

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 inch (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 inch (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

Repair Information

If the M9203-xxx-2(Z) Series Electric Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement M9203-xxx-2(Z) actuator, contact the nearest Johnson Controls® representative.

Accessories and Replacement Parts (Order Separately)

Code Number	Description
DMPR-KC003 ¹	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)
M9000-341	Weathershield 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)
M9000-400	Jackshaft Linkage Adapter Kit (quantity 1)
M9000-560	Ball Valve Linkage Kit for applying M9104, M9203, and M9208 Series Electric Actuators to VG1000 Series Valves (quantity 1)
M9000-561	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)
M9000-604	Replacement Anti-Rotation Bracket Kit for M9203, M9208, M9210, and M9220 Series Electric Spring Return Actuators (quantity 1)
M9000-606	Position Indicator for Damper Applications (quantity 5)
M9000-607	Position Indicator for VG1000 Series Ball Valve Applications (quantity 5)
M9203-100	Remote Mounting Kit with Crankarm Kit (quantity 1)
M9203-110	Universal Mounting Kit without Crankarm Kit (quantity 1)
M9203-115	Universal Mounting Kit with Crankarm Kit (quantity 1)
M9203-150	Crankarm Kit (quantity 1)
M9203-250	Remote Mounting Kit with Crankarm Kit and Damper Linkage for D1300 Dampers (quantity 1)
M9203-601	Replacement Standard Coupler Kit (with Retainer) for Mounting M9203 Series Electric Spring Return Actuators (quantity 1)
M9203-602	Replacement Retainer for M9203 Series Electric Spring Return Actuators (quantity 5)
M9203-603	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 for 90°		Power Requirements		Power Consumption			Input Signal			Position Feedback	Auxiliary Switch	Electrical Connection			
	Power On – Running (Seconds)	Power Off – Spring Return (Seconds)	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)			0(2) to 10 VDC	1 SPDT, 5.0 A (2.9 A Inductive) at 240 V	48 in. (1.2 m) 18 AWG Appliance Cable	120 in. (3.05 m) 19 AWG Plenum Cable
M9203-AGA-2	150	<25	X		6	4.7 (2.7)	---		X						X	X
M9203-AGB-2	150	<25	X		6	4.7 (2.7)	---		X			X	X		X	X
M9203-AGA-2Z	90	<25	X		6	5.1 (2.8)	---		X					X		X
M9203-AGB-2Z	90	<25	X		6	5.1 (2.8)	---		X			X	X			X
M9203-BGA-2	<75	<25	X		6	5.0 (2.5)	---	X					X	X		X
M9203-BGB-2	<75	<25	X		6	5.0 (2.5)	---	X				X	X			X
M9203-BUA-2	<75	<25		X		---	0.06 (0.02)	X						X	X	X
M9203-BUB-2	<75	<25		X		---	0.06 (0.02)	X				X	X		X	X
M9203-BUA-2Z	<30	<25		X		---	0.08 (0.02)	X						X	X	X
M9203-BUB-2Z	<30	<25		X		---	0.08 (0.02)	X				X	X		X	X
M9203-GGA-2	150	<25	X		6	4.7 (2.7)	---		X	X					X	X
M9203-GGB-2	150	<25	X		6	4.7 (2.7)	---		X	X		X	X		X	X
M9203-GGA-2Z	90	<25	X		6	5.1 (2.8)	---		X	X				X	X	X
M9203-GGB-2Z	90	<25	X		6	5.1 (2.8)	---		X	X		X	X		X	X

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 ohm Current Input: 500 ohm 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


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

M9203-GGx-2(Z) Series Proportional Electric Spring Return Actuator (Part 2 of 2)		
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 ²) 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 ²) Conductors and 0.25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral 1/2 in. (13 mm) Threaded Conduit Connector(s)
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)
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		-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 3)		
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

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 3)		
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 ohm
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)
Electrical Connections	-AGA-2(Z) Models	120 in. (3.05 m) UL 444 Type CMP Plenum Rated Cable with 19 AWG (0.75 mm ²) 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 ²) Conductors and 0.25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral 1/2 in. (13 mm) Threaded Conduit Connector(s)
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)

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 3 of 3)		
	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
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 ²) 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 ²) Conductors and 0.25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral 1/2 in. (13 mm) Threaded Conduit Connector(s)

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)		
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)	
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)	