

# VG1000 Series Three-Way, Plated Brass Ball and Stem, NPT End Connections Ball Valve Assemblies with End Switches

## Description

VG1000 Series Ball Valves are designed to regulate the flow of hot or chilled water and, for some models, low-pressure steam in response to the demand of a controller in HVAC systems. Available in sizes 1/2 through 2 in. (DN15 through DN50), this family of two- and three-way forged brass valves is factory or field mounted to Johnson Controls® VA9104, M9106, M9109, and M9100 Series Non-Spring-Return and VA9203 and VA9208 Series Spring-Return Electric Actuators for on/off, floating, or proportional control.

Refer to the *VG1000 Series Forged Brass Ball Valves Product Bulletin (LIT-977132)* for important product application information.

## Features

- Forged Brass Body — provides 580 psig static pressure rating.
- Chrome-Plated Brass Ball and Stem Assembly Standard — handles both chilled and hot water applications with a fluid temperature range of 23 to 203°F (-5 to 95°C).
- Graphite-Reinforced Polytetrafluoroethylene (PTFE) Seats — include 15% graphite-reinforced ball seals, providing better wear resistance.
- 500:1 Rangeability — provides accurate control under all load conditions.
- Maintenance-Free Design — performs without failure in excess of 200,000 full stroke cycles in iron-oxide contaminated water.



**VG1000 Series Three-Way, Spring-Return, Plated Brass Ball and Stem Ball Valve Assemblies with End Switches**

## Repair Information

If the VG1000 Series Ball Valve fails to operate within its specifications, replace the valve body, actuator, or entire assembly. For replacement parts, contact the nearest Johnson Controls representative.

## Selection Charts

### Three-Way — Spring Return Valve Counterclockwise — Port A (Coil) Open with Switches

Fluid Temperatures: 23 to 203°F (-5 to 95°C)				AC 24 V			AC 85–264 V (VA9203) AC 120 V (VA9208)
Valve	Size, in.	Cv Port A/B	Closeoff psig	Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				<b>Spring Return Port A Open — Valve Spring Return Counterclockwise — Actuator with One Switch</b>			
				<b>VA9203-AGB-2Z</b>	<b>VA9203-GGB-2Z</b>	<b>VA9203-BGB-2</b>	<b>VA9203-BUB-2</b>
<b>VG1841AD</b>	1/2	1.2/0.7 <sup>1</sup>	200	VG1841AD+923AGB	VG1841AD+923GGB	VG1841AD+923BGB	VG1841AD+923BUB
<b>VG1841AE</b>		1.9/1.2 <sup>1</sup>		VG1841AE+923AGB	VG1841AE+923GGB	VG1841AE+923BGB	VG1841AE+923BUB
<b>VG1841AF</b>		2.9/1.9 <sup>1</sup>		VG1841AF+923AGB	VG1841AF+923GGB	VG1841AF+923BGB	VG1841AF+923BUB
<b>VG1841AG</b>		4.7/2.9 <sup>1</sup>		VG1841AG+923AGB	VG1841AG+923GGB	VG1841AG+923BGB	VG1841AG+923BUB
<b>VG1841AL</b>		7.4/4.7 <sup>1</sup>		VG1841AL+923AGB	VG1841AL+923GGB	VG1841AL+923BGB	VG1841AL+923BUB
<b>VG1841AN</b>		11.7/5.8		VG1841AN+923AGB	VG1841AN+923GGB	VG1841AN+923BGB	VG1841AN+923BUB
<b>VG1841BG</b>	3/4	4.7/2.9 <sup>1</sup>	200	VG1841BG+923AGB	VG1841BG+923GGB	VG1841BG+923BGB	VG1841BG+923BUB
<b>VG1841BL</b>		7.4/4.7 <sup>1</sup>		VG1841BL+923AGB	VG1841BL+923GGB	VG1841BL+923BGB	VG1841BL+923BUB
<b>VG1841BN</b>		11.7/5.8		VG1841BN+923AGB	VG1841BN+923GGB	VG1841BN+923BGB	VG1841BN+923BUB
<b>VG1841CL</b>	1	7.4/4.7 <sup>1</sup>	200	VG1841CL+923AGB	VG1841CL+923GGB	VG1841CL+923BGB	VG1841CL+923BUB
<b>VG1841CN</b>		11.7/7.4 <sup>1</sup>		VG1841CN+923AGB	VG1841CN+923GGB	VG1841CN+923BGB	VG1841CN+923BUB
<b>VG1841CP</b>		18.7/9.4		VG1841CP+923AGB	VG1841CP+923GGB	VG1841CP+923BGB	VG1841CP+923BUB
				<b>Spring Return Port A Open — Valve Spring Return Counterclockwise — Actuator with Two Switches</b>			
				<b>VA9208-AGC-3</b>	<b>VA9208-GGC-3</b>	<b>VA9208-BGC-3</b>	<b>VA9208-BAC-3</b>
<b>VG1841DN</b>	1-1/4	11.7/7.4 <sup>1</sup>	200	VG1841DN+938AGC	VG1841DN+938GGC	VG1841DN+938BGC	VG1841DN+938BAC
<b>VG1841DP</b>		18.7/9.4 <sup>1</sup>		VG1841DP+938AGC	VG1841DP+938GGC	VG1841DP+938BGC	VG1841DP+938BAC
<b>VG1841DR</b>		29.2/14.6		VG1841DR+938AGC	VG1841DR+938GGC	VG1841DR+938BGC	VG1841DR+938BAC
<b>VG1841EP</b>	1-1/2	18.7/11.7 <sup>1</sup>	200	VG1841EP+938AGC	VG1841EP+938GGC	VG1841EP+938BGC	VG1841EP+938BAC
<b>VG1841ER</b>		29.2/14.6 <sup>1</sup>		VG1841ER+938AGC	VG1841ER+938GGC	VG1841ER+938BGC	VG1841ER+938BAC
<b>VG1841ES</b>		46.8/23.4		VG1841ES+938AGC	VG1841ES+938GGC	VG1841ES+938BGC	VG1841ES+938BAC
<b>VG1841FR</b>	2	29.2/18.7 <sup>1</sup>	200	VG1841FR+938AGC	VG1841FR+938GGC	VG1841FR+938BGC	VG1841FR+938BAC
<b>VG1841FS</b>		46.8/29.2 <sup>1</sup>		VG1841FS+938AGC	VG1841FS+938GGC	VG1841FS+938BGC	VG1841FS+938BAC
<b>VG1841FT</b>		73.7/36.8		VG1841FT+938AGC	VG1841FT+938GGC	VG1841FT+938BGC	VG1841FT+938BAC

1. Valve has a characterizing disk.

**VG1000 Series Three-Way, Plated Brass Ball and Stem, NPT End Connections Ball Valve Assemblies with End Switches (Continued)**

Three-Way — Spring Return Valve Clockwise — Port A (Coil) Closed with End Switches

Fluid Temperatures: 23 to 203°F (-5 to 95°C)				AC 24 V			AC 85–264 V (VA9203) AC 120 V (VA9208)
Valve	Size, in.	Cv Port A/B	Closeoff psig	Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				<b>Spring Return Port A Closed — Valve Spring Return Clockwise — Actuator with One Switch</b>			
				<b>VA9203-AGB-2Z</b>	<b>VA9203-GGB-2Z</b>	<b>VA9203-BGB-2</b>	<b>VA9203-BUB-2</b>
VG1841AD	1/2	1.2/0.7 <sup>1</sup>	200	VG1841AD+943AGB	VG1841AD+943GGB	VG1841AD+943BGB	VG1841AD+943BUB
VG1841AE		1.9/1.2 <sup>1</sup>		VG1841AE+943AGB	VG1841AE+943GGB	VG1841AE+943BGB	VG1841AE+943BUB
VG1841AF		2.9/1.9 <sup>1</sup>		VG1841AF+943AGB	VG1841AF+943GGB	VG1841AF+943BGB	VG1841AF+943BUB
VG1841AG		4.7/2.9 <sup>1</sup>		VG1841AG+943AGB	VG1841AG+943GGB	VG1841AG+943BGB	VG1841AG+943BUB
VG1841AL		7.4/4.7 <sup>1</sup>		VG1841AL+943AGB	VG1841AL+943GGB	VG1841AL+943BGB	VG1841AL+943BUB
VG1841AN		11.7/5.8		VG1841AN+943AGB	VG1841AN+943GGB	VG1841AN+943BGB	VG1841AN+943BUB
VG1841BG	3/4	4.7/2.9 <sup>1</sup>	200	VG1841BG+943AGB	VG1841BG+943GGB	VG1841BG+943BGB	VG1841BG+943BUB
VG1841BL		7.4/4.7 <sup>1</sup>		VG1841BL+943AGB	VG1841BL+943GGB	VG1841BL+943BGB	VG1841BL+943BUB
VG1841BN		11.7/5.8		VG1841BN+943AGB	VG1841BN+943GGB	VG1841BN+943BGB	VG1841BN+943BUB
VG1841CL	1	7.4/4.7 <sup>1</sup>	200	VG1841CL+943AGB	VG1841CL+943GGB	VG1841CL+943BGB	VG1841CL+943BUB
VG1841CN		11.7/7.4 <sup>1</sup>		VG1841CN+943AGB	VG1841CN+943GGB	VG1841CN+943BGB	VG1841CN+943BUB
VG1841CP		18.7/9.4		VG1841CP+943AGB	VG1841CP+943GGB	VG1841CP+943BGB	VG1841CP+943BUB
				<b>Spring Return Port A Closed — Valve Spring Return Clockwise — Actuator with Two Switches</b>			
				<b>VA9208-AGC-3</b>	<b>VA9208-GGC-3</b>	<b>VA9208-BGC-3</b>	<b>VA9208-BAC-3</b>
VG1841DN	1-1/4	11.7/7.4 <sup>1</sup>	200	VG1841DN+958AGC	VG1841DN+958GGC	VG1841DN+958BGC	VG1841DN+958BAC
VG1841DP		18.7/9.4 <sup>1</sup>		VG1841DP+958AGC	VG1841DP+958GGC	VG1841DP+958BGC	VG1841DP+958BAC
VG1841DR		29.2/14.6		VG1841DR+958AGC	VG1841DR+958GGC	VG1841DR+958BGC	VG1841DR+958BAC
VG1841EP	1-1/2	18.7/11.7 <sup>1</sup>	200	VG1841EP+958AGC	VG1841EP+958GGC	VG1841EP+958BGC	VG1841EP+958BAC
VG1841ER		29.2/14.6 <sup>1</sup>		VG1841ER+958AGC	VG1841ER+958GGC	VG1841ER+958BGC	VG1841ER+958BAC
VG1841ES		46.8/23.4		VG1841ES+958AGC	VG1841ES+958GGC	VG1841ES+958BGC	VG1841ES+958BAC
VG1841FR	2	29.2/18.7 <sup>1</sup>	200	VG1841FR+958AGC	VG1841FR+958GGC	VG1841FR+958BGC	VG1841FR+958BAC
VG1841FS		46.8/29.2 <sup>1</sup>		VG1841FS+958AGC	VG1841FS+958GGC	VG1841FS+958BGC	VG1841FS+958BAC
VG1841FT		73.7/36.8		VG1841FT+958AGC	VG1841FT+958GGC	VG1841FT+958BGC	VG1841FT+958BAC

1. Valve has a characterizing disk.

**VG1000 Series Three-Way, Plated Brass Ball and Stem, NPT End Connections Ball Valve Assemblies with End Switches (Continued)**

**Technical Specifications**

VG1000 Series Three-Way, Plated Brass Ball and Stem, NPT End Connections Ball Valve Assemblies with End Switches		
<b>Service<sup>1</sup></b>		Hot Water, Chilled Water, 50/50 Glycol Solutions
<b>Fluid Temperature Limits</b>	<b>Water</b>	23 to 203°F (-5 to 95°C)
	<b>Steam</b>	Not Rated for Steam Service
<b>Valve Body Pressure Rating</b>	<b>Water</b>	580 psig (4,000 kPa) (PN40)
	<b>Steam</b>	Not Rated for Steam Service
<b>Maximum Closeoff Pressure</b>		200 psid (1,378 kPa)
<b>Maximum Recommended Operating Pressure Drop</b>		50 psid (340 kPa)
<b>Flow Characteristics</b>	<b>Three-Way</b>	Equal Percentage Flow Characteristics of In-Line Port A (Coil) and Linear Flow Characteristics of Angle Port B (Bypass)
<b>Rangeability<sup>2</sup></b>		Greater than 500:1
<b>Minimum Ambient Operating Temperature</b>	<b>-22°F (-30°C)</b>	VA9203 Series Spring-Return Actuators
	<b>-40°F (-40°C)</b>	VA9208 Series Spring-Return Actuators
<b>Maximum Ambient Operating Temperature</b>	<b>140°F (60°C)</b>	VA9203 or VA9208 Series Spring-Return Actuators
<b>Leakage</b>		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4 1% of Maximum Flow for Three-Way Bypass Port
<b>End Connections</b>		National Pipe Thread (NPT)
<b>Materials</b>	<b>Body</b>	Forged Brass
	<b>Ball</b>	Chrome Plated Brass
	<b>Blowout-Proof Stem</b>	Nickel Plated Brass
	<b>Seats</b>	Graphite-Reinforced Polytetrafluoroethylene (PTFE) with Ethylene Propylene Diene Monomer (EPDM) O-Ring Backing
	<b>Stem Seals</b>	EPDM Double O-Rings
	<b>Characterizing Disk</b>	Amodel® AS-1145HS Polyphthalamide Resin

1. Proper water treatment is recommended; refer to the VDI 2035 Guideline.
2. Rangeability is defined as the ratio of maximum controllable flow to minimum controllable flow.