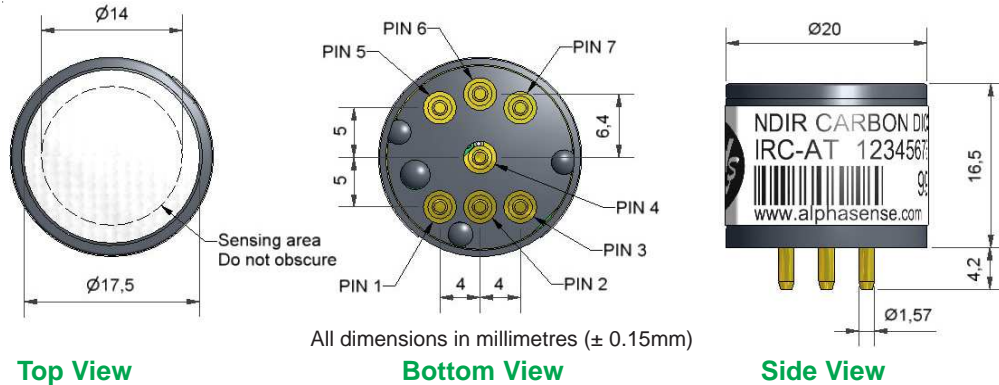




# IRC-AT CARBON DIOXIDE INFRARED SENSOR Thermopile Detector



**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, 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 <sub>2</sub> (peak-to-peak)	4 to 7 mV @ 3 Hz, 50% duty cycle
Reference Output in N <sub>2</sub> (peak-to-peak)	2 to 5 mV @ 3 Hz, 50% duty cycle
Response Time (t <sub>90</sub> )	< 40 s @ 20°C ambient
Warm-up Time	To final zero $\pm 100$ ppm: < 30 s @ 20°C To specification: < 30 minutes @ 20°C

**LIFETIME**

MTBF > 5 years

**KEY SPECIFICATIONS**

Temperature Signal	Integral thermistor (NTC, R <sub>25</sub> = 100K $\Omega$ 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	$\pm 20$	$\pm 50$	0.000325	0.9363	4000 ppm
	0 to 5 % vol (Safety)	1.5	10	100	$\pm 20$	$\pm 500$	0.5411	0.6716	4%
Other	0 to 20 % vol (Combustion)	2.5	10	2000	$\pm 20$	$\pm 2500$	1.0459	0.2932	16%
	0 to 100 % vol (Process Control)	tbc	10	tbc	$\pm 20$	tbc	tbc	tbc	100%

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



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.

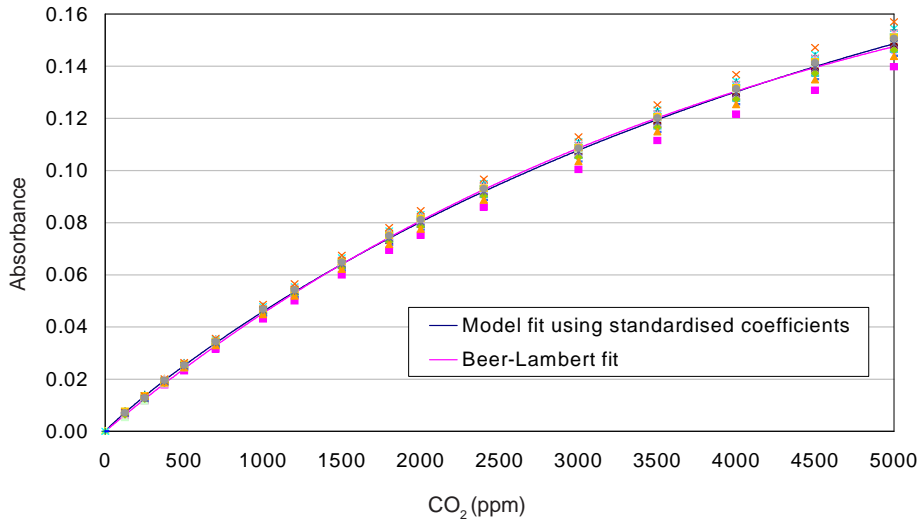
**NOTE:** all sensors are tested at ambient environmental conditions, with 47 ohm load resistor, unless otherwise stated. As applications of use are outside our control, the information provided is given without legal responsibility. Customers should test under their own conditions, to ensure that the sensors are suitable for their own requirements.



# IRC-AT Performance Data

# Technical Specification

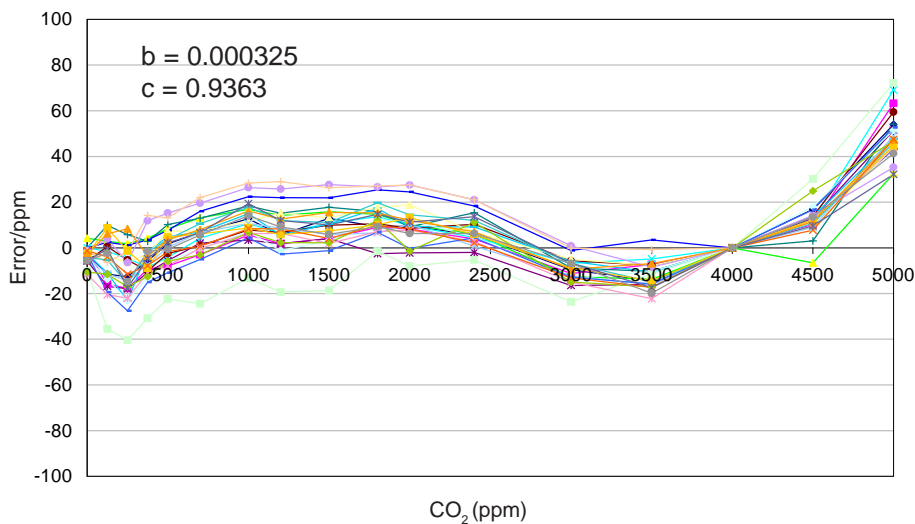
**Figure 2 Beer Lambert Performance**



Typical response from 0 to 5000ppm CO<sub>2</sub>.

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

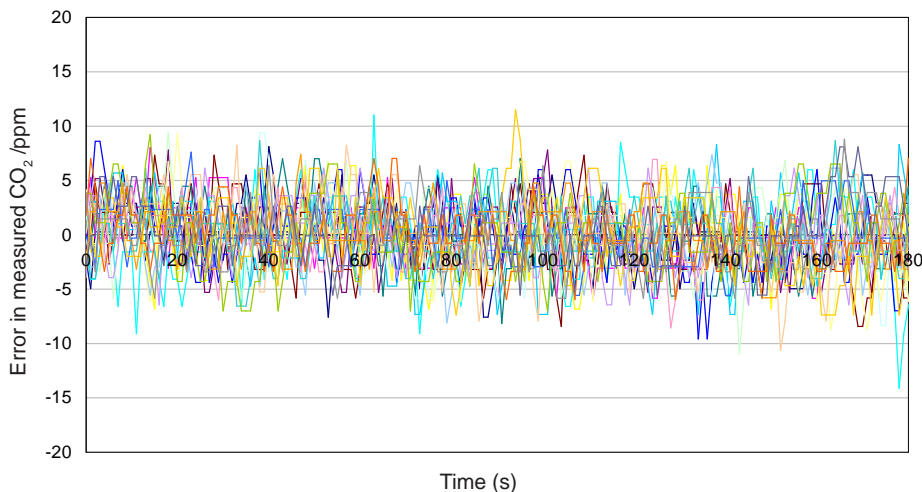
**Figure 3 Linearisation**



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 CO<sub>2</sub> gives the error shown above: typically less than  $\pm 40$ ppm from 0 to 4500ppm.

**Figure 4 Resolution**



Excellent resolution and noise at 1000ppm CO<sub>2</sub> 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 Ltd. For Application Notes visit "[www.alphasense.com](http://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/NOV13*