Electrochemical Gas Detection Module

User's Manual V1.3
（Model：ZE11）

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Zhengzhou Winsen Electronics Technology Co., Ltd

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Zhengzhou Winsen Electronics Technology CO., LTD

Electrochemical Detection Module ZE11

ZE11 is a general-purpose and high-performance electrochemical module. It can detect the benzene、dimethyl benzene、ethylene oxide、chloro ethylene based on electrochemical principle, it has good selectivity and stability. A temperature sensor is built-in for temperature compensation. It has the digital output and analog voltage output at the same time which facilities the usage and calibration and shorten the development period. It is a combination of mature electrochemical detection principle and sophisticated circuit design, to meet customers' different detection needs.

Features

High sensitivity & resolution
Low power consumption & long working life
UART and analog voltage output
Good stability and excellent anti-interference ability
Temperature compensation and excellent linear output

Main Application

Petroleum and chemical industry, environment protection filed, detection of benzene、dimethyl benzene、ethylene oxide、chloro ethylene and vinyl benzene

Technical Parameters

Model No.	ZE11
Target Gas	benzene、dimethyl benzene、ethylene oxide、chloro ethylene
Preheat time	≤3 Min
Response time	≤60 Sec
Resume time	≤60 Sec
Resolution	≤0.5 ppm
Working Voltage	DC 5.0V±0.1V
Output Data	DAC(0.4～2V) standard voltage signal
	UART Output
	Sensor amplified voltage signal
Working Life	2 years
Operating Environment	Temp.: -20～50℃
	Humidity.: 15%RH-90％RH (no condensation)
Storage Environment	Temp.: 20～25℃
Dimension	Ø32㎜*31.2㎜
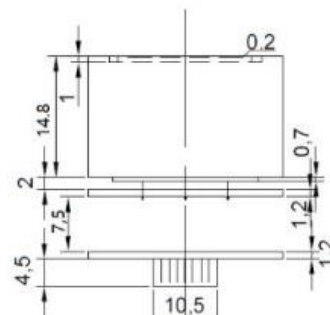
Side view
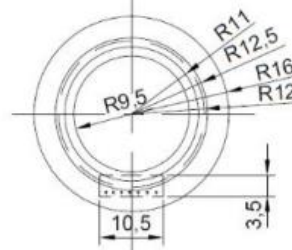
Top view
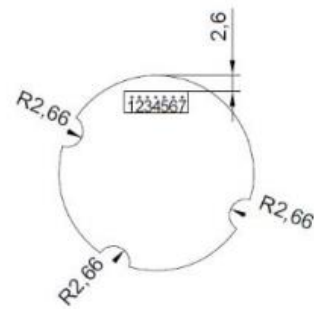
Bottom view

Pin definition table2.

Pin4	Vin(voltage input 5.0±0.1V)
Pin3	GND
Pin2	DAC(0.4~2V for 0~full measurement)
Pin7	Sensor amplified voltage
Pin1	NC
Pin5	UART(RXD) data input
Pin6	UART(TXD) data output
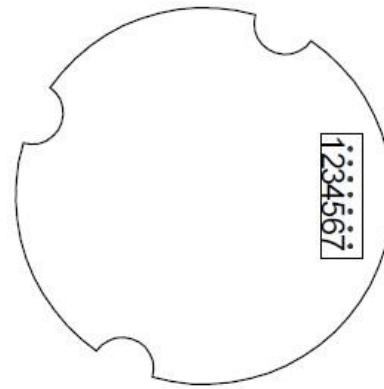
As figure 2, from up to down Pin1、Pin2、Pin3、Pin4、Pin5、Pin6、Pin7

Detection range and signal output   stable2.

Detection gas	Benzene	Methyl Benzene	Ethylene oxide	vinyl benzene
Detection range	(0-100) ppm	(0-500) ppm	(0-20) ppm	(0-100) ppm

Communication Protocol

1. General Settings

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

2. Communication Specification

The default communication type is active upload and it sends gas concentration every one second. For example, if detect CO, the command line format is like below Table 4.

0	1	2	3	4	5	6	7	8
Start bit	reserve	Unit PPm	decimal digit	Gas concentration hi order	Gas concentration low order	Full measurement high order	Full measurement low order	Check value
0xFF	0x40	0x03	0x01	0x00	0x00	0x03	0xE8	0xD1

Gas concentration value=concentration high order*256+concentration low oder

Shift to question and answer mode, command line format as below (table 5)

0	1	2	3	4	5	6	7	8
Start bit	Reserve	Switch command	Question and answer	reserve	reserve	reserve	reserve	Check value
0xFF	0x01	0x78	0x41	0x00	0x00	0x00	0x00	0X46

Switch to active upload , command line format as below(table 6).

0	1	2	3	4	5	6	7	8
Start bit	Reserve	Switch command	Active upload	reserve	reserve	reserve	reserve	Check value
0xFF	0x01	0x78	0x40	0x00	0x00	0x00	0x00	0X47

Reading format of gas concentration as below (table 7).

0	1	2	3	4	5	6	7	8
Start bit	Reserve	command	Reserve	reserve	reserve	reserve	reserve	Check value
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	0X79

Sensor returned value format as below (table 8).

0	1	2	3	4	5	6	7	8
Start bit	Command	reserve	reserve	reserve	Decimal digit	Gas concentration high order(ppm)	Gas concentration low order(ppm)	Check value
0xFF	0x86	0x00	0x00	0x00	0x01	0x00	0xD0	0xA9

3.Checksum and calculation

```
/****************************************************************
* Function Name: unsigned char FucCheckSum(uchar *i,ucharln)
* Functional description: Sum check 【Take 1\2\3\4\5\6\7 of sending and receiving protocol Non+1】
 * * Function declaration: array[n]     NOT〔Sum（array[1]~array[n-1]）〕+1
（number of array must be larger than2）
****************************************************************/
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);
 }
```

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Cautions

- Sensor shall avoid organic solvent, coatings, medicine, oil and high concentration gases
- Please do not open sensor, the electrolyte leakage will cause damages.
- Cannot be fully packaged by resin material, cannot be immersed in oxygen-free environment, or it may impact the performance of sensor.
- Cannot be used in corrosive gas for long time, corrosive gas will damaged sensor.
- Disclosing and damaging waterproof and breathable cover is prohibited
- Sensor gas inlet side cannot be blocked and polluted.
- Excessive impact or vibration should be avoided
- Please keep the modules warming up for at least 5 minutes when first using
- Please do not use the modules in systems which related to human being's safety.
- Please do not use the modules in strong air convection environment.
- Please do not expose the modules in high concentration organic gas for a long time.

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