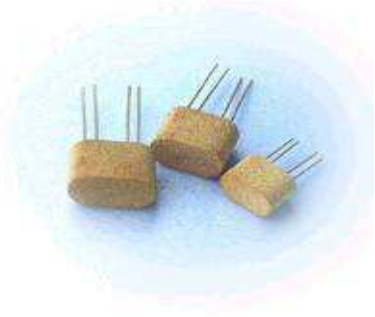
MD61 Thermal Conductor Gas Sensor

Overview

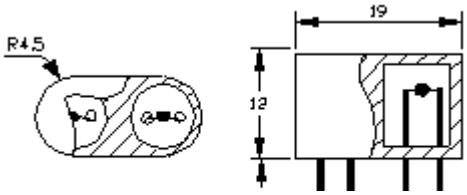
MD series gas sensor is designed on principle of the total thermal coefficient for mixture gas varies with the variant target gas content. It consists of detecting element and compensating element with the same resistance, which are the two legs of the electric bridge. When the detecting element meets the gas whose thermal coefficient is larger than the air, its resistance would decrease. When the detecting element meets the gas whose thermal coefficient is less than the air, its resistance would increase (air background), the voltage variation of bridge circuit output increase in direct proportion according to gas concentration, the compensating element performs for the reference and temperature compensation functions.

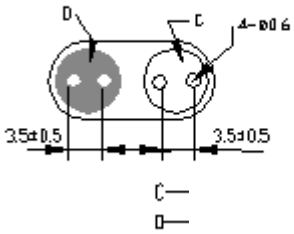


Features

*Wide detection range(0－100%VOL)
*Linear output voltage of bridge
* Quick response
* Good reproducibility and reliable performance
* Resistant to toxicosis
* Detecting without Oxygen or oxygen-poor

Configuration





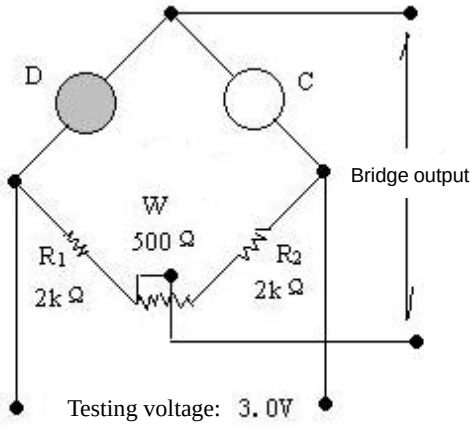
Application

Domestic, Industrial spot for Natural gas, LPG, coal gas, alkyl etc and gasoline, pure, ketone, benzene and other organic solvent detection. Also suitable for CO2, CCl4, freon detection.

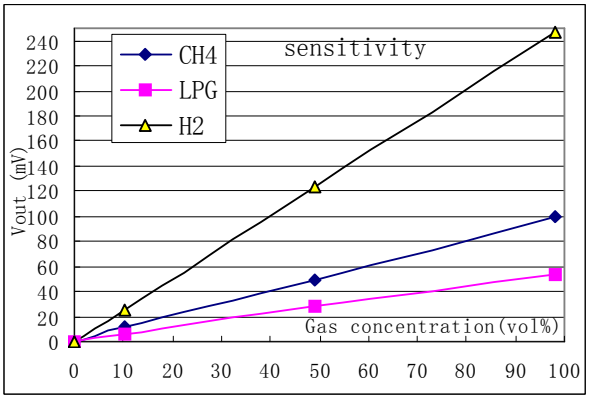
Technical specification

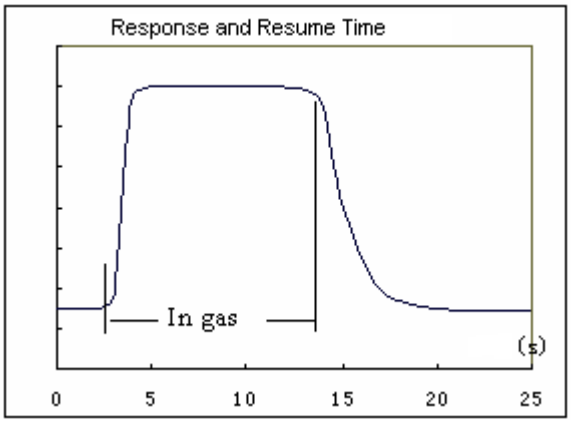
Model		MD61
Type		Thermal conductor gas sensor
Standard encapsulation		Metal encapsulation/Metallurgical dust net
Working voltage(V)		32.5±0.1
Working circuit(mA)		≤140
Sensitivity(mV)	10%Methane	>10
	10%Butane	>5
	10%Hydrogen	>25
Linearity（%）		0~5
Response time (90%)		≤10
Resume time (90%)		≤30
Using environment		-20－+50℃ under 95%RH
Storage environment		-20—+70℃ under 70%RH
Dimension（mm）		10×14×18

Basic testing circuit

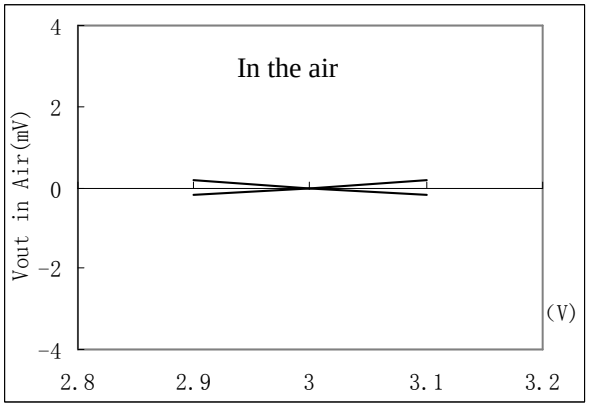


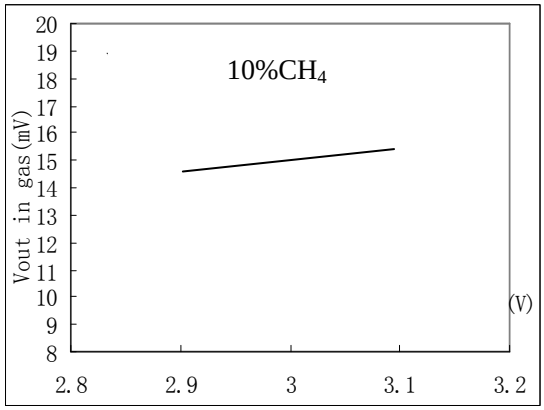
The features of sensitivity, response and resume





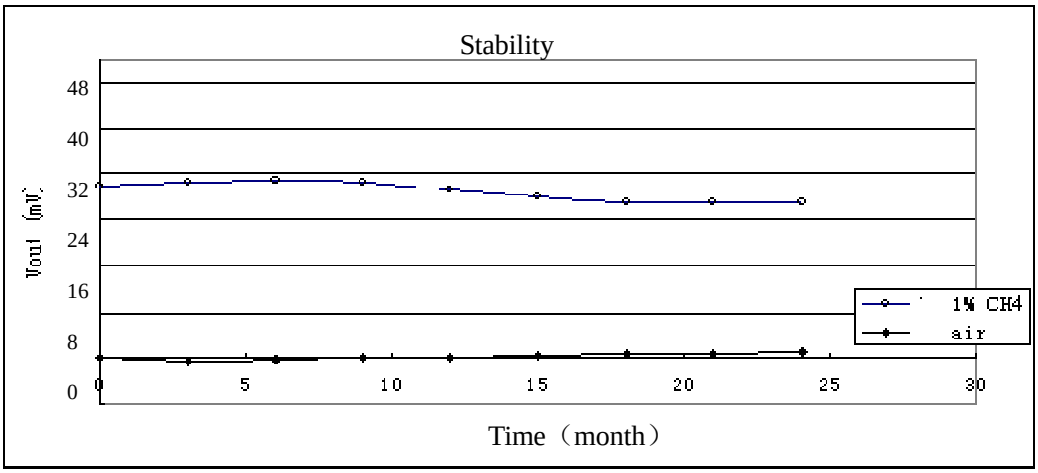
The output signal varies with working voltage





Long-term stability

The drift in the air is less than ±2mV per year, and the drift in the 20% CH_4 is less than ±2mV. It would cost 10 hours aging for the stability of sensor according to short term storage (2 weeks), and cost 24 hours aging for the stability of sensor according to long-term storage (1 year).



Note

1 Following conditions must be avoided.

1.1 Exposed to organic silicon steam.

If organic silicon steam is adsorbed on the surface of sensor, sensitive material of sensor will be coated, which will restrain sensitivity of sensor and beyond retrieve. The sensor should avoid exposing to where existing of silicon adhesive, fixature, silicon latex, putty or other plastic additive contains silicon.

1.2 High corrosive gas environment

If the sensors 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 will make the sensitive materials changed irreversibly.

1.3 Alkali, Alkali metals salt, halogen pollution

The sensors performance will lead to deterioration if sensors are sprayed polluted by alkali metals salt especially brine, or exposed to halogen such as fluorin.

1.4 Exposed to the water

The sensitivity of sensor will be reduced when spattered or dipped in water.

1.5 Freezing

If icing up on surface of sensor, it will lead sensitive material disintegrate then lose sensitivity.

1.6 Applied voltage overhigh

If applied voltage on sensors or heater higher than specified value, it will lead to wire lead and heater broken, and reduce its sensitivity, even if sensors have no physics damage.

2 Following conditions should be possibly avoided

2.1 Condensation water

Under indoor conditions, slight condensation water will effect performance of sensor lightly. However, if condensation water on the surface of sensor and keep a certain period, sensitiviy of sensor will decrease.

2.2 Used in high gas concentration

No matter the sensor is electrified or not, if placed in high gas concentration for a long time, it will effect features of sensor.

2.3 Long time storage

If stored for long time without being electrified, the resistance of sensor produces reversible drift, which is related with storage conditions. Sensor should be stored in airproof without silicon gel bag with clean air. For the sensor with long time storage but no electrify, they need long aging time for stability before using.

2.4 Long time exposed to adverse environment

No matter the sensor electrified or not, if exposed to adverse environment for long time, such as high humidity, high temperature, or high pollution etc, it will effect the performance of sensor badly.

2.5 Vibration

Continual vibration will result in sensor down-lead resonance then rupture. In transportation or assembling line, pneumatic screwdriver/ultrasonic welding machine can lead this vibration.

2.6 Concussion

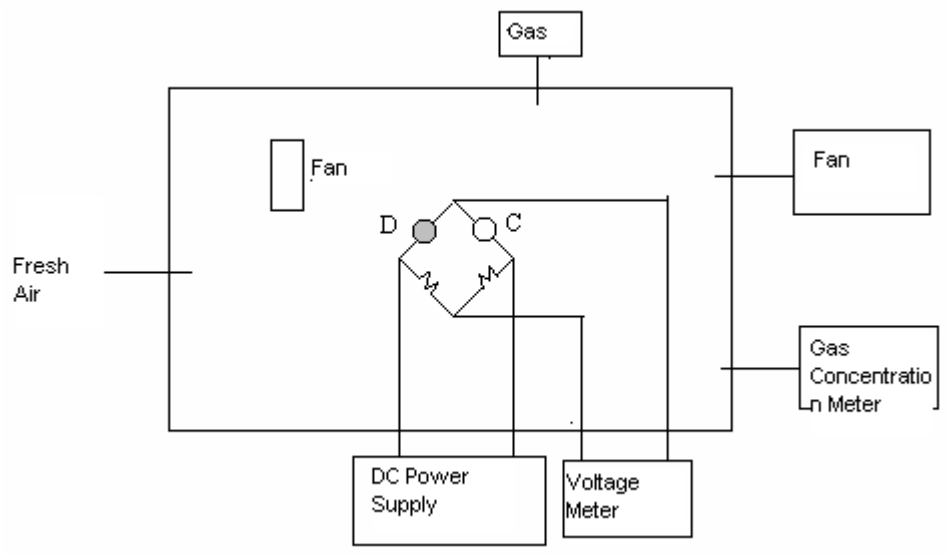
If sensors meet strong concussion, it may lead its lead wire disconnected.

2.7 Usage

For sensors, handmade wielding is optional way. If use wave crest wielding should meet the following conditions:

2.7.1 Soldering flux: rosin soldering flux contains least chlorine.
2.7.2 Speed: 1-2 Meter/Minute
2.7.3 Warm-up temperature: 100±20℃
2.7.4 Welding temperature: 250±10℃
2.7.5 A single pass wave crest welding machine

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



1、Tester:

a、Gas chamber: material of box is metal or glass, and not adsorb gas, the volume of box is more than 1 liter according to per pair sensor.

b、Test the gas concentration by infrared gas analyzer is recommended.

c、The gas inside the box should be stirred, but direct to the sensor unavailable. Airflow speed is lower than 0.5m/s。

d、Outside chamber is fresh gas.

e、Direct current regulated power supply. Impedance of millivoltmeter is bigger than 100KΩ.

f、Before each test, use ventilator to change of air, each minutes amount of ventilation is bigger than 10 times of box cubage.

g、Sensors are built in the chamber, pose along horizontal direction. If changing the pose, it will cause different heat convection.

2、Gas concentration adjustment.

Gas concentration in chamber is adjusted by cubage way, using the formula below:

$V(ml)=V1\times C\times 10^{-6}\times(273+TR)/(273+TC)$

V：inject gas cubage（ml）； V1：chamber cubage（ml）；C：gas concentration（ppm）

TR：room temperature（℃）；TC：chamber temperature（℃）。

3、Testing:

A、Aging: Before testing, use voltage rating to electrify more than 30 minutes, if sensors are stored for long time, it should be aging more than 5 hours.

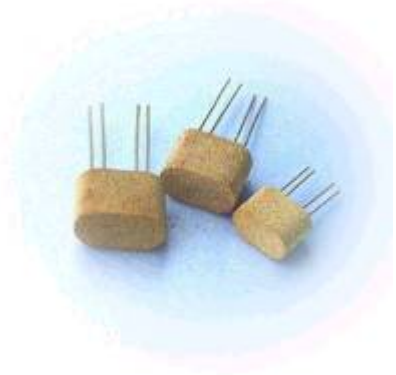
B、Testing: After presaging, measure its output voltage Va in air. It will cost 1 min for injecting the testing gas into the chamber, which is diffused to the whole chamber. Measure the voltage of sensor Vg in the testing air. Gas sensitivity could shown as :

S=（Vg-Va）/C。 C is gas concentration

MD62 Thermal conductor CO_2 Gas sensor

MD62 gas sensor consists of an active element and a reference element with the same resistance, both elements are placed in a wheatstone bridge circuit, The analyzing gas contents changes, the overall thermal coefficient of mixed gases changed correspondingly; when the active element meet the combustible gas, its resistance become smaller, when It meet other gas, , Its resistance become larger(air background), the bridge circuit output the voltage change, this change increase according to gas concentration, the reference element as a benchmark while for temperature compensation.

Features

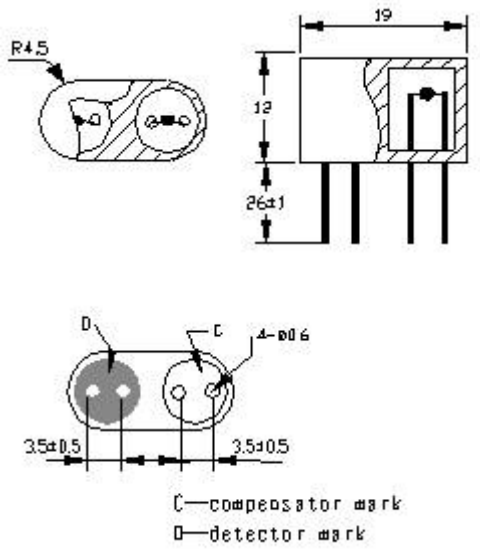


- Wide Detecting Range (0—100%VOL)
- Linear output signal
- Quick response
- Good reproducibility and reliable performance
- Resistant to toxicosis
- Detecting without Oxygen or short of oxygen

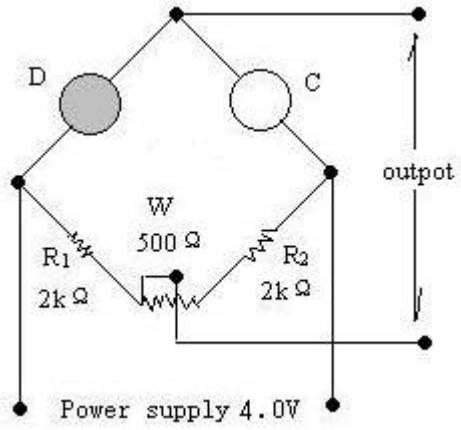
Application

Domestic, Industrial spot for CO2、CcL4、freon、Natural gas, LPG etc detecting.

Structure



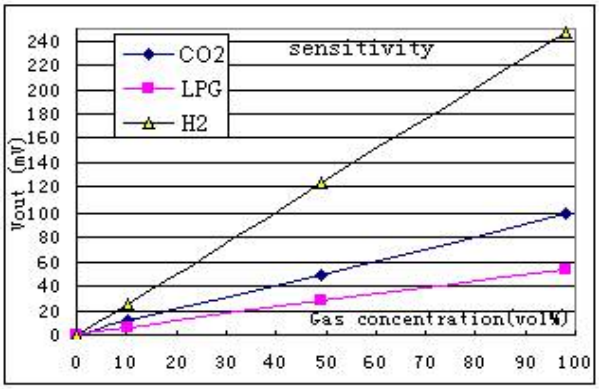
Basic testing circuit

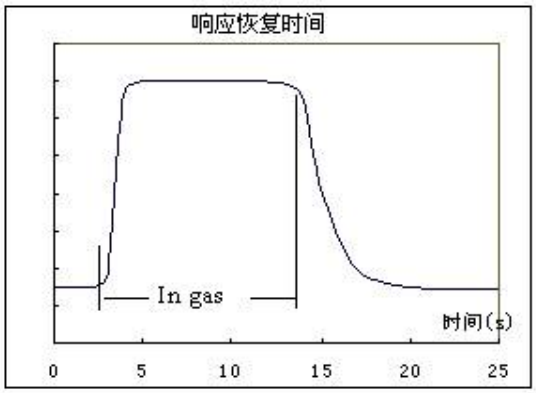


Specification

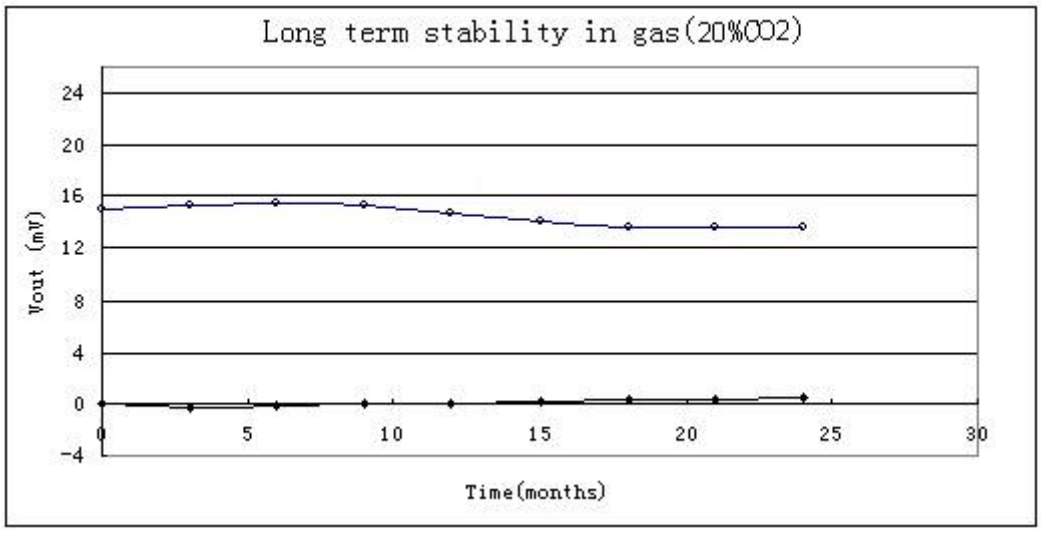
Detecting Range		0~100%vol
Working Voltage (V)		3.0±0.1
Working current(mA)		@100
Sensitivity mV	10%Methane	>12
	10%Butane	>8
	10%CO_2	>5
linearity （%）		0~5
Response time (90%)		>10sec
Resume time (90%)		>30sec
Using Environment		-20－+60℃ >95%RH
Storage Environment		-30—+80℃ >95%RH
Dimension （mm）		10×14×18

Sensitivity and response characteristic



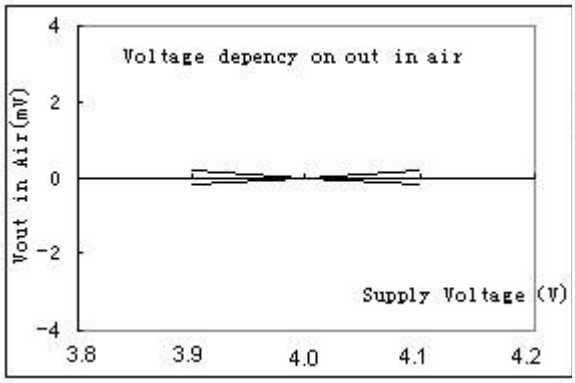


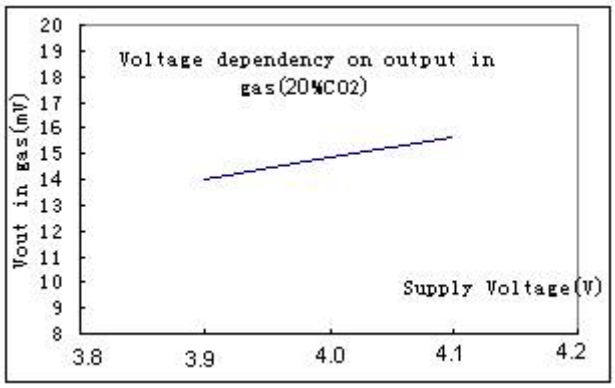
Long term stability



The drift in air is less than 2 mV per year, in 20%CO2 the drift is less than 2mV. for a short period storage (in 2 weeks), the sensor need 30mins' preheating to stabilize, for more than one year storage, it need more than 24 hours' preheating.

MD62 output singnal dependency on working voltage





Note

△ The sensor sensitivity need to calibrate termly.

△ When debugging, should strict to control the heating voltage or current, do not exceed rated voltage to burn the sensor.

△ For long period storage, do not put it in wet and corrosive environment.

△ Shocking, falling, and mechanical destroying is prohibited