

VG7000 Series Bronze Control Valves

VG7000 Series Bronze Control Valves are designed primarily to regulate the flow of water and steam in response to the demand of a controller in HVAC systems. These 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: VG7000 Series Bronze Control Valves

Features and Benefits

- | | |
|--|--|
| <p><input type="checkbox"/> Complete Family of 1/2 through 2 in. Bronze Valves, Brass and Stainless Steel Trim, with Several Styles of Electric and Pneumatic Actuators</p> | <p>Offers a broad selection to choose from, including electric spring return actuators, a true 1-1/4 in. valve body, a 3/4 in. valve with small oval top actuator, and Stainless Steel (SS) trim capable of 100 psig saturated steam</p> |
| <p><input type="checkbox"/> Flexible Features and Options Ordering Matrix</p> | <p>Engineer to suit your specific application from thousands of easy-to-select, factory-assembled combinations</p> |
| <p><input type="checkbox"/> Uses Standard Johnson Controls Ring Pack Packings</p> | <p>Provides industry-leading reliability and operating life</p> |
| <p><input type="checkbox"/> Every Valve Tested for Tight Shutoff</p> | <p>Provides energy conservation and ensures occupant comfort</p> |
| <p><input type="checkbox"/> Standard Bonnet and Stem Design</p> | <p>Allows easy field retrofit, easy field mounting, and interchangeability of actuators with the use of standardized mounting kits</p> |

Table 1: Ordering Data — VG7000 Series Bronze Control Valves

V	G	Valve Global												
1	2	7	Product Family 7 = Cast Bronze											
3	2	Body Type 2 = Two-Way, Normally Open/Push-Down-to-Close												
4	4 = Two-Way, Normally Closed/Push-Down-to-Open													
	5 = Two-Way Angle, Normally Open/Push-Down-to-Close													
	8 = Three-Way Mixing													
4	End 4 = Threaded (NPT)													
5	Connections 5 = Union Globe/Union Angle (1/2 through 1-1/2 in. Body Sizes, PDTC Only)													
	7 = Union Sweat, 3/8 in. Tubing (1/2 in. Body Size Only)													
	8 = Union Sweat, Standard Tubing													
	9 = Union Sweat, 3/4 in. Tubing (1/2 in. Body Size Only)													
1	Trim and Flow 1 = Brass Equal Percentage (All Two-Way and 1/2 in. Three-Way)													
6	Characteristics 2 = Brass Linear (Three-Way Only)													
	3 = Stainless Steel Equal Percentage (Two-Way Only)													
	4 = Stainless Steel Linear (Three-Way Only)													
L	Size and Cv (Kv)													
7	C = 1/2 in., 0.73 Cv (0.63 Kv)													
	E = 1/2 in., 1.8 Cv (1.6 Kv)													
	G = 1/2 in., 4.6 Cv (4.0 Kv)													
	L = 3/4 in., 7.3 Cv (6.3 Kv)													
	N = 1 in., 11.6 Cv (10.0 Kv)													
	P = 1-1/4 in., 18.5 Cv (16.0 Kv)													
	R = 1-1/2 in., 28.9 Cv (25.0 Kv)													
	S = 2 in., 46.2 Cv (40.0 Kv)													
T	Stem Type													
8	T = Standard Threaded Stem (All Except V-3801, MP84, VA-8x2x)													
	S = Slotted Stem and Small Bonnet (Factory-Mounted V-3801, VA-8x2x Only)													
	M = Large Threaded Stem (Factory-Mounted MP84 Only)													
+	Actuator Mounting													
9	+ = Factory-Mounted Actuator (See Tables 2 and 3.)													
	(Leave Fields 9 through 15 blank for valve without factory-mounted actuator.)													
	Valve without factory-mounted actuator is available with standard threaded stem only.)													

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

V	G	7	2	4	1	L	T	+							
Valve								+	Actuator						

Example: Cast bronze valve, two-wav, normally open/push-down-to-close, threaded (NPT) end connections, brass trim, equal percentage, 3/4 in., 7.3 Cv, standard threaded stem.

Note: Refer to Table 2 when adding a factory-mounted pneumatic actuator to a valve body. Refer to Table 3 when adding a factory-mounted electric actuator to a valve body. For valid valve and actuator combinations, refer to Tables 16 and 17.

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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	VG7241LT+7150	VA-7150/VA-7200	7150 = VA-7150-1001 On/Off (Floating) 7152 = VA-7152-1001 Proportional, 0-10 VDC 7153 = VA-7153-1001 On/Off (Floating), Feedback 7200 = VA-7200-1001 On/Off (Floating) 7202 = VA-7202-1001 Proportional, 0-10 VDC 7203 = VA-7203-1001 On/Off (Floating), Feedback	(Available for PDTC Two-Way and Three-Way Body Styles Only)
															G	Voltage	G = 24 VAC	
																Accessories	Blank = None	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	423	VA-4233	Spring Return Up	
																Electric Actuator	423 = VA-4233-xGx-2, 24 VAC/VDC	
															AGA	Features	AGA = Floating AGC = Floating, 2 Aux. Sw. BGA = On/Off BGC = On/Off, 2 Aux. Sw. GGA = Prop., 0-10 VDC, Feedback GGC = Prop., 0-10 VDC, Feedback, 2 Aux. Sw.	(Available for NPT Threaded and Union Sweat End Connections Only)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	926	M9116/M9216	Non-Spring Return	
																Electric Actuator	916 = M9116-xxx-2, 24 VAC/VDC 926 = M9216-xxx-2, Spring-to-Open (Up), 24 VAC/VDC 946 = M9216-xxx-2, Spring-to-Close (Down), 24 VAC/VDC	(Available for PDTC Two-Way and Three-Way Body Styles Only)
															AGA	Features	AGA = On/Off (Floating) AGC = On/Off (Floating), 2 Aux. Sw. GGA = Prop., 0-10 VDC, Feedback GGC = Prop., 0-10 VDC, Feedback, 2 Aux. Sw. HGA = Prop., 0-10 VDC, Feedback HGC = Prop., 0-10 VDC, Feedback, 2 Aux. Sw.	(M9116 Only) (M9216 Only)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	8020	VA-8x2x	8020 = VA-8020-1, On/Off (Floating) 8122 = VA-8122-1, Proportional	(Available for PDTC Two-Way and Three-Way Body Styles Only)
															G	Voltage	G = 24 VAC	
																Accessories	Blank = None	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	VG7241LT+8020G	Valve + Actuator	<i>Example: Cast bronze valve, two-way, push-down-to-close, threaded (NPT) end connections, brass trim, equal percentage, 3/4 in., 7.3 Cv, standard threaded stem, VA-8020-1 On/Off (Floating) Electric Actuator, 24 VAC supply.</i>	

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 valve and actuator combinations, refer to Tables 16 and 17.

Application Overview

VG7000 Series Bronze Control Valves feature brass and stainless steel trim, and are available in two-way configurations with Push-Down-to-Close (PDTC – normally open if pneumatic or spring return) or Push-Down-to-Open (PDTO – normally closed if pneumatic or spring return) with threaded (NPT), union sweat, union globe, and union angle end connections. The valve can be ordered with a variety of pneumatic actuators: V-3000-8011 (exposed, with or without a factory-mounted positioner), V-3000-8003 (enclosed), V-3801-8001 (oval top), and higher force MP8000 Series Actuators (with or without a factory-mounted pneumatic positioner).

VG7000 Series Valves can also be ordered with any of the following series electric actuators: VA-4233, VA-7150, VA-7200, VA-8x2x, M9116, or M9216. 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, and 3 for ordering data and additional details. For valid valve and actuator combinations, refer to Tables 16 and 17. For Buy American requirements, refer to Table 18 for available combinations.

The modulating valve plug of VG7000 Series Valves provides an equal percentage flow characteristic for two-way valves, and equal percentage or linear for three-way valves. Tight shutoff is ensured using a molded elastomeric disk in valves with brass trim, and a precisely machined metal-to-metal seat for valves with stainless steel trim. An arrow is cast on one side of the valve body indicating the direction of flow for proper piping.

Pneumatic Actuator Selection (See Tables 8, 10, 11, 16, 17, and 18.)

Notes: The V-3000-8011, V-3000-8003, and V-3801-8001 Pneumatic Actuators should not be confused with the V-3000-1, V-3000-2, and V-3802-1 Pneumatic Actuators.

Refer to the *V-3000-8011 (Exposed) and V-3000-8003 (Enclosed) Pneumatic Valve Actuator Product/Technical Bulletin (LIT-977252)* in the *Valve and Actuator Manual (FAN 977)* for specifics regarding interchangeability.

The V-3801-8001 is not a direct replacement for the V-3802-1, since V-3802-1 is not compatible with VG7000 Series Valves.

V-3801-8001 Pneumatic Actuator

The V-3801-8001 is a low force, oval top actuator designed specifically for 1/2 and 3/4 in. valves where mounting space is restricted. The V-3801-8001 has sufficient force to handle most seating pressures, and the molded diaphragm design provides a constant effective area (4 sq in.) throughout the valve stem stroke. Due to the simplicity of the design, it is more economical to replace the actuator than repair it. The actuator assembly can be removed or repositioned by loosening a single set screw without disturbing the rest of the valve assembly.

Because the V-3801-8001 uses a unique slotted valve stem for factory assembly (refer to the *Stem Type* section in Table 1), the spring kits available are for field mounting to standard threaded stem valves. Refer to Table 8 for mounting kit code numbers.

V-3000-8011 Pneumatic Actuator

The V-3000-8011 is a versatile, medium-force pneumatic actuator that can be used in most HVAC applications, including sequential control of valves. Refer to Tables 10 and 11 for actuator sizing and selection.

The permanently captured, molded rolling diaphragm of the V-3000-8011 provides a constant effective area (8 sq in.) throughout the valve stem stroke. Like the V-3801-8001, it is more economical to replace the actuator than to repair it due to the simplicity of the design. The actuator assembly can be removed or repositioned by loosening a single set screw without disturbing the rest of the valve assembly.

The V-9502 Pneumatic Positioner is also available for factory or field mounting to the V-3000-8011.

V-3000-8003 Pneumatic Actuator

The V-3000-8003, operationally similar to the V-3000-8011, is designed for enclosed installation in a location where the actuator might be subjected to tampering. Unlike the V-3000-8011, this model has a replaceable molded diaphragm design.

MP8000 Series Pneumatic Actuators

The higher force MP82 (25 sq in. effective diaphragm area) and MP84 (50 sq in. effective diaphragm area) Pneumatic Actuators are used where higher maximum closeoff pressures are required, such as 1-1/2 and 2 in. brass trim valves and 1/2 through 2 in. stainless steel trim valves.

These actuators 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. The MP8000 Actuators are available factory mounted or are easily field mounted to VG7000 Series Valves. Refer to Table 8 for the appropriate mounting kit.

The MP8000 Actuators are designed to allow for reversing the action of the actuators in the field. If desired, the action of the MP8000 on Normally Open (N.O.) valves can be reversed from spring-return-up to spring-return-down or vice versa. To field reverse the actuator, refer to the *MP8000 Pneumatic Valve Actuators Technical Bulletin (LIT-977258)* found in the *Valve and Actuator Manual (FAN 977)*.

The V-9502 Pneumatic Positioner is also available for factory or field mounting to MP8000 Series Pneumatic Valve Actuators.

T-3000 Valve Top Thermostat Actuators

The T-3111 and T-3311 Series Valve Top Thermostat Actuators are available for field mounting to all VG7000 Series Valves (N.O., N.C., and three-way). The valve top thermostats are a combination of a pneumatic thermostat and a pneumatic valve actuator. The T-3111 and T-3311 are available in both direct and reverse acting models with various features and options. Refer to the *T-3111 Integral Thermostat and Piston Top Valve Actuator Single Temperature, Single Pressure Product/Technical Bulletin (LIT-7171137)* and the *T-3311 Integral Thermostat and Piston Top Valve Actuator Dual Temperature, Dual Pressure Product/Technical Bulletin (LIT-7171152)* found in the *Pneumatic Control Manual (FAN 717.1)* for specifications and ordering information.

Note: A mounting kit is required to field mount T-3111 or T-3311 Valve Top Thermostats to a valve. Refer to Table 8 for the appropriate mounting kit code number.

Electric Actuator Selection

Factory-mounted electric actuators are available on two-way PDTTC and three-way mixing valve configurations only. Actuators can be easily field reversed if required. The actuators can be field mounted on PDTTO valves if desired. All proportional electric actuator assemblies are factory calibrated for nominal 0 to 10 VDC operation, to drive down with an increase in signal. The VA-4233 is available on all valve styles: PDTTO, PDTTC, and three-way.

VA-4233 Series Electric Actuators

The VA-4233 Series Electric Actuators use a stepper motor to accurately position the valve. In the event of a power failure, a spring in the actuator automatically returns the valve to the full stem-up position. These direct-mount, spring return electric actuators provide a minimum 61 lb force output for floating, on/off, or proportional control, and can be factory mounted to 1/2 through 1-1/4 in. valve bodies with NPT (threaded) and union sweat end connections.

Integral auxiliary switches are available for indicating end stop position or to perform switching functions. On proportional models, position feedback is also available through a proportional DC voltage signal. All models feature a hand crank for manual positioning of the valve, independent of a power supply.

VA-7150 Series Electric Actuators

The VA-7150 Series Actuators use a reversible synchronous motor and magnetic clutch to accurately position the valve. This non-spring return actuator has a 90 lb force output. The magnetic clutch maintains a constant load at the end of travel, ensuring tight valve shutoff and automatically compensating for seat wear.

This actuator is available in three models: floating three-wire (VA-7150), floating with 0 to 2000 ohm feedback (VA-7153), or 0 to 10 VDC proportional control (VA-7152).

VA-7200 Series Electric Actuators

The VA-7200 Series Actuators use a reversible synchronous motor and a magnetic clutch to accurately position the valve. This non-spring return actuator has a 180 lb force output. The magnetic clutch maintains a constant load at the end of travel, which ensures tight shutoff and automatically compensates for seat wear. This actuator is available in three models: floating three-wire (VA-7200), floating with 0 to 2000 ohm feedback (VA-7203), or 0 to 10 VDC (0 to 20 mA) proportional control (VA-7202).

VA-8x2x Series Electric Actuators

The VA-8x2x Series Actuators are synchronous motor-driven, force sensor limited, non-spring return actuators that feature a 22 lb seating force in a compact design. The VA-8020 accepts floating control from a three-wire, 24 VAC control signal. The VA-8122 typically accepts proportional control from a 0 to 10 VDC control signal; however, it can be field adjusted to accept signals up to 20 VDC. In addition, the VA-8122 features an input signal reversing feature that allows it to be used in both heating and cooling applications.

Note: The VA-8x2x is only available factory mounted on 1/2 and 3/4 in. valves. Because the VA-8x2x requires a unique slotted valve stem for factory assembly, it is necessary to select the "S" option in the *Stem Type* section of Table 1.

M9116 Series Electric Actuators

The M9116 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 M9000-500 Valve Mounting, the rotary motion of this actuator is converted into linear motion that will operate 1/2 through 2 in. VG7000 Series Valves. The actuator and mounting deliver a minimum stem force of 180 lb in both directions. A compression spring on the output shaft of the mounting automatically compensates for seat wear. Integral auxiliary switches are available for indicating end stop position or to perform switching functions. Position feedback is available via switches, a potentiometer, or a 0 (2) to 10 VDC signal.

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 M9000-500 Valve Mounting, the rotary motion of this actuator is converted into linear motion that will operate 1/2 through 2 in. VG7000 Series Valves.

The actuator and mounting deliver a minimum stem force of 180 lb in both directions. A compression spring on the output shaft of the mounting automatically compensates for seat wear. Integral auxiliary switches are available for indicating end stop position or to perform switching functions. Position feedback is available via switches, a potentiometer, or a 0 (2) to 10 VDC signal.

M100 Series Electric Actuators

The M100 Series is a rotary actuator used to position valves in HVAC and industrial applications. When coupled with a VG7000-M1x0 Series Valve Mounting Kit, the rotary motion of the M100 Series Actuator is converted to linear movement. The mounting kit includes an overtravel spring, which determines the maximum seating pressure in conjunction with actuator selection.

The M110, M120, M130, M140, and M150 Actuators are only available for field mounting to VG7000 Series Valves. Refer to Table 4 for ordering information and additional details. Kits are available to field mount all M100 models; refer to Tables 4, 7, and 9 for detailed information.

Table 4: M100 Actuator Mounting Kits

Actuator	Seating Force (lb)	Mounting Kit
M110	40	VG7000-M110
M120/M130	100	VG7000-M130
M140	150	VG7000-M140
M150	270	VG7000-M150

The M120, M140, and M150 are non-spring return actuators that will hold their position when de-energized. The M110 and M130 are spring return actuators that return the valve to its normal operating position when the power is disconnected. A braking mechanism keeps the return spring from driving the motor actuator toward its return position during normal reversible operation. The gear train and motor are housed in an oil-filled compartment designed for extended life.

The M100 provides the appropriate interface for a variety of electronic controllers through selection of factory-installed circuit boards. The M100 Series Actuator is compatible with all Johnson Controls controllers. The M100 can provide proportional, floating, potentiometer, or on/off control, as well as control by direct digital input from zone bus controllers. The M100 Actuator requires a 24 VAC, 50/60 Hz power supply; however, transformer options are available.

The actuator can be mounted for stem-up or stem-down operation. On three-way valves, the seating force can be applied on both the up and the down stroke.

Table 5: Shipping Weights for Brass Trim Valves

Actuator	Valve Size, in.					
	1/2	3/4	1	1-1/4	1-1/2	2
V-3801-8001	2.5	3.1	---	---	---	---
V-3000-8011	3.1	4.2	6.2	6.1	11.8	16.9
V-3000-8003	3.2	4.3	6.3	6.2	11.9	17.0
MP82	---	---	14.0	16.0	19.0	24.0
MP84	---	---	---	---	---	---
VA-4233	5.3	6.4	8.4	8.3	---	---
VA-7150	3.9	5.0	7.0	6.9	12.6	17.7
VA-7200	---	---	7.5	7.4	13.1	18.2
VA-8x2x	4.6	5.9	---	---	---	---
M9116	5.1	6.2	8.2	8.1	13.8	18.9
M9216	8.6	9.7	11.7	11.6	17.3	22.4

Note: Weights are approximate and based on the heaviest valve. Add 2 lb (0.9 kg) for pneumatic assemblies with a positioner.

Table 6: Shipping Weights for Stainless Steel Trim Valves

Actuator	Valve Size, in.					
	1/2	3/4	1	1-1/4	1-1/2	2
V-3000-8011	3.4	4.2	6.6	8.6	---	---
V-3000-8003	3.5	4.2	6.7	8.7	---	---
MP82	11.0	12.0	14.0	16.0	19.0	24.0
MP84	---	---	---	---	32.0	37.0
VA-4233	5.3	5.6	8.0	10.0	---	---
VA-7150	3.9	4.2	6.6	8.6	12.6	17.7
VA-7200	4.7	5.5	7.9	9.9	13.1	18.2
M9116	5.1	6.2	8.6	10.6	13.8	18.9
M9216	8.6	9.7	12.1	14.1	17.3	22.4

Note: Weights are approximate and based on the heaviest valve. Add 2 lb (0.9 kg) for pneumatic assemblies with a positioner.

Mounting Kits

The Y20EBE-11 Valve Mounting Adaptor Kit is designed to adapt current Y20EBD-x Mounting Kits to field mount M100 Series Actuators on VG7000 Series Valves. Refer to Table 7 for the appropriate mounting kit code number.

Field Mounting

A standard bonnet/stem design allows for easy field mounting of actuators. Refer to Table 1 to order valves without actuators, Tables 7, 8, and 9 to order the appropriate mounting kits, and Tables 16 and 17 to identify compatible actuators. Refer to the appropriate actuator product bulletin for specific actuator code number information.

Table 7: M100 Mounting Kits (Includes Linkage and Adaptor)

Mounting Kit	Adaptor Kit	Mounting Kit Code Number
Y20EBD-2	Y20EBE-11	VG7000-M140
Y20EBD-3	Y20EBE-11	VG7000-M150
Y20EBD-5	Y20EBE-11	VG7000-M110
Y20EBD-6	Y20EBE-11	VG7000-M130

Table 8: Field Mounting Kits for Pneumatic Actuators

Actuator Style	Valve Size in. (DN) ⁽¹⁾	Spring Range psig (kPa)	Mounting Kit Code Number
T-3x11 V-3000-8011 V-3000-8003	1/2 or 3/4 (DN15 or DN20) 5/16 in. (8 mm) Stroke	3 to 6 (21 to 41)	VG7000-1001 ⁽²⁾
		4 to 8 (28 to 55)	VG7000-1002 ⁽²⁾
		9 to 13 (62 to 90)	VG7000-1003 ⁽²⁾
T-3x11 V-3000-8011 V-3000-8003	1 or 1-1/4 (DN25 or DN32) 1/2 in. (13 mm) Stroke	3 to 6 (21 to 41)	VG7000-1004 ⁽²⁾
		4 to 8 (28 to 55)	VG7000-1005 ⁽²⁾
		9 to 13 (62 to 90)	VG7000-1006 ⁽²⁾
T-3x11 V-3000-8011 V-3000-8003	1-1/2 or 2 (DN40 or DN50) 3/4 in. (19 mm) Stroke	3 to 6 (21 to 41)	VG7000-1007 ⁽²⁾
		4 to 8 (28 to 55)	VG7000-1008 ⁽²⁾
		9 to 13 (62 to 90)	VG7000-1009 ⁽²⁾
V-3801-8001	1/2 or 3/4 (DN15 or DN20) 5/16 in. (8 mm) Stroke	3 to 6 (21 to 41)	VG7000-1010 ⁽²⁾
		4 to 8 (28 to 55)	VG7000-1011 ⁽²⁾
		9 to 13 (62 to 90)	VG7000-1012 ⁽²⁾
V-3801-8001	1/2 or 3/4 (DN15 or DN20) 5/16 in. (8 mm) Stroke	Kit with Three Springs: 3 to 6, 4 to 8, and 9 to 13 (Includes hardware to adapt one valve only.)	VG7000-1015 ⁽²⁾
MP82/MP83	1/2 or 3/4 (DN15 or DN20) with Stainless Steel Trim	Not Applicable	MP8000-6701 ⁽³⁾
MP82/MP83	1 through 2 (DN25 through DN50) with 1/4 in. Stem and Stainless Steel or Brass Trim	Not Applicable	MP8000-6702 ⁽³⁾
MP84/MP85	1-1/2 through 2 (DN40 through DN50) with 3/8 in. Stem and Stainless Steel Trim	Not Applicable	MP8000-6703 ⁽⁴⁾

⁽¹⁾ DN is the European designation for body size in metric units (mm).

⁽²⁾ The mounting kits include: upper spring seat, spring, stem extension, stem locking screw (or set screw), and a bonnet adaptor for the V-3801-8001.

⁽³⁾ The mounting kits include: stem nut (1), stem extender nuts (2), stem extender (1), and yoke nut (1).

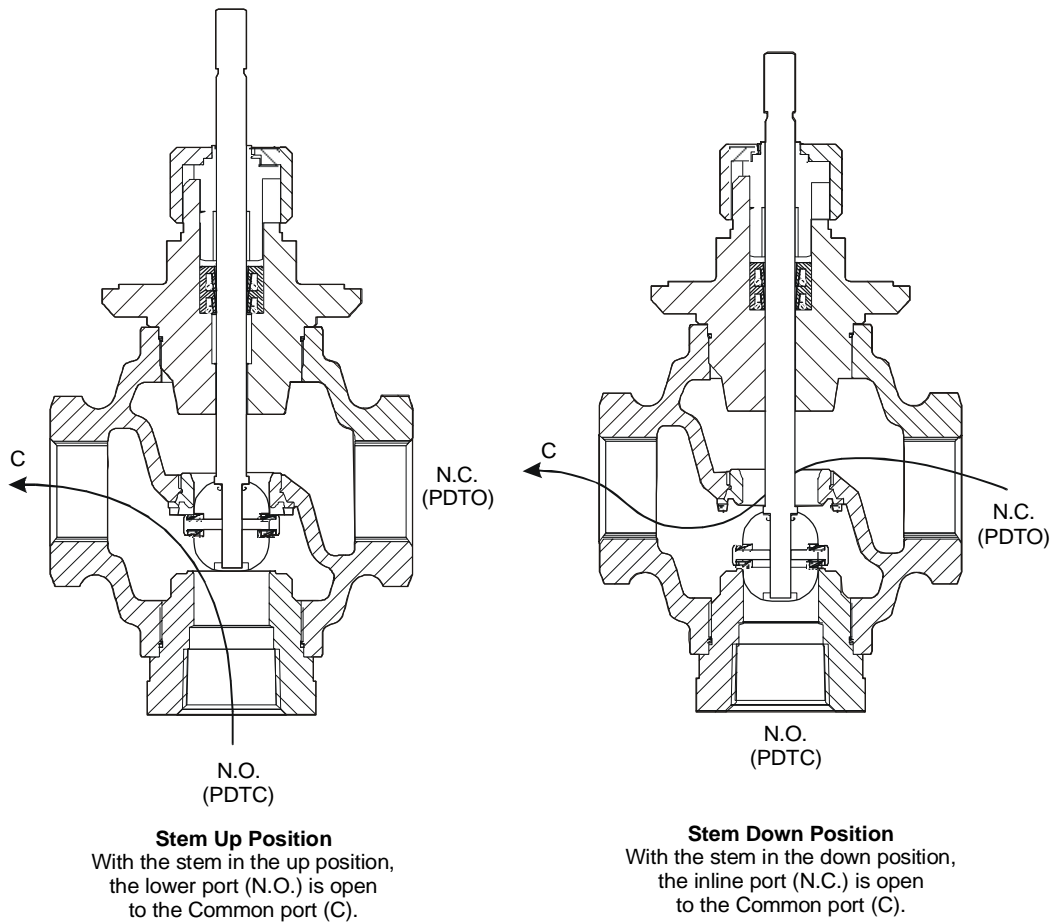
⁽⁴⁾ The mounting kit includes: stem nuts (2) and yoke nut (1).

Note: All mounting kits are for use with valves with standard threaded stem design only.

Table 9: Field Mounting Kits for Electric Actuators

Actuator Style	Valve Size, in. (DN)	Mounting Kit Code Number
M110	1/2 through 2 (DN15 through DN50)	VG7000-M110
M120/M130	1/2 through 2 (DN15 through DN50)	VG7000-M130
M140	1/2 through 2 (DN15 through DN50)	VG7000-M140
M150	1/2 through 2 (DN15 through DN50)	VG7000-M150
VA-4233	1/2 through 1-1/4 in. (DN15 through DN32)	None Required
VA-715x	1/2 through 2 (DN15 through DN50)	None Required
VA-720x	1 through 2 (DN25 through DN50)	None Required
VA-8x2x	Not available for field mounting.	
M9x16	1/2 through 2 (DN15 through DN50)	M9000-500

Note: All mounting kits are for use with valves with standard threaded stem design only.



**Figure 2: Three-Way Mixing Valves
 Fluid Flow Direction and Port Designation**

Table 10: Brass Trim – Maximum Closeoff Pressures, psig (kPa) for Pneumatically Actuated Valves

Actuator Style	Valve Size in. (DN) Brass Trim	Maximum Cv (Kv) Factor	Two-Way Normally Open or Three-Way N.O. Port (With 20 psig Supply) Spring Range (psig) ⁽¹⁾			Two-Way Normally Closed or Three-Way N.C. Port (With 0 psig Supply) Spring Range (psig) ⁽¹⁾		
			3 to 6 ⁽²⁾ (21 to 41)	4 to 8 (28 to 55)	9 to 13 (62 to 90)	3 to 6 ⁽²⁾ (21 to 41)	4 to 8 (28 to 55)	9 to 13 (62 to 90)
V-3801-8001 (248°F [120°C]) ⁽³⁾	1/2 (DN15)	0.73 (0.63)	186 (1,282)	157 (1,082)	84 (579)	37 (255)	57 (393)	158 (1,089)
	1/2 (DN15)	1.8 (1.6)	186 (1,282)	157 (1,082)	84 (579)	37 (255)	57 (393)	158 (1,089)
	1/2 (DN15)	4.6 (4.0)	105 (723)	89 (613)	48 (331)	18 (124)	28 (193)	76 (524)
	3/4 (DN20)	7.3 (6.3)	67 (462)	56 (386)	30 (207)	11 (76)	16 (110)	45 (310)
V-3000-8011 (284°F [140°C]) and V-3000-8003 (248°F [120°C]) ⁽³⁾	1/2 (DN15)	0.73 (0.63)	365 (2,515)	339 (2,336)	191 (1,316)	100 (689)	142 (978)	348 (2,398)
	1/2 (DN15)	1.8 (1.6)	365 (2,515)	339 (2,336)	191 (1,316)	100 (689)	142 (978)	348 (2,398)
	1/2 (DN15)	4.6 (4.0)	225 (1,550)	192 (1,323)	108 (744)	49 (338)	68 (469)	168 (1,158)
	3/4 (DN20)	7.3 (6.3)	144 (992)	122 (841)	69 (475)	29 (200)	41 (282)	100 (689)
	1 (DN25)	11.6 (10)	90 (620)	76 (524)	42 (289)	17 (117)	25 (172)	65 (448)
	1-1/4 (DN32)	18.5 (16)	55 (379)	47 (324)	26 (179)	10 (69)	14 (96)	37 (255)
	1-1/2 (DN40)	28.9 (25)	35 (241)	30 (207)	16 (110)	6 (41)	9 (62)	23 (158)
2 (DN50)	46.2 (40)	22 (152)	19 (131)	11 (76)	4 (28)	6 (41)	14 (96)	
MP82 (284°F [140°C]) ⁽³⁾	1 (DN25)	11.6 (10)	279 (1,924)	257 (1,772)	148 (1,020)	70 (483)	96 (662)	223 (1,536)
	1-1/4 (DN32)	18.5 (16)	170 (1,172)	157 (1,082)	90 (621)	40 (276)	55 (379)	128 (883)
	1-1/2 (DN40)	28.9 (25)	109 (752)	100 (689)	58 (400)	25 (172)	34 (234)	79 (545)
	2 (DN50)	46.2 (40)	70 (483)	64 (441)	37 (255)	16 (110)	21 (145)	50 (345)

⁽¹⁾ The recommended spring ranges for use with a V-9502 Positioner are: 3 to 6 psig (21 to 41 kPa) and 3 to 7 psig (21 to 48 kPa) for N.O. valves, 9 to 13 psig (62 to 90 kPa) for N.C. valves, and 4 to 8 psig (28 to 55 kPa) for three-way valves.

⁽²⁾ 3 to 7 psig (21 to 48 kPa) for MP82 Actuators.

⁽³⁾ The maximum valve fluid temperature is as follows:

Actuator Style	Water	Saturated Steam
V-3801-8001	248°F (120°C)	15 psig (103 kPa)
V-3000-8011	284°F (140°C)	38 psig (262 kPa)
V-3000-8003	248°F (120°C)	15 psig (103 kPa)
MP82	284°F (140°C)	38 psig (262 kPa)

Table 11: Stainless Steel Trim – Maximum Closeoff Pressure, psig (kPa) for Pneumatically Actuated Valves

Actuator Style	Valve Size, in. (DN) SS Trim	Maximum Cv (Kv) Factor	Two-Way Normally Open or Three-Way N.O. Port (With 20 psig Supply)			Two-Way Normally Closed or Three-Way N.C. Port (With 0 psig Supply)		
			Spring Range (psig) ⁽¹⁾			Spring Range (psig) ⁽¹⁾		
			3 to 6 ⁽²⁾ (21 to 41)	4 to 8 (28 to 55)	9 to 13 (62 to 90)	3 to 6 ⁽²⁾ (21 to 41)	4 to 8 (28 to 55)	9 to 13 (62 to 90)
V-3000-8011 and V-3000-8003 (338°F [170°C])⁽³⁾	1/2(DN15)	0.73 (0.63)	299 (2,060)	255 (1,757)	143 (985)	75 (517)	106 (730)	261 (1,798)
	1/2 (DN15)	1.8 (1.6)	299 (2,060)	255 (1,757)	143 (985)	75 (517)	106 (730)	261 (1,798)
	1/2 (DN15)	4.6 (4.0)	169 (1,164)	144 (992)	81 (558)	36 (248)	51 (351)	126 (868)
	3/4 (DN20)	7.3 (6.3)	108 (744)	92 (634)	52 (358)	22 (152)	31 (214)	75 (517)
	1 (DN25)	11.6 (10)	67 (462)	57 (393)	32 (220)	13 (90)	19 (131)	49 (338)
	1-1/4 (DN32)	18.5 (16)	41 (282)	35 (241)	19 (131)	7 (48)	11 (76)	28 (193)
MP82 (338°F [170°C])⁽³⁾	1/2 (DN15)	0.73 (0.63)	308 (2,124)	308 (2,124)	308 (2,124)	280 (1,929)	308 (2,124)	308 (2,124)
	1/2 (DN15)	1.8 (1.6)	308 (2,124)	308 (2,124)	308 (2,124)	280 (1,929)	308 (2,124)	308 (2,124)
	1/2 (DN15)	4.6 (4.0)	308 (2,124)	308 (2,124)	275 (1,895)	135 (930)	183 (1,261)	308 (2,124)
	3/4 (DN20)	7.3 (6.3)	308 (2,124)	304 (2,095)	175 (1,206)	81 (558)	109 (751)	252 (136)
	1 (DN25)	11.6 (10)	209 (1,440)	193 (1,330)	111 (765)	53 (365)	72 (496)	168 (1,158)
	1-1/4 (DN32)	18.5 (16)	128 (882)	118 (813)	68 (469)	30 (207)	41 (282)	96 (661)
	1-1/2 (DN40)	28.9 (25)	82 (565)	75 (517)	43 (296)	19 (131)	25 (172)	59 (407)
	2 (DN50)	46.2 (40)	52 (358)	48 (331)	28 (193)	12 (83)	16 (110)	37 (255)
MP84 (338°F [170°C])⁽³⁾	1-1/2 (DN40)	28.9 (25)	165 (1,137)	152 (1,047)	88 (606)	39 (269)	53 (365)	121 (834)
	2 (DN50)	46.2 (40)	106 (730)	97 (668)	56 (386)	24 (154)	33 (227)	76 (524)

⁽¹⁾ The recommended ranges for use with a V-9502 Positioner are: 3 to 6 psig (21 to 41 kPa) and 3 to 7 psig (21 to 48 kPa) for N.O. valves, 9 to 13 psig (62 to 90 kPa) for N.C. valves, and 4 to 8 psig (28 to 55 kPa) for three-way valves.

⁽²⁾ 3 to 7 psig (21 to 48 kPa) for MP82 and MP84 Actuators.

⁽³⁾ The maximum closeoff pressure listed is limited to the maximum allowable ANSI valve body rating corresponding to the maximum temperature rating (308 psig [2,122 kPa] at 338°F [170°C]) of the valve.

Table 12: Brass Trim – Maximum Closeoff Pressures, psig (kPa) for PDTC Two-Way and PDTC Port for Three-Way Electrically Actuated Valves

284°F (140°C) Maximum Fluid Temperature*								
Valve Size, in. (DN)	1/2 (DN15)	1/2 (DN15)	1/2 (DN15)	3/4 (DN20)	1 (DN25)	1-1/4 (DN32)	1-1/2 (DN40)	2 (DN50)
Maximum Cv (Kv) Factor	0.73 (0.63)	1.8 (1.6)	4.6 (4.0)	7.3 (6.3)	11.6 (10.0)	18.5 (16.0)	28.9 (25.0)	46.2 (40.0)
VA-715x	345 (2,377)	345 (2,377)	216 (1,488)	138 (951)	86 (593)	52 (358)	34 (234)	21 (145)
VA-720x	---	---	---	---	179 (1,233)	109 (751)	70 (482)	45 (310)
VA-4233	345 (2,377)	345 (2,377)	208 (1,433)	132 (909)	63 (434)	38 (262)	---	---
M9x16	345 (2,377)	345 (2,377)	345 (2,377)	289 (1,991)	182 (1,254)	111 (765)	71 (489)	46 (317)
M110**	144 (992)	144 (992)	82 (565)	52 (358)	31 (214)	19 (131)	12 (83)	8 (55)
M120 and M130**	345 (2,377)	345 (2,377)	221 (1,523)	141 (971)	88 (606)	54 (372)	34 (234)	22 (152)
M140**	345 (2,377)	345 (2,377)	337 (2,322)	215 (1,481)	135 (930)	82 (565)	53 (365)	34 (234)
M150**	345 (2,377)	345 (2,377)	345 (2,377)	392 (2,701)	248 (1,709)	152 (1,047)	97 (668)	62 (427)
VA-8x2x	112 (772)	80 (551)	45 (310)	29 (200)	---	---	---	---

* The maximum fluid temperature is 284°F (140°C) water to 38 psig (262 kPa) saturated steam except for the following:
 VA-4233 Actuators are limited to 35 to 250°F (2 to 121°C) water to 15 psig (103 kPa) saturated steam.
 VA-8x2x Actuators are limited to 195°F (91°C) water, and **are not rated** for steam applications.

** The M110, M120, M130, M140, and M150 Actuators are not available factory coupled to the valve body. The maximum closeoff pressure values are provided because these actuators can be field mounted to the VG7000 valve body using the mounting kits listed in Tables 7 and 9.

Notes: The maximum closeoff pressure listed is limited to the maximum allowable ANSI valve body rating corresponding to the maximum temperature rating (345 psig [2,377 kPa] at 281°F [138°C]) of the valve, except for VA-8x2x Actuators that are limited to 195°F (91°C) maximum temperature and 381 psig (2,625 kPa) pressure rating.

The maximum closeoff pressures listed are for actuators coupled to the appropriate mounting kits listed in Tables 7 and 9. Refer to Tables 16 and 17 for valid factory-mounted combinations, and Tables 7 and 9 for available field mounting kits.

Table 13: Brass Trim – Maximum Closeoff Pressures, psig (kPa) for PDTO Two-Way and PDTO Port for Three-Way Electrically Actuated Valves

Not Available Factory Coupled for PDTO Two-Way — Field Mounting Only 284°F (140°C) Maximum Fluid Temperature*								
Valve Size, in. (DN)	1/2 (DN15)	1/2 (DN15)	1/2 (DN15)	3/4 (DN20)	1 (DN25)	1-1/4 (DN32)	1-1/2 (DN40)	2 (DN50)
Maximum Cv (Kv) Factor	0.73 (0.63)	1.8 (1.6)	4.6 (4.0)	7.3 (6.3)	11.6 (10.0)	18.5 (16.0)	28.9 (25.0)	46.2 (40.0)
VA-715x	345 (2,377)	345 (2,377)	257 (1,171)	153 (1,054)	100 (690)	57 (393)	36 (248)	22 (152)
VA-720x	---	---	---	---	209 (1,440)	120 (827)	74 (510)	46 (317)
VA-4233	345 (2,377)	345 (2,377)	173 (1,192)	103 (710)	66 (455)	38 (262)	---	---
M9x16	345 (2,377)	345 (2,377)	345 (2,377)	321 (2,212)	213 (1,468)	122 (841)	76 (524)	47 (324)
M110**	200 (1,378)	200 (1,378)	97 (668)	58 (400)	36 (248)	21 (145)	13 (90)	8 (55)
M120 and M130**	345 (2,377)	345 (2,377)	262 (1,805)	156 (1,075)	103 (710)	59 (407)	36 (248)	23 (158)
M140**	345 (2,377)	345 (2,377)	345 (2,377)	239 (1,647)	158 (1,089)	90 (620)	56 (386)	35 (241)
M150**	345 (2,377)	345 (2,377)	345 (2,377)	345 (2,377)	291 (2,005)	167 (1,151)	103 (710)	64 (441)
VA-8x2x	345 (2,377)	112 (772)	54 (372)	32 (220)	---	---	---	---

* The maximum fluid temperature is 284°F (140°C) water to 38 psig (262 kPa) saturated steam except for the following:
 VA-4233 Actuators are limited to 35 to 250°F (2 to 121°C) water to 15 psig (103 kPa) saturated steam.
 VA-8x2x Actuators are limited to 195°F (91°C) water, and **are not rated** for steam applications.

** The M110, M120, M130, M140, and M150 Actuators are not available factory coupled to the valve body. The maximum closeoff pressure values are provided because these actuators can be field mounted to the VG7000 valve body using the mounting kits listed in Tables 7 and 9.

Notes: The maximum closeoff pressure listed is limited to the maximum allowable ANSI valve body rating corresponding to the maximum temperature rating (345 psig [2,377 kPa] at 281°F [138°C]) of the valve, except for VA-8x2x Actuators that are limited to 195°F (91°C) maximum temperature and 381 psig (2,625 kPa) pressure rating.

The maximum closeoff pressures listed are for actuators coupled to the appropriate mounting kits listed in Tables 7 and 9. Refer to Tables 16 and 17 for valid factory-mounted combinations, and Tables 7 and 9 for available field mounting kits.

Table 14: Stainless Steel Trim – Maximum Closeoff Pressures, psig (kPa) for PDTC Two-Way and PDTC Port for Three-Way Electrically Actuated Valves

338°F (170°C) Maximum Fluid Temperature*								
Valve Size, in. (DN)	1/2 (DN15)	1/2 (DN15)	1/2 (DN15)	3/4 (DN20)	1 (DN25)	1-1/4 (DN32)	1-1/2 (DN40)	2 (DN50)
Maximum Cv (Kv) Factor	0.73 (0.63)	1.8 (1.6)	4.6 (4.0)	7.3 (6.3)	11.6 (10.0)	18.5 (16.0)	28.9 (25.0)	46.2 (40.0)
VA-715x	239 (1,647)	239 (1,647)	135 (930)	86 (593)	54 (372)	33 (227)	21 (145)	13 (90)
VA-720x	308 (2,122)	308 (2,122)	278 (1,915)	177 (1,220)	112 (772)	68 (469)	44 (303)	28 (193)
VA-4233	230 (1,585)	230 (1,585)	130 (896)	82 (565)	39 (269)	24 (165)	---	---
M9x16	308 (2,122)	308 (2,122)	283 (1,950)	180 (1,240)	114 (785)	70 (482)	45 (310)	28 (193)
M110**	90 (620)	90 (620)	51 (351)	32 (220)	19 (131)	12 (83)	8 (55)	5 (34)
M120 and M130**	308 (2,122)	244 (1,681)	138 (951)	88 (606)	55 (379)	33 (227)	21 (145)	14 (96)
M140**	308 (2,122)	308 (2,122)	211 (1,454)	134 (923)	84 (579)	52 (358)	33 (227)	21 (145)
M150**	308 (2,122)	308 (2,122)	308 (2,122)	245 (1,688)	155 (1,068)	95 (655)	61 (420)	39 (269)

* The maximum fluid temperature is 338°F (170°C) water to 100 psig (690 kPa) saturated steam except for the following:
VA-4233 Actuators are limited to 35 to 250°F (2 to 121°C) water to 15 psig (103 kPa) saturated steam.

** The M110, M120, M130, M140, and M150 Actuators are not available factory coupled to the valve body. The maximum closeoff pressure values are provided because these actuators can be field mounted to the VG7000 valve body using the mounting kits listed in Tables 7 and 9.

Notes: The maximum closeoff pressure listed is limited to the maximum allowable ANSI valve body rating corresponding to the maximum temperature rating (308 psig [2,122 kPa] at 338°F [170°C]) of the valve.

The maximum closeoff pressures listed are for actuators coupled to the appropriate mounting kits listed in Tables 7 and 9. Refer to Tables 16 and 17 for valid factory-mounted combinations, and Tables 7 and 9 for available field mounting kits.

Table 15: Stainless Steel Trim – Maximum Closeoff Pressures, psig (kPa) for PDT0 Two-Way and PDT0 Port for Three-Way Electrically Actuated Valves

Not Available Factory Coupled for PDT0 Two-Way — Field Mounting Only 338°F (170°C) Maximum Fluid Temperature*								
Valve Size, in. (DN)	1/2 (DN15)	1/2 (DN15)	1/2 (DN15)	3/4 (DN20)	1 (DN25)	1-1/4 (DN32)	1-1/2 (DN40)	2 (DN50)
Maximum Cv (Kv) Factor	0.73 (0.63)	1.8 (1.6)	4.6 (4.0)	7.3 (6.3)	11.6 (10.0)	18.5 (16.0)	28.9 (25.0)	46.2 (40.0)
VA-715x	308 (2,122)	308 (2,122)	161 (1,109)	96 (661)	63 (434)	36 (248)	22 (152)	14 (97)
VA-720x	308 (2,122)	308 (2,122)	308 (2,122)	197 (1,357)	131 (903)	75 (517)	46 (317)	29 (200)
VA-4233	224 (1,543)	224 (1,543)	108 (744)	64 (441)	41 (282)	24 (165)	---	---
M9x16	308 (2,122)	308 (2,122)	308 (2,122)	201 (1,385)	133 (916)	76 (524)	47 (324)	30 (207)
M110**	125 (861)	125 (861)	61 (420)	36 (248)	23 (158)	13 (90)	8 (55)	5 (34)
M120 and M130**	308 (2,122)	308 (2,122)	164 (1,130)	98 (675)	64 (441)	37 (255)	23 (158)	14 (96)
M140**	308 (2,122)	308 (2,122)	250 (1,723)	149 (1,027)	99 (682)	57 (393)	35 (241)	22 (152)
M150**	308 (2,122)	308 (2,122)	308 (2,122)	273 (1,881)	182 (1,254)	104 (717)	64 (441)	40 (276)

* The maximum fluid temperature is 338°F (170°C) water to 100 psig (690 kPa) saturated steam except for the following:
VA-4233 Actuators are limited to 35 to 250°F (2 to 121°C) water to 15 psig (103 kPa) saturated steam.

** The M110, M120, M130, M140, and M150 Actuators are not available factory coupled to the valve body. The maximum closeoff pressure values are provided because these actuators can be field mounted to the VG7000 valve body using the mounting kits listed in Tables 7 and 9.

Notes: The maximum closeoff pressure listed is limited to the maximum allowable ANSI valve body rating corresponding to the maximum temperature rating (308 psig [2,122 kPa] at 338°F [170°C]) of the valve.

The maximum closeoff pressures listed are for actuators coupled to the appropriate mounting kits listed in Tables 7 and 9. Refer to Tables 16 and 17 for valid factory-mounted combinations, and Tables 7 and 9 for available field mounting kits.

Table 16: Pneumatic Actuated Valves – Available Factory-Mounted Combinations⁽¹⁾

Actuator	V-3801-8001			V-3000-8011 ⁽²⁾			V-3000-8003			MP82 ⁽²⁾			MP84 ⁽²⁾		
	3 to 6	4 to 8	9 to 13	3 to 6	4 to 8	9 to 13	3 to 6	4 to 8	9 to 13	3 to 6	4 to 8	9 to 13	3 to 6	4 to 8	9 to 13
Valve Size, in. (DN)	VG7241, VG7441, and VG7842 Valves – Brass Trim, NPT End Connections														
1/2 in. (DN15)	X	X	X	X	X	X	X	X	X	---	---	---	---	---	---
3/4 in. (DN20)	X	X	X	X	X	X	X	X	X	---	---	---	---	---	---
1 in. (DN25)	---	---	---	X	X	X	X	X	X	X	X	X	---	---	---
1-1/4 in. (DN32)	---	---	---	X	X	X	X	X	X	X	X	X	---	---	---
1-1/2 in. (DN40)	---	---	---	X	X	X	X	X	X	X	X	X	---	---	---
2 in. (DN50)	---	---	---	X	X	X	X	X	X	X	X	X	---	---	---
Valve Size, in. (DN)	VG7243, VG7443, and VG7844 Valves – Stainless Steel Trim, NPT End Connections														
1/2 in. (DN15)	---	---	---	X	X	X	X	X	X	X	X	X	---	---	---
3/4 in. (DN20)	---	---	---	X	X	X	X	X	X	X	X	X	---	---	---
1 in. (DN25)	---	---	---	X	X	X	X	X	X	X	X	X	---	---	---
1-1/4 in. (DN32)	---	---	---	X	X	X	X	X	X	X	X	X	---	---	---
1-1/2 in. (DN40)	---	---	---	---	---	---	---	---	---	X	X	X	X	X	X
2 in. (DN50)	---	---	---	---	---	---	---	---	---	X	X	X	X	X	X
Valve Size, in. (DN)	VG7281, VG7481, and VG7882 Valves – Brass Trim, Union Sweat End Connections														
1/2 in. (DN15)	X	X	X	X	X	X	X	X	X	---	---	---	---	---	---
3/4 in. (DN20)	X	X	X	X	X	X	X	X	X	---	---	---	---	---	---
1 in. (DN25)	---	---	---	X	X	X	X	X	X	---	---	---	---	---	---
1-1/4 in. (DN32)	---	---	---	X	X	X	X	X	X	---	---	---	---	---	---
1-1/2 in. (DN40)	---	---	---	X	X	X	X	X	X	---	---	---	---	---	---
2 in. (DN50)	---	---	---	X	X	X	X	X	X	---	---	---	---	---	---
Valve Size, in. (DN)	VG7271, VG7291, VG7872, and VG7892 Valves – Brass Trim, Union Sweat End Connections														
1/2 in. (DN15)	X	X	X	X	X	X	X	X	X	---	---	---	---	---	---
Valve Size, in. (DN)	VG7251, VG7451 (1/2 in. Only), and VG7551 Valves – Brass Trim, Union Globe and Union Angle End Connections (No Factory-Mounted Positioners Available)														
1/2 in. (DN15)	X	X	X	X	X	X	X	X	X	---	---	---	---	---	---
3/4 in. (DN20)	X	X	X	X	X	X	X	X	X	---	---	---	---	---	---
1 in. (DN25)	---	---	---	X	X	X	X	X	X	---	---	---	---	---	---
1-1/4 in. (DN32)	---	---	---	X	X	X	X	X	X	---	---	---	---	---	---
1-1/2 in. (DN40)	---	---	---	X	X	X	X	X	X	---	---	---	---	---	---

⁽¹⁾ Items shown as "---" are not available factory mounted, and not recommended for field assembly.

⁽²⁾ Available with or without a positioner.

Note: Stainless steel trim is available only with NPT (internal) end connections.

Table 17: Electrically Actuated Valves – Available Factory-Mounted Combinations⁽¹⁾

Actuator	Non-Spring Return				Spring Return ⁽²⁾	
	VA-7150-1001 VA-7152-1001 VA-7153-1001	VA-7200-1001 VA-7202-1001 VA-7203-1001	VA-8020-1 VA-8122-1	M9116-AGA-2 M9116-AGC-2 M9116-GGA-2 M9116-GGC-2	VA-4233-AGA-2 VA-4233-AGC-2 VA-4233-BGA-2 VA-4233-BGC-2 VA-4233-GGA-2 VA-4233-GGC-2	M9216-AGA-2 M9216-AGC-2 M9216-HGA-2 M9216-HGC-2
Valve Size, in. (DN)	VG7241 and VG7842 Valves – Brass Trim, NPT End Connections					
1/2 in. (DN15)	X	---	X	X	X	X
3/4 in. (DN20)	X	---	X	X	X	X
1 in. (DN25)	X	X	---	X	X	X
1-1/4 in. (DN32)	X	X	---	X	X	X
1-1/2 in. (DN40)	X	X	---	X	---	X
2 in. (DN50)	X	X	---	X	---	X
Valve Size, in. (DN)	VG7243 and VG7844 Valves – Stainless Steel Trim, NPT End Connections					
1/2 in. (DN15)	X	X	---	X	X	X
3/4 in. (DN20)	X	X	---	X	X	X
1 in. (DN25)	X	X	---	X	X	X
1-1/4 in. (DN32)	X	X	---	X	X	X
1-1/2 in. (DN40)	X	X	---	X	---	X
2 in. (DN50)	X	X	---	X	---	X
Valve Size, in. (DN)	VG7281 and VG7882 Valves – Brass Trim, Union Sweat End Connections					
1/2 in. (DN15)	X	---	X	X	X	X
3/4 in. (DN20)	X	---	X	X	X	X
1 in. (DN25)	X	X	---	X	X	X
1-1/4 in. (DN32)	X	X	---	X	X	X
1-1/2 in. (DN40)	X	X	---	X	---	X
2 in. (DN50)	X	X	---	X	---	X
Valve Size, in. (DN)	VG7271, VG7291, VG7872, and VG7892 Valves – Brass Trim, Union Sweat End Connections					
1/2 in. (DN15)	X	---	X	X	X	X
Valve Size, in. (DN)	VG7251 and VG7551 Valves – Brass Trim, Union Globe and Union Angle End Connections					
1/2 in. (DN15)	X	---	---	---	---	---
3/4 in. (DN20)	X	---	---	---	---	---
1 in. (DN25)	X	X	---	---	---	---
1-1/4 in. (DN32)	X	X	---	---	---	---
1-1/2 in. (DN40)	X	X	---	---	---	---

⁽¹⁾ Items shown as "---" are not available factory mounted, and not recommended for field assembly. Electric actuators are available on two-way PDTC and three-way mixing valves only (except the VA-4233-xGx-2 Series, which is available on all body styles).

⁽²⁾ The VA-4233 Series is available with spring return stem-up only, while the M9216 Series is available with spring return stem-up or spring return stem-down.

Table 18: Buy American – Available Factory-Mounted Combinations⁽¹⁾

Actuator	Pneumatically Actuated Valve Assemblies ⁽²⁾								
	V-3000-8011			V-3000-8003			MP82		
	3 to 6	4 to 8	9 to 13	3 to 6	4 to 8	9 to 13	3 to 6	4 to 8	9 to 13
Valve Size, in. (DN)	VG7241 and VG7842 Valves – Brass Trim, NPT End Connections								
1/2 in. (DN15)	X	X	X	X	X	X	---	---	---
3/4 in. (DN20)	X	X	X	X	X	X	---	---	---
1 in. (DN25)	X	X	X	X	X	X	X	X	X
1-1/4 in. (DN32)	X	X	X	X	X	X	X	X	X
1-1/2 in. (DN40)	X	X	X	X	X	X	X	X	X
2 in. (DN50)	X	X	X	X	X	X	X	X	X
Valve Size, in. (DN)	VG7281 and VG7882 Valves – Brass Trim, Union Sweat End Connections								
1/2 in. (DN15)	X	X	X	X	X	X	---	---	---
Valve Size, in. (DN)	VG7271, VG7291, VG7872, and VG7892 Valves – Brass Trim, Union Sweat End Connections								
1/2 in. (DN15)	X	X	X	X	X	X	---	---	---
Actuator	Electrically Actuated Valve Assemblies ⁽³⁾								
	Non-Spring Return					Spring Return ⁽⁴⁾			
	M9116-AGA-2 M9116-AGC-2 M9116-GGA-2 M9116-GGC-2					M9216-AGA-2 M9216-AGC-2 M9216-HGA-2 M9216-HGC-2			
Valve Size, in. (DN)	VG7241 and VG7842 Valves – Brass Trim, NPT End Connections								
1/2 in. (DN15)			X					X	
3/4 in. (DN20)			X					X	
1 in. (DN25)			X					X	
1-1/4 in. (DN32)			X					X	
1-1/2 in. (DN40)			X					X	
2 in. (DN50)			X					X	
Valve Size, in. (DN)	VG7281 and VG7882 Valves – Brass Trim, Union Sweat End Connections								
1/2 in. (DN15)			X					X	
Valve Size, in. (DN)	VG7271, VG7291, VG7872, and VG7892 Valves – Brass Trim, Union Sweat End Connections								
1/2 in. (DN15)			X					X	

⁽¹⁾ Items shown as "---" are not available factory mounted, and not recommended for field assembly.

⁽²⁾ Only available without a positioner.

⁽³⁾ Electric actuators are available on two-way PDTTC and three-way mixing valves only.

⁽⁴⁾ Available with spring return stem-up or spring return stem-down.

Operation

V-3000, V-3801-8001, and MP8000 Series Pneumatic Actuators

Air pressure from a pneumatic controller is applied to the diaphragm of the actuator, which moves the piston against the forces of the internal spring and the fluids. The piston will move the valve plugs to a position where the diaphragm pressure and the spring force balance against the fluid forces. These fluid forces will cause the operating ranges to shift from the nominal spring range. Reducing the air pressure to the diaphragm of the actuator allows the spring to return the valve plug to its normal position.

For applications requiring stable, accurate control and sequencing, the V-3000-8011, MP82, and MP84 are available with a V-9502 Pneumatic Positioner. The V-9502 Pneumatic Positioner will compensate for the spring range shift, and the valve will operate within the published range. Refer to the *Operation* section of the *V-9502 Pneumatic Valve Actuator Positioner Product Bulletin (LIT-977265)* in the *Valve and Actuator Manual (FAN 977)* for more details.

To ensure installed performance quality and optimal maximum closeoff pressure when using the positioner, the following spring ranges are recommended:

Normally Open Valve: 3 to 6 psig
(3 to 7 psig for MP82/MP84)

Normally Closed Valve: 9 to 13 psig

Three-Way Mixing Valve: 4 to 8 psig

Positioners are factory calibrated to match the nominal spring range of the actuator and valve assembly.

VA-715x and VA-720x Series Electric Valve Actuators

The VA-715x and VA-720x Series Actuators operate on 24 VAC, and are available for on-off/floating control action or proportional control. A reversible synchronous motor and a magnetic clutch are used to accurately position the valve. The actuator maintains position even if power to the actuator is removed. The magnetic clutch maintains a constant load at the end of travel, which ensures tight valve shutoff and compensates for seat wear. Refer to the appropriate electric valve actuator literature in the *Valve and Actuator Manual (FAN 977)* for specifications and available options.

VA-8x2x Series Electric Valve Actuators

The VA-8x2x Series Actuators operate on 24 VAC, and are available for on/off, floating, or proportional control. The signal drives the actuator motor, causing the valve stem to move in the desired direction. Once the valve stem reaches the end of travel, a shutoff force builds up. When the force reaches its maximum, a lever within the actuator trips a force sensor, which stops the motor.

Field calibration of the force sensor is not required. The actuator maintains the shutoff force even if power to the controller is lost. Valve stem positioning can be accomplished manually by turning the adjustment knob on the lower right portion of the actuator. Rotating the adjustment knob counterclockwise moves the valve stem up. Refer to the appropriate electric valve actuator literature in the *Valve and Actuator Manual (FAN 977)* for specifications and available options.

M9x16 Series Electric Actuators

The M9x16 Series Actuators operate on 24 VAC or VDC power, and are available for use with floating or proportional controllers. When coupled with the M9000-500 Valve Mounting, the rotary motion of this actuator is converted into linear motion that will operate 1/2 through 2 in. VG7000 Series Valves. A compression spring on the output shaft of the mounting automatically compensates for seat wear.

On three-way valves, the preset spring load is applied at both ends of travel. On loss of power, the spring return M9216 Actuator will return to its normal position. Refer to the appropriate electric actuator literature or the *M9000-500 Valve Linkage Kit for M9x16 Series Electric Motor Actuators Product/Technical Bulletin (LIT-977352)* in the *Valve and Actuator Manual (FAN 977)* for specifications and available options.

VA-4233 Series Electric Actuators

The VA-4233 Series Electric Actuators operate on 24 VAC or VDC power, and are available for use with on/off, floating, or proportional controllers. These actuators incorporate a stepper motor to accurately position the valve. In the event of a power failure, a spring in the actuator automatically returns the valve to the full stem-up position. All models feature a hand crank for manual positioning of the valve, independent of a power supply.

Proportional models include an AUTO stroke calibration feature that enables the actuator to redefine the selected input signal and feedback proportionally across the actual valve stroke. Initial application of a power signal will drive the actuator and valve assembly to the full stem-up position and then the full stem-down position, and will store these positions in nonvolatile memory (retains data when power is lost or removed). The actuator will then drive to the position determined by the applied control signal.

M100 Series Electric Actuators

The M100 Series Actuators operate on 24 VAC, and are available for on-off/floating or proportional control.

A rack and pinion drive mechanism provides the linear movement. The rack assembly contains a spring that maintains valve closeoff when compressed by overtravel of the actuator. On three-way valves, this seating force is applied on both the up and the down stroke. The actuator has an adjustable travel limit that provides the desired overtravel. On loss of power, the spring return actuator will return to its normal position. Refer to the *M100 Series Motor Actuator Product Bulletin (LIT-2681059P)* and/or the *VG7000 Valve Linkage for M100 Series Motor Actuators Technical Bulletin (LIT-977355)* in the *Valve and Actuator Manual (FAN 977)* for specifications and available options.

Installation and Servicing

It is recommended that the VG7000 Series Valves be mounted in an upright position in a conveniently accessible location. Sufficient clearance must be allowed for actuator removal. (Refer to the *Dimensions* section for more details.) The valve must be piped with the flow in the direction indicated by the arrow, so that the plug seats against the flow.

On electrically actuated valve assemblies, all wiring must be in accordance with applicable electrical code requirements. Input lines to the actuator must be wired correctly for the valve to move in the proper direction.

Notes: All actuators must be protected against moisture, which could enter the housing. Also, the actuator must **not** be covered with thermal insulating material.

VG7000 Series Valves should not be used for fluid service other than those indicated in the *Specifications* section.



CAUTION: Equipment Damage Hazard.
Do not allow foreign materials such as weld slag, thread burrs, metal chips, and scale to enter the piping system. This debris can damage or severely impede the operation of the valve.

This is particularly critical with smaller valves, as the debris may be larger than the valve opening and may never pass to downstream filters. Subsequent flushing and filtering the system with the valve installed will not remedy the problem.

When servicing, ensure:

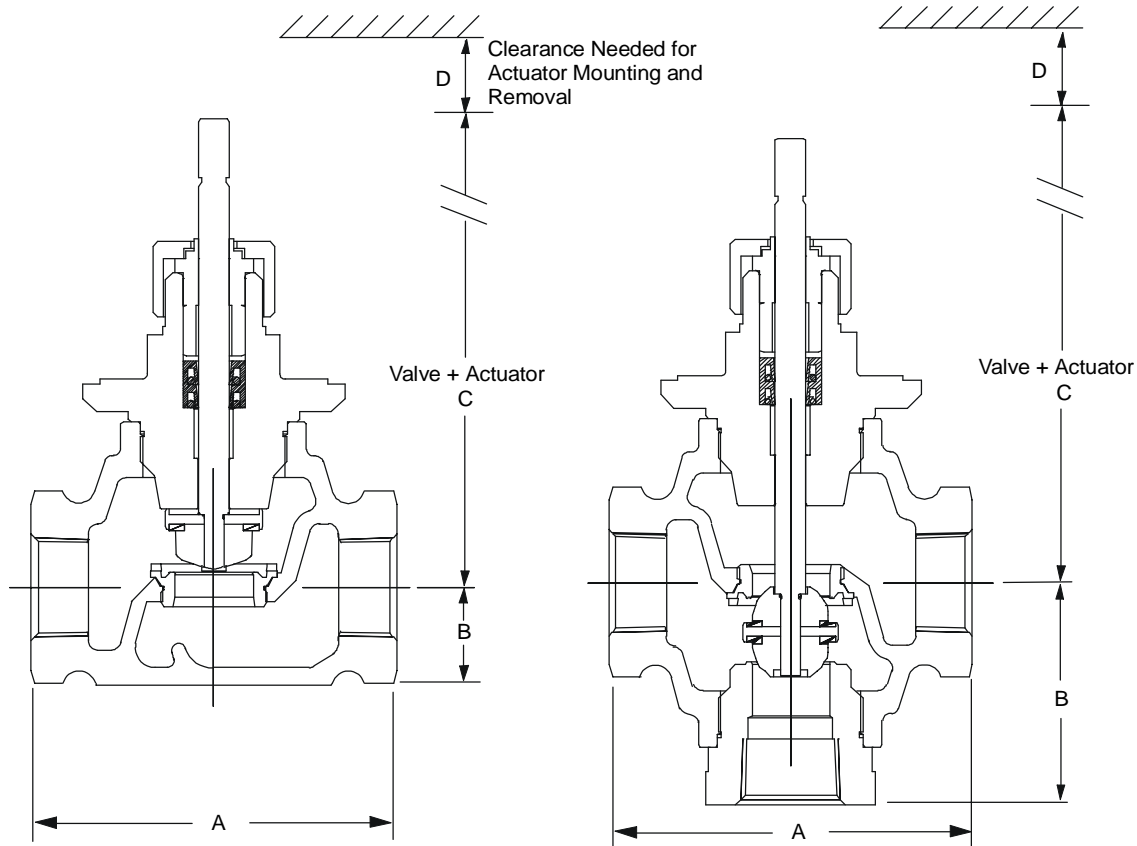
- The pneumatic or electrical power to the actuator is turned off or isolated. Do not touch or attempt to connect or disconnect wires when electrical power is on.



WARNING: Personal Injury Hazard.
Disconnect the power supply before wiring connections are made to prevent possible personal injury or damage to the equipment. Make and check all wiring connections before applying power to the system. Short-circuited or improperly connected wires may result in permanent damage to the equipment.

- The electrical wiring connections are in accordance with the National Electrical Code and local regulations.
- Sufficient clearance is allowed for actuator removal from the valve.
- No pressure is applied to the piping system when servicing the valve.

Dimensions



Note: Refer to Tables 23 and 24 for overall assembly height (C) and clearance (D) dimensions.

Figure 3: Two-Way and Three-Way Valve Dimensions

Table 19: Threaded (Internal NPT) Valve Dimensions, in. (mm)

Valve Size, in. (DN)	A	B		
	N.O./N.C./Three-Way	N.O.	N.C.	Three-Way
1/2 (DN15)	3 (76)	13/16 (21)	1-9/16 (39)	1-13/16 (46)
3/4 (DN20)	3-7/32 (81)	15/16 (24)	1-5/8 (41)	2-1/8 (54)
1 (DN25)	4-1/8 (104)	1-5/32 (29)	1-3/4 (44)	2-9/16 (65)
1-1/4 (DN32)	4-23/32 (119)	1-11/32 (34)	2 (51)	2-25/32 (70)
1-1/2 (DN40)	5-1/8 (130)	2-5/32 (55)	2-3/4 (70)	3-3/8 (85)
2 (DN50)	5-29/32 (150)	2-1/8 (53)	2-27/32 (72)	3-3/4 (95)

Note: Refer to Table 23 and 24 for overall assembly height "C" and clearance "D" dimensions.

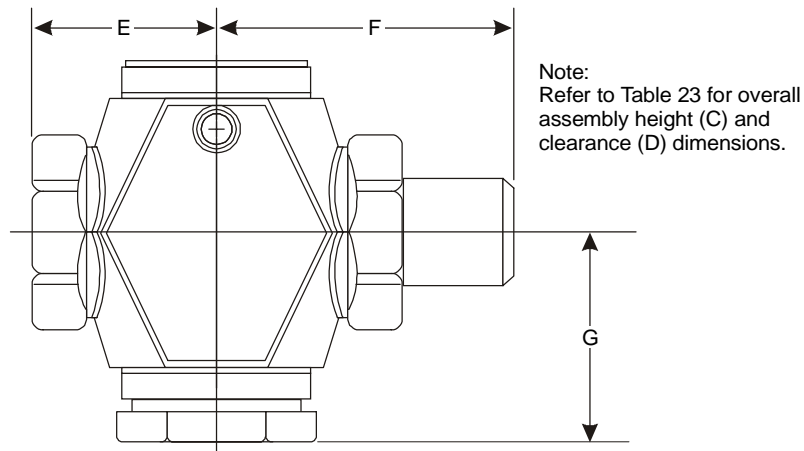


Figure 4: Two-Way Union Globe Valve Dimensions

Table 20: Two-Way Union Globe Valve Dimensions, in. (mm)

Valve Size, in. (DN)	E	F	G
1/2 (DN15) N.O./PDTC	1-1/2 (38)	2-21/32 (68)	13/16 (20)
1/2 (DN15) N.C./PDTO	1-1/2 (38)	2-21/32 (68)	1-17/32 (39)
3/4 (DN20) N.O./PDTC*	1-9/16 (40)	3-3/32 (79)	15/16 (24)
1 (DN25) N.O./PDTC*	2-1/16 (53)	4-1/32 (102)	1-5/32 (29)
1-1/4 (DN32) N.O./PDTC*	2-3/8 (60)	4-19/32 (117)	1-11/32 (34)
1-1/2 (DN40) N.O./PDTC*	2-9/16 (65)	4-27/32 (123)	2-5/32 (55)

* Sizes greater than 1/2 in. (DN15) are only available in N.O. (PDTC) configuration.

Note: Refer to Table 23 for overall assembly height "C" and clearance "D" dimensions.

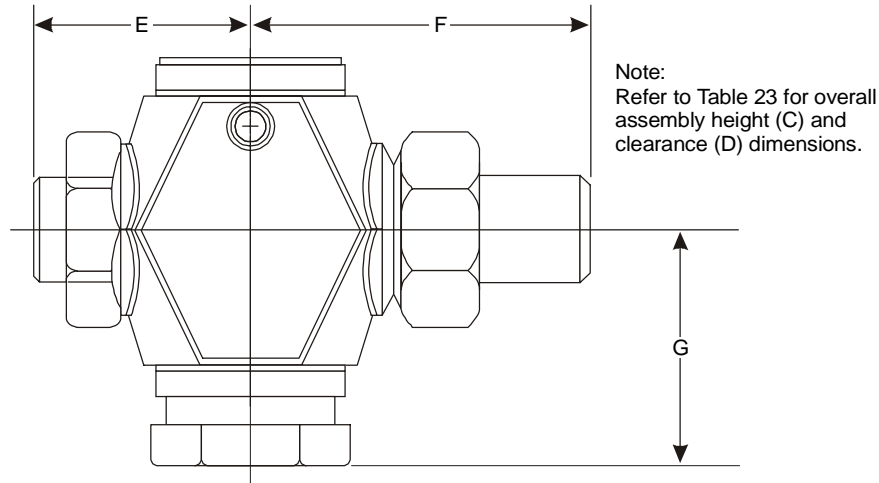


Figure 5: Two-Way Union Angle Valve Dimensions

Table 21: Two-Way Union Angle Valve Dimensions, in. (mm)

Valve Size, in. (DN)	E	F	G
1/2 (DN15) N.O./PDTC	1-23/32 (44)	2-21/32 (68)	1-7/8 (48)
3/4 (DN20) N.O./PDTC	1-9/16 (40)	3-3/32 (79)	2-1/8 (54)
1 (DN25) N.O./PDTC	2-1/16 (53)	4-1/32 (102)	2-9/16 (65)
1-1/4 (DN32) N.O./PDTC	2-3/8 (60)	4-19/32 (117)	2-25/32 (70)
1-1/2 (DN40) N.O./PDTC	2-9/16 (65)	4-27/32 (123)	3-3/8 (85)

Note: Refer to Table 23 for overall assembly height "C" and clearance "D" dimensions.

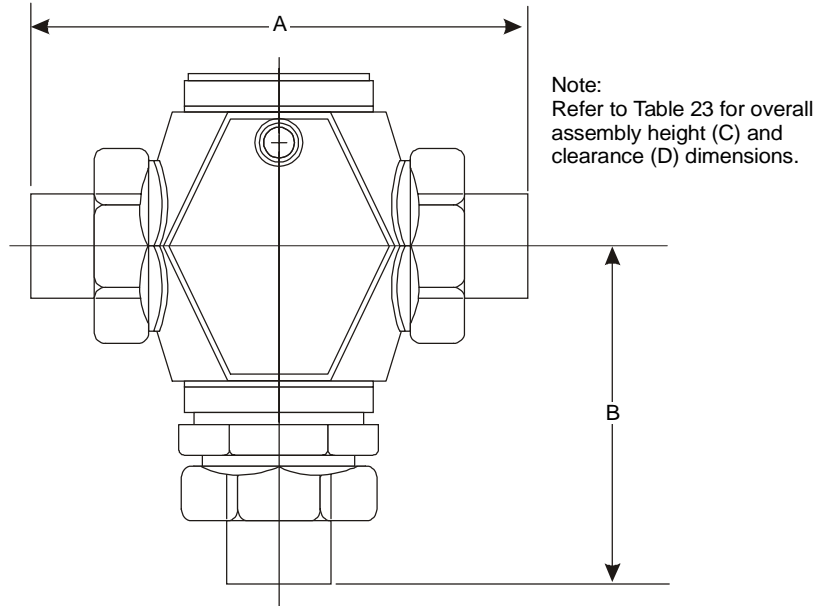


Figure 6: Two-Way and Three-Way Union Sweat Valve Dimensions

Table 22: Union Sweat Valve Dimensions, in. (mm)

Valve Size, in. (DN)	A	B		
		Two-Way N.O./PDTC	Two-Way N.C./PDTO	Three-Way Mixing
1/2 (DN15), 3/8 in. Tubing	4-3/16 (106)	13/16 (20)	1-17/32 (39)	2-17/32 (64)
1/2 (DN15), 1/2 in. Tubing	4-3/16 (106)	13/16 (20)	1-17/32 (39)	2-17/32 (64)
1/2 (DN15), 3/4 in. Tubing	4-25/32 (122)	13/16 (20)	1-17/32 (39)	2-17/32 (64)
3/4 (DN20)	5-1/16 (129)	15/16 (24)	1-9/16 (40)	3-1/4 (82)
1 (DN25)	6-3/32 (155)	1-1/8 (28)	1-3/4 (45)	3-23/32 (94)
1-1/4 (DN32)	7-9/32 (185)	1-11/32 (34)	2 (51)	4-3/32 (104)
1-1/2 (DN40)	8-19/32 (218)	2-5/32 (55)	2-3/4 (70)	4-29/32 (125)
2 (DN50)	9-7/16 (240)	2-1/8 (53)	2-27/32 (72)	5-19/32 (142)

Note: Refer to Table 23 for overall assembly height "C" and clearance "D" dimensions.

Table 23: Brass Trim Actuator Dimensions, in. (mm)

Actuator Style	C*						D*
	1/2 in. (DN15)	3/4 in. (DN20)	1 in. (DN25)	1-1/4 in. (DN32)	1-1/2 in. (DN40)	2 in. (DN50)	
V-3000-8011	4-3/4 (120)	4-3/4 (120)	5-31/32 (151)	5-7/8 (149)	5-13/16 (147)	6-3/16 (157)	3-9/16 (90)
V-3000-8003	5-11/32 (135)	5-11/32 (135)	6-9/16 (166)	6-19/32 (167)	6-13/32 (162)	6-13/16 (172)	3-9/16 (90)
V-3801-8001	4 (102)	4 (102)	---	---	---	---	2-3/8 (60)
MP82	---	---	12-23/32 (323)	12-27/32 (326)	13-13/32 (341)	13-13/16 (351)	2 (51)
VA-715x	7-11/16 (195)	7-11/16 (195)	8-5/8 (219)	8-5/8 (219)	9-5/32 (233)	9-5/32 (233)	2-1/2 (64)
VA-720x	---	---	9-19/32 (244)	9-5/8 (244)	9-15/16 (252)	10-3/4 (273)	4-1/2 (114)
VA-8x2x	6-7/16 (164)	6-7/16 (164)	---	---	---	---	1-1/2 (38)
VA-4233	8 (203)	8 (203)	9-7/32 (234)	9-7/32 (234)	---	---	1-1/2 (38)
M9x16	14 (356)	14 (356)	15-7/32 (386)	15-7/32 (386)	15-1/16 (382)	15-15/32 (392)	---
M100	10-13/16 (274)	10-13/16 (274)	12-1/32 (305)	12-1/32 (305)	11-7/8 (301)	12-1/4 (311)	---

* Dimension "C" is the overall height above the centerline of the valve body, and dimension "D" is the clearance required for actuator removal (as illustrated in Figure 3).

Table 24: Stainless Steel Trim Actuator Dimensions, in. (mm)

Actuator Style	C*						D*
	1/2 in. DN15	3/4 in. DN20	1 in. DN25	1-1/4 in. DN32	1-1/2 in. DN40	2 in. DN50	
V-3000-8011	5-7/16 (138)	5-7/16 (138)	6 (152)	6-1/4 (158)	---	---	3-9/16 (90)
V-3000-8003	6-1/16 (153)	6-1/4 (158)	6-19/32 (167)	6-27/32 (173)	---	---	3-9/16 (90)
MP82	12-3/4 (324)	13-17/64 (352)	13-39/64 (346)	13-27/32 (352)	14-1/32 (356)	14-15/64 (361)	2 (51)
MP84	---	---	---	---	17-7/32 (437)	17-27/64 (443)	2 (51)
VA-715x	8-13/32 (214)	8-5/8 (219)	8-31/32 (228)	9-7/32 (234)	9-13/32 (239)	9-5/8 (244)	2-1/2 (64)
VA-720x	9-3/32 (256)	9-5/16 (236)	9-21/32 (245)	9-7/8 (251)	10-3/32 (256)	10-9/32 (261)	4-1/2 (114)
VA-4233	8-23/32 (221)	8-15/16 (227)	9-9/32 (236)	9-13/16 (249)	---	---	1-1/2 (38)
M9x16	14-11/16 (373)	14-29/32 (378)	15-1/4 (387)	15-1/2 (393)	15-23/32 (399)	15-7/8 (403)	---
M100	11-1/2 (292)	11-23/32 (297)	12-1/16 (306)	12-5/16 (312)	12-1/2 (318)	12-11/16 (322)	---

* The extended bonnet is standard for VG7000 Series Valves with stainless steel trim to allow higher fluid temperatures (100 psig [689 kPa] saturated steam at 338°F [170°C]). Dimension "C" is the overall height above the centerline of the valve body, and dimension "D" is the clearance required for actuator removal (as illustrated in Figure 3).

Maintenance and Accessories

The maintenance parts available for the VG7000 Series Valves are listed in Table 25. Refer to Table 26 for a list of available accessories. For a replacement VG7000 Series Valve, contact the nearest Johnson Controls representative.

Table 25: Maintenance Parts (Order Separately)

Code Number	Description
VG7000-6001	<p>Ring Pack Packing Kits for Brass Trim Valves:</p> <p>Single Pack for 1/4 in. Stem (1/2 or 3/4 in. Valves)</p> <p>Kit Includes: two ring packs (U-cup with installed O-ring), one stem wiper, one insertion/removal tool, one bullet, one grease tube, and one 3 in. (76 mm) strip of crocus cloth</p>
VG7000-6002	<p>Single Pack for 3/8 in. Stem (1 through 2 in. Valves)</p> <p>Kit includes: two ring packs (U-cup with installed O-ring), one stem wiper, one stem guide, one insertion/removal tool, one sleeve packing installer, one grease tube, and one 3 in. (76 mm) strip of crocus cloth</p>
VG7000-6003	<p>Ring Pack Packing Kits for Brass Trim Valves:</p> <p>10 Pack for 1/4 in. Stem (1/2 or 3/4 in. Valves)</p> <p>Kit Includes: twenty ring packs (U-cup with installed O-ring), ten stem guides, one insertion/removal tool, one bullet, two grease tubes, and one 24 in. (610 mm) strip of crocus cloth</p>
VG7000-6004	<p>10 Pack for 3/8 in. Stem (1 through 2 in. Valves)</p> <p>Kit includes: twenty ring packs (U-cup with installed O-ring), ten stem wipers, ten stem guides, one insertion/removal tool, one sleeve packing installer, two grease tubes, and a 24 in. (610 mm) strip of crocus cloth</p>
VG7000-6011	<p>PTFE V-Ring Packing Kits for Stainless Steel Trim Valves:</p> <p>Single Pack for 1/4 in. Stem, SS Trim (1/2 or 3/4 in. Valves)</p> <p>Kit includes: two Teflon® V-rings, one rubber V-ring, two Teflon stem wipers, one Teflon stem guide, one Teflon bushing, one steel washer, one spring, one insertion/removal tool, one bullet, one grease tube, and one 3 in. (76 mm) strip of crocus cloth</p>
VG7000-6012	<p>Single Pack for 3/8 in. Stem, SS Trim (1 through 2 in. Valves)</p> <p>Kit includes: two Teflon V-rings, one rubber V-ring, two Teflon stem wipers, one Teflon stem guide, one Teflon bushing, one steel washer, one spring, one insertion/removal tool, one sleeve packing installer, one grease tube, and one 3 in. (76 mm) strip of crocus cloth</p>

Table 26: Accessories (Order Separately)

Code Number	Description
---	For specific actuator code numbers, refer to appropriate product bulletins.
---	For mounting and linkage kits, refer to Tables 6, 7, 8, and 9 in this bulletin.
EP-8000-1	EP Transducer, Low Volume, 0.5 to 9 VDC
EP-8000-2	EP Transducer, High Volume, 0.25 to 9.5 VDC
EP-8000-3	EP Transducer, Low Volume, 4 to 20 mA DC
EP-8000-4	EP Transducer, High Volume, 4 to 20 mA DC
EP-8000-101	EP-8000 Electro-Pneumatic Transducer Mounting Kit
R-3710	0.007 in. Restrictor (Required for Low Volume EP-8000 Models)
A-4000-1037	Inline Air Filter (Required for all EP-8000 Models)
JC 5361	Hypodermic Needle Test Probe Assembly
G-2010	0 to 30 psig (0 to 207 kPa) Gauge
VA-8000-102	Valve Position Indicator for Electrically Actuated Valves with VA-805x Actuators Only
VG7000-1016	Bonnet Adaptor for V-3000 Style Linkages on 1 through 2 in. VG7000 Series Valves (Required when Converting from an M100 Series Actuator to an M9x16, VA-4233, VA-715x, or VA-720x Series Actuator)
V-9502-90 V-9502-91	Positioners for V-3000-8001 and V-3000-8011: Pneumatic Positioner (Less Spring) for V-3000-8011 Pneumatic Positioner (Less Spring) for V-3000-8001
V-9502-6801 V-9502-6802 V-9502-6801 V-9502-6802 V-9502-6801 V-9502-6803	Positioner Feedback Springs for V-3000-8001 and V-3000-8011: 5/16 in. (8 mm) Stroke for 1/2 or 3/4 in. Valve – 3 psig (21 kPa) Span 5/16 in. (8 mm) Stroke for 1/2 or 3/4 in. Valve – 8 psig (55 kPa) Span 1/2 in. (13 mm) Stroke for 1 or 1-1/4 in. Valve – 5 psig (34 kPa) Span 1/2 in. (13 mm) Stroke for 1 or 1-1/4 in. Valve – 12 psig (83 kPa) Span 3/4 in. (19 mm) Stroke for 1-1/2 or 2 in. Valve – 10 psig (69 kPa) Span 3/4 in. (19 mm) Stroke for 1-1/2 or 2 in. Valve – 4 psig (28 kPa) Span
V-9502-95 MP8000-6002 EPP-1000-8 MP8000-6003	Positioners and Positioner Accessories for MP8000 Series Actuators: Pneumatic Positioner (Less Spring and Mounting Hardware) V-9502 Pneumatic Positioner Mounting Kit with Springs Electro-Pneumatic Positioner (Less Mounting Hardware) EPP-1000 Electro-Pneumatic Positioner Mounting Kit
V-9502-76 V-9502-8100 V-9502-8102 V-9502-8106	Positioner and Feedback Springs for V-400 and V-500 Actuators: Pneumatic Positioner (Less Spring) 5/16 in. (8 mm) Stroke for 1/2 or 3/4 in. Valve – Adjustable 3 to 12 psig (21 to 83 kPa) Span 1/2 in. (13 mm) Stroke for 1 or 1-1/4 in. Valve – Adjustable 3 to 12 psig (21 to 83 kPa) Span 3/4 in. (19 mm) Stroke for 1-1/2 or 2 in. Valve – Adjustable 3 to 12 psig (21 to 83 kPa) Span

Note: Positioner accessory kits include positioner and all the appropriate mounting hardware, excluding the positioner feedback spring that must be ordered separately.

Reconditioning Kits and Tools

Table 27: Ordering Data – VG7000 Series Reconditioning Kits

V	G	Valve Global							
1	2	7	Product Family 7 = Cast Bronze						
3	4	Body Type 2 = Two-Way, Normally Open/Push-Down-to-Close							
4	4 = Two-Way, Normally Closed/Push-Down-to-Open								
		5 = Two-Way Angle, Normally Open/Push-Down-to-Close							
		8 = Three-Way Mixing							
	K	Reconditioning Kits K = Inner Valve Reconditioning Kits							
5	<i>(Includes: bonnet, bonnet nut, packing, stem, plug, disk, and seat; replaceable seat is available for stainless steel trim valves only.)</i>								
1	Trim and Flow Characteristic 1 = Brass Equal Percentage (All Two-Way and 1/2 in. Three-Way)								
6	2 = Brass Linear (Two-Way Union Angle and All Three-Way)								
		3 = Stainless Steel Equal Percentage (Two-Way Only)							
		4 = Stainless Steel Linear (Three-Way Only)							
R	Size and Cv (Kv)								
7	C = 1/2 in., 0.73 Cv (0.63 Kv)								
		E = 1/2 in., 1.8 Cv (1.6 Kv)							
		G = 1/2 in., 4.6 Cv (4.0 Kv)							
		L = 3/4 in., 7.3 Cv (6.3 Kv)							
		N = 1 in., 11.6 Cv (10.0 Kv)							
		P = 1-1/4 in., 18.5 Cv (16.0 Kv)							
		R = 1-1/2 in., 28.9 Cv (25.0 Kv)							
		S = 2 in., 46.2 Cv (40.0 Kv)							
T	Stem Type								
8	T = Standard Threaded Stem (All Except V-3801, V-500, MP84, VA-8x2x)								
		S = Slotted Stem and Small Bonnet (Factory-Mounted V-3801, VA-8x2x)							
		L = Large Threaded Stem (Factory-Mounted V-500 Only)							
		M = Large Threaded Stem (Factory-Mounted MP84 Only)							
+	Optional Lower Body								
9	+ = Lower Body Option (For 1-1/2 and 2 in. Bodies Only)								
		<i>(Leave Fields 9 and 10 blank for 1/2 through 1-1/4 in. kits and for 1-1/2 and 2 in. kits without lower body.)</i>							
W	N.C. Valve Bottom Cap								
10	W = Two-Way Bottom Cap								
		<i>(For 1-1/2 and 2 in. valves, it is recommended that a new bottom cap is ordered with the reconditioning kit.)</i>							
4	Three-Way Lower Body								
10	4 = NPT								
		<i>(For 1-1/2 and 2 in. valves, it is recommended that a lower body with matching end connection is ordered with the reconditioning kit.)</i>							

1 2 3 4 5 6 7 8 9 10 = Field

V	G	7	4	K	1	R	T	+	4
Reconditioning Kit									+ 1-1/2 or 2 in. Bottom Cap/Lower Body

Example: Cast bronze valve, two-way, normally closed/push-down-to-open, brass trim, equal percentage, 1-1/2 in., 28.9 Cv, standard threaded stem, with a three-way lower body.

The reconditioning kits for VG7000 Series Valves include all the components necessary to return a valve to “near new” condition. These kits are available according to the convenient features and options format shown in Table 27. A descriptive list of the components in each kit is given below. Note that 1-1/2 and 2 in. two-way N.C. and three-way valves incorporate a stem guide in the bottom body of the valve.

The stem guide is integral for N.C./PDTO valves and the lower body for three-way valves. Depending on the wear condition of this part, it may or may not need to be replaced. While replacement is always recommended, these parts are available as an optional component included in the kit or ordered separately. The code numbers for these parts are listed in Table 28. Refer to Table 29 for the required stainless steel seat removal tools.

For N.O./PDTC valves with brass trim, the kit contains:

- bonnet, packing, and stem and plug assembly

For N.C./PDTO and three-way valves with brass trim, the kit contains:

- stem and plug assembly
- all packing components
- bonnet
- bottom cap/lower body (optional for 1-1/2 and 2 in. valves only)

For N.O./PDTC valves with stainless steel trim, the kit contains:

- preassembled bonnet, packing, and stem and plug assembly
- stainless steel seat

For N.C./PDTO and three-way valves with stainless steel trim, the kit contains:

- stem and plug assembly
- stainless steel seat (two for three-way valves)
- all packing components
- bonnet
- bottom cap/lower body (optional for 1-1/2 and 2 in. valves only)

Table 28: Lower Body Kits

Code Number	Valve Type	End Connection
VG7000-6101	1-1/2 in. Brass, N.C./PDTO	Bottom Cap
VG7000-6105	1-1/2 in. Brass, Three-Way	NPT
VG7000-6106	2 in. Brass, N.C./PDTO	Bottom Cap
VG7000-6110	2 in. Brass, Three-Way	NPT
VG7000-6111	1-1/2 in. Stainless Steel, N.C./PDTO	Bottom Cap
VG7000-6115	1-1/2 in. Stainless Steel, Three-Way	NPT
VG7000-6116	2 in. Stainless Steel, N.C./PDTO	Bottom Cap
VG7000-6120	2 in. Stainless Steel, Three-Way	NPT

Table 29: Seat Removal Tools*

Code Number	Valve Size, in. (DN)
X-200-8104	1/2 (DN15)
X-200-8106	3/4 (DN20)
X-200-8107	1 (DN25)
X-200-8108	1-1/4 (DN32)
X-200-8109	1-1/2 (DN40)
X-200-8110	2 (DN50)

* For stainless steel trim valve seats only.

Notes

Notes

Notes

Specifications

Product	VG7000 Series Bronze Control Valves		
Models and Ordering Data	See Tables 1, 2, and 3.		
Service*	Hot Water, Chilled Water, Glycol Solutions, or Steam for HVAC Systems		
Valve Body Size/Cv (Kv)	1/2 in. (DN15)	0.73 (0.63), 1.8 (1.6), and 4.6 (4.0)	
	3/4 in. (DN20)	7.3 (6.3)	
	1 in. (DN25)	11.6 (10)	
	1-1/4 in. (DN32)	18.5 (16)	
	1-1/2 in. (DN40)	28.9 (25)	
	2 in. (DN50)	46.2 (40)	
Valve Stroke	5/16 in. (8 mm) for 1/2 and 3/4 in. Valves (DN15 and DN20)		
	1/2 in. (13 mm) for 1 and 1-1/4 in. Valves (DN25 and DN32)		
	3/4 in. (19 mm) for 1-1/2 and 2 in. Valves (DN40 and DN50)		
Valve Body Rating	Meets Requirements of ANSI B16.15, Class 250		
Valve Assembly Maximum Allowable Pressure/Temperature	Steam	Brass Trim	38 psig (262 kPa) Saturated Steam at 284°F (140°C)
		SS Trim	100 psig (690 kPa) Saturated Steam at 338°F (170°C)
	Water	Brass Trim	400 psig (2,756 kPa) Up to 150°F (66°C), Decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
		SS Trim	400 psig (2,756 kPa) Up to 150°F (66°C), Decreasing to 308 psig (2,122 kPa) at 338°F (170°C)
Leakage	Brass Trim	0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4	
	SS Trim	0.05% of Maximum Flow	
Inherent Flow Characteristics	Equal Percentage: N.O./PDTC and N.C./PDTO Valves Linear: Three-Way Mixing Valves		
Rangeability**	25:1 for All Sizes		
Spring Range Pneumatic Actuators	3 to 6 psig (21 to 41 kPa); 3 to 7 psig (21 to 48 kPa) for MP8000 Series 4 to 8 psig (28 to 55 kPa) 9 to 13 psig (62 to 90 kPa)		
Maximum Recommended Operating Pressure Drop	Steam	Brass Trim	15 psig (103 kPa) for All Valve Sizes
		SS Trim	100 psig (690 kPa) for All Valve Sizes
	Water	All Trim	35 psig (241 kPa) for 1/2 through 1-1/4 in. Valves; 30 psig (207 kPa) for 1-1/2 and 2 in. Valves
Maximum Actuator Supply Pressure (Pneumatically Actuated Valves Only)	25 psig (172 kPa) Maximum		
Maximum Closeoff Pressures	See Tables 10 through 15.		

Continued on next page . . .

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

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

Specifications (Cont.)

Materials	Body	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Brass Plug	Brass
	Trim Seat	Brass Against Molded Elastomeric Disk
	Packing	Self-Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups
	Stem	Stainless Steel
	SS Plug	Stainless Steel
	Trim Seat	Stainless Steel
	Packing	Spring-Loaded PTFE and Elastomer V-Rings
Valve Fluid Operating Temperature Limits	Pneumatic	For V-3801-8001 and V-3000-8003 Actuators: 35 to 248°F (2 to 120°C); 15 psig (103 kPa) Saturated Steam
		For MP82 and V-3000-8011 Actuators: 35 to 284°F (2 to 140°C); 38 psig (262 kPa) Saturated Steam
	Brass Trim	For VA-8x2x Actuators: Water: 195°F (91°C) Maximum Steam: Actuator is not rated for this application.
		For VA-4233 Actuators: 35 to 250°F (2 to 121°C); 15 psig (103 kPa) Saturated Steam
	Electric	For All Other Actuators: 35 to 284°F (2 to 140°C); 38 psig (262 kPa) Saturated Steam
		For VA-4233 Actuators: 35 to 338°F (2 to 170°C); 100 psig (690 kPa) Saturated Steam
	SS Trim	For VA-4233 Actuators: 35 to 250°F (2 to 121°C); 15 psig (103 kPa) Saturated Steam
		For All Other Actuators: 35 to 338°F (2 to 170°C); 100 psig (690 kPa) Saturated Steam
	Actuator Ambient Operating Temperature Limits	For M9x16 Series Electric Actuators: The maximum ambient operating temperature is limited to 110°F (43°C) for fluid operating temperatures greater than 285°F (141°C).
		For All Other Actuators: Refer to the appropriate actuator or linkage kit product bulletin; ambient operating temperature or other service limitations vary by selected actuator.
Accessories (Order Separately)	See Table 26.	

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.



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

Printed in U.S.A.
www.johnsoncontrols.com