Winsen MPn-4C Flammable Gas Sensor Instruction Manual

Contents

Winsen

Winsen MPn-4C Flammable Gas Sensor

Specifications

- **Model:** MPn-4C
- **Target Gas:** CH4, Natural gas, Marsh gas
- **Detection Range:** 300~10000ppm (methane, natural gas)
- **Loop Voltage (Vc):** Adjustable
- **Heater Voltage (VH):** 350mW
- **Load Resistance (RL):** 1K-20K (in 4000ppm CH4)
- **Heater Consumption:** PH
- **Sensitive Resistance (RS):** Rs(in air)/Rs(4000ppm CH4)5
- **Sensitivity (S):** R/R0.6(4000ppm-1000ppm CH4)
- **Lifespan:** 10 years

FAQs

- **Q: What is the typical lifespan of the MPn-4C Flammable Gas Sensor?**
  - **A:** The sensor has a lifespan of approximately 10 years under standard operating conditions.
- **Q: How can I ensure accurate readings from the sensor?**
  - **A:** Properly calibrate the sensor based on the provided technical parameters and conduct regular maintenance checks to ensure its performance.

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 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.

MPn-4C Flammable Gas Sensor

MPn-4C adopts a multi-layer thick film manufacturing process, which integrates a heating electrode, a measuring electrode, and a metal oxide semiconductor gas-sensitive layer on an Al2O3 ceramic substrate, and encapsulates it in a metal housing. When the detected gas is present in the ambient air, the conductivity of the sensor will change, and the higher the concentration of the gas, the higher the conductivity of the sensor. This change in conductivity can be converted into an output signal corresponding to the gas concentration using a simple circuit. The product has good anti-interference ability to common gases such as alcohol and acetic acid in the use scene.

Features

- High sensitivity to CH4 gas
- Excellent anti-interference ability
- Excellent stability

Application

- It is widely used in combustible gas leak monitoring devices, fire/safety detection systems for home, factory, and commercial use; Flammable gas leak alarms, gas leak detectors, etc.

Technical Parameters

Model			MPn-4C
Sensor Type			Flat surfaced
Standard Encapsulation			Metal cap
Target Gas			CH4, Nature gas, marsh gas
Detection range			300~10000ppm (methane, natural gas)
Standard Circuit Conditions	Loop Voltage	Vc	≤24V DC
	Heater Voltage	VH	5V±0.1V AC or DC
	Load Resistance	RL	Adjustable
	Heater consumption	PH	≤350mW
	Sensitive resistance	RS	1KΩ 20KΩ (in 4000ppm CH4)
	Sensitivity	S	Rs(in air)/Rs(4000ppm CH4)≥5
	Concentration Slope	α	≤0.6(R4000ppm/R1000ppm CH4)
Standard test conditions	Temp. Humidity		20℃±2℃ 55%±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

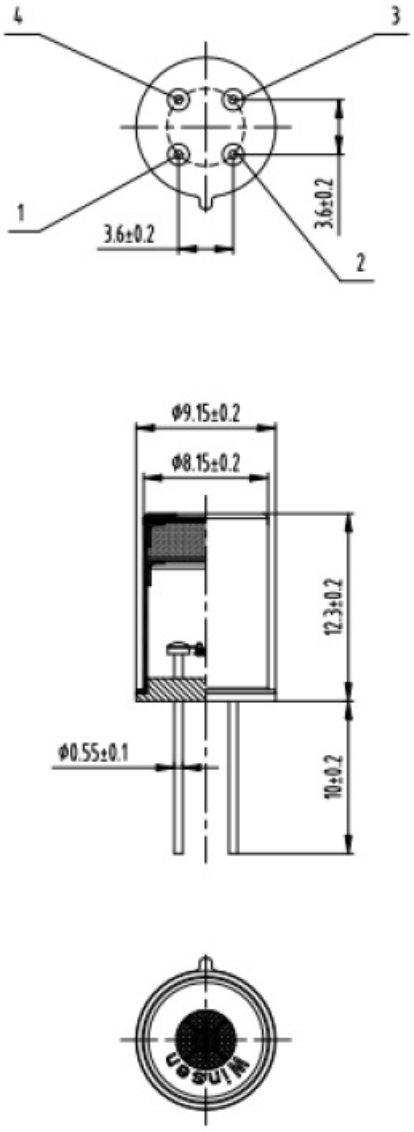


Fig1. Sensor structure

Basic circuit

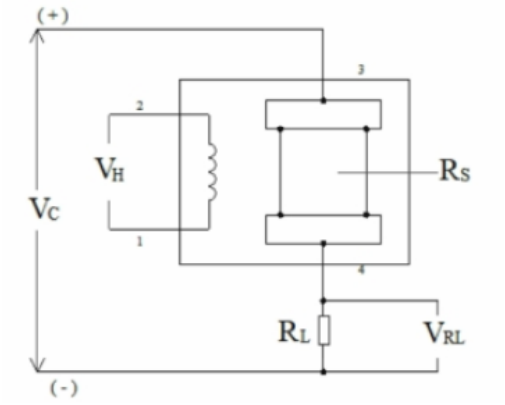
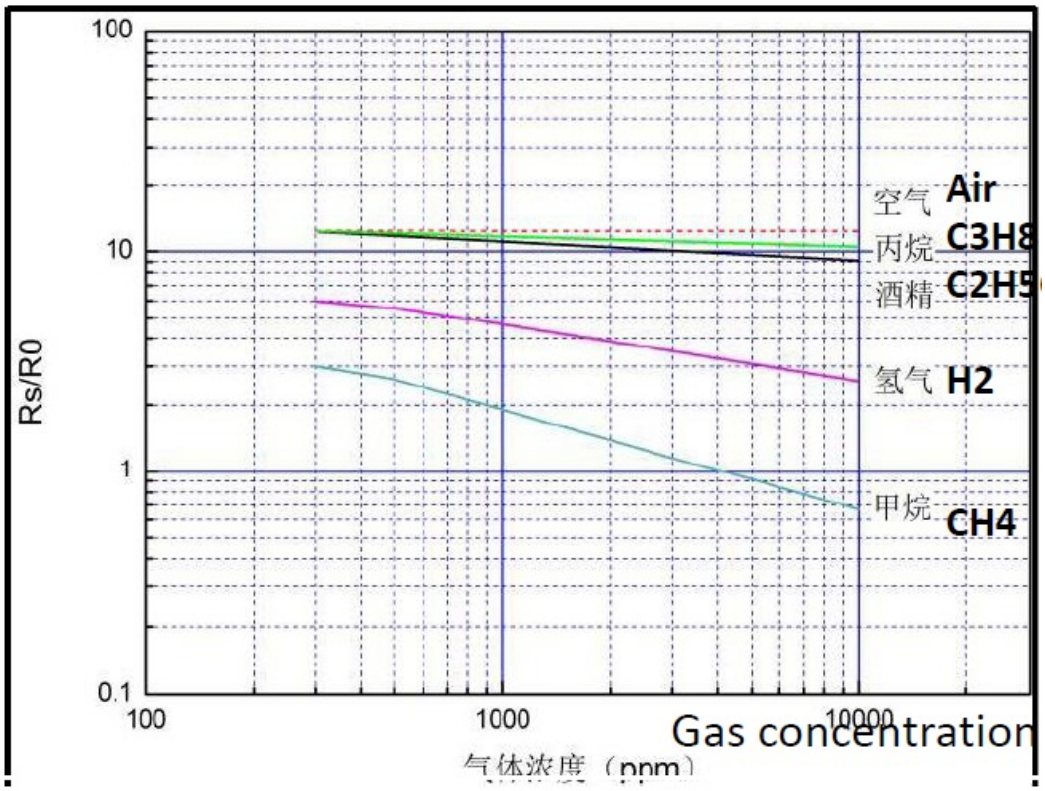


Fig2. Test circuit for MPn-4C

This circuit shows the basic measuring circuit of the sensor. Two voltages should be applied to this sensor: heating voltage (VH) and circuit voltage (Vc). VH is used for supplying a certain temperature which can be DC or AC. VRL is the voltage on the load
resistance(RL) which connects to the sensor in series. Vc supplies the test voltage for RL and it must be DC.

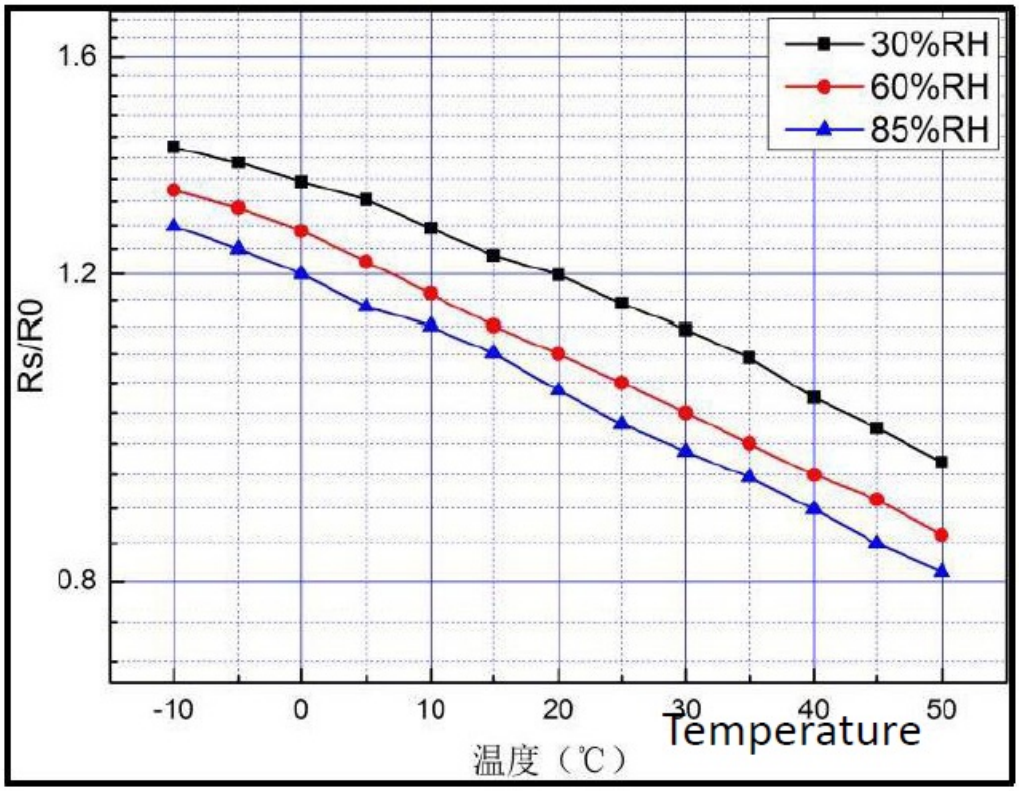
Characterization

Fig3. Typical Sensitivity Curve



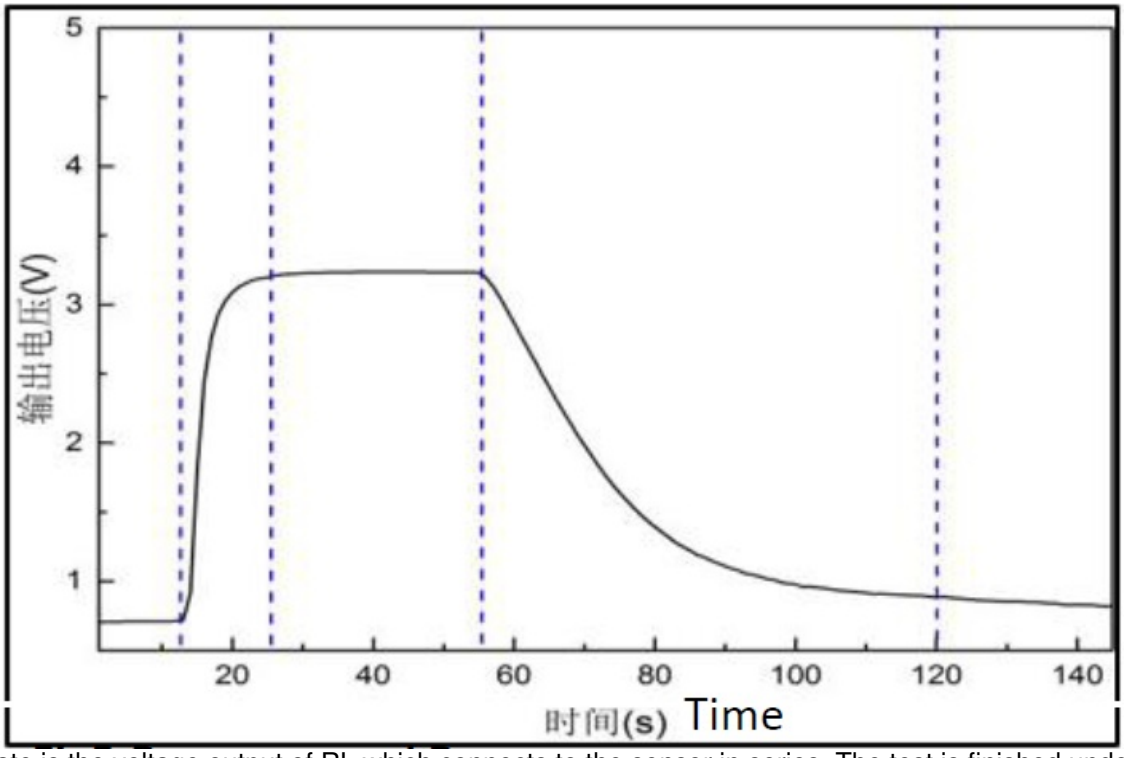
Rs means resistance in target gas with different concentrations, and R0 means the resistance of the sensor in 4000ppm CH4 gas. All tests are finished under standard test conditions. In the figure, each gas feature point takes its value when it remains in the gas of a specific concentration for 60.

Fig4. Typical temperature/humidity characteristics



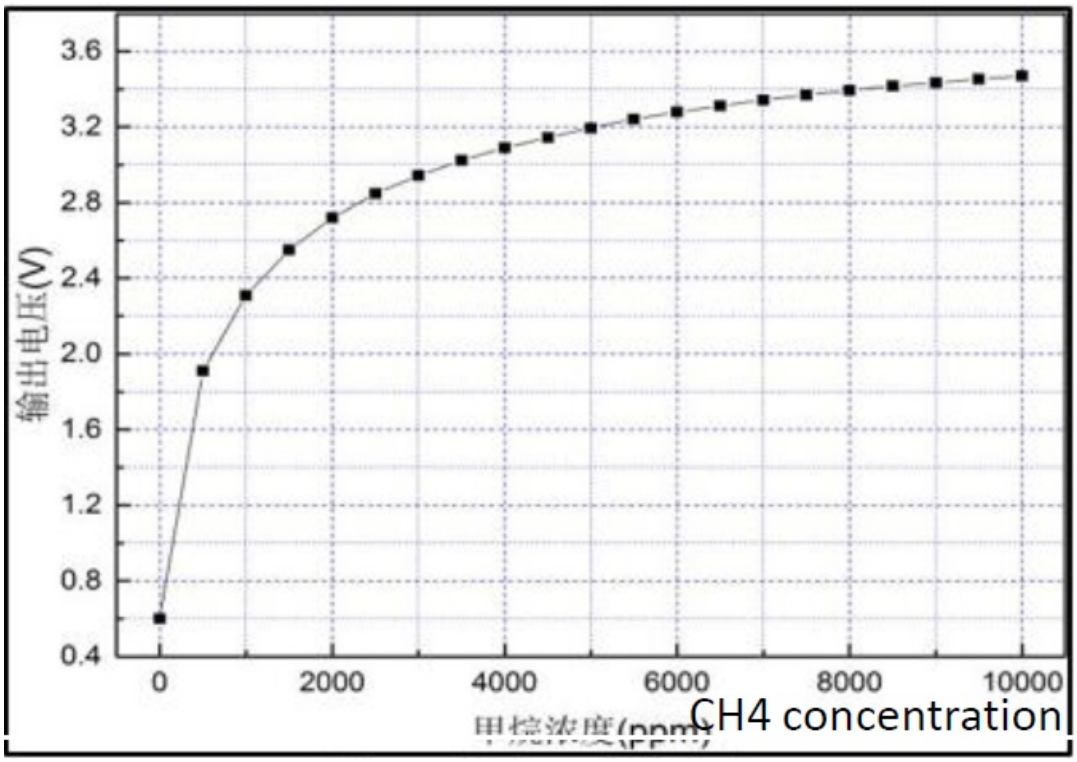
Rs means the resistance of the sensor in 4000ppm CH4 gas, R0 means resistance at 22℃, 55%RH. All tests are finished under standard test conditions.

Fig5. Response and Resume curve



The ordinate is the voltage output of RL which connects to the sensor in series. The test is finished under standard test conditions and CH4 concentration is 4000ppm.

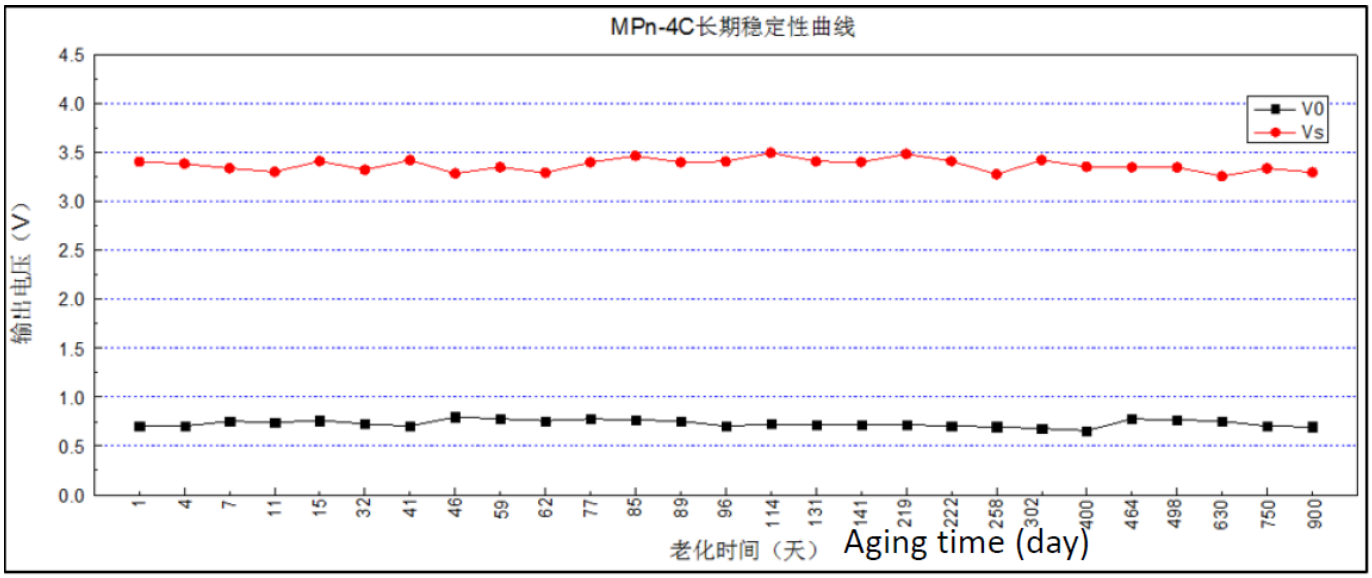
Fig6.Linear curve



The ordinate is the voltage output of RL which connects to the sensor in series. The test is finished under standard test conditions,

Long-term Stability

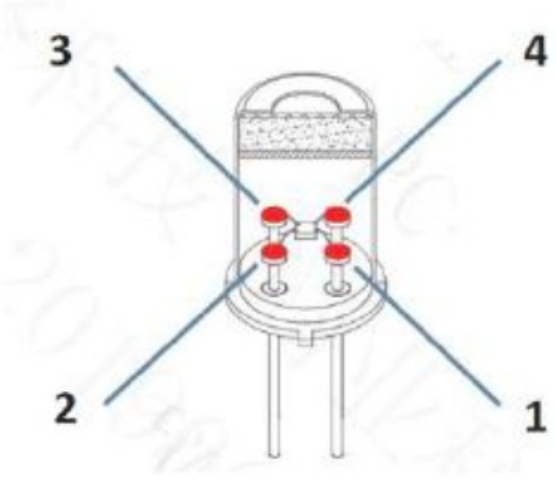
Fig7. Long-term Stability



NOTE: The output voltage in the figure is the voltage on the load resistance (RL) of the sensor in series, and the horizontal coordinate is the observation time. All the tests were done under standard conditions and measured methane concentrations of 4,000 PPM.

Cautions

1. **The following conditions must be prohibited**
    - **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.
    - **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 the 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 Fig, 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 are heating electrodes.
        - Pin 1&2 is heating electrode,
        - Pin 3&4 is measuring electrode.
        - **Fig8.Pin Schematic Diagram**



2. **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 and kept for a certain period, the sensor's sensitive will be decreased.
    - **Used in high gas concentration**
        - 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.
    - **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 conditions. Sensors should be stored in airproof bags without volatile silicon compound. For the sensors with long-term storage but no electrification, they need a long galvanic aging time for stability before use. The suggested aging time is as follows:
        - **Stable2.**

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

    - **Long time exposed to adverse environment**
        - Whether 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 sensor 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 are strongly impacted or dropped, the lead wire will be disconnected.
    - **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
- homothermal soldering iron
- **Temperature** ≤350℃
- **Time** less than 3 seconds

- If disobey the above terms, sensor sensitivity will be reduced.
- **Appendix.** Information about the load resistance
- Adjust the load resistance according to the following comparison table
- **Table 3 Sensor No. and RL**

No.	RL value
1#	1KΩ
2#	2KΩ
3#	3KΩ
4#	4.7KΩ
5#	6.8KΩ
6#	10KΩ
7#	20KΩ
8#	47KΩ
9#	100KΩ
10#	200KΩ

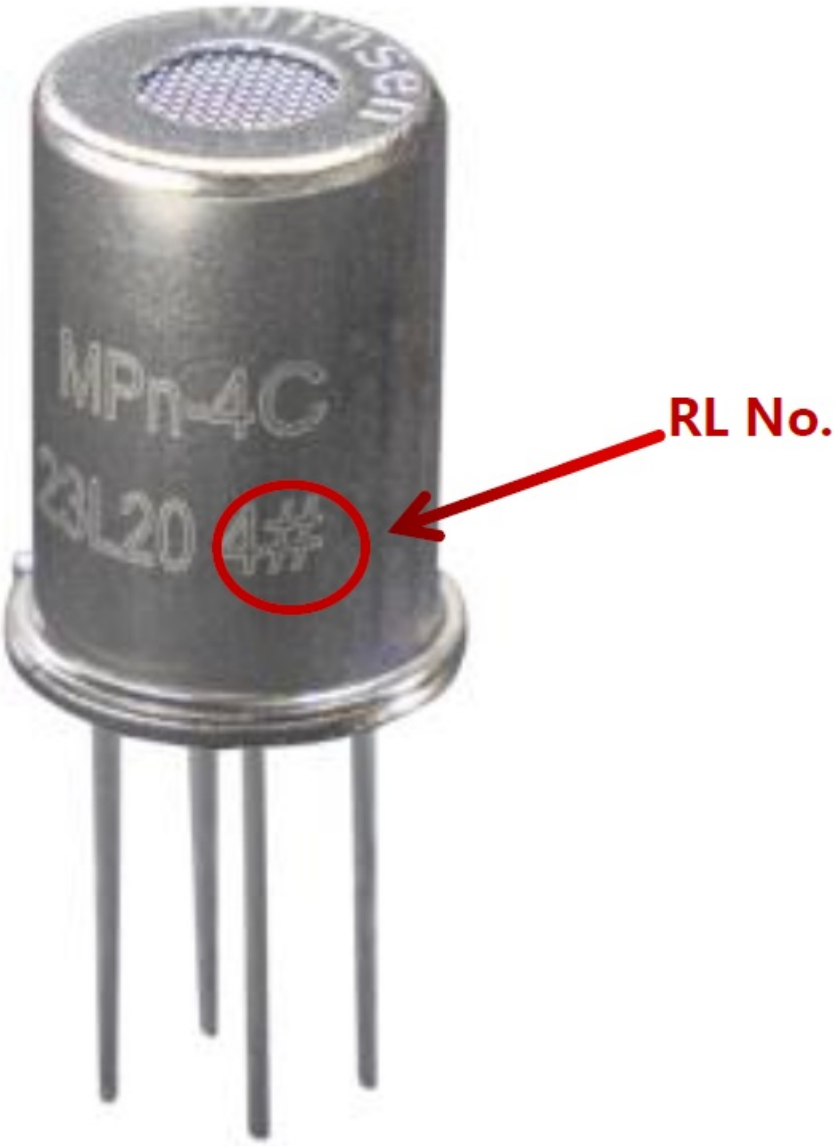


Fig9 Sensor RL No.

CONTACT INFORMATION

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Documents / Resources

	Winsen MPn-4C Flammable Gas Sensor [pdf] Instruction Manual MPn-4C, MPn-4C 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
- User Manual