ATO

Industrial EC Sensor User Manual (Analog Type)

SN-3002-EC -*

Ver 2.0

ATO

Catalog

Chapter 1 Product Introduction

1.1 Product Overview

This product is a device for measuring the conductivity of solutions. It features automatic temperature compensation, adjusting the conductivity to the specified temperature. It can be widely used for continuous monitoring of the conductivity of aqueous solutions in cross-sectional water quality, aquaculture, wastewater treatment, environmental protection, pharmaceuticals, food, and tap water.

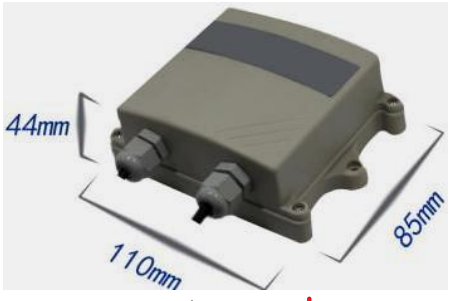
1.2 Functional Features

- Wide voltage power supply: DC 10~30V.
- IP65 protection rating (non-display model only), suitable for outdoor rain and snow environments.

1.3 Main Parameters

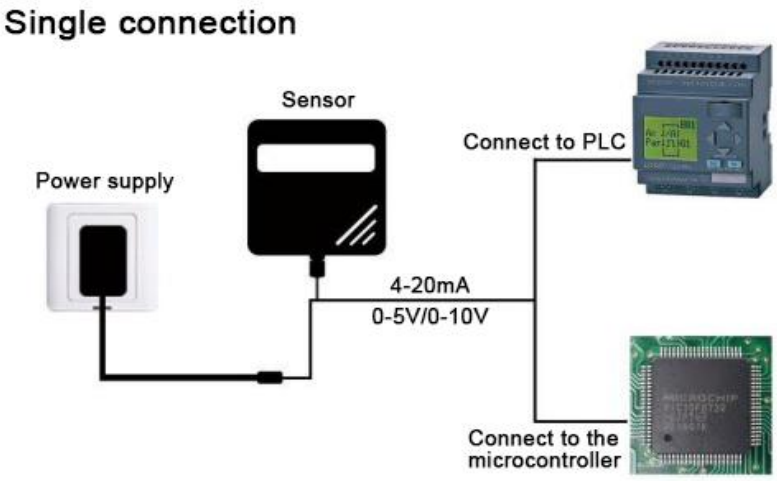
Power Supply	DC 10~30V (0~10V output requires 24V DC power)	
Power Consumption	1W	
Output Signal	Current	4~20mA
	Voltage	0~5V/0~10V
Conductivity Measurement Range	K=0.01: 0.01~20μS/cm; Resolution: 0.001μS/cm	
Conductivity Measurement Error	±1%FS	
Temperature Compensation Range	-20~+100℃ (Default Compensation Temperature: 25℃)	
Temperature Compensation Coefficient	Default 0.02	
Sensor Element Temperature and Humidity Resistance	-20℃~+80℃, 0%RH~95%RH (non-condensing)	
Electrode Wire Length	Default 5m (customizable 10m, 15m, 20m)	

Product dimensions:：

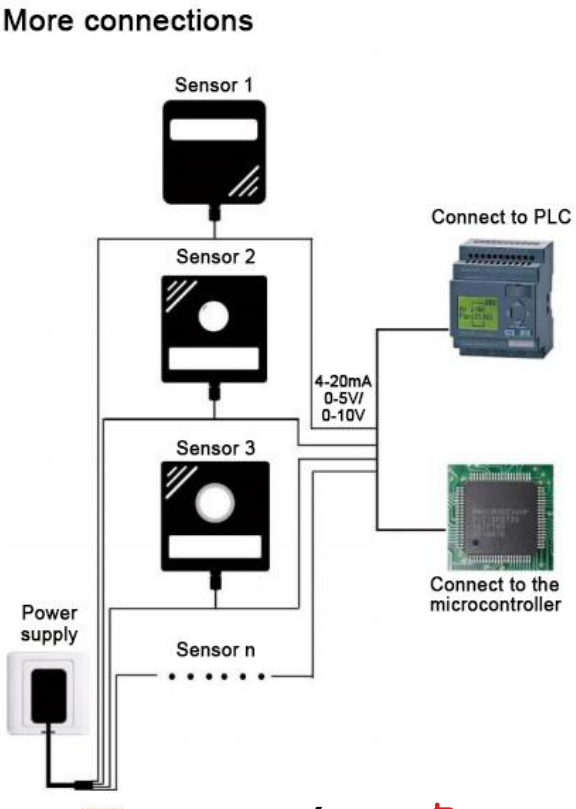


1.4 System Framework Diagram

When the system needs to connect to a single analog sensor, you only need to power the device and connect the analog output line to the DI interface of the microcontroller or PLC. Then, write the corresponding acquisition program according to the conversion relationships described below.



When the system needs to connect to multiple analog sensors, each sensor needs to be connected to a different analog acquisition port of the microcontroller or the DI interface of the PLC. Then, write the corresponding acquisition program according to the conversion relationships described below.



Chapter 2 Hardware Connection

2.1 Pre-Installation Inspection

Equipment List:

◆ 1 industrial EC sensor

◆ 1 conductivity electrode

◆ Certificate of conformity

◆ 2 expansion plugs, 2 self-tapping screws

2.2 Interface Description

Wide voltage 10~30V DC power input. For 0-10V output devices, only 24V power supply is required.

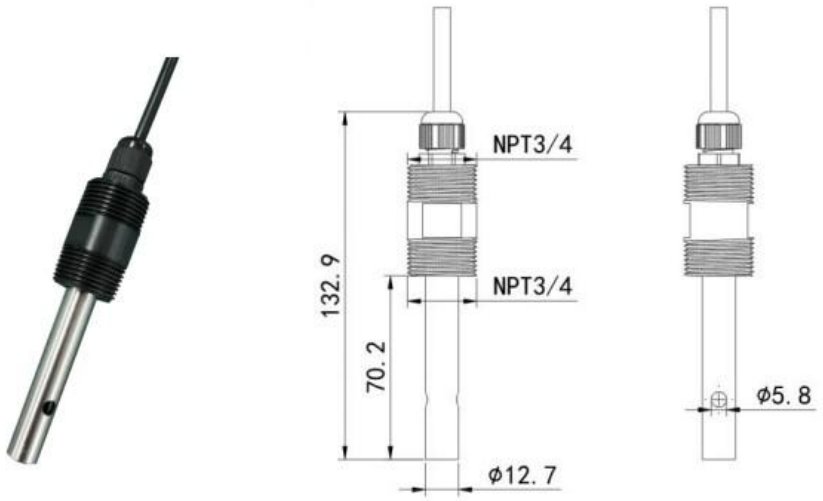
2.2.1 Sensor Wiring

The device has one independent analog output.

	Instructions	Instructions
Power Supply	Brown	Positive Power Supply (10~30V DC) For 0-10V output devices, only 24V power supply is available.
	Black	Negative Power Supply
Output	Blue	Positive Signal
	Yellow (Green)	Negative Signal

2.3 Electrode Dimensions and Installation

2.3.1 Electrode Type and Dimensions



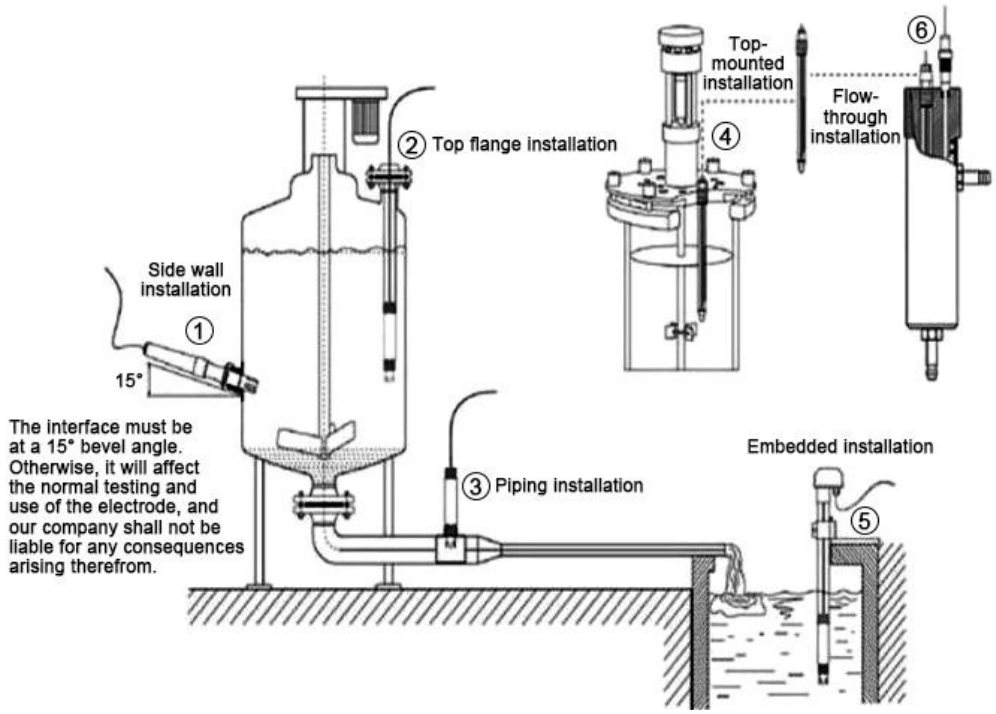
Stainless steel electrode with 3/4" threads on the top and bottom for easy installation.

2.3.2 Electrode Installation

1. Recessed Installation: The electrode lead passes through a stainless steel tube, and the top 3/4" thread of the electrode is connected to the stainless steel 3/4" thread using PTFE tape. Ensure that water does not enter the top of the electrode or the electrode lead.

2. Side Wall Installation: The manufacturer provides a 316L stainless steel sleeve with a bevel; simply screw the electrode into the sleeve.

3. Pipe Installation: Connect the electrode to the pipe via the 3/4" thread.



Chapter 3 Analog Parameter Meaning

3.1 Current-Type Output Signal Conversion Calculation

For example, with a range of 0~2000μS/cm and an output of 4~20mA, when the output signal is 12mA, calculate the current conductivity value. The maximum conductivity is 2000 μS/cm, expressed as a 16mA current signal: 2000 μS/cm/16mA = 125μS/cm/mA, meaning 1mA of current represents a conductivity change of 125μS/cm. The measured value is 12mA - 4mA = 8mA, 8mA * 125μS/cm/mA = 1000μS/cm, therefore the current conductivity value is 1000μS/cm.

3.2 Voltage-Type Output Signal Conversion Calculation

For example, with a range of 1~2000μS/cm and an output of 0-10V, when the output signal is 5V, calculate the current conductivity. The maximum conductivity is 2000, expressed as a 10V voltage signal. 2000μS/cm/10V = 200μS/cm/V, meaning 1V represents a 200μS/cm change in conductivity. The measured value is 5V - 0V = 5V, and 5V * 200 μS/cm/V = 1000μS/cm. The current conductivity value is 1000μS/cm.

Chapter 4 Precautions and Maintenance

◆ WARNING: Risk of Personal Injury

This equipment is strictly prohibited from being used as a safety device, emergency stop device, or in any situation where personal injury may result from equipment malfunction.

◆ Usage Restrictions

This equipment is for use only as designed and within its authorized scope. Before installation, operation, or maintenance, the relevant instructions in the technical manual must be carefully read and understood. Failure to comply with the above warnings and guidelines may result in death or serious personal injury.

◆The equipment itself generally does not require routine maintenance. In case of obvious malfunction, do not attempt to repair it yourself; contact us immediately!

◆Before using the equipment, the conductivity electrode needs to be thoroughly shaken in the liquid being measured to remove any attached air bubbles. After that, the conductivity of the solution can be measured normally.

◆Electrodes that are not used for a long period can generally be stored in a dry place. However, before use, they must be placed (stored) in distilled water for several hours to activate the electrodes. Electrodes that are used frequently can be placed (stored) in distilled water.

◆ Cleaning the Conductivity Electrodes:

Organic contaminants on the electrodes can be cleaned with warm water containing detergent, or with alcohol. Calcium and magnesium precipitates are best cleaned with 10% citric acid. Electrode plates or posts should only be cleaned chemically or by agitation in water. Wiping the electrode plates or posts will damage the plating (platinum black) on the electrode surface.

◆The equipment should be calibrated before each use. For long-term use, it is recommended to calibrate every 3 months. The calibration frequency should be adjusted appropriately according to different application conditions (the degree of dirt in the application environment, the deposition of chemical substances, etc.).

Chapter 5 Warranty Information

This product is covered by a 12-month warranty from the date of purchase (based on valid proof of purchase). During the warranty period, under normal use and maintenance, if a malfunction is caused by defects in product materials or workmanship, we will provide free repair or parts replacement services after confirmation by our company. After the warranty period expires, we will still provide lifetime paid repair services.

The following situations are not covered by the warranty:

1. Damage caused by incorrect installation or operation.
2. Disassembly, repair, modification, alteration, or replacement of any parts by personnel other than our company's technicians, or replacement by the user.
3. Damage caused by negligent use or the introduction of water or other substances into the equipment.
4. Malfunctions or damage caused by unexpected events or natural disasters.
5. Malfunctions or damage caused by operating parameters exceeding the range listed in the product specifications.