Winsen MP510C Refrigerant Detection Gas Sensor Instruction Manual

Contents

Winsen MP510C Refrigerant Detection Gas Sensor

Product Information

Specifications

Model	Sensor Type	Standard Encapsulation	Detection Gas	Detection Range	Loop Voltage (VC)	Heating Voltage (VH)	Load Resistance (RL)	Heating Consumption (PH)	Surface Resistance (RS)	Sensitivity (S)	Warm-up Time
MP510C	Semiconductor flat surfaced sensor	Metal Cap	Refrigerant gas	100-10000ppm	Adjustable	Standard circuit	0.5-10K (in 5000 ppm R32)	0.3-0.7 (R32)	300mW	Calculation formula	Standard condition of test

Profile

The MP510C Refrigerant Gas Sensor is a product developed by Zhengzhou Winsen Electronics Technology Co., Ltd. It is designed to detect refrigerant gases such as R32, R134a, R410a, and R290. The sensor offers high selectivity, fast response, good anti-interference, long lifespan, and good stability.

Features

- High selectivity
- Fast response
- Good anti-interference
- Long lifespan

- Good stability
- Can detect refrigerant gases R32, R134a, R410a, R290

Main Application

The MP510C Refrigerant Gas Sensor is mainly used for leak detection of refrigerants in air conditioning and refrigeration systems.

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

Profile

The MP510C Freon gas sensor uses a multilayer thick film manufacturing process to fabricate heating and measuring electrodes and a metal oxide semiconductor gas-sensitive layer on a miniature Al2O3 ceramic substrate, and encapsulate it in a metal casing. When the detected gas exists in the ambient air, the conductivity of the sensor changes. The higher the concentration of the gas, the higher the conductivity of the sensor. This change in conductivity is converted into an output signal corresponding to the gas concentration through the circuit. The product has good anti-interference ability against common gases such as alcohol and acetic acid in

usage scenarios.

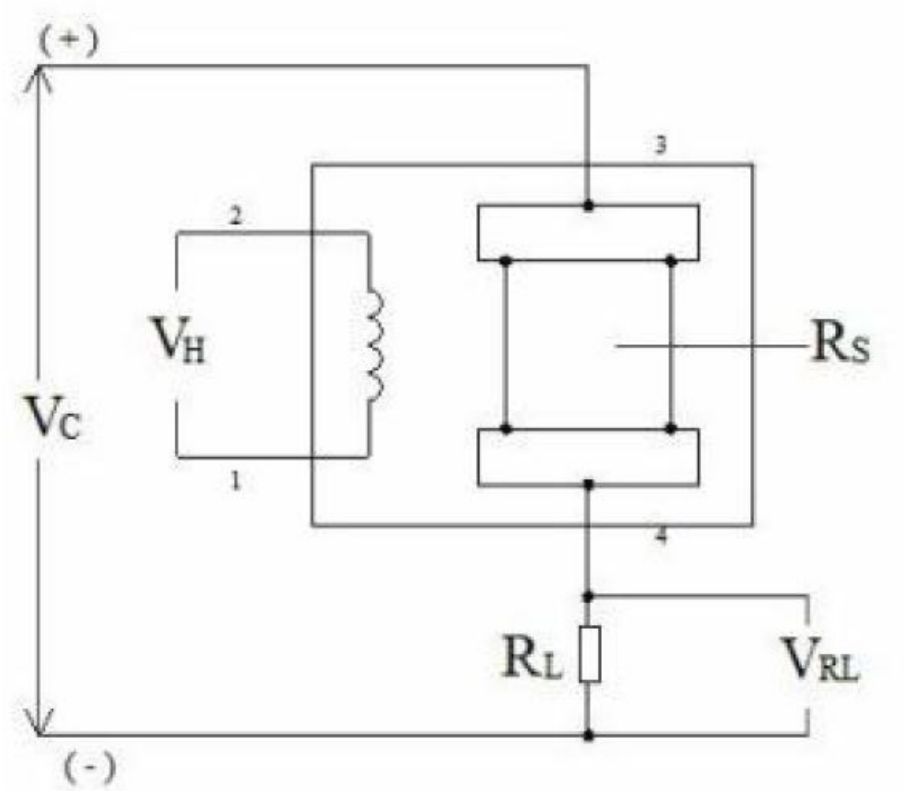
Features

High selectivity, fast response, good anti-interference, long lifespan, good stability Can detect kinds of refrigerant gases R32, R134a,R410a, R290.

Main Application

Used for leak detection of refrigerants in air conditioning and refrigeration systems

Basic test circuit



The figure below shows the basic test circuit of the MP510C sensor. The sensor needs to apply two voltages: heating voltage (VH) and test voltage (VC). Among them, VH is used to provide a specific operating temperature for the sensor, and the voltage applied to both ends of the heating electrode uses a DC power supply. VC is used to measure the loop voltage of the circuit. VRL is the voltage on the load resistance (RL) connected in series with the sensor, that is, the output voltage Vout. Under the premise of meeting the electrical characteristics of the sensor, VH and VC can share a power supply circuit.

Technical Parameters

Technical Parameters Table 1

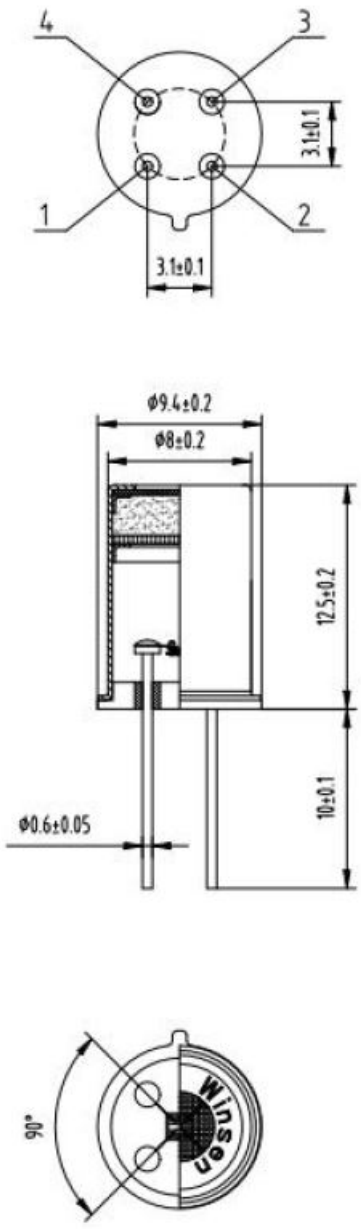


Fig1.Sensor Structure

Model			MP510C
Sensor Type			Semiconductor flat surfaced sensor
Standard Encapsulation			Metal Cap
Detection Gas			Refrigerant gas
Detection range			100 10000ppm
Standard circuit	Loop voltage	VC	5.0V±0.1V DC
	Heating voltage	VH	5.0V±0.1V DC
	Load resistance	RL	Adjustable
sensor features in standard test condition	Heating consumption	PH	≤300mW
	Surface resistance	RS	0.5 10KΩ(in 5000ppm R32)
	Sensitivity	S	0.3~0.7 (R32) Rs(in 9000ppm)/Rs(in 3000ppm)
Standard condition of test	Temperature, humidity		20℃±2℃ 65%±5%RH
	Standard test circuit		Vc:5.0V±0.1V VH:5.0V±0.1V
	Warm-up time		7 days

Calculation formula

Power consumption Ps:

$$P_S = \frac{(V_C - V_{RL})^2}{R_S}$$

Rs:

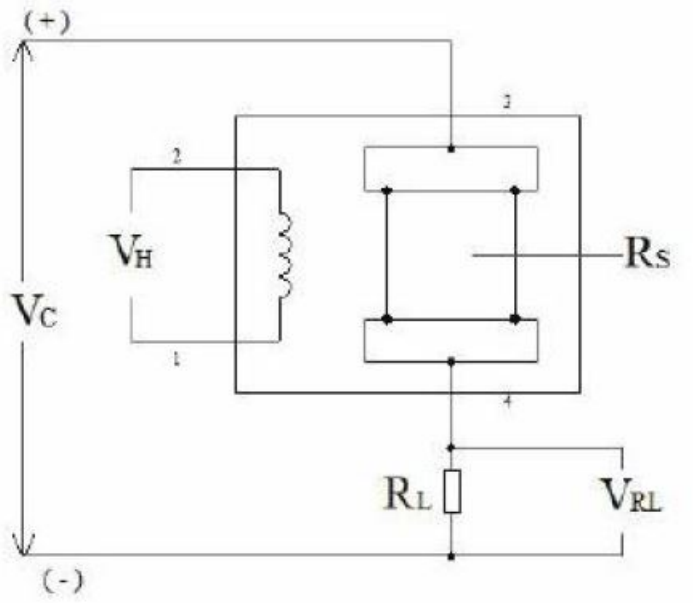
$$Rs = (\frac{Vc}{V_{RL}} - 1) \times R_L$$

Pin definition

- Pin1.Heater
- Pin2 Heater
- Pin3 Power +

- Pin4 Power –

Basic Circuit

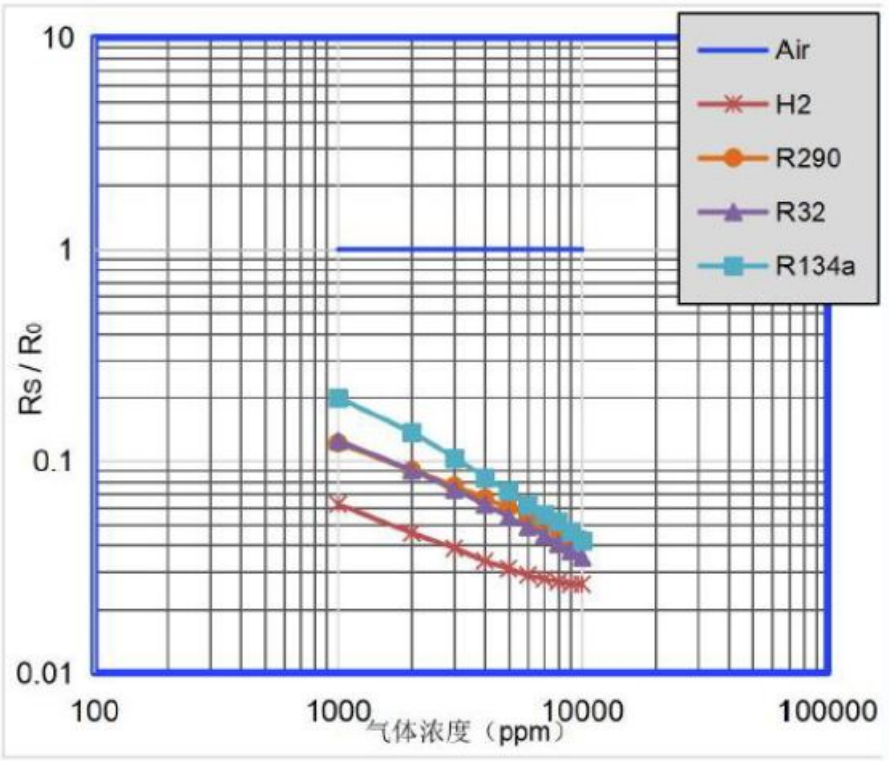


Instructions

The above fig is the basic test circuit.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 sensor. Vc supplies the detect voltage to load resistance RL and it should adopt DC power.

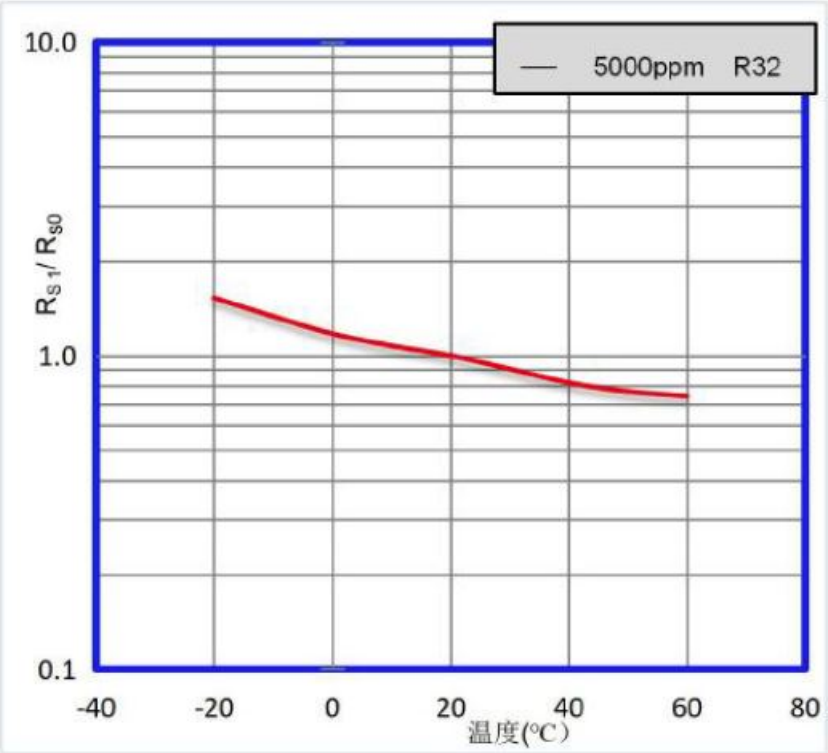
Description of Sensor Characters

Typical Sensitivity Curve



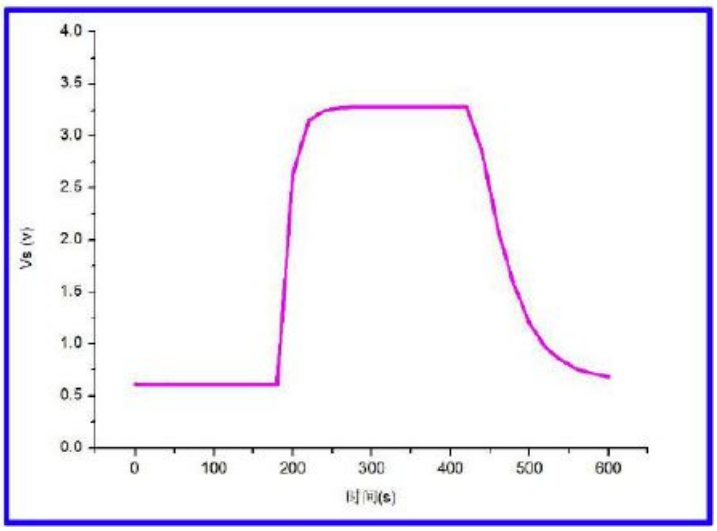
- Rs means resistance in target gas with different concentration, R0 means resistance of sensor in clean air. All tests are finished under standard test conditions.

Typical temperature/humidity characteristics



- Rs1 means resistance of sensor in 5000ppm R32 under different tem. and humidity. Rso means resistance of the sensor in clean air under 22℃/50%RH.

Response and Resume curve in 5000ppm R32

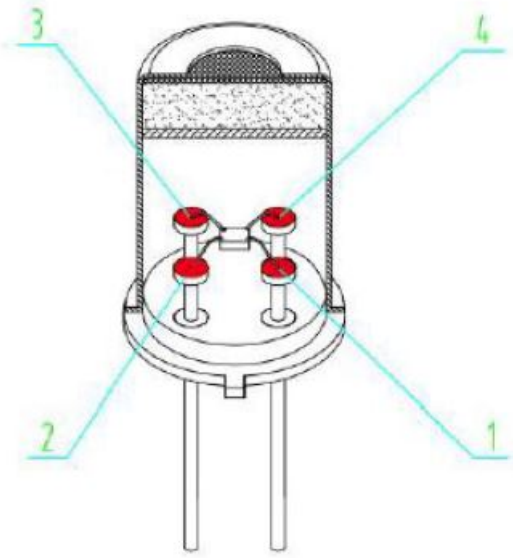


Precautions

Cautions

Following conditions must be prohibited

1. Exposed to volatilizable organic silicon steam
    - Sensing material will lose sensitivity and never recover if the sensor absorbs organic silicon steam. Sensors must avoid exposing to silicon bond, fixature, silicon latex, putty or plastic contain silicon environment.
2. 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 sensors structure, also it cause sincere sensitivity attenuation.
3. Alkali, Alkali metals salt, halogen pollution
    - The sensors performance will be changed badly if sensors be sprayed polluted by alkali metals salt especially brine, or be exposed to halogen such as fluorine.
4. Touch water
    - Sensitivity of the sensors will be reduced when spattered or dipped in water.
5. Freezing
    - Do avoid icing on sensor's surface, otherwise sensing material will be broken and lost sensitivity.
6. Applied higher voltage
    - Applied voltage on sensor should not be higher than stipulated value, even if the sensor is not physically damaged or broken, it causes down-line or heater damaged, and bring on sensors' sensitivity characteristic changed badly.
7. Voltage on wrong pins



- As Fig8,Pin 1&2 connects to heater circuit, Pin 3&4 connects to measuring circuit; Under the requested conditions, heating and measuring can use the same power circuit.

NOTE: the two pins near the protuberance mark is heating electrode.

Following conditions should be avoided

1. Water Condensation
    - Indoor conditions, slight water condensation will influence sensors' performance lightly. However, if water condensation on sensors surface and keep a certain period, sensors' sensitive will be decreased.
2. Used in high gas concentration
    - No matter the sensor is electrified or not, if it is placed in high gas concentration for long time, sensors

characteristic will be affected. If lighter gas sprays the sensor, it will cause extremely damage.

3. Long time storage
    - The sensors resistance will drift reversibly if it's stored for long time without electrify, this drift is related with storage conditions. Sensors should be stored in airproof bag without volatile silicon compound. For the sensors with long time storage but no electrify, they need long galvanical aging time for stability before using. The suggested aging time as follow:

Storage Time	**Suggested aging time**
Less than one month	No less than 48 hours
1 ~ 6 months	No less than 72 hours
More than six months	No less than 168 hours

4. Long time exposed to adverse environment
    - No matter the sensors electrified or not, if exposed to adverse environment for long time, such as high humidity, high temperature, or high pollution etc., it will influence the sensors' performance badly.
5. Vibration
    - Continual vibration will result in sensors down-lead response then break. In transportation or assembling line, pneumatic screwdriver/ultrasonic welding machine can lead this vibration.
6. Concussion
    - If sensors meet strong concussion, it may lead its lead wire disconnected.
7. Usage Conditions
    - For sensor, handmade welding is optimal way. The welding conditions as follow:
        - **Soldering flux:** Rosin soldering flux contains least chlorine
        - homo-thermal soldering iron
        - **Temperature** ≤350°C
        - Time less than 3 seconds

If disobey the above using terms, sensors sensitivity will reduce.

Contact

- **Tel:** 86-371-67169097/67169670
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- **Email:** sales@winsensor.com

Documents / Resources

	**Winsen MP510C Refrigerant Detection Gas Sensor** [pdf] Instruction Manual MP510C, MP510C Refrigerant Detection Gas Sensor, Refrigerant Detection Gas Sensor, Detection Gas Sensor, Gas Sensor, Sensor

References

- **Winsen Gas Sensor_CO2 Sensor_Air Quality Sensor_Dust Sensor_CO Sensor-Winsen Electronics**
- **User Manual**