AIR MEASURING PRODUCTS

• AMD • AMS • IAQ

DODGE ENGINEERING & CONTROLS, INC.

Your Complete Solution

October 2012

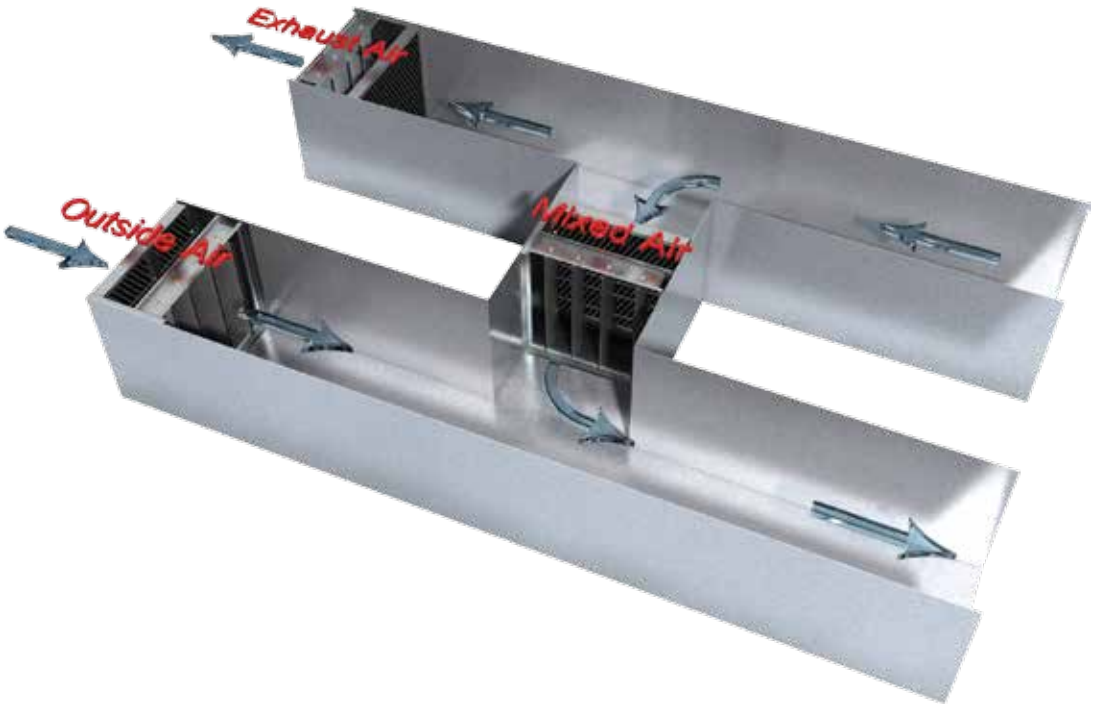
Why is outside air measurement important?

There are many significant benefits to monitoring outside air volumes.

By measuring the amount of outside air coming into a building, you can be assured a building is in compliance 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 under ventilated buildings create an environment where people are less productive.

Another advantage to monitoring outside air volumes coming into a building is to eliminate 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

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

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

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_2) concentration, a binary signal from a motion detector, or a manual switch.

IAQ-42

The IAQ-42 is an air measuring control damper that utilizes patented Speciflow™ technology.

The IAQ-42 will control air to:

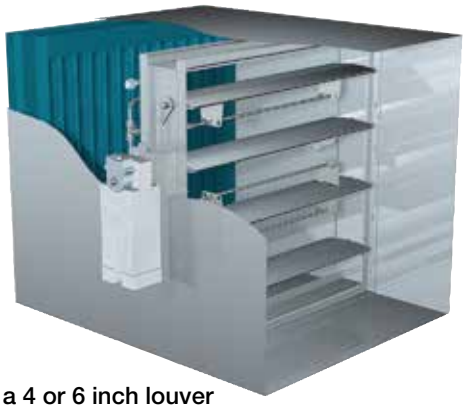
- Prevent over ventilation
- Prevent under ventilation
- Provide energy savings during low occupancy periods

The Speciflow™ technology built into the controller measures the pressure, position of the damper blades, and temperature of the air flowing through the damper.

The IAQ-42 can help buildings meet the indoor/outdoor air requirements of ASHRAE Standard 62 or California Title 24 by providing accurate monitoring and control of outside air.

The IAQ-42 is provided with a factory-supplied honeycomb air straightener (4 or 6 in. louver is optional), 24 Vac modulating actuator, air pressure pickups mounted on the damper blades, temperature sensors to allow the controller to correct airflow rate, and factory calibrated controller (optional).

IAQ-42 with straightener



IAQ-42 with a 4 or 6 inch louver

What's 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 IAQ50X	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	✓	✓	

AMS & AMD Series

AMS

The AMS is an accurate airflow measuring station and is furnished with a properly sized pressure transducer that outputs a signal proportional to cfm. A field supplied controller can use the transducer's signal along with the flow formula (provided) to regulate a modulating actuator to the target set point.

The AMS is also available with a factory supplied LON controller that accepts a target flow set point as an input (either analog or digital) and outputs a 0-10 VDC signal that can be used to position a damper (sold separately) and a 0-10 VDC signal proportional to the airflow.

AMD Series

The AMD dampers were developed as a low cost alternative to the IAQ-42 damper. Field supplied controllers are very easy to program following labeling on the damper. Factory supplied controllers are also available

A lower price solution was accomplished by:

- Providing lower cost, less complicated controllers
- Developing three different available blade styles (3V, Fabricated Airfoil, Aluminum Airfoil)
- Factory calibration is not required

The AMD series comes standard with a modulating actuator and a properly sized pressure transducer that outputs a signal proportional to CFM. A field supplied controller can use the transducer's signal along with the flow formula (provided) to regulate a modulating actuator to the target set point.

The AMD series is also available with a factory supplied LON controller that accepts a target flow set point as an input (either analog or digital) and outputs a 0-10 VDC signal proportional to the airflow.

The AMD-23 is an accurate airflow measuring station combined with a low leakage control damper into one compact assembly that both measures and regulates airflow volumes to a target set point.

Blade: 3V
Blade Action: Parallel

The AMD-33 is an accurate airflow measuring station and a low leakage control damper combined into one compact assembly that both measures and regulates airflow volumes to a target set point.

Blade: Fabricated Airfoil
Blade Action: Parallel

AMD Series

The AMD-42 is an accurate airflow measuring station combined with a low leakage control damper in one compact assembly that both measures and regulates airflow volumes to a target set point.

Blade: Extruded Aluminum
Blade Action: Parallel

The AMD-42V is an accurate airflow measuring station and a low leakage vertical blade control damper in one compact assembly that both measures and regulates airflow volumes to a target set point.

Blade: Extruded Aluminum - Vertical Blade
Blade Action: Parallel

Quick Selection Chart

		AMS	AMD-23	AMD-33	AMD-42	AMD-42V	IAQ-42
Velocity ft/min (m/s)		2000 (10.2)	2000 (10.2)	2000 (10.2)	2000 (10.2)	2000 (10.2)	2000 (10.2)
Temperature range °F (°C)		-20° to 180° (-29° to 82°)	-20° to 180° (-29° to 82°)	-20° to 180° (-29° to 82°)	-20° to 180° (-29° to 82°)	-20° to 180° (-29° to 82°)	-20° to 180° (-29° to 82°)
Factory calibration required		No	No	No	No	No	Yes
Accuracy		5%	5%	5%	5%	5%	5%
Measures airflow		✓	✓	✓	✓	✓	✓
Regulates airflow volume			✓	✓	✓	✓	✓
Temperature compensated							✓
Factory supplied transducer		✓	✓	✓	✓	✓	✓
Factory supplied controller		✓	✓	✓	✓	✓	✓
Airflow straightener		✓	✓	✓	✓	✓	✓
Blade Action	Opposed						✓
	Parallel	✓	✓	✓	✓	✓	✓
Unit depth in. (mm)		8 (203)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
Maximum size		60 x 48 (1524 x 1219)	144 x 148 (3658 x 3759)	144 x 148 (3658 x 3759)	144 x 148 (3658 x 3759)	74 x 60 (1880 x 1524)	93 x 74 (2362 x 1880)
Quick Build program		✓	✓	✓	✓	✓	

Damper Performance Testing Criteria

Pressure drop testing was conducted in accordance with AMCA Standard 500-D using the three configurations shown. All data has been corrected to represent standard air at a density of .075 lb/ft^3 (1.201 kg/m^3).

Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

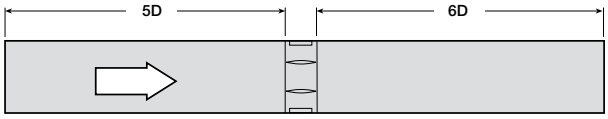


Figure 5.3

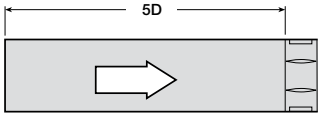


Figure 5.2

$$D = \sqrt{\frac{4\,(W)\,(H)}{3.14}}$$

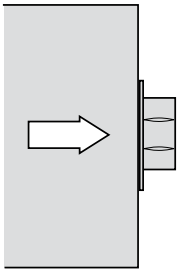


Figure 5.5

Figure 5.3 Illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

Figure 5.2 Illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

Figure 5.5 Illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.

Pressure Drop Data

AMD-23

Dimension inches	12x12			24x24			36x36			12x48			48x12		
AMCA figure	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5
Velocity (ft/min)	Pressure Drop in. wg														
500	.05	.04	.07	.03	.03	.05	.03	.03	.05	.04	.03	.06	.03	.03	.05
1000	.15	.12	.25	.10	.09	.20	.09	.07	.17	.11	.10	.20	.11	.09	.20
1500	.31	.24	.54	.21	.17	.41	.18	.14	.36	.23	.20	.43	.22	.19	.42
2000	.52	.40	.92	.36	.28	.71	.31	.23	.62	.39	.34	.74	.38	.33	.72
2500	.80	.60	1.41	.54	.43	1.10	.46	.35	.96	.58	.51	1.13	.57	.50	1.11
3000	1.12	.84	2.02	.76	.60	1.54	.64	.48	1.36	.81	.72	1.59	.79	.71	1.56
3500	1.51	1.12	2.73	1.01	.80	2.09	.86	.64	1.84	1.10	.97	2.14	1.06	.96	2.12
4000	1.92	1.44	3.53	1.32	1.03	2.76	1.12	.82	2.40	1.43	1.26	2.78	1.38	1.24	2.77

Damper Performance Testing Criteria

AMD-33

Dimension inches	12x12			24x24			36x36			12x48			48x12		
AMCA figure	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5
Velocity (ft/min)	Pressure Drop in. wg														
500	.04	.04	.07	.03	.03	.05	.03	.03	.05	.03	.03	.06	.04	.03	.05
1000	.13	.12	.24	.09	.09	.19	.08	.07	.16	.10	.10	.19	.10	.09	.19
1500	.27	.24	.50	.19	.17	.38	.16	.14	.34	.21	.20	.41	.21	.19	.41
2000	.44	.40	.86	.31	.28	.65	.26	.23	.57	.36	.34	.71	.36	.33	.71
2500	.66	.60	1.33	.47	.43	1.00	.39	.35	.88	.54	.51	1.09	.55	.50	1.10
3000	.93	.84	1.89	.65	.60	1.43	.53	.48	1.24	.76	.72	1.54	.77	.71	1.55
3500	1.25	1.12	2.57	.88	.80	1.9	.71	.64	1.67	1.02	.97	2.08	1.03	.96	2.10
4000	1.59	1.44	3.30	1.14	1.03	2.52	.91	.82	2.19	1.33	1.26	2.70	1.34	1.24	2.75

Leakage

Damper leakage (with blades fully closed) varies based on the type of low leakage seals applied. The AMD-23 and AMD-33 are available with TPE blade seals and 304SS jamb seals or optional silicone blade seals.

Test Information

Air leakage is based on operation between 32° to 120°F (0° to 49°C).
Tested for leakage in accordance with ANSI/AMCA Standard 500-D, Figure 5.5.
Tested for air performance in accordance with ANSI/AMCA Standard 500-D, Figures 5.2, 5.3 and 5.5.

Torque

Data is based on a torque of 5.0 in.lb./ft² (0.56 N·m) applied to close and seat the damper during the test.

AMD-23	Leakage Class		
Maximum Damper Width	1 in. wg (0.25 kPa)	4 in. wg (1 kPa)	6 in. wg (1.5 kPa)
12 in. (305mm)	1A	1	1
48 in. (1219mm)	1A	1	1

AMD-33	Leakage Class				
Maximum Damper Width	1 in. wg (0.25 kPa)	4 in. wg (1 kPa)	6 in. wg (1.5 kPa)	8 in. wg (2 kPa)	10 in. wg (2.5 kPa)
12 in. (305mm)	1A	1	1	1	1
60 in. 1524mm)	1A	1	1	*	*

* Consult factory for pressure ratings above 6 in. wg (1.5 kPa).

Energy Saving Dampers

The following models meet International Energy Conservation Code (IECC) requirements of damper leakage of 3 cfm/sq. ft @ 1 in. wg or less:

AMD-23	AMD-33
AMD-42	AMD-42V
ICD-44	ICD-45
IAQ-42	VCD-23
VCD-33	VCD-34
SEVCD-33	VCD-40
VCD-42	VCD-43

Check out more Energy Saving Products

Hybrid Refrigeration Systems:

- Dodge Hybrid Refrigeration Systems provide the most reliable means available to increase your system's efficiency while reducing electrical energy consumption. Our Hybrid Systems can be configured to work with the majority of existing systems in the market.

Industrial Actuators:

- High resolution, low VA Solid State industrial actuator with built-in current limiting saves you money. UL/cUL File E253926.

Steam Nozzles:

- Our compact Steam Nozzle is a precision engineered and manufactured Venturi steam trap, using 50% less steam than a typical trap.

Flow Transmitters:

- Our Loop Powered 4-20 mA Output Ultrasonic Flowmeters are ideal for measurement of flow rates of acoustically conductive liquids including most clean liquids and many liquids with entrained solids.

Visit our website at www.deicontrols.com

WARRANTY

Dodge Engineering & Controls warrants this equipment to be free from defects in material and workmanship for a period of one year from the shipment date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Dodge Engineering & Controls prove defective during this period, they should be returned to the nearest authorized motor service station. Dodge Engineering & Controls will not be responsible for any removal or installation costs.

As a result of our commitment to continuous improvement, Dodge Engineering & Controls reserves the right to change specifications without notice.

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