

# Demand-Air™ CO<sub>2</sub>

## System Description

Each Demand-Air Kit will contain:

- One (1) damper with a 24 brushless DC Motor.
- One (1) 24VAC 40 VA, Plate-type transformer
- One (1) CO<sub>2</sub> sensor, specially programmed for this application and hardware
- Quick Install and Demand-Air™ CO<sub>2</sub> Installation and Operations Manual

Need More Information?  
Scan the QR code with your smart phone. It will take you to the Demand-Air™ page on the YR website. You will find the complete Demand-Air CO<sub>2</sub> IOM and much more.



[www.YoungRegulator.com/Demand-air.aspx](http://www.YoungRegulator.com/Demand-air.aspx)

**Warnings and Cautions:** Failure to follow these warnings may cause hazardous condition and/or cause damage to the Demand-Air™ or other HVAC equipment.

### WARNINGS

- Disconnect the power supply to the damper before making any wiring connections to prevent the danger of electrical shock or equipment damage.
- Care must be taken where the fresh-air intake is placed. Avoid areas of possible contamination such as: dryer or furnace vents, driveways, trash containers, swimming pools. The intake must be mounted above any expected snow accumulation. Consult local codes for further guidance.
- All wiring must comply with all applicable local and national, electrical and safety codes, ordinances and regulations.
- Use properly grounded tools and safety glasses and gloves when drilling or cutting sheet metal or fiberglass products, ducts, fittings or equipment.
- Do not trap a finger between the damper blade and the low-leak seal. It could cause injury or ruin the low leak seal.

### CAUTIONS

- The Demand-Air™ system is designed for indoor use only. Install the damper in areas between 22°F and 122°F, non-condensing. The sensor must be mounted in conditioned space.
- You must touch a grounded metal object before handling the damper motor or the sensor circuit board to protect electronic parts from electrostatic discharge.
- Carefully Open the Sensor housing. Gently rotate the screwdriver from back to front. Alternate methods may damage the circuit board or mar the cover.
- Check system operation and measure intake draw to ensure that the proper amount of outside air is being brought in.
- Carefully follow the enclosed wiring diagram to ensure the Demand-Air™ system works correctly.
- If the sensor fails the damper will go closed.
- If the motor fails the damper blade will stop where it is. If fail-safe, spring closed operation is required specify the optional TFB24-SR motor.

## Install the Damper

The Damper comes pre-installed in a commercial quality damper shell. Ideally, the damper should be at least three duct diameters back from the intake to encourage smooth flow as the fresh air mixes with return air.

- Round dampers feature a bead on the “Upstream” end (inlet) and a crimp and bead on the “Downstream” end (outlet). Simply zip screw the damper shell in-line with the intake ductwork.
- Rectangular dampers install through a 3” slot in the side or bottom of the duct. Zip screw the mounting plate into the duct.
- Mastic or UL approved duct tape should be used to further seal the joints.



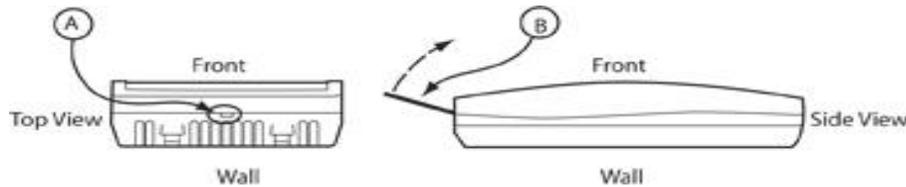
## Sensor

Demand-Air™ CO<sub>2</sub> modulates the damper based on CO<sub>2</sub> concentration. The Sensor displays the measured CO<sub>2</sub> Value in parts per million (ppm) on the LCD. These units are calibrated for the Young Regulator Demand-Air™ Damper for fresh-air intake control.



## To Open the Housing

Insert a screwdriver into the hole (A) in center of the top of the housing. Push the handle toward the front of the unit. (B)



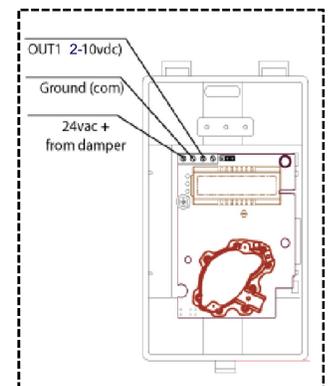
## Mount the Sensor

Mount the sensor on the wall. The sensor can cover up to 7500 square feet. It should be placed in an area that is representative of the spaces it controls. Treat it like a thermostat. It should be installed five feet off the ground, away from direct heat sources (direct sunlight, over a register or lamp). There is a mounting template on the last page of these instructions.

The sensor is powered by 24VAC. See wiring diagram below and terminal inset right.

The sensor has two output channels.

- Output 1 (2-10 Vdc) connects to the damper motor. The output is calibrated to start the damper opening at 800 ppm and be fully open at 1200 ppm.
- Output 2 (2-10 Vdc or with the addition of a resistor, 4-20 mA) is available to provide a feedback loop to a building management system.
- Error condition is indicated if the Out 2 output is 1Vdc or 2mA

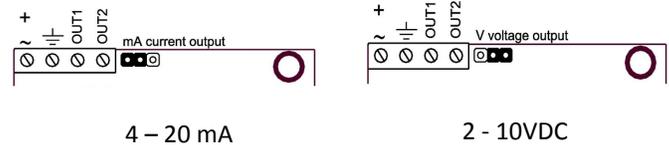


Sensor Detail

Sensor Terminal	Function (#)= Damper terminal number	Electrical	Default Settings
+	Power (+) Connects to (2) Damper Hot	24VAC/DC + +/- 20% 2W	
⏏	Power Ground (-) Connects to (1) Damper Common	24VAC/DC -	<b>NOTE: Damper, Sensor and any other controls <u>MUST use the same reference voltage</u></b>
Out 1	Analog Output 1 Connects to (3) Damper Input	2 to 10 VDC	800 ppm = 2VDC 1200 ppm = 10VDC
Out 2	Analog Output 2 Optional connection to (4) Building Management System (BMS)	2 to 10 VDC or 4-20 mA	800 ppm = 2VDC 1200 ppm = 10VDC
		0.9 to 1.6 VDC 1.5 to 2.5 mA	Status = Error
		0VDC or 0mA	Status= Not Ready

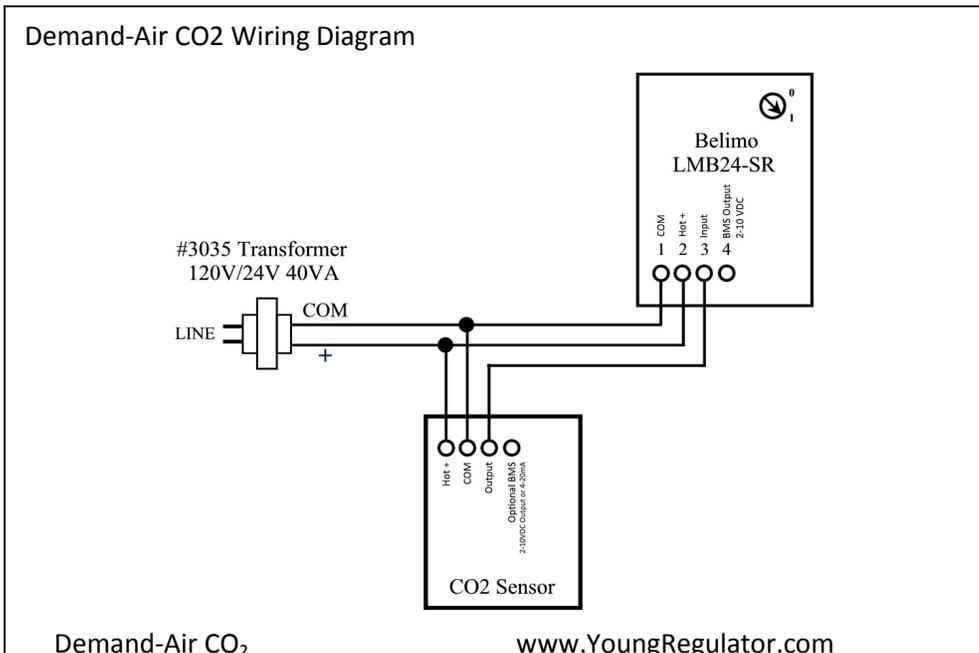
## Output 2 Configuration (BMS feedback)

If using Output 2 for connection to a building management system, set the jumper to output either 2-10 VDC or 4 to 20 mA outputs



## Wire the System

The sensor will require a three (3) wire connection to the damper. (See Wiring Diagram & Sensor Detail) Note that the ground is both the common for power and the reference voltage for the sensor and motor. **Shielded 18 to 22 gauge cable is recommended for all sensor wiring.** Shielded cable will reduce errors caused by ambient electronic noise which could cause potential over cycling. Notice that the sensor outputs 2-10 vdc and the motor responds to 2-10 vdc signals.



For more resources visit our website:

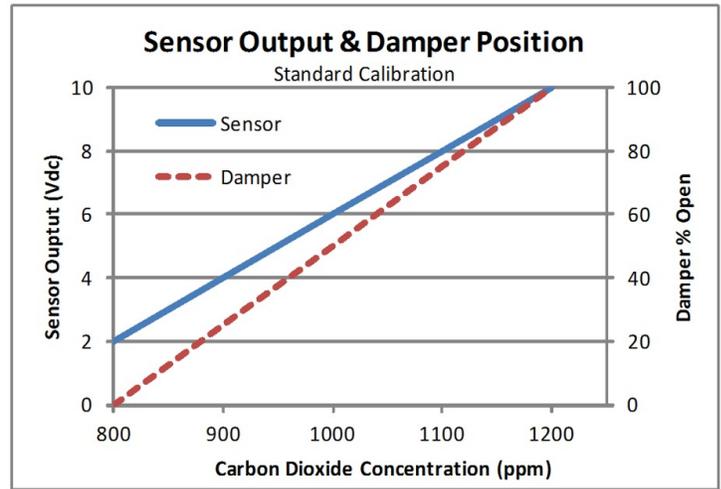
[www.YoungRegulator.com/Demand-Air.aspx](http://www.YoungRegulator.com/Demand-Air.aspx)

You will find:

- Complete Install and operation information
- Product flyers
- IntakeCalc<sup>®</sup> a spreadsheet to assist in sizing intake ducts
- Cost Savings analysis
- Warranty Information
- Links to Ashrae Std. 62.1 2010

## Sensor Calibration

The damper will start to open at 800 ppm and will be fully open by 1200 ppm (graph at right). The sensor features an Automatic Background Calibration function. When at minimum concentration readings, it adjusts itself toward 450ppm. This means the sensor adjusts for altitude and pressure differences. The sensor is fully calibrated out of the box but will improve its calibration over the course of three weeks.



This product is in accordance with the EMC 2004/108/EC, 92/31/EEG including amendments by the CE-marking Directive 93/68/EEC. The product fulfills the following demands: EN 61000-4-2 level 2, EN 61000-4-3 level 2, EN 61000-4-4 level 4, EN 61000-4-6, EN 61000-4-8 level 4, EN 55022 class B



### Young Regulator 5 Year Limited Parts Warranty:

The Demand-Air™ system is warranted from defects in material and workmanship for a period of five (5) years from the date of purchase. During the covered period, Young Regulator will repair or replace at its discretion any part that fails because of faulty material or workmanship. Damage due to negligence or improper use or other causes beyond the company's control are excluded from coverage. The company's liability extends to parts replacement only. It accepts no liability for labor to remove, repair or replace the product. It accepts no liability for incidental expenses or consequential damages. The warranty is null and void if the product is repaired or modified in the field.

The design engineer and the contractor bear all responsibility for appropriate application, installation and commissioning of Young Regulator equipment. Failures due to misapplication of the product are not a valid claim for warranty replacement.

To obtain warranty service, contact the installing contractor or design engineer.

There are no other explicit or implied warranties. Young Regulator does not assume, nor does it authorize any person to assume on its behalf, any other liability in connection with the sale of its products.

