



# Low Power-Consumption CO2 Sensor (Model NO:MG-812)

Operating Manual

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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.

# MG-812 Low Power-Consumption CO2 Sensor

## Production Description

MG-812 is a semiconductor oxide chemical sensor that uses solid electrolyte battery principles to detect CO2.

When the sensor is kept at a certain working temperature and placed in a CO2 atmosphere, an electrode reaction occurs between the positive and negative electrodes of the battery, and the output signal voltage is inversely proportional to the logarithm of the CO2 concentration. A voltage change in the test signal can detect a change in the CO2 concentration.

## Feature:

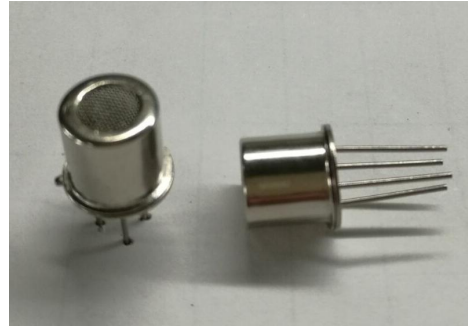
Small sizes, low power-consumption, high sensitivity and good selectivity.

Less affection by temperature and humidity.

Good stability and repeatability.

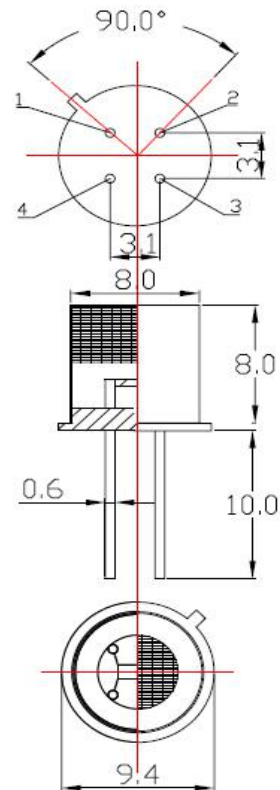
## Application

CO2 detection in air quality control, ferment process control and green house fields.



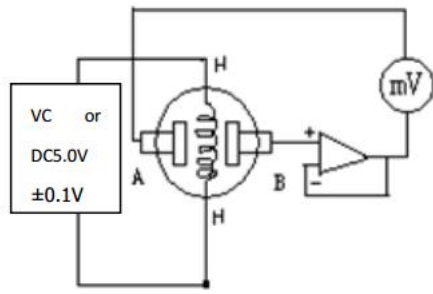
**Specification Table 1**

Model No.	MG812
Standard pack	Metal shell
Target gas	CO2
Detection range	0~ 10000ppm CO <sub>2</sub>
Heater voltage V <sub>H</sub>	5.0±0.1 V
Heater resistance R <sub>H</sub>	60.0±5Ω
Heater current I <sub>H</sub>	85±10mA
Heater consumption P <sub>H</sub>	420±50mW
Working temp Tao	-20~50°C
Storage temp	-20~70°C
Zero EM F	200-400mV (in 400ppm CO <sub>2</sub> )
Output signal ΔEM F	≥ 20mV EMF (40ppmCO <sub>2</sub> )- EMF (1000ppmCO <sub>2</sub> )



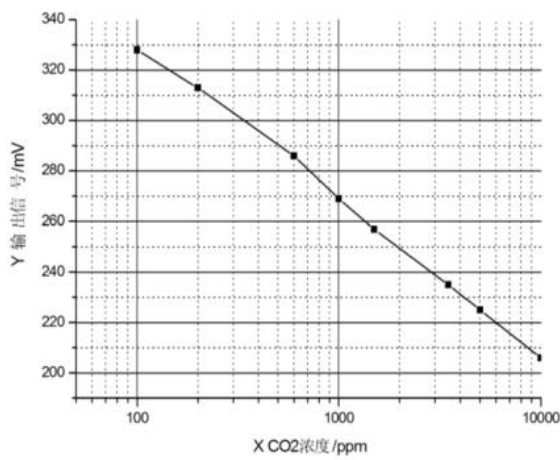
**Picture 1 Structure**

## Basic Circuit

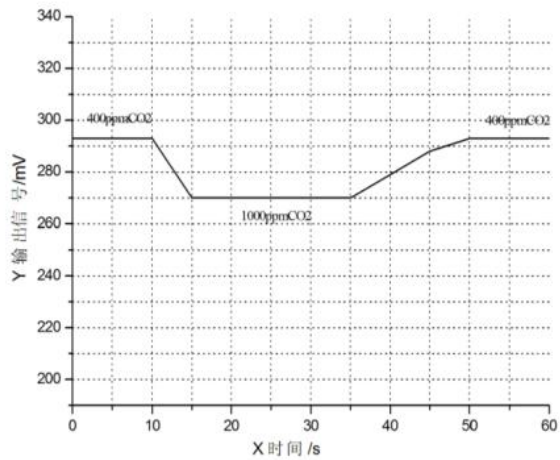


Picture 2 sensor testing circuit.  
Inner resistance should be higher 100GΩ.

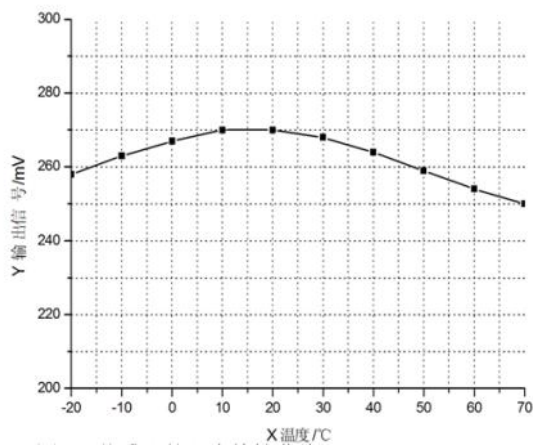
## Character Description



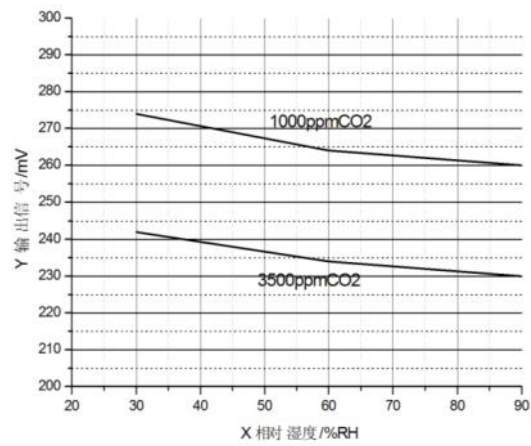
Picture 3 Sensitivity Curve



Picture 4 Response and recovery Curve



Picture5 Temperature Curve(1000ppmCO2, 40%RH);



Picture 6 Humidity Curve(25°C )

## Cautions

### 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 be 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<sub>2</sub>S, SO<sub>x</sub>, Cl<sub>2</sub>, 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 splattered or dipped in water.

### 1.5 Freezing

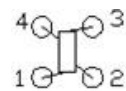
Do avoid icing on sensor's surface, otherwise sensing material will be broken and lost sensitivity.

### 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.

### 1.7 Voltage on wrong pins

On 4-pin type sensor, 1, 3 is for the heating electrode(Regardless of positive and negative), 2 and 4 is for the test electrode(2 is for positive, while 4 is for negative). If voltage on wrong pins, users won't get any signal or the sensor will be ruined.



## 2 . Following conditions must be avoided

Picture 7 sensor pin

### 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 a 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 to be long galvanized aging time for stability before using. The suggested aging time as follow:

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

#### 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.

#### 2.7 Usage Conditions

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

- Soldering flux: Rosin soldering flux with minimal chlorine content
- homothermal soldering iron
- Temperature: 250°C
- Time: less than 3 seconds

2.7.1 If users choose wave-soldering, the following conditions should be obey:

- Soldering flux: Rosin soldering flux with minimal chlorine content
- Speed: 1-2 Meter/ Minute
- Warm-up temperature: 100±20°C
- Welding temperature: 250±10°C
- One time pass wave crest welding machine
- If disobey the above using terms, sensors sensitivity will be reduced.

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