VA9905 Series Electric Non-Spring Return Valve Actuators VG1600 Series 270° Six-Way Ball Valves

Product Bulletin

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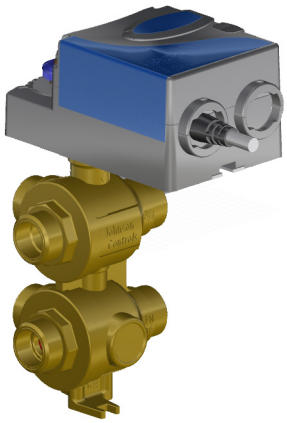
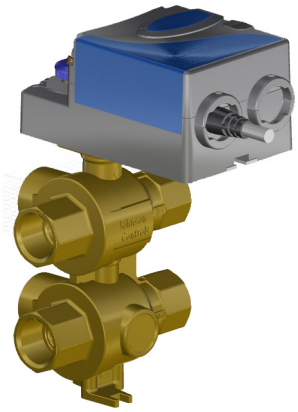
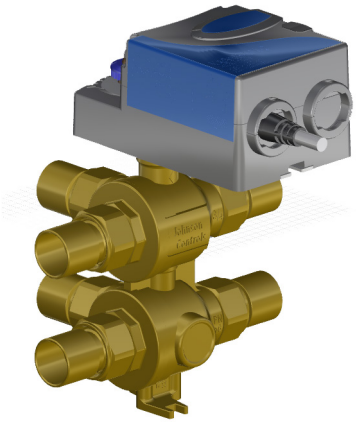


VA9905 Actuator
VG1611xx Six-Way Valve
BSPP thread (external)



VA9905 Actuator
VG1641xx Six-Way Valve
NPT thread (internal)



VA9905 Actuator
VG1671xx Six-Way Valve
Sweat Union Fitting

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

VG1600 Series 270° Six-Way Ball Valves are designed to regulate the flow in an easy and most efficient way of both hot and chilled water in response to the demand of a controller in HVAC systems. The 270° Six-Way Valve substitutes either four through valves or two through valves and one change-over valve. The VG1600 is supplied with control flow disks providing the right flow rate for a wide range of applications. Available in 1/2 inch and 3/4 inch sizes, the valve is operated by a 270° rotary multi-input signal non-spring return actuator. The coupling between valve and actuator is designed as a fool-proof mounting system in order to ensure quick installation reducing the risk of installation mistakes.

Benefits

VA9905 Series Electric Non-Spring Return Actuator

2 analog inputs, 1 analog input and 2 24VAC inputs	Configurable, programmable or conventional field controllers and thermostats. Improves control and precision.
Microprocessor-controlled brushless DC motor	Provides constant runtime independent of torque and increases lifecycle by reducing wear.
Mode configuration switches	Permits input signal range selection plus type of control.
Integral cables with colored and numbered conductors	Simplifies installation and field wiring.
Optional integral 1/2 in. (13 mm) threaded conduit connectors	Simplifies installation and field wiring.
Plenum-rated models	Enables 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.

VG1600 Series 270° Six-Way Ball Valves

National Pipe Thread (NPT), British Standard Pipe Parallel (BSPP) and Sweat Union Fittings	Provides the right valve for a broad range of applications, reduce installation time while reducing the need for adapters, and increase system reliability.
Forged brass body	Provides PN16 (300 psi) static pressure rating.
350kPa (50 psi) closeoff pressure rating	Provides tight shutoff.
Ethylene Propylene Diene Monomer (EPDM) double O-ring stem seal	Provides a leak-free seal; the packing has been tested and is leak-free after 100,000 cycles in iron-oxide contaminated water.
Graphite-Reinforced Polytetrafluoroethylene (PTFE) seats	Includes 15% graphite-reinforced ball seats, providing better wear resistance.
Maintenance – free design	Performs without failure in excess of 100,000 full stroke cycles in iron-oxide contaminated water.
Wide selection of styles for a variety of applications	Offers various valve configurations with just one valve size.
Factory- mounted VA9905 Series Electric Actuator	Reduces installation time, thus reducing overall installation cost

Product Overview

VA9905 Series Electric Non-Spring Return Actuator

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 multi-input signal 24V AC/DC actuator with Brushless DC Motor Technology.

The VA9905 Series Electric Non-Spring Return Actuator is equipped with multiple configurable signal inputs either 0…10V proportional control, 2…10V proportional control or 24VAC thermostat control to connect with configurable, programmable or conventional field controllers and thermostats. This simplifies the installation with current controllers without changing the electric wired installation. Moreover, multiple operational modes can be controlled in one actuator: two wire analog control, single wire analog control and two wire 24VAC on/off control, 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 actuator is guided by plastic posts and tabs that align with the valve flange and stem notch for proper installation.

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

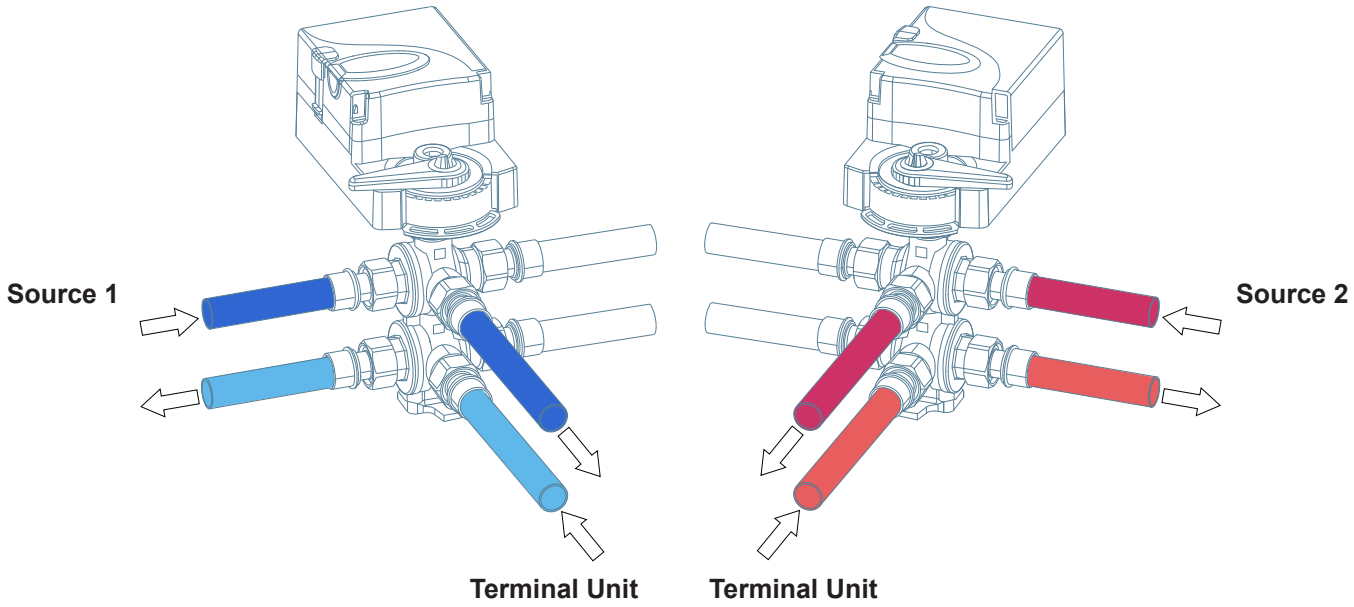
Switch 1: ON = Thermostat On/Off Control; OFF = Proportional Control.
Switch 2: ON = Single Wire Proportional Control; OFF = Dual Wire Proportional Control.
Switch 3: ON = 2 to 10V; OFF = 0 to 10V.

Note: Default position for all switches is OFF.

VG1600 Series 270° Six-Way Ball Valves

VG1600 Series 270° Six-Way Ball Valve is the easiest and the most efficient way to control both heating and cooling operational modes.

The true close-off feature, which is internal to the valve, isolates the Source 1 circuit from the Source 2 circuit. This eliminates up to four valves and two actuators or three valves and two actuators depending upon the terminal equipment system installation. Eliminating these components leads to lower installation costs for terminal equipment systems using this new technology.

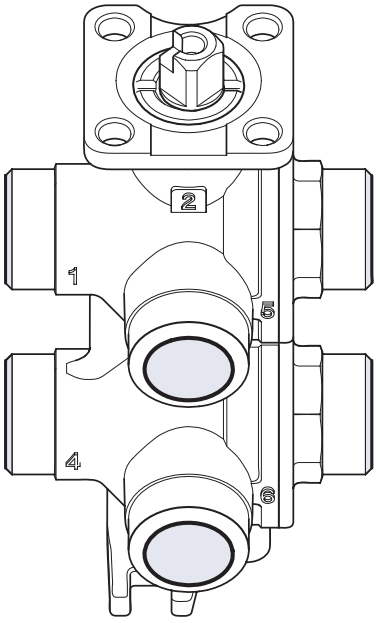


Kv Value Selection

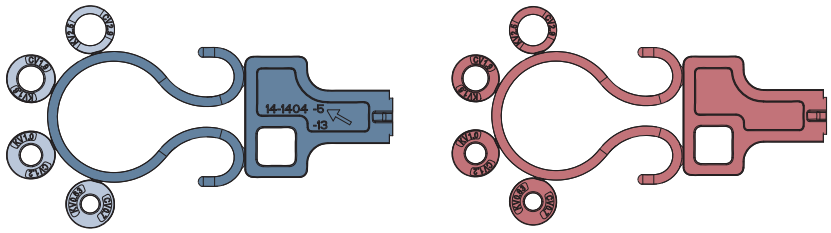
In order to simplify the logistic and the installation in the building site, the valve is supplied from the factory with the maximum Kv/Cv configuration on both sides. Heating and cooling flow rates are different due to their different flow requirements. The VG1600 is supplied with changeable control flow disks, four each for heating and cooling.

The available control flow disks have a color code (red for heating source and blue for cooling source) that provides intuitive indications for use with the respective side of valve. Each disk is clearly marked with its corresponding Kv/Cv value. The final user can select the suitable Kv/Cv for each side by installing the appropriate disk. The disks are installed or removed using the ring nut and key (wrench) provided in the kit. It is recommended to put the disks for Kv/Cv management on the return ways.

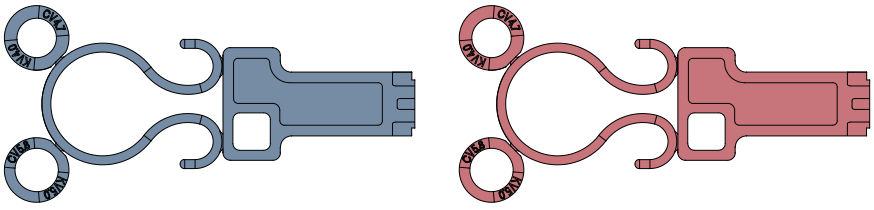
Once the appropriate disk is fitted in the valve, the rest of the flow control disks can be retained on the actuator or valve for time in the future any change is required. There is just one item per valve size and with the different disks, the combinations can cover any customer need, simplifying the valve choice and reducing the operational cost. The disk is held by a ring nut with the provided tool in the set. The flow control disk is available as a separate accessory.



VG1600 Series Valve



1/2 in. Flow Disk Sets



3/4 in. Flow Disk Sets

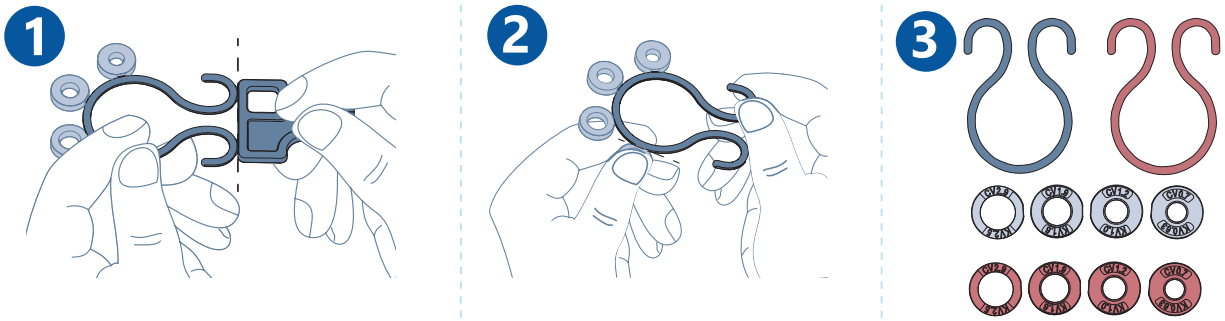
Two Ring Nuts

Tools Required

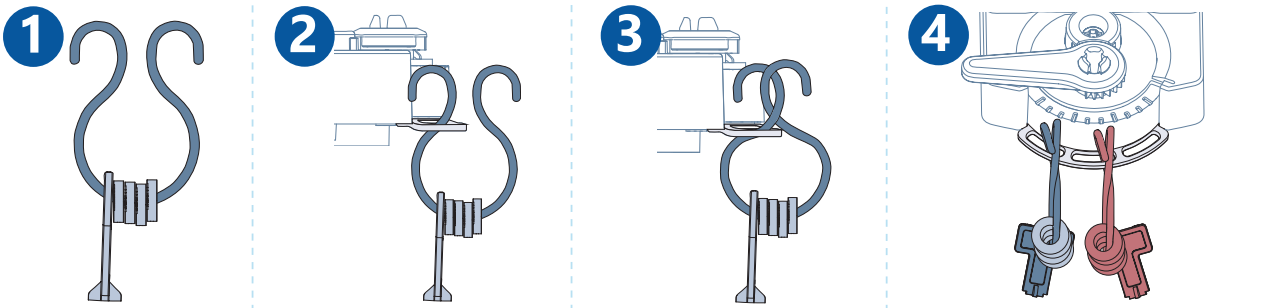
8mm (5/16 in) slotted screwdriver

Flow Disk Set

Disassembly



Disk Storage

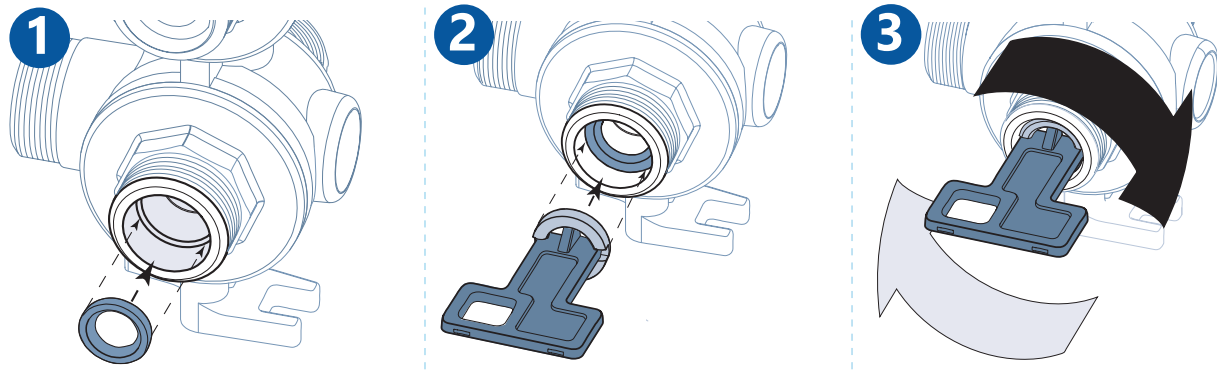


Installation

Note: Use blue restriction disks with cold water and red disks with hot water only.

Flow restriction disks have markings that indicate the rate of restriction they provide. Using the supplied restriction disks, you can set the following flow rates in ports 4 and 6:

Valve Size	Disk Opening	Smallest	Small	Medium	Largest	No disk
1/2 in.	Cv	0.7	1.2	1.9	2.9	3.8
	Kv	0.63	1.0	1.6	2.5	3.3
3/4 in.	Cv	4.7	—	—	5.8	7.4
	Kv	4.0	—	—	5.0	6.3



1/2 inch pipe size

Kv [m3/h] **Source 1**	**Kv** [m3/h] **Source 2**	**Cv** [gpm] **Source 1**	**Cv** [gpm] **Source 2**
3.3	3.3	3.8	3.8
	2.5		2.9
	1.6		1.9
	1.0		1.2
	0.63		0.7
2.5	3.3	2.9	3.8
	2.5		2.9
	1.6		1.9
	1.0		1.2
	0.63		0.7
1.6	3.3	1.9	3.8
	2.5		2.9
	1.6		1.9
	1.0		1.2
	0.63		0.7
1.0	3.3	1.2	3.8
	2.5		2.9
	1.6		1.9
	1.0		1.2
	0.63		0.7
0.63	3.3	0.7	3.8
	2.5		2.9
	1.6		1.9
	1.0		1.2
	0.63		0.7

3/4 inch pipe size

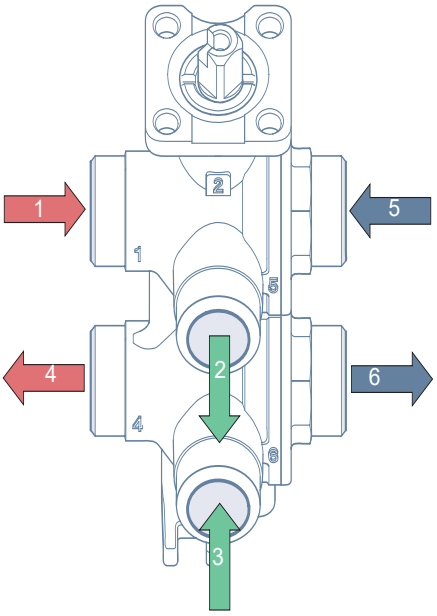
Kv [m3/h] **Source 1**	**Kv** [m3/h] **Source 2**	**Cv** [gpm] **Source 1**	**Cv** [gpm] **Source 2**
6.3	6.3	7.4	7.4
	5.0		5.8
	4.0		4.7
5.0	6.3	5.8	7.4
	5.0		5.8
	4.0		4.7
4.0	6.3	4.7	7.4
	5.0		5.8
	4.0		4.7

Just one item code covers 25 types of applications for 1/2 inch and 9 types of applications for 3/4 inch.

Mode of Operation

The diagram below illustrates the input and output flows for the Six-Way valve. Use this diagram as a guide on how to install the Six-Way valve to your system.

Note: Valve port 2 must only be used as coil supply. Valve port 3 must only be used as coil return.



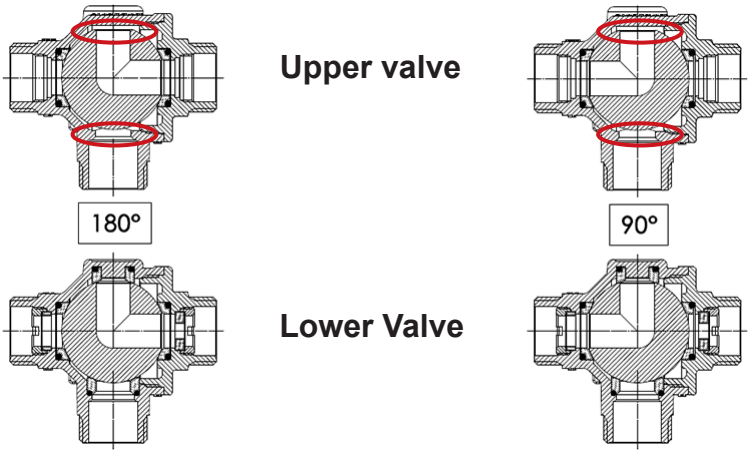
Valve port	Description	Two Wire Analog and On/Off Input Control	Single Wire Analog
1	Source 1 supply	Controlled by the gray wire	Controlled by the gray wire
2	Coil supply		
3	Coil return		
4	Source 1 return	Controlled by the gray wire	Controlled by the gray wire
5	Source 2 supply	Controlled by the orange wire	Controlled by the gray wire
6	Source 2 return	Controlled by the orange wire	Controlled by the gray wire

Note: Source 1 and 2 can be used for hot or cold water.

Over Pressure System

The 270° Six-Way Control Valve is designed to prevent any damage in the terminal unit circuit.

When the valve is in close position (for both cooling and heating operating modes) the trapped fluid may vary its pressure due to changes in ambient temperature. The pressure compensation system has to relieve such pressure changes. In order to connect the terminal unit circuit with either the sequence 1 or 2 circuit (expansion vessel), the upper valve is designed with no gasket need, while the lower valve provides a true close off. When the valve is in closed position the water flows inside the upper ball, going inside the inlet of the terminal unit since there is no gasket that prevents it.



Wiring the Actuator

The actuators operate with AC/DC 24 V and are designed to be used with Johnson Controls VG1600 Six-Way ball valves. The actuator speed is 1,5 degrees per second independent of supply voltage, frequency, and load. The actuator responds to single wire or dual wire analog DC 0 to 10 V proportional or DC 2 to 10 V control signals. The actuator can also be configured to dual wire 24VAC on/off control inputs. With the addition of a 500 ohm resistor, the actuator responds to a 0 to 20 mA or 4 to 20 mA proportional 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.

⚠ CAUTION

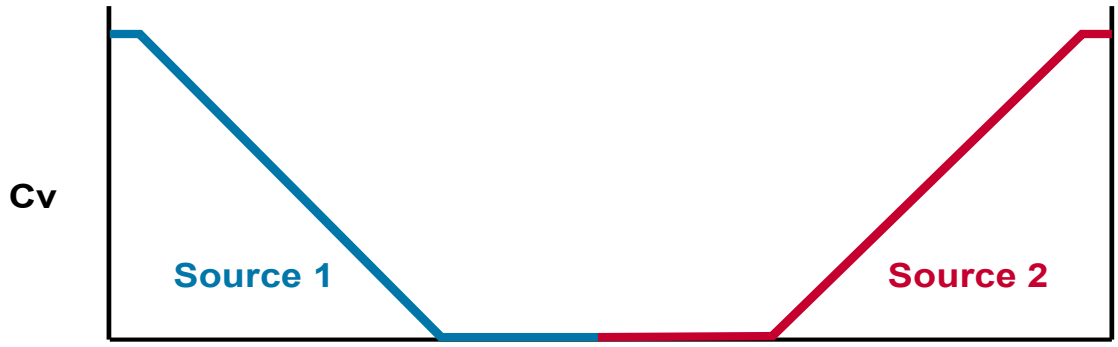
Risk of electric shock.
Disconnect the power supply before making electrical connections to avoid electric shock.

⚠ ATTENTION

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

Wire the VA9905 Actuator as described in the table below:

Wire	Input Type		
	2 Wire Analog	2 Wire 24VAC	1 Wire Analog
Black Com	24 V AC/DC		
Red ~(+)	24 V AC/DC		
Gray Y1	DC 0(2)...10V	24 VAC	DC 0(2)... 10V
Orange Y2	DC 0(2)...10V	24VAC	Not used



Dual Analog Control	10 VDC	Gray (Y1)	0(2) VDC		0(2) VDC	Orange (Y2)	10 VDC
Thermostat Control	24 VAC	Gray (Y1)	0 VAC		0 VAC	Orange (Y2)	24 VAC
Single Analog Control	0(2) VDC	Gray (Y1)	4.5(5.6) VDC	5(6) VDC	5.5(6.4) VDC	Gray (Y1)	10

Application Overview

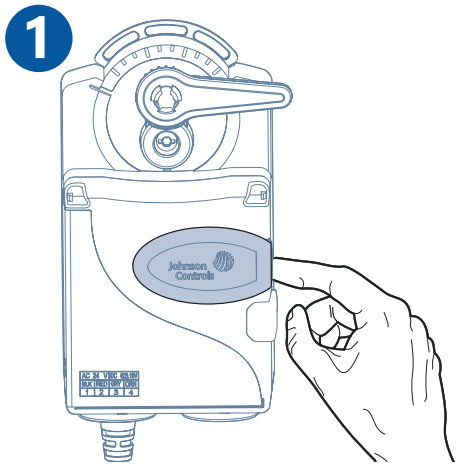
VA9905 Series Electric Non-Spring Return Valve Actuators include mounting hardware for direct coupling to VG1600 Series 270° Six-Way Ball Valves. Control signal selections include:

• Proportional Control and On/Off Control

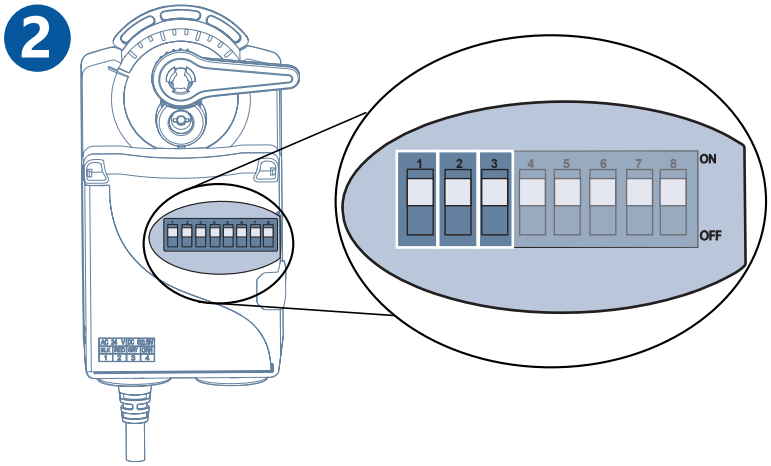
VA9905 Series Electric Non-Spring Return Valve Actuators use a brushless DC motor controlled by a microprocessor. The microprocessor drives the motor at constant speed, independent of torque.

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 and configure actuator operation based on input type.



Remove the dip switch cover by placing your finger behind it and pulling it forward.



- Switch 1:
  ON = Thermostat ON/OFF Control;
  OFF = Proportional Control
- Switch 2:
  ON = Single Wire Proportional Control;
  OFF = Dual Wire Proportional Control
- Switch 3:
  ON = 2 to 10V;
  OFF = 0 to 10V

Note: Default position for all switches is OFF.

Manual Override and Flow Direction

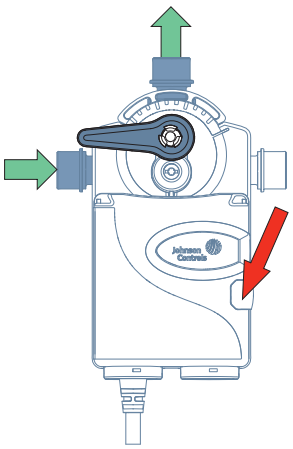
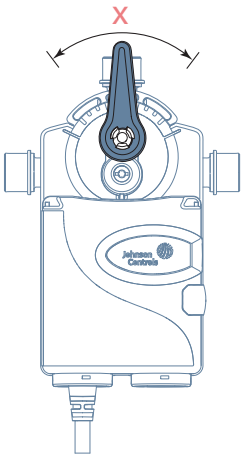
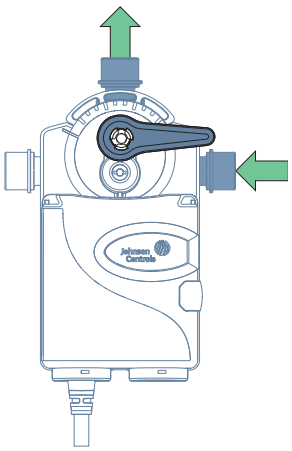
The manual override lever is used to indicate which ports are in use. To enable the manual override, press the button indicated by the red arrow.

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.

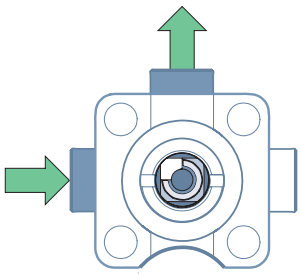
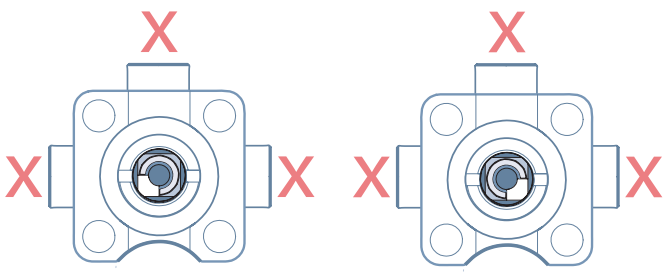
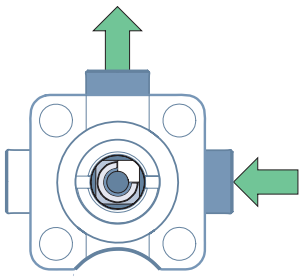
Note: The ball valve and actuator pointer rotate in opposite directions.

The following illustrations indicate lever position and flow:

Full Flow on ports 5 and 6	No Flow	Full Flow on Ports 1 and 4
		

When no actuator is installed, use the following positions of the stem to set the flow of the valve:

Note: The notch on the valve stem indicate the ports inside the valve.

Full Flow on Ports 5 and 6	No Flow	Full Flow on Ports 1 and 4
		

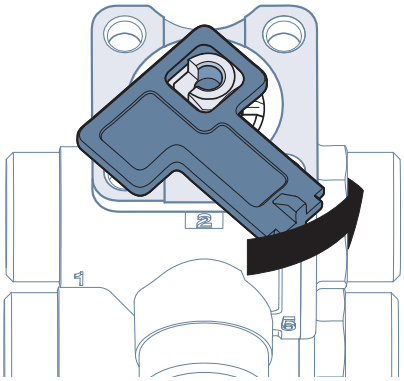
Installation

Due to the rotation sense of the 270° Six-Way valve and actuator, positioning the components for assembly is critical for the product to properly function.

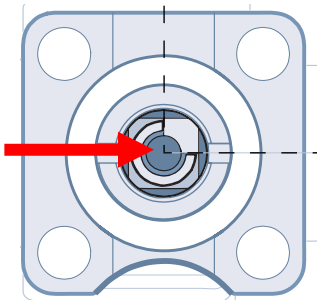
The easy-to-use mounting system of the 270° Six-Way valve and actuator ensures error-free installation due to its extremely intuitive assembly mechanism and pointer system to manually shut off the valve for commissioning or maintenance. Therefore, the IP54 protection allows the installation of the actuator in any direction.

Note: The VA9905 Actuator fits VG1600 series valves only. For alternative mounting orientations, see *VA9905 Actuator and VG1600 Series Six-Way Valves Installation Instructions, Part No. 14-88360-03206*.

1

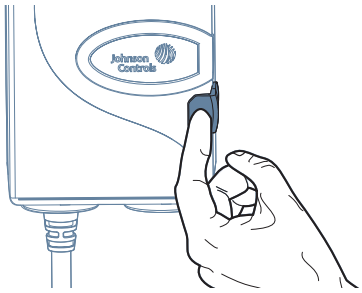


Use the valve key to adjust the valve stem to a 90° angle, away from the curved section.



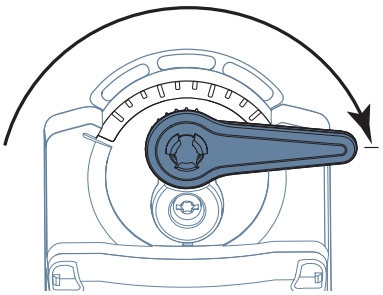
Ensure the valve stem is aligned as shown.

2



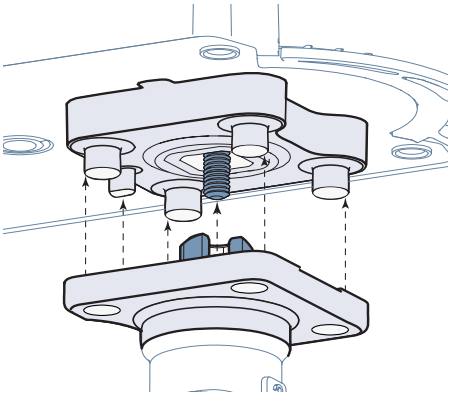
Press the manual override button on the actuator.

3



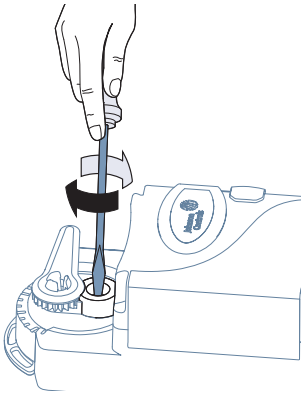
Move the actuator lever to the extreme right position.

4



Align the top of the Six-Way valve to the plate at the back of the actuator.

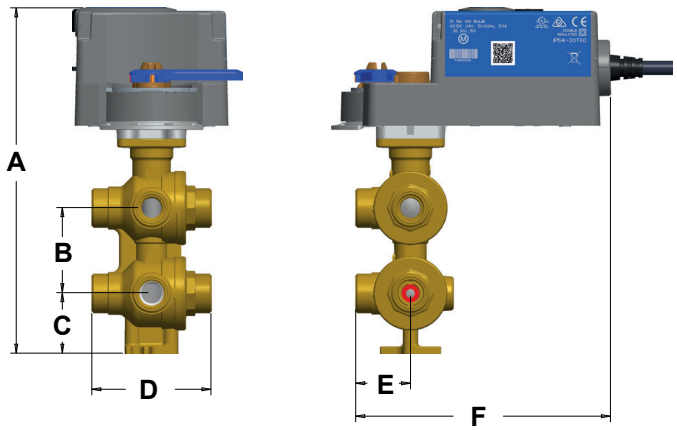
5



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

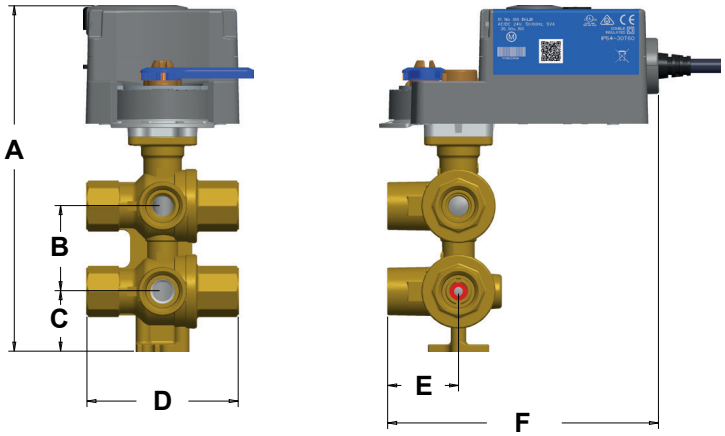
Overall Dimensions

The diagrams below illustrate the model dimensions of the VG1600 Valve Series.



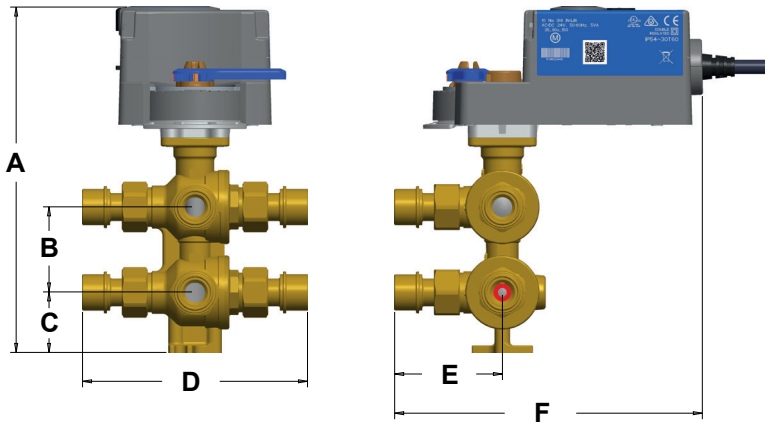
BSPP external threads

	VG1611AF 1/2 in. mm (in)	VG1611BL 3/4 in. mm (in)
A	182.7 (7.19)	208.4 (8.21)
B	45 (1.77)	57.5 (2.26)
C	32 (1.26)	39 (1.54)
D	63 (2.48)	85 (3.35)
E	29 (1.14)	44 (1.73)
F	134.7 (5.3)	149.7 (5.90)



NPT internal threads

	VG1641AF 1/2 in. mm (in)	VG1641BL 3/4 in. mm (in)
A	182.7 (7.19)	208.4 (8.21)
B	45 (1.77)	57.5 (2.26)
C	32 (1.26)	39 (1.54)
D	80 (3.15)	100 (3.94)
E	37.5 (1.48)	46 (1.81)
F	143.2 (5.64)	151.7 (5.97)

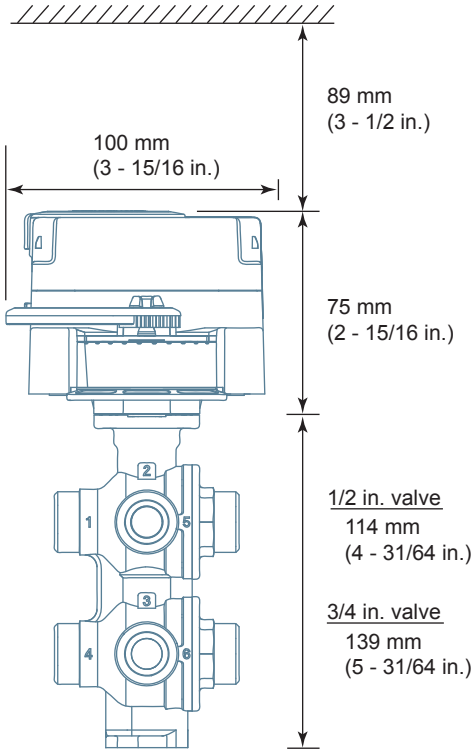


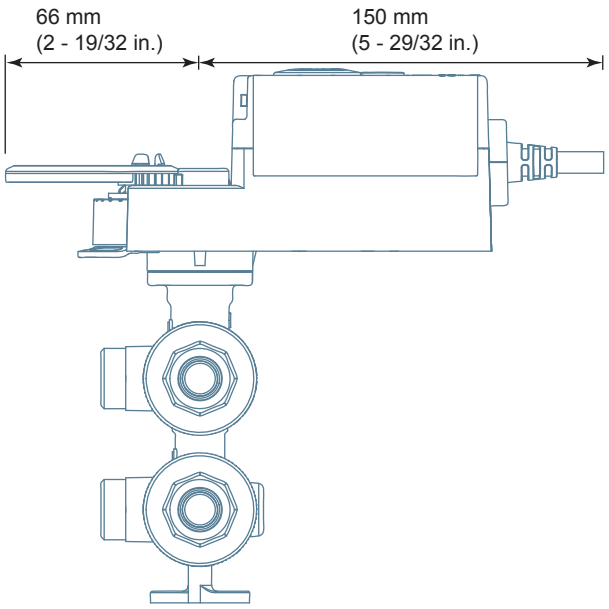
BSPP external threads
+ 6x Sweat Union Fittings

	VG1671AF 1/2 in. mm (in)	VG1671BL 3/4 in. mm (in)
A	182.7 (7.19)	208.5 (8.21)
B	45 (1.77)	57 (2.24)
C	32 (1.26)	39 (1.54)
D	119 (4.69)	152 (5.98)
E	57 (2.24)	77.5 (3.05)
F	162.7 (6.41)	183.2 (7.21)

Clearance Required

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





Actuator Ordering Codes

Code Number	Name	Description
VA9905-KGA-1	Multi-Input Signal Actuator 5Nm furnished with 2 x 0(2)... 10V, 1 x 0(2)....10V Analog Inputs, 2 x 24V Inputs	Europe / Asia
VA9905-KGA-2	Multi-Input Signal Actuator 5Nm furnished with 2 x 0(2)... 10V, 1 x 0(2)....10V Analog Inputs, 2 x 24V Inputs	North America

Note: Optional 0(4)...20mA control with field furnished 500 ohm 1/4” resistor for proportional control.

Valves Ordering Codes

Code Number	Name	Description
VG1611AF	½” BSPP external threads	Europe / Asia
VG1641AF	½” NPT internal threads	North America
VG1671AF	½” BSPP external threads + 6x Sweat Union Fitting	North America
VG1611BL	¾” BSPP external threads	Europe / Asia
VG1641BL	¾” NPT internal threads	North America
VG1671BL	¾” BSPP male + 6x Sweat Union Fittings	North America

Accessories Ordering Codes

Code Number	Name	Description
VG1600-01	½” Mounting Bracket	Europe / North America / Asia
VG1600-02	½” Flow Disk Kit (2 x flow disk sets + 2 x ring nut)	Europe / North America / Asia
VG1600-03	½” Insulation Shell	Europe / North America / Asia
VG1600-04	½” Sweat Union Fitting kits (6x Sweat Union Fitting)	North America
VG1600-05	¾” Flow Disk Kit (2 x flow disk sets + 2 x ring nut)	Europe / North America / Asia
VG1600-06	¾” Insulation Shell	Europe / North America / Asia
VG1600-07	¾” Sweat Union Fitting kits (6x Sweat Union Fitting)	North America

VA9905 Actuator Technical Specifications

Product description	**VA9905-KGA-1 (Europe/Asia):** Multi-Input Signal mode, **VA9905-KGA-2 (North America):** Multi-Input Signal mode.	
Power requirements	AC 24 V ±20% at 50/60 Hz, Class 2 (North America) or SELV (Europe), 4.7 VA Running; DC 24 V ±10% Class 2 (North America) or SELV (Europe), 1.4 W Running.	
Transformer sizing requirements	≥6 VA	
Input signal/adjustments	For dual or single wire analog control; 0 (2) to 10 VDC or 0 (4) to 20 mA with field furnished 500 ohm 1/4 W resistor for proportional control or 24VAC dual wire on/off control	
Control impedance	100k ohm DC, 4.7k ohm AC	
Rotation rate	1.5 ° per second	
Cycles	100,000 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	Width: 89 mm (3-1/2 in.), Height: 74 mm (2-15/16 in.), Length: 170 mm (5-11/16 in.)	
Shipping weight	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: 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.

VG1600 Valve Series Technical Specifications

	VG16x1AF	VG16x1BL
Total operation angle	270°	
Sequence 1	0...>90°	
Dead band	>90…<180°	
Sequence 2	>180…270°	
Characteristic curve	Linear	
ID	10,5 mm	15 mm
Fluid type	Water, glycol solutions (max 50%) for HVAC applications	
Fluid temperature	5 to 95 °C (41 to 203 °F)	
Nominal pressure	PN16 (232 psi)	
Close off pressure	350 kPa (50 psi)	
Max. differential pressure	240 kPa (35 psi)	
Range ability	100:1	
Max. Kv (Cv)	3.3 (3.8) 1/2” pipe size	6.3 (7.4) 3/4” pipe size
Body	Brass CW 617N (UNI EN 12420)	
End Connection	Brass CW 617N (UNI EN 12420)	
Balls	Brass Chrome Plated	
Stems	Brass Chrome Plated	
Ball Seat	PTFE 15% Graphite Filled	
O-ring	EPDM PEROX	
Ring Nut	Brass CW 614N (UNI EN 12164 – UNI EN 12168)	
Connections	Valve Body with Male 1/2 inch BSPP Thread (external) Valve Body with Female 1/2 inch NPT Thread (internal) 1/2 in. Sweat Union Fitting kit	Valve Body with Male 3/4 inch BSPP Thread (external) Valve Body with Female 3/4 inch NPT Thread (internal) 3/4 in. Sweat Union Fitting kit
Shipping Weight	VG1611AF: 0.7 Kg (1.55 lbs) VG1641AF: 0.8 Kg (1.85 lbs) VG1671AF: 1 Kg (2.20 lbs)	VG1611BL: 1.4 Kg (3.01 lbs) VG1641BL: 1.7 Kg (3.69 lbs) VG1671BL: 1.9 Kg (4.13 lbs)
Flow coefficient	Flow control disk	
Leakage rate	A, 100,000 cycles in iron-oxide contaminated water and air-bubble-tight (EN 12266-1)	
Water quality	Iron-oxide contaminated water (900ppm)	
Maintenance	Maintenance Free	
Warranty	Minimum 5 years to our customer	

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.

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

⚠ 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: BRASS 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