VG4000 Series
High-Capacity/High-Closeoff Electric Zone Valves

VG4000 Series High-Capacity/High-Closeoff Electric Zone Valves are designed to regulate the flow of water in response to the demand of a controller in zone and Variable Air Volume (VAV) reheat coil applications. The high-capacity/high-closeoff capability of the VG4000 Series also makes this family of valves an ideal choice for fan coil and baseboard radiation applications. Available in Normally Open (N.O.), Normally Closed (N.C.), and three-way mixing configurations, the VG4000 Series is designed for use with VA-7010 Series on/off control actuators and VA-7450 Series floating or proportional control actuators. These electric actuators can be ordered factory installed on the VG4000 Series, or they can be installed in the field after piping.

Refer to the VA-7010 Series Electric On/Off Actuator Product/Technical Bulletin (LIT-977360*) or the* VA-7450 Electronic Valve Actuator Product/Technical Bulletin (LIT-977324) *for specific information regarding either actuator series.*

Figure 1: VG4000 Series
High-Capacity/High-Closeoff Electric Zone Valves

Features and Benefits	
❑ **Cast Bronze Body and Stainless Steel Stem and Spring**	Ensures long life
❑ **Ideal for Zone, VAV Reheat Coil, Fan Coil, and Baseboard Radiation Applications**	Offers a broad range of applications
❑ **EPT Rubber Plug for Bubble-Tight Shutoff**	Maximizes energy savings
❑ **Easy, Field-Replaceable Packing**	Shortens service time
❑ **Actuator can be Field Installed After Piping**	Simplifies installation in confined locations
❑ **Built-In Return Spring for VA-7010 Series Electric Actuators**	Allows the valve to return to normal position when the actuator is de-energized

Table 1: Ordering Data for VG4000 Series Valve Assemblies with Sweat End Connections

Valve Code Number	Size (in.)	Cv	Closeoff Pressure (psig)	On/Off	On/Off	Floating	0 to 10 VDC Proportional
				24 VAC 50/60 Hz	120 VAC 50/60 Hz	24 VAC 50/60 Hz	24 VAC 50/60 Hz
				VA-7010-8001	VA-7010-8002	VA-7450-10011	VA-7452-90011
Two-Way N.O. (Push-Down-to-Close, PDTC)							
VG4270FC	1/2	2.9	50	VG4270FC+7010G	VG4270FC+7010A	VG4270FC+7450G	VG4270FC+7452G
VG4270GC	3/4	3.5	50	VG4270GC+7010G	VG4270GC+7010A	VG4270GC+7450G	VG4270GC+7452G
Two-Way N.C. (Push-Down-to-Open, PDTO)							
VG4470FC	1/2	2.9	50	VG4470FC+7010G	VG4470FC+7010A	---	---
VG4470GC	3/4	3.5	50	VG4470GC+7010G	VG4470GC+7010A	---	---
Three-Way Mixing							
VG4870FC	1/2	2.9	50 / 25*	VG4870FC+7010G	VG4870FC+7010A	VG4870FC+7450G	VG4870FC+7452G
VG4870GC	3/4	3.5	50 / 25*	VG4870GC+7010G	VG4870GC+7010A	VG4870GC+7450G	VG4870GC+7452G

* The closeoff pressure for three-way mixing valves is 50 psig on the normally closed port and 25 psig on the normally open port.

Table 2: Ordering Data for VG4000 Series Valve Assemblies with Threaded (Internal NPT) End Connections

Valve Code Number	Size (in.)	Cv	Closeoff Pressure (psig)	On/Off	On/Off	Floating	0 to 10 VDC Proportional
				24 VAC 50/60 Hz	120 VAC 50/60 Hz	24 VAC 50/60 Hz	24 VAC 50/60 Hz
				VA-7010-8001	VA-7010-8002	VA-7450-10011	VA-7452-90011
Two-Way N.O. (Push-Down-to-Close, PDTC)							
VG4240FC	1/2	2.9	50	VG4240FC+7010G	VG4240FC+7010A	VG4240FC+7450G	VG4240FC+7452G
VG4240GC	3/4	3.5	50	VG4240GC+7010G	VG4240GC+7010A	VG4240GC+7450G	VG4240GC+7452G
Two-Way N.C. (Push-Down-to-Open, PDTO)							
VG4440FC	1/2	2.9	50	VG4440FC+7010G	VG4440FC+7010A	---	---
VG4440GC	3/4	3.5	50	VG4440GC+7010G	VG4440GC+7010A	---	---
Three-Way Mixing							
VG4840FC	1/2	2.9	50 / 25*	VG4840FC+7010G	VG4840FC+7010A	VG4840FC+7450G	VG4840FC+7452G
VG4840GC	3/4	3.5	50 / 25*	VG4840GC+7010G	VG4840GC+7010A	VG4840GC+7450G	VG4840GC+7452G

* The closeoff pressure for three-way mixing valves is 50 psig on the normally closed port and 25 psig on the normally open port.

Table 3: Accessories (Order Separately)

Code Number	Description
VG4000-1	Packing Nut with Integral O-Ring
VA-7450-8900	Manual Override Ring (Opens N.C. Valves or the N.C. Port of Three-Way Mixing Valves for VA-7450 and VA-7452 Actuated Assemblies)

Table 4: Pressure Drop (psi) vs. Flow Rate in Gallons per Minute (gpm)

Pipe Size (Sweat or Threaded End Connections)	1/2 in.	3/4 in.
Cv	**2.9**	**3.5**
Pressure Drop (psi)	**Flow Rate (gpm)**	
1	2.9	3.5
2	4.1	5.0
3	5.1	6.1
4	5.9	7.0
5	6.5	7.8
6	7.2	8.6
7	7.7	9.3
8	8.3	9.9
9	8.8	10.5
10	9.2	11.1
11	9.7	11.6
12	10.1	12.2
13	10.5	12.7
14	10.9	13.1
15	11.3	13.6
16	11.7	14.0
17	12.1	14.5
18	12.4	14.9
19	12.7	15.3
20	13.1	15.7
21	13.4	16.1
22	13.7	16.5
23	14.0	16.8
24	14.3	17.2
25	14.6	17.6
26	14.9	17.9
27	15.2	18.2
28	15.5	18.6
29	15.8	18.9
30	16.0	19.2

Actuator Assemblies

VG4000 Series High-Capacity/High-Closeoff Electric Zone Valves are specifically designed for use with VA-7010 Series on/off control actuators and VA-7450 Series floating or proportional control actuators.

Note: For soldering reasons, factory-ordered assemblies featuring sweat end connections are shipped with the actuator separated from the valve body.

Operation

IMPORTANT: It is recommended that the VG4000 Series Valve be mounted within 90 degrees of the upright position.

VA-7010 Series (On/Off Control)

When power is applied to the actuator, the motor drives the gear assembly, pushing the valve stem down against the force of the return spring. When power is removed, the actuator retracts, allowing the return spring to move the valve stem up in the direction of its normal position. Figure 2 illustrates the effect that valve stem movement has on flow.

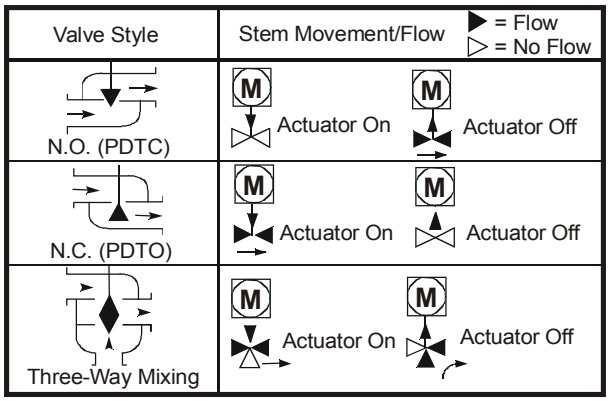

Figure 2: Effect of Valve Stem Movement on Flow

VA-7450-1001 (Floating Control)

When power is applied to the Common (blue) and Down (red) wires, the motor drives the gear assembly, pushing the valve stem down against the force of the return spring. When power is applied to the Common (blue) and Up (white) wires, the actuator retracts, allowing the return spring to move the valve stem up to its normal position. When power is removed, the actuator will hold its position.

If power remains applied to either the red or white wire, the actuator will time out and shut the motor off after approximately 80 seconds, holding its current position. Figure 2 illustrates the effect that valve stem movement has on flow.

VA-7452-90011 (Proportional Control)

When the control signal increases in the Direct Acting (DA) configuration or decreases in the Reverse Acting (RA) configuration, the actuator motor drives the gear assembly, pushing the valve stem down against the force of the return spring.

When the control signal decreases in the DA configuration or increases in the RA configuration, the actuator retracts, allowing the return spring to move the valve stem up in the direction of its normal position.

Upon loss of power, the actuator will hold its position. Figure 2 illustrates the effect that valve stem movement has on flow.

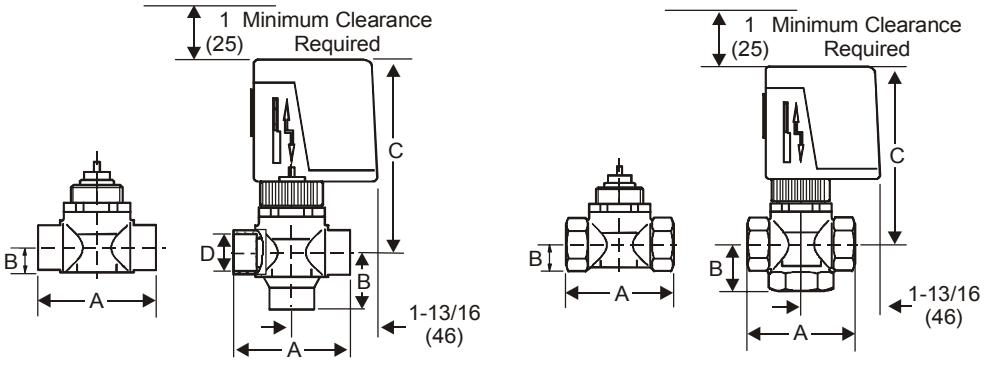

Figure 3: VA-7010 Actuated VG4000 Series Valve Dimensions, in. (mm)
(Refer to Tables 5 and 6.)

Table 5: Dimensions for VA-7010 Actuated VG4000 Series Assemblies with Sweat End Connections, in. (mm)

Dimension*	Two-Way Valve Assemblies		Three-Way Mixing Valve Assemblies	
	1/2 in. (DN15)	3/4 in. (DN20)	1/2 in. (DN15)	3/4 in. (DN20)
A	3-1/16 (78)	3-1/16 (78)	3-1/16 (78)	3-1/16 (78)
B	21/32 (17)	21/32 (17)	1-17/32 (39)	1-17/32 (39)
C	4-7/32 (107)	4-7/32 (107)	4-7/32 (107)	4-7/32 (107)
D	5/8 (16)	7/8 (22)	5/8 (16)	7/8 (22)

* For actuator-only dimensions, refer to the *VA-7010 Series Electric On/Off Actuator Product/Technical Bulletin (LIT-977360).*

Table 6: Dimensions for VA-7010 Actuated VG4000 Series Assemblies with Threaded (Internal NPT) End Connections, in. (mm)

Dimension*	Two-Way Valve Assemblies		Three-Way Mixing Valve Assemblies	
	1/2 in. (DN15)	3/4 in. (DN20)	1/2 in. (DN15)	3/4 in. (DN20)
A	2-19/32 (66)	2-19/32 (66)	2-19/32 (66)	2-19/32 (66)
B	11/16 (17)	11/16 (17)	11/16 (17)	11/16 (17)
C	4-7/32 (107)	4-7/32 (107)	4-7/32 (107)	4-7/32 (107)

* For actuator-only dimensions, refer to the *VA-7010 Series Electric On/Off Actuator Product/Technical Bulletin (LIT-977360).*

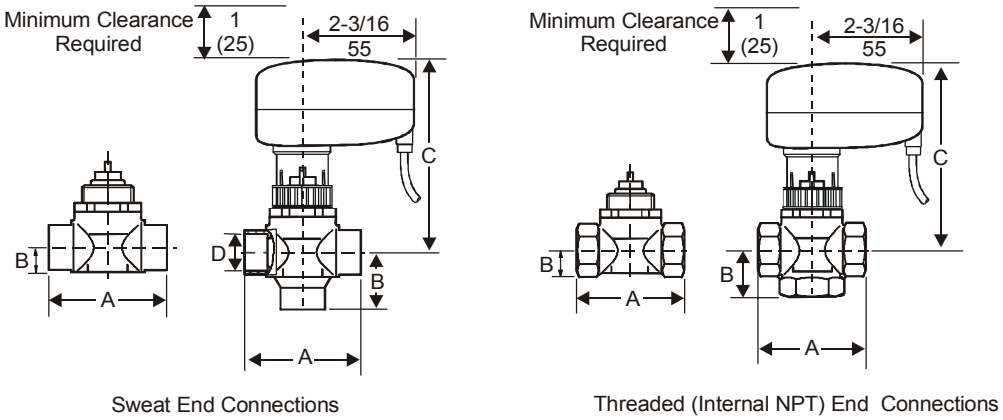

Figure 4: VA-7450 Actuated VG4000 Series Valve Dimensions, in. (mm) (Refer to Tables 7 and 8.)

Table 7: Dimensions for VA-7450 Actuated VG4000 Series Assemblies with Sweat End Connections, in. (mm)

Dimension*	Two-Way Valve Assemblies		Three-Way Mixing Valve Assemblies	
	1/2 in. (DN15)	3/4 in. (DN20)	1/2 in. (DN15)	3/4 in. (DN20)
A	3-1/16 (78)	3-1/16 (78)	3-1/16 (78)	3-1/16 (78)
B	11/16 (17)	11/16 (17)	11/16 (17)	21/32 (17)
C	4 (102)	4 (102)	4 (102)	4 (102)
D	5/8 (16)	7/8 (22)	5/8 (16)	7/8 (22)

* For actuator-only dimensions, refer to the *VA-7450 Electronic Valve Actuator Product/Technical Bulletin (LIT-977324).*

Table 8: Dimensions for VA-7450 Actuated VG4000 Series Assemblies with Threaded (Internal NPT) End Connections, in. (mm)

Dimension*	Two-Way Valve Assemblies		Three-Way Mixing Valve Assemblies	
	1/2 in. (DN15)	3/4 in. (DN20)	1/2 in. (DN15)	3/4 in. (DN20)
A	2-19/32 (66)	2-19/32 (66)	2-19/32 (66)	2-19/32 (66)
B	11/16 (17)	11/16 (17)	11/16 (17)	11/16 (17)
C	4 (102)	4 (102)	4 (102)	4 (102)

* For actuator-only dimensions, refer to the *VA-7450 Electronic Valve Actuator Product/Technical Bulletin (LIT-977324).*

Technical Data

Product	VG4000 Series High-Capacity/High-Closeoff Electric Zone Valves
Models	Refer to Tables 1 and 2.
Body Rating	PN16 Maximum Pressure: 300 psig (2,067 kPa)
Service*	Hot and Cold Water for HVAC Systems
Valve Sizes	1/2 in. (DN15) 3/4 in. (DN20)
Maximum Closeoff Pressures	Refer to Tables 1 and 2.
Leakage	0.01% of Maximum Flow; 100% Production Tested
End Connections	Sweat: ANSI B16.18 Threaded (Internal NPT): ANSI B1.20.1
Stroke	1/8 in. (3 mm)
Materials:	
Valve Body	Cast Bronze
Packing Nut and Cage	Brass
Stem	ANSI 300 Stainless Steel
Spring	Stainless Steel
Plug	EPT Rubber
Packing	Two EPT Rubber O-Rings
Fluid Temperature Limits	35 to 203°F (2 to 95°C)
Ambient Temperature Limits	35 to 122°F (2 to 50°C)
Flow Characteristics	On/Off with VA-7010 Series Actuator; Two-Way Valves with VA-7450 Series Actuator Approximately Equal Percentage; Three-Way Valves with VA-7450 Series Actuator Approximately Linear for Service Port

Valve Body Shipping Weight, lb (kg):	1/2 in. (DN15) Sweat End Connections	1/2 in. (DN15) Threaded (Internal NPT) End Connections	3/4 in. (DN20) Sweat End Connections	3/4 in. (DN20) Threaded (Internal NPT) End Connections
N.O. (PDTC)	0.78 (0.34)	0.95 (0.43)	0.78 (0.34)	0.86 (0.39)
N.C. (PDTO)	0.78 (0.34)	0.95 (0.43)	0.78 (0.34)	0.86 (0.39)
Three-Way Mixing	0.81 (0.37)	1.12 (0.51)	0.81 (0.37)	0.96 (0.44)

Actuator Shipping Weight, lb (kg)	VA-7010 Series: 1.10 (0.50) VA-7450 Series: 0.40 (0.18)

* Proper water treatment is recommended; refer to VDI 2035 Standard.

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, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

JOHNSON CONTROLS

Controls Group
507 E. Michigan Street
P.O. Box 423
Milwaukee, WI 53201

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www.johnsoncontrols.com