VA9905 Series Electric Non-Spring Return Valve Actuators

Product Bulletin

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The VA9905 Series Electric Non-Spring Return Actuators are direct-mount actuators for VG1600 Series 270° Six - Way Ball Valves.

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Figure 1: VA9905 Series Electric Non-Spring Return Actuator

Benefits

2 Analog Inputs	Configurable, programmable or conventional field controllers and thermostats. Improve control and precision.
Microprocessor-Controlled Brushless DC Motor	Provides constant runtime independent of torque and increases lifecycle by reducing wear.
Mode Configuration Switches	Permits calibration of input signal range selection
Integral Cables with Colored and Numbered Conductors	Simplify installation and field wiring.
Optional Integral 1/2 in. (13 mm) Threaded Conduit Connectors	Simplify installation and field wiring.
Plenum-Rated Models	Enable use in other environmental air spaces (plenums) in accordance with section 300.22(C) of the National Electric Code.
Small Footprint	Allows application in smaller spaces
Position Indicator Handle and Manual override	Allows intuitive indication of valve position and manual shut off
NEMA5/IP54 Enclosure	Enhances the range of application environments.

Underwriters Laboratories Inc.® (UL), CE Mark, and RCM Compliance	Provides internationally recognized regulatory agency approvals.
Manufactured under International Standards Organization (ISO) 9001 Quality Control Standards	Ensures quality.
100,000 Cycles and 2.5 Million Repositions	Ensures reliability over time.
5-Year Warranty	Protects consumer investment.

PRODUCT OVERVIEW

The VA9905 Series Electric Non-Spring Return Actuator is designed to operate with the VG1600 Series 270° Six - Way Ball Valves in order to properly control Heating and Cooling modes with 270° operational range.

It is a proportional 24V AC/DC actuator with Brushless DC Motor Technology

The VA9905 Series Electric Non-Spring Return Actuator is equipped with two configurable analog inputs either 0…10V or 2…10V to connect with configurable, programmable or conventional field controllers and thermostats. That also simplifies the installation with current controllers without changing the electric wired installation. Moreover, both operational mode can be controlled in one actuator, which has two input signals; one for Heating and one for Cooling. Thus improving the control and precision of the control loop.

The easy-to-use mounting system of the VA9905 Series Electric Non-Spring Return Actuator and VG1600 Series 270° Six - Way Ball Valves reduces mistakes in the installation due its intuitive assembly mechanism. The assembly is guided by plastic flanges that align with the valve ledge and stem hold for proper installation. This prevents control the flow rate to satisfy the load demand.

The VA9905 Electric Non-Spring Return Actuator is equipped with eight-position Dip Switch on the board. The functionality is determined as follows:

SW 8: not used
SW 7: not used
SW 6: not used
SW 5: not used
SW 4: not used
SW 3: not used
SW 2: not used
SW 1: Input Signal Definition (0 to 10V or 2 to 10V)

ACTUATOR ORDERING CODES

VA9905-KGA-1	Proportional Actuator 5Nm with 2x0(2)..10V Analog Inputs	Europe / Asia
VA9905-KGA-2	Proportional Actuator 5Nm with 2x0(2)..10V Analog Inputs	North America

PRODUCT FEATURES

The actuators operate with AC/DC 24 V and are designed to be used with JCI VG1600 6 way ball valves. They switch to velocity of 1,5 degrees per second independent of supply voltage frequency and load. The actuator responds to DC 0 to 10 V or DC 2 to 10 V 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.

The VA9905-KGA-2 model is plenum rated due to the cable.
The actuator is 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

IMPORTANT: Use this VA9905 Series Electric Non -Spring Return Valve Actuator 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.

WIRING

Wire Color	Input	
Black	Com	24 VAC\DC
Red	~(+)	
Gray (Source 1 control)	Y1	0(2) …10 VDC
Orange (Source 2 control)	Y2	

APPLICATION OVERVIEW

VA9905 Series Electric Non-Spring Return Valve Actuators include mounting hardware for direct coupling to VG1600 Series 270° Six – Way Ball Valves. Control signal selections include:

• Proportional

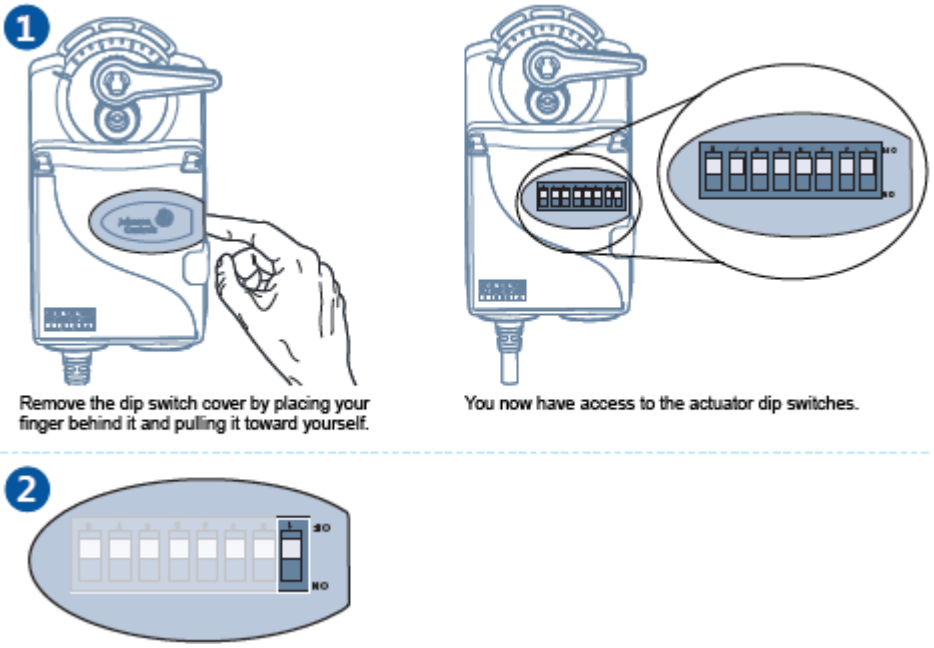
VA9905 Series Electric Non-Spring Return Valve Actuators use a brushless DC motor controlled by a microprocessor. The microprocessor drives the motor at constant speed, independent of torque. The actuator slows down before it reaches its stop position minimizing the impact on the gearbox, further reducing gear wear. 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.

Setting the DIP Switch

The actuators allow easy setting of the input signals. Through the DIP switches located under the removable oval cover in the front of the unit, it is possible to select 0 to 10 V or 2 to 10 V input.

If the controller output signal range is:

2 to 10 V: Push dip switch 1 to the **ON** position.
-or-
0 to 10 V: Push dip switch 1 to the **OFF** position



MANUAL OVERRIDE AND FLOW DIRECTION

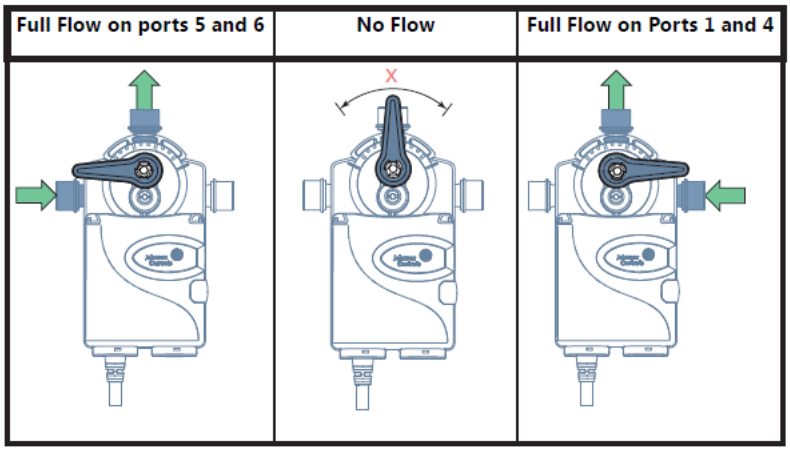
The manual override lever is used to indicate which ports are in use.

In the absence of power to the actuator, manually set the pointer to the desired position to regulate the flow of the valve.

Note: The setup procedure described in the *Attaching the Actuator to a Six-way Valve* section sets ports 1 and 4 to full flow.

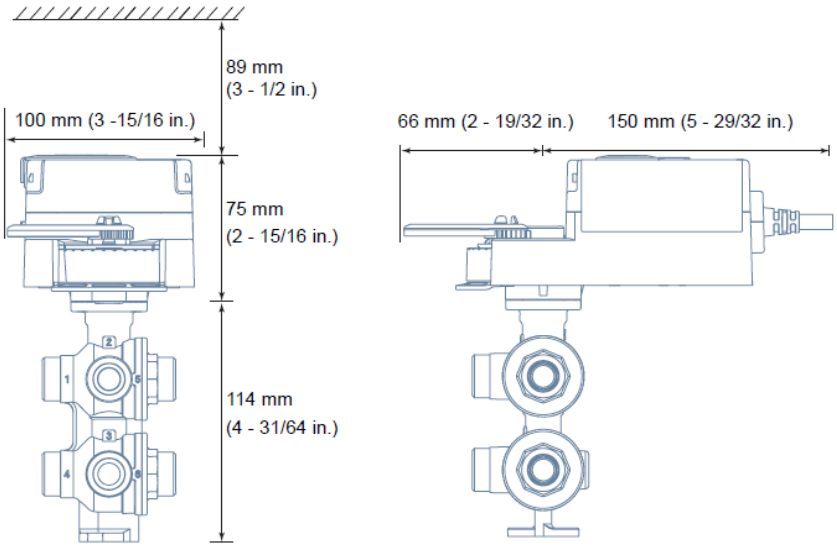
Note: The ball valve and actuator pointer rotate in opposite directions.

The following illustrations indicate lever position and flow:



CLEARANCE REQUIRED TO INSTALL AN ACTUATOR

The diagrams below illustrate the clearance required to install an actuator to the VG1600 Valve Series



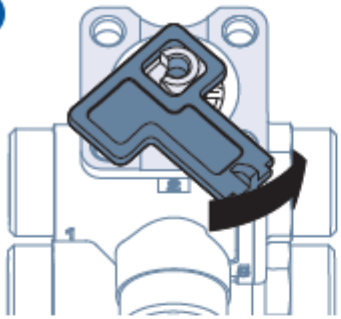
INSTALLATION

Due to the rotation sense of the 270° six-way valve and actuator, the position of the assembly between them is of prime importance for the proper functioning of the product solution. Otherwise, the assembling does not work thus preventing control the flow rate to satisfy the load demand.

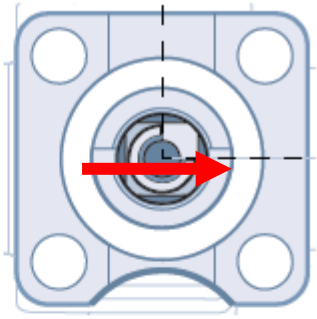
The easy-to-use mounting system of the 270° six-way valve and actuator ensures no mistake in the installation due to its extremely intuitive assembling mechanism and pointer system to manually shut off the valve for commissioning or maintenance. Therefore, the IP54 protection allows the installation of the actuator in any direction.

Note: The VA9905 Actuator fits VG1600 series valves only.

1

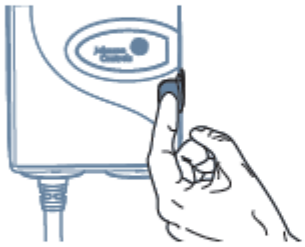


Use the valve key to adjust the valve stem to a 90° angle, away from the curved section.



Ensure the valve stem is aligned as shown.

2



Press the manual override button on the actuator.

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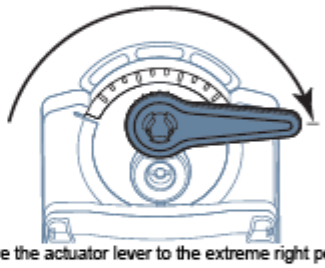

Move the actuator lever to the extreme right position.

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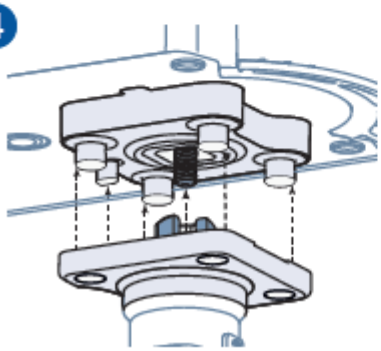

Align the top of the 6-way valve to the plate at the back of the actuator.

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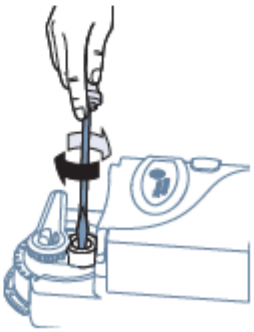

Use a slotted screwdriver or a TORX® T-20 driver to tighten the actuator screw to the 6-way valve. Tighten to a torque of 0.9 to 1.4 Nm (8 to 12 lb-in).

VA9905 Actuator Technical Specifications

Product description	**VA9905-KGA-1:** Proportional mode, **VA9905-KGA-2:** Proportional mode	
Power requirements	AC 24 V ±20% at 50/60 Hz, Class 2 (North America) or SELV (Europe), 5.2 VA Running; DC 24 V ±10% Class 2 (North America) or SELV (Europe), 1.1 W Running.	
Transformer sizing requirements	≥6 VA	
Input signal/adjustments	0 (2) to 10 VDC or 0 (4) to 20 mA with field furnished 500 ohm 1/4 W resistor	
Control impedance	100k ohm	
Rotation rate	1.5 ° per second	
Cycles	60,000 full stroke cycles; 2,500,000 repositions	
Audible noise	<35 dBA at 1 m (39-13/32 in.)	
Electrical connections	**-1 halogen-free** 1.2 m (48 in.) halogen free cable with 0.82 mm² (18 AWG) conductors and 6 mm (0.25 in.) ferrule ends	**-2 plenum-rated** 3.05 m (120 in.) UL 444 type CMP plenum rated cable with 0.75 mm² (19 AWG cable) conductors and 6 mm (0.25 in.) ferrule ends
Conduit connections	13 mm NPSM (1/2 in.) threaded conduit connectors with M9300-100 conduit	
Ambient conditions	**Operating:** 0 to 60°C (32 to 140°F), 90% RH, noncondensing **Storage:** -40 to 85°C (-40 to 185°F), 95% RH, noncondensing	
Enclosure	IP54/NEMA 5	
Dimensions	**VA9905 Actuator:** Width: 89 mm (3-1/2 in.), Height: 74 mm (2-15/16 in.), Length: 170 mm (5-11/16 in.)	
Shipping weight	**Valves:** • VG1611AF: 0.7 Kg (1.55 lbs) • VG1641AF: 0.8 Kg (1.85 lbs) • VG1671AF: 1 Kg (2.20 lbs)	**Actuator** • VA9905: 0.8 Kg (1.75 lbs)
Compliance CE	**United States:** UL Listed, CCN XAPX, File E27734; to UL 60730-1: Automatic Electrical Controls for Household and Similar Use, Part 1; and UL 60730-2-14: Part 2, Particular Requirements for Electric Actuators. Plenum Rated (UL 2043). Suitable for use in Other Environmental Air Space (Plenum) in accordance with section 300.22 (c) of the National Electrical Code. **Canada:** UL Listed, CCN XAPX7, File E27734; to CAN/CSA E60730-1:02: Automatic Electrical Controls for Household and Similar Use, Part 1; and CAN/CSA-E60730-2-14, Particular Requirements for Electric Actuators.	
	Europe: CE Mark—Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive. IEC 60730-1: Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements and IEC 60730-2-14, Automatic Electrical Controls for Household and Similar Use; Part 2—Particular Requirements for Electric Actuators	
	Australia and New Zealand: RCM—Australia/NZ Emissions Compliant	

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 shall not be liable for damages resulting from misapplication or misuse of its products.