

Thermal Dispersion Air Measuring Station with VCD-42 Control Damper

Application and Design

The AMD-42-TD combines the functionality of a highly accurate thermal dispersion airflow measuring station and a low leakage control damper into one compact assembly that both measures and regulates airflow volumes to a target set-point. The AMD-42-TD comes standard with Vari-Green thermal dispersion probes factory installed in the damper sleeve, a modulating actuator and a Vari-Green airflow measurement transmitter that outputs a signal proportional to the cfm going through the unit. The transmitter and actuator are factory wired to a terminal block for easy single-point wiring. The optional factory supplied controller makes the AMD-42-TD a turn-key solution for the measurement and control of airflow. Factory supplied controllers configured for analog operation accept a 0-10 VDC setpoint signal proportional to the required cfm and output a 0-10 VDC signal proportional to the real-time cfm going through the unit. Factory supplied controllers can also be ordered with BACnet MS/TP communication capabilities. See the installation and operation manual for a list of the BACnet datapoints.

Ratings

Velocity: 100 - 3000 fpm (0.5 - 15.2 m/s)

Leakage: 6 cfm/ft² @ 4 in. wg
(110 cmh/m² @ 1 kPa)
3 cfm/ft² @ 1 in. wg
(55 cmh/m² @ 0.25 kPa)

Temperature: -20° to 140°F (-29° to 60°C). Consult factory for temperatures lower than -20°F (-29°C).

Monitor Accuracy: 2-3% of reading



*W & H dimension furnished approximately 1/4 in. (6mm) undersize.

Construction	Standard	Optional
Frame Material	Galvanized Steel	-
Frame Material Thickness	16 ga. (1.5mm)	12 ga. (2.7mm)
Frame Type	5 in. x 1 in. hat channel	-
Blade Material	Extruded Aluminum	-
Blade Type	Airfoil	-
Blade Action	Parallel	-
Linkage	Plated steel out of airstream, concealed in jamb	316SS
Axle Bearings	Synthetic (acetal) sleeve type	316SS
Axle Material	Plated steel	316SS
Blade Seals	TPE	Silicone
Jamb Seals	Stainless Steel	-
Sleeve	16 in. (406mm)	16 in. - 48 in. (406mm - 1219mm)
Sleeve Gauge	20 ga.	14 ga. or 16 ga.
Flange	None	1 1/2 in. (38mm); Upstream side, Downstream side, Both Sides
Air Straightener	None	Polycarbonate Honeycomb
Actuator	24 VAC 50/60 Hz modulating, spring return	24 VDC modulating, Manual quadrant

W x H	Minimum Size		Maximum Size	
	External	Internal	Single Section	Multiple Section
Inches	6 x 6	12 x 8	48 x 74	120 x 74
mm	152 x 152	305 x 203	1219 x 1880	3048 x 1880

Features and Control Options

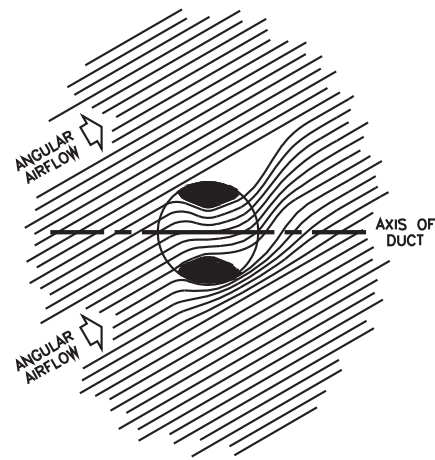
- 24 VAC modulating actuator mounted externally or internally (NEMA2)
- Optional factory supplied controller
 - Analog
 - BACnet MS/TP
- Clean wrap
- Retaining angle
- Flow straightener

Vari-Green Thermal Dispersion Technology

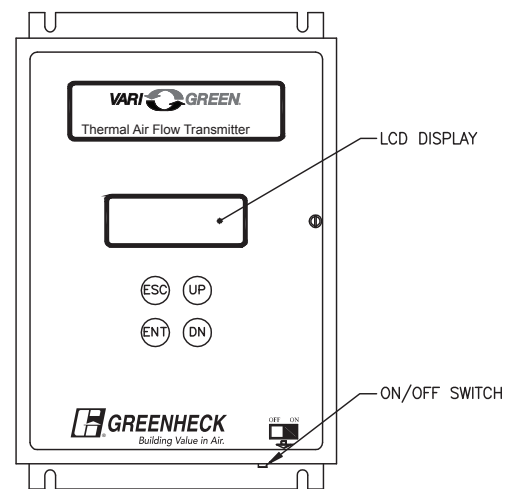
Vari-Green airflow measurement probes and transmitters utilize thermal dispersion technology to accurately measure airflow down to 0 fpm. Each probe comes with one or more airflow measuring nodes that contain precision matched thermistors. In each node one thermistor measures the ambient air temperature and the other is heated to a preset temperature differential above ambient. The air velocity is measured at each node by using the known relationship between heat transfer and air velocity and by measuring the power consumption necessary to maintain the fixed temperature difference between the thermistors. The Vari-Green transmitter then averages the velocities at each node to determine the overall cfm going through the AMD-23-TD.



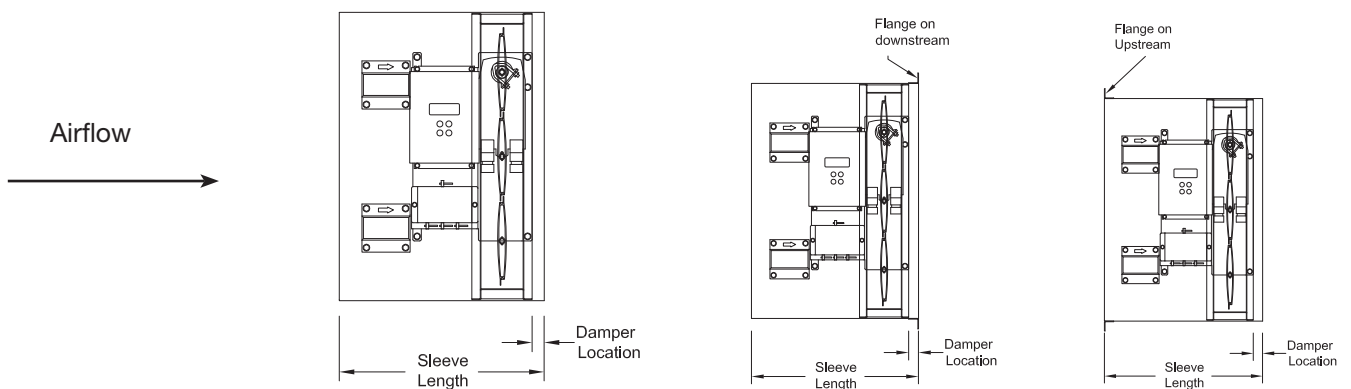
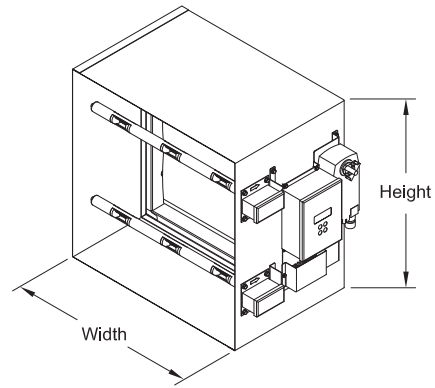
The nodes in Vari-Green probes utilize a highly engineered injection molded aperture that straightens the airflow as it passes over the thermistors to produce an accurate measurement.



Each Vari-Green airflow transmitter has multi-line, back-lit, graphical LCD that provides continuous display of cfm, velocity and ambient air temperature.

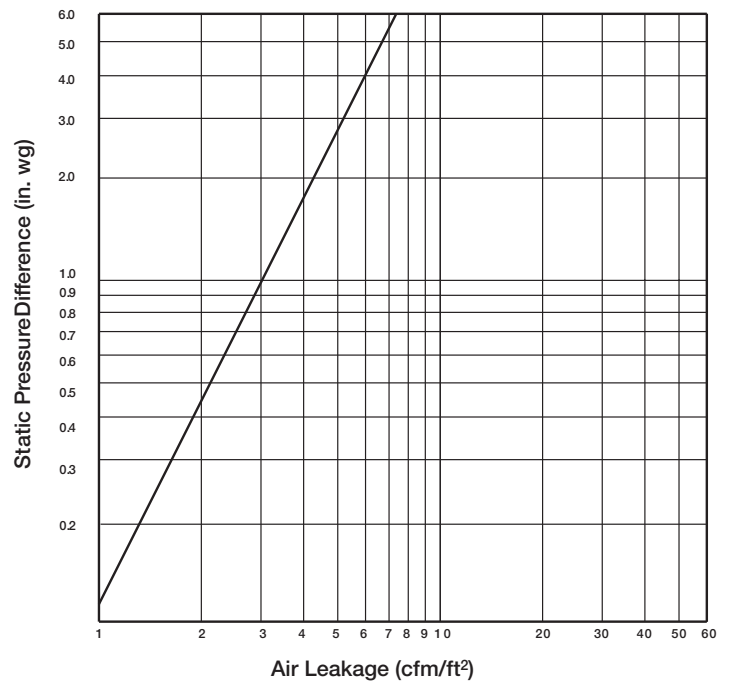


AMD-42-TD Mounting Styles



Leakage Data

Damper leakage (with blades fully closed) varies based on the type of low leakage seals applied. Model AMD-42-TD is available with silicone blade seals and stainless steel jamb seals. Leakage testing was conducted in accordance with AMCA Standard 500-D and is expressed as cfm/ft² of damper face area. All data has been corrected to represent standard air at a density of 0.075 lb/ft³ (1.201 kg/m³).



This pressure drop testing was conducted in accordance with AMCA Standard 500-D using the three configurations shown. All data has been corrected to represent standard air at a density of 0.075 lb/ft³ (1.201kg/m³).

Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

AMCA Test Figures

Figure 5.2 illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

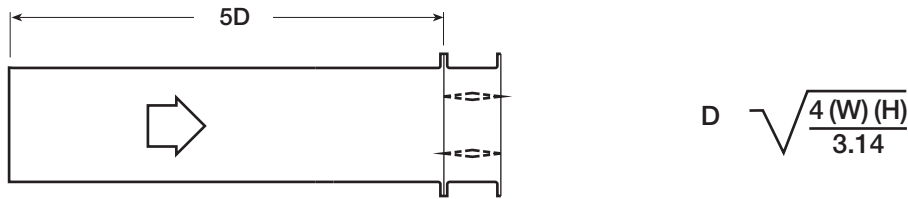


Figure 5.3 illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

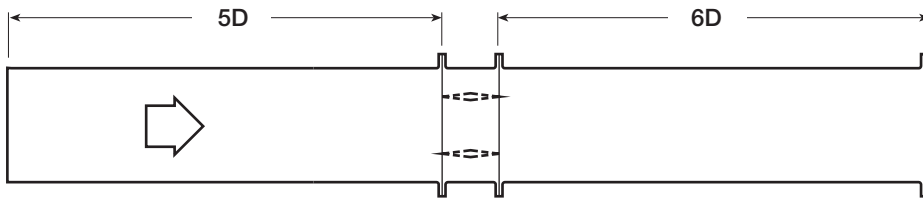
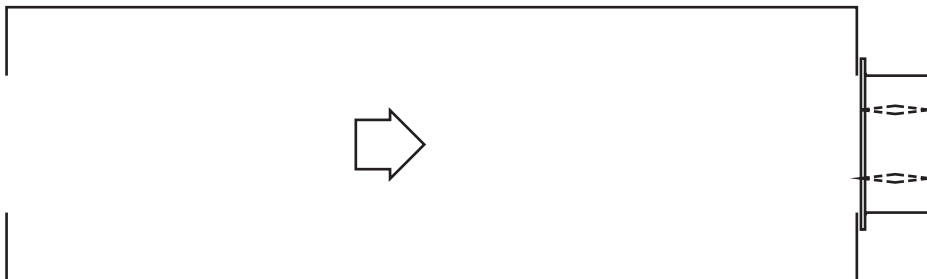
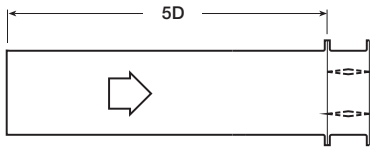


Figure 5.5 illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.



AMCA 5.2



12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.05
1000	0.18
1500	0.43
2000	0.76
2500	1.19
3000	1.71
3500	2.33
4000	3.04

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.05
1500	0.12
2000	0.22
2500	0.34
3000	0.49
3500	0.66
4000	0.87

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.09
2000	0.17
2500	0.26
3000	0.38
3500	0.51
4000	0.67

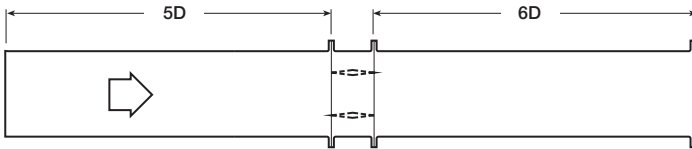
12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.01
1500	0.14
2000	0.25
2500	0.39
3000	0.57
3500	0.77
4000	1.01

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.11
1500	0.25
2000	0.44
2500	0.69
3000	1.00
3500	1.36
4000	1.78

AMCA 5.3



12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.12
1500	0.28
2000	0.49
2500	0.77
3000	1.11
3500	1.51
4000	1.98

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.03
1500	0.06
2000	0.11
2500	0.17
3000	0.24
3500	0.33
4000	0.43

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.02
1500	0.05
2000	0.08
2500	0.13
3000	0.19
3500	0.26
4000	0.34

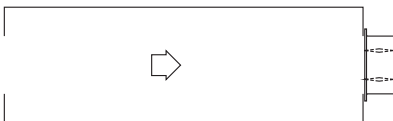
12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.09
2000	0.16
2500	0.25
3000	0.36
3500	0.49
4000	0.64

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.06
1500	0.14
2000	0.25
2500	0.39
3000	0.57
3500	0.77
4000	1.01

AMCA 5.5



12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.07
1000	0.28
1500	0.62
2000	1.11
2500	1.73
3000	2.50
3500	3.41
4000	4.45

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.04
1000	0.17
1500	0.37
2000	0.66
2500	1.04
3000	1.50
3500	2.04
4000	2.66

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.02
1000	0.12
1500	0.28
2000	0.50
2500	0.78
3000	1.13
3500	1.53
4000	2.01

12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.18
1500	0.40
2000	0.72
2500	1.12
3000	1.62
3500	2.21
4000	2.88

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.05
1000	0.19
1500	0.44
2000	0.78
2500	1.21
3000	1.75
3500	2.38
4000	3.11

Control dampers meeting the following specifications shall be installed where shown on plans as an air monitor station integral to the minimum outside air damper. The air measuring damper shall control the minimum amount of outside air as recommended by ASHRAE Standard 62 or California Title 24.

The air measuring damper shall consist of: 16 ga. (1.5mm) galvanized steel hat channel frame with 5 in. (127mm) depth; airfoil shaped, extruded aluminum blades (0.063 in. (1.6mm) thick). Blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow and operation in either direction through the damper (blades that are non-symmetrical relative to their axle pivot point or utilize blade stops larger

than ½ in. [13mm] are unacceptable). Axles shall be ½ in. (13mm) dia. plated steel turning in acetal bearings; TPE blade seals for 250°F (121°C) maximum temperature; flexible stainless steel jamb seals; and external (out of the airstream) blade-to-blade linkage. Vari-Green thermal dispersion probes to be installed in the damper sleeve. Transmitter and actuator to be factory wired to a terminal block for single point wiring.

Damper leakage rating to be in compliance with the IECC (International Energy Conservation Code) and not to exceed 3 cfm/ft² (55 cmh/m²) at 1 in. wg (0.25 kPa). Testing and ratings to be in accordance with AMCA standard 500-D.

Basis of design is model AMD-42-TD.

