M9208-xxx-x Series Electric Spring Return Actuators

Product Bulletin

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

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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.

Figure 1: M9208-xxx-x Series Electric Spring Return Actuator

Table 1: Features and Benefits (Part 1 of 2)

Features	Benefits
70 lb·in (8 N·m) Rated Torque	Provides high torque in a compact package size to expand the range of damper applications in HVAC systems.
Direct-Coupled Design	Requires no crankarm or linkage and is capable of direct mounting to a shaft up to 3/4 in. (19 mm) diameter and centered on a 1/2 in. (13 mm) shaft.
Reversible Mounting	Provides either clockwise or counterclockwise operation.
Electronic Stall Detection	Protects from overload at all angles of rotation. Power consumption is reduced in holding mode. The actuator may be stalled anywhere in its rotation range without the need for mechanical end switches.
Double-Insulated Construction	Allows that electrical ground connection is not necessary for regulatory agency compliance.
Microprocessor-controlled Brushless DC Motor (-AGx and -GGx types)	Provides constant run-time independent of torque.
External Mode Selection Switch (-AGx and -GGx types)	Permits control logic reversal for Floating Control (-AGx types). Permits calibration, input signal range selection, and control logic reversal for Proportional Control (-GGx types).

Table 1: Features and Benefits (Part 2 of 2)

Features	Benefits
Locking Manual Override with Auto Release and Crank Storage	Allows manual positioning of the actuator hub with automatic return to normal operation when power and control signal are restored.
Integral Cables with Colored and Numbered Conductors	Simplify installation and field wiring.
Integral Connectors for 3/8 in. (10 mm) Flexible Metal Conduit (FMC)	Simplify installation and field wiring.
Optional Integrated Auxiliary Switches	Provide two integrated, line-voltage-capable Single-Pole, Double-Throw (SPDT) switches with one fixed and one adjustable switch point. Facilitates safety interfacing or signaling.
UL, CE, and C-Tick Compliance	Provides internationally recognized regulatory agency approvals
Manufactured under International Standards Organization (ISO) 9001 Quality Control Standards	Ensures Quality
5-Year Warranty	Protects Consumer Investment

Application

IMPORTANT: Use these M9208-xxx-x Series Electric Spring Return Actuators only to control equipment under normal operating conditions. Where failure or malfunction of the electric actuator could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the electric actuator.

IMPORTANT: Before specifying M9208-xxx-x Series Electric Spring Return Actuators for plenum applications, verify acceptance of exposed plastic materials in plenum areas with the local building authority. Building codes for plenum requirements vary by location. Some local building authorities accept compliance to UL 1995, Heating and Cooling Equipment, while others use different acceptance criteria.

M9208-GGx-x Series Proportional Actuators

For proportional modulation of dampers requiring up to 70 lb·in. (8 N·m) in HVAC systems that are controlled by an electronic controller or positioner. The actuator responds to 0 to 10 VDC, or 2 to 10 VDC control signals. With the addition of a 500 ohm resistor, the actuator responds to a 0 to 20 mA, or 4 to 20 mA signal. A 0 to 10 VDC, or 2 to 10 VDC feedback signal indicates position and provides support for master-slave applications.

The M9208-GGA-2 actuators include plenum-rated cables and are specially configured for installation in spaces used for environmental air-handling purposes, other than ducts and plenums, as specified in National Fire Protection Association (NFPA) 70: National Electrical Code section 300.22(C), Other Space Used for Environmental Air. The space over a hung ceiling, when used for environmental air handling purposes, is an example of the type of space for which these actuators are configured.

M9208-AGx-x Series On/Off and Floating Point Actuators

For on/off control or modulation of dampers requiring up to 70 lb·in. (8 N·m) in HVAC systems. Floating point control can be provided from a triac or relay. On/off control can be provided from a manual switch, controller, auxiliary switch from a fan motor contactor, or similar device.

The M9208-AGA-2 actuators include plenum-rated cables and are specially configured for installation in spaces used for environmental air-handling purposes other than ducts and plenums as specified in National Fire Protection Association (NFPA) 70: National Electrical Code section 300.22(C), Other Space Used for Environmental Air. The space over a hung ceiling, when used for environmental air handling purposes, is an example of the type of space for which these actuators are configured.

M9208-Bxx-3 Series On/Off Actuators

For on/off control of dampers requiring up to 70 lb·in. (8 N·m) in HVAC systems. On/off control can be provided from a manual switch, controller, auxiliary switch from a fan motor contactor, or similar device.

Operation

M9208-xxx-x Series actuators provide 95º of rotation. A graduated scale from -5º to 90º and a position indicator provide visual indication of stroke. A manual override allows manual positioning and temporary locking of the actuator output hub. Restoring power and control signal to the actuator automatically releases the manual override the first time the actuator is commanded to advance past the locked position. During installation, the installer can advance the spring and mount the actuator to provide positive close-off on air-tight damper applications. When power fails during service, the mechanical spring return system provides rated torque to the connected equipment, returning it to the home position.

M9208-GGx-x Series Proportional Actuators

The M9208-GGx-x Series uses a brushless DC motor controlled by a microprocessor. The microprocessor drives the motor at constant speed, independent of torque. The microprocessor also monitors the brushless DC motor's rotation to prevent damage to the actuator in a stall condition. The actuator can be stalled anywhere within its rotation range without the need for mechanical end switches. Power consumption is reduced in the holding mode.

The M9208-GGC-3 version is provided with two integrated, line-voltage-capable auxiliary SPDT switches. The Switch S1 switch point is fixed at 11º closing, while the Switch S2 switch point is independently and continuously adjustable from 25º to 90º. Auxiliary switches are double-insulated so an electrical ground is not required.

M9208-AGx-x Series On/Off and Floating Point Actuators

The M9208-AGx-x Series uses a brushless DC motor controlled by a microprocessor. The microprocessor drives the motor at constant speed, independent of torque. The microprocessor also monitors the brushless DC motor's rotation to prevent damage to the actuator in a stall condition. The actuator can be stalled anywhere within its rotation range without the need for mechanical end switches. Power consumption is reduced in the holding mode.

The M9208-AGC-3 version is provided with two integrated, line-voltage-capable auxiliary SPDT switches. The Switch S1 switch point is fixed at 11º closing, while the Switch S2 switch point is independently and continuously adjustable from 25º to 90º. Auxiliary switches are double-insulated so an electrical ground is not required.

M9208-Bxx-3 Series On/Off Actuators

The M9208-Bxx-3 Series uses a DC brush motor controlled by analog electronics. The actuator can be stalled anywhere within its rotation range without the need for mechanical end switches. Power consumption is reduced in the holding mode. Three different voltage ratings are available for On/Off Actuators.

- M9208-BGx-3: AC 24 V 50/60 Hz or DC 24 V power
- M9208-BAx-3: AC 120 V 50/60 Hz power
- M9208-BDx-3: AC 230 V 50/60 Hz power

The M9208-BAx-3 and M9208-BDx-3 actuators are double-insulated so an electrical ground is not required.

The M9208-BxC-3 versions are provided with two integrated, line-voltage-capable auxiliary SPDT switches. The Switch S1 switch point is fixed at 11º closing, while the Switch S2 switch point is independently and continuously adjustable from 25º to 90º. Auxiliary switches are double-insulated so an electrical ground is not required.

Wiring Diagrams

M9208-GGx-x Series Proportional Actuators

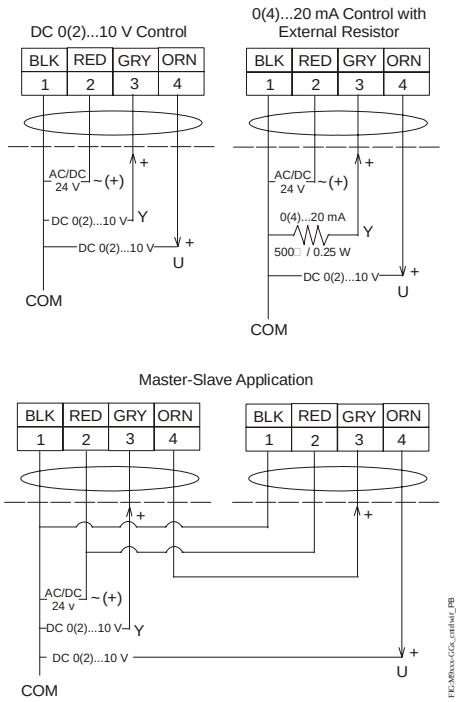

Figure 2: M9208-GGx-x Control Wiring Diagrams

IMPORTANT: Do not install multiple M9208-GGx-x Series Actuators connected to the same mechanical load. Master-slave application of M9208-GGx-x Series Actuators requires that each actuator be connected to independent loads.

M9208-Bxx-3 Series On/Off Actuators

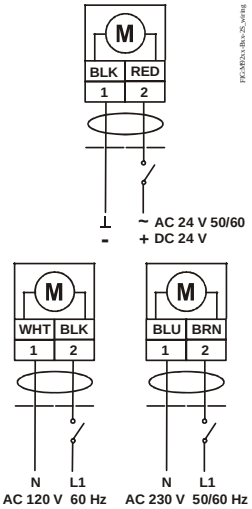

Figure 3: M9208-Bxx-3 Control Wiring Diagrams

M9208-AGx-x Series On/Off and Floating Point Actuators

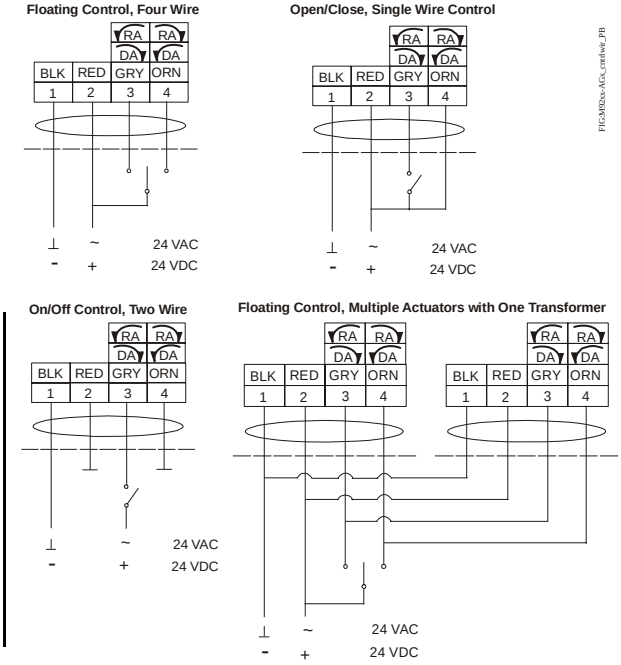

Figure 4: M9208-AGx-x Control Wiring Diagrams

M9208-xxx-x Auxiliary Switches

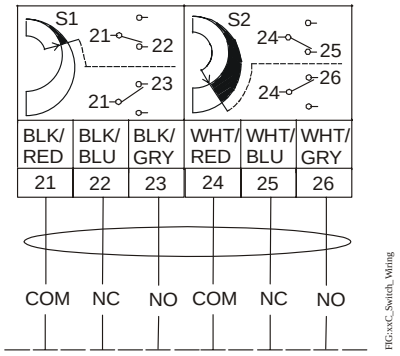

Figure 5: M9208-xxx-x Auxiliary Switch Wiring Diagram

Repair Information

A number of replacement parts are available; see Table 3 for more details. If an M9208-xxx-x Series Electric Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement electric actuator, contact the nearest Johnson Controls® representative.

Ordering Information

Table 2: M9208-xxx-x Series Electric Spring Return Actuator Models

Code Number	Rotation Time	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)	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 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	Integral 3/8 in. (10 mm) FMC Connectors
M9208-AGA-2	150	17 to 25[1]		x			8	7.9 (5.5)	-	x	x					x	x
M9208-AGA-3	150	17 to 25[1]		x			8	7.9 (5.5)	-	x	x				x		x
M9208-AGC-3	150	17 to 25[1]		x			8	7.9 (5.5)	-	x	x			x	x		x
M9208-BGA-3	55 to 71	13 to 26[2]	x				7	6.1 (1.2)	-	x					x		x
M9208-BGC-3	55 to 71	13 to 26[2]	x				7	6.1 (1.2)	-	x				x	x		x
M9208-BAA-3	55 to 71	13 to 26[2]			x		-	-	.05 (.03)	x					x		x
M9208-BAC-3	55 to 71	13 to 26[2]			x		-	-	.05 (.03)	x				x	x		x
M9208-BDA-3	55 to 71	13 to 26[2]				x	-	-	.04 (.03)	x					x		x
M9208-BDC-3	55 to 71	13 to 26[2]				x	-	-	.04 (.03)	x				x	x		x
M9208-GGA-2	150	17 to 25[1]		x			8	7.9 (5.5)	-			x	x			x	x
M9208-GGA-3	150	17 to 25[1]		x			8	7.9 (5.5)	-			x	x		x		x
M9208-GGC-3	150	17 to 25[1]		x			8	7.9 (5.5)	-			x	x	x	x		x

1. 22 seconds nominal at room temperature and rated load, 94 seconds maximum at rated load and -40ºF (-40ºC)
2. 21 seconds nominal at room temperature and rated load, 39 seconds maximum at rated load and -4ºF (-20ºC), 108 seconds maximum at 53 lb·in. (6 N·m) and -40ºF (-40ºC)

Table 3: 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)
M9000-604	Replacement Anti-Rotation Bracket Kit for M9208, M9210, and M9220 Series Electric Spring Return Actuators (quantity 1)
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.

Dimensions

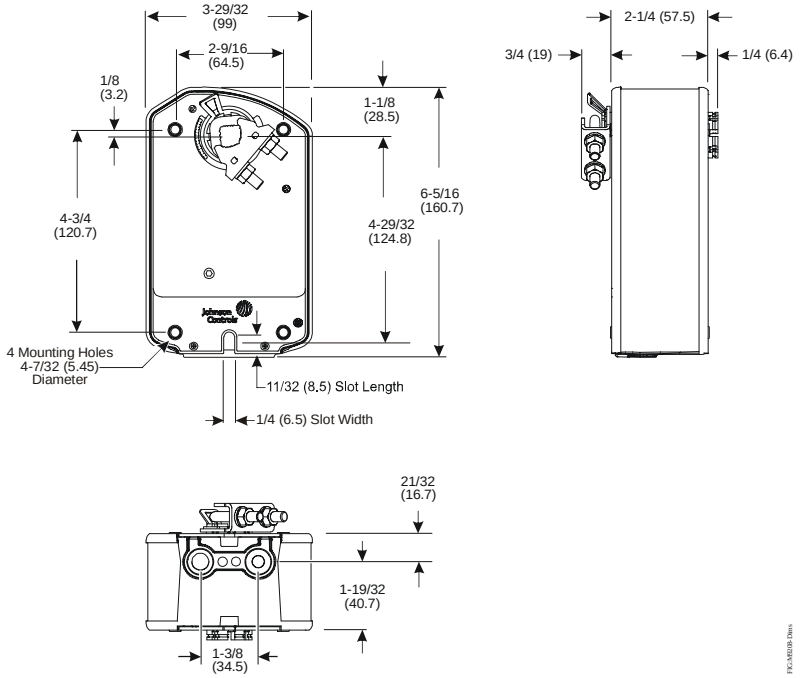

Figure 6: M9208-xxx-x Series Electric Spring Return Actuator Dimensions, in. (mm)

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 ohms Current Input: 500 ohms 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
	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 mm²) 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 mm²) 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 mm²) Conductors and .25 in. (6 mm) Ferrule Ends
Conduit Connections		Integral Connectors for 3/8 in. (10 mm) Flexible Metal Conduit

M9208-GGx-x Series Proportional Electric Spring Return Actuator (Part 2 of 2)

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 185ºF (-40 to 85ºC); 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, EMC Directive 2004/108/EC (Models: -GGA) CE Mark, Low Voltage Directive 2006/95/EC (Models: -GGC)
	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 ohms Control Inputs
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
	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 mm²) 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 mm²) 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 mm²) 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-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 185ºF (-40 to 85ºC); 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, EMC Directive 2004/108/EC (Models: -AGA) CE Mark, Low Voltage Directive 2006/95/EC (Models: -AGC)
	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 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 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 mm²) 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 mm²) 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 Orientations
Ambient Conditions	**Standard Operating**	-4 to 140°F (-20 to 60°C); 90% RH Maximum, Noncondensing
	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)

M9208-Bxx-3 Series On/Off Electric Spring Return Actuators (Part 2 of 2)

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, EMC Directive 2004/108/EC (Models: All) CE Mark, Low Voltage Directive 2006/95/EC (Models: -BGC, -BAx, -BDx)
	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 and -BDC: 4.15 lb (1.9 kg)

The performance specifications are nominal and conform to acceptable industry standards. For application 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.

Building Efficiency
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