Winsen
炜盛科技

Formaldehyde module

（Model： ZE510-CH_2O）

User’s Manual

Version: 1.0

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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.

Electrochemical CH2O Detection Module ZE510-CH2O

Profile

ZE510-CH2O electrochemical formaldehyde module is a general-purpose, miniaturized module. Using electrochemical principles to detect CH2O in the air, it has good selectivity and stability. Built-in temperature and humidity sensor for temperature and humidity compensation; with digital output interface, easy to use. ZE510-CH2O is a general-purpose gas module designed and manufactured by combining mature electrochemical detection technology with sophisticated circuit design.

Features

High sensitivity, high resolution, low power consumption, long service life; Provide UART output mode, temperature and humidity output; High stability, excellent anti-interference ability, temperature and humidity compensation, excellent linear output

Main Application

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

Technical Parameters Stable 1.

Model No.	ZE510-CH2O
Target Gas	CH2O
Interference Gas	Alcohol, CO &ect.
Output Data	UART output(3V TTL Electrical Level)
Working Voltage	3.7V~5.5V
Warm up time	≤3 minutes
Response time	≤60s
Resume time	≤60s
Detection Range	0～5ppm
Resolution	≤0.01ppm
Operating Temp.	-20℃～50℃
Temperature accuracy	±0.5℃（0℃～50℃）
Operating Hum.	15%RH-90％RH
Humidity Accuracy	±5%RH

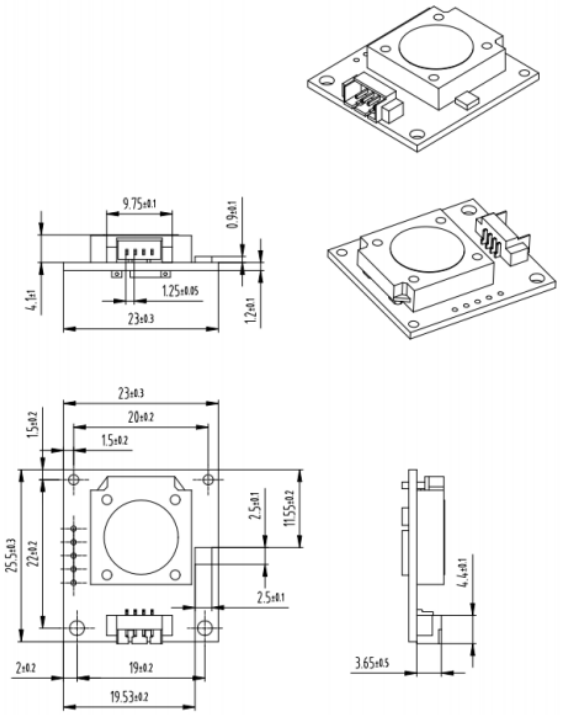


Fig 1: Module Structure Diagram

The allowable deviation of the size without tolerance is ±0.2mm

Operating temperature	-20℃～50℃
Working humidity	15%RH～90%RH（no condensation）
Storage temp.	0～25℃
Working life	5 years (in air 18 ℃ ~ 25 ℃)

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

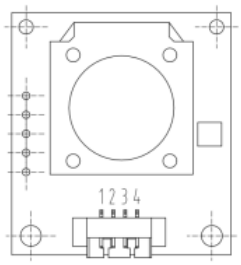


Fig2. Pin figure of the Module

UART output

Communication Protocol:

1. General Settings

Table 3

Baud Rate	9600
Data Bits	8 bytes
Stop Bits	1 byte
check bits	Null

2 .Commands

The communication is divided into active uploading and question-and-answering. The factory defaults to active uploading, and the concentration value is sent every 1S.

If the user switches to the question-and-answer mode and needs to switch to active uploading again, just 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	Environment 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

Gas concentration value (PPB)=(high gas concentration*256+low gas concentration). When converting to PPM: PPM = PPB/1000 (PPB is known).

1.25×1(PPM) ≈ 1.25mg/m3.

Temperature (°C)=((high ambient temperature*256+low ambient temperature)-500)/10.

When the user needs the question 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 can be. 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 density 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	Environment humidity (%RH)	Ambient temperature (High Byte)	Ambient temperature (Low Byte)	checksum
0xFF	0x86	0x00	0x28	0x00	0x28	0x02	0xEE	0x3A

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

Temperature (°C)=((high ambient temperature*256+low ambient temperature)-500)/10.

3 .Checksum and calculation

Checksum = (Negative (Byte1+Byte2+...+Byte7)) + 1

The reference routine is as follows:

```
/*****************************************************************
* Function Name: unsigned char FucCheckSum(uchar *i,ucharln)
 * 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 HCHO /ppm
CH_2O	5	5
C_6H_6	10	0.1
C_7H_8	10	0.46
C2H4O2	200	0.52
C2H5OH	2	0.2
H2S	10	12
CO	200	0.7

Packing:

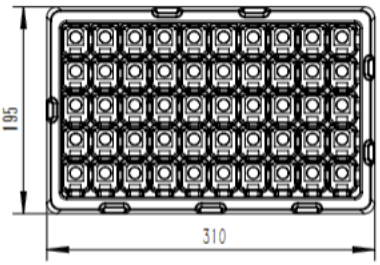
1. Place the sensor in the same direction in the blister tray.

2. Place the sensor's blister trays in the appropriate number of layers according to the box specifications.

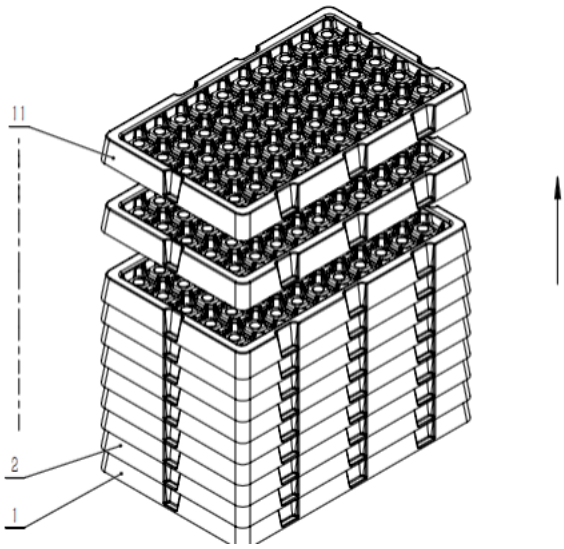
3. Place the packaged sensor in the carton.

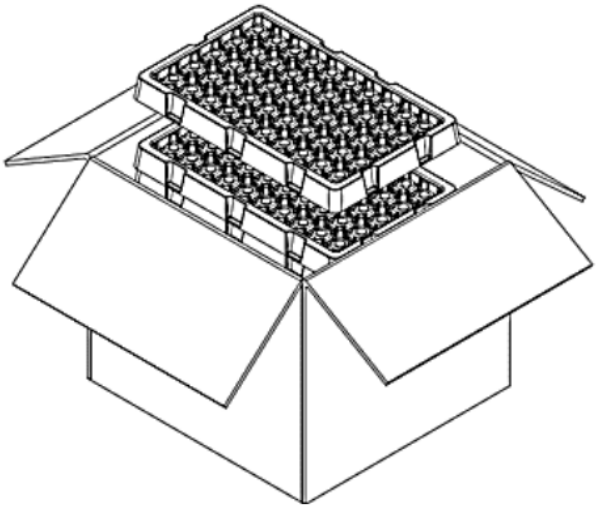
4. The carton is sealed and packed.

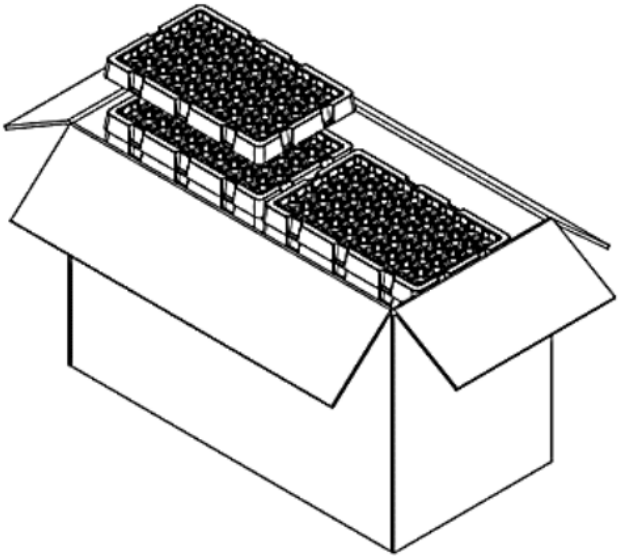
5. Orders with a single shipment less than the minimum package are not subject to this specification.



Each try can put 5 × 10=50pcs sensors







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.

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