

## V5013B-F Three-Way Mixing & Diverting Valves

### SPECIFICATION DATA



### FEATURES

- Mixing or diverting models
- Bronze body with female, screwed-end connections or cast iron body with flanged-end connections
- Stainless steel stem and replaceable seats
- Spring loaded, self-adjusting packing
- Constant total flow throughout full plug travel
- Linear flow characteristic for each port
- Suitable for pneumatic or electric/electronic actuation
- Repacking kits available for field servicing

### GENERAL

V5013 Series Three-Way Mixing and Diverting Valves ("Valves") provide proportional or two-position control of hot or cold water in heating or cooling systems. They can be used for mixing service (V5013B, D, and F) to direct flow from one of two inlets to a common outlet or for diverting service (V5013C and E) to direct flow from a common inlet to one of two outlets. Mixing and diverting Valves are not interchangeable.



## DESCRIPTION

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### Maximum Pressure Differential (for Normal Plug and Seat Life):

Two-position service: 50 psi (345 kPa)  
 Modulating service: 25 psi (172 kPa)  
 Quiet Modulating Service: 20 psi (138 kPa)

### Body Materials:

Screwed-end Valves: Bronze  
 Flanged-end Valves: Cast iron

## SPECIFICATIONS

### Models:

See Table 1

### Stem Travel:

1/2- to 3-in. Valves: 3/4 in. (19 mm)  
 4-, 5-, and 6-in. Valves: 1-1/2 in. (38 mm)

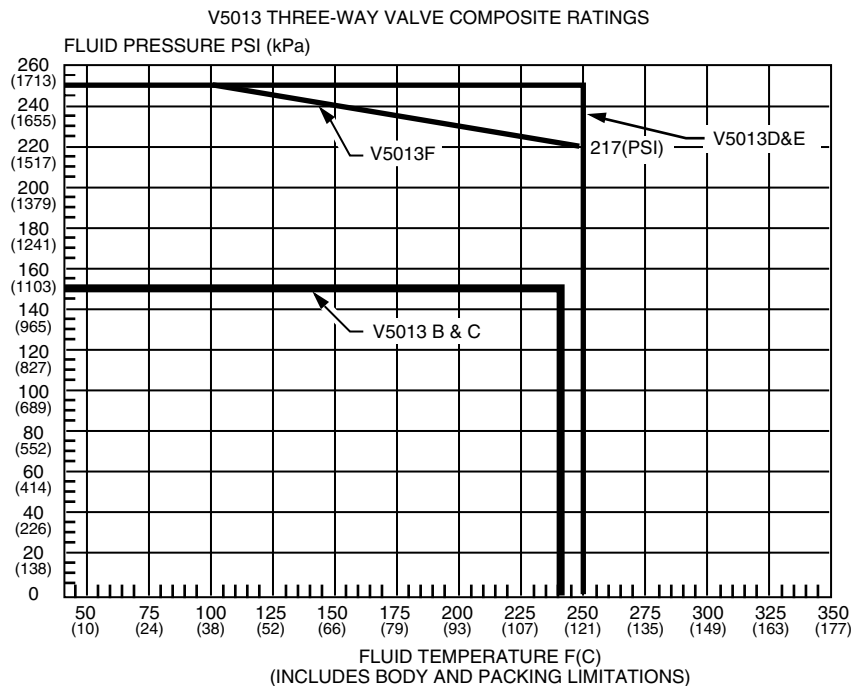


Fig. 1. Valve Pressure-Temperature Ratings.

### Flow Characteristics:

Linear, constant total flow throughout full plug travel

### Valve Pressure-Temperature Ratings:

See Figure 1

### Dimensions:

See Figures 2 and 3 and Table 2

### Internal Flow:

See Figures 4 and 5

### Close-Off Ratings:

See Figures 6 and 7 and Table 3

### Trim Materials:

Stem: Stainless steel

Packing:

V5013B & C: Teflon cone for ANSI Class 125 flanged  
 V5013F: Rubber or teflon/rubber for ANSI Class 150  
 screwed Valves

V5013D & E: Teflon V-ring for ANSI Class 250 Valves

Disc and Plug:

V5013B, C, D, and E: Bronze-skirted plug  
 V5013F: Linear contour plug, one piece brass  
 construction for metal-to-metal seating

Seat:

V5013B, C, D, and E: Bronze, removable cage type  
 V5013F: Integral brass

**Accessories:**

Actuator and linkage:

Pneumatic, see Table 4

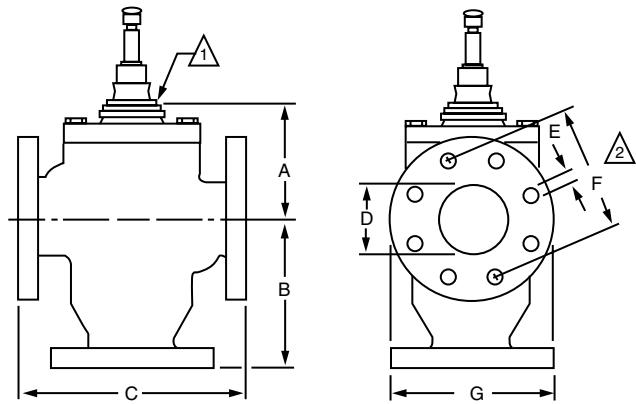
Electric, see Table 5

Repacking Kits:

14003294-003: V5013F, 1/2 to 1-1/4 in. Valves

14003295-003: V5013F, 1-1/2 to 2 in. Valves

For V5013B-E, order parts as listed in V5011A-H, J & V5013A-F Valves Service Data 77-5613 (repacking kits not available).

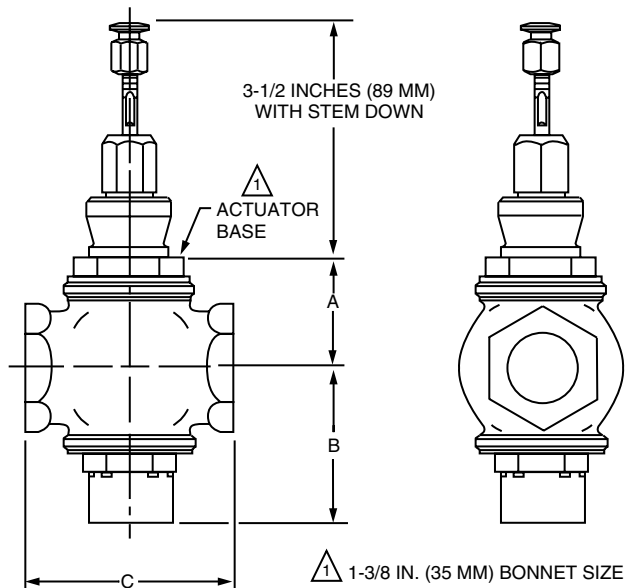


VALVE SIZE IN (MM)	BONNET SIZE IN. (MM)-DIA
2-1/2(64) & 3(76)	1-3/8 (35)
4(102), 5(125), & 6(152)	1-7/8 (48)

SEE TABLE FOR ACTUAL NUMBER OF BOLT HOLES

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**Fig. 2. V5013B-E Flanged Body Dimensions.**



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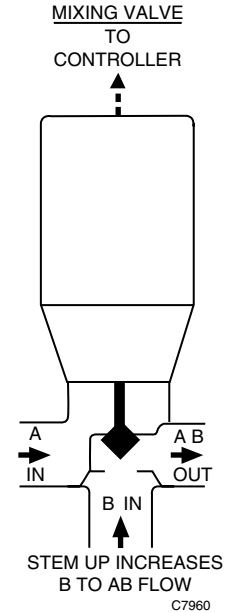
**Fig. 3. V5013F Screwed Body Dimensions.**

**Valve Actuation:**

The V5013 Valves require actuation provided by pneumatic MP953 Actuators, Type 01-15 Actuators, or 01-18S Actuators (Table 5), or by Versadrive or electric/electronic Modutrol IV motors (Table 4). Refer to Figures 8 through 12 for actuator dimensions.

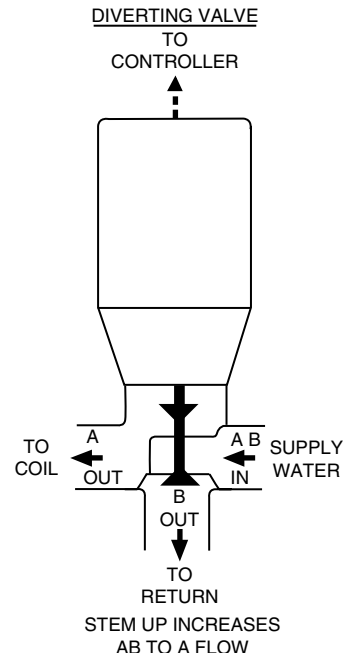
**Port Markings:**

See Figures 4 and 5



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**Fig. 4. V5013B, D, and F Flow Diagram.**



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**Fig. 5. V5013C and E Flow Diagram.**

**Table 1. Model Descriptions and Body Specifications.**

√	Model	Straight Through Flow	End Connections	Body Size in Inches	Capacity Index (Cv)	ANSI Body Class
	V5013B Mixing	Stem Down	Flanged	2-1/2	63	125 & 250
	V5013C Diverting	Stem Up		3	100	
				4	160	
	V5013D Mixing	Stem Down		5	250	
	V5013E Diverting	Stem Up		6	360	
	V5013F Mixing	Stem Down	Screwed Female NPT	1/2	2.5, 4.0	150
				3/4	6.3	
				1	10	
				1-1/4	16	
				1-1/2	25	
				2	40	

**Table 2. V5013B-F Approximate Dimensions in Inches (Millimeters).**

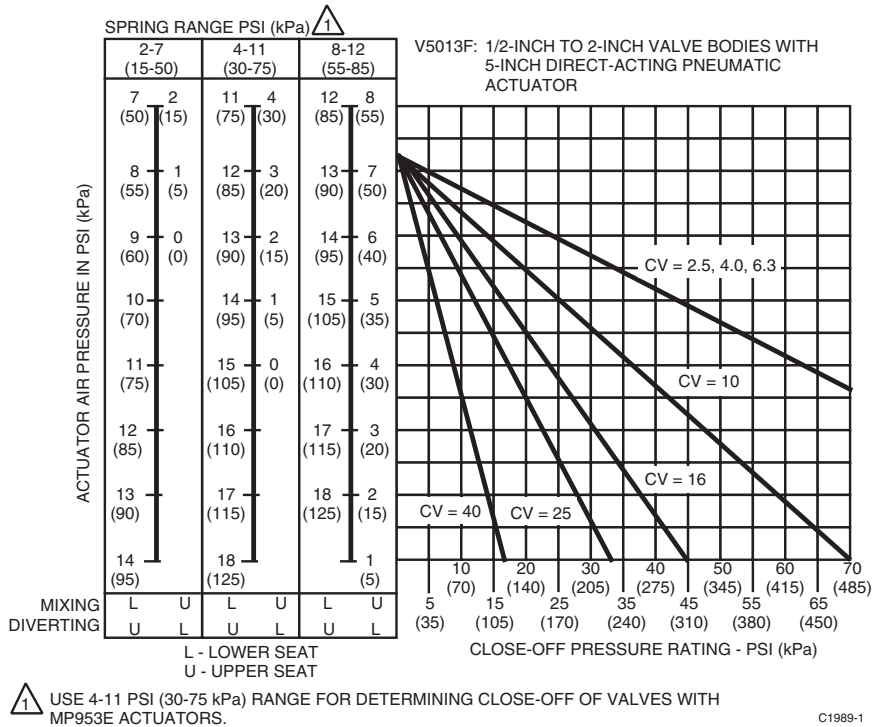
Model	Size in Inches	A	B	C	D	E	F	G	No. of Bolt Holes
V5013B & C Fig. 2	2-1/2	4-1/2 (114)	6-7/16 (164)	9-1/2 (241)	2-1/2 (64)	3/4 (19)	5-1/2 (140)	7 (178)	4
	3	5-1/4 (133)	6-5/8 (168)	11 (279)	3 (76)	3/4 (19)	6 (152)	7-1/2 (191)	4
	4	5-7/8 (149)	8-11/16 (221)	13 (330)	4 (102)	3/4 (19)	7-1/2 (191)	9 (229)	8
	5	6-1/4 (159)	9-5/8 (244)	15 (381)	5 (127)	7/8 (22)	8-1/2 (216)	10 (254)	8
	6	7-1/4 (184)	10-11/16 (271)	16-1/2 (419)	6 (152)	7/8 (22)	9-1/2 (241)	11 (279)	8
	8	9-1/4 (235)	14 (356)	21-3/8 (543)	8 (203)	7/8 (22)	11-3/4 (298)	13-1/2 (343)	12
V5013D & E Fig. 2	2-1/2	4-5/8 (117)	7 (178)	11-1/2 (292)	2-1/2 (64)	7/8 (22)	5-7/8 (149)	7-1/2 (191)	8
	3	5-1/4 (133)	7-1/2 (191)	12-1/2 (318)	3 (76)	7/8 (22)	6-5/8 (168)	8-1/4 (210)	8
	4	7-1/2 (191)	9-1/2 (241)	14-1/2 (368)	4 (102)	7/8 (22)	7-7/8 (200)	10 (254)	8
	5	8 (203)	10-3/16 (259)	16-3/4 (425)	5 (127)	7/8 (22)	9-1/4 (235)	11 (279)	8
	6	8-13/16 (224)	11-3/16 (284)	18-5/8 (473)	6 (152)	7/8 (22)	10-5/8 (270)	12-1/2 (318)	12
	8	9-1/4 (235)	14-5/8 (371)	22-3/8 (568)	8 (203)	1 (25)	13 (330)	15 (381)	12
V5013F Fig. 3	1/2	1-3/4 (44)	2-5/8 (67)	3-1/2 (89)	—	—	—	—	—
	3/4	1-3/4 (44)	2-1/2 (64)	3-3/8 (86)	—	—	—	—	—
	1	1-7/8 (48)	2-5/8 (67)	3-7/8 (98)	—	—	—	—	—
	1-1/4	2 (51)	2-5/8 (67)	4-1/4 (108)	—	—	—	—	—
	1-1/2	2-3/8 (60)	2-3/4 (70)	4-3/4 (121)	—	—	—	—	—
	2	2-5/8 (67)	3-1/8 (79)	5-7/8 (149)	—	—	—	—	—

**Table 3. Close-Off Ratings for V5013B-F Valves with Electric/Electronic Actuators and Q5001 Linkages.**

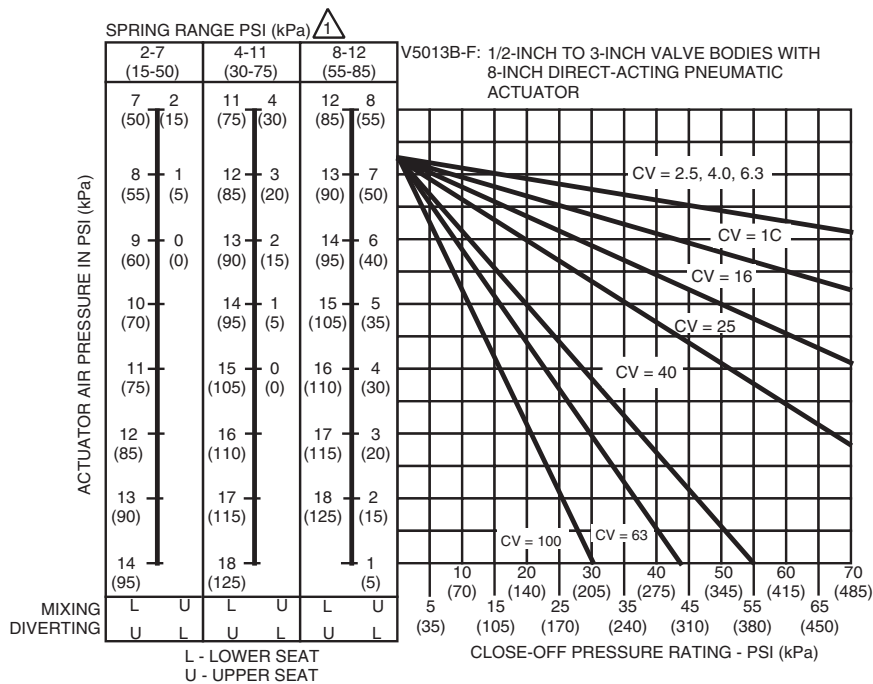
Model	Size In Inches	Close-Off Ratings psi (kPa)*		
		320 lbf (1424N) Linkage	160 lbf (712N) Linkage	80 lbf (356N) Linkage
V5013B, C, D & E	2-1/2	68 (469)	32 (221)	13 (90)
	3	47 (324)	22 (152)	9 (62)
	4	21 (145)	10 (69)	—
	5	14 (97)	6 (41)	—
	6	8 (55)	—	—
V5013F	1/2 (Cv = 2.5)	250 (1724)†	228 (1572)†	140 (965)
	1/2 (Cv = 4.0)	250 (1724)†	210 (1448)†	130 (896)
	3/4	250 (1724)†	190 (1310)	120 (827)
	1	250 (1724)†	165 (1138)	70 (483)
	1-1/4	250 (1724)†	146 (1005)	50 (345)
	1-1/2	220 (1517)†	98 (676)	35 (241)
	2	160 (1103)	67 (462)	20 (138)

\*Represents maximum pressure difference between the outlet and either of the two inlets or between the inlet and either of two outlets.

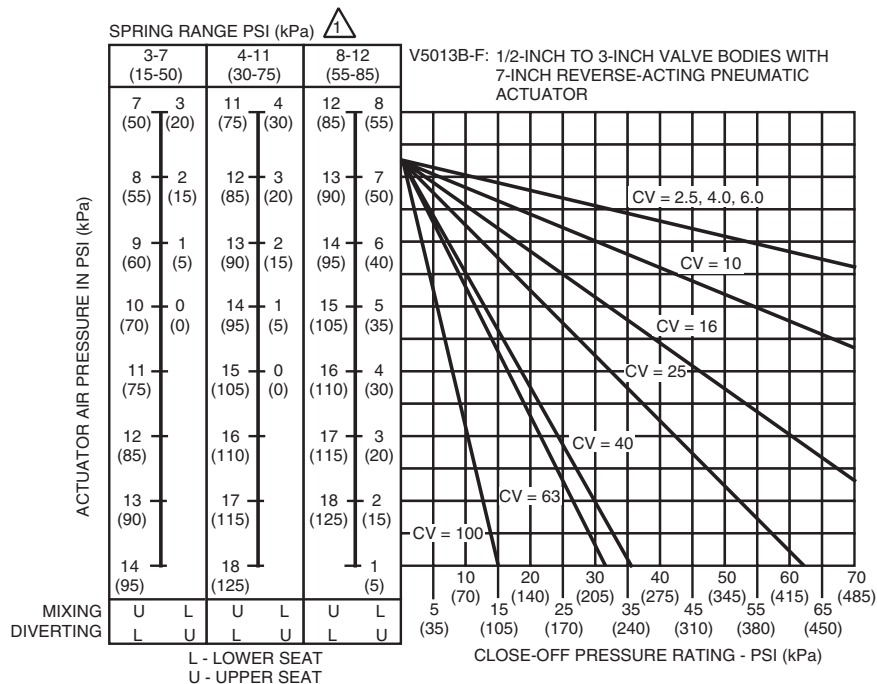
†Pressure is limited by fluid temperature. Refer to Figure 1.



**Fig. 6. Close-Off Pressures at Various Control Air Pressures for V5013 Valves and MP953 Pneumatic Actuators.**

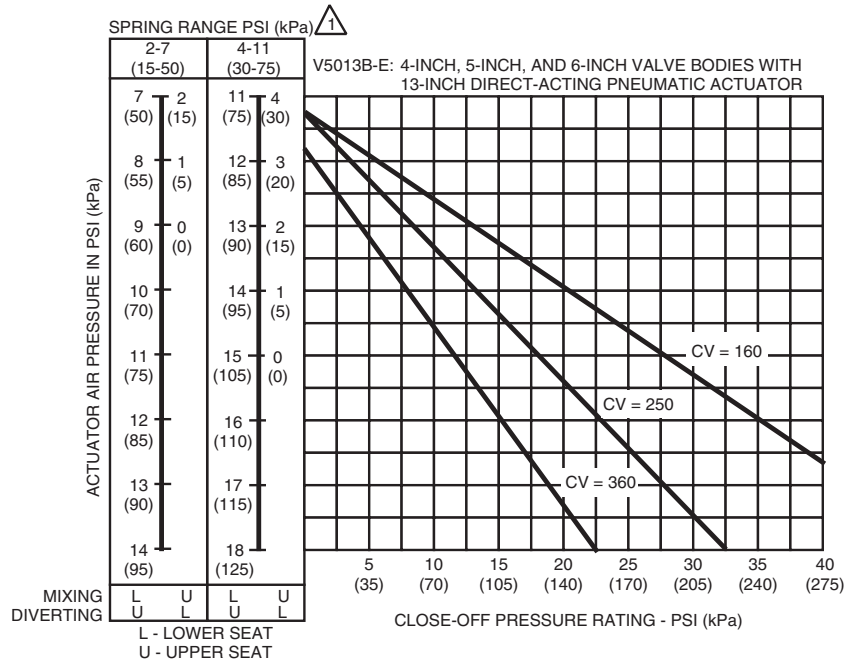


<sup>1</sup> USE 4-11 PSI (30-75 kPa) RANGE FOR DETERMINING CLOSE-OFF OF VALVES WITH MP953E ACTUATORS. C1988-1



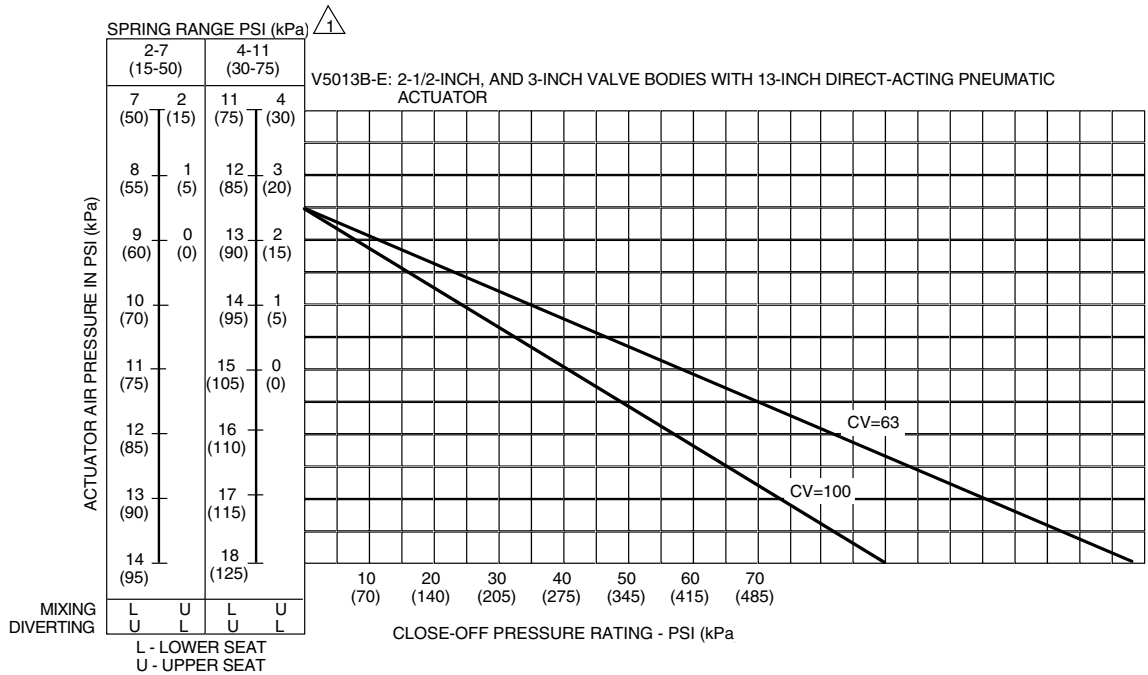
<sup>1</sup> USE 8-12 PSI (55-85 kPa) RANGE FOR DETERMINING CLOSE-OFF OF VALVES WITH MP953F ACTUATORS. C1987-1

**Fig. 6. Close-Off Pressures at Various Control Air Pressures for V5013 Valves and MP953 Pneumatic Actuators (Continued).**



<sup>△</sup><sub>1</sub> USE 4-11 PSI (30-75 kPa) RANGE FOR DETERMINING CLOSE-OFF OF VALVES WITH MP953E ACTUATORS.

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<sup>△</sup><sub>1</sub> USE 4-11 PSI (30-75 kPa) RANGE FOR DETERMINING CLOSE-OFF OF VALVES WITH MP953E ACTUATOR

**Fig. 6. Close-Off Pressures at Various Control Air Pressures for V5013 Valves and MP953 Pneumatic Actuators (Continued).**

V5013B-F THREE-WAY MIXING & DIVERTING VALVES

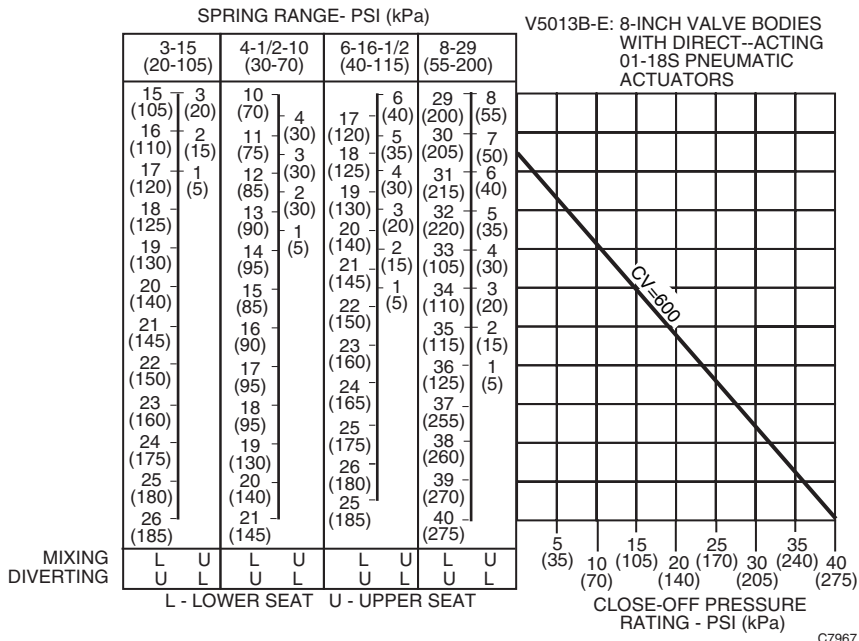
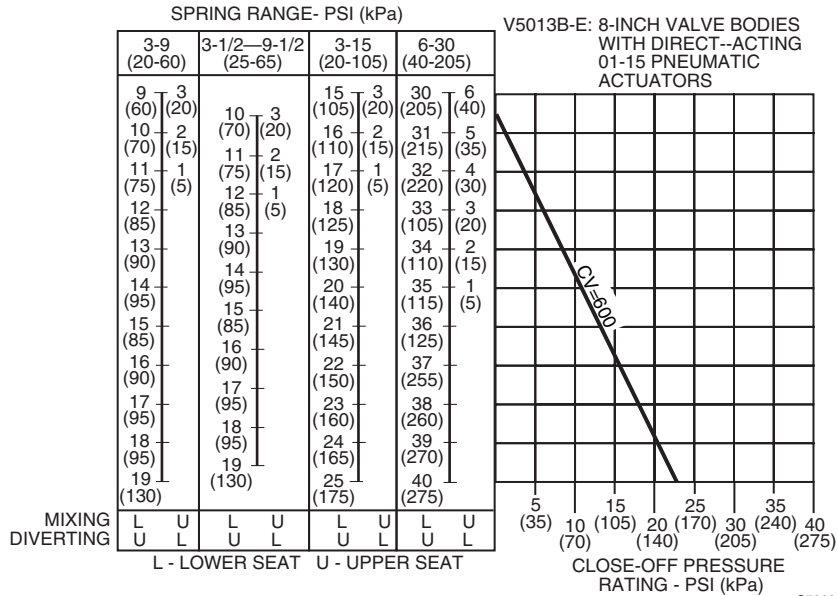


Fig. 7. Close-Off Pressures at Various Control Air Pressures for Type 01 Actuators on V5013B-E 8-Inch Valve Bodies.



**Table 4. Pneumatic Actuator Selection.**

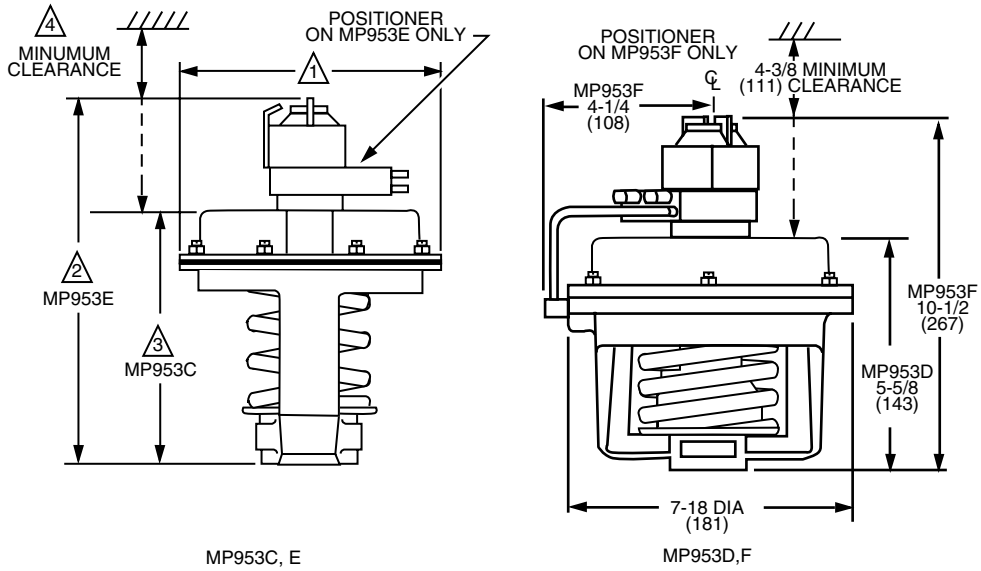
Valve Model	Size in Inches	3/4 In. Stroke						1-1/2 In. Stroke				
		With Positioner (Actuator Dia in In.)					Without Positioner (Actuator Dia in In.)	With Positioner (Actuator Dia in In.)		Without Positioner (Actuator Dia in In.)		
		DA MP953E		RA MP953F	Industrial Type 01-15 or 01-18S		DA MP953C		RA MP953D	DA MP953E	DA MP953C	
		5	8	13	7-1/8		5	8	13	7-1/8	13	13
V5013B & D (Mixing)	2-1/2	—	X	X	X	—	—	X	X	X	—	—
	3	—	X	X	X	—	—	X	X	X	—	—
V5013C & E (Diverting)	4	—	—	—	—	—	—	—	—	—	X	X
	5	—	—	—	—	—	—	—	—	—	X	X
Three-Way Flanged End Connections	6	—	—	—	—	—	—	—	—	—	X	X
	8	—	—	—	—	X	—	—	—	—	—	—
V5013F Three-Way Mixing with Screwed End Connections	1/2	X	X	—	X	—	X	X	—	X	—	—
	3/4	X	X	—	X	—	X	X	—	X	—	—
	1	X	X	—	X	—	X	X	—	X	—	—
	1-1/4	X	X	—	X	—	X	X	—	X	—	—
	1-1/2	X	X	—	X	—	X	X	—	X	—	—
	2	X	X	—	X	—	X	X	—	X	—	—

**Table 5. Electric Actuator and Linkage Selection.**

Linkage (lbf)	Linkage Model/Usage	Spring Return	Torque (lb-in.)	2-Position Model†	Floating Model†	Proportional Model†
80	Q5001A	Yes	25	M8175	—	—
160	Q5001A for 3 in. & smaller valves	Yes	60	M8185 M8186	M6285 M6286	M7285§ M7286§
		No	75	—	M6174	M7274§
		No	150	—	M6184	M7284§
160	Q5001B for 4, 5, & 6 in. Valves	No	150	—	M6184	M7284§
320	Q5001A for 3 in. & smaller valves	No	300	—	M6194	M7294§
	Q5001B for 4, 5, & 6 in. valves					
80	Integral	—	—	ML684	ML684	—
160	Integral	—	—	ML684	ML684	ML784

Linkage (lbf)	Minimum Actuator Torque Required for Linkage	
	1/2 In. Through 3 In. Valve Sizes (lb-in.)	4, 5, 6 In. Valve Sizes
80	25	—
160	50	100
320	300	300

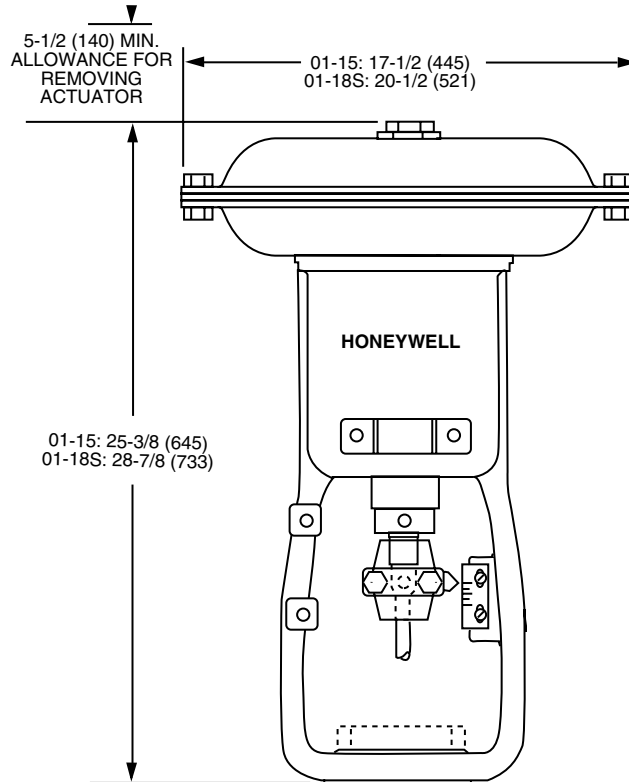
†Actuator shaft rotation must be 160 degrees  
§2 to 10V dc



OPERATION SIZE NOMINAL DIA	1	2	3	4
5-INCH	5-1/8 (130)	9-1/4 (235)	4-5/8 (117)	4-3/8 (111)
8-INCH	8-1/4 (210)	11-1/8 (283)	6-1/2 (165)	5-3/8 (137)
13-INCH	13-1/2 (343)	18-1/8 (460)	10 (254)	7-11/16 (195)

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Fig. 8. MP953C-F Dimensions in Inches (Millimeters).



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Fig. 9. Type 01-15 and 01-18S Pneumatic Actuator Dimensions in Inches (Millimeters).

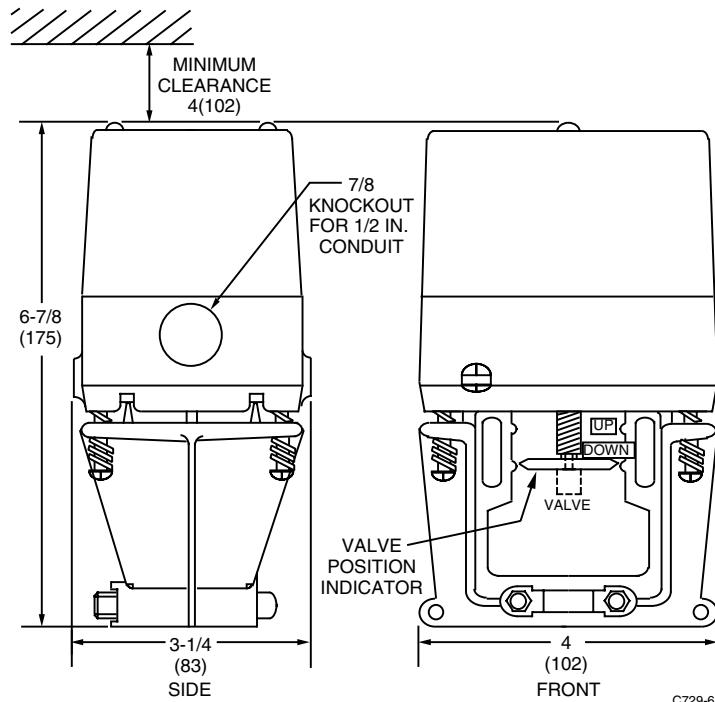


Fig. 10. Versadrive Actuator Dimensions in Inches (Millimeters).

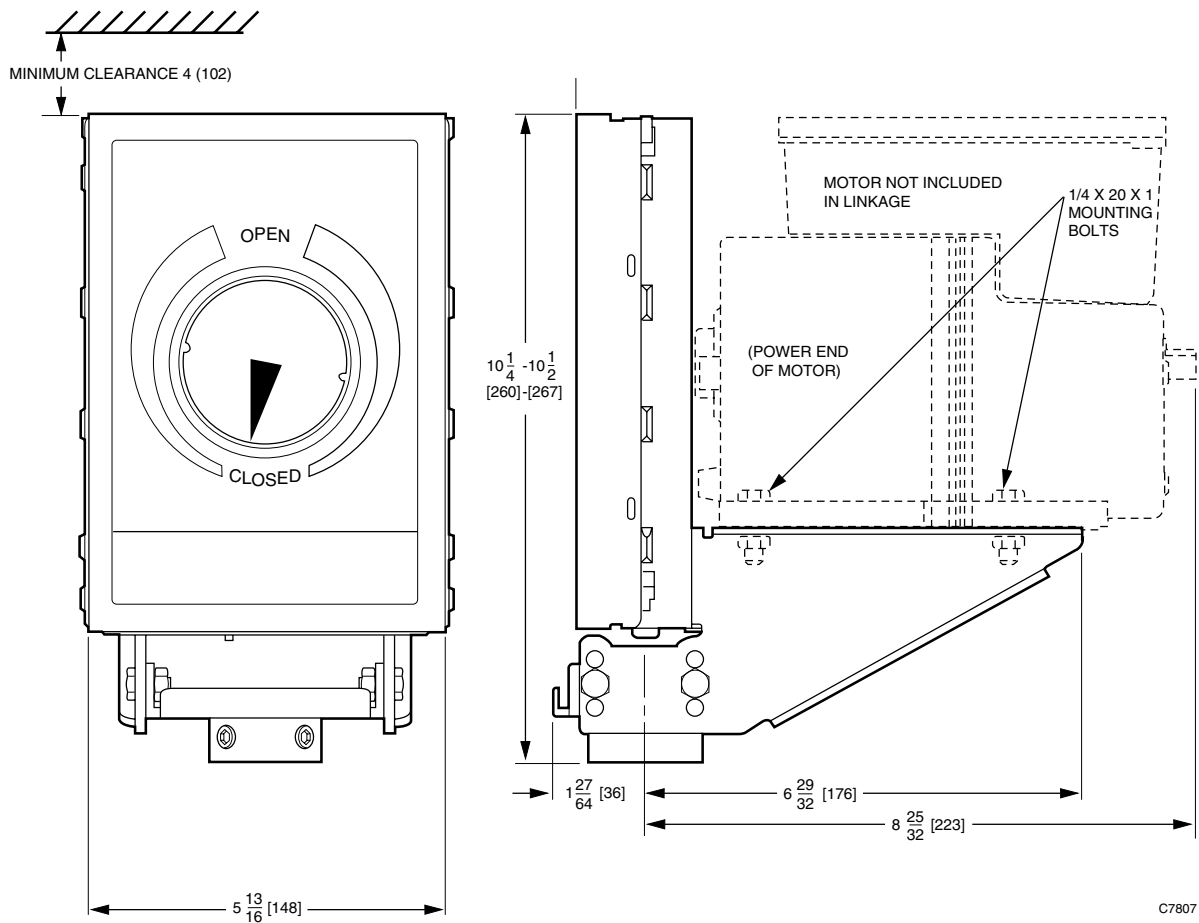


Fig. 11. Q5001 Linkage with High Torque Spring-Return Modutrol IV Motor..

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