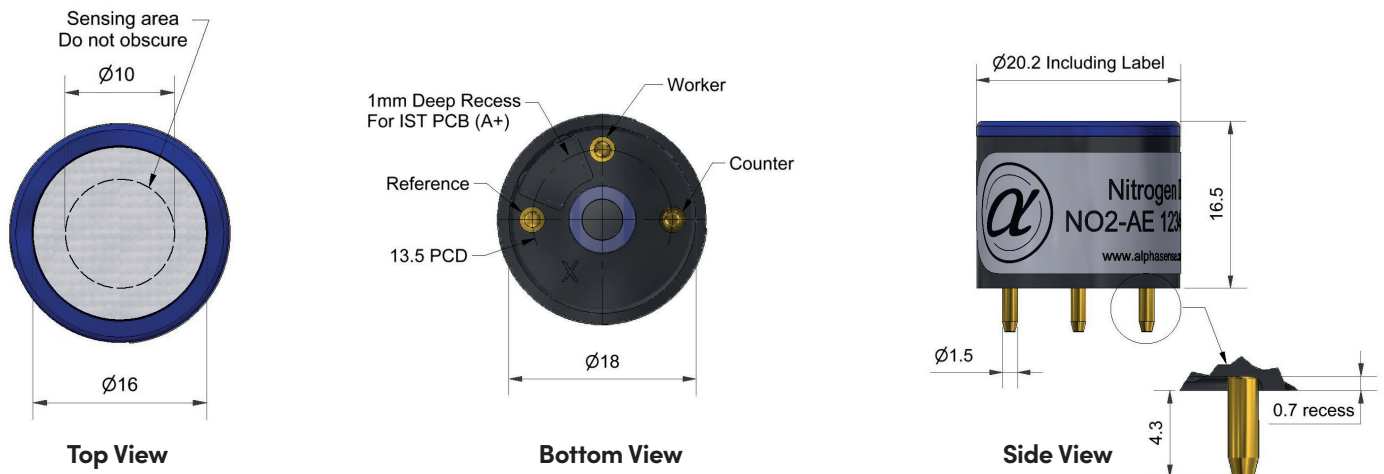


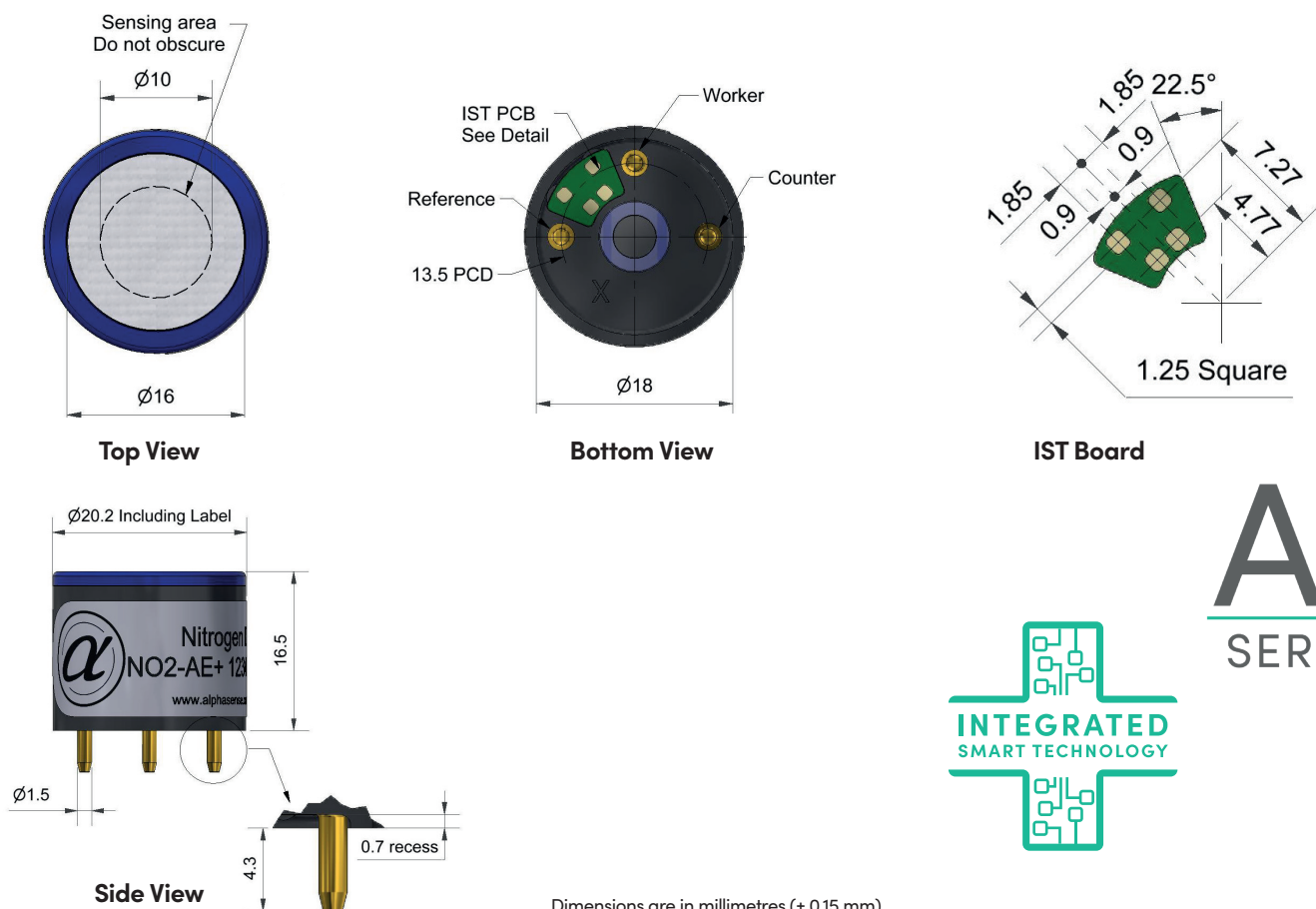
NO2-AE/NO2-AE+ Nitrogen Dioxide Sensor

The NO2-AE 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-AE) and with our patented Integrated Smart Technology (NO2-AE+) 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-AE Nitrogen Dioxide Sensor – 3-Electrode



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



Dimensions are in millimetres (± 0.15 mm).



Sensor Data

Performance	Sensitivity	nA/ppm @ 20°C in 10ppm NO ₂ (33Ω Load Resistor)	-70 to -170
	Response time	t90 (s) from zero to 10ppm NO ₂ (33Ω Load Resistor)	< 40
	Zero current	ppm equivalent in zero air	< ± 1.5
	Resolution	RMS noise (ppm equivalent) (33Ω)	< 0.1
	Range	ppm limit of performance warranty	200
	Linearity	ppm error at 200ppm, linear at 30 and 100ppm NO ₂	< 2 to 11
	Overgas limit	maximum ppm for stable response to 10 minute gas pulse	> 1,000

Lifetime	Zero drift	ppm equivalent change/year in lab air	nd
	Sensitivity drift	% change/month in lab air, twice monthly gassing	< 2
	Operating life	months until 80% original signal (24 month warranted)	> 24

Environmental	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) @ 10ppm NO ₂	75 to 95
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 10ppm NO ₂	98 to 110
	Zero @ -20°C	ppm equivalent	< ± 0.5
	Zero @ 50°C	ppm equivalent	< 0 to -5

Cross-sensitivity	CO sensitivity	% measured gas @ 400ppm	CO	< 3.5
	NO sensitivity	% measured gas @ 50ppm	NO	< 2
	SO ₂ sensitivity	% measured gas @ 20ppm	SO ₂	< -30
	Cl ₂ sensitivity	% measured gas @ 5ppm	Cl ₂	< 90
	H ₂ sensitivity	% measured gas @ 400ppm	H ₂	< -0.8
	H ₂ S sensitivity	% measured gas @ 200ppm	H ₂ S	< -220
	C ₂ H ₄ sensitivity	% measured gas @ 400ppm	C ₂ H ₄	< 0.1
	NH ₃ sensitivity	% measured gas @ 20ppm	NH ₃	< -1
	CO ₂ sensitivity	% measured gas @ 5% volume	CO ₂	< 0
	O ₃ sensitivity	% measured gas @ 100ppb	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

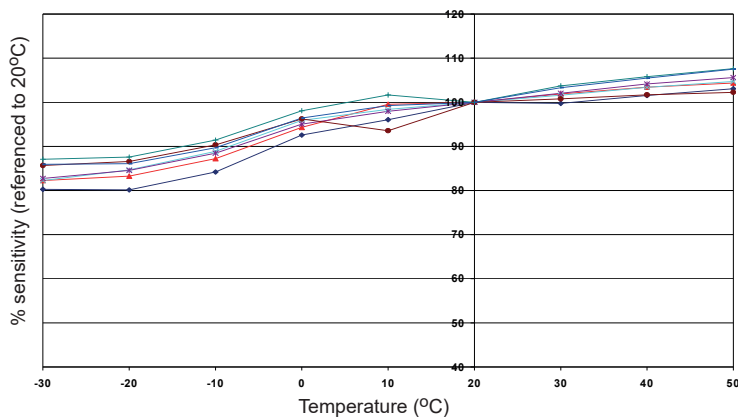


Figure 1 shows the variation in sensitivity caused by changes in temperature.

This data is taken from a typical batch of sensors.

Figure 2 Zero Temperature Dependence

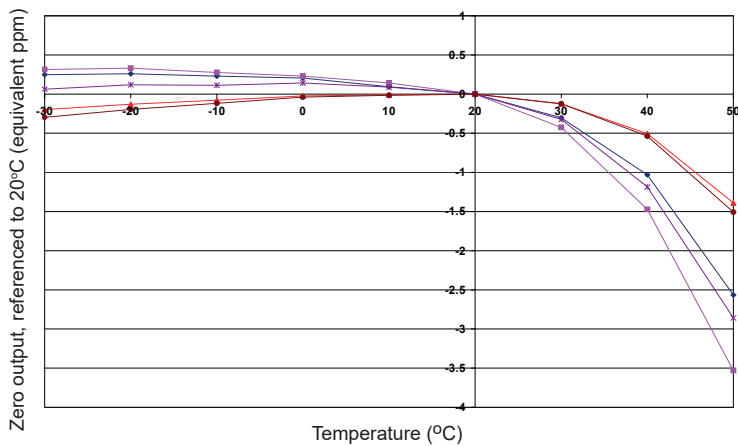


Figure 2 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to zero at 20°C.

This data is taken from a typical batch of sensors.

Figure 3 Linearity to 200ppm NO₂

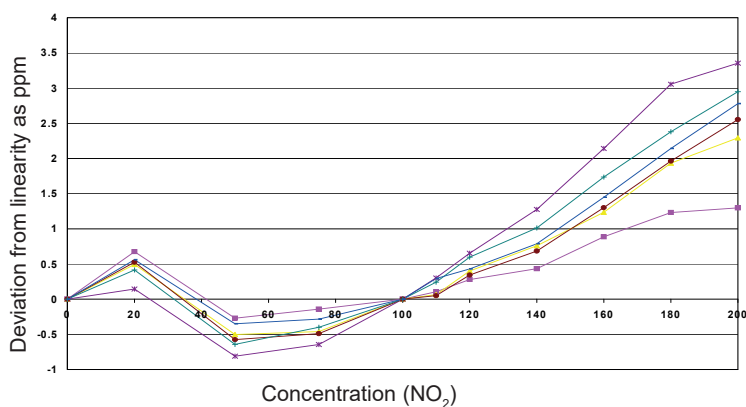


Figure 3 shows excellent and repeatable linearity to 200ppm NO₂ which allows this sensor to be used at high concentrations.

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

15,000+ locations

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

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. NO2-AE/JUN24