VG1600 Series 270° Six-Way Ball Valves

Product Bulletin

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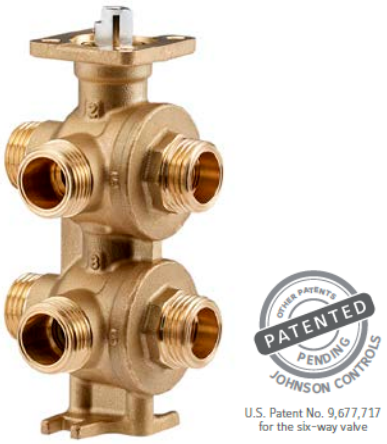
VG1600 Series 270° Six-Way Ball Valves are designed to regulate the flow in an easy and most efficient way of both hot and chilled water in response to the demand of a controller in HVAC systems. The 270° Six-Way Valve substitutes either four through valves or two through valves and one change-over valve. The VG1600 is supplied with control flow disk providing the right flow rate for a wide range of applications. Available in sizes ½'' and ¾'' inches, the valve is operated by a 270° rotary proportional actuator non spring return. 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

National Pipe Thread (NPT), British Standard Pipe Parallel (BSPP) and Sweat Union Fittings	Provide 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
Stainless Steel Ball and Stem Assembly	Tolerates high temperature water where a higher degree of corrosion protection is desired
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 100,00 cycles in iron-oxide contaminated water
Graphite-Reinforced Polytetrafluoroethylene (PTFE) Seats	Include 15% graphite-reinforced ball seats, providing better wear resistance
Maintenance – Free Design	Performs without failure in excess of 100,00 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	Reduce installation time, thus reducing overall installation cost

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PRODUCT OVERVIEW

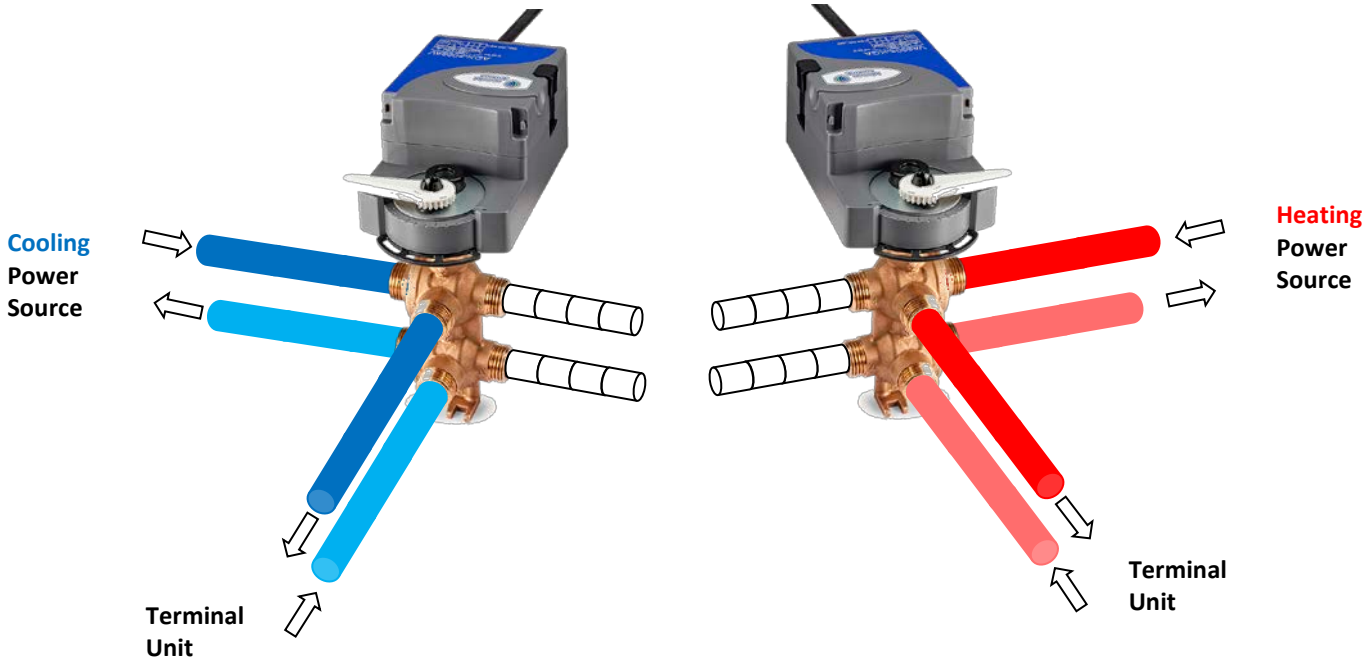
APPLICATION

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 heating circuit from the cooling 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.

VA9905 Electric Non Spring Return Rotary Actuator

VG1600 270° Six-Way Valve



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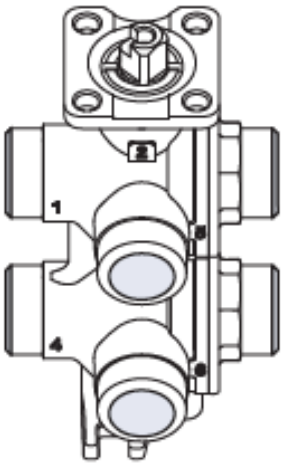
KVs Value Selection

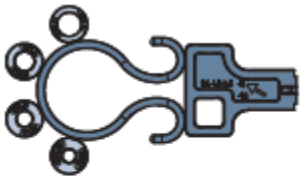
In order to simplify the logistic and the installation in the building site, the valve is supplied from the factory with the maximum Kv/Cv configuration on both sides. Heating and cooling flow rates are different due to their different ΔT project. The VG1600 is supplied with control flow disks which involves 4 couples of changeable disks made by PSU.

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

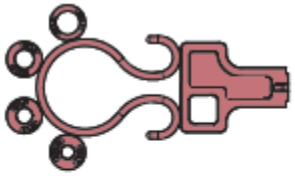
Once the appropriate disk is fitted in the valve, the rest of the flow control disks can be retained on the actuator or valve if at any time in the future any change is required. There is just one item per valve size, and then with the different disks the combinations can cover any customer need, simplifying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



VG1600 Series Valve



Two Flow Disk Sets



Two Ring Nuts

Tools Required

8mm (5/16 in) slotted screwdriver

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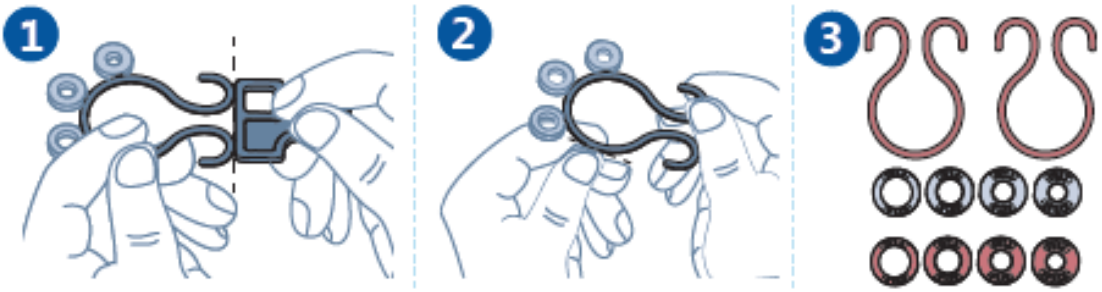
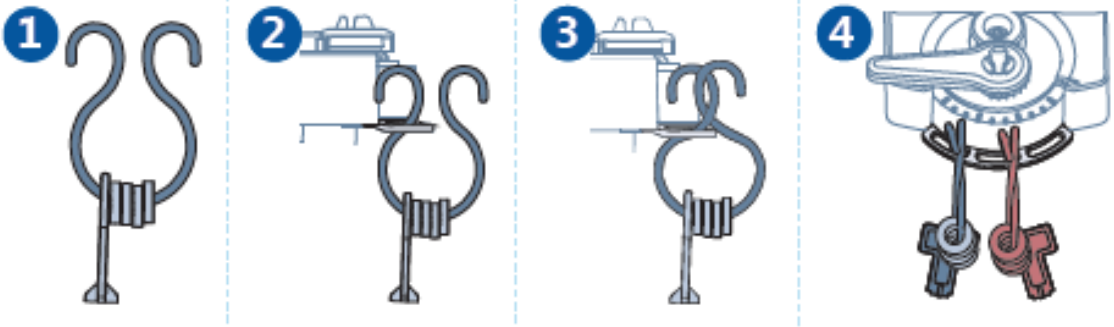
Flow Disk Set

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	3.9
Kv	0.63	1.0	1.6	2.5	3.3

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Connection Size [inches]	**Kv** [m^3/h] **Sequence 1**	**Kv** [m^3/h] **Sequence 2**	**Cv** [gpm] **Sequence 1**	**Cv** [gpm] **Sequence 1**
½''	3.3	3.3	3.8	3.8
½''	3.3	2.5	3.8	2.9
½''	3.3	1.6	3.8	1.9
½''	3.3	1.0	3.8	1.2
½''	3.3	0.63	3.8	0.7
½''	2.5	3.3	2.9	3.8
½''	2.5	2.5	2.9	2.9
½''	2.5	1.6	2.9	1.9
½''	2.5	1.0	2.9	1.2
½''	2.5	0.63	2.9	0.7
½''	1.6	3.3	1.9	3.8
½''	1.6	2.5	1.9	2.9
½''	1.6	1.6	1.9	1.9
½''	1.6	1.0	1.9	1.2
½''	1.6	0.63	1.9	0.7
½''	1.0	3.3	1.2	3.8
½''	1.0	2.5	1.2	2.9
½''	1.0	1.6	1.2	1.9
½''	1.0	1.0	1.2	1.2
½''	1.0	0.63	1.2	0.7
½''	0.63	3.3	0.7	3.8
½''	0.63	2.5	0.7	2.9
½''	0.63	1.6	0.7	1.9
½''	0.63	1.0	0.7	1.2
½''	0.63	0.63	0.7	0.7

Just one item code covers **25 type** of applications for **½''** pipe size.

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VALVES ORDERING CODES

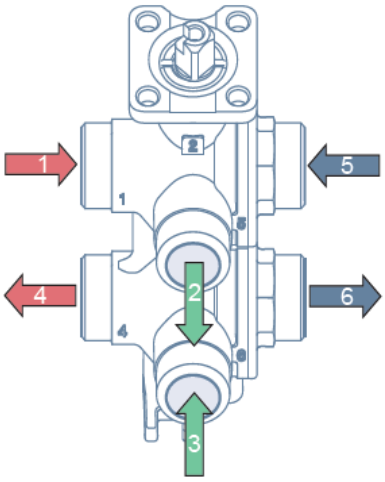
VG1611AF	½" BSPP external threads	Europe / Asia
VG1641AF	½" NPT internal threads	North America
VG1671AF	½" BSPP external threads + 6x Sweat Union Fitting	North America

ACCESSORIES ORDERING CODES

VG1600-01	Mounting Bracket	Europe / North America / Asia
VG1600-02	Flow Disk Kit (2 x flow disk sets + 2 x ring nut)	Europe / North America / Asia
VG1600-03	Insulating Shell	Europe / North America / Asia
VG1600-04	Sweat Union Fitting kits (6x Sweat Union Fitting)	North America

PRODUCT FEATURES

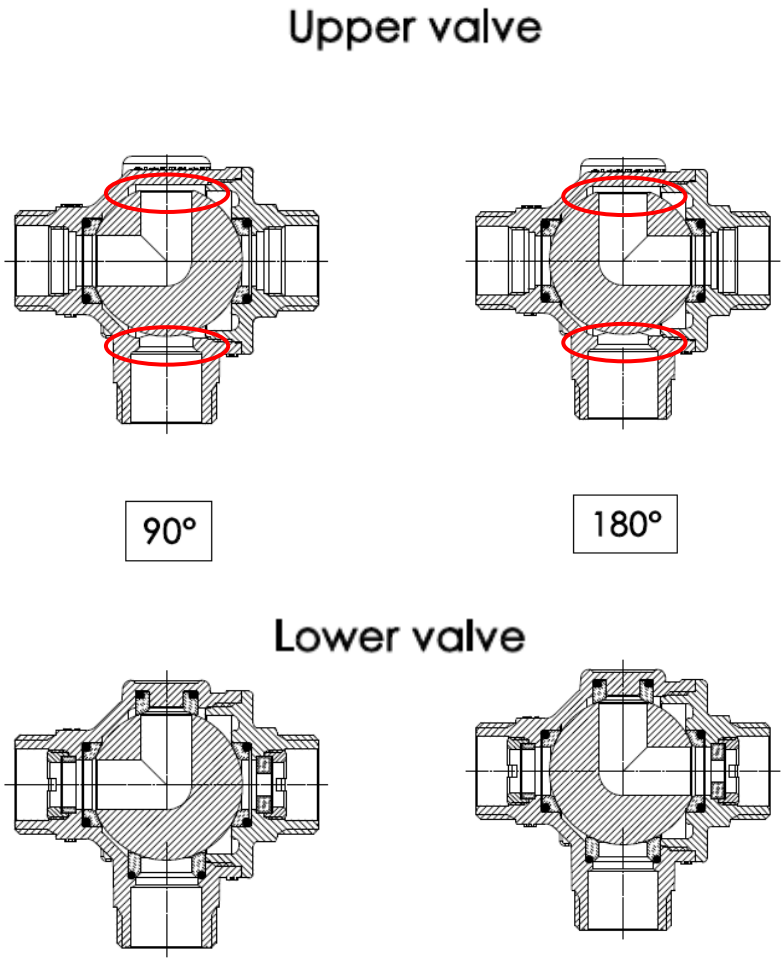
Mode of Operation: The diagram below illustrates the input and output flows for the VG1600 Valve Series. Use this diagram as a guide on how to attach a VG1600 Series Valve to your system.
Note: Valve port 2 must only be used as coil supply. Valve port 3 must only be used as coil return.



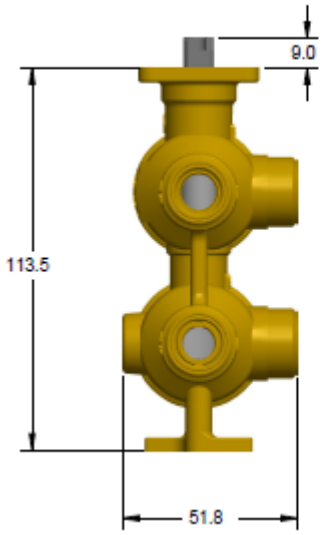
Valve Port	Description	Analog Input Control
1	Source 1 supply	Controlled by the gray wire
2	Coil supply	
3	Coil return	
4	Source 1 return	Controlled by the gray wire
5	Source 2 supply	Controlled by the orange wire
6	Source 2 return	Controlled by the orange wire

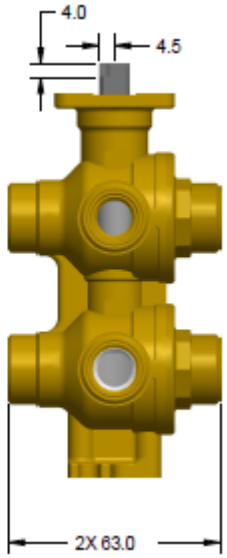
Note: Source 1 and 2 can be used for hot or cold water.

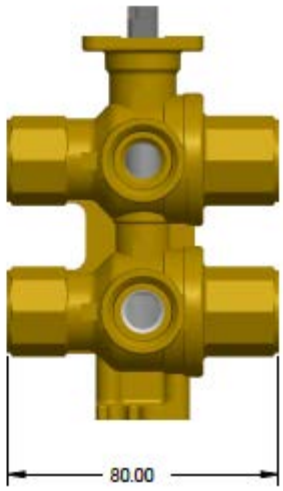
- **Over Pressure System:** The 270° Six - Way Control Valve is designed to prevent any damage in the terminal unit circuit.
When the valve is in close position (for both cooling and heating operating modes) the trapped fluid may varies its pressure due to changes in ambient temperature. The pressure 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.

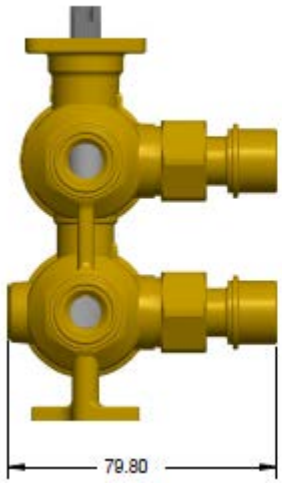


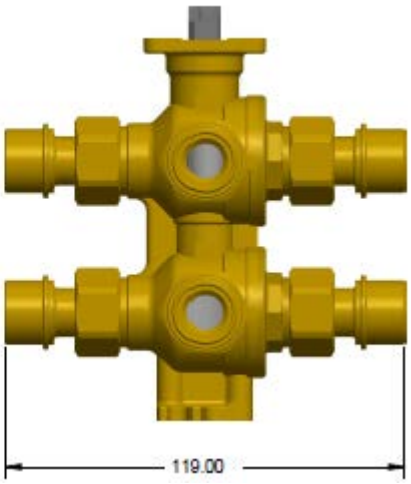
OVERALL DIMENSIONS





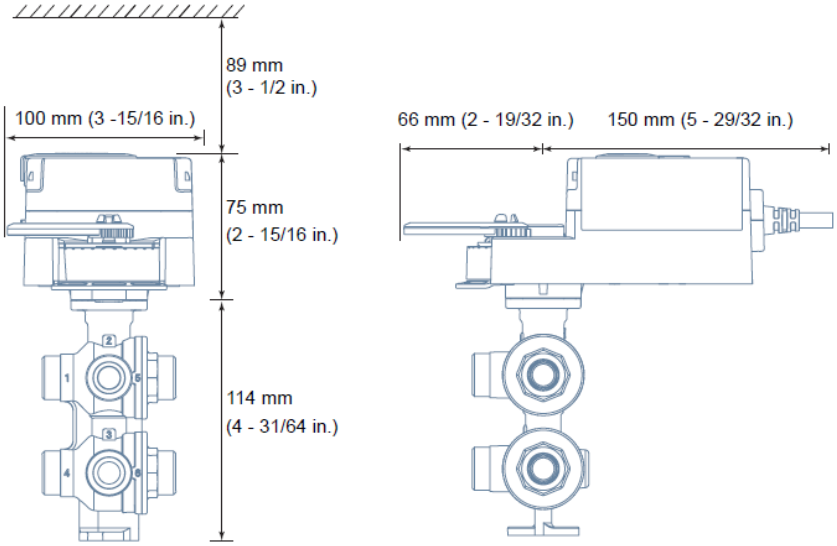






CLEARANCE REQUIRED TO INSTALL AN ACTUATOR

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



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)	3.3 (3.8) - ½'' pipe size
Material	
Body	Brass CW 617N (UNI EN 12420)
End Connection	Brass CW 617N (UNI EN 12420)
Balls	Steinless Steel AISI 304
Stems	Steinless Steel AISI 304
Ball Seat	PTFE 15% Graphite Filled
O-ring	EPDM PEROX
Ring Nut	Brass CW 614N (UNI EN 12164 – UNI EN 12168)
Connections	Male BSPP Thread (external) 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

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