

VG1000 Series

Forged Brass Ball Valves for Assembly in the Field

Description

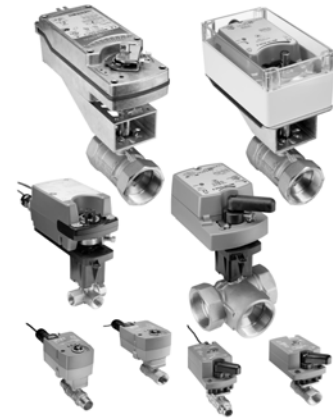
VG1000 Series Ball Valves are designed to regulate the flow of hot or chilled water and, for some models, low pressure steam in response to the demand of a controller in Heating, Ventilating, and Air Conditioning (HVAC) systems. Available in sizes 1/2 through 2 in. (DN15 through DN50), this family of two- 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

- 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 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
- 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 Shown with Field Mounted VA9104 and M9000 Series Actuators

Repair Information

If the VG1000 Series Ball Valve fails to operate within its specifications, refer to the following table for a list of repair parts available.

Selection Charts

Valid Ball Valve, Electric Actuator, Linkage Kit, and Weather Shield Combinations (for Assembly in the Field) (Part 1 of 2)

Valve Size, in. (DN)	Valve Code Numbers			Actuator Base Number ¹	Linkage Kit Code Number	Weather Shield
	NPT End Connection	Sweat End Connection	Press End Connection			
1/2 (DN15)	VG1241Ax	VG1271Ax	VG1291Ax	VA9104 ²	None Required	
	VG1245Ax	VG1275Ax	VG1295Ax	M9104 ²	M9000-550	
	VG1841Ax	VG1871Ax	VG1891Ax	VA2202	None Required	
	VG1845Ax	VG1875Ax	VG1895Ax	M2202	M2000-500	
				M9106 ²	M9000-520	
				M9206		
				M9108	M9000-516	M9000-330
				M9210	M9000-517	M9000-340
3/4 (DN20)	VG1241Bx	VG1271Bx	VG1291Bx	VA9104 ²	None Required	
	VG1245Bx	VG1275Bx	VG1295Bx	M9104 ²	M9000-550	
	VG1841Bx	VG1871Ax	VG1891Bx	VA2202	None Required	
	VG1845Bx	VG1875Ax	VG1895Bx	M2202	M2000-500	
				M9106 ²	M9000-520	
				M9206		
				M9108	M9000-516	M9000-330
				M9210	M9000-517	M9000-340
1 (DN25)	VG1241Cx	VG1271Cx	VG1291Cx	VA9104 ²	None Required	
	VG1245Cx	VG1275Cx	VG1295Cx	M9104 ²	M9000-550	
	VG1841Cx	VG1871Cx	VG1891Cx	VA2202	None Required	
	VG1845Cx	VG1875Cx	VG1895Cx	M9106 ²	M9000-520	
				M9206		
				M9108	M9000-516	M9000-330
				M9210	M9000-517	M9000-340

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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 2)

Valve Size, in. (DN)	Valve Code Numbers			Actuator Base Number ¹	Linkage Kit Code Number	Weather Shield
	NPT End Connection	Sweat End Connection	Press End Connection			
1-1/4 (DN32)	VG1241Dx VG1245Dx VG1841Dx VG1845Dx			M9106 ² M9206	M9000-520	
				M9108	M9000-516	M9000-330
				M9210	M9000-517	M9000-340
1-1/2 (DN40)	VG1241Ex VG1245Ex VG1841Ex VG1845Ex			M9106 ² M9206	M9000-520	
				M9108	M9000-516	M9000-330
				M9210	M9000-517	M9000-340
2 (DN50)	VG1241Fx VG1245Fx VG1841Fx VG1845Fx			M9109 ² M9116	M9000-520	
				M9116	M9000-516	M9000-330
				M9210	M9000-517	M9000-340

1. VA9104, M9104, M9106, M9109 and M9100 Series Actuators are non-spring return, and VA2202, M2202, M9206 and M9210 Series Actuators are spring return. Note: VA9104, M9104, VA2202, and M2202 have a maximum fluid temperature limit of 212°F (100°C).

2. To avoid excessive wear or drive time on the motor for VA9104, M9104, M9106, and M9109 AGx models, 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.

Available Ball Valves for Field Assembly¹ (Part 1 of 2)

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
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
		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
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
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
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
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



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

Available Ball Valves for Field Assembly¹ (Part 2 of 2)

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
Sweat End Connection Valves								
1/2 (DN15)	200	Yes	1.2 (1.0)	0.7 (0.6)	VG1271AD	VG1871AD	VG1275AD	VG1875AD
			1.9 (1.6)	1.2 (1.0)	VG1271AE	VG1871AE	VG1275AE	VG1875AE
			2.9 (2.5)	1.9 (1.6)	VG1271AF	VG1871AF	VG1275AF	VG1875AF
			4.7 (4.0)	2.9 (2.5)	VG1271AG	VG1871AG	VG1275AG	VG1875AG
			7.4 (6.3)	4.7 (4.0)	VG1271AL	VG1871AL	VG1275AL	VG1875AL
		No	11.7 (10.0)	5.8 (5.0)	VG1271AN	VG1871AN	VG1275AN	VG1875AN
3/4 (DN20)	200	Yes	4.7 (4.0)	2.9 (2.5)	VG1271BG	VG1871BG	VG1275BG	VG1875BG
			7.4 (6.3)	4.7 (4.0)	VG1271BL	VG1871BL	VG1275BL	VG1875BL
		No	11.7 (10.0)	5.8 (5.0)	VG1271BN	VG1871BN	VG1275BN	VG1875BN
1 (DN25)	200	Yes	7.4 (6.3)	4.7 (4.0)	VG1271CL	VG1871CL	VG1275CL	VG1875CL
			11.7 (10.0)	5.8 (5.0)	VG1271CN	VG1871CN	VG1275CN	VG1875CN
		No	18.7 (16.0)	9.4 (8.0)	VG1271CP	VG1871CP	VG1275CP	VG1875CP
Press End Connection Valves								
1/2 (DN15)	200	Yes	1.2 (1.0)	0.7 (0.6)	VG1291AD	VG1891AD	VG1295AD	VG1895AD
			1.9 (1.6)	1.2 (1.0)	VG1291AE	VG1891AE	VG1295AE	VG1895AE
			2.9 (2.5)	1.9 (1.6)	VG1291AF	VG1891AF	VG1295AF	VG1895AF
			4.7 (4.0)	2.9 (2.5)	VG1291AG	VG1891AG	VG1295AG	VG1895AG
			7.4 (6.3)	4.7 (4.0)	VG1291AL	VG1891AL	VG1295AL	VG1895AL
		No	11.7 (10.0)	5.8 (5.0)	VG1291AN	VG1891AN	VG1295AN	VG1895AN
3/4 (DN20)	200	Yes	4.7 (4.0)	2.9 (2.5)	VG1291BG	VG1891BG	VG1295BG	VG1895BG
			7.4 (6.3)	4.7 (4.0)	VG1291BL	VG1891BL	VG1295BL	VG1895BL
		No	11.7 (10.0)	5.8 (5.0)	VG1291BN	VG1891BN	VG1295BN	VG1895BN
1 (DN25)	200	Yes	7.4 (6.3)	4.7 (4.0)	VG1291CL	VG1891CL	VG1295CL	VG1895CL
			11.7 (10.0)	5.8 (5.0)	VG1291CN	VG1891CN	VG1295CN	VG1895CN
		No	18.7 (16.0)	9.4 (8.0)	VG1291CP	VG1891CP	VG1295CP	VG1895CP

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 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	—



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

Technical Specifications

VG1000 Series Forged Brass Ball Valves for Assembly in the Field		
Service ¹		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam ² for HVAC Systems
Fluid Temperature Limits	Water	VG12x1 and VG18x1 Series: 23 to 203°F (-5 to 95°C) VG12x5 and VG18x5 Series: -22 to 284°F (-30 to 140°C)
	Steam ²	VG12x5 and VG1845 Series: 15 psig (103 kPa) at 250°F (121°C) VG12x1 and VG1841 Series: Not Rated for Steam Service
Maximum Actuator Fluid Temperature Limits	212°F (100°C)	VA2202, VA9104, M2202 with M2000-500 Linkage, M9104 with M9000-550 Linkage
	284°F (140°C)	M9106, M9109, or M9206 with M9000-550 Linkage, M9210 with M9000-517 Linkage
Valve Body Pressure Rating	Water	VG1241, VG1245, VG1841, and VG1845 Series: 580 psig (3,999 kPa) (PN40), 464 psig (3,196 kPa) at 284°F (140°C) (PN40) VG1271, VG1275, VG1871, and VG1875 Series: 300 psig (2,067 kPa) VG1291, VG1295, VG1891, and VG1895 Series: 300 psig (2,067 kPa)
	Steam ²	15 psig (103 kPa) Saturated Steam
Maximum Closeoff Pressure	VG12x1 and VG12x5 Series:	200 psig (1,378 kPa)
	VG1243 Series:	150 psig (1,034 kPa)
Maximum Recommended Operating Pressure Drop		Maximum Differential Pressure: 50 psi for Valves with Characterized Flow Control Disk 30 psi for 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 ³		Greater than 500:1
Minimum Ambient Operating Temperature	-25°F (-32°C)	M9206 Series Spring Return Actuators
	-22°F (-30°C)	VA2202 and M2202 Series Spring Return Actuators
	-4°F (-20°C)	VA9104, M9104, M9106, and M9109 Series Non-Spring Return Actuators
	-40°F (-40°C)	M9210 Series Spring Return Actuators
Maximum Ambient Operating Temperature ² (Limited by the Actuator and Linkage)	Direct Mount	140°F (60°C): VA9104 Series Non-Spring Return Actuators 122°F (50°C): VA2202 Series Spring Return Actuators
	M9000-550 Linkage	140°F (60°C): M9104 Series Non-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
	M2000-500 Linkage	122°F (50°C): M2202 Series Spring Return Actuators
	M9000-51x Series Linkage	125°F (52°C): M9106 Series Non-Spring Return Actuators 122°F (50°C): M9100 Series Non-Spring Return Actuators 140°F (60°C): M9206 Series Spring Return Actuators 131°F (55°C): M9210 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		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)
Materials	Body	Forged Brass
	Ball	VG12x1 and VG18x1 Series: Chrome Plated Brass
		VG12x5 and VG18x5 Series: 300 Series Stainless Steel
	Blowout-Proof Stem	VG12x1 and VG18x1 Series: Nickel Plated Brass
		VG12x5 and VG18x5 Series: 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	

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.