ATO

Analog Industrial Air Quality Sensor
User Manual

ATO

Chapter 1 Product Introduction

1.1 Product Overview

The PM2.5/10 sensor employs a laser probe—a professional testing device for PM2.5/10 concentration sensors—as its core detection component. It features a wide measurement range, high accuracy, excellent linearity, versatility, ease of use, convenient installation, long transmission distance, and reasonable pricing.

The system employs a pumped probe, where air is pumped into the sensor by a fan. Compared to conventional diffusion sensors, this design delivers faster response times and higher accuracy.

1.2 Features

This product utilizes a highly sensitive gas detection probe, ensuring stable signals and high precision. It offers a wide measurement range, excellent linearity, ease of use, simple installation, long transmission distance, and reasonable pricing.

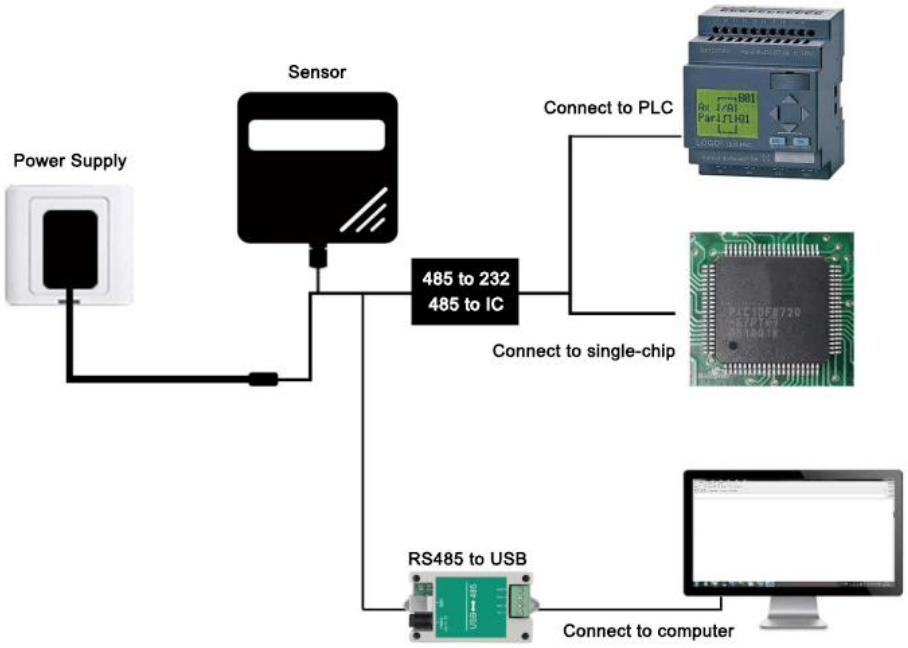
1.3 Key Parameters

Parameter	Specification
Power Supply (DC, default)	10–30 V DC
Max. Power Consumption (Current Output)	1.2 W
Max. Power Consumption (Voltage Output)	1.2 W
Resolution	1 μg/m³
Particle Counting Efficiency	50% @ 0.3 μm, 98% @ ≥0.5 μm
PM2.5 Accuracy	±3% FS (0–100 μg/m³, 25 °C, 50%RH)
Operating Temperature & Humidity (Transmitter Circuit)	−20 °C to +60 °C, 0%RH–80%RH
Measurement Range – PM2.5	0–1000 μg/m³ (default)
Measurement Range – PM10	0–1000 μg/m³ (default)
Response Time	≤ 90 s
Preheating Time	≤ 2 min
Output Signal – Current	4–20 mA
Output Signal – Voltage	0–5 V / 0–10 V
Load Capacity – Voltage Output	Output impedance ≤ 250 Ω
Load Capacity – Current Output	≤ 600 Ω

Dimensions: 110*85*44 mm

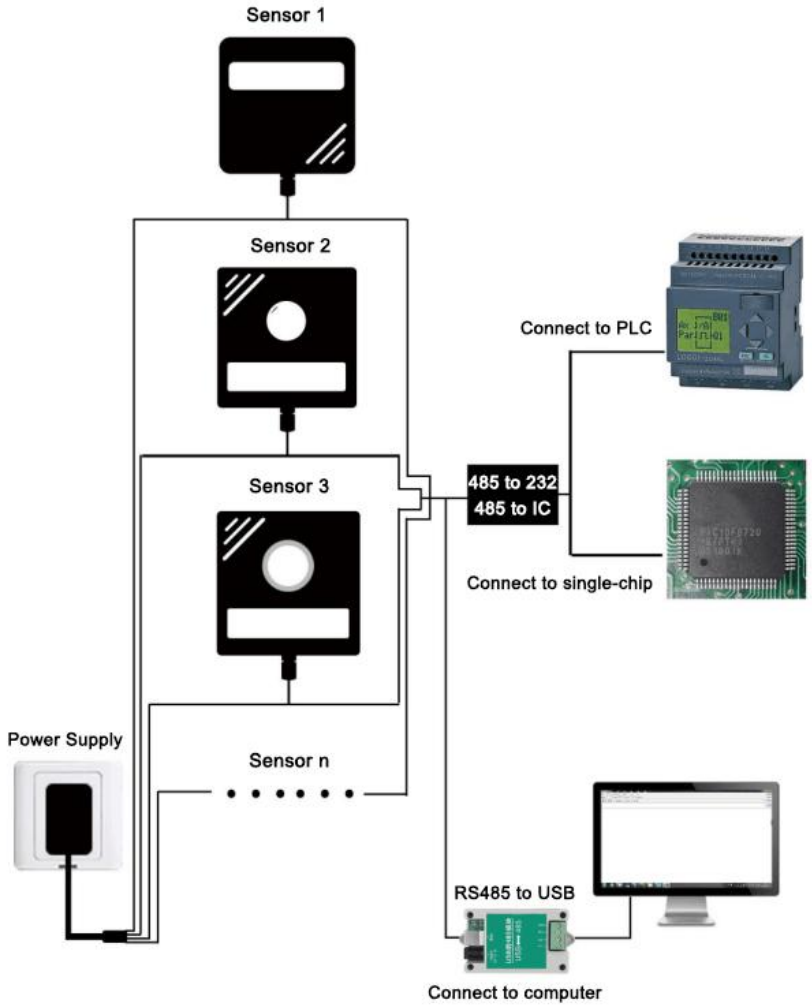
When the system requires connection to an analog sensor, simply power the device and connect the analog output line to the DI port of a microcontroller or PLC. Then, develop the corresponding data acquisition program based on the conversion relationships described later.

Single Connection



When the system requires connecting multiple analog version sensors, each sensor must be connected to a separate analog input port on a microcontroller or a DI interface on a PLC. Corresponding acquisition programs should then be developed based on the conversion relationships described later.

Multi-Sensor Connection



Chapter 2 Hardware Connection

2.1 Pre-Installation Equipment Inspection

Equipment List:

- Transmitter unit ×1
- Self-tapping screws ×2, expansion anchors ×2
- Certificate of Conformity, Warranty Card

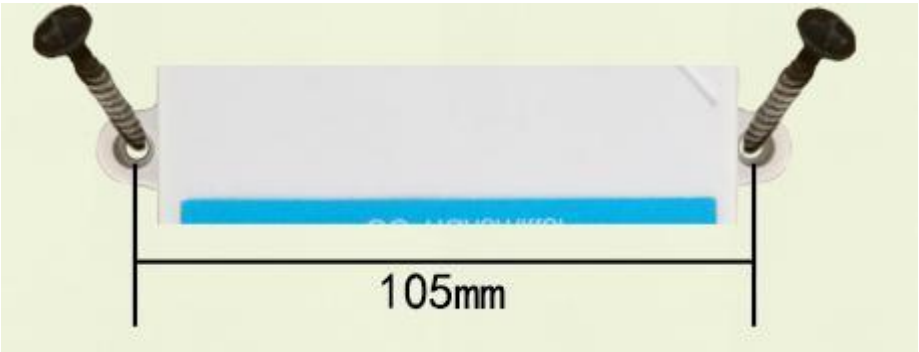
2.2 Interface Specifications

Wide voltage DC power input: 10 – 30V. For 0 – 10V output devices, only 24V power supply is permitted.

2.2.1 Sensor Wiring

Function	Wire Color	Description
Power Supply	Brown	Power +
Power Supply	Black	Power −
Output	Blue	PM10 Signal +
Output	Green	PM10 Signal −
Output	Yellow	PM2.5 Signal +
Output	White	PM2.5 Signal −

2.3 Installation Methods



Wall-mounted installation. Mounting holes are located at the center of both sides of the device. The hole diameter is less than 4mm, with a hole spacing of 105mm. Installation can be performed using 3mm self-tapping screws.

Chapter 3 Meaning of Analog Parameters

3.1 Current-Type Output Signal Conversion Calculation

Range: 0~1000 μg/m³, 4~20mA output. When the output signal is 12mA, calculate the current PM2.5 value. The PM2.5 measurement range spans 1000 μg/m³. Expressed via a 16 mA current signal:

1000 μg/m³ / 16 mA = 62.5 μg/m³/mA

Thus, each 1 mA change in current corresponds to a 62.5 μg/m³ change in PM2.5.

Then the measured value can be calculated: Measured value 12mA - 4mA = 8mA. 8mA * 62.5 μg/m³/mA = 500 μg/m³.

Therefore, the current PM2.5 = 500 μg/m³. Similarly, PM10 can be calculated.

3.2 Voltage-Type Output Signal Conversion Calculation

For a range of 0~1000 μg/m³, using a 0-10V output as an example, when the output signal is 5V, calculate the current PM2.5.

The PM2.5 range spans 1000 μg/m³, expressed by a 10V voltage signal. 1000 μg/m³ /10V = 100 μg/m³/V. This means each 1V change in voltage corresponds to a 100 μg/m³ change in PM2.5.

Measurement value:

5V - 0V = 5V. 5V × 100 μ g/m³ = 500 μ g/m³ . Thus, the current PM2.5 level is 500 μ g/m³ . PM10 can be calculated similarly.

Chapter 4 Precautions

1) Warning: Risk of Personal Injury
This device must not be used as a safety device, emergency stop device, or in any application where equipment failure could cause personal injury.
2) Usage Restrictions
This device must only be used for its intended purpose and within authorized parameters.
Before installation, operation, or maintenance, carefully read and understand all relevant instructions in the technical manual.
Failure to comply with these warnings and guidelines may result in death or serious personal injury.

Chapter 5 Warranty Statement

This product carries a 12-month warranty period from the date of purchase (valid proof of purchase required).
During the warranty period, under normal use and maintenance, if a malfunction occurs due to defects in materials or workmanship, and is confirmed by our company's inspection, we will provide free repair or parts replacement services (Note: Circuitry warranty is 24 months).
After the warranty period expires, we will continue to provide lifetime paid repair services.
The warranty does not cover any of the following situations:
1. Damage caused by incorrect installation or operation of the product.
2. Disassembly, repair, modification, alteration, or user replacement of any internal components by non-authorized personnel.
3. Damage caused by negligent use or ingress of water/other substances into the equipment.
4. Malfunctions or damage resulting from accidents or natural disasters.
5. Malfunctions or damage caused by operating outside the specified parameters listed in the product specifications.