

## COH-A1

### Carbon Monoxide Hydrogen Sulfide



# Technical Specification



#### Introduction

Personal gas safety monitors can be found in almost every industry, with the requirement for multiple gas detection becoming commonplace. Most of these gas detectors measure both Carbon Monoxide and Hydrogen Sulfide.

Alphasense new 2sense H<sub>2</sub>S+CO gas sensor allows designers to reduce significantly their gas detector size and cost. The patented 2sense uses a new approach to dual gas sensor design.

A larger version of the D2 sensor, which has a proven track record in the field over many years, the 2sense does not compromise performance or long term stability over the standard two-sensor solution when measuring both H<sub>2</sub>S and CO.

#### Specification Carbon Monoxide Channel

<b>PERFORMANCE</b>	Sensitivity	nA/ppm in 400ppm CO	60 to 110
	Response time	t <sub>90</sub> (s) from zero to 400ppm CO	< 20
	Zero current	ppm equivalent in zero air	< ±2
	Resolution	rms noise (ppm equivalent)	< 0.5
	Range	ppm CO limit of performance warranty	2,000
	Linearity	ppm error at full scale, linear at zero and 400 ppm CO	10 to 40
	Overgas limit	maximum CO for stable response to gas pulse	5,000
<b>LIFETIME</b>	Zero drift	ppm equivalent change/year in lab air	< 0.5
	Sensitivity drift	% change/year in lab air, monthly test	< 4
	Operating life	months until 80% original signal (24 month warranted)	24
<b>ENVIRONMENTAL</b>	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 100ppm CO	45 to 75
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 100ppm CO	102 to 125
	Zero @ -20°C	ppm equivalent change from 20°C	0 to 2
	Zero @ 50°C	ppm equivalent change from 20°C	0 to -6
<b>CROSS SENSITIVITY</b>	Filter Capacity	ppm-hours of Hydrogen Sulfide	nd
	H <sub>2</sub> S sensitivity	% measured gas @ 20ppm H <sub>2</sub> S	< 1.5
	NO <sub>2</sub> sensitivity	% measured gas @ 10ppm NO <sub>2</sub>	< 0.1
	Cl <sub>2</sub> sensitivity	% measured gas @ 10ppm Cl <sub>2</sub>	< 0.1
	NO sensitivity	% measured gas @ 50ppm NO	< 50
	SO <sub>2</sub> sensitivity	% measured gas @ 20ppm SO <sub>2</sub>	< 0.1
	H <sub>2</sub> sensitivity	% measured gas @ 400ppm H <sub>2</sub> @ 20°C	< 50
	C <sub>2</sub> H <sub>4</sub> sensitivity	% measured gas @ 400ppm C <sub>2</sub> H <sub>4</sub>	< 100
NH <sub>3</sub> sensitivity	% measured gas @ 20ppm NH <sub>3</sub>	< 0.1	
<b>KEY SPECIFICATIONS</b>	Temperature range	°C	-30 to 50
	Pressure range	kPa	80 to 120
	Humidity range	%rh continuous (see note below)	15 to 90
	Storage period	months @ 3 to 20°C (stored in sealed pot)	6
	Load resistor	Ω (recommended)	10 to 47
	Weight	g	< 6

**Note:** Above 85% rh and 40°C a maximum continuous exposure period of 10 days is warranted. Where such exposure occurs the sensor will recover normal electrolyte volumes, when allowed to rest at lower %rh and temperature levels for several days.



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.

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## Performance Data Carbon Monoxide Channel

Technical Specification

Figure 1 CO Channel Sensitivity Temperature Dependence

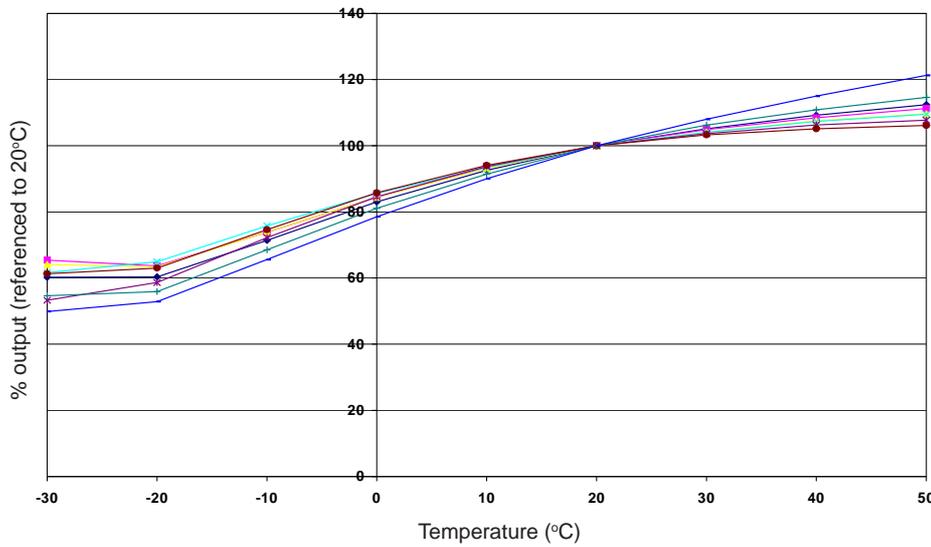


Figure 1 shows the % variation in sensitivity caused by changes in temperature.

The data is taken from a typical batch of sensors.

Figure 2 CO Channel Zero Temperature Dependence

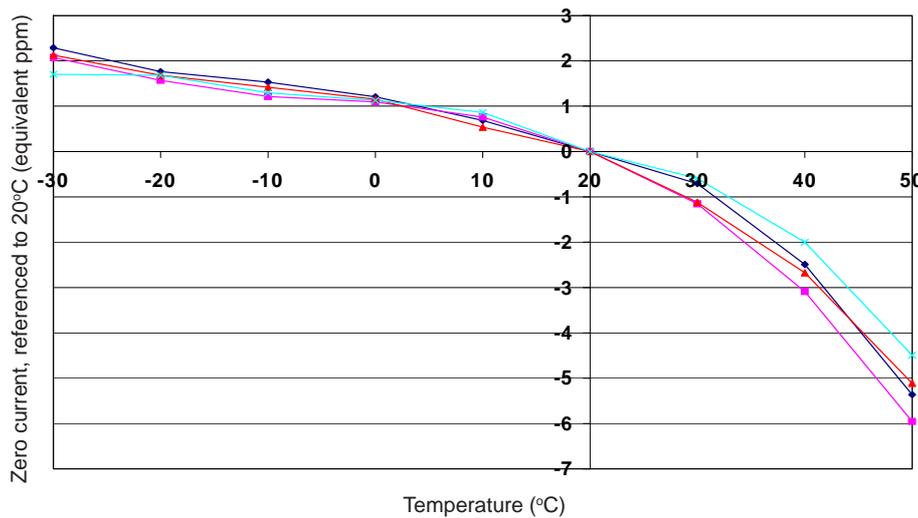


Figure 2 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to the zero at 20°C.

This data is taken from a typical batch of sensors.

Figure 3 CO Channel Response to 800ppm CO

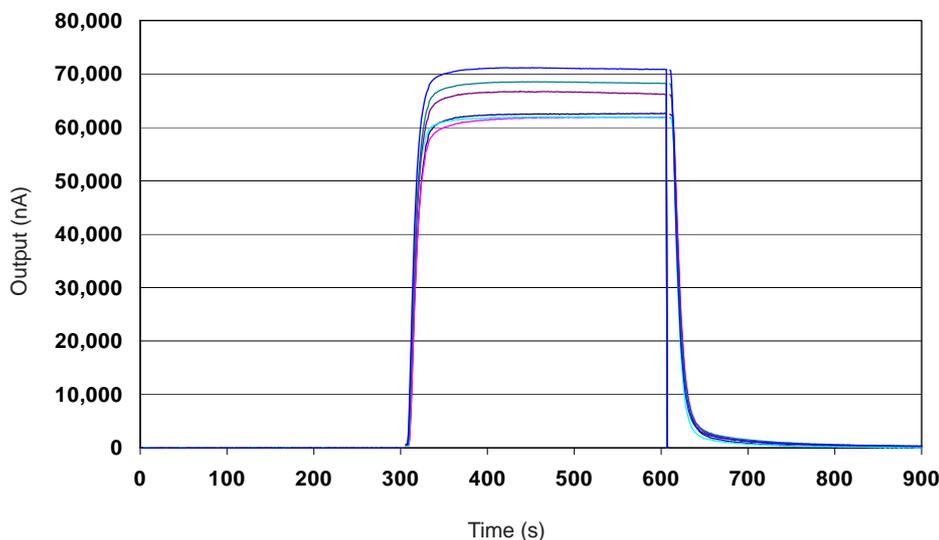


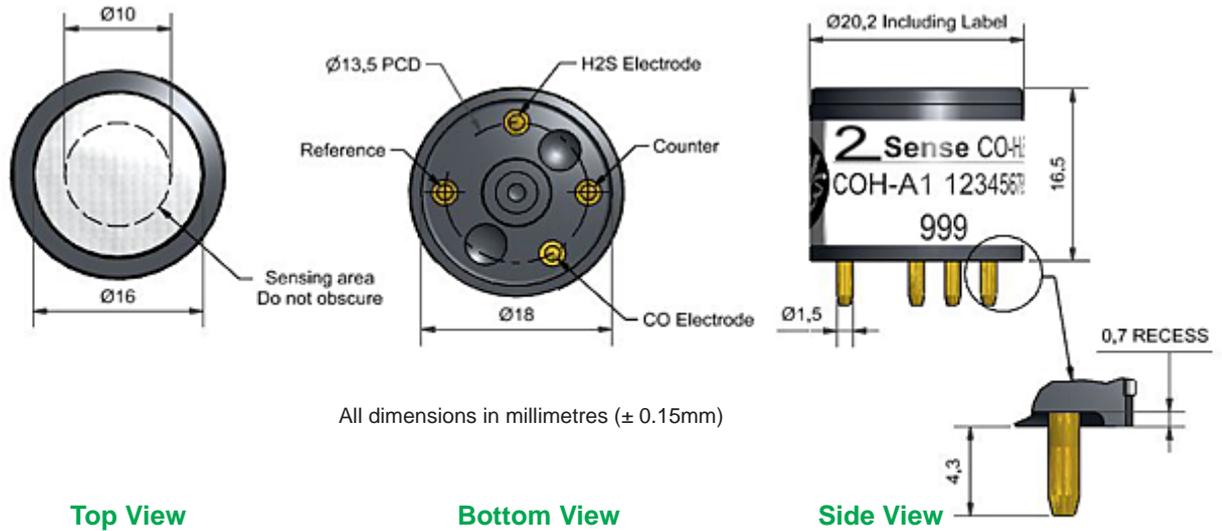
Figure 3 shows the response for a batch of sensors tested with 800ppm CO. The fast, stable response shows a robust sensor that operates well above its specification.

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## Performance Specification contd.

Figure 4 Schematic Diagram



# Technical Specification

### Specification Hydrogen Sulfide Channel

<b>PERFORMANCE</b>	Sensitivity	nA/ppm in 20ppm H <sub>2</sub> S	700 to 1000
	Response time	t <sub>90</sub> (s) from zero to 20ppm H <sub>2</sub> S @ 20°C	< 30
	Zero current	ppm equivalent in zero air	0 to -0.3
	Resolution	rms noise (ppm equivalent)	< 0.05
	Range	ppm H <sub>2</sub> S limit of performance warranty	200
	Linearity	ppm error at full scale, linear at zero and 20ppm H <sub>2</sub> S	0 to -3
	Overgas limit	maximum ppm H <sub>2</sub> S for stable response to gas pulse	500
<b>LIFETIME</b>	Zero drift	ppm equivalent change/year in lab air	< 0.1
	Sensitivity drift	% change/year in lab air, monthly test	< 2
	Operating life	months until 80% original signal (24 month warranted)	24
<b>ENVIRONMENTAL</b>	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 20ppm H <sub>2</sub> S	80 to 90
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 20ppm H <sub>2</sub> S	105 to 115
	Zero @ -20°C	ppm equivalent change from 20°C	< $\pm 0.05$
	Zero @ 50°C	ppm equivalent change from 20°C	< 0 to 0.2
<b>CROSS SENSITIVITY</b>	NO <sub>2</sub> sensitivity	% measured gas @ 10ppm NO <sub>2</sub>	< -25
	Cl <sub>2</sub> sensitivity	% measured gas @ 10ppm Cl <sub>2</sub>	< -12
	NO sensitivity	% measured gas @ 50ppm NO	< 1
	SO <sub>2</sub> sensitivity	% measured gas @ 20ppm SO <sub>2</sub>	< 8
	CO sensitivity	% measured gas @ 400ppm CO	< 6
	H <sub>2</sub> sensitivity	% measured gas @ 400ppm H <sub>2</sub>	< 0.2
	C <sub>2</sub> H <sub>4</sub> sensitivity	% measured gas @ 400ppm C <sub>2</sub> H <sub>4</sub>	< 0.5
NH <sub>3</sub> sensitivity	% measured gas @ 20ppm NH <sub>3</sub>	< 0.1	

Note: Above 85% rh and 40°C a maximum continuous exposure period of 10 days is warranted. Where such exposure occurs the sensor will recover normal electrolyte volumes, when allowed to rest at lower %rh and temperature levels for several days.

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## Performance Data Hydrogen Sulfide Channel

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Figure 5 H<sub>2</sub>S Channel Response to 25ppm H<sub>2</sub>S

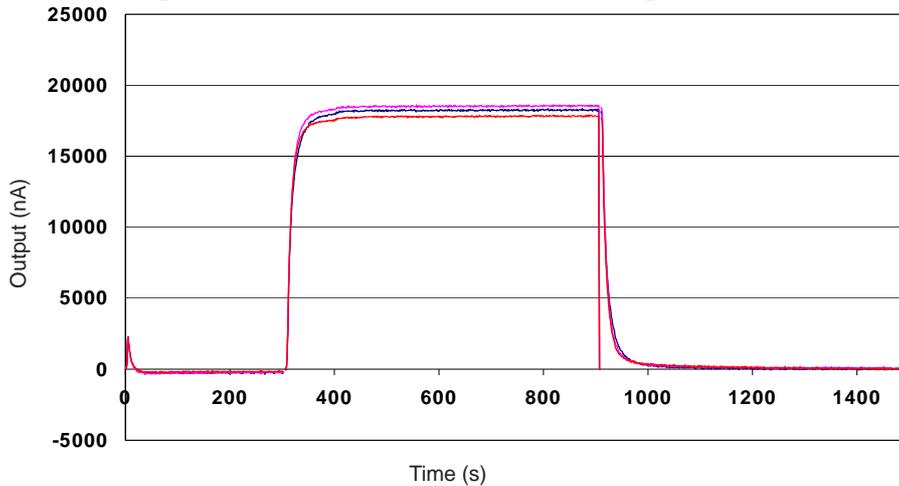


Figure 5 shows response to 25ppm H<sub>2</sub>S. Sensor shows a fast and stable response and recovery and repeatable sensitivity.

Figure 6 H<sub>2</sub>S Channel Sensitivity Temperature Dependence

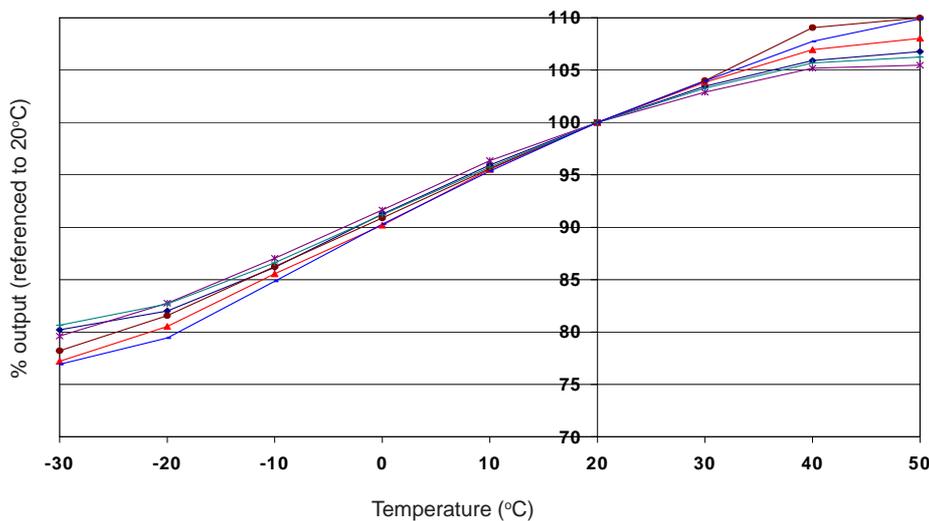


Figure 6 shows the % variation in sensitivity caused by changes in temperature.

The data is taken from a typical batch of sensors.

Figure 7 H<sub>2</sub>S Channel Zero Temperature Dependence

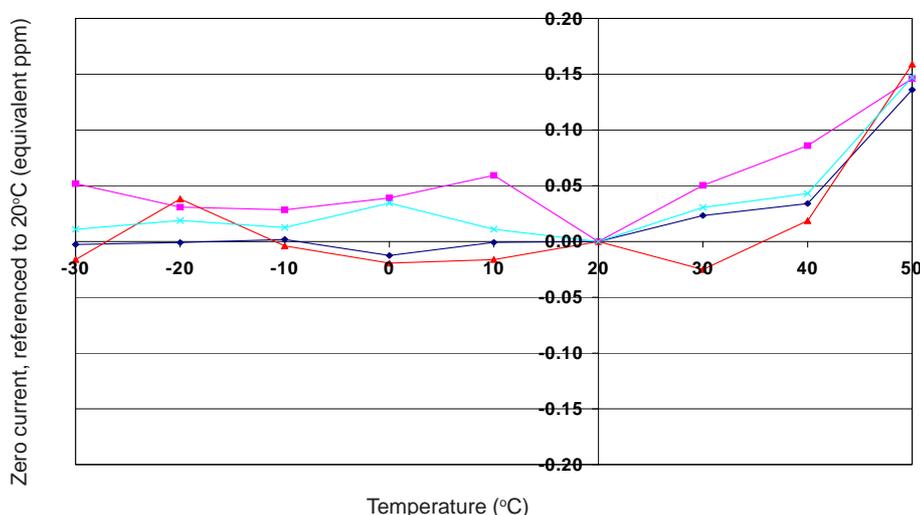


Figure 7 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to the zero at 20°C.

This data is taken from a typical batch of sensors.

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