



Catalytic hydrogen module

(Model No.: ZC601-H2)

Manual

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Zhengzhou Winsen Electronics Technology CO., Ltd

Catalytic hydrogen module ZC601

Product Profile

The ZC601-H2 catalytic module is a miniaturized and universal gas detection module. This module is equipped with Winsen's catalytic combustion sensor, which has the characteristics of short warm-up time and fast response. The circuit uses a Wheatstone bridge, a high-precision processor, and an intelligent algorithm to convert the detected gas concentration into a digital signal, which is then transmitted through a serial port, analog signal, etc.



Feature

It has short preheating time, fast response speed, high test accuracy, stable output signal, good temperature resistance and long service life.

Application

Hydrogen boiler leak detection, hydrogen refueling station gas leak detection, battery thermal runaway detection, portable hydrogen detector, etc.

Parameters

Table1

Product model	ZC601-H2
Detection gas	Hydrogen
Output method	Analog signal/UART
Working voltage	5V±0.1V DC
Working current	≤170mA
Pre-heating time	≤1S
Responding time	≤2S
Recovery time	≤30S
Range	0~40000ppm (0-100%LEL)
Accuracy error	±1200ppm (±3%LEL)
Resolution	1ppm
Working temperature	-40℃~95℃
Working humidity	0-95%RH (No condensation)
Storage temperature	-10℃~55℃
Storage humidity	30% ~ 60%RH
Life span	5years (in the air)

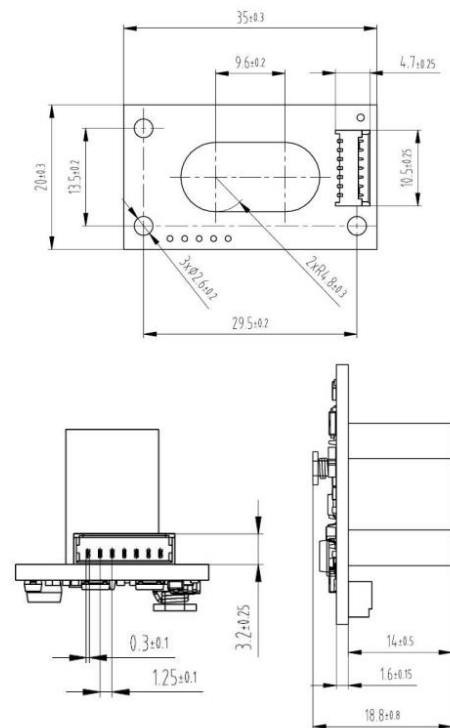


Fig1.Module structure

Unit:mm

Description for pins Table2

Pin1	reserved
Pin2	Analog signal output
Pin3	GND, input power ground
Pin4	VCC, input power positive
Pin5	UART RX pin, 5V level
Pin6	UART TX pin, 5V level
Pin7	NC

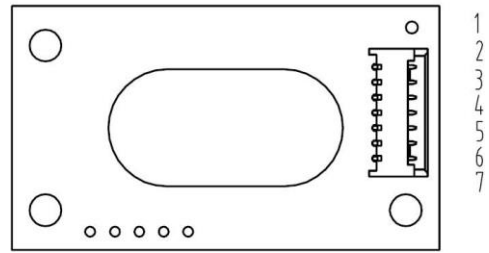


Figure 2 Module pin diagram

Analog output

Pin2 is an analog signal output pin, and the output voltage range is 500mV-4500mV. Please refer to the following table for details:

table3

H2 Concentration (ppm)	Analog voltage output (mV)
0	500
10000	1500
20000	2500
30000	3500
40000	4500

UART Communication Protocol

Communication settings Table4

baud rate	9600
data bits	8bis
Stop bit	1bit
Check Digit	none

Communication command Module communication is in question and answer mode.

The command to read the sensor concentration is as follows:

1	0x86	Read sensor concentration							
send	0	1	2	3	4	5	6	7	8
	start bit	address	order	--	--	--	--	--	Check value
	0xFF	0x01	0x86	0	0	0	0	0	0x79
EXP.	FF 01 86 00 00 00 00 00 79								
module response	0	1	2	3	4	5	6	7	8
	start bit	order	Sensor concentration value		reserved	reserved	reserved	reserved	Check value
	0xFF	0x86	High byte	Low byte	High byte	Low byte	0	0	Check value
EXP.	FF 86 00 00 00 00 00 7A								

Gas concentration value = gas concentration high level * 256 + gas concentration low level.

3. Check sum and calculation

```
/******  
* Function name: ucharFucCheckSum(uchar *i,uchar ln)  
* *Function description: Sum verification (take the sum of 1\2\3\4\5\6\7 of the sending and receiving  
  protocols and negate +1)  
*Function description: Add element 1 to the penultimate element of the array and negate +1 (the  
  number of elements must be greater than 2)  
*****/  
unsigned char FucCheckSum(unsigned char *i,unsigned char ln)  
{  
    unsigned char j,tempq=0;  
    i+=1;  
    for(j=0;j<(ln-2);j++)  
    {  
        tempq+=*i;  
        i++;  
    }  
    tempq=(~tempq)+1;  
    return(tempq);  
}
```

Installation instruction

This module uses Pin1.25mm*7 single row pin socket to connect to the outside, and needs to be matched with the corresponding connecting cable.

Cautions

1. Following conditions must be prohibited

- (1) Be sure to avoid placing the sensor in an environment containing silicon.
- (2) Exposure to volatile silicon compound vapor: The module should avoid exposure to silicone adhesives, hairspray, silicone rubber, putty or other places where volatile silicon compounds are present, otherwise the sensitivity of the module will be reduced or even Will not react.
- (3) Highly corrosive environment: The module is exposed to high concentrations of corrosive gases (such as H₂S, SOX, Cl₂, HCl, etc.), which will cause corrosion or damage to the sensor heating material and sensor leads in the module, and It will cause irreversible deterioration in the performance of sensitive materials, thereby affecting the performance and accuracy of the module.
- (4) Contact with water: If the sensor on the module is splashed with water or immersed in water, the sensitivity of the sensor will decrease, which will affect the measurement accuracy of the module.
- (5) Freezing: Freezing on the surface of the sensor sensitive material of the module will cause the sensitive layer to fragment and lose the sensitive characteristics.

2. Following conditions must be avoided

- (1) Condensation: Under indoor use conditions, slight condensation will have a slight impact on the performance of the sensor in the module. However, if water condenses on the surface of the sensitive layer and remains for a period of time, the sensor characteristics in the module will decrease and the measurement error of the module will also increase.
- (2) Being in high-concentration gas, regardless of whether the module is powered on or not, long-term placement in high-concentration gas will affect the sensor characteristics of the module.

3. Long-term storage

If the module is stored for a long time without power, the resistance of the sensor will produce reversible drift. This drift is related to the storage environment. Modules should be stored in sealed bags that do not contain volatile silicone compounds. Modules that have been stored for a long time need to be powered on for a longer period of time to stabilize before use.

4. It is forbidden to touch the sensor on the module with your hands.
5. It is prohibited to change or shift the installation status of electronic components.
6. The module cannot withstand excessive impact or vibration.
7. Please do not use this module in systems involving personal safety.
8. Please do not install the module in an environment with strong air convection.

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