

## VG1000 Series Forged Brass Ball Valves for Assembly in the Field

### 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, M9104, M9106, M9109, and M9100 Series Non-Spring Return and M9206 and M9216 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 steam seal — provides a leak-free seal; the packing has been tested and is leak-free after 200,000 cycles in iron-oxide contaminated water
- graphite reinforced Polytetrafluoroethylene (PTFE) seats — include 15% graphite-reinforced ball seals, providing better wear resistance
- 200 psi closeoff pressure rating — provides tight shutoff
- 50 psi maximum differential pressure — controls high differential pressure across flow characterizing disk in full flow applications
- 500:1 rangeability — provides accurate control under all load conditions
- chrome-plated brass ball and stem assembly — handles chilled water and hot water with a fluid temperature range of 23 to 203°F (-5 to 95°C)
- blowout-proof stem — protects the user from the risk of injury



**VG1000 Series Ball Valves Shown with Field Mounted VA9104 and M9000 Series Actuators**

### Selection Charts

#### Series Actuators: Valid Ball Valve, Electric Actuator and Linkage Combinations (for Field Assembly)

Valve Size, in. (mm) <sup>1</sup>	Valve Code Number	Actuator Base Code Number <sup>2</sup>	Linkage Kit Code Number
1/2 (DN15) 3/4 (DN20)	VG1241	VA9104	None Required
	VG1245	M9104	M9000-550
	VG1841	M9106	M9000-520
	VG1845	VA2202	None Required
		M2202	M2000-500
		M9206	M9000-520
1 (DN25)	VG1241	VA9104	None Required
	VG1245	M9104	M9000-550
	VG1841	M9106	M9000-520
	VG1845	M9206	
1-1/4 (DN32) 1-1/2 (DN40)	VG1241	M9106	M9000-520
	VG1245	M9206	
	VG1841 VG1845		
2 (DN50)	VG1241	M9109	M9000-520
	VG1245		
	VG1841	M9216	M9000-510
	VG1845		
3/4 (DN20) Two-Way	VG1243BC	M9106	M9000-512
		M9206	M9000-513
1 (DN25) Two-Way	VG1243DC	M9116	M9000-510
1-1/4 (DN32) Two-Way		M9216	
1-1/2 (DN40) Two-Way	VG1243EC	M9124	M9000-511

1. VA9104, M9104, VA2202, and M2202 have a maximum fluid temperature of 212°F (100°C).

2. VA9104, M9104, M9106, M9109 and M9100 Series Actuators are non-spring return, and M9206 and M9216 Series Actuators are spring return.

## VG1000 Series Forged Brass Ball Valves for Assembly in the Field (Continued)

### Available Ball Valves for Field Assembly<sup>1</sup>

Size, in. (mm)	Closeoff (psig)	Control Disc	Control Port Cv (kv)	Bypass Port Cv (kv) (Three-Way Only)	Plated Brass Ball and Stem (23 to 203°F Fluid Temperature)		Stainless Steel Ball and Stem (-22 to 284°F Fluid Temperature, 15 psi saturated steam)	
					Two-Way	Three-Way	Two-Way	Three-Way
1/2 (DN15)	200	Yes	1.2 (1.0)	0.7 (0.6)	VG1241AD	VG1841AD	VG1245AD	VG1845AD
			1.9 (1.6)	1.2 (1.0)	VG1241AE	VG1841AE	VG1245AE	VG1845AE
			2.9 (2.5)	1.9 (1.6)	VG1241AF	VG1841AF	VG1245AF	VG1845AF
			4.7 (4.0)	2.9 (2.5)	VG1241AG	VG1841AG	VG1245AG	VG1845AG
			7.4 (6.3)	4.7 (4.0)	VG1241AL	VG1841AL	VG1245AL	VG1845AL
		No	11.7 (10.0)	5.8 (5.0)	VG1241AN	VG1841AN	VG1245AN	VG1845AN
3/4 (DN20)	200	Yes	4.7 (4.0)	2.9 (2.5)	VG1241BG	VG1841BG	VG1245BG	VG1845BG
			7.4 (6.3)	4.7 (4.0)	VG1241BL	VG1841BL	VG1245BL	VG1845BL
		No	11.7 (10.0)	5.8 (5.0)	VG1241BN	VG1841BN	VG1245BN	VG1845BN
1 (DN25)	200	Yes	7.4 (6.3)	4.7 (4.0)	VG1241CL	VG1841CL	VG1245CL	VG1845CL
			11.7 (10.0)	5.8 (5.0)	VG1241CN	VG1841CN	VG1245CN	VG1845CN
		No	18.7 (16.0)	9.4 (8.0)	VG1241CP	VG1841CP	VG1245CP	VG1845CP
1-1/4 (DN32)	200	Yes	11.7 (10.0)	5.8 (5.0)	VG1241DN	VG1841DN	VG1245DN	VG1845DN
			18.7 (16.0)	9.4 (8.0)	VG1241DP	VG1841DP	VG1245DP	VG1845DP
		No	29.2 (25.0)	14.6 (12.5)	VG1241DR	VG1841DR	VG1245DR	VG1845DR
1-1/2 (DN40)	200	Yes	18.7 (16.0)	9.4 (8.0)	VG1241EP	VG1841EP	VG1245EP	VG1845EP
			29.2 (25.0)	14.6 (12.5)	VG1241ER	VG1841ER	VG1245ER	VG1845ER
		No	46.8 (40.0)	23.4 (20.0)	VG1241ES	VG1841ES	VG1245ES	VG1845ES
2 (DN50)	200	Yes	29.2 (25.0)	14.6 (12.5)	VG1241FR	VG1841FR	VG1245FR	VG1845FR
			46.8 (40.0)	23.4 (20.0)	VG1241FS	VG1841FS	VG1245FS	VG1845FS
		No	73.7 (63.0)	36.8 (31.5)	VG1241FT	VG1841FT	VG1245FT	VG1845FT

### Full Port Ball Valves (35 to 250°F Fluid Temperature)

3/4 (DN20)	150	No	28.7 (24.6)	—	VG1243BC	—
1 (DN25)			48.3 (41.4)		VG1243CC	
1-1/4 (DN32)			82.6 (70.7)		VG1243DC	
1-1/2 (DN40)			143.4 (122.9)		VG1243EC	

1. Before retrofitting older valves with VA9104, M9104, VA2202, or M2202 actuators be sure that the valves have a tapped hole in the center of the valve stem and no threads in the flange holes. These direct mount actuators do not fit with older valves designed without a tapped center stem hole or with threaded flange mounting holes.

### Repair Parts

Linkage	Replacement Description	Replacement Part Code Number
M9000-51x	Unit replacement	—
M9000-520	Anti-rotation slider, includes carriage screw, washers, and wing nut	M9000-600
	M5 Mounting Screws and Nuts	M9000-601
	Drive Shaft	M9000-602
	Manual Handle and Mounting Screw	M9000-603
M9000-550	Unit Replacement	—
M2000-500	Unit Replacement	—

## VG1000 Series Forged Brass Ball Valves for Assembly in the Field (Continued)

### Technical Specifications

VG1000 Series Forged Brass Ball Valves for Assembly in the Field		
Service <sup>1</sup>		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam <sup>2</sup> for HVAC Systems
Fluid Temperature Limits	Water	VG1241 and VG1841 Series: 23 to 203°F (-5 to 95°C)
		VG1245 and VG1845 Series: -22 to 284°F (-30 to 140°C)
		VG1243 Series: 35 to 250°F (2 to 121°C)
	Steam <sup>2</sup>	VG1245 and VG1243 Series: 15 psig (103 kPa) at 250°F (121°C) VG1241 Series: Not Rated for Steam Service
Maximum Actuator Fluid Temperature Limits	212°F (100°C)	VA2202, VA9104, M2202 with M2000-500 Linkage, and M9104 with M9000-550 Linkage
	284°F (140°C)	M9106, M9109, or M9209 with M9000-520 Linkage, and M9216 with M9000-510 Linkage
Valve Body Pressure/ Temperature Rating	Water	580 psig (3,996 kPa) (PN40)
	Steam <sup>2</sup>	15 psig (103 kPa) Saturated Steam
Maximum Closeoff Pressure	VG1241 and VG1245 Series:	200 psig (1,378 kPa)
	VG1243 Series:	150 psig (1,034 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	Two-Way	Equal Percentage
	Three-Way	Equal Percentage Flow Characteristics of In-line Port (Coil) and Linear Flow Characteristics of Angle Port (Bypass)
Rangeability <sup>3</sup>		Greater than 500:1
Minimum Ambient Operating Temperature	-25°F (-32°C)	M9206 Series Spring Return Actuators
	-22°F (-30°C)	M9216-GGx-2 Series Spring Return Actuators
	-4°F (-20°C)	VA2202, VA9104, M91xx, M9106 and M9109 Series Non-Spring Return Actuators M9216-AGx-2 and M9216-Bxx-2 Series Spring Return Actuators
	32°F (0°C)	VA9104 and M9104 Series Non-Spring Actuators
Maximum Ambient Operating Temperature <sup>2</sup> (Limited by the Actuator and Linkage)	Direct Mount	140°F (60°C): VA9104 Series Non-Spring Return Actuators
	M9000-500 Linkage	122°F (50°C): M2202 Series Spring Return Actuators
	M9000-520 Linkage	125°F (52°C): M9106 and M9109 Series Non-Spring Return Actuators 140°F (60°C): M9206 Series Spring Return Actuators
	M9000-550 Linkage	125°F (52°C): M9104 Series Non-Spring Return Actuators
	M9000-51x Series Linkage	For Fluid Temperature below 212°F (100°C) 122°F (50°C): M9100 Series Non-Spring Return Actuators 122°F (50°C) M9216 Series Spring Return Actuators
		125°F (52°C): M9106 Series Non-Spring Return Actuators
		140°F (60°C): M9206 Series Spring Return Actuators
		For Fluid Temperature between 212 and 284°F (100 and 140°C) <sup>2</sup> 100°F (38°C): For All Actuators
Valve Body Size/Cv (kv)		See Selection Charts.
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4 (Two- and Three-Way Control Port)
		1% of Maximum Flow for Three-Way Bypass Port
End Connections		NPT

1. Refer to VDI 2035 Standard for recommended proper water treatment.

2. In steam applications, install the valve with the stem horizontal to the piping, and wrap the valve and piping with insulation.

3. Rangeability is defined as the ratio of maximum controllable flow to minimum controllable flow.