

ELECTRA-FLO / SD

THERMAL AIRFLOW & TEMPERATURE
WITH DUAL ANALOG OUTPUTS
Installation and Operation Guide



ELECTRA-flo / SD

Thermal Airflow & Temperature

With Dual Analog Output

Installation, Operation and Maintenance Manual

SAFETY INFORMATION

This meter was calibrated at the factory prior to shipment. To ensure correct use of the meter, please read this manual thoroughly.

Regarding this Manual:

- This manual should be passed on to the end user.
- Before use, read this manual thoroughly to comprehend its contents.
- The contents of this manual may be changed without prior notice.
- All rights reserved. No part of this manual may be reproduced in any form without Air Monitors's written permission.
- Air Monitor makes no warranty of any kind with regard to this material, including, but not limited to, implied warranties of merchantability and suitability for a particular purpose.
- All reasonable effort has been made to ensure the accuracy of the contents of this manual. However, if any errors are found, please inform Air Monitor.
- Air Monitor assumes no responsibilities for this product except as stated in the warranty.
- If the customer or any third party is harmed by the use of this product, Air Monitor assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.

Safety Precautions:

The following general safety precautions must be observed during all phases of installation, operation, service, and repair of this product. Failure to comply with these precautions or with specific WARNINGS given elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Air Monitor Corporation assumes no liability for the customer's failure to comply with these requirements. If this product is used in a manner not specified in this manual, the protection provided by this product may be impaired.

The following symbols are used in this manual:



CAUTION

Messages identified as "Caution" contain information regarding potential damage to the product or other ancillary products.



IMPORTANT NOTE

Messages identified as "Important Note" contain information critical to the proper operation of the product.

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SECTION 1.0: GENERAL INFORMATION

We, at Air Monitor, would like to thank you for purchasing our quality, U.S. made, Thermal Airflow & Temperature Measurement System. As our valued customer, our commitment to you is to provide fast reliable service and assistance, while continuing to offer you new products to meet your growing flow measurement needs.

1.1 PURPOSE OF THIS GUIDE

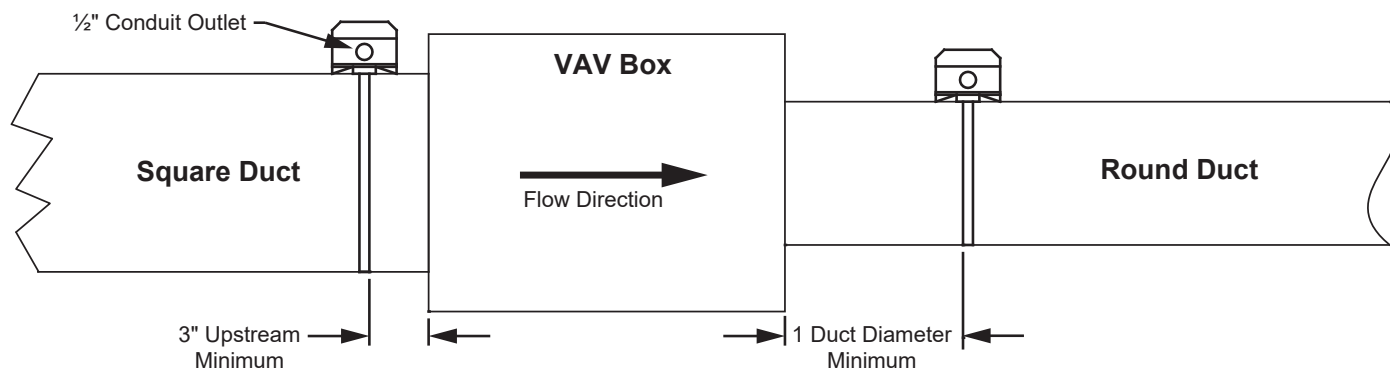
We have written this guide to provide the persons responsible for the installation, operation and maintenance of your thermal airflow measurement system with the most specific equipment information they will need. This is NOT an electrical or HVAC trade manual.

This guide is the basic reference tool for the ELECTRA-flo/SD with analog outputs only.

1.2 TYPICAL METER INSTALLATION

Air Monitor's ELECTRA-flo/SD accurately measures the average velocity of flowing air by means of thermal dispersion at the surface-mount thermistor sensor locations in the duct. Temperature is also measured via these thermistors. Microprocessor based circuitry within the enclosure then converts the rate of thermal dispersion into average airflow velocity and temperature analog signals which are transmitted via a customer-installed cable to a local controller or BMS.

TYPICAL ELECTRA-flo/SD Installation



VAV Installation Option 1: Locate ELECTRA-flo/SD a minimum of 3" upstream of the VAV box, or 3" upstream of the pneumatic flow ring (remove the ring).

VAV Installation Option 2: When mounted downstream of the VAV box, position the ELECTRA-flo/SD a minimum of one duct diameter downstream of the VAV box.

Equivalent Duct Diameter X

$$\text{Rectangular Duct: } X = \frac{2 (H \times W)}{H + W}$$

$$\text{Circular Duct: } X = \text{Duct Diameter}$$

SECTION 2.0: SPECIFICATIONS

2.1 ACCURACY

Sensor Accuracy:

Velocity: $\pm 2\%$ of Reading

Temperature: $\pm 0.15^\circ \text{F}$

Overall System Accuracy:

Flow: $\pm 3\%$ of Actual Flow

Temperature: $\pm 0.15^\circ \text{F}$ of Air Temperature

2.2 RANGE

Velocity Ranges:

User selectable via DIP switches.

0 to 500 FPM

0 to 1000 FPM

0 to 2000 FPM

0 to 3000 FPM

2.3 PROBE ASSEMBLY

Mounting:

Standard mounting bracket: 6063 aluminum with four 0.25" holes for fasteners. $\frac{1}{4}$ " thick neoprene gasket.

Optional Type 316 stainless steel mounting plate.

Length:

4", 5", 6", 7", 8", 9", 10", 12", 14", and 16"

Sensors Per Probe:

4" probe, one sensor

5"-16" probes, two sensors

Probe:

Type: 6063 anodized aluminum. $\frac{1}{2}$ " diameter tubing

Optional: Type 316 stainless steel

Sensor Housing:

Injection molded polycarbonate, UL94 V-0 rated.

Sensor Type:

Surface mount precision thermistor.

2.4 TRANSMITTER

Enclosure:

NEMA 4 rated. Injection molded polycarbonate, UL94 V-0 rated

Electrical Connections:

Separate power and signal terminal strips with plug-in connectors

Outputs:

Dual analog for airflow and temperature. User selectable via DIP switches – 0-5 VDC, 0-10 VDC, 4-20 mA. Analog outputs are isolated from input power.

Configuration:

Via eight DIP switches.

Filter:

User selectable via DIP switch – none, light, medium, and heavy.

Temperature Limits:

-20°F to 120°F Transmitter

-20°F to 120°F Airflow

Humidity Limits:

0 to 99% RH, non-condensing

2.5 POWER

Power Supply:

24 VAC (20-28 VAC) or 24 VDC (20-40 VDC), automatically selected.

Power Consumption:

5 VA or 5 W

Circuit Protection:

Power input is isolated, fused, and reverse polarity protected.

SECTION 3.0: INSTALLATION

3.1 INSTALLATION

The ELECTRA-flo/SD is intended for use in 4" to 16" ducts and in VAV terminal box applications in an environment between -20° F to 120° F where it will not be exposed to rain or snow. The ELECTRA-flo/SD electronics enclosure is designed to be mounted to the exterior of the duct or VAV box with the sensor probe inserted through the side of the duct or VAV box.

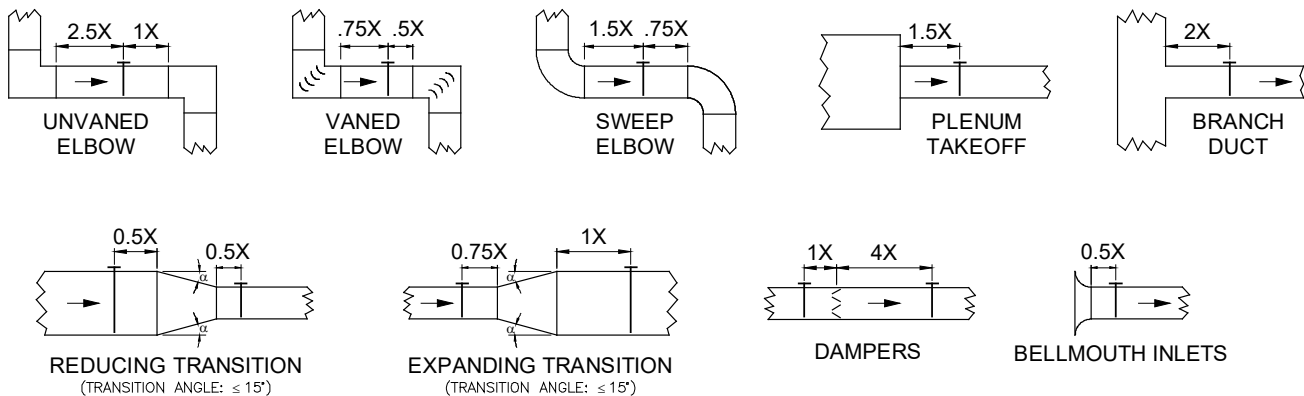
3.2 RECEIVING & INSPECTION

Carefully remove the ELECTRA-flo/SD from the shipping container and inspect for any damage. If damaged contact Air Monitor's Service Department.

Verify that the shipping container includes the four self-tapping mounting screws in addition to this IO&M manual.

3.3 PLACEMENT GUIDELINES

- Location of the ELECTRA-flo/SD is critical for proper operation and accuracy of the airflow measurement. The installation locations shown below for typical applications are the minimum separation from a source of airflow disturbances (e.g. elbow, transition, duct take-off, etc.).
- If more than the minimum clearances are available, proportionally adjust the upstream and downstream distances.
- Avoid locating the ELECTRA-flo/SD where it will be subjected to condensing moisture from a coil.
- Contact Air Monitor's Applications Engineering Department to discuss any sub-minimal installation.



Equivalent Duct Diameter X

$$\text{Rectangular Duct: } X = \frac{2(H \times W)}{H + W}$$

$$\text{Circular Duct: } X = \text{Duct Diameter}$$

- VAV Installations - Locate the ELECTRA-flo/SD a minimum of 3" upstream of the VAV box or 3" upstream of the location of a pneumatic flow ring (remove the flow ring). When mounting downstream of the VAV box, position the ELECTRA-flo/SD a minimum of one duct diameter downstream of the box.

3.4 MOUNTING

1. Determine the measurement location based upon the engineer's plans and the ELECTRA-flo/SD's minimum placement guidelines.
2. Note: It may be necessary to remove a portion of external duct insulation to allow the ELECTRA-flo/SD to be securely mounted to the exterior of the duct wall.
3. Remove the four screws (8-32 x .325) that attach the mounting bracket to the enclosure. Place the mounting bracket against the duct wall where the ELECTRA-flo/SD is to be mounted and trace the large probe insertion hole in the center of the bracket onto the duct. See Figure 2.
4. Using a 3/4" hole saw, cut the insertion hole.

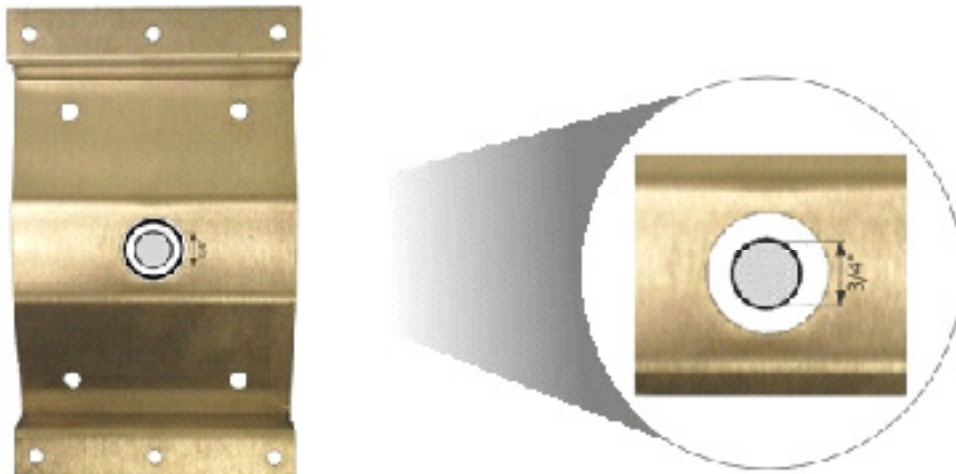


Figure 2

5. Place the mounting bracket centered over the insertion hole. Align the edge of the mounting bracket parallel with the axis of the duct, then attach the mounting bracket to the duct using the provided sheet metal screws (8-32 x .75").
6. Place the probe through the mounting hole, center the gasket in the hole in the bracket so it makes contact with the duct, then attached the enclosure to the mounting bracket at the four mounting holes using the four screws (8-32 x .325") previously removed in Step 3 above.

3.5 POWER/SIGNAL CONNECTIONS

The ELECTRA-flo/SD provides dual analog outputs of airflow velocity (or equivalent velocity pressure) and temperature. The temperature output has a fixed full scale range of -20° F to 120° F. The velocity output can be scaled at one of four user selectable ranges.

Power wiring is done at terminal strip J1 and signal wiring is done at terminal strip J2. Both terminal strips are located in the lower corners of the transmitter and are accessible by removing the enclosure cover. See Figure 3. One ½" conduit opening is provided in the bottom of the enclosure for power and signal wiring.

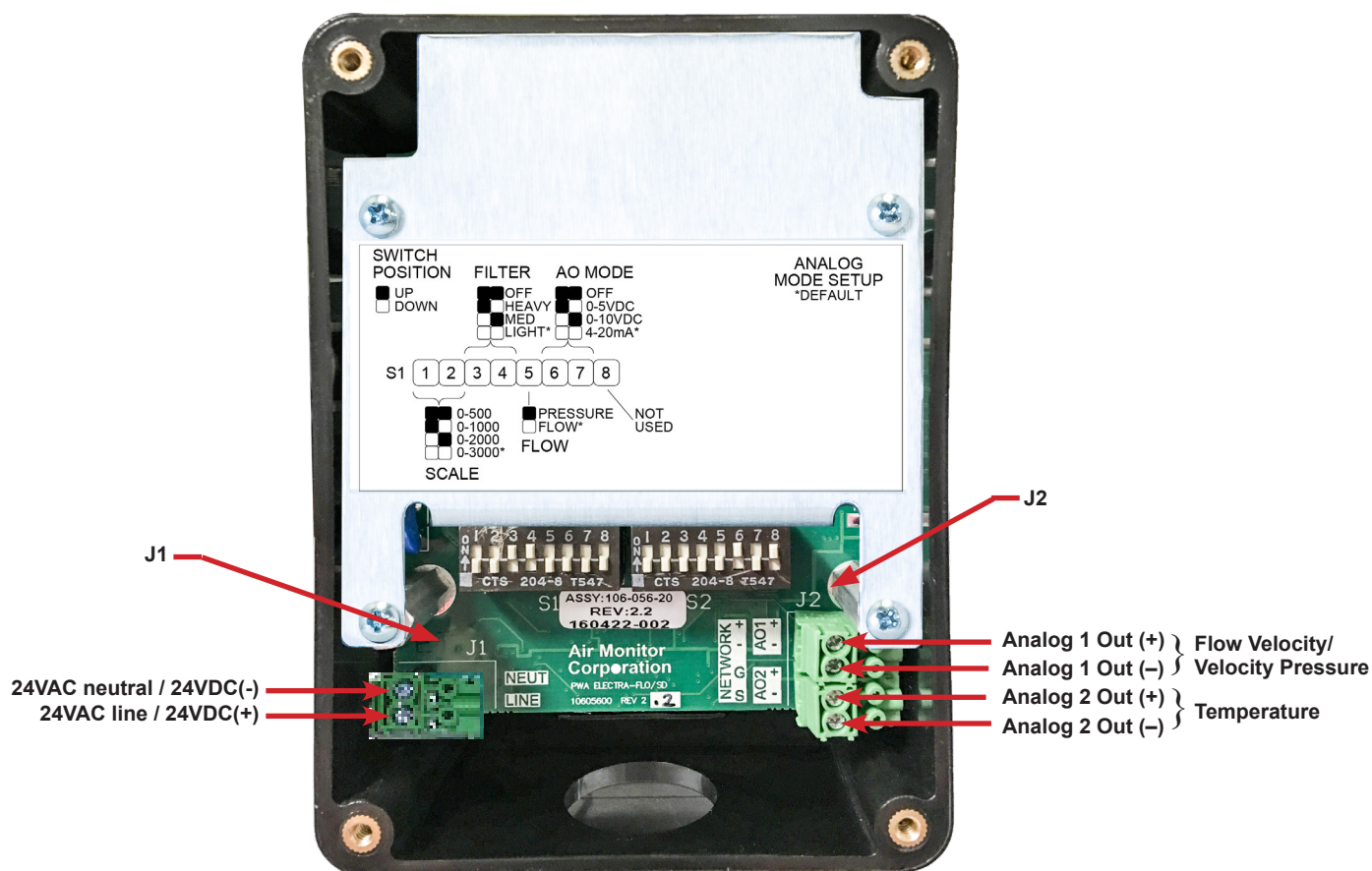


Figure 3

It is recommended that power wiring be 18 awg and signal wiring be 18 awg to 22 awg. 16 awg is the maximum wire gauge that the terminals can accommodate. To aid the wiring process, terminals J1 and J2 are removable by pulling the terminal strip straight up and off the circuit board. Once wiring has been completed replace the terminals by aligning with the receptacle and pressing firmly.



CAUTION

To prevent damage to the ELECTRA-flo/SD, the 24VAC/VDC power source must be turned off before making the power and signal connections.

The ELECTRA-flo/SD can be powered by either 24VAC providing 20-28VAC or 24VDC providing 20-40VDC.

3.6 CONFIGURATION

All device configuration is done using an 8-switch DIP package labeled S1 that can be accessed by removing the enclosure cover. The protective shield over the circuit board also has a reference guide for setting all device configurations. See Figure 4. Configuration settings can be changed while the device is powered.

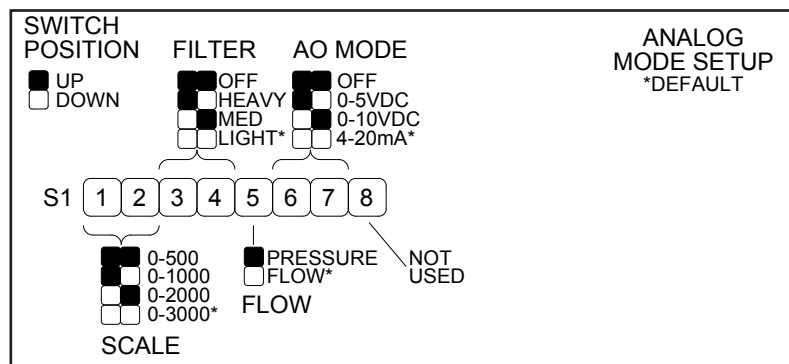


Figure 4

Note: * denotes the default setting. All configuration settings are shipped from the factory in the default mode.

SW1 & SW2 Analog Output Scaling

Up	Up	0- 500 FPM (or equivalent velocity pressure 0 - 0.16" w.c.)
Up	Down	0-1000 FPM (or equivalent velocity pressure 0 - 0.062" w.c.)
Down	Up	0-2000 FPM (or equivalent velocity pressure 0 - 0.249" w.c.)
Down	Down	0-3000 FPM* (or equivalent velocity pressure 0 - 0.560" w.c.)

SW3 & SW4 Output Filter

Up	Up	Off*
Up	Down	Heavy
Down	Up	Medium
Down	Down	Light

SW5 Airflow or Equivalent Pressure

Up	Equivalent Pressure
Down	Airflow*

SW6 & SW7 Analog Output Mode

Up	Up	Off
Up	Down	0 – 5 VDC
Down	Up	0 – 10 VDC
Down	Down	4 – 20 mADC*

SW8 – Not used

3.7 START-UP / OPERATION

1. After completion of all power and signal wiring, activate the 24 VAC / 24 VDC power source
2. Observe the Run Mode indicator located in the upper left corner of the board. See Figure 3. After a brief initialization period the Run Mode LED will begin blinking on/off in ½ second intervals indicating normal operation.
3. Confirm the signals for airflow (or equivalent pressure) and temperature are being correctly received by the BMS or controller.
4. Replace the cover of the ELECTRA-flo/SD making sure not to pinch any wires and secure in place with the four screws. Do not over tighten.

3.8 LEDs

	RUN	ALM	NET	DBG	
Flash On/Off	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Normal Mode
Flash On/Off	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Alarm Mode

Alarm Flash Sequence – Error Codes

Flash Once	=	Cal Error
Flash Twice	=	Sensor 1 Bad
Flash Three	=	Sensor 2 Bad
Flash Four	=	No Cal Data
Flash Six	=	Unknown Error

3.9 ANALOG OUTPUT SIGNALS

Temperature: Available connector J2, terminals AO2+ and AO2-. The analog output for temperature is fixed scaled for -20° F to 120° F.

Airflow: Available on connector, J2, terminals AO1+ and AO1-. When configured for airflow velocity (not equivalent velocity pressure), the analog output is scaled in FPM. To scale the airflow signal in the BMS or controller to volumetric flow, multiply the DIP selected velocity output scaling by an area factor (in square feet) corresponding to the duct cross-sectional size at the mounting location. For example, the selected airflow velocity scale is 0-2000 FPM, the analog mode is 4-20 mA, and the device is mounted in a 10" diameter round duct having a cross-sectional area factor of 0.545 square feet. The volumetric flow in CFM corresponding to the full scale 20 mADC signal would be 1091 CFM (2000 FPM x 0.545 square feet).

SECTION 4.0: MAINTENANCE / INSPECTIONS

4.1 MAINTENANCE / INSPECTIONS

The ELECTRA-flo/SD has been designed to operate in most HVAC applications without the need for periodic maintenance or calibration. In some applications it may be necessary to perform a visual inspection of the probe and sensors, and if necessary clean them using a soft, small brush and/or compressed air to remove any accumulated particulate/debris.

4.2 TROUBLESHOOTING

The ELECTRA-flo/SD is intended to provide long-term, trouble-free operation. In the event the BMS or controller ceases to receive valid airflow and/or temperature signal(s), check the following at the device after removing the cover:

1. The power wiring is securely connected and providing the intended 24V AC/DC power.
2. The signal wiring is securely connected.
3. The Run Mode light is blinking on/off in ½ second intervals indicating normal operation.

If after checking the above items normal operation is not restored, contact the factory Service Department.

TECHNICAL SUPPORT

For technical assistance please contact the factory at:

service@airmonitor.com

(707) 544-2706, Ext 3

Hours: 8:00am – 5:00pm Pacific, Monday – Friday

SECTION 5.0 – WARRANTY

5.1 WARRANTY INFORMATION

Air Monitor Corporation (hereinafter referred to as “Seller”) warrants that at the time of shipment, products sold pursuant to this contract will be free from defects in materials and workmanship and will conform to the specifications furnished or approved in writing by Seller. No warranty is given that delivered products will conform to catalog sheets, data sheets, and the like, which are subject to change without notice.

Seller will repair or replace, at its option, any product listed under this warranty which is returned freight prepaid to Seller within three (3) years after start-up or thirty-nine (39) months after shipment that upon test and examination, proves defective within the terms of this warranty. The warranty period for the ELECTRA-flo/SD module repaired or replaced shall be for the time remaining on the warranty period of the original components. Purchaser shall notify Seller in writing of such defect within sixty (60) days of discovery of the defect.

This warranty does not extend to any product sold by Seller which has been the subject of misuse, neglect, accident, damage or malfunction caused by interconnection with equipment manufactured by others, improper installation or storage, or used in violation of instructions furnished by Seller, nor does it extend to any product which has been repaired or altered by persons not expressly approved by Seller. Nor does Seller warrant equipment against normal deterioration due to environment; nor items such as lamps, glass, and similar items subject to wear or burnout through usage. Adjustments for items or equipment not manufactured by Seller shall be made to the extent of any warranty of the manufacturer or supplier thereof.

Seller shall not be liable for any special or consequential damages or for loss of damage, directly or indirectly arising from the use of the products. Seller’s warranty shall be limited to replacement of defective equipment and shall not include field removal and installation expenses.

The warranty set forth above is in lieu of all other warranties either express or implied and constitutes the full extent of Air Monitor Corporation’s liability to the customer, or any other party for breach of warranty.

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