

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

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

V	G	Valve Global														
1	2	2	Product Family 2 = Cast Iron													
		3	2	Body Type										2 = Two-Way, Normally Open/Push-Down-To-Close 4 = Two-Way, Normally Closed/Push-Down-To-Open 8 = Three-Way Mixing		
			4													
			3	End Connections										3 = ANSI Class 125 Flat-Faced Flanged		
			5													
			1	Trim and Flow Characteristics										1 = Brass, Modified Linear		
			6													
			T	Size and Cv <i>(Kv = Cv x 0.857)</i>		Valve Size	Two-Way N.O./PDTC	Two-Way N.C./PDTO	Three-Way Mixing							
			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							
			M	Stem Type										L = 3/8 in. Threaded Stem <i>(2-1/2 and 3 in. N.O. Valves with MP82 Actuator Only)</i> M = 3/8 in. Threaded Stem <i>(2-1/2 through 4 in. Valves Only)</i> N = 1/2 in. Threaded Stem <i>(3 through 6 in. Valves Only)</i>		
			8													
			+	Actuator Mounting										+ = Factory-Mounted Actuator (See Tables 2 and 3.) <i>(Leave fields 9 through 15 blank for valve without a factory-mounted actuator.)</i>		
			9													

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

V	G	2	2	3	1	T	M	+							
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: Refer to Table 2 when adding a factory-mounted pneumatic actuator to a valve body. Refer to Table 3 and Table 4 when adding a factory-mounted electric actuator to a valve body. For valid actuator and valve combinations, refer to Table 5.

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

V	G	2	2	3	1	T	L	+	8	2							
1	2	3	4	5	6	7	8	9	10	11							
											MP8000 Series 82 = MP82, 25 sq. in., Spring-Return-Up <i>(2-1/2 and 3 in. N.O. Valves with "L" Stem)</i> Pneumatic Actuator <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>						
											3	Stroke 3 = 3/4 in. <i>(2-1/2 and 3 in. Valves with MP82 or MP84 Actuators Only)</i> (MP8000 Series) 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>					
											C	Spring Range C = 3 to 7 psig <i>(Suggested for N.O. Valves with Positioner)</i> (MP8000 Series) 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>					
											0	1	Accessories 00 = None (MP8000 Series) 01 = V-9502 Pneumatic Positioner 02 = EPP-1000 Electro-Pneumatic Positioner				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 =	Field		
V	G	2	2	3	1	T	L	+	8	2	3	C	0	1			
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: Refer to Table 1 when ordering a valve body only. Refer to Table 3 and Table 4 when adding a factory-mounted electric actuator to a valve body. For valid actuator and valve combinations, refer to Table 5 through Table 13.

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

V	G	2	2	3	1	U	M	2						
1	2	3	4	5	6	7	8	9						
									9		2	6		
									10	11	12			
									A					
									13					
									G					
									14					
									C					
									15					

Factory Mounted Actuator + = Single Actuator
 2 = Tandem Actuators (M9124-xGx-2 or M9216-xGx-2 only)
 (Tandem Actuators can only be factory mounted on VG2231UM, VG2231VM, VG2231WN, VG2231YN, VG2831UM, VG2831VM, VG2831WN, VG2831YN Valves Only)
 M9216-AGA-2 & M9216-AGC-2 are NOT available in a Tandem Mount configuration

M91xx/M9216 Series Electric Actuator **Non-Spring Return**
 916 = M9116-xGx-2 (VG2231TM and VG2831TM only)
 924 = M9124-xGx-2
 (See Actuator Product Bulletin.) **Spring Return**
 926 = M9216-xGx-2 (Spring to Open, Stem Up)
 946 = M9216-xGx-2 (Spring to Close, Stem Down)

Control Type A = Floating, 24 VAC/VDC (M91xx and M9216)
 B = On/Off, 24 VAC/VDC (M9216 only)
 G = Proportional, 0-10 VDC or 0-20 mA

Supply Voltage G = 24 VAC

Feedback 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

V	G	2	2	3	1	U	M	2	9	2	6	G	G	C	
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 M9216-GGC-2 Proportional Electric Actuator, 24 VAC supply, with two auxiliary switches, and one M9216-GGA-2 Spring Return Proportional Electric Actuator, 24 VAC supply, without auxiliary switches.

Note: Refer to Table 1 when ordering a valve body only. Refer to Table 2 when adding a factory-mounted pneumatic actuator to a valve body. For valid actuator and valve combinations, refer to Table 5 through Table 13.

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

V	G	2	2	3	1	T	M	+	5	U					
1	2	3	4	5	6	7	8	9	10	11					
											M100 Series		Non-Spring Return		
											Electric Actuator		5U = M150xxx (Available on 2-1/2 through 4 in. Two-Way PDTC and Three-Way Mixing Valves with "M" Stem)		
											(See Actuator Product Bulletin.)				
											A	G	A		
											12	13	14		
											Features (M100 Series)		AGA = On/Off (Floating), 24 VAC GGA = Proportional, 0 to 10 VDC, 24 VAC		
											Accessories (M100 Series)		Blank = None Factory Assembled (Refer to Table 24 for field-assembled accessories.)		
											3	0			
											10	11			
											VA-310x or VA-610x Series		Non-Spring Return		
											Electric Actuator		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)		
											0				
											12				
											Actuator Mounting (VA-310x or VA-610x Series)		0 = 2-1/2 in. Valves with 3/8 in. Threaded Stem 1 = 3 and 4 in. Valves with 3/8 in. Threaded Stem 2 = 3 through 6 in. Valves with 1/2 in. Threaded Stem		
											A				
											13				
											Actuator Input (VA-310x or VA-610x Series)		A = On/Off (Floating) H = Proportional, 0 to 10 VDC		
											G				
											14				
											Voltage (VA-310x or VA-610x Series)		G = 24 VAC		
											C				
											15				
											Accessories (VA-310x or VA-610x Series)		A = None (VA-310x Series Only) C = Two Auxiliary Switches		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 = Field	
V	G	2	2	3	1	T	M	+	3	0	0	A	G	C	
Valve									Actuator						

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.

Note: Refer to Table 1 when ordering a valve body only. Refer to Table 2 when adding a factory-mounted pneumatic actuator to a valve body. For valid actuator and valve combinations, refer to Table 5 through Table 13.



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
MP82 Series Actuators – 25 sq. in. Effective Diaphragm Area							
2-1/2	51	53	VG2231TL+823C00	49	VG2231TL+823D00	28	VG2231TL+823E00
3	83	37	VG2231UL+823C00	34	VG2231UL+823D00	19	VG2231UL+823E00
MP84 Series Actuators – 50 sq. in. Effective Diaphragm Area							
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
MP86 Series Actuators – 100 sq. in. Effective Diaphragm Area							
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+867D00	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
MP84 Series Actuators – 50 sq. in. Effective Diaphragm Area							
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
MP86 Series Actuators – 100 sq. in. Effective Diaphragm Area							
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+867CD0	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 Valves with MP8000 Series Pneumatic Valve Actuators

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
MP84 Series Actuators – 50 sq. in. Effective Diaphragm Area							
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
MP86 Series Actuators – 100 sq. in. Effective Diaphragm Area							
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 M9216 Series Spring Return Electric Valve Actuators

Table 8: VG2x31 Valves with M9216-xGx-2 Actuators – Spring Return without Switches

				Spring Return			
				Floating without Switches	On/Off without Switches	Proportional without Switches	
Valve	Size, in.	Cv	Closeoff psig	M9216-AGA-2	M9216-BGA-2	M9216-GGA-2	
Two-Way – Spring Return Normally Open – Valve Stem Up							
VG2231TM	2-1/2	51	47	VG2231TM+926AGA	VG2231TM+926BGA	VG2231TM+926GGA	
VG2231UM	3	83	20	VG2231UM+926AGA	VG2231UM+926BGA	VG2231UM+926GGA	
VG2231UM	3	83	41		VG2231UM2926BGA*	VG2231UM2926GGA*	
VG2231VM	4	150	23		VG2231VM2926BGA*	VG2231VM2926GGA*	
VG2231WN	5	240	12		VG2231WN2926BGA*	VG2231WN2926GGA*	
Two-Way – Spring Return Normally Closed – Valve Stem Down							
VG2231TM	2-1/2	51	47	VG2231TM+946AGA	VG2231TM+946BGA	VG2231TM+946GGA	
VG2231UM	3	83	20	VG2231UM+946AGA	VG2231UM+946BGA	VG2231UM+946GGA	
VG2231UM	3	83	41		VG2231UM2946BGA*	VG2231UM2946GGA*	
VG2231VM	4	150	23		VG2231VM2946BGA*	VG2231VM2946GGA*	
VG2231WN	5	240	12		VG2231WN2946BGA*	VG2231WN2946GGA*	
Three-Way Mixing – Spring Return – Valve Stem Up							
VG2831TM	2-1/2	54	28	VG2831TM+926AGA	VG2831TM+926BGA	VG2831TM+926GGA	
VG2831UM	3	80	12	VG2831UM+926AGA	VG2831UM+926BGA	VG2831UM+926GGA	
VG2831UM	3	80	24		VG2831UM2926BGA*	VG2831UM2926GGA*	
VG2831VM	4	157	6		VG2831VM+926AGA	VG2831VM+926BGA	VG2831VM+926GGA
VG2831VM	4	157	14		VG2831VM2926BGA*	VG2831VM2926GGA*	
VG2831WN	5	238	7		VG2831WN2926BGA*	VG2831WN2926GGA*	
VG2831YN	6	347	4		VG2831YN2926BGA*	VG2831YN2926GGA*	
Three-Way Mixing – Spring Return – Valve Stem Down							
VG2831TM	2-1/2	54	28	VG2831TM+946AGA	VG2831TM+946BGA	VG2831TM+946GGA	
VG2831UM	3	80	12	VG2831UM+946AGA	VG2831UM+946BGA	VG2831UM+946GGA	
VG2831UM	3	80	24		VG2831UM2946BGA*	VG2831UM2946GGA*	
VG2831VM	4	157	6		VG2831VM+946AGA	VG2831VM+946BGA	VG2831VM+946GGA
VG2831VM	4	157	14		VG2831VM2946BGA*	VG2831VM2946GGA*	
VG2831WN	5	238	7		VG2831WN2946BGA*	VG2831WN2946GGA*	
VG2831YN	6	347	4		VG2831YN2946BGA*	VG2831YN2946GGA*	

* Valve assemblies have two actuators mounted in tandem. M9216-AGx-2 actuators are not designed for tandem operation.



Figure 6: VG2x31 Valves with M9216 Series Spring Return Electric Valve Actuators

Table 9: VG2x31 Valves with M9216-xGx-2 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	M9216-AGC-2	M9216-BGC-2	M9216-GGC-2	
Two-Way – Spring Return Normally Open – Valve Stem Up							
VG2231TM	2-1/2	51	47	VG2231TM+926AGC	VG2231TM+926BGC	VG2231TM+926GGC	
VG2231UM	3	83	20	VG2231UM+926AGC	VG2231UM+926BGC	VG2231UM+926GGC	
VG2231UM	3	83	41		VG2231UM2926BGC*	VG2231UM2926GGC*	
VG2231VM	4	150	23		VG2231VM2926BGC*	VG2231VM2926GGC*	
VG2231WN	5	240	12		VG2231WN2926BGC*	VG2231WN2926GGC*	
Two-Way – Spring Return Normally Closed – Valve Stem Down							
VG2231TM	2-1/2	51	47	VG2231TM+946AGC	VG2231TM+946BGC	VG2231TM+946GGC	
VG2231UM	3	83	20	VG2231UM+946AGC	VG2231UM+946BGC	VG2231UM+946GGC	
VG2231UM	3	83	41		VG2231UM2946BGC*	VG2231UM2946GGC*	
VG2231VM	4	150	23		VG2231VM2946BGC*	VG2231VM2946GGC*	
VG2231WN	5	240	12		VG2231WN2946BGC*	VG2231WN2946GGC*	
Three-Way Mixing – Spring Return – Valve Stem Up							
VG2831TM	2-1/2	54	28	VG2831TM+926AGC	VG2831TM+926BGC	VG2831TM+926GGC	
VG2831UM	3	80	12	VG2831UM+926AGC	VG2831UM+926BGC	VG2831UM+926GGC	
VG2831UM	3	80	24		VG2831UM2926BGC*	VG2831UM2926GGC*	
VG2831VM	4	157	6		VG2831VM+926AGC	VG2831VM+926BGC	VG2831VM+926GGC
VG2831VM	4	157	14		VG2831VM2926BGC*	VG2831VM2926GGC*	
VG2831WN	5	238	7		VG2831WN2926BGC*	VG2831WN2926GGC*	
VG2831YN	6	347	4		VG2831YN2926BGC*	VG2831YN2926GGC*	
Three-Way Mixing – Spring Return – Valve Stem Down							
VG2831TM	2-1/2	54	28	VG2831TM+946AGC	VG2831TM2946BGA	VG2831TM2946GGA	
VG2831UM	3	80	12	VG2831UM+946AGC	VG2831UM2946BGA	VG2831UM2946GGA	
VG2831UM	3	80	24		VG2831UM2946BGC*	VG2831UM2946GGC*	
VG2831VM	4	157	6		VG2831VM+946AGC	VG2831VM+946BGC	VG2831VM+946GGC
VG2831VM	4	157	14		VG2831VM2946BGC*	VG2831VM2946GGC*	
VG2831WN	5	238	7		VG2831WN2946BGC*	VG2831WN2946GGC*	
VG2831YN	6	347	4		VG2831YN2946BGC*	VG2831YN2946GGC*	

* Valve assemblies have two actuators mounted in tandem. On tandem actuator assemblies, only one actuator is provided with auxiliary switches. M9216-AGx-2 actuators are not designed for tandem operation.



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 or M9124-AGA-2	M9116-GGA-2 or M9124-GGA-2	M9116-AGC-2 or M9124-AGC-2	M9116-GGC-2 or M9124-GGC-2
Two-Way, Push-Down-To-Close						
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*
Three-Way, Mixing						
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 have two actuators mounted in tandem. On tandem actuator assemblies with switches, only one actuator is provided with auxiliary switches. M9116-AGx-2 actuators are not designed for tandem operation.

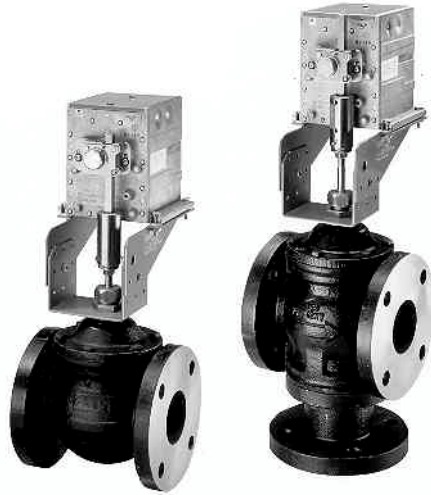


Figure 8: VG2x31 Valves with M150 Series Non-Spring Return Electric Valve Actuators

Table 11: VG2x31 Valves with M150xGx-x Series Non-Spring Return Actuators

				Non-Spring Return	
				On/Off Floating without Switches	Proportional without Switches
Valve	Size, in.	Cv	Closeoff psig	M150AGA-1	M150GGA-3
Two-Way Push-Down-To-Close					
VG2231TM	2-1/2	51	46	VG2231TM+5UAGA	VG2231TM+5UGGA
VG2231UM	3	83	32	VG2231UM+5UAGA	VG2231UM+5UGGA
VG2231VM	4	150	18	VG2231VM+5UAGA	VG2231VM+5UGGA
Three-Way Mixing					
VG2831TM	2-1/2	54	28	VG2831TM+5UAGA	VG2831TM+5UGGA
VG2831UM	3	80	19	VG2831UM+5UAGA	VG2831UM+5UGGA
VG2831VM	4	157	11	VG2831VM+5UAGA	VG2831VM+5UGGA



Figure 9: VG2x31 Valves with VA-3100 Series Non-Spring Return Electric Valve Actuators

Table 12: VG2x31 Valves with VA-3100xGx 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
Two-Way Push-Down-To-Close						
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+301AGC	VG2231WN+302HGC
VG2231YN	6	350	20	VG2231YN+302AGA	VG2231YN+301AGC	VG2231YN+302HGC
Three-Way Mixing						
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 10: VG2x31 Valves with VA-6100 Series Non-Spring Return Electric Valve Actuators

Table 13: VG2x31 Valves with VA-6100 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
Two-Way Push-Down-To-Close					
VG2231VN	4	150	89	VG2231VN+602AGC	VG2231VN+602HGC
VG2231WN	5	240	57	VG2231WN+602AGC	VG2231WN+602HGC
VG2231YN	6	350	40	VG2231YN+602AGC	VG2231YN+602HGC
Three-Way Mixing					
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 14: 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)
M9216	50 (22.7)	64 (29.0)	---	---	---
M9216 (Tandem)	---	71 (32.2)	105 (47.6)	145 (65.8)	---
M150	42.0 (19.1)	59.0 (26.8)	95.0 (43.1)	---	---
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.

Table 15: 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 16: 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)
M150	62.0 (28.1)	80.0 (36.3)	128.0 (58.1)	---	---
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)
M9216	78 (35.4)	90 (40.8)	119 (54.0)	185 (83.9)	224 (101.6)
M9216 (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.

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, M9216, M150, 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. Refer to Tables 1, 2, 3, and 4 for ordering data and additional details. For valid valve and actuator combinations, refer to Tables 5-13.

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)*.

M9216 Series Electric Actuators

The M9216 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. 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 M9216 Series Electric Actuators, refer to the *M9216 Series Electric Spring Return Actuators Product Bulletin (LIT-2681068)*.

M100 Series Electric Actuators

The M100 Series is a family of rotary actuators used to accurately position valves in HVAC and industrial applications. When coupled with the Y20EBD Valve Mounting Kit, the rotary motion of the M100 Series Actuator is converted into linear movement. The mounting kit includes an overtravel spring, which determines the maximum seating pressure in conjunction with actuator selection.

Only M150 Series Actuators are available factory mounted to VG2000 Series Valves; however, the M120, M130, and M140 Series Actuators can be field mounted. The M150 Non-Spring Return Actuator has a 270 lb (1,200 N) force output for on/off (floating) or proportional control.

For more information on M100 Series Electric Actuators, refer to the *M100 Series Motor Actuator Product Bulletin (LIT-2681059P)*.

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 17: Mounting Kits for Field Mounting M9000 and M9216 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 18: Mounting Kits for Field Mounting MP8000 Series Pneumatic Valve Actuators

Mounting Kit Code Number	Actuator Style	Valve Size	Stem Type (Diameter)
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 19: Linkage Kits for Field Mounting M100 Series Electric Valve Actuators

Linkage Kit Code Number	Valve Size	Output Force lb (N)	Spring Return Actuator	Non-Spring Return Actuator
Y20EBD-1	2-1/2 in.	75 (334)	M130	M120
Y20EBD-2	2-1/2 through 4 in.	150 (668)	---	M140
Y20EBD-3	2-1/2 through 4 in.	270 (1,202)	---	M150
Y20EBD-4	2-1/2 through 4 in.	179 (797)	---	M150
Y20EBD-6	2-1/2 and 3 in.	100 (445)	M130	M120

Table 20: Mounting Kits for Field Mounting VA-310x Series Electric Valve Actuators

Mounting Kit Code Number	Valve Size	Stem Type (Diameter)
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 21: Mounting Kits for Field Mounting VA-610x Series Electric Valve Actuators

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

Table 22: 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 23: 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 24: 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
Two-Way, Push-Down-To-Close					
M9116	62 (427)	27 (186)	---	---	---
M9124	101 (696)	43 (296)	24 (165)	---	---
M9124(Tandem)	---	88 (606)	49 (337)	26 (179)	16 (110)
M9216	47 (324)	20 (138)	---	---	---
M9216 (Tandem)	---	41 (282)	23 (158)	12 (83)	---
M150	46 (317)	32 (220)	18 (124)	---	---
VA-3100	115 (792)	79 (544)	45 (310)	29 (200)	20 (138)
VA-6100	---	---	89 (613)	57 (393)	40 (276)
Three-Way, Mixing					
M9116	37 (255)	16 (110)	9 (62)	---	---
M9124	60 (413)	26 (179)	14 (96)	7 (48)	4 (28)
M9124(Tandem)	---	53 (365)	30 (206)	15 (103)	9 (62)
M9216	28 (193)	14 (96)	6 (41)	---	---
M9216 (Tandem)	---	24 (165)	14 (96)	7 (48)	4 (28)
M150	28 (193)	19 (131)	11 (76)	---	---
VA-3100	69 (475)	48 (331)	27 (186)	17 (117)	12 (83)
VA-6100	---	---	54 (372)	34 (234)	24 (165)

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

Table 25: Maximum Closeoff Pressures, psig (kPa) for Field-Assembled M100 Series Electrically Actuated Two-Way and Three-Way Valves

Valve Size in.	M120 or M130 with Y20EBD-1 Linkage Kit		M120 or M130 with Y20EBD-6 Linkage Kit		M140 with Y20EBD-2 Linkage Kit		M150 with Special Y20EBD-4 Linkage Kit*	
	Two-Way PDTC	Three-Way Mixing	Two-Way PDTC	Three-Way Mixing	Two-Way PDTC	Three-Way Mixing	Two-Way PDTC	Three-Way Mixing
2-1/2	7 (48)	7 (48)	12 (83)	12 (83)	22 (152)	22 (152)	28 (193)	26 (179)
3	---	---	7 (48)	7 (48)	14 (96)	14 (96)	18 (124)	18 (124)
4	---	---	---	---	6 (41)	6 (41)	9 (62)	9 (62)

* The special Y20EBD-4 Linkage Kit is available to enable an M150 Series Electric Actuator to operate S91 Series Auxiliary Switches for automatic heating/cooling changeover applications. The Y20EBD-4 Linkage Kit allows additional overtravel after valve closeoff for switch operation.

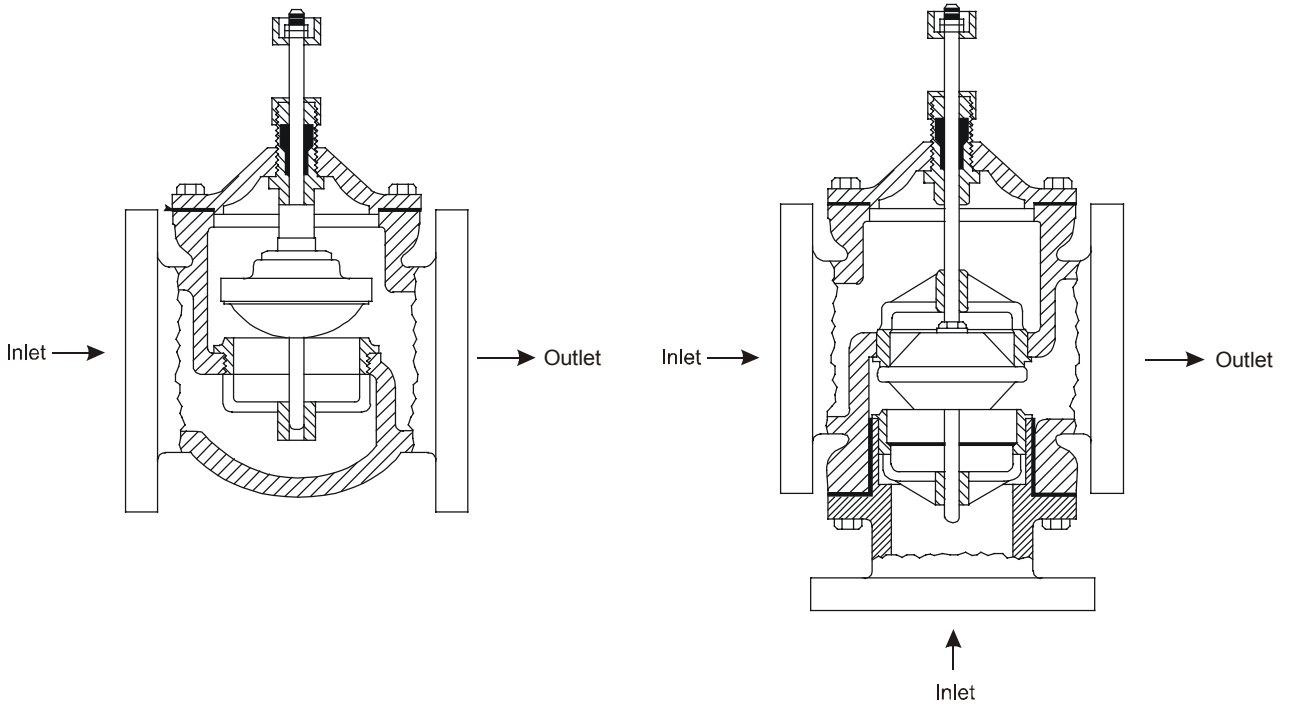
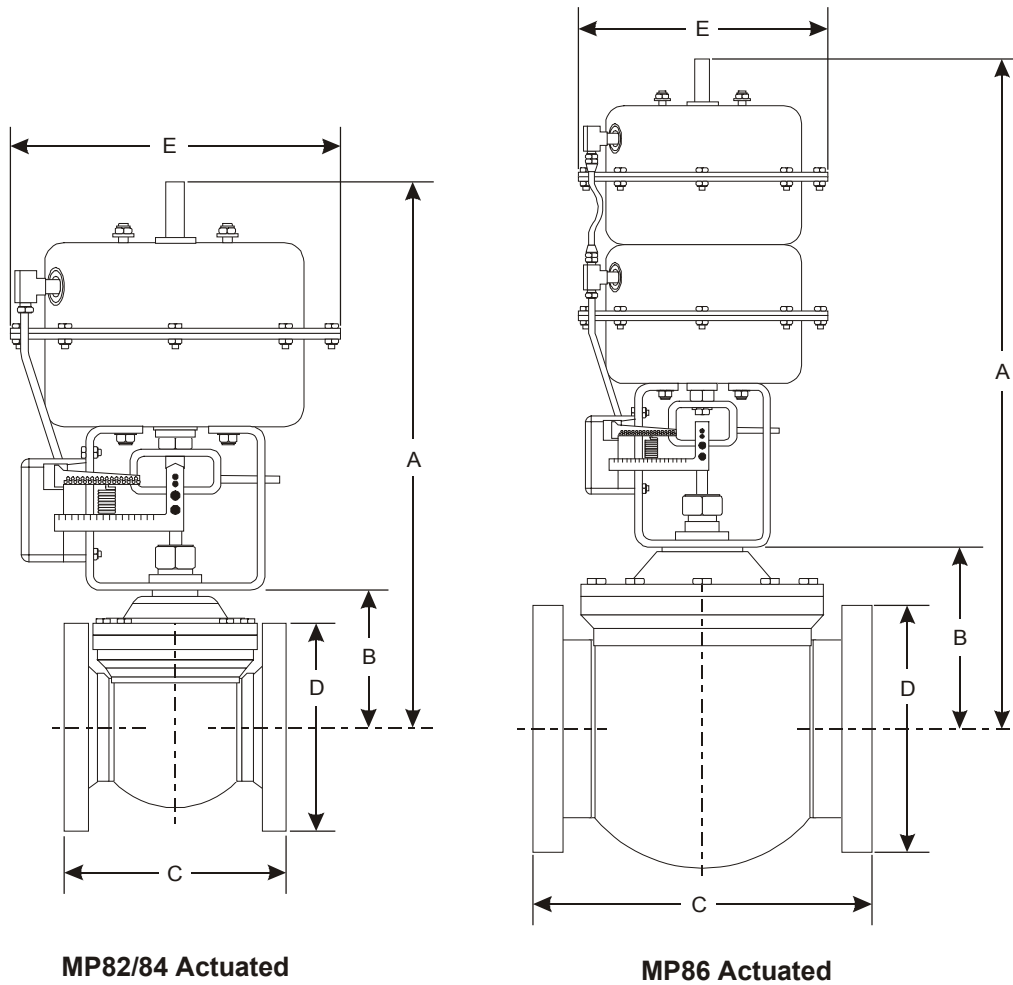


Figure 11: Valve Flow Direction, Valve Stem Shown in the Up Position

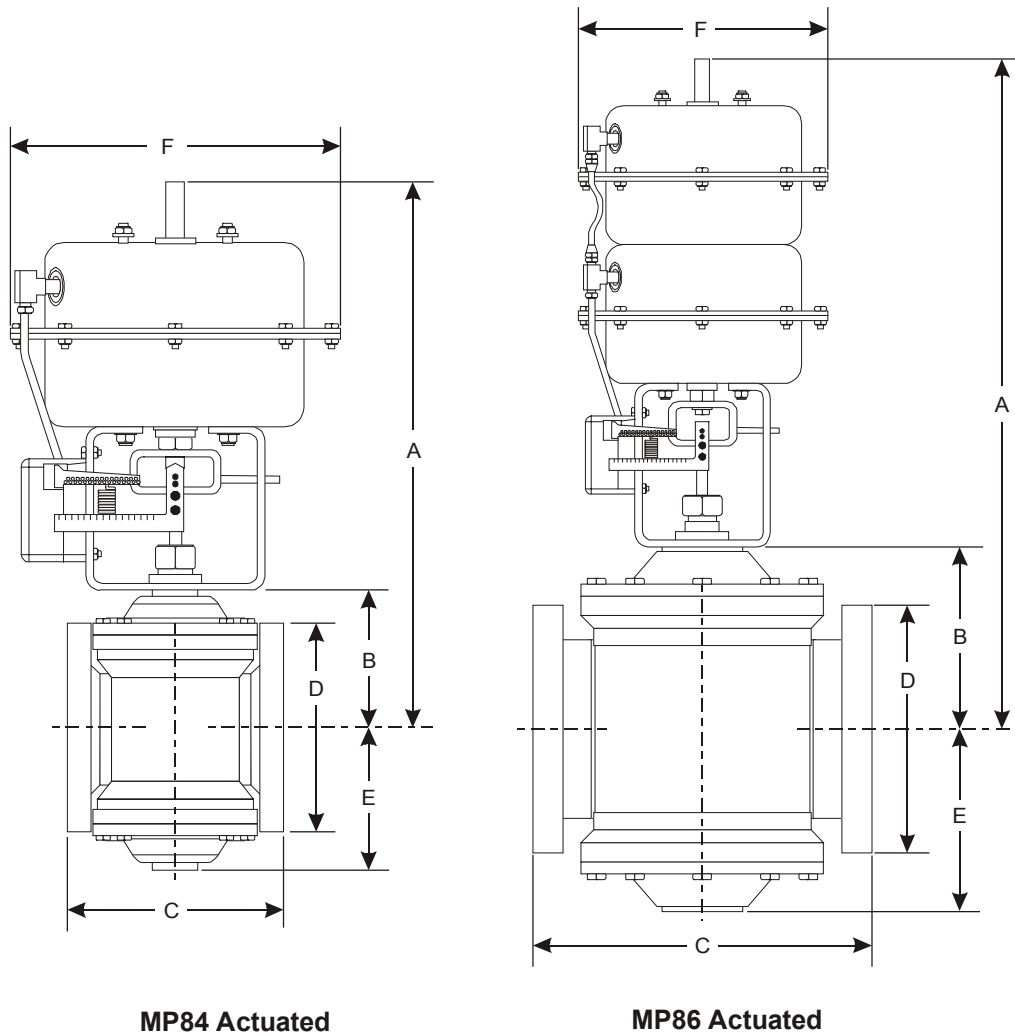


**Figure 12: MP8000 Actuated Two-Way N.O. Valve Dimensions
(Refer to Table 26)**

Table 26: 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

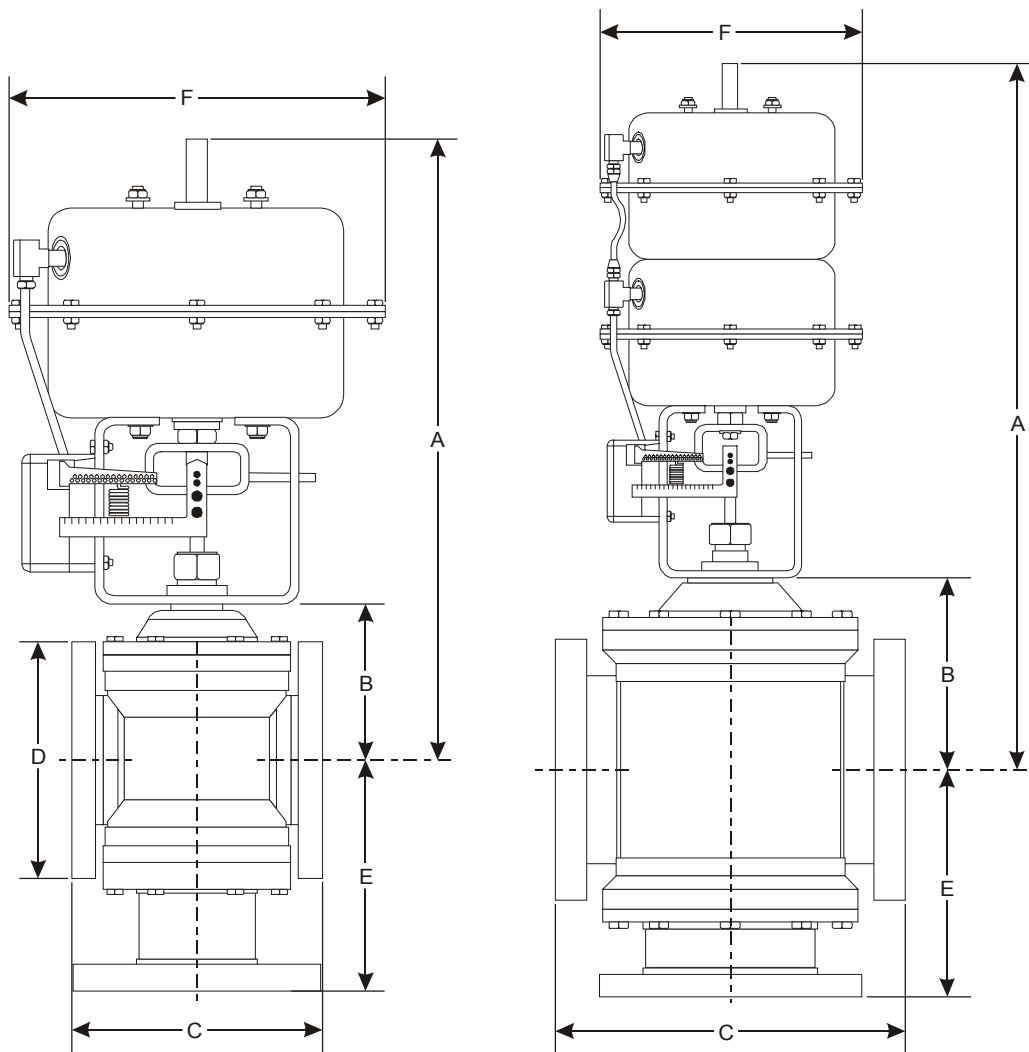
MP86 Actuated

**Figure 13: MP8000 Actuated Two-Way N.C. Valve Dimensions
(Refer to Table 27)**

Table 27: 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

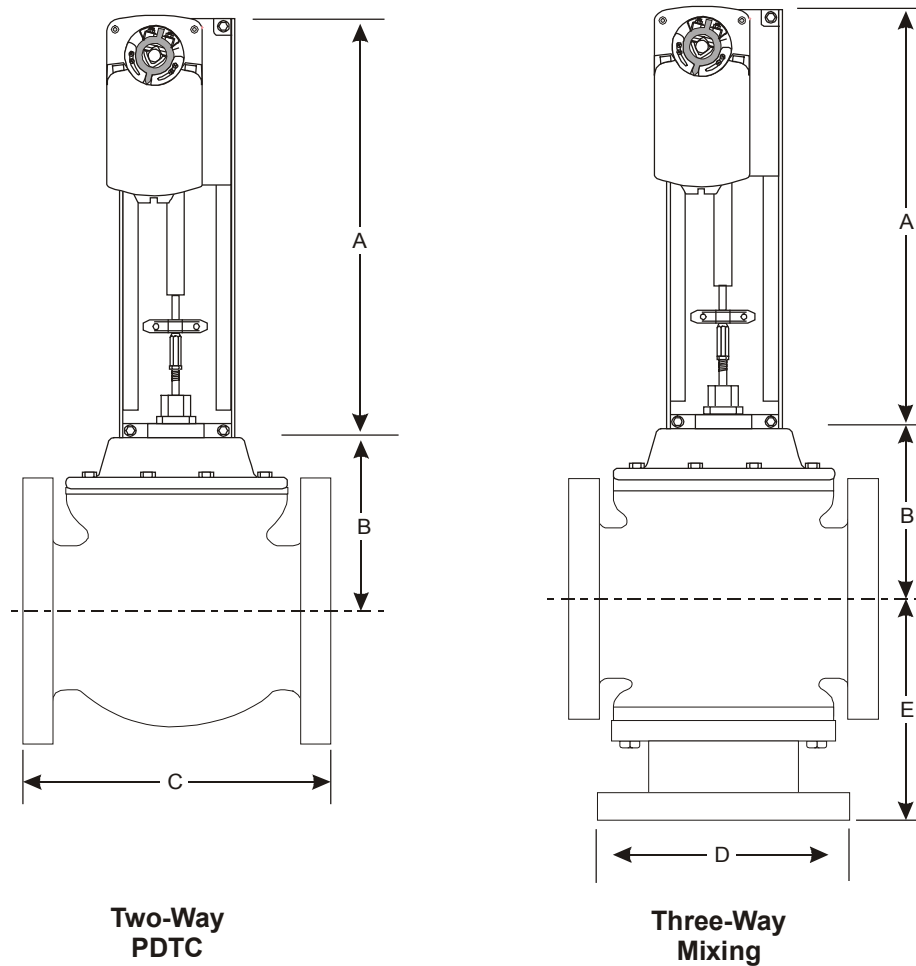
MP86 Actuated

**Figure 14: MP8000 Actuated Three-Way Mixing Valve Dimensions
(Refer to Table 28)**

Table 28: 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)

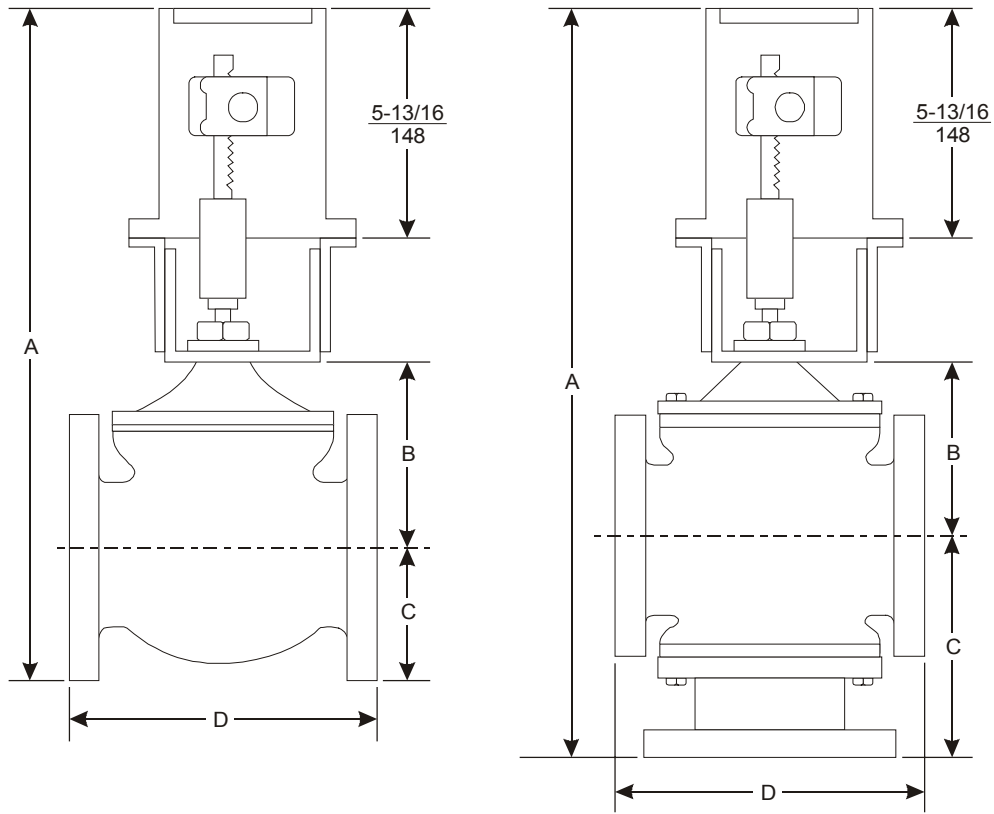
* Allow 3-3/4 in. (95 mm) clearance for MP84 actuator removal and 4-3/4 in. (121 mm) clearance for MP86 actuator removal.



**Figure 15: M9000 Actuated Valve Dimensions, in. (mm)
(Refer to Table 29)**

Table 29: M9000 Actuated VG2000 Series Cast Iron Flanged Valve Dimensions, in. (mm)

Actuator Style	Valve Size, in.	A	B	C	D	E
M9000	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)



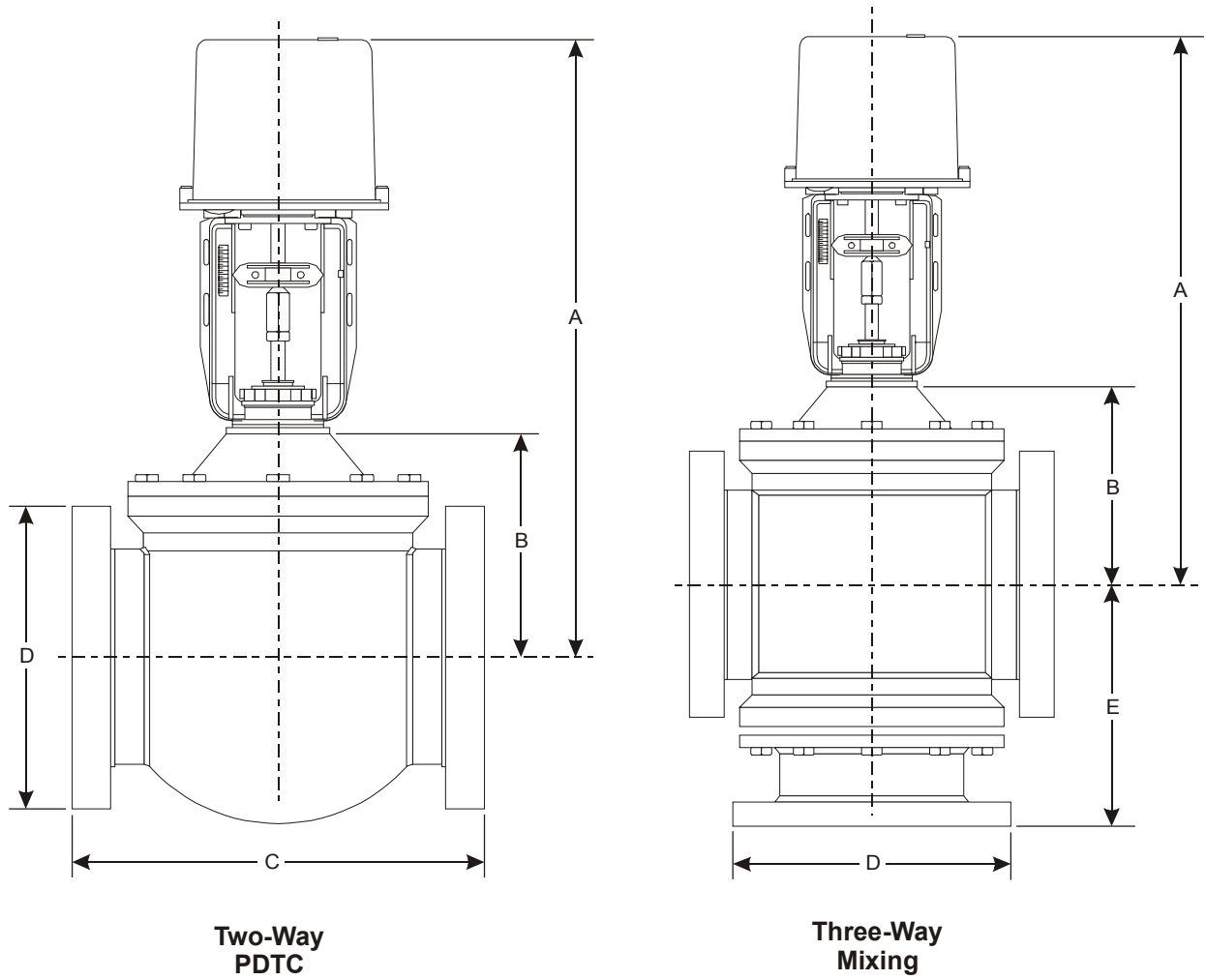
**Two-Way
PDTC**

**Three-Way
Mixing**

**Figure 16: M150 Actuated Valve Dimensions, in. (mm)
(Refer to Table 30)**

Table 30: M150 Actuated Valve Dimensions, in. (mm)

Valve Style	Valve Size, in.	A	B	C	D
Two-Way PDTC	2-1/2	18-1/4 (464)	4-21/32 (118)	3-1/2 (89)	7-1/4 (184)
	3	19-1/8 (486)	5-5/16 (135)	3-3/4 (95)	8-5/8 (219)
	4	20-7/8 (530)	6-7/16 (164)	4-1/2 (114)	10-1/2 (267)
Three-Way Mixing	2-1/2	21-3/4 (552)	4-21/32 (118)	6-13/16 (173)	7-1/4 (184)
	3	22-1/8 (562)	5-5/16 (135)	6-13/16 (173)	8-5/8 (219)
	4	24-7/16 (621)	6-7/16 (164)	8-5/16 (211)	10-1/2 (267)

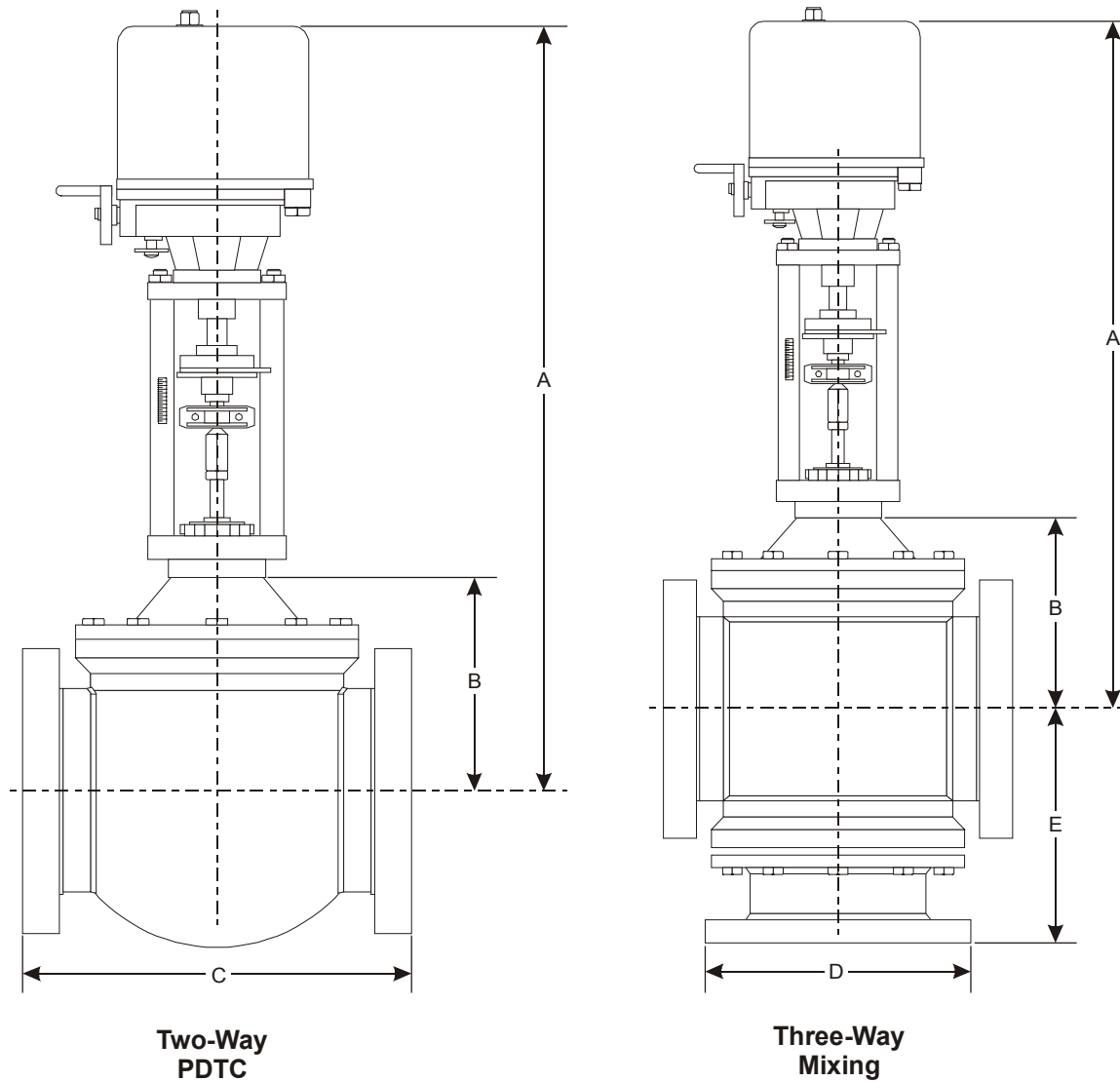


**Figure 17: VA-310x Actuated Valve Dimensions
(Refer to Table 31)**

Table 31: VA-310x Actuated Valve Dimensions, in. (mm)

Actuator Style*	Valve Size in.	A	B	C	D	E
VA-310x	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 18: VA-610x Actuated Valve Dimensions
(Refer to Table 32)**

Table 32: 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.

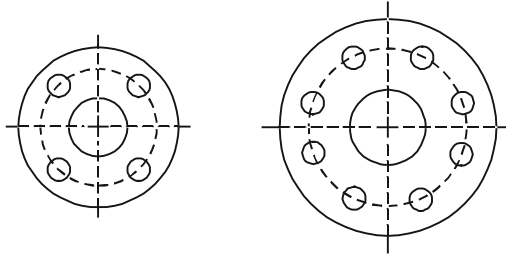


Figure 19: Flange and Bolt Circle

Table 33: 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 34: 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
MP8000-6002	Mounting Kit for V-9502-95 Pneumatic Valve Actuator Positioner (Kit includes all necessary mounting hardware and six springs)	1.3
EPP-1000-8	Electro-Pneumatic Valve Actuator Positioner (Less Mounting Hardware)	1.6
MP8000-6003	Mounting Kit for EPP-1000-8 Electro-Pneumatic Valve Actuator Positioner (Kit includes all necessary mounting hardware.)	1.5

* lb x 0.454 = kg

Table 35: Accessories for M9000 Series Electric Actuators (Order Separately)

Code Number	Description	Shipping Weight, lb*
M9000-100	Conduit Adapter Kit	0.4
M9000-103	14 VA Transformer, 120/24 VAC, 60 Hz, Class 2	1.4
M9000-104	14 VA Transformer, 230/24 VAC, 60 Hz, Class 2	1.4
M9000-105	Pluggable 3-terminal block	0.5
M9000-106	Pluggable 4-terminal block	0.5
M9000-610	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 36: Accessories for M150 Series Electric Actuators (Order Separately)

Code Number	Description	Shipping Weight, lb*
S91DJ-1	Auxiliary Switch Kit with One Single-Pole, Double-Throw Switch	1.8
S91EJ-1	Auxiliary Switch Kit with Two Single-Pole, Double-Throw Switches	1.9
S91PT-1	Auxiliary Potentiometer Switch Kit (1,000 ohms, 1/3 Watt)	1.8
CVR83A-600R	Weather Resistant Cover	0.4
Y68AA-1	Cover Mounted Transformer (120 VAC Primary Power Supply, 40 VA Transformer Capacity)	1.9
Y68DA-1	Cover Mounted Transformer (240 VAC Primary Power Supply, 40 VA Transformer Capacity)	1.9
Y68HA-1	Cover Mounted Transformer (24 VAC Primary Power Supply, 40 VA Transformer Capacity – used when an Isolation Transformer is needed)	1.9

* lb x 0.454 = kg

Table 37: Tool Kit for VA-310x Series Electric Actuators (Order Separately)

Code Number	Description	Shipping Weight, lb*
VA-3100-101	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 38: Maintenance and Repair Parts (Order Separately)

Code Number	Description	Shipping Weight, lb*
Packing Kits		
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
Packing Nut Kits (Pneumatically Actuated Assemblies Only)		
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
Gasket Kits**		
V-9999-6050	For 2-1/2 in. Valves. Kit includes: 24 Gaskets, 144 5/16-18 x 7/8 in. Hex Head Cap Screws, and 72 5/16-18 x 1-1/4 in. Hex Head Cap Screws.	7.5
V-9999-6051	For 3 in. Valves. Kit includes: 24 Gaskets, 144 3/8-16 x 7/8 in. Hex Head Cap Screws, and 72 3/8-16 x 1-1/4 in. Hex Head Cap Screws.	10.5
V-9999-6052	For 4 in. Valves. Kit includes: 12 Gaskets, 96 3/8-16 x 7/8 in. Hex Head Cap Screws, and 84 3/8-16 x 1-1/4 in. Hex Head Cap Screws.	8.9
V-9999-6053	For 5 in. Valves. Kit includes: 6 Gaskets, 48 1/2-13 x 1 in. Hex Head Cap Screws, and 24 1/2-13 x 1-3/8 in. Hex Head Cap Screws.	7.4
V-9999-6054	For 6 in. Valves. Kit includes: 6 Gaskets, 60 1/2-13 x 1 in. Hex Head Cap Screws, and 30 1/2-13 x 1-3/8 in. Hex Head Cap Screws.	9.1

* lb x 0.454 = kg

** Gasket kits are for replacing the gasket between the valve body and the valve centerpiece, or for replacing the gasket between the valve body and the lower cap/lower body on two-way N.C. and three-way mixing valves.

Table 39: 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
V-5462-6002	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
V-5462-6003	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
Continued on next page . . .		

Code Number (Cont.)	Description	Shipping Weight, lb*
V-5462-6004	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
V-5462-6005	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
V-5462-6006	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
V-5462-6007	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
V-5842-6001	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
V-5842-6002	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
V-5842-6003	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
V-5842-6004	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
V-5842-6005	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
V-5842-6006	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
V-5842-6007	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

Product	VG2000 Series Cast Iron Flanged Globe Valves	
Models and Ordering Data	Refer to Tables 1, 2, 3, and 4.	
Service*	Hot Water, Chilled Water, or Steam for HVAC Systems	
Valve Body Size/Cv (Kv)	Refer to Table 1.	
Valve Stroke	2-1/2 and 3 in. Valves	3/4 in. (19 mm)
	3 and 4 in. Valves	1-1/8 in. (29 mm)
	5 in. Valves	1-3/8 in. (35 mm)
	6 in. Valves	1-1/2 in. (38 mm)
Valve Body Rating	Meets Requirements of ANSI B16.15, Class 125	
Valve Assembly Maximum Allowable Pressure/Temperature	Steam	35 psig (241 kPa) at 281°F (138°C)
	Water	175 psig (1,206 kPa) Up to 150°F (66°C), Decreasing to 125 psig (861 kPa) at 281°F (138°C)
Leakage	0.1% of Maximum Flow	
Inherent Flow Characteristics	Modified Linear	
Rangeability**	2-1/2 in. Valves	6.5:1
	3 in. Valves	7.7:1
	4 in. Valves	9.3:1
	5 in. Valves	10.7:1
	6 in. Valves	10.4:1
Spring Ranges (MP8000 Series Actuators)	3 to 7, 4 to 8, and 9 to 13 psig (21 to 48, 28 to 55, and 62 to 90 kPa)	
Maximum Recommended Operating Pressure Drop	35 psig (241 kPa) for All Valve Sizes	
Maximum Actuator Supply Pressure (Pneumatically Actuated Valves Only)	25 psig (172 kPa) Maximum	
Maximum Closeoff Pressures	Refer to Tables 22 through 25.	
Materials	Body	Cast Iron with Black Lacquer Finish
	Stem	316 Stainless Steel
	Plug	Brass
	Packing	Ethylene Propylene Terpolymer (EPT) Ring Packs
Valve Fluid Operating Temperature Limits	35 to 281°F (2 to 138°C), 35 psig (241 kPa) Saturated Steam	
Actuator Ambient Operating Temperature Limits	Refer to the appropriate actuator product bulletin.	
Accessories (Order Separately)	Refer to Tables 34 through 36.	

* 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



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