



Winsen MC114 Catalytic Gas Sensor User Manual

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Winsen MC114 Catalytic Gas Sensor



Statement

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MC114/ MC114C Catalytic Flammable Gas Sensor

Profile

MC114/ MC114C adopts the catalytic combustion principle, and its two arms of electric bridge consist of a test element and a compensating element. The resistance of the test element rises once it meets the combustible gases, in the same time, the output voltage of the bridge changes and the voltage variation rises in direct proportion to the gas concentration. The compensating element, as a conference, has the function of compensating temperature and humidity.

Features

It has good sensitivity to methane in wide range and has advantages such as long lifespan, low cost, and simple drive circuit &etc. The bridge output is linear, quick response, good repeatability and selectivity, good stability, and excellent resistance to the interference of H₂S gas and organosilicon.

Main Applications

It is widely used in industrial occasion to detect the concentration of natural gas, LPG, coal gas and alkanes. It is also used in combustible gas leakage alarm system, combustible gas detector and gas concentration meter and so on.

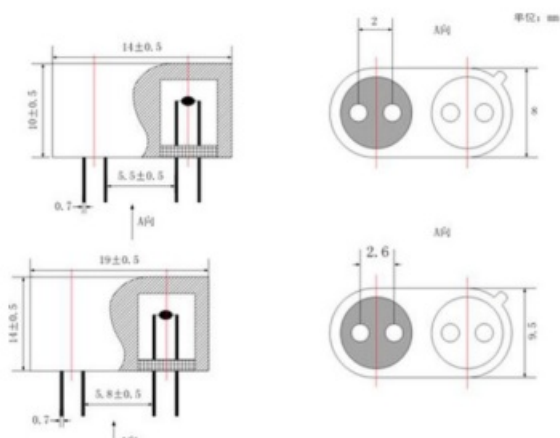


Fig1. Sensor Structure

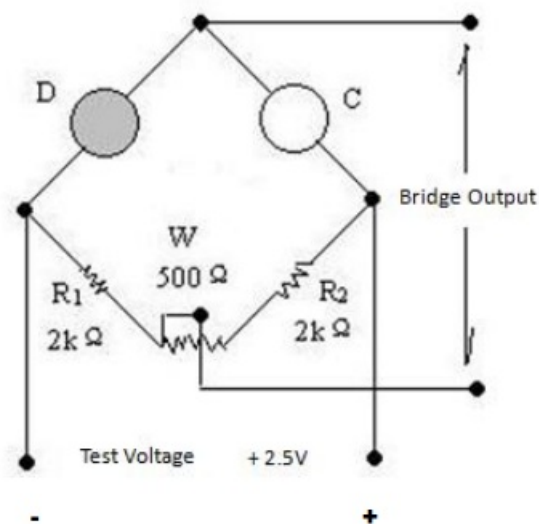
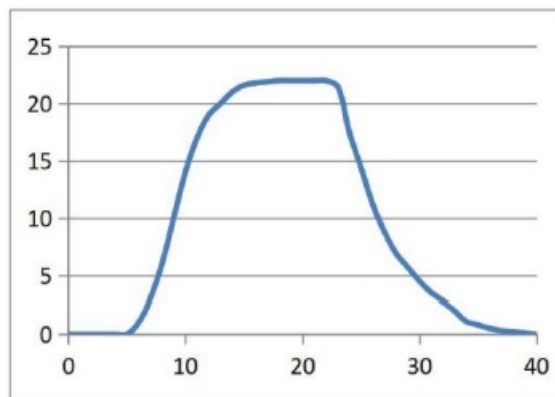
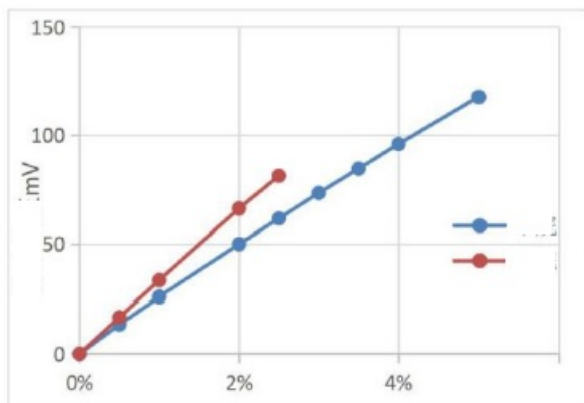


Fig2. Basic Test Circuit

Technical Parameters

Model		MC114/ MC114C
Sensor Type		Catalytic
Standard Encapsulation		Metal, Metallurgy powder mesh
Working voltage(V)		2.5±0.1
Working current(mA)		MC114: 150±10; MC114C: 90±10
Sensitivity (mV)	1% CH ₄	15~35
	1% C ₃ H ₈	20~50
Linearity		≤5%
Measuring range(%LEL)		0~100
Response Time (90%)		≤10s
Recovery Time (90%)		≤30s
Working Environment		-40 ~ +70°C, less than 95%RH
Storage Environment		-20 ~ +70°C, less than 95%RH
Size (mm)		MC114: 19×9.5×14; MC114C: 14×8×10
Lifespan		3 years
Anti-explosion Mark		Exdibl

Sensitivity, response and recovery



Changing of output signal at different temperature

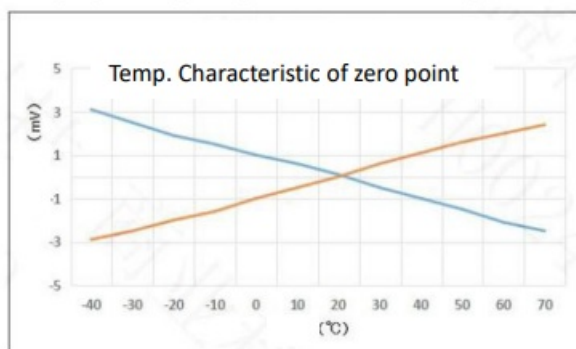


Fig5.Zero point at different temperature

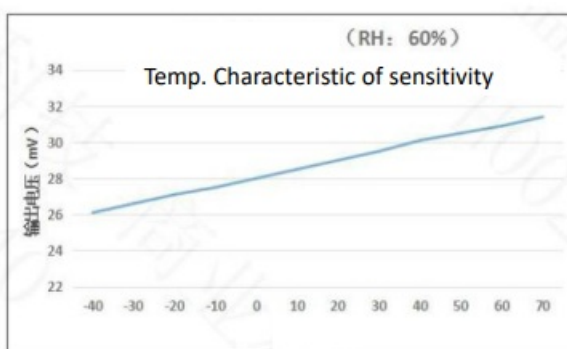


Fig6. Sensitivity at different temperature

Changing of output signal at different humidity

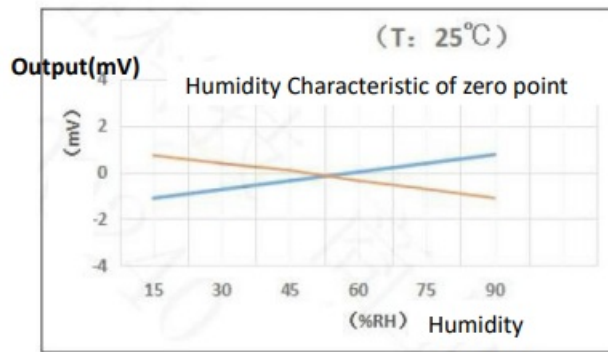


Fig7.Zero point at different humidity

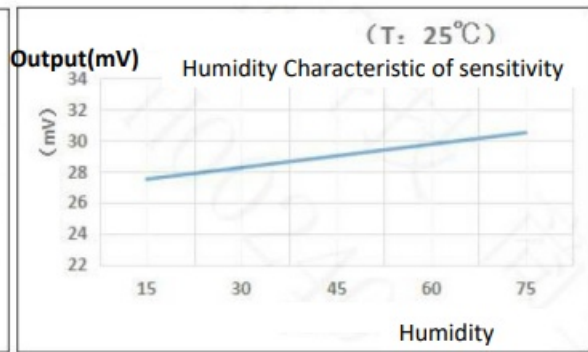


Fig8. Sensitivity at different humidity

Changing of output signal with different voltage supplying

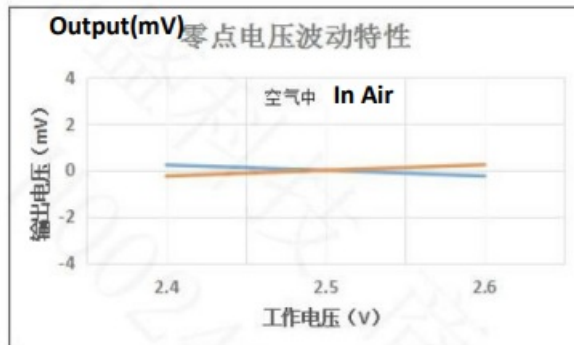


Fig9. Zero point with different voltage

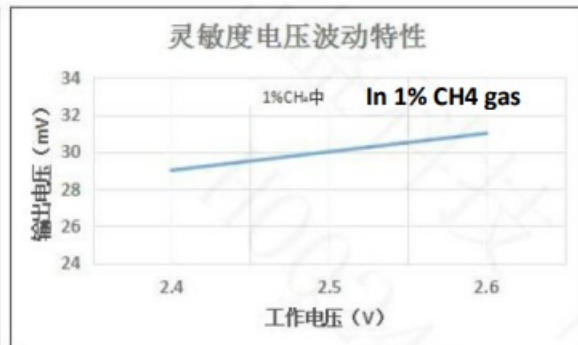


Fig10. Sensitivity with different voltage

Long-term Stability

The drift in air per year is within $\pm 2\text{mV}$, in 1%CH₄ is within $\pm 2\text{mV}$. For a short period storage (in 2 weeks), the sensor need be galvanical continuously for 8 hours to reach stability. For more than one year storage, it need more than 48 hours.

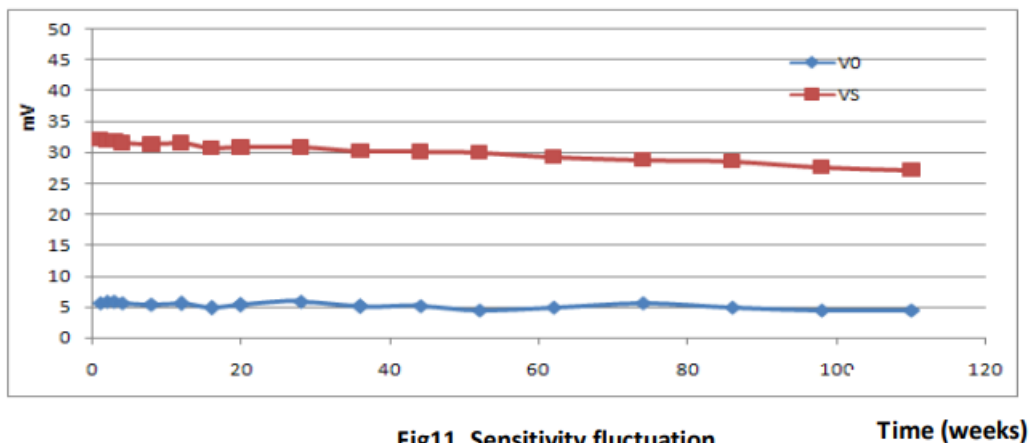


Fig11. Sensitivity fluctuation

Cautions

The following conditions must be prohibited

Exposed to 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 environment.

High Corrosive gas

If the sensors are exposed to high-concentration corrosive gas (such as H₂ S, SOX, Cl₂, HCl etc.), it will not only result in corrosion of the structure of the sensor, also it cause sincere sensitivity attenuation.

Alkali, Alkali metals salt, halogen pollution

The sensor's performance will be changed badly if sensors be sprayed and polluted by alkali metals salt especially brine, or be 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 lost 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 down-line or heater damaged, and bring on sensor's sensitivity characteristic to change badly.

Pins connection

When the sensor is connected to the circuit, one of the detection part pins and one of the compensation part pins connect as the signal output. The other one of the detection part pins connects the negative electrode, while the other one of the compensation part pins connects to the positive electrode. The part with the '■' mark is the detection part(for the separate type sensor, the one part with a bigger hole is the detector part),the other part is the compensation part.

The following conditions must be avoided**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.

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 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 long time without electricity, this drift is related with storage conditions. Sensors should be stored in airproof bag without volatile silicon compounds. For the sensors with long time storage but no electrification, they need long galvanic aging time for stability before use. The suggested aging time is 24 hours at least if the storage time is more than half a year.

Long time exposed to adverse environment

No matter the sensors are electrified or not, if exposed to the adverse environments for 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 then break. In transportation or assembling line, a pneumatic screwdriver/ultrasonic welding machine can lead this vibration.

Concussion

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


Usage Conditions

For sensor, handmade welding is optimal way. The welding conditions as follow:

- **Soldering flux:** Rosin soldering flux contains least chlorine
- Homothermal soldering iron
- **Temperature** $\leq 350^{\circ}\text{C}$
- **Time** less than 5 seconds

If disobey the above using terms, sensors sensitivity will be reduced.

Documents / Resources

 <p>Catalytic Gas Sensor Series MC114 MC114C</p> <p>Manual</p> <p>Version 1.1 V001-100-000-01-00</p> <p>Zhejiang Winsen Electronics Technology Co., Ltd</p>	<p>Winsen MC114 Catalytic Gas Sensor [pdf] User Manual MC114, MC114C, Catalytic Gas Sensor, Gas Sensor, Catalytic Sensor, MC114, Sensor</p>
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