

## **FE-1500 DUCT MOUNTED AIRFLOW MEASUREMENT STATION**

### **DESCRIPTION**

The **FE-1500** airflow measurement station consists of single or multiple airflow elements, factory mounted and pre-piped in an 8 inch deep casing, designed for flanged connection to the ductwork.

The airflow averaging element, utilized in the FE-1500, is a head type device, which generates a differential (velocity) pressure signal similar to the orifice, venture, and other head producing primary elements. The **FE-1500** is constructed so that strategically located sensing ports (based on duct size) continually sample the total and static pressures, when inserted normal to flow. The total pressures sensed by the upstream ports are continually averaged within the element in an isolated chamber. The static sensing ports (located where the influence of the velocity head is zero) are averaged in a second isolation chamber. Multiple elements are manifolded together for connection to a differential measurement device (gauge, transmitter, etc.) for flow measurement and indication purposes.

### **Features**

- Low signal-to-noise ratio
- Multiple total and static pressure sensing ports along the length of the element
- Factory mounted and pre-piped in an 8 inch deep casing
- Averaging internal manifold
- $\pm 2\%$  accuracy throughout the velocity ranges of 100 fpm and over
- Available in two materials; 6063-T5 aluminum with anodized finish and Type 316 stainless steel
- Aluminum elements can be operated continuously in temperatures up to 350°F or intermittently in temperatures up to 450°F
- Stainless steel elements can be operated continuously in temperatures up to 1650°F
- Both types of elements can be operated in humidity ranges of 0 to 100%
- Aluminum elements have good salt air and mild acid resistance; excellent solvent and aromatic hydrocarbon resistance
- Stainless steel elements have good sulfate, phosphate, salt, and reducing acid resistance

## FE-1500 Specifications

- 1. Accuracy**  
Within 2% of actual flow when installed in accordance with published recommendations
- 2. Operating Velocity Range**  
100 to 10,000 fpm
- 3. Material**  
*Probe*  
6063-T5 anodized aluminum (standard)  
Type 316 stainless steel (optional)  
*Casing*  
14 ga Type 304 stainless steel with integral formed blind flanges
- 4. Temperature**  
*Aluminum Elements*  
350°F continuous operation  
400°F intermittent operation  
*Stainless Steel Elements*  
1650°F continuous operation, depending upon corrosive conditions of the service
- 5. Humidity**  
*All Elements*  
0 to 100% non condensing
- 6. 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 sulphurous and phosphoric
- 7. Connection Fittings**  
*Aluminum Elements*  
¼" compression, suitable for use with thermoplastic or copper tubing  
*Stainless Steel Elements*  
¼" Type 316 stainless steel compression

## Casing Construction

### CIRCULAR

16 gage galvanized casing, 8 inches deep, with attached 90° connecting flanges as listed below:

CIRCULAR FLANGE DIMENSIONS		
STATION SIZE	FLANGE THICKNESS	FLANGE SIZE
6" – 15"	0.064	1"
16" – 39"	0.064	1½"
40" – 72"	0.188	1½"
73" & Over	0.188	2"

### RECTANGULAR

16 gage galvanized casing, 8 inches deep, with formed integral 90° connecting flanges as listed below:

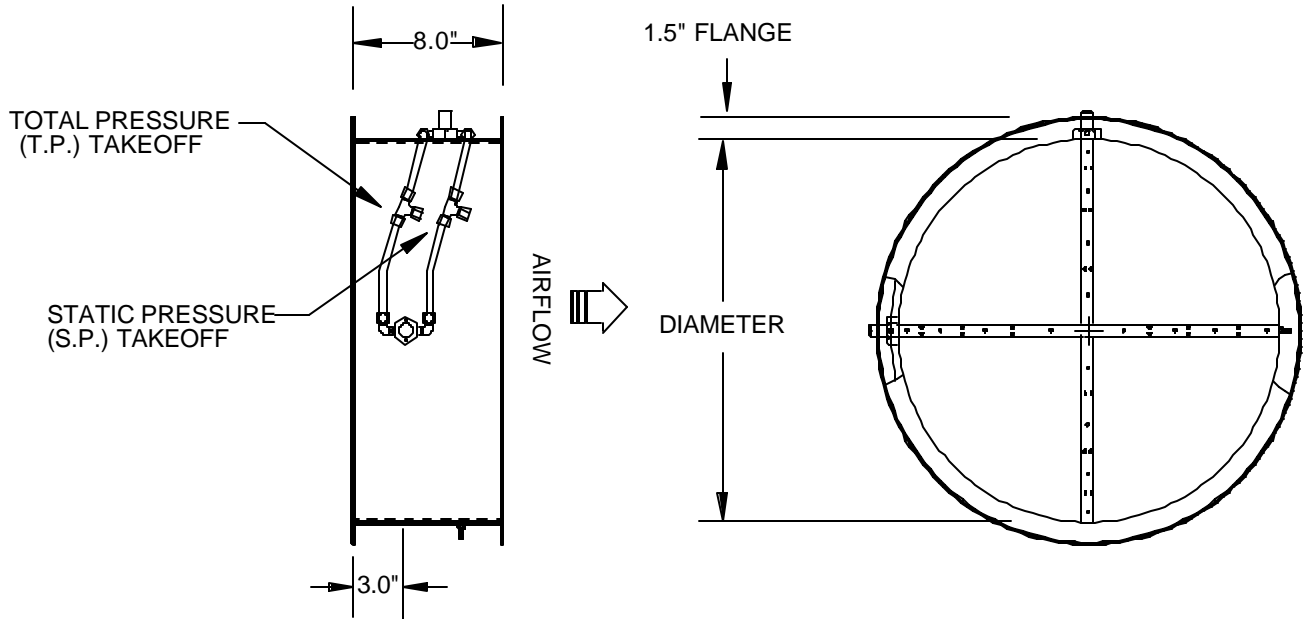
RECTANGULAR FLANGE DIMENSIONS	
STATION SIZE	FLANGE SIZE
8" – 72"	1½"
73" & Over	2"

### OVAL

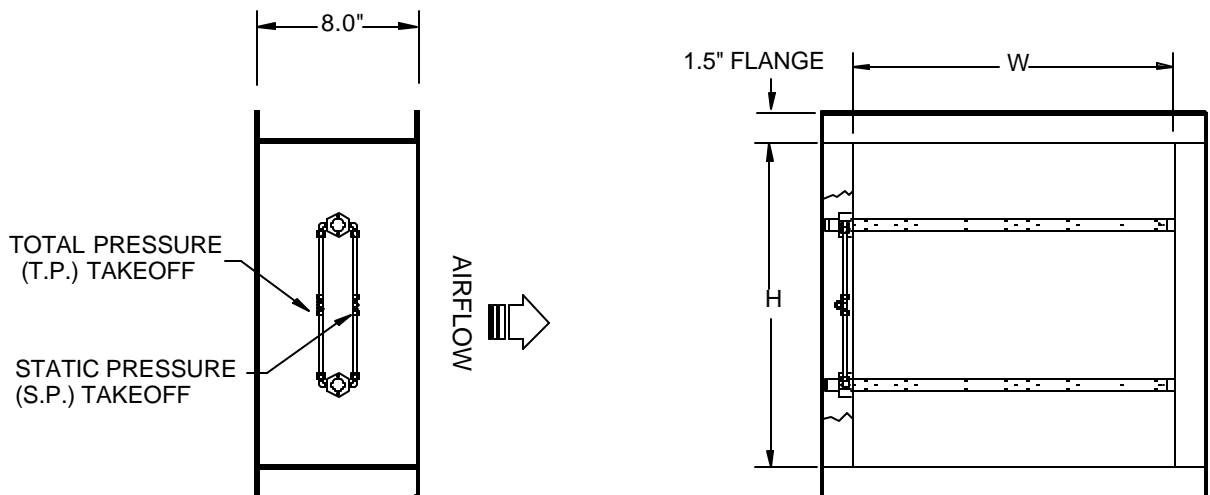
18 gage galvanized casing, 8 inches long between beads with 1 inch connecting sleeve on each end (10 inch overall length). Actual O.D. dimensions are ¼ inch less than specified duct I.D. dimensions.

**Dimensions**

*Circular Stations*

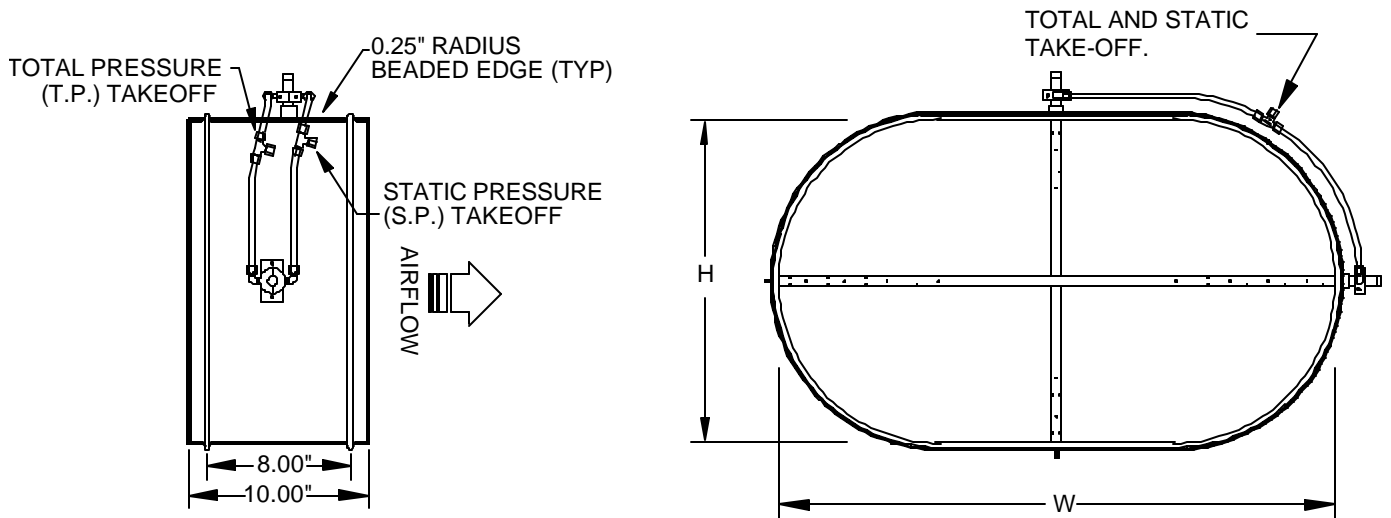


*Rectangular Stations*



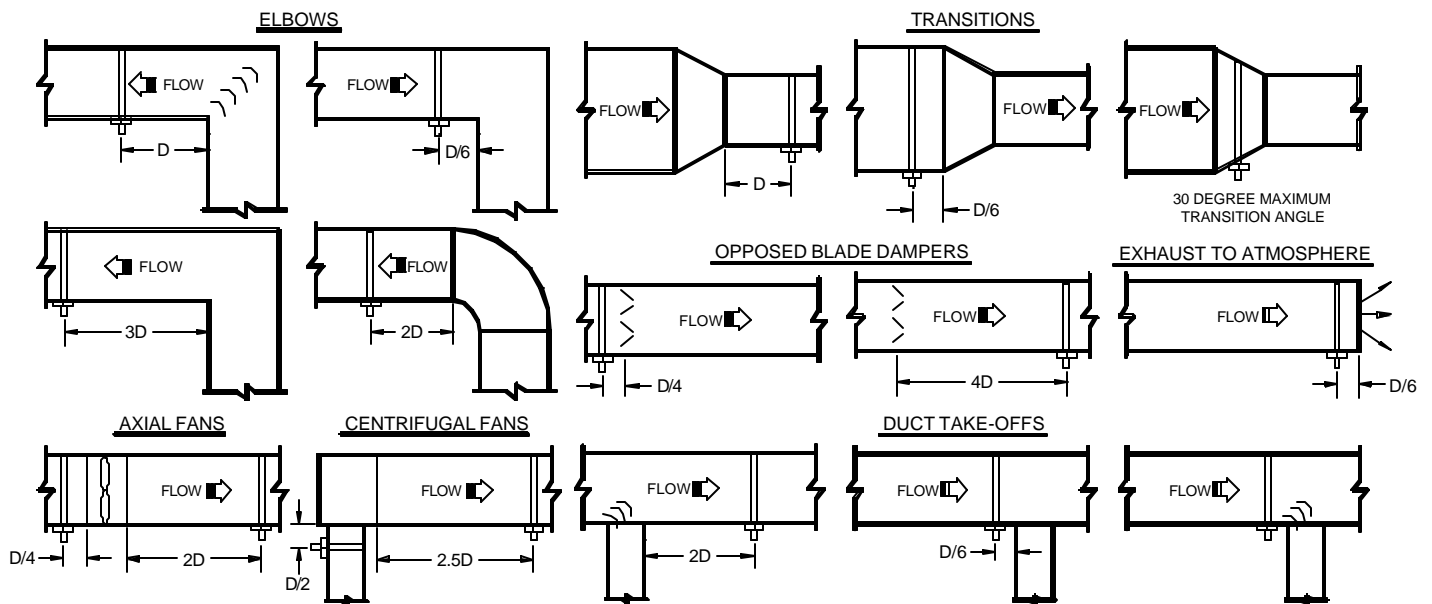
## Dimensions (Continued)

### Oval Stations



## Minimum Installation requirements

The elements may be installed in any duct configuration. However, the accuracy of the installation is dependent on the flow conditions in the duct. The minimum installation requirements for the elements based upon a uniform velocity profile approaching the duct disturbance for flow rates less than 2,500 fpm are shown below. Add one duct diameter to the installation requirements shown below for each additional flow rate of 1,000 fpm. These are not ideal locations. It is always best to locate the elements as far as possible from all duct disturbances, with upstream disturbances being the most critical consideration.



**Notes:**

Round Ducts:

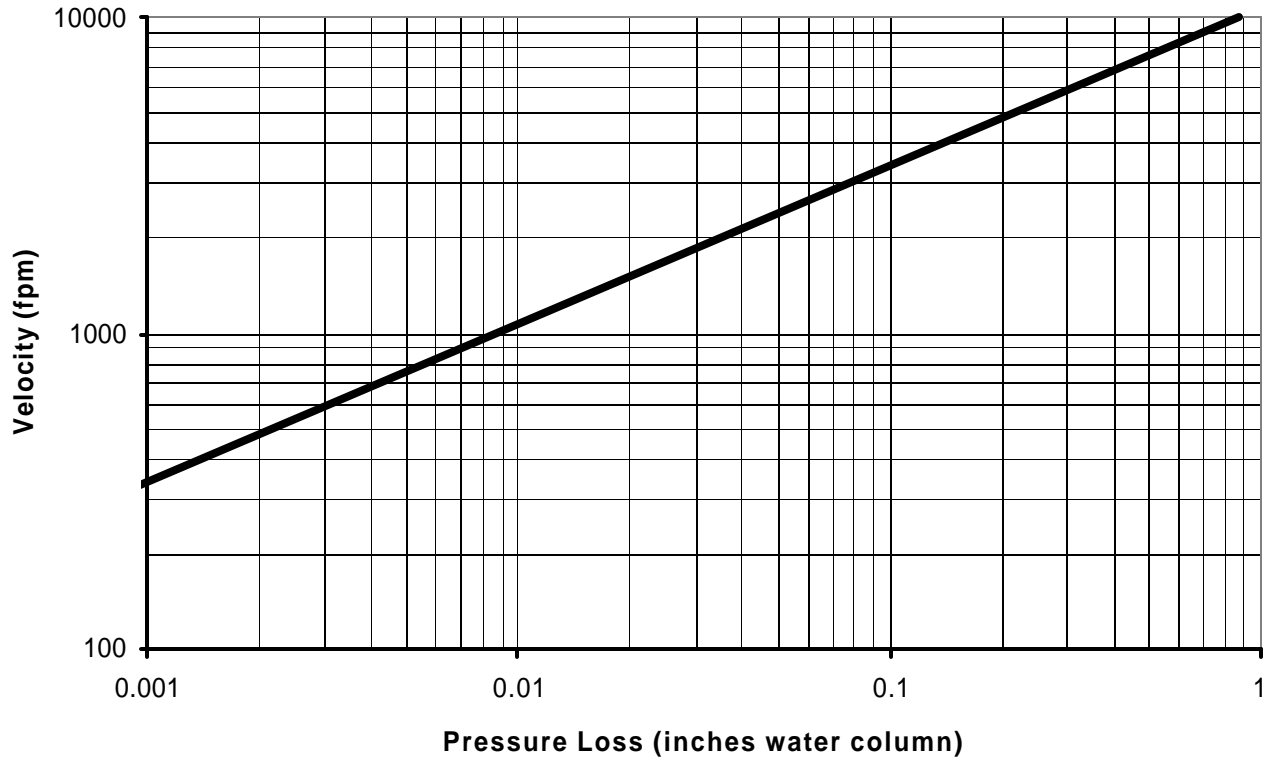
D = Duct diameter

Rectangular Ducts:

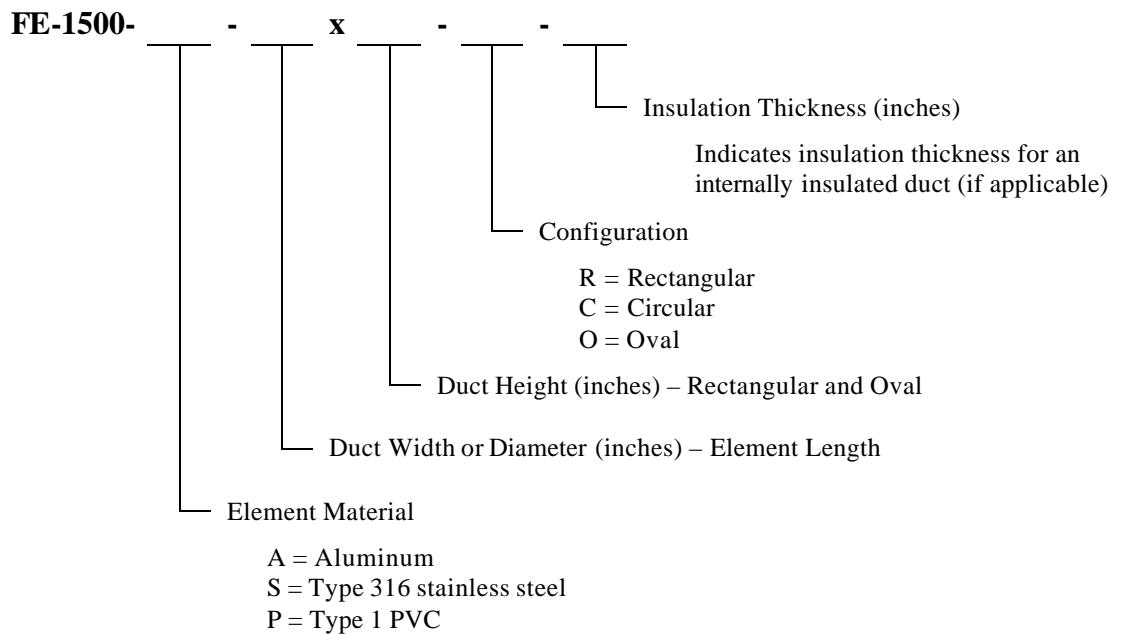
$$D = \sqrt{\frac{4HW}{p}}$$

H = Height      W = Width

## Resistance to Airflow



## Ordering Information



## 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  $\pm 20$  degrees in the approaching airstream.
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) for 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. The probes shall be mounted in an eight inch deep, 16 gauge galvanized steel casing with 90 degree undrilled flanges, fabricated to the duct size, and shall contain multiple airflow traverse elements interconnected as herein before described.
7. 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, such as air equalizers and/or additional and strategically placed measuring points, as may be required.
8. Where the stations are installed in insulated ducts, the airflow passage of the station shall be the same size as the inside airflow dimension of the duct. Station flanges shall be sized to facilitate matching connecting ductwork.

### Installation Considerations

1. Primary flow elements shall be installed in strict accordance with the manufacture's published requirements and with ASME guidelines effecting non-standard approach conditions. 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 unit casing listing model number, size, area, and specified airflow capacity.

### Manufacturer

1. Airflow measurement stations shall be Paragon Controls Inc. Model FE-1500 or equal as approved by the Engineer.
2. Naming of a manufacturer does not automatically constitute acceptance of this standard product nor waive the responsibility of the manufacturer to comply totally with all requirements of the proceeding specification.