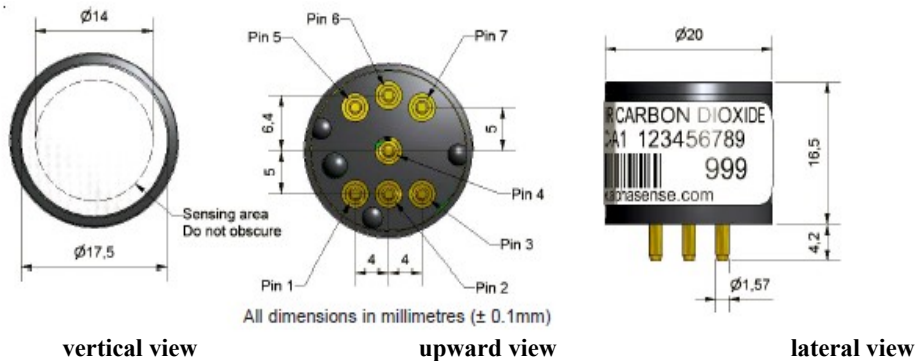


## IRC-A1 Carbon Dioxide Infrared Sensor Pyroelectric Detector



Figure 1 NDIR-A Schematic Diagram



**Pin description:**

1. Lightbulbs Return
2. Light bulb 5V power supply
- 3.+5V Pyro power supply
4. Probe output
5. Reference outputs
6. Thermistor output
- 7.0 V Pyro powered and connected to the housing

**make a footnote :**

1. Dimensions without tolerance are nominal dimensions

**Recommended PCB slot: Wearnes Cambion Ltd. Material code:**

450-3326-01-06-00

3. **Weight: 15g**

4. **Take anti-static measures when operating**

5. **Do not cut the pins**

6. **Do not solder the pins directly**

7. **We recommend that sensors be used in stationary equipment, where they can be calibrated and measured locally, and are not affected by acute mechanical stress or temperature changes.**

**function**

Maximum power consumption requires minimum operating voltage source drive frequency

Output of the working channel  $2$  in N

Response time ( $t_{90}$ ) of reference channel output in  $N_2$  (peak/peak)

preheating time

Maximum 5.0 VDC, 60mA (50% duty cycle drive)

Maximum 2.0 VDC, 20mA (50% duty cycle drive)

1.5~3 Hz (recommended 2~2.25

Hz) 60~100mV @ 2.1 Hz, 50%

duty cycle 40~80mV @ 2.1 Hz,

50% duty cycle <40s @ 20°C

environmental temperature

Time to final zero point  $\pm 100$ ppm: <30s @

20°C Time to steady state: <30 min @ 20°C

**life span**

mean free error time

> 5 years

**Key specifications and parameters**

Temperature signal

Thermistor (NTC,  $R_{25} = 3000 \Omega$   $\beta = 3450 K$ )

operating temperature range

-20°C ~ +55°C (linear compensation-10 ~ 40°C)

Storage temperature range

-40°C ~ +75°C

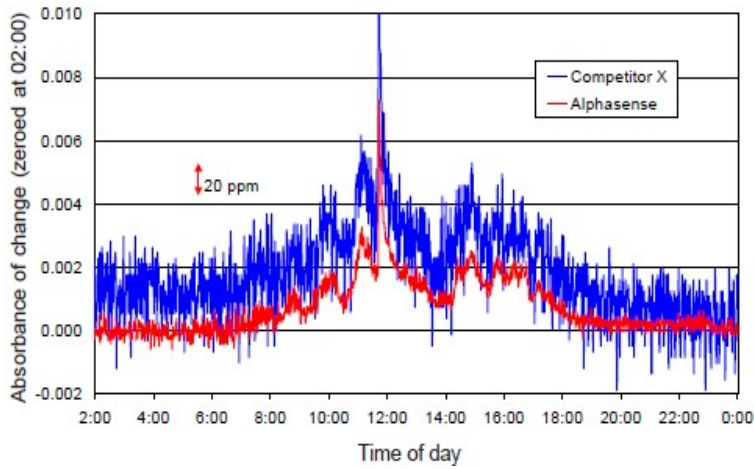
Humidity range

0 ~ 95% rh non-condensable

type	Scope (application)	Accuracy (%) FS, using universal linear coefficients)	Zero resolution	Full range resolution	Zero-point consistency	Full range consistency
IAQ (Indoor Air Quality)	0 ~5000ppm (air quality)	1	1ppm	15ppm	$\pm 10$ ppm	$\pm 50$ ppm
Other (other)	0 ~5% vol (safe)	1.5	1ppm	100ppm	$\pm 10$ ppm	$\pm 500$ ppm
	0~20% vol (combustion)	2.5	1ppm	500ppm	$\pm 10$ ppm	$\pm 2500$ ppm
	0~100% vol (process control)	4	1ppm	0.5%VOL	$\pm 10$ ppm	$\pm 5000$ ppm

When ordering, select "Indoor Air Quality" or "Other" depending on your application.

**Figure 2 Resolution Comparison**

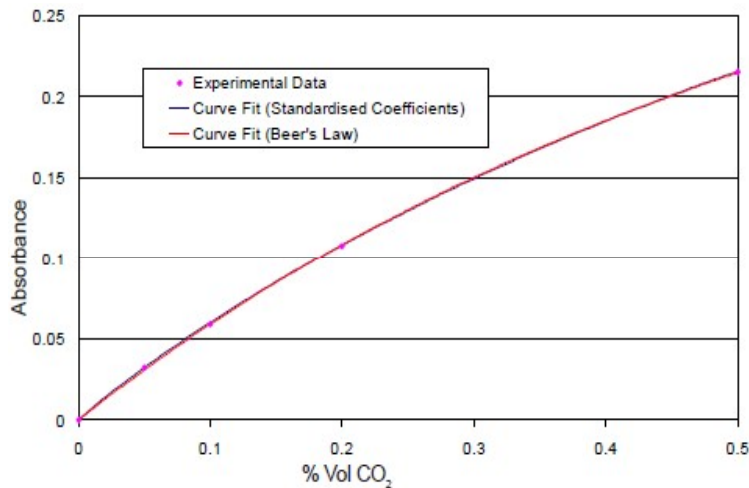


**Figure 2 Shows IRC-A1 (Red) Comparison of resolution with NDIR transducer (blue) of the same competitor with a diameter of 20mm.**

The two transmitters have the same electronic circuit and the same operating frequency of 2.5Hz. At the same time, the light source and the dual thermoelectric detector used are also the same.

The IRC-A1 has a higher resolution due to the use of a patented optical design.

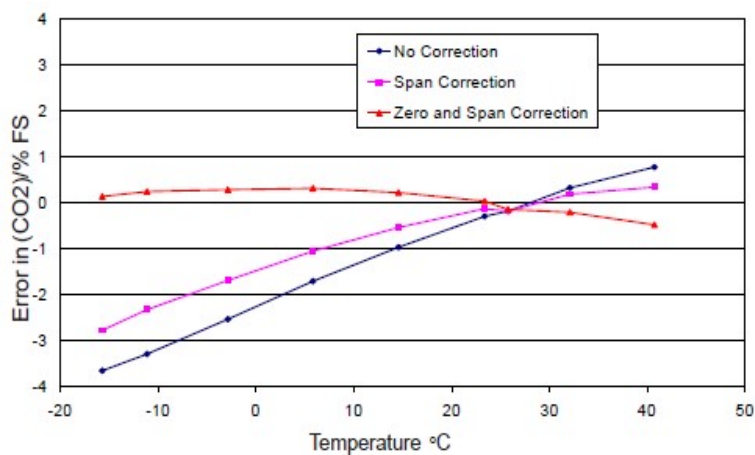
**Figure 3 Beer-Lambert Characteristics**



**Figure 3 shows the typical response of the transmitter at 0 ~ 5000ppm CO2.**

This fitted curve is very close to the theoretical curve predicted by the Beer-Lambert law.

**Figure 4 Temperature Compensation**

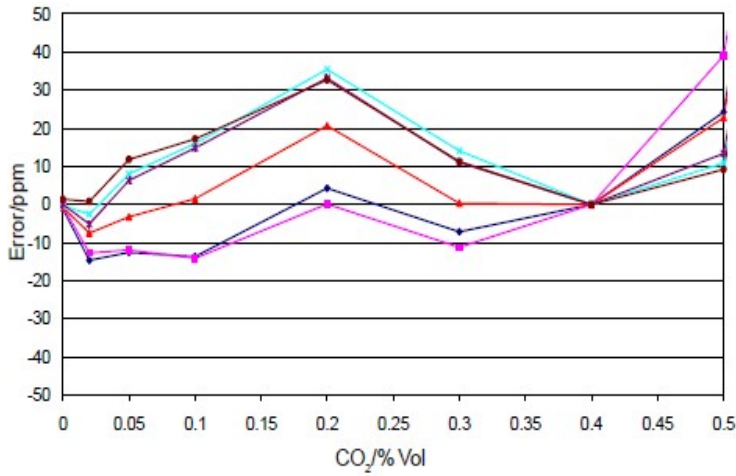


Temperature compensation to check for internal temperature error.

The most comprehensive calibration includes the correction of range and zero point; the range of each sensor is the same, but their zero temperature correction is different.

**Figure 4 shows the error at 5000ppm CO2**

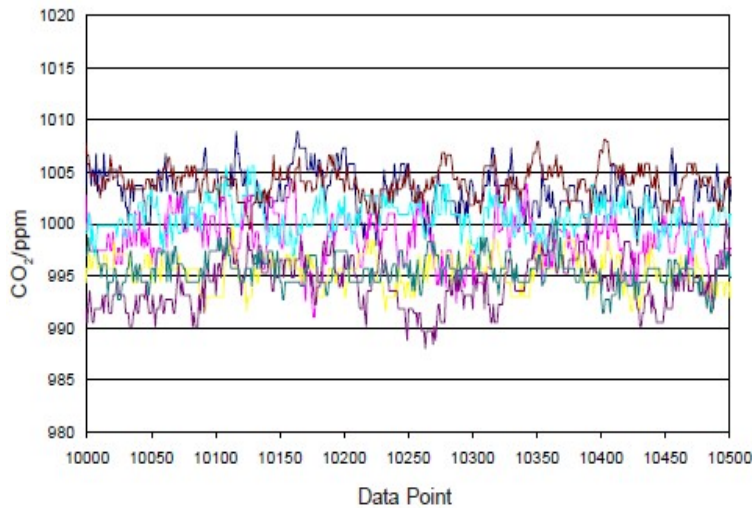
Figure 5 Linearity



IRC-A1 does not require customization of linearity. Using a common linearity constant, the consistency between sensors is very good and very convenient to use.

For IAQ applications, the errors obtained after calibration at zero and single points of 4000ppm are shown in the figure: The errors of six different IRC-A1 sensors are less than 2% of the reading, usually less than 0.5% of the reading.

Figure 6 Resolution



IRC - A1 The superior stability and resolution achieved for the 1000 ppm CO<sub>2</sub> reaction is due to improved design rather than the use of more expensive components.

remarks :

For applications where unstable ambient light may be exposed to the white filter film (top of the sensor), an additional ambient light filter (IRC-AF) can be ordered.

## 深圳市杰晟兴电子有限公司 JM Components Limited

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