

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

LIT-1900682

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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) VDC to 10 VDC or 0(4) mA 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

Accessories and replacement parts


Code number	Description
DMPR-KC003	7 in. (178 mm) blade pin extension (without bracket) for Johnson Controls direct-mount damper applications (quantity 1)  Note: Available with damper and may be ordered separately
M9000-322	Weather shield kit for damper application of M9203, M9208, VA9104, VA9308/9310 Series Electric 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)

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)	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	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)				■	■	■	■		■

Technical specifications


M9203-GGx-2(Z) Series Proportional Electric Spring-Return Actuator		
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 lb-in to 27 lb-in (3 N·m) load, at all operating conditions
	Power on (running)-GGx-2Z models	90 Seconds Constant for 0 lb-in to 27 lb-in (3 N·m) Load, at All Operating Conditions
	Power off (spring returning)	12 to 17 seconds for 0 lb-in 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)

M9203-GGx-2(Z) Series Proportional Electric Spring-Return Actuator		
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 connectors
Mechanical connections	Round shafts	Range of sizes: 1/4 in. to 1/2 in. (6 mm to 12 mm)
	Square shafts	Range of sizes: 1/4 in. to 5/16 in. (6 mm to 8 mm)
Enclosure rating		NEMA 2 (IP54) for all mounting orientations
Ambient conditions	Standard operating	-22°F to 140°F (-30°C to 60°C); 90% RH maximum, noncondensing
	Storage	-40°F to 185°F (-40°C to 85°C); 95% RH maximum, noncondensing
Dimensions		6.38 in. x 3.23 in. x 2.26 in. (162 mm x 82 mm 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 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		
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

M9203-AGx-2(Z) Series On/Off and Floating Point Control Electric Spring-Return Actuator		
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 lb-in to 27 lb-in (3 N·m) load, at all operating conditions
	Power on (running)-AGx-2Z models	90 seconds constant for 0 lb-in to 27 lb-in (3 N·m) load, at all operating conditions
	Power off (spring returning)	12 to 17 Seconds for 0 lb-in 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 connectors
Mechanical connections	Round shafts	Range of sizes: 1/4 in. to 1/2 in. (6 mm to 12 mm)
	Square shafts	Range of sizes: 1/4 in. to 5/16 in. (6 mm to 8 mm)
Enclosure rating		NEMA 2 (IP54) for all mounting orientations
Ambient conditions	Standard operating	-22°F to 140°F (-30°C to 60°C); 90% RH maximum, noncondensing
	Storage	-40°F to 185°F (-40°C to 85°C); 95% RH maximum, noncondensing
Dimensions		6.38 in. x 3.23 in. x 2.26 in. (162 mm x 82 mm 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 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		
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

M9203-Bxx-2(Z) Series On/Off Electric Spring-Return Actuators		
Auxiliary switch rating	-xxB models	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with Silver Contacts:AC 24 V, 50 VA Pilot DutyAC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot DutyAC 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 lb·in 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 lb·in 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 lb·in 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 connectors
Mechanical connections	Round shafts	Range of sizes: 1/4 in. to 1/2 in. (6 mm to 12 mm)
	Square shafts	Range of sizes: 1/4 in. to 5/16 in. (6 mm to 8 mm)
Enclosure rating		NEMA 2 (IP54) for all mounting orientations
Ambient conditions	Standard operating	-22°F to 140°F (-30°C to 60°C); 90% RH maximum, noncondensing
	Storage	-40°F to 185°F (-40°C to 85°C); 95% RH maximum, noncondensing
Dimensions		6.38 in. x 3.23 in. x 2.26 in. (162 mm x 82 mm 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
	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)

