



PH Water Quality Sensor Module

(Model: ZW-PH101)

Manual

Version: 1.2

Valid From: 2021-12-16

Zhengzhou Winsen Electronic Technology Co., Ltd

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Zhengzhou Winsen Electronics Technology CO., LTD

ZW-PH101 water quality sensor module

Profile

The ZW-PH101 water quality sensor module is a universal module that uses electrochemical principles to detect the H⁺ content in water, with good selectivity and stability. Using the digital signal output, very easy to use. ZW-PH101 is designed and manufactured with mature electrochemical detection technology closely combined with sophisticated circuit design.



Sensor characteristics

Low power consumption, high accuracy, linear output, easy calibration and excellent stability.

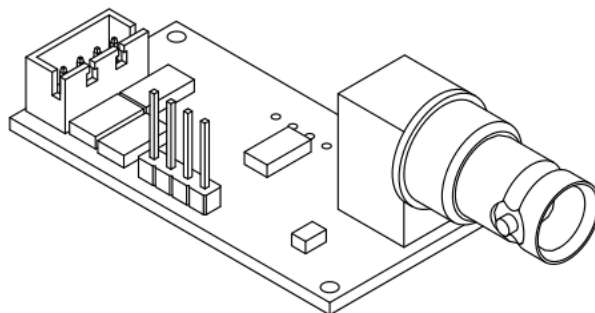
Main application

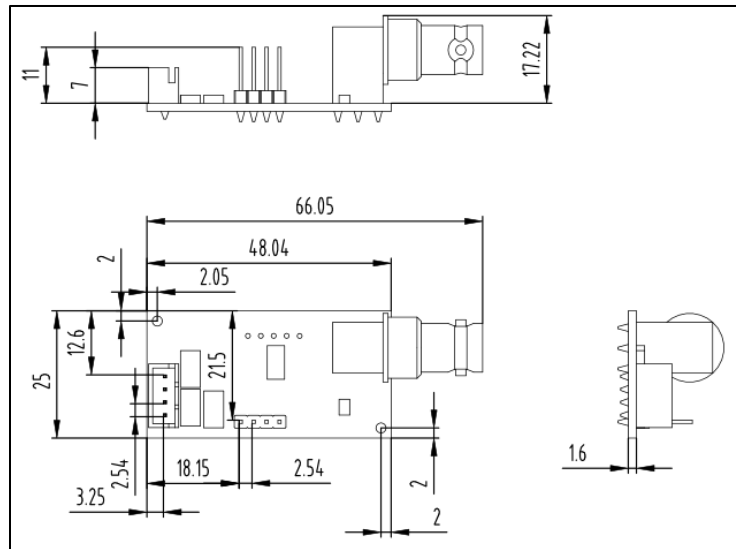
It is widely used for water quality pH detection in laboratory research, water plant water supply, waste-water treatment, aquaculture, farmland irrigation and other fields.

Technical indicators

Items	Parameter
Working voltage	12V(DC)
Consumption	<25mW
Temperature range	0-50°C
Output mode	RS485 (5V)
Output linearity	Linear
Response time	≤30S
Detection Temperature range	0-50°C

Items	Parameter
Measure range	0-14
Resolution ratio	0.02pH
Size	40×25mm
Response time	≤30 s
Output linearity	Linear
Service life	3 years
Working current	<5mA





Note: The tolerance range is $\pm 0.2\text{mm}$

Fig1. Sensor Structure

Table 2. Pin definition

PIN1	VCC
PIN2	GND
PIN3	A
PIN4	B
PIN5	GND
PIN6	RXD (3V TTL level)
PIN7	TXD (3V TTL level)
PIN8	+5V

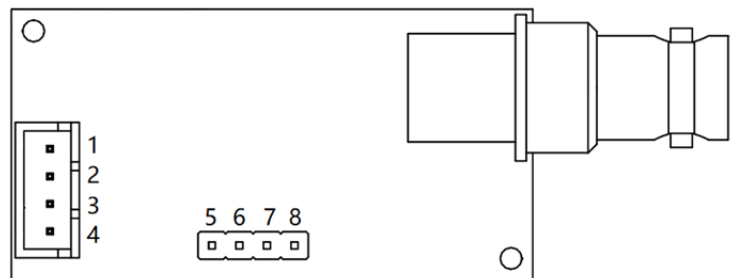


Fig2. Module Pins

Sensor linearity

The sensor be placed in standard pH buffer: pH4.01, pH 6.86 and pH 9.18 to record the output of the module as shown in the figure below.

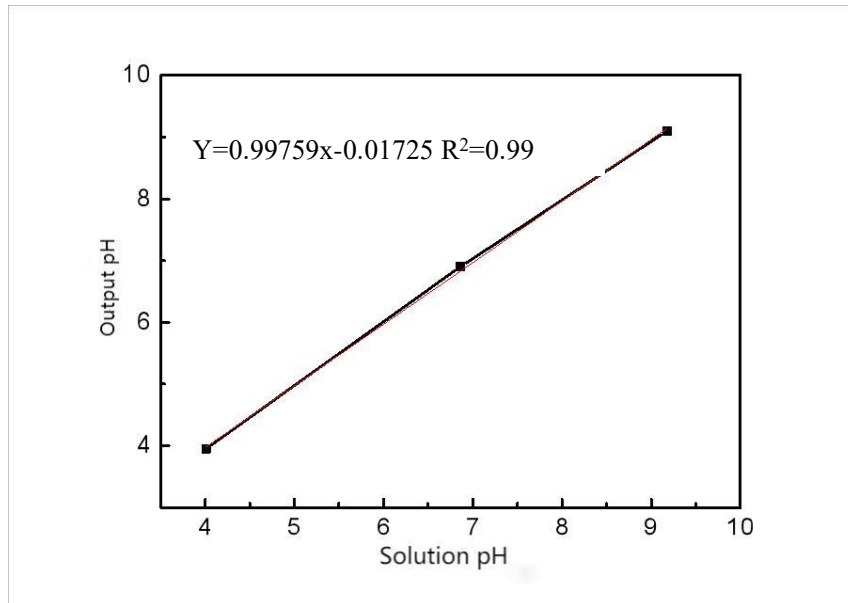


Fig3. Linear sensor curve

Communication Protocol

1.General settings

Baud rate	9600
Data byte	8
Stop byte	1
Check	Null

2.General command

Host-computer software send format

	Type	Instructions	Note
Integer	16 byte	Indicates that high and low bytes are not reversed	For example :0x 0032 turn into the decimal number is 50
Floating point number	ABCD	Represents analyze in order	For example: 41 DB 72 37Z turn into a floating point number is 27.4

Function code specification:

03	Read single or multiple registers
06	Write a single register
16	Write multiple registers

Read the current concentration value sending format:

	Module address	FC	start address		Number of registers		CRC16	
			High byte	Low byte	High byte	Low byte	Low byte	High byte
Device 1	0X01	0X03	0X00	0X30	0X00	0X01	0X84	0X05

Reply format:

	Module address	FC	Byte number	Reading concentration (Hexadecimal integer)		CRC16	
				High byte	Low byte	Low byte	High byte
Measurement value return	0X01	0X03	0X02	0X04	0X74	0XBA	0XA3

Write the device address sending format:

	Device ID address	FC	Register initial address		Write Equipment address (The HEX integer)		CRC16	
			High byte	Low byte	High byte	Low byte	Low byte	High byte
Device 1	0XFE	0X06	0X00	0X12	0X00	0X01	0XFC	0X00

Reply format:

	Module address	Function Code	Register initial address		Equipment address (Hexadecimal integer)		CRC16	
			High byte	Low byte	High byte	Low byte	Low byte	High byte
Device 1	0X01	0X06	0X00	0X12	0X00	0X01	0XE8	0X0F

The calibration of the sensor:

	Device ID address	FC	Register address		Write zero point concentration value (The HEX integer)		CRC16	
			High byte	Low byte	High byte	Low byte	Low byte	High byte
pH4.01	0X01	0X06	0X00	0X32	0X01	0X91	0XE8	0X39
pH6.86	0X01	0X06	0X00	0X33	0X02	0XAE	0XF9	0X19
pH9.18	0X01	0X06	0X00	0X34	0X03	0X96	0X48	0X9A

3.Check and calculation

```
/******
```

Name: crc16 verification

Function: crc16 verification

Enter: (byte pointer)*ptr, (data lenth) len

Return: (double byte) crc

```
*****/
```

```
uint16_t getCRC16_485(volatile unsigned char* ptr, unsigned char len)
```

```
{
```

```
    unsigned char i;
```

```
    uint16_t crc = 0xFFFF;
```

```
    while (len--)
```

```
    {
```

```
        crc ^= *ptr;
```

```
        for (i = 0; i < 8; i++)
```

```
        {
```

```
            if (crc & 1)
```

```
            {
```

```
                crc >>= 1;
```

```
                crc ^= 0xA001;
```

```
            }
```

```
            else
```

```
            {
```

```
                crc >>= 1;
```

```
            }
```

```
        }
```

```
        ptr++;
```

```
    }
```

```
    return(crc);
```

```
}
```

Precautions

1. The module shall avoid contact with organic solvents, coatings, agents and oils.
2. Do not apply the module to systems involving personal safety.
3. Do not install the module in a strong air convection environment.
4. The module shall not withstand excessive impact or vibration, and can not shake during use, otherwise the value returned will be inaccurate.
5. Please supply the module in strict accordance with the power supply voltage of the module. The voltage exceeding 12V will lead to irreversible damage to the module.
6. Do not place the module in a strong air convection environment.
7. Do not place the module in a high concentration of organic gas for a long time.

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