VG7000 Series Bronze Control Valves

Product Bulletin

VG7000 Series

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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

Table 1: Features and Benefits

Features	Benefits
Complete Family of 1/2 through 2 in. Bronze Valves, Brass and Stainless Steel Trim, with Several Styles of Electric and Pneumatic Actuators	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.
Flexible Features and Options Ordering Matrix	Engineer to suit your specific application from thousands of easy-to-select, factory-assembled combinations.
Uses Standard Johnson Controls® Ring Pack Packings	Provides industry-leading reliability and operating life.
Every Valve Tested for Tight Shutoff	Provides energy conservation and ensures occupant comfort.
Standard Bonnet and Stem Design	Allows easy field retrofit, easy field mounting, and interchangeability of actuators with the use of standardized mounting kits.

Johnson Controls

Ordering Data

Table 2: Ordering Data — VG7000 Series Bronze Control Valves[1]

V G	**Valve Global**	
1 2 **7**	**Product Family**	7 = Cast Bronze
3 **2** 4	**Body Type**	2 = Two-Way, Normally Open/Push-Down-to-Close 4 = Two-Way, Normally Closed/Push-Down-to-Open 5 = Two-Way Angle, Normally Open/Push-Down-to-Close 8 = Three-Way Mixing
4 5	**End Connections**	4 = Threaded (NPT) 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 6	**Trim and Flow Characteristics**	1 = Brass Equal Percentage (All Two-Way and 1/2 in. Three-Way) 2 = Brass Linear (Three-Way Only) 3 = Stainless Steel Equal Percentage (Two-Way Only) 4 = Stainless Steel Linear (Three-Way Only)
L 7	**Size and Cv (Kv)**	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 8	**Stem Type**	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)
+ 9	**Actuator** **Mounting**	+ = Factory-Mounted Actuator (See Table 3 and Table 4.) *(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-way, normally open/push-down-to-close, threaded (NPT) end connections, brass trim, equal percentage, 3/4 in., 7.3 Cv, standard threaded stem.

1. See Table 3 when adding a factory-mounted pneumatic actuator to a valve body. See Table 4 when adding a factory-mounted electric actuator to a valve body. For valid valve and actuator combinations, see Table 17 and Table 18.

Table 3: Ordering Data — Adding a Factory-Mounted Pneumatic Actuator[1]

V G 7 2 4 3 L T + 3 0 0 8 1 2 3 4 5 6 7 8 9 10 11 12 13	**V-3000/V-3801 Pneumatic Actuator[2]**	3801 = V-3801-8001 Small Oval Top (Slotted Stem Only) 3008 = V-3000-8011 Exposed 3003 = V-3000-8003 Enclosed
B 14	**Spring Range (V-3000/V-3801)**	B = 3 to 6 psig (Suggested for N.O. Valves with Positioner) D = 4 to 8 psig (Suggested for Three-Way Valves with Positioner) E = 9 to 13 psig (Suggested for N.C. Valves with Positioner)
P 15	**Accessories (V-3000/V-3801)**	P = V-9502 Positioner (Not Avail. with V-3801-8001 or V-3000-8003) Blank = None
8 2 10 11	**MP8000 Series Pneumatic Actuator[2]**	82 = MP82, 25 sq in. Spring-Return-Up (SS or Brass Trim) 84 = MP84, 50 sq in. Spring-Return-Up (SS Trim Only) (Only spring-return-up models of MP8000 Series Pneumatic Actuators are available factory-mounted to VG7000 Series Bronze Control Valves.)
1 12	**Stroke (MP8000 Series)**	1 = 5/16 in. (1/2 or 3/4 in. Valves with MP82 Actuator Only) 2 = 1/2 in. (1 or 1-1/4 in. Valves with MP82 Actuator Only) 3 = 3/4 in. (1-1/2 or 2 in. Valves with MP82 or MP84 Actuator)
C 13	**Spring Range (MP8000 Series)**	C = 3 to 7 psig (Suggested for N.O. Valves with Positioner) D = 4 to 8 psig (Suggested for Three-Way Valves with Positioner) E = 9 to 13 psig (Suggested for N.C. Valves with Positioner)
0 1 14 15	**Accessories (MP8000 Series)**	00 = None 01 = V-9502 Positioner

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

V G 7 2 4 3 L T + 8 2 1 C 0 1

Valve + **Actuator**

Example: Cast bronze valve, two-way, normally open, threaded (NPT) end connections, stainless steel trim, equal percentage, 3/4 in., 7.3 Cv, standard threaded stem, MP82 Series Pneumatic Actuator, 5/16 in. stroke, 3 to 7 psig spring range, with factory-mounted V-9502 Positioner.

1. See Table 2 when ordering a valve body only. See Table 4 when adding a factory-mounted electric actuator to a valve body. For valid valve and actuator combinations, see Table 17 and Table 18.
2. Refer to the Actuator Product Bulletin or Product/Technical Bulletin.

Table 4: Ordering Data — Adding a Factory-Mounted Electric Actuator[1]

V G 7 2 4 1 L T + 7 1 5 0 (1 2 3 4 5 6 7 8 9 10 11 12 13)	**VA-7150/ VA-7200 Electric Actuator[2, 3]**	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
G (14)	**Voltage (VA-7150/ VA-7200)**	G = 24 VAC
(15)	**Accessories (VA-7150/ VA-7200)**	Blank = None
4 2 3 (10 11 12)	**VA-4233 Electric Actuator[2]**	Spring Return Up 423 = VA-4233-xGx-2, 24 VAC/VDC
A G A (13 14 15)	**Features (VA-4233)[4]**	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.
9 2 N (10 11 12)	**M9116/M9220 Electric Actuator[2]**	**Non-Spring Return** 916 = M9116-xxx-2, 24 VAC/VDC **Spring Return (Available NPT Only)** 92N = M9220-xxx-3, Spring-to-Open (Up), 24 VAC/VDC 94N = M9220-xxx-3, Spring-to-Close (Down), 24 VAC/VDC
G G A (13 14 15)	**Features (M9116/M9220)**	AGA = On/Off (Floating) AGC = On/Off (Floating), 2 Aux. Sw. GGA = Proportional., 0-10 VDC, Feedback GGC = Proportional., 0-10 VDC, Feedback, 2 Aux. Sw.
8 0 2 0 (10 11 12 13)	**VA-8x2x Electric Actuator[2, 3]**	8020 = VA-8020-1, On/Off (Floating) 8122 = VA-8122-1, Proportional
G (14)	**Voltage (VA-8x2x)**	G = 24 VAC
(15)	**Accessories (VA-8x2x)**	Blank = None
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	= Field	
V G 7 2 4 1 L T + 8 0 2 0 G	**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.	
Valve + **Actuator**		

1. See Table 2 when ordering a valve body only. See Table 3 when adding a factory-mounted pneumatic actuator to a valve body. For valid valve and actuator combinations, see Table 17 and Table 18.
2. Refer to the Actuator Product Bulletin or Product/Technical Bulletin.
3. Available for PDTC Two-Way and Three-Way body styles only.
4. Available for NPT (threaded) and Union Sweat End Connections body style only.

Application Overview

IMPORTANT: The VG7000 Series Bronze Control Valves are intended to control saturated steam, hot water, and chilled water flow under normal equipment operating conditions. Where failure or malfunction of the VG7000 Series Valve could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the VG7000 Series Valve.

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. See Table 2 through Table 4 for ordering data and additional details. For valid valve and actuator combinations, see Table 17 and Table 18. (Buy American factory-mounted valve and actuator combinations are no longer available.)

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 Table 9, Table 11, Table 12, and Table 17.)

Note: 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)* 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 (see the *Stem Type* section in Table 2), the spring kits available are for field mounting to standard threaded stem valves. See Table 9 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. See Table 11 and Table 12 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. See Table 9 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)*.

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)* 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. See Table 9 for the appropriate mounting kit code number.

Electric Actuator Selection

Factory-mounted electric actuators are available on two-way PDTC and three-way mixing valve configurations only. Actuators can be easily field reversed if required. The actuators can be field mounted on PDTO 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: PDTO, PDTC, 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 2.

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.

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. When coupled with the M9000-500 Valve Mounting, the rotary motion of this actuator is converted into linear motion that operates 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. See Table 5 for ordering information and additional details. Kits are available to field mount all M100 models; see Table 5, Table 8, and Table 10 for detailed information.

Table 5: 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.

Shipping Weights

Table 6: Shipping Weights for Brass Trim Valves[1]

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	---	---	---	---
M9220	8.6	9.7	11.7	11.6	17.3	22.4

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

Table 7: Shipping Weights for Stainless Steel Trim Valves[1]

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
M9220	8.6	9.7	12.1	14.1	17.3	22.4

1. 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. See Table 8 for the appropriate mounting kit code number.

Field Mounting

A standard bonnet/stem design allows for easy field mounting of actuators. See Table 2 to order valves without actuators, Table 8, Table 9, and Table 10 to order the appropriate mounting kits, and Table 17 and Table 18 to identify compatible actuators. Refer to the appropriate actuator product bulletin for specific actuator code number information.

Table 8: 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 9: Field Mounting Kits for Pneumatic Actuators[1]

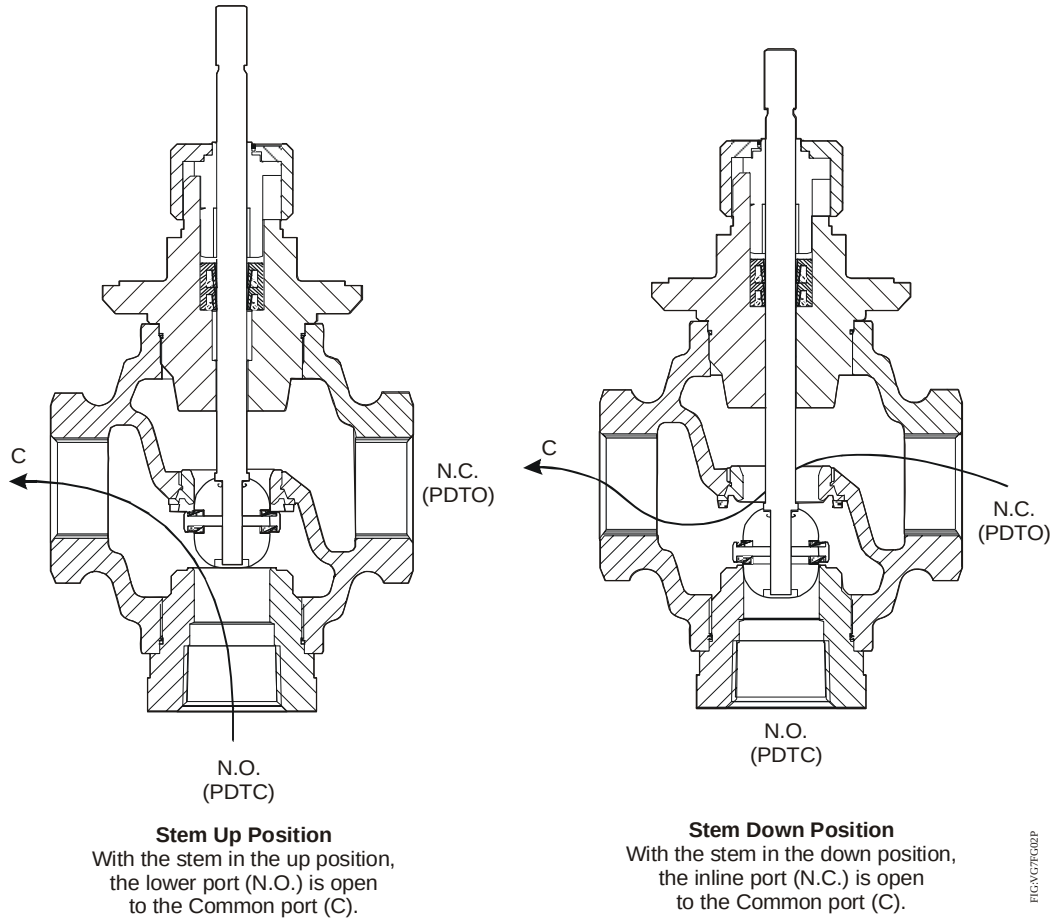
Actuator Style	Valve Size in. (DN)[2]	Spring Range psig (kPa)	Mounting Kit Code Number
T-3x11 V-3000-8011 V-3000-8003	1/2 or 3/4 (DN15 or DN20) 5/16 in. (8 mm) Stroke	3 to 6 (21 to 41)	VG7000-1001[3]
		4 to 8 (28 to 55)	VG7000-1002[3]
		9 to 13 (62 to 90)	VG7000-1003[3]
T-3x11 V-3000-8011 V-3000-8003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

1. All mounting kits are for use with valves with standard threaded stem design only.
2. DN is the European designation for body size in metric units (mm).
3. 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.
4. The mounting kits include: stem nut (1), stem extender nuts (2), stem extender (1), and yoke nut (1).
5. The mounting kit includes: stem nuts (2) and yoke nut (1).

Table 10: Field Mounting Kits for Electric Actuators[1]

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

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



Stem Up Position
With the stem in the up position, the lower port (N.O.) is open to the Common port (C).

Stem Down Position
With the stem in the down position, the inline port (N.C.) is open to the Common port (C).

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

Table 11: 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)
		1.8 (1.6)	186 (1,282)	157 (1,082)	84 (579)	37 (255)	57 (393)	158 (1,089)
		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)
		1.8 (1.6)	365 (2,515)	339 (2,336)	191 (1,316)	100 (689)	142 (978)	348 (2,398)
		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 12: 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) 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-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)
		1.8 (1.6)	299 (2,060)	255 (1,757)	143 (985)	75 (517)	106 (730)	261 (1,798)
		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)
		1.8 (1.6)	308 (2,124)	308 (2,124)	308 (2,124)	280 (1,929)	308 (2,124)	308 (2,124)
		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 13: Brass Trim – Maximum Closeoff Pressures, psig (kPa) for PDTC Two-Way and PDTC Port for Three-Way Electrically Actuated Valves[1]

284°F (140°C) Maximum Fluid Temperature[2]								
Valve Size, in. (DN)	**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)	---	---
M9116 or M9220	345 (2,377)	345 (2,377)	345 (2,377)	289 (1,991)	182 (1,254)	111 (765)	71 (489)	46 (317)
M110[3]	144 (992)	144 (992)	82 (565)	52 (358)	31 (214)	19 (131)	12 (83)	8 (55)
M120 and M130[3]	345 (2,377)	345 (2,377)	221 (1,523)	141 (971)	88 (606)	54 (372)	34 (234)	22 (152)
M140[3]	345 (2,377)	345 (2,377)	337 (2,322)	215 (1,481)	135 (930)	82 (565)	53 (365)	34 (234)
M150[3]	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)	---	---	---	---

1. 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 Table 8 and Table 10. See Table 17 and Table 18 for valid factory-mounted combinations, and Table 8 and Table 10 for available field mounting kits.
2. 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.
3. 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 Table 8 and Table 10.

Table 14: Brass Trim – Maximum Closeoff Pressures, psig (kPa) for PDTO Two-Way and PDTO Port for Three-Way Electrically Actuated Valves[1]

Not Available Factory Coupled for PDTO Two-Way — Field Mounting Only 284°F (140°C) Maximum Fluid Temperature[2]								
Valve Size, in. (DN)	**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)	---	---
M9116 or M9220	345 (2,377)	345 (2,377)	345 (2,377)	321 (2,212)	213 (1,468)	122 (841)	76 (524)	47 (324)
M110[3]	200 (1,378)	200 (1,378)	97 (668)	58 (400)	36 (248)	21 (145)	13 (90)	8 (55)
M120 and M130[3]	345 (2,377)	345 (2,377)	262 (1,805)	156 (1,075)	103 (710)	59 (407)	36 (248)	23 (158)
M140[3]	345 (2,377)	345 (2,377)	345 (2,377)	239 (1,647)	158 (1,089)	90 (620)	56 (386)	35 (241)
M150[3]	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)	---	---	---	---

1. 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 Table 8 and Table 10. See Table 17 and Table 18 for valid factory-mounted combinations, and Table 8 and Table 10 for available field mounting kits.
2. 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.
3. 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 Table 8 and Table 10.

Table 15: Stainless Steel Trim – Maximum Closeoff Pressures, psig (kPa) for PDTC Two-Way and PDTC Port for Three-Way Electrically Actuated Valves[1]

338°F (170°C) Maximum Fluid Temperature[2]								
Valve Size, in. (DN)	**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)	---	---
M9116 or M9220	308 (2,122)	308 (2,122)	283 (1,950)	180 (1,240)	114 (785)	70 (482)	45 (310)	28 (193)
M110[3]	90 (620)	90 (620)	51 (351)	32 (220)	19 (131)	12 (83)	8 (55)	5 (34)
M120 and M130[3]	308 (2,122)	244 (1,681)	138 (951)	88 (606)	55 (379)	33 (227)	21 (145)	14 (96)
M140[3]	308 (2,122)	308 (2,122)	211 (1,454)	134 (923)	84 (579)	52 (358)	33 (227)	21 (145)
M150[3]	308 (2,122)	308 (2,122)	308 (2,122)	245 (1,688)	155 (1,068)	95 (655)	61 (420)	39 (269)

1. 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 Table 8 and Table 10. See Table 17 and Table 18 for valid factory-mounted combinations, and Table 8 and Table 10 for available field mounting kits.
2. 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.
3. 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 Table 8 and Table 10.

Table 16: Stainless Steel Trim – Maximum Closeoff Pressures, psig (kPa) for PDTO Two-Way and PDTO Port for Three-Way Electrically Actuated Valves[1]

Not Available Factory Coupled for PDTO Two-Way — Field Mounting Only 338°F (170°C) Maximum Fluid Temperature[2]								
Valve Size, in. (DN)	**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)	---	---
M9116 or M9220	308 (2,122)	308 (2,122)	308 (2,122)	201 (1,385)	133 (916)	76 (524)	47 (324)	30 (207)
M110[3]	125 (861)	125 (861)	61 (420)	36 (248)	23 (158)	13 (90)	8 (55)	5 (34)
M120 and M130[3]	308 (2,122)	308 (2,122)	164 (1,130)	98 (675)	64 (441)	37 (255)	23 (158)	14 (96)
M140[3]	308 (2,122)	308 (2,122)	250 (1,723)	149 (1,027)	99 (682)	57 (393)	35 (241)	22 (152)
M150[3]	308 (2,122)	308 (2,122)	308 (2,122)	273 (1,881)	182 (1,254)	104 (717)	64 (441)	40 (276)

1. 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 Table 8 and Table 10. See Table 17 and Table 18 for valid factory-mounted combinations, and Table 8 and Table 10 for available field mounting kits.
2. 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.
3. 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 Table 8 and Table 10.

Table 17: Pneumatic Actuated Valves – Available Factory-Mounted Combinations[1] (Part 1 of 2)

Actuator	V-3801-8001			V-3000-8011[2]			V-3000-8003			P82[2]			MP84[2]		
Spring Range	**3-6**	**4-8**	**9-13**	**3-6**	**4-8**	**9-13**	**3-6**	**4-8**	**9-13**	**3-6**	**4-8**	**9-13**	**3-6**	**4-8**	**9-13**
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	---	---	---	---	---	---

Table 17: Pneumatic Actuated Valves – Available Factory-Mounted Combinations[1] (Part 2 of 2)

Actuator	V-3801-8001			V-3000-8011[2]			V-3000-8003			P82[2]			MP84[2]		
Spring Range	**3-6**	**4-8**	**9-13**	**3-6**	**4-8**	**9-13**	**3-6**	**4-8**	**9-13**	**3-6**	**4-8**	**9-13**	**3-6**	**4-8**	**9-13**
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. Stainless steel trim is available only with NPT (internal) end connections.
   Items shown as "---" are not available factory mounted, and not recommended for field assembly.
2. Available with or without a positioner.

Table 18: Electrically Actuated Valves – Available Factory-Mounted Combinations[1]

	Non-Spring Return			Spring Return[2]	
Actuator	**VA-7150-1001 VA-7152-1001 VA-7153-1001**	**VA-7200-1001 VA-7202-1001 VA-7203-1001**	**VA-8020-1 VA-8122-1**	**VA-4233-AGA-2 VA-4233-AGC-2 VA-4233-BGA-2 VA-4233-BGC-2 VA-4233-GGA-2 VA-4233-GGC-2**	**M9116-AGx-2 M9116-GGx-2 M9220-AGx-3 M9220-GGx-3**
Valve Size, in. (DN)	**VG7241 and VG7842 Valves – Brass Trim, NPT End Connections**				
1/2 in. (DN15)	X	---	X	X	X
3/4 in. (DN20)	X	---	X	X	X
1 in. (DN25)	X	X	---	X	X
1-1/4 in. (DN32)	X	X	---	X	X
1-1/2 in. (DN40)	X	X	---	---	X
2 in. (DN50)	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
3/4 in. (DN20)	X	X	---	X	X
1 in. (DN25)	X	X	---	X	X
1-1/4 in. (DN32)	X	X	---	X	X
1-1/2 in. (DN40)	X	X	---	---	X
2 in. (DN50)	X	X	---	---	X
Valve Size, in. (DN)	**VG7281 and VG7882 Valves – Brass Trim, Union Sweat End Connections**				
1/2 in. (DN15)	X	---	X	X	---
3/4 in. (DN20)	X	---	X	X	---
1 in. (DN25)	X	X	---	X	---
1-1/4 in. (DN32)	X	X	---	X	---
1-1/2 in. (DN40)	X	X	---	---	---
2 in. (DN50)	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	---
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.

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)* 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 for specifications and available options.

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.

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 for specifications and available options.

M9116/M9220 Series Electric Actuators

The M9116/M9220 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 M9220 Actuator returns to its normal position. Refer to the appropriate electric actuator literature or the *M9000-500 Valve Linkage Kit for M9116 and M9220 Series Electric Actuators Product Bulletin (LIT-977352)* in the 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.

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 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, input lines to the actuator must be wired correctly for the valve to move in the proper direction.

IMPORTANT: Protect the actuator from dripping water, condensation, and other moisture. Water or moisture could result in an electrical short, which may damage or affect the operation of the actuator.

IMPORTANT: Do not cover the actuator with thermal insulating material. High ambient temperatures may damage the actuator, and a hot water pipe, steam pipe, or other heat source may overheat it.

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

IMPORTANT: Take care to prevent foreign material such as weld slag, thread burrs, metal chips, and scale from entering the piping system. This debris can damage or severely impede the operation of the valve by embedding itself in the seats, scoring the valve, and ultimately resulting in seat leakage. If the debris becomes embedded in the seats, subsequent flushing and filtering of the piping system with the valve installed does not remedy the problem.

Before servicing a VG7000 Series Bronze Control Valve, please isolate or disconnect the pneumatic supply or electrical power to the actuator, allow sufficient clearance for actuator removal from the valve, and note the following:

WARNING: Risk of Electric Shock. Disconnect each of multiple power supplies before making electrical connections. More than one disconnect may be required to completely de energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

IMPORTANT: Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the electrical ratings of the VG7000 Series Bronze Control Valve.

CAUTION: Risk of Property Damage. Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

WARNING: Risk of Personal Injury. Shut off the liquid supply and relieve pressure in the line before servicing the valve. Contents of liquid lines could be under pressure and the release of liquid under pressure may cause severe personal injury.

Dimensions

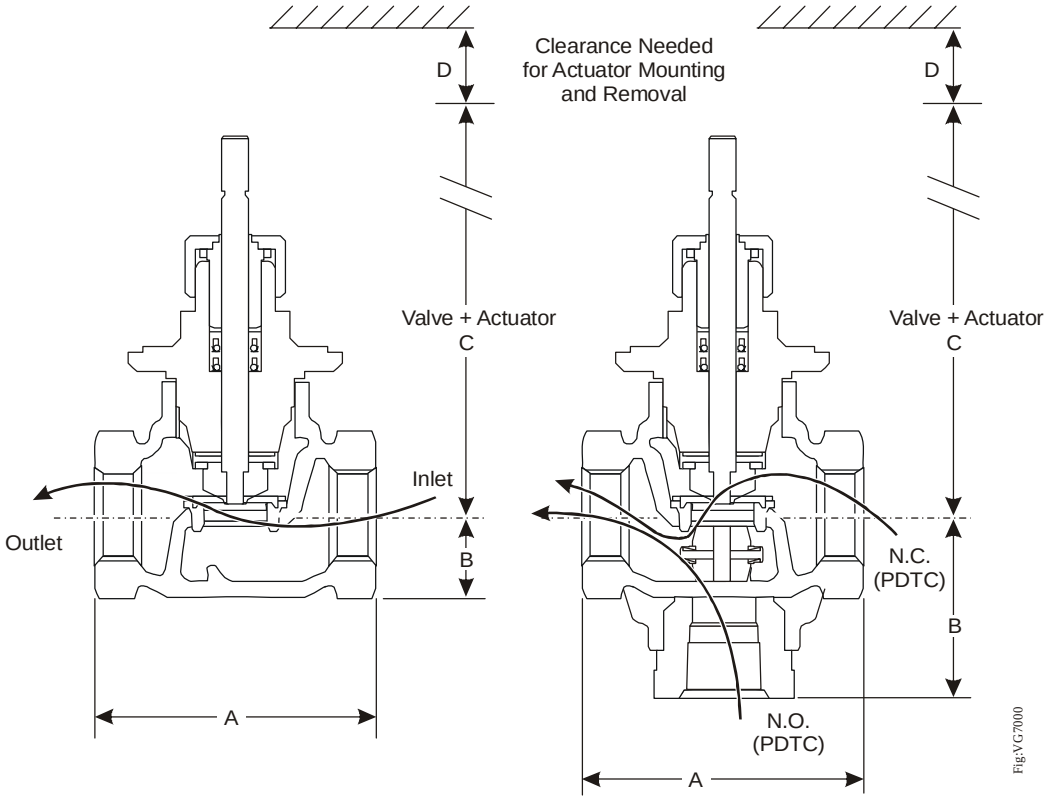


Figure 3: Two-Way and Three-Way Valve Dimensions

Table 19: National Pipe Thread (Internal NPT) Valve Dimensions, in. (mm)[1]

Valve Size, in. (DN)	A		B	
	N.O., N.C., and 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)

1. See Table 23 for overall assembly height **C** and clearance **D** dimensions.

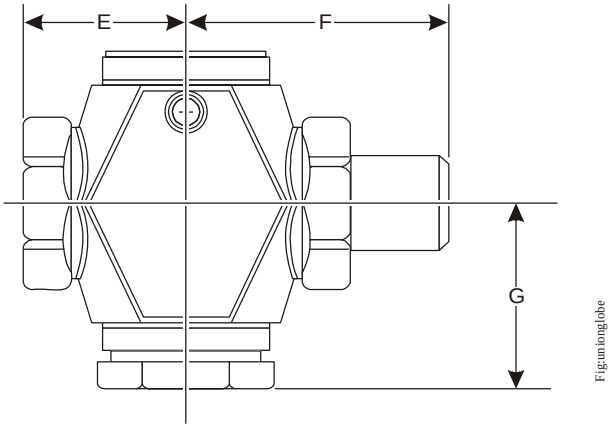


Figure 4: Two-Way Union Globe Valve Dimensions

Table 20: Two-Way Union Globe Valve Dimensions, in. (mm)[1]

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)
Sizes Greater than 1/2 in. (DN15) are Available in N.O./PDTC Only			
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)

1. See Table 23 for overall assembly height **C** and clearance **D** dimensions.

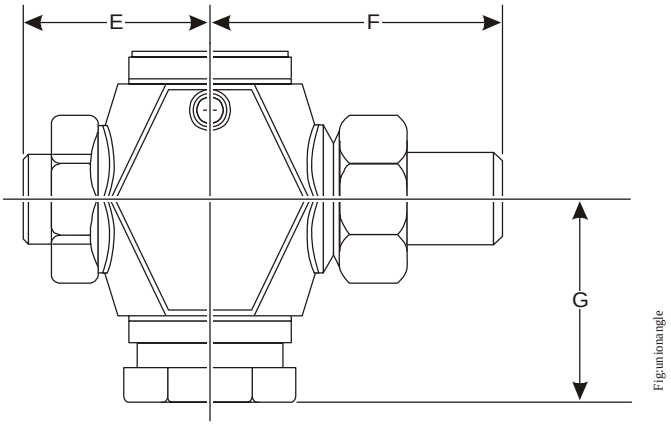


Figure 5: Two-Way Union Angle Valve Dimensions

Table 21: Two-Way Union Angle Valve Dimensions, in. (mm)[1]

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)

1. See Table 23 for overall assembly height **C** and clearance **D** dimensions.

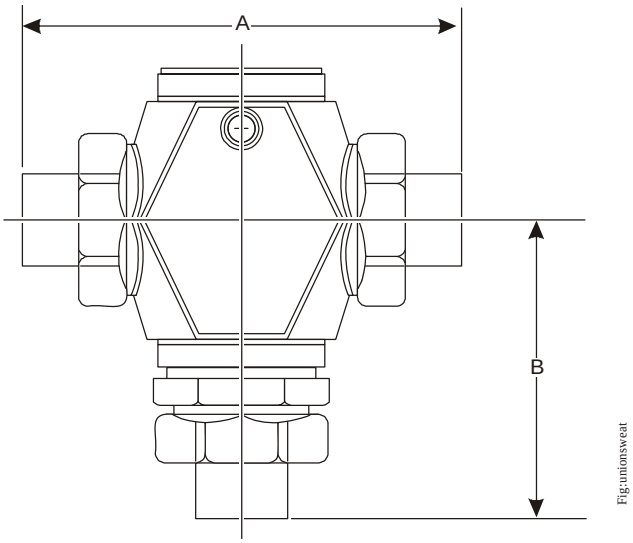


Figure 6: Union Sweat Valve Dimensions

Table 22: Union Sweat Valve Dimensions, in. (mm)[1]

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)	1-5/32 (29)	1-3/4 (44)	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)

1. See to Table 23 for overall assembly height **C** and clearance **D** dimensions.

Table 23: Valve Assembly Dimensions, in. (mm)

Actuator Type	C[1]						D[1]
	1/2 in. (DN15)	3/4 in. (DN20)	1 in. (DN25)	1-1/4 in. (DN32)	1-1/2 in. (DN40)	2 in. (DN50)	
Brass Trim Valve Assemblies							
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)
MP82xx, MP83xx	---	---	12-23/32 (323)	12-27/32 (326)	13-13/32 (341)	13-13/16 (351)	3-1/2 (89)
VA-4233	8 (203)	8 (203)	9-7/32 (234)	9-7/32 (234)	---	---	1-1/2 (38)
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-802x	6-7/16 (164)	6-7/16 (164)	---	---	---	---	1-1/2 (38)
M9116, M9220	14 (356)	14 (356)	15-7/32 (386)	15-7/32 (386)	15-1/16 (382)	15-15/32 (392)	---
M1xx	10-13/16 (274)	10-13/16 (274)	12-1/32 (305)	12-1/32 (305)	11-7/8 (301)	12-1/4 (311)	---
Stainless Steel Trim Valve Assemblies[2]							
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)
MP82xx	12-3/4 (324)	13-17/64 (337)	13-39/64 (346)	13-27/32 (352)	14-1/32 (356)	14-15/64 (361)	3-1/2 (89)
MP83xx	12-21/64 (313)	12-35/64 (319)	12-7/8 (327)	13-1/8 (333)	13-19/64 (338)	13-1/2 (343)	3-1/2 (89)
MP84xx	---	---	---	---	17-7/32 (437)	17-27/64 (443)	3-1/2 (89)
MP85xx	---	---	---	---	15-61/64 (405)	16-5/32 (410)	3-1/2 (89)
VA-4233	8-23/32 (221)	8-15/16 (227)	9-9/32 (236)	9-13/16 (249)	---	---	1-1/2 (38)
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 (231)	9-5/16 (236)	9-21/32 (245)	9-7/8 (251)	10-3/32 (256)	10-9/32 (261)	4-1/2 (114)
M9116, M9220	14-11/16 (373)	14-29/32 (378)	15-1/4 (387)	15-1/2 (393)	15-23/32 (399)	15-7/8 (403)	---
M1xx	11-1/2 (292)	11-23/32 (297)	12-1/16 (306)	12-5/16 (312)	12-1/2 (318)	12-11/16 (322)	---

1. 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).
2. An extended bonnet comes as standard equipment on VG7000 Series Bronze Control Valves with stainless steel trim, to allow for higher fluid temperatures (100 psig [689 kPa] saturated steam at 338°F [170°C]).

Repair Information

If the VG7000 Series Bronze Control Valve fails to operate within its specifications, see the *Maintenance and Accessories* and *Reconditioning Kits* sections for a list of repair parts and reconditioning kits available. For a replacement valve, contact the nearest Johnson Controls® representative.

Maintenance and Accessories

The maintenance parts available for the VG7000 Series Valves are listed in Table 24. See Table 25 for a list of available accessories.

Table 24: Maintenance Parts (Order Separately)

Code Number	Description
VG7000-6001	Ring Pack Packing Kits for Brass Trim Valves: **Single Pack for 1/4 in. Stem (1/2 or 3/4 in. Valves)** 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
VG7000-6002	**Single Pack for 3/8 in. Stem (1 through 2 in. Valves)** 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
VG7000-6003	Ring Pack Packing Kits for Brass Trim Valves: **10 Pack for 1/4 in. Stem (1/2 or 3/4 in. Valves)** 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
VG7000-6004	**10 Pack for 3/8 in. Stem (1 through 2 in. Valves)** 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
VG7000-6011	PTFE V-Ring Packing Kits for Stainless Steel Trim Valves: **Single Pack for 1/4 in. Stem, SS Trim (1/2 or 3/4 in. Valves)** 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
VG7000-6012	**Single Pack for 3/8 in. Stem, SS Trim (1 through 2 in. Valves)** 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

Table 25: Accessories (Order Separately)[1]

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

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

Reconditioning Kits

Table 26: 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**	K = Inner Valve Reconditioning Kits
5		**Kits**	(Includes: bonnet, bonnet nut, packing, stem, plug, disk, and seat; replaceable seat is available for stainless steel trim valves only.)
	1	**Trim and Flow**	1 = Brass Equal Percentage (All Two-Way and 1/2 in. Three-Way)
6		**Characteristic**	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**	C = 1/2 in., 0.73 Cv (0.63 Kv)
7		**Cv (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**	T = Standard Threaded Stem (All Except V-3801, V-500, MP84, VA-8x2x)
8			S = Slotted Stem and Small Bonnet (Factory-Mounted V-3801, VA-8x2x) Only)
			L = Large Threaded Stem (Factory-Mounted V-500 Only)
			M = Large Threaded Stem (Factory-Mounted MP84 Only)
	+	**Optional**	+ = Lower Body Option (For 1-1/2 and 2 in. Bodies Only)
9		**Lower Body**	(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.)
	W	**N.C. Valve**	W = Two-Way Bottom Cap
10		**Bottom Cap**	(For 1-1/2 and 2 in. valves, it is recommended that a new bottom cap is ordered with the reconditioning kit.)
	4	**Three-Way**	4 = NPT
10		**Lower Body**	(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.)

1	2	3	4	5	6	7	8	9	10	= Field
V	**G**	**7**	**4**	**K**	**1**	**R**	**T**	**+**	**4**	

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.

Reconditioning Kit	**+**	**1-1/2 or 2 in. Bottom Cap/ 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 26. 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 27.

For N.O./PDTC valves with brass trim, the kit contains the 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 27: 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

Technical Specifications

VG7000 Series Bronze Control Valves[1] (Part 1 of 3)

Service[2]		Hot Water, Chilled Water, 50/50 Glycol Solutions, or Steam for HVAC Systems (Fluid Group 1 According to 67/548/EEC)
Valve Body Size/Cv (kv)	**1/2 in.**	0.73 (0.63), 1.8 (1.6), and 4.6 (4.0)
	3/4 in.	7.3 (6.3)
	1 in.	11.6 (10)
	1-1/4 in.	18.5 (16)
	1-1/2 in.	28.9 (25)
	2 in.	46.2 (40)
Valve Stroke		5/16 in. (8 mm) for 1/2 or 3/4 in. Valves
		1/2 in. (13 mm) for 1 and 1-1/4 in. Valves
		3/4 in. (19 mm) for 1-1/2 and 2 in. Valves
Valve Body Rating		Meets requirements of ANSI B16.15, Class 250 (EN 12360).

VG7000 Series Bronze Control Valves[1] (Part 2 of 3)

Valve Ambient Operating Temperature Limits		35 to 150°F (2 to 65°C)
Valve Assembly Maximum Allowable Pressure/ Temperature	**Steam**	**Brass Trim:** 35 psig (241 kPa) Saturated Steam at 281°F (138°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	**Two-Way Valves**	Equal Percentage
	Three-Way Mixing Valves	Linear
Rangeability[3]		25:1 for All Sizes (EN 60534-2-4)
Spring Range Pneumatic Actuators		3 to 6 psig (21 to 41 kPa) for All Except MP8000; 3 to 7 psig (21 to 48 kPa) for MP8000 Only; 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	**Brass and SS 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
Materials		**Body:** Cast Bronze
		Bonnet: Brass
	Brass Trim	**Stem:** Stainless Steel
		Plug: Brass
		Seat: Brass Against Molded Elastomeric Disk
		Packing: Self-Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups
	SS Trim	**Stem:** Stainless Steel
		Plug: Stainless Steel
		Seat: Stainless Steel
		Packing: Spring Loaded Polytetrafluoroethylene (PTFE) and Elastomer V-Rings

VG7000 Series Bronze Control Valves[1] (Part 3 of 3)

Valve Fluid Operating Temperature Limits	**Brass Trim Valve with Pneumatic Actuator**	**For V-3801-8001 and V-3000-8003 Actuators:** 35 to 248°F (2 to 120°C) Water; 15 psig (103 kPa) Saturated Steam
		For MP82 and V-3000-8011 Actuators: 35 to 284°F (2 to 140°C) Water; 38 psig (262 kPa) Saturated Steam
	Brass Trim Valve with Electric Actuator	**For VA-8x2x Actuators:** 195°F (91°C) Maximum Water; Actuators are not rated for steam.
		For VA-4233-xGx-2 Actuators: 35 to 250°F (2 to 121°C) Water; 15 psig (103 kPa) Saturated Steam
		For All Other Electric Actuators: 35 to 284°F (2 to 140°C) Water; 38 psig (262 kPa) Saturated Steam
	SS Trim Valve with Pneumatic Actuator	**All Pneumatic Actuators:** 35 to 338°F (2 to 170°C) Water; 100 psig (690 kPa) Saturated Steam
	SS Trim Valve with Electric Actuator	**For VA-4233-xGx-2 Actuators:** 35 to 250°F (2 to 121°C) Water; 15 psig (103 kPa) Saturated Steam
		For All Other Electric Actuators: 35 to 338°F (2 to 170°C) Water; 100 psig (690 kPa) Saturated Steam
Actuator Ambient Operating Temperature Limits		**For M9116/M9220 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.
Compliance	**1/2, 3/4, and 1 in. Valves**	**Pressure Equipment Directive (PED) 97/23/EC:** Paragraph 3, Comma 3 (CE Marking is not applicable.)
	1-1/4, 1-1/2, and 2 in. Valves	**Pressure Equipment Directive (PED) 97/23/EC:** Category 1, Mod. A (Subject to CE Marking)

1. For models and ordering data, see Table 2, Table 3, and Table 4.
   For maximum closeoff pressures, see Table 11 through Table 16.
   For accessories (order separate), see Table 25.
2. Proper water treatment is recommended; refer to VDI 2035 Standard.
3. Rangeability is defined as the ratio of maximum flow to minimum controllable flow.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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