

# 3. VB-7000 Series Valve/ Actuator Assemblies



3. VB-7000 Valve/Actuator  
Assemblies



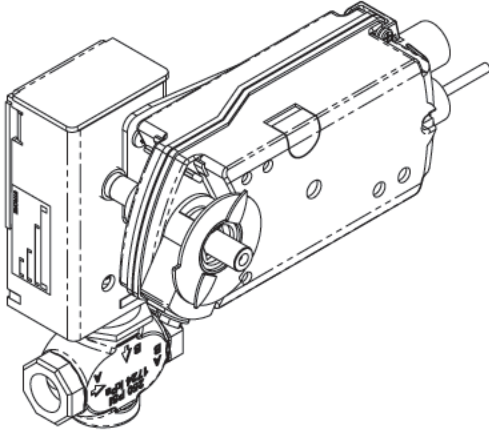
### 3. VB-7000 Valve/Actuator Assemblies

## VB-7000 ½"...2" Valve/Actuator Assemblies

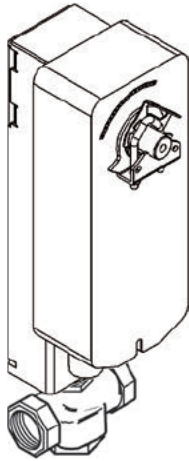
Mx4x-6xxx and Mx4x-7000 Series Spring and Non-Spring Return Actuator/Linkage Assemblies with SmartX actuators.

#### Globe Valve Assemblies

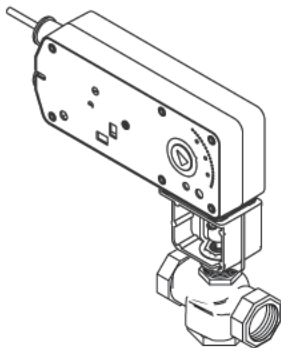
The VA, VF, and VS-7000 series Linked Globe Valve Assemblies are complete actuator/valve assemblies that accept two-position, floating or proportional control, respectively, from a DDC system or from a thermostat, for control of hot water, chilled water and steam coils. These valve assemblies consist of linked spring return and non-spring return actuators mounted on ½"...2" (15 mm... 50 mm) 2-Way and 3-Way globe valve bodies, using a specially designed linkage assembly. 3-Way assemblies are available for mixing (½"...2") and Diverting (½"...2") applications. Typical applications include reheat on VAV boxes, fan coil units, hot and chilled water coils in air handling units, unit ventilators, and central system applications. Kits are available separately to allow field assembly of SmartX actuators to valve bodies.



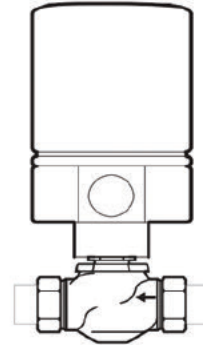
2-Way Linked Globe Valve Assembly  
(Non-Spring Return Model shown)



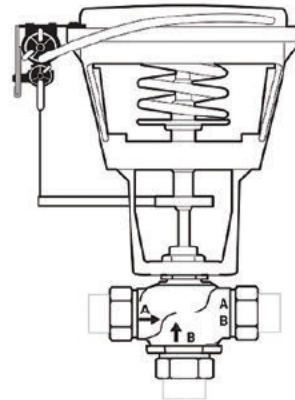
3-Way Linked Globe Valve Assembly  
(Spring Return Model shown)



VB-73xx Series ½"...2" 3-Way Assembly  
with SmartX Linear SR Actuators



VB-72xx 2-Way Globe Valve with  
MA/MP/MPR-5XXX Hydraulic Actuator



VB-73xx 3-Way Globe Valve with  
MK-66x1 Pneumatic Actuator

## Globe Valve Assembly Selection Procedure

When selecting a globe valve assembly, first determine the applicable codes for the control signal type, valve body configuration, end connection, port size and actuator according to Assembly Ordering on the next pages. Select a globe valve assembly part number as follows:

### 1. Control Signal Type, Valve Body Configuration and End Connection

Refer to Assembly Ordering and select the appropriate codes for the part-number fields.

### 2. Valve Size (Flow Coefficient)

If the required flow coefficient (Cv) has not been determined, do so as follows:

- a. Refer to Sizing and Selection to calculate the required Cv. Refer to the separately available Wiring, Dimensions and Reference Document F-28125 from the Exchange download center.
- b. Select the nearest available Cv value and corresponding valve body port code from Assembly Ordering.

### 3. Actuator

Select the appropriate actuator and code, according to Assembly Ordering on the next pages based on the control signal type, required valve normal position, and voltage requirements. For detailed actuator information, refer to *Pg. 61, 4. VB-7000 Series Globe Valves Actuators & Linkages* for applicable actuator specifications.

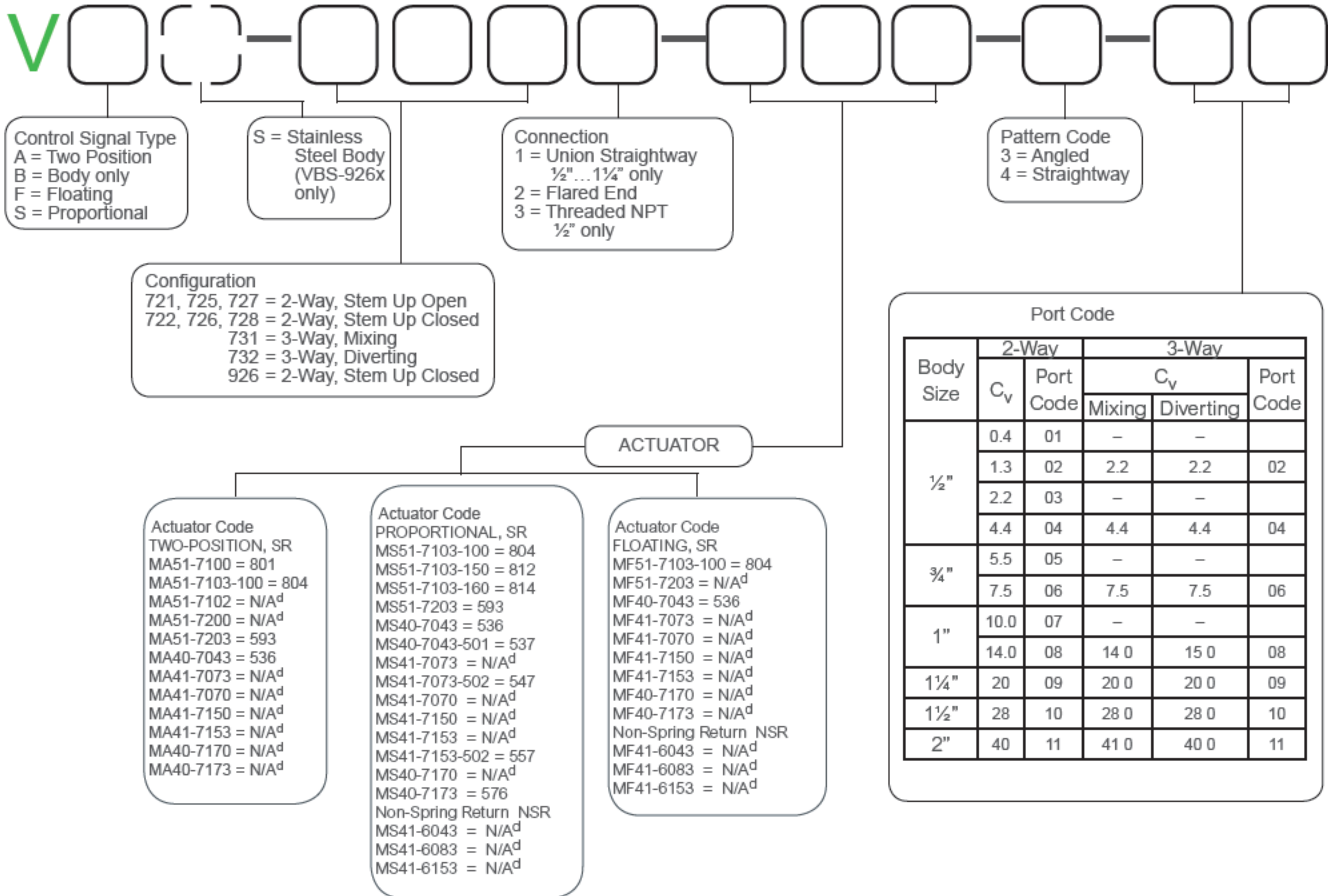
### 4. Close-off Pressure

Confirm, with respect to Actuator Close-Off Capacity, that the selected actuator and valve body combination provides sufficient close-off pressure. If no close-off pressure is shown, the valve body/actuator combination is not valid.

### 5. Available Space

If available space is a consideration, check the appropriate figure in the separately available Wiring, Dimensions and Reference document F-28125 from the Exchange Download Center.

## Assembly Ordering Linked VB-7000 SmartX Globe Valves



<sup>d</sup> - Factory assemblies not available. Purchase actuator and valve body separately and field assemble.

The configuration of the valve assembly determines the valve stem position and flow, as shipped from the factory. See the table below.

Valve Assemblies	Valve Body Action	Factory Shipped Position		Action
		Valve Stem	Flow	
Vx-721x-xxx-4-P Vx-725x-xxx-4-P Vx-727x-xxx-4-P	2-Way Stem Up Open	Up	Open	A to AB Flow decreases as actuator extends
Vx-722x-xxx-4-P Vx-726x-xxx-4-P Vx-728x-xxx-4-P Vxs-9263-xxx-x-P	2-Way Stem Up Closed		Closed	A to AB Flow increases as actuator extends
Vx-731x-xxx-4-P	3-Way Mixing		Flow B to AB	A to AB Flow increases as actuator extends B to AB Flow decreases as actuator extends
Vx-732x-xxx-4-P	3-Way Diverting	B to A Flow increases as actuator extends B to AB Flow decreases as actuator extends		

## Assembly Ordering VB-7000 Linked Globe Valve Hydraulic, Pneumatic & Forta

**Configuration**  
 A = Two Position  
 B = Body only  
 K = Pneumatic  
 S = Proportional  
 U = Universal

**Pipe Connection End Fitting**  
 1 = Union Straightway  
 3 = Threaded NPT (Bronze)  
 4 = Union Sweat End  
 5 = Metric Threaded (Rp)

**Actuator Codes**  
**HYDRAULIC**  
 MA-5213<sup>c</sup> = 201  
 MA-5210<sup>c</sup> = 211  
 MP-5213<sup>c</sup> = 201  
 MP-5210<sup>c</sup> = 211  
 MP-5413<sup>c</sup> = 247<sup>a</sup> (VS72x3)  
 MP-5410<sup>c</sup> = 244<sup>a</sup> (VS72x3)  
 MPR-5613<sup>c</sup> = 267<sup>a</sup> (VS72x3)  
 MPR-5610<sup>c</sup> = 264<sup>a</sup> (VS72x3)

**Actuator Codes**  
**PNEUMATIC**  
 MK-2690 = 201 (3-7)  
 MK-2690 = 202 (5-10)  
 MK-2690 = 203 (8-13)  
 MK-4601 = 301 (3-6)  
 MK-4611 = 302 (5-10)  
 MK-4621 = 303 (10-13)  
 MK-6601 = 611 (3-8)  
 MK-6611 = 612 (5-10)  
 MK-6621 = 613 (8-13)

**Actuator Codes**  
**FORTA**  
 M400A-VB<sup>b</sup> = 674  
 M800A-VB<sup>b</sup> = 680  
 M1500A-VB<sup>b</sup> = 686  
 M900AR-VB<sup>b</sup> = 650  
 M900AE-VB<sup>b</sup>  
 M900AWR-VB = 660

**Pattern Code**  
 3 = Angled bodies  
 4 = Straightway

**Port Code**  
 Up to 2" (Cv of 41)

The configuration of the valve assembly determines the valve stem position and flow, as shipped from the factory. See the table below.

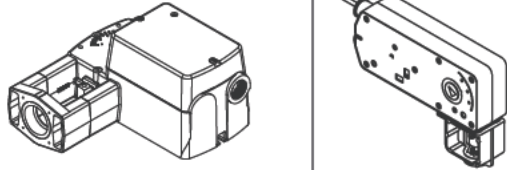
Valve Assemblies	Valve Body Action	Factory Shipped Position		Action
		Valve Stem	Flow	
Vx-721x-xxx-4-P	2-Way Stem Up Open	Up	Open	A to AB Flow decreases as actuator rotates CW
Vx-722x-xxx-4-P	2-Way Stem Up Closed		Closed	A to AB Flow increases as actuator rotates CW
Vx-731x-xxx-4-P	3-Way Mixing		Flow B to AB	A to AB Flow increases as actuator rotates CW B to AB Flow decreases as actuator rotates CW
Vx-732x-xxx-4-P	3-Way Diverting		Flow B to AB	B to A Flow increases as actuator rotates CW
				B to AB Flow decreases as actuator rotates CW

Body Size	2-Way		3-Way		Port Code
	C <sub>v</sub> <sup>*</sup>	Port Code	Mixing C <sub>v</sub>	Diverting C <sub>v</sub>	
½"	0.4	01	–	–	02
	1.3	02	2.2	2.2	
	2.2	03	–	–	
¾"	4.4	04	4.4	4.4	04
	5.5	05	–	–	
1"	7.5	06	7.5	7.5	06
	10.0	07	–	–	
1¼"	14.0	08	14.0	15.0	08
1½"	20	09	20.0	20.0	09
1¾"	28	10	28.0	28.0	10
2"	40	11	41.0	40.0	11

\*Brass trim models listed.

a - AV-601 is not available as an assembly and has to be ordered separately.  
 b - Add -S2 for auxiliary switch. Only available as a field assembly.  
 c - Add -500 for auxiliary switch. Only available as a field assembly.

Note: Choose a valve assembly having a close-off pressure capability sufficient for the application. Not all valve body and actuator combinations are available factory-assembled. Some combinations must be field-assembled.

Selection Table – 2-Way Linked Globe Valve Assemblies with Linear Series Spring Return Actuators									
2-Way Linked Globe Valve Assemblies									
					Actuator Force Rating				
					105 lbf (467 N)		220 lbf (979 N)		
					Actuator Model (Actuator Code) <sup>a</sup>				
					Two-Position MA51-7100 (801) MA51-7101 (801) MA51-7103-100 (804)		Two-Position MA51-7200 MA51-7201 MA51-7202 (593)		
					Floating MF51-7103-100 (804)		Floating MF51-7203 (593)		
					Proportional MS51-7103-100 (804) MS51-7103-120 MS51-7103-130 MS51-7103-140 MS51-7103-150 (812) MS51-7103-160 (814)		Proportional MS51-7203 (593)		
					Actuator Close-off Pressure psi <sup>d,e</sup>				
Valve Assembly Part Number <sup>b,j</sup>		P Code	Valve Size in. (mm)	Cv <sup>c</sup>	kvs <sup>c</sup>	N.O. <sup>f,j</sup>	N.C. <sup>g,j</sup>		
Vx-72x1-xxx-4-P Vx-72x2-xxx-4-P Vx-72x3-xxx-4-P VxS-9263-0-4-P	1	1/2 (15)	0.4	0.3	250	250	-		
	2		1.3	1.1					
	3		2.2	1.9					
	4		4.4	3.8					
	5	3/4 (20)	5.5	4.8	200	200			
	6		7.5	6.5					
	7	1 (25)	10.0	8.7	150	90			
	8		14.0	12					
	9	1 1/4 (32)	20.0	17	90	60	150		
Vx-72x3-xxx-4-P	10	1 1/2 (40)	28.0	24	60	35	100		
Vx-72x3-xxx-4-P	11	2 (50)	28.0	24	60	35	100		

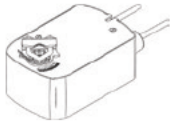
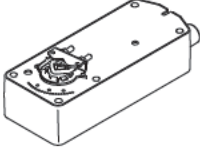
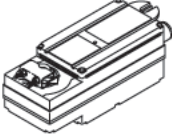
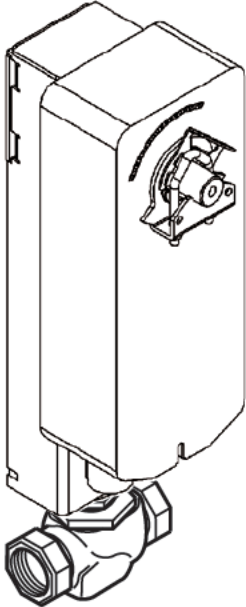
a - Models without actuator codes are not offered as factory assemblies. Purchase the actuator and the valve body separately and field assemble. For available factory assemblies, consult the price schedule.  
 b - To determine a specific part number, see Pg. 46, *Assembly Ordering Linked VB-7000 SmartX Globe Valves* for the relevant part series.  
 c -  $C_v = \text{gpm} / \sqrt{\Delta P}$  (where  $\Delta P$  is measured in psi.)  $k_{vs} = C_v / 1.156$   
 d - Close-off ANSI IV (.01%) for soft seats.  
 e - Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations. The rating value is the pressure difference between the inlet and outlet ports.  
 f - Normally open (N.O.) assembly using stem up open valve body.  
 g - Normally closed (N.C.) assembly using stem up closed valve body.  
 j - Valve body and actuator size determine the close-off capabilities. Example: All 1/2", 2-Way globe valves will make the same close-off regardless of the Cv rating for a given actuator.

3. VB-7000 Valve/Actuator Assemblies

### 3. VB-7000 Valve/Actuator Assemblies

# ½"...2" 2-Way Globe Valves with Linked SR Actuators

Note: Choose a valve assembly having a close-off pressure capability sufficient for the application.

Selection Table – 2-Way Linked Globe Valve Assemblies with Spring Return Actuators												
2-Way Spring Return Linked Globe Valve Assemblies												
					Actuator Torque Rating (minimum)							
					35 lb-in (4 N-m)		60 lb-in (7 N-m)		133 lb-in (15 N-m)		150 lb-in (17 N-m)	
					Actuator Model (Actuator Code)							
					Two-Position MA40-7040 MA40-7041 MA40-7043 (536)		Two-Position MA41-707x		Two-Position MA41-715x		Two-Position MA40-717x	
					Floating MF40-7043 (536)		Floating MF41-7073		Floating MF41-7153		Floating MF40-7173	
					Proportional MS40-7043 (536) MS40-7043-501 (537)		Proportional MS41-7073 (546) MS41-7073-502 (547)		Proportional MS41-7153 (556) MS41-7153-502 (557)		Proportional MS40-717x (576)	
Note: Not all factory actuator codes are available.												
Linkage Kit Part Number												
AV-611 (½"...2")			AV-602 (1"...2")			AV-602 (1¼"...2")						
Valve Assembly Part Number <sup>a</sup>	P Code	Valve Size in. (mm)	Cv <sup>b</sup>	kvs <sup>b</sup>	Actuator Close-off Pressure psi <sup>cd</sup>							
						Single Actuator	Single Actuator	Single Actuator				
Vx-7214-xxx-4-P	01	½ (15)	0.4	0.3	250	-	-	-				
Vx-7224-xxx-4-P	02		1.3	1.1								
Vx-7211-xxx-4-P	03		2.2	1.9								
Vx-7213-xxx-4-P	04		4.4	3.8								
Vx-7221-xxx-4-P	05	¾ (20)	5.5	4.8	-	-	-					
Vx-7223-xxx-4-P	06		7.5	6.5								
Vx-7253-xxx-4-P	07	1 (25)	10.0	8.7	125	180	-					
Vx-7263-xxx-4-P	08		14.0	12	125	180						
Vx-7273-xxx-4-P	09	1¼ (32)	20.0	17	75	120	200					
Vx-7283-xxx-4-P												
VxS-9263-xxx-4-P												
Vx-7213-xxx-4-P	10	1½ (40)	28.0	24	50	80	140	160				
Vx-7223-xxx-4-P	11	2 (50)	40.0	35	25	40	80	120				

a - To determine a specific part number, see Pg. 46, *Assembly Ordering Linked VB-7000 SmartX Globe Valves* for the relevant part series.  
 b - kvs = m<sup>3</sup>/h (ΔP = 100 kPa)    kvs = Cv / 1.156    Cv = kvs x 1.156  
 c - All Vx-72xx leakage ratings are ANSI V to 35psi and ANSI IV above 35psi; with the exception of Vx-7273 and Vx-7283 (ANSI III).  
 d - For seat leakage ratings, refer to Seat Leakage Classes.

3. VB-7000 Valve/Actuator Assemblies

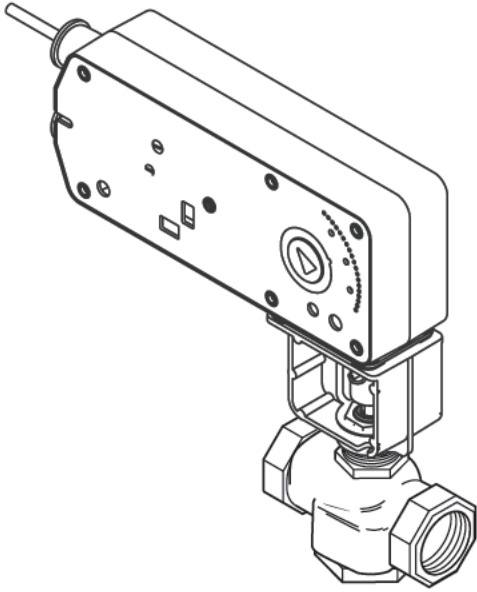
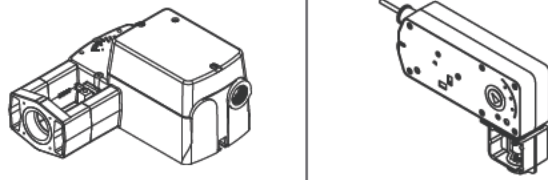


### 3. VB-7000 Valve/Actuator Assemblies

## 1/2" ... 2" 3-Way Globe Valves with Linear SR Actuators

Note: Choose a valve assembly having a close-off pressure capability sufficient for the application. Not all valve body and actuator combinations are available factory-assembled. Some combinations must be field-assembled.

**Selection Table – 3-Way Linked Globe Valve Assemblies with Linear Series Spring Return Actuators**

3-Way Linked Globe Valve Assemblies								
					Actuator Force Rating			
					105 lbf (467 N)	220 lbf (979 N)		
					Actuator Model (Actuator Code) <sup>a</sup>			
					Two-Position MA51-7100 MA51-7101 MA51-7103-100 (804)		Two-Position MA51-7200 MA51-7201 MA51-7203 (593)	
					Floating MF51-7103-100 (804)		Floating MF51-7203	
					Proportional MS51-7103-100 (804) MS51-7103-120 MS51-7103-130 MS51-7103-140 MS51-7103-150 (812) MS51-7103-160 (814)		Proportional MS51-7203 (593)	
Valve Assembly Part Number <sup>c</sup>	P Code	Valve Size In. (mm)	Cv <sup>d</sup>	kvs <sup>d</sup>	Actuator Close-off Pressure psi <sup>a,e</sup>			
Mixing Vx-7313-xxx-4-P	2	1/2 (15)	4.4	3.8	250			
	4							
	6	3/4 (20)	7.5	6.5				200
	8	1 (25)	14.0	12.0	90			
	9	1 1/4 (32)	20.0	17	60		150	
	10	1 1/2 (40)	28	24	35		100	
	11	2 (50)	41	36	20		65	
Diverting Vx-7323-xxx-4-P	4	1/2 (15)	4.4	3.8	250			
	6	3/4 (20)	7.5	6.5				
	8	1 (25)	15.0	13.0				
	9	1 1/4 (32)	20.0	17.3			250	
	10	1 1/2 (40)	28	24.2				
	11	2 (50)	40	34.6				

b - Models without actuator codes are not offered as factory assemblies. Purchase the actuator and the valve body separately and field assemble. For available factory assemblies, consult the price schedule.

c - To determine a specific part number, see Pg. 46, *Assembly Ordering Linked VB-7000 SmartX Globe Valves* for the relevant part series.

d - Cv = gpm /  $\sqrt{\Delta P}$  (where  $\Delta P$  is measured in psi.) kvs = Cv / 1.156

e - Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations. The rating value is the pressure difference between the inlet and outlet ports.

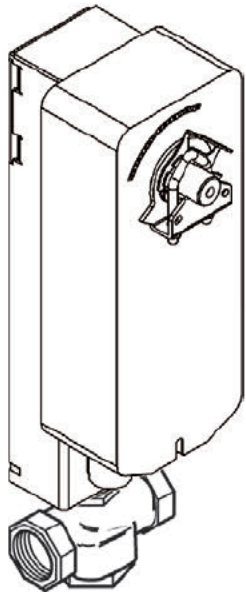
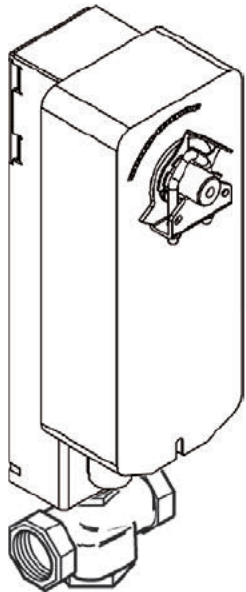
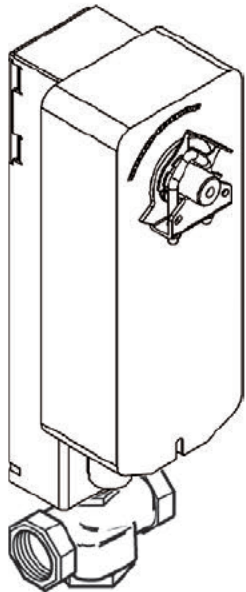


### 3. VB-7000 Valve/Actuator Assemblies

# ½"...2" 3-Way Globe Valves with Linked SR Actuators

Note: Choose a valve assembly having a close-off pressure capability sufficient for the application. Not all valve body and actuator combinations are available factory-assembled. Some combinations must be field-assembled.

**Selection Table – 3-Way Linked Globe Valve Assemblies with Spring Return Actuators**

3-Way Spring Return Linked Globe Valve Assemblies					Actuator Torque Rating (minimum)			
					35 lb-in (4 N-m)	60 lb-in (7 N-m)	133 lb-in (15 N-m)	150 lb-in (17 N-m)
					Actuator Model (Actuator Code)			
					Two-Position MA40-7040 MA40-7041 MA40-7043 (536)  Floating MF40-7043 (536)  Proportional MS40-7043 (536) MS40-7043-502 (537)	Two-Position MA41-707x  Floating MF41-7073  Proportional MS41-7073 (546) MS41-7073-502 (537)	Two-Position MA41-715x  Floating MF41-7153  Proportional MS41-7153 (556) MS41-7153-502 (557)	Two-Position -  Floating MF40-7173  Proportional MS40-7173 (576)
					Note: Not all factory actuator codes are available. <sup>e</sup>			
					Linkage Kit Part Number			
					AV-611 (½"...2")	AV-602 (1"...2")	AV-602 (1½"...2")	AV-602
					Actuator Close-off Pressure psig			
Valve Assembly Part Number <sup>b</sup>	P Code	Valve Size in. (mm)	Cv <sup>c</sup>	kvs <sup>c</sup>		Single Actuator	Single Actuator	Single Actuator
Vx-7313-xxx-4-P	02	½ (15)	2.2	1.9	250	-		
	04		4.4	3.8				
	06	¾ (20)	7.5	6.5				
	08	1 (25)	14.0	12.0	125	180		250
	09	1¼ (32)	20.0	17	75	100		
	10	1½ (40)	28	24	50	70	140	160
	11	2 (50)	41	36	25	40	80	120
Vx-7323-xxx-4-P	02	½ (15)	2.2	1.9	250			
	04		4.4	3.8				
	06	¾ (20)	7.5	6.5				
	08	1 (25)	15	13.0				
	09	1¼ (32)	20	17.3				
	10	1½ (40)	28	24.2				
	11	2 (50)	40	34.6				

b - To determine a specific part number, see Pg. 46, *Assembly Ordering Linked VB-7000 SmartX Globe Valves* for the relevant part series.

c -  $kvs = m^3/h$  ( $\Delta P = 100$  kPa)  $kvs = Cv / 1.156$   $Cv = kvs \times 1.156$

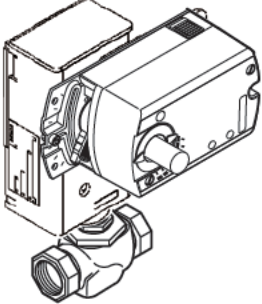
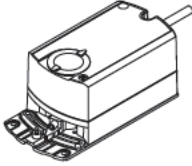
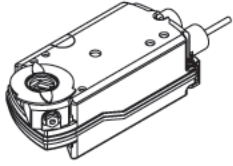
d - Mixing Valves A port seat leakage ANSI IV, B port seat leakage ANSI III, Diverting Valves seat leakage Is ANSI III.

e - For field assembly, factory actuator, linkage and valve assembly may be offered.

### 3. VB-7000 Valve/Actuator Assemblies

## 1/2" ... 2" 2-Way Globe Valves with Linked NSR Actuators

Note: Choose a valve assembly having a close-off pressure capability sufficient for the application. Not all valve body and actuator combinations are available factory-assembled. Some combinations must be field-assembled.

Selection Table – 2-Way Linked Globe Valve Assemblies with Non-Spring Return Actuators																		
<p><b>2-Way Non-Spring Return Linked Globe Valve Assemblies<sup>f</sup></b></p>  <p>Note: Only bronze bodies listed. VBS-9263-0-4-P stainless steel bodies to -06 are available with the same close-off performance.</p>																		
					Actuator Torque Rating (minimum)				44 lb-in. (5 N-m)		88 lb-in. (10 N-m)		133 lb-in. (15 N-m)					
					Actuator Model (Actuator Code)				Floating MF41-6043		Floating MF41-6083		Floating MF41- 6153					
									Proportional MS41-6043		Proportional MS41-6083		Proportional MS41- 6153					
									Note: Not all factory actuator codes are available. <sup>f</sup>									
				Linkage Kit Part Number				AV-611										
					Actuator Close-off Pressure psi <sup>cd</sup>													
Valve Assembly Part Number <sup>a</sup>					P Code		Valve Size in. (mm)		Cv <sup>b</sup>		kvs <sup>b</sup>		Single Actuator					
Vx-7211-xxx-4-P Vx-7213-xxx-4-P Vx-7214-xxx-4-P Vx-7221-xxx-4-P Vx-7223-xxx-4-P Vx-7224-xxx-4-P Vx-7253-xxx-4-P Vx-7263-xxx-4-P Vx-7273-xxx-4-P Vx-7283-xxx-4-P					01		1/2 (15)		0.4		0.3		225		-			
					02				1.3		1.1							
					03				2.2		1.9							
					04		3/4 (20)		4.4		3.8		100		130			
					05				5.5		4.8							
					06		7.5		6.5		60		100					
					07		1 (25)		10.0						8.7			
					08				14.0		12		40		70			
					09		1 1/4 (32)		20.0		17						140	
Vx-7213-xxx-4-P					10		1 1/2 (40)		28.0		24		40		70			
Vx-7223-xxx-4-P					11		2 (50)		40.0		35		20		40		80	

a - To determine a specific part number, see Pg. 46, *Assembly Ordering Linked VB-7000 SmartX Globe Valves* for the relevant part series.

b - kvs = m<sup>3</sup>/h (ΔP = 100 kPa)    kvs = Cv / 1.156    Cv = kvs x 1.156

c - All Vx-72xx leakage ratings are ANSI V to 35 psi and ANSI IV above 35 psi; with the exception of Vx-7273 and Vx-7283 (ANSI III).

d - Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations. The rating value is the pressure difference between the inlet and outlet ports.

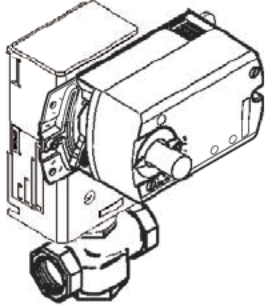

f - Shown for field assembly.

### 3. VB-7000 Valve/Actuator Assemblies

# ½"...2" 3-Way Globe Valves with Linked NSR Actuators

Note: Choose a valve assembly having a close-off pressure capability sufficient for the application. Not all valve body and actuator combinations are available factory-assembled. Some combinations must be field-assembled.

**Selection Table – 3-Way Linked Globe Valve Assemblies with Non-Spring Return Actuators**

3-Way Non-Spring Return Linked Globe Valve Assemblies <sup>f</sup>										
					Actuator Torque Rating (minimum)					
					44 lb-in (5 N-m)	88 lb-in (10 N-m)	133 lb-in (15 N-m)			
					Actuator Model (Actuator Code)					
					Floating MF41-6043  Proportional MS41-6043	Floating MF41-6083  Proportional MS41-6083	Floating MF41-6153  Proportional MS41-6153			
					Note: Not all factory actuator codes are available.					
					Linkage Kit Part Number					
					AV-611					
Valve Assembly Part Number <sup>a</sup>	P Code	Valve Size in. (mm)	Cv <sup>b</sup>	kvs <sup>b</sup>	Actuator Close-off Pressure psi <sup>ce</sup>					
Vx-7313-xxx-4-P	02	½ (15)	2.2	1.9	225	-	-	-	-	-
	04		4.4	3.8						
	06	¾ (20)	7.5	6.5						
	08	1 (25)	14.0	12.0	100	180				
	09	1¼ (32)	20.0	17	60	120				
	10	1½ (40)	28	24	40	75			140	
	11	2 (50)	41	36	20	40			80	
Vx-7323-xxx-4-P	02	½ (15)	2.2	1.9	250	-	-	-	-	-
	04		4.4	3.8						
	06	¾ (20)	7.5	6.5						
	08	1 (25)	15.0	13.0						
	09	1¼ (32)	20.0	17.3						
	10	1½ (40)	28	24.2						
	11	2 (50)	40	34.6						

a - To determine a specific part number, see Pg. 46, *Assembly Ordering Linked VB-7000 SmartX Globe Valves* for the relevant part series.

b -  $kvs = m^3/h$  ( $\Delta P = 100$  kPa)     $kvs = Cv / 1.156$      $Cv = kvs \times 1.156$

c - Mixing Valves A port seat leakage ANSI IV, B port seat leakage ANSI III, Diverting Valves seat leakage is ANSI III.

e - Dual actuators are not available as factory assemblies.

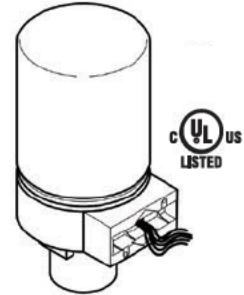
Some factory assembly may be available but components may be ordered separately for field assembly.

f - Shown for field assembly.

### 3. VB-7000 Valve/Actuator Assemblies

## 1/2" ... 2" Globe Valve Selection for Hydraulic SR Actuators

Select Actuator Type or Actuator Code (xxx) series with correct Input Signal having sufficient close-off for the application. Not all valve body and actuator combinations are available factory-assembled. Some combinations must be field-assembled.



Actuator Valve Selection for the Hydraulic Spring Return Actuators						
Actuator			MA-521x	MP-5xxx	MPR-561x	
Input Signal			2-Position Electric	Vdc	mAdc	
Actuator Code (xxx)			a	a		
	Factory Available Valve Assembly	Valve Body	P Code	Size	Close-off Pressure Rating (psi)	
N.O.	VA-7213-2xx-4-P VS-7213-xxx-4-P	VB-7213-0-4-P VB-7214-0-4-P VB-7253-0-4-P VB-7273-0-4-P	-01, -02, -03, -04	1/2" (15 mm)	130	
			-05, -06	3/4" (20 mm)	80	
			-07, -08	1" (25 mm)	40	
			-09	1 1/4" (32 mm)	25	
			-10	1 1/2" (40 mm)	15	
			-11	2" (40 mm)	10	
N.C.	VA-7223-2xx-4-P VS-7223-xxx-4-P	VB-7223-0-4-P VB-7224-0-4-P VB-7263-0-4-P VB-7283-0-4-P	-01, -02, -03, -04	1/2" (15 mm)	200	130
			-05, -06	3/4" (20 mm)	130	80
			-07, -08	1" (25 mm)	50	40
			-09	1 1/4" (32 mm)	35	25
			-10	1 1/2" (40 mm)	35	25
			-11	2" (40 mm)	20	14

a - Hydraulic actuators require AV-7600-1 linkage if field assembled. MP-541x and MPR-561x require AV-601 linkage extension for field assembly.

3-Way Hydraulic Valve/Actuator Close-Off Ratings							
Valve Linkage (1/2" ... 2")				AV-7600-1 <sup>a</sup>		AV-7600-1	
Input Signal				Electronic Vdc & 4...20 mA		SPDT Floating & 2-Position	
Actuator Code (XXX)				2XX		2XX	
Actuator Type				MP-5X1X-XXX <sup>b</sup> MPR-561X		MA-521X	
Factory Available Valve Assemblies	Valve Body	P Code	Size (In.)	Actuator Close-Off Pressure Rating <sup>S</sup> (psi) <sup>c d e</sup>			
				SU <sup>f</sup> "A"	SD <sup>f</sup> "B"	SU <sup>f</sup> "A"	SD <sup>f</sup> "B"
VA-7313-XXX-4-P VS-7313-XXX-4-P	VB-7313-0-4-P VB-7314-0-4-P	-02, -04	1/2	130	200	130	
		-06	3/4	80	130	80	
		-08	1	40	50	40	
		-09	1 1/4	25	35	25	
		-10	1 1/2	15	35	25	
		-11	2	10	20	14	
VA-7323-XXX-4-P VS-7323-XXX-4-P	VB-7323-0-4-P	-04	1/2	250			
		-06	3/4				
		-08	1				
		-09	1 1/4				
		-10	1 1/2				
		-11	2				
VF-7313-XXX-4-P	VB-7312-0-4-P VB-7313-0-4-P VB-7314-0-4-P	-02, -04	1/2 or 5/8		200	130	
		-06	3/4		130	80	
		-08	1		50	40	
		-09	1 1/4		35	25	
		-10	1 1/2		20	15	
		-11	2		14	10	

a - MP-541X, MPR-5XXX use AV-7600-1 or AV-600 and AV-601.

b - Factory shipments have unpainted large springs. For 0...10 volt and 4...20 mA controllers, use blue and booster springs.

c - Close-off ratings for mixing or sequencing valves: (SU = "A" port, SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B"; "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A".

d - Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for other limitations.

e - Diverting valves may be used in mixing applications with minor effects on flow.

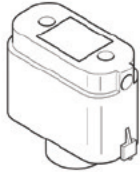
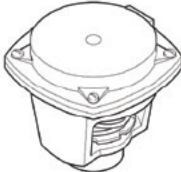
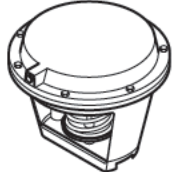
f - SU- Stem Up; SD- Stem Down.



### 3. VB-7000 Valve/Actuator Assemblies

# 1/2" ... 2" 2-Way and 5/8" 3-Way Glove Valves with Pneumatic Actuators

Select Actuator Type or Actuator Code (xxx) series with correct Input Signal having sufficient close-off for the application. If selecting component parts, select Valve Body and Positive Positioner if required.

2-Way 1/2" ... 2" Globe Valves with Pneumatic Actuators																											
																											
Effective Area			6 Sq. in.			11 Sq. in.			50 Sq. in.																		
Actuator			MK-2690			MK-4601			MK-4611			MK-4621															
Factory Actuator Code (xxx)*			201 202 203			301 302 303			611 612 613																		
Spring Range (psig)			3...7 5...10 8...13			3...6 5...10 10...13			3...8 5...10 8...13																		
Linkage			AV-7400			AV-401			AV-430																		
Positive Positioner (VK4)			AK-42309-500			AK-42309-500			AK-42309-500																		
Factory Available Assembly with Positive Positioner			N.O. Valves			Yes No No			Yes No No			Yes No No															
			N.C. Valves			No No Yes			No No Yes			No No Yes															
Actuator Close-Off Pressure Rating (psi)																											
NP	Factory Available Valve Assembly	Valve Body	P Code	Size in.	Supply Air Pressure (psig)						Supply Air Pressure (psig)						Supply Air Pressure (psig)										
					15	20	15	20	15	20	15	20	15	20	15	20	15	20	15	20	15	20					
2-Way N.O.	VK-7213-xxx-4-P VK4-7213-xxx-4-P VK-7214-xxx-4-P VK4-7214-xxx-4-P	VB-7213-0-4-P VB-7214-0-4-P VB-7253-0-4-P VB-7373-0-4-P	-1-2-3-4	1/2	130	220	60	170	-	90	250	250	120	250	10	200											
			-5-6	3/4	80	130	40	120	-	60	180	250	80	180	120												
			-7-8	1	25	70	15	50	-	25	90	150	35	100	65												
			-9	1 1/4	20	40	8	30	-	15	50	90	20	60	40												
			-10	1 1/2	14	29	5	20	-	9	30	60	10	40	25	170							250	110	230	40	160
			-11	2	6	14	-	10	-	-	15	30	-	20	-	90							160	60	120	20	90
2-Way N.C.	VK-7223-xxx-4-P VK4-7223-xxx-4-P VK-7224-xxx-4-P VK4-7224-xxx-4-P	VB-7223-0-4-P VB-7224-0-4-P VB-7263-0-4-P VB-7283-0-4-P	-1-2-3-4	1/2			50	130	30	100	250																
			-5-6	3/4			30	60	20	70	160																
			-7-8	1			9	30	5	30	60																
			-9	1 1/4			15	15	40																		
			-10	1 1/2			10	-	10	35	40							80	170								
			-11	2			-	-	15	20	50							90									

\*Not all actuator codes are factory assembled. If the assembly is no longer available but a close-off is shown on the tables above you may order the components that make up the assembly for field assembly. Note: Only bronze bodies listed. VBS-9263-0-4-P stainless steel bodies to -06 size are available with the same close off performance.

3-Way 5/8" Globe Valves with Pneumatic Actuators																									
Positive Positioner			AK-42309-500			AK-42309-500			AK-42309-500																
Actuator			MK-2690			MK-4601			MK-4611			MK-4621													
Factory Actuator Code (xxx)			201 202 203			301 302 303			313																
Spring Range (psig)			3...7 5...10 8...13			3...6 5...10 10...13			10...11.25																
Linkage			AV-7400			AV-401			AV-430																
Actuator Close-Off Pressure Rating (psi) <sup>ab</sup>																									
Supply Air Pressure (psig)					15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20			
Stem Positionc					SU	SD	SD	SU	SD	SD	SU	SU	SD	SU	SD	SD	SU	SD	SD	SU	SD	SD			
NP <sup>d</sup>	Valve Assembly	Valve Body	P Code	Size																					
SU <sup>c</sup>	VK-7312-xxx-4-P	VB-7312-0-4-P	-2-4	5/8"	5	100	75	60	50	135	95	5	85	35	250	250	130	220	240	250	30	170	-	-	-
	VK-7332-xxx-4-P	VB-7332-0-4-P	-2-3-4	5/8"				35	-	35				35	-	35	35	-	35						

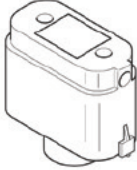
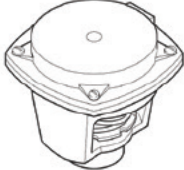
a - Close-off ratings for mixing valves: (SU = "A" port, SD = "B" port). The "A" port (SU) ratings equal pressure at Port "A" minus pressure at port "B". The "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A". Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.

b - Close-off pressure ratings describe only the differential pressure which the actuator can close off to standards with adequate seating force. Consult valve body specifications.

c - SU - Stem Up (Flow "B" to "AB"); SD - Stem Down (Flow "A" to "AB"); Normal Position Stem Up (Flow "B" to "AB").

d - NP = Normal Position.

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3-Way Mixing & Diverting/Sequencing 1/2" ... 2" Globe Valves with Pneumatic Actuators																					
																					
Effective Area				6 Sq. In.						11 Sq. In.											
Valve Linkage				AV-7400						AV-401											
Positive Positioner				AK-42309-500						AK-42309-500											
Factory Assembly with Positive Positioner				No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes		
Actuator Code (XXX)				201	202	203	203	301	302	303	301	302	303	301	302	303	301	302	303		
Actuator				MK-2690						MK-4601			MK-4611			MK-4621					
Spring Range (psig)				3...7	5...10	8...13	8...13	3...6	5...10	10...13	3...6	5...10	10...13	3...6	5...10	10...13	3...6	5...10	10...13		
<b>Actuator Close-Off Pressure Rating<sup>abc</sup></b>																					
Supply Air Pressure (psig)				15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20
Stem Position <sup>d</sup>				SU	SD	SD	SU	SD	SD	SU	SD	SD	SU	SD	SD	SU	SD	SD	SU	SD	SD
Valve Assembly	Valve Body	P Code	Size In.	-																	
VK-7313-XXX-4-P VK4-7313-XXX-4-P VK-7314-XXX-4-P VK4-7314-XXX-4-P	VB-7313-0-4-P VB-7314-0-4-P	-2-4	1/2	150	150	50	60	170	100	90	30	250	250	100	150	250	250	35	200		
		-6	3/4	60	120	30	40	100	60	60	20	180	230	70	80	180	160	15	120		
		-8	1	30	60	9	15	50	30	25	5	90	150	30	40	100	60	5	65		
		-9	1 1/4	-		8	30	15	15	-	50	90	15	25	60	40	-	40			
		-10	1 1/2	-		-	20	10	9	-	30	60	10	15	40	35	-	25			
		-11	2	-		-	10	-	-	-	15	30	-	5	20	15	-	10			
VK-7323-XXX-4-P VK4-7323-XXX-4-P	VB-7323-0-4-P	-4	1/2	250																	
		-6	3/4																		
		-8	1																		
		-9	1 1/4																		
		-10	1 1/2																		
-11	2																				

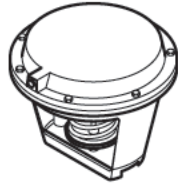
a - Close-off ratings for mixing or sequencing valves: (SU = "A", SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A". Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.

b - Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

c - Mixing valves can be used in a diverting application but diverting valves can not be used in mixing applications.

d - SU- Stem Up; SD- Stem Down. Refer to Pg. 29, 2. VB-7000 Series 1/2" ... 2" Globe Valves for flow pattern, port designations and normal position.

3. VB-7000 Valve/Actuator Assemblies

3-Way Mixing & Diverting/Sequencing 1½" & 2" Globe Valves with Pneumatic Actuators												
												
Effective Area (stroke)				50 Sq. In. (½ In.)								
Valve Linkage VB-7313-0-4-P				AV-430								
Valve Linkage VB-7323-0-X-P				AV-430								
Positive Positioner				AK-42309-500								
Factory Assembly with Positive Positioner				No			Yes			Yes		
Actuator Code (XXX)				611			612			613		
Actuator				MK-6601			MK-6611			MK-6621		
Spring Range (psig)				3...8			5...10			8...13		
				Actuator Close-Off Pressure Rating (psi) <sup>abc</sup>								
Supply Air Pressure (psig)				15/20	15	20	15/20	15	20	15/20	15	20
Stem Position <sup>d</sup>				SU	SD	SD	SU	SD	SD	SU	SD	SD
Valve Assembly	Valve Body	P Code	Size In.	-								
VK-7313-XXX-4-P	VB-7313-0-4-P	-10	1½	40	170	250	80	110	230	170	30	160
VK4-7313-XXX-4-P	VB-7314-0-4-P	-11	2	20	90	160	50	60	120	90	15	90
VK-7323-XXX-4-P	VB-7323-0-4-P	-10	1½	250								
VK4-7323-XXX-4-P		-11	2									

a - Close-off ratings for mixing or sequencing valves: (SU = "A", SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A". Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.  
 b - Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for other limitations.  
 c - Mixing valves can be used in a diverting application but diverting valves can not be used in mixing applications.  
 d - SU- Stem Up; SD- Stem Down. Refer to Pg. 29, 2. VB-7000 Series ½"...2" Globe Valves for flow pattern, port designations and normal position.

#### Applications

Schneider Electric Spring Return and Non-Spring Return Forta M900AxxVB series linear actuators mount directly onto ½"…2" VB-7000 series and obsolete VB-9xxx ½"…1¼" 2-Way and 3-Way globe valve bodies. Applications include chilled or hot water and steam, NEMA 1 or 2 (M900Axx-VB) or NEMA 4 (M900AxW-VB) models. Field selectable input signals include reverse and direct acting, floating or proportional 0…1 Vdc, 2…10 Vdc or 4…20 mA dc and proportional sequencing input signal ranges.

#### Applicable Literature

- Schneider Electric Forta M900 Datasheet, F-27682
- Forta M900 Installation Instructions, F-27683
- AV-821 Installation Instructions, F-27701
- CA-28 Control Valve Sizing, F-13755

#### Valve and Actuator Selection Procedure

##### 1. Determine the required flow coefficient (Cv/kvs).

Using the required flow and pressure drop for the application, determine the required flow coefficient (consult CA28, F-13755 if necessary).

##### 2. Determine valve body part number.

Select a 2-Way valve body from section 1.0 VB-7000 Valve Bodies having the required flow coefficient, size, body pattern, end connection, and temperature/pressure ratings appropriate for the application. Determine the desired loss of power position of the valve (M900AR-VB Spring retract, M900 AE-VB Spring extend).

##### 3. Select the Forta Actuator and appropriate spring-return action.

Using the required close-off pressure for the application and the appropriate spring-return action, select a Forta actuator having sufficient close-off pressure on the valve body selected in step 2. Additional Forta actuator specifications may be found in Actuators and Linkages.

##### 4. Determine the Assembly Part Number

If a complete factory valve and actuator assembly is required, consult the actuator code of the Forta actuator selected in Step 3. For the complete assembly part number:

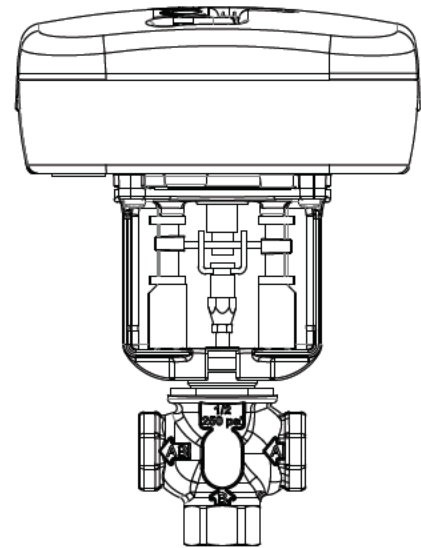
- Change the valve body part number prefix from VB to VU.
- Insert the actuator code in the third field of the part number.
- Confirm the factory assembly is available.

#### Example

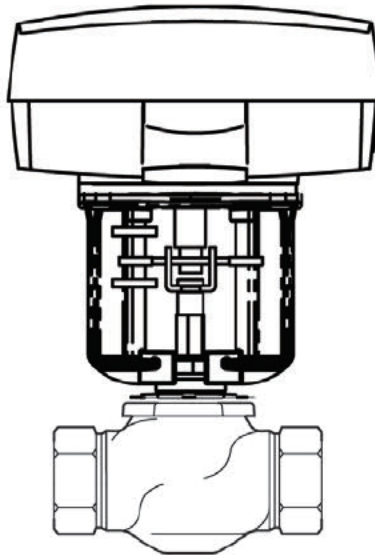
- Valve Body: VB-7253-0-4-4
- Actuator: M900AR-VB
- Complete Assembly: VU-7253-650-4-4

(Note: Not available as a factory assembly, order the valve body and actuator for field assembly.)

Forta actuators are field configured for the desired control signal type and range plus the desired action. Consult the appropriate Forta Installation Instructions for further information.







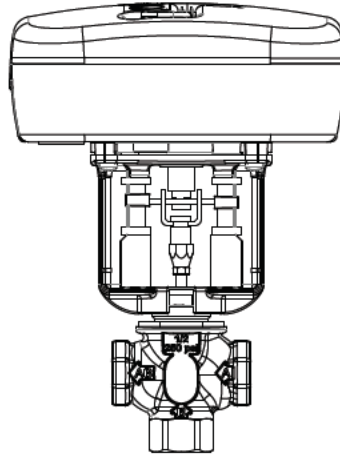
Forta Mx00A-VB Valve Actuator Mounted on a 2-Way VB-7000 Series Valve

Select a valve/actuator combination having sufficient close off for the application.

Actuator Valve Selection for the Forta Non-Spring Return Actuators							
Valve Body <sup>a</sup>			Close-off Ratings, psi (kPa)				
2-Way Valves <sup>b,c</sup>	P Code	Size	M400A (VB) 674	M800A (VB) 680	M1500A (VB) 686		
VB-7211-0-3-P VB-7211-0-4-P VB-7212-0-4-P VB-7213-0-4-P VB-7214-0-4-P VB-7221-0-4-P VB-7222-0-4-P VB-7223-0-4-P VB-7224-0-4-P VB-7253-0-4-P VB-7263-0-4-P VB-7273-0-4-P VB-7283-0-4-P	-01, -02, -03, -04	½" (15 mm)	250 (1712)	250 (1712)			
	-05, -06	¾" (20 mm)	198 (1356)	250 (1712)			
	-07, -08	1" (25 mm)	92 (630)	207 (1418)			
	-09	1¼" (32 mm)	56 (384)	130 (890)			
	-10	1½" (40 mm)	37 (253)	88 (603)		177 (1212)	
	-11	2" (40 mm)	19 (130)	48 (329)		98 (671)	
	3-Way Valves <sup>b</sup>  VB-7312-0-4-P VB-7313-0-4-P VB-7314-0-4-P	-02, -04	½" (15 mm)	250 (1712)		250 (1712)	
		-06	¾" (20 mm)	198 (1356)		250 (1712)	
-08		1" (25 mm)	92 (630)	207 (1418)			
-09		1¼" (32 mm)	56 (384)	130 (890)			
-10		1½" (40 mm)	37 (253)	88 (603)			
-11		2" (40 mm)	19 (130)	48 (329)			
VB-7323-0-4-P	-04, -06, -08, -09, -10, -11	½" .. 2"	250 (1712)		Do not use		

a - Not all bodies are available for all port codes.  
 b - Substitute VU- for VB- and add the actuator code to substitute for the -0- (i.e., 674, 680, etc.).  
 c - Not all valve styles are available in all sizes or "P" codes.

3. VB-7000 Valve/Actuator Assemblies



Forta M900A-VB Valve Actuator Mounted on a 3-Way VB-7000 Series Valve

Not all valve body and actuator combinations are available factory-assembled. Some combinations must be field-assembled. Select a valve/actuator combination having sufficient close off for the application.

Select VB-7000 Valve / M900Axx(-VB) <sup>a</sup> Spring Return Actuator				
Valve Body <sup>a,c</sup>	Valve Action	P-Code	Size	Close-off Ratings PSI M900Axx <sup>b</sup>
VB-7211-0-3-P VB-7211-0-4-P VB-7212-0-4-P VB-7214-0-4-P VB-7213-0-4-P VB-7253-0-4-P VB-7273-0-4-P	Stem up Open	1, 2, 3, 4	½"	250
		5, 6	¾"	250
		7, 8	1"	180
		9	1 1/4"	110
		10	1 ½"	75
		11	2"	40
VB-7221-0-4-P VB-7222-0-4-P VB-7224-0-4-P VB-7223-0-4-P VB-7263-0-4-P VB-7283-0-4-P	Stem up Closed	1, 2, 3, 4	½"	250
		5, 6	¾"	250
		7, 8	1"	180
		9	1 1/4"	110
		10	1 ½"	75
		11	2"	40
VB-7312-0-4-P VB-7313-0-4-P VB-7314-0-4-P	3 Way Mixing	2, 4	½"	250
		6	¾"	250
		8	1"	180
		9	1 1/4"	110
		10	1 ½"	75
VB-7323-0-4-P	3 Way Diverting	11	2"	40
		4	½"	250
		6	¾"	250
		8	1"	250
		9	1 1/4"	250
		10	1 ½"	250
VBS-9263-0-4-P	Stem Up Closed	1-7, 31-39	½"	250
		5, 6, 45	¾"	250

a - Substitute VU- for VB- and add the actuator code 650 (M900AR-VB) or 660 (M900ARW-VB) to substitute for the -0-

b - M900Axx-VB or M900Axx Styles

c - Not all valve styles are available in all sizes or "P" codes.