**Match Outside Air Ventilation to Actual Occupancy to Cut HVAC Cost to 20%**

Buildings generally set a fixed level of outside air ventilation based on maximum design occupancy. Because actual ventilation levels are generally in excess of the maximum occupancy design and buildings are not usually occupied at maximum design level, this results in over-ventilation. A CO₂ (carbon dioxide) sensing system uses real time CO₂ measurements, and adjusts air delivery to ensure ventilation meets actual occupancy needs of the space to reduce over-ventilation. HVAC savings from 5% and up to 20% are being realized. Cost is generally recovered in 18 to 36 months.

### Benefits of Real-Time Ventilation

- CO₂ based ventilation control eliminates the over-ventilation condition found in most buildings.
- As occupancy levels vary during the day, air delivery is adjusted to provide only for the real-time occupancy needs, further reducing over-ventilation.
- Excess pre-conditioned air in low occupancy areas is transferred to further reduce outside air needs.
- Ventilation control system and humidity sensing can integrate with economizers for maximum savings.

### How the System Operates

- CO₂ sensors are installed in major occupied spaces to provide the real-time information needed to deliver outside air, based on people in the space.
- If one fresh air supply feeds many zones, control is based on the highest level measured in all zones.
- A base ventilation level controls contaminants from building components when occupancy is low.
- This approach can be easily integrated with existing pneumatic or digital building control systems.
Is Your Building A Candidate?

No-cost assessments of buildings are provided to determine the economic value of upgrading to CO2 control. This assessment includes current ventilation levels, efficiency of your current ventilation system, economics of CO2 control for your building, and economizer opportunities. Rebates are also identified that may reduce the cost of installation.

How The System Works

**Principle:** The system configuration will depend on the design of your building and its mechanisms to regulate fresh air delivery. The key is to sense CO2 in all major occupied zones of a building and to have a control system, based on actual CO2 levels, that ensures all spaces are provided code required ventilation.

Installation and operation will vary based on the current type of control and its method of fresh air delivery. It works well with constant or variable airflow systems.

**Central Air Delivery System:** With a limited number of air intakes serving multiple floors, sensors are placed in major occupied spaces (4 to 6 sensors per floor). Outside air is regulated based on the highest level measured in zones served by the air intake.

**Floor Air Delivery Systems:** If fresh air is delivered to a mechanical room serving an entire floor, sensors placed in each major occupied zone provide feedback to control outside air delivery based on the greatest need for ventilation of all the zones on the floor.

**VAV Control of Ventilation And Temperature:** Any modern software based Variable Air Volume control system can be upgraded to provide zone base control of ventilation using CO2 and temperature.

**Ventilation Control with Packaged System:** Rooftop package systems serving one or more zones are upgraded to integrate CO2 control. Many systems are already CO2 ready for ventilation control.

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**CO2 Sensor Specifications**

**General**

**CO2 Detection Method:** Gold Plated Non-Dispersive Infrared Optical Sensor with Automatic Baseline Correction for Self-Calibration. Diffusion Sampling.

**Certification:** CE, EMC89/336/EEC, CA Energy Commission, ISO-9001 Certified Manufacturer

**Transmitter Rated Life:** 15 years

**Operating Conditions:** 32 to 122° F (0 to 50°C), 0 to 95% RH

**Storage Conditions:** -40 to 158° F (-40 to 70° C)

**Performance**

**CO2 Measurement Range:** 0-2000 ppm (factory set)

**Optical Sampling Path Length:** 4.7” (12 cm)

**CO2 Accuracy:** +/- 1% of measurement range + 5% of measured value.

**Calibration:** Self Calibrating, Calibration Not Required

**Response Time:** T90 = <2 minutes (diffusion)

**Power**

**Input:** 18-30 VAC, 50-60 hz (half-wave rectified)

**Average Power Consumption:** ≤ 3 Watts average

**Outputs**

**Linear Analog Output:** 0 to 10 VDC ROUT < 100 ohm

**Wiring Access:** Wall: remove front panel of transmitter to access wiring terminals and mounting plate. Duct: 12” cable with 3-wire connection.

**Wall Mount Sensor**

**Front**

**Back**

**Side**

**In-Grill Sensor**

**Front**

**Back**

**Side**

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Covered By US Patents: 6194735, 6016203, other patents pending

Specifications Subject To Change Without Notice 3/9/03

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