Hote-wire Gas Sensor

(Model No.： MR007)

Manual

Version： 1.1

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Zhengzhou Winsen Electronic Technology Co., Ltd

Statement

Thanks for purchasing our product. In order to let customers use it better and reduce the faults caused by misuse, please read the manual carefully and operate it correctly in accordance with the instructions. If users disobey the terms or remove, disassemble, change the components inside of the sensor, we shall not be responsible for the loss.

The specific such as color, appearance, sizes &etc, please in kind prevail.

We are devoting ourselves to products development and technical innovation, so we reserve the right to improve the products without notice. Please confirm it is the valid version before using this manual. At the same time, users' comments on optimized using way are welcome.

Please keep the manual properly, in order to get help if you have questions during the usage in the future.

Zhengzhou Winsen Electronics Technology CO., LTD

MR007 Hot-wire Gas Sensor

Description

MR007 gas sensor consists of a test element and a compensation element. The resistance of the test element changes with the variation of electrical and thermal conductivity caused by the adsorption of flammable gas on the surface of the sensitive material, thereby measuring the gas concentration. The MR007 detection circuit adopts a Wheatstone bridge, which consists of a pair of detection elements and compensation elements as one arm of the bridge. When encountering flammable gas, the resistance of the detection element decreases, and the output voltage of the bridge changes. This voltage change increases with the increase of gas concentration. The compensation element serves as a reference and temperature compensation.

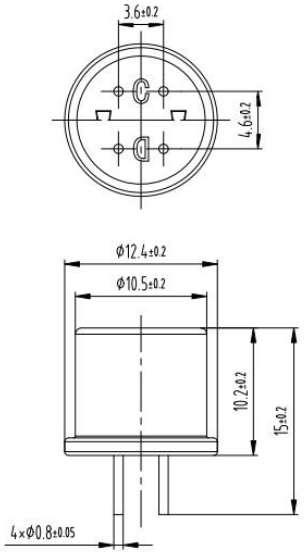
Sensor characteristics

MR007 gas sensor has advantages of good linearity, fast response , excellent repeatability, stable and reliable operation of the components, and good resistance to hydrogen sulfide and silicone interference.

Applications: suitable for combustible gas detection including Natural gas, LPG, and coal gas, etc.

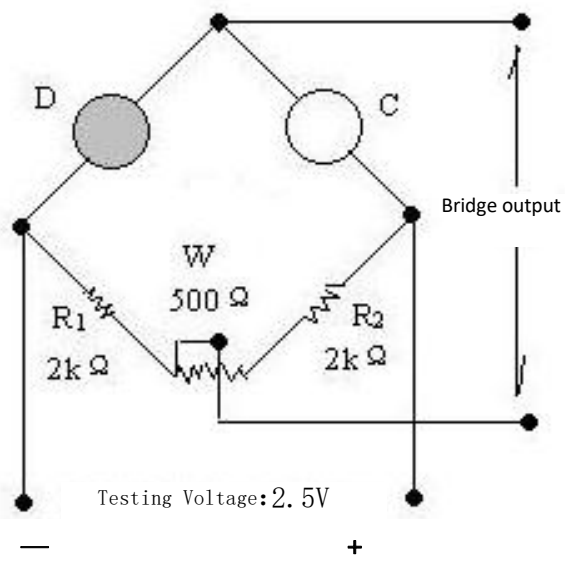
Technical Parameters

Model Part		MR007
Sensor Type		Hot-wire gas sensor
Standard Package		plastic base metal packaging
Working Voltage(V)		2.5±0.1
Working current(mA)		150±10
Zero-point(mV)		±30
Sensitivity(mV)	20%LEL CH4	12～45
	20%LELC3H8	10～30
Measurement range （%LEL）		0～100
Response Time (T_{90})		≤10s
Recovery Time (T_{90})		≤30s
Working Environment		-40～+70℃, less than 95%RH
Storage Environment		-20～+70℃ ,less than 95%RH
Lifespan		5 Year



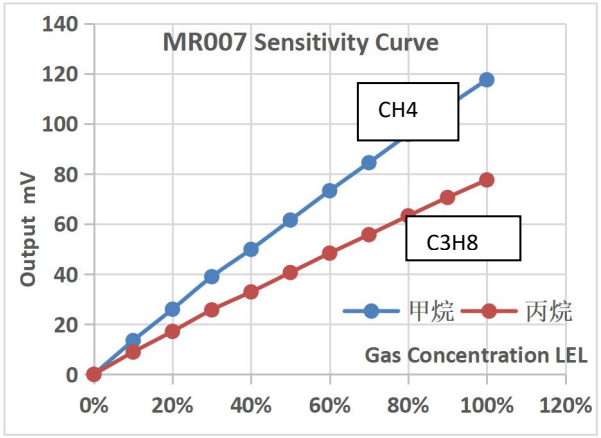
Pic1. Sensor Structure

Basic Circuit

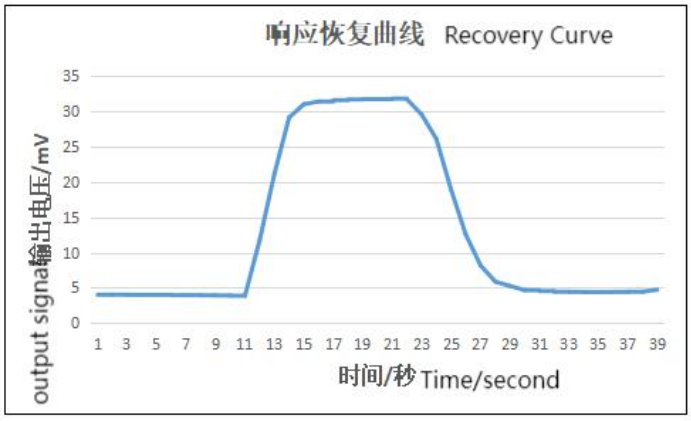


Pic 2： Basic Testing Circuit

Sensor Characteristics Description



Pic 3： Sensitivity Curve



Pic 4： Response and Resume Curve

Cautions

1. Prohibited items

1.1 Exposure to Volatile Silicon Compound Vapors

If the surface of the sensor is exposed to volatile silicon compound vapors, the sensitive material of the sensor will be coated by the silicon compounds, inhibiting the sensitivity of the sensor and making it irrecoverable. The sensor should be avoided in areas where silicon adhesives, hairsprays, silicone rubbers, putties, or other silicone plastic additives may exist.

1.2 Highly Corrosive Environments

Exposure of the sensor to high concentrations of corrosive gases (such as H2S, SOX, Cl2, HCl, etc.) will not only cause corrosion or damage to the sensor leads but also cause irreversible changes in the performance of the sensitive material.

1.3 Contamination by Alkalis, Alkali Metal Salts, and Halogens
Contamination of the sensor by alkali metals, especially salt spray, and exposure to halogens such as Freon can also cause performance deterioration.

1.4 Exposure to Water
Splashing or immersion in water will cause a decrease in sensitive characteristics.

1.5 Freezing
Freezing of water on the surface of the sensitive element will cause the sensitive material to crack and lose its sensitive characteristics.

1.6 Overvoltage Application
If the voltage applied to the sensor exceeds the specified value, even if the sensor is not physically damaged or destroyed, it will cause lead damage and a decrease in the sensitive characteristics of the sensor.

2.Possible situations to avoid

2.1 Condensation water
Under indoor use conditions, slight condensation water may have a slight impact on the performance of the sensor. However, if water condenses on the surface of the sensitive material and remains for a period of time, the characteristics of the sensor will decrease.

2.2 High concentration gas
Whether the sensor is powered or not, long-term placement in a high concentration gas will affect the characteristics of the sensor. For example, directly spraying lighter gas towards the sensor can cause significant damage to it.

2.3 Long-term storage
Long-term storage of the sensor without power may cause reversible changes in its sensitive material, which is related to the storage environment. The sensor should be stored in a clean air and silicone-free sealed bag. Sensors stored for a long time without power may requir ' 'iod of power-on to stabilize before use. If the storage time without power exceeds six months, it is recommended to age the sensor for one day before use.

2.4 Long-term exposure to extreme environments
Whether the sensor is powered or not, long-term exposure to extreme conditions such as high humidity, high temperature, or high pollution will have a serious impact on the performance of the sensor.

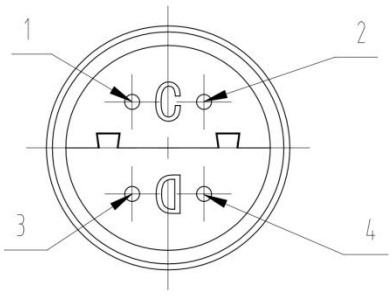
2.5 Vibration
Frequent and excessive vibration can cause resonance and breakage of the sensor lead. Using pneumatic screwdrivers/ultrasonic welding machines during transportation and assembly can generate suc 'ibrations.

2.6 Impact
If the sensor is subjected to strong impact or fall, it may cause lead breakage.

3.Usage Suggestions

3.1 Connecting to the Circuit

When connecting the sensor to the circuit, connect pin 1 to the positive pole, pin 3 to the negative pole, and connect pins 2 and 4 together as the signal output terminal. The sensor tube base marked with "D" is the detecting element, and the tube base marked with "C" is the compensation element.



Pic 5 : **Wiring Diagram**

3.2 Welding

Manual welding is the most ideal welding method for sensors. The recommended welding conditions are as follows:

- Flux: Lead-free, non-cleaning flux that does not contain chlorine or silicone
- Constant temperature soldering iron
- Temperature: Not exceeding 350℃
- Time: Not exceeding 5 seconds

Violating the above usage conditions will result in a decrease in sensor performance.