VG1000 Series

LIT-1900223

Three-Way, Stainless Steel Trim, NPT End Connection 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 Heating, Ventilating, and Air Conditioning (HVAC) systems. Available in sizes 1/2 through 2 in. (DN15 through DN50), this family of two-way and three-way forged brass valves is factory or field mounted to Johnson Controls® VA9104, M9106, M9109, and M9100 Series Non-Spring Return and VA2202, M9206, and M9210 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 includes 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

Selection Charts

Three-Way Non-Spring Return without Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off Floating without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				VA9104-AGA-xS M9106-AGA-2 M9109-AGA-2	VA9104-IGA-xS M9106-IGA-2	VA9104-GGA-xS M9106-GGA-2 M9109-GGA-2
VG1845AD	1/2	1.2 / 0.7[2]	200	VG1845AD+9T4AGA[3]	VG1845AD+9T4IGA[3]	VG1845AD+9T4GGA[3]
VG1845AE		1.9 / 1.2[2]		VG1845AE+9T4AGA[3]	VG1845AE+9T4IGA[3]	VG1845AE+9T4GGA[3]
VG1845AF		2.9 / 1.9[2]		VG1845AF+9T4AGA[3]	VG1845AF+9T4IGA[3]	VG1845AF+9T4GGA[3]
VG1845AG		4.7 / 2.9[2]		VG1845AG+9T4AGA[3]	VG1845AG+9T4IGA[3]	VG1845AG+9T4GGA[3]
VG1845AL		7.4 / 4.7[2]		VG1845AL+9T4AGA[3]	VG1845AL+9T4IGA[3]	VG1845AL+9T4GGA[3]
VG1845AN		11.7 / 5.8		VG1845AN+9T4AGA[3]	VG1845AN+9T4IGA[3]	VG1845AN+9T4GGA[3]
VG1845BG	3/4	4.7 / 2.9[2]	200	VG1845BG+9T4AGA[3]	VG1845BG+9T4IGA[3]	VG1845BG+9T4GGA[3]
VG1845BL		7.4 / 4.7[2]		VG1845BL+9T4IGA[3]	VG1845BL+9T4IGA[3]	VG1845BL+9T4GGA[3]
VG1845BN		11.7 / 5.8		VG1845BN+9T4AGA[3]	VG1845BN+9T4IGA[3]	VG1845BN+9T4GGA[3]
VG1845CL	1	7.4 / 4.7[2]	200	VG1845CL+9T4GA[3]	VG1845CL+9T4IGA[3]	VG1845CL+9T4GGA[3]
VG1845CN		11.7 / 7.4[2]		VG1845CN+9T4GA[3]	VG1845CN+9T4IGA[3]	VG1845CN+9T4GGA[3]
VG1845CP		18.7 / 9.4		VG1845CP+9T4GA[3]	VG1845CP+9T4IGA[3]	VG1845CP+9T4GGA[3]
VG1845DN	1-1/4	11.7 / 7.4[2]	200	VG1845DN+906AGA	VG1845DN+906IGA	VG1845DN+906GGA
VG1845DP		18.7 / 11.7[2]		VG1845DP+906AGA	VG1845DP+906IGA	VG1845DP+906GGA
VG1845DR		29.2 / 14.6		VG1845DR+906AGA	VG1845DR+906IGA	VG1845DR+906GGA
VG1845EP	1-1/2	18.7 / 11.7[2]	200	VG1845EP+906AGA	VG1845EP+906IGA	VG1845EP+906GGA
VG1845ER		29.2 / 18.7[2]		VG1845ER+906AGA	VG1845ER+906IGA	VG1845ER+906GGA
VG1845ES		46.8 / 23.4		VG1845ES+906AGA	VG1845ES+906IGA	VG1845ES+906GGA
VG1845FR	2	29.2 / 18.7[2]	200	VG1845FR+909AGA	—	VG1845FR+909GGA
VG1845FS		46.8 / 29.2[2]		VG1845FS+909AGA	—	VG1845FS+909GGA
VG1845FT		73.7 / 36.8		VG1845FT+909AGA	—	VG1845FT+909GGA

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. Cv has a characterizing disk.
3. Code numbers shown are for a VA9104-AGA-3S actuator with M3 screw terminals. To specify a 48 inch plenum rated cable, change the 9T4 to 9A4 in the code number for a VA9104-AGA-2S actuator. Example: VG1845AD+**9T4**AGA becomes VG1845AD+**9A4**AGA. To specify a conduit connection or for fluid temperatures greater than 212°F (100°C), change the 9T4 to 906 in the code number for a M9106-AGA-2 actuator. Example: VG1845AD+**9T4**AGA becomes VG1845AD+**906**AGA.

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

Three-Way Non-Spring Return with Two Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off Floating without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				M9106-AGC-2 M9109-AGC-2	M9106-IGC-2	M9106-GGC-2 M9109-GGC-2
VG1845AD	1/2	1.2 / 0,7[2]	200	VG1845AD+906AGC	VG1845AD+906IGC	VG1845AD+906GGC
VG1845AE		1.9 / 1.2[2]		VG1845AE+906AGC	VG1845AE+906IGC	VG1845AE+906GGC
VG1845AF		2.9 / 1.9[2]		VG1845AF+906AGC	VG1845AF+906IGC	VG1845AF+906GGC
VG1845AG		4.7 / 2.9[2]		VG1845AG+906AGC	VG1845AG+906IGC	VG1845AG+906GGC
VG1845AL		7.4 / 4.7[2]		VG1845AL+906AGC	VG1845AL+906IGC	VG1845AL+906GGC
VG1845AN		11.7 / 5.8		VG1845AN+906AGC	VG1845AN+906IGC	VG1845AN+906GGC
VG1845BG	3/4	4.7 / 2.9[2]	200	VG1845BG+906AGC	VG1845BG+906IGC	VG1845BG+906GGC
VG1845BL		7.4 / 4.7[2]		VG1845BL+906AGC	VG1845BL+906IGC	VG1845BL+906GGC
VG1845BN		11.7 / 5.8		VG1845BN+906AGC	VG1845BN+906IGC	VG1845BN+906GGC
VG1845CL	1	7.4 / 4.7[2]	200	VG1845CL+906AGC	VG1845CL+906IGC	VG1845CL+906GGC
VG1845CN		11.7 / 7.4[2*]		VG1845CN+906AGC	VG1845CN+906IGC	VG1845CN+906GGC
VG1845CP		18.7 / 9.4		VG1845CP+906AGC	VG1845CP+906IGC	VG1845CP+906GGC
VG1845DN	1-1/4	11.7 / 7.4[2]	200	VG1845DN+906AGC	VG1845DN+906IGC	VG1845DN+906GGC
VG1845DP		18.7 / 11.7[2]		VG1845DP+906AGC	VG1845DP+906IGC	VG1845DP+906GGC
VG1845DR		29.2 / 14.6		VG1845DR+906AGC	VG1845DR+906IGC	VG1845DR+906GGC
VG1845EP	1-1/2	18.7 / 11.7[2]	200	VG1845EP+906AGC	VG1845EP+906IGC	VG1845EP+906GGC
VG1845ER		29.2 / 18.7[2]		VG1845ER+906AGC	VG1845ER+906IGC	VG1845ER+906GGC
VG1845ES		46.8 / 23.4		VG1845ES+906AGC	VG1845ES+906IGC	VG1845ES+906GGC
VG1845FR	2	29.2 / 18.7[2]	200	VG1845FR+909AGC	—	VG1845FR+909GGC
VG1845FS		46.8 / 29.2[2]		VG1845FS+909AGC	—	VG1845FS+909GGC
VG1845FT		73.7 / 36.8		VG1845FT+909AGC	—	VG1845FT+909GGC

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

Repair Information

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

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

Technical Specifications

VG1000 Three-Way, Stainless Steel Trim Ball Valves with Non-Spring Return Electric Actuators		
Service[1]		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)**	VA9104 and M9104 with M9000-550 Linkage
	284°F (140°C)	M9106 or M9109 with M9000-520 Linkage
Valve Body Pressure/Temperature Rating	**Water**	580 psig (3,996 kPa) (PN40)
	Steam	15 psig (103 kPa) Saturated Steam
Maximum Closeoff Pressure		200 psig (1,378 kPa)
Maximum Recommended Operating Pressure Drop		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: Quiet Service Ball Valves
Flow Characteristics	**Three-Way**	Equal Percentage Flow Characteristics of In-line Port A (Coil) and Linear Flow Characteristics of Angle Port B (Bypass)
Rangeability[2]		Greater than 500:1
Minimum Ambient Operating Temperature		-4°F (-20°C)
Maximum Ambient Operating Temperature[3] **(Limited by the Actuator and Linkage)**	**M9000-550 Linkage (M9104 only)**	140°F (60°C): VA9104 and M9104 Series Non-Spring Return Actuators
	M9000-520 Linkage	125°F (52°C): M9106 and M9109 Series Non-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		NPT
Materials	**Body**	Forged Brass
	Ball	300 Series Stainless Steel
	Blowout-Proof Stem	300 Series Stainless Steel
	Seats	Graphite-Reinforced Polytetrafluoroethylene (PTFE) with ethylene propylene diene monomer (EPDM) O-Ring Backing
	Stem Seals	EPDM Double O-Rings
	Characterizing Disk	Amodel® AS-1145HS Polyphthalamide Resin

1. Refer to VDI 2035 Standard for recommended 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.