Winsen
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Electrochemical Hydrogen Module

（Model No.：ZE630-H2）

Manual

Version： 1.0

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Zhengzhou Winsen Electronic 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.

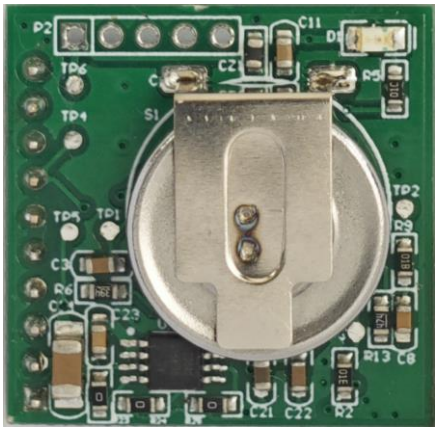
Please keep the manual properly, in order to get help if you have questions during the usage in the future.

Zhengzhou Winsen Electronics Technology CO., LTD.

Electrochemical Hydrogen Module ZE630-H2

◆ Product Description

ZE630-H2 is a general-purpose, miniaturized gas detection module. The module is equipped with a fuel cell type electrochemical button sensor, which not only has low power consumption, but also can effectively avoid the risk of leakage of traditional electrochemical sensors. In terms of circuit, the instrument amplifier, high-precision AD converter, etc., the detected gas concentration is converted into a digital signal, and the data transmission can be carried out through serial port, PWM and other signals, not only the signal is stable, but also a multiple choice.



◆ Features

High temperature resistance, fast response, low power consumption, high precision, long life.

◆ Application

Vehicle lithium battery failure detection, Hydrogen station H2 gas detection, portable hydrogen detector, etc.

◆ Technical Parameters Stable1.

Model	ZE630-H2
Detecting gas	Hydrogen
Interfering gas	CO, ethylene etc
Output	UART/PWM
Working Voltage	5V±0.5V DC
Pre-heating Time	3min
Response Time	＜40s
Recovery Time	2 min
Detecting Range	0～1000ppm
Resolution	1ppm
Working Temperature	-40℃～80℃
Working Humidity	15%RH-90%RH（No condensation）
Stock Temperature	-10~55℃
Stock Humidity	30% ～ 60%RH
Life Span	10 years (In air)

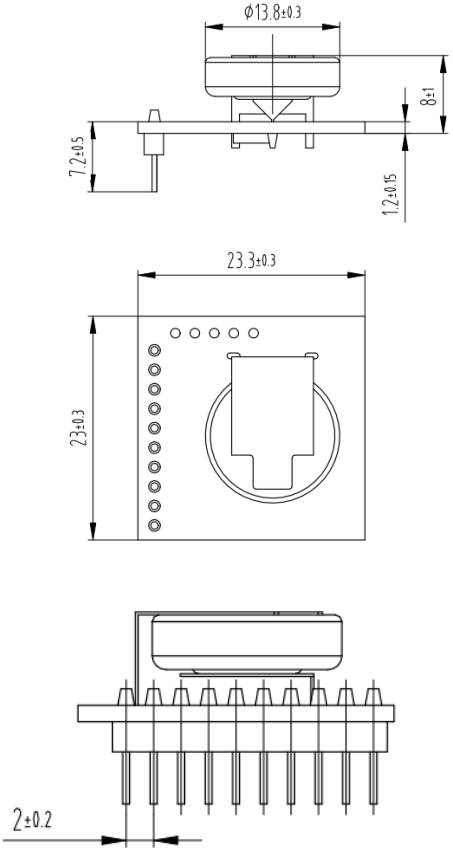


Fig1. Structure
Unit： mm

Definition of pins

Stable2.

PIN1	VCC, input power positive (5V±0.5V)
PIN2	GND, input power grand
PIN3	Reserved
PIN4	Reserved
PIN5	Reserved
PIN6	PWM output for 1 second per cycle (10% to 90% duty cycle corresponds to 0-1000PPM)
PIN7	Reserved
PIN8	UART TX pin, 3.3V level
PIN9	UART RX pin, 3.3V level
PIN10	Reserved

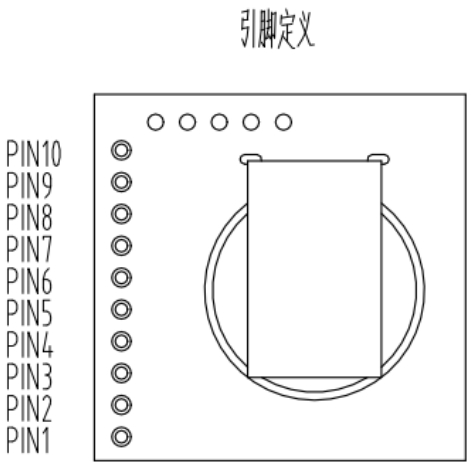


Fig2. Module Pin Diagram

Communication Protocol

1. Communication setting Table 3.

Baud rate	9600
Data bits	8
Stop bit	1
Parity	None

2. Communication description

The module has two communication modes: question and answer mode & active upload mode. When the module is powered on, it defaults to question and answer mode. After 10 seconds in question and answer mode, if the module does not receive a command frame from the application side, it will switch to active upload mode. In active upload mode, the module will send the current concentration value (in hexadecimal format) to the outside every other second. In active upload mode, if the module receives a downlink data frame from the application, it will immediately switch to question and answer mode.

3. Communication command Active upload mode

Recieve	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
	Start Bit	Gas name	Unit	Decimals	Gas concentration High level	Gas concentration Low level	Reserved Bit	Fault flag bit	Check Value
	0xFF	0x06	0x03	0x00	0x00	0x00	0x00	0x00	0xF9
EXP.	FF 04 03 00 00 00 00 00 F9								

The gas name 0x06 represents H2 gas. Unit 0x03 represents ppm. The decimal place of 0x00 represents that the uploaded gas concentration value is an integer, with a decimal place of 0.

Gas concentration value=(gas concentration high level * 256+gas concentration low level) * resolution.

Note: The decimal place is 0, and the resolution is 1; 1 decimal place with a resolution of 0.1; The decimal place is 2, and the resolution is 0.01.

Full scale Decimal is 1000 and hexadecimal is 0x3E8.

4. Fault flag bits are defined as follows:

D7	D6	D5	D4	D3	D2	D1	D0
0	0	Reserved	Reserved	Sensor open circuit fault flag	Sensor short circuit fault flag	Reserved	Reserved

D2 (sensor short circuit fault flag): Set 1 short circuit fault; Set to 0 for normal operation.
D3 (sensor open circuit fault flag): Set 1 to open circuit fault; Set to 0 for normal operation.

Question and Answer mode

0x86 Read Sensor Concentration Command Frame

1	0x86	Read sensor concentration							
Send	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
	Start Bit	Address	Command	--	--	--	--	--	Check Value
	0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	0x79
EXP.	FF 01 86 00 00 00 00 00 79								
Model Answer	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
	Start Bit	Command	Concentration value		Reserved	Reserved	Reserved	Reserved	Check value
	0xFF	0x86	0x00	0x00	0x00	0x00	0x00	0x00	0x7A
EXP.	FF 86 00 00 00 00 00 00 7A								

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

5. Check Value calculations

```
/*****************************************************************************
*Function name: ucharFucCheckSum (uchar * i, ucharln)
*Function description: Summation verification (taking the sum of 1 2 3 4 5 6 7 of the sending and receiving protocols as negation+1)
*Function description: Add the elements of the array from 1 to the second to last and take the inverse+1 (the number of elements must be greater than 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);
  }
```

◆ **Installation instructions**

This module adopts a Pin2.54mm * 10 single row pin structure and external connection. Simply weld and fix the positioning pins, and manual welding is required.

Cautions

1. Do not plug or touch the sensors on the module with your hands.
2. It is prohibited to modify or shift the installation status of electronic components.
3. The module should avoid contact with organic solvents (including silicone and other adhesives), coatings, chemicals, oils, and high concentration gases.
4. The module cannot withstand excessive impact or vibration.
5. The module needs to be preheated for at least 20 minutes when first powered on.
6. Do not apply this module to systems involving personal safety.
7. Do not install the module in a strong air convection environment for use.
8. Do not place the mold in high concentration organic gas for a long time.

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