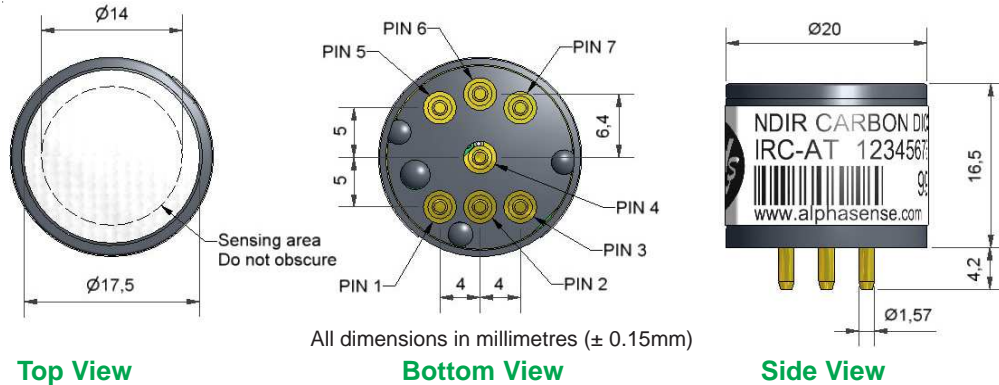




IRC-AT CARBON DIOXIDE INFRARED SENSOR Thermopile Detector



Figure 1 IRC-AT Schematic Diagram



All dimensions in millimetres ($\pm 0.15\text{mm}$)

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, 60 mA max. (50% duty cycle source drive)
Minimum Operating Voltage	2.0 VDC, 20 mA max. (50% duty cycle source drive)
Source Drive Frequency	3 Hz
Active Output in N ₂ (peak-to-peak)	4 to 7 mV @ 3 Hz, 50% duty cycle
Reference Output in N ₂ (peak-to-peak)	2 to 5 mV @ 3 Hz, 50% duty cycle
Response Time (t ₉₀)	< 40 s @ 20°C ambient
Warm-up Time	To final zero ± 100 ppm: < 30 s @ 20°C To specification: < 30 minutes @ 20°C

LIFETIME

MTBF > 5 years

KEY SPECIFICATIONS

Temperature Signal	Integral thermistor (NTC, R ₂₅ = 100K Ω 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 (ppm)	Full Scale Resolution (ppm)	Zero Repeatability (ppm)	Full Scale Repeatability (ppm)	Universal lin. coeff. b	Universal lin. coeff. c	Span calibration conc.
IAQ	0 to 5000ppm (IAQ)	1	10	50	± 20	± 50	0.000325	0.9363	4000 ppm
	0 to 5 % vol (Safety)	1.5	10	100	± 20	± 500	0.5411	0.6716	4%
Other	0 to 20 % vol (Combustion)	2.5	10	2000	± 20	± 2500	1.0459	0.2932	16%
	0 to 100 % vol (Process Control)	tbc	10	tbc	± 20	tbc	tbc	tbc	100%

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

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.



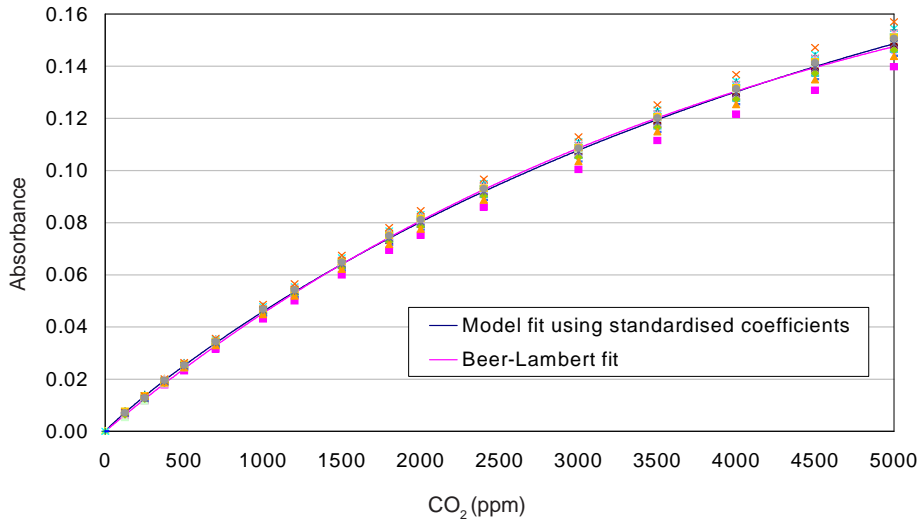
At the end of the product's life, do not dispose of any electronic sensor, component or instrument in the domestic waste, but contact the instrument manufacturer, Alphasense or its distributor for disposal instructions.



IRC-AT Performance Data

Technical Specification

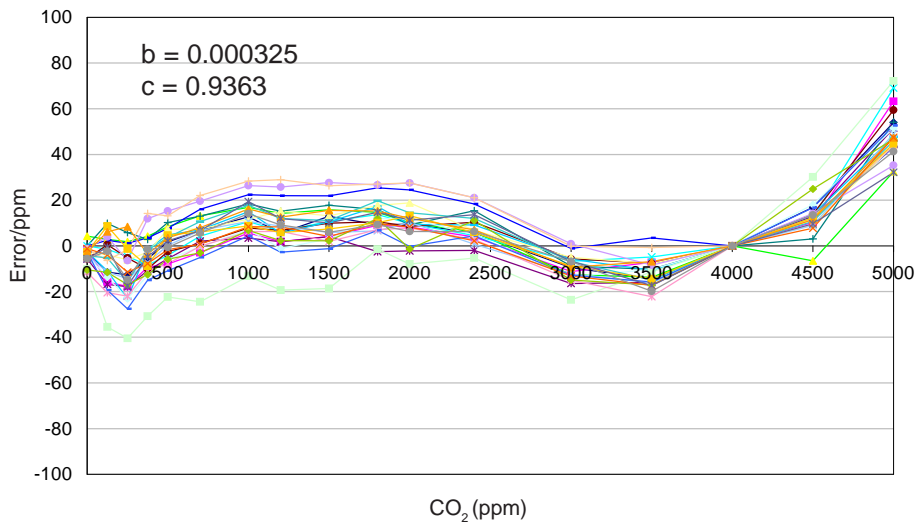
Figure 2 Beer Lambert Performance



Typical response from 0 to 5000ppm CO₂.

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

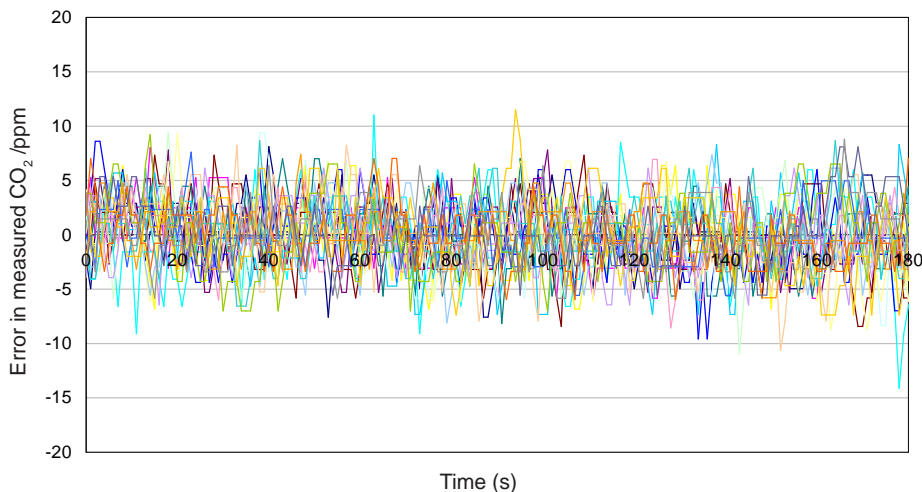
Figure 3 Linearisation



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 CO₂ gives the error shown above: typically less than ± 40ppm from 0 to 4500ppm.

Figure 4 Resolution



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

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

In the interest of continued product improvement, we reserve the right to change design features and specifications without prior notification. The data contained in this document is for guidance only. Alphasense Ltd accepts no liability for any consequential losses, injury or damage resulting from the use of this document or the information contained within. (©ALPHASENSE LTD) Doc. Ref. IRC-AT/MAY21