User's Manual

# pH sensor

U-PH-ZXEN2

# Preface

Thank you for purchasing pH sensor. Please read this manual carefully before operating and using it correctly to avoid unnecessary losses caused by false operation.

**Note**

- Modification of this manual's contents will not be notified as a result of some factors, such as function upgrading.
- We try our best to guarantee that the manual content is accurate, if you find something wrong or incorrect, please contact us.
- This product is forbidden to use in explosion-proof occasions.

**Version**

U-PH-ZXEN2

## Disclaimer

Please confirm the product and information after unpacking. Please contact us if the product is wrong, or the quantity is incorrect or the appearance is damaged.

## Package contents

| S/N | Item Name | Qty |
|---|---|---|
| 1 | Industrial online pH sensor | 1 |
| 2 | Manual | 1 |
| 3 | Certificate of Compliance | 1 |

## Description of symbols

| Symbol | Name | Meaning |
|---|---|---|
|  | Danger | Serious personal injuries, instrument damage or major property losses and other accidents will be caused if proper preventive measures are not taken. |
|  | Warning | Remind you to pay special attention to important information about products or special parts of this manual. |

# Contents

# Chapter 1 Brief Introduction

The principle of pH/ORP sensor measurement is electrochemical method and galvanic battery principle.

The primary battery is a system whose function is to turn chemical energy into electrical energy. The voltage of this battery is called electromotive force (EMF) which is made up of 2 half-cells, of which one is called a measuring cell whose potential is related to specific ionic activity; the other is a reference half-cell, commonly known as a reference sensor, which is generally interlinked with the measuring solution and is connected to the measuring instrument.

The potential difference produced by the galvanic interaction inside the sensor is transmitted to the pH controller, and the corresponding algorithm is transmitted to display the pH value.

# Chapter 2 Precautions

(1) The conventional lead wire of the sensor is a 2-core or 4-core shielded wire. Customers are forbidden to cut or connect lead wires privately; otherwise, we are not liable for the consequences.

(2) It shall avoid soaking in distilled water or protein solutions for a long time and prevent contact with silicone oil.

(3) When the sensor is used for a long time, its glass film may become transparent or be attached with sediment. At this time, it can be washed with dilute hydrochloric acid and flushed with water.

(4) When you still can not carry out the correction program and normal measurement after you maintain the sensor, it indicates that the sensor has been unable to restore response, and you should replace the sensor.

(5) The pH sensor wire is not waterproof, so it shall be avoided to be contact with water as far as possible.

(6) The service life of sensors is one year of normal use, which will be shortened because of bad environment or improper maintenance.

# Chapter 3 Maintenance

(1) An appropriate amount of 3.3 mol/LKCL solution is contained in the protective cover at the front part of the sensor, in which the sensor head is immersed so as to maintain the activation of the sensitive membrane and the liquid junction.

(2) When the sensor is used, the front transparent protective cover needs to be removed, and the glass bubble and the liquid junction be immersed in the solution for use.

(3) Before installation, make sure to use thread seal tape (at 3/4 threads) for waterproofing and sealing to avoid water into the pH sensor, resulting in short circuit of the pH sensor cable.

(4) When measuring, it shall be washed in distilled water (or deionized water) and dried with filter paper to prevent impurities from entering the measured liquid. The sensor sensitive membrane and the liquid junction shall be completely immersed in the measured liquid.

(5) Check whether the connecting terminal is dry. If there is contamination, please wipe it with anhydrous alcohol and blow dry it for use.

(6) It is suggested that users clean the sensitive membrane

and liquid junction in front of the sensor periodically and coordinate with the instrument correction regularly.

(7) When the sensor is not used, it shall be washed and inserted into the protective cover with saturated KCl solution.

# Chapter 4 Installation

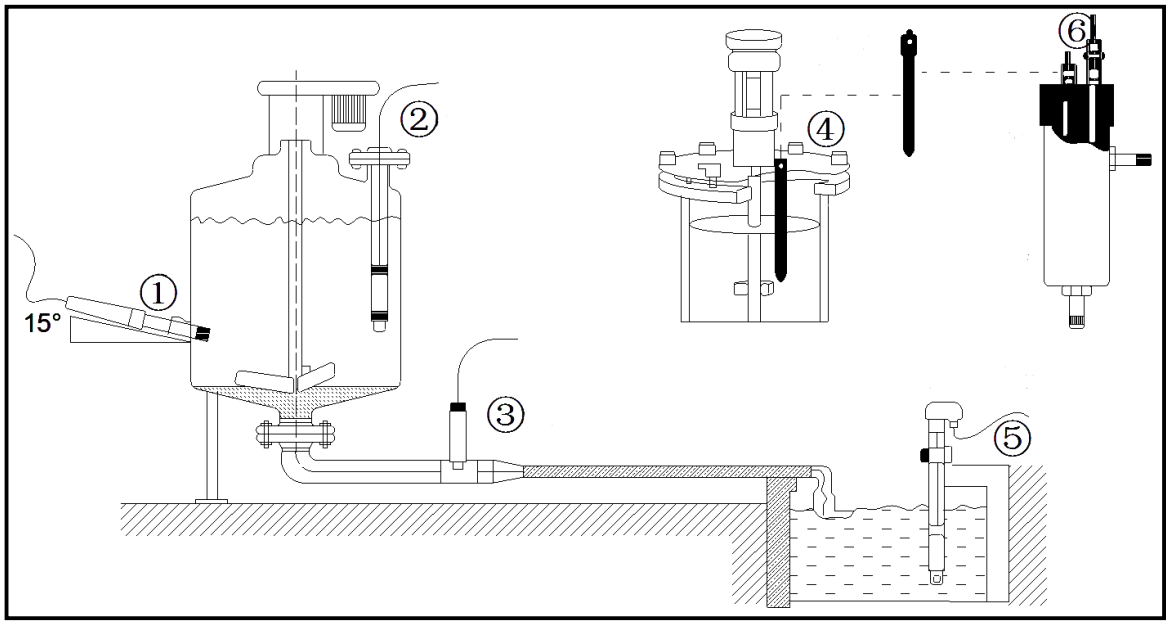


Fig. 1

① Side wall installation
② Flange mounted at the top
③ Pipe installation
④ Top installation
⑤ Submersible installation
⑥ Flow-through installation

The interface must be in 15°oblique angle, or it will affect the normal test and use of the sensor. We won't be responsible for any results due to this.

# Chapter 5 Calibration

(1) It is recommended to calibrate the sensor by three-point method. The pH 4.00 buffer solution is usually used for positioning first, then the pH 6.86 and pH 9.18 buffer solutions are used sequentially to determine the slope,calibration points are selectable in the meter.

(2) After the sensor is connected to the instrument, please connect the instrument to the power supply to preheat it for 30 minutes before performing the calibration.

(3) When performing the calibration of calibration sensor, it shall be noted that the sensor can not be placed flat, but shall be placed vertically (please put the sensor sensitive membrane downward) to prevent deviation of the sensor mV data.

(4) For sensors with temperature compensation, switch the controller to automatic temperature compensation.

# Chapter 6 Signal Parameters

sensor slope: The slope of the glass sensor is 59.16 mV at 25 ℃ theoretically, i.e. potential change of 59.16 mV for each pH change in the solution.

But in fact, neither glass sensor can reach the theoretical value 100%; in general, the sensor slope is more than 98% of the theoretical value (percentage slope). In addition, the mV difference corresponding to each unit pH value varies under different temperatures.
The conversion of temperature to electric potential difference is as follows:

$$\triangle E=59.16*[（273+T）/298]*\triangle pH$$

# Chapter 7 Parameters

## 7.1. PH-5014

The PH-5014 sensor is made of pH sensitive glass film resistant to hydrofluoric acid.The application of this sensor is not only for the determination of pH value in water containing hydrofluoric acid, but also in the dilution control of hydrofluoric acid in semiconductor wafer manufacturing and chip production.It can also be used in the petrochemical industry, iron and steel waste water and other corrosive systems in the determination of pH value.

sensor interface: VP,S8M,K2, etc.
Conversion coefficient: > 98%
Membrane resistance: < 250MΩ
Practical response time: < 1 min
Measurement range: 0--14 pH
Salt bridge: Special porous ceramic core
Temperature: 0--130℃
Pressure resistance: 0.4MPa
Hydrofluoric acid concentration range: ≤4000ppm

Fig. 1

## 7.2. PH-5015

PH-5015 sensor has large sensitive areas and is resistant to mechanical shock; it is widely used in various chemical processes including microbial technology, pharmaceuticals, food and beverages, sugar manufacturing, chlor-alkali, mining and smelting, paper pulp, textiles, petrochemical industry and semiconductor electronic industry as well as fields such as waste water treatment.

Connector: VP, S8M, K2, etc.
Zero potential point: 7 ±0.5 pH
Conversion coefficient: > 98%
Membrane resistance: general: <250MΩ
Practical response time: < 1 min
Measurement range: 0--14 pH
Salt bridge: Porous ceramic core; porous Teflon
Temperature compensation:Pt100/Pt1000/NTC10K
Temperature: 0--130℃
Pressure resistance: up to 6 Bar at 25 ℃
Thread Connection: PG13.5

Fig. 2

## 7.3. PH-5017

The PH-5017 sensor uses a cylindrical pH-sensitive membrane made of alkali-resistant glass by blowing. The external reference electrolyte system is composed of pre-charged gel PFT/GFT, which can withstand the osmotic pressure of up to 6 Bar. The sensor is widely used in various chemical processes including chlor-alkali, mining and smelting, papermaking, paper pulp, textiles, petrochemical industry and semiconductor electronic industry as well as fields such as biotechnology and wastewater treatment.

Connector: VP, S8M, K2, etc.
Zero potential point: 7 ± 0.25 pH
Conversion coefficient: > 98%
Membrane resistance: <600MΩ
Practical response time: < 1 min
Measurement range: 0--14 pH
Temperature compensation:Pt100/Pt1000/NTC10K
Temperature: 0-130℃
Pressure resistance: up to 6 Bar at 25 ℃
Thread Connection: PG13.5

Fig. 3

## 7.4. PH-5018

The PH-5018 sensor has large sensitive areas and strong mechanical shock resistance, which can be widely used in various chemical processes including microbial technology, pharmaceuticals, food and beverages, sugar manufacturing, chlor-alkali, mining and smelting, paper-making, paper pulp, textiles, petrochemical industry and semiconductor electronic industry as well as fields such as waste water treatment.

Connector: VP, S8M, K2, etc.
Zero potential point: 7 ± 0.5 pH
Conversion coefficient: > 98%
Membrane resistance: general: <250MΩ
Practical response time: < 1 min
Measurement range: 0--14 pH
Salt bridge: Porous ceramic core/ porous Teflon
Temperature compensation:Pt100/Pt1000/NTC10K
Temperature: 0--100℃
Pressure resistance: up to 4 Bar at 25 ℃
Thread Connection: PG13.5

Fig. 4

## 7.5. PH-5019

The PH-5019 sensor consists of a pH-sensitive membrane, double-junction reference GPT medium electrolyte, and a porous large-area Teflon salt bridge. The plastic case is made of modified PON, which can withstand high temperature up to 80°C and resist strong acid and strong alkali corrosion. It is widely used in waste water treatment and fields including mining and smelting, paper-making, paper pulp, textiles, petrochemical industry, process of semiconductor electronic industry and downstream engineering of biotechnology.

Temperature compensation:10KΩ/2.252KΩ/Pt100/Pt1000
Zero potential point: 7 ± 0.5 pH
Conversion coefficient: > 98%
Membrane resistance: <250MΩ
Practical response time: < 1 min
Measurement range: 0--14 pH
Salt bridge: Porous Teflon
Temperature: 0--60℃ for general cables
Pressure resistance: 1 ~ 3 Bar at 25 ℃
Thread Connection: 3/4NPT

Fig. 5

## 7.6. PH-5100

The PH-5100 sensor is composed of pressure- resistant hemispherical PH sensitive film, intermediate dielectric composed of GMT mixed with glue, Ag/AgCL/KCL external reference system, and salt-free bridge open liquid interface.Widely used in pure water and high purity water and complex chemical processes.

Measurement range: 0--14 pH
Temperature: 0--130 ℃
Pressure: 0.4MPa
Reference: Ag/AgCl
Connector: VP,S8M,K2, etc.
Conversion coefficient: > 98%
Membrane resistance: <250MΩ
Practical response time: < 1 min
Salt bridge: OPEN aneroid junction salt bridge

Fig. 6

## 7.7. PH-5011

Increasing the silver ion at the reference sensor part, to enhance the stability and accuracy, suitable for general industrial waste water and discharge solutions.

Zero potential point: 7±0.25
Conversion coefficient:≥95%
Membrane resistance: ＜500Ω
Practical response time:< 1 min
Measurement range: 0--14 pH
Temperature compensation: Pt100/Pt1000/NTC10K
Temperature: 0~60℃
Reference: Ag/AgCl
Pressure resistance: 4 bar at 25 ℃
Thread Connection: 3/4NPT
Material: PPS/PC

Fig. 7

## 7.8. PH-5013A

Low-impedance glass sensitive film, wear-resistant, strong acid and alkali resistant, with protection ring in the the front to protect glass bulb and better precision and linearity.

Zero potential point: 7±0.25
Conversion coefficient: ≥95%
Membrane resistance: ＜500Ω
Practical response time: < 1 min
Measurement range: 0--14 pH
Temperature compensation: Pt100/Pt1000/NTC10K
Temperature: 0~60℃
Reference: Ag/AgCl
Pressure resistance: 4 bar at 25 ℃
Thread Connection: 3/4NPT
Material: PTFE

Fig. 8

## 7.9. PH-6001

The sensor can be directly used with a variety of domestic or imported pH meter.

Measurement range: 2~12pH
Temperature: 0~80℃
Pressure range: 0.4MPa
Temperature compensation: NTC10K/PT100/PT1000
Thread Connection: 3/4NPT
Application range: Environmental protection, water treatment, breeding, municipal
Installation: Submersible installation, pipe installation, thread Installation, flange installation
Wire: 5m (customizable)
sensor: Φ25*165mm

Fig. 9

## 7.10. PH-7001

7001 industrial planar PH sensor is made of ring-type polytetrafluoro-reference liquid interface, solid electrolyte and special glass sensitive film, so that the reaction speed and anti-pollution ability of the sensor are enhanced and its performance reaches the level of similar sensors in the world.

Measurement range: 2~12pH
Temperature: 0~60℃
Pressure range: 0.4MPa
Temperature compensation: NTC10K/PT100/PT1000
Reference structure: Teflon ring/double liquid junction
Thread Connection: 3/4NPT
Shell material: PPS
Slope: (PTS values) ≧95% (25℃)
Resistance: ≦ 250 mΩ

Fig. 10

## 7.11. PH-7002

The 7002 industrial PH sensor uses the ring-type polytetrafluoro-reference liquid interface, solid electrolyte and special glass sensitive film, which enhances the reaction speed and anti-pollution ability of the sensor, and reaches the level of similar sensors in the world.

Measurement range: 2~12pH
Temperature: 0~80℃
Pressure range: 0.4MPa
Temperature compensation: NTC10K/PT100/PT1000
Thread Connection: 3/4NPT
Shell material: PPS
Slope: (PTS values) ≧95% (25℃)
Resistance: ≦ 250 mΩ

Fig. 11

## 7.12. PH-7003

The 7003 pure water pH sensor adopts ring type PTFE reference liquid boundary, solid electrolyte and special glass sensitive film, so that the reaction speed and anti-pollution ability of the sensor are enhanced and the performance is perfect, reaching the level of similar sensors in the world.Please follow the following instructions carefully to obtain the best test results and prolong the service life of the sensor.

Measurement range: 0-14pH
Temperature: 0-80℃
Zero potential: 7±0.5pH（25℃）
Slope: (PTS) ≥95% (25℃)
Resistance: ≦ 250 m Ω
Pressure resistance: ≤ 0.6mpa

Fig. 12

## 7.13. PH 8001

The 8001 pH digital sensor designed for the aquaculture industry is equipped with numbers interface (RS485*1), can be used for measuring aqueous solution system within the range change in pH/ORP. The 8001 pH sensor is applied in different fields: Aquaculture, water quality testing, information data collection, Internet of Things water quality testing.

Measurement range: 0-14pH, ±1000.0mV
Temperature: 0~60℃
Resolution: 0.01pH,0.1mV
Accuracy: 0.02pH, 0.5℃, 0.2mV
Output: RS485
Communication: Modbus-RTU
Power supply: 12VDC

Fig. 13

## 7.14. ORP 6050

The industrial 6050 sensor USES the ring-type polytetrafluoroethylene reference liquid interface, solid electrolyte and ring-type platinum ring, which makes the reaction speed and anti-pollution ability of the sensor strengthened, and the performance is perfect, reaching the level of the international similar sensor.

Measurement range: -2000mV-2000mV
sensor unit: 245－270mV(15－30℃,256mV calibration fluid)
Temperature compensation: NTC10K/PT100/PT1000
Pressure range: ≤0.6Mpa
sensor stability: ± 4mV /24h
Measurement range: 2~12pH
Temperature: 0~80℃
Thread Connection: 3/4NPT
Shell material: PPS
Slope: (PTS values) ≧95% (25℃)
Resistance: ≦ 250 m Ω

Fig. 14

## 7.15. ORP 6041

ORP 6041 sensors can be directly used in conjunction with various imported and domestic REDOX instruments.The electrode belt is used to fix the wire, and the length of the wire is required by the user. It is important that electrode materials are high quality polymer engineering plastics with strong acid and alkali resistance, organic solvent resistance and temperature resistance up to 200℃.The application conditions can be: medicine, chlor-alkali chemical industry, pigment dye, pulp and paper making, intermediate, chemical fertilizer, starch industry.

Measurement range: ±2000mV
Temperature: 0-100℃
Pressure resistance: ≤ 0.6mpa
Installation size: PG13.5
Material: Glass
Thread Connection: 3/4NPT
Connection: direct low noise cable

Fig. 15

## 7.16. ORP 6042

The ORP 6042 sensor is composed of PT-Ag indicating electrode and AgCL reference electrode. It is used for the detection of REDOX potential in circuit board and chrome-containing sewage treatment.During the measurement of the sensor, the test part and the reference part must be immersed simultaneously.

Measurement range: 245-270mV
Temperature: 5-70℃
Resistance: ≦ 10kΩ
Stability: ±8mv/24h
Storage in standard liquid solution: 48 hours

Fig. 16