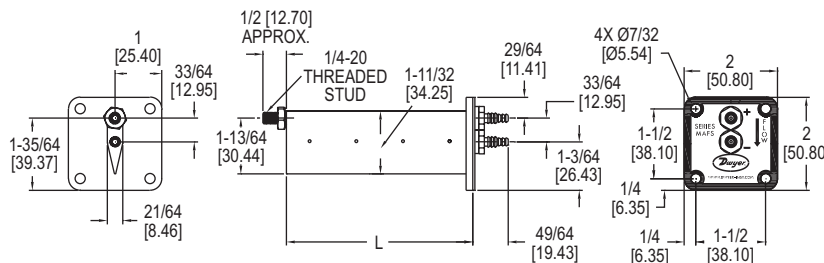




# Series MAFS Averaging Flow Sensor

## Specifications - Installation and Operating Instructions



The **Series MAFS Averaging Flow Sensor** uses evenly distributed total and static pressure measuring points to deliver an accurate measurement of flows in a duct. The Air Flow Measuring Probe can be completely installed from outside of the duct making it very easy to install. With its lightweight and durable construction in addition to its ease of installation, this product lends itself to being used in the HVAC industry. These air flow measuring probes may be ordered to fit into either round or rectangular duct installations.

### INSTALLATION

When you unpack the Series MAFS Averaging Flow Sensor ensure that there is no visible damage from shipping. Inspect each sensing point on the probes to ensure that they are not filled with debris from shipping. If there is obvious shipping damage, the probe must be replaced prior to use in order to avoid inaccurate measurements. Please contact Dwyer Instruments, Inc. if it is necessary to replace your air flow measurement probe.

**Location** - The sensor should be installed in the flowing line with as much straight run upstream as possible. A rule of thumb is to allow 10 - 15 diameters upstream and 5 downstream. The table below lists recommended up and down piping.

### CALCULATING VELOCITY

$$\text{Air Velocity} = 1096.2 (C_p) \sqrt{\frac{P_v}{D}}$$

where:

$P_v$  = Sensed pressure difference (velocity pressure) in inches of water column

$D$  = Air density in lbs/ft<sup>3</sup> (dry air = .075)

$C_p$  = Pitot tube coefficient: See specifications for K-factor vs. size

$$\text{Air Density} = 1.325 \times \frac{P_B}{T}$$

$P_B$  = Barometric pressure in inches of mercury

$T$  = Absolute Temperature (Indicated Temperature in °F plus 460)

### SPECIFICATIONS

- Service:** Clean air.
- Wetted Materials:** Aluminum AA6063.
- Accuracy:** 0 to 9000 FPM (45.7 m/s); ±2% FS, ±3% FS for 6" (160 mm) and 48" (1200 mm) length models.
- K-Factor:** 0.81, 0.80 for 6" (160 mm) and 48" (1200 mm) lengths, 4" (100 mm) length = 0.82.
- Max. Temperature:** 400°F (204°C); Gasket: -31 to 230°F (-35 to 110°C).
- Minimum Design Flow:** 400 fpm (2.03 m/sec).
- Maximum Design Flow:** 12,000 fpm (60.96 m/sec).
- Process Connections:** 1/4" barb.
- Straight Run Requirements:** 5 diameters or longest side dimensions.

### RECTANGULAR DUCT MODELS

Determining Probe Number and Placement for Rectangular Ducts

1. To determine the number of probes you need please consult the chart below.

Short Duct Dimension (mm)	<12" (<305 mm)	12" - 23" (<305 mm - 585 mm)	24" - 35" (610 mm - 889 mm)	36" - 48" (914 mm - 1200 mm)
Number of Probes	1	2	3	4

2. In order to determine where to place your probes, divide the short duct dimension by number of probes.
3. Divide the result by two and this will be the distance from the top edge of the duct to the first probe location.
4. The next probe will be placed two times the resulting distance from step two from the first probe. So, if the first probe was placed 4" from the top edge of the duct, your next probe would be placed 8" from the first probe, or 12" from the top of the duct.
5. Continue this pattern until you have determined all probe locations.

**Example:** You have a duct with a 24" short side, and upon consulting the chart determined that you needed 3 probes for this size duct.

$$24 / 3 = 8$$

$$8 / 2 = 4$$

Therefore, the first probe is placed 4" from the top of the duct.

The second probe is placed 4" + 8" = 12" from the top of the duct.

The third probe is placed 4" + (2 x 8") = 20" from the top of the duct.

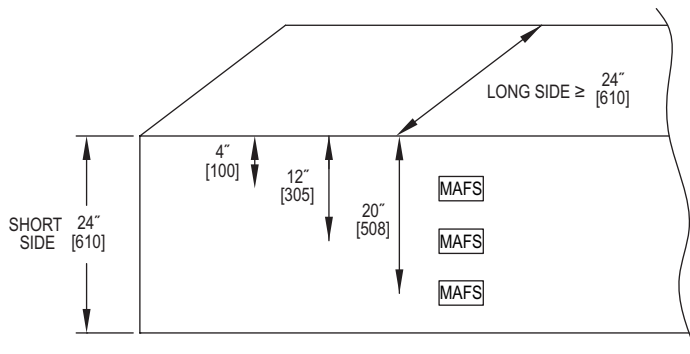


Figure 1: View illustration of probe placement example.

Please note that all probes should be installed vertically and running parallel to each other if installed in a rectangular duct.

#### RECTANGULAR DUCT PROBE INSTALLATION

1. See drawing for proper opening to cut for insertion. Cut a hole at locations calculated above in side of duct. Drill a 5/16" hole on opposite side of duct. Remove o-ring, hex and acorn nuts.
2. Place silicon bead around holes.
3. Slide MAFS into holes and screw the included four self drilling screws into duct to attach MAFS. On far end, re-attach o-ring, hex and acorn nuts.
4. Connect 3/16" I.D. tubing to barb fittings on MAFS.
5. Check all fittings and tubing connections for leaks using a leak detector.
6. Tee all high and low ports into one high and one low line and connect to transmitter or gage.
7. The devices should be checked occasionally for build-up of dirt or debris common in an HVAC system.

#### CIRCULAR DUCT MODELS

##### Determining Probe Number and Location for Round Ducts

1. Note that in round ducts only two probes are needed. The quantity of probes needed does not depend on size of the duct.
2. Locate probes 90 degrees apart. See Figure 2 for an example.

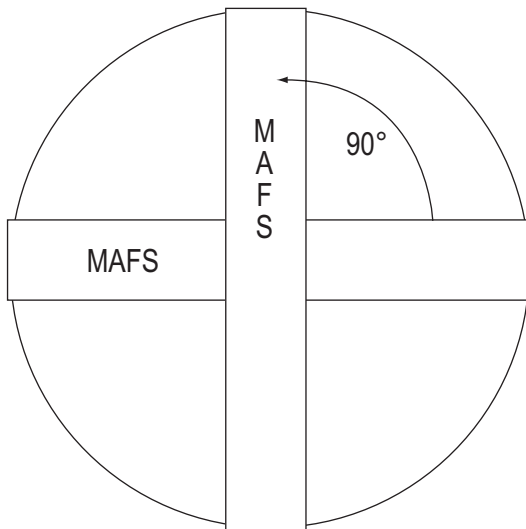


Figure 2: Cross-sectional view of probe placement in a round duct

#### ROUND DUCT PROBE INSTALLATION

1. See drawing for proper opening to cut for insertion. Cut a hole at locations calculated above in side of duct. Drill a 5/16" hole on opposite side of duct. Remove o-ring, hex and acorn nuts.
2. Place silicon bead around holes.
3. Slide MAFS into holes and screw four self drilling screws into duct to attach MAFS. On far end, re-attach o-ring, hex and acorn nuts.
4. Connect 3/16" I.D. tubing to barb fittings on MAFS.
5. Check all fittings and tubing connections for leaks using a leak detector.
6. Tee all high and low ports into one high and one low line and connect to transmitter or gage.
7. The devices should be checked occasionally for build-up of dirt or debris common in an HVAC system.

#### CALIBRATION

Sometimes field calibration may be required if the probe is installed in a bad location i.e. immediately downstream of an elbow. In order to calibrate, you must either perform a traverse of the duct or a sum of the air registers and compare this with the MAFS output. Then, you must make the correction to the effective area in the computer to make up for the error.

#### MAINTENANCE/REPAIR

Upon final installation of the Series MAFS, no routine maintenance is required. The Series MAFS is not field serviceable and should be returned if repair is needed. Field repair should not be attempted and may void warranty.

#### WARRANTY/RETURN

Refer to "Terms and Conditions of Sales" in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.