

# VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Non-Spring Return Electric Actuators

## 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, and VA9300 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.
- 200 psi Closeoff Pressure Rating — provides tight shutoff.

- Graphite-Reinforced Polytetrafluoroethylene (PTFE) Seats — include 15% graphite-reinforced ball seals, providing better wear resistance.
- 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.



**VG1000 Series Three-Way, Non-Spring Return, Stainless Steel Ball and Stem Ball Valve Assemblies**

## 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 Stainless Steel Trim Ball Valves, Non-Spring Return, VA9104 Series Electric Actuators without Switches

Fluid Temperatures: -4 to 212°F (-22 to 100°C) Not Rated for Steam Service				AC 24 V		
Valve	Size, in.	Cv (Port A/B)	Closeoff psig	On/Off and/or Floating without Timeout	On/Off and/or Floating with Timeout	DC 0 to 10 V Proportional
<b>Actuators with M3 Screw Terminals</b>				<b>VA9104-AGA-3S</b>	<b>VA9104-IGA-3S</b>	<b>VA9104-GGA-3S</b>
VG1845AD	1/2	1.2/0.7 <sup>1</sup>	200	VG1845AD+9T4AGA	VG1845AD+9T4IGA	VG1845AD+9T4GGA
VG1845AE		1.9/1.2 <sup>1</sup>		VG1845AE+9T4AGA	VG1845AE+9T4IGA	VG1845AE+9T4GGA
VG1845AF		2.9/1.9 <sup>1</sup>		VG1845AF+9T4AGA	VG1845AF+9T4IGA	VG1845AF+9T4GGA
VG1845AG		4.7/2.9 <sup>1</sup>		VG1845AG+9T4AGA	VG1845AG+9T4IGA	VG1845AG+9T4GGA
VG1845AL		7.4/4.7 <sup>1</sup>		VG1845AL+9T4AGA	VG1845AL+9T4IGA	VG1845AL+9T4GGA
VG1845AN		11.7/5.8		VG1845AN+9T4AGA	VG1845AN+9T4IGA	VG1845AN+9T4GGA
VG1845BG	3/4	4.7/2.9 <sup>1</sup>	200	VG1845BG+9T4AGA	VG1845BG+9T4IGA	VG1845BG+9T4GGA
VG1845BL		7.4/4.7 <sup>1</sup>		VG1845BL+9T4AGA	VG1845BL+9T4IGA	VG1845BL+9T4GGA
VG1845BN		11.7/5.8		VG1845BN+9T4AGA	VG1845BN+9T4IGA	VG1845BN+9T4GGA
VG1845CL	1	7.4/4.7 <sup>1</sup>	200	VG1845CL+9T4AGA	VG1845CL+9T4IGA	VG1845CL+9T4GGA
VG1845CN		11.7/7.4 <sup>1</sup>		VG1845CN+9T4AGA	VG1845CN+9T4IGA	VG1845CN+9T4GGA
VG1845CP		18.7/9.4		VG1845CP+9T4AGA	VG1845CP+9T4IGA	VG1845CP+9T4GGA
<b>Actuators with 120 in. (3.05 m) 18 AWG Plenum Cable</b>				<b>VA9104-AGA-2S</b>	<b>VA9104-IGA-2S</b>	<b>VA9104-GGA-2S</b>
VG1845AD	1/2	1.2/0.7 <sup>1</sup>	200	VG1845AD+9A4AGA	VG1845AD+9A4IGA	VG1845AD+9A4GGA
VG1845AE		1.9/1.2 <sup>1</sup>		VG1845AE+9A4AGA	VG1845AE+9A4IGA	VG1845AE+9A4GGA
VG1845AF		2.9/1.9 <sup>1</sup>		VG1845AF+9A4AGA	VG1845AF+9A4IGA	VG1845AF+9A4GGA
VG1845AG		4.7/2.9 <sup>1</sup>		VG1845AG+9A4AGA	VG1845AG+9A4IGA	VG1845AG+9A4GGA
VG1845AL		7.4/4.7 <sup>1</sup>		VG1845AL+9A4AGA	VG1845AL+9A4IGA	VG1845AL+9A4GGA
VG1845AN		11.7/5.8		VG1845AN+9A4AGA	VG1845AN+9A4IGA	VG1845AN+9A4GGA
VG1845BG	3/4	4.7/2.9 <sup>1</sup>	200	VG1845BG+9A4AGA	VG1845BG+9A4IGA	VG1845BG+9A4GGA
VG1845BL		7.4/4.7 <sup>1</sup>		VG1845BL+9A4AGA	VG1845BL+9A4IGA	VG1845BL+9A4GGA
VG1845BN		11.7/5.8		VG1845BN+9A4AGA	VG1845BN+9A4IGA	VG1845BN+9A4GGA
VG1845CL	1	7.4/4.7 <sup>1</sup>	200	VG1845CL+9A4AGA	VG1845CL+9A4IGA	VG1845CL+9A4GGA
VG1845CN		11.7/7.4 <sup>1</sup>		VG1845CN+9A4AGA	VG1845CN+9A4IGA	VG1845CN+9A4GGA
VG1845CP		18.7/9.4		VG1845CP+9A4AGA	VG1845CP+9A4IGA	VG1845CP+9A4GGA

1. The for CV listed is for Port.

## VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Non-Spring Return Electric Actuators (Continued)

Three-Way Stainless Steel Trim Ball Valves, Non-Spring Return, VA9104 Series Electric Actuators without Switches with M9000-561 Thermal Barrier Installed

Fluid Temperatures: -22 to 284°F (-30 to 140°C) Water and 15 psi Saturated Steam				AC 24 V		
Valve	Size, in.	Cv (Port A/B)	Closeoff psig	On/Off and/or Floating without Timeout <sup>1</sup>	On/Off and/or Floating with Timeout	DC 0 to 10 V Proportional
Actuators with M3 Screw Terminals with M9000-561 Thermal Barrier Installed				VA9104-AGA-3S	VA9104-IGA-3S	VA9104-GGA-3S
VG1845AD	1/2	1.2/0.7 <sup>2</sup>	200	VG1845ADH9T4AGA	VG1845ADH9T4IGA	VG1845ADH9T4GGA
VG1845AE		1.9/1.2 <sup>2</sup>		VG1845AEH9T4AGA	VG1845AEH9T4IGA	VG1845AEH9T4GGA
VG1845AF		2.9/1.9 <sup>2</sup>		VG1845AFH9T4AGA	VG1845AFH9T4IGA	VG1845AFH9T4GGA
VG1845AG		4.7/2.9 <sup>2</sup>		VG1845AGH9T4AGA	VG1845AGH9T4IGA	VG1845AGH9T4GGA
VG1845AL		7.4/4.7 <sup>2</sup>		VG1845ALH9T4AGA	VG1845ALH9T4IGA	VG1845ALH9T4GGA
VG1845AN		11.7/5.8		VG1845ANH9T4AGA	VG1845ANH9T4IGA	VG1845ANH9T4GGA
VG1845BG	3/4	4.7/2.9 <sup>2</sup>	200	VG1845BGH9T4AGA	VG1845BGH9T4IGA	VG1845BGH9T4GGA
VG1845BL		7.4/4.7 <sup>2</sup>		VG1845BLH9T4AGA	VG1845BLH9T4IGA	VG1845BLH9T4GGA
VG1845BN		11.7/5.8		VG1845BNH9T4AGA	VG1845BNH9T4IGA	VG1845BNH9T4GGA
VG1845CL	1	7.4/4.7 <sup>2</sup>	200	VG1845CLH9T4AGA	VG1845CLH9T4IGA	VG1845CLH9T4GGA
VG1845CN		11.7/7.4 <sup>2</sup>		VG1845CNH9T4AGA	VG1845CNH9T4IGA	VG1845CNH9T4GGA
VG1845CP		18.7/9.4		VG1845CPH9T4AGA	VG1845CPH9T4IGA	VG1845CPH9T4GGA
Actuators with 120 in. (3.05 m) 18 AWG Plenum Cable with M9000-561 Thermal Barrier Installed				VA9104-AGA-2S	VA9104-IGA-2S	VA9104-GGA-2S
VG1845AD	1/2	1.2/0.7 <sup>2</sup>	200	VG1845ADH9A4AGA	VG1845ADH9A4IGA	VG1845ADH9A4GGA
VG1845AE		1.9/1.2 <sup>2</sup>		VG1845AEH9A4AGA	VG1845AEH9A4IGA	VG1845AEH9A4GGA
VG1845AF		2.9/1.9 <sup>2</sup>		VG1845AFH9A4AGA	VG1845AFH9A4IGA	VG1845AFH9A4GGA
VG1845AG		4.7/2.9 <sup>2</sup>		VG1845AGH9A4AGA	VG1845AGH9A4IGA	VG1845AGH9A4GGA
VG1845AL		7.4/4.7 <sup>2</sup>		VG1845ALH9A4AGA	VG1845ALH9A4IGA	VG1845ALH9A4GGA
VG1845AN		11.7/5.8		VG1845ANH9A4AGA	VG1845ANH9A4IGA	VG1845ANH9A4GGA
VG1845BG	3/4	4.7/2.9 <sup>2</sup>	200	VG1845BGH9A4AGA	VG1845BGH9A4IGA	VG1845BGH9A4GGA
VG1845BL		7.4/4.7 <sup>2</sup>		VG1845BLH9A4AGA	VG1845BLH9A4IGA	VG1845BLH9A4GGA
VG1845BN		11.7/5.8		VG1845BNH9A4AGA	VG1845BNH9A4IGA	VG1845BNH9A4GGA
VG1845CL	1	7.4/4.7 <sup>2</sup>	200	VG1845CLH9A4AGA	VG1845CLH9A4IGA	VG1845CLH9A4GGA
VG1845CN		11.7/7.4 <sup>2</sup>		VG1845CNH9A4AGA	VG1845CNH9A4IGA	VG1845CNH9A4GGA
VG1845CP		18.7/9.4		VG1845CPH9A4AGA	VG1845CPH9A4IGA	VG1845CPH9A4GGA

1. To avoid excessive wear or drive time on the motor for the AGA models, use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall).
2. Valve has a characterizing disk.



## VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Non-Spring Return Electric Actuators (Continued)

### Three-Way Stainless Steel Trim Ball Valves, Non-Spring Return, VA9300 Series Electric Actuators without Switches

Fluid Temperatures: -4 to 212°F (-20 to 100°C) Not Rated for Steam Service				AC/DC 24 V		
				On/Off	Floating	DC 0(2) to 10 V Proportional
Valve	Size, in.	Cv	Closeoff psi	VA9310-HGA-2		
VG1845DN	1-1/4	11.7 <sup>1</sup>	200	VG1845DN+910HGA		
VG1845DP		18.7 <sup>1</sup>		VG1845DP+910HGA		
VG1845DR		29.2		VG1845DR+910HGA		
VG1845EP	1-1/2	18.7 <sup>1</sup>	200	VG1845EP+910HGA		
VG1845ER		29.2 <sup>1</sup>		VG1845ER+910HGA		
VG1845ES		46.8		VG1845ES+910HGA		
VG1845FR	2	29.2 <sup>1</sup>	200	VG1845FR+910HGA		
VG1845FS		48.8 <sup>1</sup>		VG1845FS+910HGA		
VG1845FT		73.7		VG1845FT+910HGA		

1. Valve has a characterizing disk.

### Three-Way Stainless Steel Trim Ball Valves, Non-Spring Return, VA9300 Series Electric Actuators with Switches

Fluid Temperatures: -4 to 212°F (-20 to 100°C) Not Rated for Steam Service				AC/DC 24 V		
				On/Off	Floating	DC 0(2) to 10 V Proportional
Valve	Size, in.	Cv	Closeoff psi	VA9310-HGA-2 actuator with M9300-2 Switch Kit <sup>1</sup>		
VG1845AD	1/2	1.2 <sup>2</sup>	200	VG1845AD+910HGC		
VG1845AE		1.9 <sup>2</sup>		VG1845AE+910HGC		
VG1845AF		2.9 <sup>2</sup>		VG1845AF+910HGC		
VG1845AG		4.7 <sup>2</sup>		VG1845AG+910HGC		
VG1845AL		7.4 <sup>2</sup>		VG1845AL+910HGC		
VG1845AN		11.7		VG1845AN+910HGC		
VG1845BG	3/4	4.7 <sup>2</sup>	200	VG1845BG+910HGC		
VG1845BL		7.4 <sup>2</sup>		VG1845BL+910HGC		
VG1845BN		11.7		VG1845BN+910HGC		
VG1845CL	1	7.4 <sup>2</sup>	200	VG1845CL+910HGC		
VG1845CN		11.7 <sup>2</sup>		VG1845CN+910HGC		
VG1845CP		18.7		VG1845CP+910HGC		
VG1845DN	1-1/4	11.7 <sup>2</sup>	200	VG1845DN+910HGC		
VG1845DP		18.7 <sup>2</sup>		VG1845DP+910HGC		
VG1845DR		29.2		VG1845DR+910HGC		
VG1845EP	1-1/2	18.7 <sup>2</sup>	200	VG1845EP+910HGC		
VG1845ER		29.2 <sup>2</sup>		VG1845ER+910HGC		
VG1845ES		46.8		VG1845ES+910HGC		
VG1845FR	2	29.2 <sup>2</sup>	200	VG1845FR+910HGC		
VG1845FS		46.8 <sup>2</sup>		VG1845FS+910HGC		
VG1845FT		73.7		VG1845FT+910HGC		

1. For field mounting order VA9310-HGA-2 and the M9300-2 Switch Kit separately.

2. Valve has a characterizing disk.

## VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Non-Spring Return Electric Actuators (Continued)

Three-Way Stainless Steel Trim Ball Valves, Non-Spring Return, VA9300 Series Electric Actuators without Switches with Optional M9000-561 Thermal Barrier

Fluid Temperatures: -22 to 284°F (-30 to 140°C) Water and 15 psi Saturated Steam				AC/DC 24 V		
				On/Off	Floating	DC 0(2) to 10 V Proportional
Valve	Size, in.	Cv	Closeoff psi	VA9310-HGA-2 with M9000-561 Thermal Barrier		
VG1845DN	1-1/4	11.7 <sup>1</sup>	200	VG1845DNH910HGA		
VG1845DP		18.7 <sup>1</sup>		VG1845DPH910HGA		
VG1845DR		29.2		VG1845DRH910HGA		
VG1845EP	1-1/2	18.7 <sup>1</sup>	200	VG1845EPH910HGA		
VG1845ER		29.2 <sup>1</sup>		VG1845ERH910HGA		
VG1845ES		46.8		VG1845ESH910HGA		
VG1845FR	2	29.2 <sup>1</sup>	200	VG1845FRH910HGA		
VG1845FS		48.8 <sup>1</sup>		VG1845FSH910HGA		
VG1845FT		73.7		VG1845FTH910HGA		

1. Valve has a characterizing disk.

Three-Way Stainless Steel Trim Ball Valves, Non-Spring Return, VA9300 Series Electric Actuators with Switches with Optional M9000-561 Thermal Barrier

Fluid Temperatures: -22 to 284°F (-30 to 140°C) Water and 15 psi Saturated Steam				AC/DC 24 V		
				On/Off	Floating	DC 0(2) to 10 V Proportional
Valve	Size, in.	Cv	Closeoff psi	VA9310-HGA-2 actuator with M9300-2 Switch Kit with M9000-561 Thermal Barrier <sup>1</sup>		
VG1845AD	1/2	1.2 <sup>2</sup>	200	VG1845ADH910HGC		
VG1845AE		1.9 <sup>2</sup>		VG1845AEH910HGC		
VG1845AF		2.9 <sup>2</sup>		VG1845AFH910HGC		
VG1845AG		4.7 <sup>2</sup>		VG1845AGH910HGC		
VG1845AL		7.4 <sup>2</sup>		VG1845ALH910HGC		
VG1845AN		11.7		VG1845ANH910HGC		
VG1845BG	3/4	4.7 <sup>2</sup>	200	VG1845BGH910HGC		
VG1845BL		7.4 <sup>2</sup>		VG1845BLH910HGC		
VG1845BN		11.7		VG1845BNH910HGC		
VG1845CL	1	7.4 <sup>2</sup>	200	VG1845CLH910HGC		
VG1845CN		11.7 <sup>2</sup>		VG1845CNH910HGC		
VG1845CP		18.7		VG1845CPH910HGC		
VG1845DN	1-1/4	11.7 <sup>2</sup>	200	VG1845DNH910HGC		
VG1845DP		18.7 <sup>2</sup>		VG1845DPH910HGC		
VG1845DR		29.2		VG1845DRH910HGC		
VG1845EP	1-1/2	18.7 <sup>2</sup>	200	VG1845EPH910HGC		
VG1845ER		29.2 <sup>2</sup>		VG1845ERH910HGC		
VG1845ES		46.8		VG1845ESH910HGC		
VG1845FR	2	29.2 <sup>2</sup>	200	VG1845FRH910HGC		
VG1845FS		46.8 <sup>2</sup>		VG1845FSH910HGC		
VG1845FT		73.7		VG1845FTH910HGC		

1. For field mounting order VA9310-HGA-2, M9300-2 Switch Kit, and M9000-561 Thermal Barrier separately

2. Valve has a characterizing disk.

## VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Non-Spring Return Electric Actuators (Continued)

### Technical Specifications

VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connections Ball Valves with Non-Spring Return Electric Actuators		
<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 Fluid Temperature Limits</b>	<b>212°F (100°C)</b>	VA9104 Series Non-Spring Return Actuators VA9300 Series Non-Spring Return Actuators
	<b>284°F (140°C)</b>	VA9104 Series Non-Spring Return Actuators with M9000-561 Thermal Barrier VA9300 Series Non-Spring Return Actuators with M9000-561 Thermal Barrier
<b>Valve Body Pressure/Temperature Rating</b>	<b>Water</b>	580 psig (4,000 kPa) at 203°F (95°C) (PN40) 464 psig (3,199 kPa) at 284°F (140°C) (PN40)
	<b>Steam</b>	15 psig (103 kPa) Saturated Steam
<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>-4°F (-20°C)</b>	VA9104 Series Non-Spring Return Actuators
	<b>-22°F (-30°C)</b>	VA9300 Series Non-Spring Return Actuators
<b>Maximum Ambient Operating Temperature<sup>3</sup></b>	<b>140°F (60°C)</b>	VA9104 Series Non-Spring Return Actuators VA9300 Series Non-Spring Return Actuators
<b>Leakage</b>		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
<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 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
<b>Compliance CRN</b>		0C16910.5C

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.