

M9216-Bxx-2 Series On/Off Control Electric Spring Return Actuators

The M9216-Bxx-2 Series direct-mount, spring return electric actuators operate on 24 VAC or VDC or Line Voltage power and are available for use with on/off 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). M9216-Bxx-2 actuators 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 M9216-Bxx-2 model delivers up to 140 lb-in (16 N·m) of torque. Two Bxx models in tandem deliver twice the torque or 280 lb-in (32 N·m). The angle of rotation is mechanically adjustable from 30 to 90°. Integral auxiliary switches are available to indicate end-stop position or to perform switching functions at any angle within the selected rotation range.



Figure 1: M9216 Series Actuator

Features and Benefits	
☐ Electronic Stall Detection	Ensures higher reliability by deactivating the actuator motor when a stall condition is detected
☐ Dual Scale (0 to 90° and 90 to 0°) on the Cover	Indicates the position of the actuator's rotation in 10° increments
☐ Removable Coupler	Allows adjustment of the rotation range from 0 to 90°
☐ Steel U-bolt Clamp	Provides four-point damper shaft gripping
☐ Available Torques: 140 and 280 lb-in (16 and 32 N·m)	Offer selection most suitable for the application
☐ Bidirectional, Return-to-Normal Spring Return	Allows selectable rotation/spring return direction simplifying installation
☐ Manual Override	Allows manual positioning when the actuator is not powered; simplifies setup and field adjustments
☐ National Pipe Thread (NPT) Conduit Adaptor (Included)	Provides easy connection for electrical fittings and armored cable

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.

M9216-Bxx-2 actuators are designed to position air dampers and valves in Heating, Ventilating, and Air Conditioning (HVAC) systems. Applications include:

- positioning return air, exhaust, or outdoor air dampers
- controlling face and bypass dampers
- positioning blades for variable volume fans
- positioning VG1000 Series ball valves and VG7000 Series ball valves when used with an M9000-5xx Valve Linkage

Refer to the manufacturer's information to properly size the damper, valve, and/or actuator.

Operation

IMPORTANT: The M9216-Bxx-2 Series actuators are intended to control equipment under normal operating conditions. Where failure or malfunction of an M9216-Bxx-2 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 M9216-Bxx-2 actuator must be incorporated into and maintained as part of the control system.

M9216-Bxx-2 actuators operate on 24 VAC at 50/60 Hz, 24 VDC, or 120VAC. They use a DC motor with stall detection circuitry that operates throughout the entire stroke. Mounting two M9216-Bxx-2 models in tandem provides twice the amount of running torque as a single unit.

Rotation is mechanically limited to 93° by integral end-stops. The position of the actuator is visually indicated from 0 to 90° on the cover. An anti-rotation bracket prevents lateral movement of the actuator. The damper position may be set manually with the manual override feature in the event of a power failure.

Dimensions

See Figure 2 for actuator dimensions.

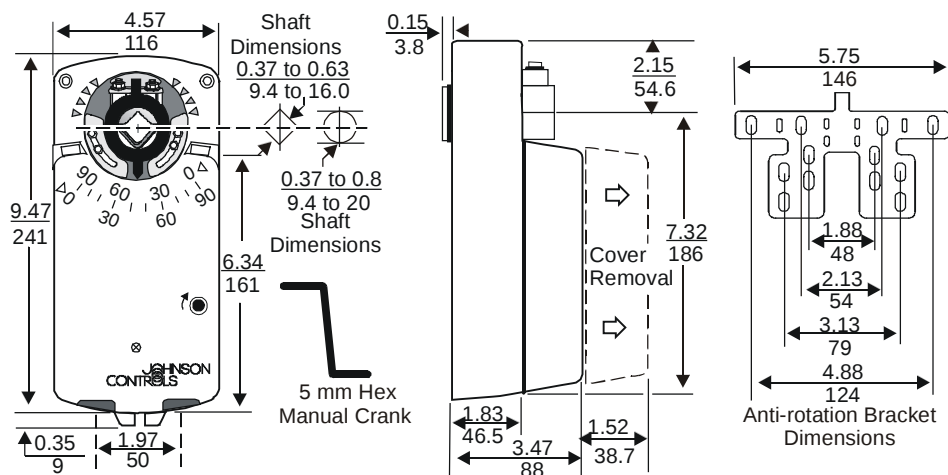


Figure 2: Actuator, Anti-Rotation Bracket, and Manual Crank Dimensions, in. (mm)

Ordering Information

Table 1: Actuator Models and Accessories

Product Code Number	Description
M9216-BAA-2	140 lb-in (16 N-m) or 280 lb-in (32 N-m) in tandem electric spring return actuator for on/off control with line voltage input and M9000-103 14 VA transformer
M9216-BAC-2	140 lb-in (16 N-m) or 280 lb-in (32 N-m) in tandem electric spring return actuator for on/off control with two SPDT 24 VAC auxiliary switches, line voltage input, and M9000-103 14 VA transformer
M9216-BGA-2	140 lb-in (16 N-m) or 280 lb-in (32 N-m) in tandem electric spring return actuator for on/off control, 24 VAC input
M9216-BGC-2	140 lb-in (16 N-m) or 280 lb-in (32 N-m) in tandem electric spring return actuator for on/off control with two SPDT 24 VAC auxiliary switches, 24 VAC input
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
M9000-100**	Conduit Adaptor Kit
M9000-103	14 VA Transformer, 120/24 VAC, 60 Hz, Class 2
M9000-104	14 VA Transformer, 230/24 VAC, 60 Hz, Class 2
M9000-105	Pluggable 3-terminal block
M9000-106	Pluggable 4-terminal block
M9000-150	Damper Mount Linkage Kit for remote inside duct mounting an M9216 actuator to a 3-blade or larger damper (not intended for a Johnson Controls damper)
M9000-151	Base Mount Linkage Kit for remote inside duct mounting (not intended for M9216 tandem applications)
M9000-153	Crank Arm Kit for remote mounting (not intended for M9216 tandem applications)
M9000-154	1 in. Jackshaft Coupler for mounting on a 1 in. diameter damper shaft
M9000-158	Mounting Kit for tandem mounting two each M9216 BAx or BGx models on a damper
M9000-160	Replacement anti-rotation bracket for M9216 Series actuators
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators.
M9000-500	Valve Linkage Kit for mounting M9216 actuators to 1/2 to 2 in. VG7000 Series globe valves
M9000-510	Valve Linkage Kit for mounting M9216 actuators to 1/2 and 3/4 in. 2-way or 3-way VG1000 Series ball valves, and M9216 actuators to 1 and 1-1/4 in. 2-way VG1000 Series ball valves
M9000-511	Valve Linkage Kit for field mounting M9216 actuators to 1 and 1-1/4 in. 3-way VG1000 Series ball valves

* Furnished with the damper and may be ordered separately.

** Furnished with the actuator and may be ordered separately.

Technical Specifications

Product	M9216-Bxx-2 Series On/Off Control Electric Spring Return Actuators	
Power Requirements	M9216-BGx:	20 to 30 VAC at 50/60 Hz or 24 VDC $\pm 10\%$, 10 VA supply, Class 2
	M9216-BAx:	120 VAC at 60 Hz or 240 VAC at 60 Hz, 14 VA supply
Input Signal	BGA, BGC:	24 VAC at 50/60 Hz or 24 VDC, 420 mA maximum
	BAA, BAC:	120 VAC with M9000-103 14 VA transformer (included)
Input Signal Adjustments	Factory Setting:	Terminals 1 and 2, CW rotation
Auxiliary Switch Rating	BAC, BGC:	Two SPDT (Single-Pole, Double-Throw) switches rated at 24 VAC, 1.5 A inductive, 3.0 A resistive, 35 VA maximum per switch, Class 2
Spring Return	Factory Setting:	CCW; Direction is selectable with the coupler.
Mechanical Output (Running Torque)	140 lb-in (16 N·m) for one unit, 280 lb-in (32 N·m) for two units in tandem	
Rotation Range	Adjustable from 30 to 90°, CW or CCW, mechanically limited to 93°	
Rotation Time	70 to 130 seconds for 0 to 140 lb-in (0 to 16 N·m); 90 seconds nominal at 50% rated load (Powered rotation is faster in the spring return direction than in the spring winding direction; power failed spring return is less than 15 seconds.)	
Cycles	65,000 full stroke cycles	
Electrical Connection	Screw terminals for 22-14 AWG; maximum of two 18, 20, or 22 AWG each	
	M9000-100:	One included with all models; two included with BGC
Mechanical Connection	3/8 to 3/4 in. (10 to 20 mm) diameter round shaft; 3/8 to 5/8 in. (10 to 16 mm) square shaft	
Enclosure	NEMA 2, IP42	
Ambient Operating Conditions	-4 to 122°F (-20 to 50°C); 0 to 95% RH, noncondensing	
Ambient Storage Conditions	-40 to 186°F (-40 to 86°C); 0 to 95% RH, noncondensing	
Dimensions (H x W x D)	9.82 x 4.57 x 3.62 in. (249.4 x 116.0 x 91.9 mm)	
Shipping Weight	6.4 lb (2.9 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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