

IAQ-Tek

Outdoor Airflow Transmitter

Installation, Operation

& Maintenance Manual

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WARRANTY STATEMENT

Accutrol LLC, having its principal place of business at 21 Commerce Dr. Danbury, CT USA ("Manufacturer") warrants its IAQ-TEK Outdoor Airflow Transmitter product (the "Products") as follows:

1. Limited Warranty.

Manufacturer warrants that the Products sold hereunder will be free from defects in material and workmanship for a period of thirty-six (36) months from the date of purchase. If the Products do not conform to this Limited Warranty during the warranty period (as herein above specified), Buyer shall notify Manufacturer in writing of the claimed defects and demonstrate to Manufacturer's satisfaction that said defects are covered by this Limited Warranty. If the defects are properly reported to Manufacturer within the warranty period, and the defects are of such type and nature as to be covered by this warranty, Manufacturer shall, at its own expense, furnish, replacement Products or, at Manufacturer's option, replacement parts or services for the defective Products. Shipping and installation of the replacement Products or replacement parts shall be at Buyer's expense.

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THIS WARRANTY IS EXCLUSIVE. The sole and exclusive obligation of Manufacturer shall be to repair or replace the defective Products in the manner and for the period provided above. Manufacturer shall not have any other obligation with respect to the Products or any part thereof, whether based on contract, tort, strict liability or otherwise. Under no circumstances, whether based on this Limited Warranty or otherwise, shall Manufacturer be liable for incidental, special, or consequential damages.

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5. Entire Obligation.

This Limited Warranty states the entire obligation of Manufacturer with respect to the Products. If any part of this Limited Warranty is determined to be void or illegal, the remainder shall remain in full force and effect.

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Appendix A Various Probe Installations

Step 1

Unpacking

Check that you have received the following items with your IAQ-TEK.



(1) Transducer PN 44-0175





(1) 50' Cable Assembly PN 1025CAB00030

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Probe and Mounting Kit, Single Probe Kit Shown Below PN 2001ASM00320



Vertical Brackets

For two-probe configuration, quantity of each item in the kit doubles and two T-Fittings are included. For three-probe configuration, quantity of each item triples, etc



Step 2

Probe Installation

Install the probe(s) in the outdoor-air intake plenum per Figure 1 (*Reference Appendix A for various types of installations*). For multiple probe installations, determine probe location by dividing the damper area into as many quadrants as you have probes. Mount each probe in the center of each quadrant repeating Steps 2a through 2f for each probe.

Note: All probes must be mounted with the brass fittings up to prevent moisture blockage in tubing.



Figure 1 PROBE INSTALLATION

- **Step 2a:** Locate the center of area to be measured and attach the upper end bracket to the upper mounting surface using (2) lock-washers and (2) sheet metal screws provided. Make sure the back of the Probe is at least six inches from the fully open damper.
- **Step 2b:** Attach the (2) vertical brackets to the upper end bracket using (4) $\frac{1}{4}$ -20x $\frac{1}{2}$ screws and (4) lock-nuts provided.
- **Step 2c:** Slide the (2) lower vertical brackets onto the upper vertical brackets as shown and extend to the lower mounting surface.
- **Step 2d:** Attach the lower end bracket to the (2) vertical brackets using (4) ¹/₄-20 screws and (4) lock-nuts provided.
- **Step 2e:** Attach the lower end bracket to the lower mounting surface using (2) lock-washers and (2) sheet metal screws provided.
- **Step 2f:** Locate the Probe in center of the damper and mount to the vertical brackets using (4) ¹/₄-20x ¹/₂ screws and (4) lock-washers provided.

Step 3

Transducer Installation

Mount the transducer vertically in the outdoor-air intake plenum in close proximity to the probe(s) per Figure 2. The transducer should be located no more that 4 feet from the probe. If it is not possible to mount the transducer into the outdoor-air intake plenum, it can be mounted outside and external to the air handler (provided it is in the shade) or in a machine room. If the transducer is going to be mounted in a machine room or other location that is not in the outside air, the auxiliary temperature probe (purchased separately) is required. Mount the transducer using (4) screws suitable for the 3/16 holes provided in the mounting bracket. *This mounting hardware is not included in the kit.*



Figure 2 System Installation

Step 4

Monitor Installation

We recommend that the monitor be installed in a location that is protected from environmental extremes such as the penthouse or mechanical room, however, the monitor may be mounted outdoors providing the monitor will not be exposed to direct sunlight and the specified operating conditions are not exceeded. The monitor should be mounted in a location that is easily accessible for set-up. To access the mounting holes remove the window door and mount the monitor using a minimum of (4) #8 screws in the slots provided. *This mounting hardware is not included in the kit.*

Step 5

Tubing Installation

Single Probe Configuration

- **Step 5a:** Measure the distance from the transducer "High" port to the probe "High" port.
- **Step 5b:** Cut a piece of the tubing provided to the proper length and attach it to "High" ports of the transducer and probe.
- **Step 5c:** Repeat steps 5a and 5b for the "Low" port.



Note: The tubing must run continuous directly from the probe to the transducer with no kinks, pockets or loops.

Multiple Probe Configuration

- **Step 5d**: Connect each of the probes "High" ports together using "tee" fittings and the tubing provided.
- **Step 5e**: Connect the probes "High" ports to the transducer "High" port per figure below.
- **Step 5f**: Repeat Steps 5d and 5e for the "Low" ports.



Note: The tubing must have no kinks, pockets or loops.

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Step 6

Wiring

Transducer Wiring

Connect the 50-foot cable assembly to the pressure transducer. One end of this cable has flying leads to allow cable to be run through conduit.

Loosen the strain relief fitting nut on the lower right side of the monitor enclosure. Guide the cable end through the strain relief fitting and terminate the transducer wires to the monitor 9-pin terminal block per Figure 3. Be sure to secure each screw after landing wire in the proper location.

Secure strain relief fitting nut.



Wire Table					
Color	Pin	Function			
BLK	1	HTR (+)			
WHT	2	HTR (-)			
ORG	3	DC(+)			
SHIELD	4	CMN			
BLU	5	Pres (+)			
RED	6	Enc Temp			
YEL	7	OA Temp			
GRN	8	Temp Cmn			
BRN	9	Zero Valve			

Figure 3 Transducer Wiring

Input Power Wiring

Loosen the strain relief fitting nut located on the lower left side of the monitor enclosure.

Guide the 24 VAC input power wires (18 AWG) through the strain relief fitting and terminate on the green input power terminals.

Note: The power source must be capable of providing 25 VA to the monitor.



Figure 4 Input Power Wiring

Step 6

Wiring

Wiring to BAS

Loosen the strain relief fitting nut located on the lower left side of the monitor enclosure (Same as used for the power wires).

Guide the cable from the BAS through the strain relief fitting and terminate on the appropriate terminal blocks per Figure 5. Be sure to secure each screw after landing wire in the proper location.

Secure the strain relief fitting nut.



Figure 5 Wiring to BAS

Step 7

Power-Up

Activate the input power (24 VAC) to the Monitor. The IAQ-TEK Monitor Display should be at the **HOME** menu with **ALARMS> NO.** If Monitor Display indicates **ALARMS> YES**, you probably have an installation error. Refer to the **Diagnostic Alarms Section** for an explanation of the alarms.

Basic Display and Keypad Operation

The IAQ-TEK display and keypad have been designed to function together in such a way as to provide a straightforward and intuitive tool for the setup, calibration, and troubleshooting of the monitor. Following is a brief description of the basic keypad operation.

Buttons will index the displays in the hierarchy.



Buttons will also be used to enter numbers in numeric fields. When a numeric data entry display is indexed, buttons act as follows.

- Pressing will cause the cursor to move to the right, one digit per press. When at the far right, one additional press will bring the cursor back to the leftmost character.
- Will cause the cursor to move to the left, one digit per press. When at the far left, one additional press will cause the display to exit the numeric data entry mode.
- ▲ Will cause the numeric value to scroll up or down in response to the specific button pressed.
- **ENTER** Will cause the numeric value to be set. All entries of ENTER shall be followed by a message which asks the user to confirm this is what he/she wants as a value.

Password Operation

A password is required to access any menus that allow the user to make changes to the Monitor operation. Password protected menu items include; Diagnostic Tests, Set-Up Wizards, Custom Setup and Factory Setup.

The factory default password is 1234. This password will give the user access to *Diagnostic Tests*, *Set-Up Wizards*, and *Custom Set-Up*. You may change the password through the **CUSTOM SETUP** menu. To disable password protection, enter 9999 as the new password.

There is a password lockout function that resets fifteen minutes after the keypad is last touched. If the user is in a password protected menu item and the keypad is not touched for fifteen minutes, the user will have to re-enter the password to proceed.

Verify Functionality Using Diagnostic Alarms

Diagnostic Alarms

The Diagnostic Alarms are used to provide diagnostic information on the performance of the product, and to alert the user to a possible malfunction. Following is a description of the Diagnostic Alarms that are available in the IAQ-TEK.

Low Flow Alarm

The Low Flow Alarm is used to alert the building operators that the intake volume has fallen below the minimum acceptable level. The basis of the alarm shall be the result of the Balancer Adjusted CFM (BCFM). The Low Flow Alarm set point is user established and stored in a register in nonvolatile memory. The default value shall be 0 CFM. Should the air volume fall below the low volume alarm limit, the alarm delay timer shall activate. Should the alarm condition persist longer than the time period established by the alarm delay timer, the low volume alarm will toggle to ALARM. To reset to a NORMAL condition, the air volume must rise to a value that is ten percent higher than the Low Volume Alarm Limit. Once this threshold has been crossed, the alarm process is reset automatically.

Reverse Flow Alarm

The Reverse Flow Alarm is used to alert the building operators that the airflow is blowing out of the intake to the air handler. No deadband shall apply to this alarm. Should the alarm condition persist longer than the time period established by the alarm delay timer, the reverse flow alarm bit shall toggle to 1 or ALARM. To reset to a NORMAL condition, the pressure must increase from a negative value to zero or have the sign change to positive. Once this threshold has been crossed, the alarm process is reset automatically.

Verify Functionality Using Diagnostic Alarms

Pressure Loss Alarm

Should the incoming signal from the pressure transducer indicate a negative pressure, a Pressure Loss alarm flag will be initiated immediately and without delay.

Outdoor Air Temperature Sensor Loss Alarm

Should the OA Temp Input to the monitor go either high (input short) or low (input open), an OA Sensor Loss alarm flag will be initiated immediately and without delay.

Enclosure Temperature Loss

Should the ENC TEMP input to the monitor representing the transducer temperature go either high (input short) or low (input open), an Encl Temp Loss alarm flag will be initiated immediately and without delay.

Loss of Enclosure Heater

Should the enclosure temperature fall to eleven degrees below the enclosure temperature set point, an Enclosure Heater Alarm flag will be initiated after the time delay period. Should the heater alarm flag continue for a period of one hour, a heater malfunction flag will be initiated.

Auto-Zero Valve Malfunction

Should the pressure transducer's auto-zero valve malfunction, the Auto Zero Valve alarm flag will be initiated immediately and without delay.

Memory Loss Alarm

Indicates there has been a loss of nonvolatile memory parameters. The Memory Loss alarm will occur immediately and without delay.

Checksum Error Alarm

Indicates that there is a memory checksum error. The Checksum Error alarm will occur immediately and without delay.

Set-Up Using the Wizards

The typical set-up of the IAQ-TEK is performed in three steps:

- 1. The Temperature Control Contractor sets up the monitor functions.
- 2. The Air Balancer verifies the system operation and calibrates the IAQ-TEK to field conditions.
- 3. The Facilities Manager sets the alarm limits to meet their requirements for minimum outdoor air.

The IAQ-TEK has three Set-Up Wizards which allows for the selection and implementation of predefined step by step procedures required for set-up. The three Wizards are; **"Temp. Control Wizard**", the **"Air Balancer Wizard**" and the **"Facilities Mgmnt. Wizard**". Steps 1 through 8 will guide you through the IAQ-TEK Set-Up using the Wizards.

Note: The Pressure Transducer has an internal heating element, which must be stabilized at set point before proceeding. Allow the Pressure Transducer to warm-up for a period of 30 minutes prior to proceeding.

Step 1: Scroll to the **PRIMARY MENU** and select **Setup Wizards**. The **SETUP WIZARDS** menu should read as follows:



Step 2:To set up Monitor functions, Select Temp. Control from the SETUPWIZARDS menu.Answer each question in the TEMP CONTROL SETUP.

Note: The second question will ask you for probe type, below is a diagram of each type:



Set-Up Using the Wizards

Step 3: After answering all of the questions, the display should now read:



The ### should have the full scale CFM value that you input.

Step 4: If the full scale CFM is correct, confirm with keypad.



The "!" on the right of Temp. Control should be gone. This indicates the Temp. Control wizard has been performed.

Step 5: To verify system operation and calibrate readings for field conditions, select **Air Balancer** from the **SETUP WIZARDS** menu. Follow the procedure as prompted in the **BALANCER SETUP**.

Step 6: Once you have completed the procedure, the display should now read:

BALANCER SETUP					
Monitor:	###### CFM				
Balancer:	###### CFM				
Error:	##.## %				

If the **Error** is less than 25%, hit the ENTER key. You will then be asked to "Use Balancer Flow?" Enter Yes.

If the **Error** is greater that 25% the wizard will guide you through setup parameters that may have been entered incorrectly.

Step 7: The display should now read as follows:



The "!" on the right of Air Balancer should be gone. This indicates the Air Balancer Wizard has been performed.

Step 8: To access the facility related items, select **Facilities Mgmnt**. from the **SETUP WIZARDS** menu. Answer each question in the **FACILITIES SETUP**.

This completes the Set-Up procedure using the Set-Up Wizards. If you would like to customize your set-up, then turn to the section titled Custom Set-Up.

Custom Set-Up

Custom Set-Up provides a one stop means to setup any parameter. A password is required for entry to this display group. Items in this group allow the user to individually setup each of the read/write registers.

Each Item is a read/write value found in the register table.

Current Value and Units – Displays the value now existing in the register and the engineering units if appropriate.

New Value -- Enter the new value here, or toggle if a digital value.

ENTER to Change - Prompts the user to press ENTER to change the value.

HELP MENU's -- For each item there is a help menu which includes a brief description

Custom Set-Up Items

Area of Flow Device -- Enter the area of the measurement point in square feet. The input value must be in the range from 1 to 999.9 square feet. Factory default is 1 square foot.

Sensor Flow Coeff. -- Enter the Sensor Flow Coefficient (SFC) for the type of differential pressure generating device being used. Following is a list a standard Tek-Air products and their respective SFC;

Generic Pitot	1.00
TFP-5000 or 6000	0.754
TPS-6000	0.624
IAQ-TEK Probe	0.762 (Factory Default)

Altitude -- Enter the altitude in feet above or below sea level for the location of the probe. Default is 0 ft.

Low Flow Alarm Stpt -- Enter the desired value for the Low Flow Alarm set point in CFM. Default is 0 CFM.

Analog Out Flow FS -- Enter the full-scale range in CFM for the analog output scaling. Default is 20,000 CFM.

Alarm Delay Period -- Several of the IAQ-TEK alarm conditions have their initiation inhibited for a delay period. This period is utilized to create a delay between the actual occurrence of an alarm and the reporting of the alarm either at the display, through the contact output, the digital outputs, or through communications. The Alarm Delay Period is adjustable between 5 and 60 seconds. The default time is 20 seconds. The IAQ-TEK alarms are non-latching type, meaning that the alarm will automatically clear when the alarm condition clears.

Custom Set-Up

Press. Average Int -- Enter the Averaging Time in seconds between one and twenty seconds for the average pressure calculation. Factory default is 2 seconds.

Use Fan Interlock? -- Select either NO (OFF) or YES (ON) to activate or deactivate the fan interlock. The Fan Interlock Function is used to interlock the action of the monitor to the running of the fan. The default setting is OFF, meaning the feature is not active. If the Fan Interlock Function is ON, the low CFM airflow alarm is deactivated any time the digital input function reports that the fan is OFF. When the fan is ON the alarm is active. The reporting of diagnostic alarms is not inhibited by fan run status. Fan status is provided on the HOME display if this feature is activated.

Balancers Adj Fact -- The Balancers Adj Fact (BAF) allows the Balancer to adjust the readings determined by the monitor, to those observed by the Balancer. Enter the BAF as a percentage of monitor reading. For example; if the monitor indicates the flow 1000 CFM and the Balancer indicates the flow is 900 CFM, the BAF is 1000/900 = 90%. Factory default is 100%.

Password Change -- To change the password, enter new four-digit number. The factory default is 1234.

Auto-Zero Interval -- Enter the Auto-Zero Interval in minutes between five and sixty minutes. Factory default is 30 minutes.

Encl Temp Set Pt -- Enter the Transducer Enclosure Temperature Set Point in degrees F. This value should be only a couple of degrees greater than the maximum outdoor air temperature. Factory default is 100 degrees F.

OA Temp Sensor Bias -- Allows the Balancer to adjust the monitor outside air temperature readings to those observed by the Balancer. Enter the offset desired in degrees F. Factory default is 0.

Transducer Zero -- Sets the monitor Zero range in "wc corresponding to the transducer 4mA output. Factory default is 0.00 "wc.

Transducer FS -- Sets the monitor Full Scale range in "wc corresponding to the transducer 20mA output. Factory default is 0.25"wc.

Diagnostic Functions

The Diagnostic Functions provide the user with a method by which the functionality of the monitor system can be established by manually reading input status and manipulating outputs. Once activated, Diagnostic Functions will cause all calculation and alarming activities to halt. If left performing Diagnostic Functions for more that fifteen minutes, the monitor will exit Diagnostic Functions and return to normal operation and HOME. Below is a brief description of the Diagnostic Functions.

Test Analog Inputs

When in this mode, the user will be able to view the Transducer Input Current (mA), the Transducer Enclosure Temperature Sensor Resistance (ohms), and the Outdoor Air Temperature Sensor resistance (ohms).

Test Digital Input

When this mode is indexed, the user can view the status of the digital input contact as OPEN or CLOSED.

Test Analog Output #1

When indexed this function will cause the 4-20mA Output (CFM OUT) to step from 4 ma, to 12 mA, to 20 mA, and repeat successively in 3-second intervals.

Test Analog Output #2

When indexed this function will cause the 4-20mA Output (TEMP OUT) to step from 4 ma, to 12 mA, to 20 mA, and repeat successively in 3 second intervals.

Test Contact Output-

When activated this function will cause the Alarm Contacts to toggle successively from energized to de-energized every five seconds.

Test Zero Valve

Five seconds after indexing this function, the Auto-Zero Valve shall energize for ten seconds and the display will show the uncorrected pressure from the transducer. After five seconds more this sequence will repeat. The most current value of offset pressure will also be displayed for informational purposes.

Check Registers

This function allows you to index through all of the registers in sequential order.

Specifications

System Accuracy

Intake Velocity 750 to 200 FPM; \pm 5 % reading 200 to 100 FPM; \pm 10% reading

Probe and Transducer





Temperature Operating: -40 to 120 ±°F Storage: -40 to 150 °F Air Velocity Capabilities Discharge of intake louver- 75 to 750 FPM Free Air, before damper- 100 to 1000 FPM

Probe

Material: PVC/ABS Fire Rating: UL-94-V0 and UL-94-5VB Quantity Required: Louver area <64 square feet: 1 per 12 sq. ft. with aspect ratio of 1 to 1.5. 1 per 8 sq. ft. with aspect ratio greater than 1.5 Louver area > 64 square feet: 1 per 16 square feet Weight: 1.5 lbs. Tubing Connections: 1/4" barb fittings

Transducer

Enclosure: NEMA-4X Watertight Electrical Connection: Integral Cable Weight: 1.5 lbs. Tubing Connections: 1/4" barb fittings

Monitor



Temperature Operating: 30 to 110 °F Storage: -40 to 150 °F

Warning: Do Not Install Monitor in a location that will expose it to direct sunlight otherwise damage may occur.

Enclosure Type: NEMA-4X Watertight Weight: 3.5 lbs. Power Supply Voltage: 24 VAC, limits 19/31 VAC Power: 25 VA Digital Input for Fan Status Interlock: Type: Dry Contact Analog Outputs Type: Powered and Isolated 4-20mA Scaling: CFM user set, Temperature -30 to 120 F Output Load: 0-600 ohms Digital Alarm Output: Type: Dry Contact, SPDT Rating: 0.5 Amps Max State: Normally Energized Display Type: LCD Size: 4x20 lines, backlit

Appendix A





Side Draw Outdoor Air Intake

Appendix A



McQuay Type Intake







Standard Rain Hood Intake