Product Instruction Manual

	Product Name: Multi-parameter Air Quality Sensor
	Product Model: ATO-FS00802A
	Specification Version:v2.09
	Spec Status:☐sample ☐mass-product
	Sample Spec: suitable for small batch trial production of products
	Mass Production Spec: Suitable for mass production of products

Buyer		Vendor		
Confirmation	Date	Production	Verify	Approve

Remark: We have improvement adjustment, without affecting the customer's use, we will not make any further notice, please raise any objection.

1. Product overview

ATO-FS00802A-10v is an air quality detection product that utilizes a 0~10V output method. It can be equipped with various sensors to meet different application needs, with each type of environmental index utilizing an independent sensor probe. It features a compact design, small footprint, comprehensive functionality, stable performance, and excellent cost-effectiveness. It facilitates the development and application of environmental quality monitoring and Internet of Things gas detection solutions.

2. Product characteristic

- Easy installation, supports both ceiling and wall-mounted installations.
- Flexible application, various sensors can be freely selected.
- Accurate detection, sensitive response.
- Supports 4~20mA output for convenient customer debugging and interfacing.
- Supports custom development for customers.

3. Fields of application

- IoT device, air quality testing
- Smart building, smart community
- Schools, hospitals, supermarkets, subways and other public places
- Agricultural production, livestock breeding
- Industrial workshop, production park, etc.

4. Technical specification

Electric Parameter	Technical Specification
Operating voltage	DC 10V~30V (Standard 24V)
Operating current	≤200mA (@5V Electricity supply)
Stable time	2min
Detection frequency	Data updated 1 time per second (default)
Output	4~20mA
Product material	ABS flame retardant housing
Installation method	ceiling-mounted, wall-mounted
Reference size	100x100x30 mm

Table 1

Environmental Parameter	Technical Specification
Operating temperature	-10℃～50℃
Operating humidity	0～99%RH (No condensation)
Storage temperature	-30℃～ 60℃
Storage humidity	0～99%RH (No condensation)

Table 2

Detection Type	Detection Range	Resolution	Data Accuracy	Service life
Temperature	-40℃~100℃	0.01℃	±0.3℃	10 years
Humidity	0~99%RH	0.1%RH	±3%RH	10 years
pm2.5	0~1000μg/m³	1μg/m³	±10% reading	≥40000 h
pm10	0~1000μg/m³	1μg/m³	±10% reading	≥40000 h
pm1.0	0~1000μg/m³	1μg/m³	±10% reading	≥40000 h
CO2	400~5000ppm	1ppm	±50ppm±3%FS	10 years (in air)
Formaldehyde	0~5000μg/m³	1μg/m³	±10μg/m³ ±10%FS	2 years (in air)
TVOC	0~5000μg/m³	1μg/m³	±10% reading	10 years (in air)
Alcohol	0~500ppm	1ppm	±10% reading	2 years (in air)
O3	0~10ppm	0.1ppm	±2%FS	2 years (in air)
CH4	0~100%LEL	1%LEL	±5%FS	3 years (in air)
CO	0~1000ppm	0.1ppm	±3%FS	2 years (in air)
O2	0~25%Vol	0.1%Vol	±3%FS	2 years (in air)
NH3	0~100ppm	1ppm	±5%FS	2 years (in air)
H2S	0~100ppm	1ppm	±5%FS	2 years (in air)
C12	0~10ppm	0.1ppm	±3%FS	2 years (in air)
NO2	0~20ppm	0.1ppm	±3%FS	2 years (in air)
SO2	0~20ppm	0.1ppm	±3%FS	2 years (in air)
SF6	0~1500ppm	1ppm	±2%FS	10 years (in air)

Table 3

5. Pin definition

Figure 1

PIN	Definition	Explanation
24V	VCC	Power input +24V
GND	GND	Grounding terminal
IOUT1	current signal	current signal
IOUT2	current signal	current signal
Note: IOUT1 outputs temperature or other sensor data, and IOUT2 outputs humidity		

Table 4

6. Communication protocol

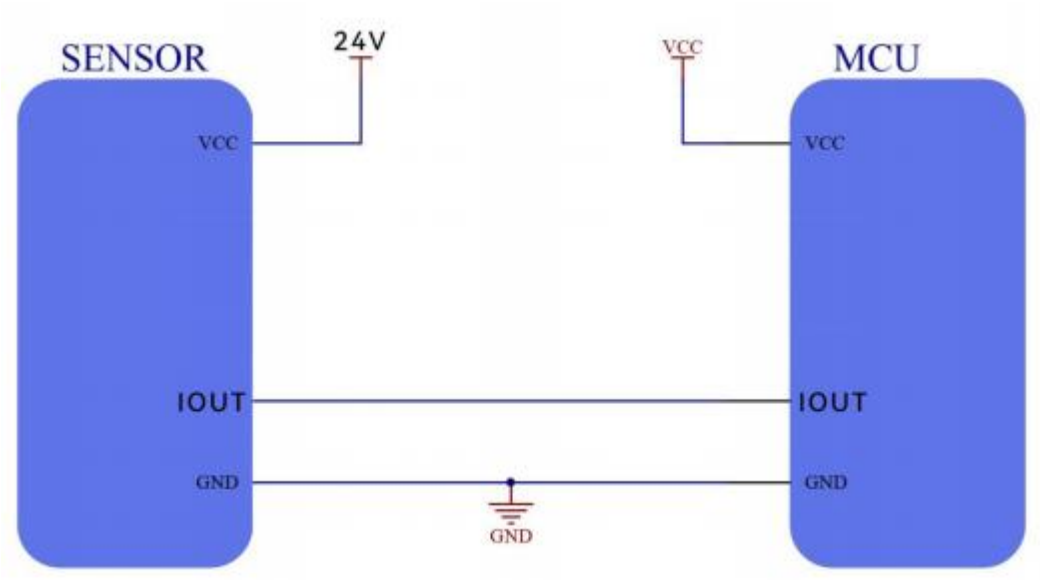

Figure 2

Signal Output Conversion Calculation			
Protocol: The 4~20mA corresponds to the gas concentration range. For specific gas concentration ranges, refer to Table 1.			
Example:pm2.5		Example:CO2	
Detecting Range	0~1000μg/m³	Detecting Range	400~5000ppm
Output Voltage	10mA	Output Voltage	8mA
Corresponding Concentration	375μg/m³	Corresponding Concentration	1150ppm
(1000-0) / (20-4) * (10-4) =375		(5000-400)/(20-4)* (8-4) =1150	
Calculation Formula: (Upper Range - Lower Range) / (Upper Current - Lower Current) × (Output Current - Lower Current) = Output Concentration (Unit)			

Table 5

7. External dimension

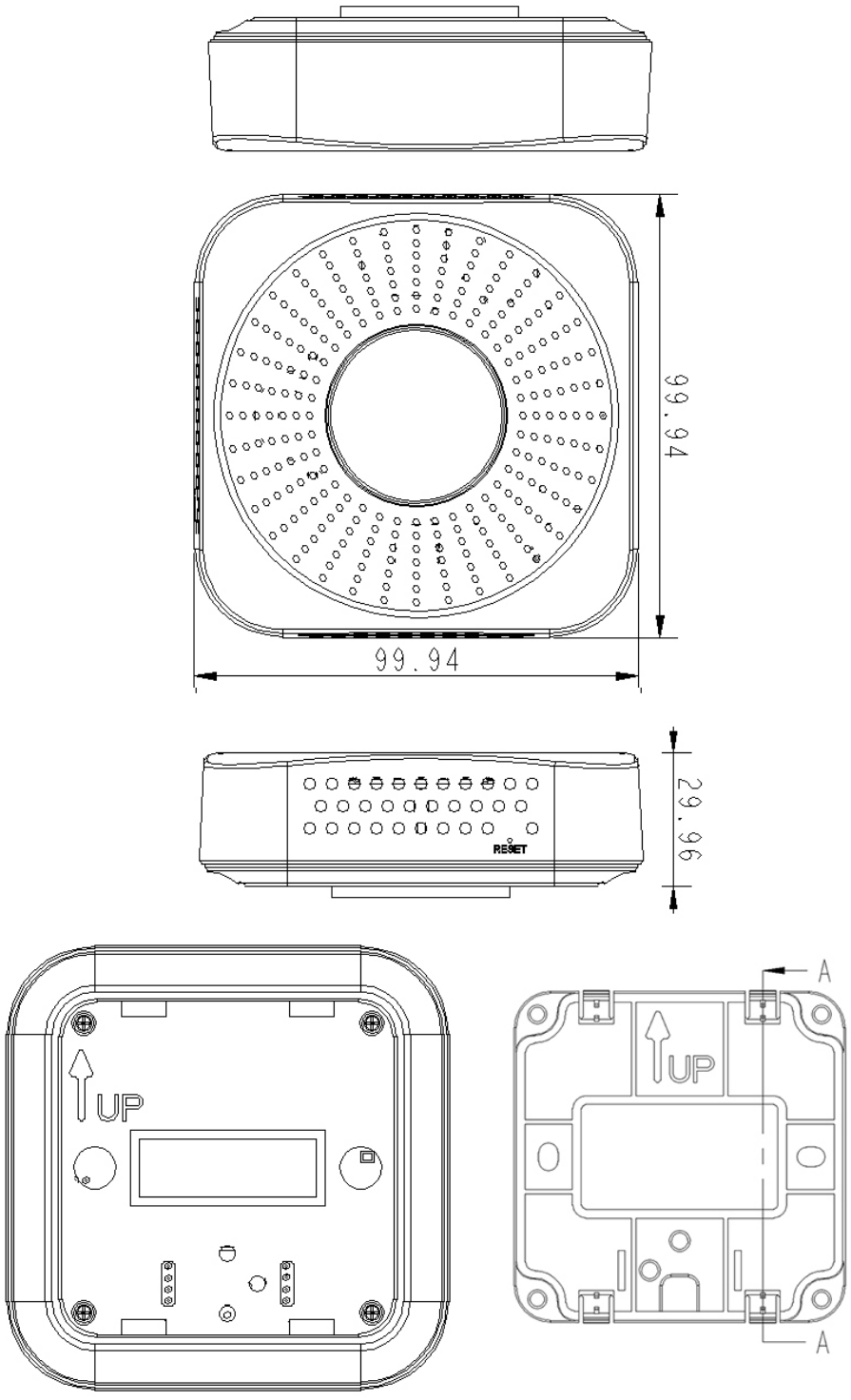

Figure 3 unit: mm, error ≤0.1mm

8. Reliability test

Test Items	Test Condition	Standard	Number of Samples : N Number of Defects : C
low temperature storage	The sensor is stored unenergised at -30±2° C for 72 hours and then placed in a normal temperature environment to measure the error.	After 2 hours of recovery in the normal temperature environment, the sensor should work normally.	N=5 C=0
High temperature storage	The sensor is stored unenergised at 60±2℃ for 72 hours and then placed in a normal temperature environment to measure the error.	After 2 hours of recovery in the normal temperature environment, the sensor should work normally.	N=5 C=0
Low temperature work	The sensor is placed in a low temperature environment of -10±2° C, the rated voltage is applied and the sensor is operated for 72 hours and then placed in a normal temperature environment to measure the measurement error of the sensor.	After 2 hours of recovery in the normal temperature environment, the sensor should work normally.	N=5 C=0
High temperature work	The sensor is placed in a high temperature environment of 50±2° C, the rated voltage is applied and the sensor is operated for 72 hours and then placed in a normal temperature environment to measure the measurement error of the sensor.	After 2 hours of recovery in the normal temperature environment, the sensor should work normally.	N=5 C=0
High and low temperature shock	After holding at -30 ° C for 60 minutes, switch to 60 ° C within 10 s and keep it for another 60 minutes, repeating the cycle 10 times. During the test, the sample was not energized.	After 2 hours of recovery in the normal temperature environment, the sensor should work normally.	N=5 C=0
High temperature and humidity work	Place the sensor in an environment of 45±2℃, 90±5%RH, and work with the maximum voltage (within the acceptable working voltage range) for 72 hours.	After 2 hours of recovery in the normal temperature environment, the sensor should work normally.	N=5 C=0
Salt spray test	According to GB/T2423.17, place the sensor in a salt spray box at 35° C and spray it with 5% sodium chloride brine for 24 hours. After the experiment, it was washed with distilled water and air-dried.	Recovery should be no less than 1h and no more than 2h in a standard environment, with no ill appearance or corrosion.	N=2 C=0
Vibration	The bare machine in the X / Y / Z axis should be able to withstand vibration tests under the following conditions: Frequency range: 10 ~ 55 ~ 10 Hz/min. Amplitude of vibration: 1.5 mm. Scan period: 2H	After the test, there should be no defects in appearance. The sensor meets basic performance test criteria.	N=4 C=0

Package drop	Drop height: Set the height according to the weight height specified in GB/T4857.18. Test in accordance with GB/T4857.5 Packaging and transport packaging drop test method. The order of the drop test is one corner, three lines and six sides.	After the package drop test, the sensor should have no bad appearance, no parts fall off, and the sensor should work normally.	N=1 box C=0

Table 6

9. Caution

- The PM2.5 sensor on this module is suitable for the detection of dust particles in general indoor environments. The actual use of the module should try to avoid grease environments, dust particles too large, high humidity environments, etc. For example, kitchens, bathrooms, smoking rooms, outdoor areas, etc. If used in such environments, protective measures should be added to the equipment to avoid sticky particles or large particulate matter entering the sensor and forming a deposit inside the sensor and affecting the sensor's performance.
- Avoid contact with organic solvents (including silicone and other adhesives), paints, chemicals, oils and highly concentrated gases.
- The sensor must not be completely encapsulated in resin or submerged in an oxygen-free environment as this could damage the performance of the sensor.
- The sensor must not be used for long periods of time in environments containing corrosive gases, which can damage the sensor.
- The sensor must be warmed up for at least 3 minutes for initial use.
- Do not use the sensor in systems where personal safety is involved.
- If the sensor is to be placed in a small space, this space should be well ventilated.
- Do not install the sensor in an environment with strong convective air.
- Do not expose the sensor to high concentrations of organic gases for long periods of time as this may cause a drift in the zero point of the sensor and slow recovery.
- Do not encapsulate the sensor with hot melt adhesives or sealants that cure at temperatures above 80° C.
- The sensor should be kept away from heat sources and protected from direct sunlight or other thermal radiation.
- The sensor must not be subjected to excessive shocks or vibrations.