

## Carbon Monoxide Sensor – p-type Metal Oxide



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.

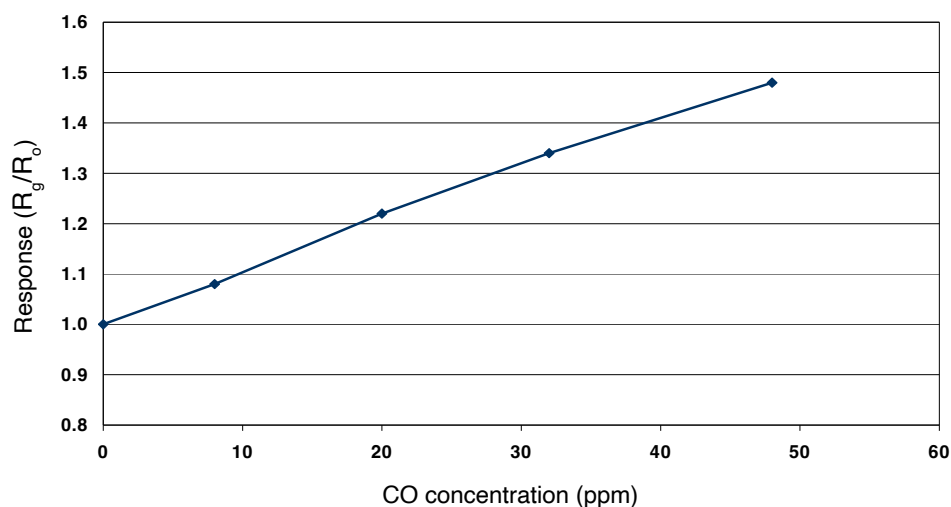
### Performance

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

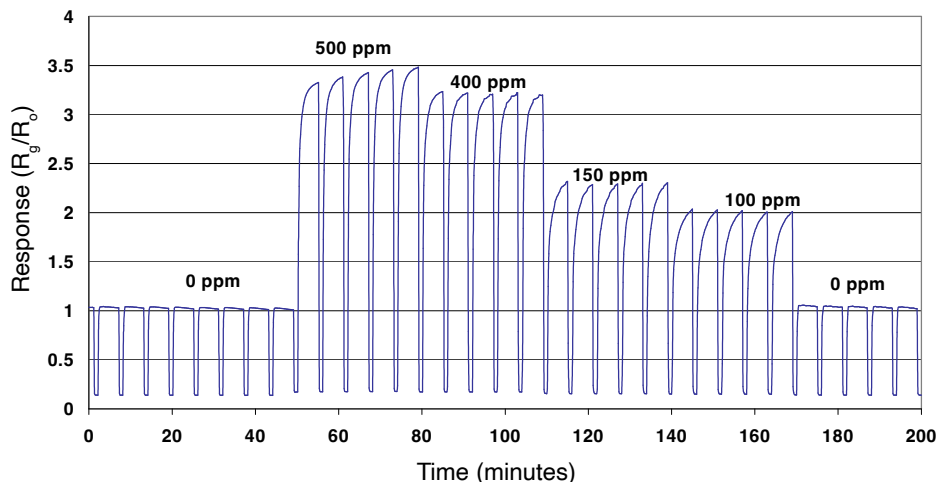
H <sub>2</sub> sensitivity	% measured gas @ 100 ppm H <sub>2</sub>	TBA
EtOH sensitivity	% measured gas @ 50 ppm EtOH	TBA
C <sub>3</sub> H <sub>8</sub> sensitivity	% measured gas @ 500 ppm C <sub>3</sub> H <sub>8</sub>	TBA
NH <sub>3</sub> sensitivity	% measured gas @ 25 ppm NH <sub>3</sub>	TBA

Figure 1 Response at low concentrations



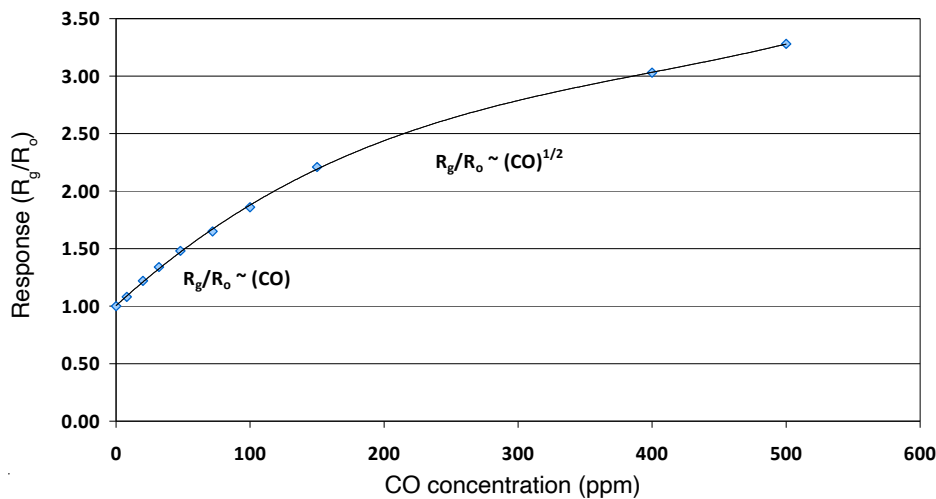
Response from 8–48ppm CO, operating in 2-temperature mode with a 5:1 cycle ratio of sensing (400°C) and resetting (525°C).

Figure 2 Real-time response at high CO concentrations



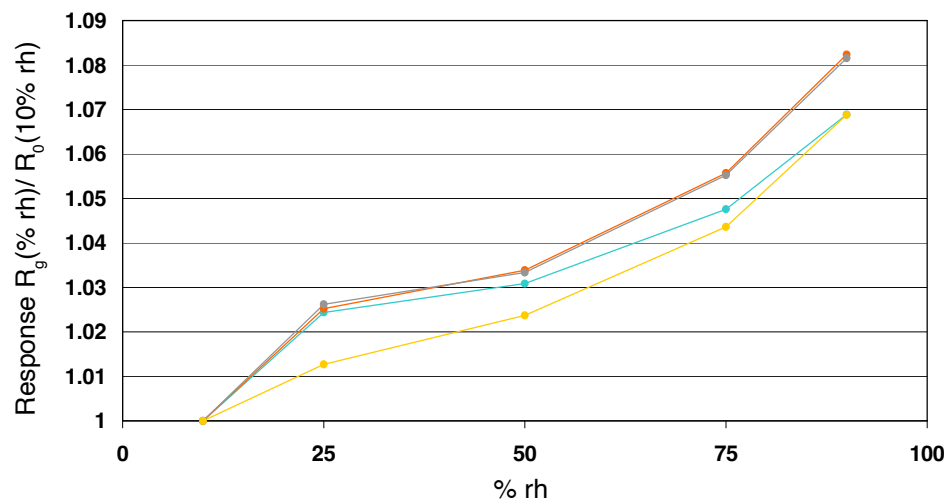
Real-time response data over range 100 – 500ppm CO in 50% rh air. Sensor operating in 2-temperature mode, pulsing between 5 mins at 400°C for 5 mins and 525°C for 1 min.

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". 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. MM0-CO/SEP22