

M9216 Series

Electric Spring Return Actuators



M9216

Description

The M9216 Series direct-mount, spring return electric actuators operate on 24 VAC or VDC power and are available for use with on/off, floating, proportional, or resistive 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 inch (20 mm) in diameter or a square shaft up to 5/8 inch (16 mm). M9216 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 model delivers up to 140 lb-in (16 N-m) of torque. Two BGx, GGx, or HGx 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. Position feedback is available through switches, a potentiometer, or a 0 (2) to 10 VDC signal.

Features

- available torques: 140 and 280 lb-in (16 and 32 Nm) offer selection most suitable for the application
- bidirectional, return-to-normal spring return allows selectable rotation/spring return direction simplifying installation
- extended temperature range meets the needs of most outdoor air applications
- output position feedback provides simple, closed-loop control with accurate position sensing
- electronic stall detection ensures higher reliability by deactivating the actuator motor when a stall condition is detected
- auto stroke calibration (GGx models) reduces field installation time and cost due to self adjustment
- zero and span adjustment (HGx models) allows sequential operation of dampers from a single input signal of 0 (2) to 10 VDC or 0 (4) to 20 mA
- manual override allows manual positioning when the actuator is not powered; simplifies setup and field adjustments
- NPT conduit adaptor (included) provides easy connection for electrical fittings and armored cable

Accessories

See the Accessories chart on Page 3.

Repair Parts

Replace the unit.

Selection Chart

M9216 Series Electric Spring Return Actuator 140 lb-in (16 N-m)	M9216-AGA-2	M9216-AGC-2	M9216-AGD-2	M9216-AGE-2	M9216-BGA-2	M9216-BGC-2	M9216-CGA-2	M9216-CGC-2	M9216-HGA-2	M9216-HGC-2	M9216-JGA-2	M9216-JGC-2
On/Off Control	(a)	(a)	(a)	(a)	■	■						
Floating Control	■	■	■	■								
Proportional Control							■	■	■	■		
VDC and mA Input with Zero and Span									■	■		
Resistive Input Control											■	■
Feedback												
135 ohm Potentiometer			■									
1,000 ohm Potentiometer				■								
0 to 10 VDC							■	■	■	■	■	■
2 Auxiliary Switches		■				■		■		■		■
Tandem Operation					■	■	■	■	■	■		

(a) May be used with 2-wire on/off control.

Note: AGx, HGx, and JGx models have a 25-second delay upon startup.
Use two actuators with the same torque and control input for tandem operation.

Applications

M9216 actuators are designed to position air dampers and valves in HVAC systems. Applications include:

- positioning of 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 globe valves when used with an M9000-5xx Valve Linkage

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

These actuators use a DC motor with stall detection circuitry that operates throughout the entire stroke. The proportional and resistive actuators employ noise-filtering techniques on the control signal to eliminate repositioning due to line noise.

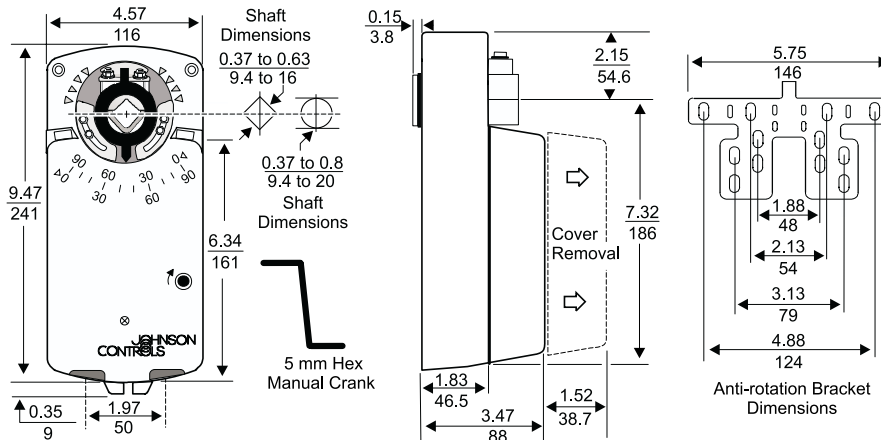
Rotation is mechanically limited to 93° by integral end-stops. The position of the actuator is visually indicated from 0 to 90° on the cover. An anti-rotation bracket prevents lateral movement of the actuator. The damper position may be set manually with the manual override feature in the event of a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

For more information, refer to the *M9216 Series Electric Spring Return Actuators Product Bulletin, LIT-2681068* or the *M9216 Series Electric Spring Return Actuators Installation Instructions, Part No. 34-636-461*.

To Order

Specify the code number from the following selection chart.

M9216 Series Electric Spring Return Actuators (Continued)



Dimensions, in./mm

Specifications

M9216 Series Electric Spring Return Actuators	
Power Requirements	AGx, HGx, and JGx: 20 to 30 VAC at 50/60 Hz or 24 VDC ±10%; 12 VA supply minimum, Class 2 BGx: 20 to 30 VAC at 50/60 Hz or 24 VDC ±10%; 10 VA supply minimum, Class 2 GGx: 20 to 30 VAC at 50/60 Hz or 24 VDC ±10%; 14 VA supply from 32 to 122°F (0 to 50°C) or 18 VA supply from -22 to 32°F (-30 to 0°C), minimum, Class 2
Input Signal	AGx: 24 VAC at 50/60 Hz or 24 VDC, 4.8 mA (on/off mode, 500 mA maximum) BGx: 24 VAC at 50/60 Hz or 24 VDC, 420 mA maximum GGx and HGx: 0 to 10 VDC or 0 to 20 mA JGx: Potentiometer value is 100 ohms minimum to 10,000 ohms maximum
Input Signal Adjustments	AGx Factory Setting: Terminals 1 and 3, CW rotation; Terminals 1 and 4, CCW rotation BGx Factory Setting: Terminals 1 and 2, CW rotation GGx (Voltage or Current Input): Switch Selectable: 0 (2) to 10 VDC or 0 (4) to 20 mA Factory Setting: 0 to 10 VDC, CW rotation with signal increase HGx (Voltage Input or Current Input): Jumper Selectable, Fixed: 0 (2) to 10 VDC, or 0 (4) to 20 mA Adjustable: Zero, 0 to 6 V (0 to 12 mA); Span, 2 to 10 V (4 to 20 mA) Factory Setting: 0 to 10 VDC, 0 to 20 mA, CW rotation with signal increase GGx, HGx, and JGx: Direction of action is user selectable Direct (CW) or Reverse (CCW) with signal increase.
Input Impedance	GGx and HGx: Voltage Input, 200,000 ohms; Current Input, 500 ohms JGx: 1.8 Megohms
Feedback Signal	AGD: 135 ohm feedback potentiometer AGE: 1,000 ohm feedback potentiometer GGx and HGx: 0 to 10 VDC or 2 to 10 VDC for 90° (10 VDC at 1 mA) Corresponds to input signal span selection and rotation limits. JGx: 0 to 10 VDC for 90° (10 VDC at 1 mA)
Auxiliary Switch Rating	xGC: 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	BGx, CGx, HGx: 140 lb-in (16 N-m) for one unit All Models: 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	GGx: 1/4 in. spade terminals with pluggable terminal blocks (See Accessories chart.) All Other Models: Screw terminals for 22 to 14 AWG (Insert a maximum of two 18, 20, or 22 AWG per terminal.) M9000-100: One included with all models; two included with AGD, AGE, and xGC
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, GGx: -22 to 122°F (-30 to 50°C); 0 to 95% RH, non-condensing All Other Models: -4 to 122°F (-20 to 50°C); 0 to 95% RH, non-condensing Storage, All Models: -40 to 186°F (-40 to 86°C); 0 to 95% RH, non-condensing
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 873 Listed, File E27734, CCN XAPX CSA C22.2 No. 139 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 applications 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. © 10/01 Johnson Controls, Inc

M9216 Series Electric Spring Return Actuators (Continued)

Accessories

Code Number	Description
DMPR-KR003 ^(a)	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
DMPR-KC003 ^(a)	Blade Pin Extension without Bracket for Johnson Controls CD-1300 direct-mount applications
DMPR-KC254	Inside Frame Mounting Kit for damper applications requiring the actuator within the airstream
M9000-100 ^(b)	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
M9000-151 ^(c)	Base Mount Linkage Kit for remote inside duct mounting
M9000-153 ^(c)	Crank Arm Kit for remote mounting
M9000-154	1 in. Jackshaft Coupler for mounting on a 1 in. diameter damper shaft
M9000-158	Mounting Kit to tandem mount two each M9216 BGx, GGx, or HGx 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 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

(a) Furnished with the damper and may be ordered separately.

(b) Furnished with the actuator and may be ordered separately.

(c) Not intended for M9216 tandem applications.