

M9208-xxx-RK Series Electric Spring-Return Actuators

Description

The M9208-xxx-RK Series Electric Spring-Return Actuators provide control of dampers in 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
- 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 (-GGx types)
- external mode selection switch (-GGx types)
- locking manual override with auto release and crank storage
- integral cables with colored and numbered conductors
- integral connectors for 3/8 in. (10 mm) Flexible Metal Conduit (FMC)
- optional integrated auxiliary switches
- Underwriters Laboratories Inc.® (UL), CE, and C-Tick compliance
- manufactured under International Standards Organization (ISO) 9001 quality control standards
- 5-year warranty



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Accessories and Replacement Parts

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	Weather Shield 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)
M9000-604	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-RK Series Electric Spring-Return Actuators (Continued)

Selection Chart

Code Number	Rotation Time (Seconds) for 90°		Power Requirements				Power Consumption			Input Signal	Position Feedback	Auxiliary Switches	Electrical Connection		
	Power On (Running)	Power Off (Spring Return)	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)	Current: Running (Holding)				On/Off	0(2) to 10 VDC 0(4) to 20 mA (with 500 Ohm Resistor)	0(2) to 10 VDC
M9208-BGA-RK	55 to 71	13 to 26 ¹	■				7	6.1 (1.2)	—	■				■	■
M9208-BGC-RK	55 to 71	13 to 26 ²	■				7	6.1 (1.2)	—	■			■	■	■
M9208-BAA-RK	55 to 71	13 to 26 ²			■		—	—	0.05 (0.03)	■				■	■
M9208-BAC-RK	55 to 71	13 to 26 ²			■		—	—	0.05 (0.03)	■			■	■	■
M9208-GGA-RK	150	17 to 25 ¹		■			8	7.9 (5.5)	—		■	■		■	■

1. 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-RK Series Electric Spring-Return Actuators (Continued)

Technical Specifications

M9208-GGA-RK Series Proportional Electric Spring-Return Actuator		
Power Requirements		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		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
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		3 ft. (0.91 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 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)
	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		3.43 lb (1.6 kg)

M9208-xxx-RK Series Electric Spring-Return Actuators (Continued)

M9208-Bxx-RK Series On/Off Electric Spring-Return Actuators		
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
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)	3 ft. (0.91 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 Switches (-xxC Models)	3 ft. (0.91 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 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)
Ambient Conditions	Extended Operating	-40 to -4°F (-40 to -20°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)
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	Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant (Models: All)
Shipping Weight		Models: -BGC: 3.75 lb (1.7 kg) Models: -BAC: 4.15 lb (1.9 kg)