

M9108 Series Proportional Electric Non-spring Return Actuators

The M9108-GGx-2 and M9108-HGx-2 Series direct-mount electric actuators operate on 24 VAC or VDC power, and are available for use with proportional controllers. These bidirectional actuators do not require a damper linkage, and are easily installed on a damper with a round shaft up to 3/4 in. (19 mm) in diameter or a square shaft up to 5/8 in. (16 mm). They may be direct or remote mounted to a damper, or mounted to a VG1000 Series ball valve using the M9000-510 Valve Linkage Kit.

A single M9108-GGx-2 or M9108-HGx-2 model delivers up to 70 lb-in (8 N-m) of torque. The angle of rotation is mechanically adjustable from 0 to 90° in 5-degree increments. Integral auxiliary switches are available to indicate end-stop position or to perform switching functions at any angle within the selected rotation range. Jumpers on the actuator allow users to select the direction of action, range of control input, and calibration (fixed or adjustable). Position feedback is available through switches, a potentiometer, or a 0 to 10 VDC signal.



Figure 1: M9108 Series Actuator

Features and Benefits	
<input type="checkbox"/> Two Control Inputs	Meet the needs of most applications
<input type="checkbox"/> Output Position Feedback	Provides simple, closed-loop control with accurate position sensing
<input type="checkbox"/> Electronic Stall Detection	Ensures higher reliability by deactivating the actuator motor if a stall condition is detected
<input type="checkbox"/> Dual Scale (0 to 90° and 90 to 0°) on the Cover	Indicates the position of the actuator's rotation in 10° increments
<input type="checkbox"/> Removable Coupler	Allows adjustment of the rotation range from 0 to 90°
<input type="checkbox"/> Steel U-bolt Clamp	Provides four-point damper shaft gripping
<input type="checkbox"/> Jumper-selectable Rotation Direction and Manual Gear Release	Simplifies installation, setup, and field adjustments
<input type="checkbox"/> National Pipe Thread (NPT) Threaded Housing	Provides easy connection for electrical fittings

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 M9108 proportional actuators may be mounted in any convenient orientation. They are designed to position air dampers and valves in Heating, Ventilating, and Air Conditioning (HVAC) systems. Applications include:

- positioning return air or exhaust dampers
- controlling face and bypass dampers
- positioning blades for variable volume fans
- positioning VG1000 Series ball valves when used with an M9000-510 Valve Linkage

Refer to the manufacturer's information to properly size the damper, valve, and/or actuator. Spring return actuators, such as Johnson Controls M9206 and M9216 Series, are recommended for use with outdoor air dampers in cold climates.

Operation

IMPORTANT: The M9108 Series proportional actuators are intended to control equipment under normal operating conditions. Where failure or malfunction of an M9108 proportional 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 the M9108 actuator must be incorporated into and maintained as part of the control system.

M9108 proportional actuators operate on 24 VAC at 50/60 Hz or 24 VDC. These compact actuators use a DC motor with stall detection circuitry that operates throughout the entire stroke. The M9108 proportional actuators employ noise-filtering techniques on the control signal to eliminate repositioning due to line noise.

Rotation is mechanically limited to 93° by integral end-stops. The position of the actuator is marked from 0 to 90° on the cover. An anti-rotation bracket prevents lateral movement of the actuator. Press the spring-loaded gear release on the actuator cover to disengage the gear train for manual repositioning of the coupler.

Dimensions

See Figure 2 for actuator dimensions.

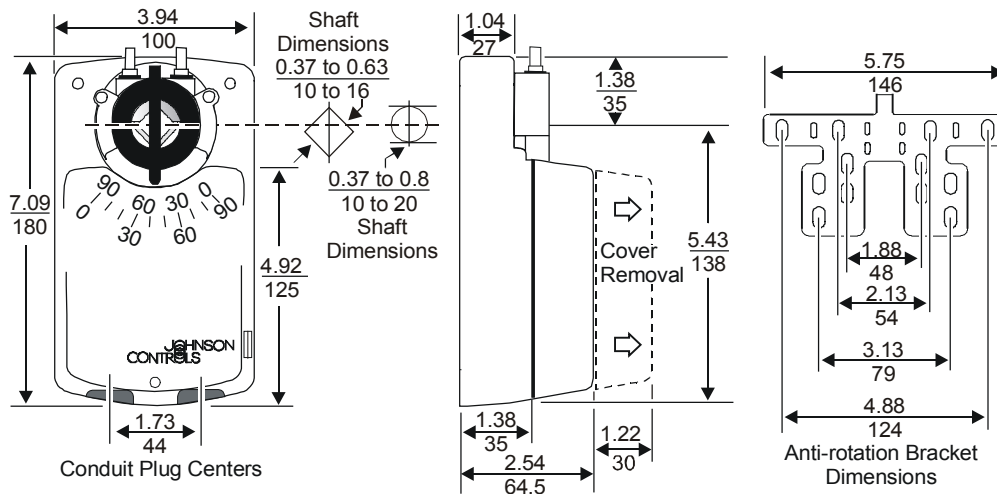


Figure 2: Actuator and Anti-Rotation Bracket Dimensions, in. (mm)

Ordering Information

Table 1: Actuator Models and Accessories

Product Code Number	Description
M9108-GGA-2	70 lb-in (8 N·m) electric non-spring return actuator for proportional control with 0 to 10 VDC feedback
M9108-GGC-2	70 lb-in (8 N·m) electric non-spring return actuator for proportional control with two SPDT 24 VAC auxiliary switches and 0 to 10 VDC feedback
M9108-HGA-2	70 lb-in (8 N·m) electric non-spring return actuator for proportional control with 0 to 10 VDC feedback and adjustable zero and span
M9108-HGC-2	70 lb-in (8 N·m) electric non-spring return actuator for proportional control with two SPDT 24 VAC auxiliary switches, 0 to 10 VDC feedback, and adjustable zero and span
DMPR-KR003*	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
DMPR-KC003*	Blade Pin Extension without Bracket for Johnson Controls D-1300 direct-mount applications
DMPR-KC254	Inside Frame Mounting Kit for Johnson Controls dampers that require the actuator within the airstream
M9000-103	14 VA Transformer, 120/24 VAC, 60 Hz, Class 2
M9000-104	14 VA Transformer, 230/24 VAC, 60 Hz, Class 2
M9000-150	Damper Mount Linkage Kit for remote inside duct mounting an M9108 actuator to a three-blade or larger damper (not intended for a Johnson Controls damper)
M9000-151	Base Mount Linkage Kit for remote inside duct mounting
M9000-153	Crank Arm Kit for remote mounting
M9000-154	1 in. Jackshaft Coupler Kit for mounting on a 1 in. diameter damper shaft
M9000-155	Manual Handle for positioning a damper or valve when power is removed from an M9108 actuator
M9000-160	Replacement anti-rotation bracket for M9108 actuators
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators
M9000-300	Weather Shield Enclosure protects M9108 actuators in outdoor damper applications
M9000-510	Valve Linkage Kit for mounting M9108 actuators to 1/2 through 1-1/4 in. 2-way and 1/2 and 3/4 in. 3-way VG1000 Series ball valves

* Furnished with the damper and may be ordered separately.

Technical Specifications

Product	M9108 Series Proportional Electric Non-spring Return Actuators
Power Requirements	20 to 30 VAC at 50/60 Hz or 24 VDC $\pm 10\%$; 7.5 VA supply, Class 2
Input Signal	0 (2) to 10 VDC, 0 (4) to 20 VDC, or 0 (4) to 20 mA
Input Signal Adjustments	Jumper Selectable: 0 (2) to 10 VDC, 0 (4) to 20 VDC, or 0 (4) to 20 mA Adjustable: Zero, 0 to 6 VDC, 0 to 12 VDC, or 0 to 12 mA Span, 2 to 10 VDC, 4 to 20 VDC, or 4 to 20 mA Factory Setting: 0 to 10 VDC, 0 to 20 mA, CW rotation with signal increase Action is jumper selectable Direct (CW) or Reverse (CCW) with signal increase
Input Impedance	Voltage Input, 205,000 ohms for 0 (2) to 10 V and 410,000 ohms for 0 (4) to 20 V Current Input, 500 ohms
Feedback Signal	0 to 10 VDC or 2 to 10 VDC for 90° (10 VDC at 1 mA) Corresponds to input input signal span selection
Auxiliary Switch Rating	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
Mechanical Output (Running Torque)	70 lb·in (8 N·m) for one unit; not intended for tandem use
Audible Noise Rating	45 dBA at 1 m
Rotation Range	0 to 90° in 5-degree increments, mechanically limited to 93°
Rotation Time	30 seconds at 50% rated load, 25 to 50 seconds for 0 to 70 lb·in (0 to 8 N·m)
Electrical Connection	Screw terminals for 22 to 14 AWG; maximum of two 18, 20, or 22 AWG per terminal
Mechanical Connection	3/8 to 3/4 in. (10 to 20 mm) diameter round shaft or 3/8 to 5/8 in. (10 to 16 mm) square shaft
Enclosure	NEMA 2, IP42
Ambient Conditions	Operating: -4 to 122°F (-20 to 50°C); 0 to 95% RH, noncondensing Storage: -40 to 186°F (-40 to 86°C); 0 to 95% RH, noncondensing
Dimensions (H x W x D)	7.09 x 3.94 x 2.54 in. (180 x 100 x 64.5 mm)
Shipping Weight	2.9 lb (1.3 kg)
Agency Compliance	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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Published in U.S.A.
www.johnsoncontrols.com