

M9220-Bxx-3 Series On/Off Electric Spring Return Actuators

The M9220-Bxx-3 Series On/Off Actuators are direct-mount, spring return electric actuators that operate on AC 24 V power at 50/60 Hz, DC 24 V power, AC 120 V power at 60 Hz, or AC 230 V power at 50/60 Hz. These bidirectional actuators do not require a damper linkage, and are easily installed on dampers with 1/2 to 3/4 in. or 12 to 19 mm round shafts, or 3/8 and 1/2 in. or 10, 12, and 14 mm square shafts using the standard shaft clamp included with the actuator. An optional M9220-600 Jackshaft Coupler Kit is available for 3/4 to 1-1/16 in. or 19 to 27 mm round shafts, or 5/8 and 3/4 in. or 16, 18, and 19 mm square shafts.

A single M9220-Bxx-3 Series On/Off Electric Spring Return Actuator provides a running and spring return torque of 177 lb-in (20 N·m). Two like models mounted in tandem using the M9000-158 Tandem Mounting Kit deliver twice the torque or 354 lb-in (40 N·m). Integral line voltage auxiliary switches are available on the BxC models to indicate end-stop position, or to perform switching functions within the selected rotation range.



**Figure 1: M9220-Bxx-3 Series
On/Off Electric Spring Return Actuator**

Features and Benefits	
<input type="checkbox"/> Available Torques of 177 lb-in (20 N·m) for Single Actuators and 354 lb-in (40 N·m) for Two Like Models Mounted in Tandem	Offer a selection that is most suitable for the application
<input type="checkbox"/> Reversible Mounting Design	Simplifies installation and enables the actuator to spring return in either direction
<input type="checkbox"/> Electronic Stall Detection throughout Entire Rotation Range	Extends the life of the actuator by deactivating the actuator motor when an overload condition is detected
<input type="checkbox"/> Removable Coupler	Adapts to a shorter damper shaft
<input type="checkbox"/> Integral 48 in. (1.2 m) Halogen-Free Cables with Colored and Numbered Conductors	Simplify field wiring
<input type="checkbox"/> Integral Auxiliary Switches (BxC Models)	Provide one fixed and one adjustable switch point with line voltage capability
Continued on next page . . .	

Features and Benefits (Cont.)

<input type="checkbox"/> NEMA 2 (IP54) Rated Aluminum Enclosure	Protects the internal components of the actuator from dirt and moisture
<input type="checkbox"/> Easy-to-Use Locking Manual Override with Auto Release and Crank Storage	Allows for manual positioning of the actuator hub
<input type="checkbox"/> Integral Connectors for 3/8 in. Flexible Metal Conduit	Simplify installation and field wiring

Product Details

The M9220-Bxx-3 Series On/Off Electric Spring Return Actuators are designed to position return air, exhaust air, or outside air dampers in Heating, Ventilating, and Air Conditioning (HVAC) systems. Refer to the manufacturer's information to properly size the damper and/or actuator.

IMPORTANT: Use this M9220-Bxx-3 Series On/Off Electric Spring Return Actuator only to control equipment under normal operating conditions. Where failure or malfunction of the electric actuator could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices such as supervisory or alarm systems or safety or limit controls intended to warn of, or protect against, failure or malfunction of the electric actuator.

IMPORTANT: Do not install or use this M9220-Bxx-3 Series On/Off Electric Spring Return Actuator in or near environments where corrosive substances or vapors could be present. Exposure of the electric actuator to corrosive environments may damage the internal components of the device, and will void the warranty.

Operation

With power applied, the M9220-Bxx-3 Series On/Off Electric Spring Return Actuator provides reliable, integrated damper control. An AC 24 V at 50/60 Hz or DC 24 V input signal (BGx models), an AC 120 V input signal at 60 Hz (BAx models), or an AC 230 V input signal at 50/60 Hz (BDx models) causes the output hub to rotate from -5 to 90° (unless an external mechanical limit is reached).

The output hub holds its position until power is removed. When power is removed, the actuator spring returns to its -5° position (unless an external mechanical limit is reached). A stall condition during travel from -5 to 90° causes the output hub to stop motion and hold its position until power is removed. Rotation is mechanically limited to 90° by integral end-stops. Optional end-stops are available to limit the output hub travel. An anti-rotation bracket prevents rotational movement of the actuator body. The actuator output rotates Clockwise (CW) when viewed from Side A and Counterclockwise (CCW) when viewed from Side B.

Repairs and Replacement

A number of replacement parts are available; see Table 2 for more details. If the M9220-Bxx-3 Series On/Off Electric Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement electric actuator, contact the nearest Johnson Controls representative.

Ordering Information

Table 1: Electric Spring Return Actuator Models

Code Number	Control Type	Auxiliary Switches	Power Requirements
M9220-BGA-3	On/Off	None	AC 24 V at 50/60 Hz or DC 24 V
M9220-BGC-3	On/Off	Two	AC 24 V at 50/60 Hz or DC 24 V
M9220-BAA-3	On/Off	None	AC 120 V at 60 Hz
M9220-BAC-3	On/Off	Two	AC 120 V at 60 Hz
M9220-BDA-3	On/Off	None	AC 230 V at 50/60 Hz
M9220-BDC-3	On/Off	Two	AC 230 V at 50/60 Hz

Table 2: Accessories and Replacement Parts (Order Separately)

Code Number	Description
DMPR-KC003*	7 in. (178 mm) Blade Pin Extension (without Bracket) for Johnson Controls® Direct-Mount Damper Applications
M9000-158	Tandem Mounting Kit used to Mount Two Like Models of M9220-Bxx-3 Series On/Off Electric Spring Return Actuators in Tandem to Deliver Twice the Torque
M9000-200	Commissioning Tool that Provides a Control Signal to Drive 24 V On/Off, Floating, Proportional, and/or Resistive Electric Actuators
M9000-604	Replacement Anti-rotation Bracket Kit (with Screws) for M9220-Bxx-3 Series On/Off Electric Spring Return Actuators
M9220-600	1 in. (25 mm) Jackshaft Coupler Kit (with Locking Clip) for Mounting M9220-Bxx-3 Series On/Off Electric Spring Return Actuators on Dampers with 3/4 to 1-1/16 in. or 19 to 27 mm Round Shafts, or 5/8 and 3/4 in. or 16, 18, and 19 mm Square Shafts
M9220-601	Replacement Coupler Kit (with Locking Clip) for Mounting M9220-Bxx-3 Series On/Off Electric Spring Return Actuators on Dampers with 1/2 to 3/4 in. or 12 to 19 mm Round Shafts, or 3/8 and 1/2 in. or 10, 12, and 14 mm Square Shafts
M9220-602	Replacement Locking Clips for M9220-Bxx-3 Series On/Off Electric Spring Return Actuators (Five per Bag)
M9220-603	Adjustable Stop Kit for M9220-Bxx-3 Series On/Off Electric Spring Return Actuators
M9220-604	Replacement Manual Override Cranks for M9220-Bxx-3 Series On/Off Electric Spring Return Actuators (Five per Bag)
M9220-610	Replacement Shaft Gripper, 10 mm Square Shaft with Locking Clip
M9220-612	Replacement Shaft Gripper, 12 mm Square Shaft with Locking Clip
M9220-614	Replacement Shaft Gripper, 14 mm Square Shaft with Locking Clip

* Furnished with the damper and may be ordered separately.

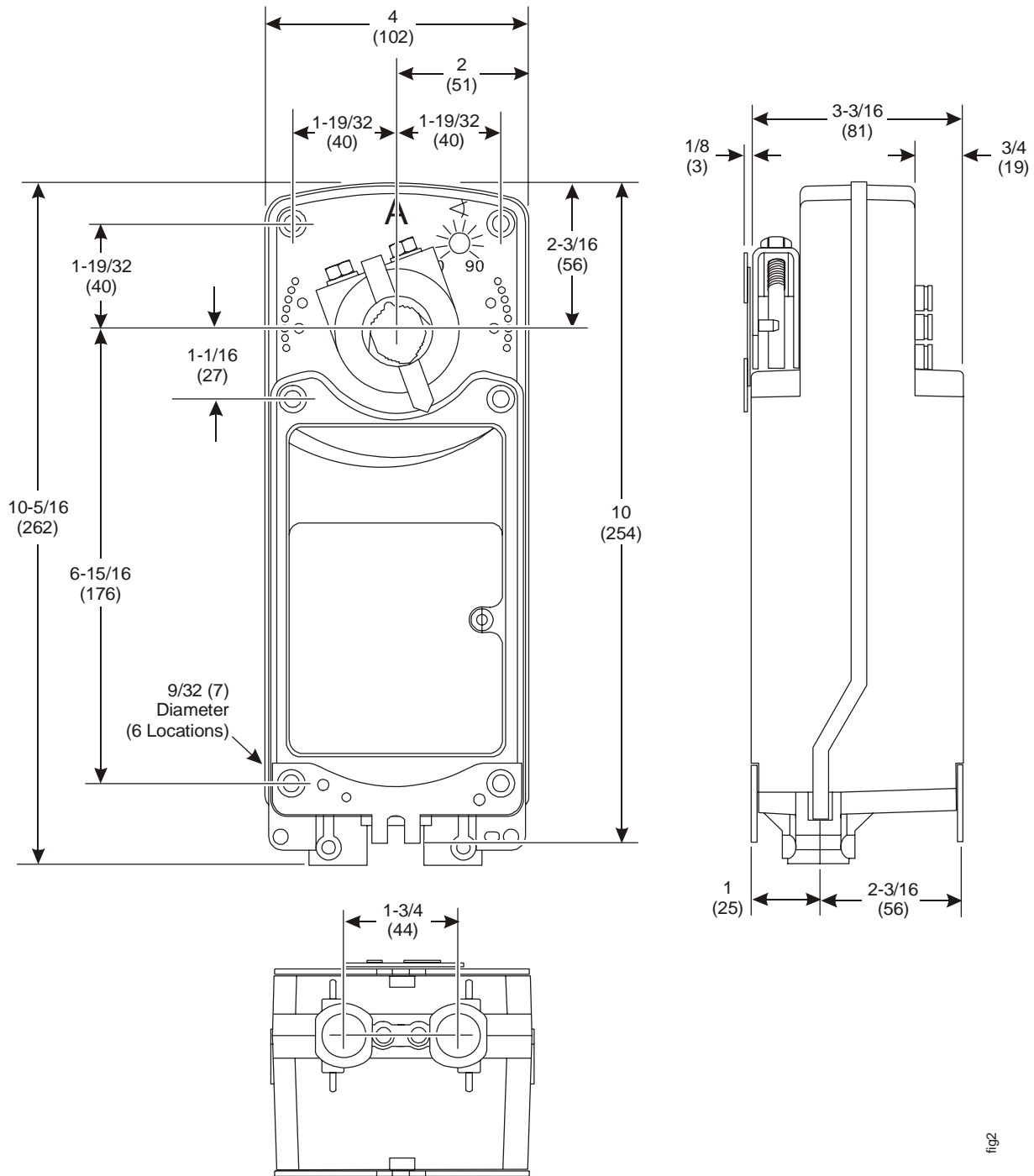


fig2

**Figure 2: M9220-Bxx-3 Series
On/Off Electric Spring Return Actuator Dimensions, in (mm)**

Technical Specifications

Product		M9220-Bxx-3 Series On/Off Electric Spring Return Actuators
Power Requirements	BGx Models	Nominal AC 24 V at 50/60 Hz: Class 2, 24.6 VA Running, 5.4 VA Holding Position; Nominal DC 24 V: Class 2, 17.6 W Running, 2.8 W Holding Position
	BAx Models	Nominal AC 120 V at 60 Hz: 0.25 A Running, 0.13 A Holding Position
	BDx Models	Nominal AC 230 V at 50/60 Hz: 0.15 A Running, 0.09 A Holding Position
Auxiliary Switch Rating	BxC Models	Two Single-Pole, Double-Throw (SPDT), Double-Insulated Switches with Gold Flash Contacts: AC 24 V, 50 VA Pilot Duty; AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty; AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty
Spring Return		Direction is Selectable with Mounting Position of Actuator: Side A, Actuator Face Away from Damper for CCW Spring Return; Side B, Actuator Face Away from Damper for CW Spring Return
Running and Spring Return Torque		177 lb-in (20 N·m) for a Single Actuator; 354 lb-in (40 N·m) for Two Like Models Mounted in Tandem
Rotation Range		Adjustable from 30 to 90° CW or CCW with Optional M9220-603 Adjustable Stop Kit; Mechanically Limited to 90°
Rotation Time	Power On (Running)	24 to 57 Seconds for 0 to 177 lb-in (0 to 20 N·m) at All Operating Conditions; 35 Seconds Nominal at Full Rated Load
	Power Off (Spring Returning)	11 to 15 Seconds for 0 to 177 lb-in (0 to 20 N·m) at Room Temperature; 35 Seconds Maximum for 0 to 177 lb-in (0 to 20 N·m) at -22°F (-30°C) 130 Seconds Maximum for 0 to 177 lb-in (0 to 20 N·m) at -40°F (-40°C)
Cycles		60,000 Full Stroke Cycles
Audible Noise Rating	Power On (Running)	66 dBA Nominal at 39-13/32 in. (1 m)
	Power On (Holding)	18 dBA Nominal at 39-13/32 in. (1 m)
	Power Off (Spring Returning)	66 dBA Nominal at 39-13/32 in. (1 m)
Electrical Connections	Actuator (All Models)	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm ²) Wire Leads
	Auxiliary Switches (BxC Models)	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm ²) Wire Leads
Conduit Connections		Integral Connectors for 3/8 in. Flexible Metal Conduit
Mechanical Connections	Standard Shaft Clamp Included with Actuator	1/2 to 3/4 in. or 12 to 19 mm Diameter Round Shafts, or 3/8 and 1/2 in. or 10, 12, and 14 mm Square Shafts
	Optional M9220-600 Jackshaft Coupler Kit	3/4 to 1-1/16 in. or 19 to 27 mm Diameter Round Shafts, or 5/8 and 3/4 in. or 16, 18, and 19 mm Square Shafts
Aluminum Enclosure		NEMA 2 (IP54) for All Mounting Orientations
Ambient Conditions	Operating	-40 to 131°F (-40 to 55°C); 90% RH Maximum, Noncondensing
	Storage	-85 to 185°F (-65 to 85°C); 95% RH Maximum, Noncondensing
Dimensions		See Figure 2.
Continued on next page . . .		

Technical Specifications (Cont.)

Compliance	North America	UL Listed, File E27734, CCN XAPX (United States) and XAPX7 (Canada)
	European Union	CE Mark, EMC Directive 89/336/EEC (BGx and BDx Models)
		CE Mark, Low Voltage Directive 73/23/EEC (BGC and BDx Models)
Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant (BGx and BDx Models)	
Shipping Weight	BAx and BDx Models	7.6 lb (3.5 kg)
	BGx Models	6.4 lb (2.9 kg)

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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