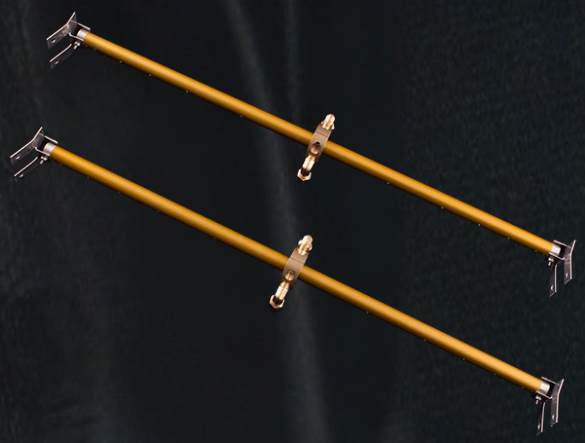
PARAGON CONTROLS INCORPORATED

Technical Data Sheet



FE1050 Fan Inlet Airflow Sensing Element

- ±2% Accuracy
- Easy to Install
- Low Maintenance
- Ideal for Retrofits

FE1050 FAN INLET AIRFLOW SENSING ELEMENT

DESCRIPTION

The **FE-1050** is an airflow measuring element assembly specifically designed for installation in the inlet cone of centrifugal fans or inlet bell of vane-axial fans. The design of these primary elements provides a means of accurate measurement of fan capacity along with ease of installation. Each assembly is complete with two airflow measuring elements and pivot mounting hardware

The FE-1050 airflow averaging element assembly is a head type device, which generates a differential (velocity) pressure signal. The basic design is a "cylindrical tube within a cylindrical tube" creating independent chambers which permit the simultaneous measurement of both total pressure and static pressure. Multiple total and static pressure sensing ports (which are strategically located based on the known pressure distribution over a cylindrical surface) provide comprehensive averaging of the velocity variations. Each chamber is then connected to one side of a differential measurement device (gauge, transmitter, etc.) for flow measurement and indication purposes.

Additional Features

- Low signal-to-noise ratio
- Multiple total and static pressure sensing ports along the length of the element
- Averaging internal manifold
- Insensitive to flow angle variations of as much as ±20° when faced in the normal direction of flow
- ±2% accuracy throughout the velocity rages of 100 fpm and over
- Standard construction is 6063-T5 aluminum with anodized finish
- Available in optional corrosive resistance materials including Type 316L stainless steel, and Type 1 PVC
- Standard elements can be operated (in air) continuously in temperatures up to 350°F or intermittently in temperatures up to 400°F
- All elements can be operated in humidity ranges of 0 to 100%
- Standard elements have good salt air and mild acid resistance; excellent solvent and aromatic hydrocarbon resistance

SPECIFICATIONS

Accuracy

Within 2% of actual flow when installed in accordance with published recommendations

Operating Velocity Range

100 to 8,000 fpm

Note: Model FE-1050 fan inlet airflow measuring elements should not be used on fan inlet applications where the narrowest diameter of the inlet cone is less than 12 inches

Material

Elements

6063-T5 anodized aluminum (standard)

Type 316L Stainless Steel (optional)

Type 1 PVC (optional)

Temperature

Aluminum Elements

350°F continuous operation (in air)

400°F intermittent operation (in air)

Stainless Steel Elements

1600°F continuous or intermittent operation (in air)

PVC Elements

120°F continuous Operation and 170°F intermittent operation (in air)

Note: Corrosive resistant element maximum operating temperatures vary greatly with the concentration of the media in the process stream. Consult factory for further information.

Humidity

All Elements

0 to 100% non-condensing

Corrosion Resistance

Aluminum Elements

Good salt, air, and mild acid gas resistance; excellent solvent and aromatic hydrocarbon resistance

Stainless Steel Elements

Good for sulfates, phosphates and other salts, as well as reducing acids such as sulfuric and phosphoric

PVC Elements

Excellent acid and alkalis resistance (supplied with stainless steel alloy mounting brackets)

Instrument Connections

Aluminum Elements

¼" compression, brass, suitable for use with thermoplastic or copper tubing; thermoplastic tubing requires the use of tubing inserts, which are supplied with the fittings

Stainless Steel Elements

1/8 – 27 Female NPT

PVC Elements

1/8 - 27 Female NPT

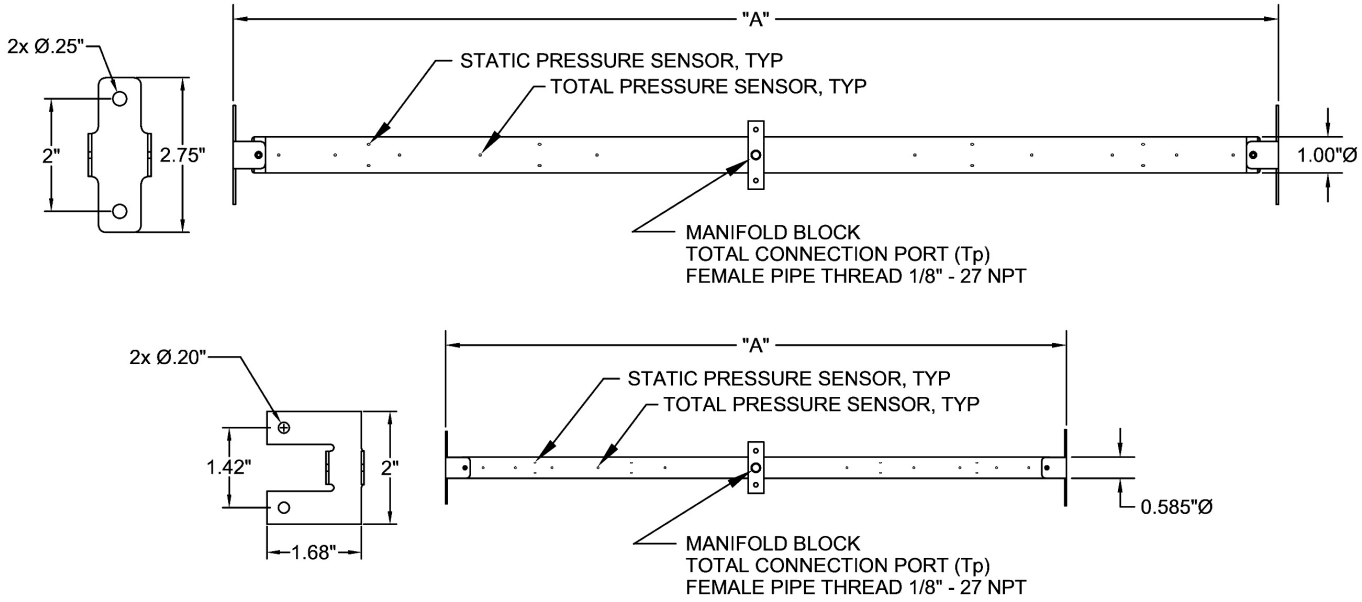
FE-1050 APPLICATION GUIDE

To determine the proper quantity and size of the FE-1050 assembly(s) required, follow the steps listed below:

1. Determine the inlet diameter (12 inch minimum inlet diameter recommended) at the point where the elements will be mounted. The FE-1050 assembly is designed to be installed at the minimum inlet diameter of any fan inlet cone not obstructed by inlet vanes.
2. One set of two elements is required for each inlet. Double inlet fans require two sets of two elements, which are manifolded together by instrument tubing external to the fan.
3. Care should be taken to determine that drive motors, actuator arms, fan shafts, bearing supports, etc., do not directly interfere with the selected mounting location or sensing ports of the elements.

FE-1050 DIMENSIONS

Aluminum Elements

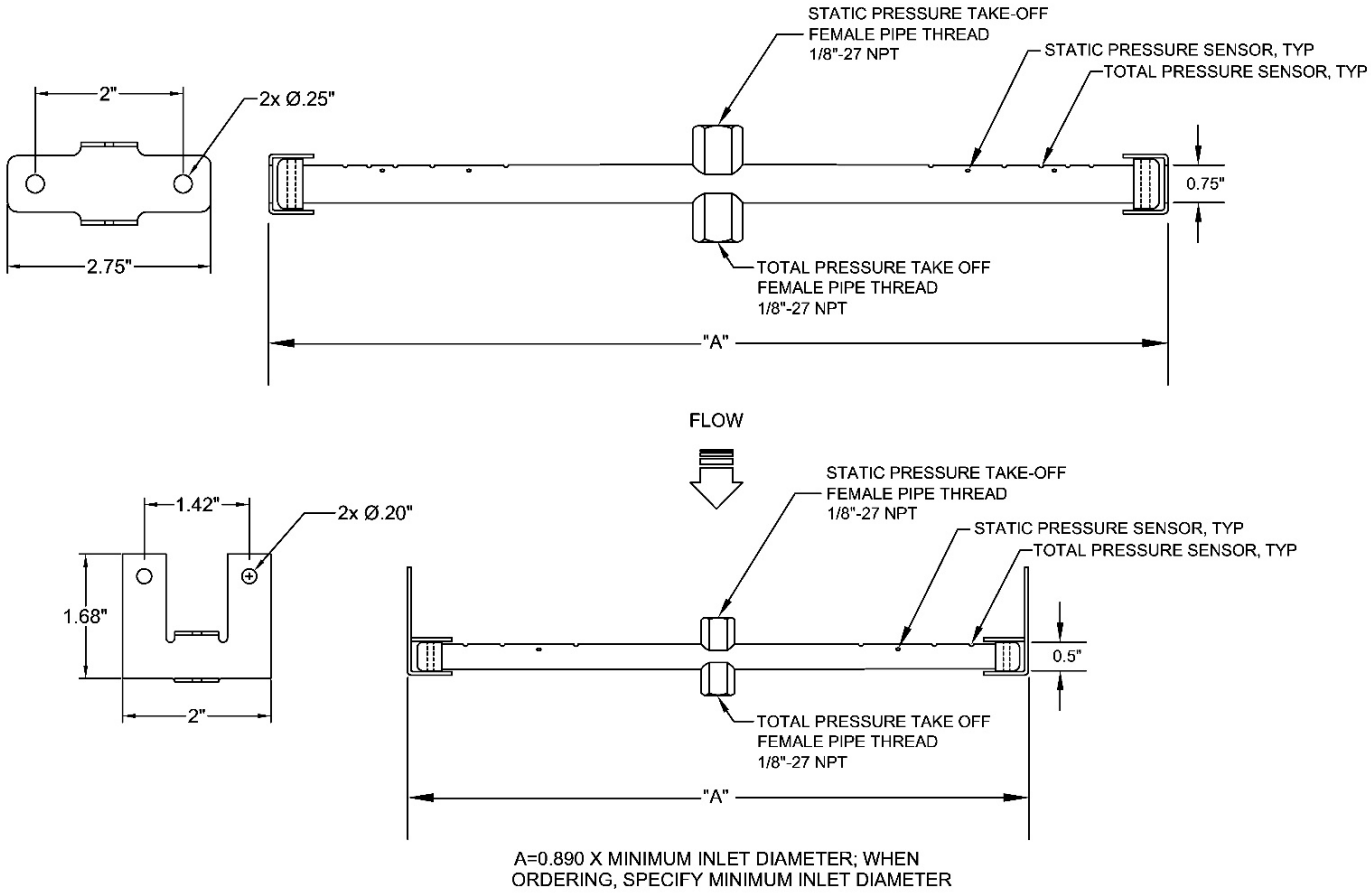


A = 0.89 X MINIMUM INLET DIAMETER; WHEN ORDERING, SPECIFY MINIMUM INLET DIAMETER

Note: The 0.585 inch diameter probe is used for minimum fan inlets less than or equal to 28.5 inches and the 1 inch diameter probe is used for minimum fan inlets greater than 28.5 inches. Aluminum elements come with brass ¼" compression 90-degree elbow fittings installed in the manifold block.

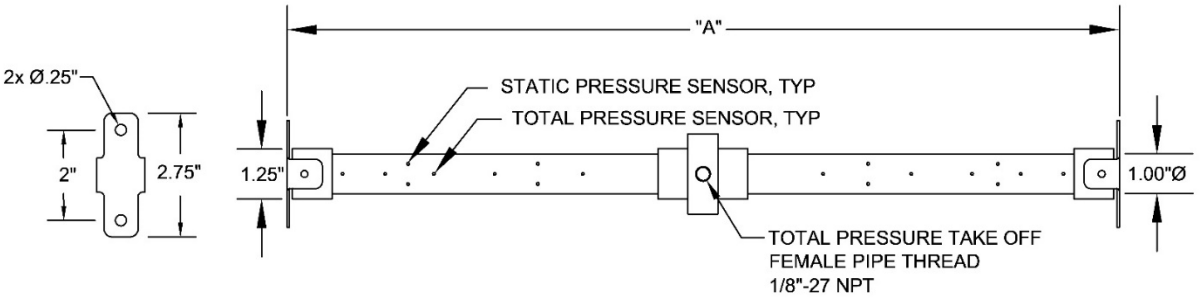
FE-1050 DIMENSIONS

Stainless Steel Elements



A=0.890 X MINIMUM INLET DIAMETER; WHEN ORDERING, SPECIFY MINIMUM INLET DIAMETER

PVC Elements



A = 0.89 X MINIMUM INLET DIAMETER; WHEN ORDERING, SPECIFY MINIMUM INLET DIAMETER

FE-1050 SPECIFICATION GUIDE

Airflow Measurement Stations

1. Provide where indicated and/or scheduled airflow traverse elements capable of continuously monitoring the fan or duct air volumes they serve.
2. Each element shall be designed and built to comply with, and provide results in accordance with, accepted practice for duct system traversing as defined in the ASHRAE Handbook of Fundamentals, AMCA publication #203, as well as the Industrial Ventilation Handbook. The number of sensing ports on each element, and the quantity of elements utilized at each installation, shall comply with ASHRAE Standard #111 for equal area duct traversing.
3. Each element shall be of a dual integral chambered design. Each airflow measuring element shall contain multiple total and static pressure sensing ports placed along the leading edge of the cylinder. The static pressure chamber shall incorporate dual offset static taps on opposing sides of the averaging chamber, so as to be insensitive to flow angle variations of as much as ± 20 degrees in the approaching air stream.
4. The airflow traverse elements shall be capable of producing steady, non-pulsating signals of true total and static pressure, with an accuracy of 2% of actual flow for operating velocities as low as 180 feet per minute (fpm). Signal amplifying sensors requiring flow correction (K factors) or field calibration are not acceptable.
5. The airflow traverse elements shall not induce a measurable pressure drop, greater than 0.18 inch at 4,000 fpm. The units shall have a self-generated sound rating of less than NC40 and the sound level within the duct shall not be amplified, nor shall additional sound be generated.
6. Where mounted into controllable pitch axial inlet bells, or cones on centrifugal fans, the traverse probe assemblies shall be complete with all necessary pivoting mounting plates. Eight mounting bolts, lock washers and nuts; interconnecting tubing and compression fittings to be provided by the installing contractor.
7. Primary flow elements shall not be used on fan inlet applications where the narrowest diameter of the inlet cones is less than 12 inches without prior approval. Fan inlet sensors shall not be used on fans having inlet guide vanes. The use of only one static element and one total pressure element on fan inlets is prohibited. Fan primary elements shall not exceed 0.585 inch in diameter on fans having inlet cone diameters less than 28 inches.
8. Where primary flow elements are located outside of the manufacturer's published installation guidelines the manufacturer shall be consulted and approve of any special configurations.

Installation Considerations

1. Primary flow elements shall be installed in strict accordance with the manufacture's published requirements. These elements serve as the primary signals for the airflow systems; it shall be the responsibility of the contractor to verify correct installation to assure that accurate primary signals are obtained.
2. An identification label shall be placed on each primary flow element listing the model number, system served, size and identifying tag number.

Manufacturer

1. Fan inlet airflow measuring elements shall be Paragon Controls Inc. Model FE-1050 or equal as approved by the Engineer.

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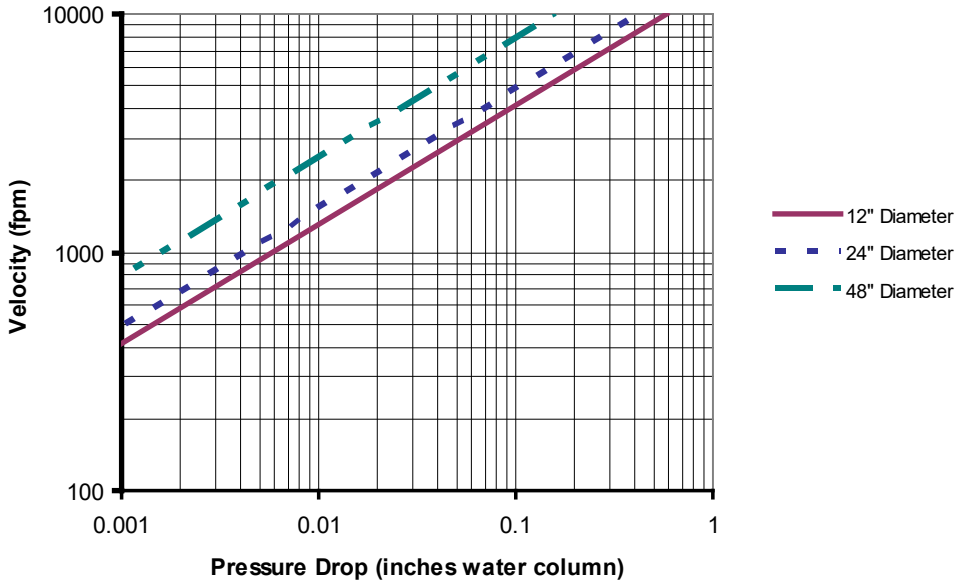
FE1050 Fan Inlet Airflow Measuring Element

FE-1050 RESISTANCE TO AIRFLOW