

M9102-AGA-2S, -3S and M9104-xxA-2S, -3S Series Electric Non-Spring Return Actuators

Product Bulletin

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The M9102 and M9104 Series Actuators are direct-mount, non-spring return electric actuators that operate on AC 24 V or 100 to 240 VAC power. These motor-driven actuators provide floating control (AGA), floating control with automatic shutoff (IGA), proportional control with selectable 0-10 or 2-10 VDC (GGA), and line voltage power supply (IUA). The -2S models are equipped with plenum cables, and the -3S models are equipped with terminal blocks.

All models are compact in size and are easily installed on VAV boxes, Variable Air Volume and Temperature (VVT) two-position zone applications, or small- to medium-sized dampers with a round shaft up to 1/2 in. (13 mm) in diameter or a 3/8 in. (10 mm) square shaft.

The M9102 Series Electric Non-Spring Return Actuators provide a running torque of 18 lb·in (2 N·m), and the nominal travel time is 30 seconds at 60 Hz (36 seconds at 50 Hz) for 90° of rotation.

The M9104 Series Electric Non-Spring Return Actuators provide a running torque of 35 lb·in (4 N·m), and the nominal travel time is 60 seconds at 60 Hz for 90° of rotation.



Figure 1: M9102/M9104 Series Electric Non-Spring Return Actuator

Table 1: Features and benefits

Features	Benefits
Two torques available: 18 and 35 lb·in (2 and 4 N·m)	Offer the most suitable choice for the specific application.
Short 30-second travel time available	Provides a quick response for two-position zone applications.
35 dBA maximum audible noise rating at one meter	Meets the audible noise requirements for open ceiling environments.
Synchronous drive (AGA, IGA, GGA models)	Provides a constant rotation time that is independent of the load.
100,000 cycle rating	Provides years of trouble-free service.
Direct shaft mounting with single-screw coupler	Reduces installation time and provides three-point shaft gripping.
Magnetic clutch	Protects the actuator gear train and the damper from damage due to excessive torque during a stall condition.
Manual gear release	Simplifies actuator setup and adjustments in the field.
Plenum cable or screw terminal electric connections	Make wiring quick and easy.
Floating, floating with timeout, and proportional 0(4)...10 VDC control inputs available	Offer a full range of control input options.
Small, compact design	Allows installation in tight-fitting locations.

Product details

The M9102 and M9104 Series Electric Non-Spring Return Actuators are designed to position balancing, control, round, and zone dampers in HVAC systems. These electric actuators are also designed to position blades in a VAV box, or they can be used in VVT two-position zone applications.

Each actuator mounts directly to the surface in any convenient orientation using a single No. 10 standard sheet metal screw (included with the actuator). No additional linkages or couplers are required. Electrical connections on the actuator are clearly labeled to simplify installation.

IMPORTANT: Use this M9102 or M9104 Series Electric Non-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 M9102 or M9104 Series Electric Non-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

When combined with a VAV or VVT controller, the M9102 or M9104 Series Electric Non-Spring Return Actuator provides reliable, integrated damper control.

AGA models

An AC 24 V input signal from the controller to the clockwise (CW) or counterclockwise (CCW) terminal on the electric actuator causes the motor to rotate in the proper direction, and moves the damper blades open or closed. When the controller stops sending the input signal, the electric actuator remains in place.

Note: Use a VAV or VVT controller and/or software that provides a timeout function at the end of rotation (stall) to avoid excessive wear or drive time on the actuator motor.

IGA models

The IGA models operate in the same fashion as the AGA models, except the motor automatically shuts off after a time delay. IGA models can be used with controllers that apply a constant CW or CCW signal.

GGA models

The GGA models accept a 0(4)...10 VDC command signal to position the Output hub. The GGA-2S actuator returns a 0-10 volt position indication on the Feedback signal. A selectable switch or an mA input with a field supplied resistor allows 0 to 10 VDC or 2 to 10 VDC commands and Reverse Acting/Direct Acting (RA/DA) operation.

IUA models

The IUA models operate on AC 100 to 240 V (-15% +10%) power and work with a variety of controllers. These actuators include an integrated 48 in. (1.2 m) long cable.

Repair information

If the M9102 or M9104 Series Electric Non-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 2: Electric non-spring return actuator models

Code number	Control type	Running torque	Travel time	Power supply (VA rating)	Electrical connections
M9102-AGA-2S	Floating	18 lb·in (2 N·m)	30 seconds at 60 Hz 36 seconds at 50 Hz	2.5	48 in. (1.2 m) UL 444 Type CMP plenum rated cable with 19 AWG (0.75 mm ²) conductors and .25 in. (6 mm) ferrule ends
M9102-AGA-3S	Floating	18 lb·in (2 N·m)	30 seconds at 60 Hz 36 seconds at 50 Hz	2.5	M3 screw terminals
M9104-AGA-2S	Floating	35 lb·in (4 N·m)	60 seconds at 60 Hz 72 seconds at 50 Hz	2.1	36 in. (0.9 m) UL 444 Type CMP plenum rated cable with 19 AWG (0.75 mm ²) conductors and .25 in. (6 mm) ferrule ends
M9104-AGA-3S	Floating	35 lb·in (4 N·m)	60 seconds at 60 Hz 72 seconds at 50 Hz	2.1	M3 screw terminals
M9104-IGA-2S	Floating or on/off	35 lb·in (4 N·m)	60 seconds at 60 Hz 72 seconds at 50 Hz	3.0	48 in. (1.2 m) UL 444 Type CMP Plenum Rated cable with 19 AWG (0.75 mm ²) conductors and .25 in. (6 mm) ferrule ends
M9104-IGA-3S	Floating or on/off	35 lb·in (4 N·m)	60 seconds at 60 Hz 72 seconds at 50 Hz	3.0	M3 Screw Terminals
M9104-GGA-2S	Proportional	35 lb·in (4 N·m)	60 seconds at 60 Hz 72 seconds at 50 Hz	2.9	36 in. (0.9 m) UL 444 Type CMP plenum rated cable with 19 AWG (0.75 mm ²) conductors and .25 in. (6 mm) ferrule ends
M9104-GGA-3S	Proportional	35 lb·in (4 N·m)	60 seconds at 60 Hz 72 seconds at 50 Hz	2.9	M3 screw terminals
M9104-IUA-2S	Floating or on/off	35 lb·in (4 N·m)	60 seconds at 50/60 Hz	7.5 (0.07A)	48 in. (1.2 m) UL 444 Type CMP plenum rated cable with 18 AWG (1.02 mm ²) conductors for 3/8 in. (10 mm) flexible metal conduit

Table 3: Accessories (order separately)

Code number	Description
DMPR-KC003	7 in. (178 mm) blade pin extension without bracket for Johnson Controls direct-mount damper applications Note: Available with the damper and may also be ordered separately
DMPR-KR003	Sleeve pin kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft Note: Available with the damper and may also be ordered separately
M9104-100	Connector for 3/8 in. (10 mm) flexible metal conduit

Dimensions

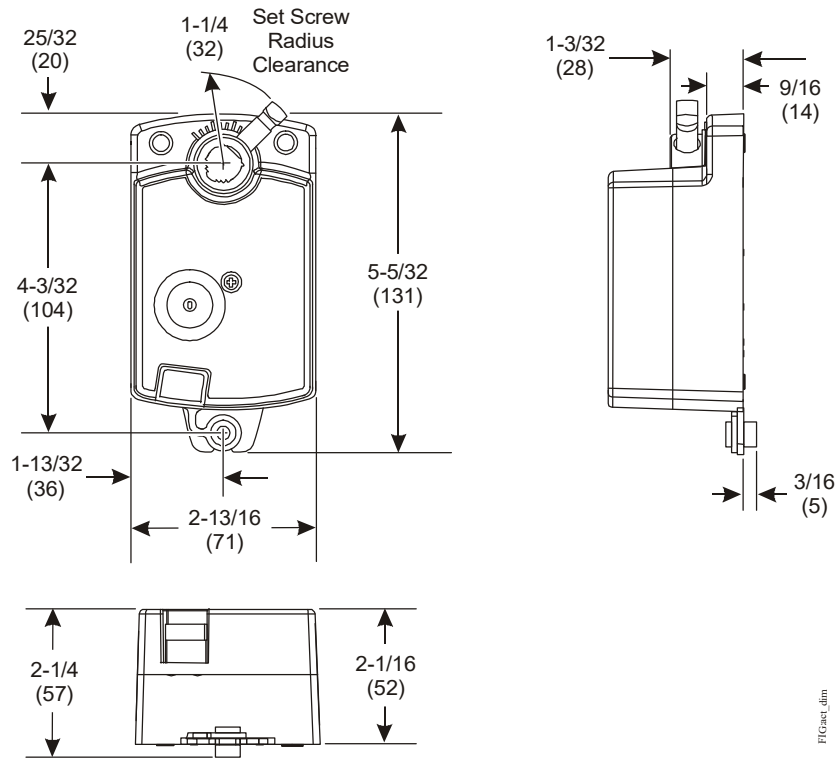


Figure 2: M9102/M9104 Series Electric Non-Spring Return Actuator dimensions, in. (mm)

Technical specifications

M9102-AGA-2S, -3S and M9104-xxA-2S, -3S Series Electric Non-Spring Return Actuators (Part 1 of 2)

Power requirements	M910x-AGA-xS	AC 24 V +25%/-20% at 50/60 Hz, 2.1 VA, Class 2, Safety Extra-Low Voltage (SELV)
	M9104-IGA-xS	AC 24 V +25%/-20% at 50/60 Hz, 3.0 VA, Class 2, SELV
	M9104-GGA-xS	AC 24 V +25%/-20% at 50/60 Hz, 2.9 VA, Class 2, SELV
	M9104-IUA-2S	AC 100 to 240 V (-15%+10%) at 60 Hz, 0.07A, and 7.5 VA supply
Control type	M910x-AGA-xS	Floating control without timeout
	M9104-IGA-xS	Floating or on/off control with timeout
	M9104-GGA-xS	Proportional control
	M9104-IUA-2S	Floating or on/off control with timeout
Input signal	M910x-AGA-xS	AC 24 V +25%/-20% at 50/60 Hz, Class 2, SELV without timeout
	M9104-IGA-xS	AC 24 V +25%/-20% at 50/60 Hz, Class 2, SELV with timeout
	M9104-GGA-xS	0(2) to 10 VDC or 0(4) to 20 mA with field-furnished 500 ohm resistor
	M9104-IUA-2S	AC 100 to 240 V (-15%+10%) at 50/60 Hz, and 7.5 VA supply
Feedback signal	M9104-GGA-2S	0 to 10 VDC or 2 to 10 VDC for 90° (10 VDC at 1 mA) corresponds to input signal span selection
Motor input impedance		200 ohms nominal
Running torque	M9102 Series	18 lb·in (2 N·m)
	M9104 Series	35 lb·in (4 N·m)
Travel time	M9102 Series	30 seconds at 60 Hz (36 seconds at 50 Hz) for 90° of rotation
	M9104 Series	60 seconds at 60 Hz (72 seconds at 50 Hz) for 90° of rotation
	M9104 (IUA)	60 seconds at 50/60 Hz for 90° of rotation
Rotation range		93° ±3°, CW or CCW
Cycles		100,000 full stroke cycles; 2,500,000 repositions at rated running torque
Audible noise rating		35 dBA at 39-13/32 in. (1 m) maximum
Electrical connections	M9102-AGA-2S M9104-IGA-2S	48 in. (1.2 m) UL 444 Type CMP plenum rated cable with 18 AWG (1.02 mm) conductors and 1/4 in. (6 mm) ferrule ends
	M9102-AGA-3S M9104-IGA-3S	M3 screw terminals
	M9104-IUA-2S	48 in. (1.2 m) with 18 AWG (1.02 mm ²) conductors and connector for 3/8 in. (10 mm) flexible metal conduit
	M9104 AGA and GGA models	36 in. (0.9 m) UL 444 Type CMP plenum rated cable with 18 AWG (1.02 mm) conductors and 1/4 in. (6 mm) ferrule ends
Mechanical connections		Up to 1/2 in. (13 mm) diameter round damper shaft or 3/8 in. (10 mm) square damper shaft
Enclosure	M9102-AGA-2S M9104-xxA-2S	NEMA 1, IP42
	M9102-AGA-3S M9104-xxA-3S	NEMA 1, IP40

**M9102-AGA-2S, -3S and M9104-xxA-2S, -3S Series Electric Non-Spring Return Actuators
(Part 2 of 2)**

Ambient conditions	Operating	-4 to 140°F (-20 to 60°C); 90% RH maximum, noncondensing
	Storage	-20 to 150°F (-29 to 66°C); 90% RH maximum, noncondensing
Compliance	United States	UL Listed, CCN XAPX, File 27734 Plenum rated, UL2043, suitable for use in other environmental spaces (plenums) in accordance with section 300.22.(c) of the National Electrical Code
	Canada	cUL Listed, CCN XAPX7, File 27734 Plenum Rated Per CSA 22.2 No. 236/UL 1995, Heating and Cooling Equipment
	Europe	Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and the Low Voltage Directive 2006/95/EC
	Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant
Shipping weight		1.0 lb (0.5 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 shall not be liable for damages resulting from misapplication or misuse of its products.



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