Winsen
炜盛科技

Electrochemical Gas
Detection Module

User's Manual V2.0
（Model：ZE03）

Valid from: 2015-12-16

Zhengzhou Winsen Electronics Technology Co., Ltd

Statement

This manual copyright belongs to Zhengzhou Winsen Electronics Technology Co., LTD. Without the written permission, any part of this manual shall not be copied, translated, stored in database or retrieval system, also can't spread through electronic, copying, record ways.

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 Detection Module ZE03

ZE03 is a general-purpose and high-performance electrochemical module. It uses three electrodes, electrochemical gas sensor and high-performance micro-processor. By installing different gas sensor, the module could detect relevant gas. It is with built-in temperature sensor to make temperature compensation, which makes it could detect the gas concentration accurately. 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
UART and analog voltage output
Good stability and excellent anti-interference ability

## Main Application

Portable and fixed gas detector, various gas detection equipment and situation.

Technical Parameters

Model No.	ZE03
Target Gas	CO, O2, NH3, H2S, NO2, O3, SO2, CL2
Measurement Range	Refer stable 2.
Working Voltage	DC 4V～9V
Working Current	＜ 5 mA
Output Data	UART Output (TTL electrical level,3V)
	Analog Voltage(refer stable2. for sensor original amplifying signal)
Working Life	2 year
Operating Environment	Temp.: -20～50℃
	Humidity.: 15%RH-90％RH(no condensation)
Storage Environment	Temp.: 20～25℃
	Hum.: 30%RH-70％RH
Size	∅23.5mm*24.5mm

Leading gas sensing solutions supplier in China!
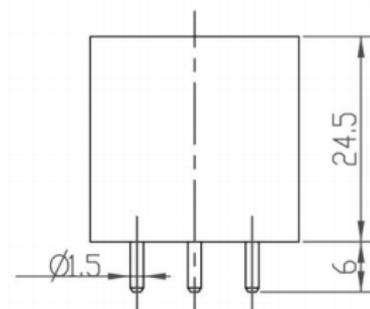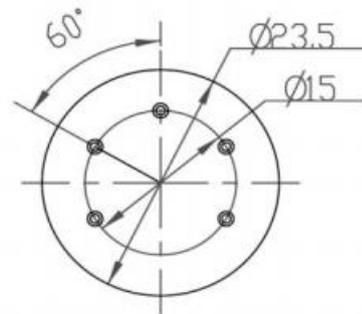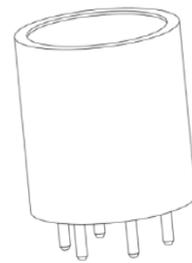
Detection range and signal output   stable2.

Detection gas	CO	O2	NH3	H2S	NO2	SO2	CL2	O3
Detection range	0-1000ppm	0-25%vol	0-100ppm	0-100ppm	0-20ppm	0-20ppm	0-10ppm	0-20ppm
Decimal point of serial port	null	1 byte	null	null	1 byte	1 byte	1 byte	1 byte
Voltage output	0.6-3V	1.5-0V	0.6-3V	0.6-3V	2-0V	0.6-3V	2-0V	2-0V
Response Time	<20s	≤15s	≤150s	≤30s	≤25s	≤30s	≤60s	≤120s

Pin definition stable3.

GND	Ground
VCC	Power supply
VO	Voltage output
RXD	Series port input
TXD	Series port output

Bottom view
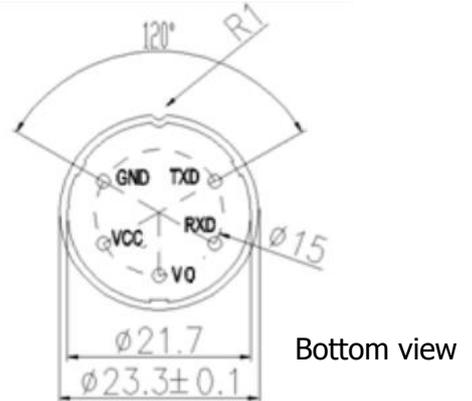
Name rules

Model name: ZE03-X-X-X

"Z" means module, "E " means electrochemical type sensor, "03" means version, the first X means gas type, the second X means detection range, the third X means output way.

Eg. "ZE03-CO-(0-1000)ppm-UART/VDC","ZE03-O2-(0-25)%VOL-UART/VDC".

"UART/VDC" means the output way is series port and analog voltage (non standard voltage, refer stable2.)

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 other one second (the concentration is 16 hexadecimal). Send 0x78 command to change communication type. After changing the communication type to 0x04 (Q&A type), only by receiving the 0x86 command (reading concentration value command), current concentration value can be sent.

3.Commands

0X78—to change the communicate type (communication type: 0x03 is active upload type, 0x04 is passive upload type)

1	0x78			Change communication type					
	0	1	2	3	4	5	6	7	8
Upload	Start Byte	Address	Demand	Communication Type	--	--	--	--	Checksum
	0XFF	0X01	0x78	0x03	0	0	0	0	0x84
EXP.	FF 01 78 03 00 00 00 00 84								
	0	1	2	3	4	5	6	7	8
Receive	Start Byte	Command	Return calibration	--	--	--	--	--	Checksum
	0XFF	0X78	Success: 1 Failure: 0	0	0	0	0	0	0x84
EXP	FF 78 01 00 00 00 00 00 87								

0x86 — To read the concentration value

1	0x86			Change communication type					
	0	1	2	3	4	5	6	7	8
Upload	Start Byte	Address	Command	--	--	--	--	--	Checksum
	0XFF	0X01	0x86	0	0	0	0	0	0x79
EXP.	FF 01 86 00 00 00 00 00 79								
	0	1	2	3	4	5	6	7	8
Receive	Start Byte	Command	Concentration value		--	--	--	--	Checksum
	0XFF	0X86	High byte	Low byte	0	0	0	0	--
EXP.	FF 86 00 00 00 00 00 00 7A (concentration value is 0)								

Calculate method for gas concentration:

For CO, NH3, H2S, the concentration =(High bytex256+Low byte)ppm

For O2, NO2, SO2, O3, CL2, the concentration=(High bytex256+Low byte)x0.1 ppm

4.Checksum and calculation

/***

* Function Name: ucharFucCheckSum (uchar *i,ucharln)

* Functional description: Sum check【Take Non(Byte1+Byte2+…Byte7) +1】

***/

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);

}
```

Cautions

- Please do not take away or plug the sensor in the module
- It is prohibited to weld the pins of the module. The socket could be welded.
- Sensor shall avoid organic solvent, coatings, medicine, oil and high concentration gases
- 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.