

## IAQ50 INTEGRAL AIRFLOW MONITOR/DAMPER OUTSIDE AIR VENTILATION CONTROLLER FOR INDOOR AIR QUALITY

\*PATENT PENDING\*

### STANDARD CONSTRUCTION

#### FRAME

Nominal 6" x 1<sup>3</sup>/<sub>8</sub>" (152 x 35) 6063T5 extruded aluminum hat channel with 0.125" (3.18) wall thickness. Mounting flanges on both sides of frame.

#### BLADES

Airfoil shaped 6063T5 heavy gage extruded aluminum. Anodized monitoring blades are fixed within the damper frame and contain air pressure sensing ports.

#### SEALS

Jamb seals: flexible metal compression type.  
Blade seals: Ruskiprene seal along control blade edges.

#### BEARINGS

Molded synthetic.

#### LINKAGE

Galvanized steel, concealed in frame.

#### AXLES

1/2" (13) plated steel hex.

#### OPERATING TEMPERATURES

-22°F to +140°F (-30°C to +60°C) standard.  
Optional actuator heater option allows -40°F to +140°F (-40°C to +60°C).

#### POWER REQUIREMENTS

120VAC 50/60 Hz connection to IAQ50 control panel.  
Consumption: 100VA.

#### ELECTRIC ACTUATOR(S)

Power: 24VAC, 50/60 Hz single phase (from control panel).  
Signal: 2-10VDC modulating action.  
Spring return: 20 sec.  
Manual override: hex crank.  
Torque: 10 N.m (88 in-lbs.) (Operates 12 ft<sup>2</sup> damper area).  
Position feedback signal: 2-10VDC.

#### DIGITAL CONTROLLER

Application Specific Controller designed for the IAQ50. Programming logic and calibration in a nonvolatile EPROM.

#### AIR STRAIGHTENER SECTION

Air straightener contained in 5" (127) long sleeve attached to damper frame.

#### SIZES AVAILABLE

Minimum – 9" w x 9 1/2" h (229 x 241).  
Maximum single section – 48" w x 84" h (1219 x 2134).  
Maximum multiple section: Unlimited Size.

#### AIR FLOW (FACE AREA)

Minimum 150 FPM  
Maximum 2000 FPM

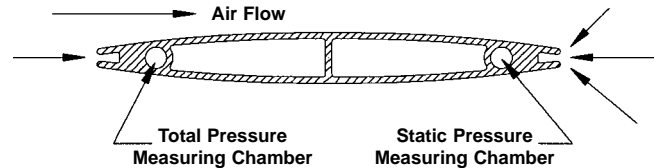
**Notes:** Dimensions shown in parentheses ( ) indicate millimeters.  
\* Orientation determined from exhaust side of damper.  
\*\* Units furnished approximately 1/4" (6) smaller than given opening dimensions.  
\*\*\* Low velocities require maintaining system pressure.

### APPLICATION

The IAQ50 integral air monitor/damper is an outside air damper for flow measurement and control. It is ideally suited for both new and existing units, ductwork, and air plenum wall mountings. Typically sized to meet minimum fresh air requirements per system design, each IAQ50 is individually calibrated to proper airflow setpoints prior to shipment utilizing one of Ruskin's AMCA registered wind tunnels. **Ruskin has designed the IAQ50 to help buildings meet or exceed the minimum ventilation requirements as stated in ASHRAE Standard 62.**

### PERFORMANCE

#### IAQ50 AIRFLOW SENSING BLADE



The IAQ50 integral air monitor/damper incorporates the highest level of performance available in damper designs.

- **Ultra-low Leakage:** For a 48" x 48" closed IAQ50 damper, air leakage is a low 2.0 CFM/ft<sup>2</sup> at 1.0" static pressure.
- **Monitor Accuracy:** The IAQ50 measures, controls, and reports the airflow within an accuracy of 5%.
- **Airflow Range:** The acceptable range for operation is 150 fpm to 2000 fpm face velocity. This range makes the IAQ50 suitable for a wide variety of applications.\*\*\*
- **Pressure Drop:** The pressure drop across both the IAQ50 and the air straightener section is a low 0.13" w.g. for an air velocity of 1000 fpm.
- **System Pressure:** 2" w.g. maximum. For higher system pressures consult Ruskin.

### VARIATIONS

The IAQ50 integral air monitor/damper is available with several options to better suit your building's specific needs.

- **Louver option:** If selected, the IAQ50 damper assembly will include a low pressure drop Ruskin louver (specify non-drainable or drainable) attached to the front of the straightening vanes sleeve section.
- **Actuator heater option:** If selected this unit will allow actuator operation in ambient temperatures to -40°.
- **Stainless steel option:** If selected, stainless steel bearings, linkage, and/or axles will be incorporated into the IAQ50 construction.
- **Economizer damper option:** If selected, Ruskin will mount the IAQ50 to an economizer control damper at the factory to form a single outside air assembly.
- **Custom designs:** If a special IAQ50 design is required, please consult the factory for application assistance and pricing.

QUANTITY	INTAKE OPENING		CFM REQUIREMENTS			IAQ50 CONFIG (Min or Full)	MOUNTING STYLE (FL or NF)	FLANGE DIM (FL STYLE ONLY)	ACTUATOR* MOUNT (Ext or Int L or R)	VARIATION
	A*	B*	DESIGN SETPOINT	ADJUSTABLE CFM RANGE LOW LIMIT HIGH LIMIT						

## OPERATION

The unique design of the IAQ50 incorporates an air monitor into the assembly of a high performance, aluminum airfoil blade control damper. Ruskin has combined modulating airfoil blades with strategically placed airflow sensing blades to measure the airstream velocity pressure. Air tubing/piping connections connect the damper/monitor frame to a differential pressure transducer located in the IAQ50 control panel (provided as part of the IAQ50 damper). The IAQ50 controller also monitors the control blade position using the feedback signal feature of the damper actuator. With the signal from the pressure transducer and the blade position signal, the IAQ50 controller converts the pressure differential into an accurate CFM value.

After computing a value for the CFM, the controller compares this value to the CFM setpoint as determined by the particular mode of

operation of the HVAC system. In normal operation, this setpoint will correspond to the minimum outside air ventilation required by the system design to meet ASHRAE Standard 62. Based on the difference between the actual CFM reading and the desired CFM setpoint, the controller will position the modulating damper blades as necessary to ensure that the actual outside air flow meets the desired level.

The IAQ50 provides a scaled 0-20mA signal for remote monitoring of the actual ventilation rate in CFM. Additionally, the IAQ50 can receive a 0-10VDC setpoint adjustment signal if a ventilation range is desired.

**NOTE:** 0-20mA scaled signal for remote monitoring can be changed to 0-10VDC signal by adding a 500 ohm resistor.

## FEATURES

The IAQ50 integral air monitor/damper incorporates many high quality features of Ruskin's industry leading damper designs.

- Narrow total depth of 11" (279) (damper/monitor + air straightening vane section) means unparalleled versatility in both retrofit and new construction projects.
- The IAQ50 typically costs less than separate air monitoring stations, controls, and damper construction arrangements.
- Universal interface with building control systems for remote monitoring and setpoint adjustment.
- The IAQ50 also operates as a fully functional stand alone package.
- The response of the IAQ50 to airflow volume changes makes it suitable for use with VAV systems.
- Complete airfoil design allows for lowest possible pressure drop, and anodized sensing blades provide improved flow characteristics and added corrosion resistance.
- Concealed linkage is out of the airstream which requires less maintenance and reduced air turbulence. Actuator and jackshaft may be located in air stream if desired.

## IAQ50 CONFIGURATIONS

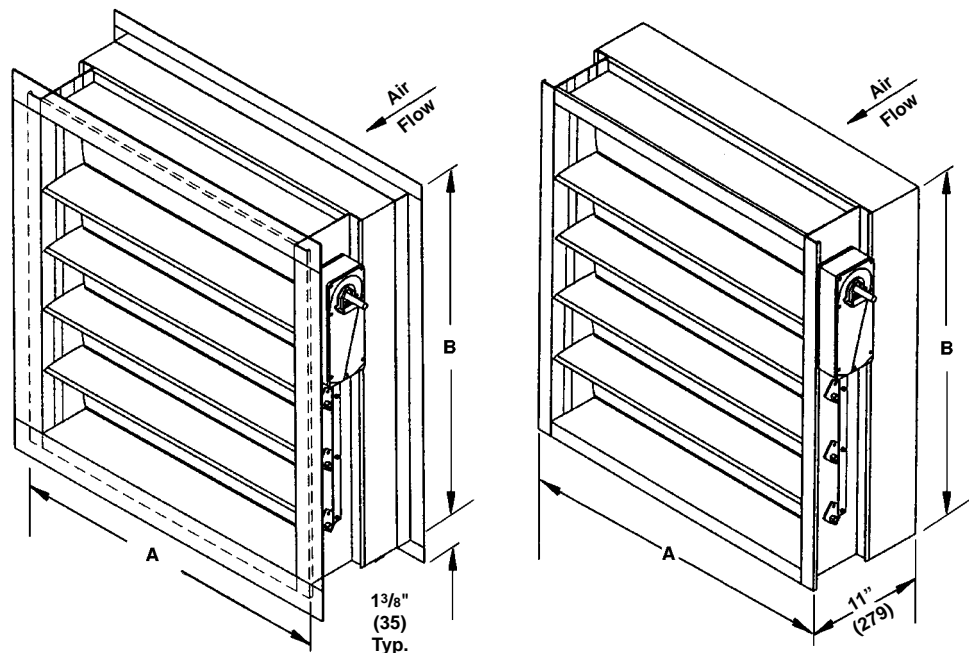
The IAQ50 integral air monitor/damper is available in two different configurations to suit your building's particular HVAC system.

- **Minimum** Outside Air Damper: The IAQ50 will always monitor airflow and control to minimum outside air requirements during building occupied hours. The IAQ50 is sized for the minimum ventilation and encompasses only this portion of the outside air opening. In this configuration, another damper in the outside air intake section provides outside air for free cooling as necessary during economizer cycles. Economizer control options are available from Ruskin.
- **Full-Size** Outside Air Damper: The IAQ50 will always monitor and control airflow in order to meet minimum outside air ventilation requirements during building occupied hours. In this configuration, the IAQ50 is sized to fill the entire outside air intake opening. A signal for free cooling from unit temperature controls (optional) will modulate the IAQ50 damper open beyond minimum position as necessary to satisfy temperature demands, thus increasing outside airflow above minimum requirements. The IAQ50 controller will not allow the airflow to fall below the minimum requirements during occupied hours regardless of the cooling signal.

## IAQ50 MOUNTING STYLES

The IAQ50 integral air monitor/damper is available in two different mounting styles to suit your particular installation:

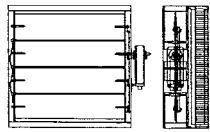
- **Flanged Style (FL):** The IAQ50 can be designed to fit your outside air opening with a standard flange both sides of the unit as shown in the FLANGED STYLE figure. This is most ideal for mounting to either side of an air handling unit (AHU).
- **Non-flanged Style (NF):** The IAQ50 can be designed to fit your outside air opening as shown in the NON-FLANGED STYLE figure. This style is ideal for ducted and sleeved installations where mounting flanges are not required.



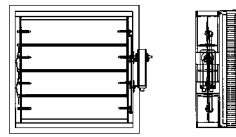
IAQ50 FLANGED STYLE

IAQ50 NON-FLANGED STYLE

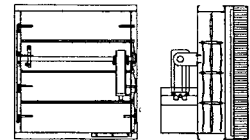
## IAQ50 STANDARD MOUNTING STYLES



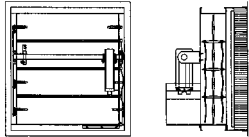
Single Section N/F External Actuator



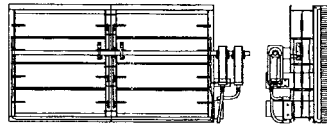
Single Section Flanged External Actuator



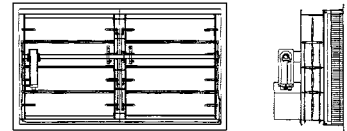
Single Section N/F Internal Actuator



Single Section Flanged Internal Actuator

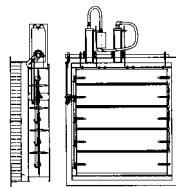


Double Section N/F External Actuator

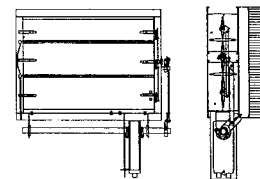


Double Section Flanged Internal Actuator

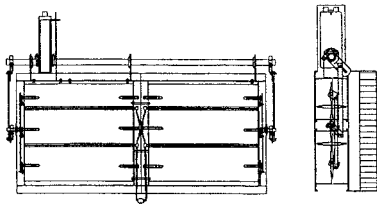
## IAQ50 NON-STANDARD MOUNTING STYLES



Single Section Flanged Top Actuator

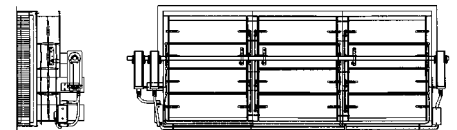


Single Section N/F Bottom Actuator



Double Section N/F Top Actuator

N/F = Non-Flanged



Triple Section Flanged External Actuator

## IAQ50 MOUNTING ARRANGEMENTS (min/max)

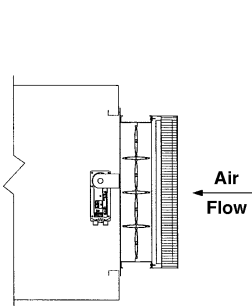


Fig.1  
Full Min./Max. Flanged mounted out

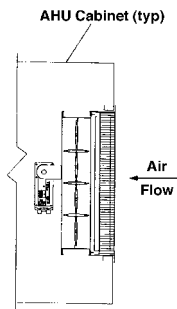


Fig.2  
Full Option

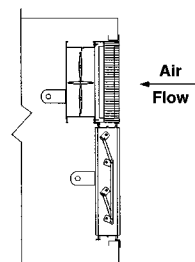


Fig.3  
Over/Under Min.

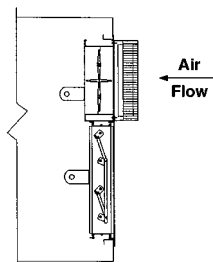


Fig.4  
Over/Under Min.  
(Shown with External Straightener)

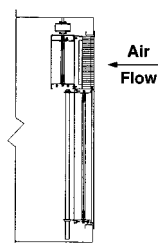


Fig.5  
Side x Side Min.  
(Shown with Vertical Blade)

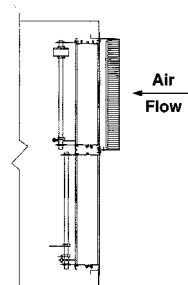
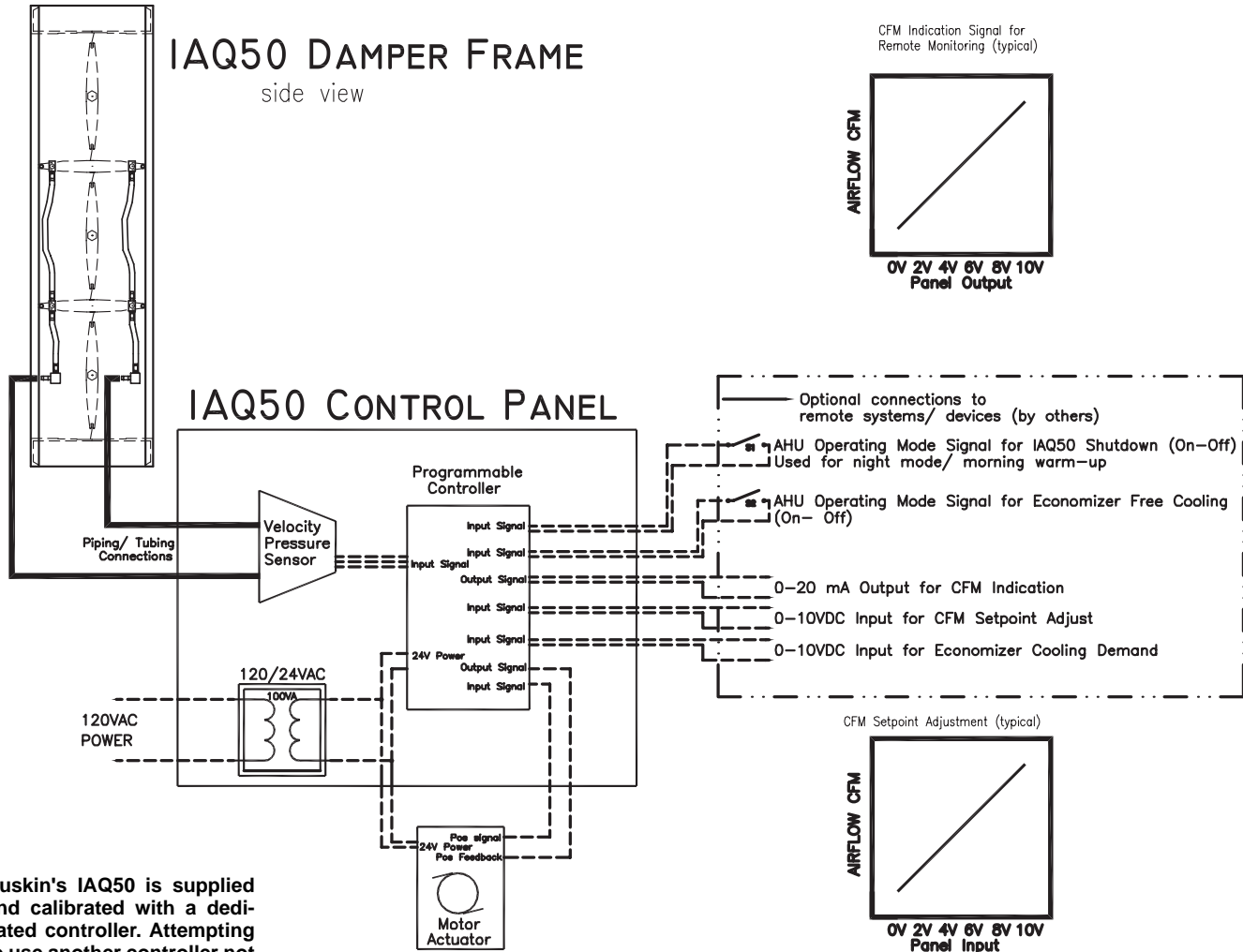


Fig.6  
Side x Side Min. (Shown with Vertical  
Blade and External Straightener)

# TYPICAL IAQ50 WIRING AND PIPING SCHEMATIC



Ruskin's IAQ50 is supplied and calibrated with a dedicated controller. Attempting to use another controller not supplied by Ruskin will void warranty and will render IAQ50 damper ineffective.

## SUGGESTED SPECIFICATION

Furnish and install at locations shown on the plans, or as in accordance with schedules, an air monitor station integral to the minimum outside air damper. The integral air monitor/damper shall incorporate measuring ports built into the damper blades and shall control the minimum amount of outside air as recommended by ASHRAE Standard 62. The construction of the air monitor/damper shall be 6" x 1.375" x .125" (152 x 35 x 3.18) aluminum frame. The IAQ50 frame shall be designed for 4 bolt and flange cleat installation and shall provide maximum free area for lowest pressure drop performance. The damper blades shall be heavy gage aluminum airfoil type with Ruskiprene blade edge seals. Jamb seals shall be flexible metal compression type, and the linkage shall be concealed out of the airstream and located within the damper frame to reduce pressure drop and noise. Outside air damper leakage characteristics shall comply with the International Building Code & International Energy Conservation Code. Maximum leakage shall not exceed 3

CFM per sq. ft. of damper face area at 1" w.g. The integral damper/monitor assembly shall incorporate an air straightener section to ensure proper airflow readings. The air straightener section shall be flanged as required by the application.

Each air monitor/damper shall include 24VAC electric modulating motor and an application specific controller designed for this application furnished by the damper manufacturer. Each integral air monitor/damper shall be calibrated in an AMCA registered laboratory and a certification chart shall accompany the air monitor/damper. The integral air monitor/damper shall be Ruskin's model IAQ50.

### SPECIFIER SELECT OPTIONS

Where required or requested, the integral air damper/monitor shall be used in conjunction with Ruskin's 4" (102) wide louver.