

M9116-AGx-2 Series On/Off and Floating Control Electric Non-Spring-Return Actuators

Product Bulletin

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The M9116-AGx-2 Series direct-mount electric actuators operate on 24 VAC or VDC power and are available for use with on/off or floating 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) or a square shaft up to 5/8 in. (16 mm) in diameter. They may be direct- or remote-mounted to a damper or mounted to a valve using the M9000-500 Valve Linkage Kit.

A single M9116 model delivers up to 140 lb·in (16 N·m) of torque. 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. Position feedback is available through either a 135 or a 1,000 ohm potentiometer.



Figure 1: M9116 Series Actuator

Table 1: Features and Benefits

Features	Benefits
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.
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.
Manual Gear Release	Simplifies installation, setup, and field adjustments.
National Pipe Thread (NPT) Threaded Housing	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.

M9116-AGx-2 actuators are designed to position air dampers and valves in 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 and VG7000 Series globe valves when used with the M9000-500 Valve Linkage

Refer to the manufacturer's information to properly size the damper, valve, or actuator. Spring-return actuators, such as Johnson Controls® M9206 and M9216 Series, are recommended for use with outdoor air dampers in cold climates.

Dimensions

See Figure 2 for actuator dimensions.

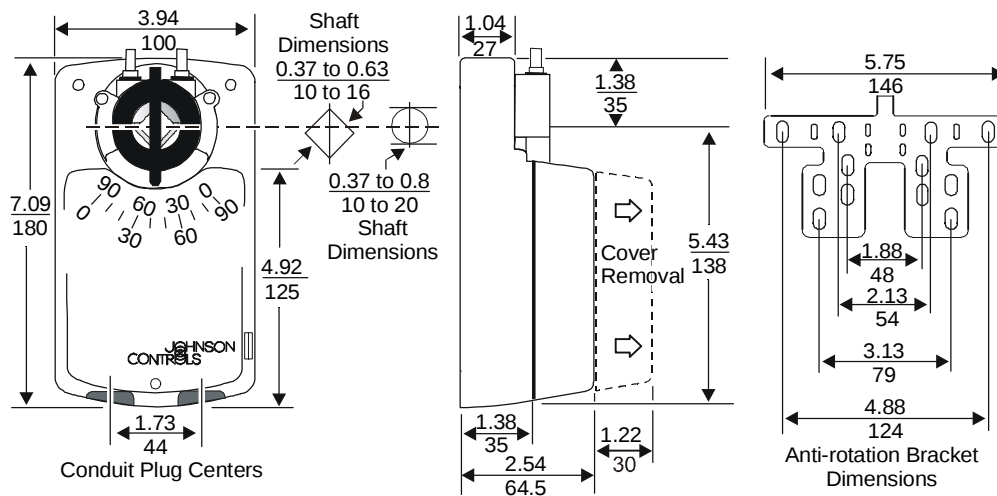


Figure 2: Actuator and Anti-Rotation Bracket Dimensions, in. (mm)

Operation

IMPORTANT: Use this M9116-AGx-2 Series electric actuator only to control equipment under normal operating conditions. Where failure or malfunction of the 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 actuator.

M9116 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.

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 2: Actuator Models and Accessories

Product Code Number	Description
M9116-AGA-2	140 lb-in (16 N·m) electric non-spring-return actuator for on/off or floating control with 24 VAC/VDC input
M9116-AGC-2	140 lb-in (16 N·m) electric non-spring-return actuator for on/off or floating control with 24 VAC/VDC input and two SPDT 24 VAC auxiliary switches
M9116-AGD-2	140 lb-in (16 N·m) electric non-spring-return actuator for on/off or floating control with 24 VAC/VDC input and a 135 ohm feedback potentiometer
M9116-AGE-2	140 lb-in (16 N·m) electric non-spring-return actuator for on/off or floating control with 24 VAC/VDC input and a 1k ohm feedback potentiometer
DMPR-KR003¹	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
DMPR-KC003¹	Blade Pin Extension without Bracket for Johnson Controls D-1300 direct-mount applications
DMPR-KC254	Inside Frame Mounting Kit for damper applications requiring the actuator within the airstream
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
M9000-150	Damper Mount Linkage Kit for remote inside duct mounting an M9116 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
M9000-153	Crank Arm Kit for remote mounting
M9000-154	1 in. Jackshaft Coupler Kit for mounting on a 1 in. diameter damper shaft
M9000-155	Manual Handle for positioning a damper or valve when power is removed from an M91xx actuator
M9000-160	Replacement anti-rotation bracket for M91xx Series actuators
M9000-500	Valve Linkage Kit for mounting M9116 actuators to 1/2 to 2 in. VG7000 Series globe valves

1. Furnished with the damper and may be ordered separately.

Technical Specifications

M9116-AGx-2 Series On/Off and Floating Control Electric Non-Spring-Return Actuators

Power Requirements	20 to 30 VAC at 50/60 Hz or 24 VDC $\pm 10\%$; 6.5 VA supply, Class 2
Input Signal	24 VAC at 50/60 Hz or 24 VDC
Input Signal Adjustments	Factory Setting, Terminals 1 and 2, CW rotation; Terminals 1 and 3
Feedback Signal	AGD: 135 ohm feedback potentiometer AGE: 1,000 ohm feedback potentiometer
Auxiliary Switch Rating	AGC: 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
Mechanical Output (Running Torque)	140 lb-in (16 N·m) for one unit
Audible Noise Rating	45 dBA at 1 m
Rotation Range	0 to 90° in 5 degree increments, mechanically limited to 93°
Rotation Time	80 seconds at 50% rated load, 70 to 115 seconds for 0 to 140 lb-in (0 to 16 N·m)
Electrical Connection	Screw terminals for 22 to 14 AWG; maximum of two 18, 20, or 22 AWG per terminal
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: -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
Dimensions (H x W x D)	7.09 x 3.94 x 2.54 in. (180 x 100 x 64.5 mm)
Shipping Weight	2.9 lb (1.3 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 shall not be liable for damages resulting from misapplication or misuse of its products.



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