

ATTENTION!

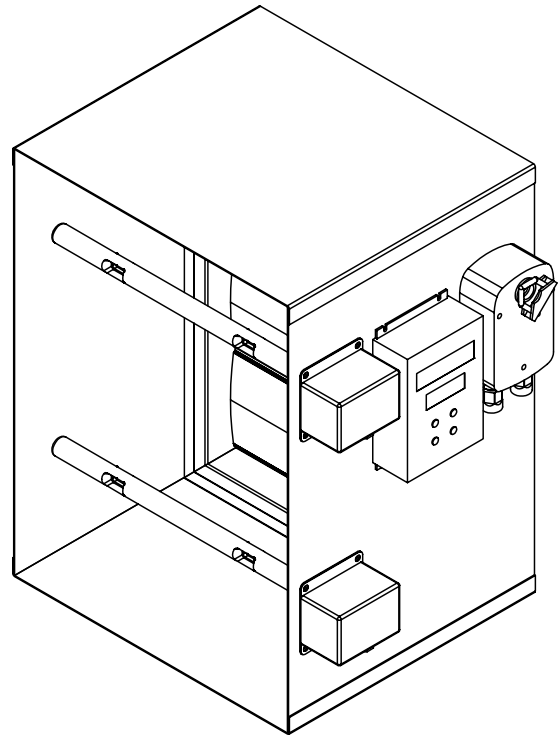
Ensure this manual is read in its entirety before handling the AMD-TD-XX Unit. Any product tampering should be done after carefully reading this manual, with special attention to all safety information included. This is done to ensure your safety, as well as others near and/or handling the equipment. Failure to follow these instructions may result in personal injury and/or property damage and may void the product warranty. Save this manual for future references.

IN REGARD TO THIS MANUAL:

This manual is intended to be used for the installation of Nailor Industries AMD-TD-XX Thermal Dispersion Air Measuring Control Dampers. This manual is not an HVAC informational guide, nor is it meant to be treated as such.

This Manual discusses the installation of the AMD-TD-XX unit, safety information, site selection/optimal location, and electrical wiring. Read all warnings and safety precautions to ensure the product is handled with the necessary care and to avoid injury/damage. Refer to the "Operation and Maintenance Manual" for additional information.

- This manual should be turned over to the end user.
- 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 Nailor Industries' written permission.
- Nailor Industries makes no warranty of any kind regarding 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 Nailor Industries.
- Nailor Industries assumes no responsibilities for this product except as stated in the warranty. If the customer or any third party is harmed using this product, Nailor Industries 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. Nailor Industries 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 messages 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.

ELECTRICAL SAFETY PRECAUTIONS:

Ensure all wiring is done in accordance with the National Electrical Code ANSI/NFPA-70 latest edition, as well as any local codes that may apply. Follow all wiring diagrams that are developed in agreement with the job and/or project design and specifications. Reasonable consideration should be given to clearances for electrical connections.

ATTENTION!

Electrical power and wiring may be necessary to install this unit. All electrical installation should be carried out by a qualified electrician, ensuring no wires are left exposed. Nailor Industries is not responsible for any damage or operational failure to all equipment due to incorrect and unsafe field wiring. Read all instructions first and follow all instructions carefully to avoid bodily harm and/or death to technicians and building occupants. Verify that all dampers open and close completely to ensure equipment operates as intended. Follow wiring diagrams and instructions as described in this manual.

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1.0 UPON RECEIVING UNIT(S)

1.1 Inspection and Handling:

Upon delivery, carefully open the Air Measuring Damper shipping container(s) and remove all equipment. Inspect shipping containers and Air Measuring Dampers carefully. Verify all components are included as ordered. Note any damage on trucker's delivery receipt. Contact the freight company within 24 hours for inspection. Do not install dampers. It is easier to repair on the floor than in the duct.

Verify that the configuration recorded on the factory set-up sheet is correct for your application. Please contact the Nailor Industries Application Engineering Department if you have questions.

The serial number of your ELECTRA-flo G5 transmitter is located outside of the enclosure. The serial number and sales order number is a unique identifier for your product. Please have it available when contacting Nailor Industries Application Engineering for assistance regarding your product.

Handle Air Measuring Dampers by frame only. Do not lift by blades, linkage, probes, transmitter, actuator, or jackshaft. Use sufficient people to evenly lift multiple section assemblies. Do not drop, drag, step on, or apply excessive bending, twisting, or racking. It is important not to drop or mishandle the equipment such that damage is done to the probes, damper, actuator, flanges, or any other component of the unit.

1.2 Storage and Containment

Store in an orderly manner. Do not pile Air Measuring Dampers on each other. Cover with plastic sheeting to protect from excessive moisture, dirt, and debris. Avoid unnecessary handling of dampers. Do not store in locations where the weather may exceed 100°F (38°C).

2.0 Before Installing Unit

2.1 Site Selection

- When installing the Air Measuring Damper, select a location that is at or below the Minimum Installation Requirements (see Section 2.3 below).
- When more than the combined upstream and downstream minimum requirements for undisturbed straight duct is available, distribute the excess duct length in proportion to the minimum requirements.
- Avoid locating the units where they will be exposed to condensing moisture, such as downstream of a coil or humidifier.
- Locating the units too close to upstream sources of thermal influence (heaters, coolers) may cause a short delay on the transmitter display due to the change in temperature.
- Contact Nailor Industries Applications Engineering Department for guidance when the intended installation location does not meet the Minimum Installation Requirements (see Section 2.3 below).
- ELECTRA-flo G5 NEMA 1 transmitter enclosures are designed for use in indoor installations that are free of condensing moisture. NEMA 4X enclosures with display windows are designed for use in wet indoor installations. Do not expose these transmitters to direct sunlight, temperature extremes, or excessive vibration. The operating ambient air temperature range for both enclosures is -20°F to 140°F (-29°C to 60°C).

2.2 Installation Considerations

Considerations when installing Air Measuring Dampers are as follows:

- **Turbulent Airflow:** The aerodynamic design of the Air Measuring Damper probes aperture will permit accurate flow measurement in the presence of moderate air turbulence. The distances from air turbulence producing fittings, transitions, etc., shown in Figure 1 are required to assure accurate airflow measurement.
- **Stratified Airflow:** The Air Measuring Damper should be mounted so that the probes cross any stratified airflow - not parallel to stratification. This mounting arrangement will permit the probe to sense the wide range of velocities present in stratified airflow.
- **Airborne Contaminants:** The levels of air filtration and cleanliness associated with commercial HVAC systems are satisfactory for the air measuring damper probes and unit. Applications containing airborne contaminants or condensing moisture may impair measurement accuracy and functionality.
- **Minimum Requirements:** The Air Measuring Damper locations shown are the minimum clearances required from air turbulence producing sources. Wherever possible, the Air Measuring Damper unit should be installed where greater runs of straight duct or clearances exist.

2.3 Minimum Installation Requirements

The following diagrams in Figure 1 show the minimum clearances required to install the Air Measuring Damper Unit. Contact Nailor Industries Applications Engineering Department if you cannot meet these requirements. Use of a honeycomb attachment allows for clearances in Figure 2 and/or specific lab tests may prove to use smaller clearances. 'X' represents the duct diameter dimension for circular ducts. To determine the equivalent duct diameter dimension for rectangular ducts, use the equation below.

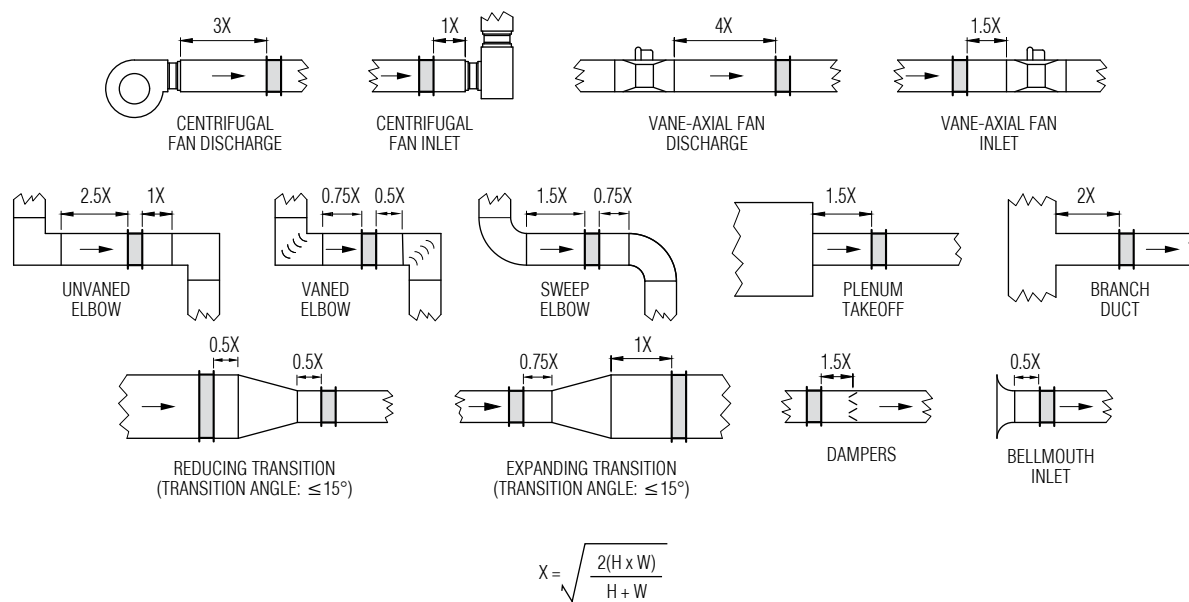


Figure 1: Minimum Installation Requirements

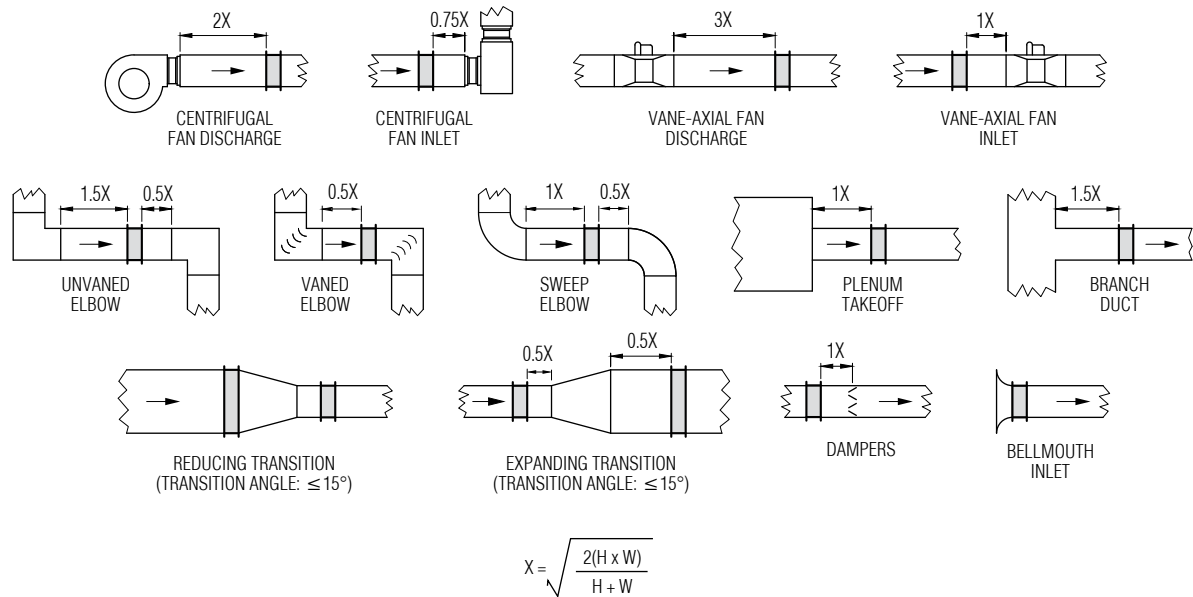


Figure 2: Minimum Installation Requirements with Honeycomb Attachment

2.4 Guidelines

A proper installation for the AMD-TD-XX requires it to be held rigidly in the opening such that there is no interference nor disturbance to the damper operation. Review the following items which will help in successful installation of the Air Measuring Damper Unit.

1. Be wary of where screws are inserted so that they do not interfere with blade linkage or blades themselves that would in turn prevent the damper from fully opening and/or closing.
2. Pre-plan installation by checking scheduling and Air Measuring Damper location. Air Measuring Dampers are factory calibrated and are specific to the specified duct location. Visually inspect the Air Measuring Damper after each time it is handled.
3. As mentioned above, only carry and move the Air Measuring Damper Unit by the sleeve or frame. Do not handle the damper by grabbing onto any of the other components, which could in turn damage the unit. Use sufficient support at each mullion whenever handling multiple section units. Do not step on the units, and do not drag them or use excessive force when installing that may cause twisting, racking, and/or bending.
4. The unit must be squared in the duct such that there is no misalignment and the unit is free of twist. Do not squeeze or stretch the equipment into the duct/opening. Improper installation that results in misalignment will lead to higher torque requirements and/or unwanted leakage.
5. The unit must always be kept dry and clean, with attention to the probes, transmitter, actuator, and damper. Ensure the unit is cleaned before and after handling/installing so that it is free of dirt, dust, and/or foreign materials.
6. If there is any spray painting or wall texturing performed within 5 feet (1.5 m) of the Air Measuring Damper, cover the Air Measuring Damper to prevent it from becoming dirty. Any spray that gets onto the unit could result in higher torque requirements and/or unwanted leakage, as well as inaccurate probe readings.
7. There must be enough space to provide suitable access for future servicing and inspection. If there is not room allotted, then a removable section of duct will be necessary.

3.0 Installation

3.1 Unit Installation

Handle dampers by frame only. Do not lift by probes, blades, linkage, actuator, or jackshaft. Use sufficient people to evenly lift multiple section assemblies. Do not drop, drag, step on, or apply excessive bending, twisting, or racking. Cycle dampers by hand before installation to ensure freedom of movement. Not following the instructions and/or incorrect installation will void warranty.

1. Determine the airflow direction of the duct/opening. The Air Measuring Damper is installed such that the air passes through the probes first. (Damper downstream of the probes).
2. Inspect ductwork or opening where damper will be installed for any obstructions and to ensure it is straight and level. It is essential to support ductwork to prevent sagging due to damper weight.
3. Position the Airflow Measuring Control Damper in the duct or opening.
4. Nailor Industries ensures its Airflow Measuring Control Dampers are rigidly designed and constructed to ensure structural integrity for its intended application. It is the installers responsibility to use the appropriate framing, anchoring, mating flanges and attachment to properly fasten the unit in the duct, opening, and/or walls. Field engineers are responsible for conducting the design calculations for the appropriate supporting and retaining members to be used.
5. Use shims as appropriate between damper frame and duct opening and between damper sections as necessary to prevent distortion of frame by fasteners. Ensure fasteners do not interfere with blade movement or damper linkage. Bracing is required at every horizontal mullion for strength and to support

weight. Vertical bracing is recommended at every 8 feet (2.4 meters) minimum of damper width for strength. Dampers in high velocity and/or high-pressure systems require more bracing.

6. Ensure dampers are set completely square, plumb, and free from racking, twisting, or bending and are free to operate without binding (see Figure 3). A clearance must be maintained between blade and blade bearing. Move blade solidly to one side against bearing and measure clearance at the other end. If jamb seals are present, compress to determine clearance. Dampers must operate without binding. Before system operation, cycle damper after installation to assure proper operation. On multiple section assemblies, all sections should open and close simultaneously.

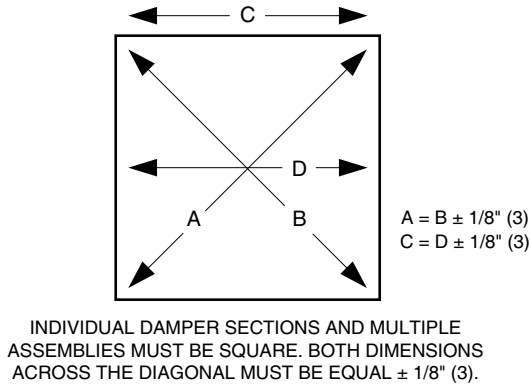


Figure 3

3.2 Wiring

Air Measuring Dampers are factory assembled to reduce field labor and installation time. The unit will consist of a sleeve, damper, Electra-flo G5 thermal dispersion probes, terminal block, and Electra-flo G5 airflow rate transmitter, all of which will be factory assembled and wired. The unit may then be ordered with a hand-locking quadrant or with an electric modulating actuator.

3.2.1 Factory Installed Hand-Locking Quadrant

Units ordered with hand-locking quadrants allow the damper to be fixed to one point. This combination is used in applications where the airflow must be known, and the airflow is to be adjusted and pressure imbalances alleviated.

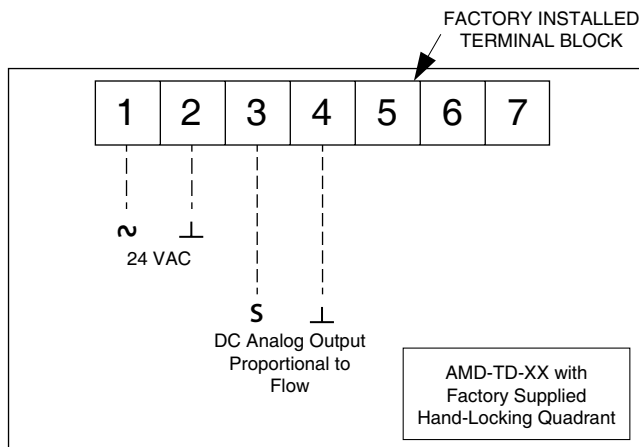


Figure 4

Figure 4 shows a layout of the terminal block in this configuration. Terminals 1 and 2 are 24 VAC power and common, respectively, to power the electrical components. Terminals 3 and 4 are a DC analog signal and common, respectively, proportional to the airflow being read, which is pre-configured to 4 - 20 mA DC, 0 - 5 VDC, or 0 - 10 VDC based on configuration ordered. Reference the Operation and Maintenance Manual Section 3.3 for information regarding transmitter settings. Transmitter output 2 will need to be wired directly to the transmitter, as it is not wired to the terminal block. Follow directions from Section 3.2.3 and reference the Operation and Maintenance Manual Section 2.3 for more information.

3.2.2 Modulating Actuator Factory Wiring

A unit that is ordered with a modulating actuator will consist of a sleeve, damper, Electra-flo G5 thermal dispersion probes, terminal block, Electra-flo G5 airflow rate transmitter, and an electric modulating actuator, all of which will be factory assembled and wired. The probes are connected to the transmitter using mini-din snap lock connectors. The transmitter and the actuator are connected to the terminal block for single-point wiring. See Figure 5 for a diagram of the wiring schematic.

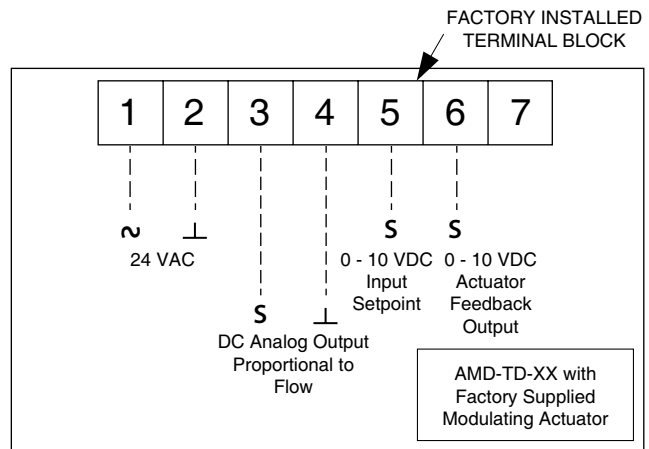


Figure 5

Terminals 1 and 2 are 24 VAC power and common, respectively, to power the electrical components. Terminals 3 and 4 are a DC analog signal and common, respectively, proportional to the airflow being read, which is pre-configured to 4 - 20 mA DC, 0 - 5 VDC, or 0 - 10 VDC based on configuration ordered. Reference the Operation and Maintenance Manual Section 3.3 for information regarding transmitter settings. Transmitter output 2 will need to be wired directly to the transmitter, as it is not wired to the terminal block. Follow directions from Section 3.2.3 and reference the Operation and Maintenance Manual Section 2.3 for more information. Terminal 5 is a 0 - 10 VDC input to the actuator to tell it how much to open or close the damper based on the set airflow requirements (use Terminal 2 for common). Terminal 6 is a 0 - 10 VDC feedback output coming from the actuator.

IMPORTANT NOTE:

Connect the actuator 0 - 10 VDC input common wire to Terminal 2. Do NOT connect to Terminal 4.

3.2.3 Connecting to Alarm and BACnet Capabilities

The wiring terminal blocks to the Electra-flo transmitter alarm and BACnet capabilities are located inside the transmitter. Loosen the screw holding the front cover in place and hinge open the cover to provide access to the wiring terminal

blocks. Ensure the cover is closed and the screw is securely fastened once wiring is completed. Reference the Operation and Maintenance Manual Section 2.3 for more information.

4.2 Transmitter BACnet Objects

4.2.1. PICS

Table 1

Device Object			
Property	Default Value	Writable	Comment
Object Identifier	1	No	0 - 4,194,303
Object Name	ELECTRA-flo	Yes	16 alpha numeric characters max.
Object Type	Device	No	
System Status	Operational	No	
Vendor Name	Air Monitor	No	
Location	Default Location	Yes	
Description	Thermal	Yes	
Protocol Version	1	No	
Protocol Revision	12	No	
Services Supported	Read Property, Read Property Multiple, Write Property, Device Communication Control, I-Am, I-Have, Reinitialize Device, Who-Has, Who-Is	No	
Object Types Supported	Device, Analog Input	No	
Object List	Varies (device 1), (analog input 1-x) where x=1 + # of sensors *2	No	
Max. ADPU Length	128	No	
Segmentation Supported	No Segmentation	No	
APDU Timeout	3000	No	
# of ADPU Retries	3	Yes	
Max. Master	127	No	
Device Address Binding	∅	No	
Database Revision	3	No	

Table 2

Analog Input			
Property	Default Value	Writable	Comment
Object Identifier	Analog Input-0 to Analog Input-X	No	
Object Name	Various	No	
Object Type	Analog Input	No	
Present Value	Real		
Status Flags	F, F, F, F	No	
Event State	Normal	No	
Out of Service	FALSE	Yes	
Description	Various	Yes	
Location	Various	No	
Units	Various	No	

4.2.2. BTL Listing

BIBBs Supported

Data Sharing	ReadProperty-B	DS-RP-B
	ReadPropertyMultiple-B	DS-RPM-B
	WriteProperty-B	DS-WP-B

Device Management	Dynamic Device Binding-B	DM-DDB-B
	Dynamic Object Binding-B	DM-DOB-B
	Device CommunicationControl-B	DM-DCC-B
	ReinitializeDevice-B	DM-RD-B

Object Type Support

Analog Input	Device	
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Data Link Layer Options

Media	Options
MS/TP Master	9600, 19200, 38400, 57600, 76800, 115200

Character Set Support

ISO 10646 (UTF-8)

Dimensions are in inches (mm).



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