

# VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Spring-Return Electric Actuators without 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.
- 300 Series Stainless Steel Ball and Stem Assembly — tolerates high-temperature water or 15 psi saturated steam with fluid temperatures of -22 to 284°F (-30 to 140°C) or where a higher degree of corrosion protection is desired.
- 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, Stainless Steel Ball and Stem Ball Valve Assemblies without 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 without Switches (Not Rated for Steam Service) (Part 1 of 2)

Fluid Temperatures: -22 to 212°F (-30 to 100°C) Not Rated for Steam Service				AC 24 V			AC 85–264 V (VA9203) AC 120 V (VA9208)
Valve	Size, in.	Cv (Port A/B)	Closeoff psig	Floating	0 to 10 VDC Proportional	On/Off	On/Off
				Spring Return Port A Open — Valve Spring Return Counterclockwise			
				VA9203-AGA-2Z	VA9203-GGA-2Z	VA9203-BGA-2	VA9203-BUA-2
VG1845AD	1/2	1.2 <sup>1</sup>	200	VG1845AD+923AGA	VG1845AD+923GGA	VG1845AD+923BGA	VG1845AD+923BUA
VG1845AE		1.9 <sup>1</sup>		VG1845AE+923AGA	VG1845AE+923GGA	VG1845AE+923BGA	VG1845AE+923BUA
VG1845AF		2.9 <sup>1</sup>		VG1845AF+923AGA	VG1845AF+923GGA	VG1845AF+923BGA	VG1845AF+923BUA
VG1845AG		4.7 <sup>1</sup>		VG1845AG+923AGA	VG1845AG+923GGA	VG1845AG+923BGA	VG1845AG+923BUA
VG1845AL		7.4 <sup>1</sup>		VG1845AL+923AGA	VG1845AL+923GGA	VG1845AL+923BGA	VG1845AL+923BUA
VG1845AN		11.7		VG1845AN+923AGA	VG1845AN+923GGA	VG1845AN+923BGA	VG1845AN+923BUA
VG1845BG	3/4	4.7 <sup>1</sup>	200	VG1845BG+923AGA	VG1845BG+923GGA	VG1845BG+923BGA	VG1845BG+923BUA
VG1845BL		7.4 <sup>1</sup>		VG1845BL+923AGA	VG1845BL+923GGA	VG1845BL+923BGA	VG1845BL+923BUA
VG1845BN		11.7		VG1845BN+923AGA	VG1845BN+923GGA	VG1845BN+923BGA	VG1845BN+923BUA
VG1845CL	1	7.4 <sup>1</sup>	200	VG1845CL+923AGA	VG1845CL+923GGA	VG1845CL+923BGA	VG1845CL+923BUA
VG1845CN		11.7 <sup>1</sup>		VG1845CN+923AGA	VG1845CN+923GGA	VG1845CN+923BGA	VG1845CN+923BUA
VG1845CP		18.7		VG1845CP+923AGA	VG1845CP+923GGA	VG1845CP+923BGA	VG1845CP+923BUA
				Spring Return Port A Open — Valve Spring Return Counterclockwise			
				VA9208-AGA-2	VA9208-GGA-2	VA9208-BGA-3	VA9208-BAA-3
VG1845DN	1-1/4	11.7 <sup>1</sup>	200	VG1845DN+928AGA	VG1845DN+928GGA	VG1845DN+938BGA	VG1845DN+938BAA
VG1845DP		18.7 <sup>1</sup>		VG1845DP+928AGA	VG1845DP+928GGA	VG1845DP+938BGA	VG1845DP+938BAA
VG1845DR		29.2		VG1845DR+928AGA	VG1845DR+928GGA	VG1845DR+938BGA	VG1845DR+938BAA
VG1845EP	1-1/2	18.7 <sup>1</sup>	200	VG1845EP+928AGA	VG1845EP+928GGA	VG1845EP+938BGA	VG1845EP+938BAA
VG1845ER		29.2 <sup>1</sup>		VG1845ER+928AGA	VG1845ER+928GGA	VG1845ER+938BGA	VG1845ER+938BAA
VG1845ES		46.8		VG1845ES+928AGA	VG1845ES+928GGA	VG1845ES+938BGA	VG1845ES+938BAA
VG1845FR	2	29.2 <sup>1</sup>	200	VG1845FR+928AGA	VG1845FR+928GGA	VG1845FR+938BGA	VG1845FR+938BAA
VG1845FS		46.8 <sup>1</sup>		VG1845FS+928AGA	VG1845FS+928GGA	VG1845FS+938BGA	VG1845FS+938BAA
VG1845FT		73.7		VG1845FT+928AGA	VG1845FT+928GGA	VG1845FT+938BGA	VG1845FT+938BAA

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 2014 Johnson Controls, Inc.

**VG1000 Series Three-Way, Stainless Steel Trim, NPT EndConnections Ball Valves with Spring-Return Electric Actuators without Switches (Continued)**

Three-Way — Spring Return without Switches (Not Rated for Steam Service) (Part 2 of 2)

Fluid Temperatures: -22 to 212°F (-30 to 100°C) Not Rated for Steam Service				AC 24 V			AC 85–264 V (VA9203) AC 120 V (VA9208)
Valve	Size, in.	Cv (Port A/B)	Closeoff psig	Floating	0 to 10 VDC Proportional	On/Off	On/Off
<b>Spring Return Port A Closed — Valve Spring Return Clockwise</b>							
				<b>VA9203-AGA-2Z</b>	<b>VA9203-GGA-2Z</b>	<b>VA9203-BGA-2</b>	<b>VA9203-BUA-2</b>
VG1845AD	1/2	1.2 <sup>1</sup>	200	VG1845AD+943AGA	VG1845AD+943GGA	VG1845AD+943BGA	VG1845AD+943BUA
VG1845AE		1.9 <sup>1</sup>		VG1845AE+943AGA	VG1845AE+943GGA	VG1845AE+943BGA	VG1845AE+943BUA
VG1845AF		2.9 <sup>1</sup>		VG1845AF+943AGA	VG1845AF+943GGA	VG1845AF+943BGA	VG1845AF+943BUA
VG1845AG		4.7 <sup>1</sup>		VG1845AG+943AGA	VG1845AG+943GGA	VG1845AG+943BGA	VG1845AG+943BUA
VG1845AL		7.4 <sup>1</sup>		VG1845AL+943AGA	VG1845AL+943GGA	VG1845AL+943BGA	VG1845AL+943BUA
VG1845AN		11.7		VG1845AN+943AGA	VG1845AN+943GGA	VG1845AN+943BGA	VG1845AN+943BUA
VG1845BG	3/4	4.7 <sup>1</sup>	200	VG1845BG+943AGA	VG1845BG+943GGA	VG1845BG+943BGA	VG1845BG+943BUA
VG1845BL		7.4 <sup>1</sup>		VG1845BL+943AGA	VG1845BL+943GGA	VG1845BL+943BGA	VG1845BL+943BUA
VG1845BN		11.7		VG1845BN+943AGA	VG1845BN+943GGA	VG1845BN+943BGA	VG1845BN+943BUA
VG1845CL	1	7.4 <sup>1</sup>	200	VG1845CL+943AGA	VG1845CL+943GGA	VG1845CL+943BGA	VG1845CL+943BUA
VG1845CN		11.7 <sup>1</sup>		VG1845CN+943AGA	VG1845CN+943GGA	VG1845CN+943BGA	VG1845CN+943BUA
VG1845CP		18.7		VG1845CP+943AGA	VG1845CP+943GGA	VG1845CP+943BGA	VG1845CP+943BUA
<b>Spring Return Port A Closed — Valve Spring Return Clockwise</b>							
				<b>VA9208-AGA-2</b>	<b>VA9208-GGA-2</b>	<b>VA9208-BGA-3</b>	<b>VA9208-BAA-3</b>
VG1845DN	1-1/4	11.7 <sup>1</sup>	200	VG1845DN+948AGA	VG1845DN+948GGA	VG1845DN+958BGA	VG1845DN+958BAA
VG1845DP		18.7 <sup>1</sup>		VG1845DP+948AGA	VG1845DP+948GGA	VG1845DP+958BGA	VG1845DP+958BAA
VG1845DR		29.2		VG1845DR+948AGA	VG1845DR+948GGA	VG1845DR+958BGA	VG1845DR+958BAA
VG1845EP	1-1/2	18.7 <sup>1</sup>	200	VG1845EP+948AGA	VG1845EP+948GGA	VG1845EP+958BGA	VG1845EP+958BAA
VG1845ER		29.2 <sup>1</sup>		VG1845ER+948AGA	VG1845ER+948GGA	VG1845ER+958BGA	VG1845ER+958BAA
VG1845ES		46.8		VG1845ES+948AGA	VG1845ES+948GGA	VG1845ES+958BGA	VG1845ES+958BAA
VG1845FR	2	29.2 <sup>1</sup>	200	VG1845FR+948AGA	VG1845FR+948GGA	VG1845FR+958BGA	VG1845FR+958BAA
VG1845FS		46.8 <sup>1</sup>		VG1845FS+948AGA	VG1845FS+948GGA	VG1845FS+958BGA	VG1845FS+958BAA
VG1845FT		73.7		VG1845FT+948AGA	VG1845FT+948GGA	VG1845FT+958BGA	VG1845FT+958BAA

1. Valve has a characterizing disk.

Valve Assemblies with M9000-561 Thermal Barrier Installed — Rated for High-Temperature Fluid Service, Three-Way — Spring Return without Switches (Part 1 of 2)

Fluid Temperatures: -22 to 284°F (-30 to 140°C) Water and 15 psi Steam				AC 24 V			AC 85–264 V (VA9203) AC 120 V (VA9208)
Valve	Size, in.	Cv (Port A/B)	Closeoff psig	Floating	0 to 10 VDC Proportional	On/Off	On/Off
<b>Spring Return Port A Open — Valve Spring Return Counterclockwise</b>							
				<b>VA9203-AGA-2Z</b>	<b>VA9203-GGA-2Z</b>	<b>VA9203-BGA-2</b>	<b>VA9203-BUA-2</b>
VG1845AD	1/2	1.2 <sup>1</sup>	200	VG1845ADH923AGA	VG1845ADH923GGA	VG1845ADH923BGA	VG1845ADH923BUA
VG1845AE		1.9 <sup>1</sup>		VG1845AEH923AGA	VG1845AEH923GGA	VG1845AEH923BGA	VG1845AEH923BUA
VG1845AF		2.9 <sup>1</sup>		VG1845AFH923AGA	VG1845AFH923GGA	VG1845AFH923BGA	VG1845AFH923BUA
VG1845AG		4.7 <sup>1</sup>		VG1845AGH923AGA	VG1845AGH923GGA	VG1845AGH923BGA	VG1845AGH923BUA
VG1845AL		7.4 <sup>1</sup>		VG1845ALH923AGA	VG1845ALH923GGA	VG1845ALH923BGA	VG1845ALH923BUA
VG1845AN		11.7		VG1845ANH923AGA	VG1845ANH923GGA	VG1845ANH923BGA	VG1845ANH923BUA
VG1845BG	3/4	4.7 <sup>1</sup>	200	VG1845BGH923AGA	VG1845BGH923GGA	VG1845BGH923BGA	VG1845BGH923BUA
VG1845BL		7.4 <sup>1</sup>		VG1845BLH923AGA	VG1845BLH923GGA	VG1845BLH923BGA	VG1845BLH923BUA
VG1845BN		11.7		VG1845BNH923AGA	VG1845BNH923GGA	VG1845BNH923BGA	VG1845BNH923BUA
VG1845CL	1	7.4 <sup>1</sup>	200	VG1845CLH923AGA	VG1845CLH923GGA	VG1845CLH923BGA	VG1845CLH923BUA
VG1845CN		11.7 <sup>1</sup>		VG1845CNH923AGA	VG1845CNH923GGA	VG1845CNH923BGA	VG1845CNH923BUA
VG1845CP		18.7		VG1845CPH923AGA	VG1845CPH923GGA	VG1845CPH923BGA	VG1845CPH923BUA

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**VG1000 Series Three-Way, Stainless Steel Trim, NPT EndConnections Ball Valves with Spring-Return Electric Actuators without Switches (Continued)**

Valve Assemblies with M9000-561 Thermal Barrier Installed — Rated for High-Temperature Fluid Service, Three-Way — Spring Return without Switches (Part 2 of 2)

Fluid Temperatures: -22 to 284°F (-30 to 140°C) Water and 15 psi Steam				AC 24 V			AC 85–264 V (VA9203) AC 120 V (VA9208)
Valve	Size, in.	Cv (Port A/B)	Closeoff psig	Floating	0 to 10 VDC Proportional	On/Off	On/Off
<b>Spring Return Port A Open — Valve Spring Return Counterclockwise</b>							
				<b>VA9208-AGA-2</b>	<b>VA9208-GGA-2</b>	<b>VA9208-BGA-3</b>	<b>VA9208-BAA-3</b>
VG1845DN	1-1/4	11.7 <sup>1</sup>	200	VG1845DNH928AGA	VG1845DNH928GGA	VG1845DNH938BGA	VG1845DNH938BAA
VG1845DP		18.7 <sup>1</sup>		VG1845DPH928AGA	VG1845DPH928GGA	VG1845DPH938BGA	VG1845DPH938BAA
VG1845DR		29.2		VG1845DRH928AGA	VG1845DRH928GGA	VG1845DRH938BGA	VG1845DRH938BAA
VG1845EP	1-1/2	18.7 <sup>1</sup>	200	VG1845EPH928AGA	VG1845EPH928GGA	VG1845EPH938BGA	VG1845EPH938BAA
VG1845ER		29.2 <sup>1</sup>		VG1845ERH928AGA	VG1845ERH928GGA	VG1845ERH938BGA	VG1845ERH938BAA
VG1845ES		46.8		VG1845ESH928AGA	VG1845ESH928GGA	VG1845ESH938BGA	VG1845ESH938BAA
VG1845FR	2	29.2 <sup>1</sup>	200	VG1845FRH928AGA	VG1845FRH928GGA	VG1845FRH938BGA	VG1845FRH938BAA
VG1845FS		46.8 <sup>1</sup>		VG1845FSH928AGA	VG1845FSH928GGA	VG1845FSH938BGA	VG1845FSH938BAA
VG1845FT		73.7		VG1845FTH928AGA	VG1845FTH928GGA	VG1845FTH938BGA	VG1845FTH938BAA
<b>Spring Return Port A Closed — Valve Spring Return Clockwise</b>							
				<b>VA9203-AGA-2Z</b>	<b>VA9203-GGA-2Z</b>	<b>VA9203-BGA-2</b>	<b>VA9203-BUA-2</b>
VG1845AD	1/2	1.2 <sup>1</sup>	200	VG1845ADH943AGA	VG1845ADH943GGA	VG1845ADH943BGA	VG1845ADH943BUA
VG1845AE		1.9 <sup>1</sup>		VG1845AEH943AGA	VG1845AEH943GGA	VG1845AEH943BGA	VG1845AEH943BUA
VG1845AF		2.9 <sup>1</sup>		VG1845AFH943AGA	VG1845AFH943GGA	VG1845AFH943BGA	VG1845AFH943BUA
VG1845AG		4.7 <sup>1</sup>		VG1845AGH943AGA	VG1845AGH943GGA	VG1845AGH943BGA	VG1845AGH943BUA
VG1845AL		7.4 <sup>1</sup>		VG1845ALH943AGA	VG1845ALH943GGA	VG1845ALH943BGA	VG1845ALH943BUA
VG1845AN		11.7		VG1845ANH943AGA	VG1845ANH943GGA	VG1845ANH943BGA	VG1845ANH943BUA
VG1845BG		3/4		4.7 <sup>1</sup>	200	VG1845BGH943AGA	VG1845BGH943GGA
VG1845BL	7.4 <sup>1</sup>		VG1845BLH943AGA	VG1845BLH943GGA		VG1845BLH943BGA	VG1845BLH943BUA
VG1845BN	11.7		VG1845BNH943AGA	VG1845BNH943GGA		VG1845BNH943BGA	VG1845BNH943BUA
VG1845CL	1	7.4 <sup>1</sup>	200	VG1845CLH943AGA	VG1845CLH943GGA	VG1845CLH943BGA	VG1845CLH943BUA
VG1845CN		11.7 <sup>1</sup>		VG1845CNH943AGA	VG1845CNH943GGA	VG1845CNH943BGA	VG1845CNH943BUA
VG1845CP		18.7		VG1845CPH943AGA	VG1845CPH943GGA	VG1845CPH943BGA	VG1845CPH943BUA
<b>Spring Return Port A Closed — Valve Spring Return Clockwise</b>							
				<b>VA9208-AGA-2</b>	<b>VA9208-GGA-2</b>	<b>VA9208-BGA-3</b>	<b>VA9208-BAA-3</b>
VG1845DN	1-1/4	11.7 <sup>1</sup>	200	VG1845DNH948AGA	VG1845DNH948GGA	VG1845DNH958BGA	VG1845DNH958BAA
VG1845DP		18.7 <sup>1</sup>		VG1845DPH948AGA	VG1845DPH948GGA	VG1845DPH958BGA	VG1845DPH958BAA
VG1845DR		29.2		VG1845DRH948AGA	VG1845DRH948GGA	VG1845DRH958BGA	VG1845DRH958BAA
VG1845EP	1-1/2	18.7 <sup>1</sup>	200	VG1845EPH948AGA	VG1845EPH948GGA	VG1845EPH958BGA	VG1845EPH958BAA
VG1845ER		29.2 <sup>1</sup>		VG1845ERH948AGA	VG1845ERH948GGA	VG1845ERH958BGA	VG1845ERH958BAA
VG1845ES		46.8		VG1845ESH948AGA	VG1845ESH948GGA	VG1845ESH958BGA	VG1845ESH958BAA
VG1845FR	2	29.2 <sup>1</sup>	200	VG1845FRH948AGA	VG1845FRH948GGA	VG1845FRH958BGA	VG1845FRH958BAA
VG1845FS		46.8 <sup>1</sup>		VG1845FSH948AGA	VG1845FSH948GGA	VG1845FSH958BGA	VG1845FSH958BAA
VG1845FT		73.7		VG1845FTH948AGA	VG1845FTH948GGA	VG1845FTH958BGA	VG1845FTH958BAA

1. Valve has a characterizing disk.

**VG1000 Series Three-Way, Stainless Steel Trim, NPT EndConnections Ball Valves with Spring-Return Electric Actuators without Switches (Continued)**

**Technical Specifications**

VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Spring-Return Electric Actuators without Switches		
<b>Service<sup>1</sup></b>		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for HVAC Systems
<b>Fluid Temperature Limits</b>	<b>Water</b>	-22 to 284°F (-30 to 140°C)
	<b>Steam</b>	15 psig (103 kPa) at 250°F (121°C)
<b>Maximum Actuator Fluid Temperature Limits</b>	<b>212°F (100°C)</b>	VA9203 Series Spring-Return Actuators VA9208 Series Spring-Return Actuators
	<b>284°F (140°C)</b>	VA9203 Series Spring-Return Actuators with M9000-561 Thermal Barrier Installed VA9208 Series Spring-Return Actuators with M9000-561 Thermal Barrier Installed
<b>Valve Body Pressure Rating</b>	<b>Water</b>	580 psig (4,000 kPa) at 203°F (95°C) (PN40) 464 psig (3,196 kPa) at 284°F (140°C) (PN40)
	<b>Steam</b>	15 psig (103 kPa) Saturated Steam (Applies to VA9208 Series Spring Return Actuator with M9000-561 Thermal Barrier Installed)
<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<sup>3</sup> (Limited by the Actuator and Linkage)</b>	<b>Direct Mount</b>	140°F (60°C): VA9208 Series Spring-Return Actuators
<b>Leakage</b>		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
		1% of Maximum Flow
<b>End Connections</b>		National Pipe Thread (NPT)
<b>Materials</b>	<b>Body</b>	Forged Brass
	<b>Ball</b>	300 Series Stainless Steel
	<b>Blowout-Proof Stem</b>	300 Series Stainless Steel
	<b>Seats</b>	Graphite-Reinforced 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.
3. In steam applications, install the valve with the stem horizontal to the piping and wrap the valve and piping with insulation.