

KIP2 FAN INLET AIRFLOW SENSING ELEMENT

The **KIP2** 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, pivot mounting hardware, and signal connection fittings.

INSTALLATION GUIDELINES

FITTING ASSEMBLY PROCEDURE FOR 9/16" DIAMETER ELEMENTS

The total and static pressure connection ports are 1/8 FPT. When making the joint a sealing tape or joint compound **must** be used to assure against leaks (see Figure 1A).

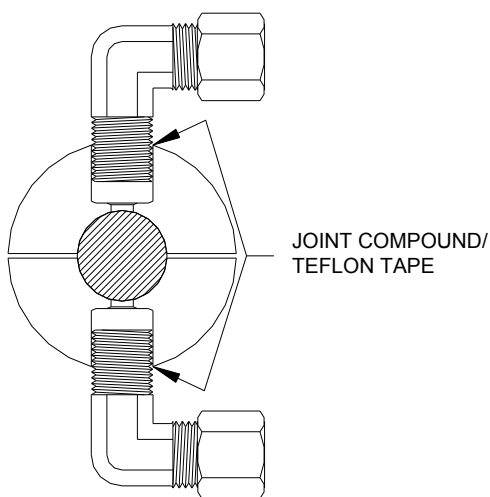


FIGURE 1A

FITTING ASSEMBLY PROCEDURE FOR 1" DIAMETER ELEMENTS

Each element requires the assembly of seat washers (sealers) and port connection fittings as follows:

1. Insert nylon seat washer into take-off port (see Figure 1B). Failure to install the washer may result in erroneous signals.
2. Thread connection fitting into take-off port until hand tight.
3. With wrench, turn connection fitting one half (180 degree) to one full turn (360 degrees) to align fitting parallel to hex block, and achieve proper seating pressure for seal.
4. Joint Compound or Teflon tape should be used to prevent galling of threads.

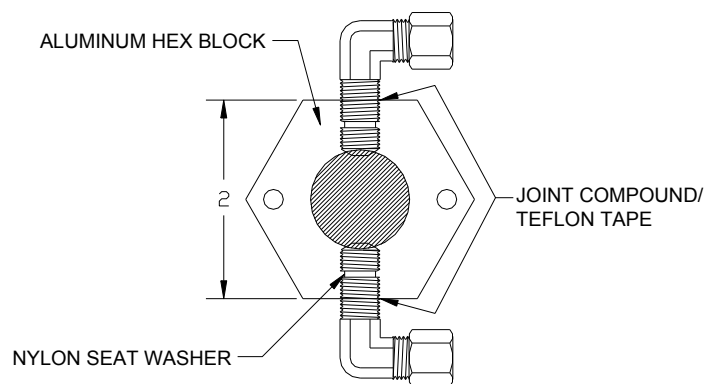


FIGURE 1B



MOUNTING PROCEDURE

The flow elements (2 per fan inlet) must be parallel in one plane, with the sensing holes perpendicular to that plane and facing into the direction of flow with the minimum amount of obstructions from bearing supports, etc.

STEP 1: DETERMINE MOUNTING PLANE

Minimum Inlet: Determine the mounting plane inside the inlet bell of the fan on which the flow elements are to be installed. This will be the smallest diameter of the inlet bell (see Figure 2A and 2B)

Mid Bell Installation: If, for engineering reasons (mechanical interference in plug fans, flow rates beyond recommended use, etc.) the flow elements cannot be installed in the minimum inlet of the fan, they must be relocated to a plane further away. It is crucial that this plane be laid out perpendicular to the flow and has an exact predetermined area. To facilitate this we recommend that a split ring (optional) rolled to the exact diameter of the predetermined plane be fabricated and used as a template (see Figure 3A and 3B).

STEP 2: INSTALL 1ST ELEMENT

Using the flow element to be installed as a mounting hole template, place the element (with pivot mounting brackets attached) on the mounting plane (see Figure 2A

Detail A, Figure 2B Detail C, Figure 3A Detail E, or Figure 3B Detail G). Mark the location for the holes to be drilled. Be sure the outside of the inlet bell is free of obstacles

where the mounting bolts will protrude. Remove the element, drill the mounting holes, and install the element (1/4-20 bolts for 1"; 10-32 bolts for 9/16": Lock-nuts are recommended).

When mounted, the element should be in compression between the pivot mounting brackets (see Figures 4A and 4B). If the element is

installed under tension between the mounting brackets, resonance could possibly occur.

WARNING: Continuous vibration can work harden the brackets, causing cracks and possible failure, damaging both your flow elements and fan. Scheduled inspection for wear or cracks (indicating vibration) should be done every 6 months.

STEP 3: INSTALL 2ND ELEMENT

Place the other flow element on the same plane as the first element, rotating it until both elements are parallel. Mark the location for the holes to be drilled. Remove the element, drill the mounting holes, and install the element.



Once both elements are mounted and confirmed to ***NOT*** be in tension the end bracket pivot bolts can be tightened.

STEP 4: SIGNAL CONNECTION

Signal tubing connections must come off at 90 degrees to the element (see Figures 2A and 2B), and maintain a minimum 2" clearance from the element when run parallel to the element.

At no time should the signal tubing obstruct any of the total or static pressure impact ports on the element.

WARNING: For 1" elements do not rotate fittings for realignment.

Rotating fittings will cause damage to the seat washer. If fittings need to be realigned, follow the assembly procedure on page 1. Note: new seat washers are required for realignment.



STANDARD MINIMUM INLET INSTALLATION FOR 0.585" DIAMETER ELEMENTS

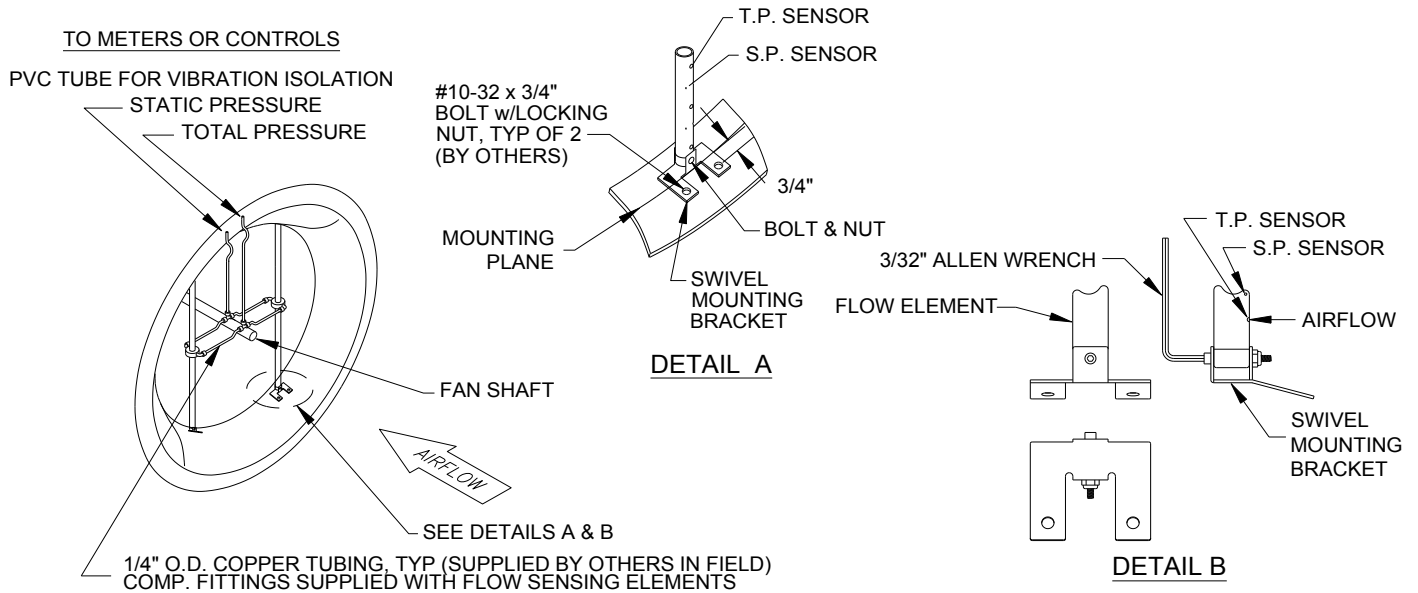


FIGURE 2A

STANDARD MINIMUM INLET INSTALLATION FOR 1" DIAMETER ELEMENTS

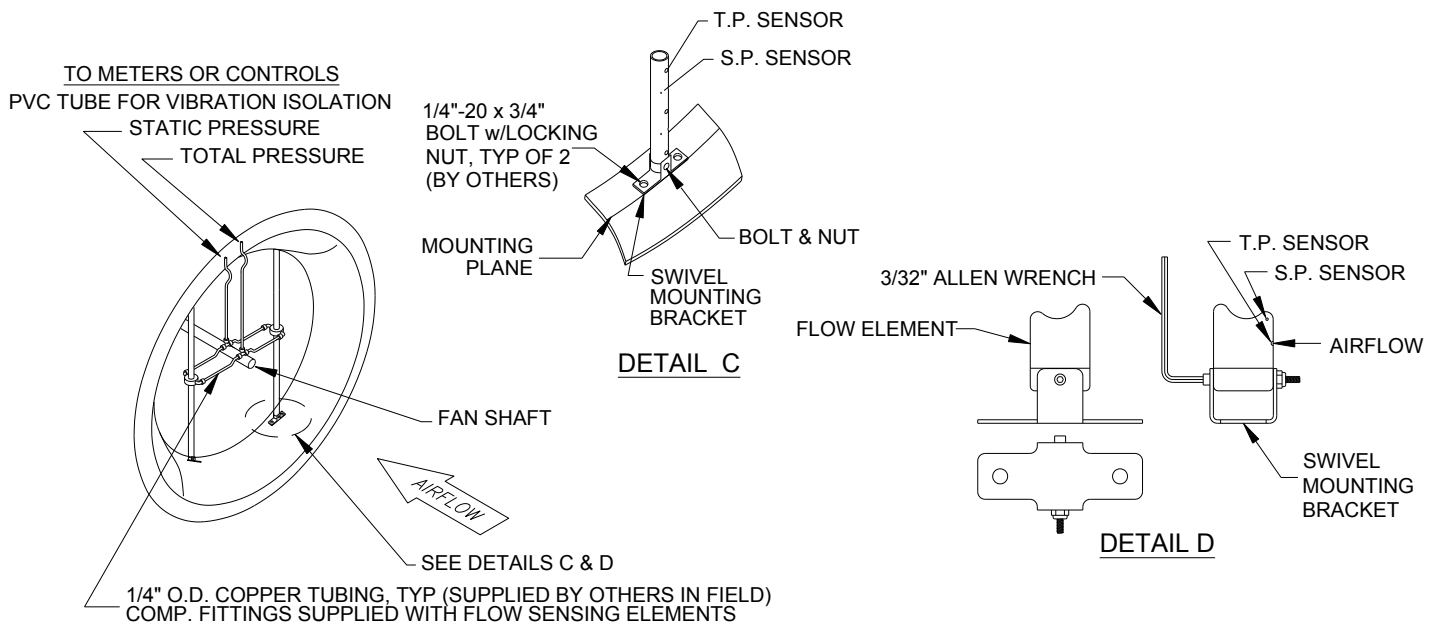
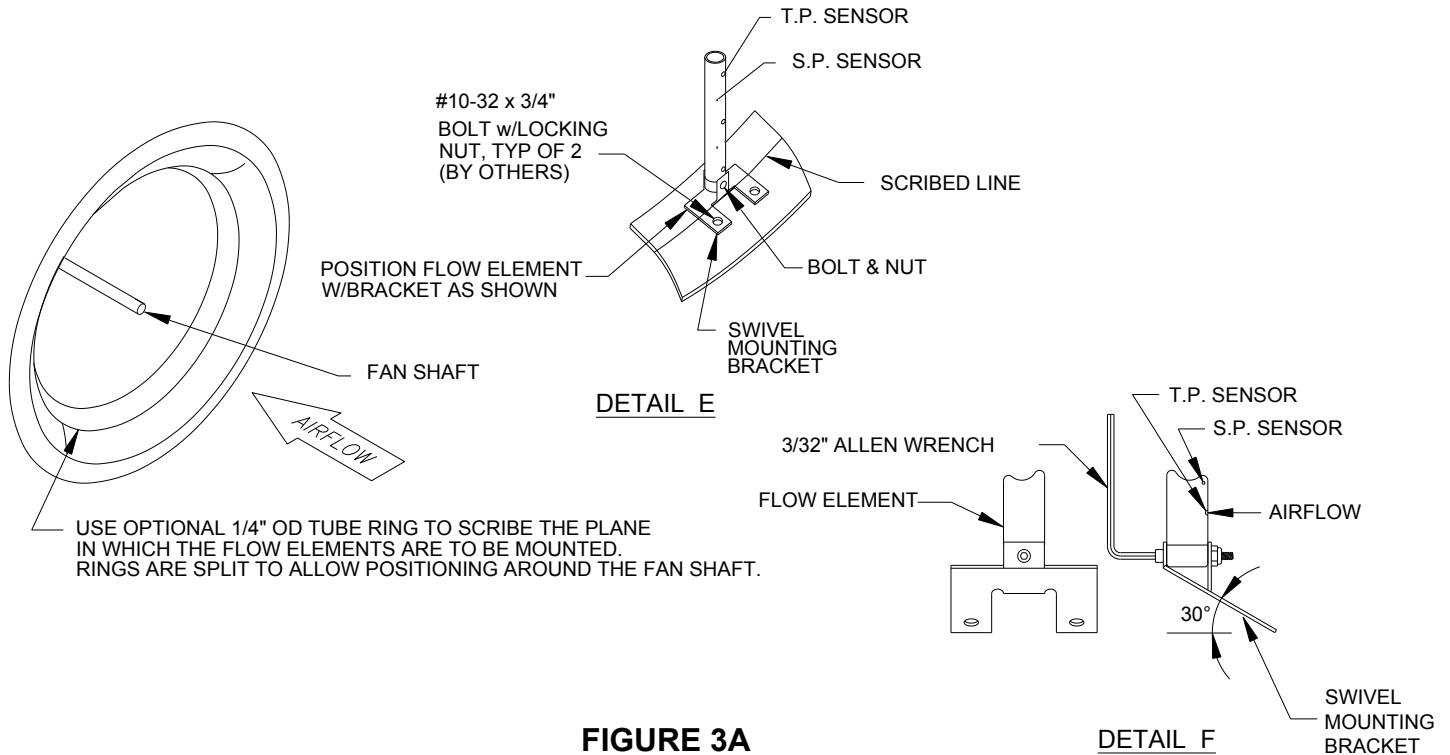


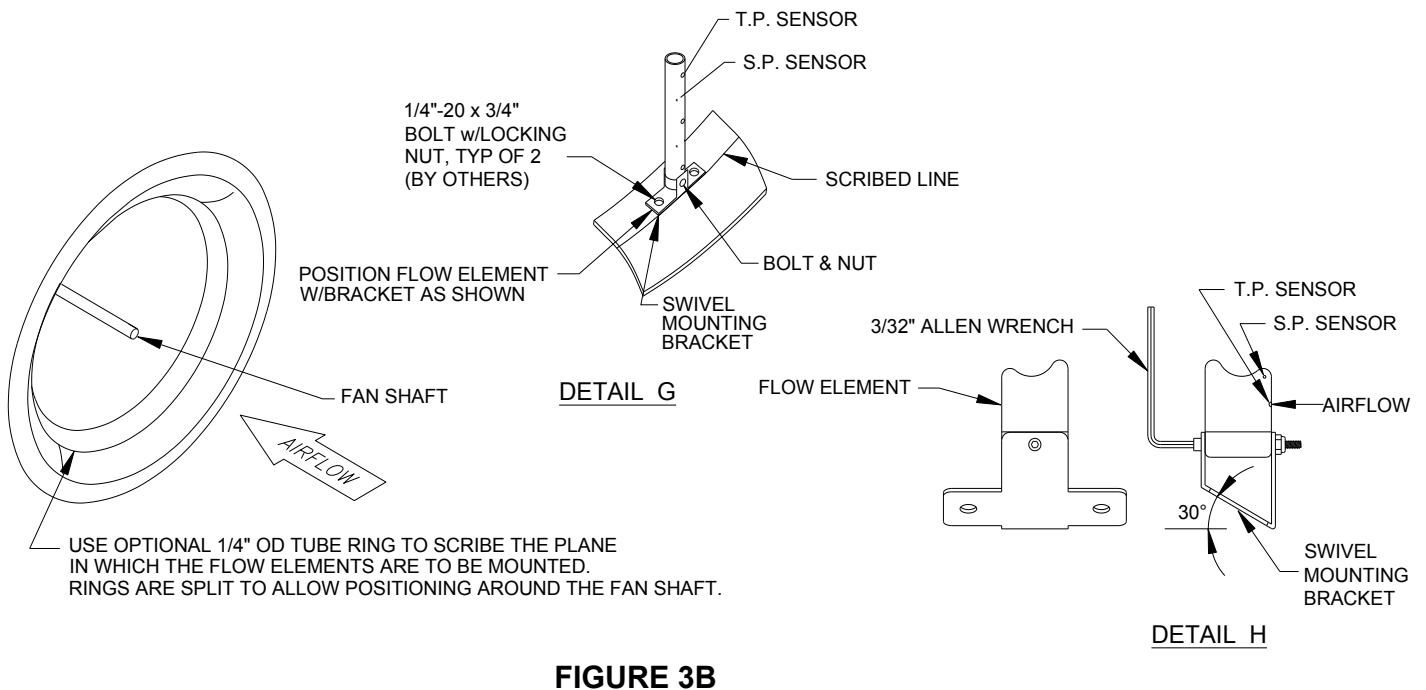
FIGURE 2B



MID-BELL INSTALLATION FOR 0.585" DIAMETER ELEMENTS



MID-BELL INSTALLATION FOR 1" DIAMETER ELEMENTS



SENSORS IN COMPRESSION FOR 0.585" DIAMETER ELEMENTS

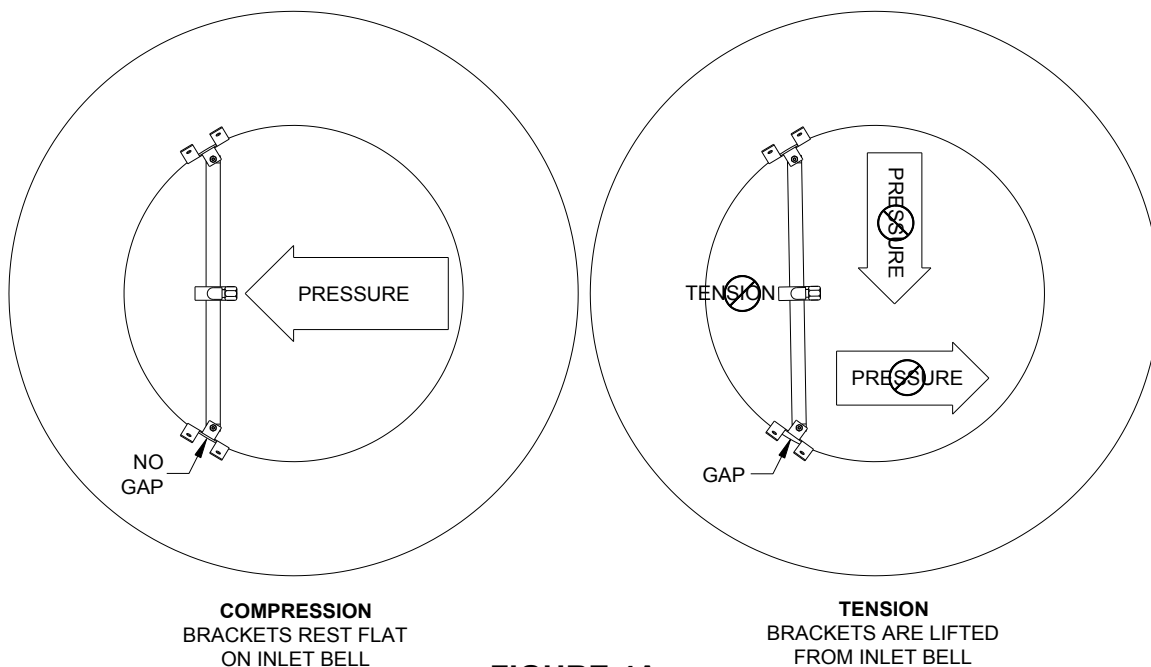


FIGURE 4A

SENSORS IN COMPRESSION FOR 1" DIAMETER ELEMENTS

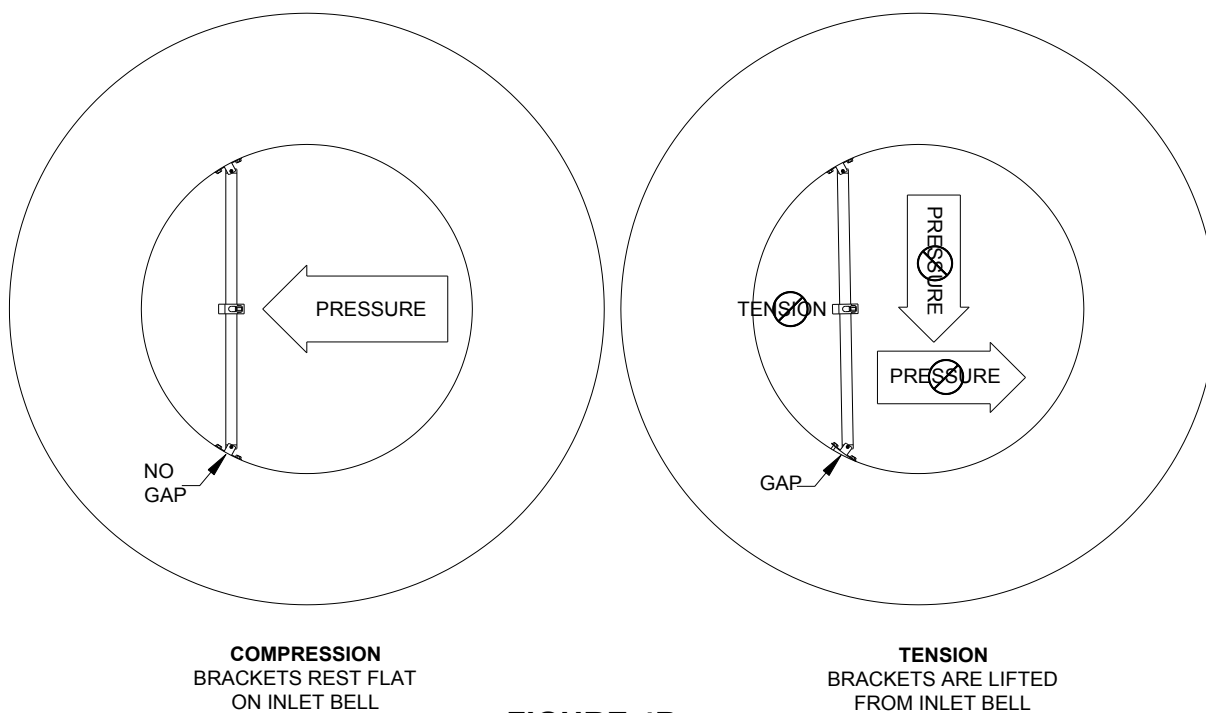
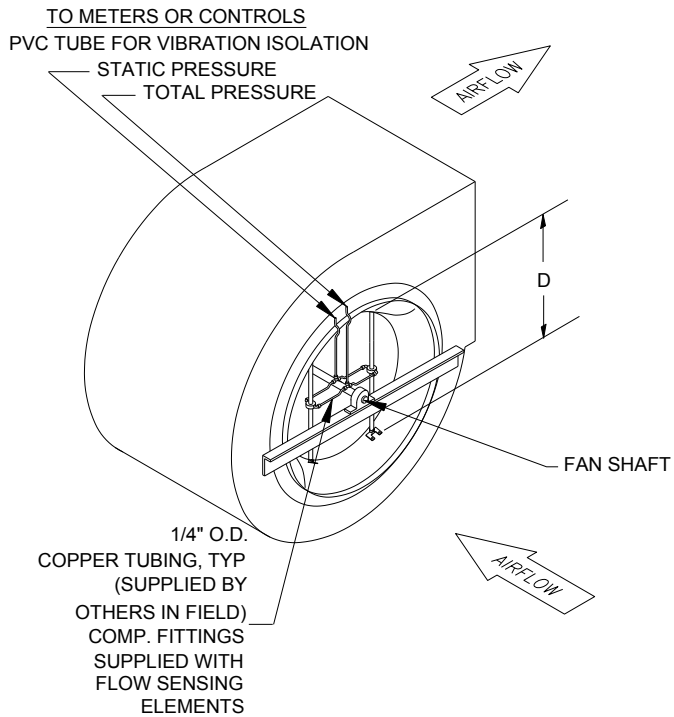


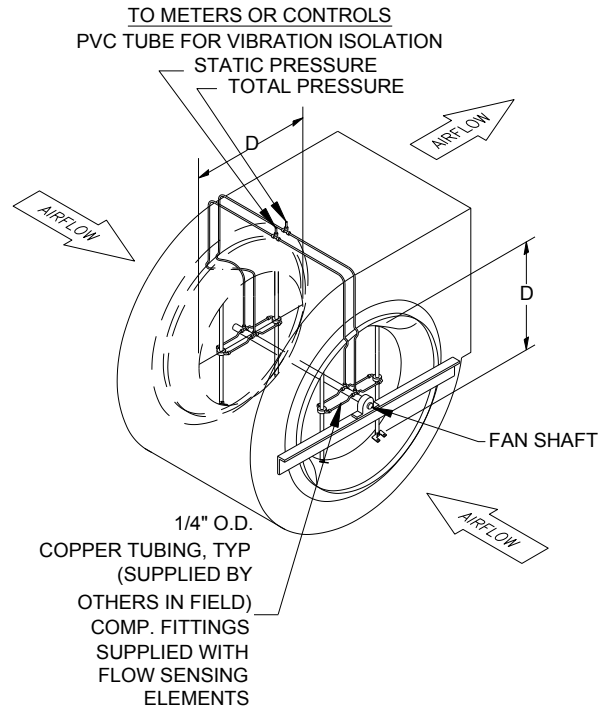
FIGURE 4B

SAMPLE INSTALLATION CONFIGUREATIONS

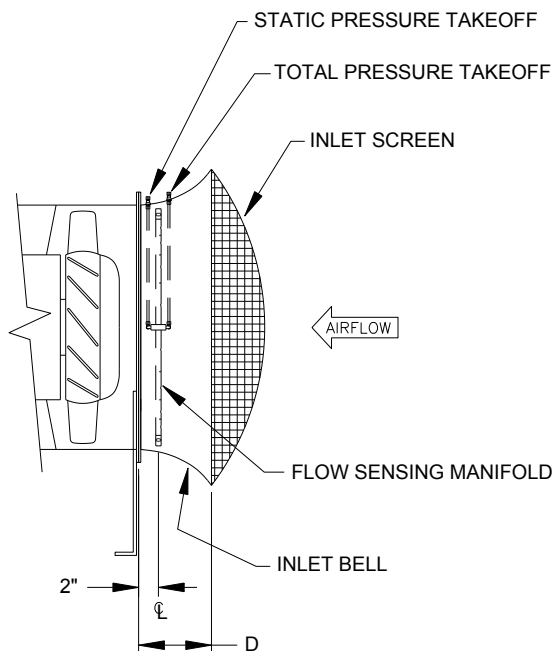
SINGLE WIDE/SINGLE INLET FAN



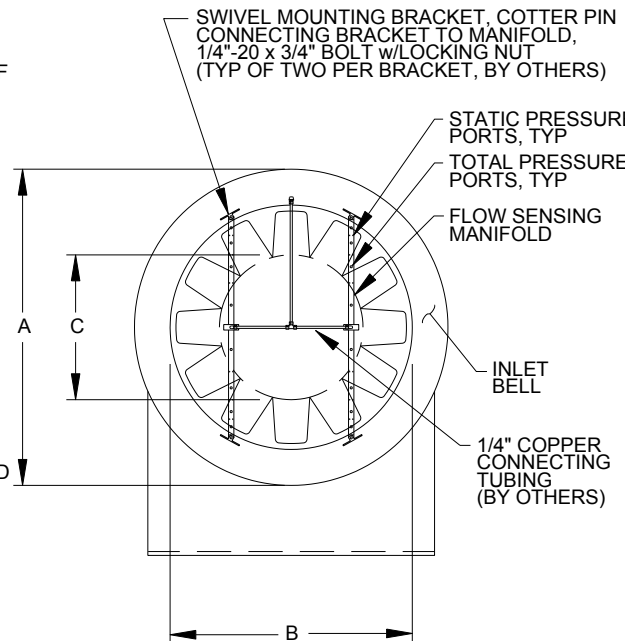
DOUBLE WIDE/DOUBLE INLET FAN



VANE AXIAL FAN



SIDE VIEW



VIEW FROM UPSTREAM
(WITHOUT INLET SCREEN)



OPERATION

The KIP2 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:

$$V = \frac{Q}{A} \quad P_v = \frac{V^2}{C}$$

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

Continuous vibration can work harden the brackets, causing cracks and possible failure, damaging both your flow elements and fan. Scheduled inspection for wear or cracks (indicating vibration) should be done every 6 months.

Since the model KIP2 airflow measuring elements have no moving parts, only periodic cleaning may be required. The flow 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 flow 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 static) of the flow element being cleaned. While purging the flow element, wipe the surface of the cylinder with a cloth or brush to loosen and remove all contaminant buildup.

Cleaning: In applications where the airflow 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 KIP2 is constructed of (i.e. aluminum, stainless steel, etc.)

SITE STORAGE, HANDLING, AND SPARE PARTS

The KIP2 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 flow 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 KIP2 comes as a complete fabricated assembly. **No spare parts are required.**

