



FE1500 Airflow Measurement Station

- ✓ ±2% Accuracy
- ✓ Pre-Piped, Pre-Assembled, and Factory Tested
- ✓ Application Specific Materials; Fully Customizable
- ✓ Simple Installation Procedure

FE1500 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 a casing designed for flanged connection to the ductwork. Standard materials consist of a G90 galvanized casing and 6063-T5 anodized aluminum flow sensors, suitable for most HVAC applications.

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, venturi, 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.

Additional 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 a flanged duct section (casing)
- ±2% accuracy throughout the velocity ranges of 100 fpm and over
- Standard construction includes a galvanized casing and 6063-T5 anodized aluminum flow sensors
- Available in optional corrosive or high temperature resistance materials including 316L stainless steel
- Standard airflow stations can be operated (in air) continuously in temperatures up to 350°F or intermittently in temperatures up to 400°F
- All airflow stations can be operated in humidity ranges of 0 to 100%
- Standard airflow stations have good salt air resistance and are suitable for most HVAC applications

SPECIFICATIONS

Accuracy

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

Operating Velocity Range

100 to 10,000 fpm

Material

Elements

6063-T5 anodized aluminum (standard)
Type 316L Stainless Steel (optional)

Casings

16 ga G90 galvanized steel (standard)
16 ga Type 316L stainless steel (optional)

Temperature

Galvanized Casings and Aluminum Elements

350°F continuous operation (in air)
400°F intermittent operation (in air)

Stainless Steel Casings and Elements

Type 316L -1600°F continuous or intermittent operation (in air)

Note 1: 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 Airflow Stations

0 to 100% non-condensing

Corrosion Resistance ^{Note 1}

Galvanized Casings

Widely used for most air handling systems; not recommended for corrosive atmospheres

Note: Circular galvanized casings greater than 45" in diameter will be supplied with A36 steel flanges, not G90 galvanized steel.

Aluminum Elements

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

Stainless Steel Elements and Casings

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

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

FE-1500 CASING CONSTRUCTION

Circular Stations

Standard circular airflow measuring stations include a 16-gauge galvanized casing with attached 90° connecting flanges as listed below:

Circular Flange Dimensions			
Station Size	Flange Thickness	Flange Size	Casing Length "L"
6" - 15"	0.064"	1"	6"
16" - 44"	0.064"	1½"	6"
45" - 72"	0.188"	1½"	10"
73" & Over	0.188"	2"	12"

Note: Flanges on stations ≥45" will be a A36 steel rings coated with cold galvanizing compound touch-up paint.

Rectangular Stations

Standard rectangular airflow measuring stations include a 16-gauge galvanized casing, 5 inches long, with formed integral 90° connecting flanges as listed below:

Rectangular Flange Dimensions	
Station Size	Flange Size
8" - 72"	1½"
73" & Over	2"

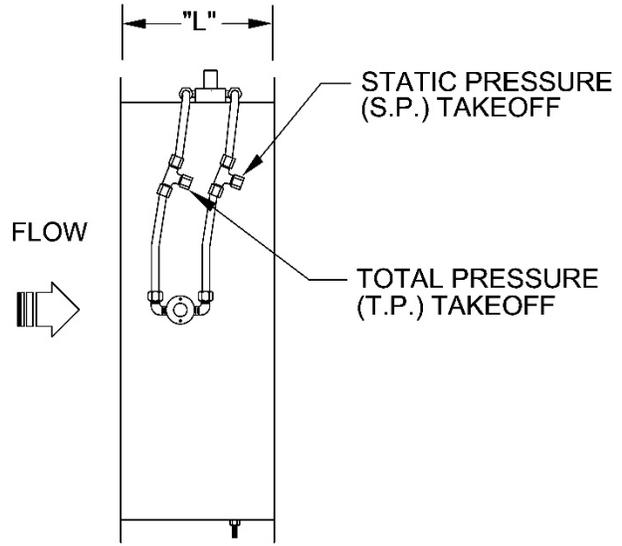
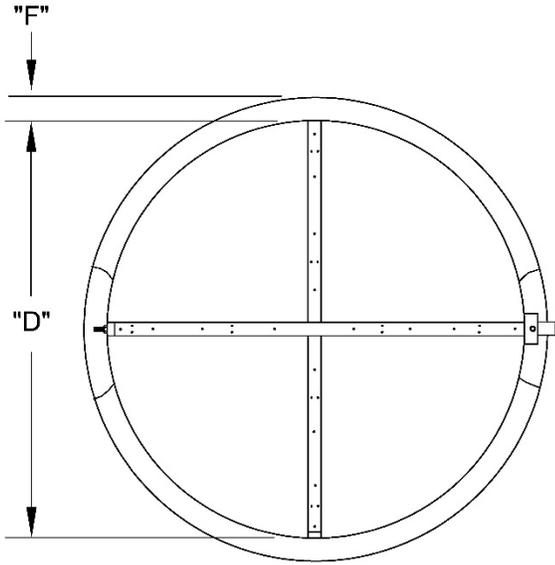
Oval Stations

Standard oval airflow measuring stations include an 18-gauge galvanized casing, 5 inches long between beads with 1 ¼ inch connecting sleeve on each end (7 ½ inch overall length). Actual O.D. dimensions are ¼ inch less than specified duct I.D. dimensions:

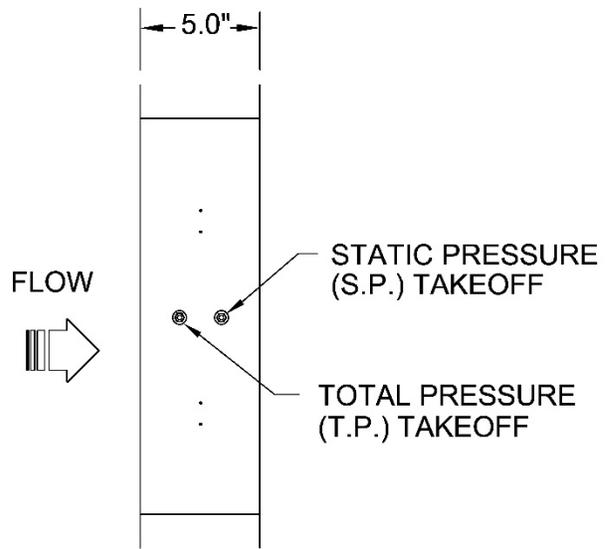
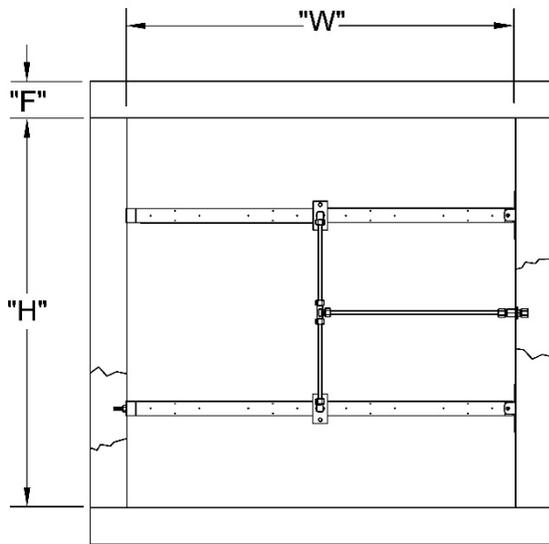
Oval Flange Dimensions (Optional)			
Station Width	Flange Thickness	Flange Size	Casing Length "L"
Up to 48"	0.064"	1½"	6"
Over 48"	0.188"	1½"	8"

FE-1500 DIMENSIONS

Circular Stations

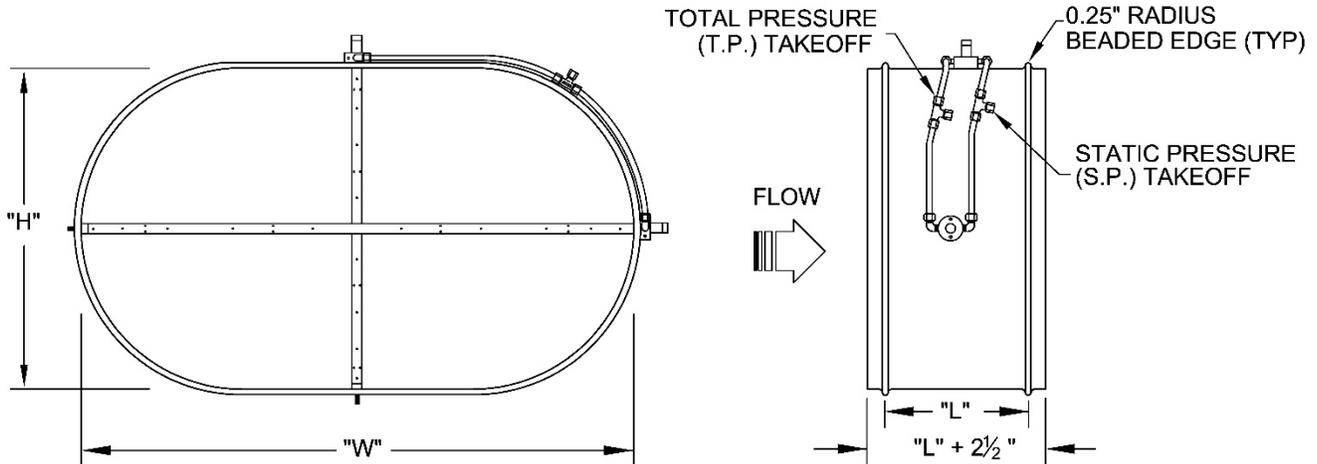


Rectangular Stations



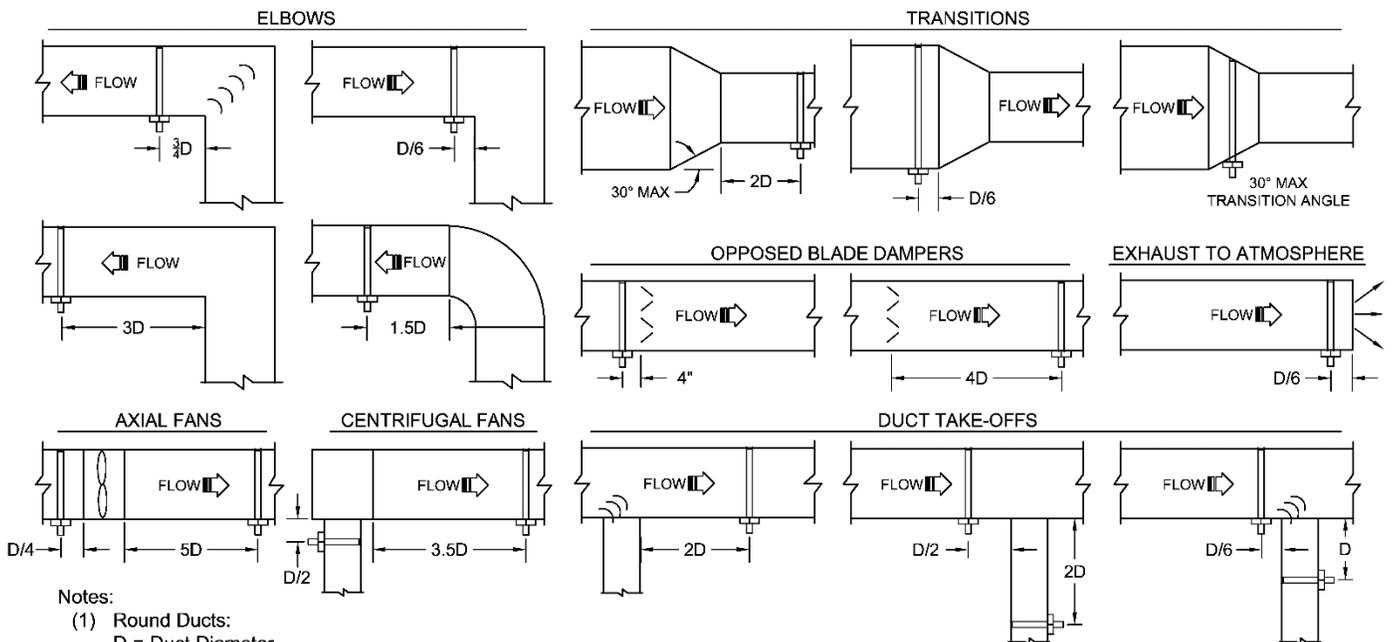
FE-1500 DIMENSIONS (Continued)

Oval Stations



FE-1500 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:

- (1) Round Ducts:
D = Duct Diameter
- (2) Rectangular Ducts:

$$D = \sqrt{\frac{4HW}{\pi}} \quad H = \text{Duct height} \quad W = \text{Duct Width}$$

FE-1500 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. 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

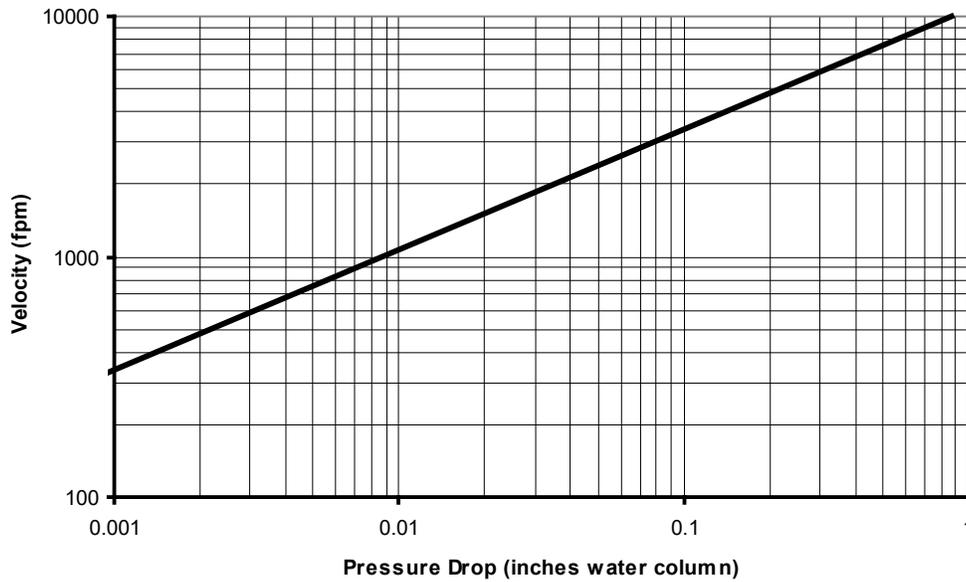
1. Primary flow elements shall be installed in strict accordance with the manufacture's published requirements and with ASME guidelines effecting non-standard approach conditions. These elements serve as the primary signals for the airflow systems; it shall be the responsibility of the contractor to 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.

FE1500 Airflow Measurement Station

FE-1500 RESISTANCE TO AIRFLOW



NIST

