

产 品 规 格 书
PRODUCT SPECIFICATION

高温二氧化碳气体传感器
High Temperature NDIR CO₂ Sensor
U91050001 Rev. A0



版本 Version	修订记录 Revision Record	发行日期 Issue Date
A0	初始发放 Initial Release	2023. 11. 21

1. 产品介绍 Product Introduction

1.1 产品概述 Product Description

U91050001是一款用在培养箱/孵化箱内、适用于高温灭菌环境的红外二氧化碳传感器，本产品利用非色散红外（NDIR）原理探测空气中的CO₂浓度。它采用优化的结构设计、电路设计、数字信号处理算法和补偿算法，相较于市场同类型产品，具有信噪比高、重复性好、响应快的特点。得益于其额外的参考通道，它具有更好的稳定性。此外，通过稳健性设计，产品通过了多项严苛的环境测试和寿命测试，具有优越的可靠性。U91050001 is an infrared carbon dioxide (CO₂) sensor used in incubators and applicable for high-temperature sterilization. The sensor utilizes the principle of non-dispersive infrared (NDIR) to detect CO₂ concentration in the air. Because of its dual-beam design, it has better stability compared with single-beam NDIR sensors. With optimized mechanical design, circuit design, digital signal processing algorithm, and compensation algorithm, it has a high signal-to-noise ratio, good repeatability. In addition, through the robust design, the product has passed several environmental and life tests that guarantee superior reliability.

1.2 产品特性 Product Features

- ◇ 多温度点/全量程校准 Full-measurement-range calibration at multi-points temperature
- ◇ 双通道设计，漂移少 Dual-beam design to ensure low drift
- ◇ RMS噪声小于0.02% Vol @ 5% Vol.; RMS noise less than 0.02% Vol @ 5% Vol.
- ◇ 使用寿命大于10年 Work-life more than 10 years
- ◇ 高温灭菌温度可达190摄氏度 Sterilization temperature up to 190 °C
- ◇ 提供自动校准模式和手工校准模式 Auto-calibration and Manual-calibration available

2. 产品特性 Product Characteristics

2.1 技术指标 Technical Specification

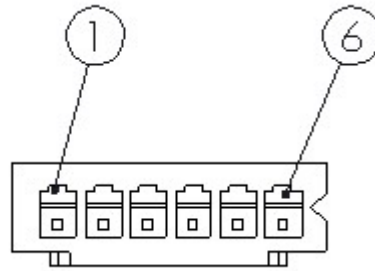
产品型号 Product Number	U91050001
检测气体 Target Gas	Carbon Dioxide (CO ₂)
检测范围 Measurement Range	0~20% Vol.
检测精度 Accuracy	± (0.05% Vol. + 5% reading) ⁽¹⁾
零点漂移 Zero Drift	≤ ± 0.1% Vol. ⁽²⁾
预热时间 Warm-up Time	< 30 seconds for startup < 5 minutes for full spec
响应时间 Response Time	< 30 seconds
温度依赖性 Temp. Dependence	≤ ± 0.1% Vol. @ 0~ 8% Vol. & 20~60 °C
压力依赖性 Pressure Dependence	< ± 0.15% reading per kPa with compensation
湿度依赖性 Humidity Dependence	< ± 1% reading @ 37 °C with compensation
工作条件 Operation Conditions	0~70 °C; 0~95% RH (Non-condensing)
存储条件 Storage Conditions	-40 °C ~ 190 °C for probe, -40 °C ~ 85 °C for control unit
供电电压 Power Supply	DC 3.6 V~5.5 V or 12V~30V, Ripple voltage < 50 mV
平均工作电流 Average Current	< 30 mA @ 5V supply voltage
峰值电流 Peak Current	< 300 mA @ 5V supply voltage
通讯接口 Communication Interface	1) UART TTL (3.3 V) 2) Current output (4 mA - 20 mA, reserved) ⁽³⁾
产品寿命 Life Expectancy	10 years
长期稳定性 Long-term Stability	≤ ± 0.2% Vol. @ 5% Vol. annually
重量 Weight	~ 200 grams

(1) Specification is referenced to certificated calibration gas mixture (±1.5% uncertainty).

(2) Ambient condition: 20 to 30 °C, 50% to 70%RH.

(3) Contact Unitense for customized requirements.

2.2 引脚定义 Pin Definition



From wire terminal side view

引脚 Pin-out	描述 Description
1	GND
2	DC power supply
3	UART_RXD
4	UART_TXD
5	Current output (4 mA - 20 mA) corresponding to 0 – 100% full range (upon request)
6	Reserved

3. 外形尺寸 Product Outlines (unit: mm)

