Winsen
炜盛科技

Combustible Gas Sensor

(Model: MH-742B)

Manual

Version: 2.0

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Zhengzhou Winsen Electronics Technology Co., Ltd.

Statement

Thanks for purchasing our product. In order to keep customers using 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.

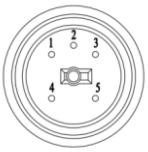
Zhengzhou Winsen Electronics Technology CO., LTD.

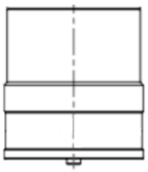
MH-742B Combustible Gas Sensor

1. Product Description

MH-742B is a universal type intelligent sensor to detect combustible gas,taking advantage of non-dispersive infrared (NDIR) principle. With high selectivity, no oxygen dependence, high performance and long lifespan features, MH-742B also has built-in temperature compensation feature. MH-742B is a compact and high-performance sensor based on infrared absorption of gas detection technology, micro-machining and sophisticated circuit design.

2. Features





- High sensitivity, high resolution, low power consumption
- Output method: UART, analog voltage signal, etc.
- Quick response
- Temperature compensation, excellent linear output
- Excellent stability, Long lifespan
- Anti-poisons, anti-vapor interference

3. Application

Widely used for industrial field instrumentation, industrial-process control and safety protection

4. Specification

Table 1 Technical Index

Product Model	MH-742B
Gas Detected	Combustible gas (see Table 2 for details)
Working Voltage	4.5 V ~ 5.5V DC
Average Current	< 100mA
Interface Level	3.3V
Measurement Range	0~100%VOL optional (view table 2)
Output Signal	UART
	0.4-2V DC
Warm-up Time	<2min
Response Time	T_{90} < 30s
Working Temperature	-40℃ ~ 70℃
Working Humidity	0 to 95%RH, non-condensing
Dimension	Φ39×44mm
Weight	280g
Lifespan	>5 years
Protected Class	IP54

Table 2 Measurement Range and Accuracy

Gas name	Molecular Formula	Range	Resolution	Note
Methane	CH4	0～5% Vol	0.01% Vol	Temperature compensation
Methane	CH4	0～10% Vol	0.01% Vol	Temperature compensation
Methane	CH4	0～100% Vol	0.1% Vol	Temperature compensation
Propane	C3H8	0～2.1% Vol	0.01% Vol	Temperature compensation
Propane	C3H8	0～100% Vol	0.1% Vol	Temperature compensation
Methyl chloride	CH3CL	0～8.1% Vol	0.01% Vol	Temperature compensation
Methyl chloride	CH3CL	0～100% Vol	0.1% Vol	Temperature compensation
Acetylene	C2H2	0～2.1% Vol	0.02% Vol	Temperature compensation
Propylene	C3H6	0～2.0% Vol	0.02% Vol	Temperature compensation
Ethylene	C2H4	0～2.7% Vol	0.027% Vol	Temperature compensation
Ethane	CH3CH3	0～3.0% Vol	0.03% Vol	Temperature compensation
Iso-butane	C4H10	0～1.8% Vol	0.018% Vol	Temperature compensation
Gasoline	C3-C12	0～1.1% Vol	0.01% Vol	Temperature compensation
Cyclopentane	C5H10	0～1.4% Vol	0.01% Vol	No temperature compensation
Cyclohexane	C6H12	0～1.3% Vol	0.01% Vol	No temperature compensation
Methanol	CH3OH	0～6.7% Vol	0.06% Vol	No temperature compensation
Dichloromethane	CH2CL2	0～15% Vol	0.15% Vol	No temperature compensation
Benzene	C6H6	0～1.2% Vol	0.012% Vol	No temperature compensation
Toluene	C7H8	0～1.2% Vol	0.012% Vol	No temperature compensation
Alcohol	C2H5OH	0～3.3% Vol	0.033% Vol	No temperature compensation
Ethylene oxide	C2H4O	0～3.0% Vol	0.03% Vol	No temperature compensation
Epichlorohydrin	C3H5CLO	0～3.8% Vol	0.038% Vol	No temperature compensation
Ehloropropene	C3H5CL	0～2.9% Vol	0.029% Vol	No temperature compensation
Pentane	C5H12	0～1.4% Vol	0.014% Vol	No temperature compensation
Ethyl acetate	C4H8O2	0～2.0% Vol	0.02% Vol	No temperature compensation

5. Structural Drawing

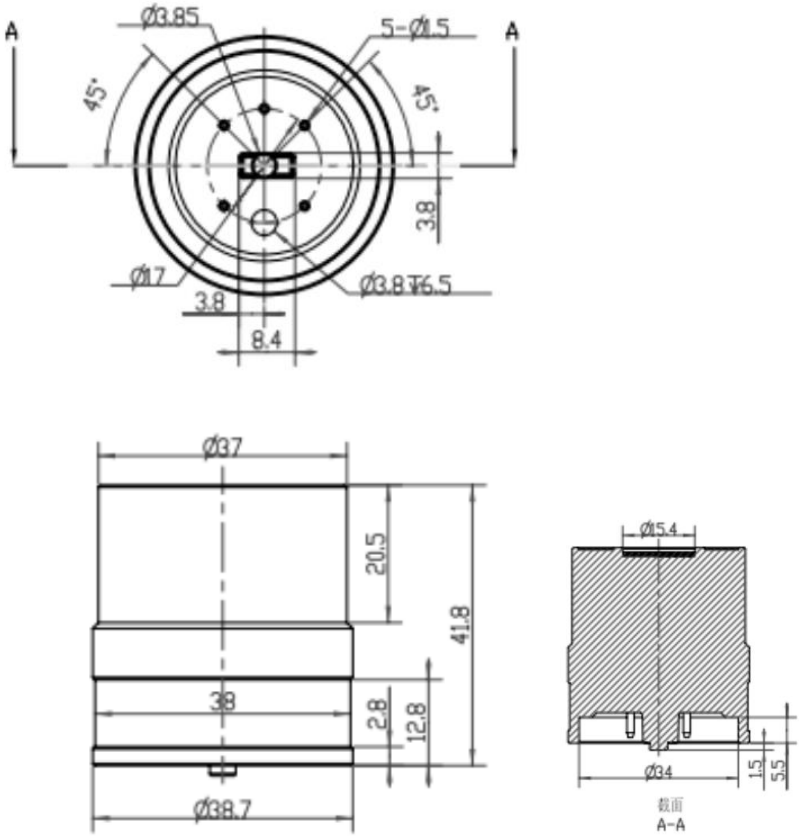


Figure 2 Structural Drawing of Sensor

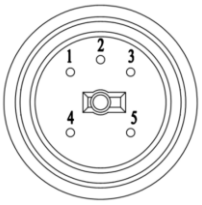


Figure 3 Pin Definition

Table 3 Definition of Pin

Pin	Description
Pin 3	Vin Voltage Input
Pin 2	GND
Pin 1	Vout (0.4～2 V)
Pin 5	UART（RXD） 0～3.3V Data Input
Pin 4	UART（TXD）0～3.3V Data Output

6. Application Circuit

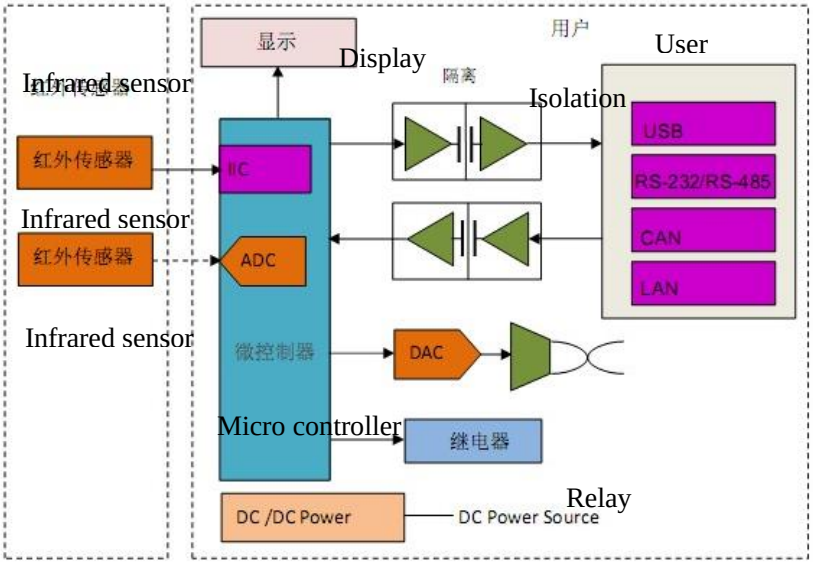


Figure 3 Application Circuit

7. Explanation

7.1 Analogue Voltage Output

Input 5V voltage to Win Pin, GND Pin connect power ground and Vout Pin connect input side of ADC, then warm-up the sensor, the Vout side will output a voltage value which stands for the gas concentration, while output voltage range 0.4V~2V stands for gas concentration 0~Full scale. If it found in trouble in self-inspection process, the output voltage of sensor is 0V.

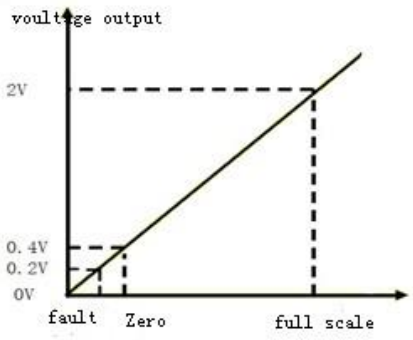


Figure 4 Analogue Voltage Output

Analog voltage output Vo

Cppm=(Vo(V)-0.4V)*detection range(ppm)/(2.0V-0.4V)

Serial Output(UART)

Hardware Connection

Connect the sensor's Vin-GND-RXD-TXD to the user's 5V-GND-TXD-RXD. (TTL level shall be used by the client.If it is RS232 level, it must be converted). The detector can directly read the gas concentration value through the UART interface of the sensor without calculation.

Software Setting

Set the serial port baud rate to 9600, data bit to 8, stop bit to 1, parity bit to none.

Protocol command interface list and meaning	
0x86	To read gas concentration value
0x87	To calibrate zero point（ZERO）
0x88	To calibrate span point（SPAN）

0x86- To reading gas concentration value								
Send command								
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Start byte	Sensor no.	Command	-	-	-	-	-	checksum
0XFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	0x79
Returning								
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Start byte	command	Concentration high-position	Concentration low-position	-	-	-	-	checksum
0XFF	0x86	0x02	0x60	0x47	0x00	0x00	0x00	0xD1
Gas concentration value=Concentration high-position *256+Concentration low-position								

0x87-To calibrate sensor zero point								
Send command								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	Sensor no.	Command	-	-	-	-	-	checksum
0XFF	0x01	0x87	0x00	0x00	0x00	0x00	0x00	0x78
The sensor has no return value								

0x88-To calibrate sensor span point								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	Sensor no.	Command	Concentration high-position	Concentration low-position	-	-	-	checksum
0xFF	0x01	0x88	0x07	0xD0	0x00	0x00	0x00	0xA0
The sensor has no return value								

Calibrate and Calculate

The checksum = (invert (byte1 +byte2+byte3... + byte7)) + 1

For example

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	No.	command	-	-	-	-	-	Checksum
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	checksum

1. Add from Byte1 to Byte7: 0x01 + 0x86+ 0 + 0 + 0 + 0 + 0 + 0 + 0 = 0x87
2. Negation: 0xff － 0x87 = 0x78
3. Add 1: 0x78 + 0x01 = 0x79

Example Program

C Language Calibrate & Calculate and Routine

```
char getCheckSum(char *packet)
{
      char i, checksum;
      for( i = 1; i < 8; i++)
      {
            checksum += packet[i];
      }
      checksum = 0xff – checksum;
      checksum += 1;
      return checksum;
}
```

Cautions

1.The sensor should be calibrated regularly. Recommended cycle time is once per 6 months.
2.Do not use the sensor in the high dusty environment for long time.
3.Please use the sensor with correct power supply.
4.Forbid cutting or soldering sensor's pins.

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