



Indoor Agriculture: Smart Greenhouse Environmental Monitoring and Control

Overview

Indoor agricultural facilities and greenhouses require proper environmental conditions for optimal plant growth and health. Most critical to productivity, quality, and energy conservation are the monitoring and control of carbon dioxide (CO₂) concentration in combination with temperature, humidity, and ambient light (photosynthetically active radiation, or PAR).

CO₂ is one of several key elements enabling photosynthesis and is therefore essential for plant growth. At ambient levels of CO₂ (~400 parts per million, ppm), plants generally grow well. However, as CO₂ concentrations are increased to ~1000 ppm and above, photosynthesis increases proportionately, resulting in more sugars and carbohydrates available for plant growth. Conversely, sub-ambient CO₂ atmospheres caused by poor ventilation and tightly sealed structures retard plant vitality and development. In many cases, CO₂ enrichment systems utilizing the byproducts of hydrocarbon fuel combustion or liquified/compressed CO₂ tanks are deployed to augment sub-optimal CO₂ concentrations.

Accurate and reliable CO₂ measurement is essential for cost-effective and efficient operation of supplemental CO₂ systems. The proper quantity and placement of CO₂ sensors enables sophisticated wired or wireless indoor agriculture climate control system to monitor and maintain optimal CO₂ setpoints in relation to other environmental parameters such as temperature, humidity and PAR.

Telaire T3000 Series | CO₂ Sensors for Harsh Environments

The Telaire T3000 Series CO₂ sensors are designed for CO₂ monitoring in harsh and demanding environments. Utilizing Telaire's nondispersive infrared (NDIR) sensor and electronic signal conditioning technology, the T3000 Series provides robust packaging in numerous configurations of measurement range, supply voltage, and output signals.

Features

- High-accuracy carbon dioxide (CO₂) transmitters for measurement and control applications in harsh environments
- Nondispersive infrared (NDIR) sensing technology
- Dual wavelength sensor design enables reliable operation in environments with prolonged periods of elevated CO₂ concentrations
- Extended temperature operating range
- Factory calibrations available up to 20% CO₂ concentration
- Analog or digital output options
- Available IP67 ingress protection
- Integrated diffusion filter and easy mounting via external tabs
- Custom designs available



Telaire's T9602 Series | Temperature and Humidity Sensors

The Telaire T9602 Series Temperature and Humidity sensors deliver accurate and reliable operation in a compact, fully-integrated, and ready-to-use package. Designed for harsh and demanding environments, the T9602 Series utilizes Telaire's advanced ChipCap2 sensing technology and is available in a variety of configurations to serve applications in HVAC, industrial, and healthcare markets.

Features

- Fully calibrated and temperature compensated
- Waterproof - IP67 Certified
- I²C Digital Output or Pulse Density Modulated (PDM) Output (convertible to analog)
- Precise and accurate ($\pm 2\%$ RH, $\pm 0.5^\circ\text{C}$, 14-bit resolution)
- Low current consumption; 3.3 or 5 VDC operation
- Robust over-molded package with integrated filter ensures reliable operation in harsh environments
- Available in multiple cable lengths
- Flexible mounting options



Thermometrics JI/JIC Temperature Sensor Assemblies

The Thermometrics JI/JIC Temperature Sensor Assemblies incorporate NTC thermistors molded onto a flexible cable. Providing IP68 rated waterproof protection, the Type JIC model offers the option of a stainless-steel sensor housing.

Features

- Waterproof - IP68 Certified
- Withstands freeze/thaw cycling
- Range of wire lengths from 300-5000mm (11.8 in-16.4 ft)
- Sensor tip and extension cable; integrated over molded construction
- RoHS compliant



AAS Advantage

Telaire products have been at the forefront of carbon dioxide sensing technology for the last 28 years and are the originators of the maintenance free CO₂ infrared sensor.

Telaire has over 35 technology patents including ABC Logic™ and warrants single-wavelength sensor calibration for the life of the sensor.

Amphenol Advanced Sensors is a trusted OEM partner providing temperature, humidity, pressure, CO₂ and dust sensors to solution providers in HVAC, automotive, industrial, and healthcare markets.

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