

TELAIRE[®]

Air Quality Sensors

Particle Matter, CO₂, Humidity,
Temperature and Dust Products

OEM Sensor Components for
Air Quality and Environmental Control





As the world's first and leading manufacturer of Non-Dispersive Infrared (NDIR) Carbon Dioxide (CO₂) Sensors, Telaire has been on the forefront of CO₂ sensing technology for over 25 years. Telaire holds 30+ awarded patents in CO₂ sensing, including the original automatic calibration algorithm - ABC Logic.

In more recent years, the Telaire has expanded its product line to include other air quality sensors, including Dust (PM_{2.5} and PM₁₀) and Relative Humidity Sensors. Telaire products are used in commercial and residential building ventilation applications, consumer air quality devices for the home, and controlling air quality conditions in automobiles.

Typical Applications:

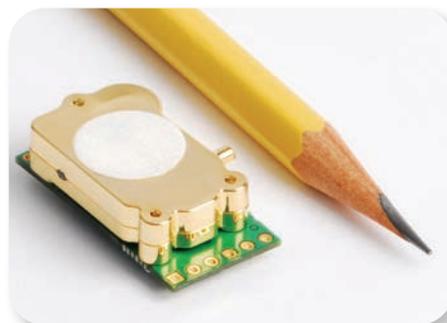
- Commercial building Demand Control Ventilation (DCV)
- Commercial building energy conservation and air quality control
- Demand based sensing for residential heat exchangers
- Core technology of HVAC transmitters
- Sensing in refrigerated storage/shipping containers
- Indoor growing CO₂ control
- Agricultural livestock housing ventilation control
- Air purifier control and monitoring
- Automotive in-cabin air quality and safety
- Liquid fuel-based residential heating safety
- Handheld CO₂ and indoor air quality (IAQ) instruments
- CO₂ leak detection
- Frost monitoring for small ventilation units
- Occupancy detection for wall-mounted heaters
- Gas sensing in incubators

Carbon Dioxide (CO₂) Sensor Modules

Module Selection - Single or Dual Channel?

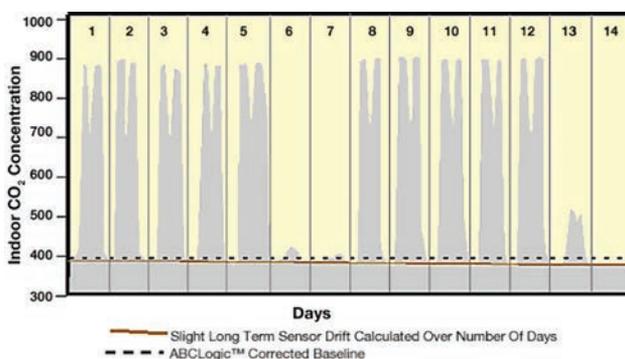
The difference between single and dual wavelength CO₂ sensing is how sensor drift is controlled. Telaire is the only manufacturer that has both technologies within their portfolio. Factory calibration and interfaces are generally the same.

Single Wavelength continuously monitors the environment and records the lowest values. It then makes any necessary corrections to the calibration based on these low values. This self-calibration is made possible via Telaire's ABC Logic algorithm. Where applicable, it is the most stable methodology to control long-term drift. Single wavelength should only be used where the environment periodically drops to ambient (~400ppm) CO₂ levels.



Dual Wavelength makes a continuous comparison to a reference wavelength within the sensor and makes any necessary adjustments accordingly. Whilst not as accurate as ABC Logic, it does offer stability in environments where the natural lows are not registered. Therefore, it is important to use dual wavelength in any application where the environment does not periodically drop to ambient (~400ppm) CO₂ levels.

Single Wavelength		Dual Wavelength
Part Numbers	T6613-X Sensor Modules T6713-X Sensor Modules	T6615-X Sensor Modules
Typical Uses	<ul style="list-style-type: none"> Commercial office monitoring Residential monitoring Cinemas Exhibition halls Automotive sensing Railway car monitoring 	<ul style="list-style-type: none"> 24/7 security suite Agricultural applications, such as indoor growing, green/glass house, pig shed Hospitals Food monitoring and storage Metering



Miniature CO₂ Sensors

T6700 Series

The Telaire T6700 Series is a range of miniature Non-Dispersive Infrared (NDIR) Carbon Dioxide (CO₂) Sensors with the same accuracy and reliability of many larger sensors. The miniature size allows OEMs to integrate into smaller enclosures and equipment, and uses significantly less power than many other devices on the market.

Available Models:

T6713

The Telaire T6713 Sensor is ideal for applications where CO₂ levels need to be measured and controlled for indoor air quality and energy saving applications, such as demand control ventilation.

All units are factory-calibrated to measure CO₂ concentration levels up to 5000ppm.

T6703

The Telaire T6703 Sensor is configured for applications where CO₂ levels are less critical, but still require an assessment of indoor air quality, such as residential applications. The minimum order requirement reflects the high volumes of these applications.

All units are factory-calibrated to measure CO₂ concentration levels up to 5000ppm, while maintaining accuracy across the range.

Features

- Eliminates the need for calibration in most applications with Telaire's ABC Logic Software. Lifetime calibration warranty.
- A reliable sensor design based on 20 years of engineering and manufacturing expertise.
- Self-calibrating dual channel models available for high CO₂ concentration and 24 hour occupancy (T6615).
- Flexible CO₂ sensor platform designed to interact with other microprocessor devices.
- Compact design allows for simple product integration.
- Identical footprint and communication protocols for T6713 and T6703, allowing a single design to accommodate either single or dual channel options.



T6713 / T6703

Carbon Dioxide (CO₂) Sensors

T6600 Series

The Telaire T6600 Series is a range of compact Carbon Dioxide (CO₂) Sensor Modules designed to integrate into existing controls and equipment.

Available Models:

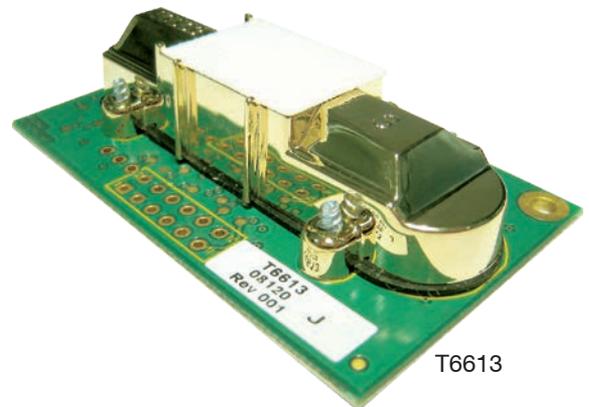
T6613

The Telaire T6613 Sensor Module is designed to meet the volume, cost and delivery expectations of OEMs. The module is ideal for customers who are familiar with the design, integration and handling of electronic components.

All units are factory-calibrated to measure CO₂ concentration levels up to 2000 to 5000ppm. Telaire dual channel sensors are available for higher concentrations.

Features

- A reliable sensor design based on 15 years of engineering and manufacturing expertise.
- Flexible CO₂ sensor platform designed to interact with other microprocessor devices.
- Eliminates the need for calibration in most applications with Telaire's ABC Logic software.
- Identical footprint to T6615, allowing a single design to accommodate either single or dual channel options.

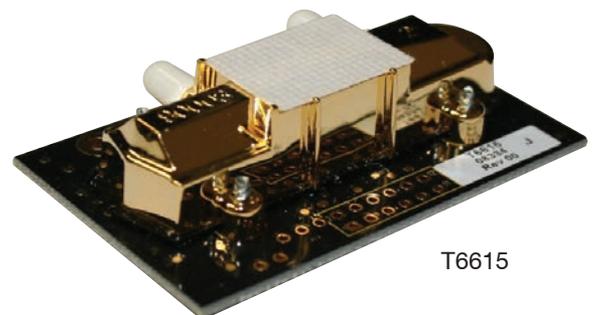


T6615

The Telaire T6615 Dual Channel Sensor Module is designed to integrate into existing controls and equipment for use in instrumentation and applications up to 50,000ppm. Dual channels consist of one CO₂ channel that measures gas concentration and a second reference channel that measures the sensor signal intensity.

Features

- Flexible platform designed to interact with other microprocessor devices.
- Dual-channel optical system and three-point calibration process for enhanced stability, accuracy and reliability.
- Designed for applications where ABC Logic cannot be used.
- Sensor may be field-calibrated. Lifetime calibration warranty.
- Identical footprint to T6613, allowing a single design to accommodate either single or dual channel options.



Dust Sensors

SM-UART-04L | PM2.5 Particulate Dust Sensor

The Telaire SM-UART-04L PM2.5 Particulate Dust Sensor is designed for a wide range of air quality applications where fine particle dust needs to be measured. The optical design leverages laser technology, which allows customers to achieve excellent performance with balanced reliability. SM-UART-04L is an ideal solution for industrial and consumer applications.

SM-UART-04L is a PM2.5 laser-based Particulate Dust Sensor that detects dust particle concentration in air by using an optical sensing method. A laser light emitting diode (laser LED) and a photo sensor are optically arranged in the device. The photo sensor detects the reflected laser LED light by dust particles in air. The dust sensor can detect small particles from large house dust, by the pulse pattern of the signal output.



Features

- High Accuracy and Fast Response
- Output: PM2.5 / PM10 Calculated
- ROHS and REACH Compliant
- UART Series Digital Output
- Compact Size
- Flexible Mounting Style
- Protected from EMC Intrusion by Metal Case
- Wide Detection Range
- Average Time Before Recalibration: 40,000 hrs

Applications

- Indoor Air Quality Monitoring
- Air Conditioners and HVAC
- Air Purifiers and Cleaners
- Outdoor Dust Monitoring (with Additional Protection)



Humidity Sensors

ChipCap 2 | Humidity & Temperature Sensor

The Telaire ChipCap 2 offers the most advanced and cost effective humidity and temperature sensing solution for virtually any type of application. A capacitive polymer sensor chip and CMOS integrated circuit with EEPROM are integrated into one embedded system in a reflow solderable SMD package.

Individually calibrated and tested, ChipCap 2 performs at $\pm 2\%$ from 20% to 80% RH ($\pm 3\%$ over entire humidity range). It is simple and ready to use without further calibration or temperature compensation.

ChipCap 2 provides linear output signals in various interfaces to customer requirements, including digital or analog output with alarm function.



ChipCap 2

ChipCap 2-SIP | Humidity & Temperature Sensor

The Telaire ChipCap 2-SIP offers all of the features and benefits of the ChipCap 2 in a Single In-line Package (SIP) with ready installed V-core capacitor for easy and convenient application.

Features

- Fully-calibrated and temperature-compensated
- Digital or analog output with alarm function
- Precise and accurate ($\pm 2\%$ RH, $\pm 0.3^\circ\text{C}$, 14 bit)
- Free operating voltage (min 2.7V to max 5.5V)
- Low current consumption
- SMD package for automated assembly
- Reliable in harsh environments

Applications

- **HVAC Control**
Air conditioning, refrigeration, indoor air quality, vent fans, home appliances, humidifiers/dehumidifiers
- **Process Control & Instrumentation**
Medical instruments, handheld devices, weather stations, food processing, printers, RFIDs
- **Automotive & Transportation**
Cabin climate control, defogging control condensing preventive devices
- **Medical**
Nebulizers, oxygen, CPAP/sleep apnea devices
- Mass quantity applications per custom OEM specifications



ChipCap 2 SIP

HS | Relative Humidity Sensors

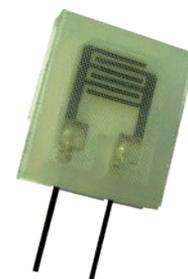
Telaire offers many polymer-based Relative Humidity (RH) Sensors that are reliable in harsh environments, instrumentation and HVAC control applications.

Features

- Accurate, long-term reliability
- Cost-effective performance
- Quick response

Applications

- Humidity monitors and controllers
- Air conditioners
- Humidifiers/dehumidifiers
- Automatic ventilation



HS30P



HS12SP

Harsh Environment Sensors For Humidity & Temperature Measurement

Designed to withstand challenging harsh media environments, Telaire offers several fully-calibrated and temperature-compensated sensor solutions supplied in a water-resistant IP67 package.

Features

- Fully calibrated and temperature compensated
- Water resistant (IP67)
- Precision and accuracy ($\pm 2\%$ RH at 20% to 80%, $\pm 0.5^\circ\text{C}$ Temperature, 14 bit resolution)
- Low current consumption



HVAC Control Applications: Process & Control Instrumentation Applications:

- | | |
|---|--|
| <ul style="list-style-type: none">• Air conditioning• Refrigeration• Indoor air quality• Vent fans• Home appliances• Humidifiers/dehumidifiers | <ul style="list-style-type: none">• Medical instruments• Handheld devices• Weather stations• Food processing• Printers• RFIDs |
|---|--|

T9602 | Humidity & Temperature Sensor

The Telaire T9602 is a fully-calibrated and temperature-compensated combined humidity and temperature sensor supplied in a water-resistant IP67 package, making it the most advanced and cost-effective sensing solution for virtually any type of harsh environment application.

It provides linearized output signals in one of two interfaces – Digital (I²C) Output or Pulse Density Modulated (PDM) Output convertible to an analog signal – to meet a wider range of customer requirements.

Additional Features

- Digital output or pulse density modulated (PDM) output converted to Analog
- Available in multiple flexible cable lengths
- Flexible mounting options

T9501 | Humidity & Temperature Sensor

The Telaire T9501 Humidity & Temperature Sensor provides cost-effective humidity and temperature sensing via MODBUS communication protocol for virtually any type of application. Designed to withstand challenging environments, the IP67 rated transmitter utilizes an individually calibrated and tested ChipCap 2 Sensor that's ready to integrate into control/monitoring systems without further calibration or temperature compensation.

Additional Features

- Digital RS485 MODBUS communication
- "Heater Mode" capability for condensation recovery



Harsh Environment Sensors For Carbon Dioxide (CO₂) Measurement

T3000 Series | CO₂ Sensors

The Telaire T3000 Series is a range of Carbon Dioxide (CO₂) Sensors designed to meet the specific needs of customers who require measuring CO₂ in harsh or difficult environments. Based on a series of modules, the casing offers a number of combinations to meet the needs of range, supply voltage and output type in various applications.

Features

- Easy mount with two external tabs
- Rated up to IP67 (build dependent)
- Available with potting
- Different calibrations available up to 20% CO₂ concentration
- Output Options: Analog or Digital
- Non-dispersive infrared (NDIR) measuring technology
- Shipped factory-calibrated
- Accuracy for 10-year life
- Extended operating temperature range

Applications

- HVAC Control
- Incubators
- Buses
- Refrigerators
- Subway Stations
- Railway Carriages



T3000



T3022 - Single channel 2000ppm CO₂ Sensor with I²C communication and IP65 enclosure for OEM integrations



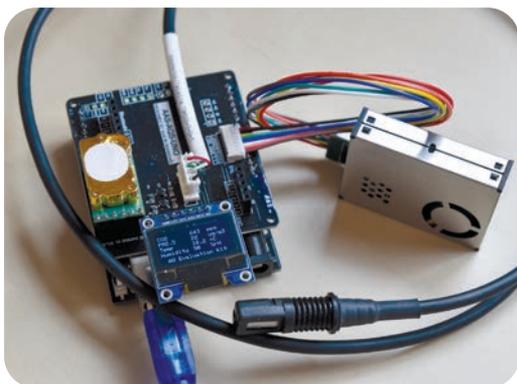
Engineering Development Kits

AAS-LDS-UNO | Air Quality Evaluation Board

The Telair AAS-LDS-UNO Evaluation Board is used to evaluate Telair Air Quality Sensors, including SM-UART-04L PM2.5 Laser Dust Sensor, T9602 Temperature & Humidity Sensors, T6713 Carbon Dioxide (CO2) Sensor, and other sensors from the Amphenol range. In addition, the OLED display can be supported at the same time. This evaluation board is designed to speed up evaluation and development of relevant sensors. The serial output can be configured to send sensor data to a PC over USB connection for recording and analysis in third party software.

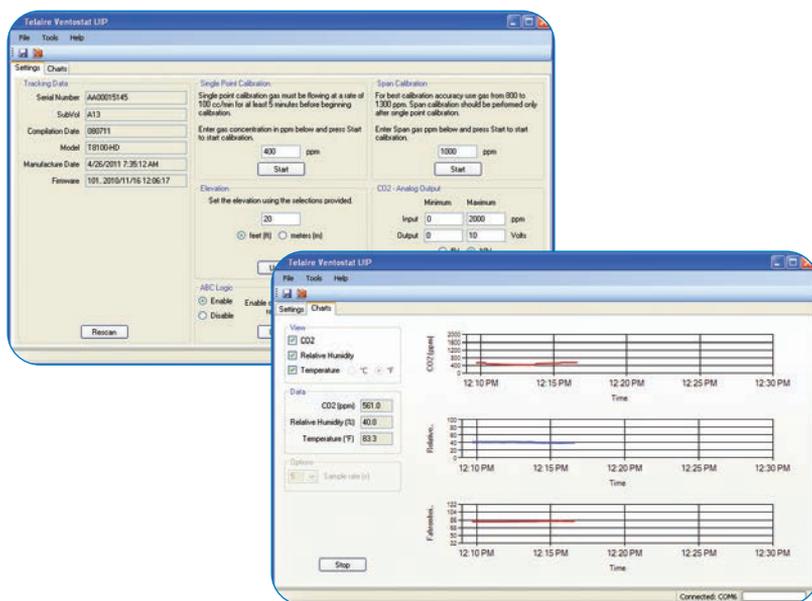
Available Kits

- AAS-LDS-UNO
- AAS-LDS-UNO-RH-CO₂



Features

- Arduino development platform, open source code
- Reserved SM-UART-04L PM2.5 Laser Dust Sensor interface
- Reserved T6713 CO₂ Sensor interface
- Reserved T9602 Temperature & Humidity Sensor interface
- Supports 128 x 64 OLED display screen
- External USB power supply
- Sample code available on www.Github.com



Embedded Sensing Technologies for Transportation, Healthcare and Industrial Applications



Improving Your World

Temperature

- NTC and PTC thermistors and sensor assemblies
- Non-contact infrared temperature sensors
- Inrush current limiting thermistors
- Wide range of customization available

Pressure / MEMS

- MEMS-based piezoresistive pressure sensors
- SenStable® technology for world-class accuracy and low drift
- Low pressure 2" H₂O to 5000 PSI

Carbon Dioxide (CO₂)

- Non-dispersive infrared (NDIR)
- Self-calibrating with lifetime calibration warranty
- Small footprint

Humidity

- Various calibrated outputs (digital and analog)
- Fully-integrated humidity and temperature transmitters
- Harsh environment probes

Dust

- Laser LED versions
- PM 2.5 and PM 10 measurements
- Digital output

Industry Leaders for Over 75 Years





Amphenol
Advanced Sensors

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www.amphenol-sensors.com

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