

VA2202-xxx-2 Series Electric Spring Return Valve Actuators Installation Instructions

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Applications

IMPORTANT: Use the VA2202 Series Spring Return Electric Valve Actuator only as an operating control. Where failure or malfunction of the VA2202 Series could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the 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 VA2202 Series.

VA2202 Series Spring Return Electric Valve actuators models are available for use in Heating, Ventilating, and Air Conditioning (HVAC) applications, as shown in Table 1. All models provide 18 lb-in (2 N-m) of output force and feature a NEMA 2 (IP42) housing for indoor use. Versions with a factory-installed Single Pole, Double Throw (SPDT) auxiliary switch are available.

The VA2202 Series Actuators are designed for easy mounting in the field to 1/2 and 3/4 in. Johnson Controls® VG1000 Series Ball Valves. The optional available auxiliary switch is adjustable from 5 to 95°.

Table 1: Control Applications by Model

Model	Voltage	Control	Auxiliary Switch
VA2202-AGA	24 VAC	Floating	No
VA2202-AGB			Yes
VA2202-BAA	120 VAC	On/Off	No
VA2202-BAB			Yes
VA2202-BGA	24 V AC/DC		No
VA2202-BGB			Yes
VA2202-GGA	24 VAC/ VDC	Proportional, 2-10 VDC	No
VA2202-GGB			Yes

Installation

Parts Included

- VA2202 actuator
- stem coupler
- pointer
- mounting plate
- M4 screw and lock washer

Dimensions

See Figure 1 and Table 2 for dimensions of VG1241, VG1245, VG1841, and VG1845 Series Ball Valves with VA2202 actuators.

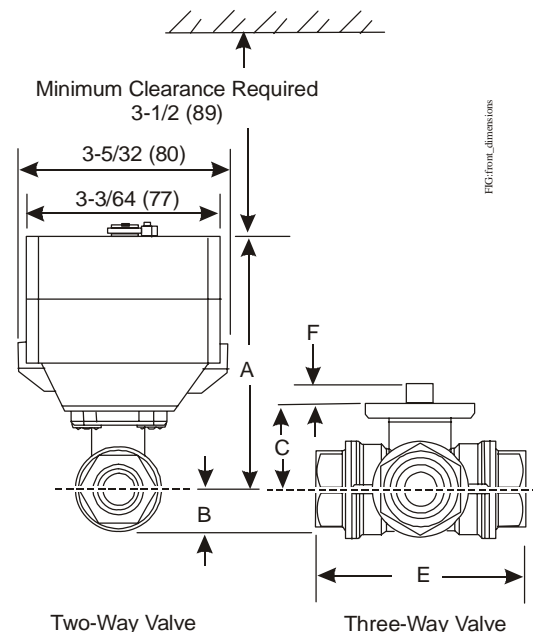


Figure 1: Dimensions of VG1241, VG1245, VG1841, and VG1845 Series Ball Valves with VA2202 actuators, in. (mm), Front View

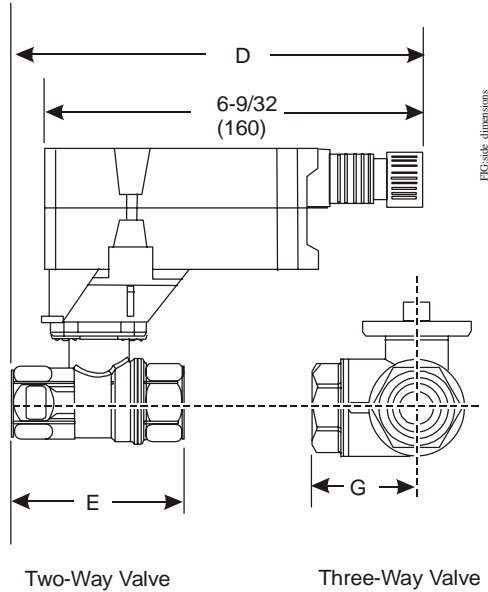


Figure 2: Dimensions of VG1241, VG1245, VG1841, and VG1845 Series Ball Valves with VA2202 actuators, in. (mm), Side View

Table 2: Dimensions of VG1241, VG1245, VG1841, and VG1845 Series Ball Valves with VA2202 actuators, in. (mm)

Valve Size in. (DN) ¹	1/2 (DN15)	3/4 (DN20)
A	4-1/4 (108)	
B	11/16 (17)	
C	1-1/4 (32)	
D	6-3/4 (171)	6-13/16 (175)
E	2-9/16 (64)	2-13/16 (71)
F	3/8 (9)	
G	1-1/4 (32)	1-7/16 (36)

1. On models with the flow-characterizing disk, the disk is located in Port A. Port A must be the inlet.

Mounting

IMPORTANT: Mount the VA2202/VG1000 Series Valve assembly within 90 degrees of the upright position.

Use the following guidelines when mounting the VA2202 Series Actuators.

- Mount the VA2202 Series Electric Actuator on the VG1000 Series Ball Valve with the actuator at or above the centerline of the horizontal piping.
- When mounting the actuator on vertical pipe, make certain the actuator is level with or above the valve.
- To minimize heat transfer, wrap the valve and piping with insulation.
- Allow sufficient clearance to remove the actuator (see Figure 1 for clearance dimensions).

Preparing the Valve

1. Rotate the valve stem manually several times using an adjustable wrench to break the torque that may have built up during long-term storage. Then, rotate the valve stem so that Port A on the valve is open.

Note: Two-way valves in the fully open position have the index marking on the top of the valve stem, parallel with the direction of flow. Two-way valves in the fully closed position have the index marking perpendicular to the direction of flow.

Three-way valves feature two index markings on the top of the valve stem, with one of the index markings parallel to the common port. See Figure 3.

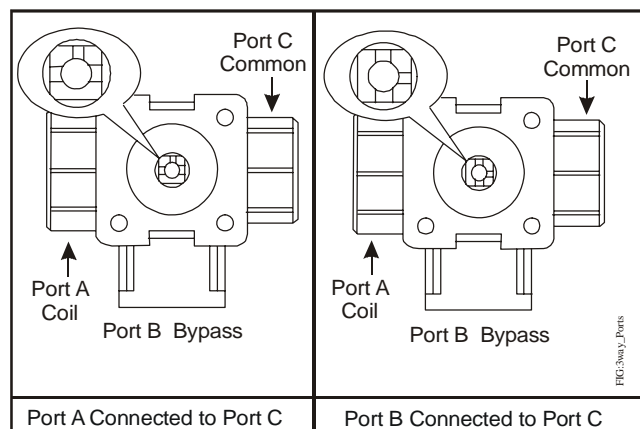


Figure 3: VG1000 Series Three-Way Ball Valve

2. Rotate the valve stem such that the valve is in the correct position when the actuator has spring returned. See Figure 3.

Determining the Correct Mounting Orientation

For Counterclockwise (CCW) spring return operation (see Figure 4 and Table 3), mount the actuator, so the CCW face of the actuator (blue side) is away from the valve as illustrated in Figure 5. The actuator drives Clockwise (CW) and spring returns CCW.

For CW spring return operation (see Figure 4 and Table 3), mount the actuator so the CW face of the actuator (gray side) is away from the valve as illustrated in Figure 5. The actuator drives CCW and spring returns CW.

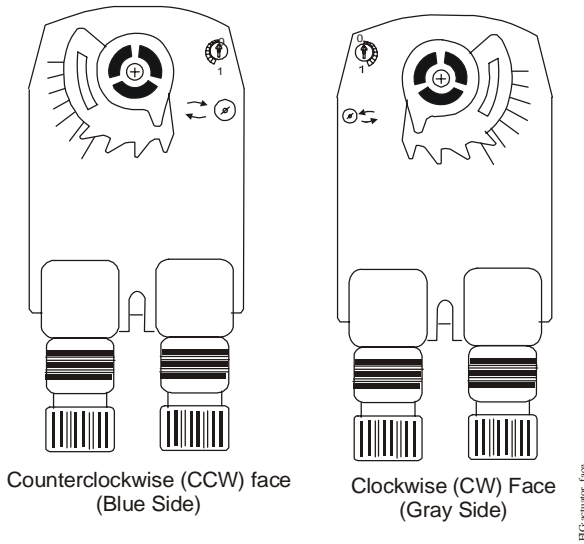


Figure 4: Selecting the Spring-Return Direction

Table 3: Control Variations

Valve Style	Side of Actuator Mounted Away from Valve	
	Blue Side	Gray Side
Two-Way	Spring Return open	Spring Return closed
Three Way	Connect Port A to Port C	Connect Port B to Port C

Mounting the Actuator

See Figure 5 for correct sequence of parts installation.

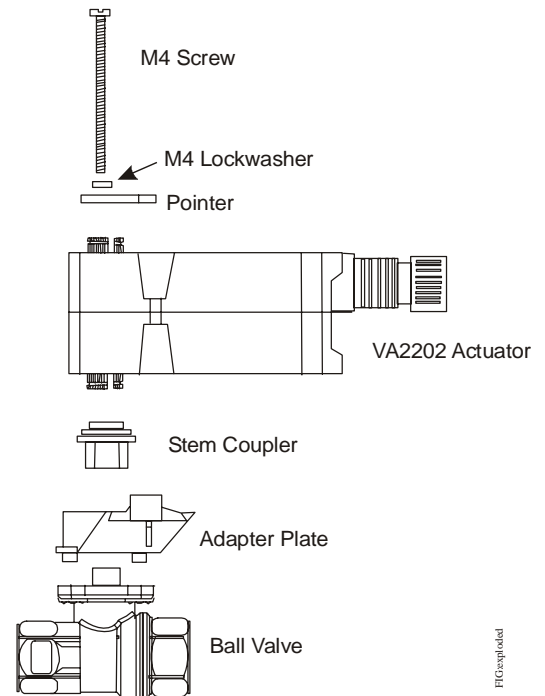


Figure 5: Exploded View of Actuator Mounting

To mount the actuator, use the following procedure:

1. Verify that the actuator is oriented correctly for the desired spring-return direction.
2. Install the stem coupler. Make sure that keys on the stem coupler align with the grooves on the inside of the actuator stem. See Figure 6.

Note: For counterclockwise spring return, install the stem coupler into the actuator stem on the gray side of the actuator. For clockwise spring return, install the stem coupler into the actuator stem on the blue side of the actuator.

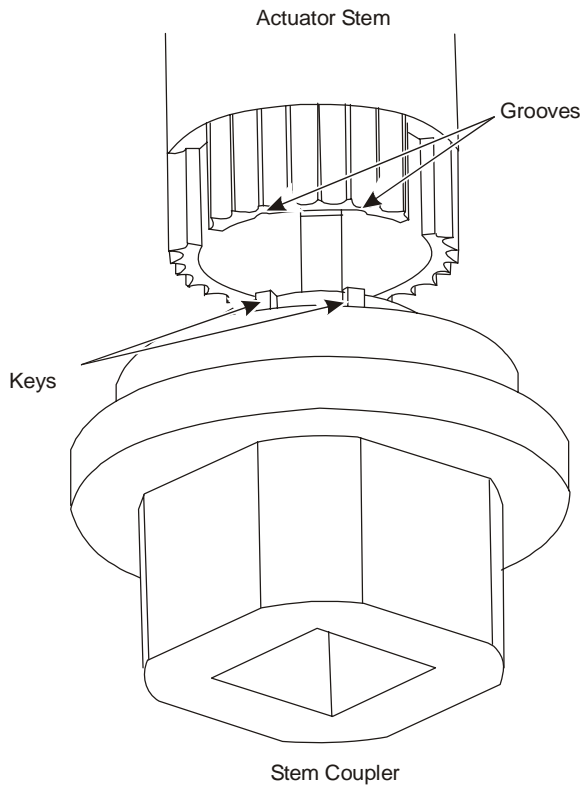


Figure 6: Installing the Stem Coupler

3. Install the adapter plate over the stem coupler and on to the actuator.
4. Install the pointer on the actuator stem on the side opposite the valve. The pointer should be pointing towards the conduit adaptors.
5. Fasten the actuator to the valve using the supplied M4 screw and lockwasher, and tighten to a torque of 10 lb-in (1.1 N·m).

IMPORTANT: Do not overtighten the mounting screw. Overtightening may strip the threads.

For additional installation information, refer to the *VG1000 Series Forged Brass Ball Valves Installation Instructions (Part No. 14-1201-5)*.

Location Considerations

IMPORTANT: Do not cover the actuator with thermal insulating material. High ambient temperatures may damage the actuator, and a hot water pipe, a steam pipe, or other heat source may overheat it.

IMPORTANT: Protect the actuator from dripping water, condensation, and other moisture. Water or moisture could result in an electrical short, which may damage or affect the operation of the actuator.

Wiring



WARNING: Risk of Electric Shock.

Disconnect each of multiple power supplies before making electrical connections. More than one disconnect may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.



WARNING: Risk of Electric Shock.

Do not remove the conduit adaptor on VA2202 actuator models with auxiliary switches. Removing the adapter defeats the double insulation and strain relief features and can result in electric shock leading to severe personal injury or death.



CAUTION: Risk of Property Damage.

Do not apply power to the system before checking all wiring connections. Short-circuited or improperly connected wires may result in permanent damage to the equipment.

IMPORTANT: Make all wiring connections in accordance with the National Electrical Code and local regulations. Use proper Electrostatic Discharge (ESD) precautions during installation and servicing to avoid damaging the actuator's electronic circuits.

IMPORTANT: Use flexible metallic conduit or its equivalent with the conduit fitting. To avoid stressing a mounted actuator, use a tool to grasp the conduit housing when installing the fitting. Do not overtighten the fitting into the actuator to avoid damaging the actuator housing.

Wiring Guidelines

Use the following guidelines when wiring the VA2202 Series actuators:

- Provide overload protection or disconnect, as required, for transformers.
- Observe power consumption and load impedance when connecting actuators in parallel.
- Note that actuators with plenum-rated cables do not have numbered wires; use color codes instead.

Floating Control

VA2202-AGx-2 Series of actuators operate on 24 VAC at 50/60 Hz. A switch on the actuator sets the direction of travel. The actuator can be mounted to spring return either clockwise or counterclockwise. See Table 3.

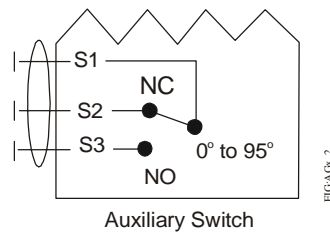
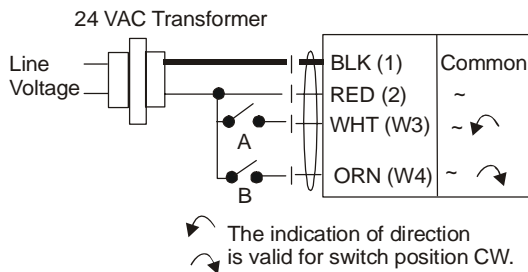


Figure 7: Floating Control (VA2202-AGx-2)

On/Off Control

VA2202-BGx-2 Series operate on 24 VAC at 50/60 Hz or 24 VDC. VA-2202-BAx-2 Series operate on 85 to 265 VAC at 50/60Hz. The actuator can be mounted to spring return either clockwise or counterclockwise. See Table 3 and Figure 4.

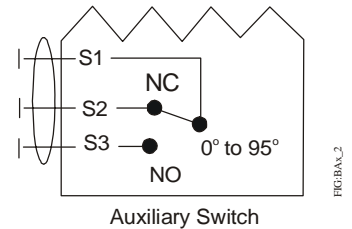
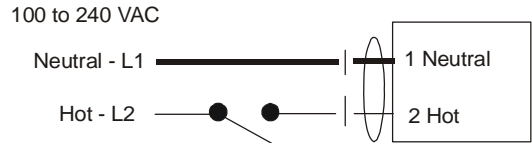


Figure 8: On/Off Control (VA2202-BAx-2)

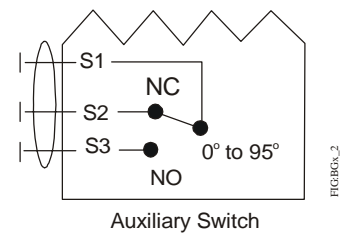
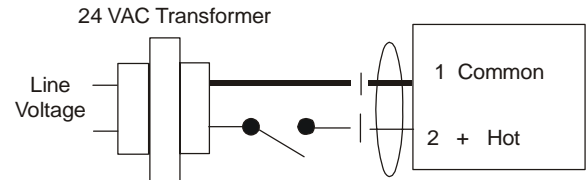


Figure 9: On/Off Control (VA2202-BGx-2)

Proportional Control

VA2202-GGx-2 Series of actuators operate on 24 VAC at 50/60 Hz or 24 VDC. 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 positions the valve in response to a control signal.

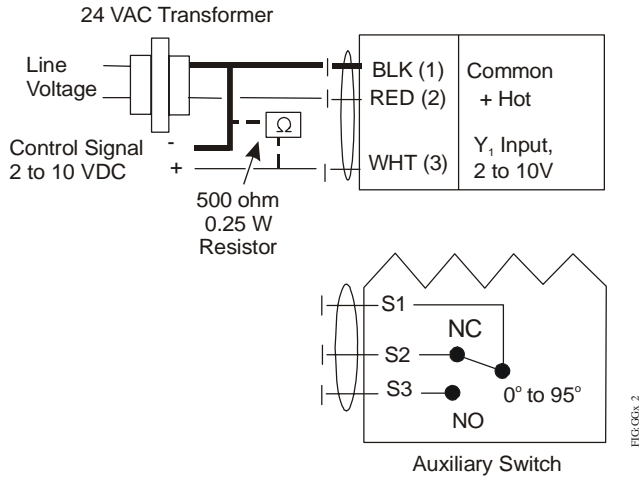


Figure 10: Proportional Control (VA2202-GGx-2)

Setup and Adjustments

Setting the Rotation Direction Switch

VA2202-AGx and VA2202-GGx actuators have a rotation direction switch on the cover as shown in Table 4 and Table 5. Switch position indicates start point.

VA2202-AGx actuators rotate as shown in Table 4.

Table 4: Shaft Rotation with Floating Control

External Switch Positions (See Figure 7.)		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			

VA2202-GGx actuators rotate as shown in Table 5.

Table 5: Shaft Rotation with Proportional Control

Signal	Side of Actuator Mounted Away from Valve			
	Blue Side		Gray Side	
	Position of Rotation Direction Switch			
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

Auxiliary Switch (xxB Models)

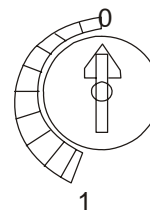


WARNING: Risk of Electric Shock and Property Damage.

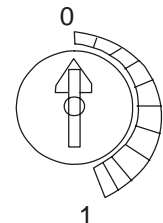
Insulate and secure each unused wire lead before applying power to the VA2202 actuator. Failure to insulate and secure each unused wire lead may result in property damage, electric shock, and severe personal injury or death.

The VA2202-xxB models have one built-in auxiliary switch with switch adjuster accessible on either face of the actuator. (See Figure 11.) Factory setting is 20° nominal. See the *Technical Specifications* section for switch parameters.

The auxiliary switch is labeled in percent of actuator full stroke. Turn indicator with small flat bladed screwdriver to set switch trip position.



Counterclockwise (CCW) face (Blue Side)



Clockwise (CW) Face (Gray Side)

FIG: Auxiliary_Switch

Figure 11: Auxiliary Switch

Repair Information

Do not make field repairs. To order a replacement actuator, see Table 6.

Table 6: Repair Parts (Order Separately)

Code Number	Description
M2000-500	Linkage Kit Complete, includes adapter plate, coupler, lock washer, screw and pointer

Technical Specifications

VA2202 Series Electric Valve Actuators

Power Requirements	VA2202-AGx	24 VAC \pm 20% at 50/60 Hz, 4 VA
	VA2202-BAx	85 to 265 VAC at 50/60 Hz, 5 VA
	VA2202-BGx	24 VAC \pm 20% at 50/60 Hz, 24 VDC \pm 10%, 5 VA
	VA2202-GGx	24 VAC \pm 20% at 50/60 Hz, 24 VDC \pm 10%, 4 VA
Input Signal	VA2202-AGx-2	24 VAC \pm 20% at 50/60 Hz
	VA2202-Bxx-2	(See Power Requirements.)
	VA2202-GGx-2	2 to 10 VDC or 4 to 20 mA (with field furnished 500 ohm resistor)
Auxiliary Switch Rating		One SPDT, 3A @ 250 VAC, adjustable 0 to 95°
Input Impedance	VA2202-AGx	1,000 ohms (0.6 W)
	VA2202-GGx	Voltage: 100,000 ohms, (0.1 mA) Current: 500 ohms (with field furnished 500 ohm 0.25 W minimum resistor)
Electrical Connections	VA2202-AGA-2 VA2202-GGA-2	Plenum cable, 36 inch, 18 AWG, 1/2 in. conduit connector
	VA2202-BxA-2	Appliance cable, 36 inch, 18 AWG, 1/2 in. conduit connector
	VA2202-BxB-2 VA2202-xGB-2	Two appliance cables, 36 inch, 18 AWG, 1/2 in. conduit connector
		18 lb-in (2 N·m) minimum
Output Torque		
Nominal Run Time	Powered	95 seconds maximum VA2202-AGx-2 and VA2202-GGx-2 models 75 seconds maximum VA2202-Bxx-2 models
	Spring Return	25 seconds maximum: -4 to 122°F (-20 to 50°C), 60 seconds maximum at -22°F (-30°C) for VA2202-AGx-2 and VA2202-GGx-2 models; 75 seconds maximum for VA2202-Bxx-2 models
Cycles		60,000 full stroke cycles; rated at 16 lb-in (2 N·m)
Enclosure		NEMA 2, IP42
Valve Fluid Temperature Limits		0 to 212°F (-18 to 100°C)
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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