



# Catalytic Flammable Gas Sensor

(Model: MC21B)

# Manual

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Zhengzhou Winsen Electronics Technology CO., LTD

## MC21B Catalytic Flammable Gas Sensor

### Product description:

MC21B adopts catalytic combustion principle, and its two arms of electric bridge consists of a test element and a compensate 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 compensate element, as a conference, has the function of compensating temperature and humidity.



### Characteristics:

Bridge output voltage in linear; Fast response; Good repeatability and selectivity; Stable and reliable; Resist H<sub>2</sub>S poisoning & organosilicone.

### Main Applications:

It is used for household occasions to detect combustible gases leakage alarm or concentration such as natural gas, liquefied gas and so on.

### Parameters:

Table1.

Model	MC21B	
Sensor Type	Catalytic Type	
Standard Encapsulation	Metal cap & Plastic base	
Working voltage(V)	2.5±0.1	
Working current(mA)	150±10	
Sensitivity (mV)	20%LEL CH <sub>4</sub>	12~45
Sensitivity (mV)	20%LEL C <sub>3</sub> H <sub>8</sub>	10~30
Linearity	≤5%	
Measuring range(%LEL)	0~100	
Response Time (90%)	≤10s	
Recovery Time (90%)	≤30s	
Operation Environment	-40~+70°C <95%RH	
Storage Environment	-20~+70°C <95%RH	
Lifespan	5 years	

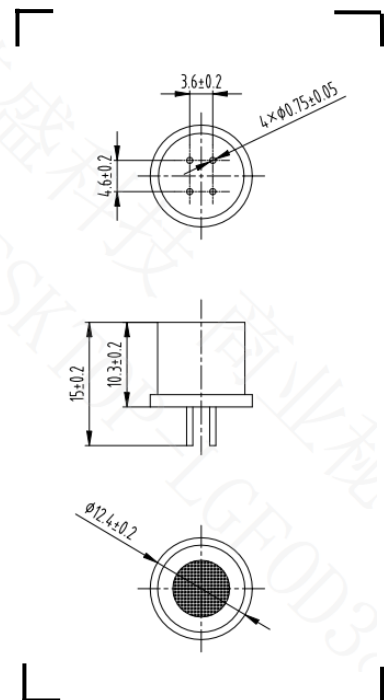


Fig1. Sensor Structure

Basic Circuit

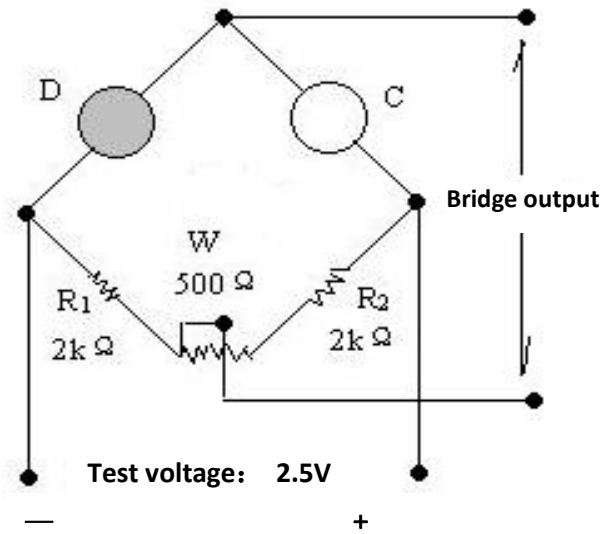


Fig2. Basic Test Circuit

Sensor Characteristics Description

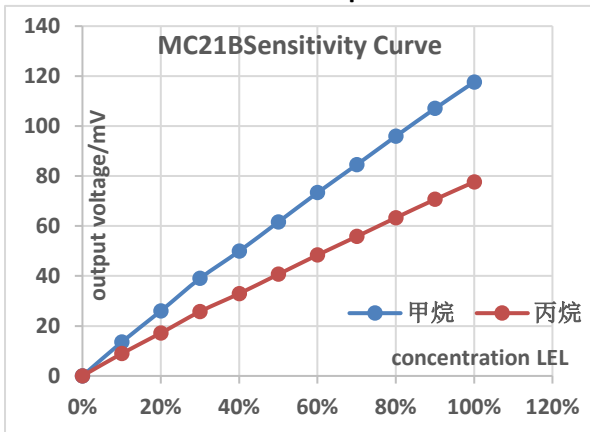


Fig3. Sensitivity Curve

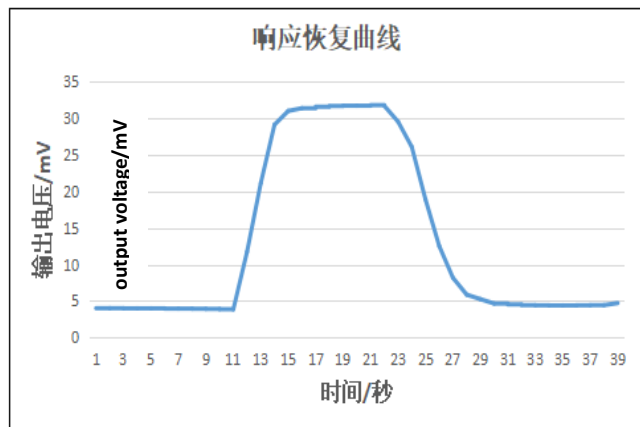


Fig4. Response and Recovery Curve

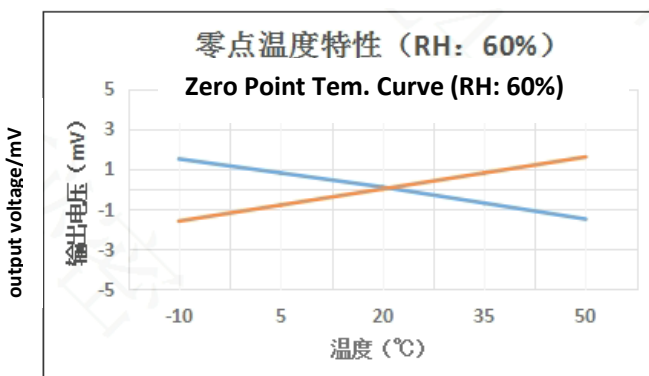


Fig5. Zero point at different temp.

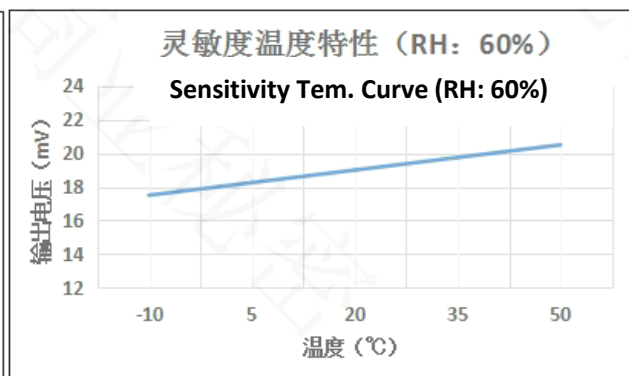


Fig6. Sensitivity at different temp.

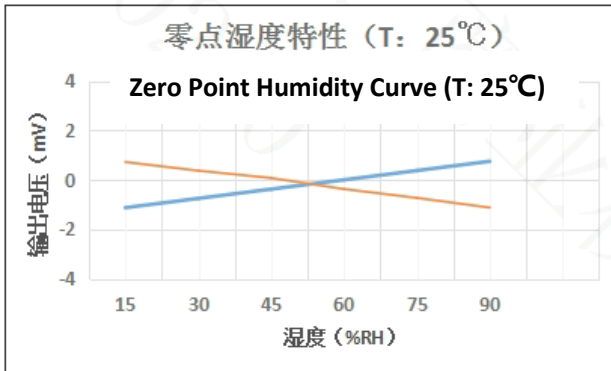


Fig7. Zero point at different humidity

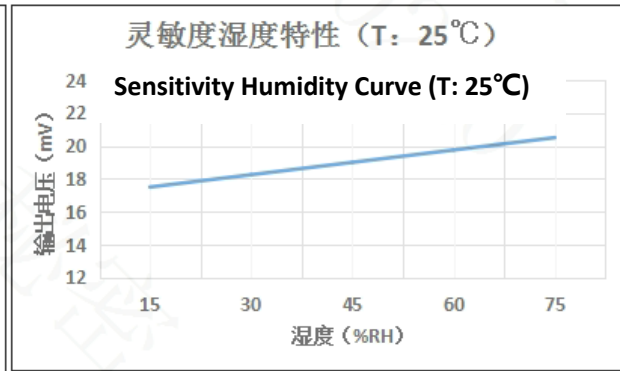


Fig8. Sensitivity at different humidity

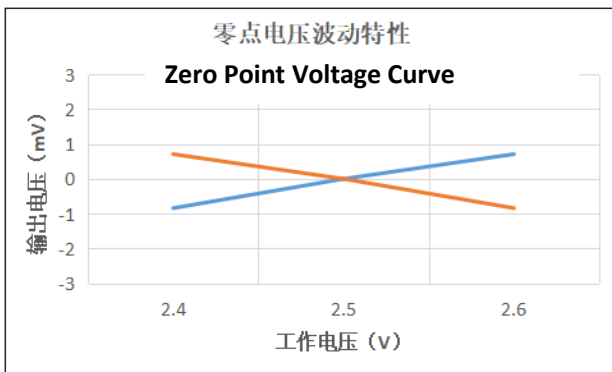


Fig9. Zero Drift with different voltage

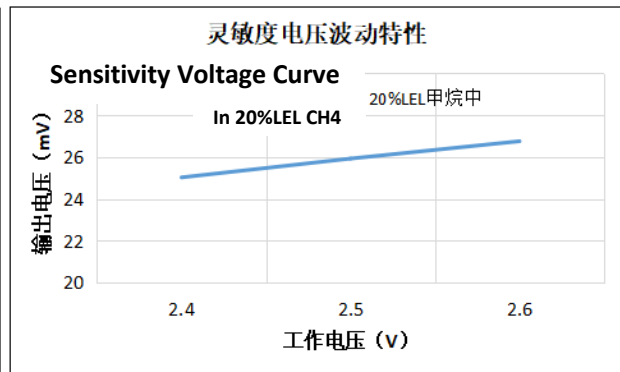


Fig10. Sensitivity with different voltage

## Circuit

### 1. Following conditions must be prohibited

#### 1.1 Exposed to 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, fixture, silicon latex, putty or plastic contain silicon environment.

#### 1.2 High Corrosive gas

If the sensors are exposed to high concentration corrosive gas (such as  $H_2S$ ,  $SO_x$ ,  $Cl_2$ ,  $HCl$  etc.), it will not only result in corrosion of sensors structure, also it cause sincere sensitivity attenuation.

#### 1.3 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.

#### 1.4 Touch water

Sensitivity of the sensors will be reduced when spattered or dipped in water.

#### 1.5 Freezing

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

#### 1.6 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.

### 2. Following conditions must be avoided

#### 2.1 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.

#### 2.2 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.

**2.3 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 is 24 hours at least if the storage time is more than half an year.

**2.4 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.

**2.5 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.

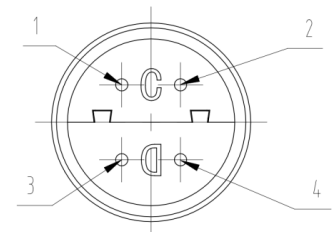
**2.6 Concussion**

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

**3. Usage suggestion**

**3.1 Pins connection**

When the sensor is connecting to the circuit, pin1 connects to positive electrode while pin3 connects to negative electrode. Pin2&pin4 are connecting together as signal output. The part with "D" mark on the sensor bottom is the detection element, the other part with "C" mark is the compensation element.



**Fig11.pins connecting**

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

- Soldering flux: Rosin soldering flux contains least chlorine
- Homothermal soldering iron
- Temperature: <350°C
- Time: less than 5 seconds

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

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