



Electrochemical CH₂O Detection Module
(Model: ZES10-CH₂O)

User's Manual

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Zhengzhou Winsen Electronics Technology Co., Ltd

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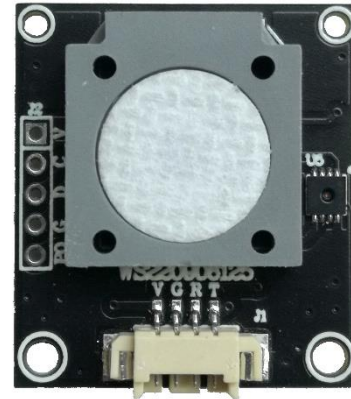
Please keep the manual properly, in order to get help if you have questions during the usage in the future.

Zhengzhou Winsen Electronics Technology CO., LTD.

Electrochemical CH2O Detection Module ZES10-CH2O

Profile

ZES10-CH2O is a general-purpose and miniaturization electrochemical formaldehyde detection module. It utilizes electrochemical principle to detect CH2O in air which makes the module with high selectivity and stability. It is built-in temperature and humidity sensor to make Temperature and Humidity compensation. It is a combination of mature electrochemical detection principle and sophisticated circuit design, with digital output and is easy to use.



Features

- * High sensitivity & resolution, Good stability,
- * Low power consumption, Excellent Linear output
- * Excellent ability of Anti-interference, Long life span,
- * **Temperature & Humidity** compensation ,

Main Application

Portable detector, air-quality monitor, air cleaner, air renewal system, air conditioner, smart home.

Technical Parameters Stable 1.

Model No.	ZES10-CH2O
Target Gas	CH2O
Interference Gas	Alcohol, CO &ect.
Output Data	UART output (3V TTL)
Working Voltage	3.7V~5.5V
Warm up time	≤3min
Response time	≤60s
Resume time	≤60s
Detection Range	0~5ppm
Resolution	≤0.001ppm
Operating Temp.	-20℃~50℃
Operating Hum.	15%RH-90%RH(No condensation)
Storage temp.	0~25℃
Working life	5 years (in clean air 18 ℃ ~ 25 ℃)

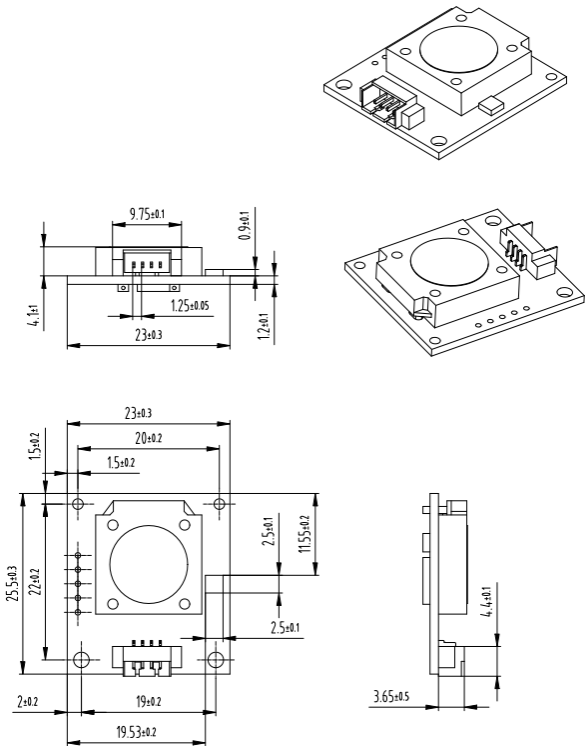


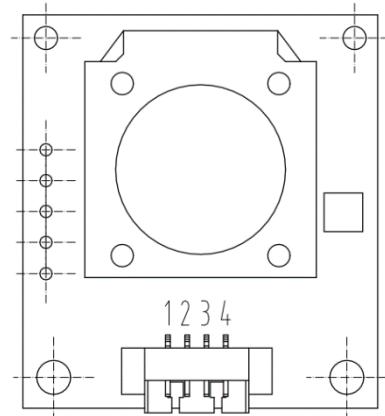
Fig 1: Module structure

Temperature Detection range	-20℃~50℃
Temperature Precision	±0.5℃ (0℃~50℃)
Humidity Detection range	15%RH-90%RH
Humidity Precision	±5%RH

Pin Description:

Table 2

PIN	Instruction
Pin1	Vin (Voltage input 3.7V~5.5V)
Pin2	GND
Pin3	UART (RXD) 0~3.0V data input
Pin4	UART (TXD) 0~3.0V data output



Communication Protocol:

1. General Settings

Table 3

Baud Rate	9600
Data Bits	8
Stop Bits	1
Parity	None

2. Commands

There are two communication type: active upload type and Q&A type. The default type for this module is active upload and it sends gas concentration every other one second.

If the user switched to the question and answer mode, need to re-switch to active upload, send the following command line format:

Table 4

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start Byte	reserved	Switch command	Active upload	reserved	reserved	reserved	reserved	checksum
0xFF	0x01	0x78	0x40	0x00	0x00	0x00	0x00	0x47

Active upload data display format is as follows:

Table 5

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start Byte	Gas Name CH2O	Unit ppb	Ambient humidity (%RH)	Concentration (High Byte)	Concentration (Low Byte)	Ambient Temperature (High Byte)	Ambient Temperature (Low Byte)	Checksum
0xFF	0x17	0x04	0x28	0x00	0x25	0x02	0xEE	0xA8

NOTE: Gas concentration value=High byte of concentration *256+ Low byte of concentration.

(1PPM = 1000 PPB 1PPM ≈ 1.25mg / m3)

Temperature (°C)=(Temperature High Byte)*256+ Temperature Low Byte)-500)/10.

When require the quest and answer mode, you can send the following command format to close the active upload data, and then send the command to read the concentration. Close the active command line format as follows:

Table 6

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start Byte	reserved	Switch command	Q&A	reserved	reserved	reserved	reserved	checksum
0xFF	0x01	0x78	0x41	0x00	0x00	0x00	0x00	0x46

In question and answer mode, the command format for reading the concentration is as follows:

Table 7

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start Byte	reserved	command	reserved	reserved	reserved	reserved	reserved	checksum
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	0x79

The returned sensor density value display format is as follows:

Table 8

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start Byte	command	High byte(ug/m3)	Low byte (ug/m3)	reserved	Ambient humidity (%RH)	Ambient Temperature (High Byte)	Ambient Temperature (Low Byte)	checksum
0xFF	0x86	0x00	0x28	0x00	0x28	0x02	0xEE	0x3A

NOTE: Gas concentration value=High byte of concentration *256+ Low byte of concentration.

(1PPM = 1000 PPB 1PPM ≈ 1.25mg / m3)

Temperature (°C)=(Temperature High Byte)*256+ Temperature Low Byte)-500)/10.

3 .Checksum and calculation

/******

* Function Name: unsigned char FucCheckSum(uchar *i,ucharIn)

* Functional description: Sum check 【 Take Not(Byte1+Byte2+...Byte7) +1 】

* Function declaration: Take Not(Byte1+Byte2+...ByteX (X>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);
    }
    
```

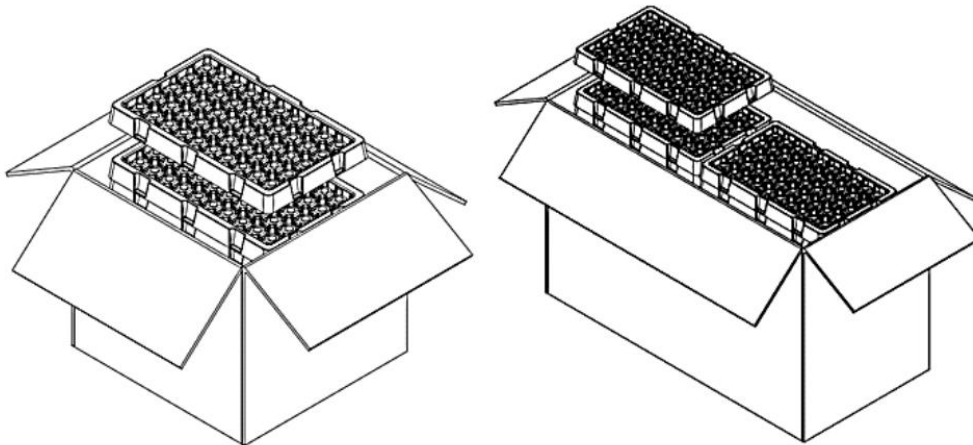
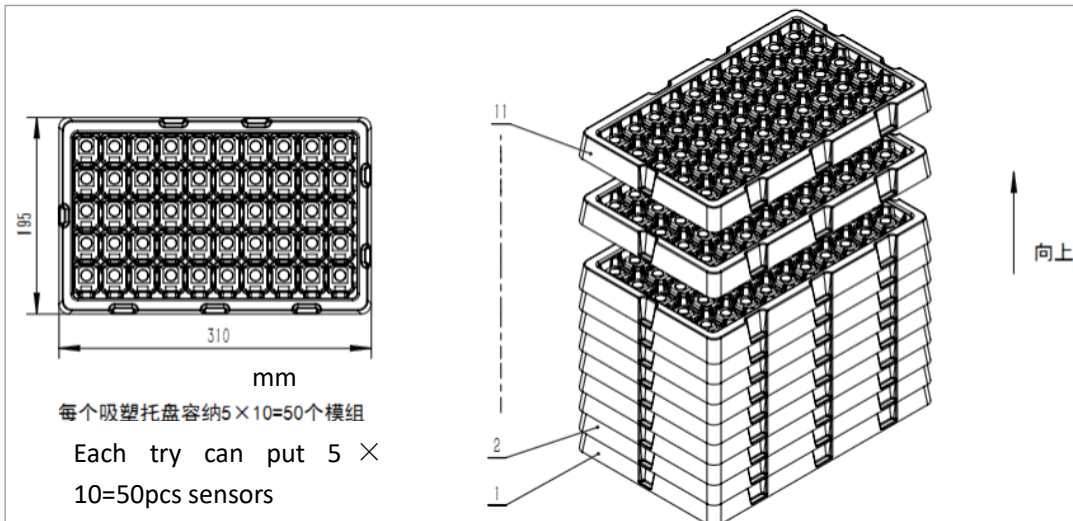
Cross interference gas

Table 9

Gas	Concentration/ppm	Equivalent CH ₂ O/ppm
CH ₂ O	5	5
C ₆ H ₆	10	0.1
C ₇ H ₈	10	0.46
C ₂ H ₄ O ₂	200	0.52
C ₂ H ₅ OH	2	0.2
H ₂ S	10	12
CO	200	0.7

Packing:

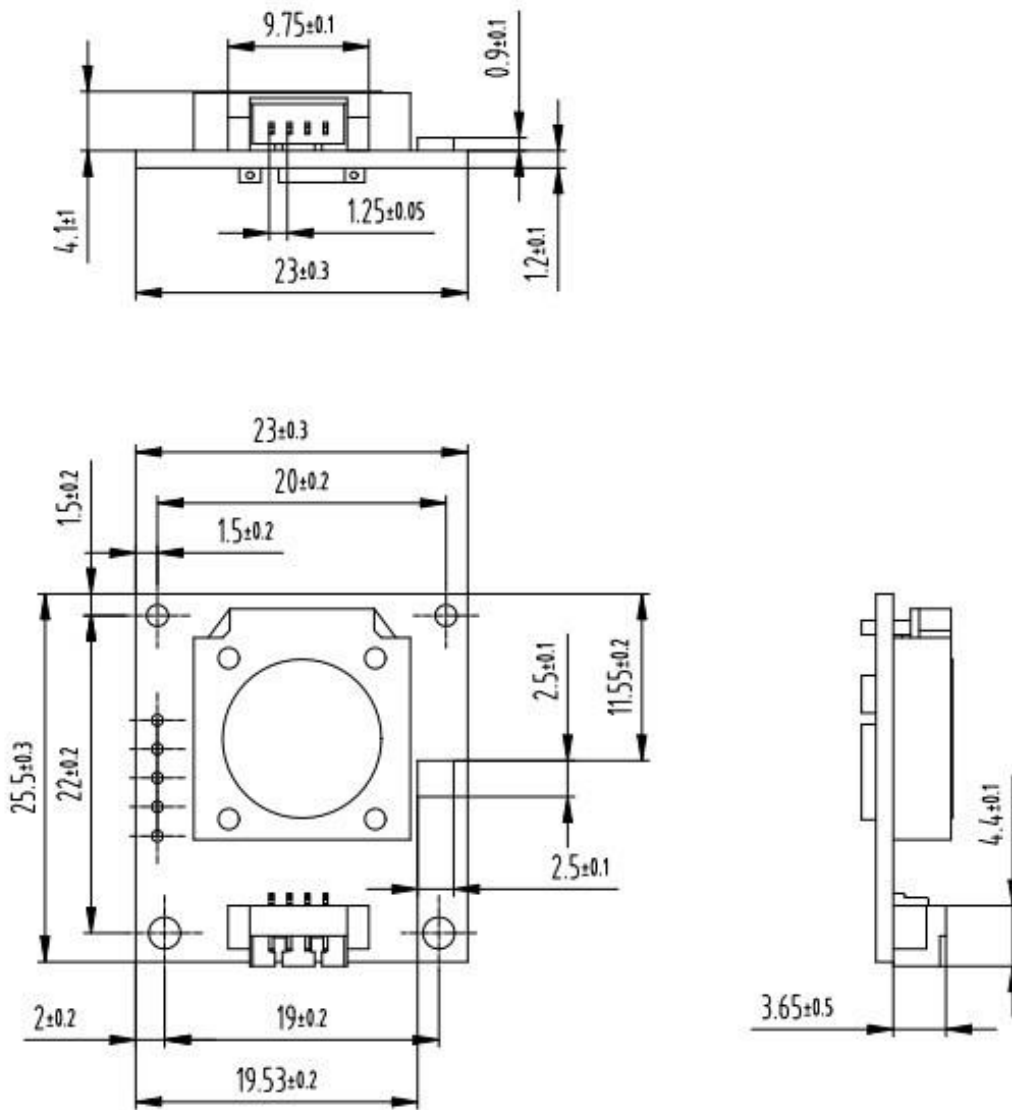
1. Place the sensor in the same direction in the blister tray.
2. Place the sensor's blister trays in the appropriate number of layers according to the box specifications.
3. Place the packaged sensor in the carton.
4. The carton is sealed and packed.
5. Orders with a single shipment less than the minimum package are not subject to this specification.



Cautions:

1. Sensor shall Avoid organic solvent, coatings, medicine, oil and high concentration gases
2. The module may not be completely encapsulated with resin material, nor may it be immersed in an oxygen-free environment, otherwise the performance of the sensor may be damaged;
3. Modules cannot be used in environments with corrosive gases for long periods of time, and corrosive gases can damage the sensor;
4. Excessive impact or vibration should be avoided;
5. The initial power-up of the module needs to be preheated for 24-48 hours, so that the module is fully stabilized and then tested normally.
6. Please do not use the modules in systems which related to human being's safety.
7. Please do not use the modules in strong air convection environment.
8. Do not leave the module in a high concentration of organic gas for a long time. If it is placed for a long time, it will cause the sensor zero to drift and recover slowly.
9. It is forbidden to use hot melt adhesive or sealant package module with curing temperature higher than 80 ° C;
10. It is forbidden to store and use in high concentration alkaline gas for a long time.

Appendix: Structure size drawing



Unit: mm

Tolerance: ± 0.2 mm

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