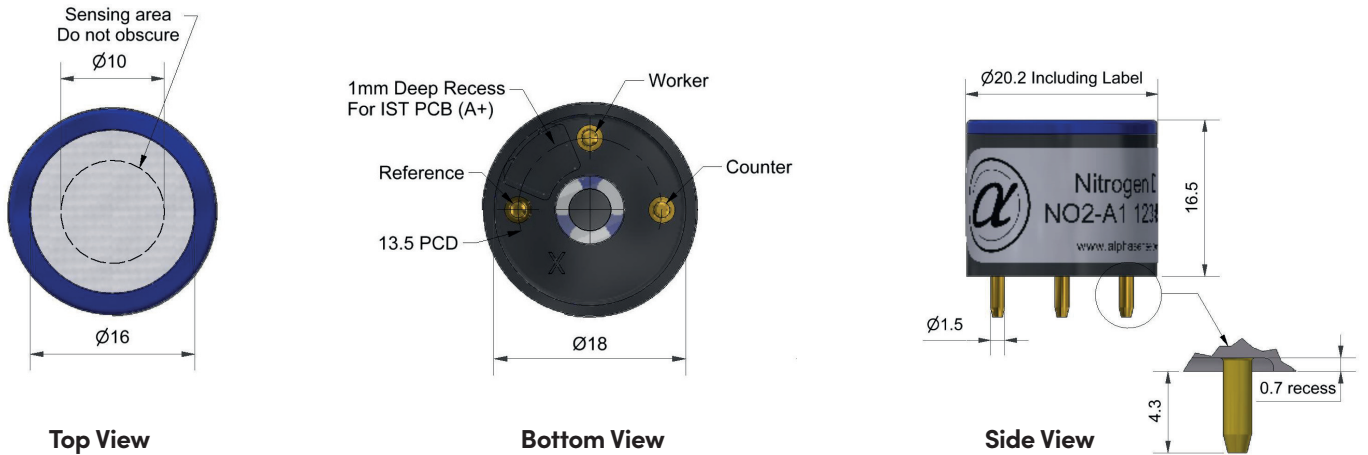


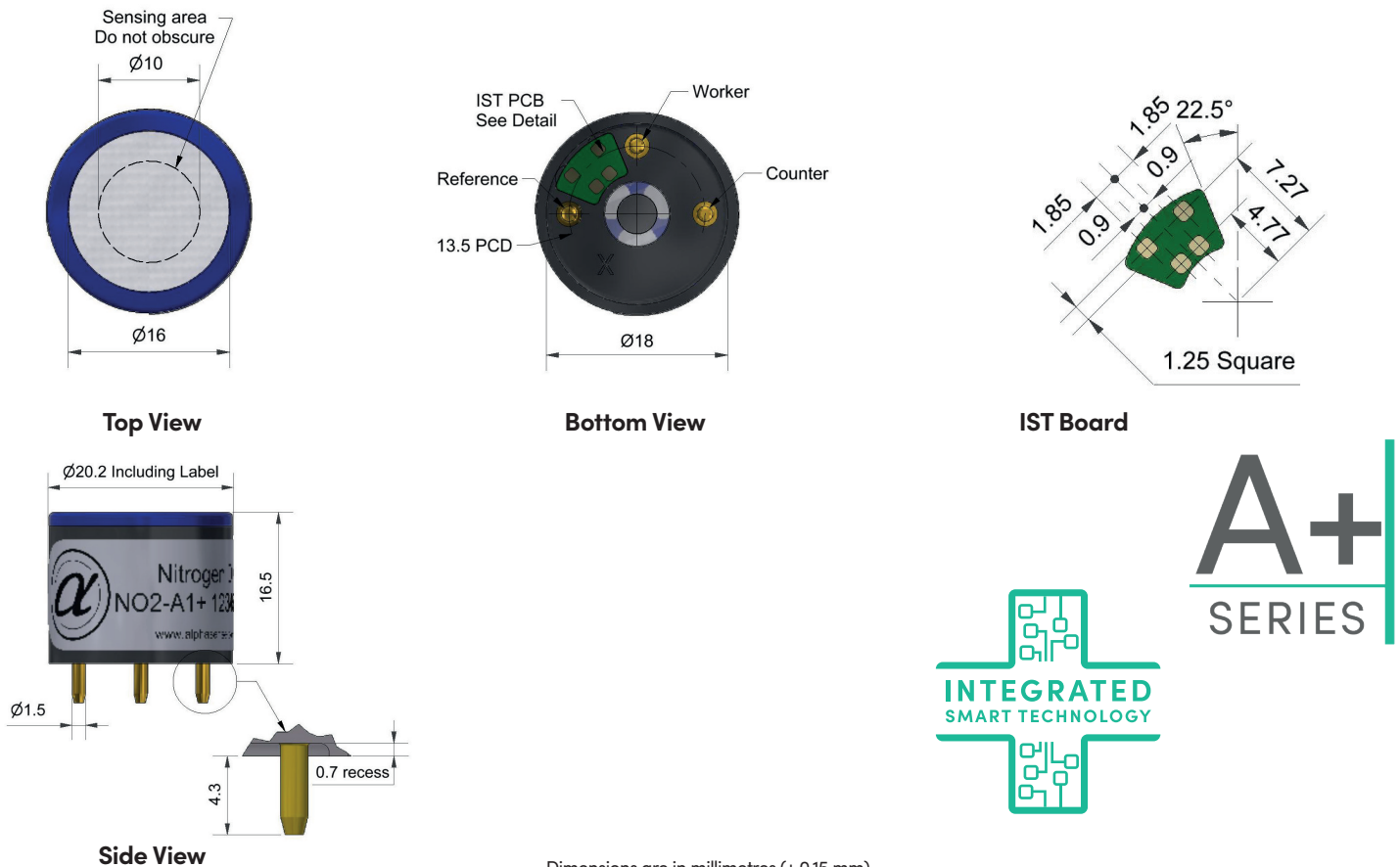
NO2-A1/NO2-A1+ Nitrogen Dioxide Sensor

The NO2-A1 sensor is a PPM sensor that is designed for a broad variety of applications and instrumentation including portable gas detectors and fixed gas detection systems for industrial safety, environmental air quality analysis and process control. The A series is the most widely used sensor format for portable gas detection applications. It is available in our standard format (NO2-A1) and with our patented Integrated Smart Technology (NO2-A1+) that has an IST board with a memory chip and temperature sensor integrated in the sensor. The + sensors store specific calibration, specification, and identification data on every sensor allowing plug and play operation. The on-board temperature sensor improves the accuracy and simplicity of temperature compensation algorithms.

NO2-A1 Nitrogen Dioxide Sensor – 3-Electrode



NO2-A1+ Nitrogen Dioxide Sensor – 3-Electrode (with Integrated Smart Technology)



Dimensions are in millimetres (± 0.15 mm).



Sensor Data

Performance	Sensitivity	nA/ppm in 10ppm NO ₂	-250 to -650
	Response time	t90 (s) from zero to 10ppm NO ₂ (33Ω Load Resistor)	< 50
	Zero current	ppm equivalent in zero air	< ± 0.4
	Resolution	RMS noise (ppm equivalent) (33Ω Load Resistor)	< 0.02
	Range	ppm NO ₂ limit of performance warranty	20
	Linearity	ppm error at full scale, linear at zero and 10ppm	< 1.5
	Overgas limit	NO ₂ maximum ppm for stable response to gas pulse	100
Lifetime	Zero drift	ppm equivalent change/year in lab air	< 0.05
	Sensitivity drift	% change/year in lab air, monthly test	< -20 to -40
	Operating life	months until 80% original signal (24-month warranted)	> 24
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 5ppm NO ₂	73 to 94
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 5ppm NO ₂	105 to 125
	Zero @ -20°C	ppm equivalent change from 20°C	< ± 0.2
	Zero @ 50°C	ppm equivalent change from 20°C	< 0 to -0.5
Cross-sensitivity	H ₂ S sensitivity	% measured gas @ 20ppm	H ₂ S < -35
	Cl ₂ sensitivity	% measured gas @ 10ppm	Cl ₂ < 80
	NO sensitivity	% measured gas @ 50ppm	NO < 5
	SO ₂ sensitivity	% measured gas @ 20ppm	SO ₂ < -15
	CO sensitivity	% measured gas @ 400ppm	CO < 0.1
	H ₂ sensitivity	% measured gas @ 400ppm	H ₂ < 0.1
	C ₂ H ₄ sensitivity	% measured gas @ 50ppm	C ₂ H ₄ < 0.1
	NH ₃ sensitivity	% measured gas @ 20ppm	NH ₃ < 0.1
	CO ₂ sensitivity	% measured gas @ 5% volume	CO ₂ < 0.1
O ₃ sensitivity	% measured gas @ 200ppb	O ₃ < 120	
Key Specifications	Temperature range	°C	-20 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 (for optimum performance)	33
	Weight	g	< 6

Figure 1 Sensitivity Temperature Dependence

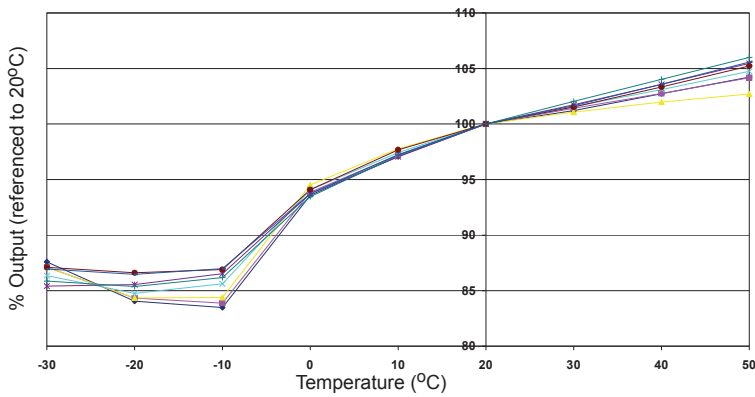


Figure 1 shows the variation in sensitivity caused by changes in temperature.

This data is taken from a typical batch of sensors.

Figure 2 Zero Temperature Dependence

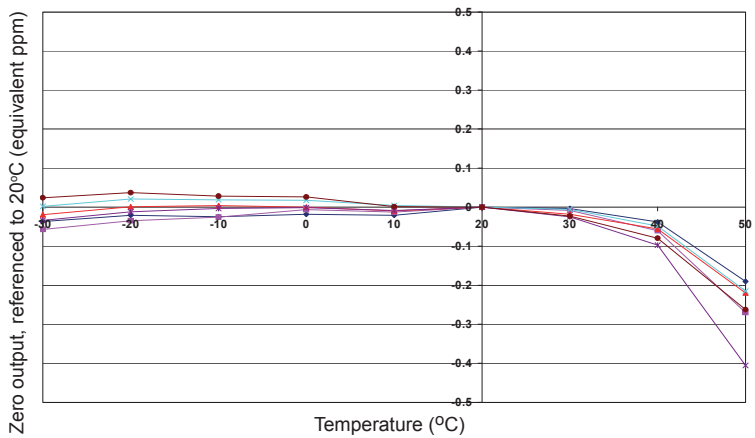


Figure 2 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to zero at 20°C.

This data is taken from a typical batch of sensors.

Figure 3 Humidity plus Temperature Transient Response

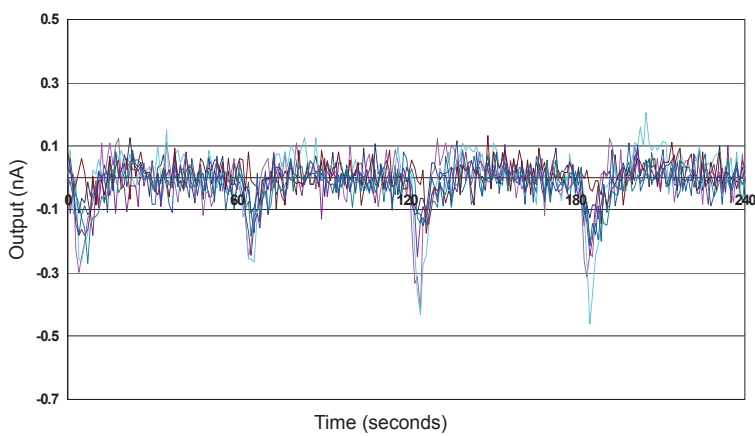


Figure 3 shows typical sensor outputs for a group of sensors exposed to exhaled breath for 4 cycles over 240 seconds.

This is an extreme test for such sensors and the shift in the base line of no more than 0.5 ppm shows a very strong resistance to this test.

IST Board Data

Interface	Communication Bus	Compatible with the 400 kHz I ² C protocol
	Max. Bus Speed	Up to 1 MHz
	Input Logic Levels	High (Recessive) < 2.3 V Low (Dominant) < 0.2 V
	Absolute Max. Input Signal	3.6 V
Electrical	Supply Voltage Range	1.7 V to 3.6 V
	Supply current – Stand-By	< 5 µA
	Supply current – Operating	< 0.15 mA (temperature reading only) < 2.15 mA (temperature reading + memory reading/writing)
	Power Supply Conditioning	Built-In 100 nF decoupling capacitor
	ESD Protection	4 kV (human body model) – Enhanced ESD / Latch-Up protection
	Bus Pins Input Capacitance	15 pF max.
Performance	Operational Temperature	-40 °C to +85 °C
	Temperature Sensor Accuracy	±1°C (-0°C to +70°C)
	Memory Data Retention	> 200 years
	Memory Write Cycles	> 4,000,000
Data & Communication	Memory IC & I2C Address	M24128X-FCU Device Address: R – 0xA0 / W – 0xA1
	Temperature IC & I2C Address	MAX31875R0TZS+T Device Address: R – 0x90 / W – 0x91
	Product Data Start Address	0x0900
	Calibration Data Start Address	0x0B00
	User Data Area	0x0D00 – 0x18FF (3,072 Bytes)
	CRC Polynomial	0x 01 04C1 1DB7
	Digital Signature Algorithm	SHA-256

Factory-populated data

Product Data

Data Format Version
 Customer (OEM) ID
 Product ID
 Type of Sensor / Target Gas
 Sensor Serial Number
 End of Storage Period Date
 Sensor Replacement Date
 Product Data Checksum
 Alphasense Digital Signature
 Customer Digital Signature

Calibration

Calibration Data Units
 Zero (clean dry air) Output
 Calibration Span
 Calibration Output
 Sensitivity
 Calibration Date
 Calibration Data Checksum
 Calibration Data Signature

Sensor Specification

Over-gas limit
 Concentration Range
 Temperature Range Low
 Temperature Range High
 Humidity Range Low
 Humidity Range High
 Pressure Range Low
 Pressure Range High
 Specification Checksum

15,000+ locations

Customer Specific

Custom Parameters
 Re-Calibration Due Date
 Operational Limits:
 Low | High | STEL | TWA
 Next Bump Test Due Date
 User Data Area

Important. The CO-BX must be operated with a 0 Volt bias between Reference & Working electrodes. Failure to comply with this requirement will result in a loss of its low Hydrogen cross sensitivity performance.

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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