

Single Beam CO₂ Ventilation Transmitters/Controllers

The I-8001 and I-8002 carbon dioxide (CO₂) sensors and controllers are designed for Demand Controlled Ventilation DCV in buildings. This approach, using CO₂ as an indicator of occupancy, allows ventilation based on actual occupancy while still maintaining ASHRAE recommended per-person ventilation rates. Over-ventilation of buildings can be reduced, energy can be saved and air quality can be optimized. The optional black case (I-8001B and



Commercial Grade

I-8002B) is UL94-V5 rated making these models suitable for mounting directly inside the ductwork. Typical applications for the I-8001 and I-8002 include office buildings, conference rooms, schools, retail stores, restaurants, gymnasiums, and movie theaters.



I-8001



I-8001B



I-8002



I-8002B

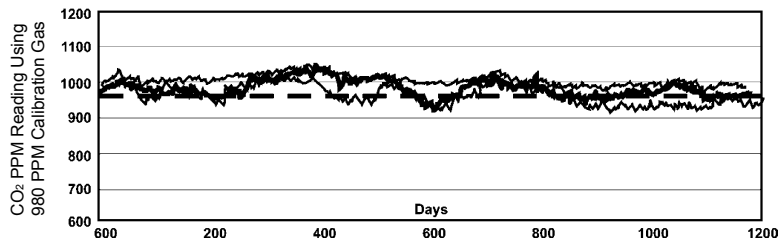
Features/Benefits

- Patented Absorption Infrared™ gas sensing engine provides high accuracy in a compact low cost package.
- Patented ABC Logic™ self-calibration system eliminates the need for manual calibration in most applications (see ABC Logic™ section).
- 10 years of experience and reliability built in.
- Gold-plated optical sensor increases sensor life and durability.
- Attractive low profile case in either white or black to suit your building décor.
- Mounting plate with terminal block provides quick, easy wiring. Compatible with standard US and European junction boxes.
- Gas permeable, water resistant diffusion filter prevents particulate and water contamination of the sensor.
- Locking screw secures cover and sensor to the mounting plate for tamper resistance.
- Dual simultaneous analog output (V & mA).
- On-board relay (normally open or closed) with adjustable setpoint and dead-band.
- Choice of 9 pre-programmed "standard settings".
- Adjustable settings allow for simple configuration with economizers to deliver specific target cfm/person ventilation rates.
- Simple plug-in PC based user interface program allows for configuring and calibrating the sensor.
- On-board push-button interface and 2 line by 8 character display allows for quick, easy customizing (I-8002 models only).
- Optional enclosures available for wet and cold temperature environments.
- One-step calibration process (if necessary) can be completed in 5 minutes.
- The I-8001B/8002B (Black Case) includes conformal-coated PCB with a UL94-5V rated enclosure for direct in duct mounting or increased environmental durability.
- No maintenance required.
- Lifetime calibration guarantee.

ABC Logic™ Provides Automatic Calibration

I-8001 and I-8002 commercial CO₂ controllers use the patented ABC Logic™ (Automatic Background Calibration) self-Calibration system that virtually eliminates the need for manual calibration in applications where the indoor CO₂ level drops to outside levels during unoccupied periods (e.g. during evening hours). ABC Logic™ is a special software routine in the sensor

that remembers the background readings for 14 consecutive evenings and calculates if there is sensor drift and then corrects for it. ABC Logic™ will not work properly in applications where the space is unoccupied for less than four hours a day or where there are industrial sources of CO₂ in the building such as breweries or wineries.



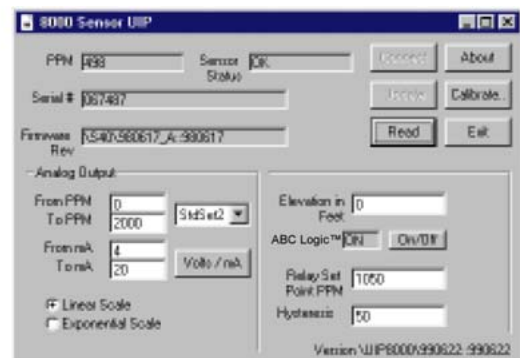
Fast One Step Calibration

All I-8000 Series CO₂ Sensors feature a fast one step calibration process should it ever be required. A zero calibration can be performed in 5 minutes by flowing gas to the calibration port and activating the calibration routine. If drift occurs in the sensor it usually affects the zero setting of the sensor only. If a two-point calibration is desired, it can be performed using the UIP Program.

User Interface Program (UIP)

All I-8000 series controllers can be connected to a PC using the UIP 2072 easy-to-use Windows® program. Simply connect to the sensor using the on-board RJ45 jack and you can adjust the output scaling, elevation adjustment,

relay setpoint, relay dead-band, select linear or proportional or exponential output, perform single-point or two-point calibration, and check ppm levels. Display units can also be adjusted using the keypad.



CO₂ Engineering Specification

The CO₂ sensor for demand control ventilation shall be the I-8001 or I-8002 non-dispersive infrared sensor, provided by INTEC Controls (858) 578-7887. The diffusion gas chamber in the sensor should incorporate a reflective, gold-plated light pipe or waveguide surrounded by a gas permeable Teflon-based hydrophobic diffusion filter that prevents particulate and water contamination of the sensor. The sensor shall provide simultaneous analog outputs in volts and milliamps and shall have a gold bifurcated relay that can be operated as normally open or closed. The sensor shall incorporate elevation correction adjustment and ABC Logic™ (Automatic Background Calibration) software for self-correction for stability less than 2% full scale over the 15 year expected life. The sensor shall have an accuracy of ±40 ppm plus 3% of reading at 72°F when compared against a certified factory reference. All adjustments to the sensor including output scaling, elevation adjustment, relay setpoint, relay dead-band, proportional or exponential output, and single-point calibration shall be made via computer connection to an on-board RJ45 jack. The I-8002 product shall also be adjusted using the on-board push buttons and display. For ease of installation, the sensor shall have a detachable base with all field wiring terminals on the base. This product meets or exceeds specifications for the Model 2001V.

Accessories



1505 Water Resistant Enclosure for Harsh Environments



1551 Outside Air Enclosure for Temperatures to -20°F (-29°C)



1508 Aspiration Box For In Duct Mounting



2072 UIP For Customizing Settings and Calibration



2075 Calibration Kit For Performing Zero and Span Calibration



Replacement Bottles For Replacing 2075 Gas Bottles

Factory calibration available – Call for details.

Model/Features

I-8001



- No Display
- Wall Mount
- 0-2,000 PPM*

I-8001B**



- No Display
- Wall or In-Duct Mount
- 0-2,000 PPM*

I-8002



- Display
- Wall Mount
- 0-2,000 PPM*

I-8002B**



- Display
- Wall or In-Duct Mount
- 0-2,000 PPM*



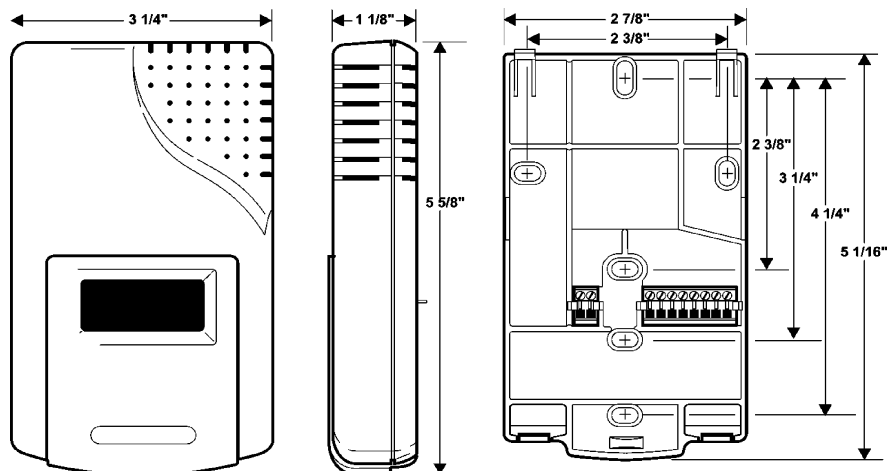
* Adjustable to 10,000 ppm

- All units are compatible with Accessory Enclosures, 2072 UIP and Calibration Kit.
- All units can be zero calibrated using a zero gas and on-board keypad.
- (***) Black enclosures are UL94-5V Rated and electronics are conformally coated for direct in-duct mounting.
- Display units are provided with locking covers for hidden or visible display.

Cross-Reference

The I-8001 and I-8002 controllers meet or exceed the performance specifications and functionality for the Model 2001V and may be used as a direct substitute.

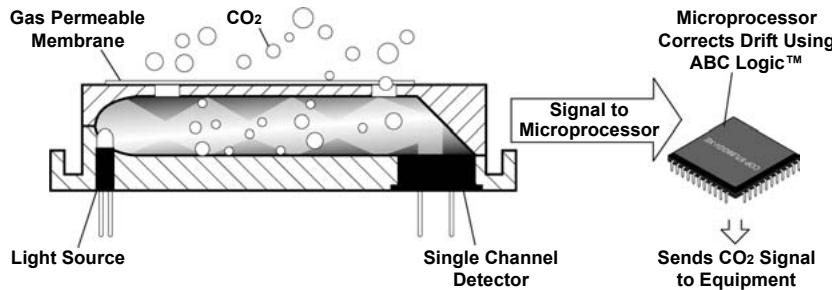
Dimensions



How the Commercial Grade Sensor Works

CO₂ sensor can detect gases based on the fact that gases will absorb light at very specific wavelengths in the infrared spectrum. In the sensor, gas diffuses through a gas permeable membrane and into the sample chamber. The gas permeable membrane allows gas molecules to pass freely but prevents the entry of particulates. A light source at one end of the chamber generates a broad band of infrared energy that is directed through the sample chamber. Because much of the light bounces off the gold plated walls of the sensor, a longer effective

sample path can be achieved in a small distance. At the other end of the sensor is a special optical filter installed on top of a light detector. The optical filter is designed to only admit light at the wavelength where CO₂ is known to absorb light. The small change in light intensity caused by a change in CO₂ concentrations is then measured by the detector and converted into a CO₂ measurement by a microprocessor. The microprocessor also automatically calibrates and corrects the sensor for long-term drift using self-calibration software.



Specifications

Method

Single Beam Absorption Infrared Diffusion sample method

Performance

Measurement Range

0-2,000 ppm factory default
Adjustable to 10,000 ppm

Accuracy

±40 ppm, + 3% of reading @ 72°F when compared against a certified factory reference

Non-Linearity

< 1% of FS

Stability

< 2% of FS over life of sensor (15 yrs typical) when using ABC Logic™

Temp. Dependence

± 0.11% FS per °F
(± 0.2% FS per °C)

Elevation (Pressure) Correction

Add 0.13% of reading per mm Hg decrease from 760 mm Hg (On-board correction, user set with UIP software), preset at sea level

Response Time 0-90%

< 2 minutes, typical

Warm-Up Time @ 25°C

< 2 minutes (nominal)
10 minutes (maximum accuracy)

Operating Conditions

32°F to 122°F (0°C to 50°C)
0-95% RH, non-condensing

Storage Temperature

-20°C to 70°C

Agency Certification

FCC Part 15 Class B / CE
Black Case - UL94-5V Rated
California Energy Commission

Input/Output

Power

18-30 VAC RMS, 50/60 Hz - half-wave rectified
18-42 VDC polarity protected
1.75 VA maximum average power
2.75 VA peak power

Analog Output (Simultaneous)

0-10 VDC (100 Ohms output impedance)
4-20 mA (RLmax = 500 Ohms)

Both outputs available simultaneously

Relay Output

Normally Open and Normally Closed (wire either way), gold bifurcated, 2A max. @ 24 VAC. Adjustable setpoint, factory set at 1,000 ppm, 50 ppm hysteresis

Wiring

18-28 AWG stranded copper wire only. 2 wires each for power, analog output, relay

Digital I/O

RS-232 interface for use with optional PC software and cable for UIP kit 2072

Warranty/Other

Warranty

18 months parts and labor

Calibration

- Factory calibrated
- Field calibration not required
- Lifetime calibration guarantee

Wiring Configurations

