



# Carbon Monoxide Sensor

## p-type Metal Oxide



# Technical Specification

This sensor works well in ambient conditions and also in extreme temperatures and humidities where electrochemical sensors cannot survive. This metal oxide gas sensor is equipped with a filter that allows CO selectivity.

Unlike common n-type sensors, this p-type sensor has a large dynamic range, repeatable response, low humidity response and resistance increases in the presence of CO.

The change in resistance can be converted to an output voltage via a simple electrical circuit. Although the sensor can be used in constant temperature/ voltage mode, best response is achieved when the sensor is cycled between 400°C (sensing temperature) and 525°C (reset temperature). See our Application Note.

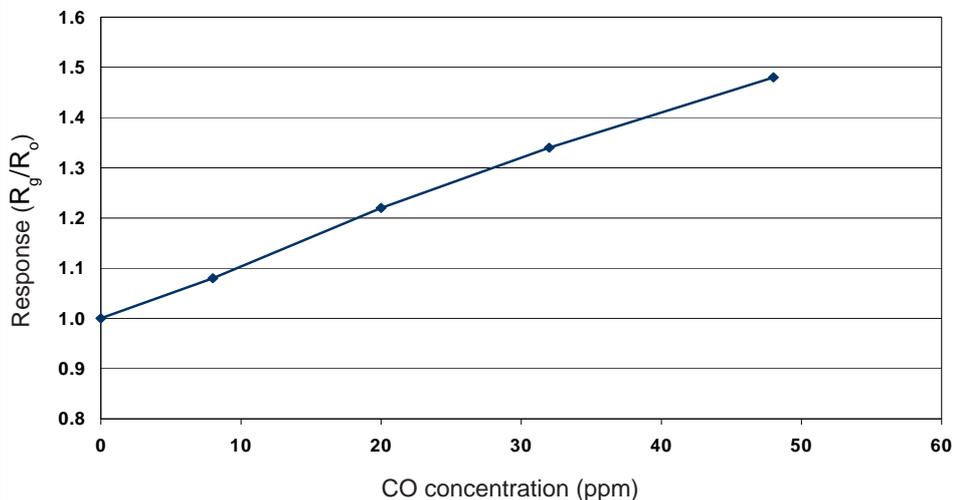
### PERFORMANCE

Range	ppm CO limit of performance warranty	5 to 500
Sensor resistance ( $R_o$ )	$k\Omega$ (50%rh, 23 ( $\pm 2$ )°C)	220 $\pm$ 50
Sensor resistance ratio ( $R_g/R_o \times 100\%$ )	% CO @ 20ppm in air	120 $\pm$ 15
Gas response relationship ( $R_g/R_o - 1 = k \cdot \text{Conc}$ )	5 - 50ppm	0.01 $\pm$ 10%
Gas response relationship ( $R_g/R_o - 1 = k \cdot \text{Conc}^{0.5}$ )	50 - 500ppm	0.08 $\pm$ 15%
Heater resistance ( $R_H$ @ RT)	$\Omega$ (23 $\pm$ 1°C)	10 $\pm$ 1.5
Heater resistance ( $R_H$ @ sensing temp.)	$\Omega$ (400 $\pm$ 10°C)	22 $\pm$ 3
Heater resistance ( $R_H$ @ reset temp.)	$\Omega$ (525 $\pm$ 10°C)	26 $\pm$ 3
Heater power consumption (mW) typical for 5:1	$V_H = 2.7 \pm 0.2V$ (400°C) $3.7 \pm 0.3V$ (525°C)	340 $\pm$ 30 530 $\pm$ 50
Operating Temperature Range	°C	-20 to 120

### CROSS SENSITIVITY

H <sub>2</sub> sensitivity	% measured gas @ 100 ppm H <sub>2</sub>	TBA
EtOH sensitivity	% measured gas @ 50 ppm EtOH	TBA
C <sub>3</sub> H <sub>8</sub> sensitivity	% measured gas @ 500 ppm C <sub>3</sub> H <sub>8</sub>	TBA
NH <sub>3</sub> sensitivity	% measured gas @ 25 ppm NH <sub>3</sub>	TBA

**Figure 1 Response at low concentrations**



Response from 8-48ppm CO, operating in 2-temperature mode with a 5:1 cycle ratio of sensing (400°C) and resetting (525°C).



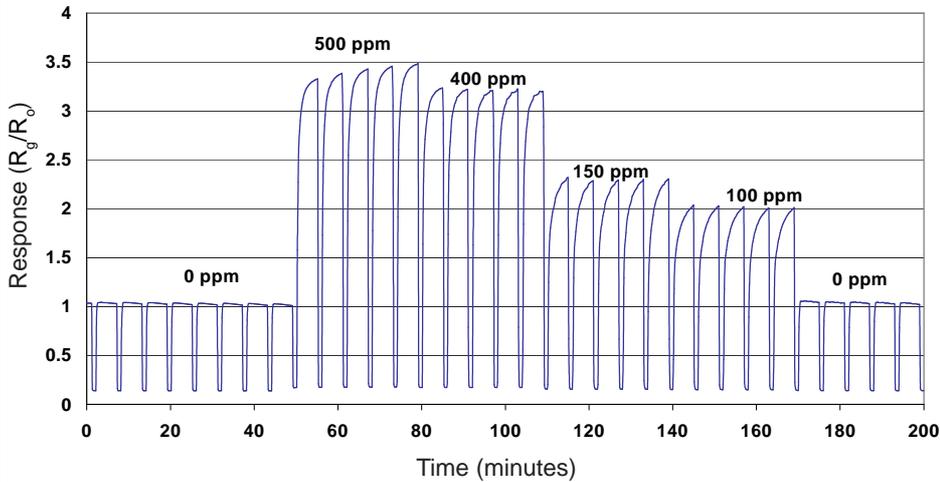
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**Performance Data**



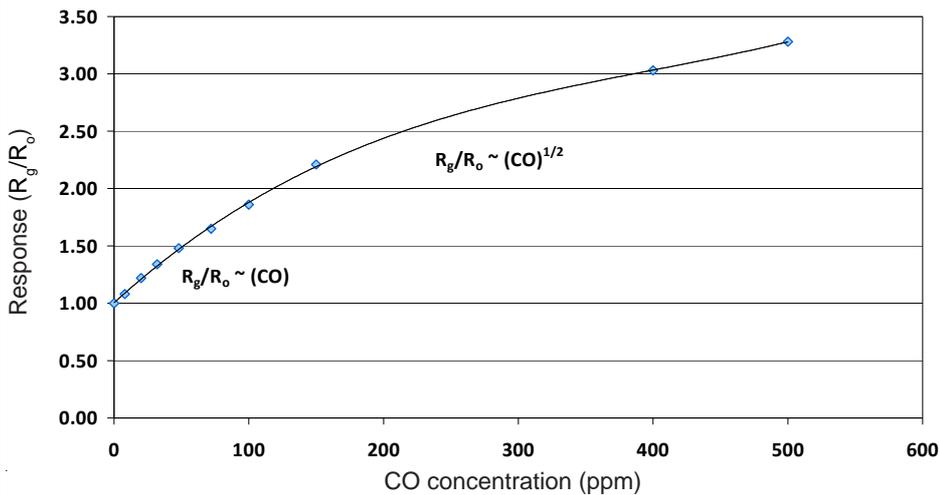
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**Figure 2 Real-time response at high CO concentrations**



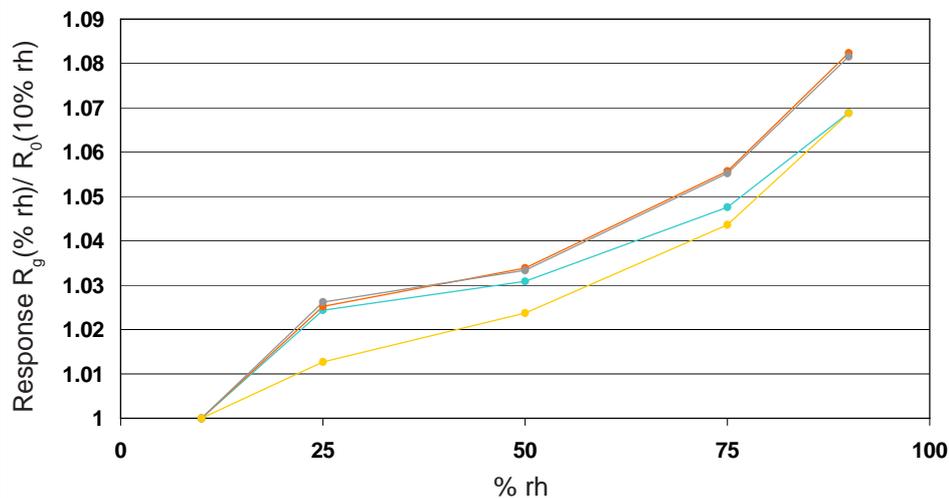
Real-time response data over range 100 - 500ppm CO in 50% rh air. Sensor operating in 2-temperature mode, pulsing between 5 mins at 400°C for 5 mins and 525°C for 1 min.

**Figure 3 Response from 10 to 500ppm CO**



Response over range of 8 - 500ppm CO operating in 2-temperature mode with a 5:1 cycle ratio of sensing (400°C) and resetting (525°C). Note linear behaviour <50ppm and power law behaviour >50ppm.

**Figure 4 Response from 10% to 90% rh at 23°C**



Response over range of 10% - 90% rh air, operating in 2-temperature mode with a 5:1 cycle ratio of sensing (400°C) and resetting (525°C)

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)".

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