Application Solution

Outdoor and Greenhouse Dual Channel CO_2 Sensors

KEY POINTS

- Single channel CO_2 sensors utilize an internal calibration protocol (Automatic Background Correction-ABC) that can lead to inaccurate readings when used in outdoor, greenhouse or continuously occupied spaces.
- Turning ABC off on a single channel sensor will result in measurement drift compounding over time causing high inaccuracies.
- Dual channel CO_2 sensors minimize drift in applications where ABC cannot be used and are preferred for all outdoor, greenhouse or continuously occupied spaces for CO_2 measurement.
- In an effort to provide you the best accuracy and highest reliability, all of Senva's outdoor rated products now come standard with a dual-channel element.

DUAL-CHANNEL NDIR CO2 SENSORS

All sensor experience drift. Most CO_2 sensors use automatic baseline calibration (ABC) to mitigate drift effects. ABC measures CO_2 for some calibration period, tracks the minimum value during that time, and then calibrates assuming the lowest point should be equal to a known minimum CO_2 level which is typically 400 ppm. Typical spaces have cyclical periods of in-occupation allowing sensors to return to the minimum value and calibrate effectively. ABC eliminates the effects of drift and is highly accurate in most applications.

However, not all applications benefit from ABC. Where ABC cannot be used, a dual-channel sensor can minimize drift effects. An NDIR sensor consists of an infrared light source, a filtering lens, and an infrared absorber. A dual channel NDIR element works similarly to a single-channel element, except that it utilizes a secondary reference filter and absorber, as shown in Figure 1. The second filter is tuned slightly differently to accept a wavelength at which no gases are detectable. Thus, the second absorber acts as a reference reading or a zero.

This second reading gives the sensor a known value to calibrate against, minimizing the effects of drift and eliminating the need for manual calibration.

ABC should not be used on outdoor sensors, greenhouse sensors, or sensors that will be in a continuously occupied area such as a casino or 24 hour grocery store. Read more about continuously occupied spaces here:

Scan to read more about dual channel CO2 technology

Dual Channel NDIR Senor

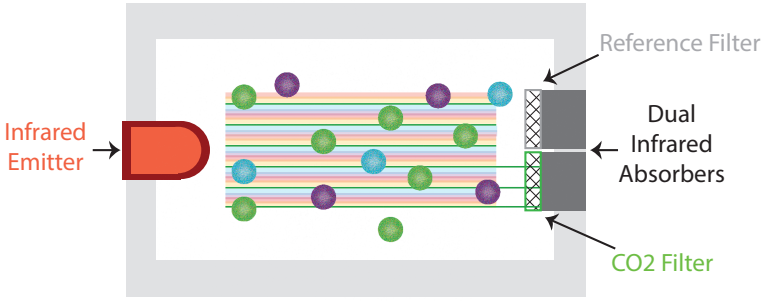

Figure 1: Dual-Channel NDIR CO_2 Element

OUTDOOR APPLICATIONS

For an outdoor sensor, CO_2 levels change more moderately than indoors. Outdoor concentrations may vary by up to ±5 ppm throughout a year, and the average year to year tends to increase by a couple ppm.

Using ABC will mean every two weeks the measured value gets set to the assumed minimum 400 ppm. As the variance in CO_2 measurement is so slow in an outdoor setting, the outcome of an ABC cycle will almost always leave the sensor reading 400 ppm, regardless of seasonal changes and yearly increases. The sensor will still see relative changes within the two week cycle, such as daily variances.

With ABC disabled, dual channel technology is a superior choice for it's ability to give a true, absolute reading of CO_2 with minimal drift effects.

GREENHOUSE APPLICATIONS

Many greenhouses maintain much higher concentrations of CO2 to encourage photosynthesis and growth of the plants.

In an application where the ambient CO2 level is 1200 ppm, an ABC cycle will reset to 400 ppm causing significantly low readings. The impact of this calibration is much more significant in a greenhouse than in an outdoor setting.

For many years, disabling ABC was suggested for greenhouse applications and drift was an acceptable side effect. Now, dual channel technology enables greenhouse owners to experience minimize drift effects.

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Outdoor and Greenhouse Dual Channel CO2 Sensors

SOLUTION

In an effort to provide you the best accuracy and highest reliability, all of Senva's outdoor rated products now come standard with a dual-channel element.

Senva's rugged outdoor enclosure protects from rain, overhead watering systems, and harmful ultraviolet rays. It's easy to install and built for reliability.

Our TotalSense Series and CT1O Outdoor CO2/Temp products allow options for any project.

Check out Senvainc.com or call (866) 660-8864 to learn more.

CT1O OUTDOOR CO2/TEMP SENSOR

Senva's CT1O series features an integrated LCD display and pushbuttons for simple setup. It comes standard with a replaceable, dual-channel CO_2 element, an adjustable analog output and a setpoint relay. Choose an analog temperature output or from a range of thermistors.

RUGGED ENCLOSURE

FAST SETUP

TotalSense™

Senva's TotalSense Outdoor allows complete configuration with up to 6 environmental sensors as well as a full-color OLED display. Choose from analog and Modbus/BACnet options. Now available with PID functionality - control CO2 levels directly from the TotalSense.

RUGGED ENCLOSURE

6 SENSOR OPTIONS

- CO_2 ±30PPM CO_2
- TEMPERATURE
- ±2% RELATIVE HUMIDITY
- PARTICULATE MATTER
- BAROMETRIC PRESSURE
- TVOC

FAST SETUP

Full-Color Display

Senva Sync App

PROUDLY MADE IN USA

7 year limited warranty