Hydrogen Gas Sensor

(Model: MP810)

Manual

Version： 1.0

Valid From： 2023.06.06

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.

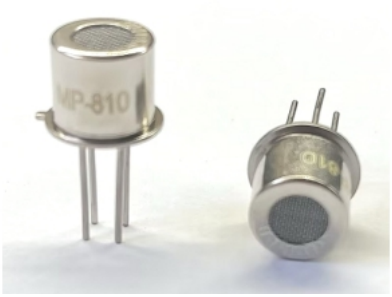
Please keep the manual properly, in order to get help if you have questions during the usage in the future.

Zhengzhou Winsen Electronics Technology CO., LTD

MP810 Hydrogen Gas Sensor

Profile

MP801 gas sensor is for hydrogen. It adopts multilayer thick film manufacturing technology. The heater and metal oxide semiconductor material on the ceramic substrate of subminiature Al_2O_3 are fetched out by electrode down-lead, encapsulated in metal socket and cap. Conductivity of the sensor is affected by the concentration of target gas. The higher the concentration is, the higher conductivity of sensor gets. Users can adopt simple circuit to convert variation of conductivity into output signal corresponding to gas concentration.



Features

High sensitivity, fast response speed, long service life, and simple application circuit

Main Application

Used for hydrogen leakage detection for energy vehicles and hydrogen storage stations

Basic Circuit

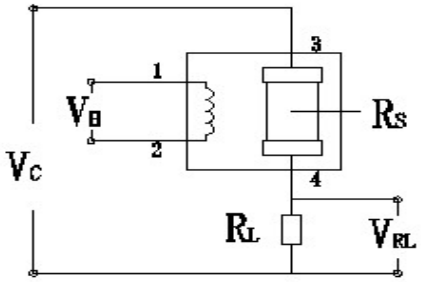
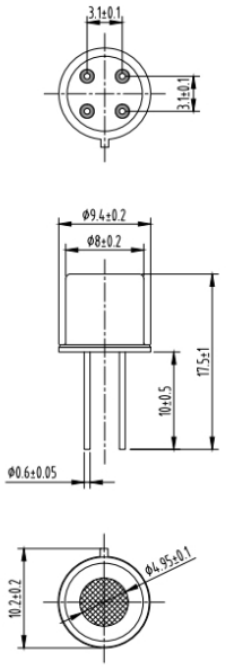


Fig2. MP810 Test Circuit

Instructions: The above fig is the basic test circuit of MP810.The sensor requires two voltage: heater voltage (V_H) and circuit voltage (V_C). The V_H supply specific working temperature for the sensor, it can use AC or DC. V_{RL} is the voltage of load resistance R_L which is in series with sensor; V_C supply power for Load resistance R_L. They must adopt DC power.

Technical Parameters **Table 1.**

Model			MP810
Sensor Type			Semiconductor flat surfaced sensor
Standard Encapsulation			TO-5
Detection Gas			H2
Detection range			100～3000ppm
Standard circuit	Loop voltage	V_C	5.0V±0.1V DC
	Heating voltage	V_H	5.0V±0.1V DC
	Load resistance	R_L	Adjustable
	Heating consumption	P_H	≤300mW
	Surface resistance	R_S	0.5KΩ～10KΩ (in 1000ppm H2)
	Sensitivity(Rs)		0.2~0.6（H2） Rs1000ppm/Rs100ppm
Standard condition of testing	Temperature, humidity		20℃±2℃；65%±5%RH
	Standard test circuit		VC/VH :5.0V±0.1V
	Warm-up time		7 days



Unit:mm

Fig1.Sensor Structure

Formula

Ps $P_S = \frac{(V_C - V_{RL})^2}{R_S}$

Pin Definition

1 Heater

2 Heater

3 Sensor electrodes（+ ）

4 Sensor electrodes（- ）

Cauculate Rs from V_{RL} $Rs = (\frac{Vc}{V_{RL}} - 1) \times R_L$

Description of Sensor Characters

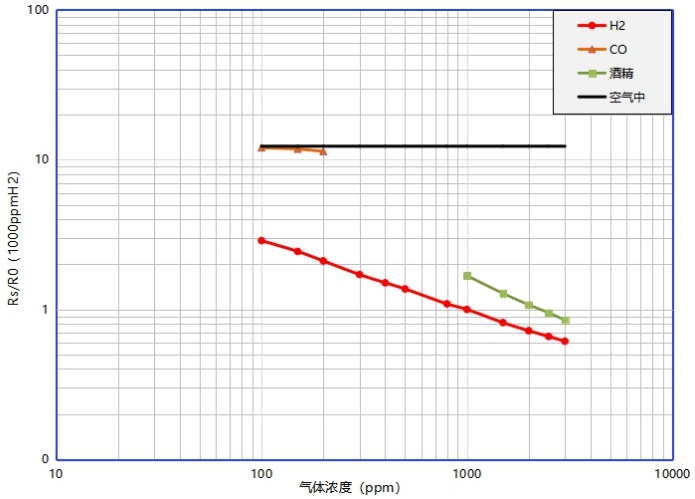
Sensitivity characteristics

The following figure shows the sensitivity characteristic curves of different gases measured under standard test conditions.

The vertical axis represents the sensor resistance ratio Rs/R0, and Rs and R0 are defined as follows:

Rs:the resistance of sensor in various gases

R0:the resistance of sensors in 1000ppm H2

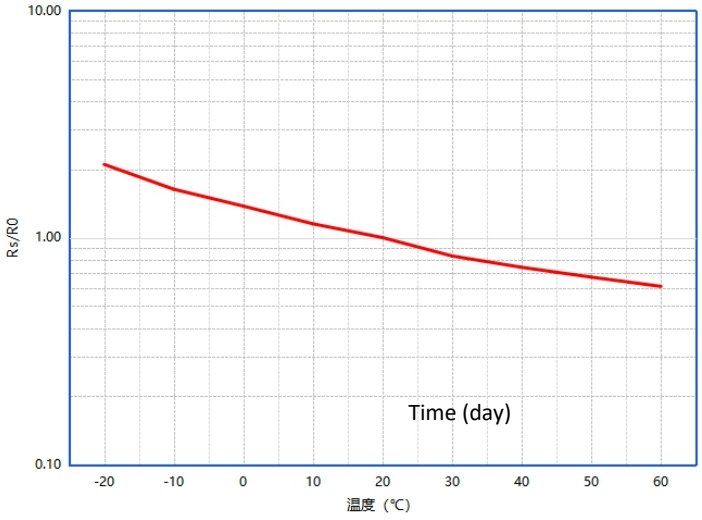


temperature characteristic

The following figure shows the characteristic curve of the sensor affected by temperature and humidity

The vertical axis represents the sensor resistance ratio Rs/R0, and Rs and R0 are defined as follows:

The resistance value of RS sensor in 1000ppmH2 under different temperature conditions, and the resistance value of R0 in 1000ppmH2 under normal temperature conditions.



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

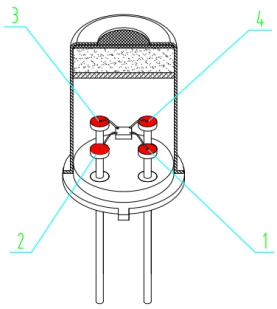
Applied voltage on sensor should not be higher than stipulated value, even if the sensor is not physically damaged or broken, it causes down-line or heater damaged, and bring on sensors' sensitivity characteristic changed badly.

1.7 Voltage on wrong pins

As Fig8,Pin 1 and Pin 2 connect to heater power supply, Pin 3 and Pin 4 connect to test power supply ground;The heater power and test power can use same power circuit but must satisfy the power supply.

Note:Please not the bulge, the two pins closed to is are heating pole.

Pins Schematic Diagram



1,2 are heating pole

3,4 are test pole

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:

Table2.

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

2.7.1For 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 reduce.

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.winsensor.com