VD-1300 Volume Control Dampers

Product Bulletin

VD-1300

Code No. LIT-1201635
Issued April 27, 2015

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Since 1885, Johnson Controls has provided the highest quality control dampers that fit your application and size requirements.

- VD-1330
  Airfoil-shaped aluminum blades/galvanized frame
- VD-1320
  Double-piece blades/galvanized frame
- VD-1310
  16-gauge blades/galvanized frame
  Not for outdoor air applications

Figure 1: VD-1300 Damper Family

Table 1: Features and Benefits

Features	Benefits
Tested to Over 100,000 Cycles	Assures long damper life.
3-Year Warranty on Materials and Workmanship	Provides confidence of company standing behind product.
3-Working-Day Standard Shipping after Order Entry	Results in fast response for short lead time projects.
1-Working-Day Fast Track Shipping	Provides Fast Track at a cost premium.
Factory-Installed Actuator	Reduces installation and commissioning time.
Factory-Installed Jackshaft	Reduces installation and commissioning time.

Johnson Controls

Applications

VD-1300 dampers are designed to control the flow of air in Heating, Ventilating, and Air Conditioning (HVAC) systems, and to meet different application and environmental requirements. These applications include, but are not limited to:

- volume (air) control applications, which regulate the flow of air
- temperature control applications, which maintain a constant temperature
- pressure control applications, which maintain a constant pressure

Dampers are tested at an Air Movement Control Association (AMCA) Certified Laboratory using instrumentation and procedures in accordance with AMCA Standard No. 500, Test Methods for Louvers, Dampers, and Shutters. The VD-1300 Series includes Class IA, I, and III leakage-rated dampers, available in 1-inch increments. Testing has determined the following product classifications:

- VD-1330 dampers with seals rated for Class IA leakage resistance in applications requiring very tight closure and high velocities
- VD-1320 dampers with seals rated for Class I leakage resistance in applications requiring tight closure with less velocity, such as outdoor air
- VD-1310 dampers with seals rated for Class III leakage resistance in applications where tight closure is not required, such as return air applications. Do not use VD-1310 dampers for outdoor air applications.

Table 2: Leakage Resistance Classes[1]

Class	Static Pressure (inches water)			
	1	**4**	**8**	**12**
IA	3	--	--	--
I	4	8	11	14
II	10	20	28	35
III	40	80	112	140

1. Maximum allowable leakage in cfm/sq ft is ($m^3/s/m^2$ x 196) for all sizes.

Submittal Specifications

VD-1320 Class I or VD-1330 Class IA Dampers

Furnish and install Johnson Controls® **VD-1320** Class I or **VD-1330** Class IA volume control dampers.

Frames are to be constructed of formed 13-gauge galvanized sheet steel, mechanically joined with linkage concealed in the side channel to eliminate noise and friction. Compressible spring stainless steel side seals and self-lubricating bearings shall also be provided.

Blades are to be constructed with 1/16-inch extruded aluminum in an airfoil shape. Damper blade width shall not exceed 8 inches and shall have seals. Blade rotation is to be parallel or opposed as shown on the schedules.

Performance shall be designed for very tight shutoff and tested in accordance with AMCA Standard 500. Leakage resistance for a 48-inch x 48-inch damper with seals shall not exceed 2.2 cfm per square foot at a 1-inch pressure differential, 3.7 cfm per square foot at a 4-inch pressure differential. Damper sealing force at a 4-inch differential shall not exceed 6 lb·in/sq ft. The damper must be rated to operate over a temperature range of -40 to 200°F (-40 to 93°C) standard and -40 to 250°F (-40 to 121°C) high temperature.

Sizing shall be determined by the designer in accordance with accepted industry practices to ensure proper system performance.

VD-1310 Class III Dampers (Not for Outdoor Air Applications)

Furnish and install Johnson Controls **VD-1310** Class III volume control dampers.

Frames are to be constructed of formed 13-gauge galvanized sheet steel, mechanically joined with linkage concealed in the side channels to eliminate noise and friction. Compressible spring stainless steel side seals and self-lubricating bearings shall also be provided.

Blades are to be constructed with formed 16-gauge galvanized steel. Damper blade width shall not exceed 8 inches and shall have seals. Blade rotation is to be parallel or opposed as shown on the schedules.

Performance shall be designed for normal shutoff in return air applications and tested in accordance with AMCA Standard 500. Leakage resistance for a 48-inch x 48-inch damper with seals shall not exceed 17 cfm per square foot at a 1-inch pressure differential, 45 cfm per square foot at a 4-inch pressure differential. Damper operating force at a 4-inch differential shall not exceed 6 lb·in/sq ft. The damper must be rated to operate over a temperature range of -40 to 200°F (-40 to 93°C) standard and -40 to 250°F (-40 to 121°C) high temperature.

Sizing shall be determined by the designer in accordance with accepted industry practices to ensure proper system performance.

Construction

Each rigid frame is made of 13-gauge galvanized steel, formed into channels, and mechanically joined with linkage concealed in the side channel to eliminate noise and friction and provide maximum strength. Compressible spring stainless steel side seals and self-lubricating bearings are standard. The modular design of the frame provides quick and easy coupling in the field.

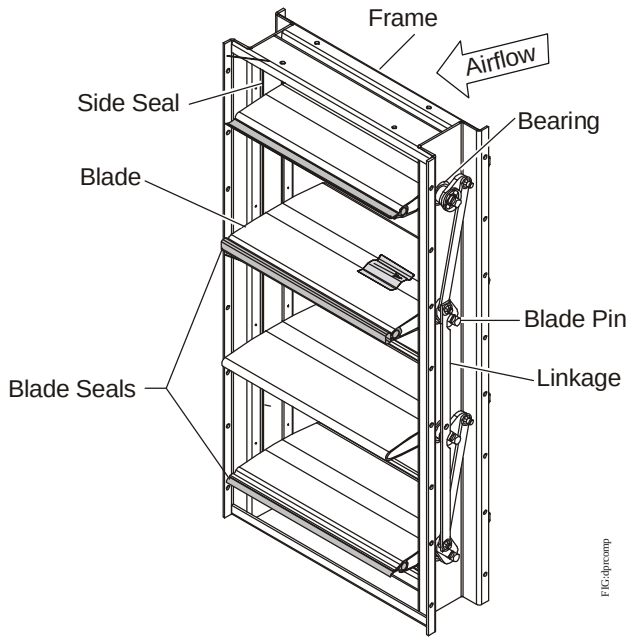

Figure 2: Damper Components

Table 3: Materials, VD-1300

Part	Materials
Frame	3-1/2 x 1 in. x 13-gauge galvanized steel, hat channel shaped, mechanically joined
Blades	**VD-1310:** 16-gauge galvanized steel **VD-1320:** Double layer of 22-gauge galvanized steel, mechanically joined **VD-1330:** 1/16 in. aluminum in airfoil shape **Note:** Blades are 6 in. nominal width and 8 in. maximum width.
Linkage	1/8 in. rolled steel, zinc plated, concealed in both end channels
Blade Pin	3/8 in. square steel, zinc plated
Blade Pin Extension	1/2 in. diameter, 7 in. long pin included with all control dampers (DMPR-KC003)
Bearings	Self-lubricating acetal or Self-lubricating bronze
Blade Seal	Santoprene® or silicone
Side Seal	Self-compensating stainless steel

Dimensions

All Johnson Controls height and width dimensions are from the outside edges of the frame. Actual damper size is 1/4 in. less than nominal.

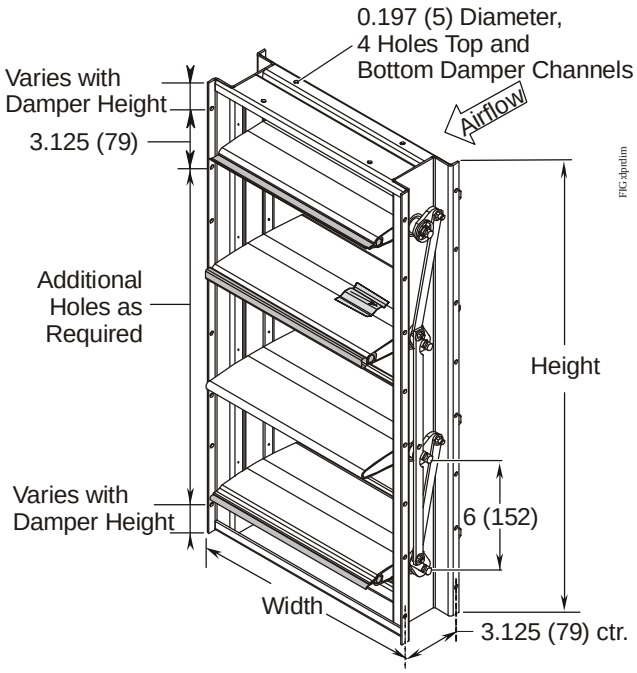

Figure 3: Mounting Dimensions, inches (mm)

To determine the distance the blade extends beyond the frame, use the frame depth of 3.5 inches centered on Figure 4, Figure 5, and Figure 7.

Table 4: Single-Panel Size Limits

Dimension	Limits
Width	**VD-1310:** 8 to 36 in. **VD-1320:** 8 to 48 in. **VD-1330:** 8 to 48 in.
Height	6 to 76 in.
Size Increment	1 in. increments

Airfoil blades are made from nominal 1/16 in. extruded aluminum in an airfoil shape for high performance. Blade and side seals are standard. See Figure 4.

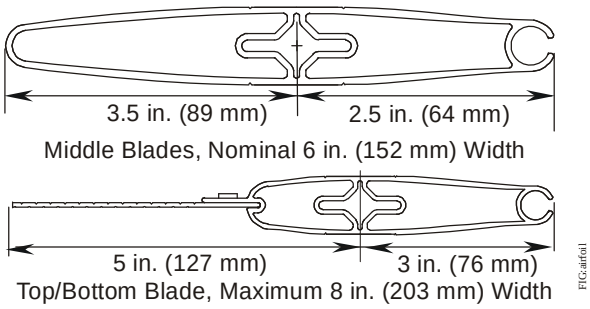

Figure 4: Airfoil Blade Profile

Double-piece blades are made from two layers of 22 gauge rolled sheet metal, mechanically joined for strength. Blade and side seals are standard. See Figure 5.

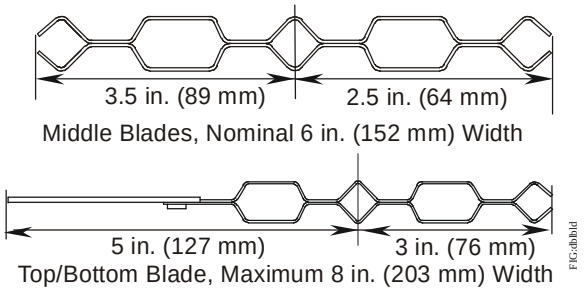

Figure 5: Double-Piece Blade Profile

The redesigned seals for the double-piece blades overlap each other to provide less leakage. See Figure 6.

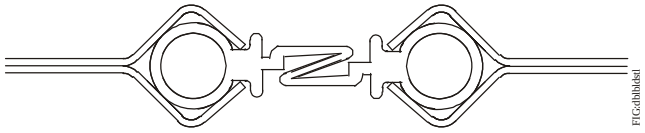

Figure 6: Double-Piece Blade Steel Profile

16-gauge blades are made from rolled 16-gauge galvanized steel. Blade and side seals are standard. See Figure 7.

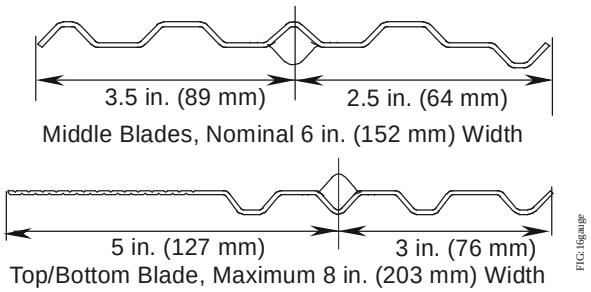

Figure 7: 16-Gauge Blade Profile

The top and bottom blades may be up to 8 in. wide with up to 2 in. extensions on one side of each blade as shown in Figure 4, Figure 5, and Figure 7.

Note: All dimensions are nominal.

Performance Data

Free Area Factor

Table 5 provides the free area factor of Johnson Controls VD-1300 damper products. Free area is the nominal area x free area ratio where nominal area equals W x H of the damper frame.

Table 5: Free Area Factor (Part 1 of 2)

Height	Width, inches (cm)										
inches (cm)	**8 (20)**	**12 (30)**	**16 (41)**	**20 (51)**	**24 (61)**	**28 (71)**	**32 (81)**	**36 (91)**	**40 (102)**	**44 (112)**	**48 (122)**
6 (15)	0.47	0.54	0.57	0.59	0.60	0.61	0.62	0.62	0.63	0.63	0.64
14 (36)	0.60	0.69	0.73	0.76	0.77	0.79	0.79	0.80	0.81	0.81	0.82
22 (56)	0.64	0.73	0.77	0.80	0.82	0.83	0.84	0.85	0.86	0.86	0.86
30 (76)	0.66	0.75	0.80	0.82	0.84	0.85	0.86	0.87	0.88	0.88	0.89
38 (97)	0.67	0.76	0.81	0.84	0.85	0.87	0.88	0.89	0.89	0.90	0.90

Table 5: Free Area Factor (Part 2 of 2)

Height	Width, inches (cm)										
inches (cm)	**8 (20)**	**12 (30)**	**16 (41)**	**20 (51)**	**24 (61)**	**28 (71)**	**32 (81)**	**36 (91)**	**40 (102)**	**44 (112)**	**48 (122)**
42 (107)	0.67	0.76	0.81	0.84	0.86	0.87	0.88	0.89	0.90	0.90	0.91
50 (127)	0.68	0.77	0.82	0.85	0.87	0.88	0.89	0.90	0.90	0.91	0.91
58 (148)	0.68	0.77	0.82	0.85	0.87	0.88	0.89	0.90	0.91	0.91	0.92
66 (168)	0.68	0.78	0.83	0.85	0.87	0.89	0.90	0.91	0.91	0.92	0.92
74 (188)	0.68	0.78	0.83	0.86	0.88	0.89	0.90	0.91	0.92	0.92	0.93
76 (193)	0.68	0.78	0.83	0.86	0.88	0.89	0.90	0.91	0.92	0.92	0.93

Pressure Drop

To determine the pressure drop:

1. Select the damper free area factor based on the damper width and height from Table 5.
2. Solve the equation (below) using the free area.
3. For installations where damper is not installed in ductwork, multiply static pressure drop obtained by the formula below by 2.8 + $\sqrt{\text{AREA FACTOR}}$

$\Delta P = 1.60 * [((CFM \div \text{Free Area}) - \text{Velocity}) \div 4005]^2$

Where:

- Δ**P** = Pressure drop in inches of water gauge (in wg).
- **Velocity** = Duct Velocity in feet per minute
- **CFM** = Duct area (sq ft) x Velocity (fpm)

Selection Information

Use the following process to select the product:

1. Configure your damper to the operation and performance required using the Damper Selector in Table 6.
2. Enter width and height of damper.

Note: Actual damper size is 1/4 in. less than nominal.

3. Enter options required.

Volume Control damper ordering size limits are 108 in. wide and 76 in. high. All VD-1300 dampers are shipped as separate panels.

Each individual panel is identified for assembly in the field.

The following kits are provided with VD-1300 as required, but are not factory assembled:

- Pin-to-pin coupling kits (DMPR-KC202) are provided for dampers over 48 in. wide, as required.
- Vertical Coupling (DMPR-KC100) is provided for dampers greater than 76 in. high.
- Support Bar (DMPR-KC200) is provided for extra support at internal junctions of four panels.

For sizes larger than our ordering limits, divide the size by the width or height limit to find the quantity of dampers. Then divide the width or height by the quantity to provide equal size dampers.

Factory-mounted actuators are standard outside air stream on a side plate. Actuators are selected by the factory for best performance at 5.5 lb·in/sq ft.

Table 6: Damper Selector[1]

	Ordering Code Number	V				-	w	w	w	x	h	h	h		
Application	V = Volume Control														
Blade Operation	O = Opposed P = Parallel														
Blade/Frame	A = Aluminum Airfoil/13-gauge Galvanized P = Double-Piece/13-gauge Galvanized V = 16-gauge/13-gauge Galvanized														
Bearing/Seal	S = Standard (Acetal/Santoprene) E = Extended (Bronze/Santoprene) H = High (Bronze/Silicone)														
Actuator	A = M9208-AGC or M9220-AGC (24 V Floating, Spring Return) B = M9208-GGC or M9220-GGC (24 V Modulating, Spring Return) C = M9208-BAC or M9220-BAC (120 V Two-Position, Spring Return) D = M9208-BGC or M9220-BGC (24 V Two-Position, Spring Return) F = M9106-AGC or M9116-AGC (24 V Floating, Non-Spring Return) G = M9106-GGC or M9116-HGC (24 V Modulating, Non-Spring Return) N = No Actuators P = D-3062-3 or D-3153-2 (Pneumatic, 8-13# Spring Range)														
Width	VD-1310: 008 to 108 inches, 1 in. increments VD-1320/VD-1330: 008 to 192 inches, 1 in. increments														
Height	VD-1310: 006 to 076 inches, 1 in. increments VD-1320/VD-1330: 006 to 228 inches, 1 in. increments														
Options (limit two)	See *Factory Options* for descriptions and combinations.														

1. Not all combinations are available, check selector tool for valid combinations.

Factory Options

E Exact whole inch size, no undercut

F 1.5 in. L front flange air leaving side (cannot be used with option G or H)

G 1.5 in. L rear flange air entering side (cannot be used with option F or H)

H Double flange (cannot be used with option F or G)

I Indicator switch (DMPR-KC014)

J Jackshaft (field installed)[1]

M Jackshaft (factory installed and assembled damper with jackshaft)[2]

Q Internal mount actuator

1. Use this option when you want a multi-section damper in individual panels and a loose jackshaft.
2. Use this option when you want a multi-section damper to come assembled in partial sections with a jackshaft installed.

Note: If you select a damper with a factory-mounted actuator, you receive an assembled damper (no larger than a 3 panel by 1 panel) with actuators and jackshaft installed. Do not select option J or M.

Note: If you select a damper with a factory-mounted actuator, the actuator is mounted externally (outside the air stream) unless you select option Q.

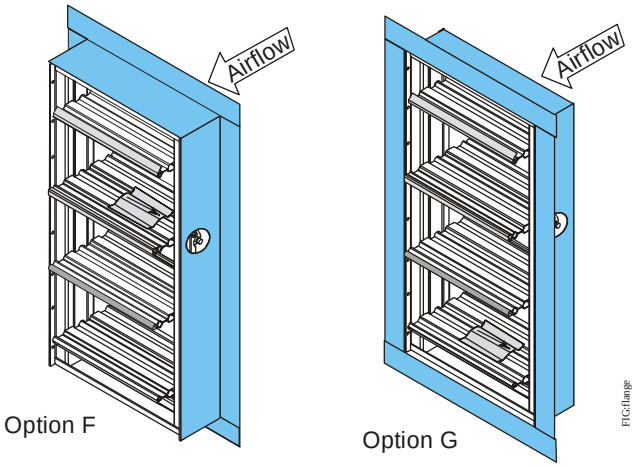

Figure 8: Factory-Installed Flange Options

Multiple Section Stacking Details

Maximum Panel size for VD-1320 and VD-1330 is 48 in. wide x 76 in. high. Maximum panel size for VD-1310 is 36 in. wide x 76 in. high.

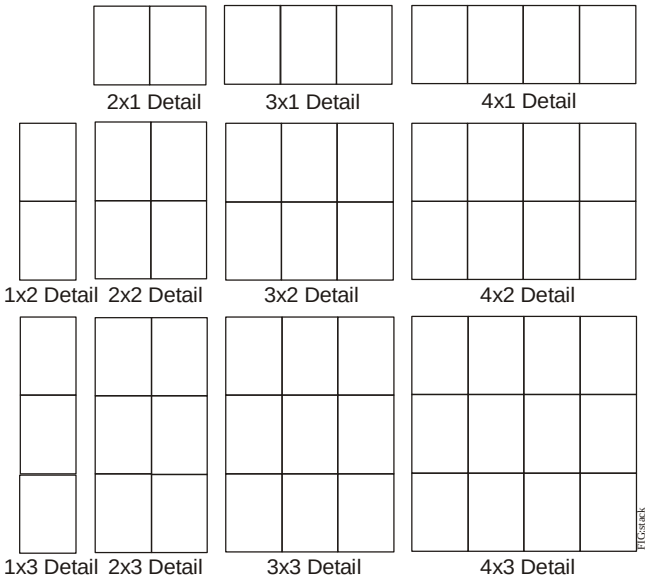

Figure 9: Multiple Section Stacking Options

Accessories

Table 7 lists typical accessories for the VD-1300 Volume Control Dampers.

Table 7: Typical VD-1300 Accessory Kits[1]

Description	Kit Number
Blade Pin Extension Support Bracket	DMPR-KC001
3-1/4 in. Blade Pin Extension	DMPR-KC002
15 in. Blade Pin Extension	DMPR-KC004
Blade Pin Extension Coupler	DMPR-KC006
5 in. Blade Pin Extension	DMPR-KC007
Crank Arm, 7/16 in. Shaft, Adjustable 1 to 2-3/4 in. Radius	DMPR-KC050
Blade Arm	DMPR-KC054
Internal Vertical Blade-to-Blade Linkage	DMPR-KC100
External Vertical Pin-to-Pin Linkage	DMPR-KC101
Linkage Rod, 4 ft	DMPR-KC102
Horizontal Face/Bypass Bracket	DMPR-KC150
Horizontal Blade-to-Blade Bracket	DMPR-KC151
90° Blade-to-Blade Linkage	DMPR-KC152
Support Bar	DMPR-KC200
Damper Fastener	DMPR-KC201
Pin-to-Pin Coupling	DMPR-KC202
Drive Arm and U-Bolt	DMPR-KC203
Manual Locking Quadrant	DMPR-KC250

1. For complete listing and pictures, refer to the *Damper Accessory Kits and Replacement Parts Product Bulletin (LIT-2681100).*

Replacement Parts

Table 8: VD-1300 Replacement Parts[1]

Description	Code Number
Standard/High Temp, Single Skin, Double and Airfoil with Extension (for VD-1310, VD-1320, and VD-1330), 8 ft Long	DMPR-RC056
Standard/High Temp, Double-Piece and Airfoil (VD-1320 and VD-1330), 10 ft Long	DMPR-RC057

1. The length of all replacement blade seals fit a single blade in a panel that is 48 in. wide.

Maintenance

Johnson Controls VD-1300 dampers have no components that require routine scheduled maintenance.

During normal duct maintenance, damper blades should be wiped clean if necessary and opened/closed to verify complete rotation and sealing.

Repair Information

If the VD-1300 Volume Control Damper fails to operate within its specifications, replace the unit. For a replacement VD-1300 damper, contact the nearest Johnson Controls representative.

Only seals listed in Table 8 are field replaceable.

All Johnson Controls Dampers are built to order and cannot be returned due to ordering errors. All dampers are backed by a 3-year warranty, which covers defects in materials or workmanship. Refer to terms and conditions of sale for specifics.

Technical Specifications

VD-1300 Volume Control Dampers[1]

Leakage Resistance	**VD-1310**	17 cfm/sq ft maximum at 1 in. static pressure 45 cfm/sq ft maximum at 4 in. static pressure			
	VD-1320	3.4 cfm/sq ft maximum at 1 in. static pressure 6.0 cfm/sq ft maximum at 4 in. static pressure			
	VD-1330	2.2 cfm/sq ft maximum at 1 in. static pressure 3.7 cfm/sq ft maximum at 4 in. static pressure			
Operating Torque	0.5 in. static pressure and 100 fpm fully open approach velocity 1 in. static pressure and 1,000 fpm fully open approach velocity				4.5 lb·in/sq ft 5.5 lb·in/sq ft
Pressure Drop (inches WG) - Fully Open	**Size (in.)**	**Approach Velocity (fpm)**			
		1,000	**2,000**	**3,000**	**4,000**
	12 x 12	0.16	0.42	--	--
	24 x 24	0.05	0.20	0.42	0.57
	48 x 48	0.03	0.10	0.25	0.45
Velocity Requirements		**Width (in.)**			
		12	**24**	**36**	**48**
	VD-1310	6,000 fpm at 6 in. static	4,500 fpm at 6 in. static	3,000 fpm at 4.5 in. static	1,500 fpm at 3 in. static
	VD-1320	8,000 fpm at 8 in. static	6,000 fpm at 8 in. static	4,000 fpm at 6 in. static	2,000 fpm at 4 in. static
	VD-1330	8,000 fpm at 12 in. static	8,000 fpm at 10 in. static	6,000 fpm at 10 in. static	4,000 fpm at 4 in. static
Temperature Rating	**Normal and Extended Operating Conditions**			-40 to 200°F (-40 to 93°C)	
	High (with Bronze Bearings and Silicone Seals)			-40 to 250°F (-40 to 121°C)	
	Actuator			-4 to 122°F (-20 to 50°C)	
Approximate Weight	**Damper**	5 pounds/square foot (2.7 kg/sq ft)			
	Actuator	2.9 pounds (1.6 kg) per actuator			

1. All Performance data is determined using instrumentation and procedures at an AMCA Certified Laboratory in accordance with AMCA Standard No. 500, Test Methods for Louvers, Dampers, and Shutters.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. Refer to the M9208-xxx-x Series Electric Spring Return Actuators Product Bulletin (LIT-12011480), M9220-xxx-3 Electric Spring Return Actuators Product Bulletin (LIT-12011057), and M9108, M9116, M9124, and M9132 Series Electric Non-spring Return Actuators Product Bulletin (LIT-2681058) for necessary information on operating and performance specifications for the actuator.

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Published in U.S.A. www.johnsoncontrols.com