

# VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Spring-Return Electric Actuators with 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.
- 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 200,000 cycles in iron-oxide contaminated water.
- Blowout-Proof Stem — protects the user from the risk of injury.



**VG1000 Series Three-Way, Spring-Return, Stainless Steel Ball and Stem Ball Valve 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 (Not Rated for Steam Service)

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 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>VG1845AD</b>	1/2	1.2/0.7 <sup>1</sup>	200	VG1845AD+923AGB	VG1845AD+923GGB	VG1845AD+923BGB	VG1845AD+923BUB
<b>VG1845AE</b>		1.9/1.2 <sup>1</sup>		VG1845AE+923AGB	VG1845AE+923GGB	VG1845AE+923BGB	VG1845AE+923BUB
<b>VG1845AF</b>		2.9/1.9 <sup>1</sup>		VG1845AF+923AGB	VG1845AF+923GGB	VG1845AF+923BGB	VG1845AF+923BUB
<b>VG1845AG</b>		4.7/2.9 <sup>1</sup>		VG1845AG+923AGB	VG1845AG+923GGB	VG1845AG+923BGB	VG1845AG+923BUB
<b>VG1845AL</b>		7.4/4.7 <sup>1</sup>		VG1845AL+923AGB	VG1845AL+923GGB	VG1845AL+923BGB	VG1845AL+923BUB
<b>VG1845AN</b>		11.7/5.8		VG1845AN+923AGB	VG1845AN+923GGB	VG1845AN+923BGB	VG1845AN+923BUB
<b>VG1845BG</b>	3/4	4.7/2.9 <sup>1</sup>	200	VG1845BG+923AGB	VG1845BG+923GGB	VG1845BG+923BGB	VG1845BG+923BUB
<b>VG1845BL</b>		7.4/4.7 <sup>1</sup>		VG1845BL+923AGB	VG1845BL+923GGB	VG1845BL+923BGB	VG1845BL+923BUB
<b>VG1845BN</b>		11.7/5.8		VG1845BN+923AGB	VG1845BN+923GGB	VG1845BN+923BGB	VG1845BN+923BUB
<b>VG1845CL</b>	1	7.4/4.7 <sup>1</sup>	200	VG1845CL+923AGB	VG1845CL+923GGB	VG1845CL+923BGB	VG1845CL+923BUB
<b>VG1845CN</b>		11.7/7.4 <sup>1</sup>		VG1845CN+923AGB	VG1845CN+923GGB	VG1845CN+923BGB	VG1845CN+923BUB
<b>VG1845CP</b>		18.7/9.4		VG1845CP+923AGB	VG1845CP+923GGB	VG1845CP+923BGB	VG1845CP+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>VG1845DN</b>	1-1/4	11.7/7.4 <sup>1</sup>	200	VG1845DN+938AGC	VG1845DN+938GGC	VG1845DN+938BGC	VG1845DN+938BAC
<b>VG1845DP</b>		18.7/11.7 <sup>1</sup>		VG1845DP+938AGC	VG1845DP+938GGC	VG1845DP+938BGC	VG1845DP+938BAC
<b>VG1845DR</b>		29.2/14.6		VG1845DR+938AGC	VG1845DR+938GGC	VG1845DR+938BGC	VG1845DR+938BAC
<b>VG1845EP</b>	1-1/2	18.7/11.7 <sup>1</sup>	200	VG1845EP+938AGC	VG1845EP+938GGC	VG1845EP+938BGC	VG1845EP+938BAC
<b>VG1845ER</b>		29.2/18.7 <sup>1</sup>		VG1845ER+938AGC	VG1845ER+938GGC	VG1845ER+938BGC	VG1845ER+938BAC
<b>VG1845ES</b>		46.8/23.4		VG1845ES+938AGC	VG1845ES+938GGC	VG1845ES+938BGC	VG1845ES+938BAC
<b>VG1845FR</b>	2	29.2/18.7 <sup>1</sup>	200	VG1845FR+938AGC	VG1845FR+938GGC	VG1845FR+938BGC	VG1845FR+938BAC
<b>VG1845FS</b>		46.8/29.2 <sup>1</sup>		VG1845FS+938AGC	VG1845FS+938GGC	VG1845FS+938BGC	VG1845FS+938BAC
<b>VG1845FT</b>		73.7/36.8		VG1845FT+938AGC	VG1845FT+938GGC	VG1845FT+938BGC	VG1845FT+938BAC

1. Valve has a characterizing disk.

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 with Switches (Continued)**

Three-Way — Spring Return Valve Clockwise — Port A (Coil) Closed with End Switches (Not Rated for Steam Service)

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 — 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>
VG1845AD	1/2	1.2/0.7 <sup>1</sup>	200	VG1845AD+943AGB	VG1845AD+943GGB	VG1845AD+943BGB	VG1845AD+943BUB
VG1845AE		1.9/1.2 <sup>1</sup>		VG1845AE+943AGB	VG1845AE+943GGB	VG1845AE+943BGB	VG1845AE+943BUB
VG1845AF		2.9/1.9 <sup>1</sup>		VG1845AF+943AGB	VG1845AF+943GGB	VG1845AF+943BGB	VG1845AF+943BUB
VG1845AG		4.7/2.9 <sup>1</sup>		VG1845AG+943AGB	VG1845AG+943GGB	VG1845AG+943BGB	VG1845AG+943BUB
VG1845AL		7.4/4.7 <sup>1</sup>		VG1845AL+943AGB	VG1845AL+943GGB	VG1845AL+943BGB	VG1845AL+943BUB
VG1845AN		11.7/5.8		VG1845AN+943AGB	VG1845AN+943GGB	VG1845AN+943BGB	VG1845AN+943BUB
VG1845BG	3/4	4.7/2.9 <sup>1</sup>	200	VG1845BG+943AGB	VG1845BG+943GGB	VG1845BG+943BGB	VG1845BG+943BUB
VG1845BL		7.4/4.7 <sup>1</sup>		VG1845BL+943AGB	VG1845BL+943GGB	VG1845BL+943BGB	VG1845BL+943BUB
VG1845BN		11.7/5.8		VG1845BN+943AGB	VG1845BN+943GGB	VG1845BN+943BGB	VG1845BN+943BUB
VG1845CL	1	7.4/4.7 <sup>1</sup>	200	VG1845CL+943AGB	VG1845CL+943GGB	VG1845CL+943BGB	VG1845CL+943BUB
VG1845CN		11.7/7.4 <sup>1</sup>		VG1845CN+943AGB	VG1845CN+943GGB	VG1845CN+943BGB	VG1845CN+943BUB
VG1845CP		18.7/9.4		VG1845CP+943AGB	VG1845CP+943GGB	VG1845CP+943BGB	VG1845CP+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>
VG1845DN	1-1/4	11.7/7.4 <sup>1</sup>	200	VG1845DN+958AGC	VG1845DN+958GGC	VG1845DN+958BGC	VG1845DN+958BAC
VG1845DP		18.7/11.7 <sup>1</sup>		VG1845DP+958AGC	VG1845DP+958GGC	VG1845DP+958BGC	VG1845DP+958BAC
VG1845DR		29.2/14.6		VG1845DR+958AGC	VG1845DR+958GGC	VG1845DR+958BGC	VG1845DR+958BAC
VG1845EP	1-1/2	18.7/11.7 <sup>1</sup>	200	VG1845EP+958AGC	VG1845EP+958GGC	VG1845EP+958BGC	VG1845EP+958BAC
VG1845ER		29.2/18.7 <sup>1</sup>		VG1845ER+958AGC	VG1845ER+958GGC	VG1845ER+958BGC	VG1845ER+958BAC
VG1845ES		46.8/23.4		VG1845ES+958AGC	VG1845ES+958GGC	VG1845ES+958BGC	VG1845ES+958BAC
VG1845FR	2	29.2/18.7 <sup>1</sup>	200	VG1845FR+958AGC	VG1845FR+958GGC	VG1845FR+958BGC	VG1845FR+958BAC
VG1845FS		46.8/29.2 <sup>1</sup>		VG1845FS+958AGC	VG1845FS+958GGC	VG1845FS+958BGC	VG1845FS+958BAC
VG1845FT		73.7/36.8		VG1845FT+958AGC	VG1845FT+958GGC	VG1845FT+958BGC	VG1845FT+958BAC

1. Valve has a characterizing disk.

**VG1000 Series Three-Way, Stainless Steel Trim, NPT EndConnections Ball Valves with Spring-Return Electric Actuators with Switches (Continued)**

Valve Assemblies with M9000-561 Thermal Barrier Installed — Rated for High-Temperature Fluid Service, Three-Way — Spring Return — with End 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 — Actuator with One Switch and 48 in. (18 AWG) Appliance Cables</b>			
				<b>VA9203-AGB-2Z</b>	<b>VA9203-GGB-2Z</b>	<b>VA9203-BGB-2</b>	<b>VA9203-BUB-2</b>
VG1845AD	1/2	1.2/0.7 <sup>1</sup>	200	VG1845ADH923AGB	VG1845ADH923GGB	VG1845ADH923BGB	VG1845ADH923BUB
VG1845AE		1.9/1.2 <sup>1</sup>		VG1845AEH923AGB	VG1845AEH923GGB	VG1845AEH923BGB	VG1845AEH923BUB
VG1845AF		2.9/1.9 <sup>1</sup>		VG1845AFH923AGB	VG1845AFH923GGB	VG1845AFH923BGB	VG1845AFH923BUB
VG1845AG		4.7/2.9 <sup>1</sup>		VG1845AGH923AGB	VG1845AGH923GGB	VG1845AGH923BGB	VG1845AGH923BUB
VG1845AL		7.4/4.7 <sup>1</sup>		VG1845ALH923AGB	VG1845ALH923GGB	VG1845ALH923BGB	VG1845ALH923BUB
VG1845AN		11.7/5.8		VG1845ANH923AGB	VG1845ANH923GGB	VG1845ANH923BGB	VG1845ANH923BUB
VG1845BG	3/4	4.7/2.9 <sup>1</sup>	200	VG1845BGH923AGB	VG1845BGH923GGB	VG1845BGH923BGB	VG1845BGH923BUB
VG1845BL		7.4/4.7 <sup>1</sup>		VG1845BLH923AGB	VG1845BLH923GGB	VG1845BLH923BGB	VG1845BLH923BUB
VG1845BN		11.7/5.8		VG1845BNH923AGB	VG1845BNH923GGB	VG1845BNH923BGB	VG1845BNH923BUB
VG1845CL	1	7.4/4.7 <sup>1</sup>	200	VG1845CLH923AGB	VG1845CLH923GGB	VG1845CLH923BGB	VG1845CLH923BUB
VG1845CN		11.7/7.4 <sup>1</sup>		VG1845CNH923AGB	VG1845CNH923GGB	VG1845CNH923BGB	VG1845CNH923BUB
VG1845CP		18.7/9.4		VG1845CPH923AGB	VG1845CPH923GGB	VG1845CPH923BGB	VG1845CPH923BUB
				<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>
VG1845DN	1-1/4	11.7/7.4 <sup>1</sup>	200	VG1845DNH938AGC	VG1845DNH938GGC	VG1845DNH938BGC	VG1845DNH938BAC
VG1845DP		18.7/11.7 <sup>1</sup>		VG1845DPH938AGC	VG1845DPH938GGC	VG1845DPH938BGC	VG1845DPH938BAC
VG1845DR		29.2/14.6		VG1845DRH938AGC	VG1845DRH938GGC	VG1845DRH938BGC	VG1845DRH938BAC
VG1845EP	1-1/2	18.7/11.7 <sup>1</sup>	200	VG1845EPH938AGC	VG1845EPH938GGC	VG1845EPH938BGC	VG1845EPH938BAC
VG1845ER		29.2/18.7 <sup>1</sup>		VG1845ERH938AGC	VG1845ERH938GGC	VG1845ERH938BGC	VG1845ERH938BAC
VG1845ES		46.8/23.4		VG1845ESH938AGC	VG1845ESH938GGC	VG1845ESH938BGC	VG1845ESH938BAC
VG1845FR	2	29.2/18.7 <sup>1</sup>	200	VG1845FRH938AGC	VG1845FRH938GGC	VG1845FRH938BGC	VG1845FRH938BAC
VG1845FS		46.8/29.2 <sup>1</sup>		VG1845FSH938AGC	VG1845FSH938GGC	VG1845FSH938BGC	VG1845FSH938BAC
VG1845FT		73.7/36.8		VG1845FTH938AGC	VG1845FTH938GGC	VG1845FTH938BGC	VG1845FTH938BAC
				<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>
VG1845AD	1/2	1.2/0.7	200	VG1845ADH943AGB	VG1845ADH943GGB	VG1845ADH943BGB	VG1845ADH943BUB
VG1845AE		1.9/1.2 <sup>1</sup>		VG1845AEH943AGB	VG1845AEH943GGB	VG1845AEH943BGB	VG1845AEH943BUB
VG1845AF		2.9/1.9 <sup>1</sup>		VG1845AFH943AGB	VG1845AFH943GGB	VG1845AFH943BGB	VG1845AFH943BUB
VG1845AG		4.7/2.9 <sup>1</sup>		VG1845AGH943AGB	VG1845AGH943GGB	VG1845AGH943BGB	VG1845AGH943BUB
VG1845AL		7.4/4.7 <sup>1</sup>		VG1845ALH943AGB	VG1845ALH943GGB	VG1845ALH943BGB	VG1845ALH943BUB
VG1845AN		11.7/5.8		VG1845ANH943AGB	VG1845ANH943GGB	VG1845ANH943BGB	VG1845ANH943BUB
VG1845BG	3/4	4.7/2.9 <sup>1</sup>	200	VG1845BGH943AGB	VG1845BGH943GGB	VG1845BGH943BGB	VG1845BGH943BUB
VG1845BL		7.4/4.7 <sup>1</sup>		VG1845BLH943AGB	VG1845BLH943GGB	VG1845BLH943BGB	VG1845BLH943BUB
VG1845BN		11.7/5.8		VG1845BNH943AGB	VG1845BNH943GGB	VG1845BNH943BGB	VG1845BNH943BUB
VG1845CL	1	7.4/4.7 <sup>1</sup>	200	VG1845CLH943AGB	VG1845CLH943GGB	VG1845CLH943BGB	VG1845CLH943BUB
VG1845CN		11.7/7.4 <sup>1</sup>		VG1845CNH943AGB	VG1845CNH943GGB	VG1845CNH943BGB	VG1845CNH943BUB
VG1845CP		18.7/9.4		VG1845CPH943AGB	VG1845CPH943GGB	VG1845CPH943BGB	VG1845CPH943BUB

Threaded Ball Valves and Actuators

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**VG1000 Series Three-Way, Stainless Steel Trim, NPT EndConnections Ball Valves with Spring-Return Electric Actuators with Switches (Continued)**

Valve Assemblies with M9000-561 Thermal Barrier Installed — Rated for High-Temperature Fluid Service, Three-Way — Spring Return — with End 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
				Spring Return Port A Closed — Valve Spring Return Clockwise — Actuator with Two Switches			
				VA9208-AGC-3	VA9208-GGC-3	VA9208-BGC-3	VA9208-BAC-3
VG1845DN	1-1/4	11.7/7.4 <sup>1</sup>	200	VG1845DNH958AGC	VG1845DNH958GGC	VG1845DNH958BGC	VG1845DNH958BAC
VG1845DP		18.7/11.7 <sup>1</sup>		VG1845DPH958AGC	VG1845DPH958GGC	VG1845DPH958BGC	VG1845DPH958BAC
VG1845DR		29.2/14.6		VG1845DRH958AGC	VG1845DRH958GGC	VG1845DRH958BGC	VG1845DRH958BAC
VG1845EP	1-1/2	18.7/11.7 <sup>1</sup>	200	VG1845EPH958AGC	VG1845EPH958GGC	VG1845EPH958BGC	VG1845EPH958BAC
VG1845ER		29.2/18.7 <sup>1</sup>		VG1845ERH958AGC	VG1845ERH958GGC	VG1845ERH958BGC	VG1845ERH958BAC
VG1845ES		46.8/23.4		VG1845ESH958AGC	VG1845ESH958GGC	VG1845ESH958BGC	VG1845ESH958BAC
VG1845FR	2	29.2/18.7 <sup>1</sup>	200	VG1845FRH958AGC	VG1845FRH958GGC	VG1845FRH958BGC	VG1845FRH958BAC
VG1845FS		46.8/29.2 <sup>1</sup>		VG1845FSH958AGC	VG1845FSH958GGC	VG1845FSH958BGC	VG1845FSH958BAC
VG1845FT		73.7/36.8		VG1845FTH958AGC	VG1845FTH958GGC	VG1845FTH958BGC	VG1845FTH958BAC

1. Valve has a characterizing disk.

**Technical Specifications**

VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Spring-Return Electric Actuators with Switches		
Service <sup>1</sup>	Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for HVAC Systems	
Fluid Temperature Limits	Water	-22 to 284°F (-30 to 140°C)
	Steam	15 psig (103 kPa) at 250°F (121°C)
Maximum Actuator Fluid Temperature Limits	212°F (100°C)	VA9203 Series Spring-Return Actuators VA9208 Series Spring-Return Actuators
	284°F (140°C)	VA9203 with M9000-561 Thermal Barrier VA9208 with M9000-561 Thermal Barrier
Valve Body Pressure Rating	Water	580 psig (4,000 kPa) at 203°F (95°C) (PN40) 464 psig (3,199 kPa) at 284°F (140°C) (PN40)
	Steam	15 psig (103 kPa) Saturated Steam (Applies to VA9203 Series or VA9208 Series Actuators with M9000-561 Thermal Barrier Installed)
Maximum Closeoff Pressure	200 psid (1,378 kPa)	
Maximum Recommended Operating Pressure Drop	50 psid (340 kPa)	
Flow Characteristics	Three-Way	Equal Percentage Flow Characteristics of In-Line Port (Coil) and Linear Flow Characteristics of Angle Port B (Bypass)
Rangeability <sup>2</sup>	Greater than 500:1	
Minimum Ambient Operating Temperature	-22°F (-30°C)	VA9203 Series Spring-Return Actuators
	-40°F (-40°C)	VA9208 Series Spring-Return Actuators
Maximum Ambient Operating Temperature <sup>3</sup> (Limited by the Actuator and Linkage)	Direct Mount	140°F (60°C): VA9208 Series Spring-Return Actuators
Leakage	0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4 1% of Maximum Flow for Three-Way Bypass Port	
End Connections	National Pipe Thread (NPT)	
Materials	Body	Forged Brass
	Ball	300 Series Stainless Steel
	Blowout-Proof Stem	300 Series Stainless Steel
	Seats	Graphite-Reinforced PTFE with EPDM O-Ring Backing
	Stem Seals	EPDM Double O-Rings
	Characterizing Disk	Amodel® AS-1145HS Polyphthalamide Resin

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