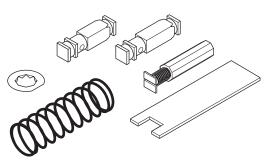


Hydraulic Actuator Valve Linkage Kit General Instructions

## Application

The AV-600 linkage is used to field assemble MA-521x, MF-5x13, MP-521x, MP-541x, MPR-561x, MPR-571x, and MPR-581x round hydraulic actuators to 1/2" through 2" VB-7xxx and obsolete VB-9xxx twoway and three-way valve bodies.



### Features

 AV-600 provides direct couple interface between MA, MF, MP, and MPR-5xxx actuators and 1/2" to 1-1/4" VB-7xxx valve bodies.

## **Applicable Literature**

- Environmental Controls Cross-Reference Guide, F-23638
- Environmental Controls Reference Manual, F-21683
- Environmental Controls Application Manual, F-21335
- Pneumatic Products Catalog, F-27383
- Environmental Controls Valve Selection Guide, F-26094
- EN-205 Water System Guidelines, F-26080
- AV-601 Linkage Extension Kit General Instructions, F-26280

#### **Temperature Restrictions**

Verify that temperature of the media in the valve versus the ambient temperature at the actuator does not exceed the ratings shown in Table-1.

Maximum Temperature of Media	Maximum Ambient MF-5x13, MP-541x	•	Maximum Ambient Temperature of MA-521x or MP-521x		
in the Valve Body (Check Ratings of the Valve)	AV-600 Only for Chilled Water Applications Only	AV-600 & AV-601 <sup>a</sup>	AV-600 Only	AV-600 & AV-601 <sup>a</sup>	
366°F (180°C)	Do Not Use	88°F (31°C)	90°F (32°C)	90°F (32°C)	
340°F (171°C)	Do Not Use	93°F (34°C)	100°F (38°C)	100°F (38°C)	
281°F (138°C)	Do Not Use	103°F (39°C)	115°F (46°C)	140°F (60°C) <sup>b</sup>	
181°F (83°C)	Do Not Use	120°F (48°C)	140°F (60°C) <sup>b</sup>	140°F (60°C) <sup>b</sup>	
80°F (26°C)	140°F (60°C) <sup>b</sup>	140°F (60°C) <sup>b</sup>	140°F (60°C) <sup>b</sup>	140°F (60°C) <sup>b</sup>	

<sup>a</sup> For applications requiring AV-601 refer to AV-601, Linkage Extension Kit General Instructions, F-26280.
 <sup>b</sup> Maximum allowable ambient temperature of the actuator.

#### **Close-off Pressure Rating**

Close-off pressure ratings are listed in Table-2 and Table-3. For current valve bodies, make sure the close-off pressure is adequate for the application.

Required	AM-602	Adaptor for current actuators to obsolete linkages. See Figure-7 through Figure-9.
Components	AM-603	Adaptor for obsolete actuators to AV-600. See Figure-7 through Figure-9.
Componente	AV-601	Linkage Extension Kit

#### INSTALLATION

Inspection

Inspect the package for damage. If damaged, notify the appropriate carrier immediately. If undamaged, open the package and inspect the device for obvious damage. Return damaged products.

#### Requirements

#### • Tools (not provided):

- Two (2) 3/8" wrenches
- TOOL-19, 1/8" diameter rod
- TOOL-20-1, Packing and linkage wrench
- TOOL-37, 1-5/8" open-ended wrench (optional)
- 6" or longer ruler
- Linkage wrench (provided)
- Training: Installer must be a qualified, experienced technician.

#### Caution:

- Avoid locations where excessive moisture, corrosive fumes, or vibration is present.
- Install all two-way valves so that they close against the flow. An arrow on the valve body or a tag indicates the proper flow direction.
- Always install three-way mixing valves with two inlets and one outlet.
- Always install three-way diverting valves with one inlet and two outlets.
- Do not install the actuator below the center line of the valve. For steam applications mount the actuators above the valve body at 45° from vertical.

The AV-600 linkage kit contains parts for installation on both current 1/2" to 2" VB-7xxx series valve bodies and on obsolete 1/2" to 1-1/4" VB-9xxx and older valve bodies.

#### AV-600 Valve Linkage Kit Used with VB-7xxx Series Valves

The AV-600 linkage kit used on VB-7xxx series valve bodies require no stem height setting. Refer to **Environmental Controls Valve Selection Guide, F-26094**, for valves accommodating the AV-600 linkage kit.

#### Caution:

- It is essential that the proper parts be used for the valve body on which the linkage is being installed to ensure proper actuator operation and close off.
- Do not attempt to use the square stem extension with VB-7xxx valves. Parts or valves may be damaged internally.

#### Linkage Installation

The linkage kit is assembled onto the VB-7xxx valve body with the stem in the up position.

1. Thread the hexagon coupler onto the valve stem all the way to the bottom of the stem thread, finger tight (Figure-1).

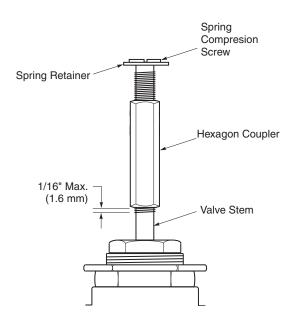


Figure-1 Installation of Hexagon Coupler and Spring Compression Screw.

*Caution:* The hexagon coupler must reach to within 1/16" (1.6 mm) of the smooth section of the stem to assure proper seating. Do not use the Spring Compression Screw to run the Hexagon Coupler down.

- 2. Start the spring compression screw one turn or more into the hexagon coupler. Pull the valve stem completely up.
- 3. Slip the spring over the coupler and screw.
- Place the retainer over the screw. Twist the retainer 45° to lock it in place on the spring compression screw.
- 5. Insert the linkage wrench (supplied with kit, also included on TOOL-20-1) through the spring coils to hold hexagon coupler.

- 6. Tighten the spring compression screw. To establish proper linkage height, run the spring compression screw down until the screw end bottoms firmly on the stem top (Figure-2).
  - On stem up closed valves (VB-722x) or 3-way valve (VB-73xx), you will feel the screw bottom.
  - On stem up open valve (VB-721x), the stem and hexagon coupler will begin to turn.

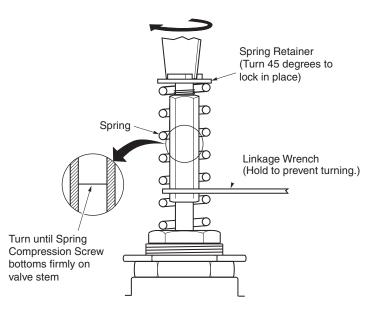


Figure-2 Completing Linkage Kit Assembly to Valve.

7. Confirm stem height setting:

2-5/16" (59 mm) maximum after installation on stem up open valves (VB-721x)

- 2-7/32" (56 mm) maximum on stem up closed (VB-722x) or 3-way (VB-73xx) valves.
- 8. Center the spring on top and bottom to assure smooth actuator operation. See Figure-3 for total assembly components required.

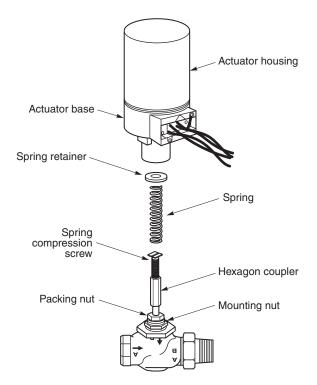


Figure-3 Assembly of AV-600 Linkage Kit onto VB-7xxx Series Valve.

AV-600 Linkage Used with VB-121, VB-324, and VB-9xxx Series Valves Refer to the following tables to select compatible valves for the desired actuator using the AV-600 linkage kit that require stem height settings. Refer to Table-2 for current valves. Table-3 and Table-4 list the obsolete valve bodies using the AV-600 linkage kit. Follow the assembly procedures on pages 8 through 10.

Use Table-1 to determine if AV-601 linkage extension kit is required for the application. Consult Table-2, Table-3, and Table-4 to make sure the valve selected is compatible with AV-600 valve linkage kit. Follow the assembly procedures on page 10.

For replacement of obsolete actuators and linkages, refer to Figure-7 through Figure-9 and Table-3 or Table-4.

Valve Assembly Number	Valve Body Part Number	Valve Body Type (Normal Position)	Stem Height Setting for Dim. "x" in inches (mm) (Note: Use short stem extension 1-15/32".)	
VA-1219 VP-1219	VB-121-0-4-P (P Code -1 to -3)	2-Way 1/2" O.D. Flared Straightway (Normal Open)	1-25/32 (45) Stem Down	
VA-3249 VP-3249	VB-324-0-5-4	3-Way 1/2" O.D. Flared Mixing	2-3/16 (56) Stem Up	

# Table-3 Required Stem Height Settings for AV-600 with Obsolete Valve Bodies and Close-off Ratings for the Combination of AV-600 Valve Body and Actuator Combination.

				ACTUATORS			Stem Height
			•	MA-521x	MP-521x	MF-5x13, MP-541x	Setting for
				Series	Series	& MPR-5xxx	AV-600 Dimension
v	alve Linkages Require	ed		AV-600	AV-600	AV-600 & AV-601 <sup>a</sup>	"x"
	VALVE BODY INFORMATION						(Note: Use short
Valve Body Part Number	Description	Cv	Size	CLC	DSE-OFF PRES	SURE (psi)	stem extension 1-15/32".)
VB-111-0-3-1		0.4	1/2"	100	100	100	
VB-111-0-3-2		1.3	1/2"	100	100	100	
VB-111-0-3-3		2.2	1/2"	100	100	100	
VB-111-0-3-4	2-Way	3.8	1/2"	100	100	100	4.40/40
VB-111-0-3-5	Normally Open Union End NPT	5.5	3/4"	80	80	80	1-13/16" Stem Down
VB-111-0-3-6	Angle Body	7.5	3/4"	80	80	80	Sterri Down
VB-111-0-3-7	/	8.5	1"	45	45	45	
VB-111-0-3-8		10.5	1"	45	45	45	
VB-111-0-3-9		15	1-1/4"	25	25	25	
VB-9211-0-4-1		0.4	1/2"	180	190	190	
VB-9211-0-4-2		1.3	1/2"	180	190	190	-
VB-9211-0-4-3		2.2	1/2"	180	190	190	
VB-9211-0-4-4	2-Way	3.3	1/2"	180	190	190	
VB-9211-0-4-5	Normally Open Union End NPT	5	3/4"	75	85	85	1-25/32" Stem Down
VB-9211-0-4-6	Straightway Body	6.2	3/4"	75	85	85	Stelli Down
VB-9211-0-4-7		8.2	1"	40	45	45	
VB-9211-0-4-8		10.5	1"	40	45	45	
VB-9211-0-4-9		15	1-1/4"	25	30	30	
VB-9212-0-4-1	2-Way	0.4	5/8" O.D.	180	190	190	
VB-9212-0-4-2	Normally Open	1.3	5/8" O.D.	180	190	190	1-25/32"
VB-9212-0-4-3	SAE 45° Flared	2.2	5/8" O.D.	180	190	190	Stem Down
VB-9212-0-4-4	Straightway Body	3.3	5/8" O.D.	180	190	190	
VB-9213-0-4-1		0.4	1/2"	180	190	190	
VB-9213-0-4-2		1.3	1/2"	180	190	190	
VB-9213-0-4-3		2.2	1/2"	180	190	190	1
VB-9213-0-4-4	2-Way Normally Open FNPT	3.6	1/2"	180	190	190	4.05/00"
VB-9213-0-4-5		5	3/4"	75	85	85	1-25/32" Stem Down
VB-9213-0-4-6	Straightway Body	6.2	3/4"	75	85	85	
VB-9213-0-4-7	Saaightway Doay	8.2	1"	40	45	45	1
VB-9213-0-4-8		11	1"	40	45	45	1
VB-9213-0-4-9		16	1-1/4"	25	30	30	1

#### Table-3 Required Stem Height Settings for AV-600 with Obsolete Valve Bodies and Close-off Ratings for the Combination of AV-600 Valve Body and Actuator Combination. (Continued)

NA-521x         MP-521x         MP-521x <t< th=""><th></th><th></th><th>-</th><th>Γ</th><th></th><th>ACTUATO</th><th>RS</th><th>Stem Height</th></t<>			-	Γ		ACTUATO	RS	Stem Height
Series         Series         Series         & MPR-Sox AV-600         AV-600         <		MA-521x						-
VALVE BODY INFORMATION         C/         Size         CLOSE-OFF PRESURE (ps)         (hote: Use a) stem extens 1-15/32*.]           Valve Body Part Number         Description         C/         Size         CLOSE-OFF PRESURE (ps)         (hote: Use a) stem extens 1-15/32*.]           VB-9214-04-1         Description         C/         Size         CLOSE-OFF PRESURE (ps)         (hote: Use a) stem extens 1-15/32*.]           VB-9214-04-43         VB-9214-04-44         Vmmally Open Union Swat Strightway Body         0.4         1/2*         180         190         190           VB-9214-04-47         Vmmally Open Union Swat VB-9221-04-4         C/////VM         3////////////VM         11         1*         40         45         45           VB-921-04-4         Vmmally Closed VB-9221-04-4         10         11/2*         250         220         220         220           VB-9221-04-4         Vmmally Closed VB-9221-04-5         11/2*         250         220         220         2-1/8*         Stem Up           VB-9221-04-5         Vmmally Closed VB-9221-04-4         11         1/2*         250         220         220         2-1/8*           VB-9221-04-4         Vmmally Closed VB-9222-04-4         Starightway Body         3.3         58* OD         25         220         220					Series	Series		AV-600 Dimension
VALVE BODY INFORMATION         CV         Size         CLOSE-OFF PRESURE (psi)         (Note: Use a) site extension and the analysis of the analysi	V	alve Linkages Require	d		AV-600	AV-600	AV-600 & AV-601 <sup>a</sup>	"x"
Mark Budy Part Number         Description         Cv         Size         Description         1-15/32*1           VB-9214-04-1         Nesself-4-1         Nesself-4-1         Nesself-4-1         1480         190         190           VB-9214-04-3         2-Way         1.15/32*1         180         190         190         190           VB-9214-04-45         Union Swatt         5         3/4"         75         85         85         5           VB-9214-04-47         Normally Open         6.2         3/4"         75         85         85         5           VB-9214-04-47         Normally Open         6.2         11'         40         45         45           VB-9214-04-47         Normally Open         6.2         11'         40         45         45           VB-9214-04-47         Normally Open         1.1'         20         20         220         220           VB-9221-04-6         Normally Obed         5         3/4"         140         90         90         5         3/4"         140         90         90         5         3/4"         140         90         90         5         3/4"         140         90         90         5         3/4"								(Note: Use short
V8-9214-04-2 V8-9214-04-4 V8-9214-04-4         2-Way Normally Open Use 2214-04-4         1.3         1/2"         180         190         190           V8-9214-04-4         2-Way Normally Open Use 2214-04-7         2-Way Straightway Body         2.4         1/2"         180         190         190         190           V8-9214-04-4         Straightway Body         5         3/4"         75         85         85         55           V8-9214-04-4         Straightway Body         11         1"         40         45         45           V8-921-04-4         V8-921-04-4         10         1/2"         250         220         220           V8-9221-04-4         V8-9221-04-4         Vmmally Cleased         0.4         1/2"         250         220         220           V8-9221-04-4         V8-9221-04-4         Vmmally Cleased         1.5         1.14"         45         30         30           V8-9221-04-7         Skat 6/* Nard         Skat 6/* Nard         2.18"         10.5         1"         75         50         50           V8-9221-04-8         Skat 6/* Nard         Skat 6/* Nard         3.5         50         2.18"         2.18"           V8-9222-04-1         2.4         7"         75	•	Description	Cv	Size	CLC	SE-OFF PRES	SURE (psi)	stem extension 1-15/32".)
VB-92140-4-3 VB-92140-4-5 VB-92140-4-5         2-Way Normally Open Union Sweat Sraightway Body         2.2         1/2'         180         190         190           VB-92140-4-5 VB-92140-4-7         Sraightway Body         2.2         1/2'         180         190         190           VB-92140-4-7         Sraightway Body         2.2         1/2'         180         190         190           VB-92140-4-8         VB-92140-4-8         VB-9210-4-1         0.4         1'2         250         220         220           VB-92210-4-1         0.4         1/2'         250         220         220         220           VB-92210-4-1         0.4         1/2'         250         220         220         220           VB-92210-4-6         Normally Closed Union End NPT         1.3         1/2'         250         220         220           VB-92210-4-6         Normally Closed Union End NPT         1.3         5/8' O.D.         250         220         220           VB-92210-4-1         2-Way         0.4         5/8' O.D.         250         220         220         21/8'           VB-9222-0.4-1         Normally Closed         1.3         5/8' O.D.         250         220         220         21/8'	VB-9214-0-4-1		0.4	1/2"	180	190	190	
VB-9214-0-46 VB-9214-0-46 VB-9214-0-46 VB-9214-0-46 VB-9214-0-46 VB-9214-0-46 VB-9214-0-46 VB-9214-0-46 VB-9214-0-46         3.6         1/2"         180         190         190         1-25/32" Stem Dow           VB-9214-0-46 VB-9214-0-46 VB-9214-0-46 VB-9214-0-46 VB-9221-0-47 VB-9221-0-47 VB-9221-0-46 VB-9221-0-47 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9222-0-42 VB-9223-0-47 VB-9224-0-47 VB-9223-0-47 VB-9224-0-47 VB-9223-0-47 VB-9224-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47 VB-9223-0-47	VB-9214-0-4-2		1.3	1/2"	180	190	190	-
10         100	VB-9214-0-4-3		2.2	1/2"	180	190	190	
VH-9214-04-5 VB-9214-04-7         Union Sweat Xiaghtway Body         5 5         3/4"         75         85         85         Stem Dow           VB-9214-04-7         Xiaghtway Body         6.2         3/4"         75         85         85           VB-9214-04-7         Xiaghtway Body         6.2         1"         40         45         46           VB-921-04-47         Xiaghtway Body         6.2         1"         40         45         46           VB-921-04-43         Xiaghtway Body         6.4         1/2"         250         220         220           VB-9221-04-4         Normally Closed         1.3         1/2"         250         220         220           VB-9221-04-6         Xiaghtway Body         6.2         3/4"         140         90         90           VB-9221-04-7         Xiaghtway Body         6.2         3/4"         140         90         90           VB-9221-04-7         Xiaghtway Body         1.3         5/6" OD         250         220         220           VB-9222-04-2         Normally Closed         3.5         5/6" OD         250         220         220           VB-9223-04-6         YB-9223-04-6         YB-9223-04-7         YA         1/2"	VB-9214-0-4-4		3.6	1/2"	180	190	190	-
WB-9214-0-46 VB-9214-0-47         Straightway Body VB-9214-0-48         6.2 8.2 1         3/4" 40         75 45         85 45         85 45           VB-9214-0-48         Normally Closed Union End NPT VB-9221-0-4-4         16         1-1/4"         25         30         30           VB-9214-0-4-2         VB-9221-0-4-2         VB-9221-0-4-3         VB-9221-0-4-4         VB-9221-0-4-4         VB-9221-0-4-4         1.3         1/2"         250         220         220           VB-9221-0-4-4         VB-9221-0-4-5         Straightway Body         5         3/4"         140         90         90         Stem Up           VB-9221-0-4-8         VB-9221-0-4-8         VB-9221-0-4-8         VB-9221-0-4-9         10.5         1''         75         50         50           VB-9221-0-4-8         VB-9222-0-4-4         Straightway Body         1.5         1''         75         50         50           VB-9222-0-4-4         VB-9222-0-4-4         2.Way         1.3         58" O.D.         250         220         220           VB-9222-0-4-4         Normally Closed SA 64 5' Flored Straightway Body         3.3         58" O.D.         250         220         220           VB-9223-0-4-4         Normally Closed Union Sweat         1.1         1'''         2.48	VB-9214-0-4-5		5	3/4"	75	85	85	
VB-9214-0-4-7 VB-9214-0-4-8         Conditional State (NB-9214-0-4-8)         Conditional State (NB-9214-0-4-8)         Conditional State (NB-921-0-4-4)         Conditional State (NB-9221-0-4-4)         Conditional State (NB-9222-0-4-4)         Conditional State (NB-9223-0-4-4)         Conditional State (NB-9223-0-4-4) <thconditional state<br="">(NB-9223-0-4-4)         C</thconditional>	VB-9214-0-4-6		6.2	3/4"	75	85	85	Stem Down
VB-9214-04-8         II         I'         40         45         45           VB-9214-04-9         VB-921-04-1         16         1.1/4'         25         30         30           VB-921-04-2         VB-921-04-3         VB-921-04-4         VB-921-04-4         VB-921-04-4         VB-921-04-4         VB-921-04-4         VB-921-04-4         VB-921-04-7         2-Way         3.3         1/2"         250         220         220           VB-921-04-7         VB-921-04-7         VB-921-04-7         VB-921-04-7         VB-921-04-7         Sate AP         5         3/4"         140         90         90         Stem Up           VB-921-04-7         VB-921-04-8         VB-922-04-1         2-Way         0.4         5/8" O.D.         250         220         220         20           VB-922-04-1         2-Way         0.4         5/8" O.D.         250         220 <t< td=""><td></td><td>Oliaightway Dody</td><td></td><td>1"</td><td>40</td><td></td><td></td><td>-</td></t<>		Oliaightway Dody		1"	40			-
VB-9214-04-9 WB-9221-04-1         16         1-1/4*         25         30         30           VB-921-04-1         VB-9221-04-2         1         1         1/2"         250         220         220           VB-9221-04-3         2-Way VB-9221-04-6         Normally Closed Union End NPT         1.3         1/2"         250         220         220         220           VB-9221-04-6         Normally Closed Union End NPT         5         3/4"         140         90         90         5<				1"	40			-
VB-9221-0-4-1 VB-9221-0-4-3 VB-9221-0-4-3 VB-9221-0-4-4 VB-9221-0-4-4 VB-9221-0-4-5 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-9         0.4         1/2"         250         220         220           1.3         1/2"         250         220         220         220           VB-9221-0-4-4 VB-9221-0-4-7 VB-9221-0-4-8         Straightway Body         6.2         3/4"         140         90         90           VB-9221-0-4-7 VB-9222-0-4-1         2-Way VB-9222-0-4-1         2-Way VB-9222-0-4-2         Normally Closed VB-9222-0-4-3         8.4         5/8" O.D.         250         220         220           VB-9222-0-4-3         SAE 45" Flard6         0.4         5/8" O.D.         250         220         220         21/8"           VB-9223-0-4-2         VB-9223-0-4-3         SAE 45" Flard6         0.4         1/2"         250         220         220         21/8"           VB-9223-0-4-2         VB-9223-0-4-2         Straightway Body         5.6         1.3         1/2"         250         220         220         220         220           VB-9223-0-4-2         VB-9223-0-4-2         VB-9223-0-4-2         1.3         1/2"         250         220         220         22-1/8"           VB-9223-0-4-2         VB-9223-0-4-2         VB-9224-0-4-2         1.3 </td <td></td> <td></td> <td></td> <td>1-1/4"</td> <td>-</td> <td></td> <td></td> <td>-</td>				1-1/4"	-			-
VB-9221-0-4-2 VB-9221-0-4-3 VB-9221-0-4-5 Usep221-0-4-5 Usep221-0-4-6 Usep221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9222-0-4-7 VB-9222-0-4-7 VB-9222-0-4-1 VB-9222-0-4-7 VB-9222-0-4-7 VB-9223-0-4-1 VB-9223-0-4-1 VB-9223-0-4-7 VB-923-0-4-7 VB-923-				-	-			
VB-9221-0-4-3 VB-9221-0-4-4 VB-9221-0-4-5 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-8         2-Way Straightway Body         2.2         1/2"         250         220         220           0.5         3/4"         140         90         90         90         90           VB-9221-0-4-7         Straightway Body         6.2         3/4"         140         90         90           VB-9221-0-4-8         VB-9221-0-4-9         15         1-1/4"         45         30         30           VB-9222-0-4-1         2-Way VB-9222-0-4-2         Normally Closed VB-9222-0-4-4         0.4         5/8" O.D.         250         220         220         2-1/8"           VB-9222-0-4-4         Straightway Body         5/8" O.D.         250         220         21/8"         2-1/8"         2-1/8"         2-1/8"         2-				-				-
VB-9221-0-4-4 VB-9221-0-4-5 VB-9221-0-4-6 VB-9221-0-4-6 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-8 VB-9221-0-4-9         2-Way Normally Closed Straightway Body         3.3         1/2*         250         220         220           VB-9221-0-4-7 VB-9221-0-4-7 VB-9221-0-4-9         0.4         5/8* 0.D.         250         50         50           VB-9221-0-4-9         0.4         5/8* 0.D.         250         220         220           VB-9222-0-4-1 VB-9222-0-4-1 VB-9223-0-4-2 VB-9223-0-4-1 VB-9223-0-4-1 VB-9223-0-4-4         0.4         5/8* 0.D.         250         220         220           VB-9223-0-4-1 VB-9223-0-4-3 VB-9223-0-4-4 VB-9223-0-4-4 VB-9223-0-4-4 VB-9223-0-4-4 VB-9223-0-4-4 VB-9223-0-4-7				-		-	-	4
Normaly Closed W8-9221-04-6         Normaly Closed W8-9221-04-7         Normaly Closed W8-9221-04-7         Normaly Closed W8-9221-04-7         Normaly Closed W8-9221-04-8         Normaly Closed W8-9221-04-8         Normaly Closed W8-9221-04-9         Normaly Closed W8-9221-04-9         Normaly Closed W8-9221-04-9         Normaly Closed W8-9221-04-9         Normaly Closed W8-9222-04-1         Normaly Closed W8-9222-04-2         Normaly Closed W8-9222-04-3         Normaly Closed W8-9223-04-4         Normaly Closed W8-9224-04-4         Normaly Closed W8-9224-04-4 <t< td=""><td></td><td>2-Wav</td><td></td><td>-</td><td></td><td>-</td><td>-</td><td>4</td></t<>		2-Wav		-		-	-	4
UB-9221-04-6 VB-9221-04-7 VB-9221-04-7 VB-9221-04-7         Union End NPI Straightway Body         6.2 8.2         3/4"         140         90         90           VB-9221-04-7 VB-9221-04-7         5         10.5         1"         75         50         50           VB-9221-04-9         15         1-1/4"         45         30         30           VB-9221-04-9         2-Way Normally Closed Straightway Body         0.4         5/8" O.D.         250         220         220         2-1/8"           VB-9222-04-4         Skaf 45" Flared Straightway Body         0.4         5/8" O.D.         250         220         220         2-1/8"           VB-9223-04-3         Skaf 45" Flared Straightway Body         0.4         1/2"         250         220         220         220         220         2-1/8"           VB-9223-04-4         Normally Closed FNPT         5         3/4"         140         90         90         90         3         56" O.D         250         220         220         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"         2-1/8"				-				
VB-9221-0-4-7 VB-9221-0-4-8         Oring INNY 0507 VB         8.2         1"         75         50         50           VB-9221-0-4-8         10.5         1"         75         50         50           VB-9221-0-4-9         2-Way         0.4         5/8" O.D.         250         220         220           VB-9222-0-4-1         2-Way         Normally Closed SAE 45" Flared         5/8" O.D.         250         220         220         220           VB-9223-0-4-3         Straightway Body         5/8" O.D.         250         220         220         220           VB-9223-0-4-4         Straightway Body         5/8" O.D.         250         220         220         220           VB-9223-0-4-4         0.4         1/2"         250         220         220         220           VB-9223-0-4-6         FNPT         Straightway Body         5         3/4"         140         90         90         8.2         1"         75         50         50           VB-9223-0-4-7         VB-9224-0-4-2         11         1"         75         50         50         50           VB-9224-0-4-2         VB-9224-0-4-2         13         1/2"         250         220         220         22/4"/// </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Stem Up</td>								Stem Up
VB-9221-0-4-8         ID.5         1"         75         50         50           VB-9221-0-4-9         2-Way         0.4         5/8" O.D.         250         220         220           VB-9222-0-4-1         2-Way         0.4         5/8" O.D.         250         220         220           VB-9222-0-4-2         Ska 45" Flared         5/8" O.D.         250         220         220         21/8"           VB-9223-0-4-1         VB-9223-0-4-2         Straightway Body         3.3         5/8" O.D.         250         220         220         21/8"           VB-9223-0-4-5         VB-9223-0-4-5         Normally Closed         5         3/4"         140         90         90         2-1/8"           VB-9223-0-4-6         Straightway Body         3.6         1/2"         250         220         220         2-1/8"           VB-9223-0-4-6         Straightway Body         5         3/4"         140         90         90         30           VB-9223-0-4-6         Straightway Body         11         1"         75         50         50           VB-9223-0-4-7         Straightway Body         16         1-1/4"         45         30         30           VB-9224-0-4-1		Straightway Body			-			-
VB-9221-0-4-9         15         1-1/4"         45         30         30           VB-9222-0-4-1         2-Way         Normally Closed         5/8" O.D.         250         220         220         2-1/8"           VB-9222-0-4-3         SAE 45' Flared         5/8" O.D.         250         220         220         220         21/8"           VB-922-0-4-4         Straightway Body         5/8" O.D.         250         220         220         220         21/8"           VB-9223-0-4-3         Ske 45' Flared         5/8" O.D.         250         220         21/8"         30         30         30         30         30         30         30         30         30         30         30         30         30								-
VB-9222-0-4-1 VB-9222-0-4-2 SAE 45° Flared SAE 45° Flared Straightway Body         0.4         5/8° O.D.         250         220         220           VB-9222-0-4-2 VB-9222-0-4-4 VB-9223-0-4-1 VB-9223-0-4-3 VB-9223-0-4-3 VB-9223-0-4-5 VB-9223-0-4-6 VB-9223-0-4-6 VB-9223-0-4-6 VB-9223-0-4-6 VB-9223-0-4-6 VB-9223-0-4-6 VB-9223-0-4-6 VB-9223-0-4-7 VB-9223-0-4-7 VB-9223-0-4-8 VB-9223-0-4-8 VB-9224-0-4-3 VB-9224-0-4-3 VB-9224-0-4-7 VB-9223-0-4-7 VB-9224-0-4-7 VB-9224-0-4-7 VB-9223-0-4-7 VB-9224-0-4-7 VB-9223-0-4-7 VB-9224-0-4-7 VB-9223-0-4-7 VB-9224-0-4-7 VB-9223-0-4-7 VB-9224-0-4-7 VB-9224-0-4-7 VB-9224-0-4-7 VB-9224-0					-			-
VB-9222-0.4-2         Normally Closed SAE 45° Flared Straightway Body         1.3         5/8° 0.D.         250         220         220         2-1/8° Stem Up           VB-9222-0.4-4         Straightway Body         3.3         5/8° 0.D.         250         220         23.3         3/4°         140         90         90         90         30         30         30         20         20         220         220         220         220         220         220         220         220         220         220         220         220         220 <td< td=""><td></td><td></td><td></td><td>-</td><td>-</td><td></td><td></td><td></td></td<>				-	-			
VB-9222-0.4-3 VB-9223-0.4-4         SAE 45° Flared Straightway Body         2.2         5/8" O.D.         250         220         220           VB-9223-0-4-4         Straightway Body         3.3         5/8" O.D.         250         220         220           VB-9223-0-4-2         VB-9223-0-4-3          0.4         1/2"         250         220         220           VB-9223-0-4-3          0.4         1/2"         250         220         220           VB-9223-0-4-3          2-Way          3.6         1/2"         250         220         220           VB-9223-0-4-6         FNPT         Straightway Body         6.2         3/4"         140         90         90         90           VB-9223-0-4-7         VB-9223-0-4-8         Straightway Body         8.2         1"         75         50         50           VB-9224-0-4-2         VB-9224-0-4-2          1.3         1/2"         250         220         220           VB-9224-0-4-4         Straightway Body         Sc         3.6         1/2"         250         220         220           VB-9224-0-4-8         Straightway Body         Sc         3/4"         140         90         9								-
VB-9222-0-4-4         Straightway Body         3.3         5/8 00.0.1         2.00         2.10						-	-	
VB-9223-0-4-1         VB-9223-0-4-1         VB-9223-0-4-1         VB-9223-0-4-3         VB-9223-0-4-3         VB-9223-0-4-3         VB-9223-0-4-3         VB-9223-0-4-4         VB-9223-0-4-5         VB-9223-0-4-6         VB-9223-0-4-6         VB-9223-0-4-7         VB-9223-0-4-7         VB-9223-0-4-7         VB-9223-0-4-7         VB-9223-0-4-7         VB-9223-0-4-7         VB-9223-0-4-8         VB-9223-0-4-7         VB-9223-0-4-8         VB-9223-0-4-9         VB-9223-0-4-9         VB-9223-0-4-9         VB-9223-0-4-9         VB-9223-0-4-9         VB-9223-0-4-9         VB-9223-0-4-9         VB-9223-0-4-9         VB-9223-0-4-3         VB-9223-0-4-3         VB-9224-0-4-1         VB-9224-0-4-1         VB-9224-0-4-3         VB-9223-0-4-3         VB-9223-						-	-	Stem Op
VB-9223-0-4-2         2-Way         1.3         1/2"         250         220         220           VB-9223-0-4-3         2-Way         Normally Closed FNPT         3.6         1/2"         250         220         220           VB-9223-0-4-6         FNPT         Straightway Body         5         3/4"         140         90         90           VB-9223-0-4-7         Straightway Body         6.2         3/4"         140         90         90           VB-9223-0-4-8         VB-9223-0-4-9         Straightway Body         8.2         1"         75         50         50           VB-9223-0-4-9         VB-9224-0-4-1         It         1"         75         50         50           VB-9224-0-4-1         VB-9224-0-4-3         VB-9224-0-4-3         0.4         1/2"         250         220         220           VB-9224-0-4-5         Union Sweat         Straightway Body         5         3/4"         140         90         90         90           VB-9224-0-4-6         Union Sweat         Straightway Body         5         3/4"         140         90         90         90           VB-9224-0-4-7         It         1"         75         50         50         50 <td></td> <td>Chaighthay Body</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		Chaighthay Body						
VB-9223-0-4-3 VB-9223-0-4-6 VB-9223-0-4-6 VB-9223-0-4-6 VB-9223-0-4-7 VB-9223-0-4-7         2-Way Normally Closed FNPT Straightway Body         2.2         1/2"         250         220         220           3.6         1/2"         250         220         220         220         220         220         220         220         220         21/8"         Straightway Body         5         3/4"         140         90 <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td>						-		
VB-9223-0-4-4 VB-9223-0-4-5 VB-9223-0-4-6 VB-9223-0-4-7         2-Way Normally Closed FNPT Straightway Body         3.6         1/2"         250         220         220         22-1/8" Stem Up           VB-9223-0-4-6 VB-9223-0-4-7         Straightway Body         6.2         3/4"         140         90         90         90           VB-9223-0-4-7         Straightway Body         6.2         3/4"         140         90         90         90           VB-9223-0-4-7         VB-9224-0-4-1         VB-9224-0-4-1         0.4         1/2"         250         220         220           VB-9224-0-4-2         VB-9224-0-4-3         0.4         1/2"         250         220         220         220           VB-9224-0-4-4         Normally Closed Union Sweat Straightway Body         0.4         1/2"         250         220         220         2-1/8"           VB-9224-0-4-5         Normally Closed Union Sweat Straightway Body         3.6         1/2"         250         220         220         2-1/8"         Stem Up           VB-9224-0-4-7         VB-9224-0-4-8         VB-9253-0-4-1         0.4         1/2"         180         190         190         2-1/8"         Stem Up           VB-9253-0-4-3         VB-9253-0-4-4         Normally Open FNPT         0				-		-	-	
Normally Closed VB-9223-0-4-5 VB-9223-0-4-6 VB-9223-0-4-7         Normally Closed FNPT         Normally Closed FNPT         Normally Closed FNPT         Normally Closed Straightway Body         Normally Closed E.2         Normally Closed FNPT         Straightway Body         Straightw		0.14/						
VB-9223-0-4-6 VB-9223-0-4-7 VB-9223-0-4-7         FNPT Straightway Body         5         3/4         140         90         90         Stem Up           0.2         3/4"         140         90				-		-		2-1/8"
VB-9223-0-4-6 VB-9223-0-4-7         Straightway Body         6.2         3/4"         140         90         90           VB-9223-0-4-7         8.2         1"         75         50         50           VB-9223-0-4-8         11         1"         75         50         50           VB-9223-0-4-9         16         1-1/4"         45         30         30           VB-9224-0-4-1         VS         16         1-1/4"         45         20         220           VB-9224-0-4-2         VS         1.3         1/2"         250         220         220           VB-9224-0-4-3         VS         2-Way         3.6         1/2"         250         220         220           VB-9224-0-4-4         VS         3.6         1/2"         250         220         220           VB-9224-0-4-5         VS         Straightway Body         6.2         3/4"         140         90         90         90           VB-9224-0-4-6         Straightway Body         8.2         1"         75         50         50         50           VB-9253-0-4-1         VS-9253-0-4-2         VS         1.3         1/2"         180         190         190					-			
VB-9223-0-4-8         11         1"         75         50         50           VB-9223-0-4-9         16         1-1/4"         45         30         30           VB-9224-0-4-1           0.4         1/2"         250         220         220           VB-9224-0-4-3           0.4         1/2"         250         220         220           VB-9224-0-4-4           1.3         1/2"         250         220         220           VB-9224-0-4-5           3.6         1/2"         250         220         220           VB-9224-0-4-6            3.6         1/2"         250         220         220           VB-9224-0-4-6            3.6         1/2"         250         220         220           VB-9224-0-4-7             140         90         90         90           VB-9224-0-4-9             140         90         90         90           VB-9253-0-4-1             160         1		Straightway Body						
VB-92230-4-9         In	VB-9223-0-4-7				-			
VB-9224-0-4-1 VB-9224-0-4-2 VB-9224-0-4-3 VB-9224-0-4-4 VB-9224-0-4-5 VB-9224-0-4-6 VB-9224-0-4-6 VB-9224-0-4-6 VB-9224-0-4-6 VB-9224-0-4-7 VB-9224-0-4-7         0.4         1/2"         250         220         220           2.2         1/2"         250         220         21/8"         5         3/4"         140         90         90         90         90         90         90         8.2         1"         75         50         50         50         50         50         11         1"         1"         75         50         50         50         50         50         50         50         11         1.3         1/2"         180         190         190         1.4         1.25/32"         1"         1.42"         180         190         190         1.25/32"         5         36         1.25/32"         5         3.6         1.2"	VB-9223-0-4-8		11	1"	75	50	50	
VB-9224-0-4-2 VB-9224-0-4-3 VB-9224-0-4-4 VB-9224-0-4-5 VB-9224-0-4-6 VB-9224-0-4-6 VB-9224-0-4-7         2-Way Normally Closed Union Sweat Straightway Body         1.3         1/2"         250         220         220           0.4         1/2"         250         220         210         5         3/4"         140         90         90         90         82         1"         75         50 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>								
VB-9224-0-4-3 VB-9224-0-4-4 VB-9224-0-4-5 VB-9224-0-4-6 VB-9224-0-4-7 VB-9224-0-4-7 VB-9224-0-4-7 VB-9224-0-4-8         2-Way Normally Closed Union Sweat Straightway Body         2.2         1/2"         250         220         220         220           VB-9224-0-4-6 VB-9224-0-4-7 VB-9224-0-4-8         2.2         1/2"         250         220         220         220         210"           VB-9224-0-4-7 VB-9224-0-4-8         2.2         1/2"         140         90         90         90           VB-9224-0-4-7         11         1"         75         50         50         50           VB-9224-0-4-8         0.4         1-1/4"         45         30         30         30           VB-9253-0-4-1         0.4         1/2"         180         190         190         190           VB-9253-0-4-2         2-Way Normally Open FNPT         3.6         1/2"         180         190         190         1-25/32"           VB-9253-0-4-5         VB-9253-0-4-6         Straightway Body Stainless Steel Trim Teflon Disc         5         3/4"         75         85         85         85           VB-9253-0-4-7         Teflon Disc         8.2         1"         40         45         45	VB-9224-0-4-1		0.4	1/2"	250	220	220	
VB-9224-0-4-4 VB-9224-0-4-5 VB-9224-0-4-6 VB-9224-0-4-7 VB-9224-0-4-7         2-Way Normally Closed Union Sweat Straightway Body         3.6         1/2"         250         220         220         220           VB-9224-0-4-5 VB-9224-0-4-7         Straightway Body         5         3/4"         140         90         90         90           VB-9224-0-4-7         NB-9224-0-4-7         NB-9224-0-4-8         11         1"         75         50         50         50           VB-9224-0-4-9         16         1-1/4"         45         30         30         30           VB-9253-0-4-1         0.4         1/2"         180         190         190         190           VB-9253-0-4-3         2-Way         Normally Open FNPT         3.6         1/2"         180         190         190           VB-9253-0-4-5         2-Way         Normally Open FNPT         5         3/4"         75         85         85         85           VB-9253-0-4-6         VB-9253-0-4-6         5         3/4"         75         85         85         85           VB-9253-0-4-6         Stainless Steel Trim Teflon Disc         8.2         1"         40         45         45	VB-9224-0-4-2		1.3	1/2"	250	220	220	
VB-9224-0-4-5 VB-9224-0-4-6 VB-9224-0-4-7         Normally Closed Union Sweat Straightway Body         0.0         11/2         200         210         210         2-1/8" Stem Up           VB-9224-0-4-6 VB-9224-0-4-7         Normally Closed Union Sweat Straightway Body         5         3/4"         140         90         90         90           VB-9224-0-4-7         NB-9224-0-4-7         Normally Closed Union Sweat         11         1"         75         50         50         50           VB-9224-0-4-9         16         1-1/4"         45         30         30         30         100         190         190         190         190         190         190         190         190         190         125/2"         1-25/32"         1-25/32"         1-25/32"         Stem Dow         1-25/32"         1-25/32"         Stem Dow         1-25	VB-9224-0-4-3		2.2	1/2"	250	220	220	]
VB-9224-0-4-5 VB-9224-0-4-6 VB-9224-0-4-7         Union Sweat Straightway Body         5         3/4"         140         90         90         90         Stem Up           VB-9224-0-4-6 VB-9224-0-4-7         Straightway Body         6.2         3/4"         140         90         10         10	VB-9224-0-4-4		3.6	1/2"	250	220	220	0.4/0"
VB-9224-0-4-6 VB-9224-0-4-7         Straightway Body         6.2         3/4"         140         90         90           VB-9224-0-4-7         8.2         1"         75         50         50           VB-9224-0-4-8         11         1"         75         50         50           VB-9224-0-4-9         16         1-1/4"         45         30         30           VB-9253-0-4-1         0.4         1/2"         180         190         190           VB-9253-0-4-2         0.4         1/2"         180         190         190           VB-9253-0-4-3         2-Way         1.3         1/2"         180         190         190           VB-9253-0-4-4         Normally Open         5         3/4"         75         85         85           VB-9253-0-4-5         Straightway Body         5         3/4"         75         85         85           VB-9253-0-4-6         Stainless Steel Trim         6.2         3/4"         75         85         85           VB-9253-0-4-7         Teflon Disc         8.2         1"         40         45         45	VB-9224-0-4-5		5	3/4"	140	90	90	
VB-9224-0-4-7         8.2         1"         75         50         50           VB-9224-0-4-8         11         1"         75         50         50           VB-9224-0-4-8         16         1-1/4"         45         30         30           VB-9223-0-4-9         0.4         1/2"         180         190         190           VB-9253-0-4-1         0.4         1/2"         180         190         190           VB-9253-0-4-2         2-Way         1.3         1/2"         180         190         190           VB-9253-0-4-3         2-Way         Normally Open FNPT         3.6         1/2"         180         190         190           VB-9253-0-4-5         Straightway Body         5         3/4"         75         85         85           VB-9253-0-4-6         FNPT         5         3/4"         75         85         85           VB-9253-0-4-6         Stainless Steel Trim Teflon Disc         8.2         1"         40         45         45	VB-9224-0-4-6		6.2	3/4"	140	90	90	Jen op
VB-9224-04-9         16         1-1/4"         45         30         30           VB-9253-0-4-1          0.4         1/2"         180         190         190           VB-9253-0-4-2          0.4         1/2"         180         190         190           VB-9253-0-4-3         2-Way         1.3         1/2"         180         190         190           VB-9253-0-4-4         Normally Open FNPT         3.6         1/2"         180         190         190           VB-9253-0-4-5         Straightway Body Stainless Steel Trim Teflon Disc         5         3/4"         75         85         85           VB-9253-0-4-7         Teflon Disc         8.2         1"         40         45         45	VB-9224-0-4-7		8.2	1"	75	50	50	
VB-9224-0-4-9         16         1-1/4"         45         30         30           VB-9253-0-4-1         0.4         1/2"         180         190         190           VB-9253-0-4-2         1.3         1/2"         180         190         190           VB-9253-0-4-3         2-Way         2.2         1/2"         180         190         190           VB-9253-0-4-3         2-Way         Normally Open FNPT         3.6         1/2"         180         190         190           VB-9253-0-4-5         Straightway Body         3.6         1/2"         180         190         190           VB-9253-0-4-6         FNPT         5         3/4"         75         85         85           VB-9253-0-4-7         Teflon Disc         6.2         3/4"         75         85         85	VB-9224-0-4-8		11	1"	75	50	50	•
VB-9253-0-4-1         0.4         1/2"         180         190         190           VB-9253-0-4-2         2-Way         1.3         1/2"         180         190         190           VB-9253-0-4-3         2-Way         0.4         1/2"         180         190         190           VB-9253-0-4-3         2-Way         0.6         1/2"         180         190         190           VB-9253-0-4-4         Normally Open         FNPT         3.6         1/2"         180         190         190           VB-9253-0-4-5         Straightway Body         5         3/4"         75         85         85           VB-9253-0-4-6         Stainless Steel Trim         6.2         3/4"         75         85         85           VB-9253-0-4-7         Teflon Disc         8.2         1"         40         45         45				1-1/4"	45	30	30	
VB-9253-0-4-2         2-Way         1.3         1/2"         180         190         190           VB-9253-0-4-3         2-Way         Normally Open         2.2         1/2"         180         190         190           VB-9253-0-4-3         Normally Open         FNPT         3.6         1/2"         180         190         190           VB-9253-0-4-5         Straightway Body         5         3/4"         75         85         85           VB-9253-0-4-6         Straightway Body         6.2         3/4"         75         85         85           VB-9253-0-4-7         Teflon Disc         8.2         1"         40         45         45				1/2"	180		190	
VB-9253-0-4-3         2-Way         2.2         1/2"         180         190         190           VB-9253-0-4-4         Normally Open FNPT         3.6         1/2"         180         190         190         190           VB-9253-0-4-5         Straightway Body VB-9253-0-4-6         5         3/4"         75         85         85           VB-9253-0-4-7         Teflon Disc         6.2         3/4"         75         85         85		2-Wav						1
VB-9253-0-4-4         Normally Open FNPT         3.6         1/2"         180         190         190         190           VB-9253-0-4-5         Straightway Body Stainless Steel Trim VB-9253-0-4-7         5         3/4"         75         85         85         Stem Down           VB-9253-0-4-6         Steel Trim Teflon Disc         6.2         3/4"         75         85         85         Stem Down								1
VB-9253-0-4-5         FNPT         5         3/4"         75         85         85         1-25/32"           VB-9253-0-4-6         Straightway Body Stainless Steel Trim VB-9253-0-4-7         5         3/4"         75         85         85         Stem Down           VB-9253-0-4-7         Teflon Disc         8.2         1"         40         45         45		Normally Open						-
VB-9253-0-4-6         Straightway Body Stainless Steel Trim         6.2         3/4"         75         85         85           VB-9253-0-4-7         Teflon Disc         8.2         1"         40         45         45		FNPT						
VB-9253-0-4-7         Teflon Disc         8.2         1"         40         45         45		Straightway Body						Stem Down
								4
					-			4
VB-9253-0-4-9     16     1-1/4"     25     30     30				-	-		-	-

# Table-3 Required Stem Height Settings for AV-600 with Obsolete Valve Bodies and Close-off Ratings for the Combination of AV-600 Valve Body and Actuator Combination. (Continued)

				ACTUATORS			
				MA-521x	MP-521x	MF-5x13, MP-541x	Stem Height Setting for
				Series	Series	& MPR-5xxx	AV-600 Dimension
· · · · ·	/alve Linkages Require	d		AV-600	AV-600	AV-600 & AV-601 <sup>a</sup>	"x"
	LVE BODY INFORMATI						(Note: Use short
Valve Body Part Number	Description	Cv	Size	CLO	SE-OFF PRES	SURE (psi)	stem extension 1-15/32".)
VB-9263-0-4-1		0.4	1/2"	250	220	220	
VB-9263-0-4-2		1.3	1/2"	250	220	220	-
VB-9263-0-4-3	2-Way	2.2	1/2"	250	220	220	
VB-9263-0-4-4	Normally Closed	3.6	1/2"	250	220	220	
VB-9263-0-4-5	FNPT	5	3/4"	140	90	90	2-1/8"
VB-9263-0-4-6	Straightway Body Stainless Steel Trim	6.2	3/4"	140	90	90	Stem Up
VB-9263-0-4-7	Teflon Disc	8.2	1"	75	50	50	
VB-9263-0-4-8		11	1"	75	50	50	
VB-9263-0-4-9		16	1-1/4"	45	30	30	-
VB-9273-0-4-1		0.4	1/2"	180	190	190	
VB-9273-0-4-2	1	1.3	1/2"	180	190	190	1
VB-9273-0-4-3		2.2	1/2"	180	190	190	1
VB-9273-0-4-4	2-Way Normally Open	3.6	1/2"	180	190	190	-
VB-9273-0-4-5	FNPT	5	3/4"	75	85	85	1-25/32"
VB-9273-0-4-6	Straightway Body	6.2	3/4"	75	85	85	Stem Down
VB-9273-0-4-7	Stainless Steel Trim	8.2	1"	40	45	45	
VB-9273-0-4-8	-	11	1"	40	45	45	
VB-9273-0-4-9		16	1-1/4"	25	30	30	
VB-9283-0-4-1		0.4	1/2"	250	220	220	
VB-9283-0-4-2	-	1.3	1/2"	250	220	220	-
VB-9283-0-4-3	-	2.2	1/2"	250	220	220	-
VB-9283-0-4-4	2-Way	3.6	1/2"	250	220	220	-
VB-9283-0-4-5	Normally Closed FNPT	5	3/4"	140	90	90	2-1/8"
VB-9283-0-4-6	Straightway Body	6.2	3/4"	140	90	90	Stem Up
VB-9283-0-4-7	Stainless Steel Trim	8.2		75	50	50	-
VB-9283-0-4-8	-	11	1"	75	50	50	-
VB-9283-0-4-9		16	1-1/4"	45	30	30	-
VB-9312-0-4-2	3-Way Mixing	2	5/8" O.D.	100	100	100	0.1/01
VB-9312-0-4-4	SAE 45° Flared Normal Position	4	5/8" O.D.	100	100	100	2-1/8" Stem Up
	Flow B to AB						
VB-9313-0-4-2		2	1/2"	100	100	100	-
VB-9313-0-4-4	3-Way Mixing FNPT	4	1/2"	100	100	100	2-1/8"
VB-9313-0-4-6	Normal Position	6.8	3/4"	55	55	55	Stem Up
VB-9313-0-4-8	Flow B to AB	12	1"	35	35	35	
VB-9313-0-4-9		16	1-1/4"	22	22	22	
VB-9314-0-4-2	0.144	2	1/2"	100	100	100	
VB-9314-0-4-4	3-Way Mixing Union Sweat	4	1/2"	100	100	100	2-1/8"
VB-9314-0-4-6	Normal Position	6.8	3/4"	55	55	55	Stem Up
VB-9314-0-4-8	Flow B to AB	12	1"	35	35	35	
VB-9314-0-4-9	]	16	1-1/4"	22	22	22	
VB-9323-0-4-4	3-Way Diverting	6	1/2"	250	250	250	
VB-9323-0-4-6	FNPT	8	3/4"	250	250	250	2-1/8"
VB-9323-0-4-8	Normal Position	12	1"	250	250	250	Stem Up
VB-9323-0-4-9	Flow B to AB	16	1-1/4"	250	250	250	
VB-9332-0-4-2	3-Way Sequencing 45° SAE Flared	1.7	5/8" O.D.		35	35	
VB-9332-0-4-3	Normal Position	2.4	5/8" O.D.	Not Available	35	35	1-15/16" <sup>b</sup>
VB-9332-0-4-4	Flow B to AB	4	5/8" O.D.	1	35	35	1

<sup>a</sup> For applications requiring AV-601 refer to AV-601, Linkage Extension Kit General Instructions, F-26280.
 <sup>b</sup> Depress stem to lower seat, release stem, and adjust height in this position.

Valve Body Part Number Series	Valve Assembly Part Number Series	Description of Valve Body	Obsolete Linkage Stem Height Setting Dimension "x"	AV-600 Stem Height Setting Dimension "x"
VB-111-0-3-P	VA-1102, VA-1112, VP-1112	2-Way, Normally Open, Union End, Angle	1-7/32"Stem Down	1-13/16"Stem Down
VB-111-0-4-P	VA-1102, VA-1112, VP-1112	2-Way, Normally Open, Union End, Stwy	1-7/32"Stem Down	1-13/16"Stem Down
VB-121-0-3-P	VA-1212, VP-1212	2-Way, N.O., 1/2" O.D. Flared, Angle	1-7/32"Stem Down	1-13/16"Stem Down
VB-121-0-4-P	VA-1212, VP-1212	2-Way, N.O., 1/2" O.D. Flared, Straightway	1-7/32"Stem Down	1-13/16"Stem Down
VB-131-001-3-4	VA-1302, VP-1312	2-Way, N.O., 5/8" O.D. Flared, Angle	1-11/32"Stem Down	1-13/16"Stem Down
VB-131-001-3-7	VA-1302, VP-1312	2-Way, N.O., 7/8" O.D. Flared, Angle	1-9/32"Stem Down	1-13/16"Stem Down
VB-131-001-4-P	VA-1302, VP-1312	2-Way, Normally Open, Flared, Straightway	1-7/32"Stem Down	1-13/16"Stem Down
VB-131-002-3-4	VA-1302, VP-1312	2-Way, N.C., 5/8" O.D. Flared, Angle	1-11/32"Stem Down	2-1/8"Stem Up
VB-131-002-3-7	VA-1302, VP-1312	2-Way, N.C., 7/8" O.D. Flared, Angle	1-9/32"Stem Down	2-1/8"Stem Up
VB-131-002-4-P	VA-1302, VP-1312	2-Way, Normally Closed, Flared, Straightway	1-9/16"Stem Up	2-1/8"Stem Up
VB-151-0-1-P	VA-1512, VP-1512	2-Way, Normally Closed, FNPT, Straightway	1-17/32"Stem Up	2-1/8"Stem Up
OYBB-233-4	VA-2402, VP-2452	2-Way, Normally Closed, 1/2" FNPT, Stwy	1-9/32"Stem Down	2-1/8"Stem Up
OYBB-233-7	VA-2402, VP-2452	2-Way, Normally Closed, 3/4" FNPT, Stwy	1-5/32"Stem Down	2-1/8"Stem Up
VB-314-0-1-4	VA-3142, VP-3142	3-Way, Mixing, 1/2" FNPT	1-11/32"Stem Down	2-1/8"Stem Up <sup>a</sup>
VB-314-0-1-7	VA-3142, VP-3142	3-Way, Mixing, 3/4" FNPT	1-9/32"Stem Down	2-1/8"Stem Up
VB-314-0-1-8	VA-3142, VP-3142	3-Way, Mixing, 1" FNPT	1-9/32"Stem Down	2-1/8"Stem Up
VB-324-0-5-4	VA-3242, VP-3242	3-Way, Mixing, 1/2" O.D., Flared	1-11/32"Stem Down	2-13/16"Stem Up
VB-334-0-5-4	VP-3342	3-Way, Sequencing, 1/2" O.D. Flared	2-3/8" <sup>b</sup>	1-15/16" <sup>b</sup>
VB-354-0-5-4	VA-3542, VP-3542	3-Way, Mixing, 5/8" O.D. Flared	1-11/32"Stem Down	2-1/8"Stem Up <sup>a</sup>
VB-354-0-5-7	VA-3542, VP-3542	3-Way, Mixing, 7/8" O.D. Flared	1-9/32"Stem Down	2-1/8"Stem Up
VB-701-0-5-P	VP-7012	4-Pipe Valve	2-3/8" <sup>b</sup>	1-15/16" <sup>b</sup>
VB-711-0-5-P	VP-7112	5-Pipe Valve	2-3/8" <sup>b</sup>	1-15/16" <sup>b</sup>

## Table-4 Required Stem Height Setting for AV-600 with Obsolete Valve Bodies (Note: Use the long stem extension 1-21/32".)

<sup>a</sup> Use the locknut enclosed in the coin envelope. Do not break the locknut on the stem extension.

<sup>b</sup> Depress stem to lower seat, release stem, and adjust height in this position.

#### Caution:

- It is essential that the proper parts be used for the valve body on which the linkage is being installed to ensure proper actuator operation and close off.
- Do not attempt to use the hexagon coupler and spring compression screw with VB-121, VB-324, or VB-9xxx valves. Stroke or close off maybe affected.

#### Linkage Installation

The AV-600 linkage includes of two (2) different lengths of combination square stem extension and breakaway locknut, spring, spring retainer, and a locknut (used with certain obsolete valve bodies only).

- 1. Select the correct square stem extension.
  - The short square stem extension [1-15/32" (37.3 mm)] is used with the obsolete VB-9xxx valves shown in Table-3.
  - The long stem extension [1-21/32" (42 mm)] is used with current VB-121 and VB-324 valves shown in Table-2 and obsolete VB-9xxx valve bodies shown in Table-4.
- 2. Thread the correct stem extension several threads on to the valve stem (Figure-4).

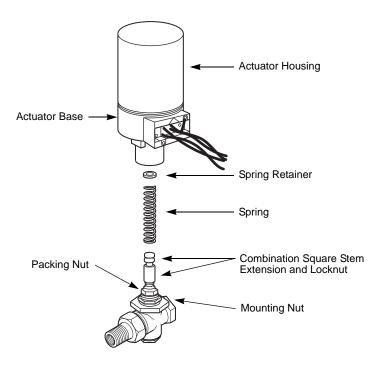


Figure-4 Installation of AV-600.

3. Position the valve stem as indicated for the appropriate valve body shown in Table-3 or Table-4, stem up or stem down.

*Caution:* Do not twist or exert any force on the actuator housing during installation (Figure-4). Either turn the base of the actuator by hand or, if necessary, use a 1-5/8" open end wrench (TOOL-37) on flats provided on the actuator base and valve body mounting nut (Figure-4).

4. Adjust the height of the stem extension to the "x" dimension shown in Table-3 or Table-4 for the appropriate valve body. The "x" dimension is from the top of the stem extension to the top of the valve packing nut (Figure-5).

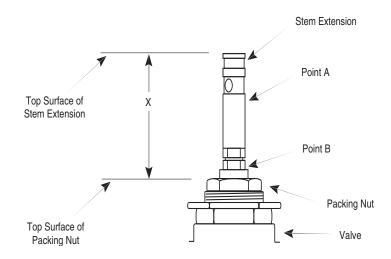


Figure-5 Height Adjustment of Combination Stem Extension and Locknut.

5. Using one 3/8" wrench on the square stem extension and one on the locknut, hold the wrench stationary at the stem extension while turning the wrench at the locknut clockwise. The locknut should separate from the stem extension. Next, while still holding the wrench stationary at the stem extension, turn the wrench at the locknut counterclockwise to jam the locknut against the stem extension, securing it in position.

- 6. With the valve stem in the up position, place the spring over the valve stem (Figure-4).
- 7. Insert TOOL-19, 1/8" (3 mm) diameter rod, through the spring coil and through the hole in the stem extension (Figure-6).

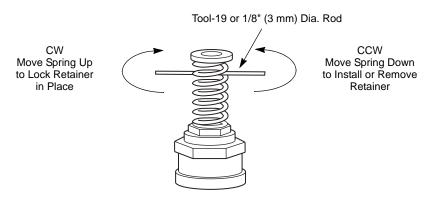


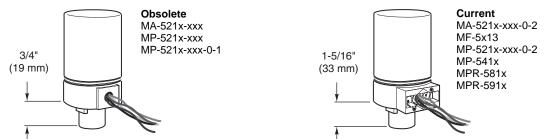
Figure-6 Installation of Spring and Spring Retainer.

- 8. Hold the spring to keep it from turning and "walk" the tool up the spring by turning it counterclockwise. Pushing down on the tool reduces the torque required to turn the stem and plug into the seat.
- 9. Set the retainer over the stem extension when the boss on the stem extension projects above the top of the spring coil.
- 10. Turn the retainer 45° to lock it in place.
- 11. Turn the tool clockwise down the spring coil to release the tension. Remove the tool from the assembly.
- 12. If AV-601 linkage extension is required, refer to the AV-601 the installation instructions contained in AV-601, Linkage Extension Kit General Instructions, F-26280.
- 13. The actuator is attached by screwing the mounting nut of the valve into the base of the actuator. The actuator may be rotated as desired for ease in making wiring connections.

#### MAINTENANCE

The actuator linkage requires no maintenance.

Regular maintenance of the total system is recommended to assure sustained, optimum performance. Hard water leaves abrasive deposits and reduces component life. To maximize valve life consult **EN-205, Water System Guidelines, F-26080.** 



Note: When replacing MP-521x-xxx with MP-5x1x-0-2, consult EN-111, System 8000 Electronic Control, F-15264.

Figure-7 Identification of Obsolete and Current Actuators.

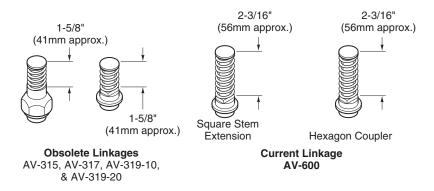


Figure-8 Identification of Obsolete Valve Linkages and Current AV-600.





**AM-603** To adapt AV-600 to obsolete actuators.

Figure-9 Adaptors for Obsolete Linkages and Actuators.

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