

FE-1500

AIRFLOW MEASUREMENT STATIONS

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, 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.

INSTALLATION GUIDELINES

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 in Figure 1.

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.

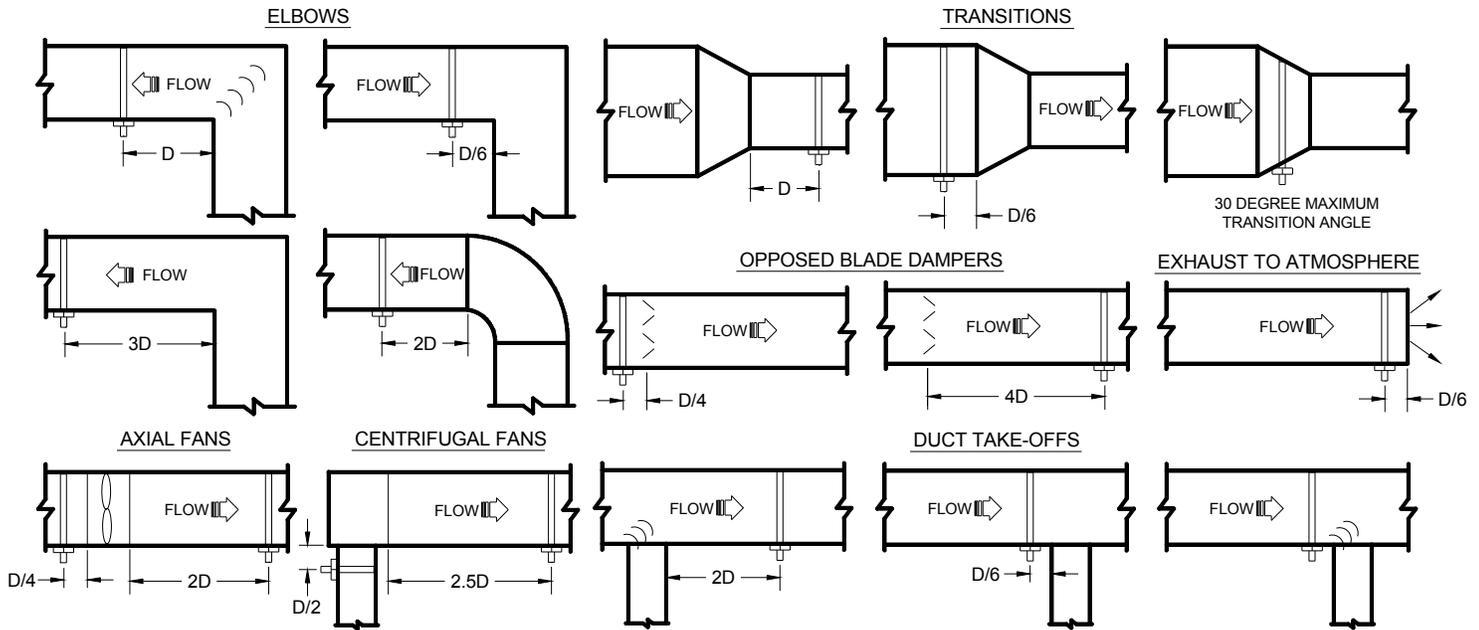


FIGURE 1

Round Ducts:

D = Duct diameter

Rectangular Ducts:

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

OPERATION

The FE-1500 airflow measuring elements produce pneumatic output signals referred to as total (high) and static (low) pressure. These two pressures are piped to a differential pressure sensing device (i.e. magnehelic, transducer, etc.) where the static pressure is subtracted from the total and the result indicated as velocity pressure. This measured differential pressure is equal to the average velocity of the air stream moving through the plane that the flow elements are located in.

This signal can be converted to air volume using the following equations:

$$V = \frac{Q}{A}$$

$$P_v = \left(\frac{V}{C}\right)^2 \times \rho$$

Where:

V = Velocity, in fpm

Q = Flow, in cfm

A = Area, in ft²

C = 1096.7

ρ = Density of air, in lb/ft³

P_v = Velocity pressure, in inches H₂O

MAINTENANCE

Since the sensing elements have no moving parts, only periodic cleaning may be required. The sensing elements should be inspected for fouling of the sensing holes as part of an annual preventative maintenance program. Installations having viscous airborne particles may require more frequent inspection. If the sensing holes on the elements have become fouled or plugged, the following procedure is recommended. **Caution, all instruments must be isolated (removed) from the sensing lines prior to performing the following cleaning procedure.**

Backpurging: Connect clean/dry compressed air, set at a maximum pressure of 25 psi, to the output pressure ports (total and/or static) of the sensing element being cleaned. While purging the sensing element, wipe the surface of the cylinder with a cloth or brush to loosen and remove all contaminant buildup.

Cleaning: In applications where the sensing elements are subject to viscous contaminants it is recommended that the surface be washed with a cleaning agent. The cleaning agent used **must** be suitable for use on the type of material the sensing element is constructed of (i.e. aluminum, stainless steel, etc.)

SITE STORAGE, HANDLING, AND SPARE PARTS

The sensing elements must be stored indoors, in the original shipping package, and in a dry place. Failure to do so may result in internal blockage of averaging chambers due to dust migration and/or insect infestation. Although the sensing elements are not fragile by design, care must be taken not to damage or disfigure the cylinder surface when handling and installing.

Particular attention must be given to the surface areas in which sensing ports are located. The sensing elements come as a complete fabricated assembly. **No spare parts are required.**

