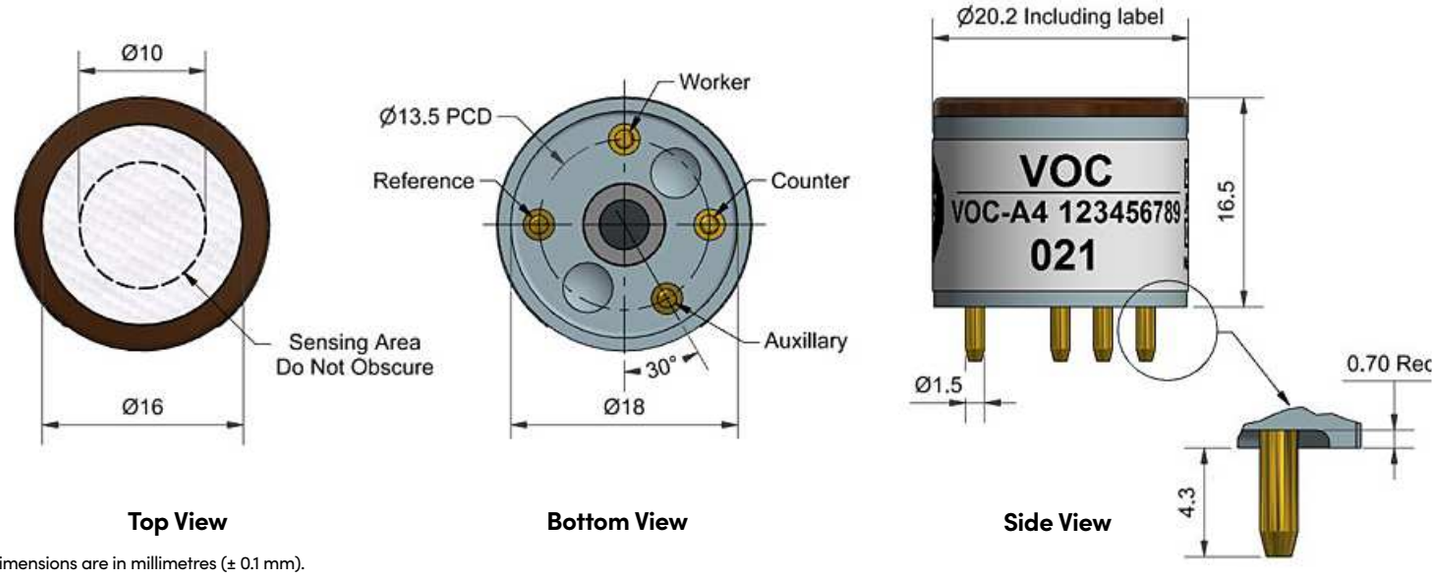
alphasense
AMETEK

Technical specifications Version 1.0

VOC-A4 4-Electrode Volatile Organic Compound Sensor



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

Dimensions are in millimetres (± 0.1 mm).

Specification CO sensing

Performance	Sensitivity	nA/ppm in 2ppm CO	230 to 410
	Response time	t_{90} (s) from zero to 2ppm CO	< 30
	Zero current	nA in zero air at 20°C	±200
	Noise*	±2 standard deviations (ppb equivalent)	20
	Range	ppm limit of performance warranty	190
	Linearity	ppm CO error at full scale, linear at zero, 10ppm CO	±1.5
	Overgas limit	maximum ppm for stable response to gas pulse	1000
Lifetime	Zero drift	ppm equivalent change/year in lab air	±500
	Sensitivity drift	% change/year in lab air, monthly test	< 15
	Operating life	months until 50% original signal (24 month warranted)	> 36
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 2ppm CO	50 to 80
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 2ppm CO	100 to 120
	Zero @ -20°C	nA change from 20°C	±20
	Zero @ 50°C	nA change from 20°C	±100
Cross sensitivity	C_2H_6O sensitivity	% measured gas @ <1ppm C_2H_6O	< 125
	H_2S sensitivity	% measured gas @ 5ppm H_2S	< 400
	NO_2 sensitivity	% measured gas @ 5ppm NO_2	< -90
	Cl_2 sensitivity	% measured gas @ 5ppm Cl_2	< -45
	NO sensitivity	% measured gas @ 5ppm NO	< 35
	SO_2 sensitivity	% measured gas @ 5ppm SO_2	< 110
	H_2 sensitivity	% measured gas @ 100ppm H_2 at 20°C	< 50
	C_2H_4 sensitivity	% measured gas @ 40ppm C_2H_4	< 115
	NH_3 sensitivity	% measured gas @ 20ppm NH_3	< -0.1
	CO_2 sensitivity	% measured gas @ 5% vol CO_2	< 0.1
Key specifications	Temperature range	°C	-30 to 50
	Pressure range	kPa	80 to 120
	Humidity range	% rh continuous	15 to 90
	Storage period	months @ 3 to 20°C (stored in sealed pot)	6
	Load resistor	Ω (AFE circuit is recommended)	33 to 100
	Weight	g	< 6

T: +44 (0)1376 556700 **E:** sensors@alphasense.com **W:** www.alphasense.com

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 Linearity from 0 to 10ppm CO

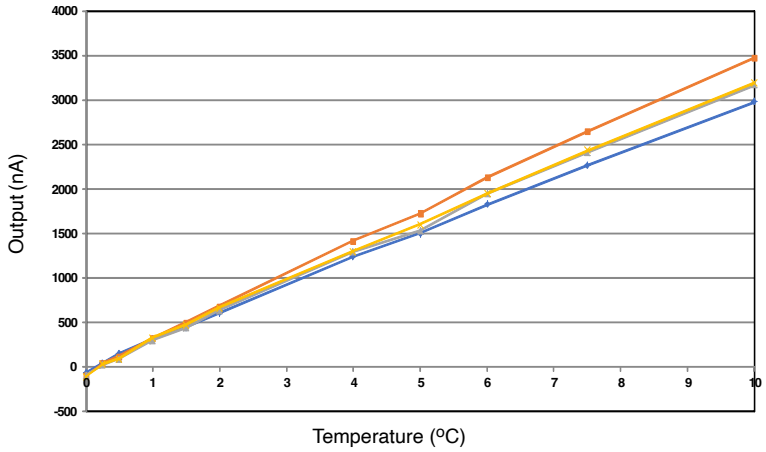


Figure 1 shows example sensor response at concentrations of up to 10ppm CO.

Figure 2 Zero Temperature Dependence

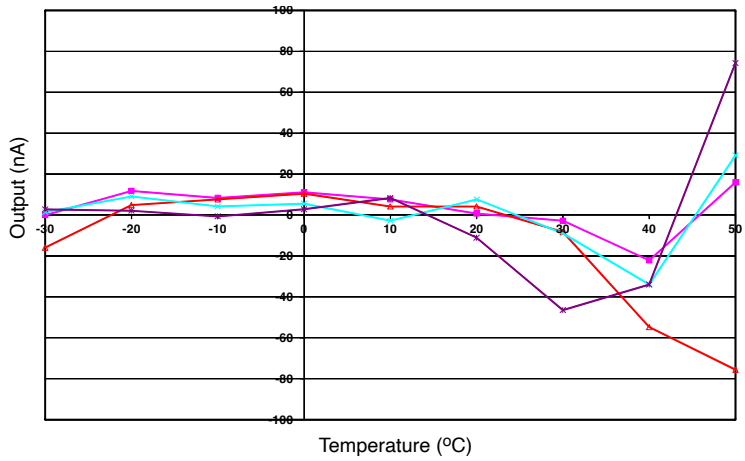


Figure 2 shows example variation in zero output of the working electrode caused by changes in temperature, expressed as nA.

VOC-A4 4-Electrode Volatile Organic Compound Sensor

The VOC-A4 detects both VOCs and CO gases. Using both a VOC-A4 and a CO-A4 sensor in combination allows the estimation of VOC concentration at 0V bias.

The data given in this TDS refers to the use of the VOC-A4 sensor at 0V bias. Other voltages within the range 0 to 0.3V can also be applied (see application note AAN-805).

In order to calculate the VOC concentration, it is necessary to ensure the signals from the two sensors have been corrected for electronic zero offset, sensor zero offset and temperature dependence, and sensitivity (nA/ppm) calibration and temperature dependence.

Specification Ethanol (C_2H_6O) sensing

Performance	Sensitivity	nA/ppm in <1ppm C_2H_6O	200 to 400
	Response time	t_{90} (s) from zero to <1ppm C_2H_6O	< 30
	Zero current	nA in zero air at 20°C	±200
	Noise	±2 standard deviations (ppb equivalent)	20
	Range	ppm limit of performance warranty	2
	Linearity	ppm error at full scale, linear at zero, <1ppm C_2H_6O	< 0.13
	Overgas limit	maximum ppm for stable response to gas pulse	5
Lifetime	Zero drift	ppb equivalent change/year in lab air	±500
	Sensitivity drift	% change/year in lab air, monthly test	< 15
	Operating life	months until 50% original signal (24 month warranted)	> 36
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C)	ND
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C)	ND
	Zero @ -20°C	nA change from 20°C	±20
	Zero @ 50°C	nA change from 20°C	±100
Cross sensitivity	CO sensitivity	% measured gas @ 2ppm CO	< 110
	H_2S sensitivity	% measured gas @ 5ppm H_2S	< 400
	NO_2 sensitivity	% measured gas @ 5ppm NO_2	< -80
	Cl_2 sensitivity	% measured gas @ 5ppm Cl_2	< -40
	NO sensitivity	% measured gas @ 5ppm NO	< 40
	SO_2 sensitivity	% measured gas @ 5ppm SO_2	< 100
	H_2 sensitivity	% measured gas @ 100ppm H_2 at 20°C	< 50
	C_2H_4 sensitivity	% measured gas @ 40ppm C_2H_4	< 110
	NH_3 sensitivity	% measured gas @ 20ppm NH_3	< -0.1
	CO_2 sensitivity	% measured gas @ 5% vol CO_2	< 0.1
Key specifications	Temperature range	°C	-30 to 50
	Pressure range	kPa	80 to 120
	Humidity range	% rh continuous	15 to 90
	Storage period	months @ 3 to 20°C (stored in sealed pot)	6
	Load resistor	Ω (AFE circuit is recommended)	33 to 100
	Weight	g	< 6

T: +44 (0)1376 556700 **E:** sensors@alphasense.com **W:** www.alphasense.com

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 3 Linearity from 0 to 860ppb (approx) Ethanol

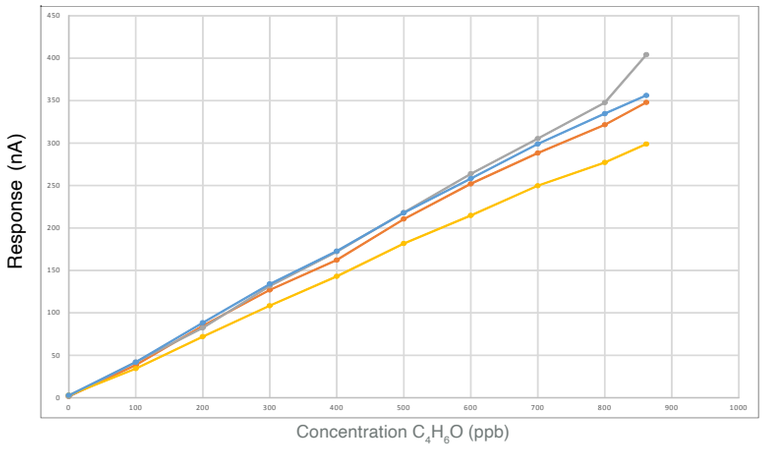


Figure 3 shows example sensor output at concentrations of up to 860ppb Ethanol.

Figure 4 Response to 860ppb (approx) Ethanol

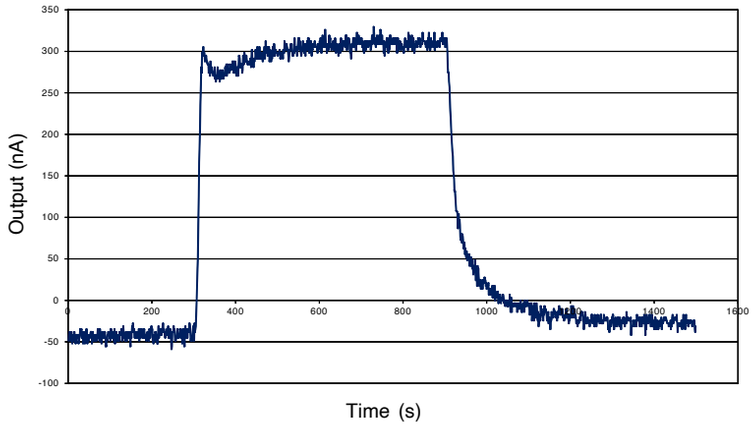


Figure 4 shows example sensor output in reponse to 860ppb Ethanol.

Figure 5 Response to 2ppm C_4H_8 with voltage bias

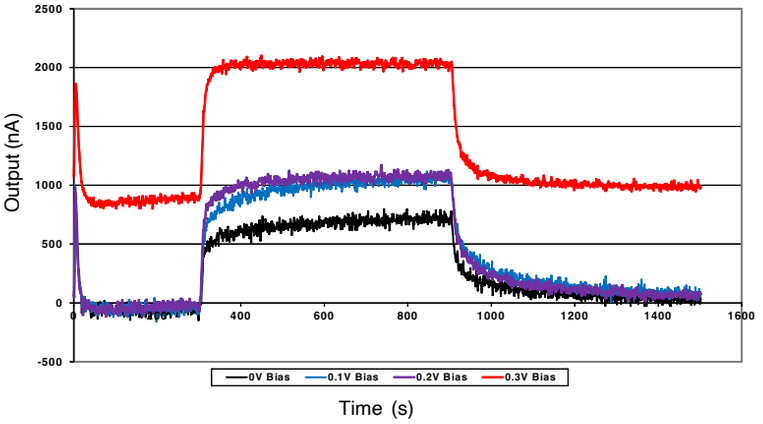


Figure 5 shows example output at different bias voltages in reponse to 2ppm C_4H_8.