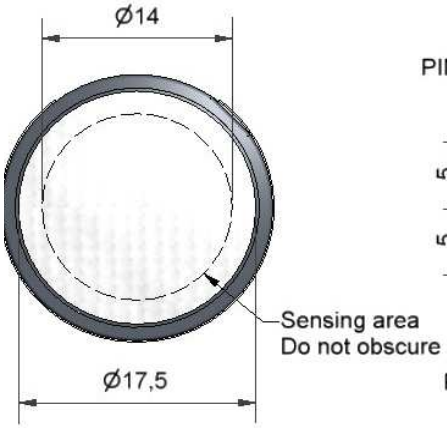
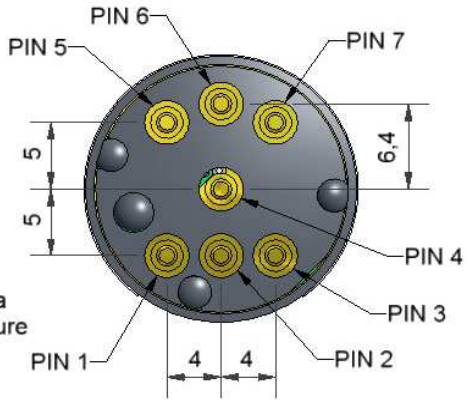
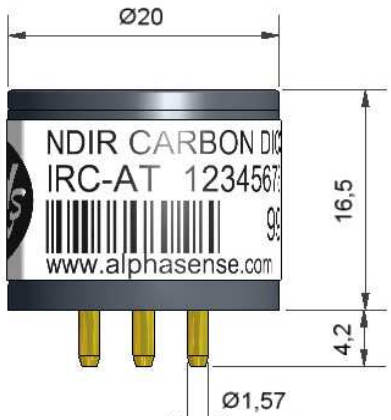
IRC-AT Carbon Dioxide infrared sensor – thermopile detector



Top View



Bottom View



Side View

Dimensions are in millimetres (± 0.15mm).

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
7. We suggest this sensor is best used in a fixed site instrument where calibration and measurement can be carried out in-situ, and the sensor is not subject to acute mechanical stress or changes of temperature.

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	3 Hz
	Active output in N_2 (peak-to-peak)	4 to 7mV @ 3 Hz, 50% duty cycle
	Reference output in N_2 (peak-to-peak)	2 to 5mV @ 3 Hz, 50% duty cycle
	Response time (t90)	< 40s @ 20°C ambient
	Warm-up time	To final zero ± 100ppm: < 30 s @ 20°C To specification: < 30 minutes @ 20°C
Lifetime	MTBF	> 5 years
Key Specifications	Temperature signal	Integral thermistor (NTC, R_{25} = 100KΩ B= 3940 K)
	Operating temperature range	-20°C to +50°C (linear compensation from 0 to 40°C)
	Storage temperature range	-40°C to +75°C
	Humidity range	0 to 95% rh non-condensing

Type*	Range (Application)	Accuracy (%FS, using universal linearisation coefficients)	Zero Resolution	Full Scale Resolution	Zero Repeatability	Full Scale Repeatability	Universal lin. coeff. b	Universal lin. coeff. c	Span calibration conc.
IAQ	0 to 5000ppm (IAQ)	1	10ppm	50ppm	±20ppm	±50ppm	0.000325	0.9363	4000ppm
Other	0 to 5 % vol (Safety)	1.5	10ppm	100ppm	±20ppm	±500ppm	0.5411	0.6716	4%
	0 to 20 % vol (Combustion)	2.5	10ppm	2000ppm	±20ppm	±2500ppm	1.0459	0.2932	16%
	0 to 100 % vol (Process Control)	tbc	10ppm	tbc	±20ppm	tbc	tbc	tbc	100%

* When ordering, select 'IAQ' or 'Other', depending on your application.

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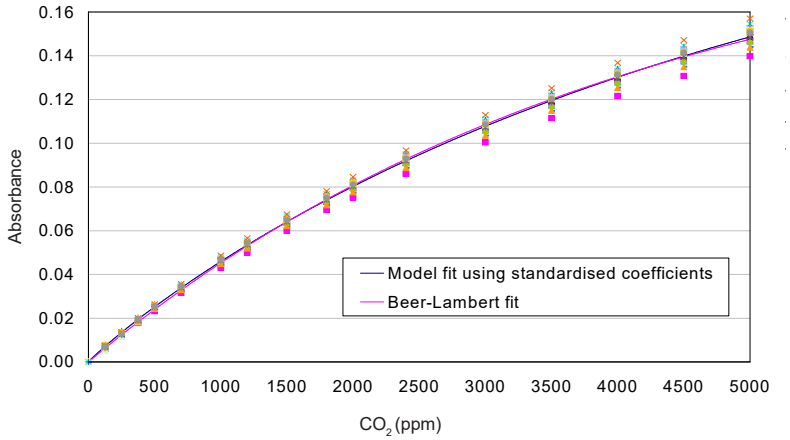
For further information on the performance of this sensor, on other sensors in the range or any other subject, please contact Alphasense Ltd. or visit our website at "www.alphasense.com".

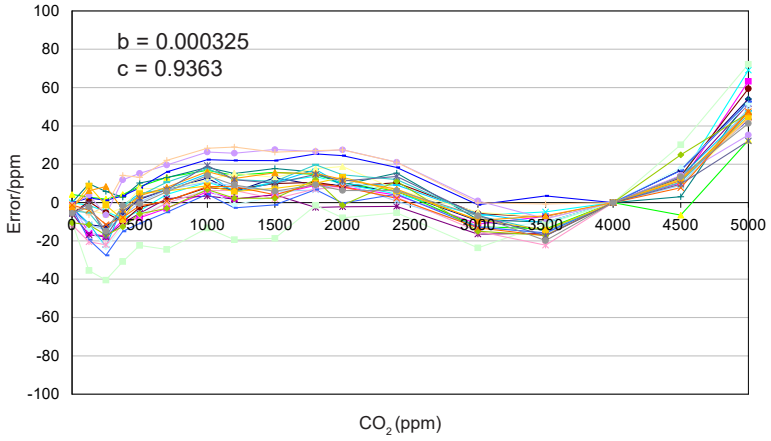
Figure 1 Beer-Lambert Performance



Typical response from 0 to 5000ppm CO_2.

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

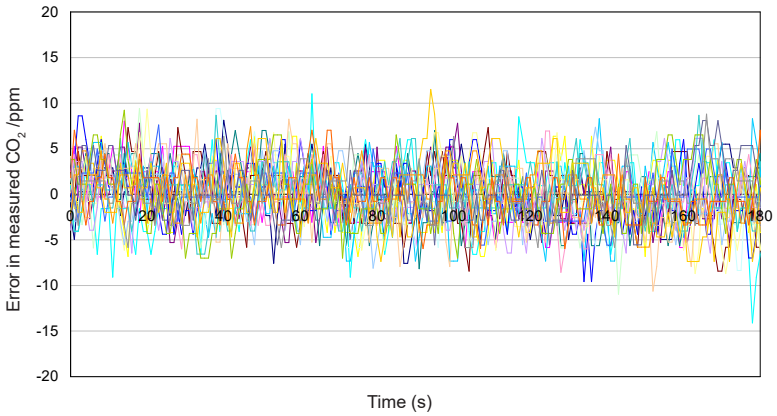
Figure 2 Linearisation



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

For an IAQ application, a zero and then single calibration at 4000ppm CO_2 gives the error shown above: typically less than ± 40ppm from 0 to 4500ppm.

Figure 3 Resolution



Excellent resolution and noise at 1000ppm CO_2 for the IRC-AT is achieved by better design, not by using more expensive components.

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