

ELECTRA-flo / FI

Thermal Fan Inlet Airflow System



System Features

- 2% of reading sensor accuracy
- Mount directly in the inlet of centrifugal or vane axial fans
- Adjustable length support struts simplify ordering and installation
- 0 to 5,000 FPM airflow measurement range
- Two sensors per fan inlet
- Fully field serviceable sensors
- Rugged, anodized probe construction
- Optional LonWorks® communication protocol
- Dual analog outputs (4-20mA, 0-5VDC or 0-10VDC) for airflow and temperature
- Individual sensor self-diagnostics
- High visibility backlit LCD can be mounted up to 100' from station or probe array
- Selectable display of individual sensor velocity and temperature
- Password protected membrane keypad for easy access to all transmitter functions
- Installed accuracy, typically 3-10% of airflow. 2-3% accuracy with field adjustment
- CFD (Computational Fluid Dynamics) and wind tunnel optimized sensor aperture design ensures accurate airflow measurement in angular flow conditions

Accurate airflow measurement for demanding applications



AIR MONITOR
CORPORATION

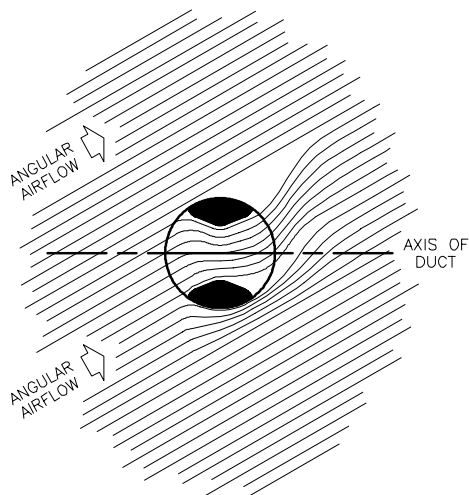
ELECTRA-flo™/FI

How It Works

The ELECTRA-flo utilizes thermal dispersion technology to measure airflow. As air moves across the surface of an elevated temperature sensor, heat is transferred from the sensor to the airflow in a mathematically defined relationship between heat transfer rate and airflow velocity.

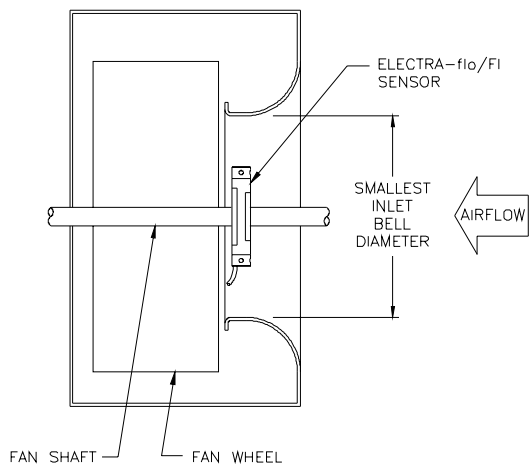
Each ELECTRA-flo sensing node utilizes a pair of precision matched thermistors. One functions as a reference sensor measuring the ambient air temperature at the sensing node location, and the other thermistor is heated to a preset temperature differential (ΔT) above the ambient air temperature. Airflow velocity is determined using the measured ambient air temperature, the known heat transfer characteristics of the heated thermistor, and the power consumed to maintain the ΔT between the two thermistors.

Using a combination of Computational Fluid Dynamics (CFD) modeling and extensive full-scale wind tunnel verification, the aerodynamically optimized cross section of the sensing node aperture prevents error inducing turbulence typical of sharp edged sensing tubes.

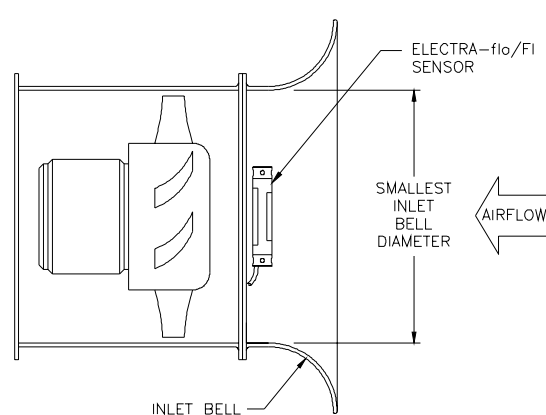


The aperture's injection molded shape has been engineered to minimize the angular flow effects naturally present in any duct. The flared aperture captures a representative sample of the ducted airflow, while the contoured leading edges prevent the creation of vortices. The center cross section of the aperture functions in the same manner as a venturi. It stabilizes and flattens the velocity profile at the point of measurement ensuring the airflow maintains full contact with the sensing thermistors. The flow conditioning characteristic of the aperture compensates for turbulent airflow with pitch and/or yaw angles up to ± 30 degrees and produces an accuracy of $\pm 2\%$ of reading for each ELECTRA-flo sensor.

Applications



Where double inlet centrifugal fans are utilized in HVAC system design, a set of ELECTRA-flo/FI probes must be mounted in each fan inlet.



When vane-axial fans are installed in a ducted configuration on the inlet side, the application may require the use of the ELECTRA-flo designed for ducted airflow. Contact Factory for recommendation.

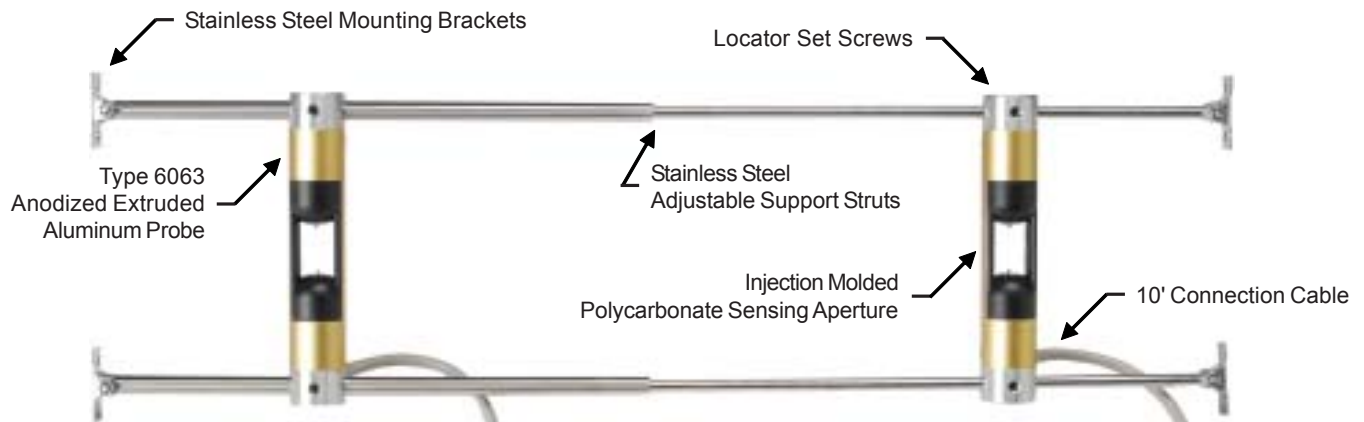
Probe Size Selection

ELECTRA-flo/FI probes are ordered based upon the fan's minimum inlet diameter where the probes are to be mounted. Based upon the inlet diameter, select one of the eight adjustable standard sizes. The chart indicates the range of minimum inlet diameters that each standard size can accommodate.

Range Designator	A	B	C	D	E	F	G	H
Min Inlet Diameter	10.00"	13.00"	17.00"	24.00"	36.00"	48.00"	60.00"	72.00"
Max Inlet Diameter	12.99"	16.99"	23.99"	35.99"	47.99"	59.99"	71.99"	83.99"

ELECTRA-flo™/FI

Construction Features



Product Application

To apply the ELECTRA-flo/FI to fan inlets, the following determinations must be made:

1. The ELECTRA-flo/FI was designed specifically to mount in the minimum diameter point of the fan inlet bell.
2. When ordering, provide the minimum diameter (mounting location) of the fan inlet bellmouth. DO NOT provide fan wheel diameter.
3. When ordering, advise the presence and size of any fan shaft in the inlet.
4. Due to variations in fan design and construction, contact the Factory regarding application suitability for installation on fans having inlet vanes or dampers, extra large motor shafts, motor mounting in the fan inlet, and any auxiliary equipment that could interfere with probe mounting and connecting tubing.

Performance Specifications

SYSTEM

- Flow Accuracy. 3-10% of actual airflow, as installed
2-3% of actual airflow, with field adjustment
- Temperature Accuracy. $\pm 0.1^\circ\text{F}$ of air temperature

PROBE ASSEMBLY

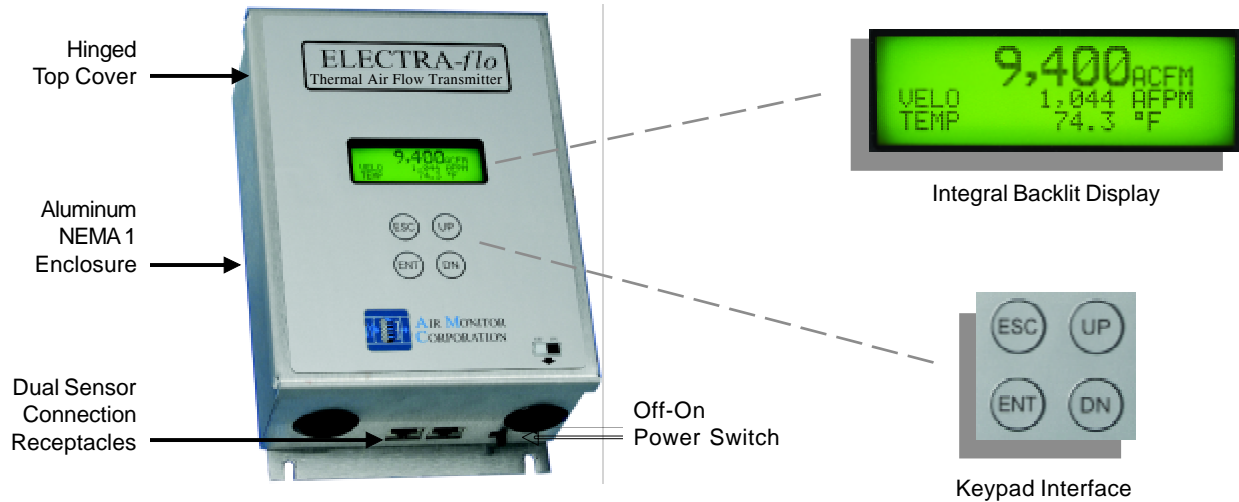
- Sensor Accuracy. Velocity. $\pm 2\%$ of reading
Temperature. $\pm 0.1^\circ\text{F}$
- Sensor Assembly. Injection molded polycarbonate
- Sensor Type. Sealed thermistor
- Sensor Signal Processing. Via microprocessor in each sensor, with calibration data stored in non-volatile memory. Built in 12 bit A/D conversion.
- Number of Calibration Points Per Sensor. 6
- Velocity Calibration Range. 0 to 10,000 FPM
- Humidity Range. 0 to 95% RH, non-condensing
- Sensor Mounting. Via stainless steel mounting brackets and support struts
- Probe to Transmitter Signal Connections. Via a shielded cable with RJ-45 connection. Standard length is 10', with optional 50' and 100' lengths.
- Number of Sensors Per Fan Inlet. 2

TRANSMITTER

- Display. Backlit graphical LCD. $\frac{3}{4}'' \times 2\frac{1}{2}''$ display size. Field selectable in U.S. or S.I. units for velocity/flow and temperature.
- Configuration Access. By means of enclosure cover mounted membrane keypad. Password protected.
- Power Supply. 24VAC (20-28VAC) or 24VDC (20-40VDC), with automatic selection.
- Power Consumption. 21-26VA, dependent upon whether the fan is single or dual inlet.
- Circuit Protection. Power input is isolated, fused, and reverse polarity protected.
- Analog Outputs. Dual outputs, field configurable via jumper for 0-5VDC, 0-10VDC, or 4-20mADC.
- Analog Output Scaling. Field adjustable digital scaling.
 - Velocity Range: 0 to 5,000 FPM
 - Temperature Range: 0 to 140°F
- Analog Output Resolution. 0.02%
- Analog Output Filtering. Field adjustable digital low pass filter
- Network Output Communication. LonWorks® Free Topology
- Humidity Limits. 0 to 95% RH, non-condensing
- Temperature Limits. -20°F to 180°F Storage
 -20°F to 140°F Operating
- Enclosure. NEMA 1 aluminum with hinged cover

ELECTRA-flo™ "Smart" Transmitter

Construction Features



- **Continuous Display of Process.** The ELECTRA-flo comes equipped with a multi-line, backlit, graphical LCD for use during transmitter configuration and calibration, and to display multiple measured processes in engineering units. The LCD provides one line having double width and height characters for high visibility plus two 20 digit lines having standard size characters, and various descriptors for transmitter operating status.
- **Output Communication.** Standard dual analog outputs can be individually configured for 0-5VDC, 0-10VDC or 4-20mADC by means of jumpers. LonWorks® Free Topology is available as an option.
- **Multiple Operating Power Selections.** Standard input power can be either 24VAC or 24VDC with automatic detection and selection.
- **Output Signal Filtering.** To eliminate flow signal pulsations, the ELECTRA-flo transmitter is equipped with a user selectable digital low pass noise filter.
- **Enclosure.** The ELECTRA-flo transmitter is furnished in a NEMA 1 aluminum enclosure with a hinged cover and internal plug-in type terminal strip for ease of field wiring.
- **Individual Sensor Diagnostics.** The ELECTRA-flo transmitter is able to detect any sensor that is operating outside factory preset tolerances, remove that sensor's measured values from the overall airflow average, and generate a visual fault alarm on the LCD.
- **Membrane Keypad Interface.** All transmitter configuration, scaling, and diagnostic functions can be performed by means of a password protected, cover mounted membrane keypad.

Dimensional Information

