antrumX™
Airflow that Makes Sense

CARBON DIOXIDE SENSING

DESCRIPTION

The Sensor Pack monitors multiple air quality parameters across 16 zones, independently reporting on each. Each sensor pack contains sensors for air velocity, temperature, humidity, and pressure. With a reference to clean air, it cancels sensor drift, ensuring more accurate and consistent data compared to standard wall-mounted solutions. All required sensors for a specific application are pre-installed in one sensor pack, making calibration effortless through a tool-free replacement process.

WHY

Elevated CO_2 levels can indicate inadequate ventilation, potentially leading to discomfort, drowsiness, or reduced cognitive function among occupants. Additionally, in industrial settings or processes where CO_2 is a byproduct or a potential hazard, monitoring helps maintain safety standards and prevents potential health risks or environmental impacts. Lastly, in larger environmental contexts, tracking CO_2 levels aids in understanding and addressing global climate change, as it is a significant greenhouse gas contributing to the warming of the Earth's atmosphere.

Safety: Heightened CO_2 levels have the potential to impact focus and cognitive function. Monitoring and maintaining optimal CO_2 levels is directed towards establishing an environment that enhances concentration and overall performance while prioritizing the well-being of occupants.

Building Performance: Monitoring CO_2 levels aids in evaluating the effectiveness of a building's HVAC systems. It helps identify areas that might need improved ventilation and allows for adjustments to maintain optimal indoor air quality.

Optimizing Ventilation: Proper ventilation is essential to ensure a healthy working environment. Monitoring CO_2 levels helps assess the effectiveness of ventilation systems and ensures adequate airflow to maintain a comfortable and safe workspace.

Compliance: ASHRAE Standard 62.1 suggests target concentrations to ensure acceptable indoor air quality. The standard recommends that CO_2 levels should not exceed 700 parts per million (ppm) above outdoor levels. ASHRAE also suggests that any sensor used for Demand-Controlled Ventilation be calibrated at least once every five years.

Monitoring CO_2 levels in accordance with ASHRAE standards allows building managers and engineers to assess ventilation effectiveness. When CO_2 levels rise above the recommended thresholds, it signals the need for improved ventilation or increased fresh air intake to maintain acceptable IAQ.

Airflow that Makes Sense

CARBON DIOXIDE SENSING

HOW IT WORKS

Utilizing nondispersive infrared (NDIR) technology, the lamp emits an infrared radiation band that closely aligns with the 4.26-micron absorption band specific to CO_2. This alignment allows the sensor to detect CO_2 molecules by precisely matching the wavelength of the light source to the unique IR spectrum of CO_2.

As the IR light passes through the sample tube of air, the CO_2 gas molecules absorb the specific band of IR light while letting other wavelengths of light pass through. At the detector end, the remaining light hits an optical filter that absorbs every wavelength of light except the wavelength absorbed by CO_2 molecules in the sample tube. An IR detector reads the remaining amount of light that was not absorbed by the CO_2 molecules or the optical filter. The difference between the amount of light radiated by the IR lamp and the amount of IR light received by the detector is measured. Since the difference is the result of the light being absorbed by the CO_2 molecules in the air inside the tube, it is directly proportional to the number of CO_2 molecules in the air sample tube.

While the original IR gas analyzer was accurate, it was bulky. The sample tube alone was 16 inches long. Today's newest generation of CO2 sensors have even more optimized waveguides, allowing a longer optical light path to be folded into an even smaller footprint. Additionally, with advances in LED light sources and photo-diode light detectors, these solid-state sensors also provide a much longer life-span and consume much less power.

SPECIFICATIONS

Parameter	Value	Units
Technology	NDIR	
Range	0–5,000	ppm
Resolution	1	ppm
Accuracy	±30ppm ±3%	Reading
Response[1]	22	s
Recovery[1]	22	s
Calibration	5	Year(s)

1. T90