M2202-xxx-2 Series Electric Spring Return Actuators

Product Bulletin

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The M2202-xxx-2 Series electric spring return actuators are designed for On-Off, Floating, or Proportional control of dampers in Heating, Ventilating, and Air Conditioning (HVAC) systems.

The actuator is mounted directly to a damper shaft (up to 1/2 in. diameter) by means of a removable coupler. An optional crank arm, mounting brackets, and weather shields are available to meet various installation requirements.

Figure 1: M2202-GGA-2 Series Electric Spring-Return Actuator

Table 1: Features and Benefits

Features	Benefits
Proportional, Floating, and On/Off Control Models Available	Allows the actuator to be used in wide range of applications and optimal choice of control signal
Optional Auxiliary Switch Available	Provides independent verification of actuator position
Reversible Mounting Design	Simplifies setup of valve spring return position

Application

IMPORTANT: Use this M2202 Series actuator only to control equipment under normal operating conditions. Where failure or malfunction of an M2202 actuator could lead to an abnormal operating condition that could cause personal injury or damage to the 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 M2202.

IMPORTANT: This device is not designed or intended to be used in or near environments where explosive vapors or gases could be present, or environments where substances corrosive to the device's internal components could be present.

See Table 2 for information on control applications by model.

Table 2: Control Applications by Model

Model	Voltage	Control	Auxiliary Switch
M2202-AGA-2	24 VAC	Floating	No
M2202-AGB-2			Yes
M2202-BAA-2	120 VAC	On/Off	No
M2202-BAB-2			Yes
M2202-BGA-2	24 V AC/DC		No
M2202-BGB-2			Yes
M2202-GGA-2		Proportional, 2-10 VDC	No
M2202-GGB-2			Yes

Operation

Spring Return Direction

For Counterclockwise (CCW) spring return operation, mount the actuator on the damper shaft so the CCW face of the actuator (blue side) is away from the damper as illustrated in Figure 2. The coupler is at the 0° position to drive Clockwise (CW) and spring return CCW.

For CW spring return operation, mount the actuator on the damper shaft so the CW face of the actuator (gray side) is away from the damper as illustrated in Figure 2. The actuator now drives CCW from the 0° position and spring returns CW.

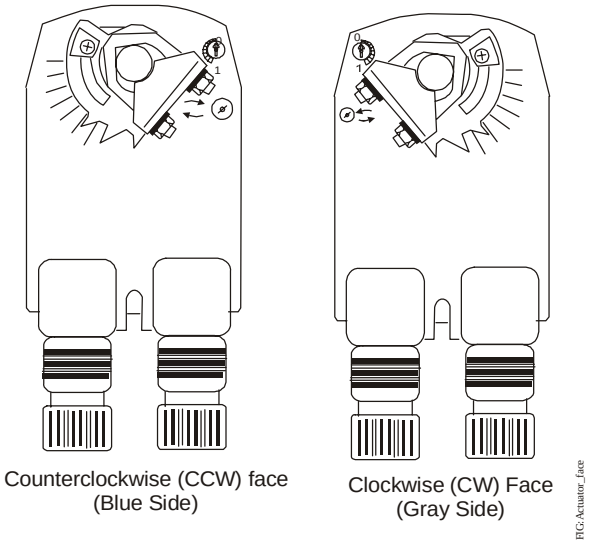


Figure 2: Selecting Spring Return Direction

Floating Control

M2202-AGx-2 Series of actuators operate on 24 VAC at 50/60 Hz. A switch on the actuator sets the direction of travel. You can mount the actuator to spring return either clockwise or counterclockwise.

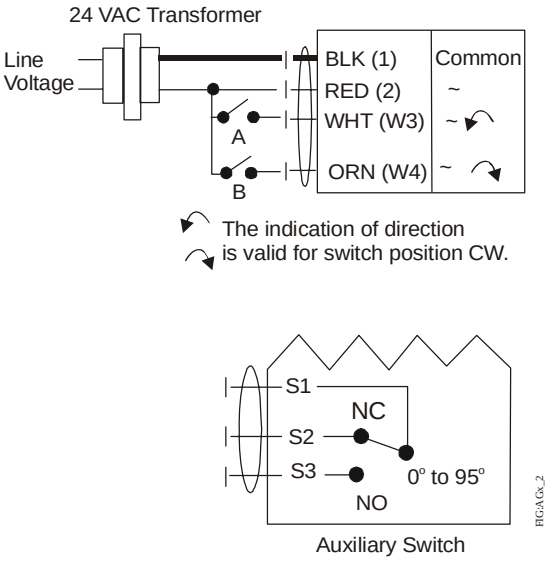
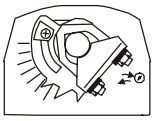
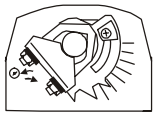


Figure 3: Floating Control (M2202-AGx-2)

M2202-AGx actuators have a rotation direction switch on the cover as shown in Table 3. Switch position indicates start point.

Table 3: Shaft Rotation with Floating Control

External Switch Positions (See Figure 3)		Side of Actuator Mounted Away from Damper			
		Blue Side		Gray Side	
					
		Position of Rotation Direction Switch			
A (W3)	**B (W4)**	 **CW**	 **CCW**	 **CCW**	 **CW**
		Direction of Shaft Rotation			
Closed	**Open**	 CCW	 CW	 CW	 CCW
Open	**Open**	stop	stop	stop	stop
Open	**Closed**	 CW	 CCW	 CCW	 CW
Closed	**Closed**	Not Recommended			

On/Off Control

M2202-BAx-2 Series operate on 85 to 265 VAC at 50/60Hz. M2202-BGx-2 Series operate on 24 VAC at 50/60 Hz or 24 VDC. You can mount the actuator to spring return either clockwise or counterclockwise.

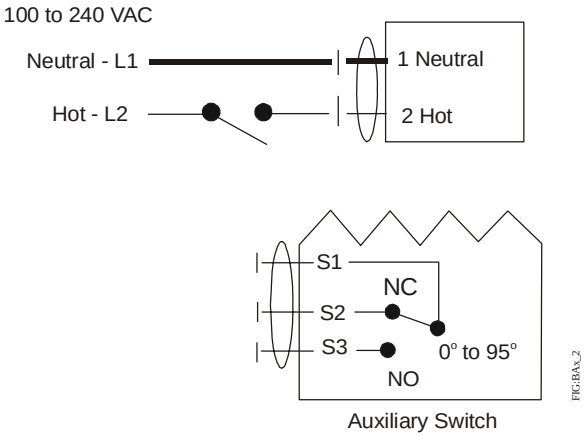


Figure 4: On/Off Control (M2202-BAx-2)

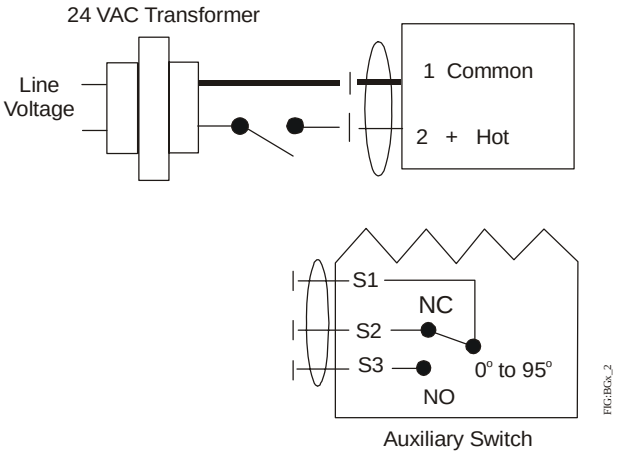


Figure 5: On/Off Control (M2202-BGx-2)

Proportional Control

M2202-GGx-2 Series of actuators operate on 24 VAC at 50/60 Hz or 24 VDC. You can mount the actuator to spring return either clockwise or counterclockwise.

The actuator can be wired to respond to either a 2 to 10 VDC or 4 to 20 mA control signal with a field supplied 500 ohm resistor and will position the valve in response to a control signal.

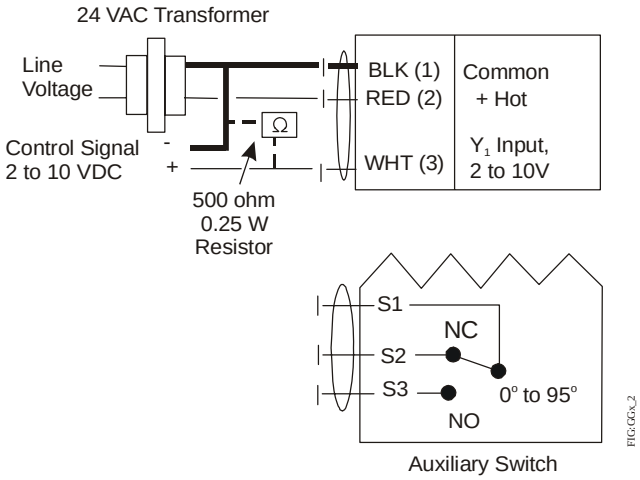
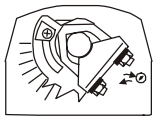
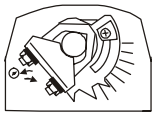


Figure 6: Proportional Control (M2202-GGx-2)

M2202-GGx actuators have a rotation direction switch on the cover as shown in Table 4. Switch position indicates start point.

Table 4: Spring Return with Proportional Control

Signal	**Side of Actuator Mounted Away from Valve**			
	Blue Side		**Gray Side**	
				
	Position of Rotation Direction Switch			
	 **CW**	 **CCW**	 **CCW**	 **CW**
	Direction of Shaft Rotation			
Increasing Signal (2 to 10 VDC or 4 to 20 mA)	 CCW	 CW	 CW	 CCW
Decreasing Signal (10 to 2 VDC or 20 to 4 mA)	 CW	 CCW	 CCW	 CW

Dimensions

See Figure 7 for M2202 Series actuator dimensions.

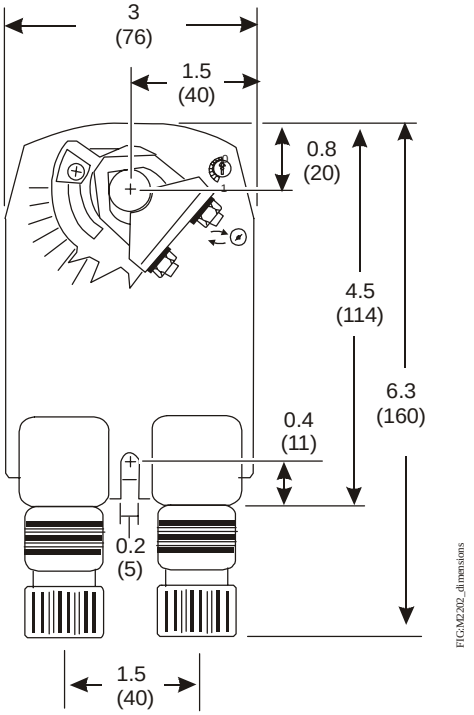


Figure 7: M2202-xxx-2 Series Actuators Mounting Dimensions, in. (mm)

Ordering Information

See Table 5 to order M2202 Series Actuators. See Table 6 to order accessories.

Table 5: Models Available

Code Number	Description
M2202-AGA-2	24 VAC 3-Wire Floating Control, Spring Return without auxiliary switch
M2202-AGB-2	24 VAC 3-Wire Floating Control, Spring Return with one SPDT auxiliary switch
M2202-BAA-2	85 to 265 VAC 50/60 Hz, 2-Wire On/Off Control, Spring Return without auxiliary switch
M2202-BAB-2	85 to 265 VAC 50/60 Hz, 2-Wire On/Off Control, Spring Return with one SPDT auxiliary switch
M2202-BGA-2	24 VAC 50/60 Hz, or 24 VDC, 2-Wire On/Off Control, Spring Return without auxiliary switch
M2202-BGB-2	24 VAC 50/60 Hz, or 24 VDC 2-Wire On/Off Control, Spring Return with one SPDT auxiliary switch
M2202-GGA-2	2 to 10 VDC (4 to 20 mA) Proportional Control, Spring Return without auxiliary switch[1]
M2202-GGB-2	2 to 10 VDC (4 to 20 mA) Proportional Control, Spring Return with one SPDT auxiliary switch[1]

1. Milliamp input signal requires field-furnished 500 ohm resistor.

Table 6: Accessories

Code Number	Description
M2202-502	Anti-rotation bracket
M2202-503	Crank arm for 1/2” round shaft
M2202-504	Universal mounting kit, hollow pillars, and hardware
M2202-505	Weather shield, metal
M2202-506	Weather shield, polycarbonate
M2202-510	Universal mounting kit without crank arm
M2202-511	L bracket for foot mounting

Technical Specifications

Table 7: M2202 Series Electric Valve Actuators

Power Requirements	**M2202-AGx-2**	24 VAC ±20% at 50/60 Hz, 4 VA
	M2202-BAx-2	85 to 265 VAC at 50/60 Hz, 5 VA
	M2202-BGx-2	24 VAC ±20% at 50/60 Hz, 24 VDC ±10%, 5 VA
	M2202-GGx-2	24 VAC ±20% at 50/60 Hz, 24 VDC ±10%, 4 VA
Input Signal	**M2202-AGx-2**	24 VAC ±20% at 50/60 Hz
	M2202-Bxx-2	See power requirements.
	M2202-GGx-2	2 to 10 VDC or 4 to 20 mA (with field furnished 500 ohm resistor)
Input Impedance	**M2202-AGx**	1,000 ohms (0.6 W)
	M2202-GGx	Voltage: 100,000 ohms (0.1 mA)
		Current: 500 ohms (with field furnished 500 ohm 0.25 W minimum resistor)
Electrical Connections	**M2202-AGA-2** **M2202-GGA-2**	Plenum cable, 36 inch, 18 AWG, 1/2 in. conduit connector
	M2202-BxA-2	Appliance cable, 36 inch, 18 AWG, 1/2 in. conduit connector
	M2202-BxB-2 **M2202-xGB-2**	Two appliance cables, 36 inch, 18 AWG, 1/2 in. conduit connector
Auxiliary Switch Rating	**M2202-xxB-2**	One SPDT, 3A @ 250 VAC, adjustable 0 to 95°
Mechanical Connection		1/4 to 1/2 in. (10 to 12.7 mm) diameter round shaft 1/4 to 5/16 in. (10 mm) square shaft
Output Torque		18 lb·in (2 N·m) minimum
Rotation Range		Adjustable from 37 to 100%, mechanically limited to 95°
Nominal Run Time	**Powered**	95 seconds maximum
	Spring Return	25 seconds maximum -4 to 122°F(-20 to 50°C), 60 seconds maximum at -22°F (-30°C)
Cycles		60,000 full stroke cycles; 1,500,000 repositions rated at 16 lb·in (2 N·m)
Enclosure		NEMA 2, IP42
Ambient Conditions	**Operating**	-22 to 122°F (-30 to 50°C); 5 to 90% RH, noncondensing
	Storage	-40 to 176°F (-40 to 80°C); 5 to 95% RH, noncondensing
Compliance	**United States**	UL listed according to UL 60730-1, UL 60730-2-14 (XAPX)
	Canada	cUL listed according to CAN/CSA C22.2 No.24 (XAPX7)
	Europe	CE Mark, Low Voltage Directive (73/23/EEC), -xAx and -xxB models only CE Mark, EMC Directive (89/336/EEC), all models
Shipping Weight		1.5 lb (0.7 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.

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