

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 Heating, Ventilating, and Air Conditioning (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 (690 kPa) saturated steam.
Flexible Features and Options Ordering Matrix	Suits your specific application via thousands of easy-to-select, factory-assembled combinations.
Standard Johnson Controls® Ring Pack Packings	Provides industry-leading reliability and operating life.
Testing for Tight Shutoff of Every Valve	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.



Ordering Data

Table 2: Ordering Data — VG7000 Series Bronze Control Valves¹

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 = Two-Way, Normally Closed/Push-Down-to-Open 5 = Two-Way Angle, Normally Open/Push-Down-to-Close 8 = Three-Way Mixing											
		4	End Connections 4 = Threaded National Pipe Thread (NPT) 5 = Union Globe/Union Angle (1/2 through 1-1/2 in. Body Sizes, PDTC Only, Brass Trim Valves Only)) 7 = Union Sweat, 3/8 in. Tubing (1/2 in. Body Size Only, Brass Trim Valves Only)) 8 = Union Sweat, Standard Tubing (Brass Trim Valves Only) 9 = Union Sweat, 3/4 in. Tubing (1/2 in. Body Size Only, Brass Trim Valves Only))											
		1	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	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	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; Only Brass Trim Valves) M = Large Threaded Stem (Factory-Mounted MP84 Only, Only Stainless Steel Trim Valves)											
		+	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 16 and Table 17.

Table 3: Ordering Data — Adding a Factory-Mounted Pneumatic Actuator¹

V	G	7	2	4	3	L	T	+	3	0	0	8	V-3000/V-3801 Pneumatic Actuator ²		3801 = V-3801-8001 Small Oval Top (Slotted Stem Only, Brass Trim Valves Only, Must be Factory Assembled)			
1	2	3	4	5	6	7	8	9	10	11	12	13			3008 = V-3000-8012 Exposed			
																3003 = V-3000-8003 Enclosed		
													B	Spring Range (V-3000/V-3801)	B = 3 to 6 psig (Suggested for N.O. Valves with Positioner)			
													14		D = 4 to 8 psig (Suggested for Three-Way Valves with Positioner)			
														P	Accessories (V-3000/V-3801)	P = V-9502 Positioner (Not Available with V-3801-8001 or V-3000-8003)		
														15		Blank = None		
								8	2							MP8000 Series Pneumatic Actuator ²	82 = MP82, 25 sq in. Spring-Return-Up (SS or Brass Trim)	
								10	11								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					Stroke (MP8000 Series)	1 = 5/16 in. (1/2 or 3/4 in. Valves with MP82 Actuator Only)	
											12						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					Spring Range (MP8000 Series)	C = 3 to 7 psig (Suggested for N.O. Valves with Positioner)
												13						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					Accessories (MP8000 Series)	00 = None
											14	15						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	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			
Valve								+	Actuator									

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 16 and Table 17.
2. Refer to the actuator product bulletin or product/technical bulletin.

Table 4: Ordering Data — Adding a Factory-Mounted Electric Actuator¹

V	G	7	2	4	1	L	T	+	7	1	5	0	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			
1	2	3	4	5	6	7	8	9	10	11	12	13	G		Voltage (VA-7150/ VA-7200)	G = 24 VAC		
									14				Accessories (VA-7150/ VA-7200)		Blank = None			
									15									
									4	2	3	VA-4233 Electric Actuator ²		Spring Return Up 423 = VA-4233-xGx-2, 24 VAC/VDC				
									10	11	12							
											A	G	A	Features (VA-4233) ⁴		AGA = Floating AGC = Floating, 2 Auxiliary Switches BGA = On/Off BGC = On/Off, 2 Auxiliary Switches GGA = Prop., 0-10 VDC, Feedback GGC = Prop., 0-10 VDC, Feedback, 2 Auxiliary Switches		
											13	14	15					
									7	2	C	VA7810 VA7820/ VA7830 ⁵ Electric Actuator ^{2,6}		Non-Spring Return 71C = VA7810-xGx-2, 24 VAC/VDC Spring Return 72C = VA7820-HGx-2, Spring-Return Stem Up 24 VAC 74C = VA7830-HGx-2, Spring-Return Stem Down 24 VAC				
									10	11	12							
											G	G	A	Features (VA78x0) ⁷		AGA = On/Off (Floating) (Available only with VA7810 Actuator) AGC = On/Off (Floating), 2 Auxiliary Switches (Available only with VA7810) HGA = Proportional, 0-10 VDC, Feedback HGC = Proportional, 0-10 VDC, Feedback, 2		
											13	14	15					
									8	0	2	0	VA-8x2x Electric Actuator ^{2,3, 8}		8020 = VA-8020-1, On/Off (Floating) 8122 = VA-8122-1, Proportional			
									10	11	12	13						
											G			Voltage (VA-8x2x)		G = 24 VAC		
											14							
															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 16 and Table 17.
2. Refer to the actuator product bulletin or product/technical bulletin.
3. Available only for PDTC Two-Way and Three-Way body styles.
4. Available only for NPT (threaded) and Union Sweat End Connections body style.
5. VA7830 actuator is available only on Three-Way Mixing body style.
6. Available only for NPT (threaded) body style.
7. VA7820 and VA7830 Proportional Control Actuators have selectable switches for field conversion to On/Off or Floating Control.
8. Available only for 1/2 and 3/4 in. valves.

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 (PDTTC) (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-3000-8012 (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, VA7810, VA7820, or VA7830. All electric actuators are fully compatible with Johnson Controls® controllers, reducing installation costs. Valves without actuators can be ordered with the standard bonnet and threaded 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 16 and Table 17.

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 7, Table 9, Table 11, and Table 16.

Do not confuse the V-3000-8012, V-3000-8003, and V-3801-8001 Pneumatic Actuators 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 Actuators Product/Technical Bulletin (LIT-977252)* for specifics regarding interchangeability. The V-3801-8001 is not a direct replacement for the V-3802-1 because 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 7 for mounting kit code numbers.

V-3000-8012 Pneumatic Actuator

The V-3000-8012 is a versatile, medium-force pneumatic actuator that can be used in most HVAC applications, including sequential control of valves. See Table 9 and Table 11 for actuator sizing and selection.

The permanently captured, molded rolling diaphragm of the V-3000-8012 provides a constant effective area (8 sq in.) throughout the valve stem stroke. 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-3000-8012.

V-3000-8003 Pneumatic Actuator

The V-3000-8003, operationally similar to the V-3000-8012, is designed for enclosed installation in a location where the actuator might be subjected to tampering. The V-3000-8003 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 7 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 7 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 PDO 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 and VA78x0 are available on all valve styles: PDO, 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.

VA7810 Series Electric Actuators

The VA7810 Series is a line of motor driven, direct mount, non-spring return actuators that operate on 24 VAC and are available for use with on/off (floating) or proportional controllers. The actuator is available factory mounted to 1/2 through 2 in. valve body styles with NPT (threaded) end connections. The actuator is available separately for field mounting to union sweat, union globe, and union angle VG7000 Series valves.

The actuator delivers a minimum stem force of 180 lb. Integral auxiliary switches are available for indicating end-stop position or to perform switching functions. For proportional models a 0 (2) to 10 VDC signal feedback is available.

VA7820/VA7830 Series Electric Actuators

The VA7820/VA7830 Series is a line of motor driven, direct mount, spring return actuators that operate on 24 VAC. The actuators ship already set for 0 to 10 VDC Proportional control. With a simple change of DIP switch settings, the actuator can be reconfigured in the field for On/Off (Floating) Control. Position feedback is available via switches or a 0 (2) to 10 VDC signal. The actuator delivers a minimum stem force of 180 lb. If the power fails, the automatic spring returns the valve stem up for the VA7820 actuator or the valve stem down for the VA7830 actuator. A manual override allows manual positioning of the valve when power is not available. The actuator is available factory mounted to 1/2 through 2 in. valves body styles with NPT (threaded) end connections. The actuator is available separately for field mounting to union sweat, union globe, and union angle VG7000 Series valves.

Shipping Weights

Table 5: Shipping Weights for Brass Trim Valves¹

Actuator	Valve Weight, lb					
	1/2	3/4	1	1-1/4	1-1/2	2
V-3801-8001	2.5	3.1	---	---	---	---
V-3000-8012	3.4	4.5	6.5	6.5	12.1	17.2
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	---	---	---	---
VA7810	---	---	6.2	6.2	11.8	16.9
VA7820/ VA7830	---	---	7.9	7.9	13.5	18.6

1. 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 Valves¹

Actuator	Valve Weight, lb					
	1/2	3/4	1	1-1/4	1-1/2	2
V-3000-8012	3.7	4.5	6.9	8.9	---	---
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
VA7810	3.1	4.2	6.6	8.6	11.8	16.9
VA7820/ VA7830	4.8	5.9	8.3	10.3	13.5	18.6

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

Field Mounting

A standard bonnet/stem design allows for easy field mounting of actuators. See Table 2 to order valves without actuators; Table 7, and Table 8 to order the appropriate mounting kits; and Table 16 and Table 17 to identify compatible actuators. Refer to the appropriate actuator product bulletin for specific actuator code number information.

Table 7: Field Mounting Kits for Pneumatic Actuators¹

Actuator Style	Valve Size, in. (DN) ²	Spring Range psig (kPa)	Mounting Kit Code Number
T-3x11 V-3000-8012 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-3000-8012 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-3000-8012 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. Use all mounting kits 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. Use this only on valves with threaded stems.
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 8: Field Mounting Kits for Electric Actuators¹

Actuator Style	Valve Size, in. (DN)	Mounting Kit Code Number
VA-4233	1/2 through 1-1/4 (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	1/2 and 3/4 in. (DN15 and DN??)	VA-8020-100 (Refit only)
VA78x0	1/2 through 2 (DN15 through DN50)	None Required

1. Use all mounting kits with valves with standard threaded stem design only.

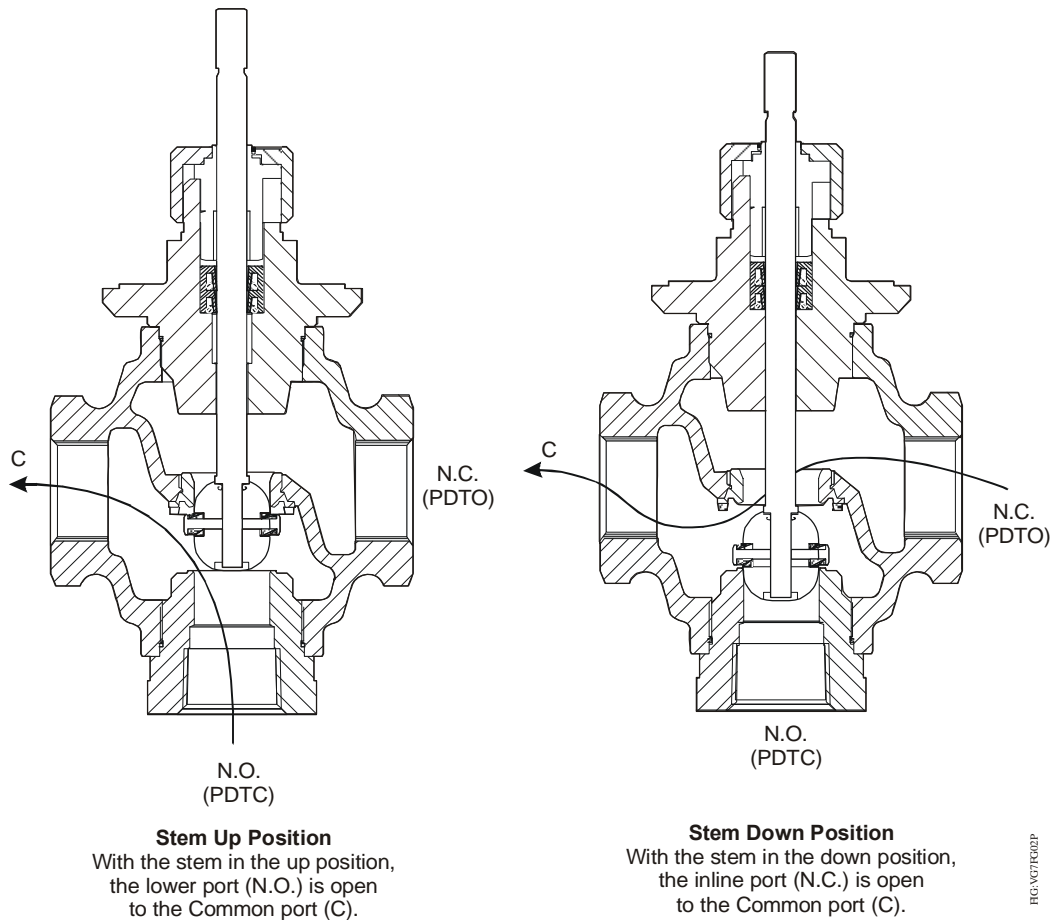


Figure 2: Three-Way Mixing Valves Fluid Flow Direction and Port Designation

Table 9: Brass Trim – Maximum Closeoff Pressures, psig (kPa) for Pneumatically Actuated Valves (Part 1 of 2)

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])	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)

Table 9: Brass Trim – Maximum Closeoff Pressures, psig (kPa) for Pneumatically Actuated Valves (Part 2 of 2)

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-3000-8012 (284°F [140°C]) and V-3000-8003 (248°F [120°C])	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])	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.

Table 10: Brass Trim – Maximum Fluid Temperature for Pneumatically Actuated Valves

Actuator Style	Water	Saturated Steam
V-3801-8001	248°F (120°C)	15 psig (103 kPa)
V-3000-8012	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) 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-3000-8012 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 American National Standards Institute (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 Valves¹

284°F (140°C) Maximum Fluid Temperature²								
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)	---	---
VA78x0	---	---	---	---	182 (1,254)	111 (765)	71 (489)	46 (317)
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 7 and Table 8. See Table 16 and Table 17 for valid factory-mounted combinations, and Table 7 and Table 8 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.

Table 13: Brass Trim – Maximum Closeoff Pressures, psig (kPa) for PDTO Two-Way and PDTO Port for Three-Way Electrically Actuated Valves^{1,2}

Not Available Factory Coupled for PDTO Two-Way — Field Mounting Only								
284°F (140°C) Maximum Fluid Temperature³								
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)	---	---
VA78x0	---	---	---	---	213 (1,468)	122 (841)	76 (524)	47 (324)
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 7 and Table 8. See Table 16 and Table 17 for valid factory-mounted combinations, and Table 7 and Table 8 for available field mounting kits.
2. The VA-715x, VA-720x, and VA-8x2x are not available factory coupled for PDTC two-way. These are available for field mounting only.
3. 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.

Table 14: Stainless Steel Trim – Maximum Closeoff Pressures, psig (kPa) for PDTC Two-Way and PDTC Port for Three-Way Electrically Actuated Valves¹

338°F (170°C) Maximum Fluid Temperature²								
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)	---	---
VA78x0	308 (2,122)	308 (2,122)	283 (1,950)	180 (1,240)	114 (785)	70 (482)	45 (310)	28 (193)

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 7 and Table 8. See Table 16 and Table 17 for valid factory-mounted combinations, and Table 7 and Table 8 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.

Table 15: Stainless Steel Trim – Maximum Closeoff Pressures, psig (kPa) for PDT0 Two-Way and PDT0 Port for Three-Way Electrically Actuated Valves^{1,2}

Not Available Factory Coupled for PDT0 Two-Way — Field Mounting Only 338°F (170°C) Maximum Fluid Temperature³								
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)	---	---
VA78x0	308 (2,122)	308 (2,122)	308 (2,122)	201 (1,385)	133 (916)	76 (524)	47 (324)	30 (207)

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 7 and Table 8. See Table 16 and Table 17 for valid factory-mounted combinations, and Table 7 and Table 8 for available field mounting kits.
2. The VA-715x, VA-720x, VA-8x2x are not available factory coupled for PDT0 two-way. These are available for field mounting only.
3. 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.

Table 16: Pneumatic Actuated Valves – Available Factory-Mounted Combinations¹ (Part 1 of 2)

Actuator	V-3801-8001			V-3000-8012 ²			V-3000-8003			MP82 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 16: Pneumatic Actuated Valves – Available Factory-Mounted Combinations¹ (Part 2 of 2)

Actuator	V-3801-8001			V-3000-8012 ²			V-3000-8003			MP82 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 17: Electrically Actuated Valves – Available Factory-Mounted Combinations¹

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	VA7810-AGA-2 VA7810-AGC-2 VA7810-HGA-2 VA7810-HGC-2	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	VA7820-HGA-2 VA7820-HGC-2 VA7830-HGA-2 VA7830-HGC-2
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	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	---
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 moves the valve plugs to a position where the diaphragm pressure and the spring force balance against the fluid forces. These fluid forces 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-3000-8012, MP82, and MP84 are available with a V-9502 Pneumatic Positioner. The V-9502 Pneumatic Positioner compensates for the spring range shift, and the valve operates within the published range. Refer to the *Operation* section of the *V-9502 Pneumatic Valve Actuator Positioners 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 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 for specifications and available options.

VA7810 Series Electric Actuators

The VA7810 Series of non-spring return actuators operates on 24 VAC and are available for use with on/off (floating) or proportional controllers. Models are available with two auxiliary switches and all proportional models include a 0 (2) to 10 VDC feedback signal. Proportional models are self-calibrating and can also be used as an on/off and floating actuator with a change of switch settings.

The direct mount series of actuators features a manual override as standard, an IP54 enclosure, a status Light-Emitting Diode (LED) and a brushless motor for long life. Refer to the *VA7800 Series Electric Valve Actuators Product Bulletin (LIT-12011474)* for specifications and available options.

VA7820/VA7830 Series Electric Actuators

The VA7820 spring return stem up or VA7830 spring return stem down series of actuators operates on 24 VAC. Actuators are shipped already set for proportional control but with a simple change of switch settings, can be changed to on/off or floating control. The actuators are self-calibrating and come standard with a 0 (2) to 10 VDC feedback signal, manual override, an IP54 enclosure, a status LED, and a brushless motor for long life.

Models with two auxiliary switches are available. Refer to the *VA7800 Series Electric Valve Actuators Product Bulletin (LIT-12011474)* 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 drives the actuator and valve assembly to the full stem-up position and then the full stem-down position, and stores these positions in nonvolatile memory (retains data when power is lost or removed). The actuator then drives to the position determined by the applied control signal.

Installation and Servicing

We recommend that the VG7000 Series Valves be mounted in an upright position in a conveniently accessible location. Sufficient clearance must be allowed for actuator removal. See 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.

Note: VG7000 Series Valves should not be used for fluid service other than those indicated in the [Technical Specifications](#) section.

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.

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, 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 or isolate all power supplies before making electrical connections. More than one disconnect or isolation 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.



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.



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.

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.

Dimensions

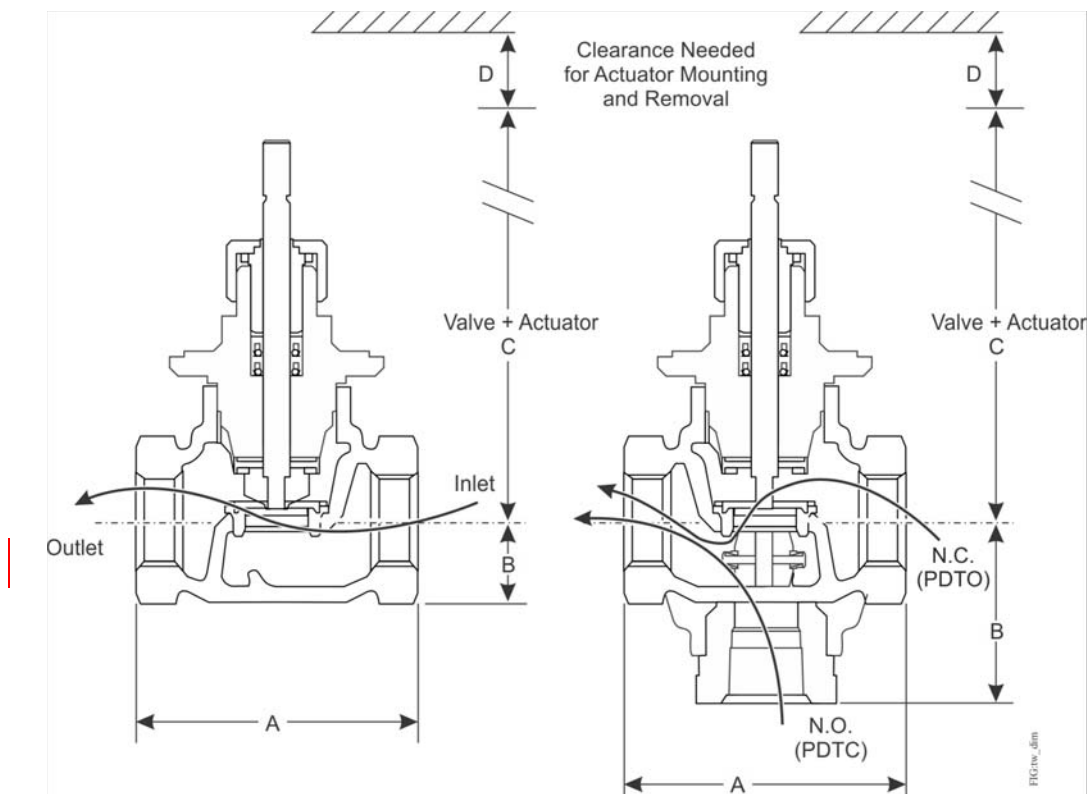


Figure 3: Two-Way and Three-Way Valve Dimensions

Table 18: National Pipe Thread (Internal NPT) Valve Dimensions, in. (mm)¹

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)

1. See Table 22 for overall assembly height **C** and clearance **D** dimensions.

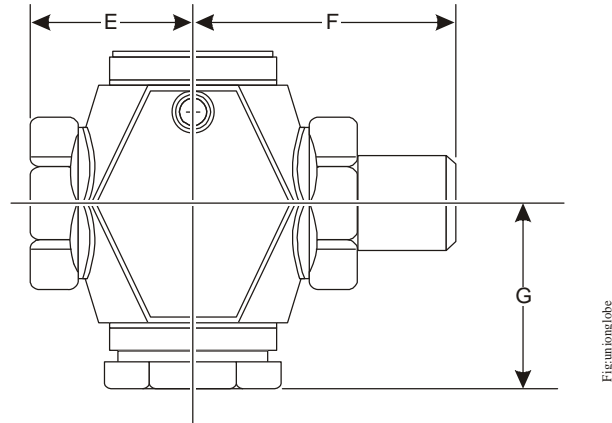


Figure 4: Two-Way Union Globe Valve Dimensions

Table 19: 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)
3/4 (DN20) N.O./PDTC ²	1-9/16 (40)	3-3/32 (79)	15/16 (24)
1 (DN25) N.O./PDTC ²	2-1/16 (53)	4-1/32 (102)	1-5/32 (29)
1-1/4 (DN32) N.O./PDTC ²	2-3/8 (60)	4-19/32 (117)	1-11/32 (34)
1-1/2 (DN40) N.O./PDTC ²	2-9/16 (65)	4-27/32 (123)	2-5/32 (55)

1. See Table 22 for overall assembly height **C** and clearance **D** dimensions.
2. Sizes greater than 1/2 in. (DN15) are available in N.O./PDTC Only.

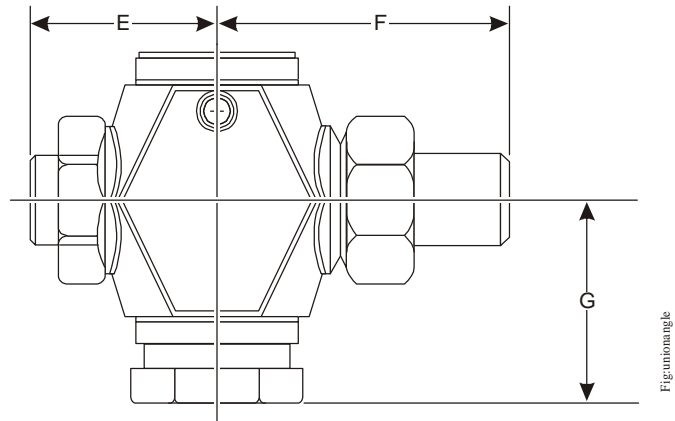


Figure 5: Two-Way Union Angle Valve Dimensions

Table 20: 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 22 for overall assembly height **C** and clearance **D** dimensions.

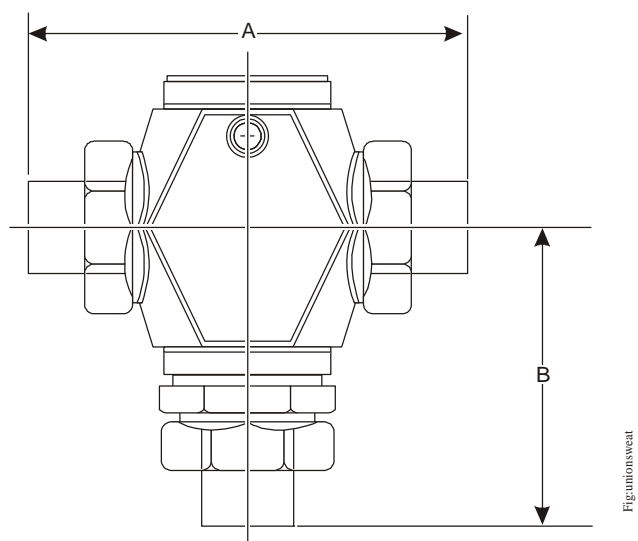


Figure 6: Union Sweat Valve Dimensions

Table 21: 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 22 for overall assembly height **C** and clearance **D** dimensions.

Table 22: 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-3000-8012	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	8-15/32 (215)	8-15/32 (215)	9-7/16 (240)	9-9/16 (243)	---	---	1-1/2 (38)
VA-715x	7-11/16 (195)	7-11/16 (195)	8-21/32 (220)	8-25/32 (223)	9-11/32 (238)	9-3/4 (248)	2-1/2 (64)
VA-720x	---	---	10-7/16 (265)	10-17/32 (268)	11-1/8 (283)	11-1/2 (293)	4-1/2 (114)
VA-8x2x	6-7/16 (164)	6-7/16 (164)	---	---	---	---	1-1/2 (38)
VA78x0	---	---	11-23/32 (298)	11-27/32 (301)	12-13/32 (315)	12-13/16 (325)	4-1/2 (114)
Stainless Steel Trim Valve Assemblies ²							
V-3000-8012	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)
VA78x0	11-15/32 (291)	11-11/16 (297)	12-19/32 (320)	12-27/32 (326)	13-1/32 (331)	13-1/4 (336)	4-1/2 (114)

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 23. See Table 24 for a list of available accessories.

Table 23: 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
VG7000-6011	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 24: Accessories (Order Separately)¹

Code Number	Description
---	For specific actuator code numbers, refer to appropriate product bulletins.
---	For mounting and linkage kits, see Tables 6, 7, 8, and 9 in this document.
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-3000-600	Replacement Diaphragm for V-3000-8012
V-3000-6001	Replacement Diaphragm for V-3000-8003
V-9502-90 V-9502-91	Positioners for V-3000-8001 and V-3000-8012: Pneumatic Positioner (Less Spring) for V-3000-8012 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-3000-8012: 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 25: 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 = Two-Way, Normally Closed/Push-Down-to-Open 8 = Three-Way Mixing						
		K	Reconditioning Kits K = Inner Valve Reconditioning Kits (Includes: bonnet, bonnet nut, packing, stem, plug, disk, and seat; replaceable seat is available for stainless steel trim valves only.)						
		5							
		1	Trim and Flow Characteristic 1 = Brass Equal Percentage (All Two-Way and 1/2 in. Three-Way) 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)						
		6							
		R	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)						
		7							
		T	Stem Type 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 Only) L = Large Threaded Stem (Factory-Mounted V-500 Only) M = Large Threaded Stem (Factory-Mounted MP84 Only)						
		8							
		+	Optional Lower Body + = Lower Body Option (For 1-1/2 and 2 in. Bodies Only) (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.)						
		9							
		W	N.C. Valve Bottom Cap W = Two-Way Bottom Cap (For 1-1/2 and 2 in. valves, it is recommended that a new bottom cap is ordered with the reconditioning kit.)						
		10							
		4	Three-Way Lower Body 4 = NPT (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.)						
		10							
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 25. This section provides a list of the components included in each kit. 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.

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 the bonnet, packing, and stem and plug assembly.

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:

- bonnet, packing, stem and plug assembly
- stainless steel seat (two for three-way valves)

Technical Specifications

VG7000 Series Bronze Control Valves¹ (Part 1 of 3)

Service²		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).
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

VG7000 Series Bronze Control Valves¹ (Part 2 of 3)

Inherent Flow Characteristics	Two-Way Valves	Equal Percentage
	Three-Way Mixing Valves	Linear
Rangeability ³		> 25:1 for the 1/2 in. size, Cv 0.73, valve bodies > 100:1 for all other VG7000 series valves
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
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-3000-8012 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

VG7000 Series Bronze Control Valves¹ (Part 3 of 3)

Actuator Ambient Operating Temperature Limits		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)
	All Valve Sizes	CRN: C1099.9087YTN

1. For models and ordering data, see Table 2, Table 3, and Table 4. For maximum closeoff pressures, see Table 9 through Table 15. For accessories (order separate), see Table 24.
2. Proper water treatment is recommended; refer to VDI 2035 Guideline.
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.



Building Efficiency

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