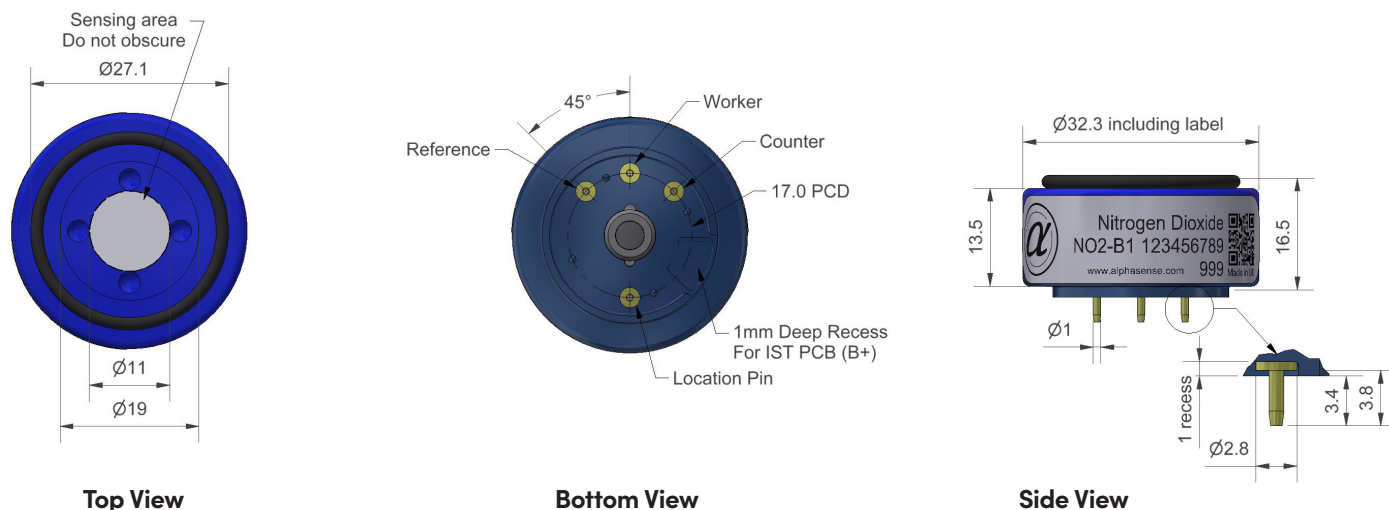


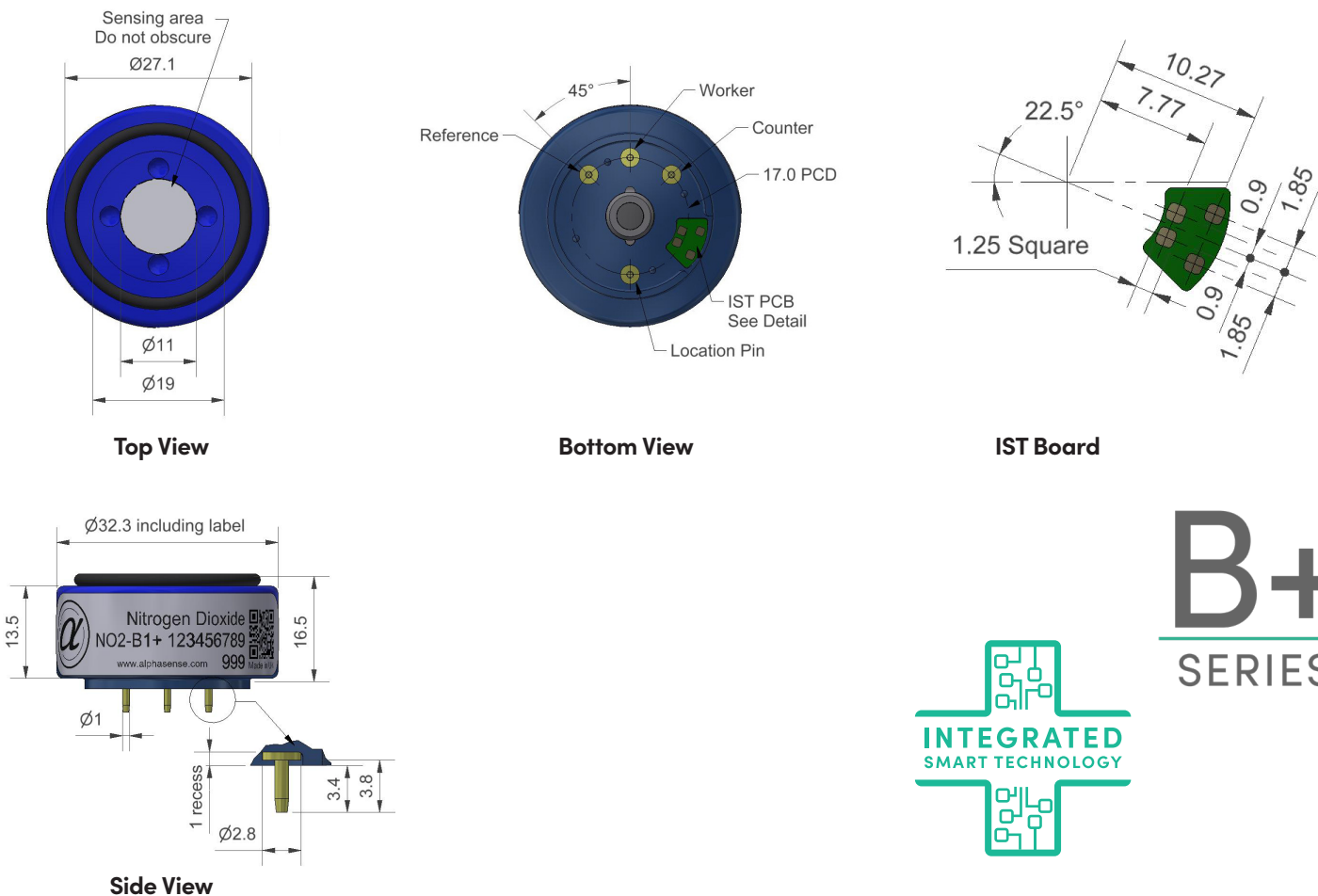
NO2-B1/NO2-B1+ Nitrogen Dioxide Sensor

The NO2-B1 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 and process control. This product is available in our standard format (NO2-B1) and with our patented Integrated Smart Technology (NO2-B1+) 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-B1 Nitrogen Dioxide Sensor – 3-Electrode



NO2-B1+ 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	-450 to -1000
	Response time	t90 (s) from zero to 10ppm NO ₂ (33Ω load resistor)	< 60
	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 NO ₂	< ± 0.2
	Overgas limit	maximum ppm for stable response to gas pulse	100

Lifetime	Zero drift	ppm equivalent change/year in lab air	< 0.03
	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	75 to 95
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 5ppm NO ₂	100 to 112
	Zero @ -20°C	ppm equivalent change from 20°C	< ± 0.1
	Zero @ 50°	ppm equivalent change from 20°C	< 0 to -0.5

Cross Sensitivity	H ₂ S sensitivity	% measured gas @ 20ppm	H ₂ S	< -100
	NO sensitivity	% measured gas @ 50ppm	NO	< 0.5
	Cl ₂ sensitivity	% measured gas @ 10ppm	Cl ₂	< 100
	SO ₂ sensitivity	% measured gas @ 20ppm	SO ₂	< -2
	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 @ 400ppm	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

Key Specifications	Temperature range	°C	-20 to 50
	Pressure range	kPa	80 to 120
	Humidity range	% rh continuous (see note) months @	15 to 90
	Storage period	3 to 20°C (stored in sealed pot)	6
	Load resistor	Ω (for optimum performance)	33
	Weight	g	< 13

Figure 1 Sensitivity Temperature Dependence

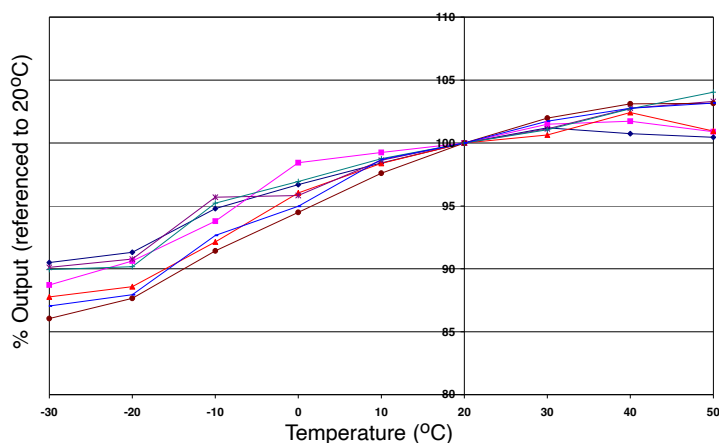


Figure 1 shows the variation in sensitivity caused by changes in temperature.

This data is taken from a typical batch of sensors.

Figure 2 Zero Temperature Dependence

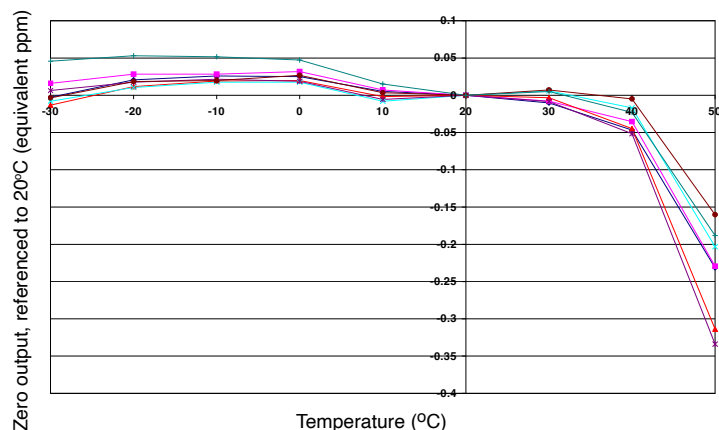


Figure 2 shows the variation in zero output caused by changes in temperature, expressed as ppm gas equivalent, referenced to zero at 20°C.

This data is taken from a typical batch of sensors.

Figure 3 Effect of Load Resistor Value on Noise

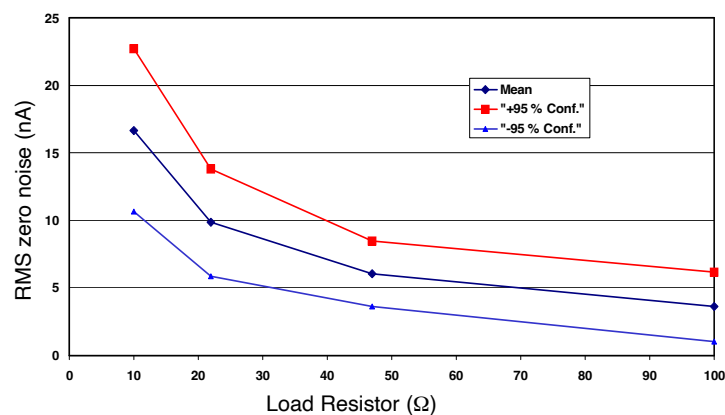


Figure 3 shows the effect of the load resistor on the RMS zero noise for the NO₂-B1 sensor. The mean and $\pm 95\%$ confidence intervals are shown.

The t_{90} response time increases linearly with increasing load resistor value. If a fast response is required then a 10 Ω load resistor should be employed; this will give a fast response.

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

Note: Above 85% rh and 40°C a maximum continuous exposure period of 10 days is warranted. Where such exposure occurs the sensor will recover normal electrolyte volumes when allowed to rest at lower % rh and temperature levels for several days.

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-B1/FEB24

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For further information on the performance of this sensor, on other sensors in the range or any other subject, please contact Alphasense Ltd. or visit our website at "www.alphasense.com".