

VG2000 Series

# Cast Iron Flanged Globe Valves for Assembly in the Field

## Description

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.

Refer to the *VG2000 Series Cast Iron Flanged Globe Valves Product Bulletin (LIT-977133)* for important product application information.

## Repair Information

If the VG2000 Series Cast Iron Flanged Globe Valve fails to operate within its specifications, refer to the *VG2000 Series Cast Iron Flanged Globe Valves Product Bulletin (LIT-977133)* for a list of repair parts available.

## Features

- 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
- flexible features and options ordering matrix — allow engineering to suit your specific application from thousands of easy-to-select, factory-assembled combinations
- standard Johnson Controls® Ring Pack Packings — provide industry-leading reliability and operating life
- every valve tested for leakage — provides energy conservation and ensures occupant comfort



MP84 Actuated VG2000 Valve

## Selection Charts

### VG2000 Flanged Globe Valve Bodies/MP8000 Series Pneumatic Spring Return Actuators

Spring Range			3 to 7 psig		4 to 8 psig		9 to 13 psig	
Valve Body Code Number	Valve Size in.	Cv	Closeoff psig	Actuator Code Number	Closeoff psig	Actuator Code Number	Closeoff psig	Actuator Code Number
<b>Two-Way Normally Open with MP82 Series</b>								
VG2231TL	2-1/2	51	53	MP823C001E	49	MP823D001E	28	MP823E001E
VG2231UL	3	83	37	MP823C001E	34	MP823D001E	19	MP823E001E
<b>Two-Way Normally Open with MP84 Series</b>								
VG2231TM	2/1/2	51	109	MP843C001F	100	MP843D001F	58	MP843E001F
VG2231UM	3	83	75	MP845C001F	70	MP845D001F	40	MP845E001F
VG2231VM	4	150	42	MP845C001F	39	MP845D001F	23	MP845E001F
<b>Two-Way Normally Open with MP86 Series</b>								
VG2231UN	3	83	152	MP865C001G	140	MP865D001G	81	MP865E001G
VG2231VN	4	150	86	MP865C001G	79	MP865D001G	46	MP865E001G
VG2231WN	5	240	55	MP867C001G	51	MP867D001G	29	MP867E001G
VG2231YN	6	350	38	MP867C001G	35	MP867D001G	20	MP867E001G
<b>Two-Way Normally Closed with MP84 Series</b>								
VG2431TM	2-1/2	54	24	MP843C001F	32	MP843D001F	75	MP843E001F
VG2431UM	3	83	17	MP845C001F	22	MP845D001F	52	MP845E001F
VG2431VM	4	150	9	MP845C001F	13	MP845D001F	29	MP845E001F
<b>Two-Way Normally Closed with MP86 Series</b>								
VG2431UN	3	83	34	MP865C001G	46	MP865D001G	105	MP865E001G
VG2431VN	4	150	19	MP865C001G	26	MP865D001G	59	MP865E001G
VG2431WN	5	237	12	MP867C001G	17	MP867D001G	38	MP867E001G
VG2431YN	6	344	9	MP867C001G	11	MP867D001G	26	MP867E001G
<b>Three-Way Mixing with MP84 Series</b>								
VG2831TM	2-1/2	54	65/14	MP843C001F	60/19	MP843D001F	35/45	MP843E001F
VG2831UM	3	80	45/10	MP845C001F	42/13	MP845D001F	24/31	MP845E001F
VG2831VM	4	157	25/6	MP845C001F	23/8	MP845D001F	14/18	MP845E001F
<b>Three-Way Mixing with MP86 Series</b>								
VG2831UN	3	80	91/21	MP865C001G	84/28	MP865D001G	49/63	MP865E001G
VG2831VN	4	157	51/12	MP865C001G	47/16	MP865D001G	27/35	MP865E001G
VG2831WN	5	238	33/7	MP867C001G	23/8	MP867D001G	18/23	MP867E001G
VG2831YN	6	347	23/5	MP867C001G	21/7	MP867D001G	12/16	MP867E001G

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## Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)

### Mounting Kits for Field Mounting MP8000 Series Pneumatic 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.)

### Positioners and Positioner Mounting Kits for MP8000 Series Pneumatic Valve Actuators

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)
	Mounting Kit for EPP-1000-8 Electro-Pneumatic Valve Actuator Positioner (Kit includes all necessary mounting hardware.)	1.5 (0.68)



M9100 Non-Spring Return Actuated VG2000 Valves



M9220 Spring Return Actuated VG2000 Valves

### VG2000 Flanged Globe Valve Bodies/M9100 Series Electric Non-Spring Return Actuators (Part 1 of 2)

Valve Body Code Number	Valve Size in.	Cv	Closeoff psig	Mounting Kit Code Number	Non-Spring Return Actuator Code Numbers			
					Floating Control		0 to 10 VDC Proportional	
					Without Switches	With Two Switches	Without Switches	With Two Switches
<b>Two-Way Push-Down-to-Close</b>								
VG2231TM	2-1/2	51	62	M9000-530	M9116-AGA-2	M9116-AGC-2	M9116-GGA-2	M9116-GGC-2
VG2231TM	2 1/2	51	101		M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2
VG2231UM	3	83	27	M9000-531	M9116-AGA-2	M9116-AGC-2	M9116-GGA-2	M9116-GGC-2
VG2231UM	3	83	43		M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2
VG2231UM	3	83	88	M9000-532	M9124-AGA-2 <sup>1</sup>	M9124-AGC-2 <sup>1</sup>	M9124-GGA-2 <sup>1</sup>	M9124-GGC-2 <sup>1</sup>
VG2231VM	4	150	24	M9000-531	M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2
VG2231VM	4	150	49	M9000-532	M9124-AGA-2 <sup>1</sup>	M9124-AGC-2 <sup>1</sup>	M9124-GGA-2 <sup>1</sup>	M9124-GGC-2 <sup>1</sup>
VG2231WN	5	240	26	M9000-534	M9124-AGA-2 <sup>1</sup>	M9124-AGC-2 <sup>1</sup>	M9124-GGA-2 <sup>1</sup>	M9124-GGC-2 <sup>1</sup>
VG2231YN	6	350	16	M9000-536	M9124-AGA-2 <sup>1</sup>	M9124-AGC-2 <sup>1</sup>	M9124-GGA-2 <sup>1</sup>	M9124-GGC-2 <sup>1</sup>
<b>Three-Way Mixing</b>								
VG2831TM	2-1/2	54	37	M9000-530	M9116-AGA-2	M9116-AGC-2	M9116-GGA-2	M9116-GGC-2
VG2831TM	2-1/2	54	60		M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2
VG2831UM	3	80	16	M9000-531	M9116-AGA-2	M9116-AGC-2	M9116-GGA-2	M9116-GGC-2
VG2831UM	3	80	26		M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2
VG2831UM	3	80	53	M9000-532	M9124-AGA-2 <sup>1</sup>	M9124-AGC-2 <sup>1</sup>	M9124-GGA-2 <sup>1</sup>	M9124-GGC-2 <sup>1</sup>
VG2831VM	4	157	9	M9000-531	M9116-AGA-2	M9116-AGC-2	M9116-GGA-2	M9116-GGC-2
VG2831VM	4	157	14		M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2
VG2831VM	4	157	30	M9000-532	M9124-AGA-2 <sup>1</sup>	M9124-AGC-2 <sup>1</sup>	M9124-GGA-2 <sup>1</sup>	M9124-GGC-2 <sup>1</sup>
VG2831WN	5	238	7	M9000-533	M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2

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## Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)

### VG2000 Flanged Globe Valve Bodies/M9100 Series Electric Non-Spring Return Actuators (Part 2 of 2)

Valve Body Code Number	Valve Size in.	Cv	Closeoff psig	Mounting Kit Code Number	Non-Spring Return Actuator Code Numbers			
					Floating Control		0 to 10 VDC Proportional	
					Without Switches	With Two Switches	Without Switches	With Two Switches
VG2831WN	5	238	15	M9000-534	M9124-AGA-2 <sup>1</sup>	M9124-AGC-2 <sup>1</sup>	M9124-GGA-2 <sup>1</sup>	M9124-GGC-2 <sup>1</sup>
VG2831YN	6	347	4	M9000-535	M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2
VG2831YN	6	347	9	M9000-536	M9124-AGA-2 <sup>1</sup>	M9124-AGC-2 <sup>1</sup>	M9124-GGA-2 <sup>1</sup>	M9124-GGC-2 <sup>1</sup>

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

### Flanged Globe Valve Bodies/M9220 Series Electric Spring Return Actuators

Valve Body Code Number	Valve Size in.	Cv	Closeoff psig	Mounting Kit Code Number	Spring Return Actuator Code Numbers					
					Floating Control		On/Off Control		0 to 10 VDC Proportional	
					Without Switches	With Two Switches	Without Switches	With Two Switches	Without Switches	With Two Switches
<b>Two-Way Push-Down-to-Close<sup>1</sup></b>										
VG2231TM	2-1/2	51	76	M9000-530	M9220-AGA-3	M9220-AGC-3	M9220-BGA-3	M9220-BGC-3	M9220-GGA-3	M9220-GGC-3
VG2231UM	3	83	33	M9000-531	M9220-AGA-3 <sup>2</sup>	M9220-AGC-3 <sup>2</sup>	M9220-BGA-3 <sup>2</sup>	M9220-BGC-3 <sup>2</sup>	M9220-GGA-3 <sup>2</sup>	M9220-GGC-3 <sup>2</sup>
VG2231UM	3	83	66	M9000-532						
VG2231VM	4	150	37	M9000-533						
VG2231WN	5	240	20	M9000-534						
<b>Three-Way Mixing</b>										
VG2831TM	2-1/2	54	45	M9000-530	M9220-AGA-3	M9220-AGC-3	M9220-BGA-3	M9220-BGC-3	M9220-GGA-3	M9220-GGC-3
VG2831UM	3	80	20	M9000-531	M9220-AGA-3 <sup>2</sup>	M9220-AGC-3 <sup>2</sup>	M9220-BGA-3 <sup>2</sup>	M9220-BGC-3 <sup>2</sup>	M9220-GGA-3 <sup>2</sup>	M9220-GGC-3 <sup>2</sup>
VG2831UM	3	80	40	M9000-532						
VG2831VM	4	157	11	M9000-531						
VG2831VN	4	157	22	M9000-532	M9220-AGA-3 <sup>2</sup>	M9220-AGC-3 <sup>2</sup>	M9220-BGA-3 <sup>2</sup>	M9220-BGC-3 <sup>2</sup>	M9220-GGA-3 <sup>2</sup>	M9220-GGC-3 <sup>2</sup>
VG2831WN	5	238	12	M9000-534						
VG2831YN	6	347	7	M9000-536						

1. Actuator can be configured to spring return the valve either open or closed.

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

### Mounting Kits for Field Mounting M9100 and M9220 Series Electric Actuators

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

**Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)**



VA-3100 Actuated Two-Way VG2000 Series Valves



VA-6100 Actuated Three-Way VG200 Series Valves

**Flanged Globe Valve Bodies/VA-3100 Series Electric Non-Spring Return Actuators**

Valve Body Code Number	Valve Size (in.)	Cv	Closeoff psig	Mounting Kit Code Number	Non-Spring Return Actuator Code Numbers		
					Floating without Switches	Floating with Two Switches	0 to 10 VDC Proportional with Two Switches
<b>Two-Way Push-Down-to-Close</b>							
VG2231TM	2-1/2	51	115	VA-3100-500	VA-3100-AGA	VA-3100-AGC	VA-3100-HGC
VG2231UM	3	83	79				
VG2231VM	4	150	45				
VG2231WM	5	240	29	VA-3100-501			
VG2231YN	6	350	20				
<b>Three-Way Mixing</b>							
VG2831TM	2-1/2	54	69	VA-3100-500	VA-3100-AGA	VA-3100-AGC	VA-3100-HGC
VG2831UM	3	80	48				
VG2831VM	4	157	27				
VG2831WM	5	238	17	VA-3100-501			
VG2831YN	6	347	12				

**Flanged Globe Valve Bodies/VA-6100 Series Electric Non-Spring Return Actuators**

Valve Body Code Number	Valve Size (in.)	Cv	Closeoff psig	Mounting Kit Code Number	Non-Spring Return Actuator Code Numbers	
					Floating without Switches	0 to 10 VDC Proportional with Two Switches
<b>Two-Way Push-Down-to-Close</b>						
VG2231VN	4	150	89	VA-3100-501	VA-6100-AGC	VA-6100-HGC
VG2231WM	5	240	57			
VG2231YN	6	350	40			
<b>Three-Way Mixing</b>						
VG2831VM	4	157	54	VA-3100-501	VA-6100-AGC	VA-6100-HGC
VG2831WM	5	238	34			
VG2831YN	6	347	24			

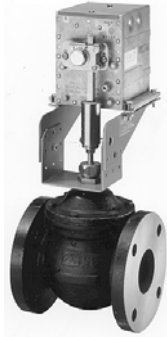
**Mounting Kits for Field Mounting VA-3100 and VA-6100 Series Electric Actuators**

Mounting Kit Code Number	Actuator Series	Valve Size	Stem Type (Diameter)
VA-3100-500	VA-3100	2-1/2 through 4 in.	"M" Stem (3/8 in.)
		5 and 6 in.	"N" Stem (1/2 in.)
VA-3100-501	VA-6100	4 through 6 in.	

**Tool Kit for VA-3100 Series Electric Actuators**

Code Number	Description
VA-3100-101	Auxiliary Switch Cam Adjusting Wrench (Used on VA-3100 Series Electric Actuators – One Wrench is Supplied with Each Actuator)

## Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)



M100 Actuated Two-Way VG2000 Series Valve



M100 Actuated Three-Way VG2000 Series Valve

### VG2000 Flanged Globe Valve Bodies/M100 Series Electric Actuators

Valve Body Code Number	Valve Size (in.)	Cv	Closeoff Pressure (psig)				
			M120 or M130 with Y20EBD-1 Linkage Kit	M120 or M130 with Y20EBD-1 Linkage Kit	M140 with Y20EBD-2 Linkage Kit	M150 with Y20EBD-3 Linkage Kit	M140 with Y20EBD-4 Linkage Kit <sup>1</sup>
<b>Two-Way Push-Down-to-Close</b>							
VG2231TM	2-1/2	51	7 (48)	12 (83)	22 (152)	46 (317)	28 (193)
VG2231UM	3	83	—	7 (48)	14 (96)	31 (214)	18 (124)
VG2231VM	4	150	—	—	6 (41)	16 (110)	9 (62)
<b>Three-Way Mixing</b>							
VG2831TM	2-1/2	54	7 (48)	12 (83)	22 (152)	28 (193)	26 (179)
VG2831UM	3	80	—	7 (48)	14 (96)	19 (131)	18 (124)
VG2831VM	4	157	—	—	6 (41)	11 (76)	9 (62)

1. 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 over travel after valve closeoff for switch operation.

### Available M100 Series Electric Actuators

Description	Actuator Code Numbers			
	Torque			
	35 lb-in	75 lb-in	150 lb-in	50 lb-in
	Non-Spring Return			Spring Return
On/Off (Floating) Control, 120 VAC, Adjustable Travel	M120AAA-1	M140AAA-1	—	—
On/Off (Floating) Control, 120 VAC, Adjustable Travel, One Auxiliary Switch	—	—	—	M130AAB-1
On/Off (Floating) Control, 120 VAC, Adjustable Travel, Two Auxiliary Switches	M120AAC-1	—	—	—
On/Off (Floating) Control, 24 VAC, Adjustable Travel	M120AGA-1	M140AGA-1	M150AGA-1	M130AGA-1
On/Off (Floating) Control, 24 VAC, Adjustable Travel, One Auxiliary Switch	—	—	M150AGB-1	M130AGB-1
Proportional Control, Digital Input (R81CCA-2), 24 VAC, Adjustable Travel	M120CGA-2	M140CGA-2	M150CGA-2	M130CGA-2
DA/RA Analog DC Input (R81GAA-2), 24 VAC, Adjustable Travel	M120GGA-3	M140GGA-3	M150GGA-3	M130GGA-3
Proportional, Potentiometer Input (R81JAA-1), 120 VAC, Adjustable Travel	M120JAA-1	M140JAA-1	—	—
Proportional, Potentiometer Input (R81JAA-1), 120 VAC, Adjustable Travel, Two Auxiliary Switches	M120JAC-1	—	—	—
Proportional, Potentiometer Input (R81JAA-1), 24 VAC, Adjustable Travel	M120JGA-1	M140JGA-1	M150JGA-1	M130JGA-1
Proportional, Potentiometer Input (R81JAA-1), 120 VAC, Adjustable Travel, One Auxiliary Switch	—	—	M150JGB-1	M130JGB-1
Proportional, Potentiometer Input (R81JAA-1), 120 VAC, Adjustable Travel, Two Auxiliary Switches	—	—	M150JGC-1	M130JGC-1
Thermistor Input (R81QAA-1), 40 to 90° Set Point Range, 24 VAC, Adjustable Travel	—	—	M150QGA-1	M130QGA-1
Thermistor Input (R81QAA-1), 40 to 90° Set Point Range, 24 VAC, Adjustable Travel, One Auxiliary Switch	—	—	M150QGB-1	—

## Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)

### Accessories

M100 Series Electric Actuators		
Code Number	Description	Ship Weight lb (kg)
S91DJ-1	Auxiliary Switch Kit with One Single-Pole, Double-Throw Switch	1.8 (0.82)
S91EJ-1	Auxiliary Switch Kit with Two Single-Pole, Double-Throw Switches	1.9 (0.87)
S91PT-1	Auxiliary Potentiometer Switch Kit (1,000 ohms, 1/3 watt)	1.8 (0.82)
CVR83A-600R	Weather Resistant Cover	0.4 (0.18)
Y68AA-1	Cover Mounted Transformer (120 VAC Primary Power Supply, 40 VA Transformer Capacity)	1.9 (0.87)
Y68DA-1	Cover Mounted Transformer (240 VAC Primary Power Supply, 40 VA Transformer Capacity)	1.9 (0.87)
Y68HA-1	Cover Mounted Transformer (24 VAC Primary Power Supply, 40 VA Transformer Capacity - used when an Isolation Transformer is needed))	1.9 (0.87)

### Technical Specifications

VG2000 Series Cast Iron Flanged Globe Valves		
Service <sup>1</sup>		Hot Water, Chilled Water, 50% Glycol Solutions or Steam for HVAC Systems
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 ASME B16.1, 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 <sup>2</sup>	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
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	M91xx Series	-4 to 122°F (-20 to 50°C)
	M9220 Series	-40 to 131°F (-40 to 55°C)
	VA-3100 Series	14 to 140°F (-10 to 60°C) Floating Control 14 to 122°F (-10 to 50°C) Proportional Control
	VA-6100 Series	-4 to 140°F (-20 to 60°C)
	MP8000 Series	-20 to 150°F (-29 to 66°C)

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

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