COH-A2 Carbon Monoxide and Hydrogen Sulfide

Introduction

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

Alphasense's new 2sense H_2S+CO gas sensor allows designers to reduce significantly their gas detector size and cost. The 2sense uses a patented approach to dual gas sensor design and utilises our also patented low Hydrogen sensitivity CO electrode.

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_2S and CO.

Specification Carbon Monoxide Channel

Performance	Sensitivity	nA/ppm in 400ppm CO		50 to 100
	Response time	t90 (s) from zero to 400ppm CO		< 35
	Zero current	ppm equivalent in zero air		-3 to + 3.5
	Resolution	rms noise (ppm equivalent)		< 0.5
	Range	ppm CO limit of performance warranty		1,000
	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
Lifetime	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
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 100ppm CO		30 to 50
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 100ppm CO		120 to 145
	Zero @ -20°C	ppm equivalent change from 20°C		0 to 5
	Zero @ 50°	ppm equivalent change from 20°C		0 to -5
Cross Sensitivity	Filter capacity	ppm hours of Hydrogen Sulfide		1200
	H_2S sensitivity	% measured gas @ 20ppm	H_2S	< 12
	H_2 sensitivity	% measured gas @ 400ppm	H_2 @ 20°C	< 8
	NO_2 sensitivity	% measured gas @ 10ppm	NO_2	< 3
	Cl_2 sensitivity	% measured gas @ 10ppm	Cl_2	< 0.1
	NO sensitivity	% measured gas @ 50ppm	NO	< 100
	SO_2 sensitivity	% measured gas @ 20ppm	SO_2	< 2
	C_2H_4 sensitivity	% measured gas @ 400ppm	C_2H_4	< 60
	NH_3 sensitivity	% measured gas @ 20ppm	NH_3	± 0.5
Key Specifications	Temperature range	°C		-30 to 50
	Pressure range	kPa		80 to 120
	Humidity range	% h 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

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For further information on the performance of this sensor, on other sensors in the range or any other subject, please contact Alphasense Ltd. or visit our website at "www.alphasense.com".

Figure 1 CO Channel Sensitivity Temperature Dependence

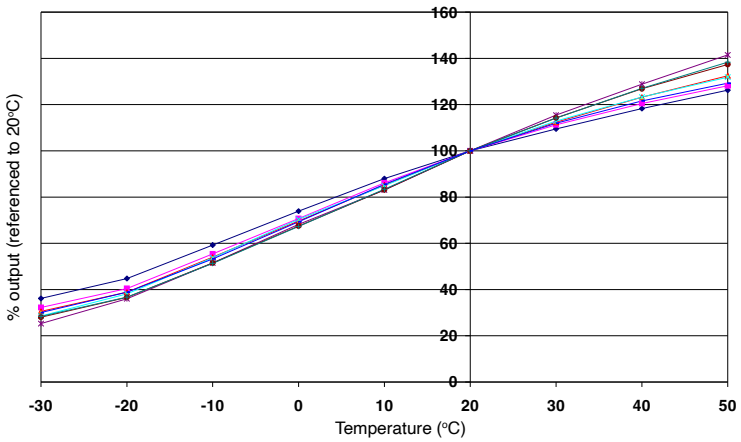


Figure 1 shows the % variation in sensitivity caused by changes in temperature.

The data is taken from a typical batch of sensors.

Figure 2 CO Channel Zero Temperature Dependence

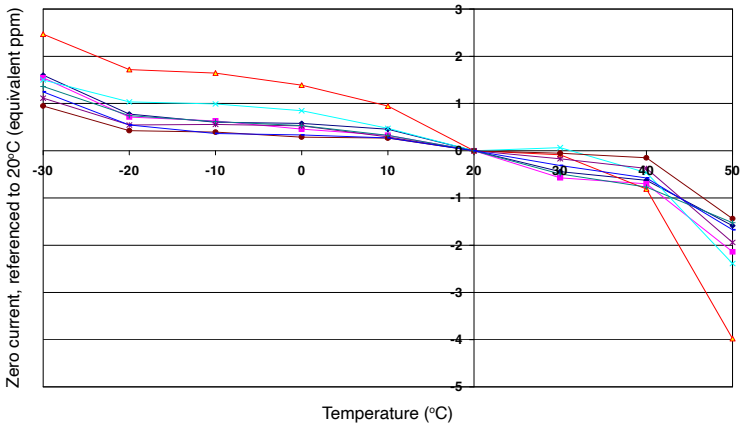


Figure 2 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to the zero at 20°C.

This data is taken from a typical batch of sensors.

Figure 3 CO Channel Response to 800ppm CO

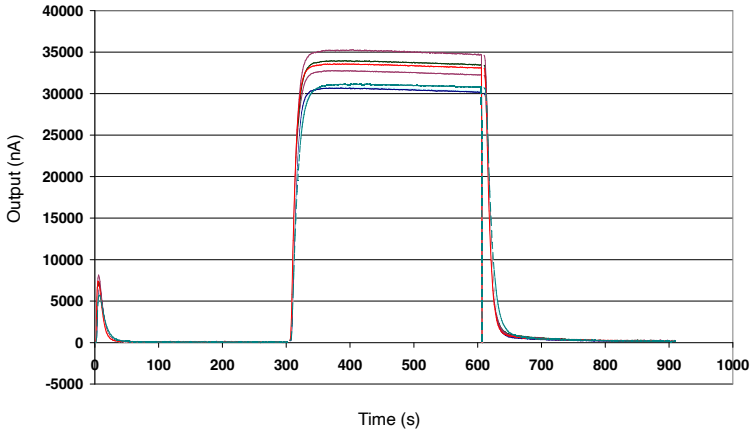
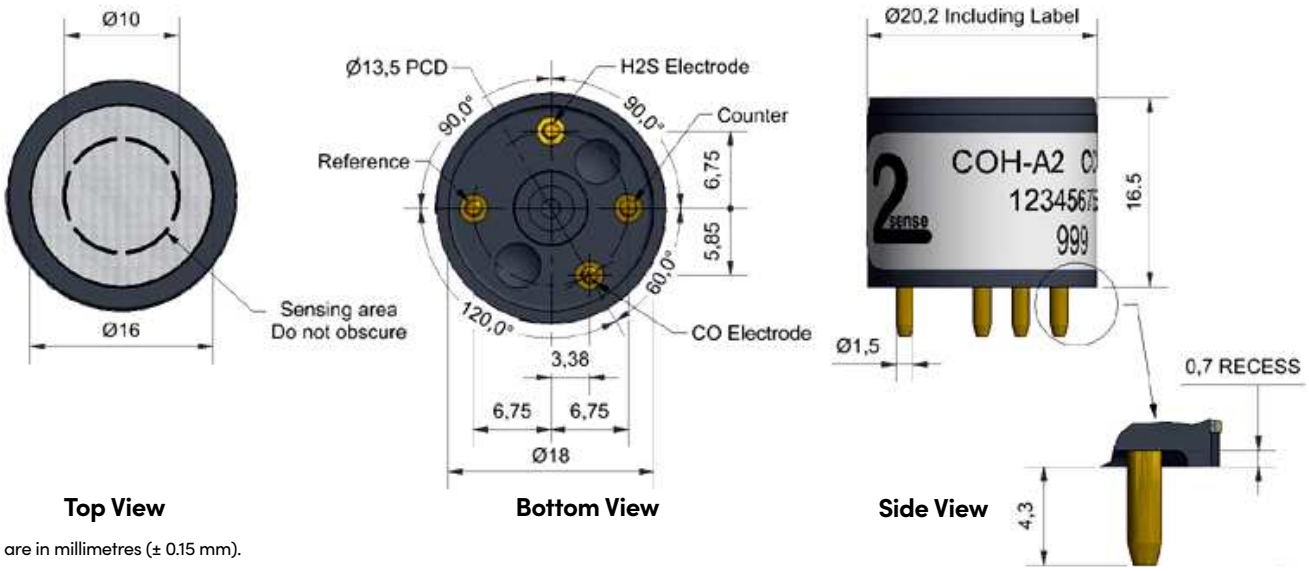


Figure 3 shows the response for a batch of sensors tested with 400ppm CO. The fast, stable response shows a robust sensor that operates well above its specification.



Top View **Bottom View** **Side View**

Dimensions are in millimetres (± 0.15 mm).

Specification Hydrogen Sulfide Channel

Performance	Sensitivity	nA/ppm in 20ppm H_2S	650 to 1100
	Response time	t90 (s) from zero to 20ppm H_2S @ 20°C	< 30
	Zero current	ppm equivalent in zero air	± 0.25
	Resolution	rms noise (ppm equivalent)	< 0.1
	Range	ppm H_2S limit of performance warranty	100
	Linearity	ppm error at full scale, linear at zero and 20ppm H_2S	< ± 5
	Overgas limit	maximum ppm H_2S for stable response to gas pulse	200
Lifetime	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
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 20ppm H_2S	75 to 90
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 20ppm H_2S	100 to 112
	Zero @ -20°C	ppm equivalent change from 20°C	± 0.05
	Zero @ 50°	ppm equivalent change from 20°C	< 0 to 0.2

Cross Sensitivity	NO_2 sensitivity	% measured gas @ 10ppm	NO_2	< -30
	Cl_2 sensitivity	% measured gas @ 10ppm	Cl_2	< -25
	NO sensitivity	% measured gas @ 50ppm	NO	< 30
	SO_2 sensitivity	% measured gas @ 20ppm	SO_2	< 30
	CO sensitivity	% measured gas @ 400ppm	CO	< 1.5
	H_2 sensitivity	% measured gas @ 400ppm	H_2	< 0.3
	C_2H_4 sensitivity	% measured gas @ 400ppm	C_2H_4	< 0.2
	NH_3 sensitivity	% measured gas @ 20ppm	NH_3	< 2

Figure 4 H_2S Channel Response to 25ppm H_2S

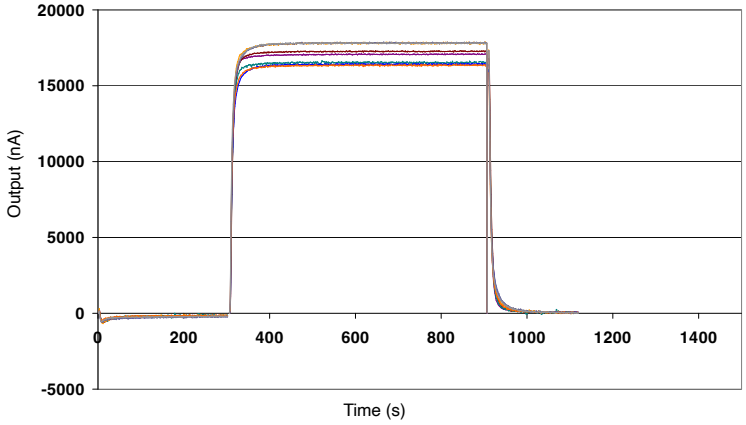


Figure 4 shows response to 25ppm H_2S. Sensor shows a fast and stable response and recovery and repeatable sensitivity.

Figure 5 H_2S Channel Sensitivity Temperature Dependence

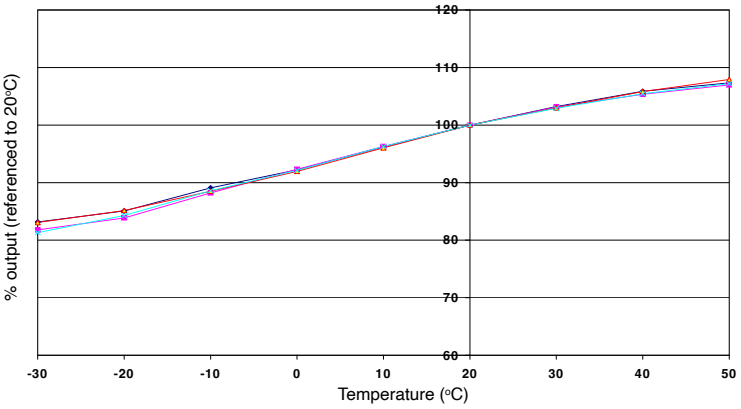


Figure 5 shows the % variation in sensitivity caused by changes in temperature.

The data is taken from a typical batch of sensors.

Figure 6 H_2S Channel Zero Temperature Dependence

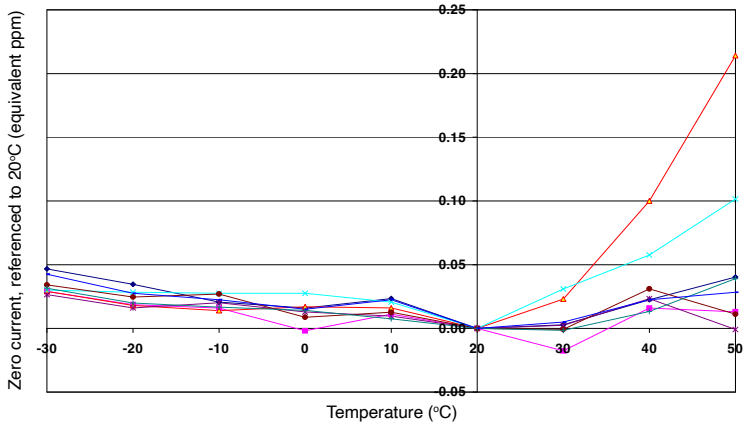


Figure 6 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to the zero at 20°C.

This data is taken from a typical batch of sensors.

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. NOTE: all sensors are tested at ambient environmental conditions 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.

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