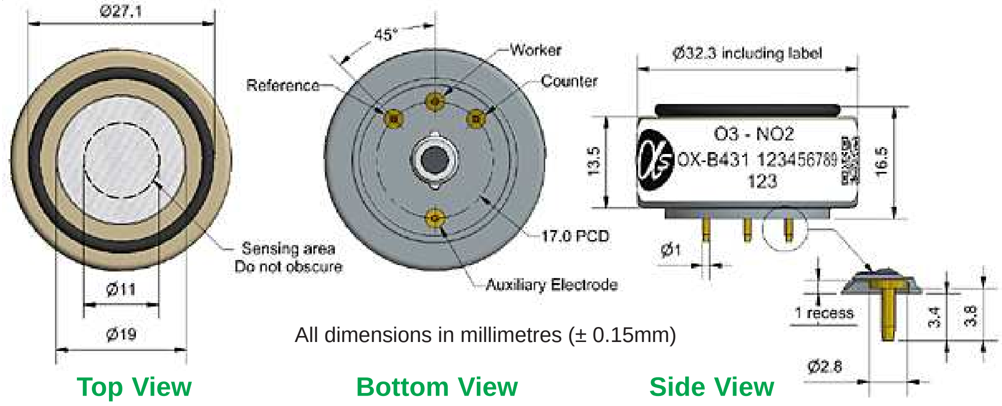
Technical Specification

OX-B431 Oxidising Gas Sensor
Ozone + Nitrogen Dioxide
4-Electrode

Patented

Figure 1 OX-B431 Schematic Diagram



Top View Bottom View Side View

Specification O_3 Sensing

PERFORMANCE			
	Sensitivity	nA/ppm at 1ppm O_3	-225 to -550
	Response time	t_{90} (s) from zero to 1ppm O_3	< 45
	Zero current	nA in zero air at 20°C	-50 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	70 to 90
	Sensitivity @ 40°C	(% output @ 40°C/output @ 20°C) @ 2ppm O_3	95 to 125
	Zero @ -20°C	nA	0 to 25
	Zero @ 40°C	nA	5 to 100

CROSS SENSITIVITY	H_2S	sensitivity % measured gas	@	5ppm	H_2S	< 170
	NO	sensitivity % measured gas	@	5ppm	NO	< 5
	Cl_2	sensitivity % measured gas	@	5ppm	Cl_2	< 90
	SO_2	sensitivity % measured gas	@	5ppm	SO_2	< -7
	CO	sensitivity % measured gas	@	5ppm	CO	< 0.1
	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% Vol	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 recommended)	33 to 100
	Weight	g	< 6

NOTE: all sensors are tested at ambient environmental conditions, with 47 ohm load resistor, 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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Technical Specification

OX-B431 Performance Data

Figure 2 Sensitivity temperature dependence to 1ppm O_3

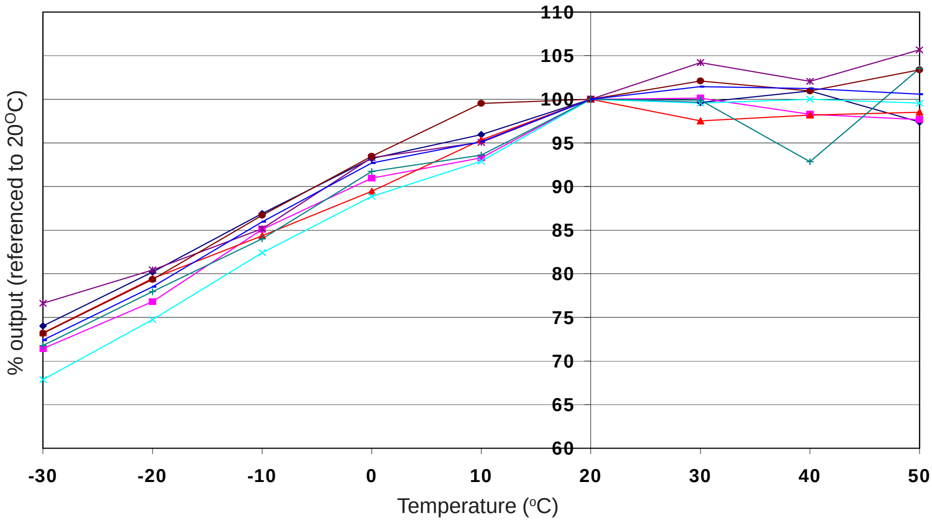

Figure 2 shows the temperature dependence of sensitivity at 1ppm O_3.

This data is taken from a typical batch of sensors.

Figure 3 Zero temperature dependence

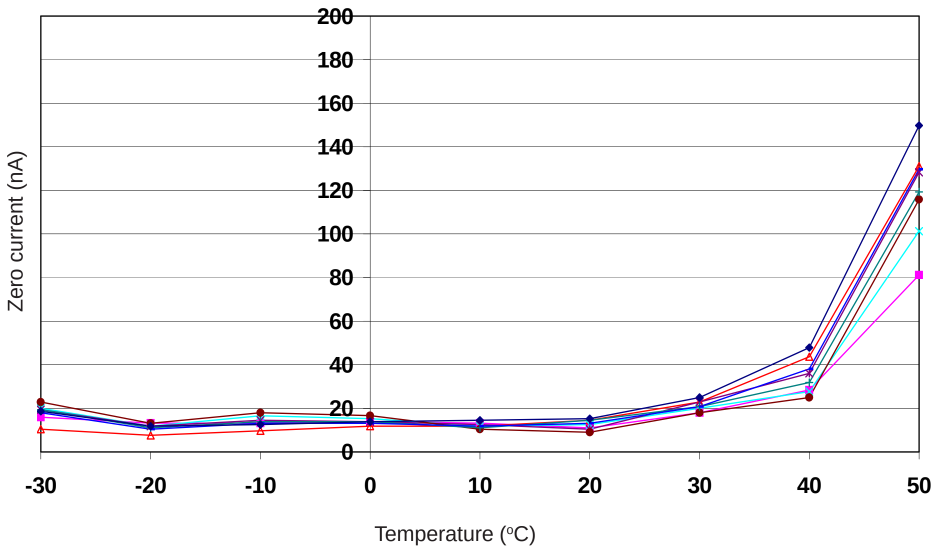

Figure 3 shows the variation in zero output of the working electrode caused by changes in temperature, expressed as nA.

This data is taken from a typical batch of sensors.

Contact Alphasense for futher information on zero current correction.

Figure 4 Response from 200 ppb to 0 ppb O_3

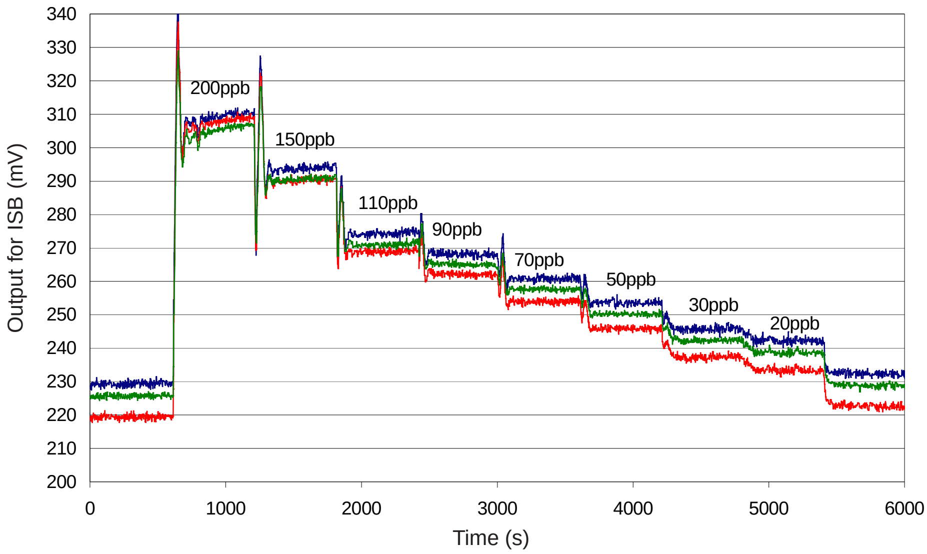

Figure 4 shows response from 200ppb O_3 to 0ppb O_3.

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

Offset voltage is due to intentional ISB circuit electronic offset.

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OX-B431 Oxidising Gas Sensor
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The OX-B431 detects both ozone and nitrogen dioxide (O_3 +NO_2). The NO2-B43F measures only nitrogen dioxide, filtering out ozone. Using these sensors together allows you to calculate the O_3 concentration by subtracting the corrected NO2-B43F concentration from the corrected OX-B431 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	-250 to -650
	Response time	t_{90} (s) from zero to 2ppm NO_2	< 35
	Zero current	nA in zero air at 20°C	-50 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	70 to 90
	Sensitivity @ 40°C	(% output @ 50°C/output @ 20°C) @ 2ppm NO_2	95 to 110
	Zero @ -20°C	nA	0 to 25
	Zero @ 40°C	nA	5 to 50

CROSS SENSITIVITY	H_2S	sensitivity % measured gas	@	5ppm	H_2S	< 170
	NO	sensitivity % measured gas	@	5ppm	NO	< 5
	Cl_2	sensitivity % measured gas	@	5ppm	Cl_2	< 90
	SO_2	sensitivity % measured gas	@	5ppm	SO_2	< -7
	CO	sensitivity % measured gas	@	5ppm	CO	< 0.1
	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% Vol	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
			< 6

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, with 47 ohm load resistor, 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.

Technical Specification

OX-B431 Performance Data

Figure 5 Sensitivity temperature dependence to 2ppm NO_2

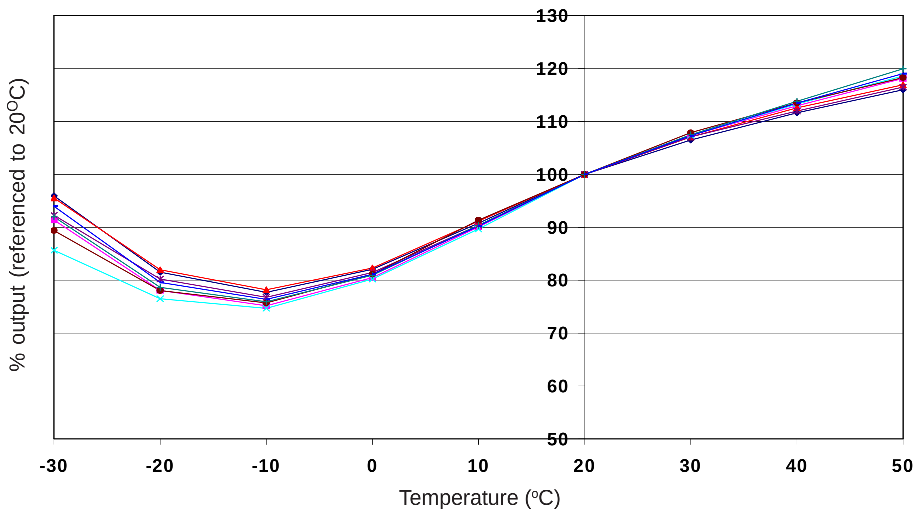

Figure 5 shows the temperature dependence of sensitivity at 2ppm NO_2.

This data is taken from a typical batch of sensors.

Figure 6 Response to 50ppb NO_2

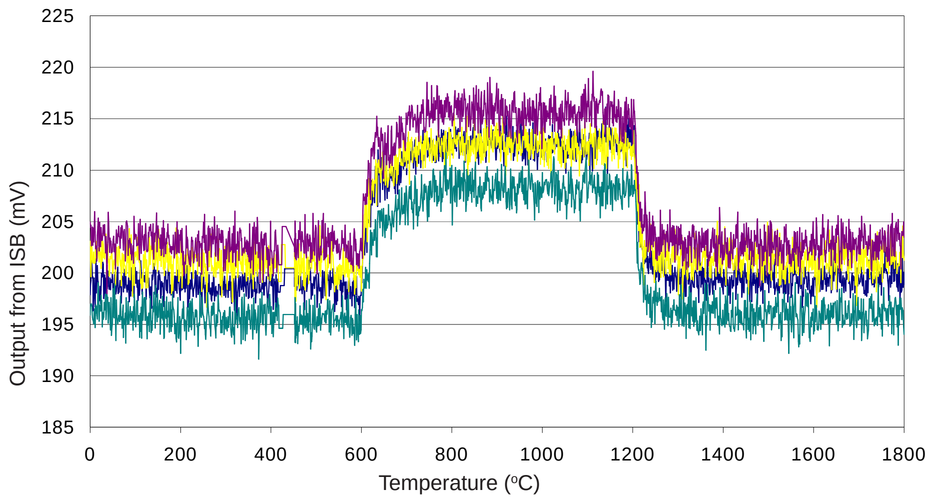

Figure 6 shows the fast response and good baseline recovery of the OX-B431 to 50ppb NO_2.

Figure 7 Response from 200 ppb to 0 ppb NO_2

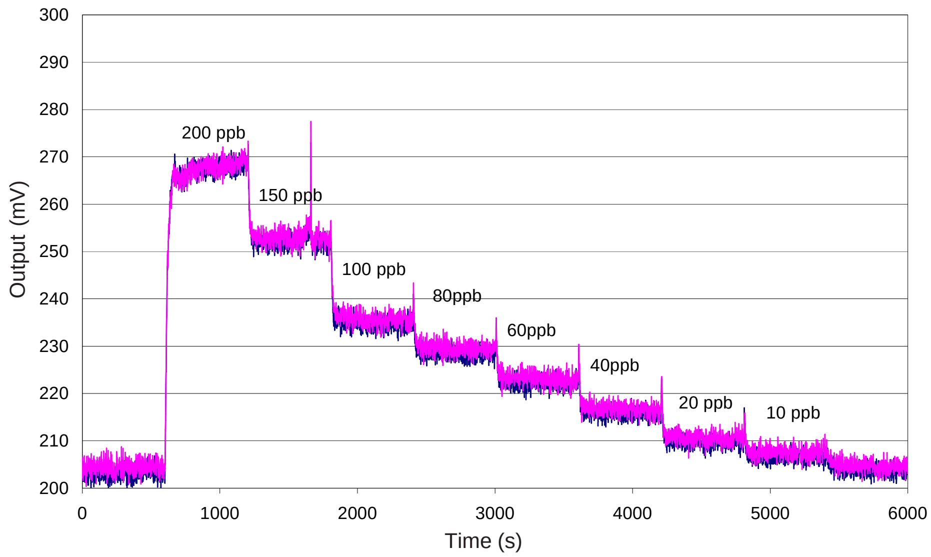

Figure 7 shows response from 200ppb NO_2 to 0ppb NO_2.

Use of Alphasense AFE circuit reduces noise to 15ppb, with the opportunity of digital smooting to reduce noise to less than ± 5ppb.

Offset voltage is due to intentional ISB circuit electronic offset.

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