

# ▶ **INDOOR AIR QUALITY**

## **AIR FLOW MEASURING CONTROL DAMPER**

*Model: IAQ-42*



**DODGE ENGINEERING  
& CONTROLS, INC.**

*Your Complete Solution*

## ► *Why is outside air measurement important?*

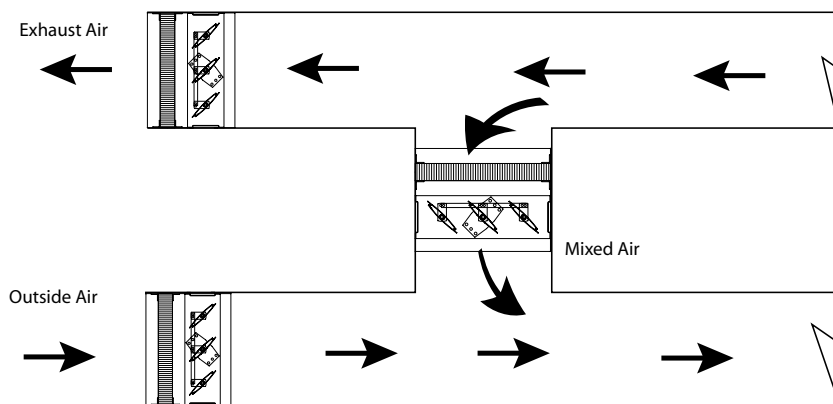
There are many significant benefits to monitoring outside air volumes. First, by measuring the amount of outside air coming into a building you can be assured that the building is complying with all applicable indoor air quality codes including ASHRAE Standard 62 and California Title 24. Meeting these

minimum requirements reduces indoor airborne viruses and bacteria which can lead to Sick Building Syndrome. Studies have shown that buildings that are under ventilated suffer from reduced productivity levels.

The second major advantage to monitoring outside air volumes is that it

eliminates costly over ventilation. In addition to increased energy costs associated with heating and cooling of outside air, over ventilation causes an increase in humidity that can result in mold development.

## ► *Where should an air measuring damper be used?*



### *Exhaust Air*

In this application an air measuring control damper is used to measure and control outdoor air intake while a second air measuring control damper is used to measure and control the exhaust flow. The set point for the exhaust air damper would track the flow of the outdoor air damper (minus a differential if positive building pressure is desired.)

### *Mixed Air*

In this application, an air measuring control damper is used to measure and control outdoor air intake while a second air measuring control damper is used to control the mixed air temperature. Normally an averaging sensor is required for mixed-air temperature control because the large temperature differences between return air and outdoor air cause stratification. The mixed air temperature is calculated from the flows and temperatures measured by each damper eliminating the measurement problem caused by stratification.

### *Outside Air*

In this application, an air measuring control damper provides outdoor air control based on a demand signal. The demand signal could be determined by a set schedule or by occupancy sensors. Examples of demand signals are carbon dioxide (CO<sub>2</sub>) concentration, a binary signal from a motion detector, or a manual switch.

## ► *Why is Factory Calibration important?*

Every IAQ-42 damper is factory calibrated before shipping. A certification chart is provided with every damper. You can be assured of the most accurate airflow readings possible.

The IAQ-42 is available with or without a factory calibrated controller. The Speciflow™ technology built into the controller measures the pressure, position of the damper blades, and the temperature of the air flowing through the damper. From these readings, the controller computes the airflow rate and adjusts the damper blades accordingly.



## ► *What is the IAQ-42?*

IAQ-42 is an air measuring control damper that utilizes patented Speciflow™ technology. The IAQ-42 will control air to prevent over-ventilation, provide energy savings during periods of low occupancy, and prevent under-ventilation not meeting ASHRAE Standard 62. The Speciflow™ technology built into the controller measures the pressure, position of the damper blades, and the temperature of the air flowing through the damper.

The IAQ-42 can help buildings meet the minimum outdoor air requirements of ASHRAE Standard 62 or California Title 24 by providing accurate monitoring and control of outside air. You can earn LEED-EB credits for air monitoring, increased ventilation, and ultra low leakage.

The IAQ-42 meets IECC (International Energy Conservation Code®) requirements with a leakage rating of 3 cfm/ft<sup>2</sup> @ 1 in. wg (55cmh/m<sup>2</sup> @ .25 kPa) or less.



*The IAQ-42 is provided with a factory supplied honeycomb air straightener. When ordering an IAQ-42 with an optional 4 inch (101mm) or 6 inch (152mm) louver it does not require an airflow straightener.*



*Every damper is provided with a 24 Vac modulating actuator to control the damper's blade position and provide feedback to the controller. The actuator can be mounted externally or internally.*



*The air pressure pickups are designed to be mounted on the blades. Temperature sensors monitor air temperature to allow the controller to correct the airflow rate for changes in air density.*

## ► *What is the benefit of the IAQ-42 over the competition?*

The IAQ-42 has a number of advantages over the competition:

- By integrating the pressure pickups with the control damper, the pressure signal is increased at low velocities making the unit more accurate in non-uniform flow conditions.
- Locating the pickups on the blade amplifies the pressure signal which increases the accuracy of readings.
- The pickups can easily be repaired or replaced.
- The small size of the pickups add minimal pressure drop to the system.
- The controller with Speciflow™ technology automatically compensates for the effect of air temperature on air density.
- The controller with Speciflow™ technology can operate stand alone or integrated with a DDC building control system.

Benefits	Dodge IAQ-42	Ruskin IAQ50	Trane Traq™ Damper
Low pressure drop	✓	✓	✓
Low velocity accuracy	✓	✓	
Temperature compensated	✓		✓
Insensitive to condensation	✓	✓	✓
Integral controller	✓	✓	✓
Factory calibrated	✓	✓	
No additional ductwork required	✓	✓	
Easily maintainable	✓		✓
Insensitive to non-uniform flow	✓	✓	

*This table shows the benefits of the IAQ-42 versus competitor's models.*

## ► *Why is temperature compensation important?*

Airflow measurement accuracy is dependent on the density of the air being measured and in turn air density is a function of temperature. The IAQ-42 monitors the dry-bulb temperature of the air passing through it and corrects the air density used to calculate the airflow rate. Airflow measuring devices that do not compensate for changes in air density must assume a “standard” density to calculate an airflow rate.

As air heats up it gets lighter. If this change in air density is not taken into consideration the monitoring device will allow too much hot outside air into the building, thus unnecessarily

increasing the cooling load. On a hot summer day outside air temperatures coming off of a black tar roof can easily reach over 120° F (49°C).

Without temperature compensation, an airflow-monitoring device would be telling the system to allow about 5% more air into the building than is desired. For an air-handler with an outside air design load of 20,000 cfm (101 m/s), this could cost a facility \$500 per year. In parts of the country where dynamic utility rates will be used, the penalty for a 20,000 cfm (101 m/s) outdoor air load would be \$750 per year. In addition to increasing energy costs,

over-ventilation in humid climates could cause excessively high indoor humidity, which could promote the growth of mold.

The opposite is true as air cools down and gets heavier. In cold climates outside air temperatures can reach -40° F (-40°C). This condition can lead to under-ventilation. An airflow-measuring device that does not compensate for temperature changes would measure 11% more outside air than is actually coming into the building. Under-ventilation from lack of temperature compensation will occur at the same time as cold and flu season.

## ► *IAQ-42 can save you space!*

In a typical ventilation system, there is a separate damper and airflow monitor. The airflow monitor needs to be a certain distance from the damper (formula driven).

The IAQ-42 with a straightener is mounted in a sleeve; the spacing doesn't change based on the size that you need. The total space required is 12 inches (305mm)! The IAQ-42 with a 4 inch (101mm) or 6 inch (152mm) louver needs 16 inches (406mm) of space.

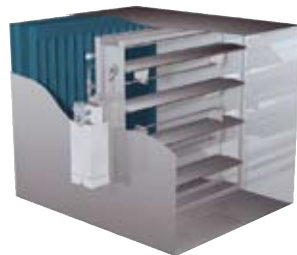


*IAQ-42 with straightener requires a 12 inch (305mm) sleeve.*

### **Example:**

If the opening is 36 inches W x 36 inches H (914mm x 914mm), the space between the damper and airflow monitor would be 18 inches (457mm). If you add in the damper depth, 5 inches (127mm), and air monitor depth, 8 inches (203mm), you would need 31 inches (787mm) of space.

The IAQ-42 with straightener takes only 12 inches (305mm) of space and it doesn't change! That saves 19 inches (483mm) of space!



*IAQ-42 with a 4 or 6 inch (101 or 152mm) louver requires a 16 inch (406mm) sleeve.*

*IAQ-42 is available with louver models ESD-635, ESJ-401LT, or EHV-602.*

## ► *Strong Support*



Let Dodge Engineering & Controls provide dampers and damper actuation to meet your project needs. Send us your damper schedule for a quote and great pricing.

**Toll Free:** (877) 334-2875

**Fax:** (978) 244-1422

**Website:** DEIControls.com

**E-mail:** Mail@DEIControls.com

**Mail:** 196 Riverneck Road  
Chelmsford, MA 01824

Our dampers are shipped directly to you from many convenient locations throughout the country to better serve you.

We also offer **Fast Track** service for even faster delivery.

### **WARRANTY**

Dodge Engineering & Controls warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to the factory, transportation prepaid. Dodge Engineering & Controls shall not be liable for damages resulting from misapplication or misuse of its products. Dodge Engineering & Controls will not be responsible for any installation or removal costs. Dodge Engineering & Controls will not be responsible for any service work or backcharges without prior written authorization.

Actuators are warranted by the actuator manufacturer. Should actuators furnished by Dodge Engineering & Controls prove defective during this period, they should be returned to the factory. Call Dodge Engineering & Controls prior to return for proper authorization for returning materials.

Due to continuing research, Dodge Engineering & Controls reserves the right to change specifications without notice.