Winsen
炜盛科技

Carbon Monoxide Gas Sensor

（Model：MP-7）

Manual

Version: 1.4

Valid from: 2021-07-17

Zhengzhou Winsen Electronics Technology Co., Ltd

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.

MP-7 Carbon Monoxide GAS SENSOR

MP-7 adopts advanced planar construction production technics, using MOS material formed by micro AL2O3 ceramic tube and heater, electro-down-lead be fetched out, and are fixed into a metal base and cover. Adopting low and high temperature circling detection: when low temperature （V_H=1.5V）, it detects CO, Conductance of sensor bigger along with CO concentration in air; When high temperature（V_H=5.0V）, clean other gases, using simple circuit could change the conductance, change it to be output signal which relatively to the gas concentration.

Character

* High Sensitivity to CO
* Mini Size
* Fast response and resume character
* Excellent Stability and long life

Application

* They are used in gas leakage detecting equipment in family, industry and commercial field, fire resistance/ safety detection system.
* CO gas leakage alarm and detector

Parameters

Model			MP-7
Sensor Type			Flat surfaced
Standard Encapsulation			Metal cap
Target Gas			CO gas
Detection range			50-1000ppm CO
Standard Circuit Conditions	Loop Voltage	V_c	≤10V DC
	Heater Voltage	V_H	5V±0.1V AC or DC(high temp.) 1.5V±0.1V AC or DC(low temp.)
	Heating time	T_L	60S±1S（high temp.） 90S±1S（low temp.）
	Load Resistance	R_L	Adjustable
Sensor character under standard test conditions	Heater Resistance	R_H	105Ω±10Ω (room temp.)
	Heater consumption	P_H	≤240mW
	Sensitivity	S	Ro(in air)/Rs(100ppm CO)≥3
	Output voltage	V_S	2.5V～4.3V (in 100ppm CO)
	Concentration Slope	α	≤0.6(R_{300ppm}/R_{50ppm} CO)
Standard test conditions	Operation Temp.	Tao	-10℃～50℃
	Storage Temp.	Tas	-20℃～70℃
	Relative Humidity	RH	＜95%RH
	O2 content		21%±1%（not less than 18%） O2 concentration effects initial value, sensitivity and repeatability.
	Preheat time		Not less than 48 hours
Lifespan			10 years

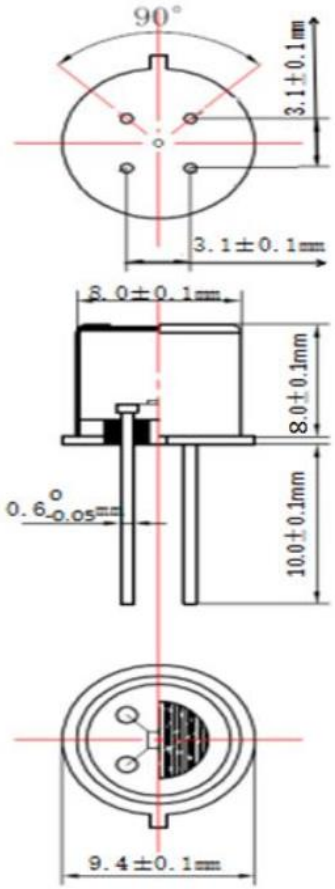
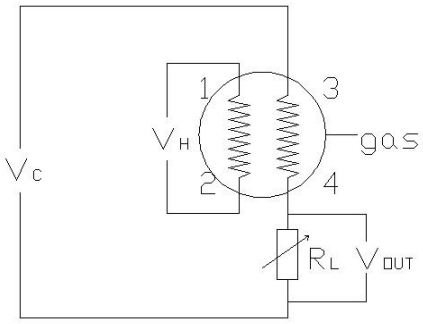


Fig1. Sensor structure

Basic circuit



This circuit shows the basic measuring circuit of MP-7 sensor. Two voltage should be applied to this sensor, heating voltage (V_H) and testing voltage(Vc). V_H is used for supplying a certain temperature, both of DC or AC are suitable. While detecting CO gas, the V_H need to be at 1.5V±0.1V low voltage condition; while non detecting (recovering) status, it must be at 5V±0.1V. V_{RL} is voltage on the series load resistance(R_L). Vc is the testing voltage to R_L, It must be DC

Fig2. MP-7 test circuit

Characterization

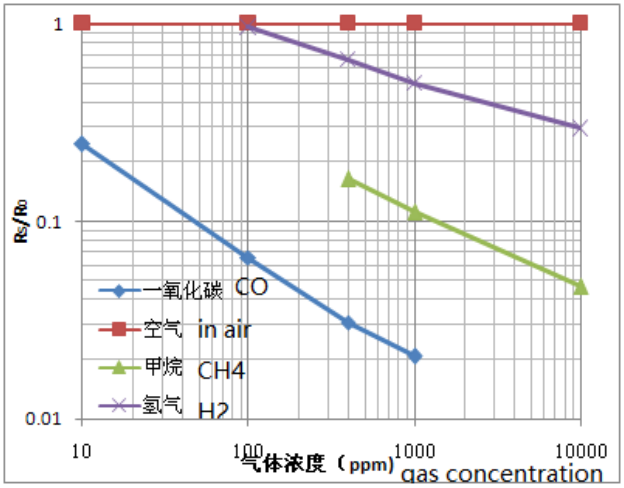


Fig3. Typical Sensitivity Curve
The ordinate is resistance ratio of the sensor (R_s/R_0), the abscissa is concentration of gases. Rs means resistance in target gas, R_0 means resistance of sensor in clean air. All tests are finished under standard test conditions.

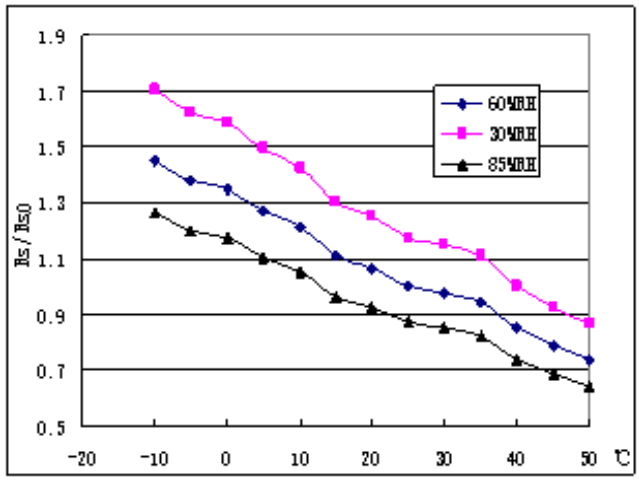


Fig4. Typical temperature/humidity characteristics
The ordinate is resistance ratio of the sensor (Rs/Rso).Rs means resistance of sensor in 100ppm CO gas under different tem. and humidity. Rso means resistance of the sensor in 100ppm CO gas under 20℃/55%RH.

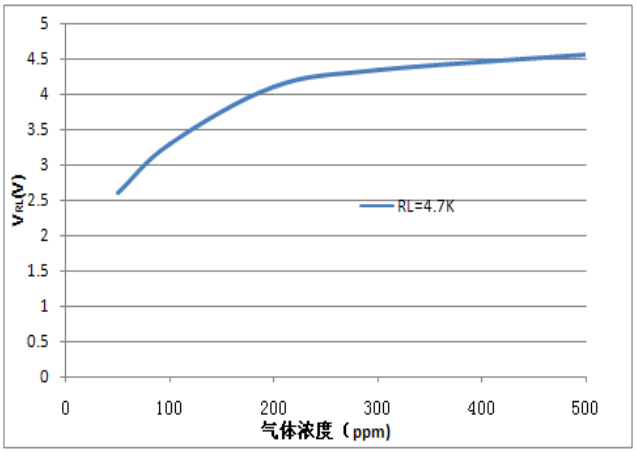


Fig5.Sensitive curve
V_{RL} in different CO concentration, RL=4.7K, All tests are finished under standard test conditions.

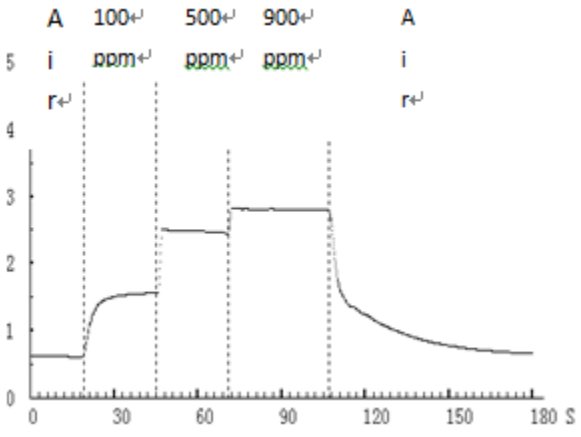


Fig6.Response and Resume
Sensor in air, different CO concentration and recover form CO

Cautions

1 .Following conditions must be prohibited

1.1 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.

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 should 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 as follow:

Stable2.

Storage Time	Suggested aging time
Less than one month	Not less than 48 hours
1 ~ 6 months	Not less than 72 hours
More than six months	Not 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

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

- Soldering flux: Rosin soldering flux contains least chlorine
- homothermal soldering iron
- Temperature： ≤350℃
- Time：less than 3 seconds

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

Zhengzhou Winsen Electronics Technology Co., Ltd
Add: No.299, Jinsuo Road, National Hi-Tech Zone, Zhengzhou 450001 China
Tel: +86-371-67169097/67169670
Fax: +86-371-60932988
E-mail: sales@winsensor.com
Website: www.winsen-sensor.com