

# VG2000 Series Cast Iron Flanged Globe Valves

*VG2000 Series Cast Iron Flanged Globe Valves are designed primarily to regulate the flow of water and steam in response to the demand of a controller in Heating, Ventilating, and Air Conditioning (HVAC) systems. Available in sizes 2-1/2 through 6 in., these ANSI Class 125 valves are available in Normally Open (N.O.), Normally Closed (N.C.), and three-way mixing configurations. Both electric and pneumatic actuators are available for factory or field mounting.*



**Figure 1: VG2000 Series Cast Iron Flanged Globe Valves**

Features and Benefits	
<input type="checkbox"/> <b>Complete Family of 2-1/2 through 6 in. Cast Iron Flanged Globe Valves, Brass Trim, with Several Styles of Electric and Pneumatic Actuators</b>	Offers a broad selection from which to choose
<input type="checkbox"/> <b>Flexible Features and Options Ordering Matrix</b>	Allow engineering to suit your specific application from thousands of easy-to-select, factory-assembled combinations
<input type="checkbox"/> <b>Standard Johnson Controls® Ring Pack Packings</b>	Provide industry-leading reliability and operating life
<input type="checkbox"/> <b>Every Valve Tested for Leakage</b>	Provides energy conservation and ensures occupant comfort

**Table 1: Ordering Data — VG2000 Series Cast Iron Flanged Globe Valves**

<b>V</b>	<b>G</b>	<b>Valve Global</b>														
1	2	<b>2</b>	<b>Product Family 2 = Cast Iron</b>													
		3	<b>2</b>	<b>Body Type</b> 2 = Two-Way, Normally Open/Push-Down-To-Close 4 = Two-Way, Normally Closed/Push-Down-To-Open 8 = Three-Way Mixing												
			4													
			<b>3</b>	<b>End Connections</b> 3 = ANSI Class 125 Flat-Faced Flanged												
			5													
			<b>1</b>	<b>Trim and Flow Characteristics</b> 1 = Brass, Modified Linear												
			6													
			<b>T</b>	<b>Size and Cv</b> ( $K_v = C_v \times 0.857$ )				<b>Valve Size</b>	<b>Two-Way N.O./PDTC</b>	<b>Two-Way N.C./PDTO</b>	<b>Three-Way Mixing</b>					
			7					T = 2-1/2 in.	51.0	54.0	54.0					
								U = 3 in.	83.0	83.0	80.0					
								V = 4 in.	150.0	150.0	157.0					
								W = 5 in.	240.0	237.0	238.0					
								Y = 6 in.	350.0	344.0	347.0					
			<b>M</b>	<b>Stem Type</b> L = 3/8 in. Threaded Stem (2-1/2 and 3 in. N.O. Valves with MP82 Actuator Only)												
			8													
				M = 3/8 in. Threaded Stem (2-1/2 through 4 in. Valves Only)												
				N = 1/2 in. Threaded Stem (3 through 6 in. Valves Only)												
			<b>+</b>	<b>Actuator Mounting</b> + = Factory-Mounted Actuator (See Tables 2 and 3.) (Leave fields 9 through 15 blank for valve without a factory-mounted actuator.)												
			9													

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 = Field

<b>V</b>	<b>G</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>T</b>	<b>M</b>	<b>+</b>							
Valve								+	Actuator						

*Example: Cast iron valve; two-way, normally open/push-down-to-close; flat-faced flanged end connections; brass trim; modified linear; 2-1/2 in.; 51.0 Cv, 3/8 in. threaded stem.*

Note: See Table 2 when adding a factory-mounted pneumatic actuator to a valve body. See Table 3 and Table 4 when adding a factory-mounted electric actuator to a valve body. For valid actuator and valve combinations, see Table 5.

**Table 2: Ordering Data — Adding a Factory-Mounted Pneumatic Actuator**

<b>V</b>	<b>G</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>T</b>	<b>L</b>	<b>+</b>	<b>8</b>	<b>2</b>				
1	2	3	4	5	6	7	8	9	10	11				
											<b>MP8000 Series</b> 82 = MP82, 25 sq. in., Spring-Return-Up <i>(2-1/2 and 3 in. N.O. Valves with "L" Stem)</i>			
											<b>Pneumatic Actuator</b> <i>(See Actuator Product Bulletin.)</i>			
											84 = MP84, 50 sq. in., Spring-Return-Up <i>(All 2-1/2 through 4 in. Valves with "M" Stem)</i>			
											86 = MP86, 100 sq. in., Spring-Return-Up <i>(All 3 through 6 in. Valves with "N" Stem)</i>			
											<i>(Note: Only spring-return-up models of MP8000 Series Actuators are available factory mounted to VG2000 Series Cast Iron Valves.)</i>			
											<b>3</b>	<b>Stroke</b> 3 = 3/4 in. <i>(2-1/2 and 3 in. Valves with MP82 or MP84 Actuators Only)</i> <b>(MP8000 Series)</b> 5 = 1-1/8 in. <i>(3 and 4 in. Valves with MP84 or MP86 Actuators Only)</i> 7 = 1-1/2 in. <i>(5 and 6 in. Valves with MP86 Actuator Only)</i>		
											<b>C</b>	<b>Spring Range</b> C = 3 to 7 psig <i>(Suggested for N.O. Valves with Positioner)</i> <b>(MP8000 Series)</b> D = 4 to 8 psig <i>(Suggested for Three-Way Valves with Positioner)</i> E = 9 to 13 psig <i>(Suggested for N.C. Valves with Positioner)</i>		
											<b>0</b>	<b>1</b>	<b>Accessories</b> 00 = None <b>(MP8000 Series)</b> 01 = V-9502 Pneumatic Positioner 02 = EPP-1000 Electro-Pneumatic Positioner	
											12			
											13			
											14			
											15			
											15 = Field			
<b>V</b>	<b>G</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>T</b>	<b>L</b>	<b>+</b>	<b>8</b>	<b>2</b>	<b>3</b>	<b>C</b>	<b>0</b>	<b>1</b>
Valve								+	Actuator					

*Example: Cast iron valve; two-way, normally open; flat-faced flanged end connections; brass trim; modified linear; 2-1/2 in.; 51.0 Cv; 3/8 in. threaded stem; MP82 Pneumatic Actuator; 3/4 in. stroke; 3 to 7 psig spring range with factory-mounted V-9502 Positioner.*

Note: See Table 1 when ordering a valve body only. See Table 3 and Table 4 when adding a factory-mounted electric actuator to a valve body. For valid actuator and valve combinations, see Table 5 through Table 12.

**Table 3: Ordering Data — Adding a Factory-Mounted Electric Actuator**

<b>V</b>	<b>G</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>U</b>	<b>M</b>	<b>2</b>							
1	2	3	4	5	6	7	8	9							
									<b>9</b>		<b>2</b>	<b>6</b>			
									10	11	12				
									<b>M91xx/M9220 Non-Spring Return</b>						
									<b>Series Electric Actuator</b>			916 = M9116-xGx-2 (VG2231TM and VG2831TM only) 924 = M9124-xGx-2 (See Actuator Product Bulletin.)			
									<b>Spring Return</b>			92N = M9220-xGx-3 (Spring to Open, Stem Up) 94N = M9220-xGx-3 (Spring to Close, Stem Down)			
									<b>A</b>		<b>Control Type</b>		A = Floating, 24 VAC/VDC (M91xx and M9220) B = On/Off, 24 VAC/VDC (M9220 only) G = Proportional, 0-10 VDC or 0-20 mA		
									<b>G</b>		<b>Supply Voltage</b>		G = 24 VAC		
									<b>C</b>		<b>Feedback</b>		A = 0-10 VDC (Proportional only); No Feedback (All others) C = 0-10 VDC (Proportional only); 2 Aux. Sw. (All Models) Note: When ordering Option "C" on tandem factory mounted actuators, only one actuator will have auxiliary switches.		

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 = Field

<b>V</b>	<b>G</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>U</b>	<b>M</b>	<b>2</b>	<b>9</b>	<b>2</b>	<b>N</b>	<b>A</b>	<b>G</b>	<b>C</b>	
Valve									+	Actuator					

Example: Cast iron valve; two-way, push-down-to-close; flat-faced flanged end connections; brass trim; modified linear; 3 in.; 80.0 Cv; 3/8 in. threaded stem with one Spring Return M9220-AGC-3 Proportional Electric Actuator; 24 VAC supply; with two auxiliary switches; and one M9220-AGA-3 Spring Return Proportional Electric Actuator; 24 VAC supply without auxiliary switches.

Note: See Table 1 when ordering a valve body only. See Table 2 when adding a factory-mounted pneumatic actuator to a valve body. For valid actuator and valve combinations, see Table 5 through Table 12.

**Table 4: Ordering Data — Adding a Factory-Mounted Electric Actuator**

<b>V</b>	<b>G</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>T</b>	<b>M</b>	<b>+</b>	<b>3</b>	<b>0</b>					<b>VA-310x or Non-Spring Return VA-610x Series</b>			
1	2	3	4	5	6	7	8	9							<b>Electric Actuator</b>	30 = VA-310x (Available on 2-1/2 through 4 in. Two-Way PDTC and Three-Way Mixing Valves with "M" Stem, and 5 and 6 in. Two-Way PDTC and Three-Way Mixing Valves with "N" Stem)		
															(See Actuator Product/Technical Bulletin.)	60 = VA-610x (Available on 4 through 6 in. Two-Way PDTC and Three-Way Mixing Valves with "N" Stem)		
												<b>0</b>			<b>Actuator Mounting</b>	0 = 2-1/2 in. Valves with 3/8 in. Threaded Stem		
												12			1 = 3 and 4 in. Valves with 3/8 in. Threaded Stem			
															2 = 3 through 6 in. Valves with 1/2 in. Threaded Stem			
													<b>A</b>			<b>Actuator Input</b>		
													13			A = On/Off (Floating)		
																H = Proportional, 0 to 10 VDC		
																<b>(VA-310x or VA-610x Series)</b>		
														<b>G</b>			<b>Voltage</b>	
														14			G = 24 VAC	
																	<b>(VA-310x or VA-610x Series)</b>	
															<b>C</b>			<b>Accessories</b>
															15			A = None (VA-310x Series Only)
																		C = Two Auxiliary Switches
																		<b>(VA-310x or VA-610x Series)</b>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 =			Field	
<b>V</b>	<b>G</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>T</b>	<b>M</b>	<b>+</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>A</b>	<b>G</b>	<b>C</b>			<i>Example: Cast iron valve; two-way, push-down-to-close; flat-faced flanged end connections; brass trim; modified linear; 2-1/2 in.; 51.0 Cv; 3/8 in. threaded stem; VA-3100-AGC Non-Spring Return On/Off (Floating) Electric Actuator; 24 VAC supply with two auxiliary switches.</i>	
Valve									+	Actuator								

Note: See Table 1 when ordering a valve body only. See Table 2 when adding a factory-mounted pneumatic actuator to a valve body. For valid actuator and valve combinations, see Table 5 through Table 12.



Figure 2: VG2231 Two-Way Normally Open Valves with MP8000 Series Pneumatic Valve Actuators

Table 5: VG2231 Two-Way Normally Open Valves with Pneumatic Actuators

Spring Range		3 to 7 psig		4 to 8 psig		9 to 13 psig	
Size, in.	Cv	Closeoff psig	Code Number	Closeoff psig	Code Number	Closeoff psig	Code Number
<b>MP82 Series Actuators – 25 sq. in. Effective Diaphragm Area</b>							
2-1/2	51	53	VG2231TL+823C00	49	VG2231TL+823D00	28	VG2231TL+823E00
3	83	37	VG2231UL+823C00	34	VG2231UL+823D00	19	VG2231UL+823E00
<b>MP84 Series Actuators – 50 sq. in. Effective Diaphragm Area</b>							
2-1/2	51	109	VG2231TM+843C00	100	VG2231TM+843D00	58	VG2231TM+843E00
3	83	75	VG2231UM+845C00	70	VG2231UM+845D00	40	VG2231UM+845E00
4	150	42	VG2231VM+845C00	39	VG2231VM+845D00	23	VG2231VM+845E00
<b>MP86 Series Actuators – 100 sq. in. Effective Diaphragm Area</b>							
3	83	152	VG2231UN+865C00	140	VG2231UN+865D00	81	VG2231UN+865E00
4	150	86	VG2231VN+865C00	79	VG2231VN+865D00	46	VG2231VN+865E00
5	240	55	VG2231WN+867C00	51	VG2231WN+867D00	29	VG2231WN+867E00
6	350	38	VG2231YN+867C00	35	VG2231YN+867CD0	20	VG2231YN+867E00

To add an optional positioner to the valve assembly, change the **00** at the end of the code number to **01** for a V-9502-95 pneumatic positioner or to **02** for an EPP-1000-8 Electro-pneumatic positioner.

Example: VG2231TM+843C01 for a V-9502-95 pneumatic positioner, or  
 VG2231TM+843C02 for an EPP-1000-8 Electro-pneumatic positioner.



Figure 3: VG2431 Two-Way Normally Closed Valves with MP8000 Series Pneumatic Valve Actuators

Table 6: VG2431 Two-Way Normally Closed Valves with Pneumatic Actuators

Spring Range		3 to 7 psig		4 to 8 psig		9 to 13 psig	
Size, in.	Cv	Closeoff psig	Code Number	Closeoff psig	Code Number	Closeoff psig	Code Number
<b>MP84 Series Actuators – 50 sq. in. Effective Diaphragm Area</b>							
2-1/2	54	24	VG2431TM+843C00	32	VG2431TM+843D00	75	VG2431TM+843E00
3	83	17	VG2431UM+845C00	22	VG2431UM+845D00	52	VG2431UM+845E00
4	150	9	VG2431VM+845C00	13	VG2431VM+845D00	29	VG2431VM+845E00
<b>MP86 Series Actuators – 100 sq. in. Effective Diaphragm Area</b>							
3	83	34	VG2431UN+865C00	46	VG2431UN+865D00	105	VG2431UN+865E00
4	150	19	VG2431VN+865C00	26	VG2431VN+865D00	59	VG2431VN+865E00
5	237	12	VG2431WN+867C00	17	VG2431WN+867D00	38	VG2431WN+867E00
6	344	9	VG2431YN+867C00	11	VG2431YN+867D00	26	VG2431YN+867E00

To add an optional positioner to the valve assembly, change the **00** at the end of the code number to **01** for a V-9502-95 pneumatic positioner or to **02** for an EPP-1000-8 Electro-pneumatic positioner.

Example: VG2431TM+843C01 for a V-9502-95 pneumatic positioner, or  
 VG2431TM+843C02 for an EPP-1000-8 Electro-pneumatic positioner.



Figure 4: VG2831 Three-Way Mixing Valve with MP8000 Series Pneumatic Valve Actuator

Table 7: VG2831 Three-Way Mixing Valves with Pneumatic Actuators

Spring Range		3 to 7 psig		4 to 8 psig		9 to 13 psig	
Size, in.	Cv	Closeoff psig	Code Number	Closeoff psig	Code Number	Closeoff psig	Code Number
<b>MP84 Series Actuators – 50 sq. in. Effective Diaphragm Area</b>							
2-1/2	54	65/14	VG2831TM+843C00	60/19	VG2831TM+843D00	35/45	VG2831TM+843E00
3	83	45/10	VG2831UM+845C00	42/13	VG2831UM+845D00	24/31	VG2831UM+845E00
4	150	25/6	VG2831VM+845C00	23/8	VG2831VM+845D00	14/18	VG2831VM+845E00
<b>MP86 Series Actuators – 100 sq. in. Effective Diaphragm Area</b>							
3	83	91/21	VG2831UN+865C00	84/28	VG2831UN+865D00	49/63	VG2831UN+865E00
4	150	51/12	VG2831VN+865C00	47/16	VG2831VN+865D00	27/35	VG2831VN+865E00
5	237	33/7	VG2831WN+867C00	30/10	VG2831WN+867D00	18/23	VG2831WN+867E00
6	344	23/5	VG2831YN+867C00	21/7	VG2831YN+867CD0	12/16	VG2831YN+867E00

To add an optional positioner to the valve assembly, change the **00** at the end of the code number to **01** for a V-9502-95 pneumatic positioner or to **02** for an EPP-1000-8 Electro-pneumatic positioner.

Example: VG2831TM+843C01 for a V-9502-95 pneumatic positioner, or  
 VG2831TM+843C02 for an EPP-1000-8 Electro-pneumatic positioner.





Figure 5: VG2x31 Valves with M9220 Series Spring Return Electric Valve Actuators – No Switches

Table 8: VG2x31 Valves with M9220-xGA-3 Actuators – Spring Return without Switches

				Spring Return		
				Floating without Switches	On/Off without Switches	Proportional without Switches
Valve	Size, in.	Cv	Closeoff psig	M9220-AGA-3	M9220-BGA-3	M9220-GGA-3
<b>Two-Way – Spring Return Normally Open – Valve Stem Up</b>						
VG2231TM	2-1/2	51	76	VG2231TM+92NAGA	VG2231TM+92NBGA	VG2231TM+92NGGA
VG2231UM	3	83	33	VG2231UM+92NAGA	VG2231UM+92NBGA	VG2231UM+92NGGA
VG2231UM	3	83	66	VG2231TM292NAGA*	VG2231UM292NBGA*	VG2231UM292NGGA*
VG2231VM	4	150	37	VG2231UM292NAGA*	VG2231VM292NBGA*	VG2231VM292NGGA*
VG2231WN	5	240	20	VG2231WN292NAGA*	VG2231WN292NBGA*	VG2231WN292NGGA*
<b>Two-Way – Spring Return Normally Closed – Valve Stem Down</b>						
VG2231TM	2-1/2	51	76	VG2231TM+94NAGA	VG2231TM+94NBGA	VG2231TM+94NGGA
VG2231UM	3	83	33	VG2231UM+94NAGA	VG2231UM+94NBGA	VG2231UM+94NGGA
VG2231UM	3	83	66	VG2231TM294NAGA*	VG2231UM294NBGA*	VG2231UM294NGGA*
VG2231VM	4	150	37	VG2231UM294NAGA*	VG2231VM294NBGA*	VG2231VM294NGGA*
VG2231WN	5	240	20	VG2231WN294NAGA*	VG2231WN294NBGA*	VG2231WN294NGGA*
<b>Three-Way Mixing – Spring Return – Valve Stem Up – Side Inlet Port Closed</b>						
VG2831TM	2-1/2	54	45	VG2831TM+92NAGA	VG2831TM+92NBGA	VG2831TM+92NGGA
VG2831UM	3	80	20	VG2831UM+92NAGA	VG2831UM+92NBGA	VG2831UM+92NGGA
VG2831UM	3	80	40	VG2831UM292NAGA*	VG2831UM292NBGA*	VG2831UM292NGGA*
VG2831VM	4	157	11	VG2831VM+92NAGA	VG2831VM+92NBGA	VG2831VM+92NGGA
VG2831VM	4	157	22	VG2831VM292NAGA*	VG2831VM292NBGA*	VG2831VM292NGGA*
VG2831WN	5	238	12	VG2831WM292NAGA*	VG2831WN292NBGA*	VG2831WN292NGGA*
VG2831YN	6	347	7	VG2831YN292NAGA*	VG2831YN292NBGA*	VG2831YN292NGGA*
<b>Three-Way Mixing – Spring Return – Valve Stem Down – Side Inlet Port Open</b>						
VG2831TM	2-1/2	54	45	VG2831TM+94NAGA	VG2831TM+94NBGA	VG2831TM+94NGGA
VG2831UM	3	80	20	VG2831UM+94NAGA	VG2831UM+94NBGA	VG2831UM+94NGGA
VG2831UM	3	80	40	VG2831UM294NAGA*	VG2831UM294NBGA*	VG2831UM294NGGA*
VG2831VM	4	157	11	VG2831VM+92NAGA	VG2831VM+94NBGA	VG2831VM+94NGGA
VG2831VM	4	157	22	VG2831VM294NAGA*	VG2831VM294NBGA*	VG2831VM294NGGA*
VG2831WN	5	238	12	VG2831WM294NAGA*	VG2831WN294NBGA*	VG2831WN294NGGA*
VG2831YN	6	347	7	VG2831YN294NAGA*	VG2831YN294NBGA*	VG2831YN294NGGA*

\* Valve assemblies require two actuators mounted in tandem.



Figure 6: VG2x31 Valves with M9220 Series Spring Return Electric Valve Actuators – with Switches

Table 9: VG2x31 Valves with M9220-xGC-3 Actuators – Spring Return with Switches

				Spring Return		
				Floating with Two Switches	On/Off with Two Switches	Proportional with Two Switches
Valve	Size, in.	Cv	Closeoff psig	M9220-AGC-3	M9220-BGC-3	M9220-GGC-3
<b>Two-Way – Spring Return Normally Open – Valve Stem Up</b>						
VG2231TM	2-1/2	51	76	VG2231TM+92NAGC	VG2231TM+92NBGC	VG2231TM+92NGGC
VG2231UM	3	83	33	VG2231UM+92NAGC	VG2231UM+92NBGC	VG2231UM+92NGGC
VG2231UM	3	83	66	VG2231TM292NAGC*	VG2231UM292NBGC*	VG2231UM292NGGC*
VG2231VM	4	150	37	VG2231UM292NAGC*	VG2231VM292NBGC*	VG2231VM292NGGC*
VG2231WN	5	240	20	VG2231WN292NAGC*	VG2231WN292NBGC*	VG2231WN292NGGC*
<b>Two-Way – Spring Return Normally Closed – Valve Stem Down</b>						
VG2231TM	2-1/2	51	76	VG2231TM+94NAGC	VG2231TM+94NBGC	VG2231TM+94NGGC
VG2231UM	3	83	33	VG2231UM+94NAGC	VG2231UM+94NBGC	VG2231UM+94NGGC
VG2231UM	3	83	66	VG2231TM294NAGC*	VG2231UM294NBGC*	VG2231UM294NGGC*
VG2231VM	4	150	37	VG2231UM294NAGC*	VG2231VM294NBGC*	VG2231VM294NGGC*
VG2231WN	5	240	20	VG2231WN294NAGC*	VG2231WN294NBGC*	VG2231WN294NGGC*
<b>Three-Way Mixing – Spring Return – Valve Stem Up</b>						
VG2831TM	2-1/2	54	45	VG2831TM+92NAGC	VG2831TM+92NBGC	VG2831TM+92NGGC
VG2831UM	3	80	20	VG2831UM+92NAGC	VG2831UM+92NBGC	VG2831UM+92NGGC
VG2831UM	3	80	40	VG2831UM292NAGC*	VG2831UM292NBGC*	VG2831UM292NGGC*
VG2831VM	4	157	11	VG2831VM+92NAGC	VG2831VM+92NBGC	VG2831VM+92NGGC
VG2831VM	4	157	22	VG2831VM292NAGC*	VG2831VM292NBGC*	VG2831VM292NGGC*
VG2831WN	5	238	12	VG2831WM292NAGC*	VG2831WN292NBGC*	VG2831WN292NGGC*
VG2831YN	6	347	7	VG2831YN292NAGC*	VG2831YN292NBGC*	VG2831YN292NGGC*
<b>Three-Way Mixing – Spring Return – Valve Stem Down</b>						
VG2831TM	2-1/2	54	45	VG2831TM+94NAGC	VG2831TM294NBGC	VG2831TM294NGGC
VG2831UM	3	80	20	VG2831UM+94NAGC	VG2831UM294NBGC	VG2831UM294NGGC
VG2831UM	3	80	40	VG2831UM294NAGC*	VG2831UM294NBGC*	VG2831UM294NGGC*
VG2831VM	4	157	11	VG2831VM+94NAGC	VG2831VM+94NBGC	VG2831VM+94NGGC
VG2831VM	4	157	22	VG2831VM294NAGC*	VG2831VM294NBGC*	VG2831VM294NGGC*
VG2831WN	5	238	12	VG2831WM294NAGC*	VG2831WN294NBGC*	VG2831WN294NGGC*
VG2831YN	6	347	7	VG2831YN294NAGC*	VG2831YN294NBGC*	VG2831YN294NGGC*

\* Valve assemblies require two actuators mounted in tandem. On tandem assemblies with switches, only one actuator is required to have switches.



Figure 7: VG2x31 Valves with M91xx Series Non-Spring Return Electric Valve Actuators

Table 10: VG2x31 Valves with M91xx-xGx-2 Actuators – Non-Spring Return

			Non-Spring Return			
			On/Off Floating without Switches	Proportional without Switches	On/Off Floating with Two Switches	Proportional with Two Switches
Size, in.	Cv	Closeoff psig	M9116-AGA-2 M9124-AGA-2	M9116-GGA-2 M9124-GGA-2	M9116-AGC-2 M9124-AGC-2	M9116-GGC-2 M9124-GGC-2
<b>Two-Way, Push-Down-To-Close</b>						
2-1/2	51	62	VG2231TM+916AGA	VG2231TM+916GGA	VG2231TM+916AGC	VG2231TM+916GGC
2-1/2	51	101	VG2231TM+924AGA	VG2231TM+924GGA	VG2231TM+924AGC	VG2231TM+924GGC
3	83	27	VG2231UM+916AGA	VG2231UM+916GGA	VG2231UM+916AGC	VG2231UM+916GGC
3	83	43	VG2231UM+924AGA	VG2231UM+924GGA	VG2231UM+924AGC	VG2231UM+924GGC
3	83	88	VG2231UM2924AGA*	VG2231UM2924GGA*	VG2231UM2924AGC*	VG2231UM2924GGC*
4	150	24	VG2231VM+924AGA	VG2231VM+924GGA	VG2231VM+924AGC	VG2231VM+924GGC
4	150	49	VG2231VM2924AGA*	VG2231VM2924GGA*	VG2231VM2924AGC*	VG2231VM2924GGC*
5	240	26	VG2231WN2924AGA*	VG2231WN2924GGA*	VG2231WN2924AGC*	VG2231WN2924GGC*
6	350	16	VG2231YN2924AGA*	VG2231YN2924GGA*	VG2231YN2924AGC*	VG2231YN2924GGC*
<b>Three-Way, Mixing</b>						
2-1/2	54	37	VG2831TM+916AGA	VG2831TM+916GGA	VG2831TM+916AGC	VG2831TM+916GGC
2-1/2	54	60	VG2831TM+924AGA	VG2831TM+924GGA	VG2831TM+924AGC	VG2831TM+924GGC
3	80	16	VG2831UM+916AGA	VG2831UM+916GGA	VG2831UM+916AGC	VG2831UM+916GGC
3	80	26	VG2831UM+924AGA	VG2831UM+924GGA	VG2831UM+924AGC	VG2831UM+924GGC
3	80	53	VG2831UM2924AGA*	VG2831UM2924GGA*	VG2831UM2924AGC*	VG2831UM2924GGC*
4	157	9	VG2831VM+916AGA	VG2831VM+916GGA	VG2831VM+916AGC	VG2831VM+916GGC
4	157	14	VG2831VM+924AGA	VG2831VM+924GGA	VG2831VM+924AGC	VG2831VM+924GGC
4	157	30	VG2831VM2924AGA*	VG2831VM2924GGA*	VG2831VM2924AGC*	VG2831VM2924GGC*
5	238	7	VG2831WN+924AGA	VG2831WN+924GGA	VG2831WN+924AGC	VG2831WN+924GGC
5	238	15	VG2831WN2924AGA*	VG2831WN2924GGA*	VG2831WN2924AGC*	VG2831WN2924GGC*
6	347	4	VG2831YN+924AGA	VG2831YN+924GGA	VG2831YN+924AGC	VG2831YN+924GGC
6	347	9	VG2831YN2924AGA*	VG2831YN2924GGA*	VG2831YN2924AGC*	VG2831YN2924GGC*

\* Valve assemblies require two actuators mounted in tandem. On tandem assemblies with switches, only one actuator is required to have switches. M9116-AGx-2 actuators are not designed for tandem operation.



Figure 8: VG2x31 Valves with VA-3100 Series Non-Spring Return Electric Valve Actuators

Table 11: VG2x31 Valves with VA-3100-xGx Series Non-Spring Return Actuators

				Non-Spring Return		
				On/Off Floating without Switches	On/Off Floating with Two Switches	Proportional with Two Switches
Valve	Size, in.	Cv	Closeoff psig	VA-3100-AGA	VA-3100-AGC	VA-3100-HGC
<b>Two-Way Push-Down-To-Close</b>						
VG2231TM	2-1/2	51	115	VG2231TM+300AGA	VG2231TM+300AGC	VG2231TM+300HGC
VG2231UM	3	83	79	VG2231UM+301AGA	VG2231UM+301AGC	VG2231UM+301HGC
VG2231VM	4	150	45	VG2231VM+301AGA	VG2231VM+301AGC	VG2231VM+301HGC
VG2231WN	5	240	29	VG2231WN+302AGA	VG2231WN+302AGC	VG2231WN+302HGC
VG2231YN	6	350	20	VG2231YN+302AGA	VG2231YN+302AGC	VG2231YN+302HGC
<b>Three-Way Mixing</b>						
VG2831TM	2-1/2	54	69	VG2831TM+300AGA	VG2831TM+300AGC	VG2831TM+300HGC
VG2831UM	3	80	48	VG2831UM+301AGA	VG2831UM+301AGC	VG2831UM+301HGC
VG2831VM	4	157	27	VG2831VM+301AGA	VG2831VM+301AGC	VG2831VM+301HGC
VG2831WN	5	238	17	VG2831WN+302AGA	VG2831WN+302AGC	VG2831WN+302HGC
VG2831YN	6	347	12	VG2831YN+302AGA	VG2831YN+302AGC	VG2831YN+302HGC



Figure 9: VG2x31 Valves with VA-6100 Series Non-Spring Return Electric Valve Actuators

Table 12: VG2x31 Valves with VA-6100-xGx Series Non-Spring Return Actuators

				Non-Spring Return	
				On/Off Floating with Two Switches	Proportional with Two Switches
Valve	Size, in.	Cv	Closeoff psig	VA-6100-AGC	VA-6100-HGC
<b>Two-Way Push-Down-To-Close</b>					
VG2231VN	4	150	89	VG2231VN+602AGC	VG2231VN+602HGC
VG2231WN	5	240	57	VG2231WN+602AGC	VG2231WN+602HGC
VG2231YN	6	350	40	VG2231YN+602AGC	VG2231YN+602HGC
<b>Three-Way Mixing</b>					
VG2831VN	4	157	54	VG2831VN+602AGC	VG2831VN+602HGC
VG2831WN	5	238	34	VG2831WN+602AGC	VG2831WN+602HGC
VG2831YN	6	347	24	VG2831YN+602AGC	VG2831YN+602HGC

**Table 13: Shipping Weights for Two-Way N.O. (PDTC) Valve Assemblies, lb (kg)**

Actuator	Valve Size, in.				
	2-1/2	3	4	5	6
MP82	47.0 (21.3)	64.0 (29.1)	---	---	---
MP84	57.0 (25.9)	80.0 (36.3)	119.0 (54.0)	---	---
MP86	---	104.0 (47.2)	129.0 (58.6)	163.0 (74.0)	198.0 (89.9)
M9116	47 (21.3)	61 (27.7)	---	---	---
M9124	47 (21.3)	61 (27.7)	95 (43.1)	---	---
M9124 (Tandem)	---	64 (29.0)	98 (44.5)	138 (62.6)	145 (65.8)
M9220	50 (22.7)	64 (29.0)	---	---	---
M9220 (Tandem)	---	71 (32.2)	105 (47.6)	145 (65.8)	---
VA-310x	44.0 (20.0)	61.0 (27.7)	97.0 (44.0)	136.0 (61.7)	158.0 (71.7)
VA-610x	---	---	104.0 (47.2)	146.0 (66.3)	170.0 (77.2)

Note: Weights are approximate and based on the heaviest valve. Add 2.0 lb (0.9 kg) for assemblies with a factory-mounted positioner. The weights given for the M9220 actuated assemblies are for the M9220-AGx and M9220-GGx models. For assemblies with M9220-Bxx On/Off actuators, add 1.2 lb (0.55 kg) for single assembly actuators and 2.4 lb (1.1 kg) for tandem actuated assemblies to the weights listed previously.

**Table 14: Shipping Weights for Two-Way N.C. (PDTO) Valve Assemblies, lb (kg)**

Actuator	Valve Size, in.				
	2-1/2	3	4	5	6
MP84	76.0 (34.5)	90.0 (40.9)	127.0 (57.7)	---	---
MP86	---	113.0 (51.3)	149.0 (67.6)	168.0 (76.3)	224.0 (101.7)

Note: Weights are approximate and based on the heaviest valve. Add 2.0 lb (0.9 kg) for assemblies with a factory-mounted positioner.

**Table 15: Shipping Weights for Three-Way Mixing Valve Assemblies, lb (kg)**

Actuator	Valve Size, in.				
	2-1/2	3	4	5	6
MP84	86.0 (39.0)	104.0 (47.2)	149.0 (67.6)	---	---
MP86	---	126.0 (57.2)	170.0 (77.2)	209.0 (94.9)	254.0 (115.3)
M9116	68 (30.8)	87 (39.5)	116 (52.6)	---	---
M9124	68 (30.8)	87 (39.5)	116 (52.6)	182 (82.6)	221 (100.2)
M9124 (Tandem)	---	90 (40.8)	119 (54.0)	185 (83.9)	224 (101.6)
M9220	78 (35.4)	90 (40.8)	119 (54.0)	185 (83.9)	224 (101.6)
M9220 (Tandem)	---	97 (44.0)	126 (57.2)	192 (87.1)	231 (104.8)
VA-310x	64.0 (29.1)	82.0 (37.2)	130.0 (59.0)	180.0 (81.7)	220.0 (99.9)
VA-610x	---	---	137.0 (62.2)	193.0 (87.6)	228.0 (103.5)

Note: Weights are approximate and based on the heaviest valve. Add 2.0 lb (0.9 kg) for assemblies with a factory-mounted positioner. The weights given for the M9220 actuated assemblies are for the M9220-AGx and M9220-GGx models. For assemblies with M9220-Bxx On/Off actuators, add 1.2 lb (0.55 kg) for single assembly actuators and 2.4 lb (1.1 kg) for tandem actuated assemblies to the weights listed previously.

## Application Overview

VG2000 Series Cast Iron Flanged Globe Valves feature brass trim and are available in two-way Push-Down-To-Close ([PDTC] – normally open if pneumatically actuated) or Push-Down-To-Open ([PDTO] – normally closed if pneumatically actuated) and three-way mixing configurations. These iron valves can be ordered with MP8000 Series Pneumatic Actuators (with or without a factory-mounted pneumatic or electro-pneumatic positioner). VG2000 Series Valves can also be ordered with any of the following series of electric actuators: M9116, M9124, M9220, VA-310x, or VA-610x. All electric actuators are fully compatible with Johnson Controls controllers, reducing installation costs. Valves without actuators can be ordered with the standard bonnet and stem design, allowing easy interchangeability of actuators with the use of standardized mounting kits. See Tables 1, 2, 3, and 4 for ordering data and additional details. For valid valve and actuator combinations, see Tables 5 through 12.

The modulating valve plug of VG2000 Series Valves provides a modified linear flow characteristic. An arrow is cast on both sides of the valve body indicating the direction of flow for proper piping.

## Pneumatic Actuator Selection (See Tables 1 and 2.)

### MP8000 Series Pneumatic Actuators

The MP82 (25 sq. in. effective diaphragm area), MP84 (50 sq. in. effective diaphragm area), and MP86 (100 sq. in. effective diaphragm area) are equipped with a molded synthetic rubber diaphragm contained in a sturdy, carbon-steel housing that protects it against dirt and damage. The actuator can be easily removed to perform inline servicing to all parts of the valve. MP8000 Series Pneumatic Actuators are available factory mounted or are easily field mounted to VG2000 Series Valves.

MP8000 Series Pneumatic Actuators are designed to allow for reversing the action of each actuator in the field. If desired, the action of the MP8000 Series Actuator can be reversed from spring-return-up to spring-return-down or vice versa. For instructions on field reversing the action, refer to the *MP8000 Series Pneumatic Valve Actuators Technical Bulletin (LIT-977258)*. The V-9502 Pneumatic Positioner and the EPP-1000 Electro-Pneumatic Positioner are also available for factory or field mounting to MP8000 Series Pneumatic Valve Actuators.

## Electric Actuator Selection (See Tables 1, 3, and 4.)

Factory-mounted electric actuators are available on two-way PDTC and three-way mixing valve configurations only. These same actuators can be field mounted on PDTO valves if desired. All electric actuators used with VG2000 Series Cast Iron Flange Globe Valves can be easily field reversed if required. All proportional electrically actuated assemblies are factory calibrated for nominal 0 to 10 VDC operation to drive down with an increase in signal.

### M9100 Series Electric Actuators

The M9100 Series is a line of motor driven, non-spring return actuators that operate on 24 VAC or VDC power and are available for use with floating or proportional controllers. When coupled with the M9000-53x Series of Valve Linkages, the rotary motion of this actuator is converted into linear motion that operates 2-1/2 through 6 in. VG2000 Series Valves. Integral auxiliary switches are available for indicating end-stop position or performing switching functions. Position feedback is available via switches, or a 0 to 10 VDC signal. For more information on M91xx Series Electric Actuators, refer to the *M9108, M9116, M9124, and M9132 Series Electric Non-spring Return Actuators Product Bulletin (LIT-2681058)*.

### M9220 Series Electric Actuators

The M9220 Series is a line of motor driven, spring return actuators that operate on 24 VAC or VDC power and are available for use with on/off, floating, or proportional controllers. The 120 and 230 VAC models are available for field mounting for use with on/off controllers. When coupled with the M9000-53x Series of Valve Linkages, the rotary motion of this actuator is converted into linear motion that operates 2-1/2 through 6 in. VG2000 Series Valves. Integral auxiliary switches are available for indicating end-stop position or performing switching functions. Position feedback is available via switches or a 0 to 10 VDC signal. For more information on M9220 Series Electric Actuators, refer to the *M9220-xxx-3 Electric Spring Return Actuators Product Bulletin (LIT-12011057)*.

### VA-310x Series Electric Actuators

The VA-310x Series uses a synchronous motor to accurately position valves in HVAC and industrial applications. This non-spring return actuator has a 675 lb (3,000 N) force output for on/off (floating) or proportional control. Integral auxiliary switches are available for indicating end-stop position or performing switching functions.

For more information on VA-310x Series Electric Actuators, refer to the *VA-3100 Series Electric Valve Actuators Product Bulletin (LIT-977283)*.

### VA-610x Series Electric Actuators

The VA-610x Series uses a synchronous motor to accurately position valves in HVAC and industrial applications. This non-spring return actuator has a 1,350 lb (6,000 N) force output for on/off (floating) or proportional control. Integral auxiliary switches are available for indicating end-stop position or performing switching functions.

For more information on VA-610x Series Electric Actuators, refer to the *VA-6100 Series Electric Valve Actuators Product Bulletin (LIT-977284)*.

**Table 16: Mounting Kits for Field Mounting M91xx and M9220 Series Electric Actuators**

Mounting Kit Code Number	Valve	Valve Size	Valve Stroke	Stem Type (Diameter)	Number of Actuator(s)
M9000-530	VG2x31TM	2-1/2 in.	3/4 in	"M" Stem (3/8 in.)	Single
M9000-531	VG2x31UM and VG2x31VM	3 and 4 in.	1-1/8 in.	"M" Stem (3/8 in.)	Single
M9000-532	VG2x31UM and VG2x31VM	3 and 4 in.	1-1/8 in.	"M" Stem (3/8 in.)	Dual
M9000-533	VG2x31WN	5 in.	1-3/8 in.	"N" Stem (1/2 in.)	Single
M9000-534	VG2x31WN	5 in.	1-3/8 in.	"N" Stem (1/2 in.)	Dual
M9000-535	VG2x31YN	6 in.	1-1/2 in.	"N" Stem (1/2 in.)	Single
M9000-536	VG2x31YN	6 in.	1-1/2 in.	"N" Stem (1/2 in.)	Dual
M9000-537	VG2x31UN and VG2x31VN	3 and 4 in.	1-1/8 in.	"N" Stem (1/2 in.)	Dual



**Table 17: Mounting Kits for Field Mounting MP8000 Series Pneumatic Valve Actuators**

<b>Mounting Kit Code Number</b>	<b>Actuator Style</b>	<b>Valve Size</b>	<b>Stem Type (Diameter)</b>
MP8000-6201	MP82/MP83/MP84/MP85	2-1/2 through 4 in.	"L" Stem (3/8 in.) or "M" Stem (3/8 in.)
MP8000-6203	MP86/MP87	3 through 6 in.	"N" Stem (1/2 in.)

**Table 18: Mounting Kits for Field Mounting VA-310x Series Electric Valve Actuators**

<b>Mounting Kit Code Number</b>	<b>Valve Size</b>	<b>Stem Type (Diameter)</b>
VA-3100-500	2-1/2 through 4 in.	"M" Stem (3/8 in.)
VA-3100-501	5 and 6 in.	"N" Stem (1/2 in.)

**Table 19: Mounting Kits for Field Mounting VA-610x Series Electric Valve Actuators**

<b>Mounting Kit Code Number</b>	<b>Valve Size</b>	<b>Stem Type (Diameter)</b>
VA-3100-501	4 through 6 in.	"N" Stem (1/2 in.)

**Table 20: Maximum Closeoff Pressures, psig (kPa) for Factory-Assembled Pneumatically Actuated Two-Way Valves**

Actuator Style	Valve Size in.	Two-Way N.O. (with 20 psig Supply)			Two-Way N.C. (with 0 psig Supply)		
		Spring Range, psig (kPa)*			Spring Range, psig (kPa)*		
		3 to 7 (21 to 48)	4 to 8 (28 to 55)	9 to 13 (62 to 90)	3 to 7 (21 to 48)	4 to 8 (28 to 55)	9 to 13 (62 to 90)
MP82	2-1/2	53 (365)	49 (338)	28 (193)	---	---	---
	3	37 (255)	34 (234)	19 (131)	---	---	---
MP84	2-1/2	109 (751)	100 (689)	58 (400)	24 (165)	32 (220)	75 (517)
	3	75 (517)	70 (482)	40 (276)	17 (117)	22 (152)	52 (358)
	4	42 (289)	39 (269)	23 (158)	9 (62)	13 (90)	29 (200)
MP86	3	152 (1,047)	140 (965)	81 (558)	34 (234)	46 (317)	105 (723)
	4	86 (592)	79 (544)	46 (317)	19 (131)	26 (179)	59 (407)
	5	55 (379)	51 (351)	29 (200)	12 (83)	17 (117)	38 (262)
	6	38 (262)	35 (241)	20 (138)	9 (62)	11 (76)	26 (179)

\* To maximize closeoff, the recommended spring ranges for use with a positioner are 3 to 7 psig (21 to 48 kPa) for two-way N.O. valves and 9 to 13 psig (62 to 90 kPa) for two-way N.C. valves.

Note: The maximum fluid temperature is 281°F (138°C) water or 35 psig (241 kPa) saturated steam.

**Table 21: Maximum Closeoff Pressures, psig (kPa) for Factory-Assembled Pneumatically Actuated Three-Way Mixing Valves**

Actuator Style	Valve Size in.	Three-Way Mixing N.O. Port (with 20 psig Supply)			Three-Way Mixing N.C. Port (with 0 psig Supply)		
		Spring Range, psig (kPa)*			Spring Range, psig (kPa)*		
		3 to 7 (21 to 48)	4 to 8 (28 to 55)	9 to 13 (62 to 90)	3 to 7 (21 to 48)	4 to 8 (28 to 55)	9 to 13 (62 to 90)
MP84	2-1/2	65 (448)	60 (413)	35 (241)	14 (96)	19 (131)	45 (310)
	3	45 (310)	42 (289)	24 (165)	10 (69)	13 (90)	31 (214)
	4	25 (172)	23 (158)	14 (96)	6 (41)	8 (55)	18 (124)
MP86	3	91 (627)	84 (579)	49 (338)	21 (145)	28 (193)	63 (434)
	4	51 (351)	47 (324)	27 (186)	12 (83)	16 (110)	35 (241)
	5	33 (227)	30 (207)	18 (124)	7 (48)	10 (69)	23 (158)
	6	23 (158)	21 (145)	12 (83)	5 (34)	7 (48)	16 (110)

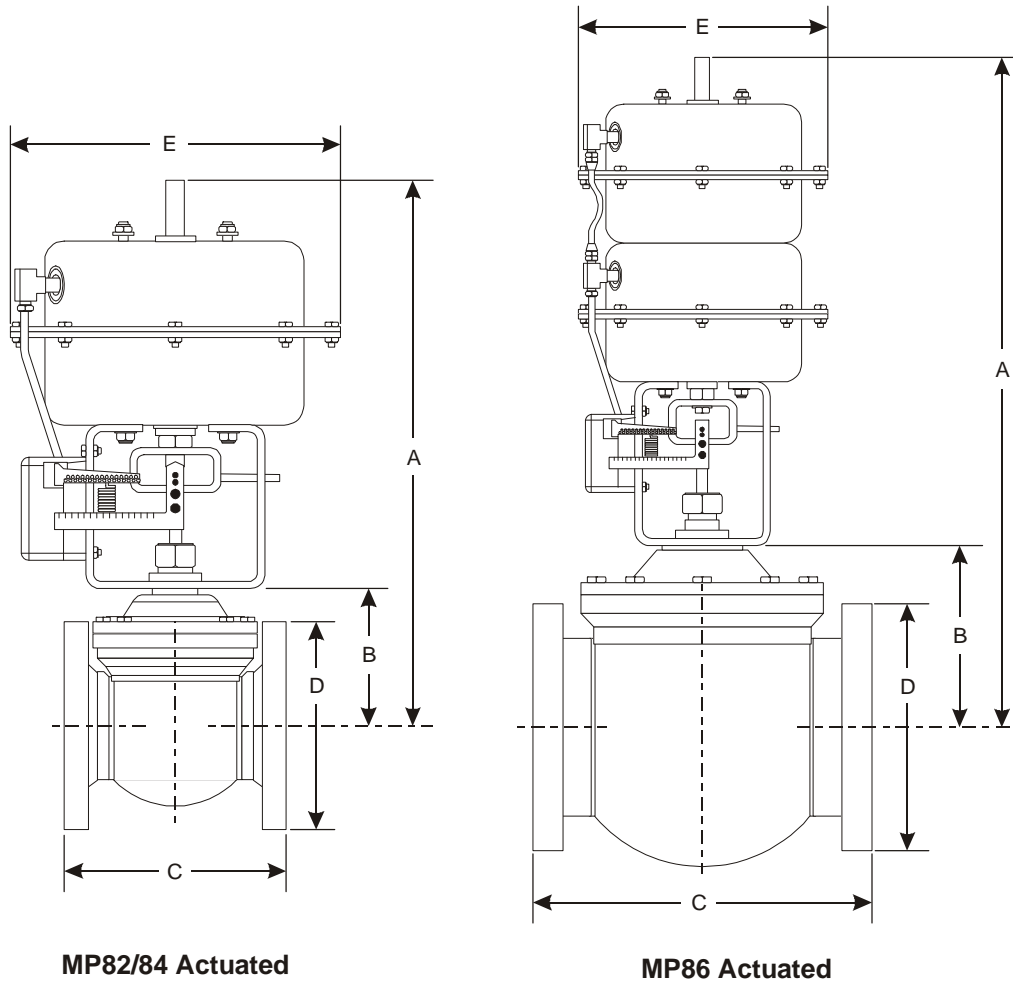
\* To maximize closeoff, the recommended spring range for use with a positioner is 4 to 8 psig (28 to 55 kPa) for three-way mixing valves.

Note: The maximum fluid temperature is 281°F (138°C) water or 35 psig (241 kPa) saturated steam.

**Table 22: Maximum Closeoff Pressures, psig (kPa) for Factory-Assembled Electrically Actuated Two-Way and Three-Way Valves**

Actuator	Valve Size, in.				
	2-1/2	3	4	5	6
<b>Two-Way, Push-Down-To-Close</b>					
<b>M9116</b>	62 (427)	27 (186)	---	---	---
<b>M9124</b>	101 (696)	43 (296)	24 (165)	---	---
<b>M9124 (Tandem)</b>	---	88 (606)	49 (337)	26 (179)	16 (110)
<b>M9220</b>	76 (524)	33 (227)	---	---	---
<b>M9220 (Tandem)</b>	---	66 (456)	37 (255)	20 (138)	---
<b>VA-3100</b>	115 (792)	79 (544)	45 (310)	29 (200)	20 (138)
<b>VA-6100</b>	---	---	89 (613)	57 (393)	40 (276)
<b>Three-Way, Mixing</b>					
<b>M9116</b>	37 (255)	16 (110)	9 (62)	---	---
<b>M9124</b>	60 (413)	26 (179)	14 (96)	7 (48)	4 (28)
<b>M9124 (Tandem)</b>	---	53 (365)	30 (206)	15 (103)	9 (62)
<b>M9220</b>	45 (310)	20 (138)	11 (76)	---	---
<b>M9220 (Tandem)</b>	---	40 (276)	22 (152)	12 (83)	7 (48)
<b>VA-3100</b>	69 (475)	48 (331)	27 (186)	17 (117)	12 (83)
<b>VA-6100</b>	---	---	54 (372)	34 (234)	24 (165)

Note: The maximum fluid temperature is 281°F (138°C) water or 35 psig (241 kPa) saturated steam.

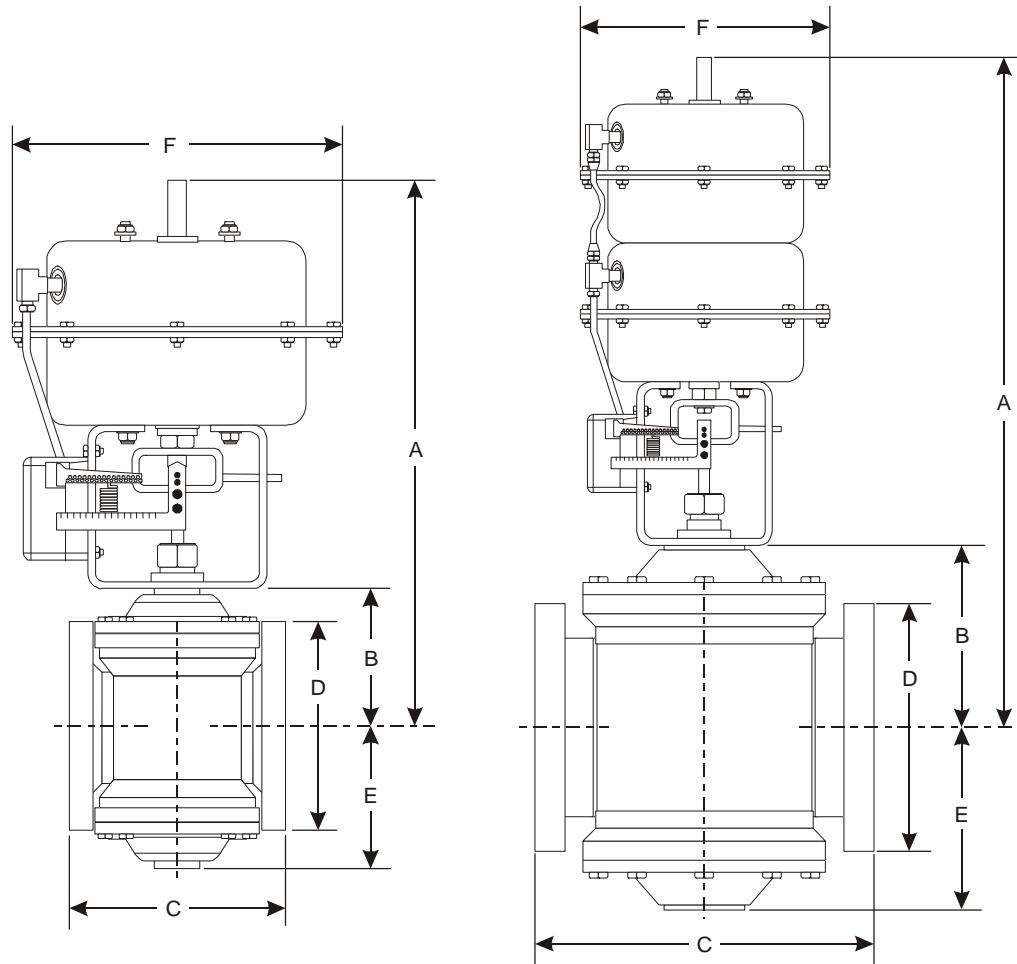


**Figure 10: MP8000 Actuated Two-Way N.O. Valve Dimensions  
(See Table 23)**

**Table 23: MP8000 Actuated Two-Way N.O. Valve Dimensions, in. (mm)**

Actuator Style*	Valve Size, in.	A	B	C	D	E
MP82	2-1/2	15-3/16 (386)	4-21/32 (118)	7-1/4 (184)	7 (178)	8-21/32 (220)
	3	15-13/16 (402)	5-3/16 (132)	8-5/8 (219)	7-1/2 (191)	8-21/32 (220)
MP84	2-1/2	18-17/32 (471)	4-21/32 (118)	7-1/4 (184)	7 (178)	10-7/8 (276)
	3	19-3/16 (487)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	10-7/8 (276)
	4	20-5/16 (516)	6-7/16 (164)	10-1/2 (267)	9 (229)	10-7/8 (276)
MP86	3	27-1/4 (692)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	10-7/8 (276)
	4	28-3/8 (721)	6-7/16 (164)	10-1/2 (267)	9 (229)	10-7/8 (276)
	5	28-13/16 (732)	6-7/8 (175)	12-1/2 (318)	10 (254)	10-7/8 (276)
	6	30-1/8 (765)	8-3/16 (208)	14-1/2 (368)	11 (279)	10-7/8 (276)

\* Allow 3-3/4 in. (95 mm) clearance for MP82/MP84 actuator removal and 4-3/4 in. (121 mm) clearance for MP86 actuator removal.



**MP84 Actuated**

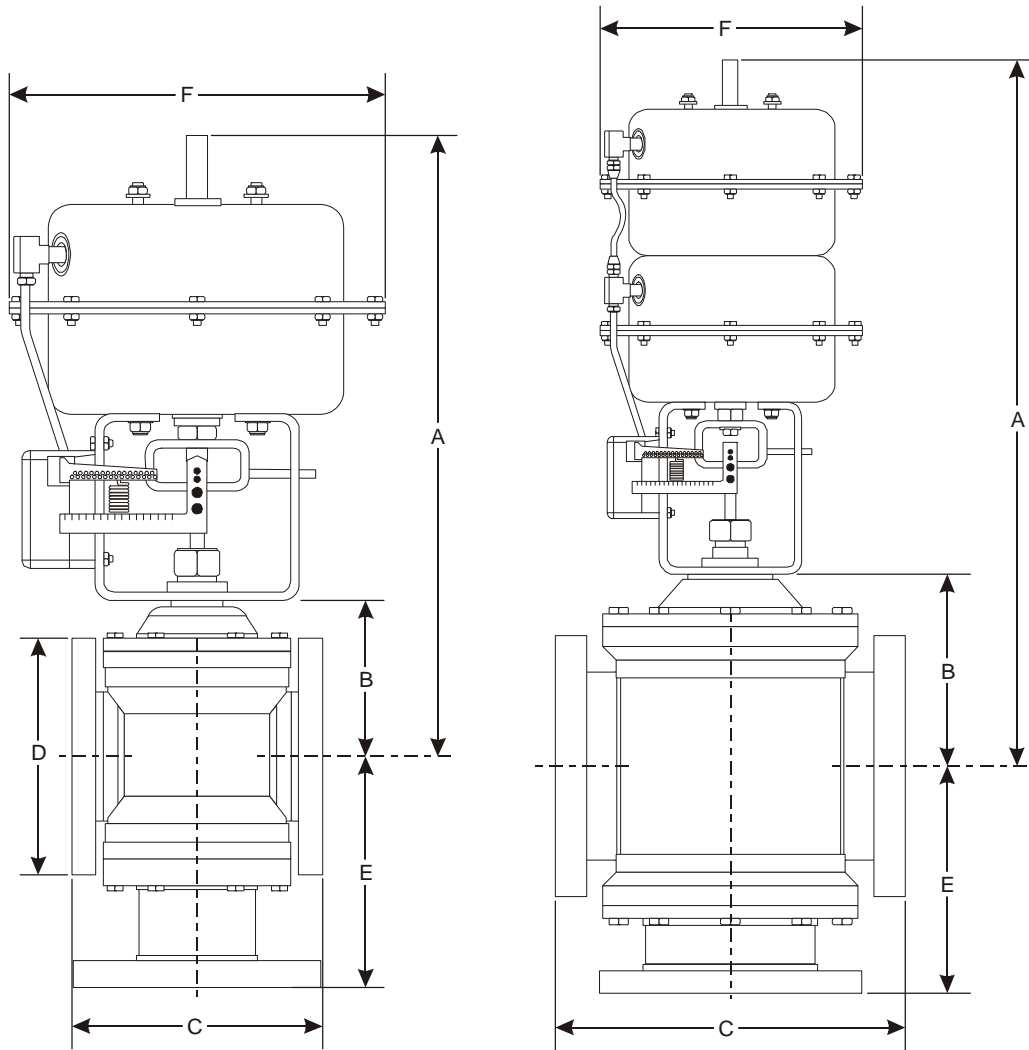
**MP86 Actuated**

**Figure 11: MP8000 Actuated Two-Way N.C. Valve Dimensions  
(See Table 24)**

**Table 24: MP8000 Actuated Two-Way N.C. Valve Dimensions, in. (mm)**

Actuator Style*	Valve Size, in.	A	B	C	D	E	F
MP84	2-1/2	18-17/32 (471)	4-21/32 (118)	7-1/4 (184)	7 (178)	4-21/32 (118)	10-7/8 (276)
	3	19-3/16 (487)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	5-5/16 (135)	10-7/8 (276)
	4	20-5/16 (516)	6-1/16 (152)	10-1/2 (267)	9 (229)	6-1/16 (152)	10-7/8 (276)
MP86	3	27-1/4 (692)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	5-5/16 (135)	10-7/8 (276)
	4	28-3/8 (721)	6-7/16 (164)	10-1/2 (267)	9 (229)	6-7/16 (164)	10-7/8 (276)
	5	28-13/16 (732)	6-7/8 (175)	12-1/2 (318)	10 (254)	6-7/8 (175)	10-7/8 (276)
	6	30-1/8 (765)	8-3/16 (208)	14-1/2 (368)	11 (279)	8-3/16 (208)	10-7/8 (276)

\* Allow 3-3/4 in. (95 mm) clearance for MP84 actuator removal and 4-3/4 in. (121 mm) clearance for MP86 actuator removal.



**MP84 Actuated**

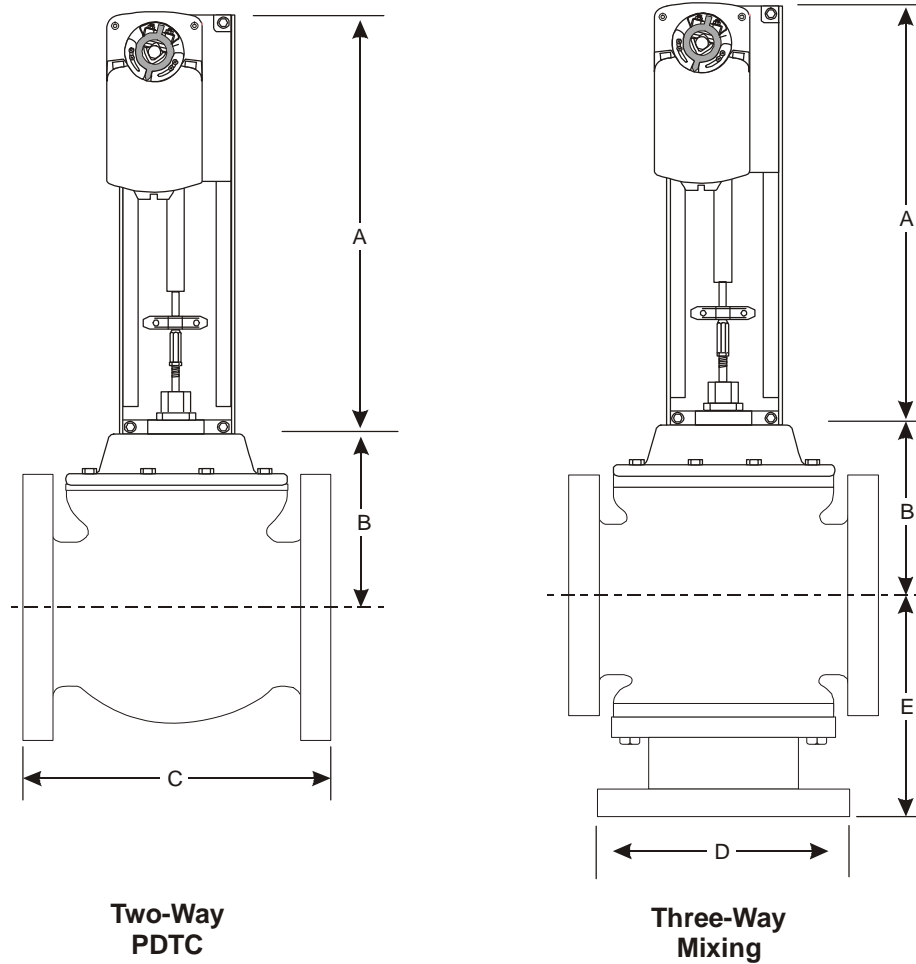
**MP86 Actuated**

**Figure 12: MP8000 Actuated Three-Way Mixing Valve Dimensions  
(See Table 25)**

**Table 25: MP8000 Actuated Three-Way Mixing Valve Dimensions, in. (mm)**

Actuator Style*	Valve Size, in.	A	B	C	D	E	F
MP84	2-1/2	18-17/32 (471)	4-21/32 (118)	7-1/4 (184)	7 (178)	6-25/32 (172)	10-7/8 (276)
	3	19-3/16 (487)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	6-13/16 (173)	10-7/8 (276)
	4	20-5/16 (516)	6-7/16 (164)	10-1/2 (267)	9 (229)	8-1/16 (205)	10-7/8 (276)
MP86	3	27-1/4 (692)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	6-13/16 (175)	10-7/8 (276)
	4	28-3/8 (721)	6-7/16 (164)	10-1/2 (267)	9 (229)	8-1/16 (205)	10-7/8 (276)
	5	28-13/16 (732)	6-7/8 (175)	12-1/2 (318)	10 (254)	9-5/32 (233)	10-7/8 (276)
	6	30-1/8 (765)	8-3/16 (208)	14-1/2 (368)	11 (279)	9-15/16 (252)	10-7/8 (276)

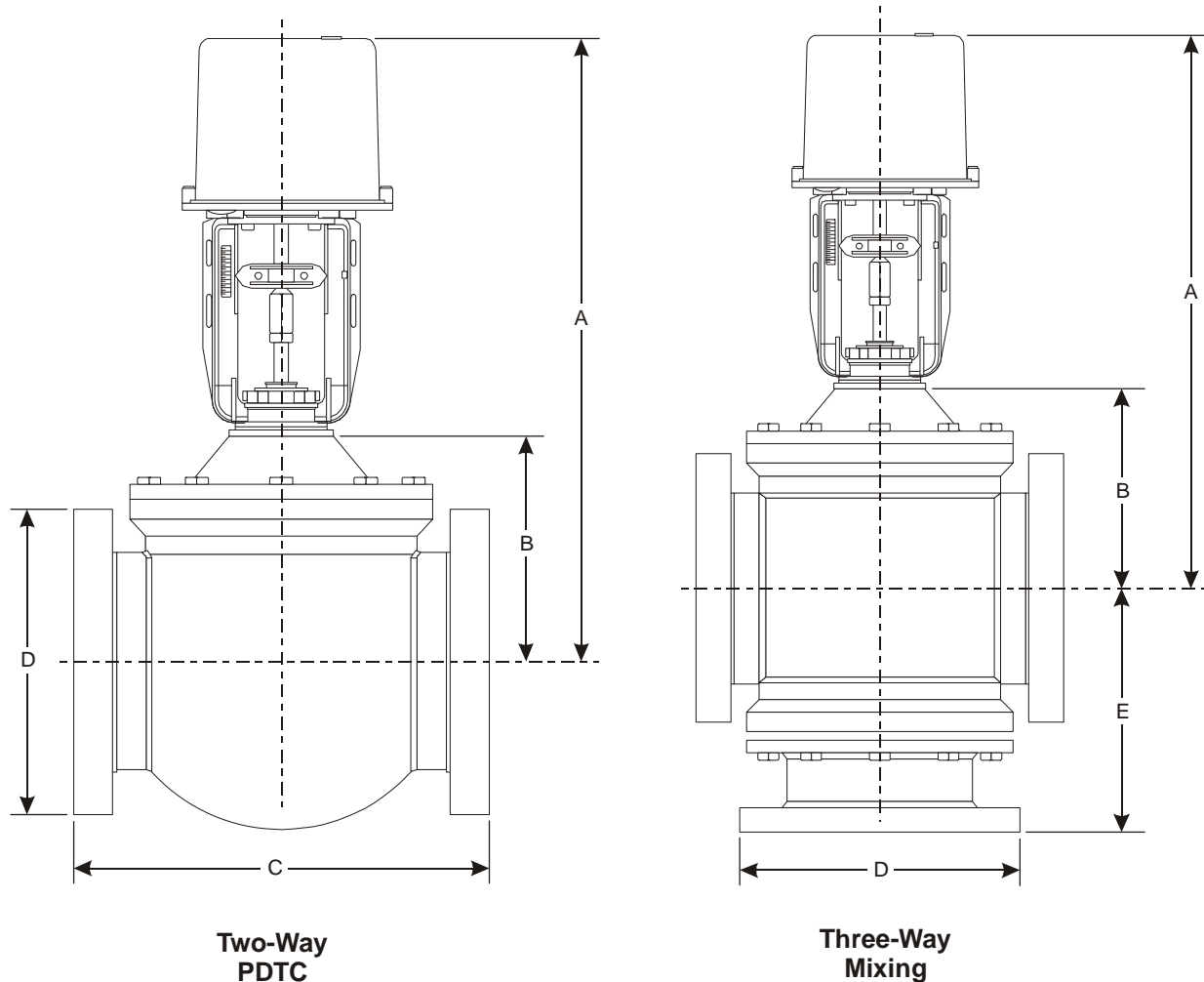
\* Allow 3-3/4 in. (95 mm) clearance for MP84 actuator removal and 4-3/4 in. (121 mm) clearance for MP86 actuator removal.



**Figure 13: M9000 Actuated Valve Dimensions, in. (mm)  
(See Table 26)**

**Table 26: M9000 Actuated VG2000 Series Cast Iron Flanged Valve Dimensions, in. (mm)**

Actuator Style	Valve Size, in.	A	B	C	D	E
<b>M9000</b>	2-1/2	16-13/16 (427)	4-21/32 (118)	7-1/4 (184)	7 (178)	6-25/32 (172)
	3	16-13/16 (427)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	6-13/16 (175)
	4	16-13/16 (427)	6-7/16 (164)	10-1/2 (267)	9 (229)	8-1/16 (205)
	5	17-3/8 (441)	6-7/8 (175)	12-1/2 (318)	10 (254)	9-5/32 (233)
	6	17-3/8 (441)	8-3/16 (208)	14-1/2 (368)	11 (279)	9-15/16 (252)



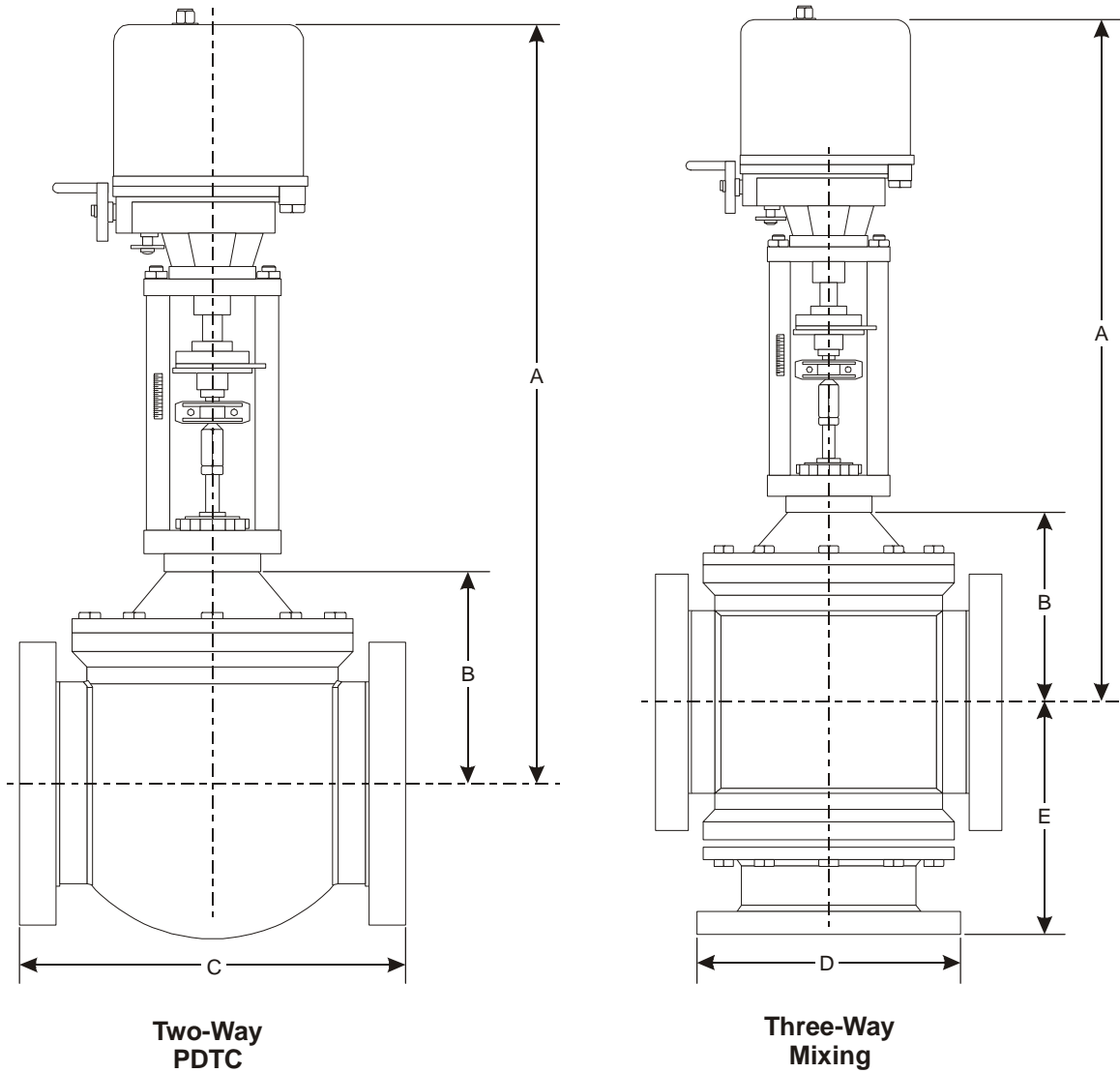
**Figure 14: VA-310x Actuated Valve Dimensions  
(See Table 27)**

**Table 27: VA-310x Actuated Valve Dimensions, in. (mm)**

Actuator Style*	Valve Size in.	A	B	C	D	E
<b>VA-310x</b>	2-1/2	18-23/32 (475)	4-21/32 (118)	7-1/4 (184)	7 (178)	6-25/32 (172)
	3	19-3/8 (492)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	6-13/16 (175)
	4	20-1/2 (521)	6-7/16 (164)	10-1/2 (267)	9 (229)	8-1/16 (205)
	5	20-15/16 (532)	6-7/8 (175)	12-1/2 (318)	10 (254)	9-5/32 (233)
	6	22-1/4 (565)	8-3/16 (208)	14-1/2 (368)	11 (279)	9-15/16 (252)

\* Allow 6-5/16 in. (160 mm) clearance for VA-310x actuator removal.



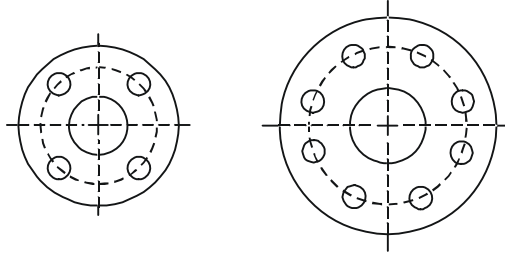


**Figure 15: VA-610x Actuated Valve Dimensions  
(See Table 28)**

**Table 28: VA-610x Actuated Valve Dimensions, in. (mm)**

Actuator Style*	Valve Size, in.	A	B	C	D	E
VA-610x	4	27-21/32 (702)	6-7/16 (164)	10-1/2 (267)	9 (229)	8-1/16 (205)
	5	28-3/32 (714)	6-7/8 (175)	12-1/2 (318)	10 (254)	9-5/32 (233)
	6	29-13/32 (747)	8-3/16 (208)	14-1/2 (368)	11 (279)	9-15/16 (252)

\* Allow 7-29/32 in. (201 mm) clearance for VA-610x actuator removal.



**Figure 16: Flange and Bolt Circle**

**Table 29: Flange and Bolt Circle Dimensions, in. (mm)**

Valve Size, in.	Diameter of Flange	Thickness of Flange	Diameter of Bolt Circle	Diameter of Bolt Holes	Number of Bolt Holes
2-1/2	7 (178)	11/16 (17)	5-1/2 (140)	3/4 (19)	4
3	7-1/2 (191)	3/4 (19)	6 (152)	3/4 (19)	4
4	9 (229)	1 (25)	7-1/2 (191)	3/4 (19)	8
5	10 (254)	1 (25)	8-1/2 (216)	7/8 (22)	8
6	11 (279)	1 (25)	9-1/2 (241)	7/8 (22)	8

**Table 30: Positioners and Positioner Mounting Kits for MP8000 Series Pneumatic Valve Actuators (Order Separately)**

Code Number	Description	Shipping Weight, lb
V-9502-95	Pneumatic Valve Actuator Positioner (Less Spring and Mounting Hardware)	0.9 (0.41)
MP8000-6002	Mounting Kit for V-9502-95 Pneumatic Valve Actuator Positioner (Kit includes all necessary mounting hardware and six springs)	1.3 (0.59)
EPP-1000-8	Electro-Pneumatic Valve Actuator Positioner (Less Mounting Hardware)	1.6 (0.73)
MP8000-6003	Mounting Kit for EPP-1000-8 Electro-Pneumatic Valve Actuator Positioner (Kit includes all necessary mounting hardware.)	1.5 (0.68)

**Table 31: Accessories for M9000 Series Electric Actuators (Order Separately)**

<b>Code Number</b>	<b>Description</b>	<b>Shipping Weight, lb*</b>
<b>M9000-100</b>	Conduit Adapter Kit	0.4
<b>M9000-103</b>	14 VA Transformer, 120/24 VAC, 60 Hz, Class 2	1.4
<b>M9000-104</b>	14 VA Transformer, 230/24 VAC, 60 Hz, Class 2	1.4
<b>M9000-105</b>	Pluggable 3-terminal block	0.5
<b>M9000-106</b>	Pluggable 4-terminal block	0.5
<b>M9000-310</b>	NEMA 3R weather shield enclosure for M9214 (two weather shield enclosures required for tandem assemblies)	2.0
<b>M9000-320</b>	NEMA 3R weather shield enclosure for M9220 (two weather shield enclosures required for tandem assemblies)	3.3
<b>M9000-610</b>	Tandem Adapter Kit (Converts Single Actuator Valve Linkage into Tandem Actuator Linkage) includes: Shaft with Spring Clip, Cable, Strain Relief, Anti-rotation bracket with screws and two plug-in terminal blocks	2.0

\* lb x 0.454 = kg

**Table 32: Tool Kit for VA-310x Series Electric Actuators (Order Separately)**

<b>Code Number</b>	<b>Description</b>	<b>Shipping Weight, lb*</b>
<b>VA-3100-101</b>	Auxiliary Switch Cam Adjusting Wrench (Used on VA-310x Series Electric Actuators – One wrench is supplied with each actuator.)	0.1

\* lb x 0.454 = kg

**Table 33: Maintenance and Repair Parts (Order Separately)**

Code Number	Description	Shipping Weight, lb*
<b>Packing Kits</b>		
V-9999-613	For 2-1/2 through 4 in. Valves with 3/8 in. Stem. Kit includes: two Ring Packs (U-Cup with O-Ring installed), one Follower, one Spacer, Insertion/Removal Tool, one Grease Tube, and one 3 in. (76 mm) strip of Crocus Cloth.	0.1
V-5252-668	For 3 through 6 in. Valves with 1/2 in. Stem. Kit includes: two Ring Packs (U-Cup with O-Ring installed), one Follower, one Spacer Insertion/Removal Tool, one Grease Tube, and one 3 in. (76 mm) strip of Crocus Cloth.	0.2
<b>Packing Nut Kits (Pneumatically Actuated Assemblies Only)</b>		
V-4510-6019	For 2-1/2 through 4 in Valves with 3/8 in. Stem	0.1
V-5252-609	For 3 through 6 in. Valves with 1/2 in. Stem	0.4

\* lb x 0.454 = kg

**Table 34: Valve Reconditioning Kits (Order Separately)**

Code Number	Description	Shipping Weight, lb*
V-5252-6001	Reconditioning Kit, 2-1/2 in. N.O. Flanged Valve, "M" Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 51.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	7.0
V-5252-6002	Reconditioning Kit, 2-1/2 in. N.O. Flanged Valve, "L" Stem (3/8 in.), for use with MP82 Pneumatic Actuator, Cv = 51.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	6.9
V-5252-6003	Reconditioning Kit, 3 in. N.O. Flanged Valve, "M" Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 83.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	9.5
V-5252-6004	Reconditioning Kit, 3 in. N.O. Flanged Valve, "L" Stem (3/8 in.), for use with MP82 Pneumatic Actuator; Cv = 83.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	9.5
V-5252-6005	Reconditioning Kit, 4 in. N.O. Flanged Valve, "M" Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 150.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	15.0
V-5252-6006	Reconditioning Kit, 4 in. N.O. Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 150.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	16.5
V-5252-6007	Reconditioning Kit, 5 in. N.O. Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 240.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	22.0
V-5252-6008	Reconditioning Kit, 6 in. N.O. Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 350.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	30.6
V-5462-6001	Reconditioning Kit, 2-1/2 in. N.C. Flanged Valve, "M" Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, CV = 54.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	7.4
<b>Continued on next page . . .</b>		

<b>Code Number (Cont.)</b>	<b>Description</b>	<b>Shipping Weight, lb*</b>
<b>V-5462-6002</b>	Reconditioning Kit, 3 in. N.C. Flanged Valve, "M" Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 83.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	9.9
<b>V-5462-6003</b>	Reconditioning Kit, 3 in. N.C. Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 83.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	12.7
<b>V-5462-6004</b>	Reconditioning Kit, 4 in. N.C. Flanged Valve, "M" Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 150.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	16.3
<b>V-5462-6005</b>	Reconditioning Kit, 4 in. N.C. Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 150.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	17.4
<b>V-5462-6006</b>	Reconditioning Kit, 5 in. N.C. Flanged Valve, "N" Stem, (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 237.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	23.7
<b>V-5462-6007</b>	Reconditioning Kit, 6 in. N.C. Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 344.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	31.1
<b>V-5842-6001</b>	Reconditioning Kit, 2-1/2 in. Three-Way Mixing Flanged Valve, "M" Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 54.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	8.1
<b>V-5842-6002</b>	Reconditioning Kit, 3 in. Three-Way Mixing Flanged Valve, "M" Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 80.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	10.8
<b>V-5842-6003</b>	Reconditioning Kit, 3 in. Three-Way Mixing Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 80.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	12.3
<b>V-5842-6004</b>	Reconditioning Kit, 4 in. Three-Way Mixing Flanged Valve, for use with Electric Actuator, Cv = 157.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	16.6
<b>V-5842-6005</b>	Reconditioning Kit, 4 in. Three-Way Mixing Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 157.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	17.8
<b>V-5842-6006</b>	Reconditioning Kit, 5 in. Three-Way Mixing Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 238.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	22.0
<b>V-5842-6007</b>	Reconditioning Kit, 6 in. Three-Way Mixing Flanged Valve, "N" Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 347.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	31.9

\* lb x 0.454 = kg

## Technical Specifications

<b>Product</b>	VG2000 Series Cast Iron Flanged Globe Valves	
<b>Models and Ordering Data</b>	See Tables 1, 2, 3, and 4.	
<b>Service*</b>	Hot Water, Chilled Water, 50% Glycol Solutions, or Steam for HVAC Systems	
<b>Valve Body Size/Cv (Kv)</b>	See Table 1.	
<b>Valve Stroke</b>	<b>2-1/2 and 3 in. Valves</b>	3/4 in. (19 mm)
	<b>3 and 4 in. Valves</b>	1-1/8 in. (29 mm)
	<b>5 in. Valves</b>	1-3/8 in. (35 mm)
	<b>6 in. Valves</b>	1-1/2 in. (38 mm)
<b>Valve Body Rating</b>	Meets Requirements of ASME B16.1, Class 125.	
<b>Valve Assembly</b>	<b>Steam</b>	35 psig (241 kPa) at 281°F (138°C)
	<b>Water</b>	175 psig (1,206 kPa) up to 150°F (66°C), Decreasing to 125 psig (861 kPa) at 281°F (138°C)
<b>Maximum Allowable Pressure/Temperature</b>		
<b>Leakage</b>	0.1% of Maximum Flow	
<b>Inherent Flow Characteristics</b>	Modified Linear	
<b>Rangeability**</b>	<b>2-1/2 in. Valves</b>	6.5:1
	<b>3 in. Valves</b>	7.7:1
	<b>4 in. Valves</b>	9.3:1
	<b>5 in. Valves</b>	10.7:1
	<b>6 in. Valves</b>	10.4:1
<b>Spring Ranges (MP8000 Series Actuators)</b>	3 to 7, 4 to 8, and 9 to 13 psig (21 to 48, 28 to 55, and 62 to 90 kPa)	
<b>Maximum Recommended Operating Pressure Drop</b>	35 psig (241 kPa) for All Valve Sizes	
<b>Maximum Actuator Supply Pressure (Pneumatically Actuated Valves Only)</b>	25 psig (172 kPa) Maximum	
<b>Maximum Closeoff Pressures</b>	See Tables 21 through 24.	
<b>Materials</b>	<b>Body</b>	Cast Iron with Black Lacquer Finish
	<b>Stem</b>	316 Stainless Steel
	<b>Plug</b>	Brass
	<b>Packing</b>	Ethylene Propylene Terpolymer (EPT) Ring Packs
<b>Valve Fluid Operating Temperature Limits</b>	35 to 281°F (2 to 138°C), 35 psig (241 kPa) Saturated Steam	
<b>Actuator Ambient Operating Temperature Limits</b>	Refer to the appropriate actuator product bulletin.	
<b>Accessories (Order Separately)</b>	See Tables 32 through 35.	

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

\*\* Rangeability is defined as the ratio of maximum flow to minimum controllable flow.

*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.*