



Young Regulator Co.

7100 Krick Rd • Walton Hills, OH 44146

P: 440-232-9700 • F: 440-232-8266

www.youngregulator.com

Submit DA-CO2-wwhh

Demand-Air™ CO₂ DA-CO2-wwhh Rectangular Modulating Damper and Sensor for Demand Response Ventilation

Application and Design

The Demand-Air™ Kit Rectangular (DA-CO2-wwhh) is the simple answer to Demand Response Ventilation. The Carbon Dioxide Sensor monitors concentrations in the space and causes the damper motor to modulate open or closed as required to maintain a healthful indoor environment while reducing operating cost. The Damper is available in any standard rectangular sizes you need. The kit features a high- quality Belimo brushless DC motor. To preclude over-ventilation, the damper begins to open at 800ppm and is full open by 1200ppm.

24VAC Transformer included.



5 Year Parts Warranty

| Standard Construction | |
|---------------------------|--|
| Frame | 16 gauge roll-formed, corrosion-resistant, galvanized steel construction w/ all welded corners. Members have hat-shaped cross-sections for added stiffness and strength. |
| 3/16" smaller tan nominal | |
| Blade | Blades are 16 ga. galvanized reinforced when width is 36" or greater. |
| Shaft | 1/2" Plated Steel |
| Bushings | Oil Impregnated Bronze |
| Min/Max Size | 6"x6" to 48"x48" |
| Sensor Data | |
| Supply Power | 24VAC ± 20% Consumption < 1 Watt (avg) |
| Output Signal | 0-10 VDC |
| Sensor Dimensions | 5.12"(h) x 3.35" (w) x 1.18" (d) |
| Sensor Coverage Area | 7,500 sq. ft. (max) |
| Calibration Life cycle | 15 years |
| Sensor Technology | Single Beam Infrared (NDIR) |

| Belimo LMB24- SR Actuator | |
|---|------------------------------------|
| 24V, 2-10 VDC Control w/ Position Feedback | |
| Volts / Watts /VA | 24VAC / 1.5W / 3VA |
| Noise | < 35dB(A) |
| Timing | 95 Seconds Constant |
| Torque | 45 in-lbs |
| Reflective Position Indicator | |
| Options | |
| 2 POSITION DAMPER MOTOR Damper fully opens when CO ₂ PPM exceed desired level. Damper will drive closed when below. | |
| AUXILIARY SWITCH Adjustable Auxiliary Switch contact made to engage another devise such as a fan to assist with ventilation. | |
| Duct Mount Sensor Available | Sensor with Visual and Audio Alarm |



| Quantity | Size (wwxhh) | Notes |
|-------------------|-------------------------|-------|
| | | |
| | | |
| | | |
| Project | Location | |
| Contractor | Design Specifier | |

Demand Response Ventilation

ASHRAE Standards 62.1 (commercial spaces) and 62.2 (low-rise residential) prescribe ventilation rates/air changes to ensure buildings are healthy, productive places for people to live and work. Bringing in fresh outside air is great but expensive because it must be dried and heated or cooled. Demand Response Ventilation is simply introducing only the fresh air required based on Actual Demand.

Why Carbon Dioxide? People breath at a relatively constant rate, carbon dioxide is a good measure of how many people are using a particular space and how much fresh-air they require. ASHRAE has set 1000 ppm as a high normal CO₂ concentration. Above that point people may start to feel stuffy or notice unpleasant levels of bioeffluence.

Case Study

To illustrate how 62.1 works, consider a simplified branch bank building. Table 1 outlines how the interior space is configured and the airflow requirements for each zone.

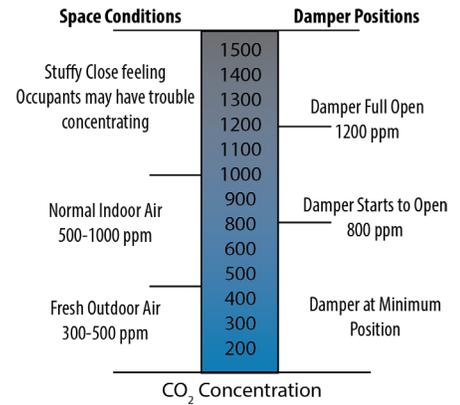


There are Requirements for each square foot depending on its usage and for each person in a particular space.

Table 2 Compares three scenarios

1. Uncontrolled Intake of 62.1 required air all the time.
2. Uncontrolled intake of required air only when the bank is open.
3. Each space being fully occupied only half the time.

Savings comes from closing the intake when CO₂ is low because occupancy is less than the planned maximum.



| Zone | Floor Space | CFM / Sqft | Area Req. | People | CFM / Person | People Req. |
|---------------|-------------|---------------|------------------------------------|--------|----------------|-------------|
| Lobby | 1200 | .06 | 72 | 10 | 7.5 | 75 |
| Offices | 1000 | .06 | 60 | 7 | 5 | 35 |
| Vault | 250 | .06 | 15 | 1 | 5 | 5 |
| Break Room | 150 | .12 | 18 | 1 | 5 | 5 |
| Storage | 100 | .06 | 6 | 0 | 5 | 0 |
| Corridors | 300 | .06 | 18 | 0 | 5 | 0 |
| Totals | 3000 | Fresh Air Req | 189 | 19 | Fresh Air Req | 120 |
| | | | Total Fresh Air Requirement | | 309 CFM | |

| Scenario | Min/Yr | 62.1 Mandate | CFM/Yr | Cost to Operate | Savings |
|------------------------------|---------|--------------|-------------|-----------------|------------------|
| Uncontrolled 24/7 | 525,600 | 309 CFM | 262,800,000 | \$ 618.00 | Baseline |
| Uncontrolled 12 hr workday | 183,600 | 309 CFM | 56,732,400 | \$ 257.88 | \$ 402.12 |
| Half Occupancy 12 hr Workday | 183,600 | 150 CFM | 27,540,400 | \$ 104.80 | \$ 513.20 |

* Cost estimates taken from Paul Raymer's Article, "The Cost of Ventilation", published in Ventilation News and Views blog August 2013.

Boston MA 3299 55 degree days
Gas @ \$1.28/therm
Electric @ \$0.18/kWh

Demand-Air™ CO₂ Specification

The Demand-Air CO₂ is a controlled fresh-air intake system that can be used either as a standalone product or as part of a building management system. Damper action will be modulating and proportional to carbon dioxide concentration in the space. Blade must be at least 20 gage galvanized steel and feature EPDM Low-Leak seals. Shell must be at least 24 gage for sizes 4 inches through 10 inches and 20 gage for dampers 12 inches through 20 inches. Shaft shall be ½ inch plated steel and turn inside an oil-impregnated bronze bearing. The damper will be driven by an electronic, direct coupled, brushless DC motor. The motor must accept either a 2 to 10 vdc or a 4 to 20 mA input from the CO₂ sensor.

The motor must also output that signal as feedback to a building management system. It will have a reflective position indicator and adjustable position stops. The motor must be able to deliver 45 inch pounds of torque and have a 95 second timing interval. The motor shall not produce sound at more than 35dB{A}. The sensor must feature Single Beam Non-Dispersive Infrared Technology and Automatic Background Calibration. It should be able to sense Carbon Dioxide from 0 to 2,000 parts per million and display the same on an attractive led display. It should have a calibration interval of not less than 15 years. The sensor must have factory configurable scaling. Total system draw should not exceed 4 Watts. The system must carry a 5 year parts warranty