



## Young Regulator Co.

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Submit DA-CO2-XX

## Demand-Air™ CO<sub>2</sub> DA-CO2-XX

Round Modulating Damper and Sensor  
for Demand Response Ventilation

### Application and Design

The Demand-Air™ Kit (DA-CO2-XX) 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 round size 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

Shell	One end straight One end crimped rolled stiffening beads	4" to 9" - 24 gauge 10" to 20" - 20 Gauge Galvanized Steel	Shell Length 8"
Blade		20 ga. Galvanized Steel	
Shaft		1/2" Plated Steel	
Bushing		Oil Impregnated Bronze	
Low Leak Seals		EPDM Rubber	

#### SENSOR DATA

Supply Voltage	24VAC +/- 20%
Power Consumption	<1 Watt average
Output Signal	0-10 VDC
Sensor Dimensions	(H) 5.12" x (W) 3.35" x (D) 1.18"
Sensor Coverage Area	7,500 Sqft maximum
Calibration lifecycle	15 years
Sensing Technology	Single Beam Infrared (NDIR)

#### BELIMO LMB24-SR ACTUATOR

24V, 2-10VDC Control Input w 2-10VDC Position Feedback

Volts	24V
Watts	1.5
VA	3
Noise	<35 dB (A)
Timing	95 Seconds Constant
Torque	45 in. lb.

Minimum and Maximum Air Adjustment Reflective Visual Position Indicator

#### OPTIONS

304 Stainless Steel Damper Construction	For Rectangular Dampers Contact the Factory
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Duct Mount Sensor (optional) provides more average information. Samples return air from the whole space.



QUANTITY	DIAMETER	NOTES
PROJECT	LOCATION	
CONTRACTOR	DESIGN SPECIFIER	

## Demand Response Ventilation

Ventilation is seeing a resurgence of importance.

ASHRAE Standard 62.1 (2013) "Ventilation for Acceptable Indoor Air Quality" describes ventilation rates for commercial and industrial spaces. Standard 62.2 prescribes ventilation for low-rise residential buildings. Rates have been determined to provide healthy, productive places for people to live and work. There is an understanding that meeting these standards imposes a large cost on building/home owners. In order to bring in fresh air, conditioned air must be exhausted. Each unit of fresh air that must be re-conditioned cost dollars and carbon impact.

Demand Response Ventilation is the task of limiting ventilation based on Actual Demand. 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

ASHRAE 62.1 dictates how much fresh air should be brought into the building. To illustrate how this works, consider a simplified branch bank building. Table 1 outlines how the interior space is configured and the 62.1 airflow requirements for each zone.

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 there are fewer than predicted people right now.

## Young Regulator Co. Demand-Air™

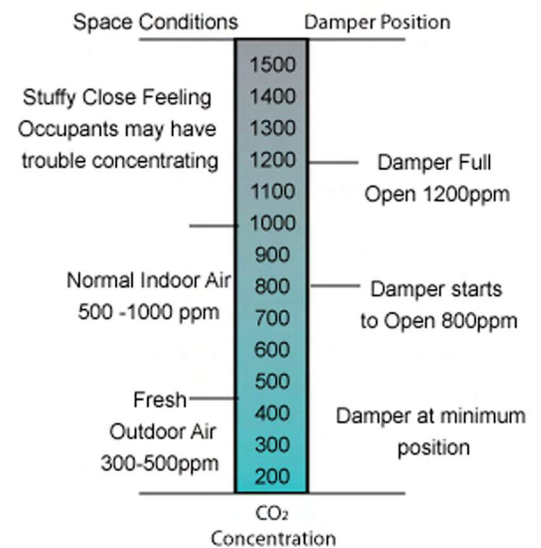


Table 1 62.1 Requirements

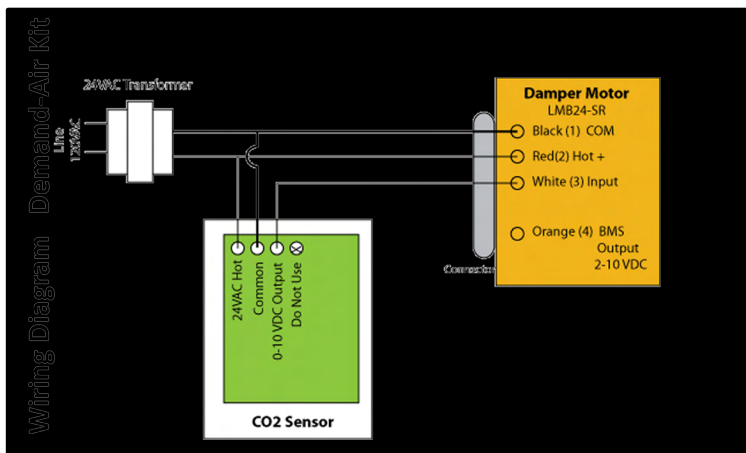
Zone	Floor Space	People	CFM/Person	CFM/ Sqft	People Req.	Area Req.
Lobby	1200	10	7.5	0.06	75	72
Offices	1000	7	5	0.06	35	60
Vault	250	1	5	0.06	5	15
Break Room	150	1	5	0.12	5	18
Storage	100	0	5	0.06	0	6
Corridors	300	0	5	0.06	0	18
<b>Total</b>	<b>3000</b>	<b>19</b>	ASHRAE 62.1		Breathing Zone Requirement	
					120	189
Fully occupied Fresh air Required					309	CFM

Table 2 Cost to Operate\*

Scenario	Min/Yr	62.1 Mandate	CFM/yr	Cost to Operate	Savings
Uncontrolled 24/7	\$25,600	309 CFM	262,800,000	\$618.00	--
Uncontrolled 12 hr. Workdays	183,600	309 CFM	56,732,400	\$257.88	\$402.12
Half Occupancy 12 hr workdays	183,600	150 CFM	27,540,000	\$104.80	\$513.20

\* Cost figures are taken from Paul Raymer's Article, "The Cost of Ventilation" Ventilation News and Views blog. Aug 2013  
3299 55 degree days, Gas @ \$1.28/therm Electricity @ \$0.18/ kWh

**Pay Back is less than a year  
in this scenario.**



## Demand-Air CO2 Typical 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 1/2 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