



Catalytic Gas Sensor

(Model: MC33J)

Manual

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MC33J Catalytic Gas Sensor

Profile

MC33J 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 hydrogen gas, at 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 reference, has the function of compensating temperature and humidity.



Features

The bridge output is linear, quick response, good repeatability and selectivity, good stability, excellent resistance to the interference of hydrogen sulfide gas and organosilicon.

Main Applications

Mainly used for hydrogen leakage alarm or concentration detection in home, vehicle and other fields.

Technical Parameters

Model		MC33J
Sensor Type		Catalytic
Standard Encapsulation		Metal encapsulation, metallurgical powder net
Working voltage(V)		0.8 ± 0.1
Working current(mA)		170 ± 10
Sensitivity (mV)	1% H ₂	15-35mV
Linearity		$\leq 5\%$
Measuring range (%LEL)		0~100
Response Time (90%)		$\leq 2s$
Start-up time in air		$\leq 1s$
Working Environment		-20~+95℃, less than 95%RH
Storage Environment		-20~+55℃, less than 95%RH
Lifespan		5 years

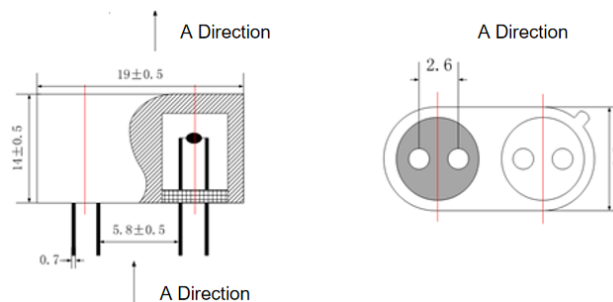


Figure 1: Sensor structure

Basic Circuit

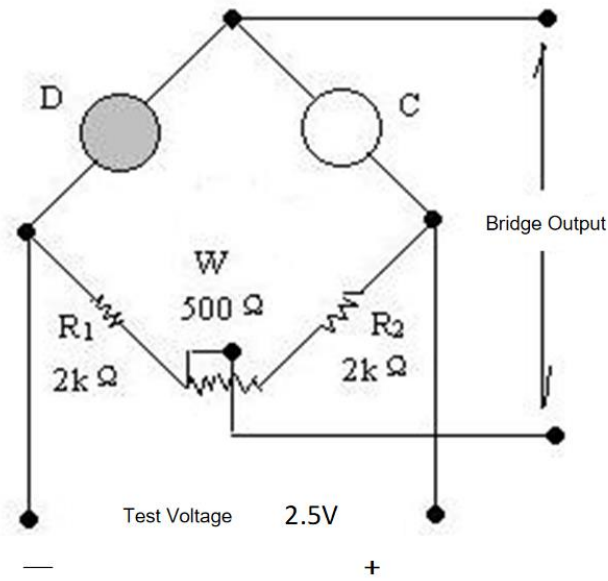


Figure 2: Basic Test Circuit

Sensor Characterization

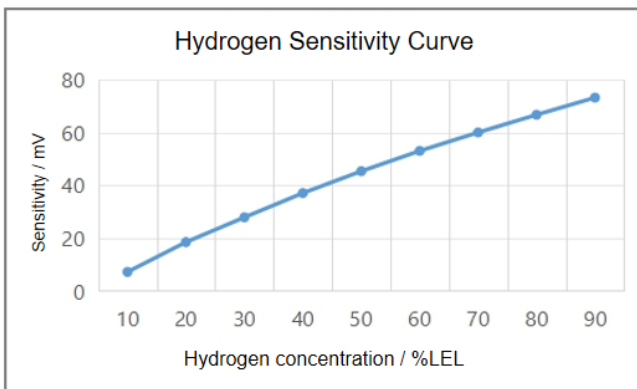


Figure 3: Sensor Sensitivity Curve

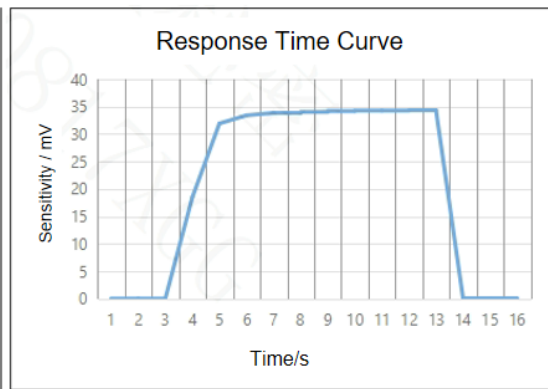


Figure 4: Sensor Response Recovery

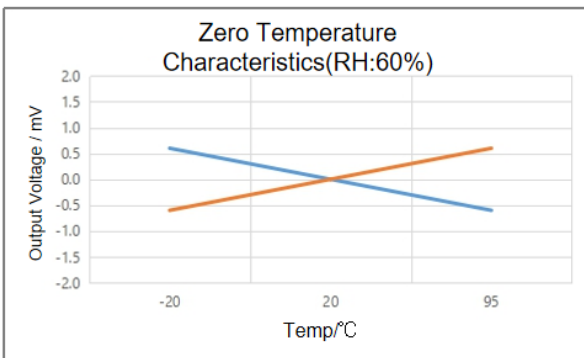


Figure 5: Zero output of the sensor at different temperature conditions

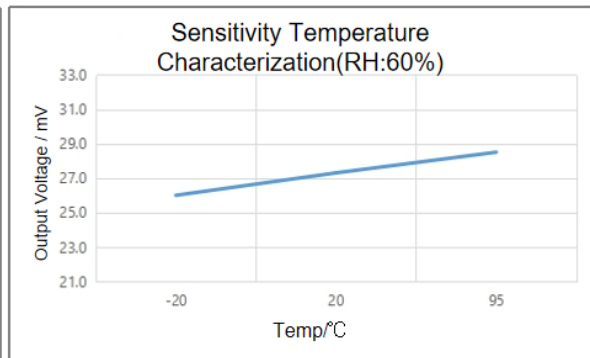


Figure 6: Sensitivity output of the sensor at different temperature conditions

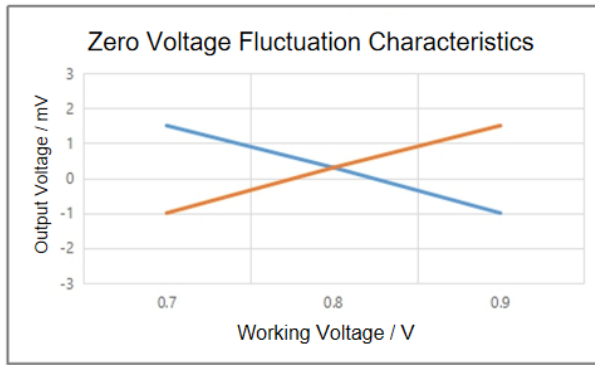


Figure 7: Zero output of the sensor at different voltage conditions

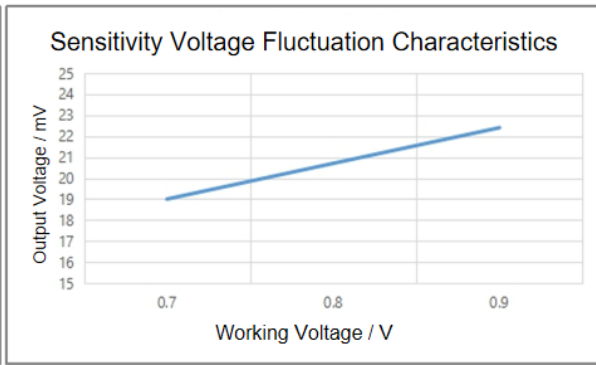


Figure 8: Sensitivity output of the sensor at different voltage conditions

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 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 Water Contacting

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

1.5 Freezing

Water freezing on the surface of a sensitive element can cause the sensitive material to fragment and lose its sensitive properties.

1.6 Applied higher voltage

If the voltage applied to the sensor is higher than the specified value, even if the sensor is not physically damaged or destroyed, it can cause damage to the leads and cause a decrease in the sensitive characteristics of the sensor.

2. Following conditions to be avoided whenever possible

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

Sensors stored for long periods of time without power can produce reversible changes in their sensitive materials, which are related to the storage environment. Sensors should be stored in a sealed bag with clean air and without silica gel. Sensors that have been stored unenergized for a long period of time need to be energized for a longer period to stabilize before use. If stored unenergized for more than six months, one day of aging is recommended before use.

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. Recommendations for use

3.1 Welding

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

- Flux: Chlorine- and silicone-free, no-clean lead-free fluxes
- Constant temperature soldering iron
- Temperature: $\leq 350^{\circ}\text{C}$
- Time: ≤ 5 seconds

Violation of the above conditions of use will degrade the sensor characteristics.