ORP sensor Introduce

Type NO.: RD-ORP-01

1. Product Introduce

Oxidation-Reduction Potential, referred to as ORP (Oxidation-Reduction Potential) or Eh. ORP is often used to indicate the relative degree of oxidation and reduction of environmental media (natural water, culture medium, soil, etc.).

The unit of ORP is mV. It consists of ORP composite electrode and mV (millivolt) meter. The ORP composite electrode consists of an electrode that can absorb or release electrons on the surface of its sensitive layer. The sensitive layer is an inert metal, usually made of platinum and gold, and is similar to the reference electrode (the same silver/pH electrode as the pH electrode). Silver chloride electrode) composition.

The ORP sensor is an online digital ORP sensor newly developed and produced by our company. It adopts imported components and advanced production technology and surface mount technology. It has an IP68 waterproof rating, and the cable is seawater resistant. It can be directly put into the water without a protective tube. Ensure the long-term stable, reliable and accurate operation of the sensor. It has two installation methods: BNC connector and waterproof connector, which is convenient for users.

2. Product Features

1. The internal use of axial capacitor filtering, 100M resistance increases impedance and enhances stability;

2. High integration, small size, low power consumption and easy to carry;

3. Really realize low cost, low price and high performance;

4. Long life, convenience and high reliability;

5. As many as four places are isolated, which can resist the complex interference situation on site, and the waterproof grade is IP68;

6. The electrode adopts high-quality low-noise cable, which can make the signal output length more than 20 meters.

3. Product application

This product can be widely used in continuous monitoring of ORP value in solutions such as chemical fertilizers, metallurgy, pharmaceuticals, biochemicals, food, aquaculture, environmental protection water treatment projects, and tap water.

4. Product Parameter

- Measuring range: -1999mV ~ + 1999mV
- Accuracy: ±1mV
- Resolution: 1mV

- Stability: ≤3mV/24 hours
- Output signal:

  A: Voltage signal (0 ~ 2V, 0 ~ 2.5V, 0 ~ 5V, 0 ~ 10V, choose one)

  B: 4 ~ 20 mA (current loop)

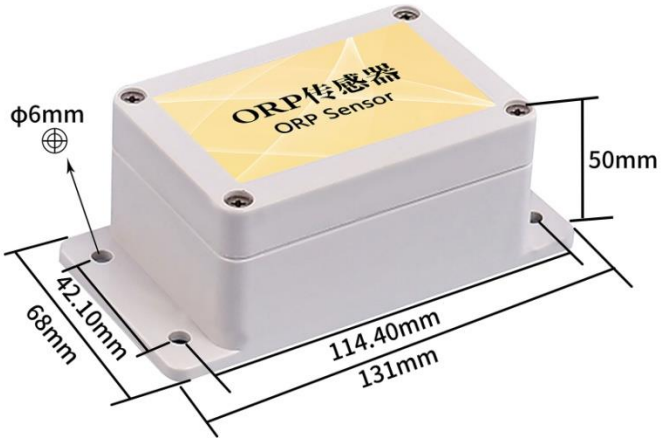
  C: RS485 (standard Modbus-RTU protocol, device default address: 01)
- Power supply voltage:

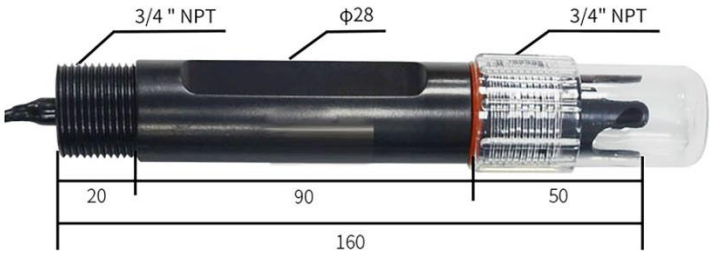
  5 ~ 24V DC (when the output signal is 0 ~ 2V, 0 ~ 2.5V, RS485)

  12 ~ 24V DC (when the output signal is 0 ~ 5V, 0 ~ 10V, 4 ~ 20mA)
- Working environment: temperature 0 ~ 60℃; humidity ≤ 85%RH
- Power consumption: ≤0.5W
- Impedance requirements for current signals

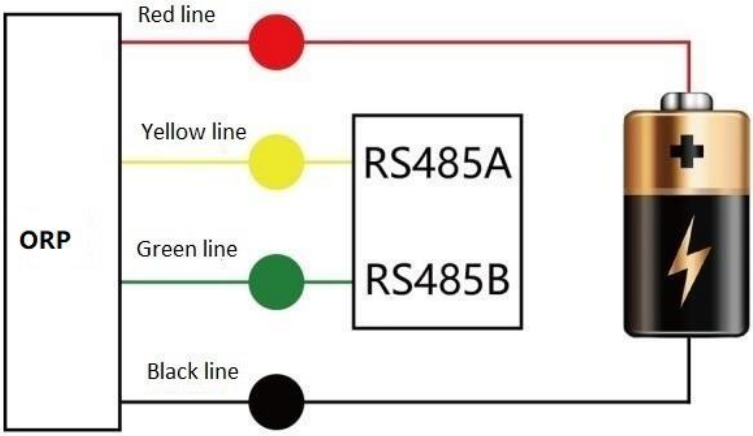
Supply voltage	9V	12V	20V	24V
Maximum impedance	125Ω	250Ω	500Ω	>500Ω

5. Product size

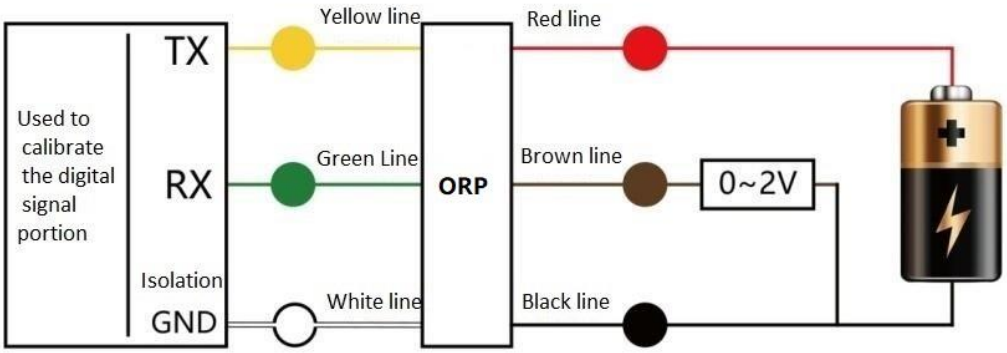




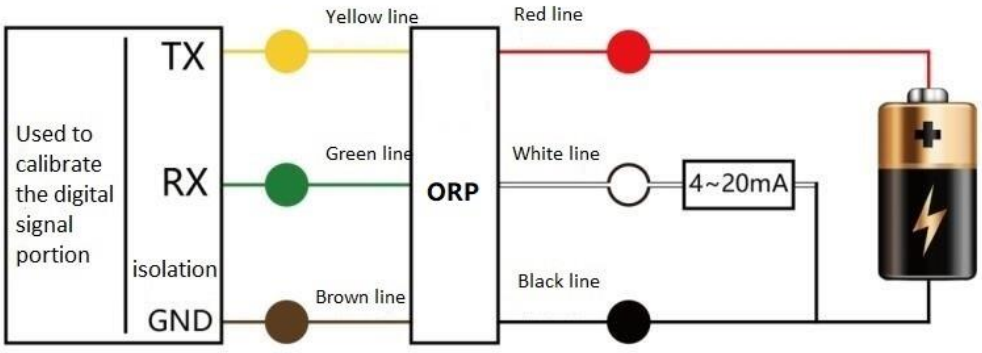
6. Line connection diagram



(RS485)



(0~2V、0~5V、0~10V)



(4~20mA)

7. Data conversion method

ORP sensor has good linear characteristics, the following is a typical calibration formula.

1. Analog output

V: The voltage value collected by the collector, unit: V

A: The current value collected by the collector, unit: mA

Output signal	ORP conversion method
0 ~ 2V DC	ORP = 2000*（V－1）
0 ~ 5V DC	ORP = 400*（2V－5）
0 ~ 10V DC	ORP = 400*（V－5）
4 ~ 20mA	ORP = 250*（A－12）

2. Digital output

RS485 signal (default address 01):

Standard Modbus-RTU protocol, baud rate: 9600; check digit: none; data bit: 8; stop bit: 1

1. modify the address, for example: change the address of the transmitter with address 1 to 2, host to slave

Original address	Function code	Reserved 1	Reserved 2	Reserved 3	new address	CRC16 low	CRC16 high
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

If the transmitter receives correctly, return the following data, slave → host

Original address	Function code	Data length	Reserved 1	new address	CRC16 low	CRC16 high
0X01	0X06	0X02	0X00	0X02	0X39	0X49

Remark: If you forget the original address of the sensor, you can use the broadcast address 0XFE instead. When using 0XFE, the host can only be connected to one slave, and the return address is still the original address, which can be used as the address query method.

2. Query data

Query the data of the transmitter (address 1) (ORP value), host → slave

Address	Function code	Start register address high	Start register address low	Register length high	Register length low	CRC16 low	CRC16 high
0X01	0X03	0X00	0X00	0X00	0X01	0X84	0X0A

If the transmitter receives correctly, return the following data, slave → host

Address	Function code	Data lenght	Register 0 data high	Register 0 data low	CRC16 low	CRC16 high
0X01	0X03	0X02	0X03	0X78	0XB8	0X96
			ORP Value			

Data representation method:

Data representation method: Convert the data to decimal, and use the complement for negative numbers

The above data indicates that ORP: 888mV

8. Installation method

Please pay attention that do not put the electrode directly into the water . Use an electrode mounting bracket or a flow cup. Be sure to use a raw material tape (3/4 thread) for waterproof sealing before installation to prevent water from entering the electrode.

9. Instructions

1. Sampling: Take a representative water sample according to sampling requirements.

2. Determine the ORP of the water sample: first rinse the electrode three times with distilled water, then rinse three times with the water sample, then immerse the electrode in the sample, shake the test cup carefully or stir to accelerate the electrode balance, leave it to stand, and record it when the reading is stable ORP.

3. If it is inconvenient to sample, you can also put the electrode into the solution to be tested. After the measured data is stable, read the output data. After a period of time, take out the electrode and clean it.

4. After the sample is measured, rinse the electrode three times with distilled water, and put the electrode back in the protective solution.

Note: When measuring multiple samples, the electrode should be cleaned before measuring the next sample to avoid affecting the experimental data.

10. Precautions for use

1. In order to ensure that the electrode is correctly measured on the pipeline, the data gap between the measuring cells should be avoided to cause data misalignment;

2. Please check whether the packaging is intact, and check whether the product model is consistent with the selection;

3. Do not electrify the wiring, the wiring is completed, and the power can be turned on after checking.

4. Do not arbitrarily change the components or wires that have been soldered at the time of shipment;

5. The sensor is a precision device, please do not disassemble it yourself, use sharp objects or corrosive liquid to touch the sensor surface to avoid damage to the product.