MEMS Catalytic H2 Sensor

（Model: CMV-2021D）

Manual

Version: 1.2

Issue Date: 2022-06-29

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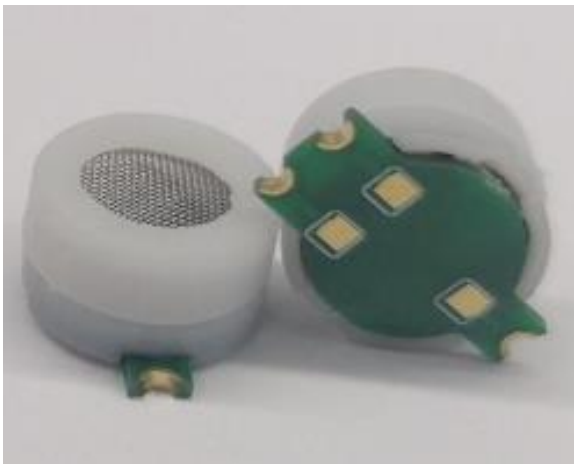
CMV-2021D Catalytic H2 Sensor

Profile

CMV-2021D catalytic hydrogen sensor adopts MEMS process, works according to the principle of catalytic combustion effect, and is paired by a detection element and a compensation element to form an arm of the bridge, when the resistance of the detection element increases, the output voltage of the bridge changes, the voltage variable increases proportionally with the increase of hydrogen concentration, and the compensation element plays a reference and temperature and humidity compensation role.



Features

The bridge output is linear

Quick response

Good repeatability and selectivity

Good stability and reliability

Low power consumption

Excellent anti-interference ability

Main Applications

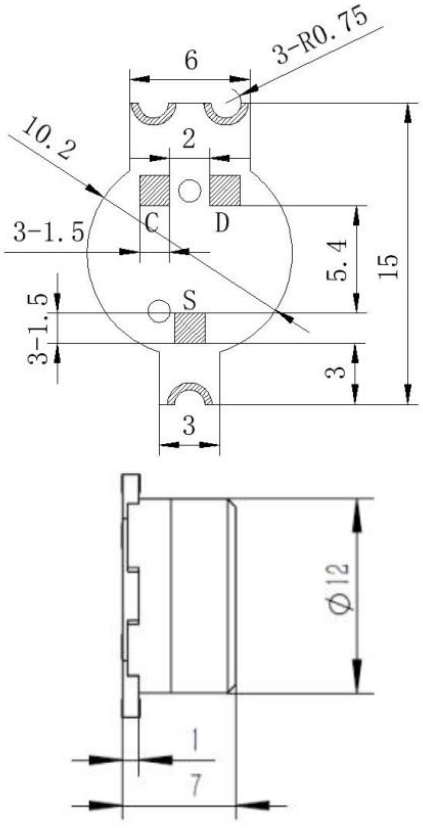
Hydrogen-powered vehicle

Hydrogen energy preparation

Hydrogen energy storage

Hydrogen energy transport and use

Hydrogen detection in other scenarios



Tolerance ±0.1mm

Fig1.Sensor Structure

Basic circuit

The right picture is the basic test circuit of CMV-2021D.
It should be applied by 3.0V.
D is test element while C is compensation element.

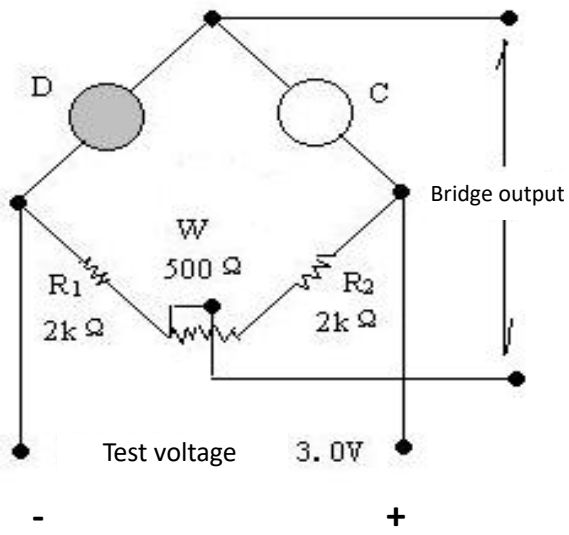


Fig2.Test circuit

Technical Parameters **Table1.**

Model		CMV-2021D
Sensor Type		MEMS Catalytic
Standard Encapsulation		Plastic Encapsulation
Working voltage(V)		3.0±0.1
Working current(mA)		14±1.0
Sensitivity (mV)	1% H_2	30～60
Linearity		≤5%
Measuring range(%LEL)		0～100
Startup time in air		≤0.5s
Response Time (90%)		≤2s
Recovery Time (90%)		≤1s
Working Environment		-40～+85℃， less than 95%RH
Storage Environment		-40～+85℃， less than 95%RH

Sensitivity, response and recovery

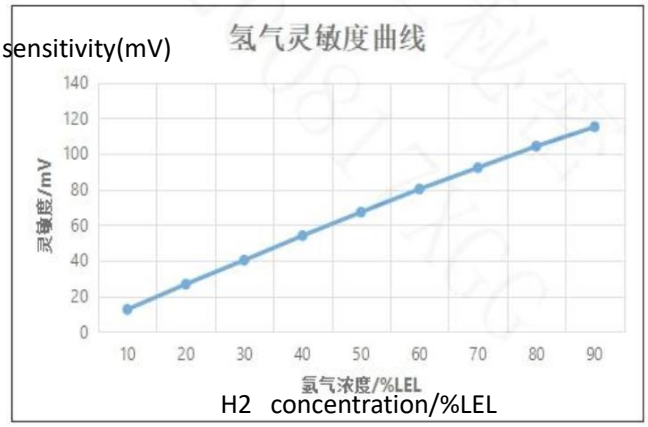


Fig3. Sensitivity Curve

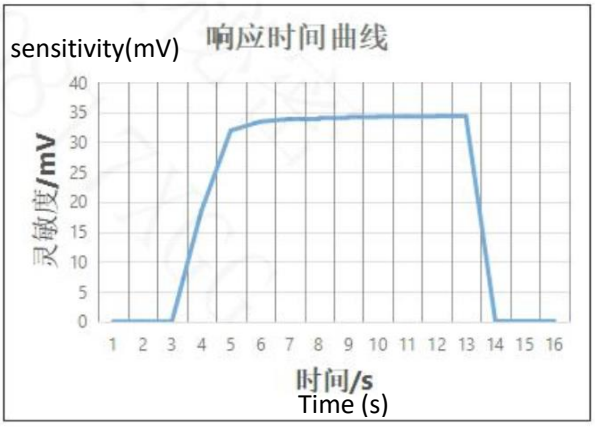


Fig4. Response and recovery curve

Changing of output signal with different voltage supply

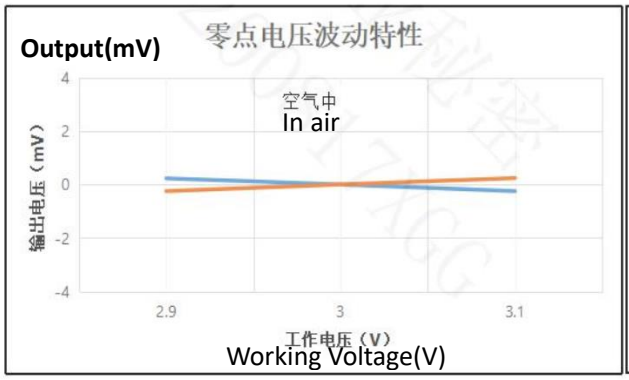


Fig5. Zero point at different voltage

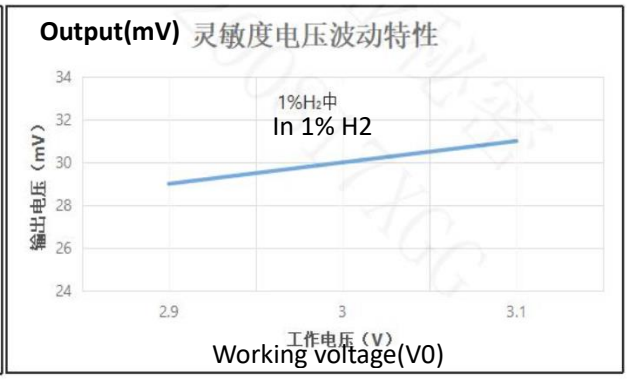


Fig6. Sensitivity at different voltage

Selectivity

Table2

Gas	Concentration/ppm	Response value/mV
CH4	10000	<2.0
NO2	5	<0.5
CO	300	<0.5
NH3	50	<0.5
CO2	4000	<0.5
H2S	50	<0.5

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, 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 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.

2.7 Usage Conditions

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℃
- Time：less than 5 seconds

If you use reflow welding, the welding conditions as follow:

- Neutral atmosphere
- Welding temperature 250±10℃
- Avoid flux vapor

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

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