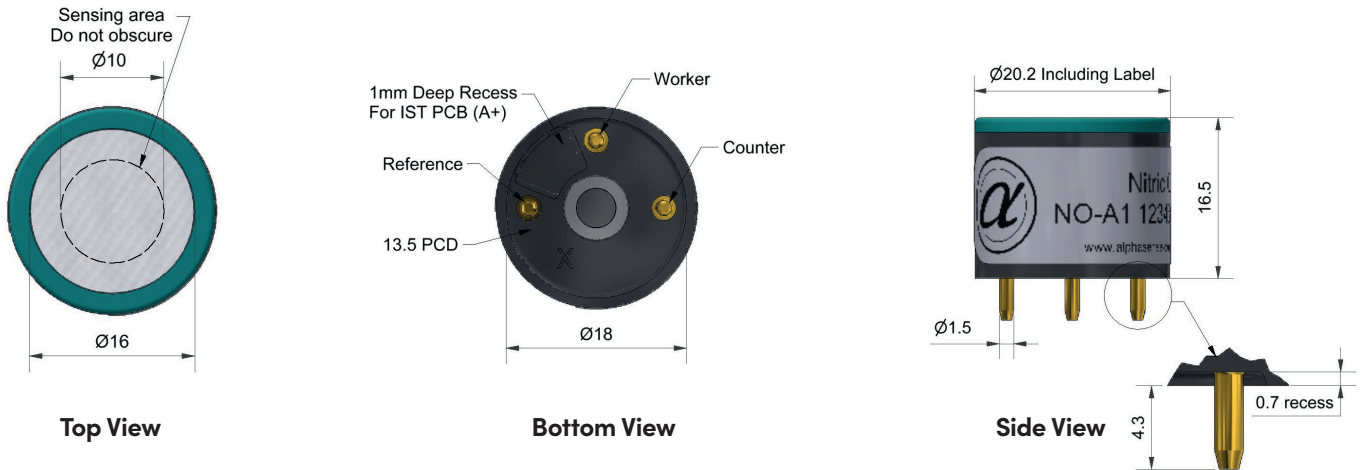


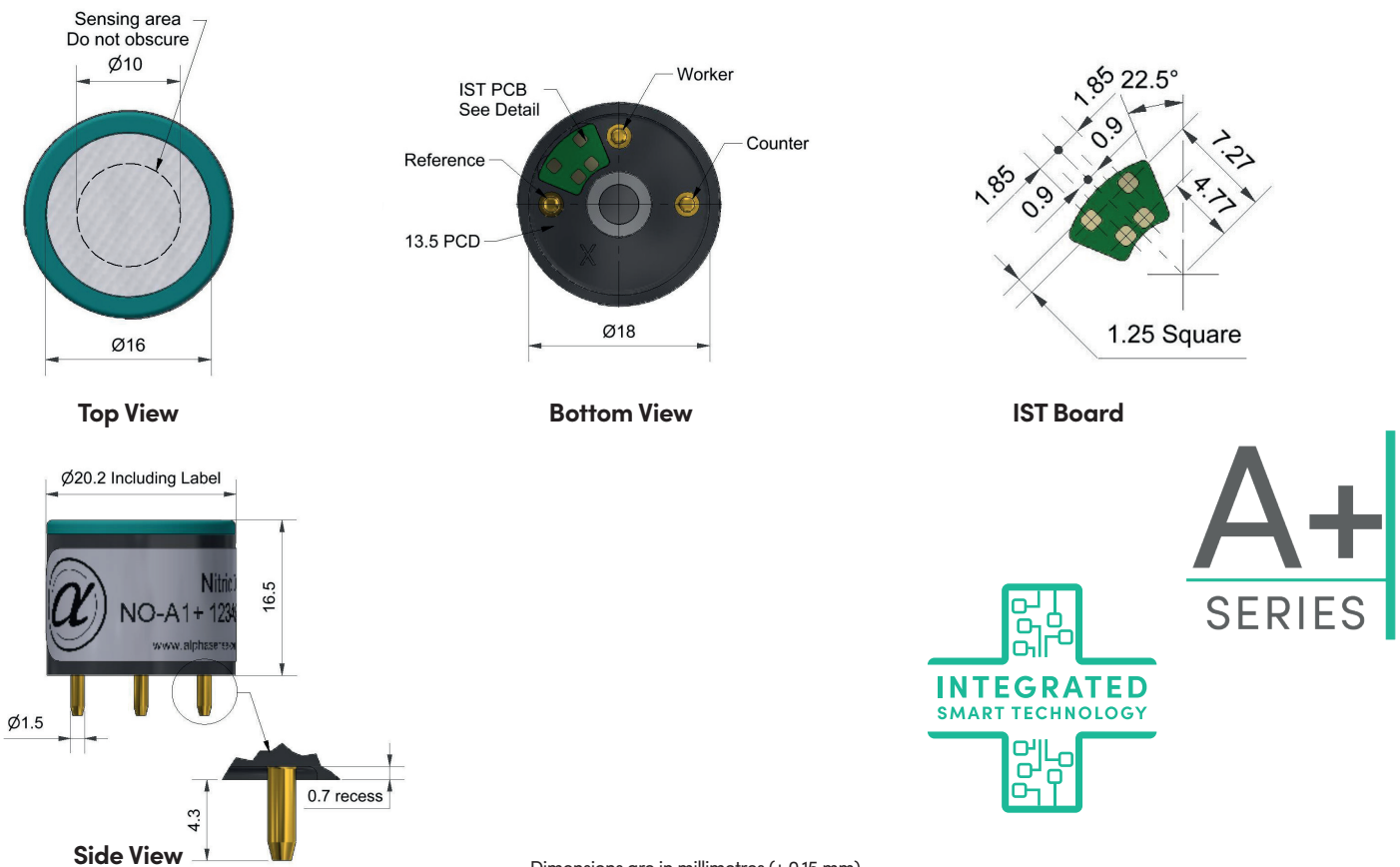
NO-A1/NO-A1+ Nitric Oxide Sensor

The NO-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 (NO-A1) and with our patented Integrated Smart Technology (NO-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.

NO-A1 Nitric Oxide Sensor – 3-Electrode



NO-A1+ Nitric Oxide Sensor – 3-Electrode (with Integrated Smart Technology)



Dimensions are in millimetres (± 0.15 mm).



Sensor Data

Performance	Sensitivity	nA/ppm in 50ppm NO	320 to 480
	Response time	t_{90} (s) from zero to 50ppm NO	< 45
	Zero current	ppm equivalent in zero air	0 to +2
	Resolution	RMS noise (ppm equivalent)	< 0.2
	Range	ppm NO limit of performance warranty	250
	Linearity	ppm error at full scale, linear at zero and 50ppm NO	+15 to +25
	Overgas limit	maximum ppm for stable response to gas pulse	800
Lifetime	Zero drift	ppm equivalent change/year in lab air	< 0.3
	Sensitivity drift	% change/year in lab air, monthly test	< 5
	Operating life	months until 80% original signal (24 month warranted)	> 24
Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 50ppm	78 to 90
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 50ppm	98 to 104
	Zero @ -20°C	ppm equivalent change from 20°C	< 0 to -1
	Zero @ 50°C	ppm equivalent change from 20°C	< 3 to 16
Cross sensitivity	H ₂ S sensitivity	% measured gas @ 20ppm H ₂ S	< 10
	NO ₂ sensitivity	% measured gas @ 50ppm NO ₂	< 2
	Cl ₂ sensitivity	% measured gas @ 10ppm Cl ₂	< 1
	SO ₂ sensitivity	% measured gas @ 20ppm SO ₂	< 3
	H ₂ sensitivity	% measured gas @ 400ppm H ₂	< 0.1
	CO sensitivity	% measured gas @ 400ppm CO	< 0.1
	NH ₃ sensitivity	% measured gas @ 20ppm NH ₃	< 0.1
CO ₂ sensitivity	% measured gas @ 5% Vol CO ₂	< 0.1	
Key specifications	Bias voltage	mV (working electrode potential is above ground)	+300
	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 (recommended)	10 to 47
	Weight	g	< 6

Figure 1 Sensitivity Temperature Dependence

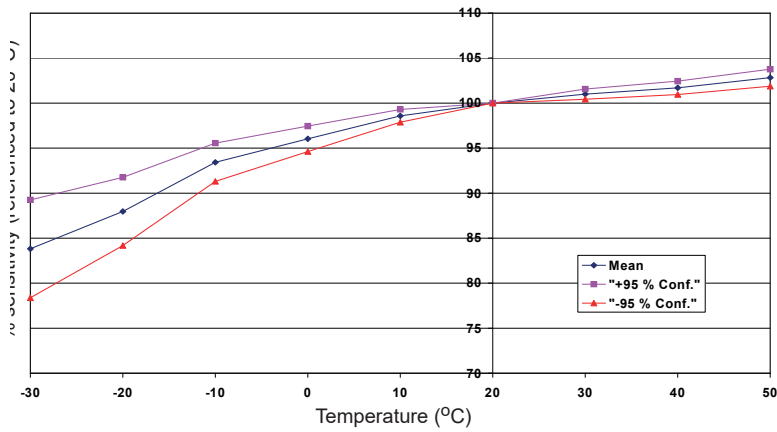


Figure 1 shows the variation in sensitivity caused by changes in temperature.

This data is taken from a typical batch of sensors. The mean and $\pm 95\%$ confidence intervals are shown.

Figure 2 Zero Temperature Dependence

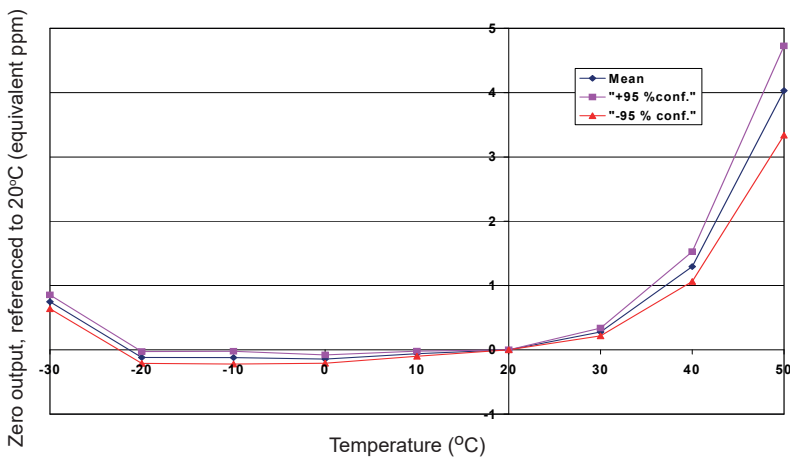
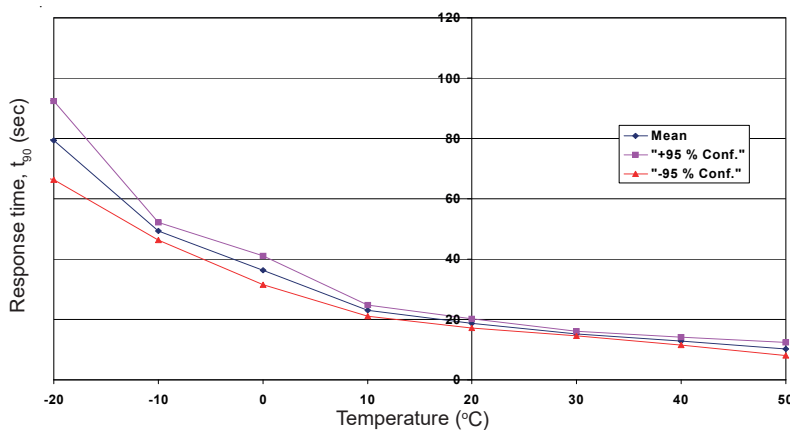


Figure 2 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to zero at 20°C.

This data is taken from a typical batch of sensors. The mean and $\pm 95\%$ confidence intervals are shown.

Figure 3 Response Time(t_{90}) Temperature Dependence



Sensor response time increases as temperature decreases. Alphasense response time (t_{90}) is measured at 20°C.

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

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.

In the interest of continued product improvement, we reserve the right to change design features and specifications without prior notification. The data contained in this document is for guidance only. Alphasense Ltd accepts no liability for any consequential losses, injury or damage resulting from the use of this document or the information contained within. (©ALPHASENSE LTD) Doc. Ref. NO-A1/JUN24