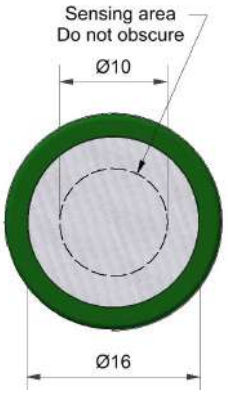
ЗАКАЗАТЬ: CO-A4 Alphasense сенсор угарного газа 0-500 ppm



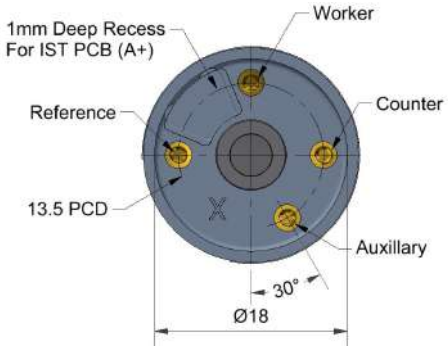
# CO-A4/CO-A4+ Carbon Monoxide Sensor

The CO-A4 sensor is a PPB sensor that is designed for industrial safety and environmental air quality applications with best-in-class baseline stability. The A series is the most widely used sensor format for portable gas detection applications. This product is available in our standard format (CO-A4) and with our patented Integrated Smart Technology (CO-A4+) 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.

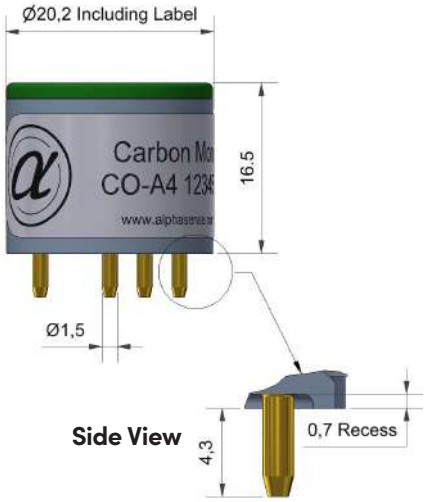
## CO-A4 Carbon Monoxide Sensor – 4-Electrode




**Top View**

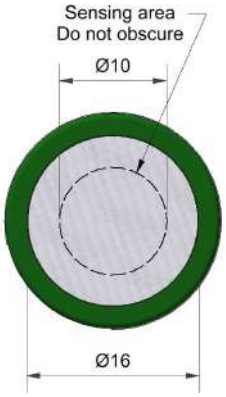



**Bottom View**

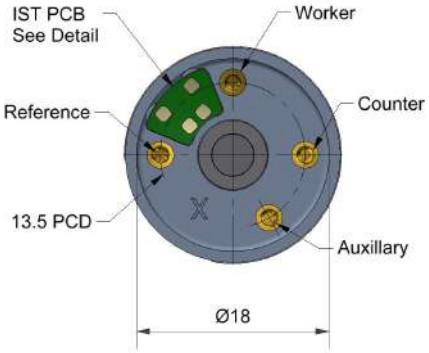



**Side View**

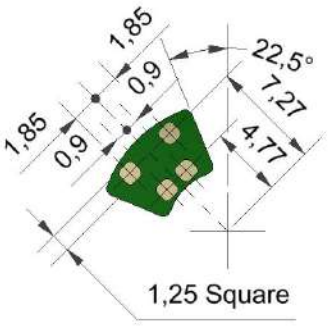
## CO-A4+ Carbon Monoxide Sensor – 4-Electrode (with Integrated Smart Technology)



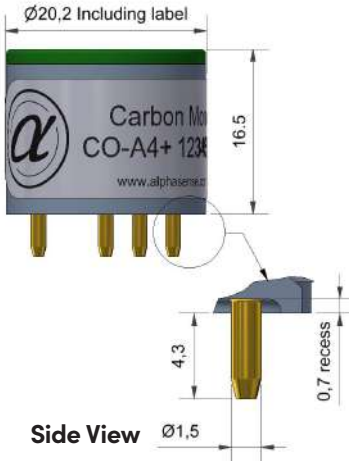

**Top View**




**Bottom View**




**IST Board**




**Side View**

Dimensions are in millimetres (± 0.15 mm).

# Sensor Data

| | | | | |
|---|---|---|---|---|
| **Performance** | Sensitivity | nA/ppm in 2ppm CO | | 220 to 410 |
| | Response time | t90 (s) from zero to 10ppm CO | | < 30 |
| | Zero current | nA in zero air at 20°C | | -100 to +10 |
| | Noise* | ±2 standard deviations (ppb equivalent) | | 20 |
| | Range ppm limit of performance warranty | | | 500 |
| | Linearity | ppm CO error at full scale, linear at zero, 15ppm CO | | < ± 1 |
| | Overgas limit | maximum ppm for stable response to gas pulse | | 2000 |
| | ***Tested with Alphasense AFE low noise circuit** | | | |
| **Lifetime** | Zero drift | ppb equivalent change/year in lab air | | < ±100 |
| | Sensitivity drift | % change/year in lab air, monthly test | | < 10 |
| | Operating life | months until 50% original signal (24-month warranted) | | > 36 |
| **Environmental** | Sensitivity @ -20°C | (% output @ -20°C/output @ 20°C) @ 5ppm CO | | 50 to 85 |
| | Sensitivity @ 50°C | (% output @ 50°C/output @ 20°C) @ 5ppm CO | | 110 to 125 |
| | Zero @ -20°C | nA change from 20°C | | 10 to 40 |
| | Zero @ 50° | nA change from 20°C | | -120 to -200 |
| **Cross Sensitivity** | Filter capacity | ppm·hrs | $H_2S$ | 250,000 |
| | $H_2S$ sensitivity | % measured gas @ 5ppm | $H_2S$ | < 0.1 |
| | $NO_2$ sensitivity | % measured gas @ 5ppm | $NO_2$ | < -2 |
| | $CL_2$ sensitivity | % measured gas @ 5ppm | $CL_2$ | < 0.1 |
| | NO sensitivity | % measured gas @ 5ppm | NO | < -2 |
| | $SO_2$ sensitivity | % measured gas @ 5ppm | $SO_2$ | < 0.1 |
| | $H_2$ sensitivity | % measured gas @ 100ppm | $H_2$ at 20°C | < 50 |
| | $C_2H_4$ sensitivity | % measured gas @ 100ppm | $C_2H_4$ | < 0.5 |
| | $NH_3$ sensitivity | % measured gas @ 20ppm | $NH_3$ | < 0.1 |
| **Key Specifications** | 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 (AFE circuit is recommended) | | 33 to 100 |
| | Weight | g | | < 6 |

## Figure 1 Sensitivity Temperature Dependence

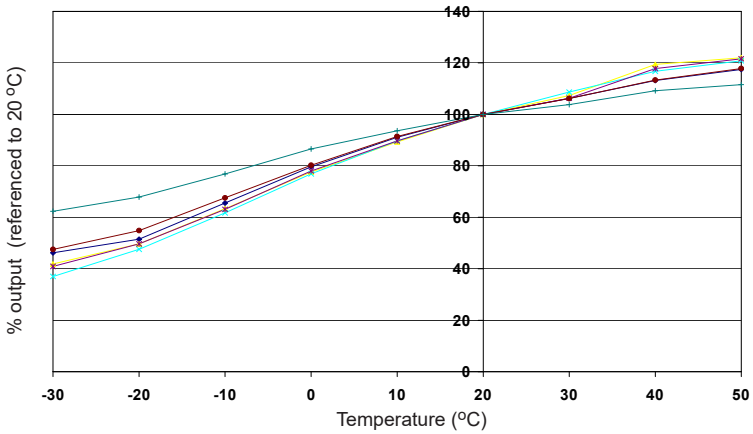



Figure 1 shows the temperature dependence of sensitivity at 2ppm CO.

This data is taken from a typical batch of sensors.

## Figure 2 Zero Temperature Dependence

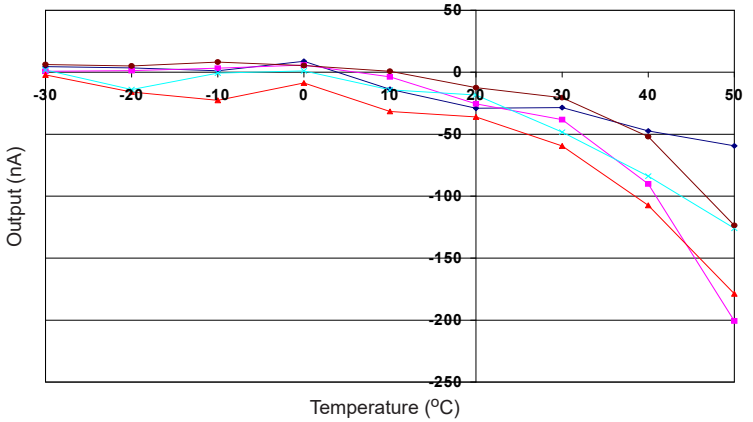



Figure 2 shows the variation in zero output of the working electrode caused by changes in temperature, expressed as nA.

This data is taken from a typical batch of sensors.

Contact Alphasense for futher information on zero current correction.

## Figure 3 Linearity from 0 to 1ppm

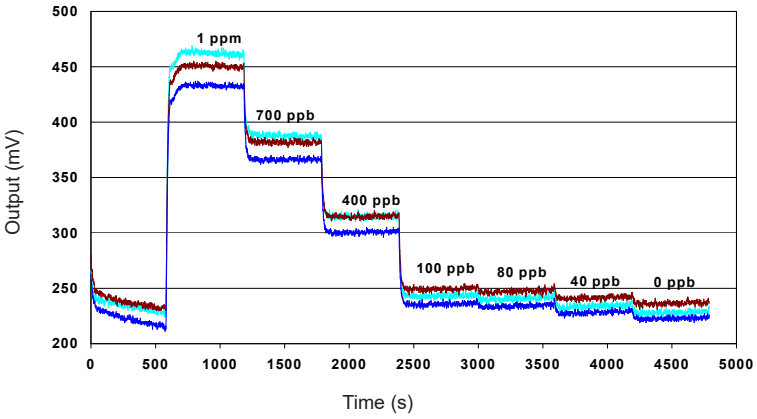



Figure 3 shows response from 0 to 1ppm CO.

Use of Alphasense AFE circuit reduces noise to 20ppb, with the opportunity of digital smoothing to reduce noise even further.

# IST Board Data

| | | |
|---|---|---|
| **Interface** | Communication Bus | Compatible with the 400 kHz I²C 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)<br>< 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. CO-A4/MAR24

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