

M9208-GGx-x, M9208-AGx-x, M9208-Bxx-3

## M9208-xxx-x Series Electric Spring Return Actuators

### Description

The M9208-xxx-x Series Electric Spring Return Actuators provide control of dampers in Heating, Ventilating, and Air Conditioning (HVAC) systems. All actuators in this series provide 70 lb-in (8 N-m) rated torque. A mechanical spring return system provides rated torque with and without power applied to the actuator. The series includes the following control options:

- On/Off, 24 V, 120 VAC, 230 VAC power
- On/Off and Floating Point, 24 V power
- Proportional, 24 V power, for 0(2) to 10 VDC or 0(4) to 20 mA Control Signal

These actuators are configured for direct mounting and do not require a damper linkage. Actuators can be mounted directly to a damper shaft from 5/16 to 5/8 in. (8 to 16 mm) diameter with a universal clamp. For shafts up to 3/4 in. (19 mm) diameter use the accessory Large Shaft Coupler Kit M9208-600. An accessory crankarm and remote mounting kit are available for applications where the actuator cannot be direct-coupled to the damper shaft. Optional line voltage auxiliary switches indicate an end-stop position or perform switching functions within the selected rotation range.

Refer to the *M9208-xxx-x Series Electric Spring Return Actuators Product Bulletin (LIT-12011480)* for important product application information.

### Features

- 70 lb-in. (8 N-m) rated torque
- direct-coupled design
- reversible mounting
- electronic stall detection
- double-insulated construction
- microprocessor-controlled brushless DC motor (-AGx and -GGx types)
- external mode selection switch (-AGx and -GGx types)
- locking manual override with auto release and crank storage
- override control (proportional model only)
- integral cables with colored and numbered conductors
- integral connectors for 3/8 in. (10 mm) Flexible Metal Conduit (FMC)
- optional integrated auxiliary switches
- UL, CE, and C-Tick compliance
- manufactured under International Standards Organization (ISO) 9001 quality control standards
- 5-year warranty



M9208-xxx-x Series Electric Spring Return Actuator

### Repair Information

If the M9208-xxx-x Series Electric Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement M9208-xxx-x actuator, contact the nearest Johnson Controls® representative.

### Accessories and Replacement Parts (Order Separately)

Code Number	Description
DMPR-KC003 <sup>1</sup>	7 in. (178 mm) Blade Pin Extension (without bracket) for Johnson Controls Direct-Mount Damper Applications (quantity 1)
M9000-200	Commissioning Tool that provides a control signal to drive 24 V On/Off, Floating, Proportional, and/or Resistive Electric Actuators (quantity 1)
M9000-321	Weathershield Kit for Damper Application of M9203 and M9208 Series Electric Spring Return Actuators (quantity 1)
M9000-400	Jackshaft Linkage Kit. Open-ended design enables clamping onto a jackshaft without requiring access to the ends of the jackshaft. (quantity 1)
M9000-560	Ball Valve Linkage Kit for applying M9203 and M9208 Series Electric Spring Return Actuators to VG1000 Series Valves (quantity 1)
M9000-604	Replacement Anti-Rotation Bracket Kit for M9208, M9210, and M9220 Series Electric Spring Return Actuators (quantity 1)
M9000-606	Position Indicator for Damper Applications of M9203 and M9208 Series Actuators (quantity 5)
M9200-100	Threaded Conduit Adapter, 1/2 NPSM, for M9210(20) and M(VA)9208 Series Actuators (quantity 5)
M9208-100	Remote Mounting Kit, including Mounting Bracket, M9208-150 Crankarm, Ball Joint, and mounting fasteners (quantity 1)
M9208-150	Crankarm Adapter Kit (quantity 1)
M9208-600	Large Shaft Coupler Kit (with Locking Clip) for Mounting M9208 Series Electric Spring Return Actuators on dampers with round shafts from 1/2 to 3/4 in. (12 to 19 mm) or square shafts from 3/8 to 9/16 in. (10 to 14 mm) (quantity 1)
M9208-601	Replacement Standard Coupler Kit (with Locking Clip) for mounting M9208 Series Electric Spring Return Actuators on dampers with round shafts from 5/16 to 5/8 in. (8 to 16 mm) or square shafts from 1/4 to 1/2 in. (6 to 12 mm) (quantity 1)
M9208-602	Replacement Locking Clips for M9208 Series Electric Spring Return Actuators (quantity 5)
M9208-603	Adjustable Stop Kit for M9208 Series Electric Spring Return Actuators (quantity 1)
M9208-604	Replacement Manual Override Cranks for M9208 Series Electric Spring Return Actuators with long crank radius: 2.83 in. (72 mm) (quantity 5)
M9208-605	Replacement Manual Override Cranks for M9208 Series Electric Spring Return Actuators with short crank radius: 1.83 in. (46.5 mm) (quantity 5)

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

## M9208-xxx-x Series Electric Spring Return Actuators (Continued)

### Selection Chart

Code Number	Rotation Time	For 90°	Power Requirements				Power Consumption			Input Signal		Position Feedback	Auxiliary Switches	Electrical Connection			
			24 VAC +/- 25%, VDC +20%/-10%	24 VAC +/- 20%, VDC +20%/-10%	120 VAC +/- 10%	230 VAC +/- 10%	VA Rating, Transformer Sizing	VA: Running (Holding)	Amperage: Running (Holding)	On/Off	Floating Point			0(2) to 10 VDC 0(4) to 20 mA (with 500 ohm Resistor)	0(2) to 10 VDC	2 Single-Pole, Double-Throw (SPDT), 5.0 A (2.9 A Inductive) at 240 V	48 in. (1.2 m) 18 AWG Appliance Cable
M9208-AGA-2	150	17 to 25 <sup>1</sup>		x			8	7.9 (5.5)	-	x	x					x	x
M9208-AGA-3	150	17 to 25 <sup>1</sup>		x			8	7.9 (5.5)	-	x	x					x	x
M9208-AGC-3	150	17 to 25 <sup>1</sup>		x			8	7.9 (5.5)	-	x	x		x			x	x
M9208-BGA-3	55 to 71	13 to 26 <sup>2</sup>	x				7	6.1 (1.2)	-	x						x	x
M9208-BGC-3	55 to 71	13 to 26 <sup>2</sup>	x				7	6.1 (1.2)	-	x			x			x	x
M9208-BAA-3	55 to 71	13 to 26 <sup>2</sup>			x		-	-	.05 (.03)	x						x	x
M9208-BAC-3	55 to 71	13 to 26 <sup>2</sup>			x		-	-	.05 (.03)	x			x			x	x
M9208-BDA-3	55 to 71	13 to 26 <sup>2</sup>				x	-	-	.04 (.03)	x						x	x
M9208-BDC-3	55 to 71	13 to 26 <sup>2</sup>				x	-	-	.04 (.03)	x			x			x	x
M9208-GGA-2	150	17 to 25 <sup>1</sup>		x			8	7.9 (5.5)	-			x	x				x
M9208-GGA-3	150	17 to 25 <sup>1</sup>		x			8	7.9 (5.5)	-			x	x				x
M9208-GGC-3	150	17 to 25 <sup>1</sup>		x			8	7.9 (5.5)	-			x	x	x			x


- 22 seconds nominal at room temperature and rated load, 94 seconds maximum at rated load and -40°F (-40°C)
- 21 seconds nominal at room temperature and rated load, 39 seconds maximum at rated load and -4°F (-20°C), 108 seconds maximum at 53 lb-in. (6 N-m) and -40°F (-40°C)

## M9208-xxx-x Series Electric Spring Return Actuators (Continued)

### Technical Specifications


M9208-GGx-x Series Proportional Electric Spring Return Actuator (Part 1 of 2)		
Power Requirements	-GGx Models	AC 24 V (AC 19.2 V to 28.8 V) at 50/60 Hz: Class 2 (North America) or Safety Extra-Low Voltage (SELV) (Europe), 7.9 VA Running, 5.5 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 3.5 W Running, 1.9 W Holding Position Minimum Transformer Size: 8 VA per Actuator
Input Signal / Adjustments	-GGx Models	Factory Set at DC 0 to 10 V, CW Rotation with Signal Increase; Selectable DC 0 (2) to 10 V or 0 (4) to 20 mA with Field-Furnished 500 ohm 0.25 W Minimum Resistor; Switch Selectable Direct or Reverse Action with Signal Increase
Control Input Impedance	-GGx Models	Voltage Input: 100,000 ohm Current Input: 500 ohm with Field Furnished 500 ohm Resistor
Feedback Signal	-GGx Models	DC 0 (2) to 10 V for Desired Rotation Range up to 95° Corresponds to Rotation Limits, 0.5 mA at 10 V Maximum
Auxiliary Switch Rating	-xxC Models	Two Single-Pole, Double-Throw (SPDT), Double-Insulated Switches with Gold over Silver 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: Actuator Face Labeled A Is Away from Damper or Valve: CCW Spring Return Actuator Face Labeled B Is Away from Damper or Valve: CW Spring Return
Rated Torque	Power On (Running)	70 lb-in. (8 N-m) All Operating Temperatures
	Power Off (Spring Returning)	70 lb-in. (8 N-m) All Operating Temperatures
Rotation Range		Maximum Full Stroke: 95° Adjustable Stop: 35° to 95° Maximum Position
Rotation Time for 90 Degrees of Travel	Power On (Running)	150 Seconds Constant for 0 to 70 lb-in (8 N-m) Load, at all Operating Conditions 90 Seconds for 0 to 70 lb-in (8 N-m) Load in Calibration Mode or Override Mode
	Power Off (Spring Returning)	17 to 25 Seconds for 0 to 70 lb-in. (8 N-m) Load, at Room Temperature 22 Seconds Nominal at Full Rated Load 94 Seconds Maximum with 70 lb-in. (8 N-m) Load, at -40°F (-40°C)
Life Cycles		60,000 Full Stroke Cycles with 70 lb-in. (8 N-m) Load 1,500,000 Repositions with 70 lb-in. (8 N-m) Load
Audible Noise Rating	Power On (Running)	<35 dBA at 70 lb-in. (8 N-m) Load, at a Distance of 39-13/32 in. (1 m)
	Power On (Holding)	<20 dBA at a Distance of 39-13/32 in. (1 m)
	Power Off (Spring Returning)	<52 dBA at 70 lb-in. (8 N-m) Load, at a Distance of 39-13/32 in. (1 m)
Electrical Connections	Models: GGx-3	48 in. (1.2 m) UL 758 Type AWM Halogen Free Cable with 18 AWG (0.85 mm <sup>2</sup> ) Conductors and .25 in. (6 mm) Ferrule Ends
	Models: GGA-2	120 in. (3.05 m) UL 444 Type CMP Plenum Rated Cable with 19 AWG (0.75 mm <sup>2</sup> ) Conductors and .25 in. (6 mm) Ferrule Ends
	Auxiliary Switches (-xxC Models)	48 in. (1.2 m) UL 758 Type AWM Halogen Free Cable with 18 AWG (0.85 mm <sup>2</sup> ) Conductors and .25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral Connectors for 3/8 in. (10 mm) Flexible Metal Conduit
Mechanical Connections	Round Shafts	Range of Sizes: 5/16 to 5/8 in. (8 to 16 mm)
	Square Shafts	Range of Sizes: 1/4 to 1/2 in. (6 to 12 mm)
Enclosure Rating		NEMA 2 (IP54) for all Mounting Directions
Ambient Conditions	Standard Operating	-40 to 140°F (-40 to 60°C); 90% RH Maximum, Noncondensing
	Storage	-40 to 185°F (-40 to 85°C); 95% RH Maximum, Noncondensing
Dimensions		6.33 x 3.90 x 2.26 in. (160.7 x 99 x 57.5 mm)

## M9208-xxx-x Series Electric Spring Return Actuators (Continued)

M9208-GGx-x Series Proportional Electric Spring Return Actuator (Part 2 of 2)		
	United States	UL Listed, CCN XAPX, File E27734; to UL 60730-1A: 2003-08, Ed. 3.1, Automatic Electrical Controls for Household and Similar Use; and UL 60730-2-14: 2002-02, Ed. 1, Part 2, Particular Requirements for Electric Actuators. (Models: All)
	Canada	UL Listed, CCN XAPX7, File E27734; to UL 60730-1:02-CAN/CSA: July 2002, 3rd Ed., Automatic Electrical Controls for Household and Similar Use; and CSA C22.2 No. 24-93 Temperature Indicating and Regulating Equipment (Models: All).
	Europe	CE Mark – Johnson Controls, Inc., declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.
	Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant (Models: All)
Shipping Weight		Models: -GGA: 3.43 lb (1.6 kg) Models: -GGC: 3.8 lb (1.7 kg)


M9208-AGx-x Series On/Off and Floating Point Control Electric Spring Return Actuator (Part 1 of 2)		
Power Requirements	-AGx Models	AC 24 V (AC 19.2 V to 28.8 V) at 50/60 Hz: Class 2 (North America) or Safety Extra-Low Voltage (SELV) (Europe), 7.9 VA Running, 5.5 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 3.5 W Running, 1.9 W Holding Position Minimum Transformer Size: 8 VA per Actuator
Input Signal	-AGx Models	AC 19.2 to 28.8 V at 50/60 Hz or DC 24 V +20%/-10%, Class 2 (North America) or SELV (Europe) Minimum Pulse Width: 500 msec
Control Input Impedance	-AGx Models	3,000 ohm Control Inputs
Auxiliary Switch Rating	-xxC Models	Two SPDT, Double-Insulated Switches with Gold over Silver 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: Actuator Face Labeled A Is Away from Damper or Valve: CCW Spring Return Actuator Face Labeled B Is Away from Damper or Valve: CW Spring Return
Rated Torque	Power On (Running)	70 lb-in. (8 N-m) All Operating Temperatures
	Power Off (Spring Returning)	70 lb-in. (8 N-m) All Operating Temperatures
Rotation Range		Maximum Full Stroke: 95° Adjustable Stop: 35 to 95° Maximum Position
Rotation Time for 90 Degrees of Travel	Power On (Running)	150 Seconds Constant for 0 to 70 lb-in. (8 N-m) Load, at all Operating Conditions
	Power Off (Spring Returning)	17 to 25 Seconds for 0 to 70 lb-in. (8 N-m) Load, at Room Temperature 22 Seconds Nominal at Full Rated Load 94 Seconds Maximum with 70 lb-in. (8 N-m) Load, at -40°F (-40°C)
Life Cycles		60,000 Full Stroke Cycles with 70 lb-in. (8 N-m) Load 1,500,000 Repositions with 70 lb-in. (8 N-m) Load
Audible Noise Rating	Power On (Running)	<35 dBA at 70 lb-in. (8 N-m) Load, at a Distance of 39-13/32 in. (1 m)
	Power On (Holding)	<20 dBA at a Distance of 39-13/32 in. (1 m)
	Power Off (Spring Returning)	<52 dBA at 70 lb-in. (8 N-m) Load, at a Distance of 39-13/32 in. (1 m)
Electrical Connections	Models: AGx-3	48 in. (1.2 m) UL 758 Type AWM Halogen Free Cable with 18 AWG (0.85 mm <sup>2</sup> ) Conductors and .25 in. (6 mm) Ferrule Ends
	Models: AGA-2	120 in. (3.05 m) UL 444 Type CMP Plenum Rated Cable with 19 AWG (0.75 mm <sup>2</sup> ) Conductors and .25 in. (6 mm) Ferrule Ends
	Auxiliary Switches (-xxC Models)	48 in. (1.2 m) UL 758 Type AWM Halogen Free Cable with 18 AWG (0.85 mm <sup>2</sup> ) Conductors and .25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral Connectors for 3/8 in. (10 mm) Flexible Metal Conduit
Mechanical Connections	Round Shafts	Range of Sizes: 5/16 to 5/8 in. (8 to 16 mm)
	Square Shafts	Range of Sizes: 1/4 to 1/2 in. (6 to 12 mm)
Enclosure Rating		NEMA 2 (IP54) for all Mounting Directions

## M9208-xxx-x Series Electric Spring Return Actuators (Continued)

M9208-AGx-x Series On/Off and Floating Point Control Electric Spring Return Actuator (Part 2 of 2)		
Ambient Conditions	Standard Operating	-40 to 140°F (-40 to 60°C); 90% RH Maximum, Noncondensing
	Storage	-40 to 185°F (-40 to 85°C); 95% RH Maximum, Noncondensing
Dimensions		6.33 x 3.90 x 2.26 in. (160.7 x 99 x 57.5 mm)
Compliance  	United States	UL Listed, CCN XAPX, File E27734; to UL 60730-1A: 2003-08, Ed. 3.1, Automatic Electrical Controls for Household and Similar Use; and UL 60730-2-14: 2002-02, Ed. 1, Part 2, Particular Requirements for Electric Actuators. (Models: All)
	Canada	UL Listed, CCN XAPX7, File E27734; to UL 60730-1:02-CAN/CSA: July 2002, 3rd Ed., Automatic Electrical Controls for Household and Similar Use; and CSA C22.2 No. 24-93 Temperature Indicating and Regulating Equipment (Models: All).
	Europe	CE Mark – Johnson Controls, Inc., declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.
	Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant (Models: All)
Shipping Weight		Models: -AGA: 3.43 lb (1.6 kg) Models: -AGC: 3.8 lb (1.7 kg)

M9208-Bxx-3 Series On/Off Electric Spring Return Actuators (Part 1 of 2)		
Power Requirements	-BGx Models	AC 24 V (AC 18 V to 30 V) at 50/60 Hz: Class 2 (North America) or Safety Extra-Low Voltage (SELV) (Europe), 6.1 VA Running, 1.2 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 3.5 W Running, 0.5 W Holding Position Minimum Transformer Size: 7 VA per Actuator
	-BAx Models	AC 120 V (AC 102 V to 132 V) at 60 Hz: 0.05 A Running, 0.03 A Holding Position
	-BDx Models	AC 230 V (AC 198 V to 264 V) at 50/60 Hz: 0.04 A Running, 0.03 A Holding Position
Auxiliary Switch Rating	-xxC Models	Two SPDT, Double-Insulated Switches with Gold over Silver 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: Actuator Side A Is Away from Damper or Valve: CCW Spring Return Actuator Side B Is Away from Damper or Valve: CW Spring Return
Rated Torque	Power On (Running)	70 lb-in. (8 N-m) All Operating Temperatures
	Power Off (Spring Returning)	70 lb-in. (8 N-m) at Standard Operating Temperatures 53 lb-in. (6 N-m) at Extended Operating Temperatures
Rotation Range		Maximum Full Stroke: 95° Adjustable Stop: 35 to 95°, Maximum Position
Rotation Time for 90 Degrees of Travel	Power On (Running)	55 to 71 Seconds for 0 to 70 lb-in. (8 N-m) Load, at All Operating Conditions 60 Seconds Nominal at Full Rated Load (0.25 rpm)
	Power Off (Spring Returning)	13 to 26 Seconds for 0 to 70 lb-in. (8 N-m) Load, at Room Temperature 21 Seconds Nominal at Full Rated Load 39 Seconds Maximum with 70 lb-in. (8 N-m) Load at -4°F (-20°C) 108 Seconds Maximum with 53 lb-in. (6 N-m) Load at -40°F (-40°C)
Life Cycles		60,000 Full-Stroke Cycles with 70 lb-in. (8 N-m) Load
Audible Noise Rating	Power On (Running)	<47 dBA at 70 lb-in. (8 N-m) Load, at a Distance of 39-13/32 in. (1 m)
	Power On (Holding)	<20 dBA at a Distance of 39-13/32 in. (1 m)
	Power Off (Spring Returning)	<52 dBA at 70 lb-in. (8 N-m) Load, at a Distance of 39-13/32 in. (1 m)
Electrical Connections	Actuator (All Models)	48 in. (1.2 m) UL 758 Type AWM Halogen-Free Cable with 18 AWG (0.85 mm <sup>2</sup> ) Conductors and .25 in. (6 mm) Ferrule Ends
	Auxiliary Switches (-xxC Models)	48 in. (1.2 m) UL 758 Type AWM Halogen-Free Cable with 18 AWG (0.85 mm <sup>2</sup> ) Conductors and .25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral Connectors for 3/8 in. (10 mm) Flexible Metal Conduit

## M9208-xxx-x Series Electric Spring Return Actuators (Continued)

M9208-Bxx-3 Series On/Off Electric Spring Return Actuators (Part 2 of 2)		
<b>Mechanical Connections</b>	<b>Round Shafts</b>	Range of Sizes: 5/16 to 5/8 in. (8 to 16 mm)
	<b>Square Shafts</b>	Range of Sizes: 1/4 to 1/2 in. (6 to 12 mm)
<b>Ambient Conditions</b>	<b>Extended Operating</b>	-40 to -4°F (-40 to -20°C); 90% RH Maximum, Noncondensing
	<b>Storage</b>	-40 to 185°F (-40 to 85°C); 95% RH Maximum, Noncondensing
<b>Dimensions</b>		6.33 x 3.90 x 2.26 in. (160.7 x 99 x 57.5 mm)
<b>Compliance</b>  	<b>United States</b>	UL Listed, CCN XAPX, File E27734; to UL 60730-1A: 2003-08, Ed. 3.1, Automatic Electrical Controls for Household and Similar Use; and UL 60730-2-14: 2002-02, Ed. 1, Part 2, Particular Requirements for Electric Actuators. (Models: All)
	<b>Canada</b>	UL Listed, CCN XAPX7, File E27734; to UL 60730-1:02-CAN/CSA: July 2002, 3rd Ed., Automatic Electrical Controls for Household and Similar Use; and CSA C22.2 No. 24-93 Temperature Indicating and Regulating Equipment (Models: All).
	<b>Europe</b>	CE Mark – Johnson Controls, Inc., declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.
	<b>Australia and New Zealand</b>	C-Tick Mark, Australia/NZ Emissions Compliant (Models: All)
<b>Shipping Weight</b>		Models: -BGC: 3.75 lb (1.7 kg) Models: -BAC and -BDC: 4.15 lb (1.9 kg)