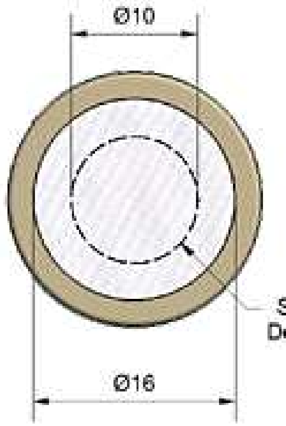
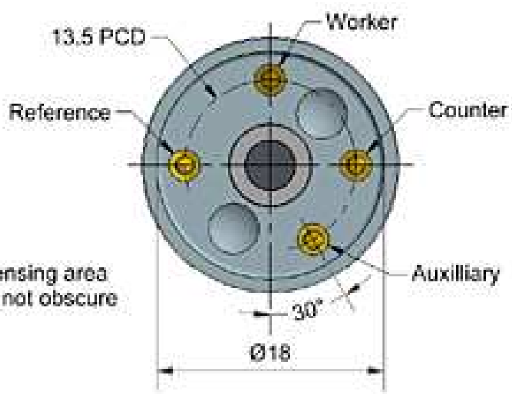
alphasense
AMETEK®

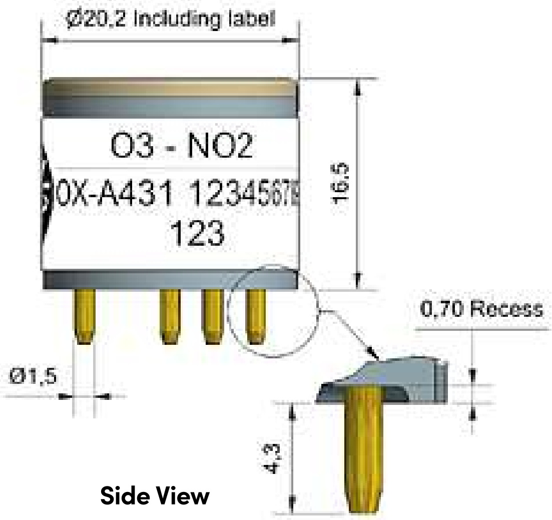
OX-A431 Oxidising Gas Sensor – Ozone + Nitrogen Dioxide – 4-Electrode



Top View



Bottom View



Side View

Dimensions are in millimetres (± 0.15 mm).

Specification O_3 Sensing

Performance	Sensitivity	nA/ppm at 1ppm O_3	-200 to -650
	Response time	t90 (s) from zero to 1ppm O_3	< 80
	Zero current	nA in zero air at 20°C	-70 to +70
	Noise*	±2 standard deviations (ppb equivalent)	15
	Range	ppm O_3 limit of performance warranty	20
	Linearity	ppm error at full scale, linear at zero and 20ppm O_3	< ± 0.5
	Overgas limit	maximum ppm for stable response to gas pulse	50
	***Tested with Alphasense AFE low noise circuit**		
Lifetime	Zero drift	ppb equivalent change/year in lab air	0 to 20
	Sensitivity drift	% change/year in lab air, monthly test	< -20 to -40
	Operating life	months until 50% original signal (24-month warranted)	> 24
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 2ppm O_3	60 to 80
	Sensitivity @ 40°C	% (output @ 40°C/output @ 20°C) @ 2ppm O_3	80 to 105
	Zero @ -20°C	nA	0 to 25
	Zero @ 40°C	nA	20 to 90

Cross Sensitivity	H_2S	sensitivity	% measured gas @ 5ppm	H_2S	< -80
	NO	sensitivity	% measured gas @ 5ppm	NO	< 5
	Cl_2	sensitivity	% measured gas @ 5ppm	Cl_2	< 100
	SO_2	sensitivity	% measured gas @ 5ppm	SO_2	< -3
	CO	sensitivity	% measured gas @ 5ppm	CO	< -3
	C_2H_4	sensitivity	% measured gas @ 100ppm	C_2H_4	< 0.1
	NH_3	sensitivity	% measured gas @ 20ppm	NH_3	< 0.1
	H_2	sensitivity	% measured gas @ 100ppm	H_2	< 0.1
	CO_2	sensitivity	% measured gas @ 5% volume	CO_2	< 0.1
	Halothane	sensitivity	% measured gas @ 100ppm	Halothane	< 0.1

Key Specifications	Temperature range	°C	-30 to 40
	Pressure range	kPa	80 to 120
	Humidity range	% rh continuous	15 to 85
	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

Figure 1 Sensitivity Temperature Dependence To 1ppm O_3

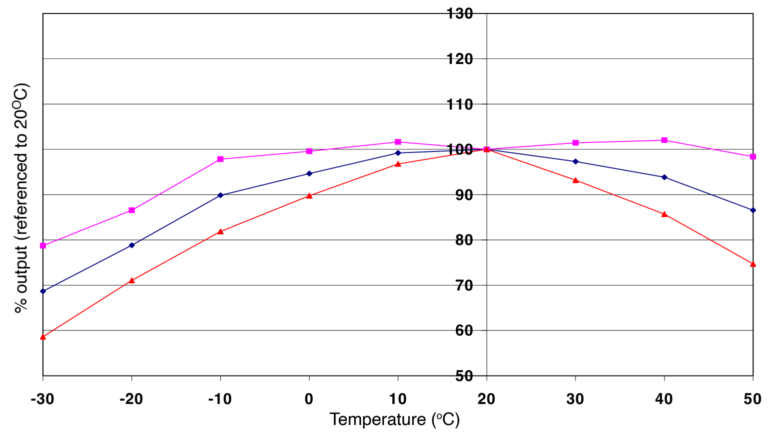


Figure 1 shows the mean and 95% confidence levels for the temperature dependence of sensitivity at 1ppm O_3.

Measuring Ozone at higher temperatures requires good casing design to ensure the Ozone reaches the sensor before reacting.

This data is taken from a typical batch of sensors.

Figure 2 Zero Temperature Dependence

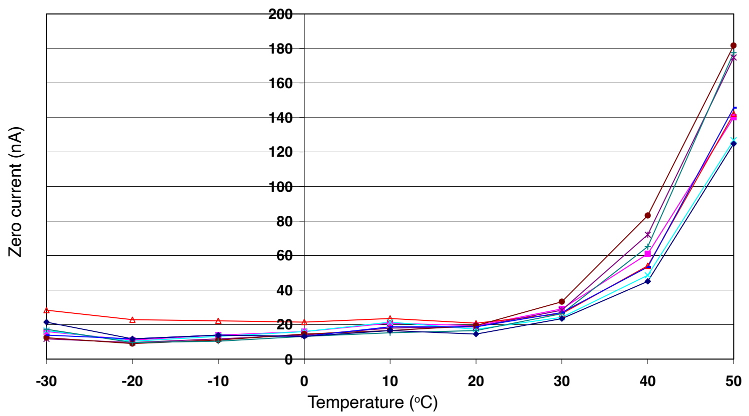


Figure 2 shows the variation in zero output of the working electrode caused by changes in temperature, expressed as nA.

This data is taken from a typical batch of sensors.

Contact Alphasense for futher information on zero current correction.

Figure 3 Response from 200ppb to 0ppb O_3

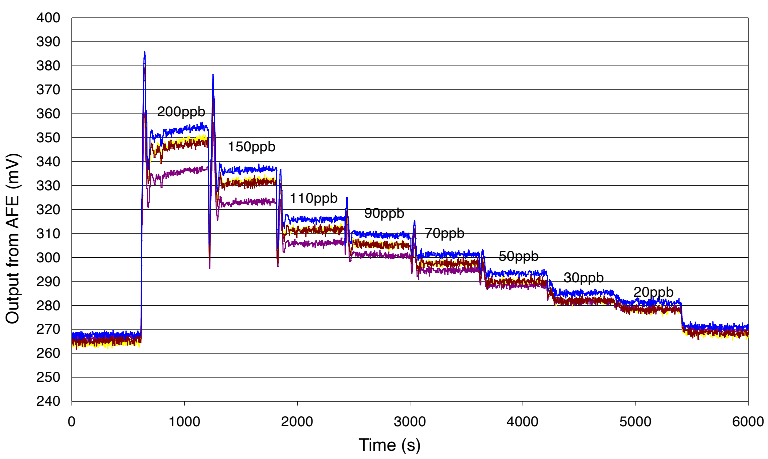


Figure 3 shows response from 200ppb O_3 to 0ppb O_3.

Use of Alphasense AFE circuit reduces noise to 15ppb, with the opportunity of digital smoothing to reduce noise even further.

Offset voltage is due to intentional AFE circuit electronic offset.

The OX-A431 detects both ozone and nitrogen dioxide (O_3 +NO_2). The NO2-A43F measures only nitrogen dioxide, filtering out ozone. Using these sensors together allows you to calculate the O_3 concentration by subtracting the corrected NO2-A43F concentration from the corrected OX-A431 concentration.

Before subtracting to determine ozone concentration, ensure that 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 NO_2 Sensing

Performance	Sensitivity to NO_2	nA/ppm at 2ppm NO_2		-200 to -550
	Response time	t90 (s) from zero to 1ppm NO_2		< 80
	Zero current	nA in zero air at 20°C		-70 to +70
	Noise*	±2 standard deviations (ppb equivalent)		15
	Range	ppm NO_2 limit of performance warranty		20
	Linearity	ppm error at full scale, linear at zero and 20ppm NO_2		< ± 0.5
	Overgas limit	maximum ppm for stable response to gas pulse		50
	***Tested with Alphasense AFE low noise circuit**			
Lifetime	Zero drift	ppb equivalent change/year in lab air		0 to 20
	Sensitivity drift	% change/year in lab air, monthly test		< -20 to -40
	Operating life	months until 50% original signal (24-month warranted)		> 24
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 2ppm NO_2		50 to 80
	Sensitivity @ 40°C	% (output @ 50°C/output @ 20°C) @ 2ppm NO_2		115 to 130
	Zero @ -20°C	nA		0 to 25
	Zero @ 40°C	nA		20 to 50
Cross Sensitivity	H_2S sensitivity	% measured gas @ 5ppm	H_2S	< -100
	NO sensitivity	% measured gas @ 5ppm	NO	< 5
	Cl_2 sensitivity	% measured gas @ 5ppm	Cl_2	< 100
	SO_2 sensitivity	% measured gas @ 5ppm	SO_2	< -3
	CO sensitivity	% measured gas @ 5ppm	CO	< -3
	C_2H_4 sensitivity	% measured gas @ 100ppm	C_2H_4	< 0.1
	NH_3 sensitivity	% measured gas @ 20ppm	NH_3	< 0.1
	H_2 sensitivity	% measured gas @ 100ppm	H_2	< 0.1
	CO_2 sensitivity	% measured gas @ 5% volume	CO_2	0.1
	Halothane sensitivity	% measured gas @ 100ppm	Halothane	< 0.1
Key Specifications	Temperature range	°C		-30 to 40
	Pressure range	kPa		80 to 120
	Humidity range	% rh continuous		15 to 85

Figure 4 Sensitivity temperature dependence to 2ppm NO_2

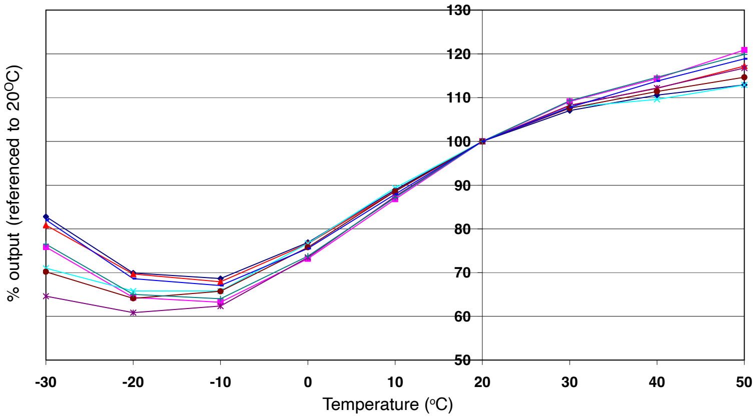
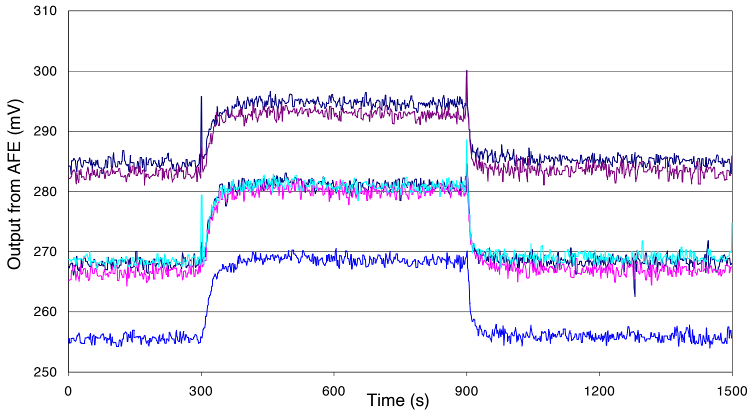


Figure 4 shows the temperature dependence of sensitivity at 2ppm NO_2.

This data is taken from a typical batch of sensors.

Figure 5 Response to 50ppb NO_2



The OX-A431 shows fast response and return to baseline, even at low concentrations.

Figure 6 Response from 200ppb to 0ppb NO_2

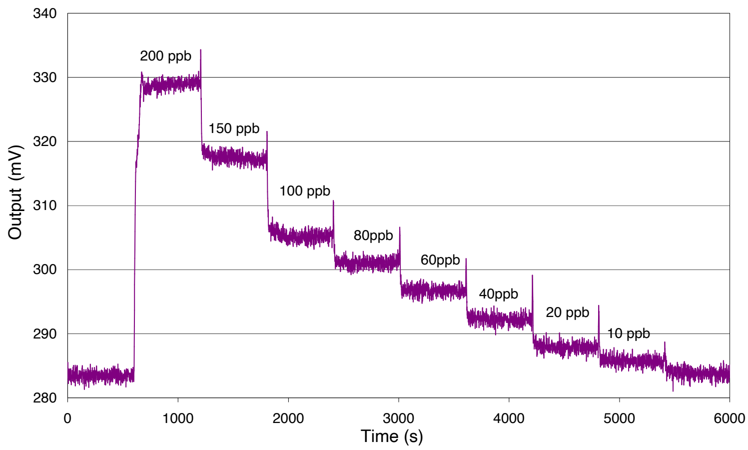


Figure 6 shows response from 200ppb NO_2 to 0ppb NO_2.

Use of Alphasense AFE circuit reduces noise to 15ppb, with the opportunity of digital smoothing to reduce noise even further.

Offset voltage is due to intentional AFE circuit electronic offset.