Air Flow Switches

McDonnell & Miller Air Flow Switches sense air flow or no air flow by responding only to velocity of air movement. They provide a positive and economical way to detect change or loss of air flow velocity caused by closed damper or fan inlet, a loose fan wheel, a slipped or broken fanbelt, a dirty or clogged filter, or an overload on a fan motor switch.

The Series AF1 flow switches are designed for medium and higher velocity systems. Models AF2 and AF3 are for systems with lower air flow velocities.

Air flow switches can be used for a variety of applications such as, but not limited to:

- Clean Room Filter Systems
- Duct Type Heating
- Exhaust Ventilating
- Air Supply System
- Air Treatment Systems

Flow Switches	NEMA Enclosure
All Models	Type 1—General purpose indoor
AFE1	Type 7—Hazardous Location (Class 1–Group C or D) Type 9—Hazardous Location (Class 2–Group E,F or G)

Model AFE1 Flow Switches are Underwriters Laboratories Inc. Listed for use in these hazardous locations:

Class I, Division I, Group C – Atmospheres containing ethylether vapors, ethylene or cyclopropane.

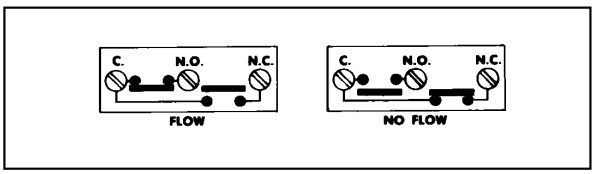
Class I, Division I, Group D – Atmospheres containing gasoline, petroleum. naphtha, benzene, butane, propane, alcohols, acetone, benzol, lacquer solvent vapors or natural gas.

Class II, Division I, Group E – Atmospheres containing dust of aluminum, magnesium or their commercial alloys.

Class II, Division I, Group F – Atmospheres containing carbon black, coal or coke dust.

Class II, Division I, Group G – Atmospheres containing flour, starch or grain dusts.

Note: For other listings contact the factory.



In the tables of flow rates included in this catalog, the word “Flow” means that switch will close one circuit and open the other, when flow rate is increased to the rate shown.

The words “No-Flow” mean the switch will reverse position—open first circuit and close the second—when flow rate is decreased to the rate shown.

Air Flow

Cubic Feet Per Minute (CFM) ..... Duct Area x FPM

$$\text{FPM} \quad \text{.....} \quad \frac{\text{CFM}}{\text{Duct Area}}$$

One Square Foot = (12" x 12" = 144 sq. In.)

How To Select Air Flow Switches

1. What function will the flow switch perform?
McDonnell & Miller Air Flow Switches are equipped with single pole double throw switches; consequently, they can be used to make or break an electrical circuit either when flow starts or when flow stops. For example, the Flow Switch can be used to:

- Actuate a signal when flow stops
- Start a motor with flow
- Shut off an alarm when flow is adequate
- Stop a motor with no flow

2. How much flow is present?
The air flow velocity at which the Air Flow Switch is to respond should be determined first. McDonnell & Miller Air Flow Switches are actuated (make or break) with an increase in velocity and will reverse switch position (break or make) with a decrease in velocity. The term "Flow" represents the actual movement of air (velocity) within a duct sufficient to actuate the switch. The term "No Flow" represents a decrease in velocity or a total air flow stoppage, which will permit the switch to return back to the original position.
IMPORTANT: In operation the switch must be actuated by "Flow" before it can be reversed again by "No-Flow". All McDonnell Flow Switches can easily be adjusted to require a higher actuating "Flow" or " No-Flow" .

3. Size of duct
McDonnell & Miller Air Flow Switches are designed for installation in ducts six inches (150mm) and larger.

4. Maximum temperature
Air temperature inside and outside of the duct should be considered. Different McDonnell & Miller Air Flow Switches can be used at temperatures from 32°F (0°C) up to 300°F (149°C).

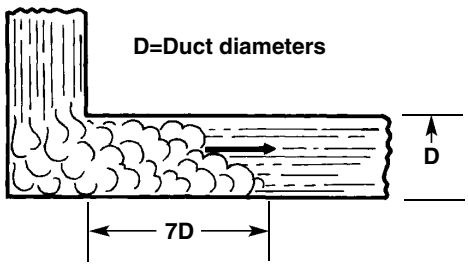
5. Maximum Velocities
The Series AF1 is designed for medium and higher velocity applications up to 2500 fpm (12.7mps). The Models AF2, AF3, and AF3-D are designed for lower air flow velocities with a maximum of 2000 fpm (10.2mps).

6. Type of air
Depending on the model, McDonnell & Miller Air Flow Switches have brass, steel, aluminum, stainless steel, Viton and Teflon® parts exposed to the inside of the duct. In addition to use with normal air, they may be used in applications where certain chemical fumes or other air-borne elements are present.

7. Installation
It is recommended that all models be located in a horizontal duct, 10 duct diameters downstream from fan or 7 duct diameters downstream from an elbow, junction or other cause of turbulence.

Often the actual flow rates in the duct appreciably exceed the flow rate required to actuate the switch. If the flow switch must be located closer than 10 duct diameters from a fan, it is recommended that the flow switch be installed on the suction side of the fan.

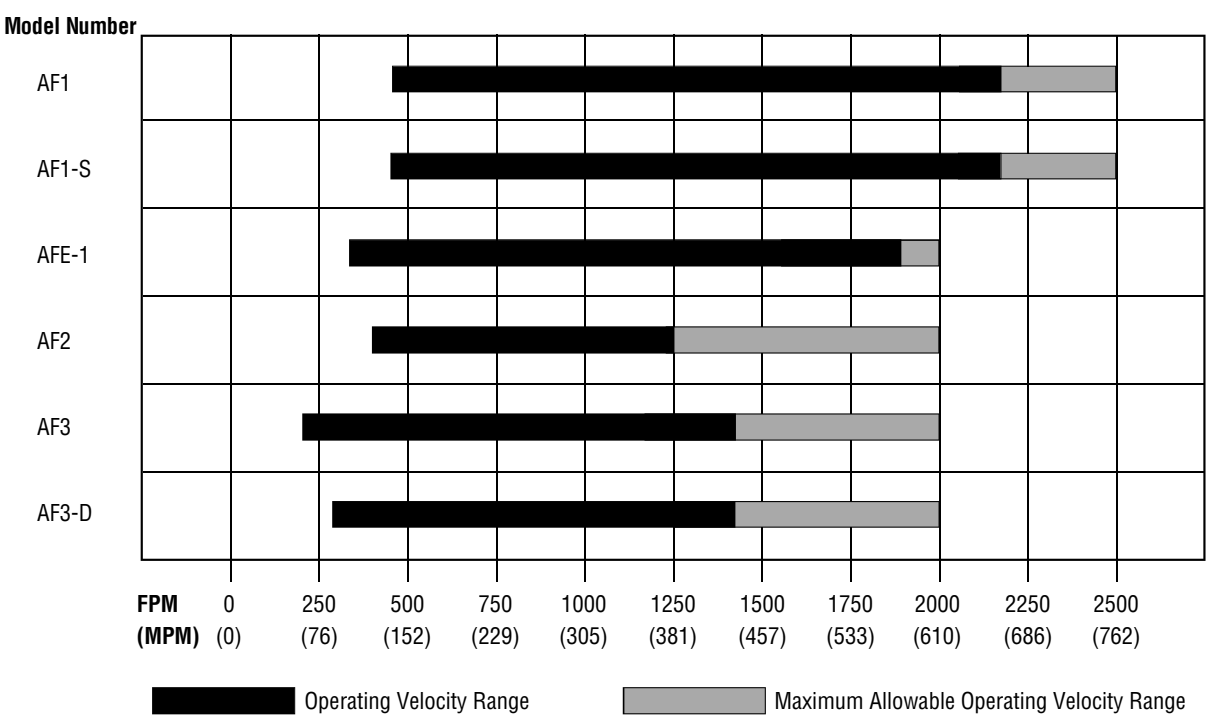
For air flow applications, the air flow switch should be mounted 7 duct diameters downstream of a flow obstruction like an elbow; 10 duct diameters downstream of a blower.



Air Flow Switch Specifications – Horizontal Mounting

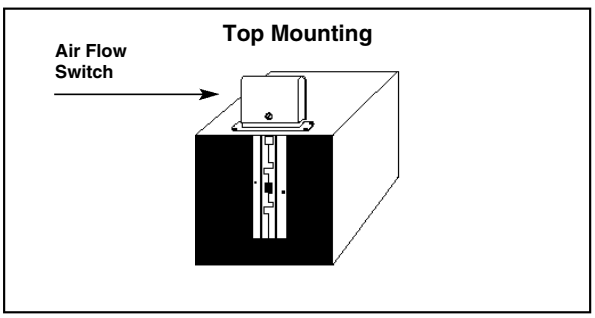
Model Number	Operating Velocity Range for Horizontal Installation fpm (mpm)	Maximum Allowable Operating Velocity fpm (mpm)	Vane Material	Seal Material	Seal Strength	Enclosure	Switch	Maximum Air Temperature °F (°C)
AF1	480 - 2230 (146 - 680)	2500 (762)	Brass, Steel	Chrome Teflon®	Low	General Purpose Indoor	SPDT	300 (149)
AF1-S	480 - 2230 (146 - 680)	2500 (762)	Stainless Steel 18-8,302 &316	Viton	Medium	General Purpose Indoor	SPDT	300 (149)
AFE-1	350-1900 (107 - 579)	2000 (610)	Brass, Stainless Steel Aluminum	Magnetic Insulation	High	Hazardous Duty Class I & II	SPDT	275 (135)
AF2	380-1250 (116 - 381)	2000 (610)	Brass, Steel, Aluminum	Chrome Teflon®	Low	General Purpose Indoor	SPDT	300 (149)
AF3	235-1445 (72 - 440)	2000 (610)	Brass, Steel, Aluminum	Chrome Teflon®	Low	General Purpose Indoor	SPDT	275 (135)
AF3-D	295-1445 (90 - 440)	2000 (610)	Brass, Steel, Aluminum	Chrome Teflon®	Low	General Purpose Indoor	DPDT	275 (135)

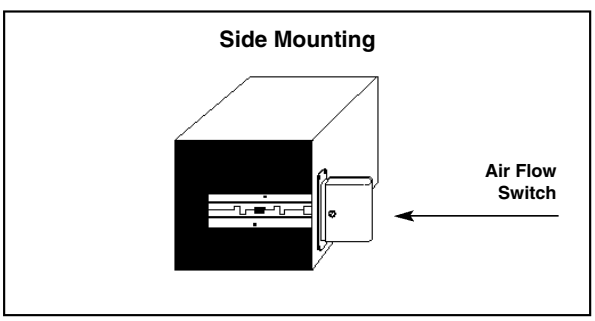
Flow Velocities

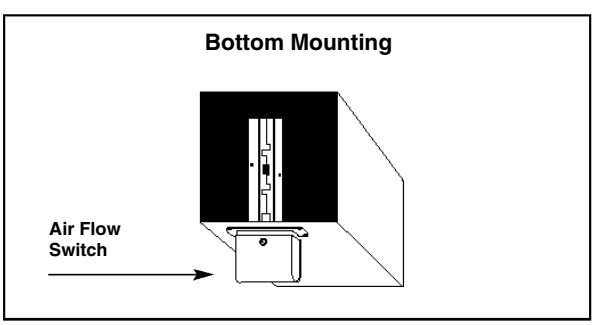


How to Select Air Flow Switches (continued)

Mounting Methods – Horizontal Ducts







Installing the air flow switch in a horizontal duct is recommended. However, if the velocity of air flow exceeds the flow rates shown in the Vertical Duct Chart to the right, the air flow switch may be installed in a vertical duct with **upward** air flow.

Vertical Duct (Upward Flow)

Model Number	Settings	Mode of Operation	
		Flow fpm (mpm)	No Flow fpm (mpm)
AF1 Standard 7 1/4" (184mm)	Factory or Minimum	910 (277)	785 (239)
	Maximum	1610 (491)	1460 (445)
AF1 Trimmed 2" (51mm) 5 1/4" (133)	Factory or Minimum	1235 (376)	1050 (320)
	Maximum	2560 (780)	2410 (735)
AF3	Factory or Minimum	450 (137)	430 (131)
	Maximum	1470 (448)	1395 (425)
AF3-D	Factory or Minimum	560 (171)	540 (165)
	Maximum	1470 (448)	1030 (314)

Based on Standard Air 0.075 pounds per Cubic Foot (1.205 kg/m^3)
Values are ± 10%
Consult factory for downward flow

Density of Air as a Function of Temperature

Based on Standard Air			
Temperature		Density	
°F	°C	lbs./ft^3	kg/m^3
-40	-40	.094	1.515
-4	-20	.087	1.395
32	0	.080	1.293
50	10	.078	1.248
68	20	.075	1.205
86	30	.072	1.165
104	40	.070	1.128
140	60	.066	1.060
176	80	.062	1.000
212	100	.059	.946
392	200	.046	.746