VA9104-xGA-2S Series Electric Non-Spring Return Valve Actuators

Installation Guide

Part No. 14-1336-15, Rev. M
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Applications

The VA9104 Series Actuators are direct-mount, non-spring return electric valve actuators that operate on AC 24 V power. These synchronous, motor-driven actuators are used to provide accurate positioning on Johnson Controls® VG1000 Series DN15, DN20, and DN25 (1/2, 3/4, and 1 in.) ball valves in HVAC applications.

The VA9104 Series Electric Non-Spring Return Actuators provide a running torque of 35 lb·in (4 N·m). The nominal travel time is 60 seconds at 60 Hz (72 seconds at 50 Hz) for 90° of rotation.

IMPORTANT: Use this VA9104 Series Actuator only to control equipment under normal operating conditions. Where failure or malfunction of the VA9104 Series 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 VA9104 Series Actuator.

IMPORTANT : Utiliser ce VA9104 Series Actuator uniquement pour commander des équipements dans des conditions normales de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du VA9104 Series Actuator risque de provoquer des blessures ou d'endommager l'équipement contrôlé ou un autre équipement, la conception du système de contrôle doit intégrer des dispositifs de protection supplémentaires. Veiller dans ce cas à intégrer de façon permanente d'autres dispositifs, tels que des systèmes de supervision ou d'alarme, ou des dispositifs de sécurité ou de limitation, ayant une fonction d'avertissement ou de protection en cas de défaillance ou de dysfonctionnement du VA9104 Series Actuator.

Installation

Install the ball valve with the actuator at or above the centerline of the horizontal piping (Figure 1).

IMPORTANT: Do not install or use this VA9104 Series Electric Non-Spring Return Valve Actuator in or near environments where corrosive substances or vapors could be present. Exposure of the electric actuator to corrosive environments may damage the internal components of the device, and will void the warranty.

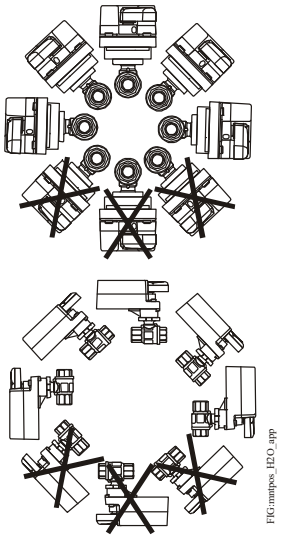

Figure 1: Mounting positions for chilled water and condensing atmosphere

Dimensions

See Figure 2 for dimensions of the Non-Spring Return VA9104 Actuated VG1241, VG1245, VG1841, and VG1845 Series Ball Valve with M9000-551 Linkage. See Table 1 for specific model linkage dimensions.

See Table 2 for specific model dimensions for the VA9104 Actuated VG1275 and VG1875 Series Sweat End and the VA9104 Actuated VG1295 and VG1895 Series Press End Connection Ball Valves.

See Figure 3 and Table 3 for VA9104 Valve Actuator dimensions with optional M9000-561 Thermal Barrier installed.

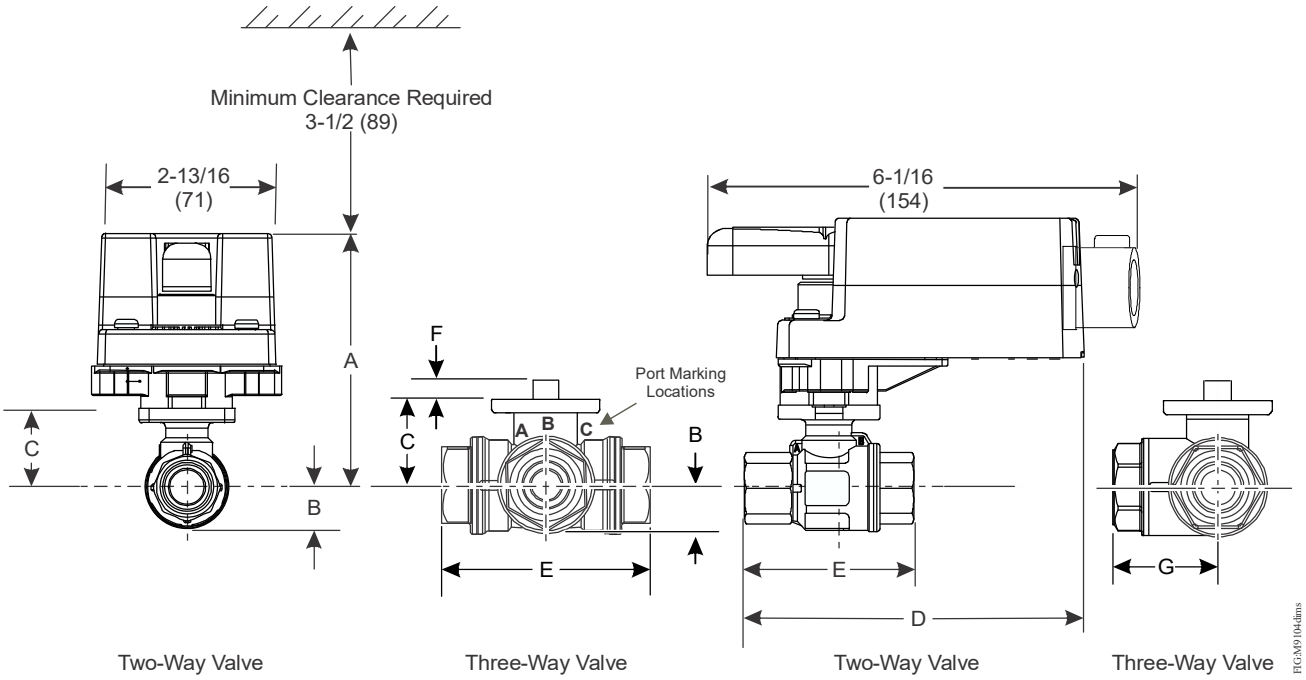

Figure 2: Non-Spring Return VA9104 Actuated VG1241, VG1245, VG1841, and VG1845 Series Ball Valve with optional M9000-551 Linkage dimensions, in. (mm.)

Table 1: VA9104 or M9104 Actuated VG1241, VG1245, VG1841, and VG1845 Series Ball Valve with optional M9000-551 Linkage dimensions, in. (mm)

Valve Size, in. (DN)[1]	A	B	C	D	E	F	G
1/2 (DN15)	3-7/8 (98)	21/32 (17)	1-7/32 (31)	5-7/64 (129)	2-33/64 (64)	11/32 (9)	1-1/4 (32)
3/4 (DN20)	3-7/8 (98)	21/32 (17)	1-7/32 (31)	5-7/32 (133)	2-51/64 (71)	11/32 (9)	1-13/32 (36)
1 (DN25)	3-11/16 (100)	3/4 (19)	1-19/64 (33)	5-9/16 (141)	3-13/32 (87)	11/32 (9)	1-11/16 (43)

1. Port A must always be connected to the coil (Figure 2).

Table 2: VA9104 actuated VG1275 and VG1875 Series Ball Valve with sweat end connections and VA9104 actuated VG1295 and VG1895 Series Ball Valves with press end connections dimensions, in. (mm)

Valve Size, in. (DN)[1]	A	B	C	D	E	F	G
1/2 (DN15)	3-7/8 (98)	21/32 (17)	1-7/32 (31)	5-45/64 (145)	3-25/32 (96)	11/32 (9)	2-13/16 (55)
3/4 (DN20)	3-7/8 (98)	21/32 (17)	1-7/32 (31)	5-57/64(150)	4-3/32 (104)	11/32 (9)	2-15/32 (62)
1 (DN25)	3-15/16 (100)	3/4 (19)	1-19/64 (33)	6-1/8 (156)	4 21/32 (118)	11/32 (9)	2-27/32 (72)

1. Port A must always be connected to the coil (Figure 2).

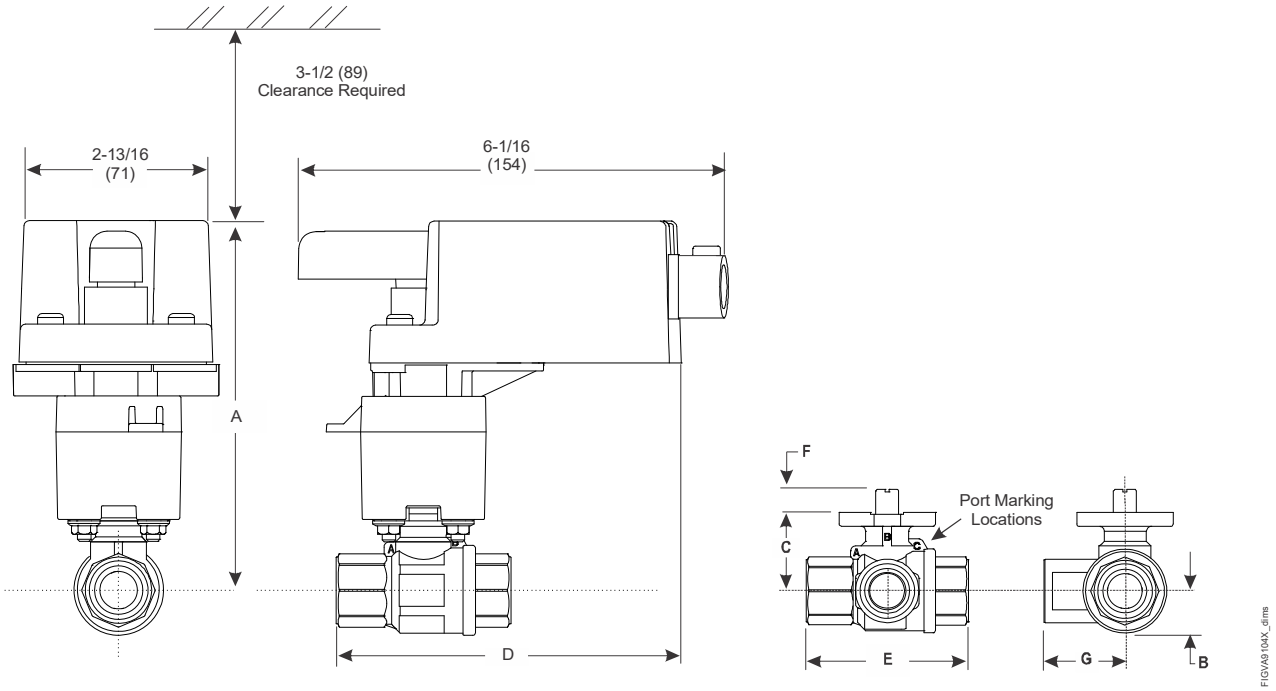

Figure 3: Field-installed VA9104 Series Electric Actuator dimensions with optional M9000-561 Thermal Barrier dimensions, in. (mm)

Table 3: VA9104 actuated VG1241, VG1245, VG1841, and VG1845 Series NPT Ball Valves with optional thermal barrier installed dimensions, in. (mm)

Valve Size, in. (DN)[1]	A	B	C	D	E	F	G
1/2 (DN15)	5-11/32 (135)	21/32 (17)	1-7/32 (31)	5-7/64 (129)	2-33/64 (64)	11/32 (9)	1-1/4 (32)
3/4 (DN20)	5-11/32 (135)	21/32 (17)	1-7/32 (31)	5-7/32 (133)	2-51/64 (71)	11/32 (9)	1-13/32 (36)
1 (DN25)	5-27/64 (137)	3/4 (19)	1-19/64 (33)	5-9/16 (141)	3-13/32 (87)	11/32 (9)	1-11/16 (43)

1. Port A must always be connected to the coil (Figure 3).

Accessories

Table 4: Accessories (order separately)

Code Number	Description
M9000-561	Thermal barrier extends M(VA)9104, M(VA)9203, and M(VA)9208 Series Electric Spring Return Actuator applications to include low pressure steam (Quantity 1)
M9000-342	Weathershield kit for VG1000 Series Ball Valve application of VA9104, VA9203, and VA9208 Series Electric Spring Return Actuators (quantity 1)
M9000-700	Universal Ball Valve Linkage Kit (quantity 1)

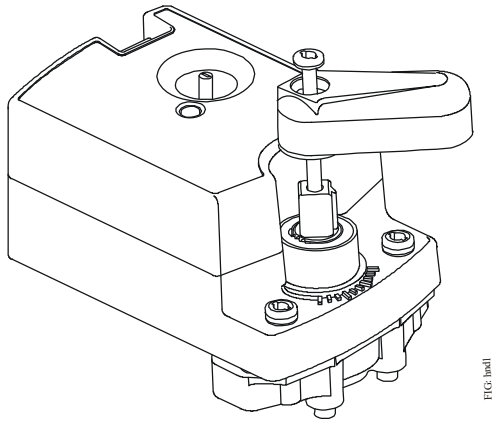

Figure 5: Installing the handle

Mounting

Mounting the actuator

To mount the actuator:

1. Turn valve stem to position below.

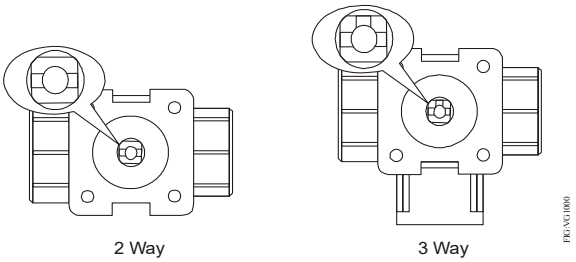

Figure 4: Positioning the valve stem

2. Mount optional M9000-561 Thermal Barrier to the valve if fluid temperature exceeds 212°F (100°C). See the *Mounting the thermal barrier* section for more information.
3. Place the handle the top of the drive shaft (Figure 5). The handle is keyed on and can only be mounted in one orientation.
4. Check that the actuator coupler and handle are in the fully counterclockwise position as viewed from the top of the actuator. If not, press the actuator gear release and rotate the handle until the actuator coupler is fully counterclockwise.

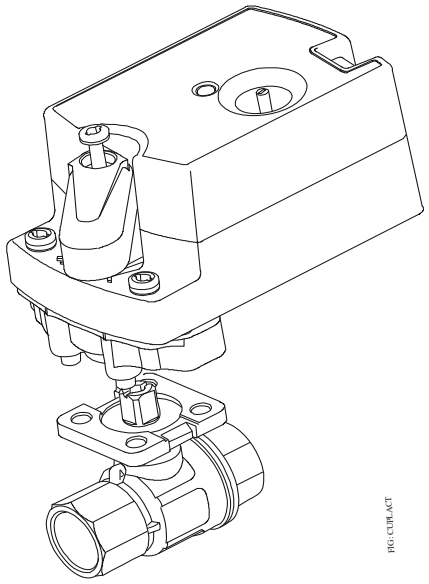

Figure 6: Coupling the actuator to the valve

5. Install the valve actuator over the ball valve mounting flange (Figure 6). Depending on the installation, position the assembly in any one of four 90° increments on the valve.

Note: For proper operation, the actuator must drive the valve counterclockwise to open Port A when viewed from above the valve.

6. To secure the actuator to the valve, use a 1/4 in. (6 mm) flat blade screwdriver. Recommended torque is 8 to 12 lb·in (0.9 to 1.4 N·m).

IMPORTANT: Do not overtighten the manual handle mounting screw. Overtightening may strip the threads resulting in damage to the valve stem threads.

Mounting the thermal barrier

Figure 7 shows the optional M9000-561 Thermal Barrier.

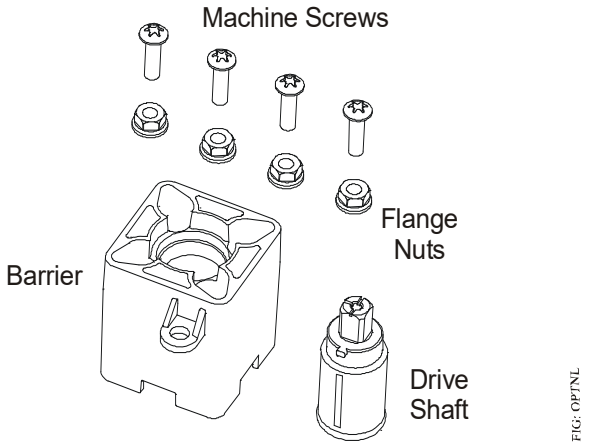

Figure 7: Optional M9000-561 Thermal Barrier

To mount the optional thermal barrier:

1. Install the thermal barrier drive shaft into the thermal barrier by aligning the tab on the drive shaft with the slot on the thermal barrier (Figure 8).

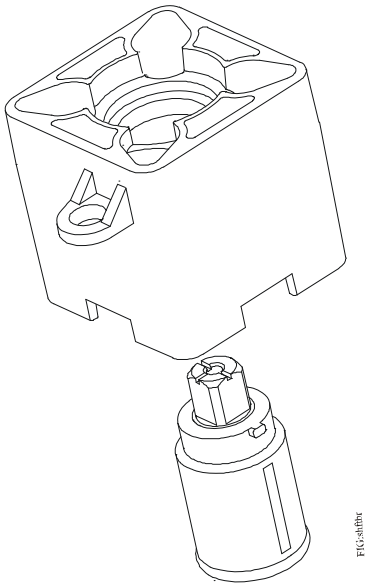

Figure 8: Installing the drive shaft into the thermal barrier

2. Rotate the drive shaft to align marks on the top of the thermal drive shaft with matching marks on the valve stem.
3. Mount the thermal barrier onto the valve using the four included M5x16 mm machine screws and four M5 flange nuts. Tighten the screws to a recommended torque of 21 to 25 lb·in. (2.4 to 2.8 N·m) (Figure 9).

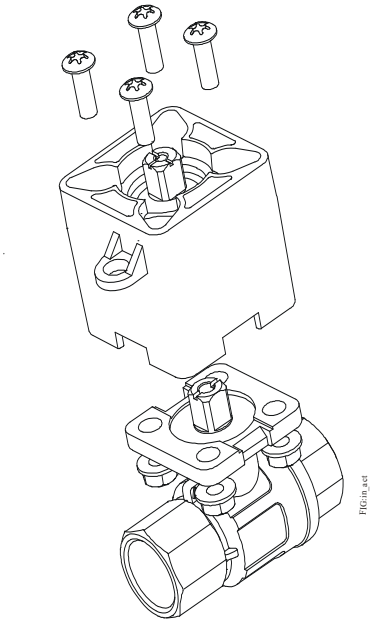

Figure 9: Installing the barrier

4. Proceed to *Mounting the actuator*. Follow the same steps as mounting directly to the valve when mounting the actuator to the thermal barrier.

Wiring

⚠ CAUTION

Risk of Electric Shock.
Disconnect the power supply before making electrical connections to avoid electric shock.

⚠ ATTENTION

Risque de décharge électrique.
Débrancher l'alimentation avant de réaliser tout raccordement électrique afin d'éviter tout risque de décharge électrique.

NOTICE

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.

NOTICE

Risque de dégâts matériels.
Ne pas mettre le système sous tension avant d'avoir vérifié tous les raccords de câblage. Des fils formant un court-circuit ou connectés de façon incorrecte risquent d'endommager irrémédiablement l'équipement.

IMPORTANT: Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the electrical ratings of the VA9104 Series Electric Non-Spring Return Valve Actuator.

VA9104-AGA-2S and VA9104-IGA-2S

The VA9104-AGA and VA9104-IGA Series Electric Non-Spring Return valve actuators require an AC 24 V input signal and work with a variety of controllers. These electric actuators include an integrated 120 in. (3.05 m) long cable; see Figure 10 for proper wiring.

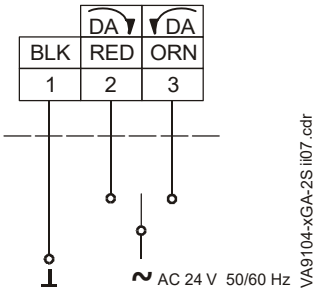

Figure 10: VA9104-AGA-2S and VA9104-IGA-2S control wiring diagram, floating

Note: When using the VA9104-AGA-1S or VA9104-IGA-1S Series actuator with a controller featuring triac output, add a 4.7k ohm resistor one half watt between the Common (COM) and Counterclockwise (CCW) terminals.

Note: For all VA9104-AGA Series actuators, use a controller and/or software that provides a timeout function at the end of rotation (stall) to avoid excessive wear or drive time on the actuator motor. The **-GGA** and **-IGA** models have an auto shutoff feature to prevent excessive wear or drive time on the motor.

VA9104-GGA-2S

The VA9104-GGA Series Electric Non-Spring Return valve actuators require AC 24 V power and a DC 0(2) to 10 V or 0(4) to 20 mA controller input signal. These electric actuators include an integrated 120 in. (3.05 m) long cable; see Figure 11 for proper wiring.

⚠ WARNING

This product can expose you to chemicals including lead, which is known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

⚠ WARNING

This product is made of copper alloy, which contains lead. The product is therefore not to be used on drinking water.

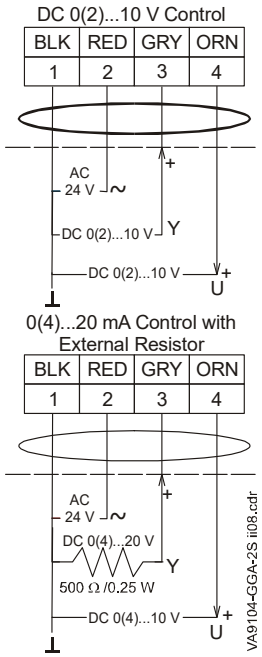

Figure 11: VA-9104-GGA-2S control wiring diagram

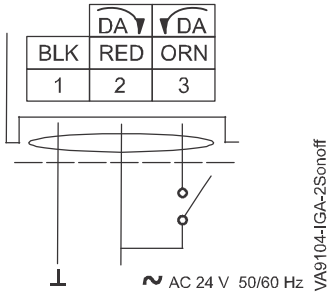

Figure 12: VA9104-IGA-2S wiring diagram, on/off

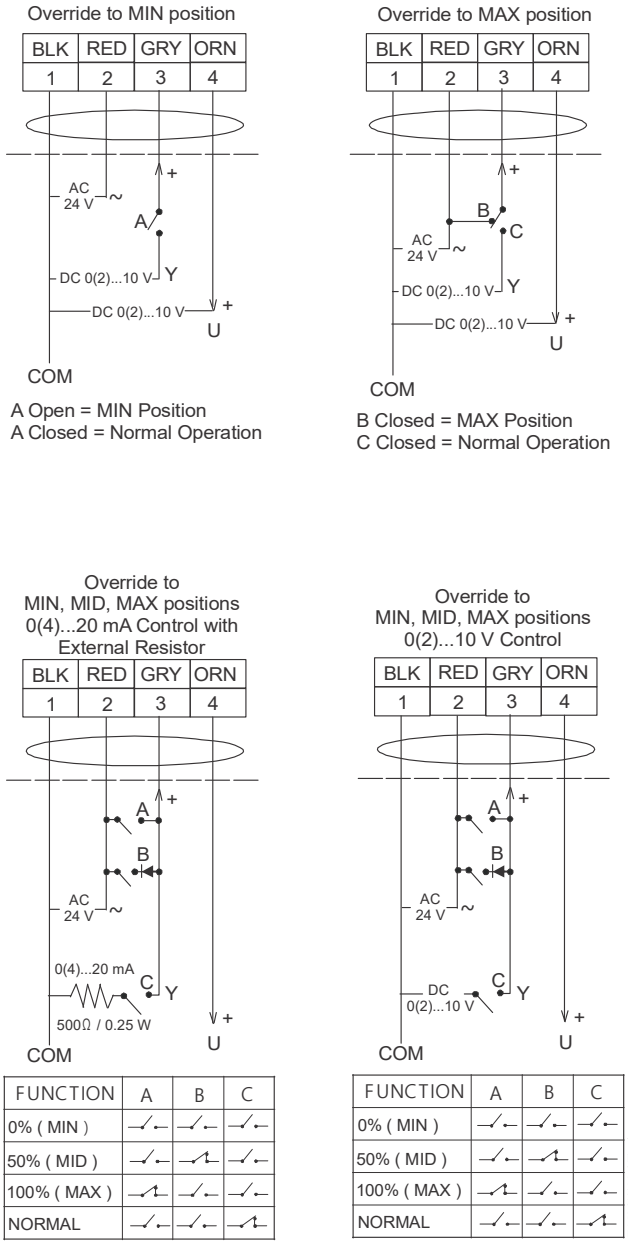

Figure 13: VA-9104-GGA-2S control wiring diagram (overrides)

VA9104-GGA actuators are factory set for Direct Acting (DA) mode and for a DC 0 to 10 V input control signal. In DA mode, a minimum control signal drives the actuator to the full CCW position, and a maximum control signal drives the actuator to the full Clockwise (CW) position.

For Reverse Acting (RA) operation, a minimum control signal drives the actuator to the full CW position and a maximum signal drives the actuator to the full CCW position. To change the factory settings, remove the actuator cover and adjust the switches on the circuit board as shown in Figure 14.

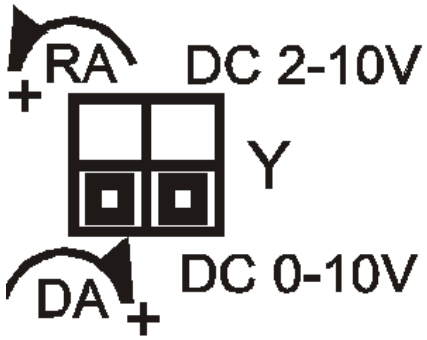

Figure 14: VA9104-GGA factory switch setting

Setup and adjustments

Commissioning

After wiring is complete, apply power to the Variable Air Volume (VAV) or Variable Air Volume and Temperature (VVT) controller and provide input signals to the actuator to drive it at least one complete cycle open and closed.

Troubleshooting

If the VA9104 Series Electric Non-Spring Return Valve Actuator is not responding or working properly:

- verify that the actuator assembly is properly secured to the valve.
- check that all electrical connections are complete and that power is applied.
- verify that the valve fully opens and closes, using the gear release button on the actuator and the manual override handle, shown in Figure 5.

Repairs

If the VA9104 Series Electric Non-Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement electric actuator, contact the nearest Johnson Controls representative.

Technical specifications

VA9104-xGA-2S Electric Non-Spring Return Valve Actuators (Part 1 of 2)

Power requirements		AC 24 V +25%/-20% at 50/60 Hz, 2.3 VA (AGA), 2.9 VA (GGA), and 3.0 VA (IGA) Supply, Class 2 or Safety Extra-Low Voltage (SELV)
Control type	**VA9104-AGA-2S**	Floating or on/off control without timeout
	VA9104-GGA-2S	Proportional control
	VA9104-IGA-2S	Floating or on/off control with timeout
Input signal	**VA9104-AGA-2S**	AC 24 V +25%/-20% at 50/60 Hz, Class 2 or SELV without timeout
	VA9104-GGA-2S	DC 0 (2) to 10 V or 0 (4) to 20 mA with field-furnished 500 ohm resistor
	VA9104-IGA-2S	AC 24 V +25%/-20% at 50/60 Hz, Class 2 or SELV with timeout
Feedback signal	**VA9104-GGA-2S**	DC 0 (2) to 10 V for 90° corresponds to input signal span selected
Motor input impedance	**VA9104-AGA-2S**	200 ohms nominal
Control input impedance	**VA9104-GGA-2S**	Voltage input: 200,000 ohm Current input: 500 ohm with field-furnished 500 ohm resistor
Running torque		35 lb·in (4 N·m)
Travel time		60 seconds at 60 Hz (72 seconds at 50 Hz) for 90° of rotation
Rotation range		93° ±3°, CW or CCW
Cycles		100,000 full stroke cycles; 2,500,000 repositions at rated running torque
Audible noise rating		35 dBA nominal at 39-13/32 in. (1 m)
Electrical connections	**VA9104-xGA-2S**	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 and connector for 3/8 in. flexible metal conduit
Enclosure	**VA9104-xGA-2S**	NEMA 2, IP42

VA9104-xGA-2S Electric Non-Spring Return Valve Actuators (Part 2 of 2)

Ambient conditions	**Operating**	-4 to 140°F (-20 to 60°C); 90% RH maximum, noncondensing
	Storage	-20 to 150°F (-29 to 66°C); 90% RH maximum, noncondensing
Fluid temperature limits (actuator and valve assembly)	**VG12x1 and VG18x1 Series**	23 to 203°F (-5 to 95°C)
	VG12x5 and VG18x5 Series	-22 to 212°F (-30 to 100°C)
	VG12x5 and VG18x5 Series with M9000-561 Thermal Barrier	-22 to 284°F (-30 to 140°C) water; 15 psig (103 kPa) at 250°F (121°C) saturated steam
Compliance	**United States**	UL Listed, CCN XAPX, File 27734 Plenum rated, UL2043, suitable for use in other environmental spaces (plenums) in accordance with section 300.22.(c) of the National Electrical Code
	Canada	cUL Listed, CCN XAPX7, File 27734 Plenum Rated Per CSA 22.2 No. 236/UL 1995, Heating and Cooling Equipment
CE	**Europe**	Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and the Low Voltage Directive.
	Australia and New Zealand	RCM Mark, Australia/NZ Emissions Compliant
Shipping weight		1.25 lb (0.55 kg)
Software licence	Any software (including firmware) included in or with this product is licensed, not sold. Any Johnson Controls software included in or with this product is subject to the terms of the Johnson Controls End User License Agreement available at https://www.johnsoncontrols.com/buildings/legal/digital/generaleula Any third party software (including open source software, if any) included in or with this product is subject to the terms of its respective license. By using any of the foregoing software, you are also agreeing to be bound to the terms of such licenses.	

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The performance specifications are nominal and conform to acceptable industry standard. 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.

Part Name 零件名	Hazardous substance 有害物质					
	Pb 铅	Hg 汞	Cd 镉	Cr 六价铬	PBB 多溴联苯	PBDE 多溴二苯醚
Body parts 阀体	X	O	O	O	O	O
Trim parts 阀芯/阀杆	O	O	O	O	O	O
Plastic parts 塑料件	O	O	O	O	O	O

O: Identify that this hazardous substance is below specified limits as described in SJ/T 11363-2006.

O：确定该有害物质低于SJ/T 11363-2006中规定的限值。

X: Identify that this hazardous substance is above specified limits as described in SJ/T 11363-2006.

X：确认该有害物质高于SJ/T 11363-2006中规定的限值。

The Environmentally Friendly Used Period (EFUP) for all enclosed products and their parts is per the symbol shown here, unless otherwise marked. The Environmentally Friendly User Period is valid only when the product is operated under the conditions defined in the product bulletin.

除非另有标记，所有产品及其零件的环保使用期限（EFUP）均符合此处所示符号。仅当产品在产品公告中规定的条件下运行时，环保使用期限才有效。

WARNING: BRASS AND BRONZE MAY CONTAIN LEAD

To fulfill our obligations towards Article 33, in accordance to the European REACH Regulation No 1907/2006 EC, we hereby inform you that this article contains the following Substances of Very High Concern mentioned on the Candidate list:

- Lead

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