

# 产品规格书

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## PRODUCT SPECIFICATION

### 冷媒（制冷剂）泄漏监测系统

### Refrigerant Leakage Detection System

### U9604 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. 10. 16
A1	更新规格 Update the Specification	2023. 12. 20

## 1. 产品介绍 Product Introduction

### 1.1 产品概述 Product Description

U9604 Series是一款光学冷媒（制冷剂）泄漏监测传感器系统，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。U9604 series is an optical-based refrigerant leakage detection system that utilizes the principle of non-dispersive infrared (NDIR) to detect refrigerant gas concentration in the air. The product series apply optimized optical design, circuit design, digital signal processing algorithm, and compensation algorithm. Compared with the like products in the market, it has the characteristics of 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 stability and 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
- ◇ 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 15 years
- ◇ 集成继电器/控制风机/压缩机 Integegrated relay for fan/compressor control
- ◇ 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 RS485; Output signal RS485

### 1.3 应用领域 Application Field

- ◇ 家用空调的冷媒泄露监测 Refrigerant gas leakage monitoring of household HVAC system
- ◇ 商用空调的冷媒泄露监测 Refrigerant gas leakage monitoring of commercial HVAC system
- ◇ 车用空调的冷媒泄露监测 Refrigerant gas leakage monitoring of automotive HVAC system

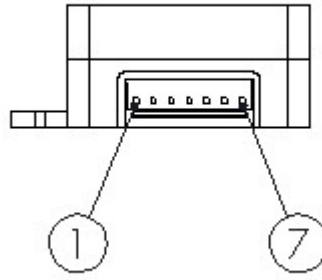
## 2. 产品特性 Product Characteristics

### 2.1 技术指标 Technical Specification

产品型号 Product Number	U9604 Series
检测气体 Target Gas	R32, R454A, R454B, R454C, R290 <sup>[1]</sup>
检测范围 Measurement Range	0~50% LFL (extended range to 100% LFL upon request <sup>(3)</sup> )
检测精度 Accuracy	±2.5% LFL for standard range ±5% LFL for extended range <sup>(2)</sup>
响应时间 Response Time	< 30 s <sup>(4)</sup>
工作条件 Operation Conditions	-40 to 85 °C, 0 to 95% RH (Non-condensing)
存储条件 Storage Conditions	-40 °C to 85 °C
供电电压 Power Supply	DC 24 V, 12 V or 5 V, Ripple voltage < 100 mV
平均工作电流 Average Current	< 50 mA @ 24V DC supply voltage
控制输出 Control Output	Relay NC/NO (default) or Digital High/Low
通讯 Communication	RS485
产品寿命 Life Expectancy	15 years
长期稳定性 Long-term Stability	≤ 2% LFL
符合性 Compliance	IEC 60335-2-40, UL 60335-2-40
重量 Weight	< 65 grams

- (1) Contact Unitense for monitoring of other refrigerant belongs to A2L, A3 safety group.  
 (2) Standard range: 0 to 25% LFL and -20 to 60 °C; Extended range: 25 to 50% LFL and -40 to 85 °C.  
 (3) Contact Unitense for customized request.  
 (4) Directly exposed to the refrigerant gas with concentration 25% LFL and Detection Threshold Limit Value set to 10% of LFL.

## 2.2 引脚定义 Pin Definition



Bottom view from PCBA surface

序号 Pin-out	描述 Description
1	Power Input
2	GND
3	Relay Common
4	Relay Normal Closed
5	Relay Normal Open
6	RS485_A
7	RS485_B

3. 外形尺寸 Product Outlines (unit: mm)

