VG2000 Series Cast Iron Flanged Globe Valves
Product Bulletin

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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 HVAC systems. These ANSI Class 125 valves are available in 2 1/2 in. through 6 in. sizes and 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	Benefits
Complete family of 2 1/2 in. 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
Flexible features and options ordering matrix	Allows engineering to suit your specific application from thousands of easy-to-select, factory-assembled combinations
Standard Johnson Controls® Ring Pack packings	Provides industry-leading reliability and operating life
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 1 2	**Valve global**		
2 3	**Product family**	2 = Cast iron	
2 4	**Body type**	2 = Two-way, normally open / push-down-to-close 4 = Two-way, normally closed / push-down-to-open 8 = Three-way mixing	
3 5	**End connections**	3 = ANSI Class 125 flat-faced flanged	
1 6	**Trim and flow characteristics**	1 = Brass, modified linear	
T 7	**Size and Cv** (Kv = Cv x 0.857)	**Valve size**	**Two-way N.O. / PDTC** / **Two-way N.C. / PDTO** / **Three-way mixing**
		T = 2 1/2 in.	45 / 47 / 49
		U = 3 in.	59 / 75 / 74
		V = 4 in.	105 / 130 / 131
		W = 5 in.	147 / 189 / 197
		Y = 6 in.	226 / 279 / 284
M 8	**Stem type**	L = 3/8 in. threaded stem (2 1/2 in. and 3 in. N.O. valves with MP82 actuator only)	
		M = 3/8 in. threaded stem (2 1/2 in. through 4 in. valves only)	
		N = 1/2 in. threaded stem (3 in. through 6 in. valves only)	
+ 9	**Actuator mounting**	+ = Factory-mounted actuator (See Table 2 and Table 3.) (Leave fields 9 through 15 blank for valve without a factory-mounted actuator.)	

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.; 45 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

V	G	2	2	3	1	T	L	+	8	2				**MP8000 Series Pneumatic Actuator** (See actuator product bulletin.)	82 = MP82, 25 sq. in., spring-return-up (2 1/2 in. and 3 in. N.O. valves with “L” Stem) 84 = MP84, 50 sq. in., spring-return-up (All 2 1/2 in. through 4 in. valves with “M” Stem) 86 = MP86, 100 sq. in., spring-return-up (All 3 in. through 6 in. valves with “N” Stem) (**Note:** Only spring-return-up models of MP8000 Series actuators are available factory-mounted to VG2000 Series cast iron valves.)
1	2	3	4	5	6	7	8	9	10	11					
											3			**Stroke (MP8000 Series)**	3 = 3/4 in. (2 1/2 in. and 3 in. valves with MP82 or MP84 actuators only) 5 = 1 1/8 in. (3 in. and 4 in. valves with MP84 or MP86 actuators only) 7 = 1 1/2 in. (5 in. and 6 in. valves with MP86 actuator only)
											12				
												C		**Spring range (MP8000 Series)**	C = 3 psig to 7 psig (Suggested for N.O. valves with positioner) D = 4 psig to 8 psig (Suggested for three-way valves with positioner) E = 9 psig to 13 psig (Suggested for N.C. valves with positioner)
												13			
													0	1	**Accessories (MP8000 Series)**	00 = None 01 = V-9502 Pneumatic Positioner 02 = EPP-1000 Electro-Pneumatic Positioner
													14	15	
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.; 45 Cv; 3/8 in. threaded stem; MP82 Pneumatic Actuator; 3/4 in. stroke; 3 psig 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

V G 2 2 3 1 U M 2	**Factory-mounted actuator**	+ = Single actuator 2 = Tandem actuators (M9124-xGx-2 or M9220-xGx-3 only) (Tandem actuators can only be factory mounted on VG2231UM, VG2231VM, VG2231WN, VG2231YN VG2831UM, VG2831VM, VG2831WN, and VG2831YN valves only)
9 2 N	**M91xx / M9220 Series electric actuator** (See actuator product bulletin.)	**Non-spring return** 916 = M9116-xGx-2 (VG2231TM and VG2831TM only) 924 = M9124-xGx-2 **Spring return** 92N = M9220-xGx-3 (Spring to open, stem up) 94N = M9220-xGx-3 (Spring to close, stem down)
A	**Control type**	A = Floating, 24 VAC / VDC (M91xx and M9220) B = On / Off, 24 VAC / VDC (M9220 only) G = Proportional, 0 VDC to 10 VDC or 0 mA to 20 mA
G	**Supply voltage**	G = 24 VAC
C	**Feedback**	A = 0 VDC to 10 VDC (Proportional only); No feedback (All others) C = 0 VDC to 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	N	A	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.; 59.0 Cv; 3/8 in. threaded stem with one M9220-AGC-3 Proportional Spring Return Electric Actuator; 24 VAC supply; with two auxiliary switches; and one M9220-AGA-3 Proportional Spring Return 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

V	G	2	2	3	1	T	M	+	3	0				**VA-310x or VA-610x Series Electric Actuator** (See actuator product / technical bulletin.)	**Non-spring return** 30 = VA-310x (Available on 2 1/2 in. through 4 in. two-way PDTC and three-way mixing valves with “M” stem, and 5 in. and 6 in. two-way PDTC and three-way mixing valves with “N” stem) 60 = VA-610x (Available on 4 in. through 6 in. two-way PDTC and three-way mixing valves with “N” stem)
1	2	3	4	5	6	7	8	9	10	11					
											0			**Actuator mounting (VA-310x or VA-610x Series)**	0 = 2 1/2 in. valves with 3/8 in. threaded stem 1 = 3 in. and 4 in. valves with 3/8 in. threaded stem 2 = 3 in. through 6 in. valves with 1/2 in. threaded stem
											12				
												A		**Actuator input (VA-310x or VA-610x Series)**	A = On / Off (Floating) H = Proportional, 0 VDC to 10 VDC
												13			
													G	**Voltage (VA-310x or VA-610x Series)**	G = 24 VAC
													14		
														C	**Accessories (VA-310x or VA-610x Series)**	A = None (VA-310x Series only) C = Two auxiliary switches
														15	
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.; 45.0 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: 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		Assembly details					
		3 psig to 7 psig		4 psig to 8 psig		9 psig to 13 psig	
Size, in.	Cv	Closeoff pressure, psig	Code number	Closeoff pressure, psig	Code number	Closeoff pressure, psig	Code number
MP82 Series actuators – 25 sq. in. effective diaphragm area							
2 1/2	45	53	VG2231TL+823C00	49	VG2231TL+823D00	28	VG2231TL+823E00
3	59	37	VG2231UL+823C00	34	VG2231UL+823D00	19	VG2231UL+823E00
MP84 Series actuators – 50 sq. in. effective diaphragm area							
2 1/2	45	109	VG2231TM+843C00	100	VG2231TM+843D00	58	VG2231TM+843E00
3	59	75	VG2231UM+845C00	70	VG2231UM+845D00	40	VG2231UM+845E00
4	105	42	VG2231VM+845C00	39	VG2231VM+845D00	23	VG2231VM+845E00
MP86 Series actuators – 100 sq. in. effective diaphragm area							
3	59	152	VG2231UN+865C00	140	VG2231UN+865D00	81	VG2231UN+865E00
4	105	86	VG2231VN+865C00	79	VG2231VN+865D00	46	VG2231VN+865E00
5	147	55	VG2231WN+867C00	51	VG2231WN+867D00	29	VG2231WN+867E00
6	226	38	VG2231YN+867C00	35	VG2231YN+867D00	20	VG2231YN+867E00

Note: 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		Assembly details					
		3 psig to 7 psig		4 psig to 8 psig		9 psig to 13 psig	
Size, in.	Cv	Closeoff pressure, psig	Code number	Closeoff pressure, psig	Code number	Closeoff pressure, psig	Code number
MP84 Series actuators – 50 sq. in. effective diaphragm area							
2 1/2	47	24	VG2431TM+843C00	32	VG2431TM+843D00	75	VG2431TM+843E00
3	75	17	VG2431UM+845C00	22	VG2431UM+845D00	52	VG2431UM+845E00
4	130	9	VG2431VM+845C00	13	VG2431VM+845D00	29	VG2431VM+845E00
MP86 Series actuators – 100 sq. in. effective diaphragm area							
3	75	34	VG2431UN+865C00	46	VG2431UN+865D00	105	VG2431UN+865E00
4	130	19	VG2431VN+865C00	26	VG2431VN+865D00	59	VG2431VN+865E00
5	189	12	VG2431WN+867C00	17	VG2431WN+867D00	38	VG2431WN+867E00
6	279	9	VG2431YN+867C00	11	VG2431YN+867D00	26	VG2431YN+867E00

Note: 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		Assembly details					
		3 psig to 7 psig		4 psig to 8 psig		9 psig to 13 psig	
Size, in.	Cv	Closeoff pressure, psig	Code number	Closeoff pressure, psig	Code number	Closeoff pressure, psig	Code number
MP84 Series actuators – 50 sq. in. effective diaphragm area							
2 1/2	49	65/14	VG2831TM+843C00	60/19	VG2831TM+843D00	35/45	VG2831TM+843E00
3	74	45/10	VG2831UM+845C00	42/13	VG2831UM+845D00	24/31	VG2831UM+845E00
4	131	25/6	VG2831VM+845C00	23/8	VG2831VM+845D00	14/18	VG2831VM+845E00
MP86 Series actuators – 100 sq. in. effective diaphragm area							
3	74	91/21	VG2831UN+865C00	84/28	VG2831UN+865D00	49/63	VG2831UN+865E00
4	131	51/12	VG2831VN+865C00	47/16	VG2831VN+865D00	27/35	VG2831VN+865E00
5	197	33/7	VG2831WN+867C00	30/10	VG2831WN+867D00	18/23	VG2831WN+867E00
6	284	23/5	VG2831YN+867C00	21/7	VG2831YN+867D00	12/16	VG2831YN+867E00

Note: 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

Valve	Size, in.	Cv	Closeoff pressure, psig	Assembly details - spring return		
				Floating, without switches	On / Off, without switches	Proportional, without switches
				M9220-AGA-3	M9220-BGA-3	M9220-GGA-3
Two-way – spring return normally open – valve stem up						
VG2231TM	2 1/2	45	76	VG2231TM+92NAGA	VG2231TM+92NBGA	VG2231TM+92NGGA
VG2231UM	3	59	33	VG2231UM+92NAGA	VG2231UM+92NBGA	VG2231UM+92NGGA
VG2231UM	3	59	66	VG2231UM292NAGA	VG2231UM292NBGA	VG2231UM292NGGA
VG2231VM	4	105	37	VG2231VM292NAGA	VG2231VM292NBGA	VG2231VM292NGGA
VG2231WN	5	147	20	VG2231WN292NAGA	VG2231WN292NBGA	VG2231WN292NGGA
Two-way – spring return normally closed – valve stem down						
VG2231TM	2 1/2	45	76	VG2231TM+94NAGA	VG2231TM+94NBGA	VG2231TM+94NGGA
VG2231UM	3	59	33	VG2231UM+94NAGA	VG2231UM+94NBGA	VG2231UM+94NGGA
VG2231UM	3	59	66	VG2231UM294NAGA	VG2231UM294NBGA	VG2231UM294NGGA
VG2231VM	4	105	37	VG2231VM294NAGA	VG2231VM294NBGA	VG2231VM294NGGA
VG2231WN	5	147	20	VG2231WN294NAGA	VG2231WN294NBGA	VG2231WN294NGGA
Three-way mixing – spring return – valve stem up – side inlet port closed						
VG2831TM	2 1/2	49	45	VG2831TM+92NAGA	VG2831TM+92NBGA	VG2831TM+92NGGA
VG2831UM	3	74	20	VG2831UM+92NAGA	VG2831UM+92NBGA	VG2831UM+92NGGA
VG2831UM	3	74	40	VG2831UM292NAGA	VG2831UM292NBGA	VG2831UM292NGGA
VG2831VM	4	131	11	VG2831VM+92NAGA	VG2831VM+92NBGA	VG2831VM+92NGGA
VG2831VM	4	131	22	VG2831VM292NAGA	VG2831VM292NBGA	VG2831VM292NGGA
VG2831WN	5	197	12	VG2831WM292NAGA	VG2831WN292NBGA	VG2831WN292NGGA
VG2831YN	6	284	7	VG2831YN292NAGA	VG2831YN292NBGA	VG2831YN292NGGA
Three-way mixing – spring return – valve stem down – side inlet port open						
VG2831TM	2 1/2	49	45	VG2831TM+94NAGA	VG2831TM+94NBGA	VG2831TM+94NGGA
VG2831UM	3	74	20	VG2831UM+94NAGA	VG2831UM+94NBGA	VG2831UM+94NGGA
VG2831UM	3	74	40	VG2831UM294NAGA	VG2831UM294NBGA	VG2831UM294NGGA
VG2831VM	4	131	11	VG2831VM+92NAGA	VG2831VM+94NBGA	VG2831VM+94NGGA
VG2831VM	4	131	22	VG2831VM294NAGA	VG2831VM294NBGA	VG2831VM294NGGA
VG2831WN	5	197	12	VG2831WM294NAGA	VG2831WN294NBGA	VG2831WN294NGGA
VG2831YN	6	284	7	VG2831YN294NAGA	VG2831YN294NBGA	VG2831YN294NGGA

Note: Product codes that use a 2 instead of a + refer to valve assemblies that have two actuators mounted in tandem.

Example: VG2231UM+92NAGA refers to a single actuator assembly. VG2231UM292NAGA refers to a tandem actuator assembly.

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

Valve	Size, in.	Cv	Closeoff pressure, psig	Assembly details - spring return		
				Floating, with two switches	On / Off, with two switches	Proportional, with two switches
				M9220-AGC-3	M9220-BGC-3	M9220-GGC-3
Two-way – spring return normally open – valve stem up						
VG2231TM	2 1/2	45	76	VG2231TM+92NAGC	VG2231TM+92NBGC	VG2231TM+92NGGC
VG2231UM	3	59	33	VG2231UM+92NAGC	VG2231UM+92NBGC	VG2231UM+92NGGC
VG2231UM	3	59	66	VG2231UM292NAGC	VG2231UM292NBGC	VG2231UM292NGGC
VG2231VM	4	105	37	VG2231VM292NAGC	VG2231VM292NBGC	VG2231VM292NGGC
VG2231WN	5	147	20	VG2231WN292NAGC	VG2231WN292NBGC	VG2231WN292NGGC
Two-way – spring return normally closed – valve stem down						
VG2231TM	2 1/2	45	76	VG2231TM+94NAGC	VG2231TM+94NBGC	VG2231TM+94NGGC
VG2231UM	3	59	33	VG2231UM+94NAGC	VG2231UM+94NBGC	VG2231UM+94NGGC
VG2231UM	3	59	66	VG2231UM294NAGC	VG2231UM294NBGC	VG2231UM294NGGC
VG2231VM	4	105	37	VG2231VM294NAGC	VG2231VM294NBGC	VG2231VM294NGGC
VG2231WN	5	147	20	VG2231WN294NAGC	VG2231WN294NBGC	VG2231WN294NGGC
Three-way mixing – spring return – valve stem up						
VG2831TM	2 1/2	49	45	VG2831TM+92NAGC	VG2831TM+92NBGC	VG2831TM+92NGGC
VG2831UM	3	74	20	VG2831UM+92NAGC	VG2831UM+92NBGC	VG2831UM+92NGGC
VG2831UM	3	74	40	VG2831UM292NAGC	VG2831UM292NBGC	VG2831UM292NGGC
VG2831VM	4	131	11	VG2831VM+92NAGC	VG2831VM+92NBGC	VG2831VM+92NGGC
VG2831VM	4	131	22	VG2831VM292NAGC	VG2831VM292NBGC	VG2831VM292NGGC
VG2831WN	5	197	12	VG2831WN292NAGC	VG2831WN292NBGC	VG2831WN292NGGC
VG2831YN	6	284	7	VG2831YN292NAGC	VG2831YN292NBGC	VG2831YN292NGGC
Three-way mixing – spring return – valve stem down						
VG2831TM	2 1/2	49	45	VG2831TM+94NAGC	VG2831TM+94NBGC	VG2831TM+94NGGC
VG2831UM	3	74	20	VG2831UM+94NAGC	VG2831UM294NBGC	VG2831UM294NGGC
VG2831UM	3	74	40	VG2831UM294NAGC	VG2831UM294NBGC	VG2831UM294NGGC
VG2831VM	4	131	11	VG2831VM+94NAGC	VG2831VM+94NBGC	VG2831VM+94NGGC
VG2831VM	4	131	22	VG2831VM294NAGC	VG2831VM294NBGC	VG2831VM294NGGC
VG2831WN	5	197	12	VG2831WN294NAGC	VG2831WN294NBGC	VG2831WN294NGGC
VG2831YN	6	284	7	VG2831YN294NAGC	VG2831YN294NBGC	VG2831YN294NGGC

Note: Product codes that use a 2 instead of a + refer to valve assemblies that have two actuators mounted in tandem. On tandem assemblies with switches, only one actuator is required to have switches.

Example: VG2231UM+92NAGA refers to a single actuator assembly. VG2231UM292NAGA refers to a tandem actuator assembly.

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

Size, in.	Cv	Closeoff pressure, psig	Assembly details - non-spring return			
			On / Off floating, without switches	Proportional, without switches	On / Off floating, with two switches	Proportional, with two switches
			M9116-AGA-2 M9124-AGA-2	M9116-GGA-2 M9124-GGA-2	M9116-AGC-2 M9124-AGC-2	M9116-GGC-2 M9124-GGC-2
Two-way, push-down-to-close						
2 1/2	45	62	VG2231TM+916AGA	VG2231TM+916GGA	VG2231TM+916AGC	VG2231TM+916GGC
2 1/2	45	101	VG2231TM+924AGA	VG2231TM+924GGA	VG2231TM+924AGC	VG2231TM+924GGC
3	59	27	VG2231UM+916AGA	VG2231UM+916GGA	VG2231UM+916AGC	VG2231UM+916GGC
3	59	43	VG2231UM+924AGA	VG2231UM+924GGA	VG2231UM+924AGC	VG2231UM+924GGC
3	59	88	VG2231UM2924AGA	VG2231UM2924GGA	VG2231UM2924AGC	VG2231UM2924GGC
4	105	24	VG2231VM+924AGA	VG2231VM+924GGA	VG2231VM+924AGC	VG2231VM+924GGC
4	105	49	VG2231VM2924AGA	VG2231VM2924GGA	VG2231VM2924AGC	VG2231VM2924GGC
5	147	26	VG2231WN2924AGA	VG2231WN2924GGA	VG2231WN2924AGC	VG2231WN2924GGC
6	226	16	VG2231YN2924AGA	VG2231YN2924GGA	VG2231YN2924AGC	VG2231YN2924GGC
Three-way, mixing						
2 1/2	45	37	VG2831TM+916AGA	VG2831TM+916GGA	VG2831TM+916AGC	VG2831TM+916GGC
2 1/2	45	60	VG2831TM+924AGA	VG2831TM+924GGA	VG2831TM+924AGC	VG2831TM+924GGC
3	59	16	VG2831UM+916AGA	VG2831UM+916GGA	VG2831UM+916AGC	VG2831UM+916GGC
3	59	26	VG2831UM+924AGA	VG2831UM+924GGA	VG2831UM+924AGC	VG2831UM+924GGC
3	59	53	VG2831UM2924AGA	VG2831UM2924GGA	VG2831UM2924AGC	VG2831UM2924GGC
4	105	9	VG2831VM+916AGA	VG2831VM+916GGA	VG2831VM+916AGC	VG2831VM+916GGC
4	105	14	VG2831VM+924AGA	VG2831VM+924GGA	VG2831VM+924AGC	VG2831VM+924GGC
4	105	30	VG2831VM2924AGA	VG2831VM2924GGA	VG2831VM2924AGC	VG2831VM2924GGC
5	147	7	VG2831WN+924AGA	VG2831WN+924GGA	VG2831WN+924AGC	VG2831WN+924GGC
5	147	15	VG2831WN2924AGA	VG2831WN2924GGA	VG2831WN2924AGC	VG2831WN2924GGC
6	226	4	VG2831YN+924AGA	VG2831YN+924GGA	VG2831YN+924AGC	VG2831YN+924GGC
6	226	9	VG2831YN2924AGA	VG2831YN2924GGA	VG2831YN2924AGC	VG2831YN2924GGC

Note: Product codes that use a 2 instead of a + refer to valve assemblies that have 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.

Example: VG2831YN+924AGA refers to a single actuator assembly. VG2831YN2924AGA refers to a tandem actuator assembly.

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

Valve	Size, in.	Cv	Closeoff pressure, psig	Non-spring return		
				On / Off floating, without switches	On / Off floating, with two switches	Proportional, with two switches
				VA-3100-AGA	VA-3100-AGC	VA-3100-HGC
Two-way – spring return normally open – valve stem up						
VG2231TM	2 1/2	45	115	VG2231TM+300AGA	VG2231TM+300AGC	VG2231TM+300HGC
VG2231UM	3	59	79	VG2231UM+301AGA	VG2231UM+301AGC	VG2231UM+301HGC
VG2231VM	4	105	45	VG2231VM+301AGA	VG2231VM+301AGC	VG2231VM+301HGC
VG2231WN	5	147	29	VG2231WN+302AGA	VG2231WN+302AGC	VG2231WN+302HGC
VG2231YN	6	226	20	VG2231YN+302AGA	VG2231YN+302AGC	VG2231YN+302HGC
Two-way – spring return normally closed – valve stem down						
VG2831TM	2 1/2	49	69	VG2831TM+300AGA	VG2831TM+300AGC	VG2831TM+300HGC
VG2831UM	3	74	48	VG2831UM+301AGA	VG2831UM+301AGC	VG2831UM+301HGC
VG2831VM	4	131	27	VG2831VM+301AGA	VG2831VM+301AGC	VG2831VM+301HGC
VG2831WN	5	197	17	VG2831WN+302AGA	VG2831WN+302AGC	VG2831WN+302HGC
VG2831YN	6	284	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

Valve	Size, in.	Cv	Closeoff pressure, psig	Non-spring return	
				On / Off floating, without switches	Proportional, with two switches
				VA-6100-AGC	VA-6100-HGC
Two-way push-down-to-close					
VG2231VN	4	105	89	VG2231VN+602AGC	VG2231VN+602HGC
VG2231WN	5	147	57	VG2231WN+602AGC	VG2231WN+602HGC
VG2231YN	6	226	40	VG2231YN+602AGC	VG2231YN+602HGC
Three-way mixing					
VG2831VN	4	131	54	VG2831VN+602AGC	VG2831VN+602HGC
VG2831WN	5	197	34	VG2831WN+602AGC	VG2831WN+602HGC
VG2831YN	6	284	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. You can easily remove the actuator 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, you can reverse the action of the MP8000 Series Actuator from spring-return-up to spring-return-down or from spring-return down to spring-return-up. 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 VDC 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 M9000-53x Series Valve Linkages, the rotary motion of this actuator is converted into linear motion that operates 2 1/2 in. 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 VDC 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 VAC and 230 VAC models are available for field-mounting for use with on / off controllers. When coupled with M9000-53x Series Valve Linkages, the rotary motion of this actuator is converted into linear motion that operates 2 1/2 in. 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 VDC 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 V*A-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 actuators
M9000-530	VG2x31TM	2 1/2 in.	3/4 in	“M” Stem (3/8 in.)	Single
M9000-531	VG2x31UM and VG2x31VM	3 in. and 4 in.	1 1/8 in.	“M” Stem (3/8 in.)	Single
M9000-532	VG2x31UM and VG2x31VM	3 in. 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 in. 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

Mounting kit code number	Actuator style	Valve size	Stem type (Diameter)
MP8000-6201	MP82 / MP83 / MP84 / MP85	2 1/2 in. through 4 in.	“L” Stem (3/8 in.) or “M” Stem (3/8 in.)
MP8000-6203	MP86 / MP87	3 in. through 6 in.	“N” Stem (1/2 in.)

Table 18: 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 in. through 4 in.	“M” Stem (3/8 in.)
VA-3100-501	5 in. and 6 in.	“N” Stem (1/2 in.)

Table 19: Mounting kits for field mounting VA-610x Series Electric Valve Actuators

Mounting kit code number	Valve size	Stem type (Diameter)
VA-3100-501	4 in. 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) Spring range, psig (kPa)			Two-way N.C. (with 0 psig supply) 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)

Note: To maximize closeoff, the recommended spring ranges for use with a positioner are 3 psig to 7 psig (21 kPa to 48 kPa) for two way N.O. valves and 9 psig to 13 psig (62 kPa 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) Spring range, psig (kPa)			Three-way mixing N.C. port (with 0 psig supply) 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)

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

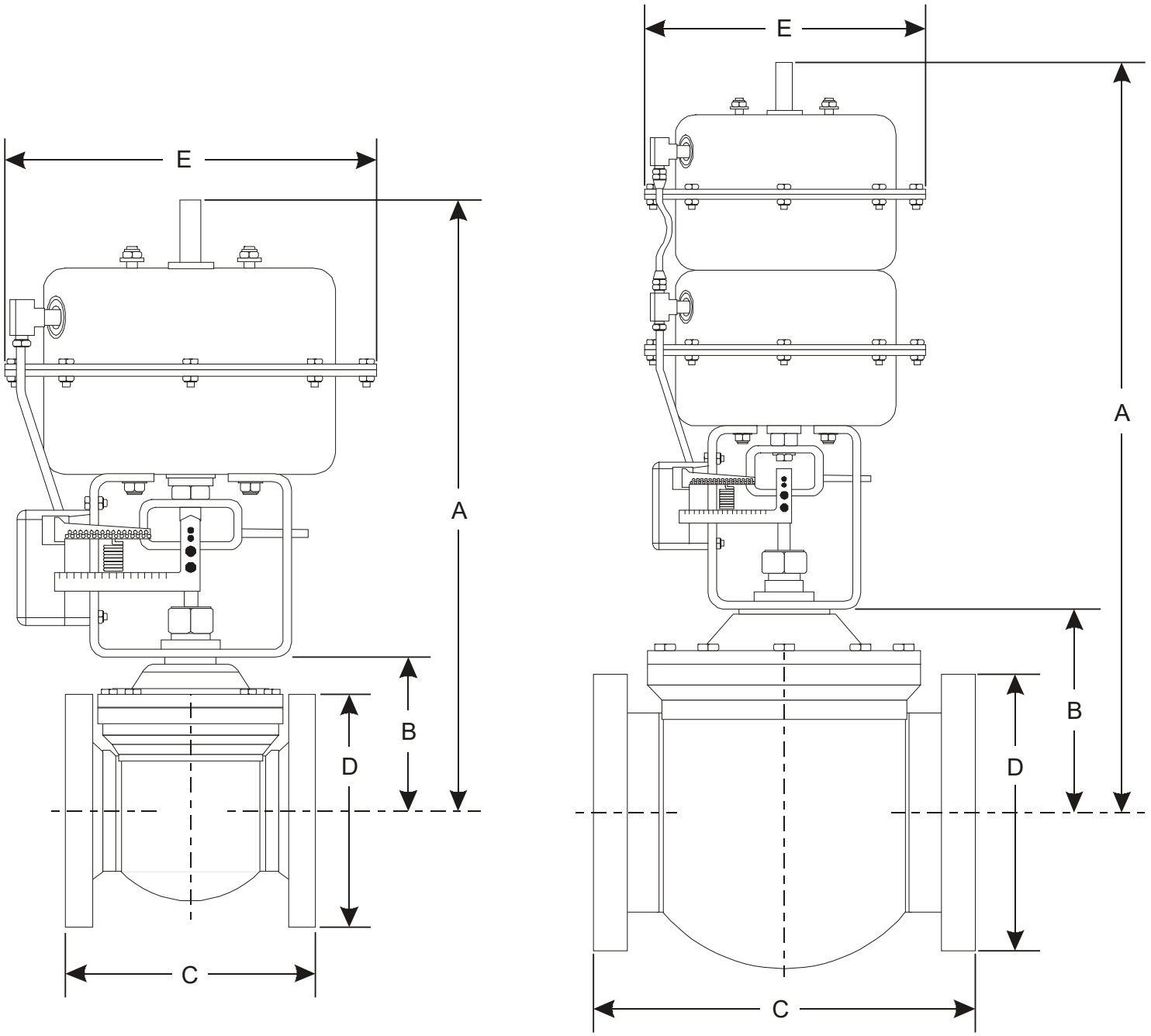
Note: The maximum fluid temperature is 281°F (138°C) water or 35 psig (241 kPa) saturated steam.

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
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)
M9220	76 (524)	33 (227)	—	—	—
M9220 (tandem)	—	66 (456)	37 (255)	20 (138)	—
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)
M9220	45 (310)	20 (138)	11 (76)	—	—
M9220 (tandem)	—	40 (276)	22 (152)	12 (83)	7 (48)
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.

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



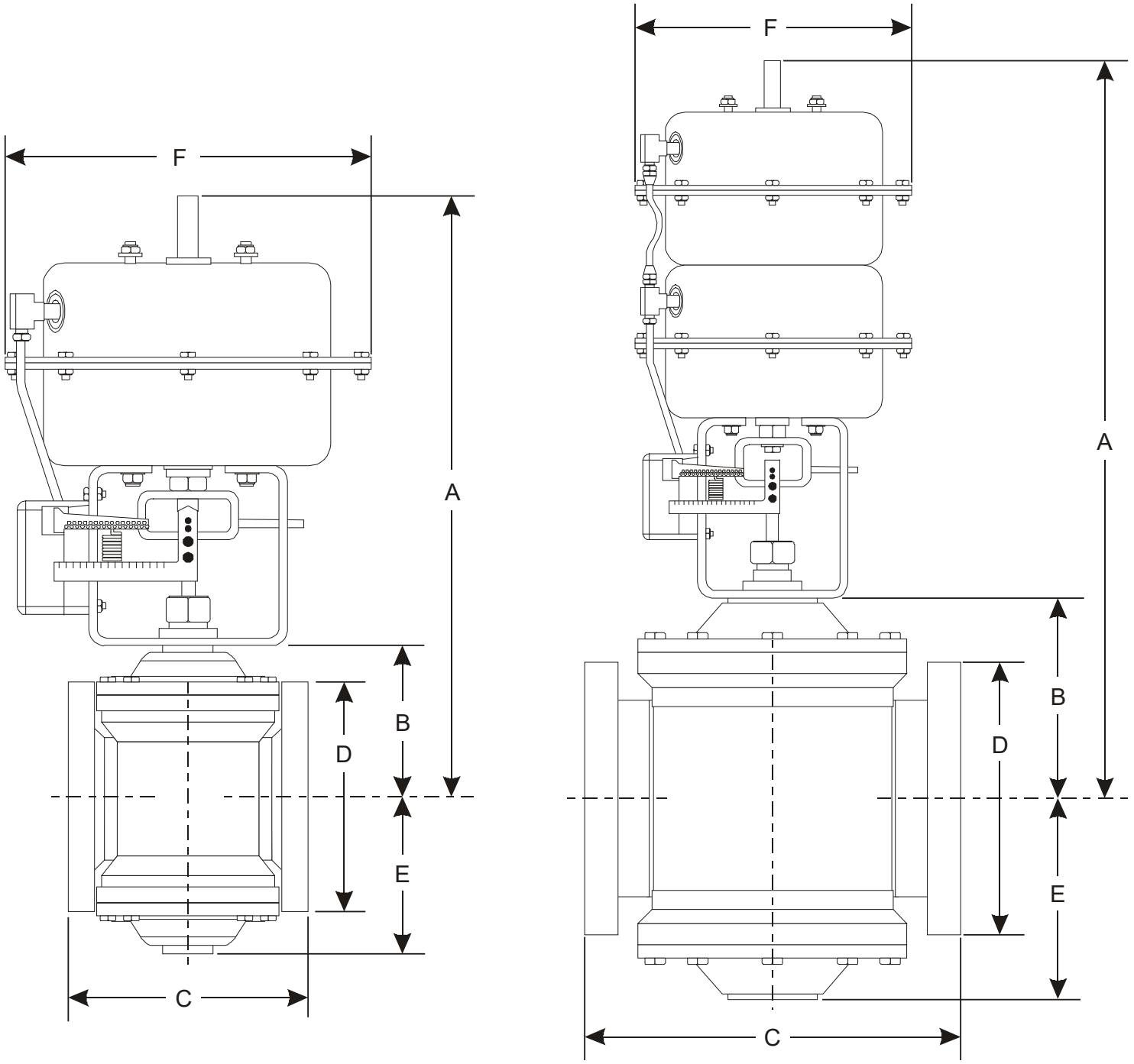
MP82/84 Actuated **MP86 Actuated**

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)

Note: 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.

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



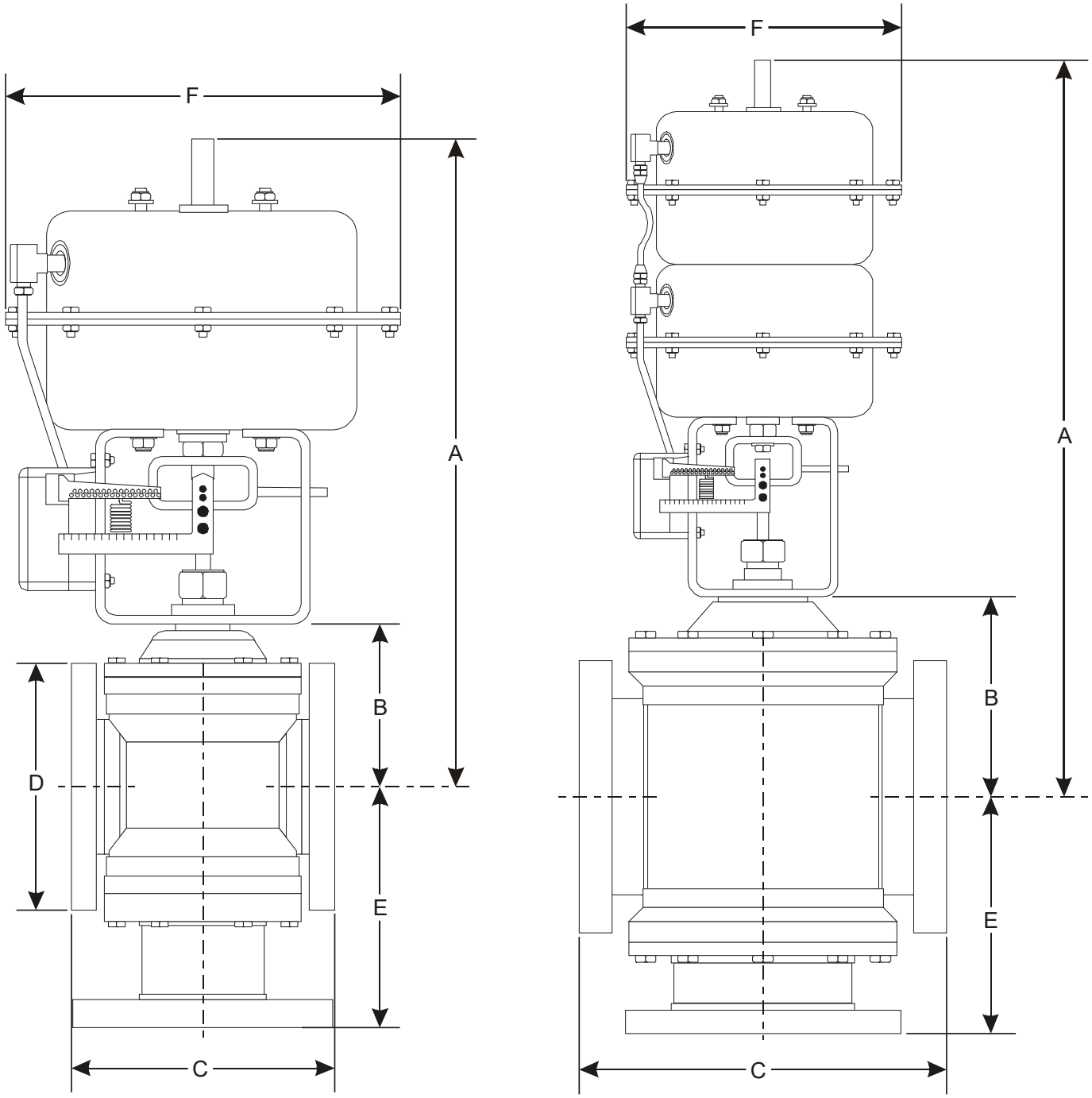
MP84 Actuated **MP86 Actuated**

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)

Note: 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 12: MP8000 Actuated Three-Way Mixing Valve dimensions (See Table 25)



MP84 Actuated **MP86 Actuated**

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)

Note: 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)

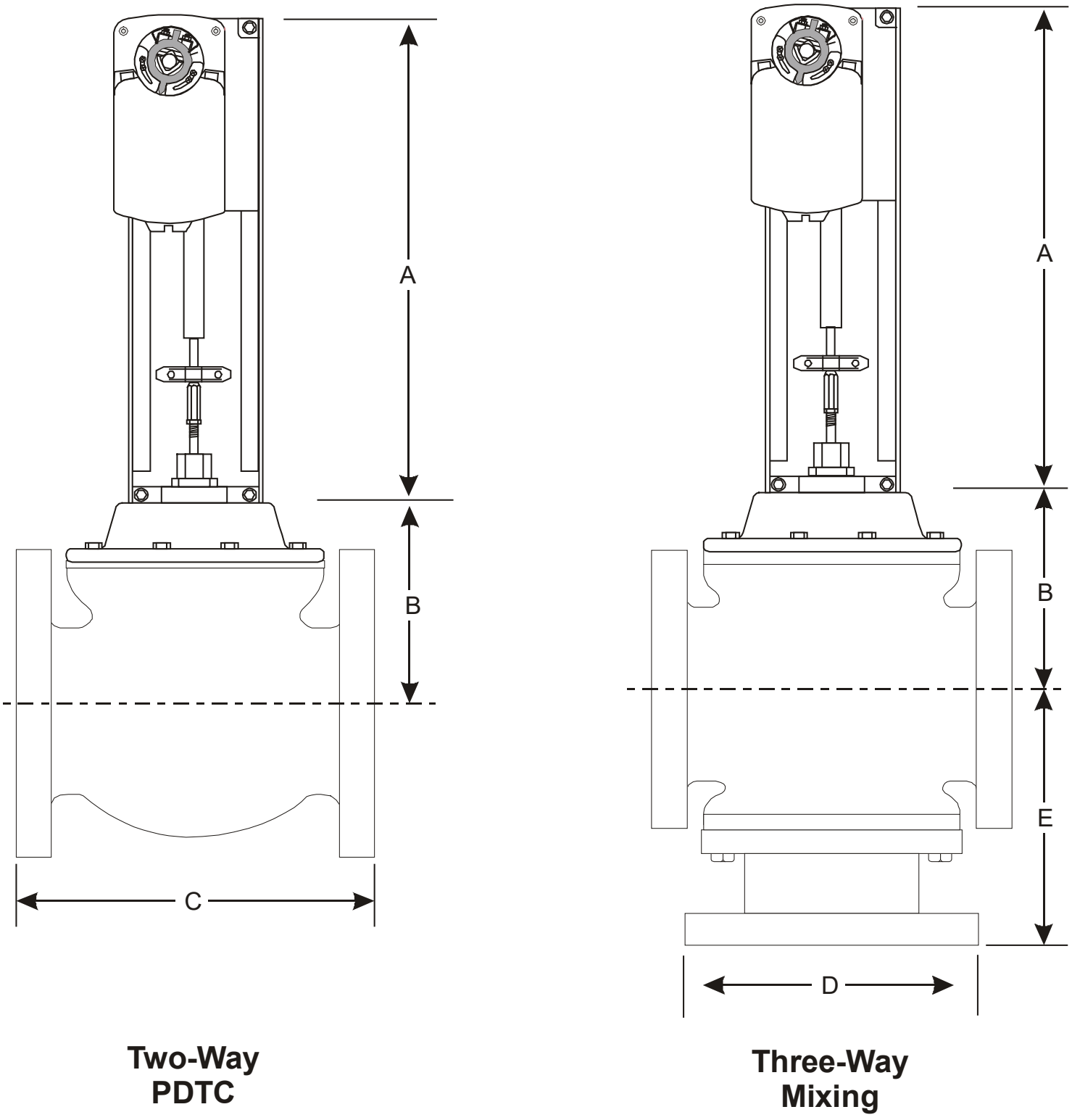
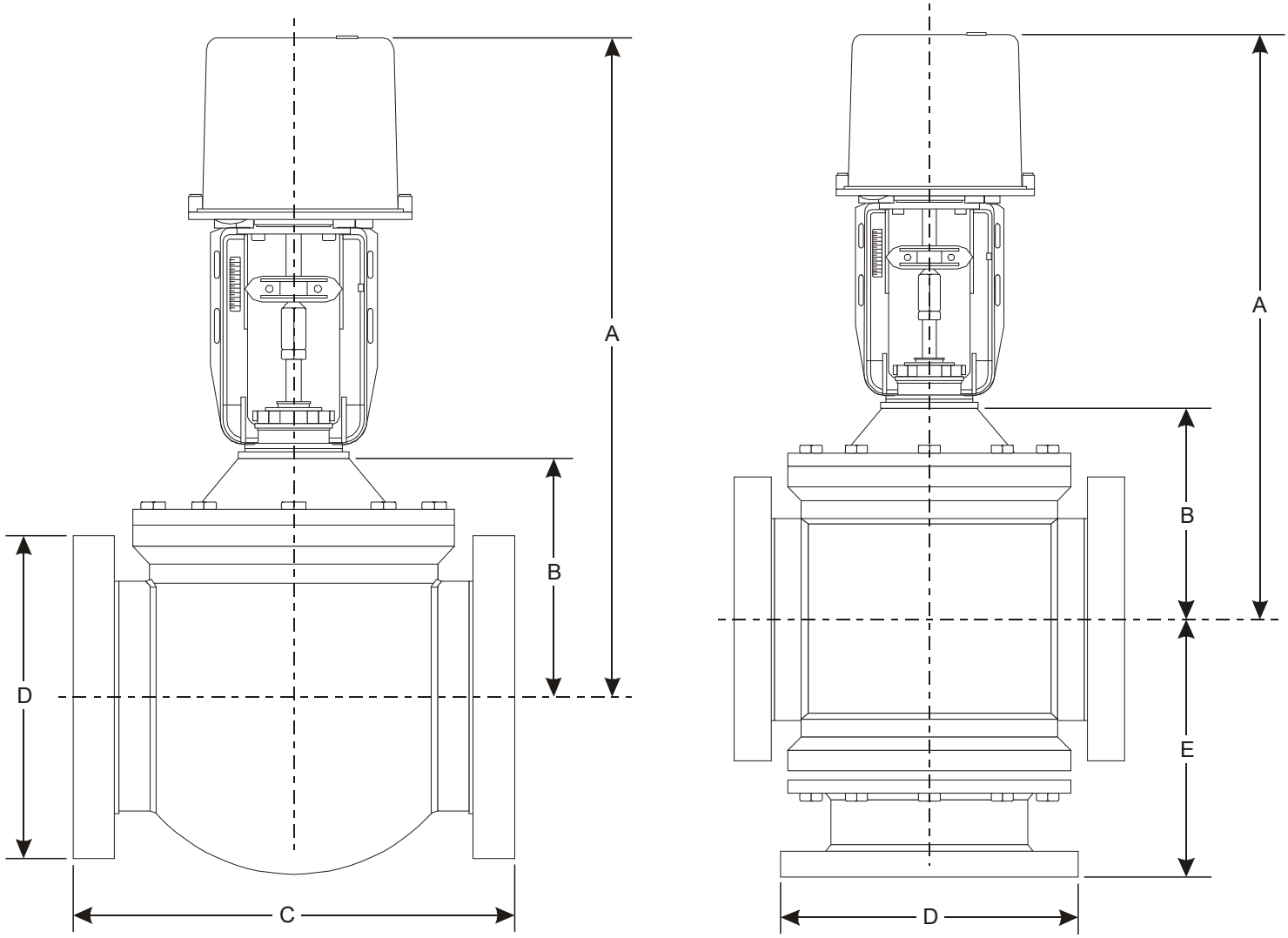


Table 26: M9000 Actuated VG2000 Series Cast Iron Flanged Valve Dimensions, in. (mm)

Actuator style	Valve size, in.	A	B	C	D	E
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)

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



Two-Way PDTC

Three-Way Mixing

Table 27: 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)

Note: Allow 6 5/16 in. (160 mm) clearance for VA 310x actuator removal.

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

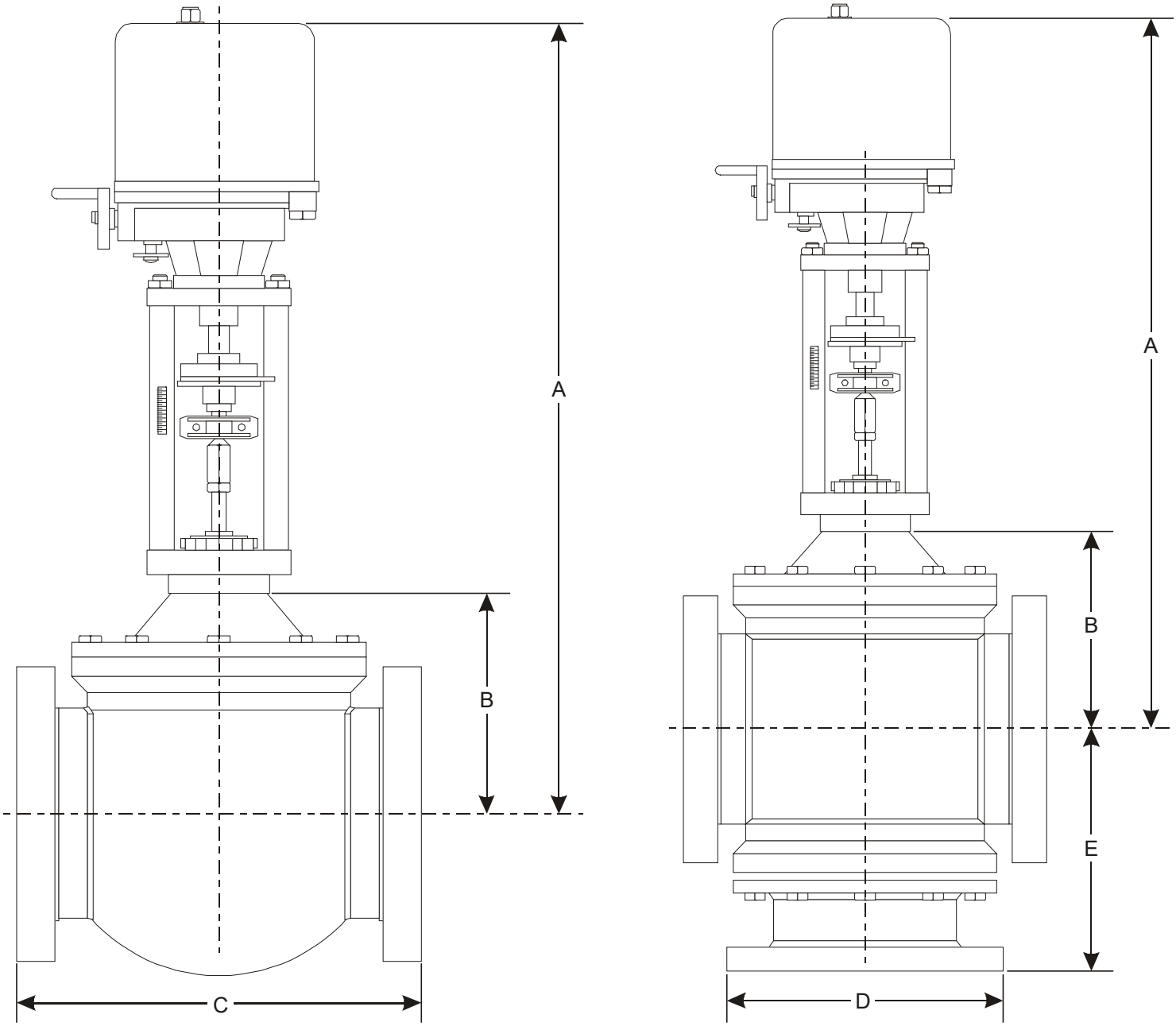


Table 28: VA-610x Actuated Valve dimensions, in. (mm)

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)

Note: Allow 6 5/16 in. (160 mm) clearance for VA 310x actuator removal.

Figure 16: Flange and bolt circle

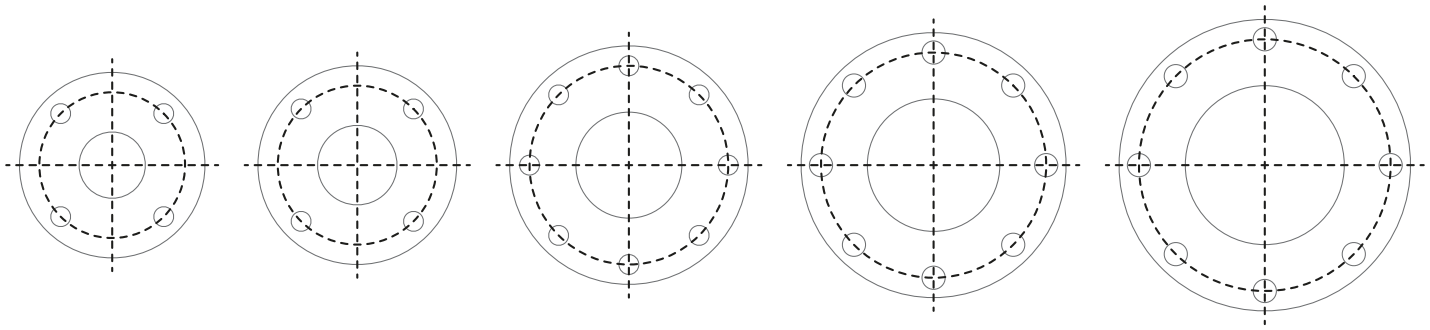


Table 29: Flange and bolt circle dimensions, in. (mm)

Valve size, in.	Diameter of flange	Thickness of flange	Diameter of bolt circle	Diameter of bolt holes	Number of bolt boles
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 (kg)
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)

Code number	Description	Shipping weight, lb (kg)
M9000-100	Conduit adapter kit	0.4 (0.18)
M9000-103	14 VA transformer, 120 VAC / 24 VAC, 60 Hz, Class 2	1.4 (0.64)
M9000-104	14 VA transformer, 230 VAC / 24 VAC, 60 Hz, Class 2	1.4 (0.64)
M9000-105	Pluggable 3 terminal block	0.5 (0.23)
M9000-106	Pluggable 4 terminal block	0.5 (0.23)
M9000-310	NEMA 3R weather shield enclosure for M9214 (two weather shield enclosures required for tandem assemblies)	2.0 (0.91)
M9000-320	NEMA 3R weather shield enclosure for M9220 (two weather shield enclosures required for tandem assemblies)	3.3 (1.49)
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 (0.91)

Table 32: Tool Kit for VA-310x Series Electric Actuators (order separately)

Code number	Description	Shipping weight, lb (kg)
VA-3100-101	Auxiliary switch cam adjusting wrench (used on VA-310x Series Electric Actuators – one wrench is supplied with each actuator.)	0.1 (0.05)

Table 33: Maintenance and repair parts (order separately)

Code number	Description	Shipping weight, lb (kg)
	Packing kits	
V-9999-613	For 2 1/2 in. 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 (0.05)
V-5252-668	For 3 in. 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 (0.09)
	Packing nut kits (pneumatically actuated assemblies only)	
V-4510-6019	For 2 1/2 in. through 4 in valves with 3/8 in. stem	0.1 (0.05)
V-5252-609	For 3 in. through 6 in. valves with 1/2 in. stem	0.4 (0.18)

Table 34: Valve reconditioning kits (order separately)

Code number	Description	Shipping weight, lb (kg)
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; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	7.0 (3.18)
V-5252-6002	Reconditioning kit, 2 1/2 in. N.O. flanged valve, “L” stem (3/8 in.), for use with MP82 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	6.9 (3.13)
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; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	9.5 (4.31)
V-5252-6004	Reconditioning kit, 3 in. N.O. flanged valve, “L” stem (3/8 in.), for use with MP82 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	9.5 (4.31)
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; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	15.0 (6.80)
V-5252-6006	Reconditioning kit, 4 in. N.O. flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator, includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	16.5 (7.48)
V-5252-6007	Reconditioning kit, 5 in. N.O. flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	22.0 (9.97)
V-5252-6008	Reconditioning kit, 6 in. N.O. flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	30.6 (13.88)
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; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	7.4 (3.36)
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, includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	9.9 (4.49)
V-5462-6003	Reconditioning kit, 3 in. N.C. flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	12.7 (5.76)
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; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	16.3 (7.39)
V-5462-6005	Reconditioning kit, 4 in. N.C. flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	17.4 (7.89)
V-5462-6006	Reconditioning kit, 5 in. N.C. flanged valve, “N” stem, (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	23.7 (10.75)
V-5462-6007	Reconditioning kit, 6 in. N.C. flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	31.1 (14.11)
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; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	8.1 (3.67)
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; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	10.8 (4.89
V-5842-6003	Reconditioning kit, 3 in. three-way mixing flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	12.3 (5.58)
V-5842-6004	Reconditioning kit, 4 in. three-way mixing flanged valve, for use with Electric Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	16.6 (7.53)
V-5842-6005	Reconditioning kit, 4 in. three-way mixing flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	17.8 (8.07)
V-5842-6006	Reconditioning kit, 5 in. three-way mixing flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	22.0 (9.98)
V-5842-6007	Reconditioning kit, 6 in. three-way mixing flanged valve, “N” stem (1/2 in.), for use with MP86 Pneumatic Actuator; includes: bonnet and packing items, stem and disk assembly, packing tools, gasket and screw set, and grease packet.	31.9 (14.47)

Technical specifications

VG2000 Series Cast Iron Flanged Globe Valves

Specification		Description
Models and ordering data		See Tables 1, 2, 3, and 4
Service		Hot water, chilled water, 50% glycol solutions, or steam for HVAC systems
Valve body size / Cv (Kv)		See Table 1
Valve stroke	2 1/2 in. and 3 in. valves	3/4 in. (19 mm)
	3 in. 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 ASME B16.1, Class 125
Valve assembly	Steam	35 psig (241 kPa) at 281°F (138°C)
Maximum allowable pressure / temperature	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 psig to 7 psig (21 kPa to 48 kPa), 4 psig to 8 psig (28 kPa to 55 kPa), and 9 psig to 13 psig (62 kPa 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		See Tables 21 through 24
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°F to 281°F (2°C to 138°C), 35 psig (241 kPa) saturated steam
Actuator ambient operating temperature limits		Refer to the appropriate actuator product bulletin
Accessories (order separately)		See Tables 32 through 34
Compliance		CRN: 0C22368.5

Note: Proper water treatment is recommended; refer to VDI 2035 Guideline.

Note: 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 product.

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