



Specifications

Isolator R: Forged brass (ASTM B283) automatic flow control valve. Assembly includes integrated isolation ball valve and stainless steel flow control cartridge. Cartridge can be removed for inspection, or can be replaced without disturbing piping connections. Valve housing includes field repairable dual Teflon and EPDM o-ring seal stem, with Nickel plated ball. Valve includes one fixed end (FNPT or SWT) connection and one union (MNPT) connection. Union end includes union nut and EPDM o-ring. Valve body has two ports with (1) Pressure/Temperature Test Valves, and (1) combination Pressure/Temperature Test Valves and manual air vent (CPTA). Valve is fully assembled. PSI/Temperature Rating: 600 WOG 400 PSI / 250°F.

6-Way Johnson Controls: Forged brass control valve with actuator. Assembly includes flow disks providing the right flow rate for both heating and cooling application. 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.

Isolator S: Ball valve and integrated strainer. Valve housing is forged brass with field repairable dual Teflon and EPDM o-ring seal stem, with Nickel plated ball. Strainer is 50 mesh stainless steel and can be removed from housing without disturbing pipe connections for inspection or replacement. Valve includes one fixed (FNPT or SWT) connection and one union (FNPT or SWT) connection. Union end includes union nut and EPDM o-ring. Body has one port with combination Pressure/Temperature Test Valves and manual air vent (CPTA). Assembly includes drain valve with 3/4" hose connection with cap. Valve is fully assembled. PSI/Temperature Rating: 400 PSI / 250°F.

Drain Valve: Rated 275 PSI / 250°F. Brass housing, Nickel plated ball. 3/4" NPSH hose connection.

Combination Pressure/Test Valve & Manual Air Vent (CPTA): Pressure/Temperature Test Valve works in conjunction with valve body feature to function as Manual Air Vent. Requires both components to operate as manual air vent.

6-Way Valve Cv (Select one for Heating and one for Cooling)

SIZE	MODEL	SMALLEST	SMALL	MEDIUM	LARGEST	NO DISK
1/2"	VG1641AF+905KGA	0.7	1.2	1.9	2.9	3.8
3/4"	VG1641BL+905KGA	4.7	N/A	N/A	5.8	7.4

Model Number Selection (6AH./6BH. And 6AC./6BC.):

LINE SIZE	6-WAY SIZE	HEATING		COOLING	
		MODEL NUMBER - FNPT	MODEL NUMBER - SWT	MODEL NUMBER - FNPT	MODEL NUMBER - SWT
1/2"	1/2"	HPP6IRIR1E__	HPP6IRIR1L__	CPP6IRIR1E__	CPP6IRIR1L__
3/4"	1/2"	HPP6IRIR1F__	HPP6IRIR1M__	CPP6IRIR1F__	CPP6IRIR1M__
3/4"	3/4"	HPP6IRIR1F__	HPP6IRIR1M__	CPP6IRIR1F__	CPP6IRIR1M__
1"	3/4"	HPP6IRIR1G__	HPP6IRIR1N__	CPP6IRIR1G__	CPP6IRIR1N__
1" Large	3/4"	HPP6IRIR2G__	HPP6IRIR2N__	CPP6IRIR2G__	CPP6IRIR2N__

Isolator R Flow Rates (+/- 5%) (Select one for Heating and one for Cooling)

SIZE	IR MODEL NO.	HEAD LOSS IN FEET ¹	PSID RANGE	GPM
1/2"L, 3/4"L, 1"	IR11__	3.5	1-14	0.33, 0.50, 0.67, 1.00, 1.33, 1.67, 2.00, 2.33, 2.67, 3.33, 4.00, 4.67, 5.00
	IR12__	7.4	2-32	0.55, 0.75, 1.00, 1.50, 2.00, 2.50, 3.00, 3.50, 4.00, 5.00, 6.00, 7.00, 8.00
	IR14__	13.4	4-57	0.75, 1.00, 1.33, 2.00, 2.67, 3.33, 4.00, 4.67, 5.33, 6.67, 8.00, 9.33, 10.00
	IR18__	30.0	8-128	1.10, 1.50, 2.00, 3.00, 4.00, 5.00, 6.00, 7.00, 8.00, 10.0, 12.0, 14.0, 16.0
1"L	IR21__	3.5	1-14	5.33, 6.00, 6.67, 7.33, 8.00, 8.67, 9.33, 10.00, 10.67, 11.33, 12.00, 12.67, 13.33, 14.00, 14.67
	IR22__	7.4	2-32	8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0
	IR24__	13.4	4-57	10.67, 12.00, 13.33, 14.67, 16.00, 17.33, 18.67, 20.00, 21.33, 22.67, 24.00, 25.33, 26.67, 28.00, 29.33
	IR28__	30.0	8-128	16.0, 18.0, 20.0, 22.0, 24.0, 26.0, 28.0, 30.0, 32.0, 34.0, 36.0, 38.0, 40.0, 42.0, 44.0

NOTES:

1. Insert 6-Way Valve Cv at end of model number.
2. Optional Extension Kit- includes cap and tube for insulation around handle, and appropriate number of extensions for PT/CPTA included in package. Add a "1" to the end of the model number to designate 1-1/2" extension option and a "2" to the end of the model number to designate 2" extension option.²
3. Standard CPPs include nickel-plated brass ball and brass stem. For optional stainless steel ball and stem change "CPP" to "CPS" in model number
4. Hose diameter matches 6-way Valve diameter.

NOTES

¹ Head Loss in Feet is provided for pump head calculations. (1 PSI = 2.307 Feet of Water)

² Extension Option includes handle cover and accessory extensions for either 1-1/2" or 2" Insulation.

VA9905 Series Actuators - VG1600 Series 270° Six-Way Ball Valves

Description

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

The easy-to-use mounting system of the VA9905 Series Electric Non-Spring Return Actuator and VG1600 Series 270° Six-Way Ball Valve reduces mistakes in the installation due to 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.

VG1600 Series 270° Six-Way Ball Valves are designed to easily and efficiently regulate the flow of both hot and chilled water in response to the demand of a controller in HVAC systems. It is a multi-input signal 24 V AC/DC actuator with Brushless DC Motor Technology. The actuator can also be configured for thermostat controlled On/Off heating and cooling applications and driven by a 24VAC thermostat or controller.

The 270° Six-Way Valve substitutes either four through valves or two through valves and one change-over valve. The true close-off feature, which is internal to the valve, isolates the Source 1 circuit from the Source 2 circuit.

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.

Refer to the *VA9905 and VG1600 Product Bulletin (LIT-12012553)* for important product application information.

Features

VA9905 Actuator

- Control Options:
 - 2 Analog Inputs
 - 1 Analog Input
 - 2 24VAC Inputs
- Microprocessor-Controlled Brushless DC Motor
- Mode Configuration Switches
- Simplified installation and field wiring
- Plenum-Rated Models
- Small Footprint
- NEMA5/IP54 Enclosure
- Position Indicator Handle and Manual Override
- Manufactured under ISO-9001 Quality Control Standards
- UL, CE Mark, and RCM Compliance
- 100,000 Cycles and 2.5 Million Repositions
- 5-Year Warranty

VG1600 270° Six-Way Ball Valves

- Available in NPT (internal), BSPP (external) and Sweat Union Fittings
- Forged Brass Body
- Ethylene Propylene Diene Monomer (EPDM) Double O-Ring Stem Seal
- Graphite-Reinforced Polytetrafluoroethylene (PTFE) Seats
- Maintenance – Free Design
- 100,000 full stroke cycles in iron oxide contaminated water
- Various valve configurations with just one valve size
- Available in 1/2 inch and 3/4 inch sizes
- Factory- Mounted VA9905 Series Electric Actuator



VA9905 Actuator and VG1600 6-way Valve

Repair Information

If the VA9905 Series Actuator or VG1600 Series 270° Six-Way Ball Valve fails to operate within its specifications, replace the unit. For a replacement VA9905 Actuator or VG1600 Ball Valve, contact the nearest Johnson Controls® representative.

Selection Chart

Valves and Actuators Ordering Codes

Code Number	Description
VG1641AF	Six-Way Ball Valve with 1/2" NPT internal threads
VG1671AF	Six-Way Ball Valve with 1/2" BSPP external threads + 6x Sweat Union Fitting
VG1641BL	Six-Way Ball Valve with 3/4" NPT internal threads
VG1671BL	Six-Way Ball Valve with 3/4" BSPP external threads + 6x Sweat Union Fitting
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
VG1641AF+905KGA	Multi-Input Signal Actuator 5Nm furnished with 2 x 0(2)... 10V, 1 x 0(2)... 10V Analog Inputs, 2 x 24V Inputs + Six-Way Ball Valve 1/2" NPT internal threads
VG1671AF+905KGA	Multi-Input Signal Actuator 5Nm furnished with 2 x 0(2)... 10V, 1 x 0(2)... 10V Analog Inputs, 2 x 24V Inputs + Six-Way Ball Valve 1/2" BSPP external threads + 6x Sweat Union Fitting
VG1641BL+905KGA	Multi-Input Signal Actuator 5Nm furnished with 2 x 0(2)... 10V, 1 x 0(2)... 10V Analog Inputs, 2 x 24V Inputs + Six-Way Ball Valve 3/4" NPT internal threads
VG1671BL+905KGA	Multi-Input Signal Actuator 5Nm furnished with 2 x 0(2)... 10V, 1 x 0(2)... 10V Analog Inputs, 2 x 24V Inputs + Six-Way Ball Valve 3/4" BSPP external threads + 6x Sweat Union Fitting

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

Accessories Ordering Codes

Code Number	Description
VG1600-01	Mounting Bracket
VG1600-02	1/2" Flow Disk Kit (2 x flow disk sets + 2 x ring nut)
VG1600-03	1/2" Insulation Shell
VG1600-04	1/2" Sweat Union Fitting kits (6x sweat union fitting)
VG1600-05	3/4" Flow Disk Kit (2 x flow disk sets + 2 x ring nut)
VG1600-06	3/4" Insulation Shell
VG1600-07	3/4" Sweat Union Fitting kits (6x sweat union fitting)

The performance specifications are nominal and conform to acceptable industry standards. For applications 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. © 2019 Johnson Controls. www.johnsoncontrols.com

VA9905 Series Actuators - VG1600 Series 270° Six-Way Ball Valves (Continued)

Technical Specifications

VA9905 Actuator

Product description	VA9905-KGA-2 (North America): Multi-Input Signal mode actuator.
Power requirements	AC 24 V \pm 20% at 50/60 Hz, Class 2 (North America) or SELV (Europe), 4.7 VA Running; DC 24 V \pm 10% Class 2 (North America) or SELV (Europe), 1.4 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 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	120 in. (3.05 m) UL 444 type CMP plenum rated cable with 0.75 mm ² (19 AWG cable) conductors and 0.25 in. (6 mm) ferrule ends
Conduit connections	1/2 in. NPSM threaded conduit
Ambient conditions	Operating: 32 to 140°F (0 to 60°C), 90% RH, noncondensing, Storage: -40 to 185°F (-40 to 85°C), 95% RH, noncondensing
Enclosure	IP54/NEMA 5
Dimensions	Width: 3-1/2 in. (89 mm), Height: 2-15/16 in. (74 mm), Length: 5-11/16 in. (170mm)
Shipping weight	1.75 lbs (0.8 Kg)
Compliance	<p>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.</p> <p>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.</p> <p>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</p> <p>Australia and New Zealand: RCM—Australia/NZ Emissions Compliant</p>

VG1600 Six-Way Ball Valve

	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	15mm
Fluid type	Water, glycol solutions (max 50%) for HVAC applications	
Fluid temperature	41 to 203 °F (5 to 95 °C)	
Nominal pressure	232 psi (PN16)	
Close off pressure	50 psi (350 kPa)	
Max. differential pressure	35 psi (240 kPa)	
Range ability	100:1	
Max. Cv (Kv)	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	1/2 inch BSPP Thread (external), 1/2 inch NPT Thread (internal), or Sweat Union Fitting Kit	3/4 inch BSPP Thread (external), 3/4 inch NPT Thread (internal), or 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	
Shipping Weight	VG1641AF: 1.85 lbs (0.8 Kg), VG1671AF: 2.20 lbs (1 Kg)	VG1641BL: 3.69 lbs (1.7 Kg), VG1671BL: 4.13 lbs (1.9 Kg)

The performance specifications are nominal and conform to acceptable industry standards. For applications 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. © 2019 Johnson Controls. www.johnsoncontrols.com

VA9905 Series Actuators - VG1600 Series 270° Six-Way Ball Valves (Continued)

⚠ 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