

## M9124 Series Proportional Control Electric Non-spring Return Actuators

The M9124-GGx and M9124-HGx Series direct-mount electric actuators operate on 24 VAC or VDC power. These actuators 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 valve using one of the M9000-5xx Valve Linkage Kits.

A single M9124-GGx or M9124 HGx-2 model delivers up to 210 lb-in (24 N·m) of torque. Two GGx or HGx models in tandem deliver twice the torque or 420 lb-in (48 N·m). 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 a 0 (2) to 10 VDC signal.



Figure 1: M9124 Series Actuator

Features and Benefits	
<input type="checkbox"/> <b>Output Position Feedback</b>	Provides simple, closed-loop control with accurate position sensing
<input type="checkbox"/> <b>Electronic Stall Detection</b>	Ensures higher reliability by deactivating the actuator motor when a stall condition is detected
<input type="checkbox"/> <b>Master/Slave Operation</b>	Allows synchronized control for two actuators stacked for tandem applications
<input type="checkbox"/> <b>Zero and Span Adjustment (HGx Models)</b>	Allows sequential operation of dampers from a single input signal of 0 (2) to 10 VDC, 0 (4) to 20 VDC, or 0 (4) to 20 mA
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<b>Features and Benefits (Cont.)</b>	
<input type="checkbox"/> <b>Removable Coupler</b>	Allows adjustment of the rotation range from 0 to 90°
<input type="checkbox"/> <b>Steel U-bolt Clamp</b>	Provides four-point damper shaft gripping
<input type="checkbox"/> <b>Coupled to a Ball-style Valve with Linkage</b>	Regulates the flow of hot or chilled water, 50% glycol solution, and low pressure steam
<input type="checkbox"/> <b>Jumper Selectable Rotation Direction and Manual Gear Release</b>	Simplify installation, setup, and field adjustments
<input type="checkbox"/> <b>Noise Filter</b>	Eliminates repositioning due to line noise
<input type="checkbox"/> <b>National Pipe Thread (NPT) Threaded Housing</b>	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.

M9124-GGx-2 or M9124-HGx-2 actuators are designed to position air dampers and valves in Heating, Ventilating, and Air Conditioning (HVAC) systems. Applications include:

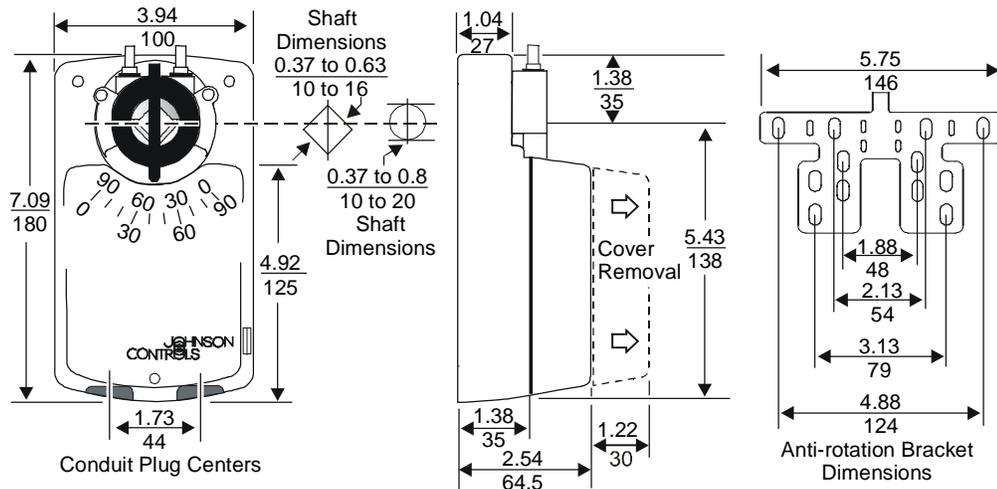
- positioning return air or exhaust dampers
- controlling face and bypass dampers
- positioning blades for variable volume fans
- positioning VG1000 Series ball valves when used with an M9000-5xx Valve Linkage

Two each of the M9124-GGx or M9124-HGx models provide twice the amount of running torque of a single unit when mounted in tandem.

Refer to the manufacturer's information to properly size the damper, valve, and/or actuator. Spring return actuators, such as Johnson Controls® M9208 and M9220 Series, are recommended for use with outdoor air dampers in cold climates.

## Dimensions

See Figure 2 for actuator dimensions.



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

## Operation

**IMPORTANT:** The M9124 Series proportional actuators are intended to control equipment under normal operating conditions. Where failure or malfunction of an M9124 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 M9124 proportional actuator must be incorporated into and maintained as part of the control system.

M9124-GGx-2 and M9124-HGx-2 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 GGx and HGx models 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.

## Ordering Information

**Table 1: Accessories**

<b>Product Code Number</b>	<b>Description</b>
<b>M9124-GGA-2</b>	210 lb-in (24 N·m) or 420 lb-in (48 N·m) in tandem electric non-spring return actuator for proportional control with 0 to 10 VDC feedback
<b>M9124-GGC-2</b>	210 lb-in (24 N·m) or 420 lb-in (48 N·m) in tandem electric non-spring return actuator for proportional control with 0 to 10 VDC feedback and two Single-Pole Double-Throw (SPDT) 24 VAC auxiliary switches
<b>M9124-HGA-2</b>	210 lb-in (24 N·m) or 420 lb-in (48 N·m) in tandem electric non-spring return actuator for proportional control with 0 to 10 VDC feedback and adjustable zero and span
<b>M9124-HGC-2</b>	210 lb-in (24 N·m) or 420 lb-in (48 N·m) in tandem electric non-spring return actuator for proportional control with 0 to 10 VDC feedback, adjustable zero and span, and two SPDT 24 VAC auxiliary switches
<b>DMPR-KR003*</b>	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
<b>DMPR-KC003*</b>	Blade Pin Extension without Bracket for Johnson Controls CD-1300 direct-mount applications
<b>DMPR-KC254</b>	Inside Frame Mounting Kit for damper applications requiring the actuator within the airstream
<b>M9000-103</b>	14 VA Transformer, 120/24 VAC, 60 Hz, Class 2
<b>M9000-104</b>	14 VA Transformer, 230/24 VAC, 60 Hz, Class 2
<b>M9000-105</b>	Pluggable 3-terminal block
<b>M9000-150</b>	Damper Mount Linkage Kit for remote inside duct mounting an M9124 actuator to a 3-blade to larger damper (not intended for a Johnson Controls damper)
<b>M9000-151</b>	Base Mount Linkage Kit for remote inside duct mounting (not intended for tandem applications)
<b>M9000-153</b>	Crank Arm Kit for remote mounting (not intended for M9132 actuators or any tandem application)
<b>M9000-154</b>	1 in. Jackshaft Coupler Kit for mounting on a 1 in. diameter damper shaft
<b>M9000-155</b>	Manual Handle for positioning a damper or valve when power is removed from an M91xx actuator
<b>M9000-158</b>	Mounting Kit to tandem mount two M9124 AGx, GGx or HGx models on a damper
<b>M9000-160</b>	Replacement anti-rotation bracket for M91xx Series actuators
<b>M9000-200</b>	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators.
<b>M9000-510</b>	Valve Linkage Kit for mounting M9124 actuators to 1/2 through 1-1/4 in. 2-way and 1/2 and 3/4 in. 3-way VG1000 Series ball valves
<b>M9000-511</b>	Valve Linkage Kit for mounting M9124 actuators to 1-1/2 in. 2-way and 3-way VG1000 Series ball valves, and M9116 and M9124 actuators to 1 and 1-1/4 in. 3-way VG1000 Series ball valves

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

## Technical Specifications

<b>Product</b>	M9124 Series Proportional Control Electric Non-spring Return Actuators
<b>Power Requirements</b>	20 to 30 VAC at 50/60 Hz or 24 VDC $\pm 10\%$ ; 7.5 VA supply, Class 2
<b>Input Signal</b>	0 (2) to 10 VDC, 0 (4) to 20 VDC, or 0 (4) to 20 mA
<b>Input Signal Adjustments</b>	(Voltage Input or Current Input): Jumper selectable: 0 (2) to 10 VDC, 0 (4) to 20 VDC, or 0 (4) to 20 mA Adjustable (HGx Only): 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.
<b>Input Impedance</b>	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
<b>Feedback Signal</b>	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 (Running Torque)</b>	210 lb-in (24 N·m) for one unit, 420 lb-in (48 N·m) for two in tandem
<b>Audible Noise Rating</b>	45 dBA at 1 m
<b>Rotation Range</b>	0 to 90° in 5-degree increments, mechanically limited to 93°
<b>Rotation Time</b>	130 seconds at 50% rated load, 115 to 175 seconds for 0 to 210 lb-in (0 to 24 N·m)
<b>Electrical Connection</b>	Screw terminals for 22 to 14 AWG; maximum of two 18, 20, or 22 AWG per terminal
<b>Mechanical Connection</b>	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
<b>Enclosure</b>	NEMA 2, IP42
<b>Ambient Conditions</b>	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
<b>Dimensions (H x W x D)</b>	7.09 x 3.94 x 2.54 in. (180 x 100 x 64.5 mm)
<b>Shipping Weight</b>	2.9 lb (1.3 kg)
<b>Agency Compliance</b>	<b>United States:</b> UL Listed, CCN XAPX, File E27734; to UL 873, the Standard for Temperature Indicating and Regulating Equipment, Eleventh Edition <b>Canada:</b> UL Listed, CCN XAPX7, File E27734; Canadian Standard C22.2 NO. 24-93, Standard for Temperature Indicating and Regulating Equipment, Eighth Edition <b>Europe:</b> CE Mark – Johnson Controls, Inc., declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.



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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