Winsen MP-5 Flammable Gas Sensor Instruction Manual

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Winsen MP-5 Flammable Gas Sensor

Product Information

Specifications

- Model: MP-5
- Sensor Type: Flat-surfaced semiconductor sensor
- Standard Encapsulation: Metal cap
- Target Gas: LPG (300-10000ppm)
- Standard Circuit Conditions: 24V DC
- Loop Voltage (Vc): Ro(in air)/Rs(2000ppm C3H8)
- Heater Voltage (VH): 5-10V DC or AC
- Load Resistance (RL): 1K-20K (in 2000ppm C3H8)
- Heater Resistance (RH): Not specified
- Heater Consumption (PH): Not specified
- Sensitivity (S): 0.6 (R2000ppm/R500ppm C3H8)
- Sensitive Resistance (RS): Not specified
- Concentration Slope: Not specified
- Tem. Humidity: Standard test conditions
- O2 Content: Not specified
- Lifespan: 10 years

Product Usage Instructions

Basic Circuit

The MP-5 Flammable Gas Sensor requires two voltage inputs:

- **Heater Voltage (VH):** This voltage is used to supply the standard working temperature to the sensor. It can adopt DC or AC power.
- **Circuit Voltage (VC)**: This voltage supplies the detected voltage to the load resistance (RL) and should adopt DC power.

The load resistance (RL) should be connected in series with the sensor.

Sensor Characteristics

The MP-5 Flammable Gas Sensor has the following characteristics:

- Fig3.Typical Sensitivity Curve: This graph shows the resistance ratio of the sensor (Rs/R0) against the concentration of gases. Rs represents the resistance in the target gas with different concentrations, while R0 represents the resistance of the sensor in clean air.
- Fig4.Typical Temperature/Humidity Characteristics: This graph shows the resistance ratio of the sensor (Rs/Rso). Rs represents the resistance of the sensor in 2000ppm propane (C3H8) under different temperature and humidity conditions, while Rso represents the resistance of the sensor in 2000ppm propane (C3H8) under 20/65%RH.
- Fig5.Response and Resume: This graph shows the output voltage (V) and time (s) during the response and resume of the sensor.
- Fig6.Linearity Curve: This graph shows the output voltage (V) against the concentration (ppm) of gases, demonstrating the linearity of the sensor.
- Long-term Stability: This test measures the stability of the sensor over time, with the abscissa representing the observing time and the ordinate representing VRL.

Cautions

1. The following conditions must be prohibited:
    1. Exposed to volatilizable organic silicon steam: The sensing material of the sensor will lose sensitivity and never recover if it absorbs organic silicon steam. Therefore, the sensor must avoid being exposed to silicon bonds, fixtures, silicon latex, putty, or plastic-containing silicon environments.
    2. High Corrosive Gas: If the sensor is exposed to high-concentration corrosive gases such as H2S, SOX, Cl2, and HCl, it will not only result in corrosion of the sensor's structure but also cause sincere sensitivity attenuation.

FAQ

Q: What is the lifespan of the MP-5 Flammable Gas Sensor?

A: The lifespan of the MP-5 Flammable Gas Sensor is 10 years.

Statement

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- The specifics such as color, appearance, sizes &, etc, please in kind prevail.
- We are devoting ourselves to product 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 the 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.

Profile

- MP-5 gas sensor is for flammable gases. It adopts multilayer thick film manufacturing technology. The heater and metal oxide semiconductor material on the ceramic substrate of Al2O3 is fetched out by an electrode down-lead, encapsulated in a metal socket and cap. The conductivity of the sensor is affected by the concentration of the target gas. The higher the concentration is, the higher the conductivity of the sensor gets. Users can adopt a simple circuit to convert variation of conductivity into an output signal corresponding to the gas concentration.

Features

- Lower consumption
- Small size
- Fast response and resume
- Highest sensitivity
- Excellent stability and long life
- Easy circuit and big signal output
- Excellent selectivity

Application

- It is widely used in domestic gas leakage alarms, industrial flammable gas alarms, and portable gas detectors.

Technical Parameters

Model			MP-5
Sensor Type			Flat-surfaced semiconductor sensor
Standard Encapsulation			Metal cap
Target Gas			LPG
Detection range			300-10000ppm LPG
Standard Circuit Conditions	Loop Voltage	Vc	≤24V DC
	Heater Voltage	VH	5V±0.1V AC or DC
	Load Resistance	RL	Adjustable
Sensor character under standard test conditions	Heater Resistance	RH	85Ω±15Ω (room temp.)
	Heater consumption	PH	≤300mW
	Sensitivity	S	Ro(in air)/Rs(2000ppm C3H8)≥5
	Sensitive resistance	RS	1KΩ 20KΩ (in 2000ppm C3H8)
	Concentration Slope	α	≤0.6(R2000ppm/R500ppm C3H8)
Standard test conditions	Tem. Humidity		20℃±2℃ 65%±5%RH
	Standard test circuit		Vc:5V±0.1V; VH: 5V±0.1V
	Preheat time		Not less than 48 hours
	O2 content		21% not less than 18% O2 concentration affects initial value, sensitivity, and repeatability.
Lifespan			10 years

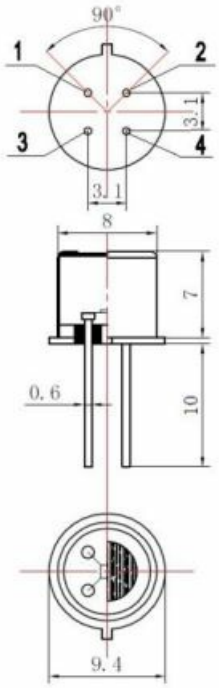
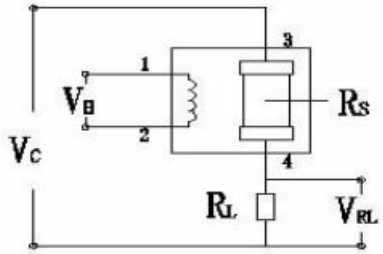


Fig1. Sensor structure

Basic circuit



Instructions: The above figure is the basic test circuit of MP-5.The sensor requires two voltage inputs: heater voltage (VH) and circuit voltage (VC). VH is used to supply standard working temperature to the sensor and it can adopt DC or AC power, while VRL is the voltage of load resistance RL which is in series with the sensor. Vc supplies the detected voltage to load resistance RL and it should adopt DC power.

Description of Sensor Characters

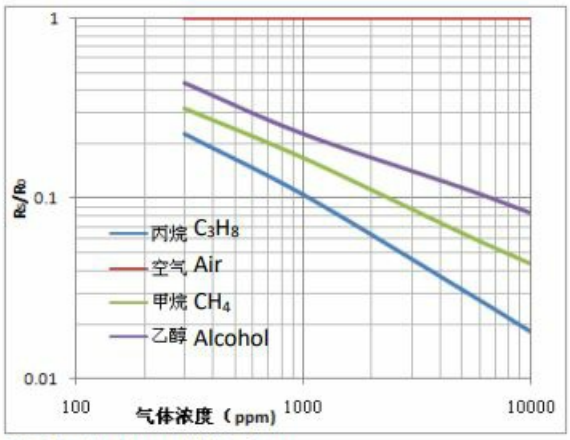


Fig3.Typical Sensitivity Curve

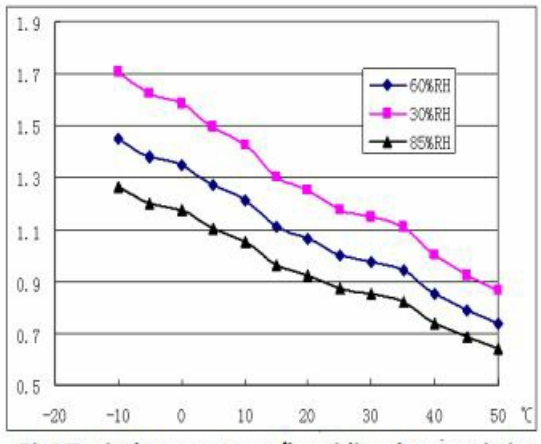


Fig4.Typical temperature/humidity characteristics

- The ordinate is the resistance ratio of the sensor (Rs/R0), and the abscissa is co concentration of gases. Rs

means resistance in target gas with different concentrations, and R0 means the resistance of the sensor in clean air. All tests are finished under standard test conditions.

- The ordinate is the resistance ratio of the sensor (Rs/Rso).Rs means the resistance of the sensor in 2000ppm propane (C3H8) under different teams. and humidity. Rso means the resistance of the sensor in 2000ppm propane (C3H8) under 20℃/65%RH.

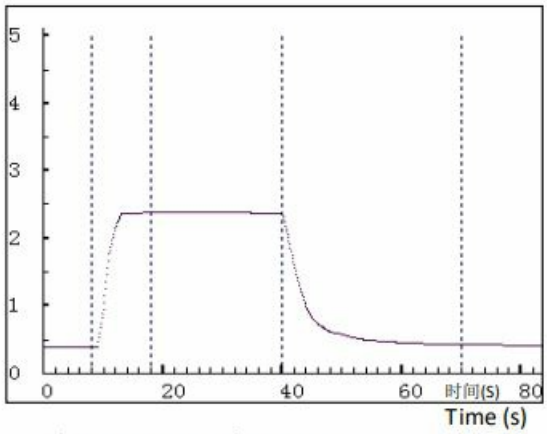


Fig5.Response and Resume

- The ordinate is the resistance ratio of the sensor (Rs/Rso).Rs means the resistance of the sensor in 2000ppm propane (C3H8) under different teams. and humidity. Rso means the resistance of the sensor in 2000ppm propane (C3H8) under 20℃/65%RH.

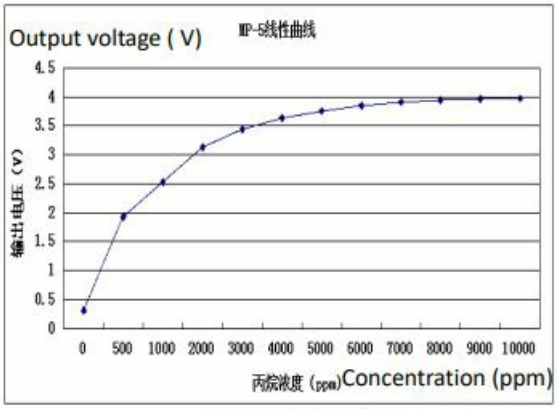
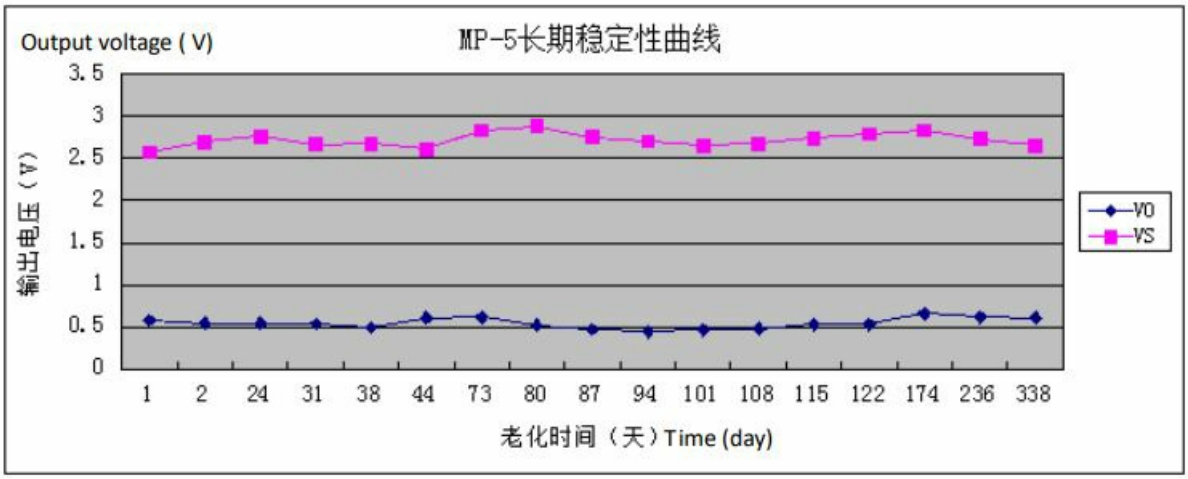


Fig6.Linearity curve



Long-term Stability

- The test is finished in standard test conditions, the abscissa is observing time and the ordinate is VRL.

Cautions

- The following conditions must be prohibited
- Exposed to volatilizable organic silicon steam Sensing material will lose sensitivity and never recover if the sensor absorbs organic silicon steam. Sensors must avoid exposure to silicon bonds, fixtures, silicon latex, putty, or plastic-containing silicon environments.

High Corrosive gas

- If the sensors are exposed to high-concentration corrosive gas (such as H2S, SOX, Cl2, HCl, etc.), it will not only result in corrosion of the sensor structure but also cause sincere sensitivity attenuation. 1.3 Alkali, Alkali metals salt, halogen pollution.
- The sensor's performance will be changed badly if sensors are sprayed polluted by alkali metals salt, especially brine, or exposed to halogen such as fluorine.

Touch water

- The sensitivity of the sensors will be reduced when spattered or dipped in water.

Freezing

- Do avoid icing on sensor's surface, otherwise sensing material will be broken and lose sensitivity.

Applied higher voltage

- The applied voltage on the sensor should not be higher than the stipulated value, even if the sensor is not physically damaged or broken, it causes a down-line or heater damage and causes on sensor's sensitivity characteristic to change badly.

Voltage on the wrong pins

- As Fig8. Pin 1&2 connects to the heater circuit, and Pin 3&4 connects to the measuring circuit; Under the requested conditions, heating and measuring can use the same power circuit.
- **NOTE:** the two pins near the protuberance mark is the heating electrode.

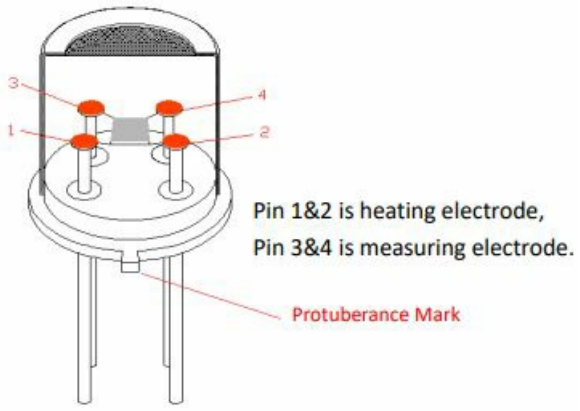


Fig8.Pin Schematic Diagram

The following conditions should be avoided

Water Condensation

- Indoor conditions and slight water condensation will influence sensors' performance lightly. However, if water condensation on the sensor surface keeps for a certain period, the sensor's sensitivities will be decreased.

Used in high gas concentration

- No matter whether the sensor is electrified or not, if it is placed in high gas concentration for a long time, the sensor's characteristics will be affected. If lighter gas sprays the sensor, it will cause extreme damage.

Long time storage

- The sensor's resistance will drift reversibly if it's stored for a long time without electricity, this drift is related to storage age conditions. Sensors should be stored in airproof bags without volatile silicon compounds. For the sensors with long time storage but no electrification, they need a long galvanically aging time for stability before use. The suggested aging time is as follows:

Stable 2.

Storage Time	**Suggested aging time**
Less than one month	Not less than 48 hours
1 ~ 6 months	Not less than 72 hours
More than six months	Not less than 168 hours

Long time exposed to adverse environment

- No matter the sensors are electrified or not if exposed to an adverse environment for a long time, such as high humidity, high temperature, or high pollution, etc .., it will influence the sensors' performance badly.

Vibration

- Continual vibration will result in sensors down lead response and then break. In transportation or assembling lines, a pneumatic screwdriver/ultrasonic welding machine can lead to this vibration.

Concussion

- If sensors meet strong concussion, it may lead its lead wire to disconnect.

Usage Conditions

- For sensors, handmade welding is the optimal way. The welding conditions are as follows.
- Soldering flux: Rosin soldering flux contains the least chlorine

- homo-thermal soldering iron
- Temperature 3 50
- Time less than 3 seconds
- If disobey the above terms, sensor sensitivity will be reduced.
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Documents / Resources

	Winsen MP-5 Flammable Gas Sensor [pdf] Instruction Manual MP-5, MP-5 Flammable Gas Sensor, Flammable Gas Sensor, Gas Sensor, Sensor

References

- Winsen Gas Sensor_CO2 Sensor_Air Quality Sensor_Dust Sensor_CO Sensor-Winsen Electronics
- Winsen Gas Sensor_CO2 Sensor_Air Quality Sensor_Dust Sensor_CO Sensor-Winsen Electronics
- Professional gas sensor factory-accurate gas detection solutions
- Professional gas sensor factory-accurate gas detection solutions
- User Manual