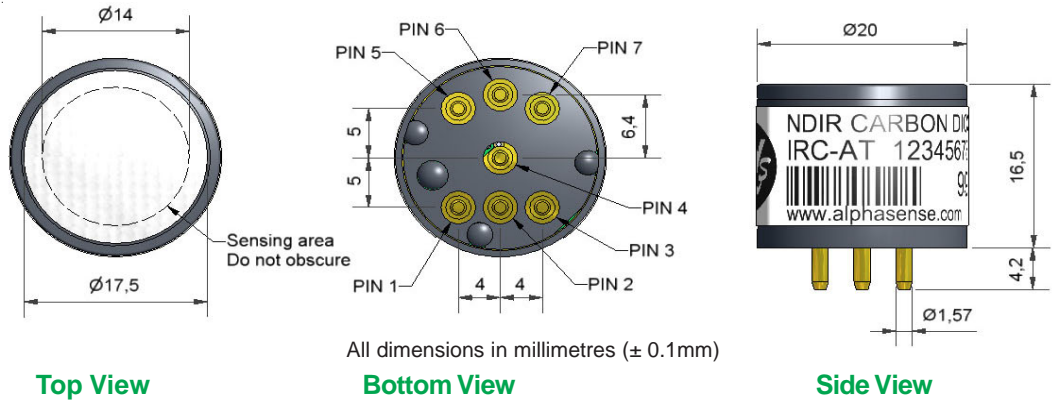


IRC-AT CARBON DIOXIDE INFRARED SENSOR

THERMOPILE DETECTOR



Figure 1 IRC-AT Schematic Diagram



Pin out details:

1. Lamp return
2. Lamp +5V
3. Not connected
4. Detector output.
5. Reference output
6. Thermistor output
7. OV supply

Notes:

1. Dimensions without tolerances are nominal
2. Recommended PCB socket: Wearnes Cambion Ltd. code: 450-3326-01-06-00
3. Weight: 15g
4. Use antistatic precautions when handling
5. Do not cut pins
6. Do not solder directly to pins

PERFORMANCE

Maximum Power Requirements	5.0 VDC, 60mA max. (50% duty cycle source drive)
Minimum Operating Voltage	2.0 VDC, 20mA max. (50% duty cycle source drive)
Source Drive Frequency	1.5 to 3 Hz (recommended 2 to 2.25 Hz)
Active Output in N ₂ (peak-to-peak)	60 - 100mV @ 2.1 Hz, 50% duty cycle
Reference Output in N ₂ (peak-to-peak)	40 - 80mV @ 2.1 Hz, 50% duty cycle
Response Time (t ₉₀)	< 40s @ 20°C ambient
Warm-up Time	To final zero ± 100 ppm: < 30 s @ 20°C To specification: < 30 minutes @ 20°C

LIFE TIME MTBF > 5 years

KEY SPECIFICATIONS

Temperature Signal	Integral thermistor (NTC, R ₂₅ = 100,000 Ω B= 3940 K)
Operating Temperature Range	-20°C to +50°C (linear compensation from -10 to 40°C)
Storage Temperature Range	-40°C to +75°C
Humidity Range	0 to 95% rh non-condensing

	IRC-AT IAQ	IRC-AT Safety	IRC-AT Combustion
Range	0 to 5000ppm	0 to 5 % vol	0 to 20 % vol
Accuracy (%FS, using universal linearisation coefficients)	1	1.5	2.5
Zero Resolution	1ppm	1ppm	1ppm
FS Resolution	25ppm	250ppm	0.4%
Zero Repeatability	± 10 ppm	± 10 ppm	± 10 ppm
FS Repeatability	± 10 ppm	$\pm 0.1\%$	$\pm 1\%$



NOTE: all sensors are tested at ambient environmental conditions, unless otherwise stated. As applications of use are outside our control, the information provided is given without legal responsibility. Customers should test under their own conditions, to ensure that the sensors are suitable for their own requirements.

Technical Specification

IRC-AT Performance Data

Technical Specification

Figure 2 Comparison of Resolution

Absorbance of change (zeroed at 02:00)

Time of day

Comparison of resolution of IRC-AT(red) and competitor's 20mm diameter NDIR cell (blue).

Both cells were operated at 2.25Hz with the same electronic circuit. Both cells use the same light source. The competitor's cell uses a pyroelectric detector.

The improved resolution of the IRC-AT is due to the patent pending optical design.

Figure 3 Beer-Lambert Performance

Absorbance

% Vol CO₂

Typical response from 0 to 5000ppm CO₂.

The fit is very close to the theoretical curve, predicted by the Beer-Lambert Law.

Figure 4 Temperature Compensation

Error in (CO2)/% FS

Temperature °C

Temperature compensation corrects for temperature error in the detector.

Best compensation includes both span and zero correction; span correction can be a universal correction, but zero temperature correction will vary with each cell.

The graph shows error at 5,000 ppm CO₂.

IRC-AT Performance Data

Technical Specification

Figure 5 Linearisation

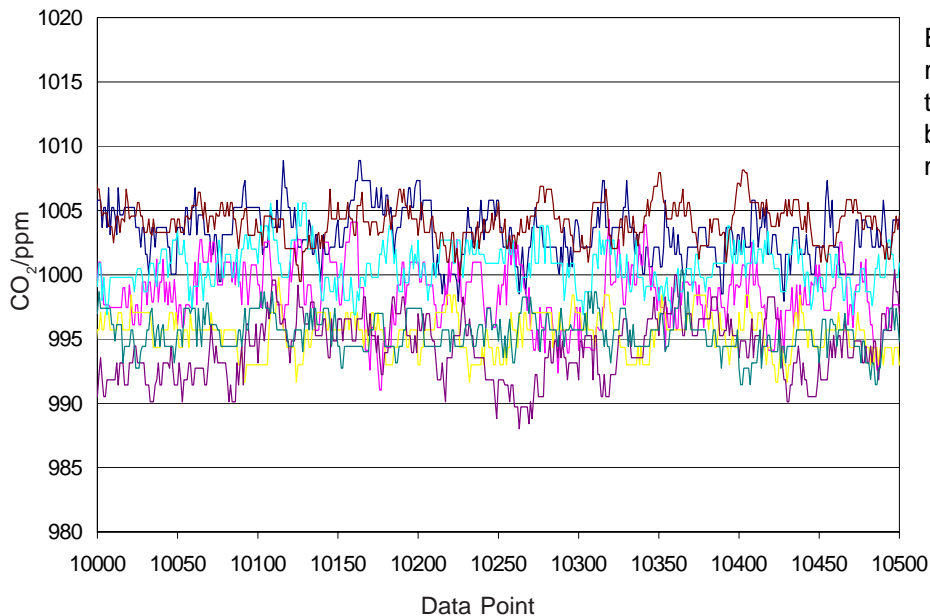
Error/ppm

(CO₂)/% Vol

Custom linearisation is not necessary with the IRC-AT. Using universal linearisation constants, repeatability between cells is very good, allowing easier implementation.

For an IAQ application, a zero and then single calibration at 1,600ppm CO₂ gives the error shown above.

Figure 6 Resolution



Excellent stability and resolution at 1000ppm CO₂ for the IRC-AT is achieved by better design, not by using more expensive components.