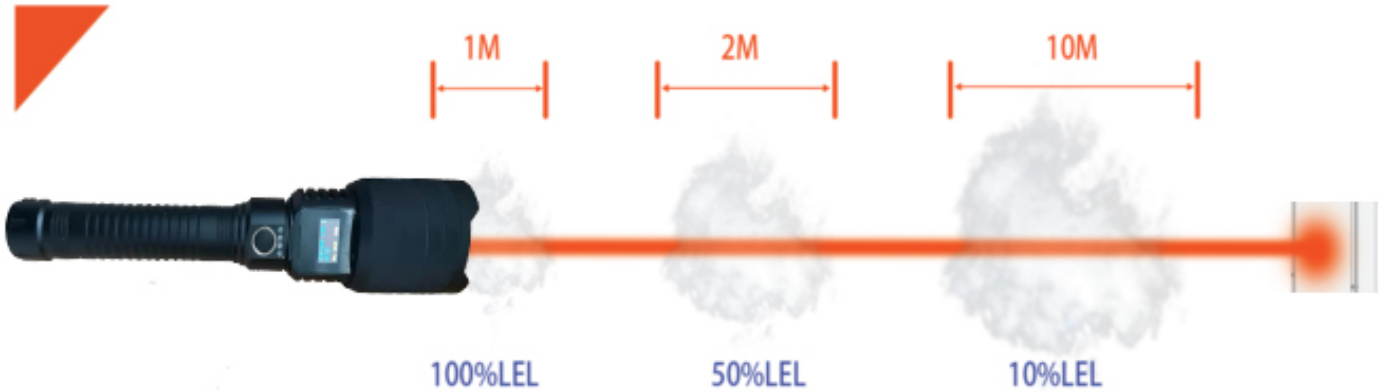
DFB laser diode can accurately emit single wavelength light with sharply narrow line width. Thus it can effectively eliminate the interference of environmental gases.



2.6 Definition of detected methane concentration

The methane concentration detected by the JJY150 laser methane detector is the cumulative concentration of the gas in the effective path of laser beam. In general, the reflection-type linear beam detector system does not distinguish the gas concentration in the local interval of the working optical path, that is, the effect of high concentration gas in a small range is the same as that of low concentration gas in a large range. The unit of the detected result is the average concentration of the gas PPM •m or %LEL•m. The following figure describes the same test results for a 1-meter air mass of 100%LEL and a 2-meter air mass of 50%LEL and a 4-meter air mass of 25%LEL.

$$100\%LEL * 1M = 50\%LEL * 2M = 25\%LEL * 4M$$



Note: Calculated by the remote detector as cumulative concentration.

2.7 About the working optical path

Working optical path refers to the space path of the laser beam emitted from the probe. The space path in the detection area should avoid any objects blocking its way and keep connect to air exchange to its surrounding area , to avoid objects blocking the optical path. It is recommended to ensure an unblocked space path of a radius of 10cm or greater for laser beam from the remote detector to the reflection plane. Do not directly launch the laser beam pointing to the air area without a reflecting surface.

3. Use and Operation

3.1 Introduction

Warning

When installing, using and maintaining the equipment in any potentially dangerous Environment, please strictly comply with local safety laws and regulations.



JJY150 has been successfully introduced into field application. Its high performance, good reliability and long-term stability is ensured by its excellent design and high quality diode laser. JJY150 remote detector has the advantages of easy to carry, high accuracy, no need of specific reflection plane and good anti-seismic quality.

It is strongly recommended to read this manual carefully before using the remote detector. It is believed that reading this manual can easily help users understand how to use JJY150 remote detector. We consider the contents in this manual to be essential for the correct use of JJY150 remote detector by customers. If you encounter any problems during the usage, please contact the after-sales staff or local dealers of manufacturer, we will help you wholeheartedly.

In order to ensure that users can correctly use JJY150 remote detector, our company has professional installation personnel for your service, the local dealer also has the installation personnel trained by the company for your 24-hour service. Customers who have not been trained by the company are not allowed to engage in the dismantling and maintenance of JJY150.

This manual clearly describes the usage of JJY150 remote detector, and introduces the usage of related the remote detector and it's accessories. After learning from this manual, users can correctly evaluate the conditions of using JJY150 remote detector, and can avoid potential dangers when using JJY150 remote detector. Studying of the manual will help users figure out where the fault is when in trouble with the remote detector, and can quickly solve the problem by cooperating with professional after-sales staff.

Every time the our sales staff serves customers, a customer service record file will be generated. This file is archived by manufacturer. It is for the purpose of better customer service in future by following the rules to make the fault history traceable .

Note: The laser diode used by JJY150 emits infrared invisible light. The pilot light is red visible light. Do not look directly at it.

3.2 Detection method

3.2.1 Introduction

When the user is ready to use the JJY150 remote detector, it is important to the user to choose a proper location for the remote detector to probe, and understand the correct probing method in advance.

3.2.2 Optimum probing location

In order to obtain best detection results, please refer to BS EN 60079-29-2:2007 & IEC 60079-29-2:2007 and local regulations for selecting the probing location.

In general, manufacturer recommends probing the following places:

- Since methane gas is lighter than air, it is recommended to probe the higher position of possible leakage area.
- When detecting possible leaks, the remote detector should be positioned as close to the source of the leaks as possible. At the same time, factors such as the wind direction of the detection area should also should take into consideration. If the wind direction is uncertain, it is recommended to repeat the probing near the potential leaks.
- Avoid direct sunlight to the lens when the sunlight is strong in the daytime. Night is the time to obtain the best detection results.
- It is testified by the field application that JJY150 remote detector can be reliably used in rainy days (light to moderate rain) without environmental interference.

When selecting the JJY150 remote detector's probing location, please pay attention to the environment of the area!

- **High temperature environment:** JJY150 remote detector is designed to operate in the environment temperature less than 50°C. If it needs to be used in high temperature environment, cooling is needed for the remote detector. If the remote detector is exposed to the hot sun light for a long time, shading is needed for the remote detector to prevent it from excessive temperature.
- **Heavily polluted environment:** Avoid heavily polluted areas to be detected by the remote detector, such as dusty area, vicinity of generator or turbine vents, drilling machines and chimneys, etc. If the remote detector is used in the above mentioned environment, consider the necessary protective measures, as physical barriers caused by the environment can affect the probing distance.
- **Direct sunlight :** Do not let sunlight as direct incident light enter the lens of JJY150 remote detector. If it happens that during the probing the lens of the remote detector is positioned directly towards

sunlight, in order to reduce probing error, shield should be used to weaken the interference sunlight to in please use a hood to reduce false positives.

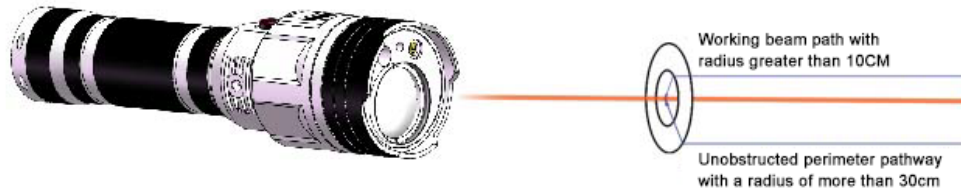
- **Heavy dust environment:** When the remote detector is used in heavy dust environment, the lens of the remote detector maybe contaminated by the dust. If it is the case, please clean the lens timely.
- **Flood and rainstorm conditions:** The waterproof rating of JJY150 remote detector is designed as IP66. Generally the functions of the remote detector it is not affected by rain. However the remote detector is not allowed to be immersed in water.
- **Influence of probing optical path through glass:** When it happens that there is a glass shielding between the remote detector and area needed to be probed, detection will be failed if the probing laser beam from the remote detector goes through the glass perpendicularly. In such cases, in order to carry out the detection properly, let the angle between the incident beam and the normal of the glass surface be greater than 30 degree.
- **Accidental collision:** Collision should be avoided from bumping or hitting by moving objects or persons for JJY150 remote detector in crowded area as far as possible. When use the remote detector in crowded area, it is recommended to put the remote detector in a protective holster.
- **Strong magnetic field environment:** JJY150 remote detector is designed to meet EN61000-6-3:2007 and EN61000-6-2:2005 Industrial requirements. Therefore, it immune from electromagnetic interference. However, in close vicinity of radiating equipment such as radio or radar, high-voltage electrical equipment and high-voltage lines, there may exist magnetic field strength enough and exceeding those specified in EN61000-6-3:2007 and EN61000-6-2:2005. Therefore, using the remote detector in these areas should be avoided as far as possible.
- **Reflection of water surface:** The remote detector can not detect gas leakage when the reflective surface is water surface. Please avoid using the water surface as a reflector.

3.2.3 The optical path

The distance between the remote detector and the reflected object should be kept within 150 meters, and the optical path should be kept clear of the surrounding objects to allow free circulation of air in the area and to prevent the laser beam from being blocked. It is recommended that a radius of no less than 30cm physical path should kept clear for optical path. In order to obtain the best performance, avoid the following environments:

- a、Steam vents and feathers;
- b、Chimneys;

- c、 Sidewalks and crowded areas;
- d、 Splashes and sprays, such as mobile spray equipment, cooling towers, etc.;
- e、 Vegetation, such as shrubs and branches, weather factors or future growth factors should also be considered;



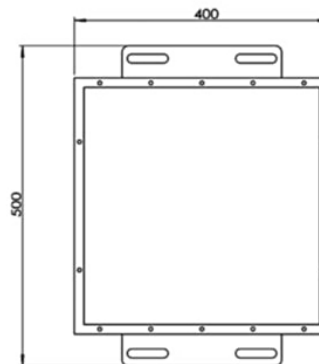
Note:

1. During probing, the distance of the reflecting surface from the remote detector should be more than 1 meter.
2. It is recommended that the radius of a clear physical path should be at least 30cm for enclosing the 10cm radius optical path.
3. The test distance is recommended to be greater than 10 meters.

3.2.4 Remote probing method

When the test distance is more than 150m, it is recommended to add a standard reflecting plate provided by manufacturer, which can enhance the probing distance to more than 400M. Due to the limitation of the probing environment, the maximum probing distance is not verified, so it is suggested that the customer use it according to the field environment. In using reflecting plate for remote probing , not only the beam diameter, but also the angle offset due to vibration and variation of fixation of the reflecting plate should be taken into account.

Reflecting plate size:



Dimension Drawing

Distance is related to the size of the reflecting surface

distance (m)	area (L*W) mm
200	500*500
400	800*800

3.3 How to use of the emote Detector

3.3.1 Power on and off

The remote detector has only one button. Push down the button for more than 3S, the device starts up, and the LCD display screen is on. Then pushing down the button for more than 3S, it turn the power off.



- Detection maximum field: In detecting mode, it displays the maximum detected value within 5 seconds.
- Reflected signal strength field: The the height of a column bar indicates the strength of the reflected signal.The higher the column bar. The stronger the reflected signal.
- Temperature field: It displays the internal temperature of the remote detector.
- Pressure field: It displays the internal pressure of the remote detector.
- Detected concentration field: It displays the real-time detected concentration value (0-100000PPM).
- Power Percentage field: It displays the battery power (0-100%). Recharging is recommended if it is less than 20%.
- The working mode field: It shows STOP or RUN. STOP means idle mode and RUN means detection mode.

Note: The remote detector has an internal temperature control circuit for the laser diode temperature control. The detection mode needs 5S preheating for before detecting.

3.3.2 Detecting starts and shuts down

In the power-on state, click the function button and the remote detector will start probing. An pilot light will be emitted. Where the pilot light is pointing is the detecting point. Then the working mode field will change from STOP to RUN. During detection, click the function button again, the remote detector will STOP detection, the pilot light will be off, and the working mode will change from RUN to STOP.



Detecting mode



Idle mode

3.3.3 Alarm value setting

In the idle state, hold down the button for 2 seconds, in the Detection maximum field the "MAX" sign will become a flashing "ALARM" sign, immediately release the button, the remote detector will enter the ALARM value setting state, Detected concentration field will display the current ALARM value, the unit is PPM. Click the button to set the alarm value, the step is +1000ppm per time, and the alarm value will cycle between (1000-20000ppm). After adjusting to the required alarm value and waiting for 10S, the remote detector will automatically save the alarm value and return to idle state.

Note: If the button is held down for more than 3 seconds, it will enter the shutdown state.



Alarm value setting state



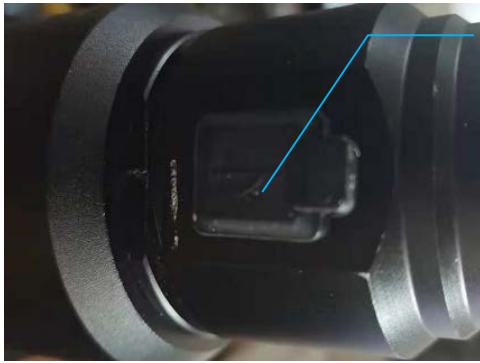
Wait 10s to save the Alarm value and return to the idle state

3.4 Charging the battery

3.4.1 Charging accessory description

A MiniUSB charging connector (5V, 2A) is used for charging. It is recommended to turn off the power for charging. There is a charging indicator between the display screen and the button. There are four indicators.

When all of them are bright without flicker, it indicates that the charging is completed.



Waterproof
rubber plug



Charging
indicator

Note:

- 1, charging must be carried out in a safe environment. Do not charge the remote detector in flammable and explosive environment;
2. Power is off when charging.

3.4.2 Lithium-ion battery charging time

- The remote detector has 2 built-in 26650 lithium batteries, each 4000mAh. Using a 2A5V charger, the full charge time is 8 hours.
- The lithium battery is designed to have (overcharge, over-discharge, short circuit, spark) a protection pack and built-in sealing. Nonprofessionals are not allowed to open the sleeve to replace the battery. If the battery feed life arrives, please contact the after-sales service for help to deal with.

3.5 Using Bluetooth APP

3.5.1 Bluetooth connection

The JJY150 remote detector can be equipped with a Bluetooth module using Android Bluetooth APP. Please install the Android Bluetooth APP to your smart phone by yourself. After turn on the remote detector, use the software by your smart phone.

Pull down the list, you can find the equipment list that has been started up. The number of JJY150-006 is unique from the factory, and the number of different equipment is different. Click the device number and the software automatically connects to the remote detector.

3.5.2 APP usage

Click "Start Test" to enter the detection state. After preheating for 30 seconds, the stable detection begins. The data will be uploaded to the smart phone screen in real time.

Click "Stop Testing" to return the standby state. At this time, the data detected will be saved automatically in the root directory of the smart phone. Please find the data table in the file of the phone.

Click "Device Shutdown" to enter the shutdown state.

Click "Device Settings" to enter the setting state. The alarm value can be set from 100 to 20,000 PPM. Turn on the smart phone's vibration and alarm ringing function, then when the methane concentration exceeds the alarm value , the the smart phone will vibrate and ring for alarm.

4 Maintenance

4.1 Cleaning and protection

- If the remote detector is using in dusty place, it is necessary to clean the dust on the front window and the surface of the remote detector housing regularly. It is better to clean it with deerskin or eyewear cloth, and do not scratch the lens and housing with sharp tools.
- Heavy rain, heavy snow will become a physical shielding in the optical path. Under such environment the remote detector will not correctly detect the gas concentration, so its output data is invalid.
In the dry and prone to static electricity, please using a leather holster for the remoter detector.

4.2 Verification and explanation of the detected results of the remote detector

4.2.1 Methane Concentration

In order to verify the the credibility and reliability of the methane concentration detected by the remote detector, put a transparent plastic bag sealed with methane gas of a known concentration exceeding the alarm value somewhere 100 meters away from JJY150 remote detector, and set the alarm value at 2000ppm, then conduct the detection. Confirm if the remote detector will display the methane gas concentration, and the alarm buzzer will go off. This way, users can verify if the remote detector is functioning normally, credibly and reliably.

4.2.2 Temperature

The detected temperature shown on the display screen of the remote detector is the internal chamber case temperature of the probe. When the ambient temperature changes sharply, it will take time for the internal case temperature to reach reach a balance with the ambient temperature. Only at this time, the temperature on display is truly the internal case temperature.

4.2.3 Pressure

The detected pressure shown on the display screen of the remote detector is the pressure inside the internal probe chamber. When the environment pressure changes sharply, it will take time for the pressure of the internal probe chamber to reach a balance with the environment pressure. Only at this time, the pressure value on the display is truly the internal chamber pressure of the remote detector.

5 Transportation and storage

5.1 In the transportation and installation, severe shock and vibration should be avoided.

5.2 For the storage of the remote detector, it should be kept in a warehouse where the indoor temperature is 0 ~ 35°C, the relative humidity is not greater than 85%, and there is no corrosive gas.

6 Answers to frequently asked questions

No.	Q	Cause analysis	A
1	The battery indicators is flashing and the remote detector id shutting down	Battery is low	Charge the battery
2	Detectable distance cannot reach to the factory standard	Lens contamination or laser hole blockage	Clean the lens and laser window
3	The buzzer is always ringing	Internal fault	Contact the manufacturer for solution
4	The gas concentration in the bag is not detected or there is no response	Laser failure or hardware failure	Contact the manufacturer for solution

7 Documents, accessories shipped with the remote detector

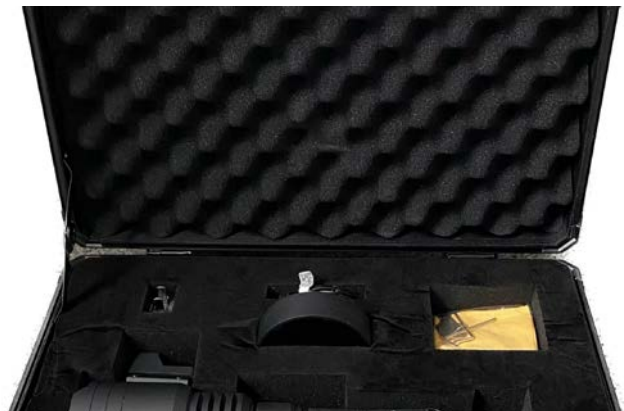
7.1 Documents

7.1.1 Operating instruction

7.1.2 Product communication protocol

7.1.3 Packing list

7.1.4 Certificate of inspection



8 Items of the remote detector product

Items	Qty	Description	Notes
JJY150	1	The remote detector main body	The standard main body
Battery charger	1	2A, 5V	Standard accessory
Charging cable	1	Mini USB, 0.5m long, 2A charging current	Standard accessory
Sighting scope	1	For long range detection in daytime	Standard accessory
Wrench	2	Install the battery and adjust the aiming light for use	Standard accessory
Reflection plate	1	For ultra long range detection	Optional accessory
Holster	1	Made of cotton textile fabric	Standard accessory
Bluetooth	1	Build-in Bluetooth module using Android APP	Optional accessory

Note: Please refer to the Bluetooth manual for the application of Bluetooth APP

9 Ordering instructions

Please specify the name and quantity of the items when ordering.

Appendix : After-sales Service and Technical Support

All JJY150 remote detector products purchased directly from manufacturer or through formal representatives authorized manufacturer are entitled to the following rights:

1. 12 months warranty of free services,
2. Lifetime free technical support,
3. Lifetime maintenance services,
4. Free services of supporting testing software of the purchased product,
5. OEM/ODM services
6. Product application software services

The free service warranty is invalid if:

1. Warranty term expired,
2. Product with no serial number or purchase voucher
3. Damage caused by customer oneself,
4. Unauthorized change of any hardware of the product,
5. Damage caused by irresistible natural disaster .

Product Repair:

Once something wrong with the remote detector is found, please contact our customer service department immediately . In order to avoid unnecessary transportation cost and time delay caused by misjudgment, communicate with our technical support engineer to confirm the problem before sending the product back for repair . On receiving the returned product, we will arrange engineers to check it on the same day and communicate with the customer to ensure it can be repaired and sent back within the shortest period. The general repair cycle is 2 working days. For the product which cannot be repaired within a short period due to special reasons, we will communicate with the user and confirm the special repair cycle.

Cost of repair:

Within the warranty term, no repair cost will be charged if the fault is not damage caused by user. If warranty is invalid, parts and labor will be charged accordingly.

Freight charge:

When the customer returns the product to factory for repair, the freight cost should be paid by the customer. After repair we will cover the transportation.