

VG1205 / VG1805

2- and 3-way Control Valves with Stainless Steel Ball

Product Bulletin

VG1000 Series Ball Valves are designed to regulate the flow of hot or chilled water and low pressure steam in response to the demand of a controller in HVAC systems.

Available in sizes DN15 through DN50, this family of two- and three-way forged brass valves is factory or field mounted to Johnson Controls® VA9104 and VA9310 Series Non-Spring Return and VA9203 and VA9208 Series Spring Return Electric Actuators for on/ off, floating, or proportional control.



- **Forged brass body**
Provides 40 bar static pressure rating
- **Amodel® Flow Characterizing Disk**
Maintains equal percentage flow characteristics for best temperature control, available in a wide variety of Kvs to cover a broad range of applications.
- **1380 kPa Closeoff Pressure Rating**
Provides tight shutoff.
- **500:1 Rangeability**
Provides accurate control under all load conditions.
- **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.
- **Maintenance-Free Design**
Performs without failure in excess of 200,000 full stroke cycles in iron-oxide contaminated water.

VALVES & ACTUATORS COMBINATIONS

VG1000 Series Ball Valves are designed for factory or field mounting to a variety of M9000 and VA9000 Series Actuators.

VA9000 Series Actuators include all hardware necessary for attachment to the valve.

		ACTUATOR TYPE																			
		Non-Spring Return					Spring Return														
		VA9104		VA9310			VA9203			VA9208											
ACTUATOR OPTIONS	CONTROL INPUT	On / Off and Floating Point	Proportional 0 (2) to 10 VDC	On / Off and Floating Point	On / Off, Floating and Proportional Point	On / Off and Floating Point	On / Off and Floating Point	On / Off	On / Off	Proportional 0 (2) to 10 VDC	On / Off and Floating Point	On / Off	On / Off	Proportional 0 (2) to 10 VDC							
	POWER SUPPLY	24 V AC	100-230 V AC	24 V AC / DC	100-230 V AC	24 V AC / DC	24 V AC / DC	100...230 V AC	24 V AC / DC	24 V AC / DC	24 V AC / DC	24 V AC / DC	230 V AC	24 V AC / DC							
	Auxiliary Switches:																				
	1 SPDT, 5.0(2.9) A @ 240 V			②	②																
2 SPDT, 5.0(2.9) A @ 240 V			②	②																	
Position Feedback:																					
0(2) to 10VDC Position Feedback																					
ACTUATOR CODE	VA9104-IGA-1S	VA9104-GGA-1S	VA9104-IUA-1S	VA9310-HGA-1	VA9310-AUA-1	VA9203-AGA-1Z	VA9203-AGB-1Z	VA9203-BGA-1	VA9203-BGB-1	VA9203-BUA-1	VA9203-BUB-1	VA9203-GGA-1Z	VA9203-GGB-1Z	VA9208-AGA-1	VA9208-AGC-1	VA9208-BGA-1	VA9208-BGC-1	VA9208-BDA-1	VA9208-BDC-1	VA9208-GGA-1	VA9208-GGC-1

Pressure Drop - kPa (bar)										DN mm	Inch	Kvs Control Port (Bypass Port)	VALVE BODY CONFIGURATION																																														
2 (0.02)	5 (0.05)	10 (0.1)	25 (0.25)	50 (0.5)	100 (1)	200 (2)	300 (3)	400 (4)	500 (5)				2-WAY	3-WAY																																													
0.14	0.22	0.32	0.50	0.71	1.00	1.41	1.73	2.00	2.24				1.0 (0,63)	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	10 (5,0)	VG1205AN	VG1805AN	6.3 (4,0)	VG1205BL	VG1805BL	10 (5,0)	VG1205BN	VG1805BN	10 (6,3)	VG1205CN	VG1805CN
0.14	0.22	0.32	0.50	0.71	1.00	1.41	1.73	2.00	2.24	15	1/2	1.0 (0,63)	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	10 (5,0)	VG1205AN	VG1805AN	6.3 (4,0)	VG1205BL	VG1805BL	10 (5,0)	VG1205BN	VG1805BN	10 (6,3)	VG1205CN	VG1805CN	16 (8,0)	VG1205CP	VG1805CP	16 (10,0)	VG1205DP	VG1805DP	25 (12,5)	VG1205DR	VG1805DR	25 (16)	VG1205ER	VG1805ER	40 (20)	VG1205ES	VG1805ES	40 (25,0)	VG1205FS	VG1805FS	63 (31,5)	VG1205FT	VG1805FT
0.14	0.22	0.32	0.50	0.71	1.00	1.41	1.73	2.00	2.24	20	3/4	1.0 (0,63)	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	10 (5,0)	VG1205AN	VG1805AN	6.3 (4,0)	VG1205BL	VG1805BL	10 (5,0)	VG1205BN	VG1805BN	10 (6,3)	VG1205CN	VG1805CN	16 (8,0)	VG1205CP	VG1805CP	16 (10,0)	VG1205DP	VG1805DP	25 (12,5)	VG1205DR	VG1805DR	25 (16)	VG1205ER	VG1805ER	40 (20)	VG1205ES	VG1805ES	40 (25,0)	VG1205FS	VG1805FS	63 (31,5)	VG1205FT	VG1805FT
0.14	0.22	0.32	0.50	0.71	1.00	1.41	1.73	2.00	2.24	25	1	1.0 (0,63)	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	10 (5,0)	VG1205AN	VG1805AN	6.3 (4,0)	VG1205BL	VG1805BL	10 (5,0)	VG1205BN	VG1805BN	10 (6,3)	VG1205CN	VG1805CN	16 (8,0)	VG1205CP	VG1805CP	16 (10,0)	VG1205DP	VG1805DP	25 (12,5)	VG1205DR	VG1805DR	25 (16)	VG1205ER	VG1805ER	40 (20)	VG1205ES	VG1805ES	40 (25,0)	VG1205FS	VG1805FS	63 (31,5)	VG1205FT	VG1805FT
0.14	0.22	0.32	0.50	0.71	1.00	1.41	1.73	2.00	2.24	32	1 1/4	1.0 (0,63)	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	10 (5,0)	VG1205AN	VG1805AN	6.3 (4,0)	VG1205BL	VG1805BL	10 (5,0)	VG1205BN	VG1805BN	10 (6,3)	VG1205CN	VG1805CN	16 (8,0)	VG1205CP	VG1805CP	16 (10,0)	VG1205DP	VG1805DP	25 (12,5)	VG1205DR	VG1805DR	25 (16)	VG1205ER	VG1805ER	40 (20)	VG1205ES	VG1805ES	40 (25,0)	VG1205FS	VG1805FS	63 (31,5)	VG1205FT	VG1805FT
0.14	0.22	0.32	0.50	0.71	1.00	1.41	1.73	2.00	2.24	40	1 1/2	1.0 (0,63)	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	10 (5,0)	VG1205AN	VG1805AN	6.3 (4,0)	VG1205BL	VG1805BL	10 (5,0)	VG1205BN	VG1805BN	10 (6,3)	VG1205CN	VG1805CN	16 (8,0)	VG1205CP	VG1805CP	16 (10,0)	VG1205DP	VG1805DP	25 (12,5)	VG1205DR	VG1805DR	25 (16)	VG1205ER	VG1805ER	40 (20)	VG1205ES	VG1805ES	40 (25,0)	VG1205FS	VG1805FS	63 (31,5)	VG1205FT	VG1805FT
0.14	0.22	0.32	0.50	0.71	1.00	1.41	1.73	2.00	2.24	50	2	1.0 (0,63)	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	10 (5,0)	VG1205AN	VG1805AN	6.3 (4,0)	VG1205BL	VG1805BL	10 (5,0)	VG1205BN	VG1805BN	10 (6,3)	VG1205CN	VG1805CN	16 (8,0)	VG1205CP	VG1805CP	16 (10,0)	VG1205DP	VG1805DP	25 (12,5)	VG1205DR	VG1805DR	25 (16)	VG1205ER	VG1805ER	40 (20)	VG1205ES	VG1805ES	40 (25,0)	VG1205FS	VG1805FS	63 (31,5)	VG1205FT	VG1805FT
0.14	0.22	0.32	0.50	0.71	1.00	1.41	1.73	2.00	2.24	50	2	1.0 (0,63)	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	10 (5,0)	VG1205AN	VG1805AN	6.3 (4,0)	VG1205BL	VG1805BL	10 (5,0)	VG1205BN	VG1805BN	10 (6,3)	VG1205CN	VG1805CN	16 (8,0)	VG1205CP	VG1805CP	16 (10,0)	VG1205DP	VG1805DP	25 (12,5)	VG1205DR	VG1805DR	25 (16)	VG1205ER	VG1805ER	40 (20)	VG1205ES	VG1805ES	40 (25,0)	VG1205FS	VG1805FS	63 (31,5)	VG1205FT	VG1805FT

FLOW RATE - m³/h

FACTORY ASSEMBLED VALVE + ACTUATOR COMBINATIONS MATRIX

FACTORY ASSEMBLY CODE + **VALVE CODE** = **MOTORIZED VALVE ASSEMBLY CODE**

Example: VG1805CP + 533GGB

FLUID TEMPERATURE LIMITS																					
Water -30° to 100 °C (-22 to 212 °F)	5A4IGA	5A4GGA	5A4IUA	510HGA	510AUA	5x3AGA	5x3AGB	5x3BGA	5x3BGB	5x3BUA	5x3BUB	5x3GGA	5x3GGB	5x8AGA	5x8AGC	5x8BGA	5x8BGC	5x8BDA	5x8BDC	5x8GGA	5x8GGC
Water -30° to 140 °C (-22 to 284 °F) Steam Max 103 kPa	6A4IGA	6A4GGA	6A4IUA	610HGA	610AUA	6x3AGA	6x3AGB	6x3BGA	6x3BGB	6x3BUA	6x3BUB	6x3GGA	6x3GGB	6x8AGA	6x8AGC	6x8BGA	6x8BGC	6x8BDA	6x8BDC	6x8GGA	6x8GGC

FACTORY ASSEMBLY CODE ①

- ① x = 3: Spring Return Port A Open
x = 5: Spring Return Port A Closed
- ② Available only as an external Kit. Not present in the assembly.
Separately order: **M9300-1** for 1 SPDT
M9300-2 for 2 SPDT

Application Overview

Available in sizes DN15 through DN50, VG1000 Series Ball Valves are designed specifically for automated commercial HVAC service. These valves feature a forged brass body with a 300 Series stainless steel ball for high temperature water to 140°C and saturated steam to 103 kPa. The Amodel Flow Characterizing Disk maintains equal percentage flow characteristics for optimum temperature control.

The blowout-proof stem and mounting flange, combined with an innovative double O-ring stem seal and self-centering stem bushing design 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 1.380 kPa closeoff pressure while ensuring operation after long idle periods. Because of their reliable design, VG1000 Series Ball Valves are maintenance free.

VA9000 Series Electric Actuators include mounting hardware for direct coupling to VG1000 Series Ball Valves. VG1000 Series Ball Valves are designed for factory or field mounting to a wide variety of Johnson Controls® VA9000 Series Electric Actuators.

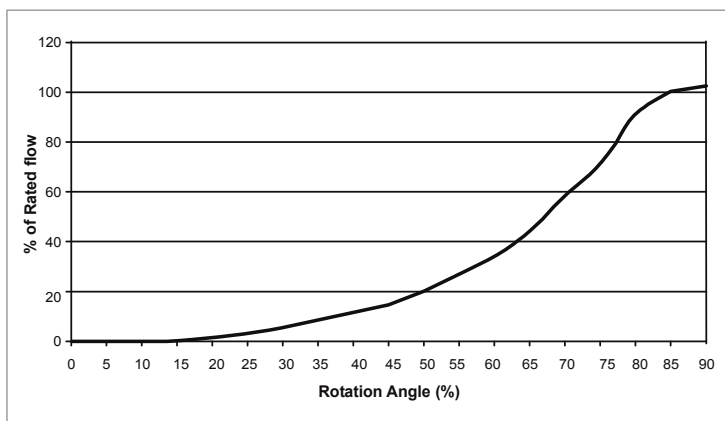


Figure 1:
Typical curve characteristic of VG1000 Valves

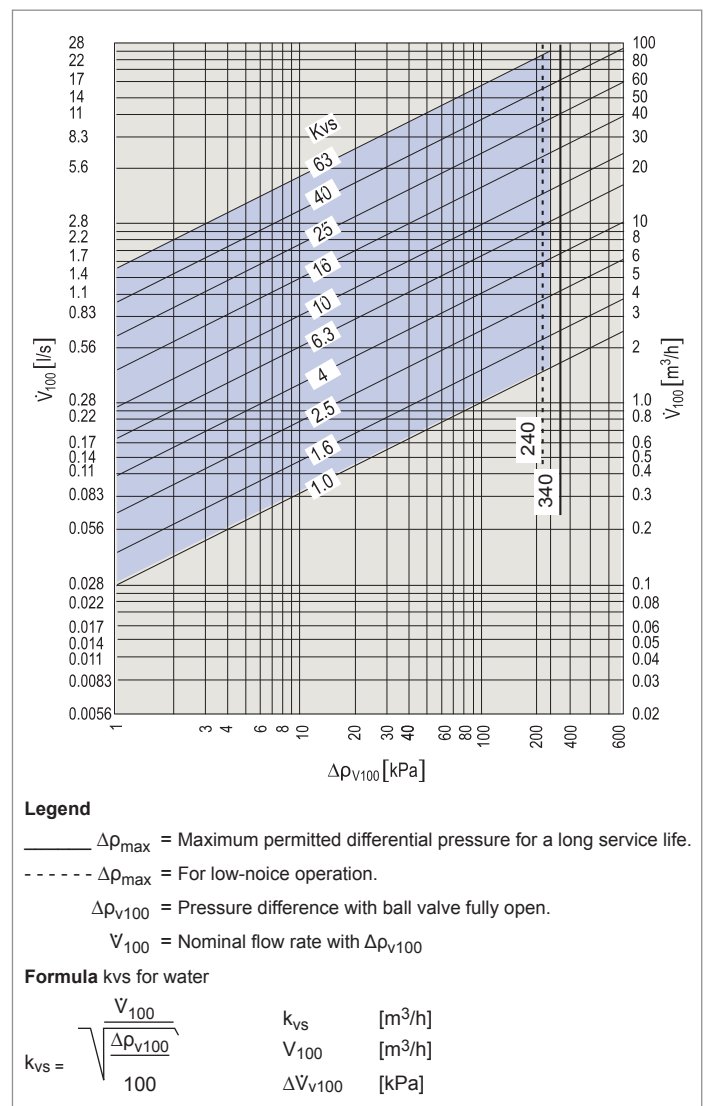


Figure 2:
Pressure drop-flow chart

Electric Actuator Control Signal Action

Two-way VG1000 Series Ball Valves are fully open when the electric actuator is fully Counterclockwise (CCW) and fully closed when the electric actuator is fully Clockwise (CW).

For three-way valves, the Port A and common port are fully open when the electric actuator is fully CCW, as shown in Figure 3.

Port B and common port are fully open when the actuator is fully CW, as shown in Figure 4.

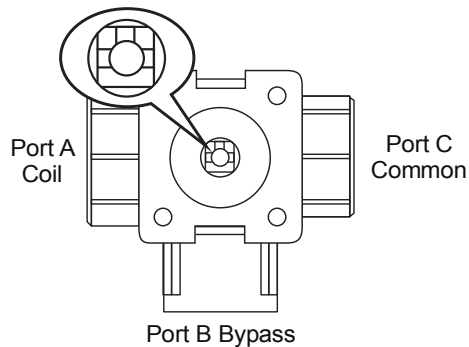


Figure 3:
VG1805 Series Three-Way Ball Valve
(Port A connected to Port C)

For non-spring return and spring-to-open proportional control models in the direct-acting mode, a minimum control signal drives the electric actuator to the fully CCW position, whereas a maximum control signal drives the electric actuator to the fully CW position.

For spring-to-close proportional control models in the direct-acting mode, a minimum control signal drives the electric actuator to the fully CW position, whereas a maximum control signal drives the electric actuator to the fully CCW position.

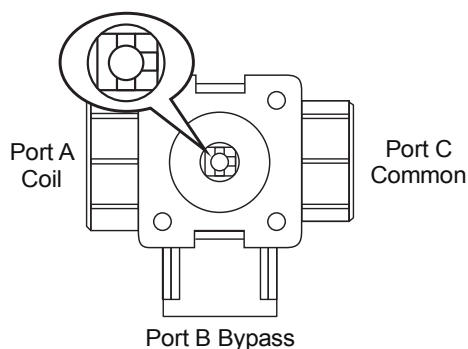


Figure 4:
VG1805 Series Three-Way Ball Valve
(Port B connected to Port C)

For non-spring return floating or on/off (floating) control models, a control signal to Terminal 2 (or wire 2) of a VA9104 or VA931x Series Actuator drives the electric actuator to the fully CW position. Likewise, a control signal to Terminal 3 (or wire 3) of a VA9104 or VA931x Series Actuator drives the electric actuator to the fully CCW position.

A control signal to Wire 3 of side A mounted (away from the valve) VA9203 or VA9208 Series actuated spring-to-open floating control valve assembly drives the electric actuator to the fully CW position. Likewise, a control signal to Wire 4 of a floating CCW-face VA9203 Series or VA9208 Series Actuator, or removal of the control signal from Wire 3 of an on/off CCW-face VA9203 Series or VA9208 Series actuated spring-to-open valve assembly, drives the electric actuator to the fully CCW position.

A control signal to Wire 3 of a CW-face (mounted away from the valve) VA9203 Series or VA9208 Series actuated spring-to-close floating control valve assembly drives the electric actuator to the fully CCW position. Likewise, a control signal to Wire 4 of a floating CW-face VA9203 Series or VA9208 Series Actuator, or removal of the control signal from Wire 3 of an on/off CW-face VA9203 Series or VA9208 Series actuated spring-to-close valve assembly, drives the electric actuator to the fully CW position.

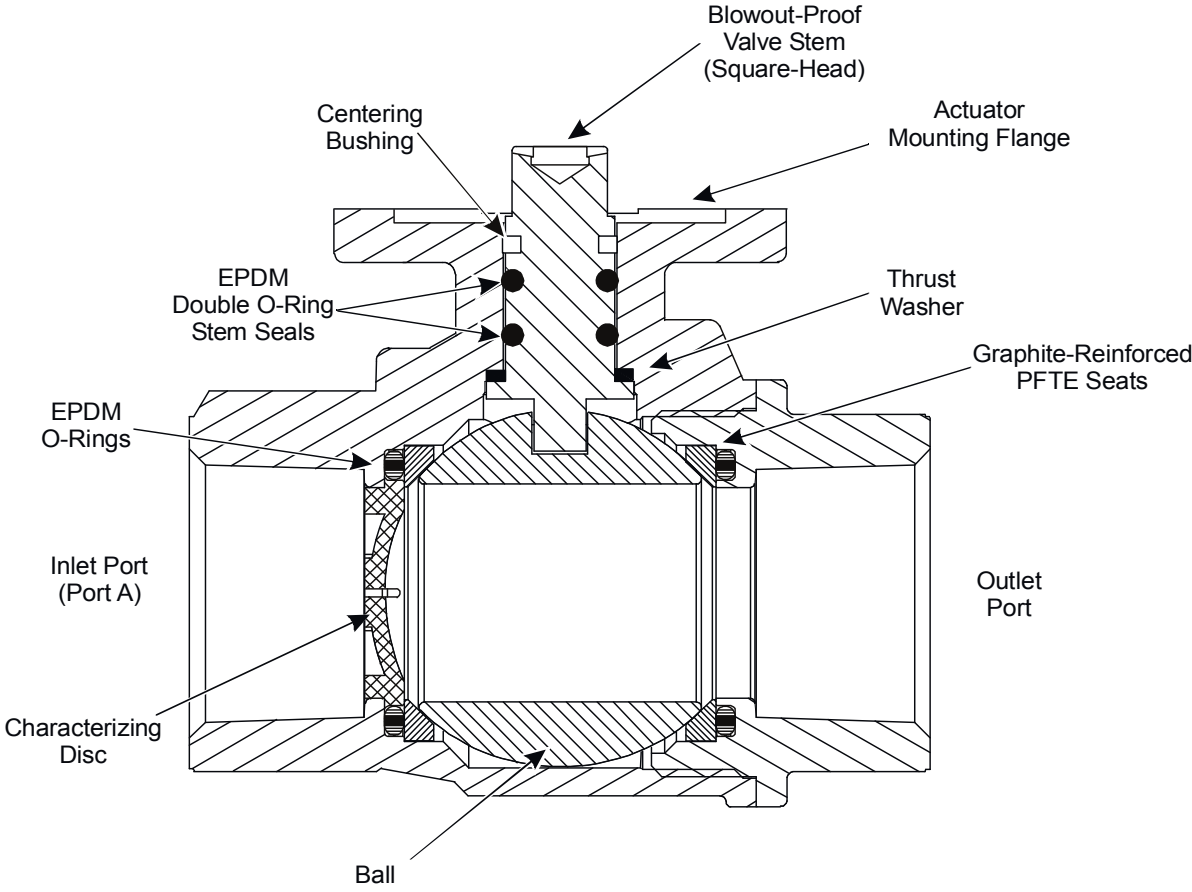
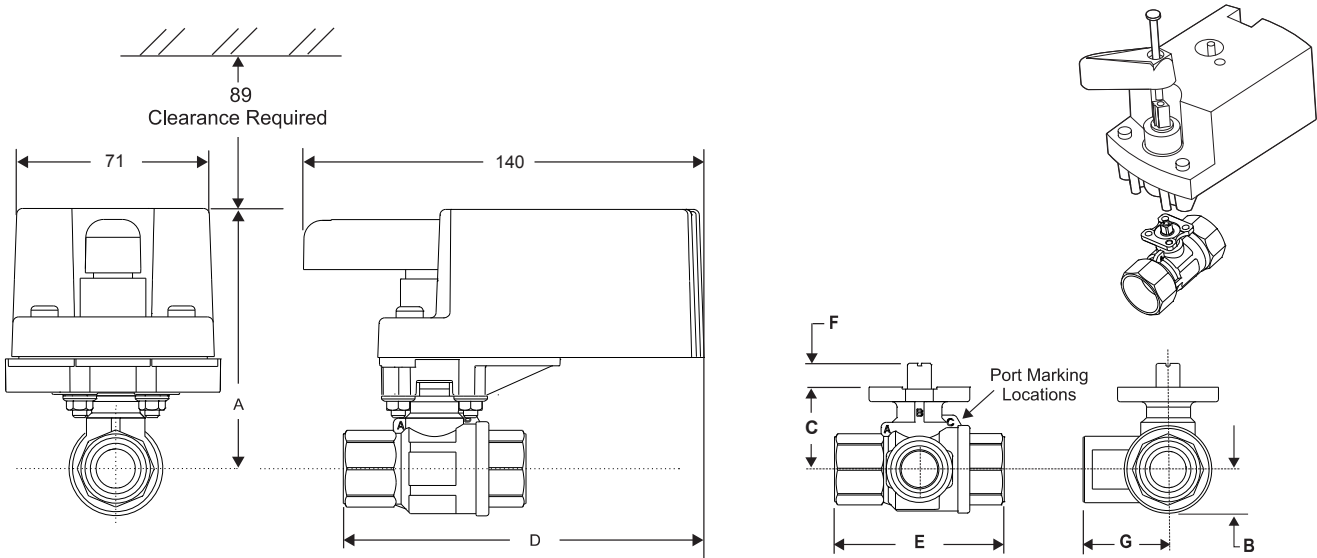


Figure 5:
Internal View of a Typical VG1000 Series Ball Valve

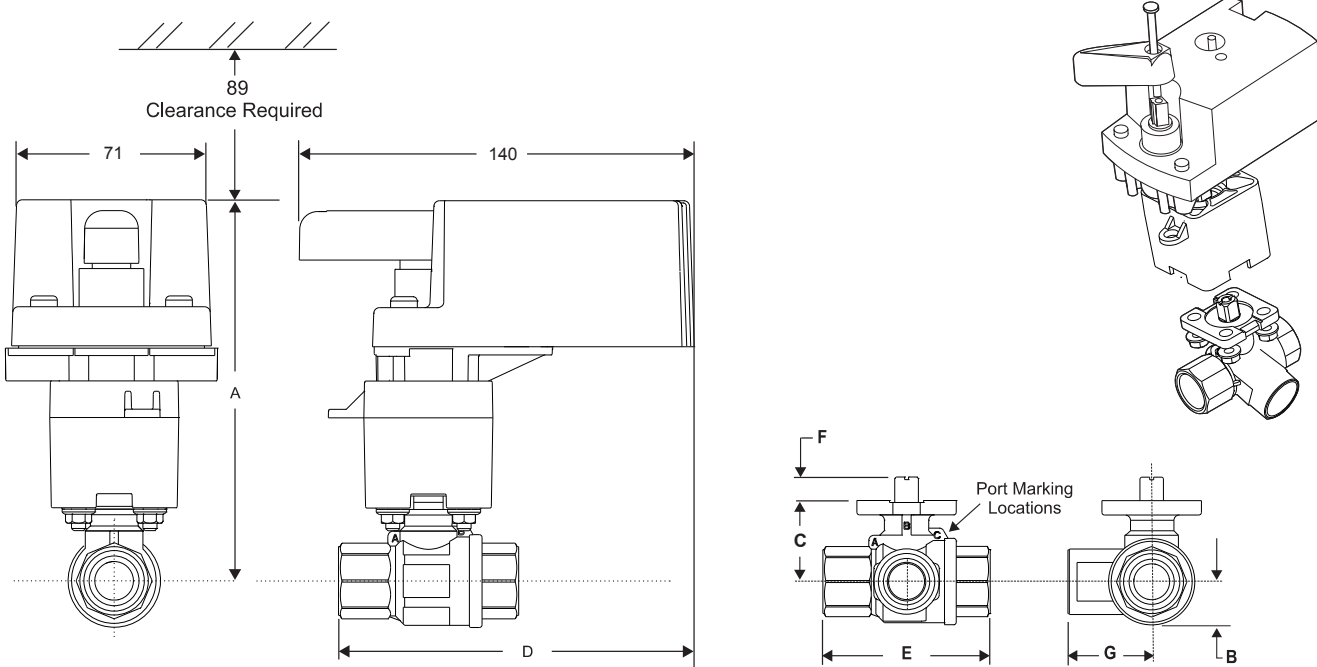
Non-Spring Return VA9104 Actuated VG1000 Series Ball Valve Linkage, Dimensions in mm



Valve Size, DN	A	B	C	D	E	F	G*
DN15	98	17	31	129	67	9	33
DN20	98	17	31	133	75	9	38
DN25	100	19	33	141	92	9	46

* for 3-way valves only

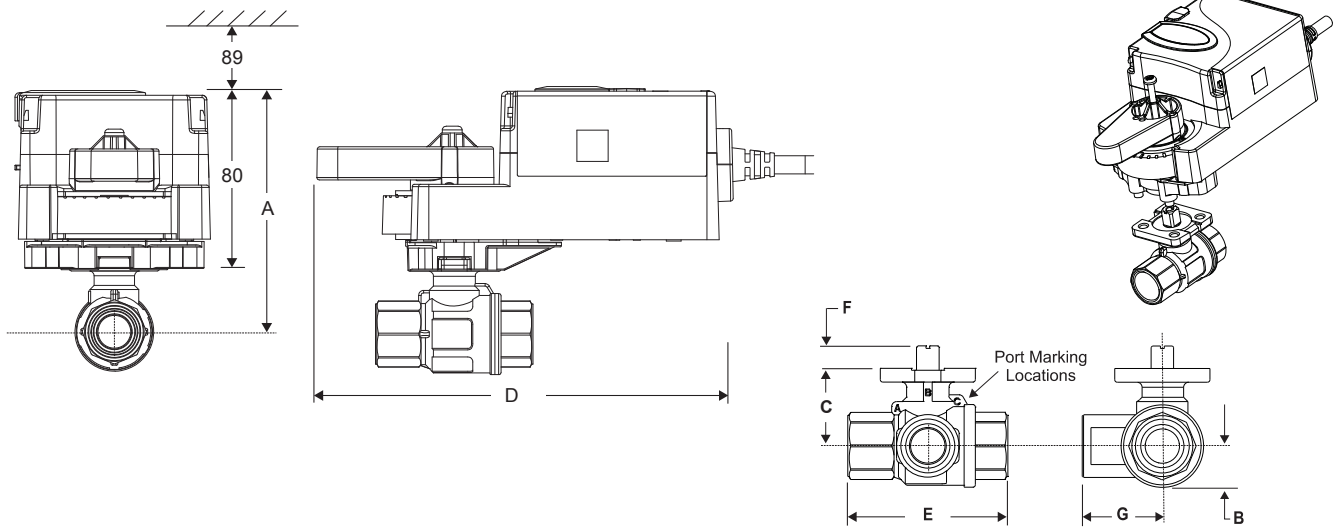
Non-Spring Return VA9104 Actuated VG1000 Series Ball Valve with M9000-561 Thermal Barrier, Dimensions in mm



Valve Size, DN	A	B	C	D	E	F	G*
DN15	133	17	31	129	67	9	33
DN20	133	17	31	133	75	9	38
DN25	135	19	33	141	92	9	46

* for 3-way valves only

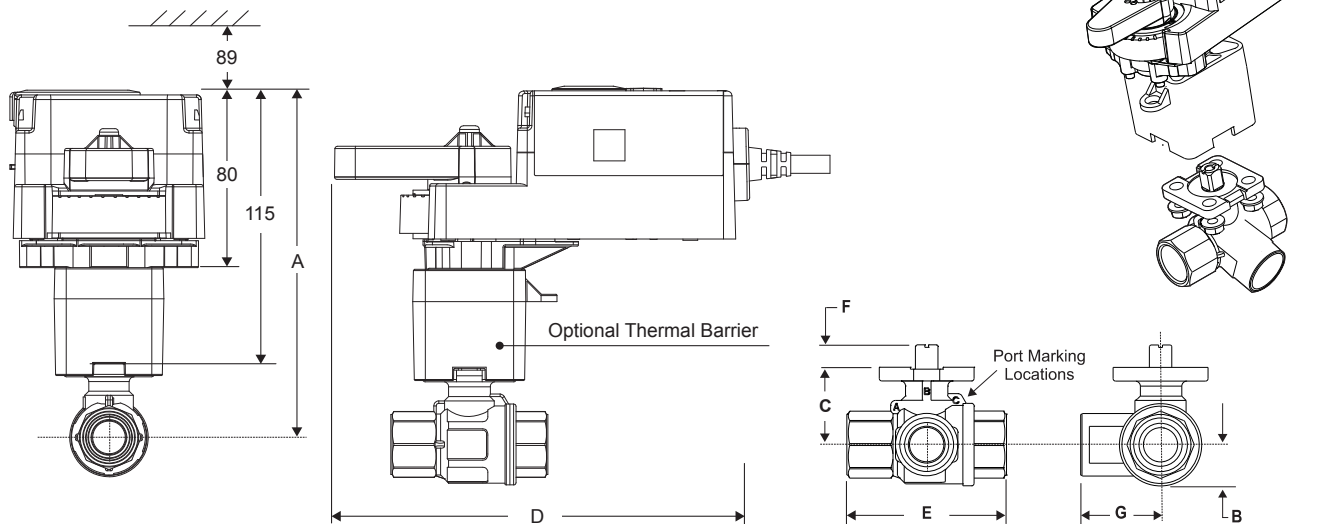
Non-Spring Return VA9310 Actuated VG1000 Series Ball Valve Linkage, Dimensions in mm



Valve Size, DN	A	B	C	D	E	F	G*
DN15	111	17	31	163	67	9	33
DN20	111	17	31	163	75	9	38
DN25	113	19	33	163	92	9	46
DN32	124	26	44	163	109	9	54
DN40	128	29	48	163	119	9	59
DN50	133	37	53	163	139	9	74

* for 3-way valves only

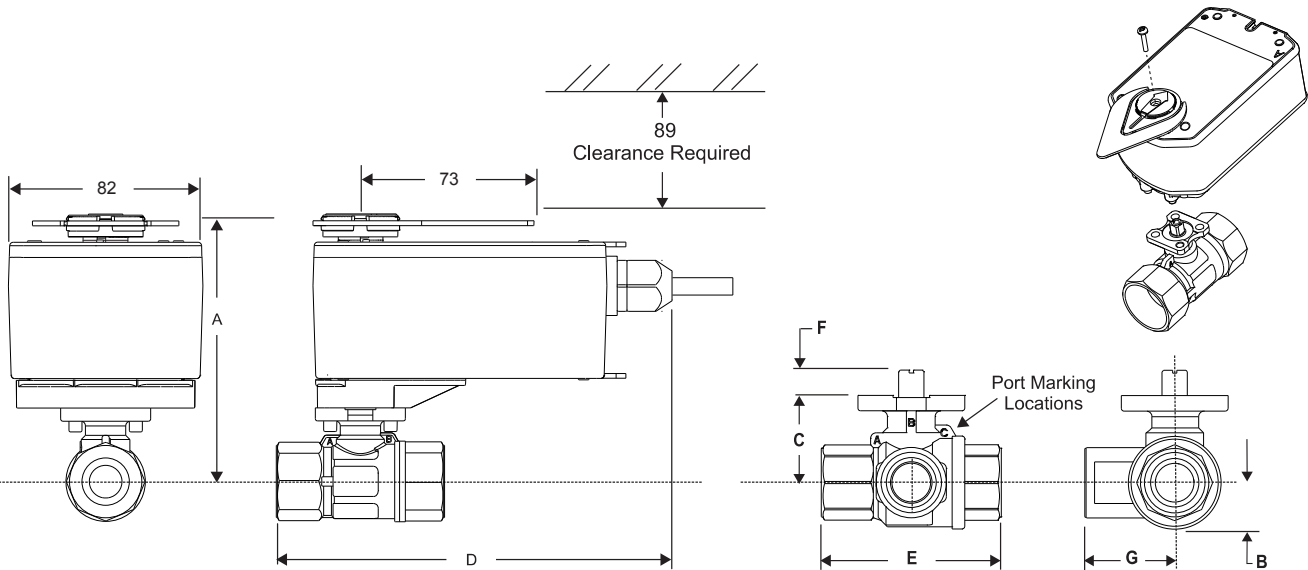
Non-Spring Return VA9310 Actuated VG1000 Series Ball Valve with M9000-561 Thermal Barrier, Dimensions in mm



Valve Size, DN	A	B	C	D	E	F	G*
DN15	146	17	31	163	67	9	33
DN20	146	17	31	163	75	9	38
DN25	148	19	33	163	92	9	46
DN32	159	26	44	163	109	9	54
DN40	163	29	48	163	119	9	59
DN50	168	37	53	163	139	9	74

* for 3-way valves only

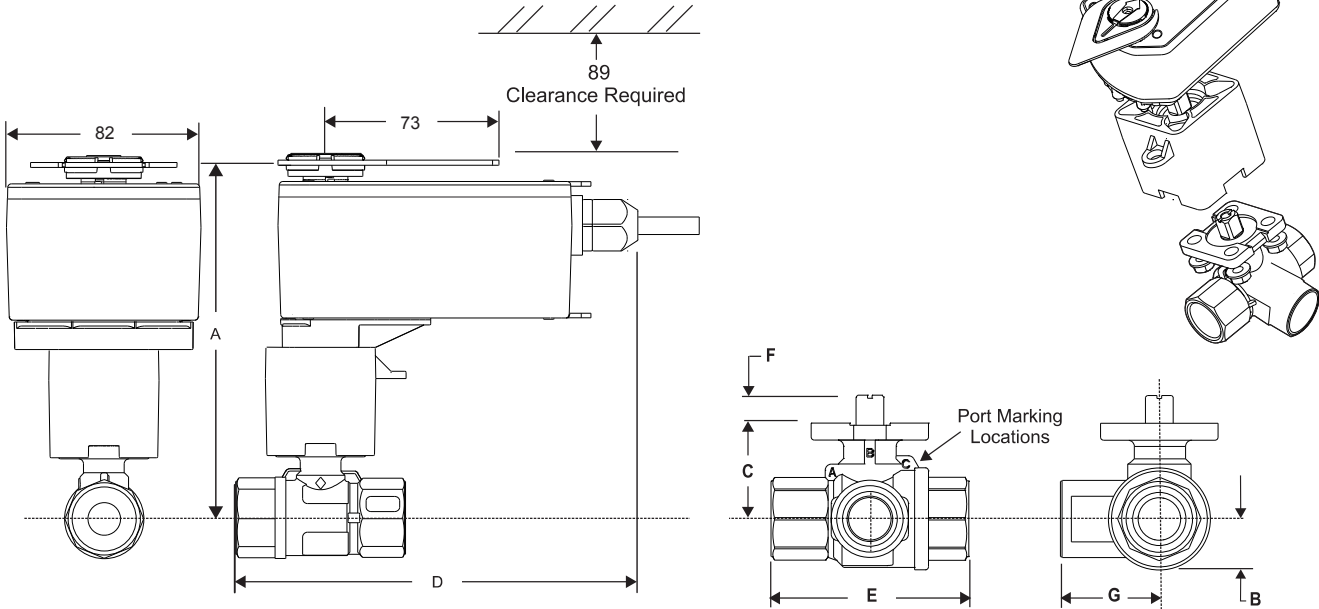
Spring Return VA9203 Actuated VG1000 Series Ball Valve, Dimensions in mm



Valve Size, DN	A	B	C	D	E	F	G
DN15	117	17	31	167	67	9	33
DN20	117	17	31	171	75	9	38
DN25	119	19	33	180	92	9	46

* for 3-way valves only

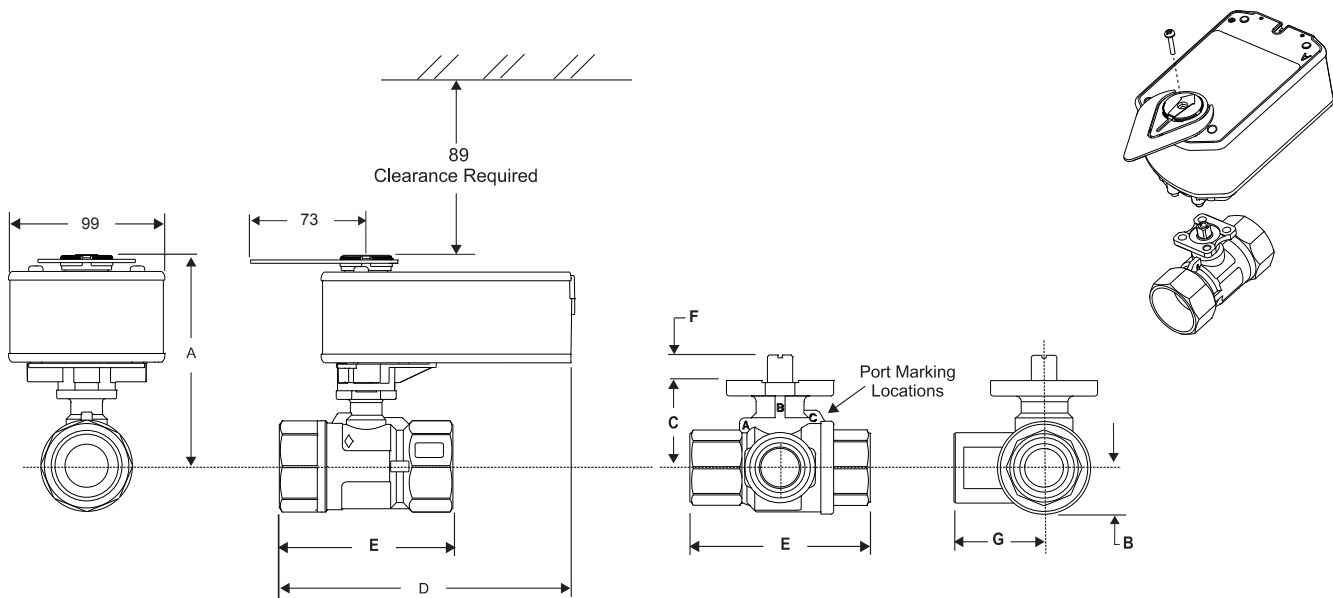
Spring Return VA9203 Actuated VG1000 Series Ball Valve with Thermal Barrier, Dimensions in mm



Valve Size, DN	A	B	C	D	E	F	G
DN15	152	17	31	167	67	9	33
DN20	152	17	31	171	75	9	38
DN25	154	19	33	180	92	9	46

* for 3-way valves only

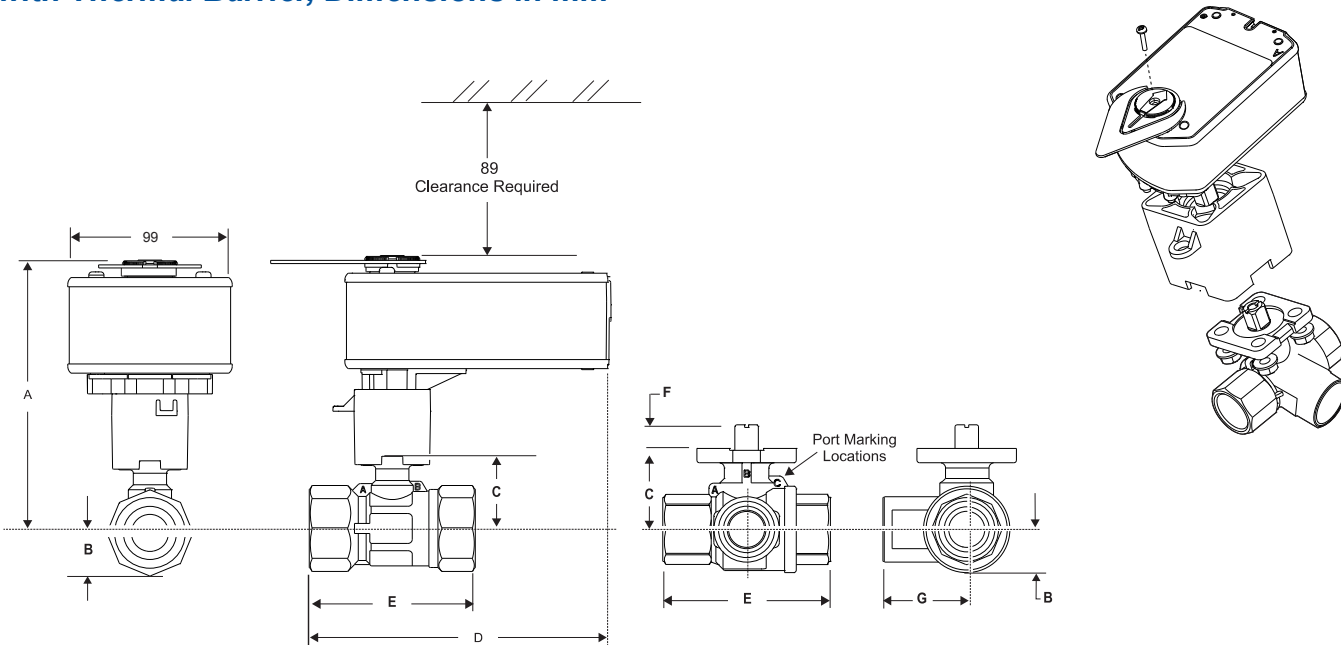
Spring Return VA9208 Actuated VG1000 Series Ball Valve, Dimensions in mm



Valve Size, DN	Valve Style*	A	B	C	D	E	F	G*
DN32	All	195	26	44	184	109	9	54
DN40	All	200	29	48	189	119	9	59
DN50	2-Way	204	37	53	195	139	9	74

* for 3-way valves only


Spring Return VA9208 Actuated VG1000 Series Ball Valve with Thermal Barrier, Dimensions in mm



Valve Size, DN	Valve Style*	A	B	C	D	E	F	G*
DN32	All	235	26	44	184	109	9	54
DN40	All	240	29	48	189	119	9	59
DN50	2-Way	244	37	53	195	139	9	74

* for 3-way valves only

Technical Specifications

Product	VG1205	VG1805
Valve Type	2-way	3-way mixing*
Service	Hot and cold water: -30...95 °C with 4Nm Non Spring Return (140 °C with M9000-561 Thermal Barrier) -30...100 °C with 10Nm Non Spring Return, 3Nm and 8Nm Spring Return (140 °C with M9000-561 Thermal Barrier). Water with glycol to max 50% volume. Steam to max 103kPa at 121 °C with 4Nm and 10Nm Non spring Return, 3Nm and 8Nm Spring Return with Thermal Barrier.	
Body pressure rating	PN40	
Close-off pressure Δp_s	1380 kPa	
Differenzial pressure Δp_{max}	340 kPa	
Flow characteristics	Equal percentage in 2-way valve Equal percentage in 3-way valve (control port) Linear in 3-way valve in bypass	
Leakage rate	< 0.01% from the Kvs, < 1% for bypass port	
Rangeability	> 500 : 1 (EN60534-2-4)	
Material	<ul style="list-style-type: none"> - Body device Forged brass body - Ball Stainless Steel - Stem Stainless Steel - Valve seat PTFE with graphite part and EPDM O-ring - Spindle gasket 2 x EPDM O-ring - Flow characterisation disk AMODEL® AS 1145HS 	
End Connections	British Standard Pipe Parallel (BSPP) - (Rp, ISO 7/1)	
 Compliance	Johnson Controls Internation plc declares that these products are in compliance with the essential requirements and other relevant provisions of the PED (Pressure Equipment Directive) 97/23/EC.	

* The valve without flow disc can also be used as diverting.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls Internation plc shall not be liable for damages resulting from misapplication or misuse of its products.