

M9216-GGx-2 and M9216-HGx-2 Series Proportional Control Electric Spring Return Actuators

The M9216-GGx-2 and M9216-HGx-2 Series direct-mount, spring return 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). M9216-GGx-2 and M9216-HGx-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-GGx-2 or M9216-HGx-2 model delivers up to 140 lb·in (16 N·m) of torque. Two GGx 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.



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
☐ 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
☐ Extended Temperature Range	Meets the needs of most outdoor air applications
☐ Output Position Feedback	Provides simple, closed-loop control with accurate position sensing
☐ 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, 0 (4) to 20 VDC, or 0 (4) to 20 mA
☐ 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-GGx-2 and M9216-HGx-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 Proportional Series actuators are intended to control equipment under normal operating conditions. Where failure or malfunction of an M9216 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 M9216 Proportional actuator must be incorporated into and maintained as part of the control system.

M9216-GGx-2 and M9216-HGx-2 actuators operate on 24 VAC at 50/60 Hz or 24 VDC. They use a DC motor with stall detection circuitry that operates throughout the entire stroke. These actuators employ noise-filtering techniques on the control signal to eliminate repositioning due to line noise. Mounting two M9216-GGx-2 or M9216-HGx-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.

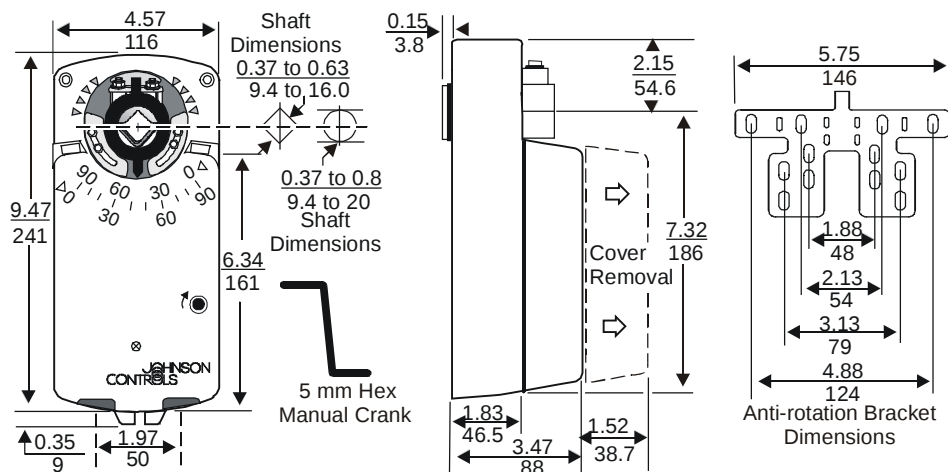


Figure 2: Actuator, Anti-Rotation Bracket, and Manual Crank Dimensions, in. (mm)

Ordering Information

Table 1: Actuator Models and Accessories

Product Code Number	Description
M9216-GGA-2	140 lb·in (16 N·m) or 280 lb·in (32 N·m) in tandem electric spring return actuator for proportional control with 0 to 10 VDC feedback and auto-calibration
M9216-GGC-2	140 lb·in (16 N·m) or 280 lb·in (32 N·m) in tandem electric spring return actuator for proportional control with 0 to 10 VDC feedback, auto-calibration, and two SPDT 24 VAC auxiliary switches
M9216-HGA-2	140 lb·in (16 N·m) or 280 lb·in (32 N·m) in tandem, electric spring return actuator for proportional control, 0 to 10 VDC feedback and adjustable zero and span
M9216-HGC-2	140 lb·in (16 N·m) or 280 lb·in (32 N·m) in tandem, electric spring return actuator for proportional control, 0 to 10 VDC feedback, adjustable zero and span, and two SPDT 24 VAC auxiliary switches
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 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

* Furnished with the damper and may be ordered separately.

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

Technical Specifications

Product	M9216 Series Proportional Control Electric Spring Return Actuators		
Power Requirements	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), Class 2	
	HGx:	20 to 30 VAC at 50/60 Hz or 24VDC +/-10%, 12 VA Supply, minimum, Class 2	
Input Signal	0 to 10 VDC or 0 to 20 mA		
Input Signal Adjustments	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
		Direction of action is user selectable Direct (CW) or Reverse (CCW) with signal increase.	
Input Impedance	Voltage Input, 200,000 ohms; Current Input, 500 ohms		
Feedback Signal	0 to 10 VDC or 2 to 10 VDC for 90° (1mA at 10VDC) Corresponds to input signal span selection and rotation limits.		
Auxiliary Switch Rating	GGC:	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	1/4 in. spade terminals with pluggable terminal blocks M9000-100: One included with all models; two included with GGC		
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	GGx:	-22 to 122°F (-30 to 50°C); 0 to 95% RH, noncondensing	
	HGx:	-4 to 122F (-20 to 50C); 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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