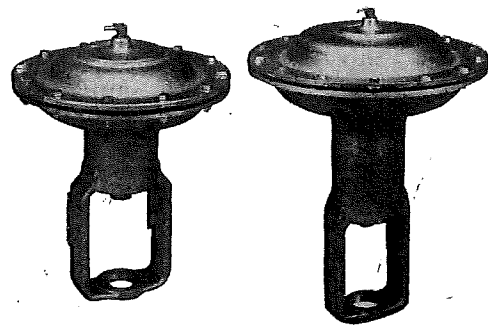


V-400 and V-500 Pneumatic Valve Actuators

The V-400 and V-500 Series Pneumatic Valve Actuators are designed to accurately position valve modulating plugs in larger chilled water, hot water, and steam control valves in response to a pneumatic signal from a controller. A valve positioner can be ordered separately for use in applications where sequential operation is desired or additional positioning power is necessary. These actuators have a molded, synthetic rubber reinforced diaphragm contained in a sturdy, metal housing that protects against dirt and damage.



**Figure 1: V-400 and V-500
Pneumatic Valve Actuators**

Features and Benefits	
<input type="checkbox"/> Designed for use in Hot Water, Chilled Water, and Steam Applications	Universal application
<input type="checkbox"/> Position Indicator Included with Every Actuator	Visual indication of valve stem position

Operation

Air pressure from a pneumatic controller is applied to the diaphragm of the actuator, which moves the piston against the valve stem. The piston will move the valve stem and plug until the diaphragm pressure balances the valve return spring force and the fluid forces. Reducing the air pressure permits the valve spring to return the valve plug to its normal position. With no control air pressure applied to the diaphragm, the valve is in the normal position.

For applications requiring stable, accurate control and sequencing the V-400 and V-500 Actuators are available with a V-9502 Positioner. Positioners are factory calibrated to match the nominal spring range of the valve/actuator assembly. Refer to the *Operation* section of the *V-9502 Product Data (FAN 977)* for more details.

Interchangeability

The V-400 and V-500 Series Pneumatic Actuators should not be confused with the V-5000 Series Pneumatic Actuators. The V-400 and V-500 Actuators can only be used on VG7000 Series Bronze Valves. The V-400 and V-500 Actuators and the V-5000 Series Pneumatic Actuators are **not** interchangeable.

Accessories

Table 2: Accessories (Order Separately)*

Description	Code Number
Mounting Kit for V-400 Mounted to 1/2 or 3/4 in. VG7000 Valves with Stainless Steel Trim	VG7000-1013
Mounting Kit for V-400 Mounted to 1 to 2 in. VG7000 Valves with Stainless Steel or Brass Trim	VG7000-1014
Pilot Positioner (Less Spring)	V-9502-76
Pilot Positioner Springs:	
5/16 in. Stroke for 1/2 or 3/4 in. Valves	V-9502-8100
1/2 in. Stroke for 1 or 1-1/4 in. Valves	V-9502-8102
3/4 in. Stroke for 1-1/2 or 2 in. Valves	V-9502-8106

* The V-500 Actuator requires a unique valve stem; therefore, it is not available for field mounting.

Dimensions

Table 1: Actuator Dimensions, in. (mm)

Actuator Code Number	A	B
V-400	8-5/32 (207)	10 (254)
V-500	11-29/32 (302)	15-1/4 (387)

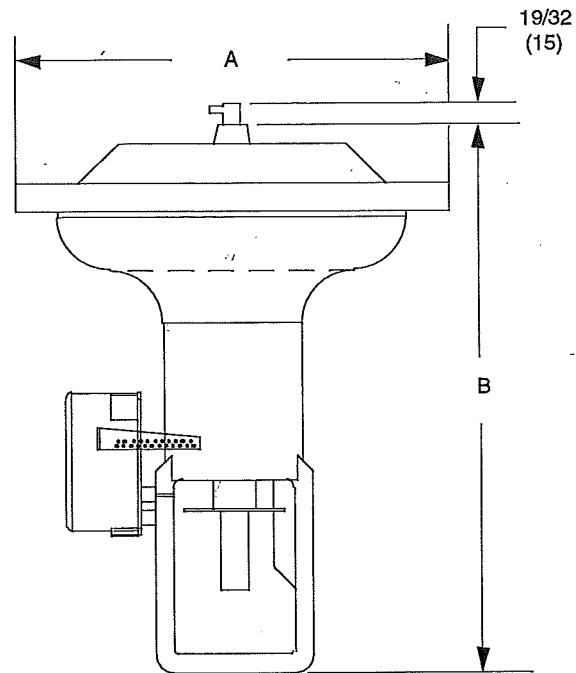


Figure 2: V-400 and V-500 Actuator Dimensions, in. (mm), Shown with Optional Positioner

Mounting

The V-400 and V-500 Series Pneumatic Actuators are available in a variety of spring ranges and strokes to cover all VG7000 valve applications. The V-400 or V-500 can be ordered factory mounted to VG7000 Series Bronze Valves. The V-400 Actuators listed in Table 3 can also be field mounted to VG7000 Series Bronze Valves using the mounting kits listed in Table 2. The V-500 is not available for field mounting because it requires a unique valve stem.

V-400 Field Mounting

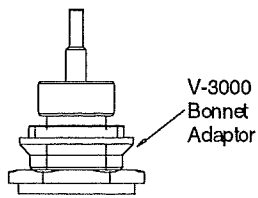


Figure 3: V-3000 Bonnet Adaptor

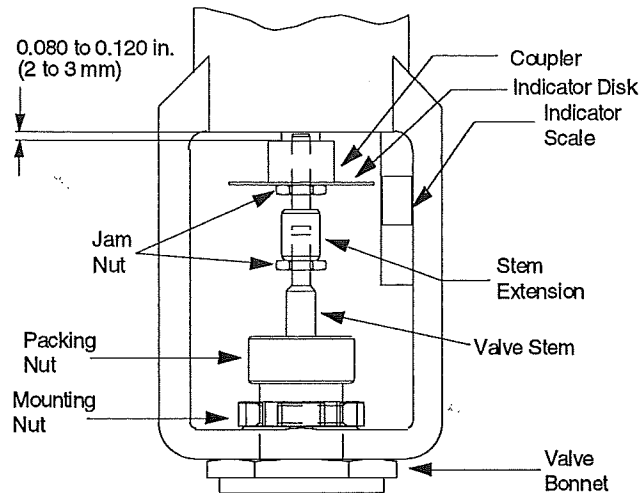


Figure 4: V-400 Mounting

Tools Required

- pliers
- adjustable or 9/16 in. (14 mm) open end wrench
- 1-1/2 in. spanner or adjustable wrench, hook-style
- squeeze bulb or air supply


Note: The appropriate mounting kit is required to mount V-400 Series Pneumatic Actuators to VG7000 Series Bronze Valves. (See Table 2.)

1. Thread the jam nut down to the shoulder on the stem extension.
2. Place the indicator disk over the stem extension threads and thread the stem extension into the actuator coupler.
3. Remove the packing nut from the valve bonnet.
4. Remove the V-3000 bonnet adaptor shown in Figure 3 (for 1 through 2 in. valve sizes only).

5. Place the actuator onto the valve bonnet and thread the mounting nut onto the bonnet about half way.
6. Thread the packing nut back onto the valve bonnet and hand tighten. It may be necessary to lift up on the actuator to clear the valve stem.
7. Orient the actuator to the desired position. Finish threading the mounting nut onto the valve bonnet and tighten against the actuator using a spanner wrench.
8. Thread the second jam nut all the way onto the valve stem.
9. Using a squeeze bulb or available air supply, slowly apply pilot pressure to the actuator until the coupler strokes 0.080 to 0.120 in. (2 to 3 mm).

It is important to obtain the proper spring rate. It can be identified and measured between the actuator and coupler as shown in Figure 4.

10. Lift the valve stem to engage the stem extension.
11. Thread the stem extension out of the coupler and onto the valve stem as far as it will go (the valve stem will begin to spin and the stem extension should still be engaged in the coupler).
12. Hold the stem extension with a pliers and using a wrench, tighten the jam nut on the valve stem against the stem extension.
13. With the extension locked against the stem, thread the stem extension back into the coupler, raising the valve stem to its full up position (the stem will spin with the extension).
14. Using a wrench, tighten the top jam nut against the indicator disk and actuator coupling.
15. Remove pilot pressure from the actuator.
16. Apply indicator scale to actuator so the top line aligns with the indicator disk.
17. Stroke the actuator down and up. Verify that there is still a gap between the actuator and the coupler.



WARNING: Injury hazard. If valve body is installed in a system, isolate and bleed pressure off the valve. Failure to do so may result in personal injury.

Table 3: V-400 Pneumatic Valve Actuators Ordering Data

VG7000 Series Valve Size in.	Spring Range psig (kPa)	Valve Stroke in. (mm)	Trim Style	Actuator Code Number
1/2 or 3/4	3 to 6 (21 to 42)	5/16 (8)	Stainless Steel*	V-400-8001
	4 to 8 (28 to 56)			V-400-8011
	9 to 13 (63 to 91)			V-400-8002
1 or 1-1/4	3 to 6 (21 to 42)	1/2 (13)	Brass/Stainless Steel	V-400-8005
	4 to 8 (28 to 56)			V-400-8012
	9 to 13 (63 to 91)			V-400-8006
1-1/2 or 2	3 to 6 (21 to 42)	3/4 (19)	Brass/Stainless Steel	V-400-8007
	4 to 8 (28 to 56)			V-400-8013
	9 to 13 (63 to 91)			V-400-8008

* Use of V-400 Actuators on 1/2 or 3/4 in. brass trim valves is not recommended. High shutoff forces may cause damage to resilient seats.

Specifications

Product	V-400 and V-500 Pneumatic Valve Actuators
Maximum Control Pressure	30 psig (207 kPa); 25 psig (172 kPa) with Pilot Positioner
Air Connection	1/8 in. NPT Barbed Fitting for 1/4 x 5/32 in. O.D. Poly tubing
Ambient Operating Temperature Limits	-20 to 150°F (-29 to 66°C)
Maximum Storage Temperature	150°F (66°C)
Effective Diaphragm Area	V-400: 24 in. ² V-500: 55 in. ²
Materials	Housing: Die-cast Aluminum Diaphragm: Synthetic Rubber
Shipping Weight	V-400: 5.25 lb (6.92 kg) V-500: 15.75 lb (7.15 kg)

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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