

## M9203-xxx-2(Z) Series Electric Spring-Return Actuators

### Description

The M9203-xxx-2(Z) Series Electric Spring-Return Actuators provide control of dampers in HVAC systems. All actuators in this series provide 27 lb-in (3 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, 85 to 264 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 1/4 to 1/2 in. (6 to 12 mm) diameter with a universal clamp. An accessory crankarm and remote mounting kit are available for applications where the actuator cannot be direct-coupled to the damper shaft. An optional line voltage auxiliary switch indicates an end-stop position or performs switching functions within the selected rotation range.

Refer to the *M9203-xxx-2(Z) Series Electric Spring-Return Actuators Product Bulletin (LIT-12011674)* for important product application information.

### Features

- 27 lb-in (3 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)
- integral cables with colored and numbered conductors
- integral 1/2 in. (13 mm) threaded conduit connectors
- optional integrated auxiliary switch
- plenum rated models
- override control (proportional models only)
- Underwriters Laboratories Inc.® (UL), CE, and C-Tick compliance
- manufactured under International Standards Organization (ISO) 9001 quality control standards
- 5-year warranty



**M9203-xxx-2(Z) Series Electric Spring-Return Actuator**

### Accessories and Replacement Parts

Code Number	Description
<b>DMPR-KC003<sup>1</sup></b>	7 in. (178 mm) Blade Pin Extension (without Bracket) for Johnson Controls Direct-Mount Damper Applications (Quantity 1)
<b>M9000-200</b>	Commissioning Tool that Provides a Control Signal to Drive 24 V On/Off, Floating, Proportional, and/or Resistive Electric Actuators (Quantity 1)
<b>M9000-321</b>	Weather Shield Kit for Damper Application of M9203 and M9208 Series Electric Spring-Return Actuators (Quantity 1)
<b>M9000-341</b>	Weather Shield Kit for VG1000 Series Ball Valve Application of M(VA)9104, M(VA)9203, and M(VA)9208 Series Electric Spring-Return Actuators (Quantity 1)
<b>M9000-400</b>	Jackshaft Linkage Adapter Kit (Quantity 1)
<b>M9000-560</b>	Ball Valve Linkage Kit for Applying M9104, M9203, and M9208 Series Electric Actuators to VG1000 Series Valves (Quantity 1)
<b>M9000-561</b>	Thermal Barrier Kit for M9000-560 Ball Valve Linkage. Extends M(VA)9104, M(VA)9203, and M(VA)9208 Series Electric Spring-Return Actuators Applications to Include Low-Pressure Steam (Quantity 1)
<b>M9000-604</b>	Replacement Anti-Rotation Bracket Kit for M9203, M9208, M9210, and M9220 Series Electric Spring-Return Actuators (Quantity 1)
<b>M9000-606</b>	Position Indicator for Damper Applications (Quantity 5)
<b>M9000-607</b>	Position Indicator for VG1000 Series Ball Valve Applications (Quantity 5)
<b>M9203-100</b>	Remote Mounting Kit with Crankarm Kit (Quantity 1)
<b>M9203-110</b>	Universal Mounting Kit without Crankarm Kit (Quantity 1)
<b>M9203-115</b>	Universal Mounting Kit with Crankarm Kit (Quantity 1)
<b>M9203-150</b>	Crankarm Kit (Quantity 1)
<b>M9203-250</b>	Remote Mounting Kit with Crankarm Kit and Damper Linkage for D1300 Dampers (Quantity 1)
<b>M9203-601</b>	Replacement Standard Coupler Kit (with Retainer) for Mounting M9203 Series Electric Spring-Return Actuators (Quantity 1)
<b>M9203-602</b>	Replacement Retainer for M9203 Series Electric Spring-Return Actuators (Quantity 5)
<b>M9203-603</b>	Adjustable Stop Kit for M9203 Series Electric Spring-Return Actuators (Quantity 1)

1. Furnished with the damper and may be ordered separately

## M9203-xxx-2(Z) Series Electric Spring-Return Actuators (Continued)

### Selection Chart

Code Number	Rotation Time (Seconds) for 90°		Power Requirements		Power Consumption			Input Signal			Position Feedback	Auxiliary Switch	Electrical Connection		
	Power On — Running	Power Off — Spring Return	24 VAC +/- 20%, VDC +/-10%	85 to 264 VAC	VA Rating, Transformer Sizing	VA: Running (Holding)	Amperage: Running (Holding)	On/Off	On/Off and Floating Point	0(2) to 10 VDC 0(4) to 20 mA (with 500 Ohm Resistor)			48 in. (1.2 m) 18 AWG Appliance Cable	120 in. (3.05 m) 19 AWG Plenum Cable	1/2 in. (13 mm) Conduit Connectors
M9203-AGA-2	150	< 25	■		6	4.7 (2.7)	—		■					■	■
M9203-AGB-2	150	< 25	■		6	4.7 (2.7)	—		■			■	■		■
M9203-AGA-2Z	90	< 25	■		6	5.1 (2.8)	—		■					■	■
M9203-AGB-2Z	90	< 25	■		6	5.1 (2.8)	—		■			■	■		■
M9203-BGA-2	< 75	< 25	■		6	5.0 (2.5)	—	■					■		■
M9203-BGB-2	< 75	< 25	■		6	5.0 (2.5)	—	■				■	■		■
M9203-BUA-2	< 75	< 25		■		—	0.06 (0.02)	■					■		■
M9203-BUB-2	< 75	< 25		■		—	0.06 (0.02)	■				■	■		■
M9203-BUA-2Z	< 30	< 25		■		—	0.08 (0.02)	■					■		■
M9203-BUB-2Z	< 30	< 25		■		—	0.08 (0.02)	■				■	■		■
M9203-GGA-2	150	< 25	■		6	4.7 (2.7)	—			■	■			■	■
M9203-GGB-2	150	< 25	■		6	4.7 (2.7)	—			■	■	■	■		■
M9203-GGA-2Z	90	< 25	■		6	5.1 (2.8)	—			■	■			■	■
M9203-GGB-2Z	90	< 25	■		6	5.1 (2.8)	—			■	■	■	■		■


## M9203-xxx-2(Z) Series Electric Spring-Return Actuators (Continued)

### Technical Specifications


M9203-GGx-2(Z) Series Proportional Electric Spring-Return Actuator (Part 1 of 2)		
Power Requirements	-GGx-2 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), 4.7 VA Running, 2.7 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 1.8 W Running, 1 W Holding Position Minimum Transformer Size: 6 VA per Actuator
	-GGx-2Z 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), 5.1 VA Running, 2.8 VA Holding Position DC 24 V (DC 19.2 V to 28.8 V): Class 2 (North America) or SELV (Europe), 1.9 W Running, 1.1 W Holding Position Minimum Transformer Size: 6 VA per Actuator
Input Signal / Adjustments		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		Voltage Input: 100,000 Ohms Current Input: 500 Ohms with Field Furnished 500 Ohm Resistor
Feedback Signal		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	-xxB Models	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with 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)	27 lb-in (3 N·m) All Operating Temperatures
	Power Off (Spring Returning)	27 lb-in (3 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) -GGx-2 Models	150 Seconds Constant for 0 to 27 lb-in (3 N·m) Load, at All Operating Conditions
	Power On (Running) -GGx-2Z Models	90 Seconds Constant for 0 to 27 lb-in (3 N·m) Load, at All Operating Conditions
	Power Off (Spring Returning)	12 to 17 Seconds for 0 to 27 lb-in (3 N·m) Load, at Room Temperature 16 Seconds Nominal at Full Rated Load 22 Seconds Maximum with 27 lb-in (3 N·m) Load, at -22°F (-30°C)
Life Cycles		60,000 Full Stroke Cycles with 27 lb-in (3 N·m) Load 1,500,000 Repositions with 27 lb-in (3 N·m) Load
Audible Noise Rating	Power On (Running) -GGx-2 Models	< 28 dBA at 27 lb-in (3 N·m) Load, at a Distance of 39-13/32 in. (1 m)
	Power On (Running) -GGx-2Z Models	< 37 dBA at 27 lb-in (3 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)	< 56 dBA at 27 lb-in (3 N·m) Load, at a Distance of 39-13/32 in. (1 m)
Electrical Connections	-GGA-2(Z) Models	120 in. (3.05 m) UL 444 Type CMP Plenum Rated Cable with 19 AWG (0.75 mm <sup>2</sup> ) Conductors and 0.25 in. (6 mm) Ferrule Ends
	Auxiliary Switch (-xxB Models)	48 in. (1.2 m) UL 758 Type AWM Halogen-Free Cable with 18 AWG (0.85 mm <sup>2</sup> ) Conductors and 0.25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral 1/2 in. (13 mm) Threaded Conduit Connectors
Mechanical Connections	Round Shafts	Range of Sizes: 1/4 to 1/2 in. (6 to 12 mm)
	Square Shafts	Range of Sizes: 1/4 to 5/16 in. (6 to 8 mm)
Enclosure Rating		NEMA 2 (IP54) for All Mounting Orientations
Ambient Conditions	Standard Operating	-22 to 140°F (-30 to 60°C); 90% RH Maximum, Noncondensing
	Storage	-40 to 185°F (-40 to 85°C); 95% RH Maximum, Noncondensing
Dimensions		6.38 x 3.23 x 2.26 in. (162 x 82 x 57.5 mm)

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. © 2014 Johnson Controls, Inc. [www.johnsoncontrols.com](http://www.johnsoncontrols.com)

## M9203-xxx-2(Z) Series Electric Spring-Return Actuators (Continued)

M9203-GGx-2(Z) 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		-GGA Models: 2.0 lb (0.9 kg) -GGB Models: 2.4 lb (1.1 kg)
M9203-AGx-2(Z) Series On/Off and Floating Point Control Electric Spring-Return Actuator (Part 1 of 2)		
Power Requirements	-AGx-2 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), 4.7 VA Running, 2.7 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 1.8 W Running, 1 W Holding Position Minimum Transformer Size: 6 VA per Actuator
	-AGx-2Z 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), 5.1 VA Running, 2.8 VA Holding Position DC 24 V (DC 19.2 V to 28.8 V): Class 2 (North America) or SELV (Europe), 1.9 W Running, 1.1 W Holding Position Minimum Transformer Size: 6 VA per Actuator
Input Signal	-AGx-2(Z) 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 ms
Control Input Impedance	-AGx-2(Z) Models	4,700 Ohms
Auxiliary Switch Rating	-xxB Models	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with 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)	27 lb-in (3 N·m) All Operating Temperatures
	Power Off (Spring Returning)	27 lb-in (3 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) -AGx-2 Models	150 Seconds Constant for 0 to 27 lb-in (3 N·m) Load, at All Operating Conditions
	Power On (Running) -AGx-2Z Models	90 Seconds Constant for 0 to 27 lb-in (3 N·m) Load, at All Operating Conditions
	Power Off (Spring Returning)	12 to 17 Seconds for 0 to 27 lb-in (3 N·m) Load, at Room Temperature 16 Seconds Nominal at Full Rated Load 22 Seconds Maximum with 27 lb-in (3 N·m) Load at -22°F (-30°C)
Life Cycles	60,000 Full Stroke Cycles with 27 lb-in (3 N·m) Load 1,500,000 Repositions with 27 lb-in (3 N·m) Load	
Audible Noise Rating	Power On (Running) -AGx-2 Models	< 28 dBA at 27 lb-in (3 N·m) Load, at a Distance of 39-13/32 in. (1 m)
	Power On (Running) -AGx-2Z Models	< 37 dBA at 27 lb-in (3 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)	< 56 dBA at 27 lb-in (3 N·m) Load, at a Distance of 39-13/32 in. (1 m)

## M9203-xxx-2(Z) Series Electric Spring-Return Actuators (Continued)

M9203-AGx-2(Z) Series On/Off and Floating Point Control Electric Spring-Return Actuator (Part 2 of 2)		
Electrical Connections	-AGA-2(Z) Models	120 in. (3.05 m) UL 444 Type CMP Plenum Rated Cable with 19 AWG (0.75 mm <sup>2</sup> ) Conductors and 0.25 in. (6 mm) Ferrule Ends
	Auxiliary Switch (-xxB Models)	48 in. (1.2 m) UL 758 Type AWM Halogen-Free Cable with 18 AWG (0.85 mm <sup>2</sup> ) Conductors and 0.25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral 1/2 in. (13 mm) Threaded Conduit Connectors
Mechanical Connections	Round Shafts	Range of Sizes: 1/4 to 1/2 in. (6 to 12 mm)
	Square Shafts	Range of Sizes: 1/4 to 5/16 in. (6 to 8 mm)
Enclosure Rating		NEMA 2 (IP54) for All Mounting Orientations
Ambient Conditions	Standard Operating	-22 to 140°F (-30 to 60°C); 90% RH Maximum, Noncondensing
	Storage	-40 to 185°F (-40 to 85°C); 95% RH Maximum, Noncondensing
Dimensions		6.38 x 3.23 x 2.26 in. (162 x 82 x 57.5 mm)
	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		-AGA Models: 2.0 lb (0.9 kg) -AGB Models: 2.4 lb (1.1 kg)

M9203-Bxx-2(Z) Series On/Off Electric Spring-Return Actuators (Part 1 of 2)		
Power Requirements	-BGx-2 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), 5 VA Running, 1.6 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 2.8 W Running, 0.8 W Holding Position Minimum Transformer Size: 6 VA per Actuator
	-BUx-2 Models	AC 100 to 240 V (AC 85 V to 264 V) at 50/60 Hz: 0.06 A Running, 0.02 A Holding Position
	-BUx-2Z Models	AC 100 to 240 V (AC 85 V to 264 V) at 50/60 Hz: 0.08 A Running, 0.02 A Holding Position
Auxiliary Switch Rating	-xxB Models	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with 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)	27 lb·in (3 N·m) All Operating Temperatures
	Power Off (Spring Returning)	27 lb·in (3 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) -Bxx-2 Models	53 to 71 Seconds for 0 to 27 lb·in (3 N·m) Load, at Room Temperature 60 Seconds Nominal at Full Rated Load (0.25 rpm)
	Power On (Running) -BUx-2Z Models	24 to 28 Seconds for 0 to 27 lb·in (3 N·m) Load, at Room Temperature 27 Seconds Nominal at Full Rated Load (0.5 rpm)
	Power Off (Spring Returning)	19 to 23 Seconds for 0 to 27 lb·in (3 N·m) Load, at Room Temperature 22 Seconds Nominal at Full Rated Load 28 Seconds Maximum with 27 lb·in (3 N·m) Load at -22°F (-30°C)
Life Cycles		60,000 Full-Stroke Cycles with 27 lb·in (3 N·m) Load

## M9203-xxx-2(Z) Series Electric Spring-Return Actuators (Continued)

M9203-Bxx-2(Z) Series On/Off Electric Spring-Return Actuators (Part 2 of 2)		
Audible Noise Rating	Power On (Running) -Bxx-2 Models	< 36 dBA at 27 lb·in (3 N·m) Load, at a Distance of 39-13/32 in. (1 m)
	Power On (Running) -BUx-2Z Models	< 45 dBA at 27 lb·in (3 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)	< 51 dBA at 27 lb·in (3 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 0.25 in. (6 mm) Ferrule Ends
	Auxiliary Switch (-xxB Models)	48 in. (1.2 m) UL 758 Type AWM Halogen-Free Cable with 18 AWG (0.85 mm <sup>2</sup> ) Conductors and 0.25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral 1/2 in. (13 mm) Threaded Conduit Connectors
Mechanical Connections	Round Shafts	Range of Sizes: 1/4 to 1/2 in. (6 to 12 mm)
	Square Shafts	Range of Sizes: 1/4 to 5/16 in. (6 to 8 mm)
Enclosure Rating		NEMA 2 (IP54) for All Mounting Orientations
Ambient Conditions	Standard Operating	-22 to 140°F (-30 to 60°C); 90% RH Maximum, Noncondensing
	Storage	-40 to 185°F (-40 to 85°C); 95% RH Maximum, Noncondensing
Dimensions		6.38 x 3.23 x 2.26 in. (162 x 82 x 57.5 mm)
<div>CE</div> 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		-BxA Models: 2.0 lb (0.9 kg) -BxB Models: 2.4 lb (1.1 kg)