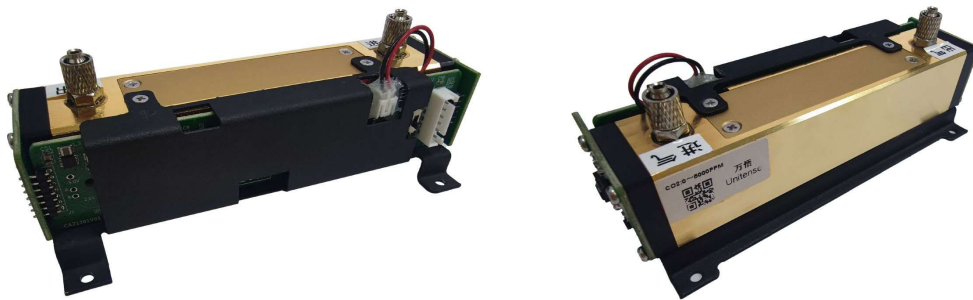


产 品 规 格 书 PRODUCT SPECIFICATOIN

高精度红外气体传感器模组 High-Precise Infrared Gas Sensor Module U9201 Series Rev. A0



版本 Version	修订记录 Revision Record	发行日期 Issue Date
A0	初次发放 Initial Release	2022. 9. 28

1. Product Introduction

1.1 Product Description

U9201 series are industrial infrared gas sensors with various measurement ranges that utilize non-dispersive infrared (NDIR) to detect environmental gas concentration. The product applies an optimized optical design, low noise circuit design, digital signal processing algorithm, and compensation algorithm. Compared with like products, it has a high precision and accuracy, quick response, good repeatability and stability.

1.2 Product Features

- ✧ Thermostat to minimize temperature drift
- ✧ Dual-beam design for stable output
- ✧ Low noise design
- ✧ High-performance light source to reduce the impact of shock and vibration
- ✧ Output type: RS-232, RS-485, and 4~20 mA analog output

1.3 Application Field

- ✧ Industrial process control and safety monitoring
- ✧ Indoor and outdoor air quality monitoring
- ✧ Agriculture, forestry and livestock process monitoring and control

1.4 Application Notes

- ✧ The sensor must be operated in a dry and dustless environment. Ensure no strong magnetic field from the heating source or electrical equipment, such as electric machinery, transformer, etc.
- ✧ Keep the inlet gas flow rate stable, the sensor is calibrated and operated at 0.8 L/min \pm 10%.
- ✧ It is recommended to perform two-point calibration before use to maximize the accuracy performance. The zero-gas required for zero calibration: nitrogen (N₂) purity \geq 99.999%.
- ✧ No modification or disassembly is allowed.
- ✧ Not applicable to the explosive environment.
- ✧ Read the documents carefully before operating. Keep it properly.

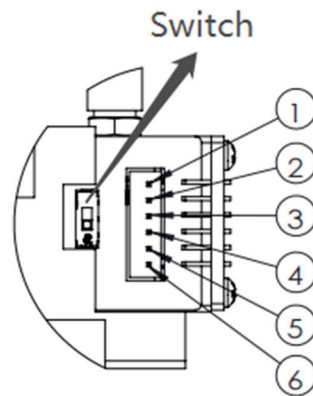
2. Product Characteristics

2.1 Technical Specification

Product Number	U9201 0001	U9201 0002	U9201 0003	U9201 0004	U9201 0005	U9201 0101	U9201 0102	U9201 0103	U9201 0104	U9201 0201	U9201 0202	U9201 0203
Target Gas ⁽¹⁾	Carbon Dioxide (CO ₂)					Carbon Monoxide (CO)				Methane (CH ₄)		
Measurement Range ⁽²⁾	0 ~ 500 ppm	0 ~ 1000 ppm	0 ~ 2000 ppm	0 ~ 5000 ppm	0 ~ 10000 ppm	0 ~ 2000 ppm	0 ~ 5000 ppm	0 ~ 10000 ppm	0 ~ 20000 ppm	0 ~ 5000 ppm	0 ~ 20000 ppm	0 ~ 50000 ppm
Accuracy ^(3,4)	< 10 ppm or 1% reading, which one is greater					< 2% F.S.				< 2% F.S.		
RMS Noise ⁽⁴⁾	< 0.5 ppm @ Zero, 5 Hz					< 10 ppm @ Zero, 5 Hz				< 20 ppm @ Zero, 5 Hz		
Zero Drift ⁽⁴⁾	< 10 ppm or 1% F.S., which one is greater					< 2% F.S.				< 2% F.S.		
Span Drift ⁽⁴⁾	< 10 ppm or 1% F.S., which one is greater					< 2% F.S.				< 2% F.S.		
Repeatability Error ⁽⁴⁾	< 1% F.S.											
Response Time ⁽⁴⁾	< 30 seconds											
Warm-up Time	< 20 minutes											
Operation Conditions	0~40 °C; 0~95% RH (Non-condensing)											
Storage Conditions	-40 °C~85 °C											
Power Supply	DC 12 V											
Power Consumption	< 24 W											
Communication Interface	RS-232 (default), RS-485, 4~20 mA											
Weight	0.85 kg											

- (1) Contact Unitense for other gas measurement: hydrocarbons (HC) gases, SF₆, SO₂, N₂O, etc.
 (2) Contact Unitense for other measurement range, up to 100% Vol.
 (3) Specification is referenced to certificated calibration gas mixture (±1% uncertainty).
 (4) Test records of each product are available upon request. Ambient condition: 20 to 30 °C, 50% to 70%RH.

2.2 Pin Definition



Pin-out	Description
1	DC +12V
2	GND
3	GND
4	RS-232 RX or RS-485 B
5	RS-232 TX or RS-485 A
6	4~20 mA current output
Switch	Select RS-232 (default) or RS-485

3. Calibration

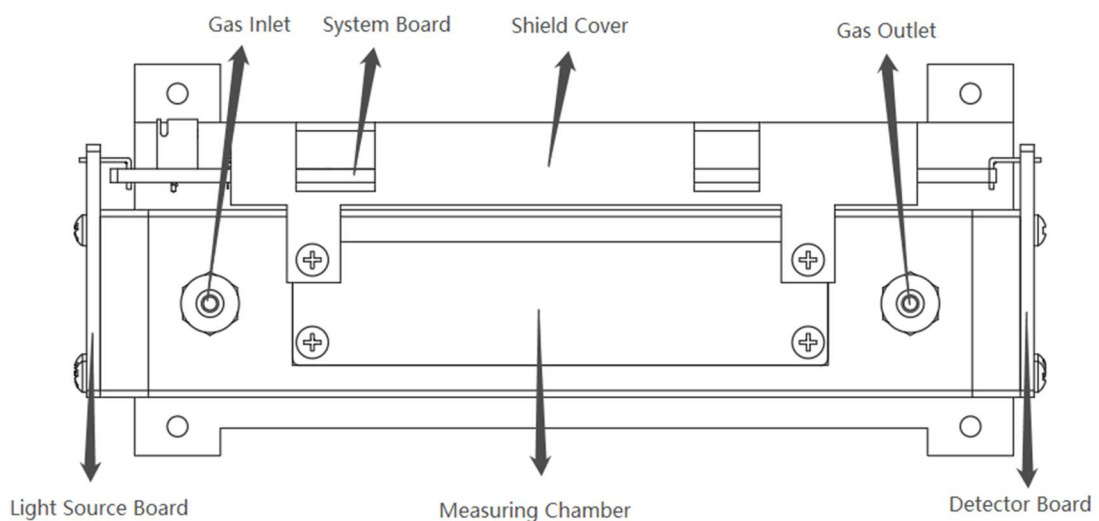
The sensor employs a two-point calibration method, calibrating at zero and 80% of the full scale. According to zero and 80% of full-scale readings for the specific gas, the sensor will calculate the correction coefficients automatically.

- 1) Zero calibration: Pass through the zero gas for over 5 minutes, wait until the reading is stable, and then send a zero calibration command to the sensor.
- 2) Full-scale calibration: Pass through the standard gas (80% of full scale) for more than 5 minutes, wait until the reading is stable, and then send full-scale calibration command to the sensor.
- 3) Once the above two steps are done, the sensor will automatically calculate the correction coefficients and save them to flash memory.

4. Maintenance

- 1) Regularly calibrate the sensor based on frequency of usage.
- 2) Regularly check the components related to gas path to see if there is leakage or loosening.
- 3) Regularly replace the dust filter on the inlet of the sensor, if any.
- 4) Do not change any component or part during maintenance.

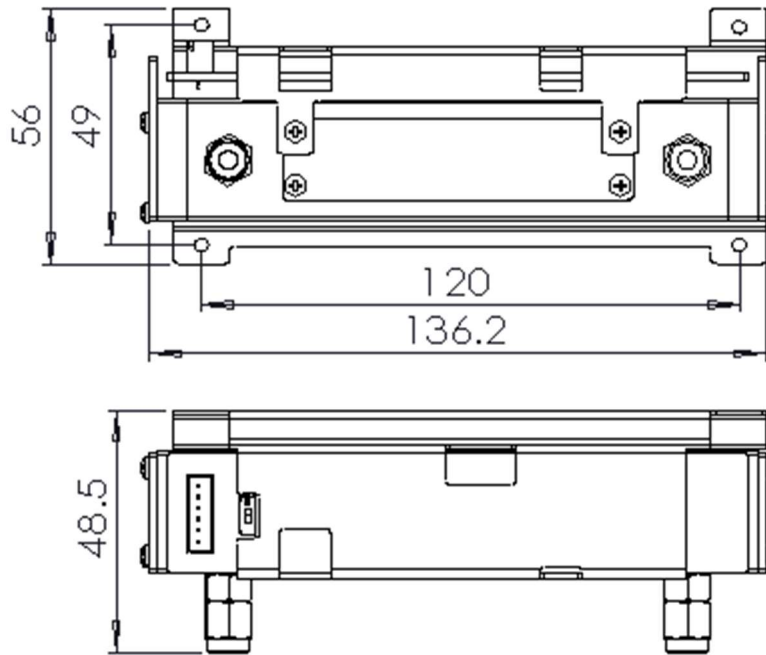
5. Product Structure



Gas inlet and outlet: $\phi 4 \times 6$ mm V-type hose connector

6. Product Outlines (unit: mm)

L x W x H = 136.2 x 56 x 48.5



7. Warranty

The warranty period for sensor modules is 12 months from the date of sale. A free warranty policy will be implemented for product faults caused by non-artificial reasons. However, the free warranty policy does not cover product malfunctions caused by misuse and vandalism. Unitense can provide a paid maintenance service for the non-warranty product.