

C1 LOW POWER CO2 SENSOR

DESCRIPTION – LOW RANGE

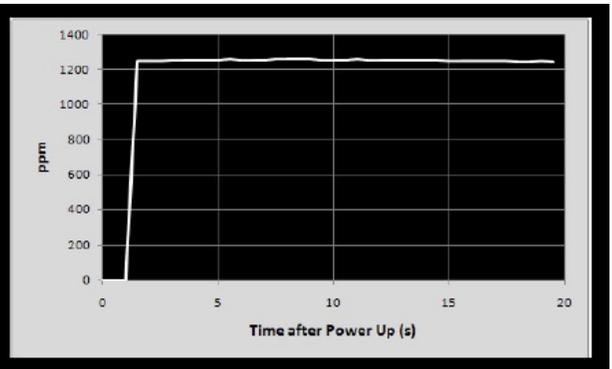
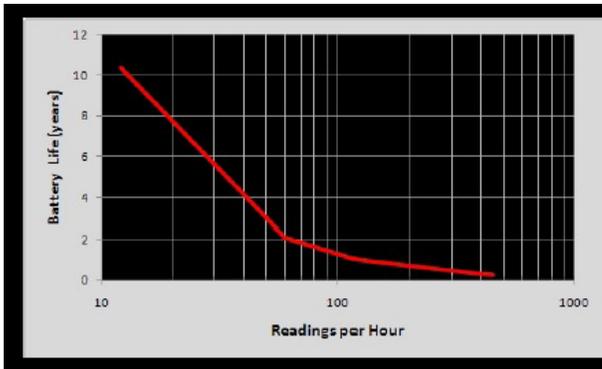
The C1 is a high sensitivity Carbon Dioxide (CO₂) sensor offering ultra low power (3.5mW).

The sensor reaches full accuracy just two seconds after powering-up. Combination of very low power and fast warm-up make it ideal for use in portable instruments, particularly battery powered applications – hand held devices, wireless systems – where low duty cycle is important to maximise battery life. Extremely low power consumption can be achieved by powering down the sensor between measurements.



The illustration below shows the battery life powering one C1 sensor from 3 x AAA batteries

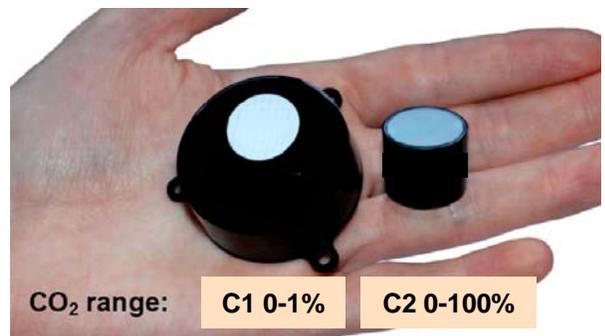
C1 warm-up is only 2 seconds



This compact infrared sensor is ideally suited for battery operation and portable instruments and for low concentration markets, including Heating, Ventilation and Air Conditioning (HVAC) and Indoor Air Quality (IAQ). The standard ranges offered are 0-2000ppm, 0-5000ppm and 0-1% volume. Optional temperature and humidity sensing is also available with this sensor.

FEATURES

- Ultra-low Power 3.5mW
- Measurement ranges from 0 to 1%
- Low noise measurement (<10ppm)
- 3.3V supply
- Peak current only 33mA
- Optional Temperature and Humidity Output



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SPECIFICATIONS

Operating Principle:	Non-dispersive infrared (NDIR) absorption. Patented gold-plated optics. Patented solid state source and detector
Gas Detected:	Carbon Dioxide CO ₂
Sample method:	Diffusion
Measurement Ranges:	Standard: 0 – 2000ppm Optional: 0 – 5000ppm Optional: 0 – 1 % volume Other ranges available on request
Response Time:	30 seconds to 3 minutes (user configurable filter response. Configurable via filter type and application) Reading refreshed twice per second (user configurable filter response)
Operating Temperature Range:	0°C to 50°C (standard); -25°C to +55°C (extended range)
Warm-up Time:	< 10 seconds. 1.2 seconds to first reading
Resolution:	1ppm
Accuracy:	+/- 50ppm +/-3% of reading (measurement at STP)
Non-Linearity:	<1% of FS
Humidity Range:	0 - 95% RH, non-condensing
Pressure Dependence:	0.13% of reading per mm Hg in normal atmospheric conditions
Operating Pressure Range:	950 – 1050 bar (external pressure calibration required to eliminate pressure dependence)
Expected Operating Life:	5 years in normal use from date of manufacture
Calibration:	Autocalibration is enabled by default. For correct operation, the sensor must experience fresh air once every week. For more details, refer to 'Autocalibration Notes'.

Electrical/Mechanical Specifications

Power Input:	3.25 Volts to 5.5 Volts dc (3.3V recommended) Peak current 33mA. Average current <1.5mA
Power Consumption:	3.5mW
Wiring Connections:	2x5 0.1" header

Power measurements for standard CO₂ sensor with 2 readings per second. If using the temperature and humidity option, temperature and humidity measurements will increase the power consumption.



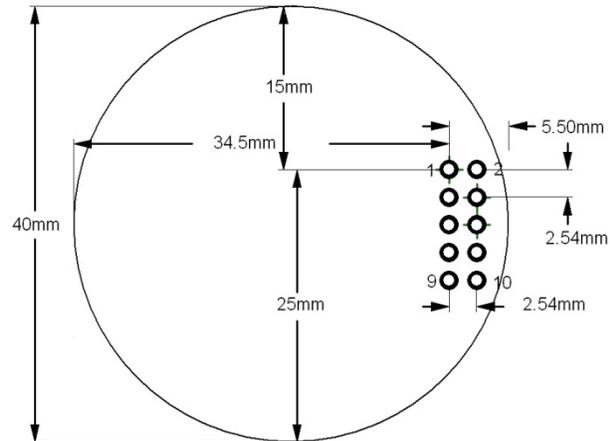
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Physical Specifications

Storage Conditions:	-30°C to +70°C
Weight:	approx. 18g
Warranty period:	6 months from date of despatch
Part Number:	2112BC1

CONNECTIONS

1	GND	2	N/C
3	3.3V (nominal)	4	N/C
5	Rx (sensor in)	6	N/C
7	Tx (sensor out)	8	Nitrogen Zero
9	Analogue output (0.1- 3.3V)	10	Fresh Air Zero



Wiring Connections: 2x5 0.1" header

View from underside
(connector side)

Please note that the drawing shows details of the PCB inside the sensor casing. The outside dimension of the sensor casing is 43mm.

Pin 2 should not be connected. Pins 4 and 6 do not require connection and are internally connected to GND.

The zeroing options are for hardware zeroing (both active low). These functions can also be implemented by sending a serial command (recommended).

Typical connections for digital interface are GND, 3.3V, Rx and Tx. Note that the Vh for the serial Tx line will be 3V regardless of the supply voltage.

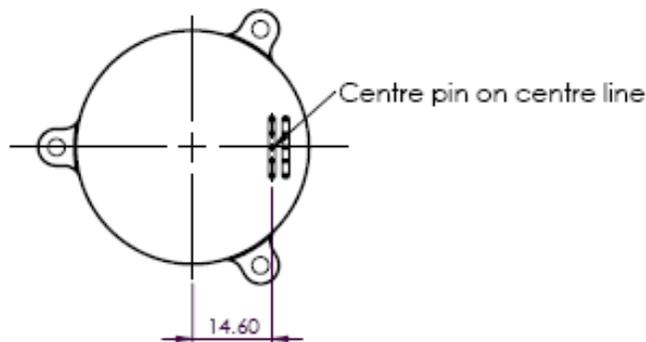
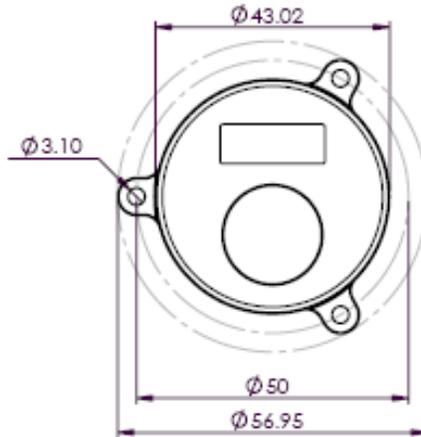
The analogue (voltage) output is available only when specified. Otherwise, N/C.

The serial connection is 9600baud, 8 bit, no parity, one stop bit. There is no hardware flow control.



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DIMENSIONS



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TEMPERATURE & HUMIDITY MEASUREMENT

An optional Temperature and Humidity sensor is available with the C1 CO₂ gas sensor. This is only available as digital output.

Sensing Method

Humidity: Capacitive

Temperature: Bandgap

Measurement Range

Temperature: -25°C to +55°C

Humidity: 0 to 95% RH

Resolution

Temperature: 0.08°C

Humidity: 0.08% RH

Repeatability

+/- 0.1°C

+/- 0.1% RH

Absolute Accuracy

+/- 1 °C 0°C to 55°C

+/- 3% RH 20°C to 55°C

+/- 2 °C over the full temperature range

+/- 5% RH over the full temperature range

Temperature and humidity derived from SHT21 chip. Data sheet available on request for full details.

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