

产 品 规 格 书

PRODUCT SPECIFICATION

冷媒（制冷剂）泄漏监测传感器

Refrigerant Leakage Detection Sensor

U9603 series Rev. A1



版本 Version	修订记录 Revision Record	发行日期 Issue Date
A0	初次发放 Initial Release	2023. 4. 12
A1	更新规格 Update the Specification	2024. 04. 24

1. 产品介绍 Product Introduction

1.1 产品概述 Product Description

U9603 Series是一款工业用途的光学A2L和A3冷媒（制冷剂）泄漏监测传感器，其利用非色散红外（NDIR）原理探测空气中的制冷剂气体浓度。本产品采用优化的光学设计、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，其具有信噪比高、重复性好、响应快的特点。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，具有优越的稳定性和可靠性。U9603 series is an industrial optical-based refrigerant leakage detection sensor that utilizes the principle of non-dispersive infrared (NDIR) to detect A2L and A3 refrigerant gas concentration in the air. Because of its dual-beam design, it has better stability compared with single-beam NDIR sensors. This product applies optimized optical design, circuit design, digital signal processing algorithm, and compensation algorithm. Compared with the like products in the market, it has a high signal-to-noise ratio, good repeatability, and fast response. 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，性能稳定 Dual-beam design to ensure stable output
- ✧ 零点噪声有效值小于10 ppm; RMS noise less than 10 ppm @ zero
- ✧ 使用寿命大于15年 Work-life more than 10 years
- ✧ 结构紧凑、便于安装 Compact mechanical structure for easy installation
- ✧ 提供自动校准模式和手动校准模式 Auto-calibration and Manual-calibration available
- ✧ 信号输出方式 UART and Voltage output signal

1.3 应用领域 Application Field

- ✧ 商用空调的冷媒泄露监测 Refrigerant gas leakage monitoring of commercial HVAC system
- ✧ 工业用途的冷媒泄露监测 Refrigerant gas leakage monitoring for industrial application

2. 产品特性 Product Characteristics

2.1 技术指标 Technical Specification

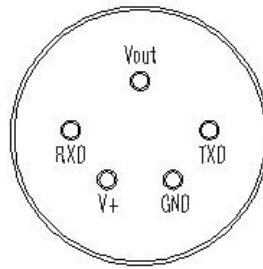
产品型号 Product Number	U96030001	U96030002	U96030003	U96030004	U96030031
检测气体 Target Gas ^[1]	R32	R454A	R454B	R454C	R290
检测范围 Measurement Range	0~50% LFL (extended range to 100% LFL upon request ⁽³⁾)				
检测精度 Accuracy	±3% LFL ⁽²⁾				
响应时间 Response Time	T90 ≤ 30 s				
工作条件 Operation Conditions	-30~60 °C; 0~95% RH (Non-condensing)				
存储条件 Storage Conditions	-40 °C~85 °C				
供电电压 Power Supply	DC 3.6 V~5.5 V, Ripple voltage < 50 mV				
平均工作电流 Average Current	< 40 mA				
通讯接口 Communication Interface	1) UART TTL (3.3 V) 2) Voltage output (0.4 V - 2 V) ⁽³⁾				
产品寿命 Life Expectancy	10 years				
长期稳定性 Long-term Stability	≤2% LFL				
重量 Weight	38 grams				

(1) Contact Unitense for monitoring of other refrigerant belongs to A2L, A3 safety group.

(2) Specification is referenced to certificated calibration gas mixture (±2% uncertainty).

(3) Contact Unitense for customized request.

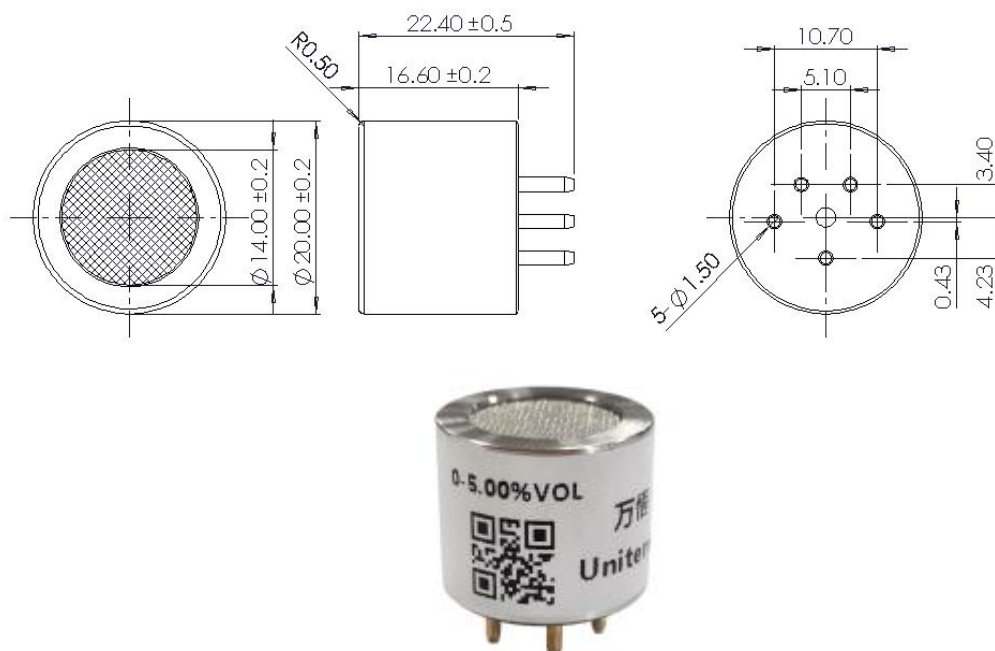
2.2 引脚定义 Pin Definition



Bottom view from pin surface

引脚 Pin-out	描述 Description
GND	GND
V+	DC power supply
RXD	UART_RXD
Vout	Voltage output (0.4 V - 2 V) corresponding to 0 – 100% LFL
TXD	UART_TXD

3. 外形尺寸 Product Outlines (unit: mm)



扫描二维码 Scan 2D barcode for P/N

P/N	Gas Type
U96030001XXXXXXXXXX	R32
U96030002XXXXXXXXXX	R454B
U96030003XXXXXXXXXX	R454A
U96030004XXXXXXXXXX	R454C
U96030031XXXXXXXXXX	R290