14-1352-6, Rev.L

VG1000 Series Flanged Ball Valves

Installation Guide

VG12A5xx, VG18A5xx

Part No. 14-1352-6, Rev. L
Issued September 2019

Applications

The VG1000 Series Flanged Ball Valves are designed to regulate hot and chilled water, 50/50 glycol solutions, and 25 psig steam in HVAC systems.

IMPORTANT: The VG1000 Series Flanged Ball Valve is intended to control saturated steam, hot water, and chilled water flow under normal operating conditions. Where failure or malfunction of the ball valve 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 ball valve.

IMPORTANT: Le VG1000 Series Flanged Ball Valve est destiné à réguler un débit saturated steam, hot water, and chilled water dans des conditions normales de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du ball valve 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 ball valve.

Installation

Install the VG1000 Series Flanged Ball Valves with the actuator at or above the centerline of the horizontal piping, as shown in Figure 1.

IMPORTANT: In steam applications, install the valve with the stem horizontal to the piping. Failure to follow these guidelines may shorten the life of the actuator.

To minimize heat transfer in steam applications, wrap the valve and piping with insulation. Allow at least 4 in. (102 mm) of clearance from the top of the shaft to remove the actuator (as noted in Table 1).

When mounting the actuator in the field and before installing the actuator, use an adjustable wrench to manually rotate the valve stem several times. This rotation breaks the torque that may have built up during long-term storage.

IMPORTANT: Do not attempt to manually rotate the drive shaft while the actuator is installed without first releasing the actuator gears. Manually rotating the drive shaft without releasing the actuator gears may result in permanent damage to the actuator.

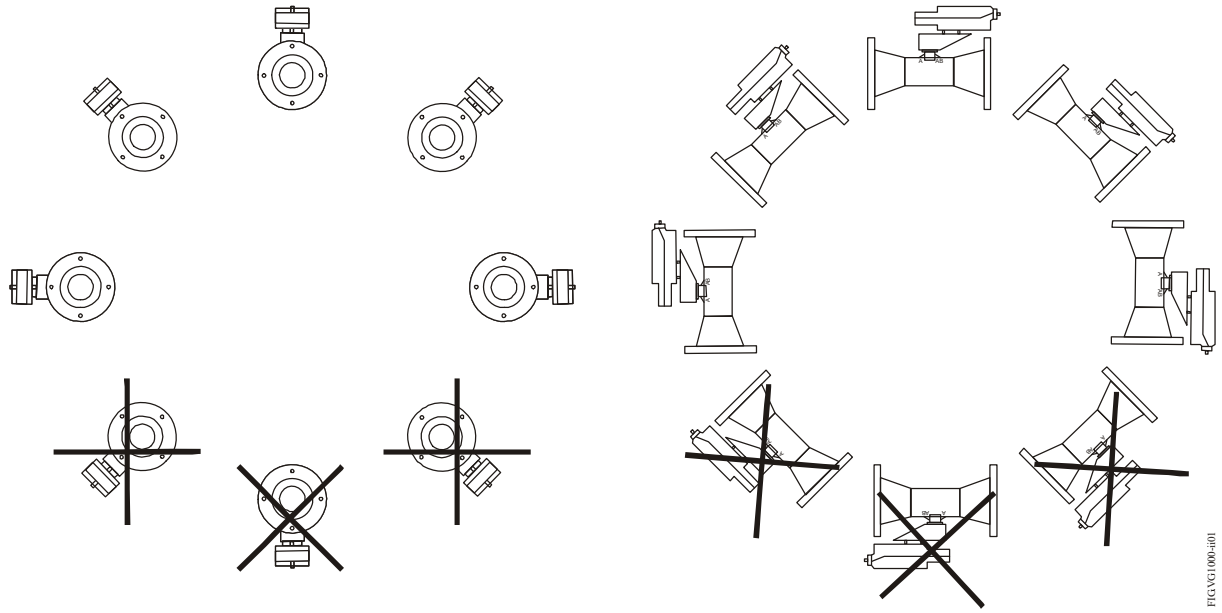
IMPORTANT: Take care to prevent foreign material such as weld slag, thread burrs, metal chips, and scale from entering the piping system. This debris can damage or severely impede the operation of the valve by embedding itself in the seats, scoring the valve, and ultimately resulting in seat leakage. If the debris becomes embedded in the seats, subsequent flushing and filtering of the piping system with the valve installed does not remedy the problem.

For detailed installation information about using specific equipment, refer to the appropriate documentation from the following list.

- *M9220-AGx-3 Series Floating Electric Spring Return Actuators Installation Instructions (Part No. 34-636-1689)*
- *M9220-Bxx-3 Series On/Off Electric Spring Return Actuators Installation Instructions (Part No. 34-636-1239)*
- *M9220-GGx-3 Series Proportional Electric Spring Return Actuators Installation Instructions (Part No. 34-636-1697)*
- *VA9320/9335 Series Electric Non-Spring Return Actuators for Valves Installation Instructions (Part No. 34-00636-02510)*

- *M9000-330 and M9000-340 Series Weather Shield Enclosures Installation Instructions (Part No. 14-1330-26)*
- *M9000-342 and M9000-343 Valve Actuator Weather Shield Kit Installation Instructions (Part No. 34-636-2499)*
- *M9000-51x Series Valve Linkage Kits Installation Instructions (Part No. 14-1201-13)*

Figure 1: Recommended Mounting Positions for Non-Steam Applications



Dimensions

See Figure 2 for VG12A5xx Two-Way Series Flanged Ball Valves with VA9320 Series Actuators dimensions. See Figure 3 for VG18A5xx Three-Way Series Flanged Ball Valves with VA9320 Series Actuators dimensions. See Table 1 for specific model dimensions.

Figure 2: VA9320 Actuated VG12A5xx Two-Way Series Ball Valves, in. (mm)

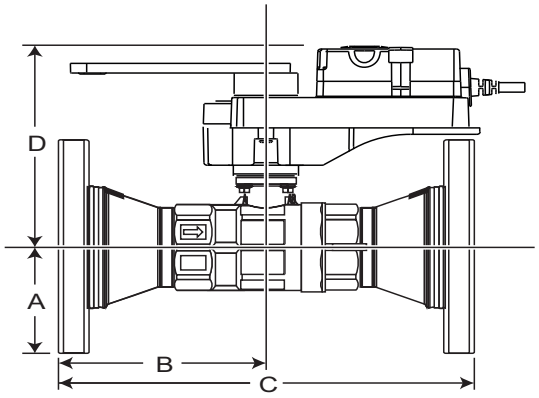
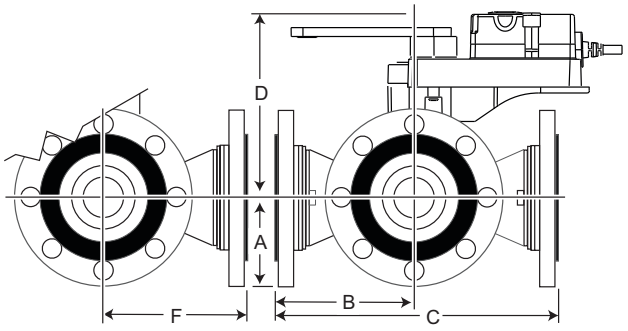


Figure 3: VA9320 Actuated VG18A5xx Three-Way Series Ball Valves, in. (mm)



See Figure 4 for VG12A5xx Two-Way Series Flanged Ball Valves with M9220 Series Actuators dimensions. See Figure 5 for VG18A5xx Three-Way Series Flanged Ball Valves with M9220 Series Actuators dimensions. See Table 1 for specific model dimensions.

Figure 4: M9220 Actuated VG12A5xx Two-Way Series Ball Valves, in. (mm)

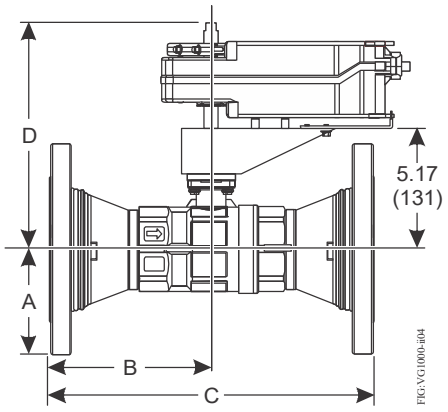


Figure 5: M9220 Actuated VG18A5xx Three-Way Series Ball Valves, in (mm)

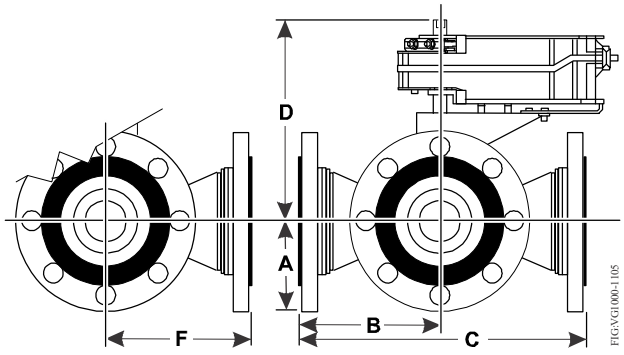


Table 1: VG1xA5xx Series Ball Valves Dimensions, in. (mm) (Part 1 of 2)

Valve Size, in. (DN)	A	Valve Code	B	C	D		F	G (Bolt Circle)	H	Number of Bolts
					VA9320[1]	M9220[1]				
2-1/2 (DN65)	3.50 (89)	VG1xA5Gx	5.71 (145)	11.42 (290)	6.56 (167)	9.64 (245)	5.87 (149)	5.50 (140)	0.75 (19)	4
		VG1xA5Kx	3.60 (92)	7.25 (184)			6.73 (171)			
3 (DN80)	3.75 (95)	VG1xA5Hx	6.10 (155)	12.20 (310)	6.56 (167)	9.65 (245)	6.26 (159)	6.00 (152)	0.75 (19)	4
		VG1xA5Lx	4.30 (110)	8.70 (220)			6.77 (172)			

Table 1: VG1xA5xx Series Ball Valves Dimensions, in. (mm) (Part 2 of 2)

Valve Size, in. (DN)	A	Valve Code	B	C	D		F	G (Bolt Circle)	H	Number of Bolts
					VA9320[1]	M9220[1]				
4 (DN100)	4.50 (114)	VG1xA5Jx	6.89 (175)	13.77 (350)	6.56 (167)	9.65 (245)	7.05 (179)	7.50 (191)	0.75 (19)	8
		VG1xA5MW	5.24 (133)	10.50 (266)	7.55 (192)	10.63 (270)	8.27 (210)			
5 (DN125)	5.00 (127)	VG1xA5NY	6.25 (159)	12.52 (318)	7.55 (192)	10.63 (270)	9.13 (232)	8.50 (217)	0.87 (22)	8
6 (DN150)	5.50 (140)	VG1xA5PZ	7.25 (184)	14.50 (368)	7.55 (192)	10.63 (270)	9.90 (251)	9.50 (242)	0.87 (22)	8

1. Allow a minimum of 4 in. clearance above the shaft to remove the actuator.

See Figure 6 for VG12A5xx Two-Way Series Flanged Ball Valves with the M9320 Series Non-Spring Return Actuators dimensions. See Figure 7 for VG18A5xx Three-Way Series Flanged Ball Valves with the M9124 Series Non-Spring Return Actuators dimensions. Each drawing includes dimensions for the field-installed M9000-343 Weathershield. See Table 2 for specific model dimensions.

Figure 6: Actuated VG12A5xx Two-Way Series Ball Valves with M9000-343 Weathershield Dimensions, in. (mm)

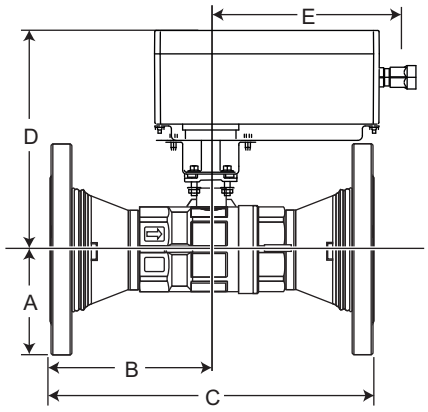
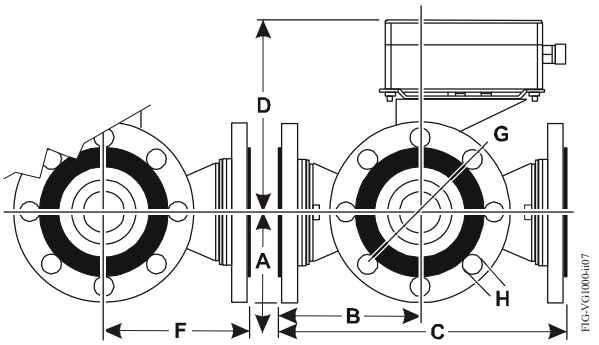


Figure 7: Actuated VG18A5xx Three-Way Series Ball Valves with M9000-330 Weathershield



See Figure 8 for VG12A5xx Two-Way Series Flanged Ball Valves with the M9220 Series Spring Return Actuators dimensions. See Figure 9 for the VG18A5xx Three-Way Series Flanged with the M9220 Series Spring Return Actuators dimensions. Each drawing includes dimensions for the field-installed M9000-340 Weathershield. See Table 2 for specific model dimensions.

Figure 8: Actuated VG12A5xx Two-Way Series Ball Valves with M9000-343 Weathershield Dimensions, in. (mm)

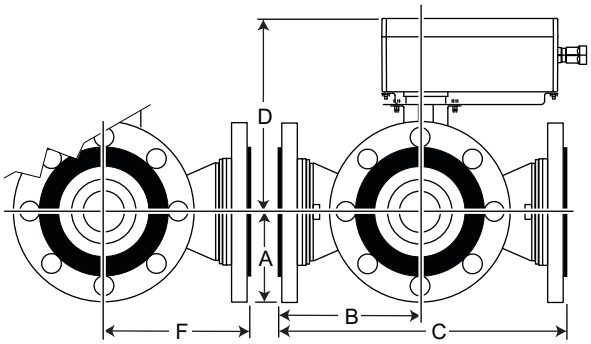


Figure 9: Actuated VG18A5xx Three-Way Series Ball Valves with M9000-340 Weathershield

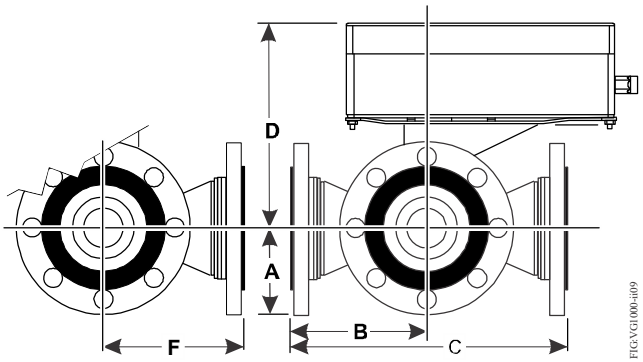


Table 2: VG1xA5xx Series Ball Valves Dimensions, in. (mm)

Valve Size, in. (DN)	A	Valve Code	B	C	D		F	G (Bolt Circle)	H	Number of Bolts
					VA9320[1]	M9220[1]				
2-1/2 (DN65)	3.50 (89)	VG1xA5Gx	5.71 (145)	11.42 (290)	6.56 (167)	9.64 (245)	5.87 (149)	5.50 (140)	0.75 (19)	4
		VG1xA5Kx	3.60 (92)	7.25 (184)	6.56 (167)	10.24 (260)	6.73 (171)			
3 (DN80)	3.75 (95)	VG1xA5Hx	6.10 (155)	12.20 (310)	6.56 (167)	10.24 (260)	6.26 (159)	6.00 (152)	0.75 (19)	4
		VG1xA5Lx	4.30 (110)	8.70 (220)			6.77 (172)			
4 (DN100)	4.50 (114)	VG1xA5Jx	6.89 (175)	13.77 (350)	6.56 (167)	10.24 (260)	7.05 (179)	7.50 (191)	0.75 (19)	8
		VG1xA5MW	5.24 (133)	10.50 (266)	7.55 (192)	11.25 (286)	8.27 (210)			
5 (DN125)	5.00 (127)	VG1xA5NY	6.25 (159)	12.52 (318)	7.55 (192)	11.25 (286)	9.13 (232)	8.50 (217)	0.87 (22)	8
6 (DN150)	5.50 (140)	VG1xA5PZ	7.25 (184)	14.50 (368)	7.55 (192)	11.25 (286)	9.90 (251)	9.50 (242)	0.87 (22)	8

1. Allow a minimum of 4 in. clearance above the shaft to remove the actuator.

Mounting

Location Considerations

IMPORTANT: Protect the actuator from dripping water, condensation, and other moisture. Water or moisture could result in an electrical short, which may damage or affect the operation of the actuator.

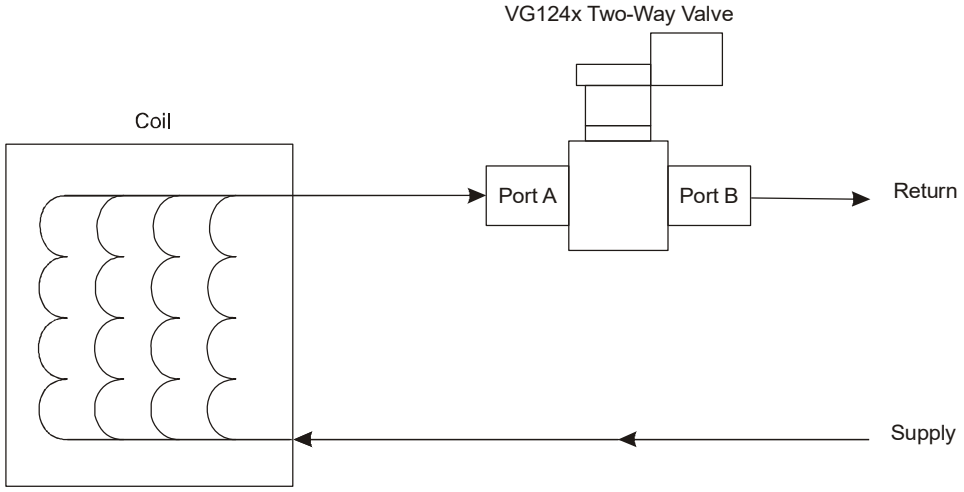
IMPORTANT: Do not cover the actuator with thermal insulating material. High ambient temperatures may damage the actuator, and a hot water pipe, a steam pipe, or other heat source may overheat it.

Piping

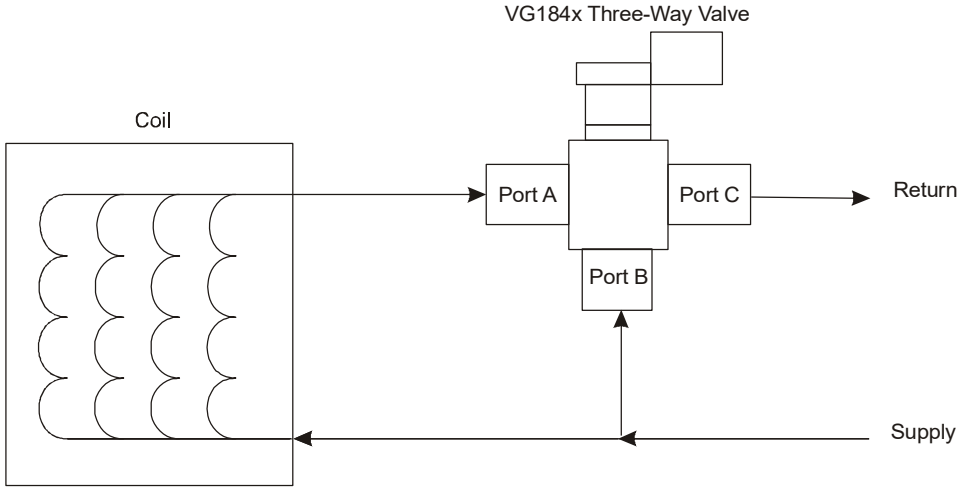
Be sure to wire the input lines to the electric actuator correctly for the valve to move in the proper direction. See Figure 10 for typical two- and three-way piping configurations.

IMPORTANT: Use copper conductors only. Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the actuator's electrical ratings.

Figure 10: Typical VG1000 Series Flanged Ball Valves Piping Application



Typical Two-Way Ball Valve Application



Typical Three-Way Ball Valve Application

FIG:VG1000pipapp

Note: Mount the valve downstream from the coil to minimize heat transfer to the actuator.

Setup and Adjustments

Port A has the flow characterizing disk. Connect Port A to the outlet from the coil. On three-way models, use Port B as the bypass port.

Two-way VG1000 Series Ball Valves are fully open when the electric actuator is fully counterclockwise (CCW) and fully closed when the electric actuator is fully clockwise (CW).

For three-way valves, the Coil Port A and Common Port AB are fully open when the electric actuator is fully CCW, as shown in Figure 11. The Bypass Port B and Common Port AB are fully open when the actuator is fully CW, as shown in Figure 12.

Figure 11: VG18A5 Series Three-Way Ball Valve (Coil Port A Open to Common Port AB)

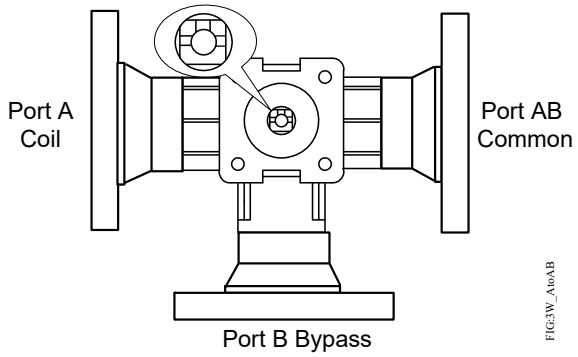
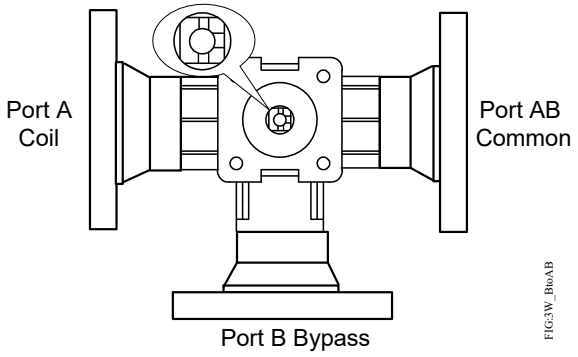


Figure 12: VG18A5 Series Three-Way Ball Valve (Bypass Port B Open to Common Port AB)



For non-spring return and spring-to-open proportional control models in the Direct Acting (DA) mode, a minimum control signal drives the electric actuator to the fully CCW position while a maximum control signal drives the electric actuator in the fully CW position.

For spring-to-close proportional control models in the DA mode, a minimum control signal drives the electric actuator to the fully CW position, while a maximum control signal drives the electric actuator to the fully CCW position.

Troubleshooting

Servicing the Actuator or Piping System

When servicing the electric actuator or the piping system:

- disconnect the power supply to the actuator

WARNING: Risk of Electric Shock.
Disconnect or isolate all power supplies before making electrical connections. More than one disconnection or isolation may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

AVERTISSEMENT : Risque de décharge électrique.
Débrancher ou isoler toute alimentation avant de réaliser un raccordement électrique. Plusieurs isolations et débranchements sont peut-être nécessaires pour -couper entièrement l'alimentation de l'équipement. Tout contact avec des composants porteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

- relieve the pressure in the piping system

CAUTION: Risk of Property Damage.
Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

MISE EN GARDE : Risque de dégâts matériels.
Ne pas mettre le système sous tension avant d'avoir vérifié tous les raccords de câblage. Des fils formant un court-circuit ou connectés de façon incorrecte risquent d'endommager irrémédiablement l'équipement.

Repair Information

If the VG1000 Series Flanged Ball Valve fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Technical Specifications

VG1000 Series Flanged Ball Valves

Service[1]		Hot water, chilled water, 50/50 Glycol solutions, and 25 psig (172 kPa) saturated steam for HVAC systems
Valve Fluid Temperature Limits		0 to 284°F (-18 to 140°C)
Valve Body Pressure/ Temperature Rating	**Water**	ASME Class 150 250 psi at -20 to 100°F (-29 to 38°C) 235 psi at: 200°F (93°C) 218 psi at: 284°F (140°C)
	Steam	25 psig (172 kPa) saturated steam for HVAC systems
Maximum Closeoff Pressure	**Two-Way**	100 psi (689 kPa)
	Three-Way	50 psi (345 kPa)
Maximum Recommended Operating Pressure Drop		30 psi (207 kPa) for quiet service
Flow Characteristics	**Two-Way**	Equal Percentage
	Three-Way	Equal Percentage Flow Characteristics of In-line Port or Linear Percentage Flow Characteristics of Angle Port
Rangeability[2]		Greater than 500:1
Leakage	**Two- or Three-Way**	0.01% of maximum flow, control port, ANSI/FCI 70-2, Class 4
	Three-Way	1% of maximum flow, bypass port
End Connections		ASME Class 150 Flange
Minimum Ambient Operating Temperature	**-4°F (-20°C)**	VA9320 Series Non-Spring Return Actuators
	-40°F (-40°C)	M9220 Series Spring Return Actuators
Maximum Ambient Operating Temperature[3]	**122°F (50°C)**	VA9320 Series Non-Spring Return Actuators
	131°F (55°C)	M9220 Series Spring Return Actuators
Materials	**Body**	Brass
	Flanges	Ductile Iron
	Ball	300 Series Stainless Steel
	Stem	300 Series Stainless Steel
Compliance CE	**Europe**	CE Mark - Johnson Controls, Inc. declares that this product is in compliance with the essential requirements and other relevant provisions of the Pressure Equipment Directive (PED).

1. Refer to VDI 2035 Guideline for proper water treatment.
2. Rangeability is defined as the ratio of maximum controllable flow to minimum controllable flow.
3. In steam applications, install the valve with the stem horizontal to the piping, and wrap the valve and piping with insulation.

The performance specifications are nominal and conform to acceptable industry standards. 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.

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JOHNSON CONTROLS
C/O CONTROLS PRODUCT MANAGEMENT
NO. 22 BLOCK D NEW DISTRICT
WUXI JIANGSU PROVINCE 214142
CHINA

WARNING: BRASS AND BRONZE 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

⚠ 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.

Part Name 零件名	Hazardous substance 有害物质					
	Pb 铅	Hg 汞	Cd 镉	Cr 六价铬	PBB 多溴联苯	PBDE 多溴二苯醚
Body parts 阀体	X	O	O	O	O	O
Trim parts 阀芯/阀杆	O	O	O	O	O	O
Plastic parts 塑料件	O	O	O	O	O	O

O: Identify that this hazardous substance is below specified limits as described in SJ/T 11363-2006.
O：确定该有害物质低于SJ/T 11363-2006中规定的限值。
X: Identify that this hazardous substance is above specified limits as described in SJ/T 11363-2006.
X：确认该有害物质高于SJ/T 11363-2006中规定的限值。

The Environmentally Friendly Used Period (EFUP) for all enclosed products and their parts is per the symbol shown here, unless otherwise marked. The Environmentally Friendly User Period is valid only when the product is operated under the conditions defined in the product bulletin.

除非另有标记，所有产品及其零件的环保使用期限（EFUP）均符合此处所示符号。仅当产品在产品公告中规定的条件下运行时，环保使用期限才有效。

Johnson Controls

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