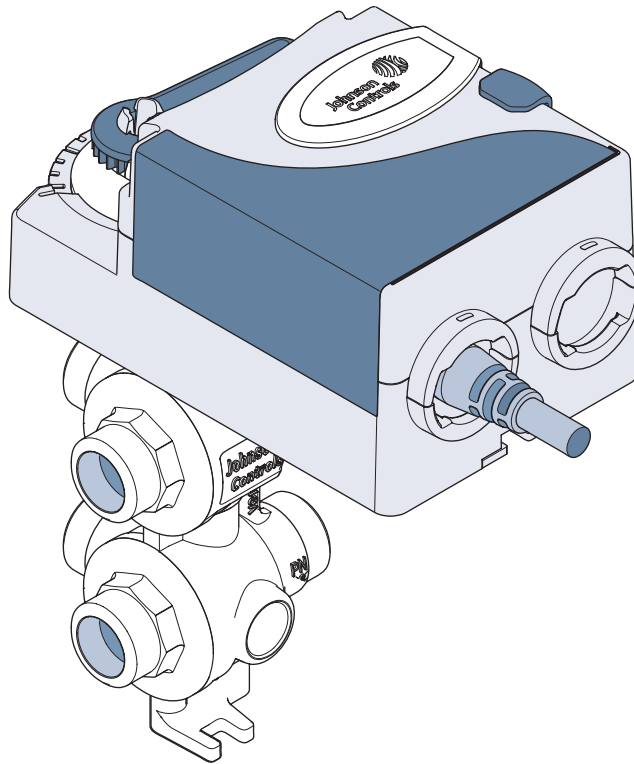


VA9905 Actuator and VG1600 Series Six-Way Valves

Installation Instructions



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Compliance Information

IMPORTANT: Use this VA9905 Actuator only to control equipment under normal operating conditions. Where failure or malfunction of the VA9905 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 device.

IMPORTANT : Utiliser ce [nom complet de l'appareil] uniquement en tant que dispositif de contrôle de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du [nom abrégé de l'appareil] 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 [nom abrégé de l'appareil].

About This Document

This guide describes how to install and configure the VA9905 Actuator and Six-Way Valve. The procedures in this guide must be completed sequentially, as they are listed.

Accessories (order separately)

Code Number	Name	Description
VG1600-01	Wall Mounting Bracket Kit	Provides a mounting bracket for the VA9905 Actuator.
VG1600-02	Flow Disk Kit	Provides replacement flow disks.
VG1600-03	Insulation Shell Kit	Provides valve insulation.
VG1600-04	Sweat Union Fitting Kit	Provides sweat union fittings.
M9300-100	Conduit Adapter Kit (5 per kit)	Provides a conduit adapter that protects the input cable.

Support Information

European Single Point of Contact:

Johnson Controls
Westendhof 3
45143 Essen
Germany

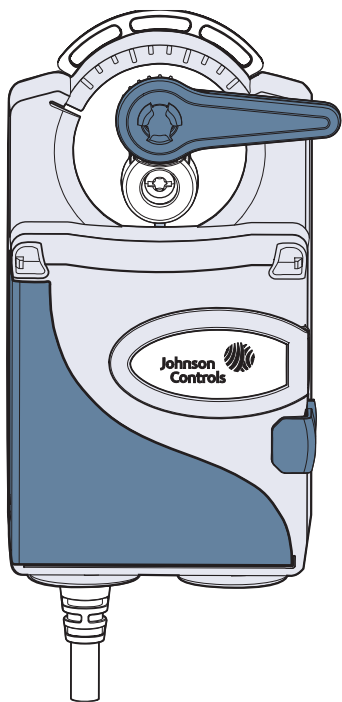
NA/SA Single Point of Contact:

Johnson Controls
507 E Michigan Street
Milwaukee WI 53202
USA

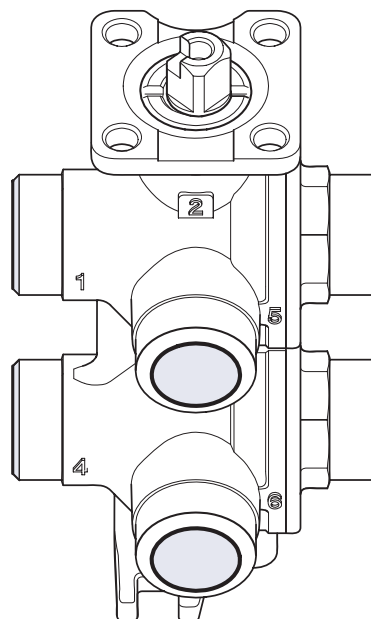
APAC Single Point of Contact:

Johnson Controls
C/O Controls Product Management
No. 22 Block D, New District
Wuxi Jiangsu Province 214142
China

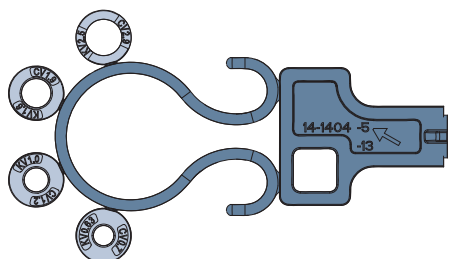
Parts Included



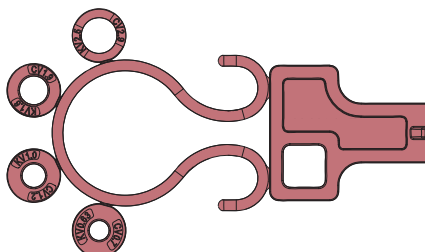
VA9905 Actuator



VG1600 Series Valve



Two Flow Disk Sets



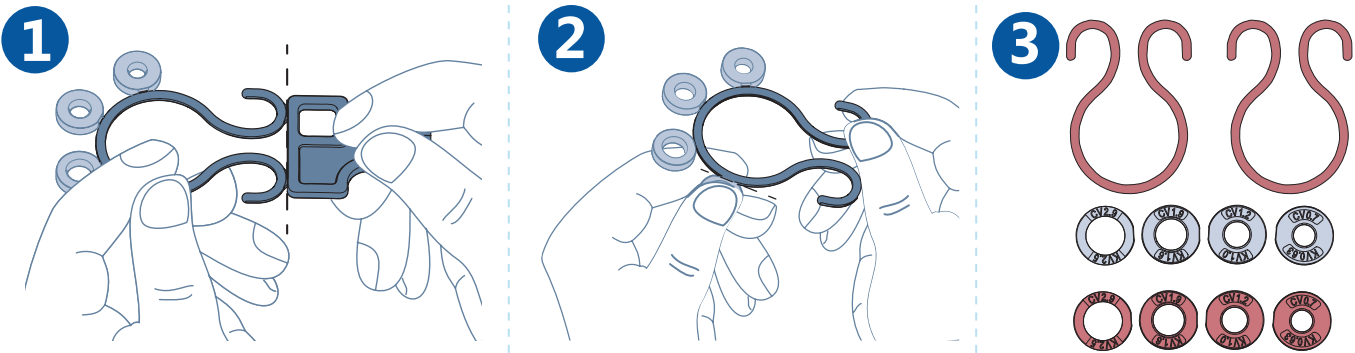
Two Ring Nuts

Tools Required

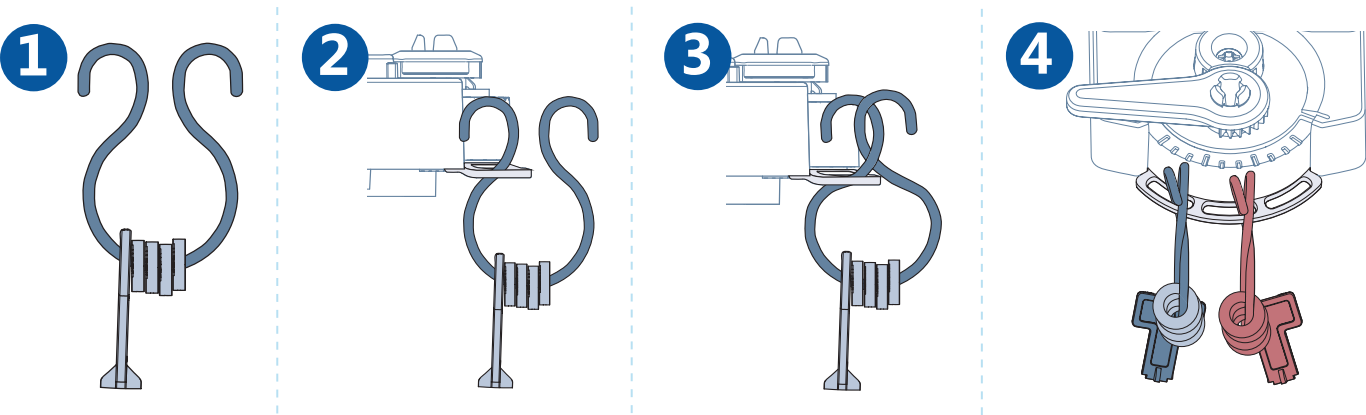
- 8mm (5/16 in) slotted screwdriver or a TORX® T-20 driver

Flow Disk Set

Disassembly



Disk Storage

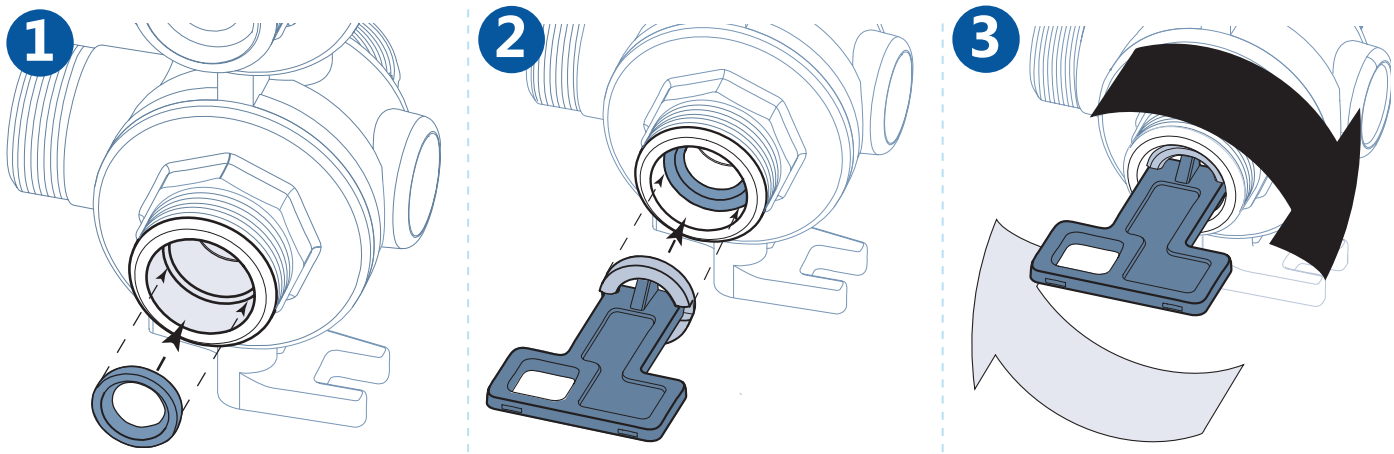


Installation

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:

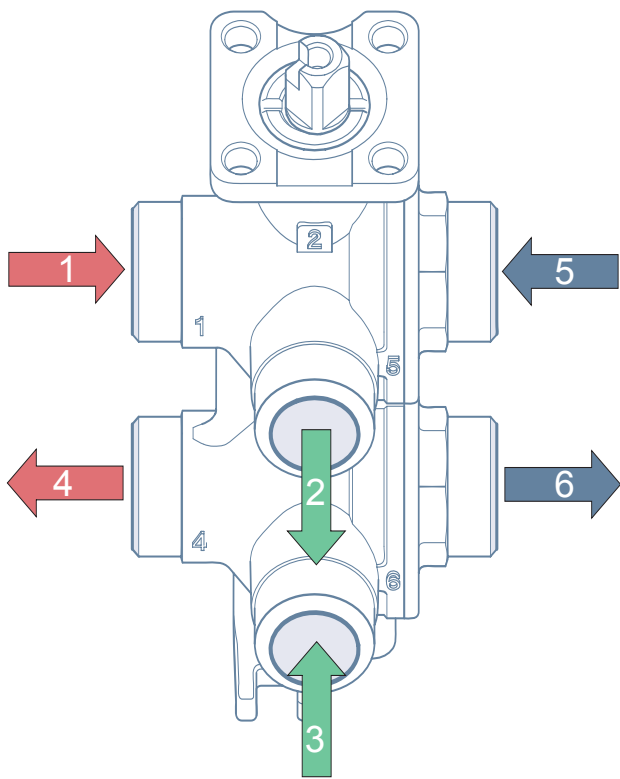
Disk Opening	Smallest	Small	Medium	Largest	No disk
Cv	0.7	1.2	1.9	2.9	3.8
Kv	0.63	1.0	1.6	2.5	3.3



Installing the Six-way Valve to a System

The diagram below illustrates the input and output flows for the 6-way valve. Use this diagram as a guide on how to install the 6-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.

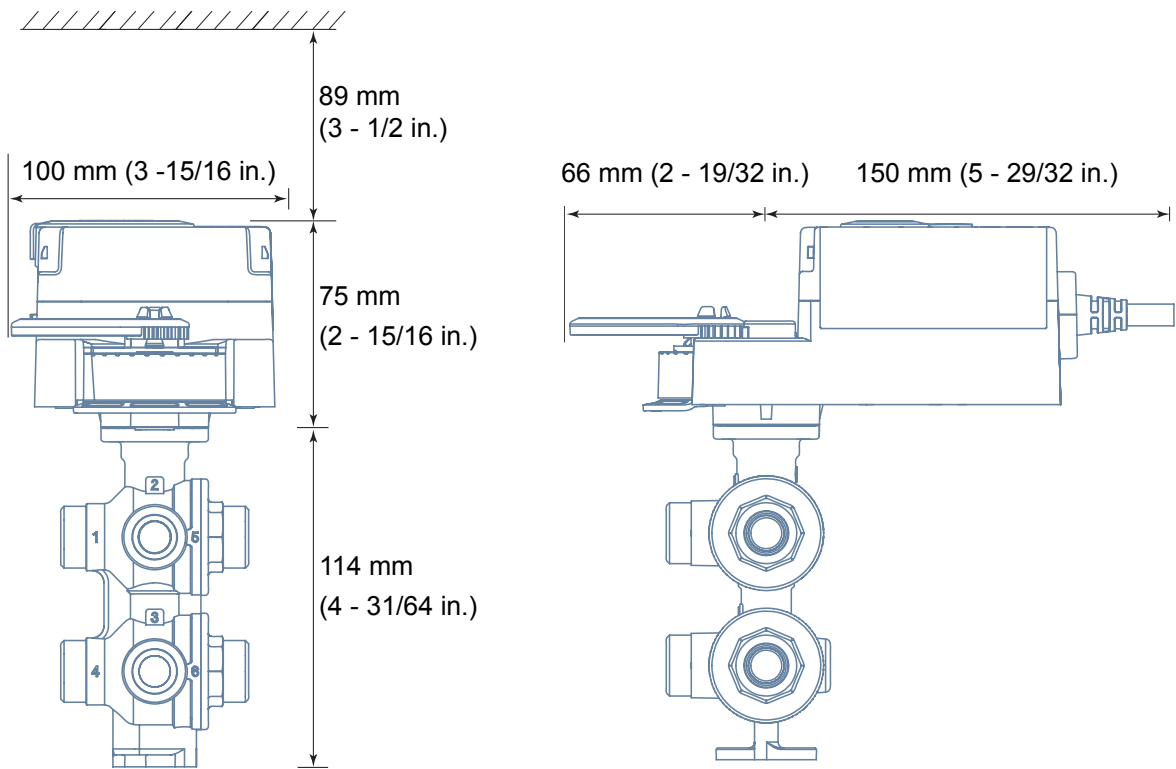


Valve port	Description	Analog Input Control
1	Source 1 supply	Controlled by the gray wire
2	Coil supply	
3	Coil return	
4	Source 1 return	Controlled by the gray wire
5	Source 2 supply	Controlled by the orange wire
6	Source 2 return	Controlled by the orange wire

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

Clearance Required to Install an Actuator

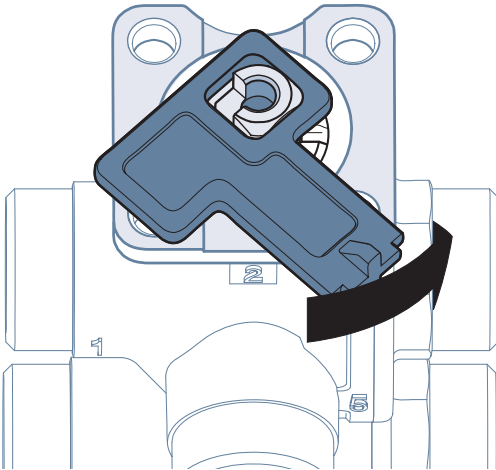
The diagrams below illustrate the clearance required to install an actuator to the VG1600 Valve Series.



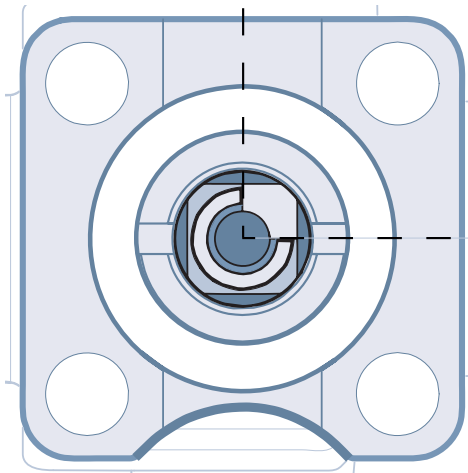
Attaching the Actuator to the Six-Way Valve

Note: The VA9905 Actuator fits VG1600 series valves only.

1

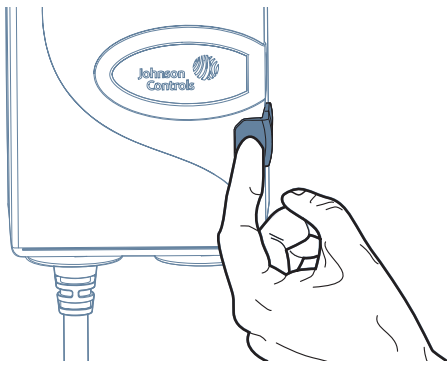


Use the valve key to adjust the valve stem to a 90° angle, away from the curved section.



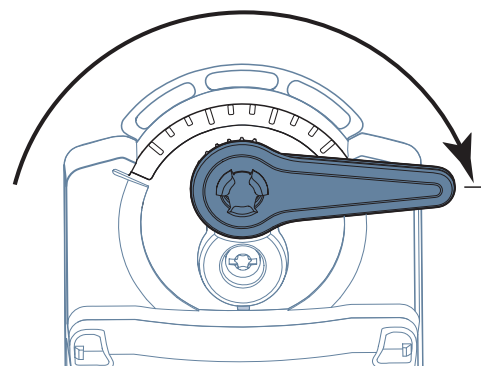
Ensure the valve stem is aligned as shown.

2



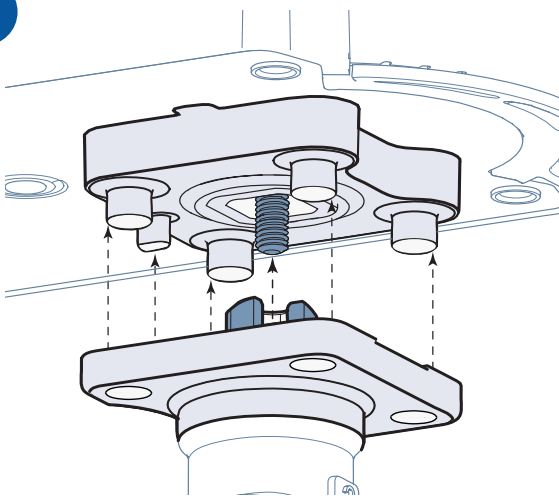
Press the manual override button on the actuator.

3



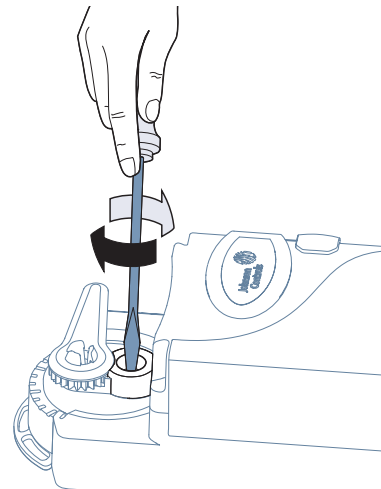
Move the actuator lever to the extreme right position.

4



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

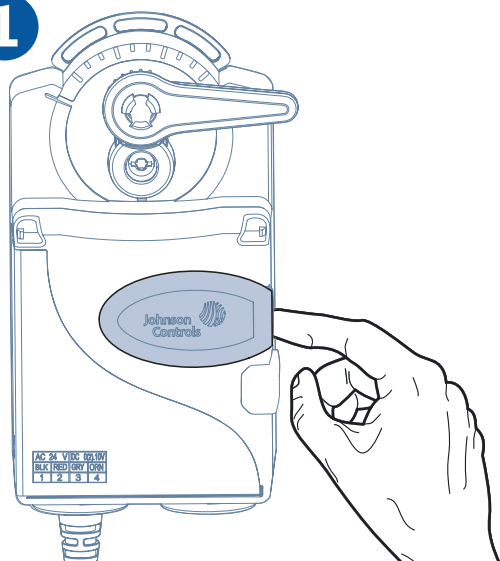
5



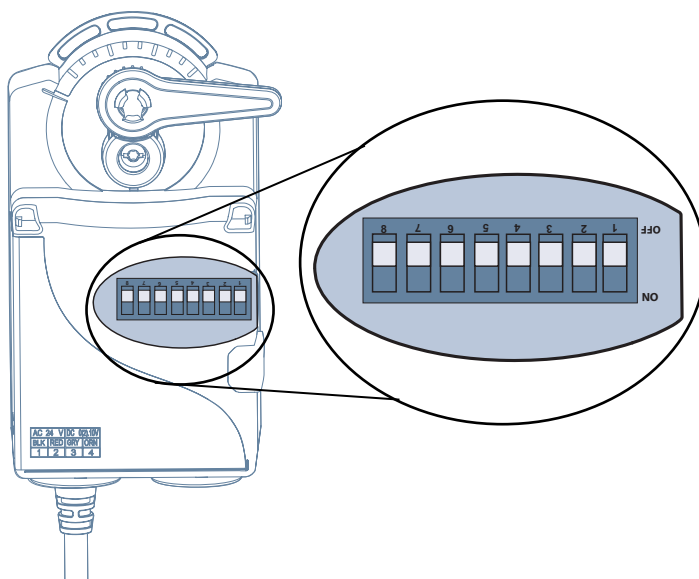
Use a slotted screwdriver or a TORX® T-20 driver to tighten the actuator screw to the 6-way valve. Tighten to a torque of 0.9 to 1.4 Nm (8 to 12 lb-in).

Setting the DIP Switches

1

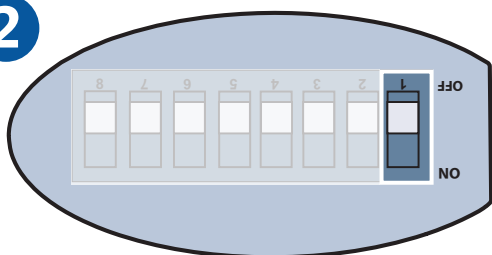


Remove the dip switch cover by placing your finger behind it and pulling it toward yourself.



You now have access to the actuator dip switches.

2



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.

Wiring the 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 Color	Input	
Black	Com	24 V AC\DC
Red	~(+)	
Gray (Source 1 control)	Y1	DC 0(2)...10 V
Orange (Source 2 control)	Y2	

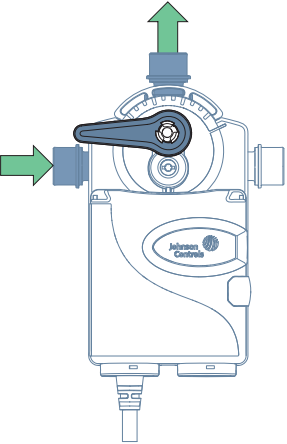
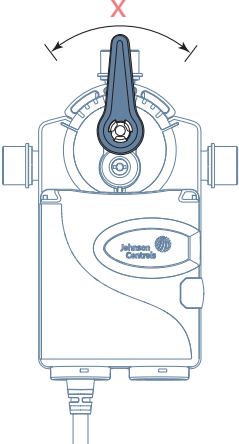
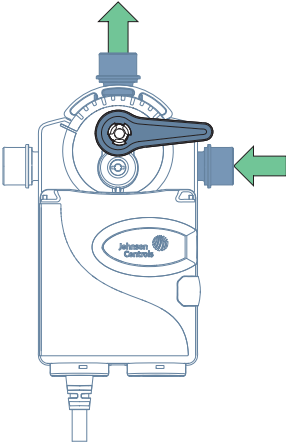
Manual Override and Flow Direction

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.

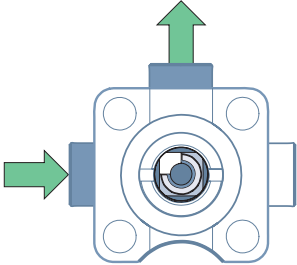
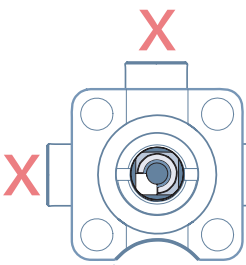
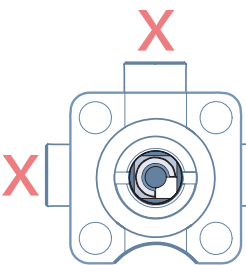
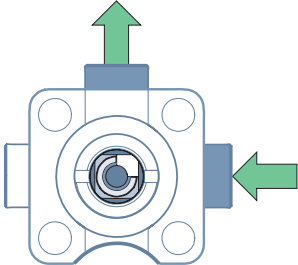
Note: The ball valve and actuator pointer rotate in opposite directions.

The following illustrations indicate lever position and flow:


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 cuts 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
			

VA9905 Actuator Technical Specifications

Product description	VA9905-KGA-1: Proportional mode, VA9905-KGA-2: Proportional mode	
Power requirements	AC 24 V \pm 20% at 50/60 Hz, Class 2 (North America) or SELV (Europe), 5.7 VA Running; DC 24 V \pm 10% Class 2 (North America) or SELV (Europe), 1.5 W Running.	
Transformer sizing requirements	\geq 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	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 mm ² (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 mm ² (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: <ul style="list-style-type: none"> VG1611AF: 0.7 Kg (1.55 lbs) VG1641AF: 0.8 Kg (1.85 lbs) VG1671AF: 1 Kg (2.20 lbs) 	Actuator <ul style="list-style-type: none"> VA9905: 0.8 Kg (1.75 lbs)
Compliance 	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.

VG1600 Valve Series Technical Specifications

Total operation angle	270°
Sequence 1	0...>90°
Dead band	>90...<180°
Sequence 2	>180...270°
Characteristic curve	Linear
ID	10,5 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. Cv (Kv)	3.8 (3.3) - ½" pipe size
Connections	<ul style="list-style-type: none"> • Valve Body with Male BSPP Thread (external) • Valve Body with Female NPT Thread (internal) • Sweat Union Fitting kit
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.