



454B Refrigerant Gas Sensor

(Model: MH-441D)

Manual

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Zhengzhou Winsen Electronics Technology Co., Ltd

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Zhengzhou Winsen Electronics Technology CO., LTD

MH-441D-454B NDIR Infrared Refrigerant Sensor

1. Introduction

MH-441D-454B refrigerant sensor is an intelligent infrared gas sensor (hereinafter referred to as the sensor), which uses the principle of non-dispersive infrared (NDIR) to detect refrigerant (label 454B), which has good selectivity and no oxygen dependence ; The sensor is a compact high-performance sensor produced by combining mature infrared absorption gas detection technology with micro-machining and sophisticated circuit design. It is easy to use and can be directly used to replace the catalytic combustion element.



2.Features

- High sensitivity, high resolution, fast response
- Output method: UART, analog voltage signal
- Temperature compensation, excellent linear output, Excellent stability, Long lifespan
- Anti-poisons, anti-vapor interference, Can replace catalytic type gas sensor directly

3.Applications

- HVAC refrigeration,
- industrial-process control and safety protection

4. Main Parameters

Table1.Technical Parameters

Part Number	MH-441D
Detection Gas	454B
Detection Range	0~5%VOL
Working Voltage	3.6~5V DC (Require powered by safety barrier)
Average Current	<85mA
Detection Range	0~5.00% Vol
Interface Level	3.0V
Output Signal	UART
	0.4~2.0V DC(Require output by safety barrier)
Warm-up time	3 min
Response time	T90<30 seconds
Working Temperature	-20°C ~ 60°C
Working Humidity	0~95%RH(no condensation)
Sizes	Φ 20×22.4mm
Weight	35g
Lifetime	>5 years
Defense Grade	IP54
Power, communication terminal Intrinsic safety	Ui=7.5VDC, Ii=265mA, Pi=0.5W, Ci=10 μ F, Li=0mH

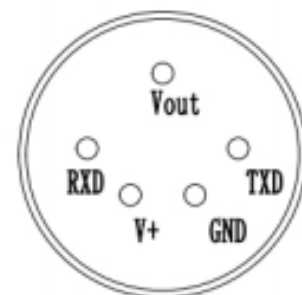
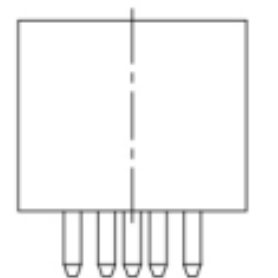
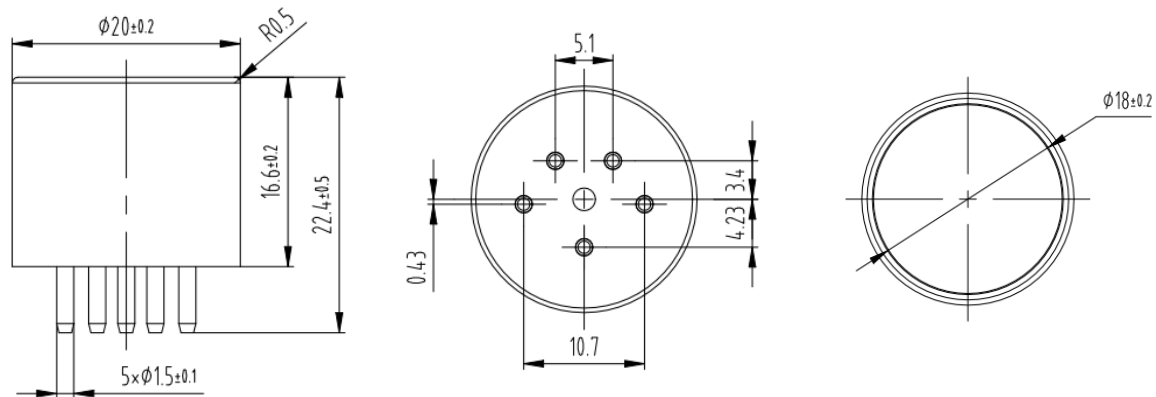


Fig1.Sensor struction

Table2.Measuring Range and accuracy

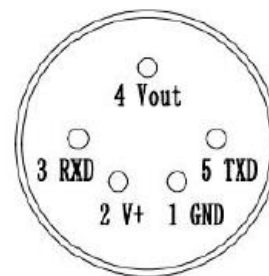
Target Gas	Molecular Formula	Measuring Range	Resolution	No. of decimal	Accuracy
454B	CH ₂ F ₂ (68.9%)	0~5.00% Vol	0.01% Vol	2	±5%F.S(0.00%-1.00%)
	C ₃ H ₂ F ₄ (31.1%)				±10%F.S(1.00%-5.00%)

5.Struction Size (Tolerance of unmarked dimensions is ±0.2)



■ **Pin definition MH-441D**

Pin	Pin definition
Pin 2	V+ power supply
Pin1	GND
Pin 4	Vout (0.4~2 V)
Pin 3	UART (RXD) 0~3.0 V data input
Pin 5	UART (TXD) 0~3.0 V data output



6. Analog Output

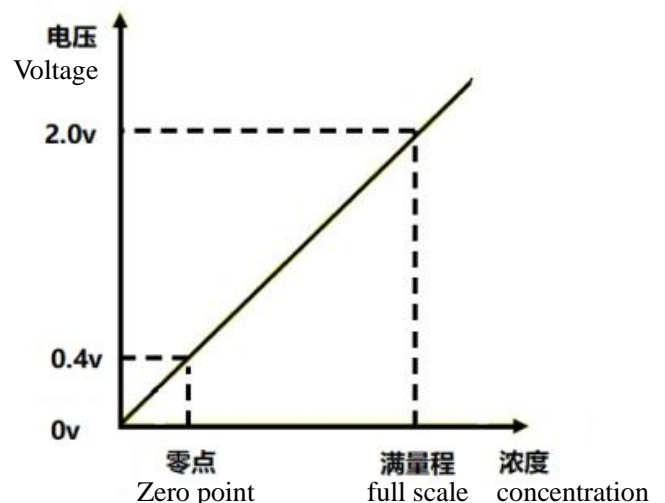
Vout output range (0.4-2.0V) stands for gas concentration(0 to full range)

Connection: V+ -5V, GND- Power Ground, Vout-ADC input.

After warm-up, Vout will show the voltage standing for the gas concentration.

If self-checking detects a fault, the output voltage is 0V.

Output concentration = Full range value * output voltage



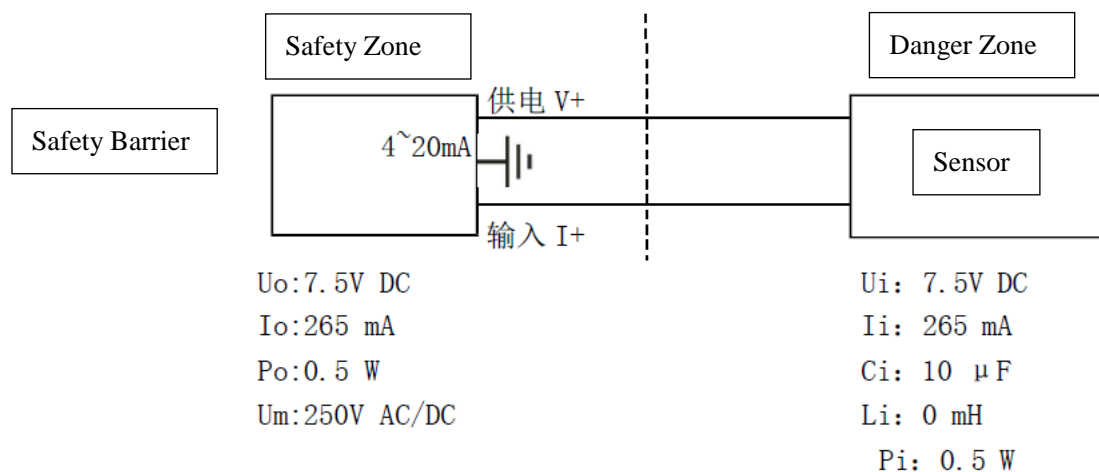
Intrinsically safe explosion-proof

This product meets the standards of GB3836.1-2010 "Explosive Atmosphere Part 1: General Requirements for Equipment" and GB3836.4-2010 "Explosive Atmosphere Part 4: Equipment Protected by Intrinsically Safe "i" standards"; the explosion-proof mark is Exib II B T4 Gb, it is suitable for zone 1 and zone 2, contains Class IIA, T1-T3 explosive environment formed by the flammable gas, mixture of steam and air; it has passed the inspection by the National Quality Inspection Center for Explosion-proof Electrical Products and obtained the explosion-proof certificate. When using, please note the following:

- The intrinsically safe power supply must be used to power the sensor, otherwise the explosion-proof performance will be affected.
- It is forbidden to replace the sensor in dangerous places.
- It is forbidden to disassemble or replace the sensor element to avoid affecting the explosion-proof performance.
- It is not allowed to replace components or structures, so as not to affect the explosion-proof performance.
- The installation and wiring of the safety barrier must be carried out in accordance with the safety barrier instruction manual, and the safety barrier must obtain an explosion-proof certificate.

Connection diagram of intrinsically safe explosion-proof system

The on-site installation must comply with the relevant regulations of the GB3836.15—2000 "Electrical Equipment for Explosive Gas Environment Part 15: Electrical Installation in Hazardous Locations (Except Coal and Mines).



The distribution parameters of the connecting cable between the safety barrier and the sensor should meet:

$$C_c \leq C_o - C_i \quad L_c \leq L_o - L_i \quad U_i \geq U_o \quad I_i \geq I_o \quad P_i \geq P_o$$

Note:

U_o : Maximum output voltage of safety barrier;

I_o : Maximum output current of safety barrier

P_o : Maximum output power of safety barrier

C_o : Maximum external capacitance of safety barrier

L_o : the maximum external inductance of the safety barrier (see the safety barrier instructions for the above parameters book)

C_c : Maximum allowable distributed capacitance of connecting cable

U_i : sensor maximum input voltage

I_i : Maximum sensor input current

P_i : sensor maximum input power

C_i : Maximum internal capacitance of the sensor

L_i : Maximum internal inductance of the sensor

Lc: Maximum allowable distributed inductance of connecting cable

7. Cautions for Maintenance

- 7.1 The sensor should be calibrated regularly. The suggested cycle time is 6 months.
- 7.2 Do not use the sensor in the high dusty environment for long time.
- 7.3 The sensor should be kept away from heat sources and away from direct sunlight or other thermal radiation.
- 7.4 Please use the sensor with correct power supply.
- 7.5 Forbid to weld the sensor pins directly.
- 7.6 Forbid to cut the sensor pins.

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