

**PRODUCT BULLETIN**

**M9109 Series Electric Non-spring Return Actuators**

The M9109 Series direct-mount electric actuators operate on 24 VAC power and are available for use with floating or proportional controllers. These non-spring return actuators are easily installed on a Variable Air Volume (VAV) box and a damper with a steel shaft up to 1/2 in. (13 mm) in diameter or 3/8 in. (10 mm) square. They may be field mounted to a VG1000 Series ball valve using the M900-512 Valve Linkage Kit.

The M9109 models have an 80 lb-in (9 N-m) running torque. They have a nominal 60-second travel time for 90° of rotation at 60 Hz (72 seconds at 50 Hz) with a load-independent rotation time. The M9109-xGC-2 models are available with integral auxiliary switches to perform switching functions at any angle within the selected rotation range. Position feedback is available through a 0 (2) to 10 VDC signal on the M9109-GGx-2 models.



**Figure 1: M9109 Non-spring Return Actuator**

<b>Features and Benefits</b>	
<input type="checkbox"/> <b>35 dBA Rating</b>	Meets audibility requirements for open ceilings
<input type="checkbox"/> <b>Synchronous Drive</b>	Provides constant rotation time independent of load
<input type="checkbox"/> <b>Direct-shaft Mount with Single-screw Coupler</b>	Simplifies installation and provides three-point shaft gripping
<input type="checkbox"/> <b>Magnetic Clutch</b>	Provides torque protection for the damper and actuator
<input type="checkbox"/> <b>Jumper-selectable Rotation Direction</b>	Simplifies installation
<input type="checkbox"/> <b>Adjustable Rotation Stops</b>	Allow application versatility with 30 to 90° Clockwise (CW) or Counterclockwise (CCW) rotation
<input type="checkbox"/> <b>1/2 in. NPT Threaded Conduit Opening</b>	Meets electrical code requirements and allows the use of armored cable
<input type="checkbox"/> <b>Manual Gear Release</b>	Simplifies setup and field adjustments
<input type="checkbox"/> <b>Output Position Feedback</b>	Provides simple, closed-loop control with accurate position sensing

## Application

**IMPORTANT:** This device is not designed or intended to be used in or near environments where explosive vapors or gases could be present or environments where substances corrosive to the device's internal components could be present.

The M9109 is used to position balancing, control, round, and zone dampers in typical Heating, Ventilating, and Air Conditioning (HVAC) applications.

The M9109 mounts directly on the duct surface, round damper, or small rectangular damper with an anti-rotation bracket and two sheet metal screws (included). Additional linkages or couplers are not required.

## Operation

**IMPORTANT:** The M9109 Series actuator is intended to control equipment under normal operating conditions. Where failure or malfunction of an M9109 actuator could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory) intended to warn of, or protect against, failure or malfunction of an M9109 actuator must be incorporated into and maintained as part of the control system.

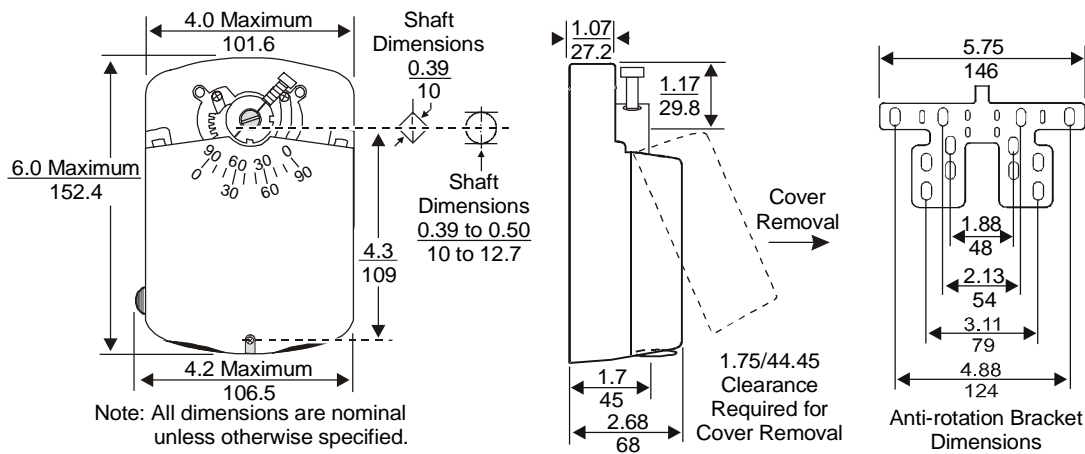
A controller provides a control signal to the actuator depending upon the desired movement of the damper blade. This signal causes the motor to rotate in the proper direction and the damper blade to open or close.

**Note:** To avoid excessive wear or drive time on the motor for the AGx models, use a controller and/or software that provides a time-out function to remove the signal at the end of rotation (stall). The GGx models have an auto shutoff to avoid excessive wear or drive time on the motor.

The actuator rotates at a nominal rate of 1.5° per second (90° in 60 seconds) at 60 Hz input. The actuator rotation is field adjustable from 30 to 90°. Determine the actual rotation time for actuators using less than 90° rotation and use that value used with the controller software. For example, 40 seconds is used for 60° rotation.

## Dimensions

See Figure 2 for the actuator dimensions.



**Figure 2: Actuator and Anti-rotation Bracket Dimensions, in. (mm)**

## Repairs and Replacement

Field repairs must not be made. For a replacement or an accessory, refer to the *Ordering Information* section.

## Ordering Information

Contact the nearest Johnson Controls representative, and specify the desired product code number from Table 1 or Table 2

**Table 1: Actuators**

<b>M9109 Series Electric Non-spring Return Actuators 80 lb-in (9 N·m)</b>	M9109-AGA-2	M9109-AGC-2	M9109-GGA-2	M9109-GGC-2
<b>Floating Control</b>	■	■		
<b>Proportional Control</b>			■	■
<b>Feedback</b>				
0 to 10 VDC			■	■
2 Auxiliary Switches		■		■

**Table 2: Accessories**

<b>Product Code Number</b>	<b>Description</b>
<b>DMPR-KC003*</b>	Blade Pin Extension without Bracket for Johnson Controls CD-1300 damper direct-mount applications
<b>DMPR-KR003*</b>	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
<b>M9000-105</b>	Pluggable 3-Terminal Block
<b>M9000-106</b>	Pluggable 4-Terminal Block
<b>M9000-160</b>	Replacement anti-rotation bracket for an M9109 actuator
<b>M9000-200</b>	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators.
<b>M9000-512</b>	Valve Linkage Kit for field mounting an M9109 actuator to a 1/2 and 3/4 in. two-way and three-way VG1000 Series ball valve

\* Furnished with the damper and may be ordered separately.

## Technical Data

<b>Product</b>	M9109 Series Electric Non-spring Return Actuators
<b>Power Requirements</b>	AGx: 20 to 30 VAC at 50/60 Hz; 2.5 VA supply, Class 2 GGx: 20 to 30 VAC at 50/60 Hz; 3.2 VA supply, Class 2
<b>Input Signal</b>	AGx: 20 to 30 VAC at 50/60 Hz GGx: 0 to 10 VDC or 0 to 20 mA
<b>Input Signal Adjustments</b>	AGx: CW and COM Terminals, CW rotation; CCW and COM Terminals, CCW rotation GGx (Voltage Input or Current Input): Jumper Selectable: 0 (2) to 10 VDC or 0 (4) to 20 mA Factory Setting: 0 to 10 VDC, CW rotation with signal increase Action is jumper selectable Direct (CW) or Reverse (CCW) with signal increase.
<b>Input Impedance</b>	AGx: 200 ohms, nominal GGx: Voltage Input, 150,000 ohms; Current Input, 500 ohms
<b>Feedback Signal</b>	GGx: 0 to 10 VDC or 2 to 10 VDC for 90° (10 VDC at 1 mA) Corresponds to input signal span selection.
<b>Auxiliary Switch Rating</b>	xGC: Two Single-Pole, Double-Throw (SPDT) switches rated at 24 VAC, 1.5 A inductive, 3.0 A resistive, 35 VA maximum per switch, Class 2
<b>Mechanical Output</b>	Running Torque: 80 lb-in (9 N·m)
<b>Cycles</b>	60,000 full cycles; 2,500,000 repositions rated at 80 lb-in (9 N·m)
<b>Audible Noise Rating</b>	35 dBA maximum at 1 m
<b>Rotation Range</b>	Adjustable from 30 to 90° CW or CCW; mechanically limited to 93°
<b>Rotation Time</b>	Nominal 60 seconds at 60 Hz and 72 seconds at 50 Hz for 90°
<b>Electrical Connection</b>	1/4 in. spade terminals (To order optional pluggable terminal blocks, see Table 2.)
<b>Mechanical Connection</b>	3/8 to 1/2 in. (10 to 12.7 mm) round steel shaft or 3/8 in. (10 mm) square steel shaft
<b>Enclosure</b>	NEMA 2, IP32
<b>Ambient Operating Conditions</b>	-4 to 125°F (-20 to 52°C); 90% RH maximum, non-condensing
<b>Ambient Storage Conditions</b>	-40 to 176°F (-40 to 80°C); 90% RH maximum, non-condensing
<b>Dimensions (H x W x D)</b>	5.9 x 4.2 x 2.64 in. (150.1 x 106.5 x 67 mm)
<b>Shipping Weight</b>	2.4 lb (1.08 kg)
<b>Agency Compliance</b>	UL Listed, File E27734, CCN XAPX CSA Certified, File LR85083, Class 3221 02 CE Mark, EMC Directive 89/336/EEC

*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.*



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