OAM II

Outdoor Airflow Measuring System
Application Guide

Air Monitor
Precision Airflow Measurement
An ONICON Brand

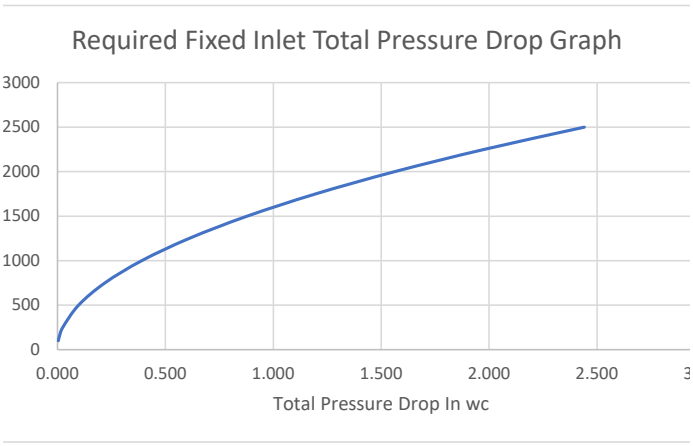
SECTION 1.0 INTRODUCTION

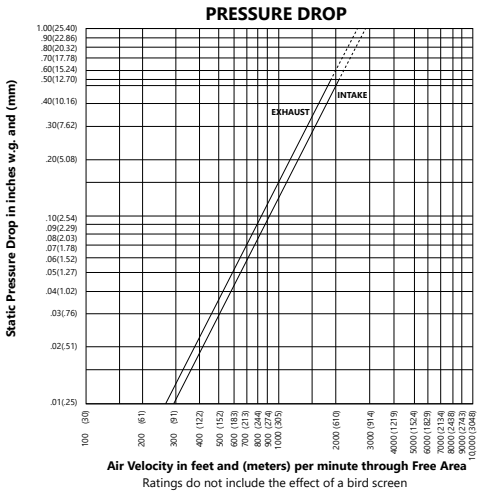
Blowing dust and debris, moist air and low flow velocities are just some of the problems commonly associated with outdoor airflow measurement. These conditions can be very challenging when trying to accurately measure the amount of outdoor air entering a building using thermal or Pitot style airflow elements. Air Monitor's OAM II Outdoor Airflow Measurement System is specifically designed to provide accurate airflow measurement in this challenging application.

Each OAM II consists of a dedicated transmitter with a built-in barometric pressure sensor, reference temperature sensor(s) and uni-sensor flow element(s). The system offers exceptional performance in this difficult but extremely important airflow measurement application.

There are three different OAM II configurations. Each offers distinct advantages for some of the most common outdoor airflow applications. This guide presents an overview of airflow inlet types, OAM II configurations, and system components. Consider the following when selecting an outdoor airflow measurement system.

What is the airflow inlet type?
There are a variety of inlet types. The most common inlets incorporate architectural louvers or packaged roof top units with single or multiple rain hoods. The OAM II utilizes the static differential pressure field created by the air entering and moving through the fixed inlet. The differential pressure required to achieve accurate airflow measurement is indicated in the graph below. Refer to the louver manufacturer's published pressure drop data to confirm it is adequate to meet your application requirements.





Example of a louver pressure drop graph

What is the airflow inlet size/geometry?
Many systems are large enough or shaped such that they will require multiple uni-sensors connected in parallel to effectively average total airflow through the inlet. Minimum/Economizer (split) inlets may also require multiple sensors.

What is the best OAM II configuration for my applications?
The OAM II is available in three different factory configurations based on your inlet type. Each configuration is optimized for a specific airflow application. A detailed description of each configuration is provided on the next page.

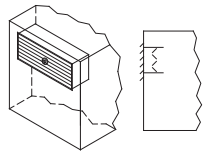
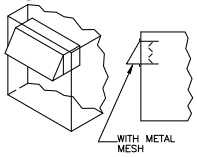
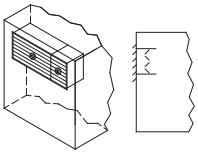
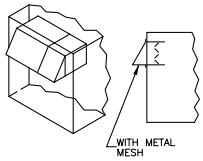
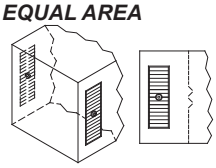
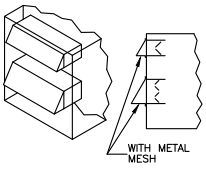
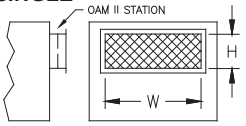
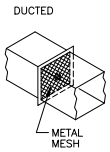
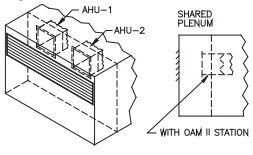
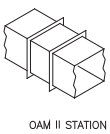
SECTION 2.0 CONFIGURATIONS

The OAM II can be factory configured to operate in three different modes.

Single Channel, Single System Airflow Measurement – This configuration provides airflow measurement from 150 to 2400 FPM. It is ideal for measuring highly variable airflow in a single inlet.

Minimum/Economizer (Split) Airflow Measurement – The Min/Econ configuration provides combined airflow measurement for separate minimum and economizer inlets. The OAM II is an effective tool for measuring this commonly used inlet configuration.

Dual Channel, Dual System Airflow Measurement – The dual channel configuration provides two separate airflow measurements in one transmitter. Ideal for built-up systems that provide outdoor air to multiple locations.

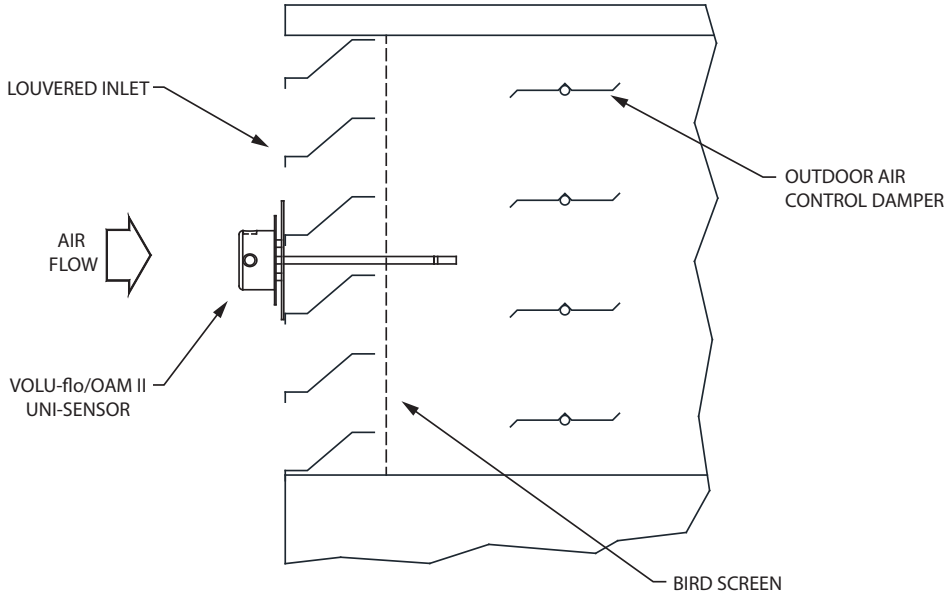
Inlet Types	System Configurations			Inlet Types	System Configurations		
	Single System	Min/Econ (Split)	Dual System		Single System	Min/Econ (Split)	Dual System
LOUVERED INLET				**RAIN HOOD INLET**			
SINGLE 	√			***SINGLE*** 	√		
SPLIT 		√		***SPLIT*** 		√	
MULTIPLE INLETS OF EQUAL AREA 	√			***DUAL*** 	√		
FREE INLET				**DUCTED INLET**			
SINGLE 	√			***METAL MESH*** 	√		
DUAL 			√	***STATION*** 	√		

SECTION 3.0
INLET TYPES

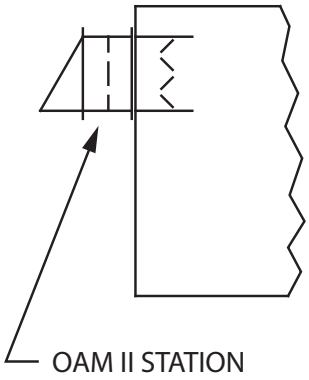
Install the uni-sensor as close to the center of the inlet as possible. The distance between the tip of the uni-sensor and the edge of the fully open damper blade should be at least 2". See drawing below.

Louvered Inlets:
Install the uni-sensor on the front face of the louver. The louver size and shape will determine the number of sensors required for the inlet. If the louver manufacturer, model number, net free area and free area velocity vs. pressure drop information is provided, Air Monitor will factory characterize the OAM II transmitter. This will eliminate the need for field characterization.

The louver depth will dictate the length of the uni-sensor probe (louver depth + 2"). Standard probe lengths are available in 1" increments.

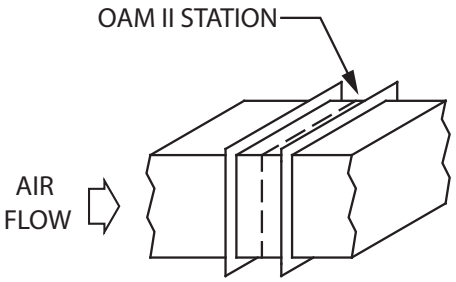


Rain Hood Inlets:
The inlet must produce the required pressure drop (as shown in the graph on page 2) in order to accurately measure the airflow through the inlet. The use of metal mesh across the inlet or an airflow station provided by Air Monitor will greatly simplify the installation process and eliminate the need for field characterization. If an OAM II Airflow Station is used, it can be sandwiched between the rain hood and the AHU's OA damper.

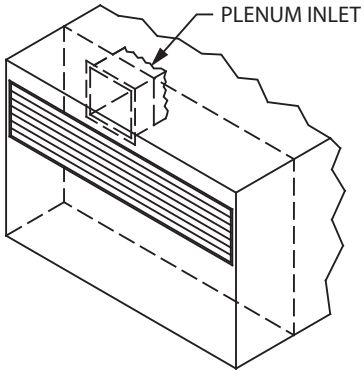


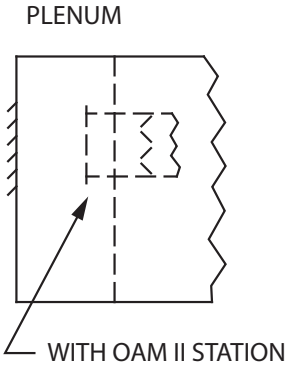
Minimum/Economizer (Split) Inlets:
In the installation below, two inlets separately provide minimum and economizer outside airflows to a single air handler. The OAM II, operating in a dual channel, single system configuration would provide both individual and totalized airflow rate information.

Ducted Inlets:
OAM II Stations or metal mesh screens installed in ducts should be located such that there is no interference upstream or downstream that would intrude into the OAM II station casing or into the area where the uni-sensor is installed.

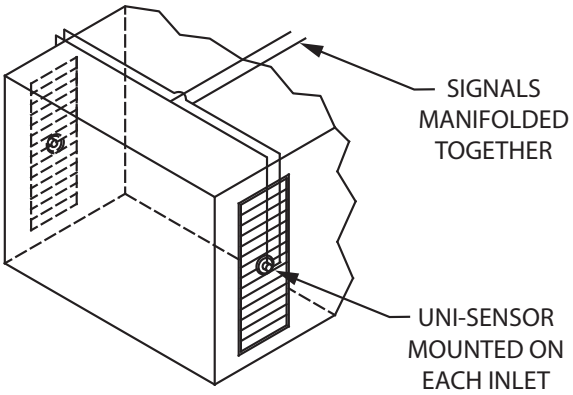


Plenum Inlets:
When mounting an OAM II station directly to a damper casing, confirm there is sufficient clearance between the fully open damper blades and the uni-sensor probe. If required, an extended case OAM II Station can be provided in order to achieve the required 2" minimum distance.





Multiple Inlets:
Uni-sensors installed on each inlet are connected via manifolds or tees to provide averaged sensor signals to the transmitter. The area of each inlet should be identical for best results, and inlet dampers must operate in unison.

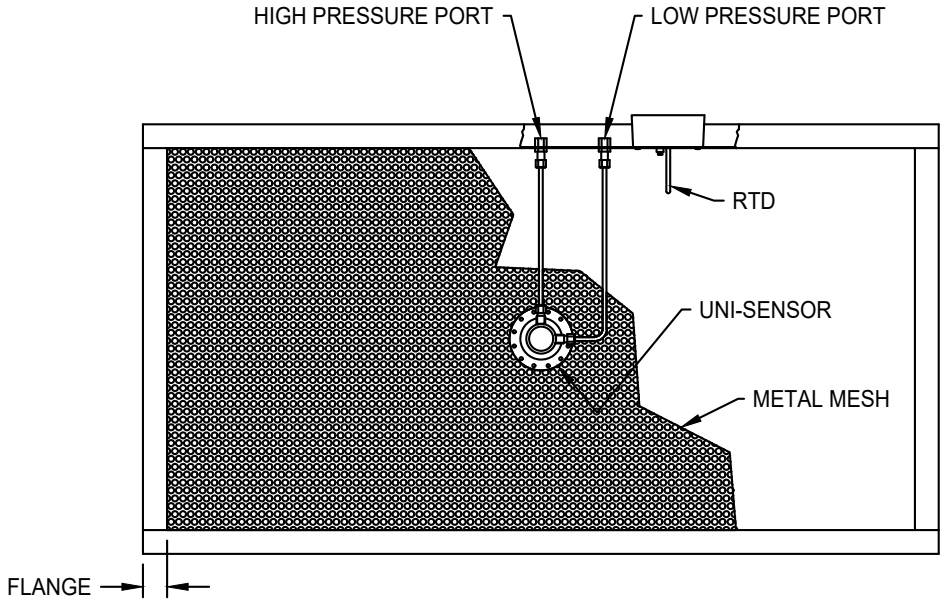


Inlets with an Aspect Ratio >6:1 & Inlets with an Area >30 ft²:
Inlets with an aspect ratio >6:1 require the use of multiple uni-sensors spaced at equidistant intervals. For example: A 2′ x 30′ louvered inlet has an aspect ratio of 15:1. Use three equally spaced sensors serving 2′ x 10′ areas to reduce the aspect ratio to 5:1 for each sensor. Another example; if a unit has a 7′ x 12′ inlet, three sensors are required with each covering a 7′ x 4′ area.

SECTION 4.0
AIRFLOW STATIONS

OAM II Stations are built to order and are delivered fully assembled. The number of sensors provided varies based on the size and shape of the station. When multiple OAM II stations are provided for a single system, only one station will include an RTD temperature sensor.

OAM II Stations are built using perforated galvanized metal sheet with 51% open (free) area, 16 gauge (.0635″) thickness, 3/16″ holes on 1/4″ staggered centers, with 18.5 holes / sq. in. The flow and pressure drop characteristics of this metal mesh is fully defined. This simplifies the installation as the airflow station is provided fully characterized from the factory.



OAM II Station (shown with a single uni-sensor)

SECTION 5.0
AIRFLOW SENSORS

The uni-sensor is constructed of 316 stainless steel and is resistant to corrosion caused by salt and most other airborne corrosives. It combines an outside reference (high pressure) sensor and an inlet airflow (low pressure) sensor into one assembly. They are provided with probe lengths that match the clearance requirements of the inlet where they will be installed.

Uni-sensors are ideal for retrofit installations because they are easily mounted to a variety of existing inlet types.

IMPORTANT NOTE
Air Monitor's OAM II system is provided with an easy-to-use field characterization program. Test and balance flow data is entered, automatically adjusting the factory OAM II response curve. Field characterization is recommended for those installations where the inlet type is not fully defined at the factory.