

# TECHNICAL BULLETIN ACCESSORY INFORMATION



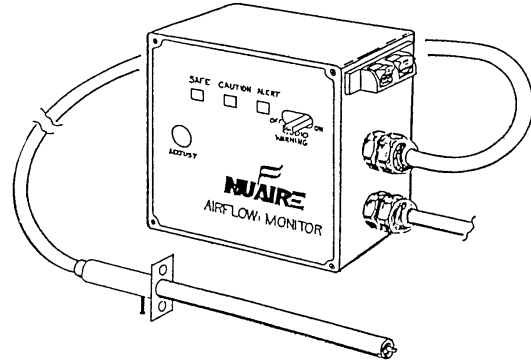
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## Model NU-946B Airflow Monitor Operation and Installation Instructions

### Specifications

\*Power: 115 or 230 VAC, .02 AMP, 50/60Hz  
Range: 50 to 1500 FPM  
Probe Temp: 50°C maximum at zero airflow  
Operating Temp: 10°C to 40°C  
Repeatability:  $\pm 2\%$  of setpoint  
Alarms: Audible: 76 dba 1000 cycle tone with  
disable switch  
Visual: Flashing, red LED  
Remote: Relay contacts, low voltage  
Size: 4-9/16" (W) x 4-9/16" (H) x 2-5/16" (D)  
116mm (W) x 116mm (H) x 59mm (D)  
Probe Cord Length: 60" (1524mm)  
Power Cord Length: 90" (2286mm)



\*Add suffix "E" for 230 VAC operation (i.e., NU-946b-E)

### General Description

The NuAire Airflow Monitor can be used for practically any application requiring the mass flow of an air stream to be monitored for minimum acceptable flow. A stable/repeatable response to airflow detection is achieved by using two thermistors: One that is self-heated and one that is measuring ambient. As air is passed over the thermistors the heated thermister is cooled, generating a difference in resistivity that translates into the flow rate. The second thermister provides the temperature compensated ambient reference. Both thermistors are encased in glass, mounted on a P.C. card and potted into an 8-inch (203mm) stainless steel tube. The sensor is intrinsically safe for use with chemicals one would normally use in ambient temperature environments or fume hoods and performs well even in relatively turbulent duct environments. The output of the sensor is amplified via chopper stabilized operational amplifiers to minimize drift and enhance long-term stability. The output is compared to the operational setpoint and lights the following light emitting diodes (LED's): (1) A green SAFE LED indicates mass flow above setpoint, (2) A yellow CAUTION LED indicates airflow at or below setpoint and, (3) A flashing red ALERT LED if a sustained (over 6 second) low flow condition exists. Upon initial power application, the monitor's green SAFE LED will light and requires approximately 6 to 12 seconds to detect low flow conditions. This should minimize any false alarms during system power-up. The alarm relay (and audible alarm) is energized whenever ALERT is lit and the relay is wired such that if the monitor fails or power is lost, the alarm contacts will be closed. Quick connect terminals are provided. The Airflow Monitor is housed in a PVC enclosure and comes complete with an internal power supply, power cord, probe cable, probe mounting brackets and Velcro mounting strips.

## Installation

The airflow monitor can be installed using various methods. The placement of the probe is not critical as long as the air velocity is greater than 100 fpm or less than 1500 (Table 1).

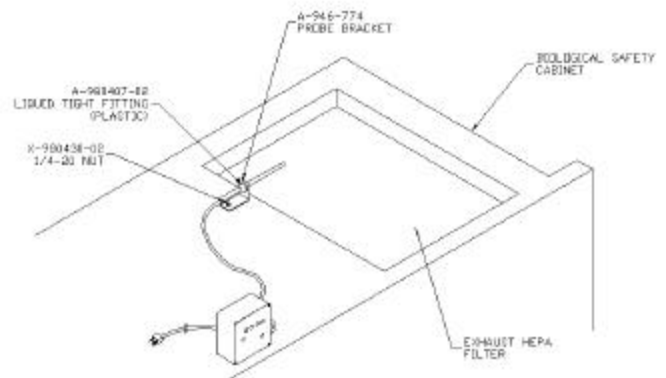
Table 1  
Maximum CFM Per Duct Size

8"	500 CFM	10"	800 CFM	12"	1100 CFM
9"	650 CFM	11"	950 CFM	14"	1500 CFM

For optimum airflow monitor performance, the airflow probe thermistors should be placed perpendicular to the airflow. Below, are typical installation methods. All brackets and hardware are provided. Velcro strips are also provided for mounting the monitor in any convenient location. The mounting surface should be smooth and free of dirt, oil, etc.

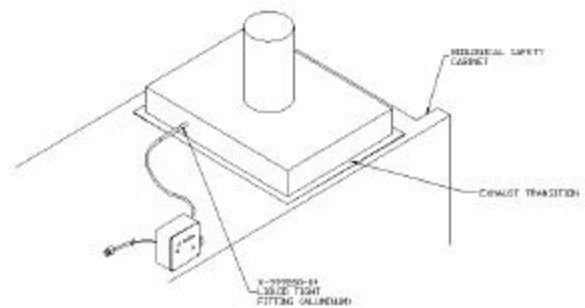
### **Method #1 - Exhaust HEPA Air stream**

Locate the bracket on any of the transition mounting studs next to the exhaust HEPA filter. The liquid tight fitting is fastened onto the bracket with the nut provided. The airflow probe is then slipped through the liquid tight fitting extending it over the exhaust HEPA filter and tightening in place.



### **Method #2 - Exhaust Transition**

NuAire exhaust transitions come with a threaded coupling on the left side of the transition. Remove plug in the coupling, if present. Use the aluminum liquid tight fitting and attach same as Method #1.

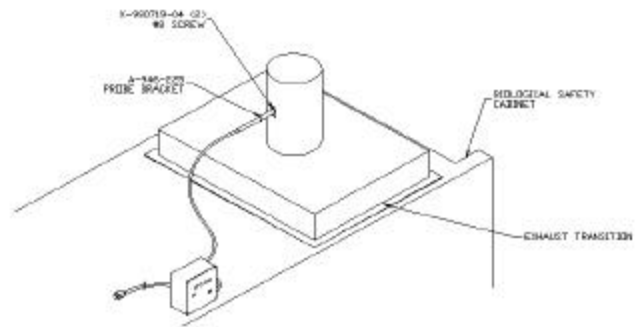


### Method #3 - Exhaust Duct

Once a location has been selected, drill a 1/2-inch hole for the probe.

#### CAUTION:

The HEPA filter, if present, should be protected from metal shavings, as they may penetrate the fragile media. Locate probe bracket over hole and mark mounting holes. Drill 1/8 inch mounting holes and fasten bracket with screws provided. Slip probe through bracket and fasten setscrew. Placing the probe in the center of the duct will usually yield 90% of actual average duct air velocity. Silicone around probe, holder and mounting screws.



All three installations are effective as shown. The alarm relay contacts are wired by depressing the connection blocks lever, inserting a bare wire and releasing the lever. The connection is non-polar, normally open dry contacts. Contact ratings are 250 VAC maximum at 2 amps.

### Indicator Sequence

The green SAFE LED indicates mass flow greater than setpoint and/or upon initial power application to avoid false alarms. Upon detection of mass flow below or at setpoint, the green SAFE LED will remain lit and a yellow CAUTION LED will light. The CAUTION LED can remain lit for a period of up to 12 seconds, if the low flow condition corrects itself within 6 seconds. If not, (i.e. sustained over 6 second low flow); (1) The flashing red ALERT LED will light, (2) Both the SAFE and CAUTION LED's will extinguish, (3) The alarm relay will energize and, (4) The audible alarm will sound. Upon correction from a low flow alarm, both the CAUTION and ALERT LED's must extinguish before the green SAFE LED will light. It is possible that either the SAFE/CAUTION or the CAUTION/ALERT LED's could be on for a period longer than 12 seconds if the air stream is fluctuating through the threshold.

### Adjustment

With proper exhaust flow or other desired exhaust volume present, the monitor powered (115 VAC) and the alarm relay disconnected (if used), note which LED is lit. (1) If the red ALERT LED is lit, turn the adjust potentiometer clockwise - slowly - until the yellow CAUTION LED is lit and finally the green safe LED is lit. Let the green SAFE LED stabilize. Adjust setpoint at threshold through several yellow/green excursions to ensure a stable setpoint. (2) If the green SAFE LED is lit, turn the ADJUST potentiometer counterclockwise - slowly - until the yellow CAUTION LED is lit. It is not necessary to allow the red ALERT LED to light. Locate threshold through several yellow/green excursions. It will be necessary to adjust the potentiometer clockwise 1/8 to 1/4 turn past the green/yellow threshold point to assure a stable setpoint. Turn on/off either cabinet or exhaust system to verify low flow detection. No internal calibration is necessary, however, the setpoint alarm should be checked whenever maintenance or certification is performed on the cabinet. If the probe is monitoring a non-HEPA filtered air stream, the probe should be wiped clean with alcohol at least annually.

## **Warranty**

NuAire, Inc. warrants that it will repair F.O.B its factory or furnish without charge F.O.B. its factory, a similar part to replace any material in its equipment within 12 months after the date of sale if proved to the satisfaction of the company to have been defective at the time it was sold provided that all parts claimed defective shall be returned, properly identified to the company at its factory, charged prepaid. Factory installed equipment or accessories are warranted only to the extent guaranteed by the original manufacturer and this warranty shall not apply to any portion of the equipment modified by the user. Claims under this warranty should be directed to NuAire, Inc. setting forth in detail the nature of the defect, the date of the initial installation and the serial and model number of the equipment.

This warranty shall not apply to any NuAire product or part thereof which has been subject to misuse, abuse, accident, shipping damage, improper installation or service or damage by fire, flood, or acts of God. If the serial number of the product is altered, removed or defaced as to be illegible, the warranty shall be null and void in its entirety.

The warranty is for the sole benefit of the original purchaser and is not assignable or transferable.

## **Shipments**

NuAire takes every reasonable precaution to insure that your incubator arrives without damage. Motor carriers are carefully selected and shipping cartons have been specially designed to insure your purchase. However, damage can occur in any shipment and the following outlines the steps you should take on receipt of a NuAire incubator to be sure that if damage has occurred, the proper claims and actions are taken immediately.

## **Damaged Shipments**

Terms are factory, unless stated otherwise. Therefore it is important to check each shipment before acceptance.

If there is visible damage, the material can be accepted after the driver makes a notation on the consignee's copy of the freight bill. Then an inspection must be made to verify the claim against the carrier. This inspection is the basis of your filing the claim against the carrier.

If concealed damage is found, it is absolutely necessary to NOTIFY THE FREIGHT AGENT AT ONCE, and request an inspection. Without this inspection, the transportation company may not accept a claim for loss or damage. If the carrier will not perform the inspection, an affidavit must be prepared stating that he was contacted on a certain date and that he failed to comply with the request. This, along with other papers in the customer's possession, will support the claim.