



# Accurate Airflow Measurement for Commercial HVAC Applications



## PRECISE, RELIABLE, TRUSTED SOLUTIONS

- BUILDING AIRFLOW MEASUREMENT AND CONTROL
- ROOM OR SPACE PRESSURIZATION
- OUTSIDE REFERENCE PRESSURE MEASUREMENT
- LABORATORY & HOOD EXHAUST
- OUTDOOR AIRFLOW MONITORING



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## Measure with Confidence

No-Fault Warranty • On-Time Delivery • Customer Support



## HVAC APPLICATIONS

**BUILDING AIRFLOW MEASUREMENT AND CONTROL** - The distribution of conditioned air is the primary means of heating and cooling most commercial buildings today. Proper airflow control within a building is not only important for the health and comfort of the building's occupants, but also for the health and long term performance and longevity of the building. Accurate airflow measurement allows the HVAC system to work effectively as designed, and efficiently as required to meet ever increasing energy conservation goals and high-performance building standards. Installations for this application include:

**Ducted Airflow Measurement** - Mechanical duct work is the most common means for distributing the conditioned air throughout most commercial buildings. The duct system provides the best opportunities for accurate airflow measurement due to its controlled dimensions, and the typical obstructions found within a duct system are generally well defined.

**Fan Inlet/Discharge Measurement** - Measuring airflow at the fan inlet presents challenges from a measurement technology stand point. Achieving accurate airflow measurement at the fan inlet, without affecting fan performance, is an important consideration when selecting the correct meter. The large variation in airflow velocity, as well as the multiple fan configurations that exist within an AHU, must be taken into consideration. Measuring airflow at the fan inlet can be advantageous from an accessibility stand point as well as monitoring the performance of fan walls at the source.

**Outdoor Airflow Measurement** - Controlling the amount of outside air entering a building is required to maintain pressurization, meet energy efficiency goals, confirm compliance with local building codes, and maintain the health of the building and its occupants. Accurate measurement of outside airflow is required for proper operation of today's high performance buildings. Outside air can pose a significant challenge regarding the metering technology to be selected. Some of the more common challenges associated with outdoor airflow measurement include: low airflow velocities over large operating ranges such as a split - min/max economizer system, blowing dust and debris, and moisture laden air at the point of measurement. Choosing a technology that is impervious to airborne contaminants, can measure low airflow rates, has high turn down capability and one that provides the desired BAS outputs will facilitate a successful installation and accurate outdoor airflow measurement.

|                                          |                                  | THERMAL DISPERSION AIRFLOW MEASUREMENT |                            |                                      | OUTDOOR MEASUREMENT                       | STATIC PRESSURE MEASUREMENT |                                           |                                   |
|------------------------------------------|----------------------------------|----------------------------------------|----------------------------|--------------------------------------|-------------------------------------------|-----------------------------|-------------------------------------------|-----------------------------------|
| Applications                             | Installations                    | ELECTRA-flo/SD                         | ELECTRA-flo/S5 Probe Array | ELECTRA-flo/FI Fan Inlet Probe Array | OAM II Outdoor Airflow Measurement System | S.A.P. Static Air Probe     | STAT-probe Static Pressure Traverse Probe | S.O.A.P. Static Outside Air Probe |
| Building Airflow Measurement and Control | Ducted Airflow                   | ★                                      | ★                          |                                      |                                           |                             |                                           |                                   |
|                                          | Fan Inlet                        |                                        |                            | ★                                    |                                           |                             |                                           |                                   |
|                                          | Fan Discharge                    | ★                                      | ★                          |                                      |                                           |                             |                                           |                                   |
|                                          | Outdoor Airflow Monitoring       |                                        | ★<br>(OAM II Recommended)  |                                      | ★                                         |                             |                                           |                                   |
| Building / Space Pressurization          | Fan Tracking                     |                                        |                            | ★                                    |                                           |                             |                                           |                                   |
|                                          | Outdoor Pressure Reference       |                                        |                            |                                      |                                           | ★                           |                                           | ★                                 |
|                                          | Room / Space Pressurization      |                                        |                            |                                      |                                           | ★                           |                                           |                                   |
|                                          | Data Center Aisle Pressurization |                                        |                            |                                      |                                           | ★                           | ★                                         |                                   |
| Indoor Air Quality                       | Outdoor Airflow Monitoring       |                                        | ★<br>(OAM II Recommended)  |                                      | ★                                         |                             |                                           |                                   |
|                                          | Laboratory Hood Exhaust Duct     |                                        |                            |                                      |                                           |                             |                                           |                                   |



**BUILDING/SPACE PRESSURIZATION** - Proper pressurization of buildings and indoor spaces is a crucial component required for the management of indoor air quality, maximizing energy efficiency and maintaining occupant health and comfort. Lack of control with regard to pressurization can lead to a host of problems including the infiltration of moisture, cold winter or hot summer drafts, and doors that are difficult to open or slam shut. Some airflow measurement strategies for this application include:

**Fan Tracking** - Fan tracking is the accurate measurement of the entire airflow system including supply and return air and outside and relief air. Airflow measurement is a much more effective and accurate means of maintaining building pressurization when compared to static pressure measurements made throughout an entire building.

**Outside Reference Pressure Measurement** - Indoor pressures must be measured relative to a reference pressure, usually the outside air pressure.

**Room or Space Pressurization** - This is essential for managing indoor air quality, energy savings and occupant comfort. Prevents unintended pressure levels which can lead to complications for the building systems, the building envelope, and problems between adjacent spaces such as laboratories and hospital rooms.

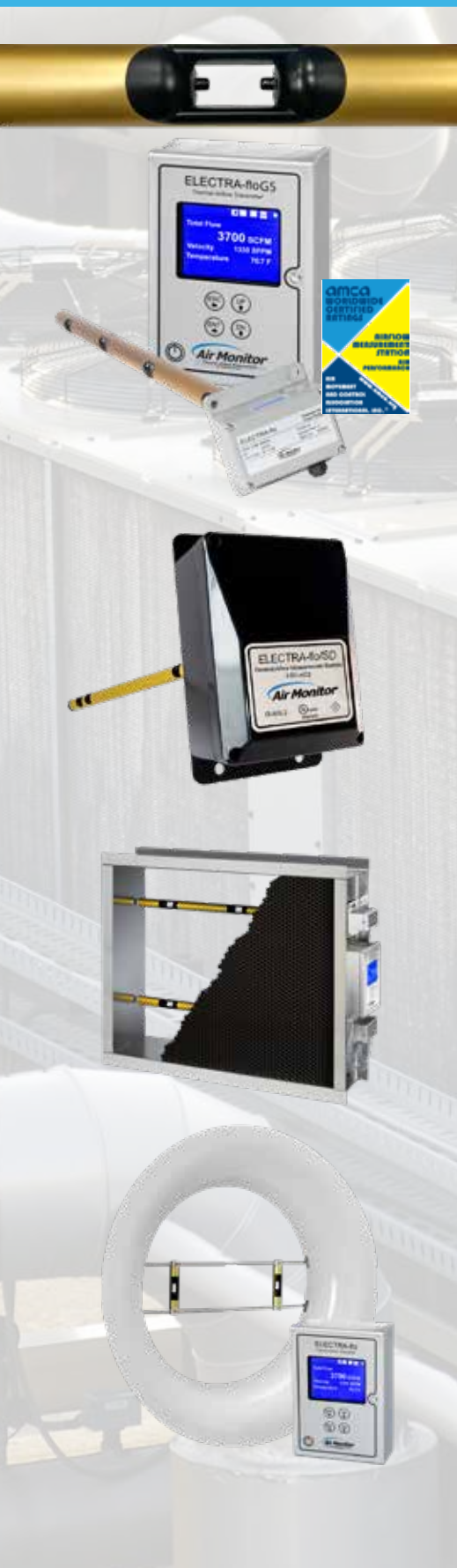
**Data Center Aisle Pressurization** - Maintaining the right pressure differential between hot and cold aisles is essential for controlling airflow and preventing mixing. If airflow is not properly measured and balanced, warm air can recirculate into cold aisles, reducing cooling efficiency and increasing cooling demand.

**INDOOR AIR QUALITY** - Creating and maintaining proper indoor air quality in today's built environment can be a challenging task. The effect that poor indoor air quality has on building occupants can range from loss of efficiency and performance to specific acute health issues. Airborne contaminants found within buildings come from a number of sources including people, processes and the materials used in building construction. Maintaining indoor air quality requires accurate airflow measurement. A few of the typical strategies implemented for this application include:

**Outdoor Airflow Monitoring** - Bringing in the right amount of outside air is crucial to maintain proper building operation, meet energy conservation goals, and maintain the IAQ demanded in today's built environment. Providing adequate dilution air to the occupied space within a building is the best way to control the level of contamination within the space. Accurately and continuously monitoring the outside air flowing into a building will allow the BAS to control the building as designed.

**Laboratory & Hood Exhaust** - Provides essential information to the lab system for maintaining occupant comfort and safety, space pressurization relative to the rest of the building and/or other spaces, and confirms fume hood operation.

| DIFFERENTIAL PRESSURE AIRFLOW MEASUREMENT |                              |                                              |                               | TRANSMITTERS AND MONITORS |                           |                               | Installations                    | Applications                             |
|-------------------------------------------|------------------------------|----------------------------------------------|-------------------------------|---------------------------|---------------------------|-------------------------------|----------------------------------|------------------------------------------|
| VOLU-probe Pitot Traverse Probe           | FAN-E Pitot Traverse Station | VOLU-probe/FI Pitot Fan Inlet Traverse Probe | LO-flo Pitot Traverse Station | FAN IV                    | VELTRON III               | DCAS Data Center Aisle Sentry |                                  |                                          |
| ★                                         | ★                            |                                              | ★                             |                           | ★                         |                               | Ducted Airflow                   | Building Airflow Measurement and Control |
|                                           |                              | ★                                            |                               | ★                         | ★<br>(FAN IV Recommended) |                               | Fan Inlet                        |                                          |
| ★                                         | ★                            |                                              |                               |                           | ★                         |                               | Fan Discharge                    |                                          |
|                                           |                              |                                              |                               |                           | ★                         |                               | Outdoor Airflow Monitoring       |                                          |
|                                           |                              | ★                                            |                               |                           | ★                         |                               | Fan Tracking                     | Building / Space Pressurization          |
|                                           |                              |                                              |                               |                           | ★                         |                               | Outdoor Pressure Reference       |                                          |
|                                           |                              |                                              |                               |                           | ★                         | ★                             | Room / Space Pressurization      |                                          |
|                                           |                              |                                              |                               |                           |                           | ★                             | Data Center Aisle Pressurization |                                          |
|                                           |                              |                                              |                               |                           |                           |                               | Outdoor Airflow Monitoring       | Indoor Air Quality                       |
| ★(SS)                                     | ★(SS)                        |                                              | ★(SS)                         | ★                         | ★                         |                               | Laboratory Hood Exhaust Duct     |                                          |



### **ELECTRA-flo 5 Series Thermal Airflow Measurement System**

- Rugged probes with aerodynamic sensor apertures - Requires less straight run
- Up to 32 individual sensing points per transmitter - More sensing points means better accuracy
- Daisy chain multiple probes per transmitter - Reduces cabling and conduit
- NIST\* traceable calibration - Guarantees accuracy within  $\pm 2\%$  of actual flow
- ELECTRA-flo G5 Transmitter included - Local display with programming interface, BACnet® MS/TP, MODBUS® and analog outputs. Optional true dual channel version with duct size, dimension data and sensing point allocation set independently for each channel
- Robust sensor design provides protection against environmental conditions and allows damage-free cleaning
- AMCA\*\* certified - within  $\pm 2\%$  certified accuracy

### **ELECTRA-flo/SD Thermal Airflow & Temperature Measurement System**

Designed to measure airflow and temperature in small duct variable air volume applications.

- Measure airflow and temperature in 4"-16" diameter ducts
- Analog outputs for flow and temperature for improved control and efficiency in multi-zone VAV systems
- Optional BACnet or MODBUS RS485

### **ELECTRA-flo/CM Thermal Airflow Measurement Station**

All features of ELECTRA-flo 5 Series Thermal Airflow Measurement System plus:

- ELECTRA-flo/S5 thermal probes mounted in rigid, welded, galvanized casing - Simplifies installation
- Honeycomb cell air straightener - Reduces straight run requirements

### **ELECTRA-flo/FI Thermal Dispersion Fan Inlet Probe Array**

- Dual point thermal dispersion sensor probes mounted in sensor housing - Simplifies installation
- Installs directly in fan inlet with virtually no pressure drop
- ELECTRA-flo G5 Transmitter included

\*National Institute of Standards and Technology

\*\*Air Movement and Control Association



## OAM II Outdoor Airflow Measurement System

Robust construction and reliable readings that are unaffected by wind direction, airborne moisture, and dirt make the OAM II the ideal solution for outdoor airflow applications!

- Robust and reliable construction - Readings are unaffected by wind direction, airborne moisture and dirt
- Factory calibration - Guarantees accuracy within  $\pm 5\%$  of reading
- Measures inlet velocities as low as 100 FPM
- New and retrofit installations onto most single and dual inlet package air handlers
- Local display of data and direct analog interface with BAS for data logging and/or control of outside air dampers
- ASHRAE 62 and 189.1 compliant



## OAM II Outdoor Airflow Measurement Uni-Sensor

- Unaffected by airborne dust and debris and condensing moisture
- Reliable airflow measurement without the need for long straight runs
- Largely immune to effects of shifting wind loads and wind gusts
- The Uni-Sensor is constructed of 316 Stainless Steel and is resistant to corrosion caused by salt and most other airborne corrosives
- Uni-Sensors are ideal for retrofit installations because they are easily mounted to a variety of existing inlet types
- Uni-Sensors combine an outside reference (high pressure) sensor and an inlet airflow (low pressure) sensor into one assembly

## OAM II Outdoor Airflow Measurement Station

- Stainless steel sensors factory mounted directly onto rugged casing - Simplifies installation
- Perforated metal mesh provides known fixed inlet flow coefficient - Removes the need for field characterization
- Factory calibrated for selected applications - Guarantees accuracy
- AMCA\* certified - Within  $\pm 5\%$  of actual airflow across specified flow range

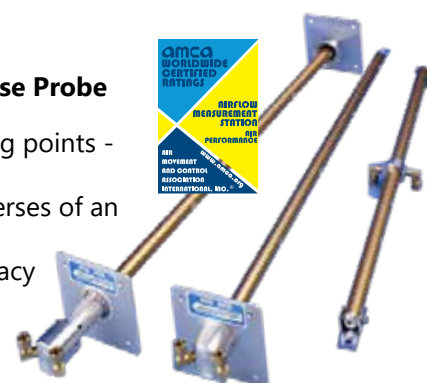


### VELTRON III Transmitter

- $\pm 3\%$  of reading accuracy when combined with Air Monitor Sensors
- Stacked transducers for higher accuracy over a wider turndown
- Dual channel configuration to measure two separate applications with one transmitter
- Field characterization for better performance in limited straight run
- Air density and relative humidity compensation
- BACnet and MODBUS Communication

### VOLU-probe Pitot Airflow Measurement Traverse Probe

- Multiple Pitot total and static pressure sensing points - Improved accuracy
- Senses average total and static pressure traverses of an air stream
- AMCA\* certified - Within  $\pm 2\%$  certified accuracy



### VOLU-probe/SS Stainless Steel Airflow Measurement Traverse Probe

- Ideal for clean or harsh and particulate laden applications
- Temperature range is  $-2^{\circ}\text{F}$  to  $900^{\circ}\text{F}$
- Accurate within  $\pm 2\text{--}3\%$  of actual flow

### VOLU-probe/VS Pitot Airflow Measurement Traverse Station

- One or more VOLU-probes factory mounted in a rigid, galvanized casing - Simplifies installation
- Senses average total and static pressure traverses of an air stream
- AMCA\* certified - Within  $\pm 2\%$  certified accuracy



### FAN-E Pitot Airflow Measurement Traverse Station

- Multiple Pitot total and static pressure sensing points
- Improved accuracy
- Traverse station includes air straightening honeycomb cell
- Reduces straight run requirements
- AMCA\* certified - Within  $\pm 2\%$  certified accuracy

### Aluminum LO-flo Pitot Airflow Measurement Traverse Station

- Measures airflow in small round duct work between 4" - 8"
- Measures volume rates between 35 - 1700 CFM
- Accurate within  $\pm 2\%$  of actual airflow



\*Air Movement and Control Association



### FAN IV Fan Array Transmitter

Multi-channel transmitter that delivers precise airflow and pressure measurement for:

- RTU Applications - 4 individual fans (one per channel)
- Fan Wall Applications - 20 total fans (4 groupings of up to 5 fans per channel)
- Transmitter provides  $\pm 1\%$  of reading measurement accuracy within 20:1 pressure turn down ratio
- Ideal for piezometer rings provided by fan manufacturers
- BACnet and MODBUS communication, 4 programmable analog outputs

### VOLU-probe/FI Pitot Fan Inlet Airflow Traverse Probe

- Pair of offset traverse probes mount directly to fan inlet
- Accurately measures inlet velocity pressure and air volume
- Aluminum or stainless steel



### DCAS - Data Center Aisle Sentry

- Extended flow range capability - Dual transducer technology maximizes the turndown ratio to ensure optimal measurement performance at near zero differential pressure conditions
- Superior resolution - the LCD displays pressure resolution to the hundred thousandths
- Transmitter provides  $\pm 0.75\%$  of reading measurement accuracy within 40:1 pressure turndown ratio

### STAT-probe - Static Pressure Traverse Probe

- Multiple static measurement points across the probe to provide a better representation of the duct static pressure
- Minimal Resistance to Airflow, Less than 0.1 inch of water column pressure drop for velocities of up to 4,000 FPM



### S.O.A.P. - Static Outside Air Probe

- Accurate and instantaneous sensing of outside static air pressure levels
- Unaffected by wind direction or gusts

### S.A.P. - Static Air Probe

- Steady, non-pulsating output of room, space or plenum pressure measurements
- Aluminum or stainless steel construction





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**3 YEAR MANUFACTURER WARRANTY**



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representative.



# READY TO GO...

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**right out of the box.** This attention to detail simplifies installation and maximizes performance.

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**SINCE 1967**

