AiQ-TD-50

Electronic Airflow Measuring Station
Class 1A Aluminum Control Damper
Airflow-IQ Series

RUSKIN
AUTHORITY IN AIR CONTROL

The AiQ-TD-50 offers accurate airflow measurement and control through electronic thermal dispersion technology utilized in Ruskin model TDP05K Airflow & Temperature Measuring probes(s) with the inclusion of Ruskin model CD50 control damper factory configured as one compact assembly. 24VAC modulating actuators (spring return or fail-in-place) can be supplied and mounted at the factory (optional) or field installed by others. When the AiQ-TD-50 is supplied with an actuator and properly wired to the Building Automation System, it provides effective airflow measurement and control from 0 to 5000 FPM (0 to 25 m/s). The ultra low-leak, Class 1A rated model CD50 airflow control damper meets leakage requirements of the International Energy Conservation Code.

STANDARD CONSTRUCTION

Assembly Casing	**Air Measuring Station:** Minimum 0.080" thick aluminum sleeved assembly. Sleeve Lengths (d): - Single Section with Extended Axle and without Airflow Straightener: 15" (381) - Single Section with Extended Axle and with Airflow Straightener: 18" (457) - Single Section with Jackshaft and without Airflow Straightener: 20" (508) - Single Section with Jackshaft and with Airflow Straightener: 22.5" (572) - Mutli-Section without Airflow Straightener: 20" (508) - Multi-Section with Airflow Straightener: 22.5" (572)
Sensor Circuit	Conformal coated, water resistant flexible polyimide circuit, with heated and ambient thermistors.
Sensor Distribution	Max 128 sensing points, up to 16 probes.
TDP05K Probes	Airfoil-shaped, Low profile 2" x 3/4" (51x19) 6063T6 extruded aluminum with acid etch clear anodized finish.
Building Automation Interface	The TDP05K Primary interfaces with the Building Automation System (BAS) using Modbus (Default) or BACnet protocol or through two (2) 4-20mA analog outputs that are proportional to the flow and temperature.
TDP05K Probe Accuracy	+/- 3%. Installed accuracy values are derived from testing in accordance with AMCA Standard 600 Figure 1. The TDP05K will provide the installed accuracy noted above when Ruskin's placement guidelines are met or exceeded.
Frame	**Damper:** 5" x 1" (127 x 25) 6063T5 extruded aluminum hat channel.
Blades	6" (152) 6063T5 heavy gauge extruded aluminum, airfoil shaped. Parallel blade configuration is Standard.
Axles	1/2" (13) plated steel hex with molded synthetic bearings.
Seals	**Blade:** Santoprene. **Jamb Seals:** flexible metal, compressible.
Linkage	Plated steel, concealed in frame.
Actuator (Optional)	Any 24VAC modulating, spring return or "fail in place" type, factory or field installed, sized for the damper area. Refer to specific actuator information, provided on a separate submittal, for power requirements, input signal and output signal information.
Power Requirement	24 VAC/VDC (+/- 15%) @ 15VA
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	8" w x 6"h (203 x 152)
Maximum Size	Single section - 60"w x 72"h (1524 x 1829) Multi-Section - 120"w x 144"h (3048 x 3657)

Consult factory for special considerations.

Figure 1

AiQ-TD-50 above is shown with optional front and rear flanges.

AiQ-TD-50 shown above depicts an **Right Hand (RH)** Mounting Configuration; where the airflow enters through the probe(s) and exits through the Control Damper.

FEATURES

- Thermal Dispersion flow and temperature sensors.
- Factory calibrated Primary in nonvolatile EPROM.
- Modbus (Default), BACnet, and Analog Output standard for TDP05K Primary.
- AMCA Class 1A Rated Ultra-Low Leak model CD50 aluminum airflow control damper with 6" external operating shaft.
- Temperature and altitude compensated.
- INSERTION mounted TDP05K probes (monitor boxes secured to exterior of sleeve).
- Type 1 rated TDP05K monitor boxes
- Exterior Right Hand (RH) mounting configuration is standard.

Ruskin's AiQ-TD-50 helps satisfy the requirements for minimum outside air as recommended by the following.

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

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.

VARIATIONS

The AiQ-TD-50 is available with options to satisfy your specific application.

- Custom density probe/sensor array.
- UL TYPE 4 rated TDP05K weather-resistant enclosures.
  NOTE: outdoor installations require all cabling to be protected using outdoor rated conduit, such as liquid-tight conduit and fittings. Conduit and fittings are to be supplied and installed by others. Airflow-IQ assembly model AiQ-TD-50 is not considered TYPE 4 rated until final installation. Ensure assemblies are stored indoors or otherwise protected from the environment upon receipt and until properly installed. If applicable, ensure selected actuator(s) are also rated for outdoor environment.
- Opposed damper blade action.
- Silicone damper blade seals.
- Stainless steel damper linkage & bearings.
- Factory supplied & mounted 24VAC modulating actuator (s). Mounted to the exterior of the sleeve or in the airstream.
- Honeycomb Airflow Straightener.
- Custom sleeve materials (Galvanized, 304SS, 316SS) and gauges.
- Internal Mounted TDP05K. When selected, the assembly will be provided with a Remote Wired Primary as Standard.
- Available with Remote Wired Primary, Wired Graphic User Interface, or Wireless Graphic User Interface.
- 1.5" tall Mounting Flanges on inlet, outlet or both ends of the sleeve. Mounting holes in flanges available upon request.
- Left Hand (LH) mounting configuration.

PRODUCT FEATURES AND DATA

TDP05K Airflow and Temperature Measurement Probe Features

- Each TDP05K includes Modbus (Default), BACnet, and Analog Output communications.
- Lowest power consumption thermal dispersion device available.
- Tool-free one touch setup through surface membrane label.
- Standard plenum-rated communication/power cabling included where applicable. Proprietary cabling is not required.
- Listings and Compliances:
  - UL Listed: UL 60730-1; UL 60730-2-9; UL 60730-2-15.
  - UL Compliant: UL 60335-1; CAN/CSA-C22.2 No. 60335-1; UL 60335-2-40; CAN/CSA C22.2 No. 60335-2-40.
  - FCC: Meets Part 15, Subpart B, Class A device requirements.
  - CE: European Shipments Only.
  - BACnet (BTL): Certified to BACnet Standard ISO 16484-5, Rev. 1.14.
- 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.
- Modbus or BACnet Low and High flow and temperature alarms.
- 16x2 character LCD (airflow, temperature, setup & diagnostics).
- Self-diagnostics utilizing artificial intelligence.
- The highest accuracy over the entire range of airflows results from probe sensing elements that are factory tested and calibrated at 20 points.

Figure 2

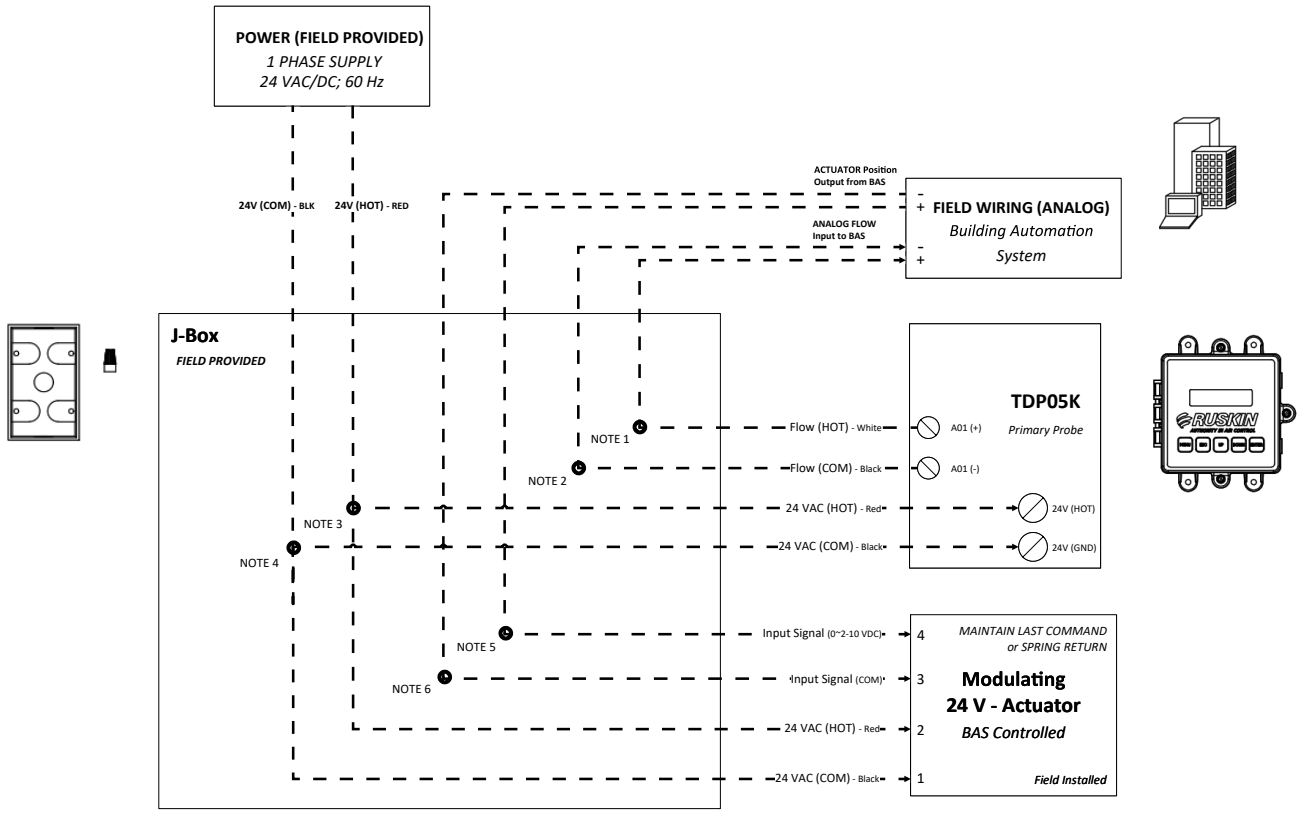
Figure 3

Damper Model CD50 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.

WIRING SCHEMATIC

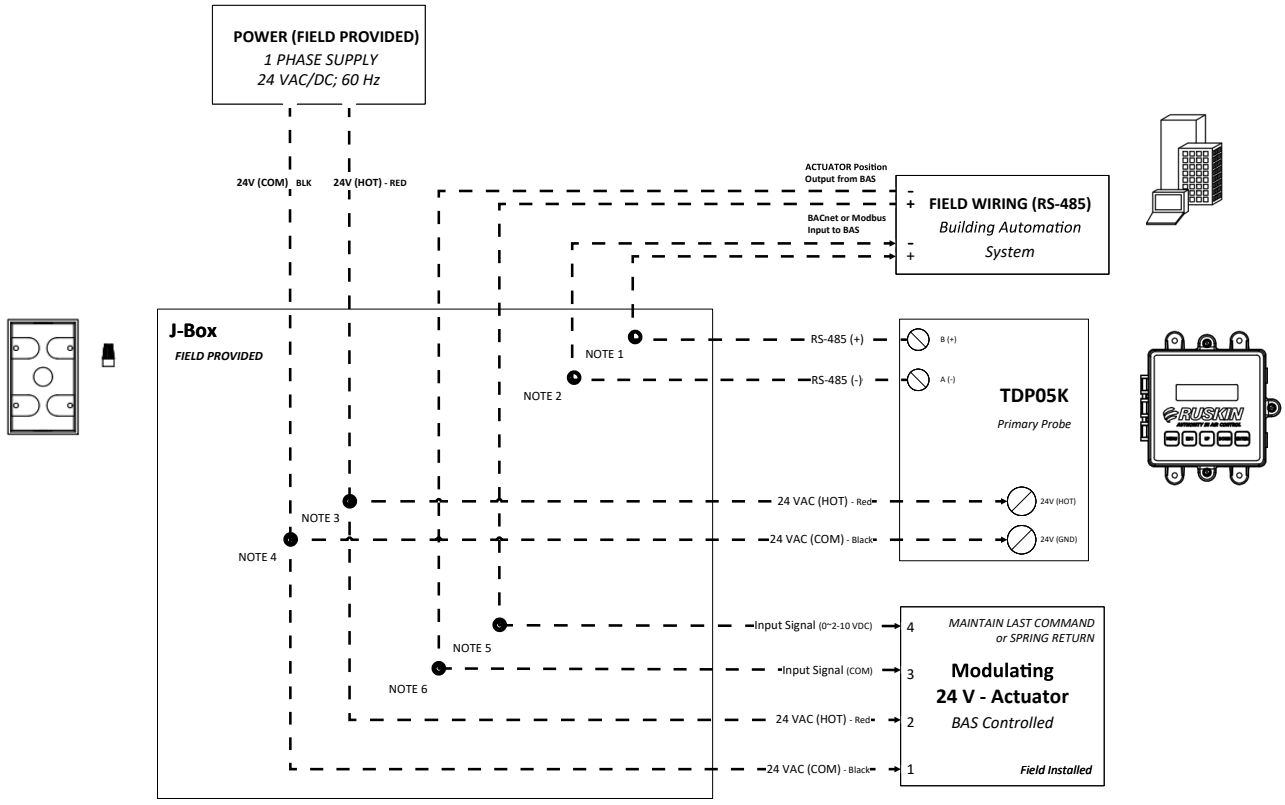
Models AiQ-TD-xx
Analog (BAS) - Field Wiring



NOTE:
1. Wire Nut #1: Airflow HOT (4-20mA or 2-10 VDC; *with 500 ohm resistor installed across the Flow + and - terminals*) wire under the same wire nut.
2. Wire Nut #2: Airflow COM (4-20mA or 2-10 VDC; *with 500 ohm resistor installed across the Flow + and - terminals*) wire under the same wire nut.
3. Wire Nut #3: 24 V HOT (Red) wires under the same wire nut.
4. Wire Nut #4: 24 V COM (Black) wires under the same wire nut.
5. Wire Nut #5: Actuator Position Signal HOT (0~2-10 VDC) wires under the same wire nut.
6. Wire Nut #6: Actuator Position Signal COM (0~2-10 VDC) wires under the same wire nut.

WIRING SCHEMATIC

Models AiQ-TD-xx
BACnet or Modbus - Field Wiring



NOTE:
1. Wire Nut #1: Airflow (B+) RS-485 Communication wires under the same wire nut.
2. Wire Nut #2: Airflow (A-) RS-485 Communication wires under the same wire nut.
3. Wire Nut #3: 24 V HOT (Red) wires under the same wire nut.
4. Wire Nut #4: 24 V COM (Black) wires under the same wire nut.
5. Wire Nut #5: Actuator Position Signal HOT (0~2-10 VDC) wires under the same wire nut.
6. Wire Nut #6: Actuator Position Signal COM (0~2-10 VDC) wires under the same wire nut.

DIMENSIONAL DETAILS (Shown with Extended Axle and Optional Front/Rear Flanges)

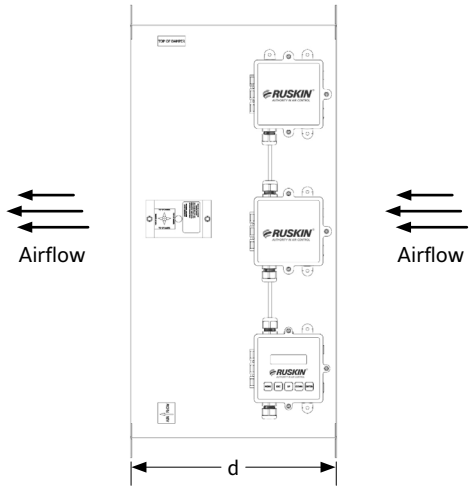


Figure 4 – Mounting Orientation
(Standard RIGHT HAND mount shown)

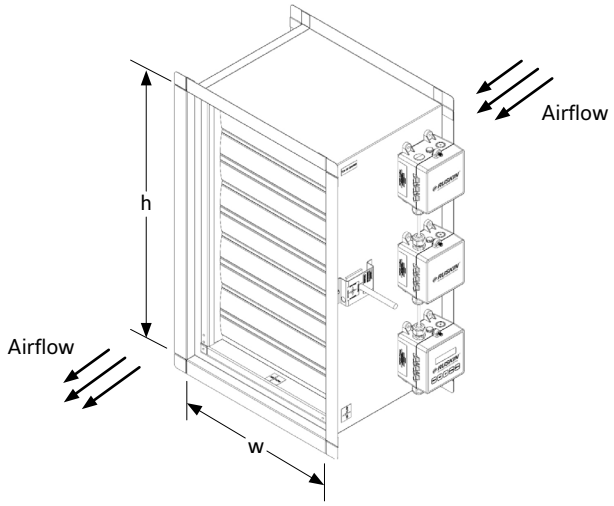
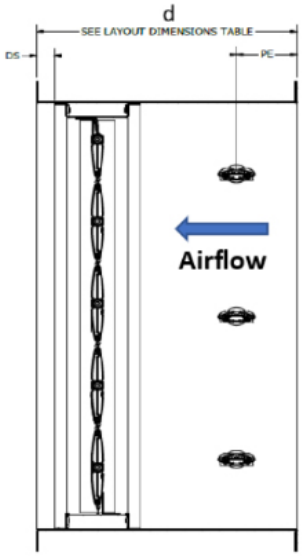


Figure 5 – Airflow enters through the TDP05K probes and exits through the control damper.



Dimensions WITH Airflow Straightener			
DS	PE	Single Section Units with Extended Axle (d)	Multi-Section Units (or Single Section with Jackshaft) (d)
1″	6″	18″	22.5″

Dimensions WITHOUT Airflow Straightener			
DS	PE	Single Section Units with Extended Axle (d)	Multi-Section Units (or Single Section with Jackshaft) (d)
1″	3.5″	15″	20″

NOTE: For this example, three (3) probes are shown in the dimensional details above.
Refer to the TDP05K Product Data sheet for the actual number of probes and sensors supplied for site specific installation.

SUGGESTED SPECIFICATION

Furnish and install an electronic, thermal dispersion airflow measuring station with integral damper and controls. Airflow measuring assembly shall include a Class 1A leakage rated control damper with 6" (152) wide, 6063T5 heavy gauge extruded aluminum, airfoil shaped blades. Damper bearings shall be molded synthetic. Damper frame shall be 6063T5 extruded aluminum hat channel. Damper shall be supplied with stainless steel compression jamb seals and 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 that interfaces with the building automation system (BAS) using Modbus or 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. The Primary 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. Complete assembly shall be constructed and calibrated in an ISO 9001 certified facility following strict ISO calibration test procedures.

Proprietary cabling is not acceptable. Factory wiring shall be completed using a factory-supplied, composite 4 wire cable similar to Connect Air W41282P-2306BL with communications and power in one cable. The Primary 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/VDC low voltage supply. The Primary shall feature a 16 character x 2 line alphanumeric backlit LCD display, digital offset/gain adjustment, continuous performing sensor/transmitter diagnostics and a visual alarm to detect malfunctions. The display shall be field adjustable to read either imperial system (IP) or metric system (SI) units. The Primary's output shall be Modbus and 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.

Airflow Measuring Stations shall be, in all respects, equivalent to Ruskin model AiQ-TD-50.

LINKS TO IMPORTANT DOCUMENTS

Document Title
Airflow-IQ Spec Sheet
Limited Warranty Document

RUSKIN®
AUTHORITY IN AIR CONTROL

3900 Doctor Greaves Road
Grandview, MO 64030
Website: www.ruskin.com
Phone: (816) 761-7476