

VG1000 Series Forged Brass Ball Valves for Assembly in the Field

Product Bulletin

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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 DN15 through DN50. You can factory or field-mount the two-way and three-way forged brass valves 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.

Features

- The 300 Series stainless steel ball and stem assembly tolerates high-temperature water or 1 bar saturated steam with fluid temperatures of -30 to 140°C or where a higher degree of corrosion protection is desired.
- The 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.
- The Graphite-reinforced Polytetrafluoroethylene (PTFE) seats include 15% graphite-reinforced ball seats, providing better wear resistance.
- The 13.8 bar closeoff pressure rating provides tight shutoff.
- The 500:1 rangeability provides accurate control under all load conditions.
- The Blowout-proof stem protects the user from the risk of injury.

Figure 1: VG1000 Series Forged Brass Ball Valve



Selection charts

Table 1: BSPP Ball Valves (for assembly in the field)

Size	Pressure rating	Characterizing Disc	Control port Kvs	Bypass port Kvs	Stainless steel ball and stem -30 to 140°C fluid temperature, 100 kPa saturated steam	
					2-way	3-way
DN15	PN40	Yes	1.0	0.6	VG1205AD	VG1805AD
			1.6	1.0	VG1205AE	VG1805AE
			2.5	1.6	VG1205AF	VG1805AF
			4.0	2.5	VG1205AG	VG1805AG
			6.3	4.0	VG1205AL	VG1805AL
No		10	5.0	VG1205AN	VG1805AN	
DN20		Yes	6.3	4.0	VG1205BL	VG1805BL
		No	10	5.0	VG1205BN	VG1805BN
DN25		Yes	10	8.0	VG1205CN	VG1805CN
		No	16	8.0	VG1205CP, VG1205CP-C	VG1805CP
DN32		Yes	16	10	VG1205DP, VG1205DP-C	VG1805DP
		No	25	12.5	VG1205DR, VG1205DR-C	VG1805DR
DN40		Yes	25	16	VG1205ER, VG1205ER-C	VG1805ER
		No	40	20	VG1205ES, VG1205ES-C	VG1805ES
DN50		Yes	40	25	VG1205FS, VG1205FS-C	VG1805FS
		No	63	31.5	VG1205FT, VG1205FT-C	VG1805FT

Note: 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.

Table 2: Valid ball valve, electric actuator and linkage kit combinations (for assembly in the field)

	Size	Fluid temperatures		Actuator	Close-off pressure
		-30 to 100°C	-30 to 140°C		
Two-way	DN15	VG1205Ax	VG1205Ax + M9000-561	VA9104	1378 kPa
				VA9310	
				VA9203	
	DN20	VG1205Bx	VG1205Bx + M9000-561	VA9104	
				VA9310	
				VA9203	
	DN25	VG1205Cx	VG1205Cx + M9000-561	VA9104	
				VA9310	
				VA9203	
	DN32	VG1205Dx	VG1205Dx + M9000-561	VA9104 ¹	
				VA9310	
				VA9208	
	DN40	VG1205Ex	VG1205Ex + M9000-561	VA9104 ¹	800 kPa
				VA9310	1378 kPa
				VA9208	
	DN50	VG1205Fx	VG1205Fx + M9000-561	VA9104 ¹	600 kPa
				VA9310	1378 kPa
				VA9208	

1. The VA9104 actuator only applies to the VG1205xx-C valve.

Three-way	DN15	VG1805Ax	VG1805Ax + M9000-561	VA9104	1378 kPa
				VA9310	
				VA9203	
	DN20	VG1805Bx	VG1805Bx + M9000-561	VA9104	
				VA9310	
				VA9203	
	DN25	VG1805Cx	VG1805Cx + M9000-561	VA9104	
				VA9310	
				VA9203	
	DN32	VG1805Dx	VG1805Dx + M9000-561	VA9310	
				VA9208	
	DN40	VG1805Ex	VG1805Ex + M9000-561	VA9310	
				VA9208	
	DN50	VG1805Fx	VG1805Fx + M9000-561	VA9310	
				VA9208	

Note: VA9104 and VA9300 Series Actuators are non-spring-return, and VA9203 and VA9208 Series Actuators are spring-return. VA9104, VA9300, VA9203, and VA9208 have a maximum fluid temperature limit of 100°C unless used with the M9000-561 Thermal Barrier. To avoid excessive wear or drive time on the motor for VA9104 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.

Repair parts

Table 3: Transforming a damper actuator (M9xxx) into a valve actuator (VA9xxx)

Valve actuator		Damper actuator		Linkage
VA9104	=	M9104	+	M9000-551
VA9310	=	M9310	+	M9310-500
VA9203	=	M9203	+	M9000-560
VA9208	=	M9208	+	M9000-550

Table 4: Accessories

Part	Description
M9000-561	Thermal Barrier for VA9104/VA9203/VA9208/VA9300 Series

Application overview

Available in sizes 1/2 through 2 in. (DN15 through DN50), VG1000 Series Ball Valves are designed specifically for automated commercial HVAC service. These valves feature a forged brass body with either a chrome-plated brass ball for water or glycol solutions to 203°F (95°C), or a 300 Series stainless steel ball for high temperature water to 284°F (140°C) and saturated steam to 15 psi. The Amodel® Flow Characterizing Disk maintains equal percentage flow characteristics for optimum temperature control, as shown in Figure 7. The blowout-proof stem and mounting flange, combined with an innovative double o-ring stem seal and self-centering stem bushing design (shown in Figure 8) provide quick and easy electric actuator field mounting while ensuring long life and leak-free valve performance. The specially engineered, graphite-reinforced PTFE seat with flexible PTFE seat design (backed with EPDM o-rings) significantly reduces the operating torque, allowing the smallest possible electric actuator available to provide the force required for the specific application. All valve and actuator assemblies provide 200 psig (1,379 kPa) closeoff pressure while ensuring operation after long idle periods. Because of their cost-effective, reliable design, VG1000 Series Ball Valves are maintenance free.

VA9000 Series Electric Actuators include mounting hardware for direct coupling to VG1000 Series Ball Valves. M9000 Series Electric Actuators require additional Valve Linkage Kits. See Table 2 for valid valve, actuator, and linkage kit combinations for assembly in the field.

VG1000 Series Ball Valves are designed for factory or field mounting to a wide variety of Johnson Controls® M9000 and VA9000 Series Electric Actuators. Control signal selections include:

- floating point without timeout
- on/off and floating point
- on/off
- proportional

IMPORTANT:

The VG1000 Series Valves are intended to control saturated steam, hot water, and chilled water flow under normal equipment operating conditions. Where failure or malfunction of the VG1000 Series Valve could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the system. Incorporate and maintain other devices such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the VG1000 Series Valve.

Figure 2: Internal view of a typical VG1000 Series Ball Valve

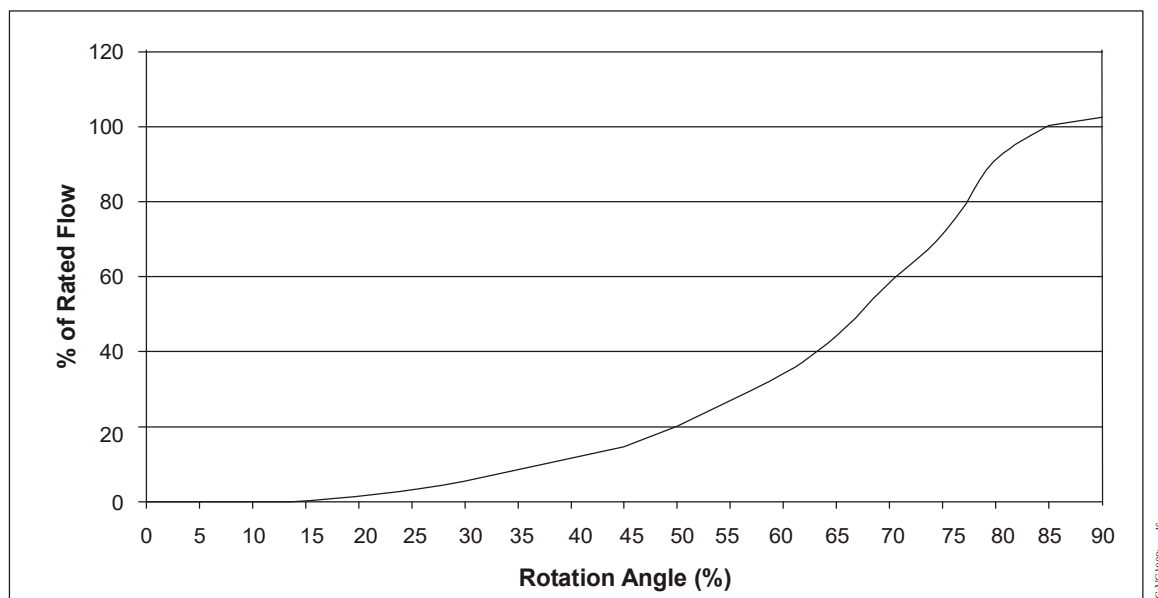


Figure 3: Typical VG1000 piping applications

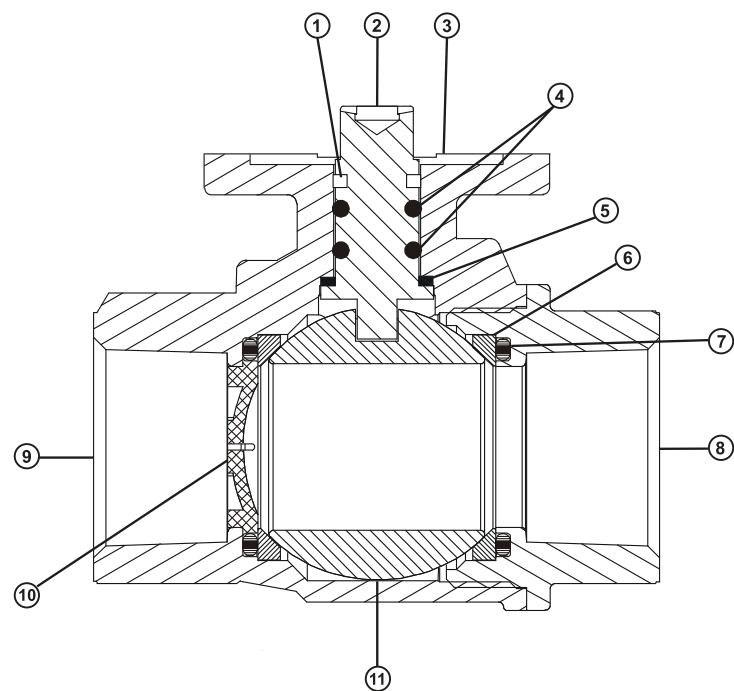


Table 5: Typical VG1000 piping applications

Callout	Component
1	Centering bushing
2	Blowout-proof valve stem (square-head)
3	Actuator mounting flange
4	EPDM double o-ring stem seals
5	Thrust washer
6	Graphite-reinforced PTFE seats
7	EPDM o-rings
8	Outlet port
9	Inlet port (port A)
10	Characterizing disc
11	Ball

Figure 4: Three-way piping application

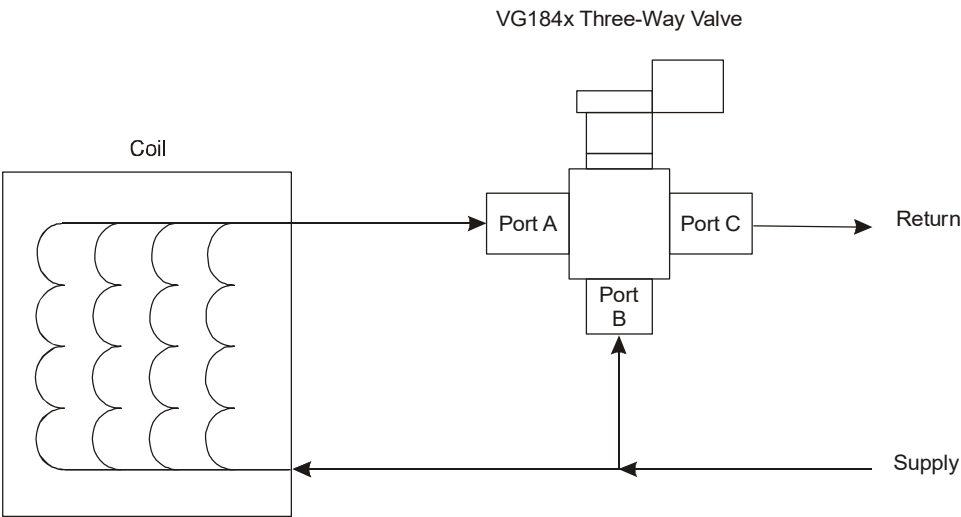
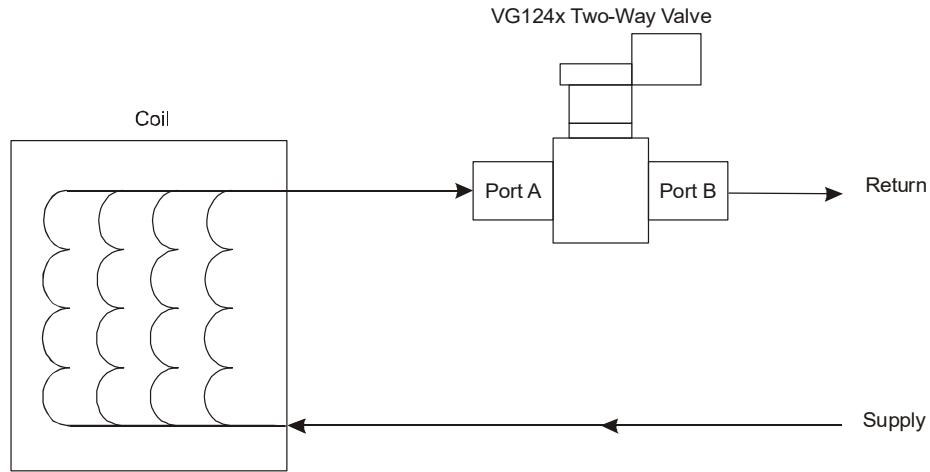


Figure 5: Two-way piping application



Note: Mount the valve downstream from the coil to minimize head transfer to the actuator. Exercise the valve prior to restart after off season to avoid any torque increase arising from shut down to avoid application problems.

Dimensions

Figure 6: VA9104 Actuated VG1205 and VG1805 Series Ball Valve with BSPP end connections with and without optional M9000-561 Thermal Barrier dimensions

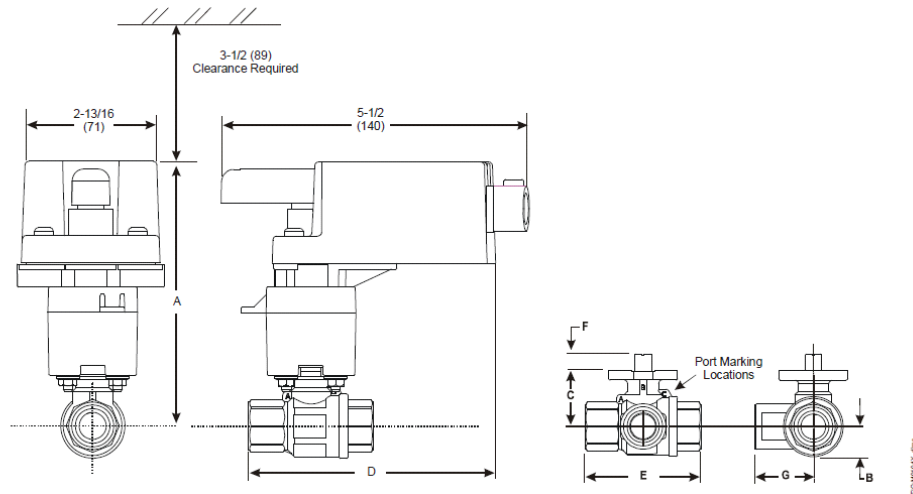


Table 6: VA9104 Actuated VG1205 and VG1805 Series Ball Valve with BSPP end connections with and without optional M9000-561 Thermal Barrier dimensions

Valve size, in. (mm)	A without thermal barrier	A with thermal barrier	B	C	D	E	F	G
1/2 (DN15)	3-7/8 (98)	5-11/32 (135)	21/32 (17)	1-7/32 (31)	5-7/64 (129)	2-5/8 (67)	11/32 (9)	1-19/64 (33)
3/4 (DN20)	3-7/8 (98)	5-11/32 (135)	21/32 (17)	1-7/32 (31)	5-7/32 (133)	2-61/64 (75)	11/32 (9)	1-1/2 (38)
1 (DN25)	3-11/16 (100)	5-27/64 (137)	3/4 (19)	1-19/64 (33)	5-9/16 (141)	3-5/8 (92)	11/32 (9)	1-13/16 (46)
1-1/4 (DN32)	4-3/8 (111)	5-3/4 (146)	1-1/32 (26)	1-23/32 (44)	5-29/32 (150)	4-19/64 (109)	11/32 (9)	2-1/8 (54)
1-1/2 (DN40)	4-17/32 (115)	5-29/32 (150)	1-1/8 (29)	1-7/8 (48)	6-1/8 (155)	4-11/16 (119)	11/32 (9)	2-21/64 (59)
2 (DN50)	4-23/32 (120)	6-1/8 (155)	1-15/32 (37)	2-1/16 (53)	6-1/2 (165)	5-31/64 (139)	11/32 (9)	2-29/32 (74)

Figure 7: VA9203 Actuated VG1205 and VG1805 Series Ball Valve with BSPP end connections with and without optional M9000-561 Thermal Barrier dimensions

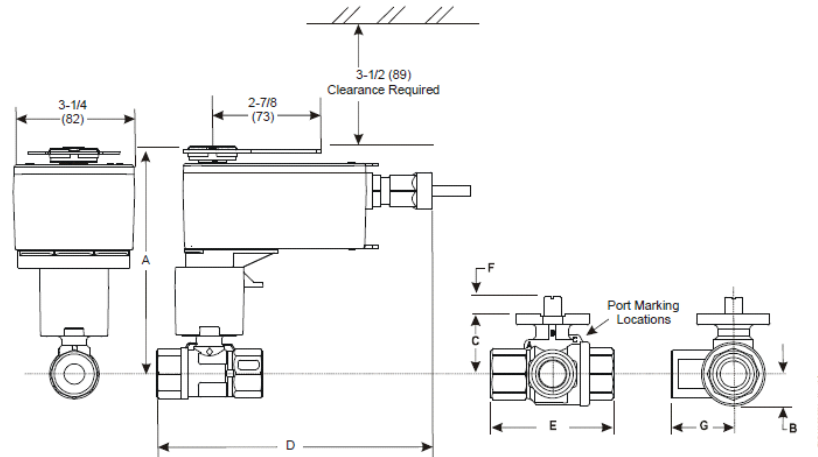


Table 7: VA9203 Actuated VG1205 and VG1805 Series Ball Valve with BSPP end connections with and without optional M9000-561 Thermal Barrier dimensions

Valve size, in. (mm)	A without thermal barrier	A with thermal barrier	B	C	D	E	F	G
1/2 (DN15)	4-1/4 (108)	6 (152)	21/32 (17)	1-7/32 (31)	6-31/32 (177)	2-5/8 (67)	11/32 (9)	1-19/64(33)
3/4 (DN20)	4-1/4 (108)	6 (152)	21/32 (17)	1-7/32 (31)	7-1/8 (181)	2-61/64 (75)	11/32 (9)	1-1/2 (38)
1 (DN25)	4-9/32 (109)	6-1/16 (154)	3/4 (19)	1-19/64 (33)	7-31/64 (190)	3-5/8 (92)	11/32 (9)	1-13/16 (46)

Figure 8: VA9310 Actuated VG1205 and VG1805 Series Ball Valve with BSPP end connections with and without optional M9000-561 Thermal Barrier, and M9300-2 Switch Kit

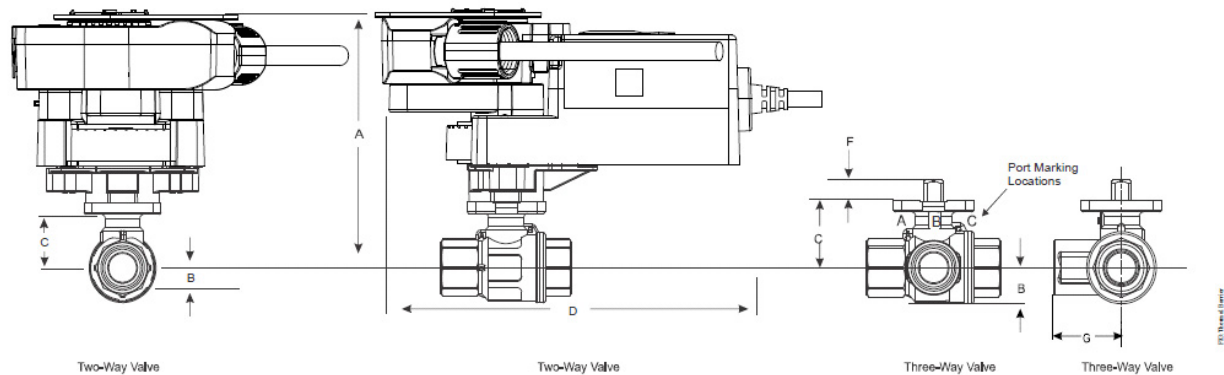


Table 8: VA9310 Actuated VG1205 and VG1805 Series Ball Valve with BSPP end connections with and without optional M9000-561 Thermal Barrier, and M9300-2 Switch Kit

Valve size, in. (mm)	A without thermal barrier	A with thermal barrier	B	C	D	E	F	G
1/2 (DN15)	4-3/4 (121)	5-3/4 (146)	21/32 (17)	1-7/32 (31)	6-21/32 (169)	2-5/8 (67)	11/32 (9)	1-19/64 (33)
3/4 (DN20)	4-3/4 (121)	5-3/4 (146)	21/32 (17)	1-7/32 (31)	6-21/32 (169)	2-61/64 (75)	11/32 (9)	1-1/2 (38)
1 (DN25)	4-21/25 (123)	5-13/16 (148)	3/4 (19)	1-19/64 (33)	6-21/32 (169)	3-5/8 (92)	11/32 (9)	1-13/16 (46)
1-1/4 (DN32)	5-1/4 (134)	6-1/4 (159)	1-1/32 (26)	1-23/32 (44)	6-21/32 (169)	4-19/64 (109)	11/32 (9)	2-1/8 (54)
1-1/2 (DN40)	5-3/8 (138)	6-13/32 (163)	1-1/8 (29)	1-7/8 (48)	6-21/32 (169)	4-11/16 (119)	11/32 (9)	2-21/64 (59)
2 (DN50)	5-5/8 (143)	6-5/8 (168)	1-15/32 (37)	2-1/16 (53)	6-21/32 (169)	5-31/64 (139)	11/32 (9)	2-29/32 (74)

Figure 9: VA9208 Actuated VG1205 and VG1805 Series Ball Valve with BSPP end connections with and without optional M9000-561 Thermal Barrier

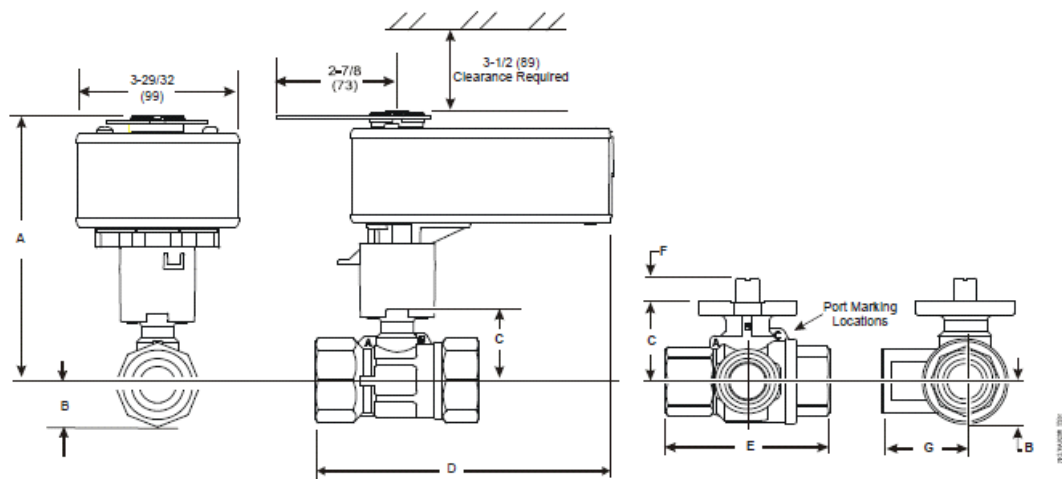


Table 9: VA9208 Actuated VG1205 and VG1805 Series Ball Valve with BSPP end connections with and without optional M9000-561 Thermal Barrier

Valve size, in. (mm)	A without thermal barrier	A with thermal barrier	B	C	D	E	F	G
1-1/4 (DN32)	7-11/16 (195)	9-17/64 (235)	1-1/32 (26)	1-23/32 (44)	7-1/4 (184)	4-19/64 (109)	11/32 (9)	1-31/32 (50)
1-1/2 (DN40)	7-7/8 (200)	9-15/16 (240)	1-1/8 (29)	1-7/8 (48)	7-7/16 (189)	4-11/16 (119)	11/32 (9)	2-11/64 (55)
2 (DN50) 2-way	8-1/32 (204)	9-31/32 (244)	1-15/32 (37)	2-1/16 (53)	7-11/16 (195)	5-31/64 (139)	11/32 (9)	NA
2 (DN50) 3-way					7-7/8 (200)			2-29/32 (74)

Part Name 零件名 148836003222 称	Hazardous substance 有害物质					
	Pb 铅	Hg 汞	Cd 镉	Cr 六价铬	PBB 多溴联苯	PBDE 多溴二苯醚
Body parts 阀体	X	O	O	O	O	O
Trim parts 阀芯/阀杆	O	O	O	O	O	O
Plastic parts 塑料件	O	O	O	O	O	O
O: Identify that this hazardous substance is below specified limits as described in SJ/T 11363-2006. O: 确定该有害物质低于SJ/T 11363-2006中规定的限值。 X: Identify that this hazardous substance is above specified limits as described in SJ/T 11363-2006. X: 确认该有害物质高于SJ/T 11363-2006中规定的限值。						

The Environmentally Friendly Used Period (EFUP) for all enclosed products and their parts is per the symbol shown here, unless otherwise marked. The Environmentally Friendly User Period is valid only when the product is operated under the conditions defined in the product bulletin.

除非另有标记，所有产品及其零件的环保使用期限（EFUP）均符合此处所示符号。仅当产品在产品公告中规定的条件下运行时，环保使用期限才有效。



Technical specifications

VG1000 Series Forged Brass Ball Valves for assembly in the field		
Service		Hot water, chilled water, 50/50 glycol solutions, and 103 kPa saturated steam for HVAC application
Fluid temperature limits	Water	VG12x5 and VG18x5 Series: -30 to 140° C
	Steam	VG12x5 and VG18x5 Series: 103 kPa at 121°C
Maximum actuator fluid temperature limits	100°C	VA9104, VA9300, VA9203, VA9208
	140°C	VA9104, VA9300, VA9203, VA9208 with M9000-561 Thermal Barrier
Valve body pressure rating	Water	VG12x5 and VG18x5 Series: 4,000 kPa (PN40), 3,196 kPa at 140°C (PN40)
	Steam	103 kPa saturated steam
Maximum closeoff pressure	VG12x5 Series VG18x5 Series	1,378 kPa - see Table 2
Maximum recommended operating pressure drop		340 kPa
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		Greater than 500:1
Minimum ambient operating temperature	-20°C	VA9104 Series Non-Spring-Return Actuators
	-30°C	VA9203 and VA9300 Series Spring-Return Actuators
	-40°C	VA9208 Series Spring-Return Actuators
Maximum ambient operating temperature (limited by the actuator and linkage)	60°C	VA9104 and M9300 Series Non-Spring-Return Actuators VA9203 and VA9208 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		British Standard Pipe Parallel (BSPP) – (Rp, ISO 7/1)
Materials	Body	Forged brass
	Ball	300 Series stainless steel
	Blowout-proof stem	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

Note:

- Refer to the VDI 2035 Guideline for recommended proper water treatment.
- In steam applications, install the valve with the stem horizontal to the piping and wrap the valve and piping with insulation.
- Rangeability is defined as the ratio of maximum controllable flow to minimum controllable flow.

WARNING: BRASS MAY CONTAIN LEAD

To fulfill our obligations towards Article 33, in accordance to the European REACH Regulation No 1907/2006 EC, we hereby inform you that this article contains the following Substances of Very High Concern mentioned on the Candidate list:

- Lead



This product is made of copper alloy, which contains lead. The product is therefore not to be used on drinking water.



This product can expose you to chemicals including lead, which is known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

Product warranty

This product is covered by a limited warranty. For details, refer to www.johnsoncontrols.com/buildingswarranty.

Patents

Patents: <http://jcipat.com>

Single point of contact

APAC	Europe	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 - CHINA	JOHNSON CONTROLS VOLTAWEG 20 6101 XK ECHT THE NETHERLANDS	JOHNSON CONTROLS 507 E MICHIGAN ST MILWAUKEE WI 53202 USA

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