

## Operating Instructions

- Duct diameter should be 4 inches or more.
- Take readings in a smooth and straight section of the duct. The section should be 1.5 duct diameters upstream and 8.5 duct diameters downstream of any disturbances. Use a flow straightener upstream of the Pitot tube if possible.
- Pitot tube has a flow coefficient, or correction factor, of  $K = 0.84$ . If the probe is a custom-made part it may have a different correction factor. Check the extra documentation included with the custom probe.
- Probe is rated to 1500°F (815°C).
- If you use any of FlowKinetics instruments the velocity is automatically calculated.
- As an approximation within 5% mean velocity in the duct corresponds to 90% of the velocity measured at the center of duct.  $V_{mean} = 0.9 \cdot V_{center}$

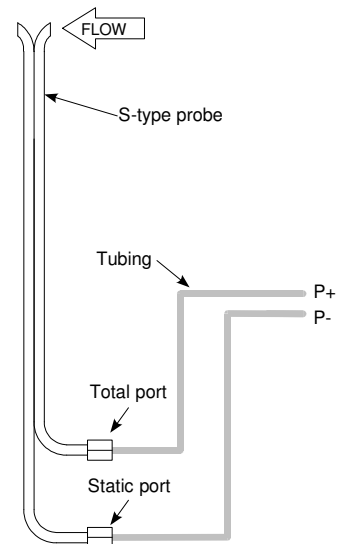
## Measuring standard velocity

You will need a differential manometer only.

Connect the static pressure port, from the tube facing away from the flow, to the low pressure port (P-) of the differential manometer. The stagnation pressure port, from the tube facing the flow, should be connected to the high pressure (P+) port on the differential manometer.

Value	Formula	Notes
Differential Pressure	$\Delta P$	Reading from meter in Pascals
Probe Coefficient	$K = 0.84$	Value may be different if probe is custom made.
Dynamic Pressure	$q = K^2 \cdot \Delta P$	Pascals
Total Pressure	$P_T = P_s + q$	Pascals
Static Pressure	$P_s = 101325 \text{ Pa}$	Standard Pressure
Density	$density = 1.2 \frac{kg}{m^3}$	Standard Density
Velocity	$V = K \cdot \sqrt{\frac{2 \cdot \Delta P}{density}} = \sqrt{\frac{2 \cdot q}{density}}$	m/sec

**If you are using a FlowKinetics manometer the velocity is calculated automatically.**

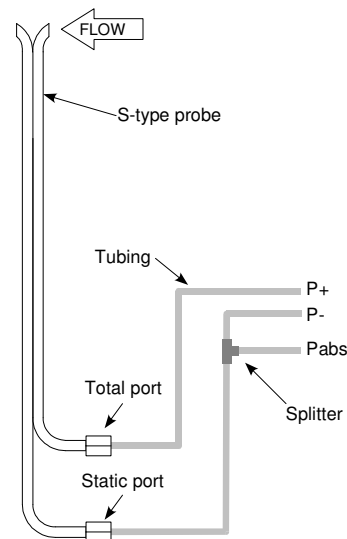


## Measuring actual velocity

You will need a differential pressure manometer, an absolute pressure manometer and a temperature meter.

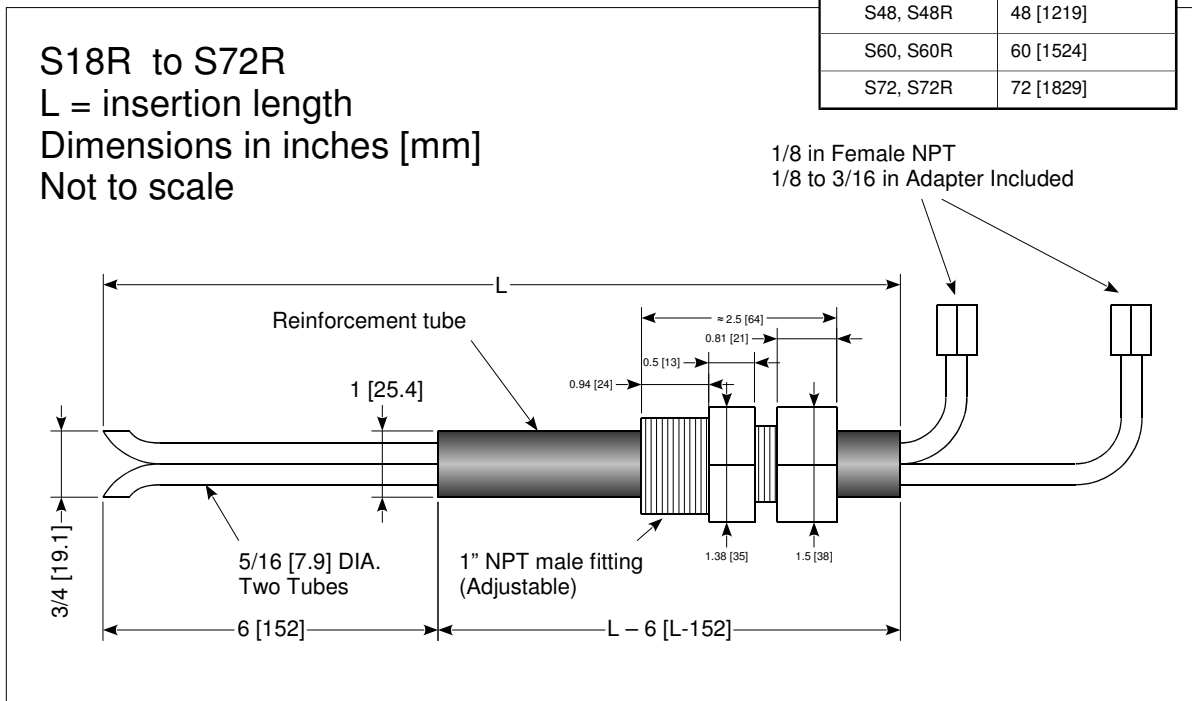
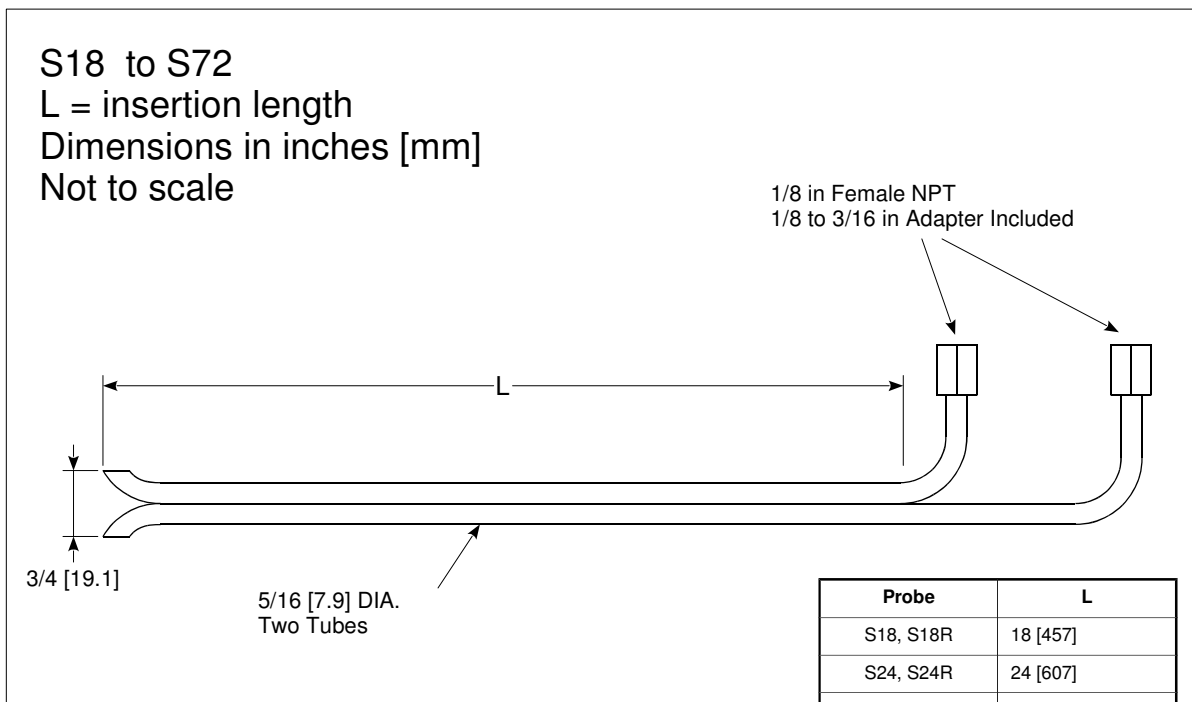
Using a splitter connect the static pressure port to the low pressure port (P-) of the differential manometer and the absolute pressure port (Pabs) of the absolute manometer. The stagnation pressure port should be connected to the high pressure (P+) port on the differential manometer. This way you can measure the differential pressure and the static pressure simultaneously. Also insert the temperature sensor into the flow.

Value	Formula	Notes
Differential Pressure	$\Delta P$	Reading from meter in Pascals
Temperature	$Temp$	Reading from meter in °C
Absolute Pressure	$Pabs$	Reading from meter in Pascals
Probe Coefficient	$K = 0.84$	Value may be different if probe is custom made.
Gas Constant	$R = \frac{8314 \frac{joule}{kg \cdot mole \cdot Kelvin}}{M_w}$ $R = 287.026 \frac{joule}{kg \cdot Kelvin}, \text{ for air}$	$M_w$ is the molecular weight of the gas. For air: $M_w = 28.966 \frac{1}{mole}$
Dynamic Pressure	$q = K^2 \cdot \Delta P$	Pascals
Total Pressure	$P_T = Pabs + \Delta P$	Pascals
Static Pressure	$P_S = Pabs + \Delta P \cdot (1 - K^2) = P_T - q$	Pascals
Density	$density = \frac{P_S}{R \cdot (Temp + 273.15)}$	kg/m <sup>3</sup>
Velocity	$V = K \cdot \sqrt{\frac{2 \cdot \Delta P}{density}} = \sqrt{\frac{2 \cdot q}{density}}$	m/sec



If you are using a FlowKinetics FKT series manometer the velocity is calculated and corrected automatically for temperature, ambient pressure, humidity and gas type.

## General Dimensions



## Limitations of Usage and Cautions

FlowKinetics™ LLC's products including, but not limited to, instruments, sensors, probes and accessories are not "inherently safe", and must not be used in dangerous or hazardous areas. Servicing of these instruments incorporating battery changing must only occur in a safe area. Use of the FKS series may require working in a hazardous environment. Necessary safety precautions must be followed.

FlowKinetics™ LLC's products are not authorized for use as any component in a life support system or device or as component of an aircraft's on board flight system. Life support systems or devices are defined as any system that can sustain, monitor or support life.

Any attempts to service or modify or alter the product in any way, will void the warranty and will negate any right of claim against FlowKinetics™ LLC, relating to any liability in respect of the product.