

# 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 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 and single point of contact information.

## Features

- National Pipe Thread (NPT), sweat, and press end connections—provide the right valve for a broad range of applications, reduce installation time while reducing the need for adapters, and increase system reliability.

- 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.
- Graphite-reinforced Polytetrafluoroethylene (PTFE) seats—include 15% graphite-reinforced ball seats, providing better wear resistance.
- 200 psi closeoff pressure rating—provides tight shutoff.
- 500:1 rangeability—provides accurate control under all load conditions.
- Chrome-plated brass ball and stem assembly standard—handles both chilled and hot water applications 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



## Selection Charts

Valid Ball Valve, Electric Actuator, Linkage Kit, and Weather Shield Combinations (for Assembly in the Field) (Part 1 of 3)

Valve Size, in. (DN)	Valve Code Numbers			Actuator Base Number <sup>1</sup>	Linkage Kit Code Number			Weather Shield
	NPT End Connection	Sweat End Connection	Press End Connection		Fluid Temperatures (<203°F [95°C])	Fluid Temperatures (<212°F [100°C])	Fluid Temperatures (≥212°F [100°C])	
1/2 (DN15)	VG1241Ax VG1841Ax		VG1291Ax VG1891Ax	VA9104 <sup>2</sup>	None Required	Not Rated	Not Rated	M9000-342
				M9104 <sup>2</sup>	M9000-551			
				VA9300	None Required			
				M9300	M9310-500			
				VA9203	None Required			
				M9203	M9000-560			
	VG1245Ax VG1845Ax	VG1275Ax VG1875Ax	VG1295Ax VG1895Ax	VA9104 <sup>2</sup>	None Required	M9000-561		
				M9104 <sup>2</sup>	M9000-551			
				VA9300	None Required			
				M9300	M9310-500			
				VA9203	None Required			
				M9203	M9000-560			

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

Valid Ball Valve, Electric Actuator, Linkage Kit, and Weather Shield Combinations (for Assembly in the Field) (Part 2 of 3)

Valve Size, in. (DN)	Valve Code Numbers			Actuator Base Number <sup>1</sup>	Linkage Kit Code Number			Weather Shield							
	NPT End Connection	Sweat End Connection	Press End Connection		Fluid Temperatures (<203°F [95°C])	Fluid Temperatures (<212°F [100°C])	Fluid Temperatures (≥212°F [100°C])								
3/4 (DN20)	VG1241Bx VG1841Bx		VG1291Bx VG1891Bx	VA9104 <sup>2</sup>	None Required	Not Rated	Not Rated	M9000-342							
				M9104 <sup>2</sup>	M9000-551										
				VA9300	None Required										
				M9300	M9310-500										
				VA9203	None Required										
				M9203	M9000-560										
	VG1245Bx VG1845Bx	VG1275Bx VG1875Bx	VG1295Bx VG1895Bx	VA9104 <sup>2</sup>	None Required	M9000-561									
				M9104 <sup>2</sup>	M9000-551										
				VA9300	None Required										
				M9300	M9310-500										
				VA9203	None Required										
				M9203	M9000-560										
				1 (DN25)	VG1241Cx VG1841Cx		VG1271Cx VG1871Cx		VG1291Cx VG1891Cx	VA9104 <sup>2</sup>	None Required	Not Rated	Not Rated	M9000-342	
										M9104 <sup>2</sup>	M9000-551				
VA9300	None Required														
M9300	M9310-500														
VA9203	None Required														
M9203	M9000-560														
VG1245Cx VG1845Cx	VG1275Cx VG1875Cx	VG1295Cx VG1895Cx	VA9104 <sup>2</sup>		None Required	M9000-561									
			M9104 <sup>2</sup>		M9000-551										
			VA9300		None Required										
			M9300		M9310-500										
			VA9203		None Required										
			M9203		M9000-560										
			1-1/4 (DN32)		VG1241Dx VG1841Dx				VA9300	None Required	Not Rated	Not Rated	M9000-342		
									M9300	M9310-500					
VA9208	None Required														
M9208	M9000-550														
VG1245Dx VG1845Dx					VA9300	None Required	M9000-561								
					M9300	M9310-500									
					VA9208	None Required									
					M9208	M9000-560									
					1-1/2 (DN40)	VG1241Ex VG1841Ex				VA9300	None Required	Not Rated		Not Rated	M9000-342
										M9300	M9310-500				
VA9208	None Required														
M9208	M9000-560														
VG1245Ex VG1845Ex				VA9300		None Required	M9000-561								
				M9300		M9310-500									
				VA9208		None Required									
				M9208		M9000-560									

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

Valid Ball Valve, Electric Actuator, Linkage Kit, and Weather Shield Combinations (for Assembly in the Field) (Part 3 of 3)

Valve Size, in. (DN)	Valve Code Numbers			Actuator Base Number <sup>1</sup>	Linkage Kit Code Number			Weather Shield
	NPT End Connection	Sweat End Connection	Press End Connection		Fluid Temperatures (<203°F [95°C])	Fluid Temperatures (<212°F [100°C])	Fluid Temperatures (≥212°F [100°C])	
2 (DN50)	VG1241Fx VG1841Fx			VA9300	None Required	Not Rated	Not Rated	M9000-342
				M9300	M9310-500			
				VA9208	None Required			
				M9208	M9000-560			
	VG1245Fx VG1845Fx			VA9300	None Required	M9000-561		
				M9300	M9310-500			
				VA9208	None Required			
				M9208	M9000-560			

1. VA9104, M9104, VA9300, and M9300 Series Actuators are non-spring-return, and VA9203, M9203, VA9208, and M9208 Series Actuators are spring-return. Note: VA9104, M9104, VA9300, M9300, VA9203, M9203, VA9208, and M9208 have a maximum fluid temperature limit of 212°F (100°C) unless used with the M9000-561 Thermal Barrier.
2. To avoid excessive wear or drive time on the motor for VA9104 and M9104 use a controller and/or software that provides a timeout function to remove the signal at the end of rotation (stall). The IGx and GGx models have an automatic shutoff to avoid excessive wear or drive time on the motor.

### Ball Valves (for Assembly in the Field)<sup>1</sup>

Size, in. (mm)	Closeoff psig	Characterizing Disc	Control Port Cv (Kvs)	Bypass Port Cv (Kvs) (Three-Way Only)	Plated Brass Ball and Stem 23 to 203°F (-5 to 95°C) Fluid Temperature		Stainless Steel Ball and Stem -22 to 284°F (-30 to 140°C) Fluid Temperature, 15 psi Saturated Steam		
					Two-Way	Three-Way	Two-Way	Three-Way	
					NPT Threaded End Connection Valves				
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	
3/4 (DN20)	200	No	11.7 (10.0)	5.8 (5.0)	VG1241AN	VG1841AN	VG1245AN	VG1845AN	
			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
1 (DN25)	200	No	11.7 (10.0)	5.8 (5.0)	VG1241BN	VG1841BN	VG1245BN	VG1845BN	
			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
1-1/4 (DN32)	200	No	18.7 (16.0)	9.4 (8.0)	VG1241CP	VG1841CP	VG1245CP	VG1845CP	
			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
1-1/2 (DN40)	200	No	29.2 (25.0)	14.6 (12.5)	VG1241DR	VG1841DR	VG1245DR	VG1845DR	
			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
2 (DN50)	200	No	46.8 (40.0)	23.4 (20.0)	VG1241ES	VG1841ES	VG1245ES	VG1845ES	
			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	

1. Before retrofitting older valves with VA9104, VA9300, VA9203, or VA9208 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 older valves designed without a tapped center stem hole or with threaded flange mounting holes unless they are used with the M9000-561 Thermal Barrier kit.

### Repair Parts

Linkage	Replacement Description	Code Number
M9000-551	Linkage with Handle for VA9104 and M9104 Series Actuators	Unit Replacement
M9000-560	Linkage for VA9203/M9203 and VA9203/M9208 Series Actuators	Unit Replacement
M9000-561	Thermal Barrier for VA9104/VA9203/VA9208/VA9300 Series Actuators	Unit Replacement
M9310-500	Linkage for VA9300/M9300 Actuators	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		
<b>Service<sup>1</sup></b>		Hot water, chilled water, 50/50 Glycol solutions, and 15 psig (103 kPa) saturated steam <sup>2</sup> for HVAC systems
<b>Fluid Temperature Limits</b>	<b>Water</b>	VG12x1 and VG18x1 Series: 23 to 203°F (-5 to 95°C) VG12x5 and VG18x5 Series: -22 to 284°F (-30 to 140°C)
	<b>Steam<sup>2</sup></b>	VG12x1 and VG18x1 Series: Not Rated for Steam Service VG12x5 and VG18x5 Series: 15 psig (103 kPa) at 250°F (121°C)
<b>Maximum Actuator Fluid Temperature Limits</b>	<b>212°F (100°C)</b>	VA9104, VA9300, VA9203, VA9208
	<b>284°F (140°C)</b>	VA9104, VA9300, VA9203, VA9208 with M9000-561 Thermal Barrier
<b>Valve Body Pressure Rating</b>	<b>Water</b>	VG1241, VG1245, VG1841, and VG1845 Series: 580 psig (4,000 kPa) (PN40), 464 psig (3,196 kPa) at 284°F (140°C) (PN40)
		VG1275 and VG1875 Series: 300 psig (2,067 kPa)
		VG1295 and VG1895 Series: 300 psig (2,067 kPa)
	<b>Steam<sup>2</sup></b>	15 psig (103 kPa) saturated steam
<b>Maximum Closeoff Pressure</b>	<b>VG12x1 and VG12x5 Series:</b>	200 psid (1,378 kPa)
<b>Maximum Recommended Operating Pressure Drop</b>		50 psid (340 kPa)
<b>Flow Characteristics</b>	<b>Two-Way</b>	Equal percentage
	<b>Three-Way</b>	Equal percentage flow characteristics of in-line port (coil) and linear flow characteristics of angle port (bypass)
<b>Rangeability<sup>3</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>	VA9203 and VA9300 Series Spring-Return Actuators
	<b>-40°F (-40°C)</b>	VA9208 Series Spring-Return Actuators
<b>Maximum Ambient Operating Temperature<sup>2</sup> (Limited by the Actuator and Linkage)</b>	<b>140°F (60°C)</b>	VA9104 and M9300 Series Non-Spring-Return Actuators VA9203 and VA9208 Series Spring-Return Actuators
<b>Leakage</b>		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
		1% of maximum flow for three-way bypass port
<b>End Connections</b>		NPT: 1/2 through 2 in.
		Sweat: 1/2 through 1 in. (DN15 through DN25)
		Press (ProPress® Compatible): 1/2 through 1 in. (DN15 through DN25)
<b>Materials</b>	<b>Body</b>	Forged Brass
	<b>Ball</b>	VG12x1 and VG18x1 Series: chrome plated brass
		VG12x5 and VG18x5 Series: 300 Series stainless steel
	<b>Blowout-Proof Stem</b>	VG12x1 and VG18x1 Series: nickel plated brass
		VG12x5 and VG18x5 Series: 300 Series stainless steel
	<b>Seats</b>	Graphite-Reinforced PTFE with 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>		For NPT threaded valves with stainless steel ball (VG1x45...): 0C16910.5C

1. Refer to the VDI 2035 Guideline 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.