



www.ruskin.com

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## AIRFLOW-IQ

### ELECTRONIC AIR MEASURING STATION WITH BACNET ACTUATOR AND CLASS 1A DAMPER

#### APPLICATION

The Ruskin model AIRFLOW-IQ is a turn-key solution that combines the features of Ruskin's TDP05K airflow and temperature measuring probe(s) with Ruskin's CD50 control damper\* and Ruskin's VAFB24- BAC RAMS Air Measurement BACnet actuator. The complete unit is factory assembled and wired to provide effective setpoint airflow control from 0 to 5000 FPM (0 to 25 m/s) using analog or BACnet interface. The ultra low-leak, class 1A rated control damper meets leakage requirements of the International Energy Conservation Code.

\*Other damper styles are available.

#### STANDARD CONSTRUCTION

##### FRAME, Air Measuring Station

15" (381) deep .08" (2.0) aluminum.

##### SENSOR CIRCUIT

Conformal coated, water resistant flexible polyimide circuit, with heated and ambient thermistors.

##### SENSOR DISTRIBUTION

Max 128 sensing points, up to 16 probes.

##### PROBE MATERIAL

Low profile 2" x 3/4" (51x19) 6063T6 extruded aluminum with acid etch clear anodized finish.

##### CONTROLLER

The air measurement actuator is the BACnet interface and setup port for the air measurement station. The air measurement actuator accepts a CFM SETPOINT and will modulate the damper to maintain the set point value.

##### ACCURACY

3% over measuring range

##### ACTUATOR

180 in-lb (20Nm), Integrated web server, Two analog inputs for flow sensing and receiving a DDC setpoint.

##### FRAME, Damper

5" X 1" (127 x 25) 6063T5 extruded aluminum hat channel.

##### BLADES

6" (152) 6063T5 heavy ga extruded aluminum, airfoil shaped.

##### AXLES

1/2" (13) plated steel hex with molded synthetic bearings.

##### SEALS

Blade: Santoprene, Jamb: flexible metal compressible.

##### LINKAGE

Plated steel, concealed in frame.

##### POWER REQUIREMENTS

24 VAC +/- 15%, 20VA, 50/60 Hz

##### INPUT SIGNAL

0-10V (or BACnet).

##### OUTPUT SIGNAL

Digital BACnet from Actuator; 4-20mA or 2-10 VDC with 500 ohm resistor (or BACnet) from TDP05K.

##### VELOCITY REQUIREMENTS

Product Range - 0 to 5000 FPM (0 m/s to 25 m/s) (Measured through face area)

##### OPERATING TEMPERATURE

-20°F to 120°F (-29°C to 50°C).

##### MINIMUM SIZE

12"w x 12"h x 15"d (305 x 305 x 381).

##### MAXIMUM SIZE

Single section - 60"w x 72"h (1524 x 1829).

Consult factory for special considerations.



Air enters probe side and exits Damper side (Shown with optional flanges)



#### FEATURES

- Thermal Dispersion flow and temperature sensors
- Factory calibrated controller in nonvolatile EPROM
- BACnet standard TDP05K & IP or MS/TP from Actuator Controller
- Factory mounted 24 volt modulating actuator
- Low-leak CD50 Aluminum Damper
- Factory mounted and commissioned controls
- Single point 24 volt power connection
- Temperature and altitude compensated

Ruskin AIRFLOW-IQ helps satisfy the requirements for minimum outside air as required by the following.

- ASHRAE 62.1, 90.1 and 189.1.
- California Title 24
- International Mechanical Code (IMC)
- International Energy Conservation Code (IECC)d

#### VARIATIONS

The AIRFLOW-IQ is available with several options to fit your specific application.

- Custom density probe/sensor array.
- NEMA 4 control enclosure.
- Opposed damper blade action
- Insulated blade damper
- Silicone damper blade seals
- Stainless steel linkage
- Stainless steel jackshaft
- 120 volt primary/24 volt secondary transformer shipped loose

#### NOTES:

1. Values shown in ( ) are millimeters unless otherwise indicated.
2. Refer to installation manual for additional details.
3. Units are furnished actual size ordered.

## PRODUCT FEATURES AND DATA

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### TDP05K Air and Temperature Measurement Features

- BACNET and analog output standard
- Lowest power consumption thermal dispersion device available
- Tool-free one touch setup through surface membrane label
- Standard cabling, no proprietary cables
- Third party verified FCC, UL, BTL, AMCA and ISO 9001
- Airfoil shaped acid-etch clear anodized sensing probes featuring lower pressure drop and less noise
- Highest density thermal dispersion sensing array up to 128 sensing points
- Up to 8 moisture resistant flex sensor pairs per probe
- BACnet low and high flow alarms
- 16x2 character LCD (airflow, temperature, setup & diagnostics)
- Self-diagnostics utilizing artificial intelligence
- The highest accuracy over the entire range of air flows results from probe sensing elements that are factory tested and calibrated at 20 points



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### VAFB24 BACnet Actuator Features

- Torque 180 in-lb
- Ethernet 10/100 Mbit/s, TCP/IP, integrated Web server
- BACnet/IP, BACnet MS/TP
- Two analog inputs for flow sensing and receiving a DDC setpoint
- Setup via integrated Web Server and Ethernet IP connection, directly to actuator, using any web browser.
- Fail Safe Signal Interlock, drives damper closed on loss of signal.
- Spring open or spring close on loss of power as required for application.
- 95 seconds open, less than 60 seconds close
- NEMA 2, IP54, UL enclosure type 2
- Built in Data Logging
- Control up to three additional actuators via MP-Bus



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### CD50 Damper Features

- The CD50 is a low leak, extruded aluminum damper designed with airfoil blades for higher velocity and pressure HVAC systems.
- It meets the leakage requirements of the International Energy Conservation Code by leaking less than 3 cfm/sq. ft. at 1" of static pressure and is AMCA licensed as a Class 1A damper.
- Airfoil blade design for low pressure drop and less noise generation. Blades have an integral structural reinforcing tube running full length of each blade.
- Positive locking hexagonal axles, non-corrosive molded synthetic bearings and shake proof link-age for low maintenance operation.
- Blade edge seals are extruded double edge design and mechanically lock into the blade for superior sealing.
- Accuracy based on tests and procedures performed in accordance with AMCA test standards.
- Other damper styles are available.



## WIRING SCHEMATIC

Ruskin's AIRFLOW-IQ is supplied and calibrated with a dedicated TDP05K Primary probe that is factory wired to one or more airflow and temperature measurement probe(s). The Primary probe has been configured at the factory with customer supplied parameters.

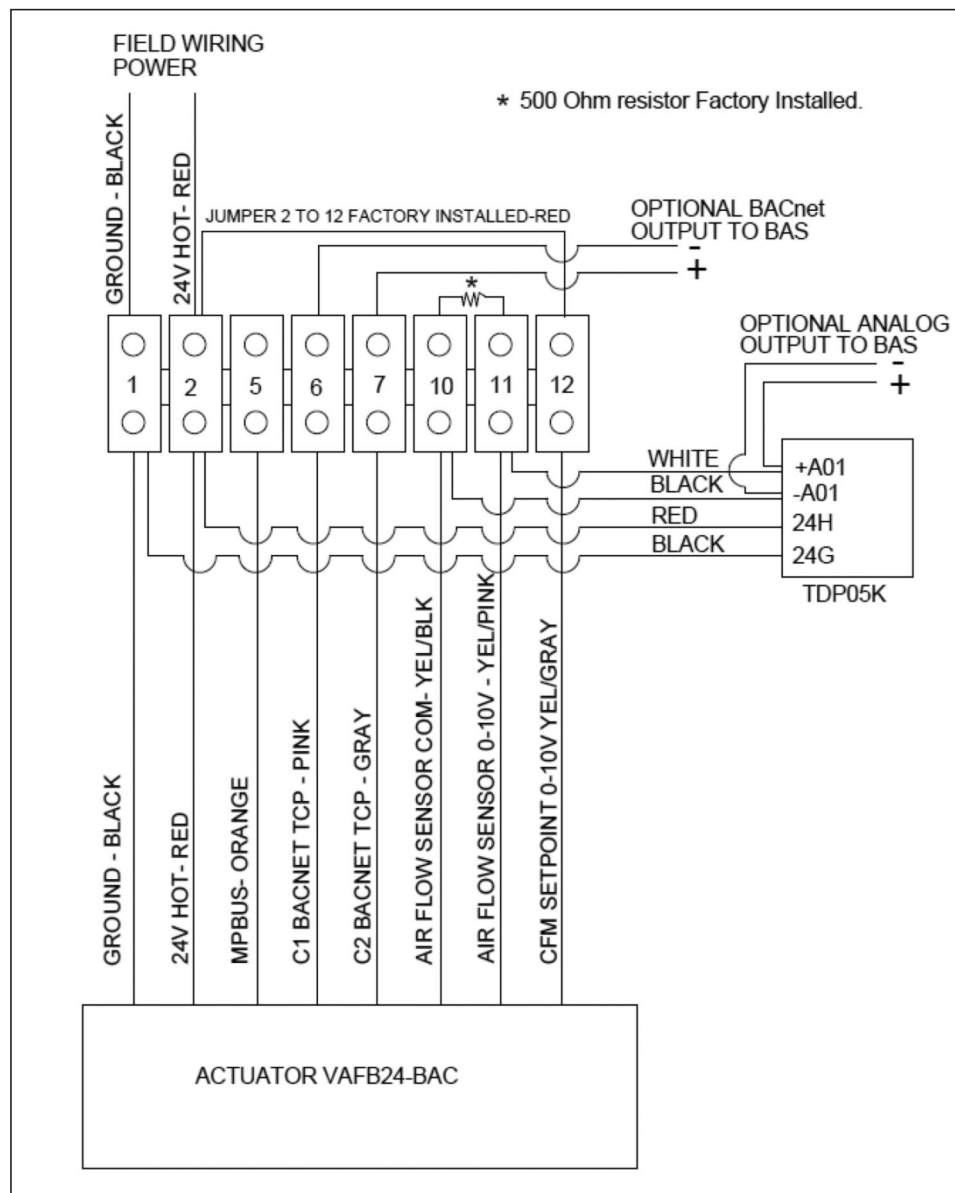
Ruskin's AIRFLOW-IQ combines the functionality of a highly accurate thermal dispersion airflow station and a low leakage control damper to control airflow volumes to a target setpoint. These models come standard with TDP05K Thermal Dispersion Probes factory-installed in the damper sleeve, a modulating actuator and a TDP05K airflow and temperature measurement Primary probe that outputs a signal proportional to the airflow going through the unit. The transmitter and actuator are factory wired to a terminal block for easy single-point wiring. The actuator controller can position the damper to deliver a target CFM setpoint. An output from the controller can also communicate the measured airflow rate to a building management system, which can use that signal to regulate a fan's VFD or signal an under-ventilation alarm.

For normal applications the Primary probe's configuration should not need to be modified in the field. For more detailed information refer to the online installation and maintenance manual at [www.ruskin.com](http://www.ruskin.com).

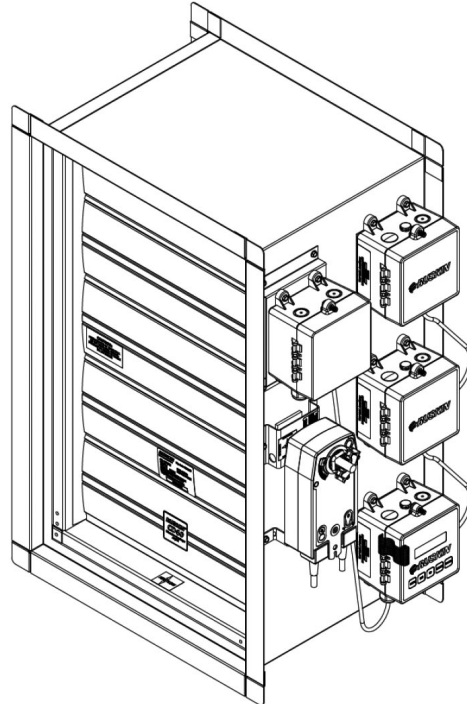
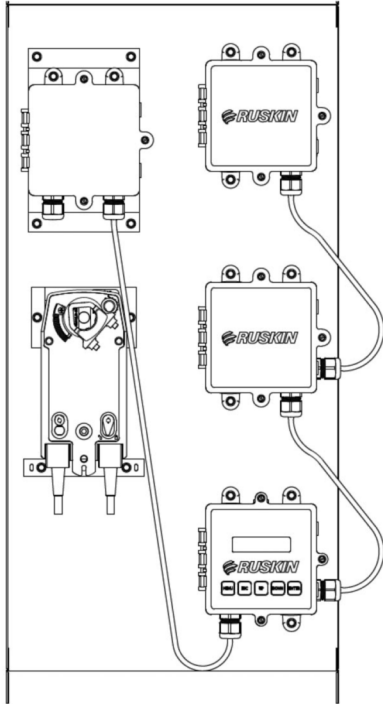
### MODE OF OPERATION

The air measurement actuator is the BACnet interface and setup port for the air measurement station. The air measurement actuator accepts a CFM SETPOINT via analog input S2. The actuator will modulate the damper to maintain the set point value. Air flow measurement sensor is connected to Input S1 of the actuator and represents a velocity air flow measurement. Air measurement is calculated based on actuator's configuration and reported via the BACnet interface or an analog output from the sensor to the building automation system. Air Measurement actuator includes WEBSEVER and can be configured using any web browser such as InternetExplorer.

Direct Position Control via BACnet or Analog Input is also possible, using the flow input for reporting only.



## DIMENSIONAL DETAILS



## SUGGESTED SPECIFICATION

Furnish and install a thermal dispersion airflow measuring station with integral damper and controls. Air measuring assembly shall include a leakage class 1A control damper with 6" (152) wide, 6063T5 heavy gauge extruded aluminum, airfoil shaped blades, and shall not exceed 60" (1524) in length. Damper bearings shall be molded synthetic. Damper frame shall be 6063T6 extruded aluminum T-Flange. Damper shall be supplied with stainless steel compression blade seals material to Santoprene blade edge seals that are mechanically fastened.

The electronic thermal dispersion type airflow and temperature measuring station (AFTMS) shall be capable of monitoring and reporting the airflow and temperature at each measuring location with up to 16 measuring probes containing 1 to 8 sensor points per probe. AFTMS shall include a primary probe that interfaces with the building automation system (BAS) using BACNET protocol or 4-20mA analog outputs reporting velocity and temperature measurements. Probe(s) shall be constructed of an airfoil shaped acid-etch clear anodized 6063T6 aluminum extrusion containing the sensor circuit(s) for low pressure drop and low noise in installed applications. Each moisture resistant flexible polyimide sensor circuit shall consist of thermistors for velocity and temperature. Primary probe user interface shall feature tool-free touch setup through surface membrane label on a hinged enclosure with dust tight or weather resistant construction. Factory calibration of thermal dispersion sensors shall be at 20 points between 0 and 5,000 FPM. Production of all circuits shall include primary and secondary deionizing wash and include conformal coating. Complete assembly shall be constructed and calibrated in an ISO 9001 certified facility following strict ISO calibration test procedures.

CSI-3 Part Guide Specification for **ELECTRONIC AIR-FLOW MEASURING/ CONTROL STATION** is available at:  
<https://www.ruskin.com/model/airflow-iq> under Additional Resources

Proprietary cables are not acceptable. For ease of installation, a composite 4 wire cable similar to Connect Air W24182P-2306BL with communications and power in one cable is recommended. Alternatively, communications cable shall be a TSP (Twisted Shielded Pair) 24AWG low capacitance wire and power shall be an 18AWG Pair. Primary Control Probe shall be capable of processing up to 128 (16 probes, 8 sensors/probe each) independent sensing points per AFTMS and shall operate on a Class 2 24VAC low voltage supply. Primary Control Probe shall feature a 16 character x 2 line alphanumeric backlit LCD FP display, digital offset/gain adjustment, continuous performing sensor/transmitter diagnostics and a visual alarm to detect malfunctions. FP display shall be field adjustable to display either I.P. or S.I. units. Primary Control Probe output shall be BACnet® compatible and also supply a field adjustable 4-20 mA, or 2-10 VDC across a 500 ohm resistor. All electronic components of the assembly shall be lead-free RoHS compliant. Accuracy shall be based on tests and procedures performed in accordance with AMCA publications 610 and 611.

A factory furnished and calibrated controller shall be programmed, with the job specific flow range. The controller shall report a 0-10V linear output that is proportional to the flow and shall be altitude and temperature compensating. Controller shall have a field selectable BACnet communication feature to facilitate digital communications when required. Installing contractor shall coordinate proper sizing and placement of the air measuring station with a qualified manufacturer's representative prior to installation. Air Measuring Stations shall be, in all respects, equivalent to Ruskin Model AIRFLOW-IQ.



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