

## Flowrite™ 599 Series

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### 2-1/2 to 6-Inch Valve, Two-Way & Three-Way, and Actuator Assembly Selection

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#### **Description**

This Technical Bulletin will aid in the selection of a Flowrite 599 Series 2-1/2 inch to 6-inch valve and actuator assembly. Begin with the graph of water capacity and the chart of close-off pressures to select a valve and actuator according to specifications. Use Tables 1 through 4 to identify product numbers.

These tables show all the possible combinations of the Flowrite 599 Series valves and compatible actuators that can be ordered as complete valve assemblies from the factory.

The dimensions of all valves and the service envelope required for each actuator are included in Tables 5 through 7.

#### **How to Use the Selection Graphs**

Use Figure 1, the water capacity graph, to select a valve. Locate the specified flow rate on the vertical axis. Follow across on the horizontal line to the point of intersection with the specified pressure drop. Choose the valve size from the heavy diagonal lines across the graph.

Use Figure 2, the close-off pressure graph, to select an actuator. First locate the valve action and actuator power source specified. Locate the bar that represents the valve line size. The top of the bar indicates the maximum close-off pressure for tight close-off.

Use the legend at the bottom of the graph to identify the actuator.

#### **How To Use The Valve Tables**

Tables have been organized to help select a valve and actuator combination using additional specifications.

Moving from left to right, identify the valve by selecting the combination of parameters needed. Continue to the right to match the selected valve to a desired actuator.

A valve and actuator assembly part number is determined by combining the actuator prefix code with the suffix of the valve product number.

#### **NOTES:**

1. No valve will combine with all actuators.
  2. The symbol “—” indicates a combination is not available.
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## **Selection Example      Specification**

Select a two-way normally closed valve and actuator assembly for an ANSI 125 piping system that will deliver 500 gpm (113 m<sup>3</sup>/h) chilled water with an equal percentage flow characteristic with no more than 5 psi (35 kPa) pressure drop across the fully open valve.

The valve shall be operated by a 24 Vac powered, 0 to 10 Vdc control signal, spring return electronic actuator, and must close off tightly against a pump head pressure of 15 psi (1 bar).

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### **Valve Sizing**

Use Figure 1, the water capacity graph, to begin valve sizing.

1. Locate 500 gpm (113 m<sup>3</sup>/h) on the vertical axis to find the required flow.
2. Read across the horizontal axis to find 5 psi (35 kPa), the maximum allowable pressure drop across the open valve.
3. Select a 5-inch (125 mm) 250 Cv (214 Kvs) line size valve because the point of intersection falls close to the 5-inch line.

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### **Actuator selection**

Use Figures 2, the close-off pressure graph, to choose an actuator.

1. Locate the graph for electronic actuators for NC valves in the upper left side of the figure.
  2. Locate the bar for 5-inch valves. The black bar represents an SKB/C actuator.
  3. Notice that the SKB/C has the sufficient force to provide tight close-off against more than 20 psi (1.4 bar) differential. For a 5-inch valve, select an SKC actuator with a 40 mm stroke.
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## Product Number Selection

Use Table 1 for ANSI Class 125 valves. Begin at the left and select the specifications necessary.

1. Select a two-way, normally closed, equal percentage flow characteristic according to the specifications.
2. Select bronze trim for the low pressure water application and standard packing for chilled water.
3. Select the 5-inch line size determined from the sizing example above. Note the 40 mm stroke of the valve. The valve part number is 599-05993.
4. Read across the top of the table to Electronic-hydraulic, 40 mm, and 24 Vac, 0-10 Vdc control signal.  
The actuator part number is SKC62U.  
The actuator code number is 294.
5. Read down the column to determine the valve and actuator assembly product number is 294-05993.

**NOTE:** A valve and actuator can be ordered separately by using the part numbers from Steps 3 and 4.

## References

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*Two-Way Valves 2-1/2 to 6-inch Flanged Iron Body Technical Instructions (155-159)*

*Three-Way Valves 2-1/2 to 6-inch Flanged Iron Body Technical Instructions (155-160)*

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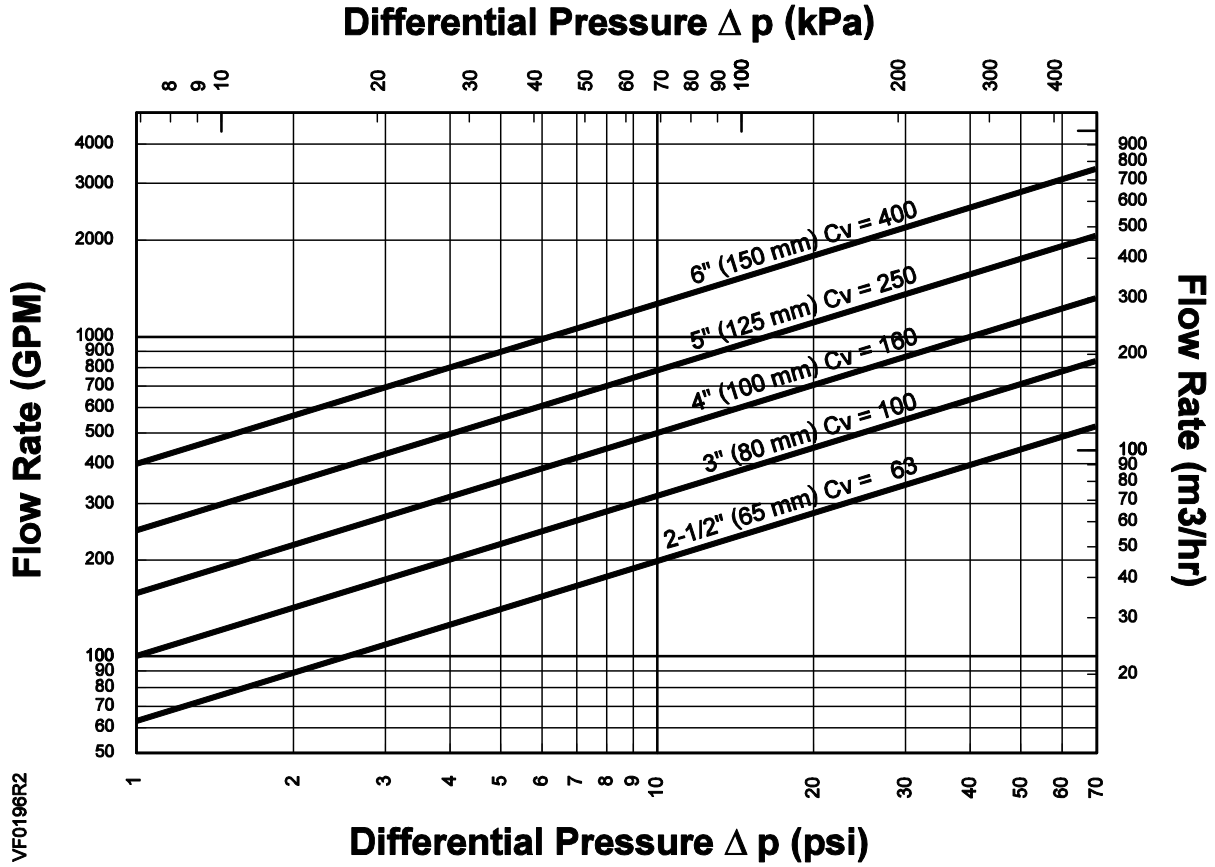


Figure 1. Water Capacity Graph.

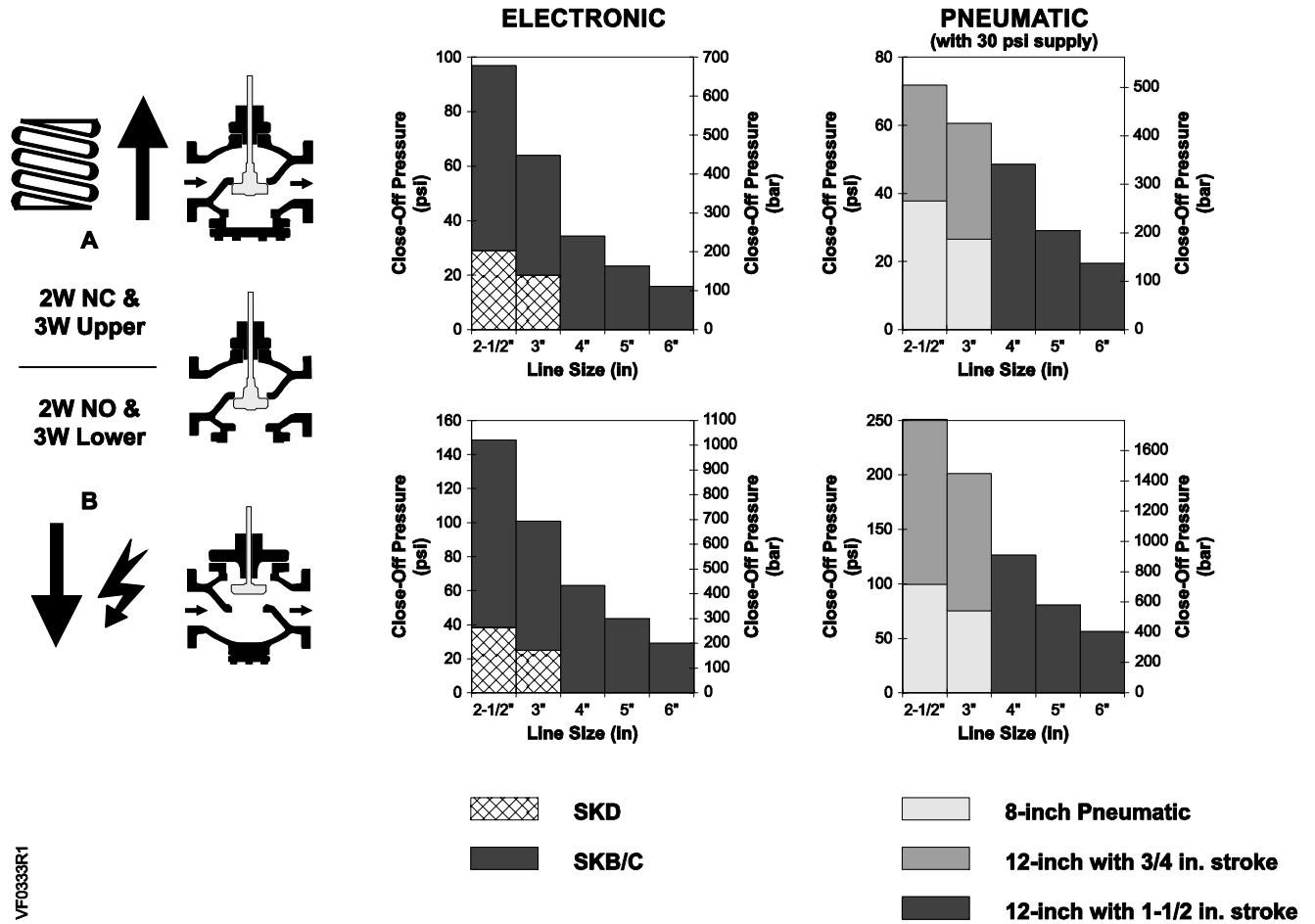


Figure 2. Close-off Pressures for 2-1/2 through 6-Inch Valves.



**Table 2. Two-Way and Three-Way, Flanged Valves, ANSI Class 125.**

Characteristic	Trim	Packing	Flow Rate		Valve Size		Stroke	Pneumatic				Pneumatic with Factory Mounted Positioner					
								Stroke	20 mm		40 mm	20 mm		40 mm			
								Description	8-inch		12-inch	8-inch		12-inch			
									Standard	Hi Temp		Standard	Hi-Temp				
								Technical Instructions	155-161P25		155-162P25		155-161P25		155-162P25		
Actuator P/N	599-01050	599-01051	599-01010	599-01000	599-01050 & 599-00426	599-01051 & 599-00426	599-01010 & 599-00423	599-01000 & 599-00423									
Valve P/N	Actuator Code																
	277	278	279	281	283	284	285	287									
2-Way Equal Percentage, NO	Bronze	Standard	63	54	2.5	65	20	599-05980	277-05980	—	279-05980	—	283-05980	—	285-05980	—	
			100	86	3	80	20	599-05981	277-05981	—	279-05981	—	283-05981	—	285-05981	—	
			160	140	4	100	40	599-05982	—	—	—	281-05982	—	—	—	287-05982	
			250	215	5	125	40	599-05983	—	—	—	281-05983	—	—	—	287-05983	
			400	340	6	150	40	599-05984	—	—	—	281-05984	—	—	—	287-05984	
			63	54	2.5	65	20	599-05960	277-05960	—	279-05960	—	283-05960	—	285-05960	—	
	100	86	3	80	20	599-05961	277-05961	—	279-05961	—	283-05961	—	285-05961	—			
	160	140	4	100	40	599-05962	—	—	—	281-05962	—	—	—	287-05962			
	250	215	5	125	40	599-05963	—	—	—	281-05963	—	—	—	287-05963			
	400	340	6	150	40	599-05964	—	—	—	281-05964	—	—	—	287-05964			
	2-Way Linear, NO	Stainless Steel	Standard	63	54	2.5	65	20	599-06060	277-06060	—	279-06060	—	283-06060	—	285-06060	—
				100	86	3	80	20	599-06061	277-06061	—	279-06061	—	283-06061	—	285-06061	—
160				140	4	100	40	599-06062	—	—	—	281-06062	—	—	—	287-06062	
250				215	5	125	40	599-06063	—	—	—	281-06063	—	—	—	287-06063	
400				340	6	150	40	599-06064	—	—	—	281-06064	—	—	—	287-06064	
63				54	2.5	65	20	599-06040	277-06040	278-06040	279-06040	—	283-06040	284-06040	285-06040	—	
100		86	3	80	20	599-06041	277-06041	278-06041	279-06041	—	283-06041	284-06041	285-06041	—			
160		140	4	100	40	599-06042	—	—	—	281-06042	—	—	—	287-06042			
250		215	5	125	40	599-06043	—	—	—	281-06043	—	—	—	287-06043			
400		340	6	150	40	599-06044	—	—	—	281-06044	—	—	—	287-06044			
2-Way Equal Percentage, NC		Bronze	Standard	63	54	2.5	65	20	599-05990	277-05990	—	279-05990	—	283-05990	—	285-05990	—
				100	86	3	80	20	599-05991	277-05991	—	279-05991	—	283-05991	—	285-05991	—
	160			140	4	100	40	599-05992	—	—	—	281-05992	—	—	—	287-05992	
	250			215	5	125	40	599-05993	—	—	—	281-05993	—	—	—	287-05993	
	400			340	6	150	40	599-05994	—	—	—	281-05994	—	—	—	287-05994	
	63			54	2.5	65	20	599-05970	277-05970	—	279-05970	—	283-05970	—	285-05970	—	
	100	86	3	80	20	599-05971	277-05971	—	279-05971	—	283-05971	—	285-05971	—			
	160	140	4	100	40	599-05972	—	—	—	281-05972	—	—	—	287-05972			
	250	215	5	125	40	599-05973	—	—	—	281-05973	—	—	—	287-05973			
	400	340	6	150	40	599-05974	—	—	—	281-05974	—	—	—	287-05974			
	2-Way Linear, NC	Stainless Steel	Standard	63	54	2.5	65	20	599-06070	277-06070	—	279-06070	—	283-06070	—	285-06070	—
				100	86	3	80	20	599-06071	277-06071	—	279-06071	—	283-06070	—	285-06070	—
160				140	4	100	40	599-06072	—	—	—	281-06072	—	—	—	287-06072	
250				215	5	125	40	599-06073	—	—	—	281-06073	—	—	—	287-06073	
400				340	6	150	40	599-06074	—	—	—	281-06074	—	—	—	287-06074	
63				54	2.5	65	20	599-06050	277-06050	278-06050	279-06050	—	283-06050	284-06050	285-06050	—	
100		86	3	80	20	599-06051	277-06051	278-06051	279-06051	—	283-06050	284-06051	285-06051	—			
160		140	4	100	40	599-06052	—	—	—	281-06052	—	—	—	287-06052			
250		215	5	125	40	599-06053	—	—	—	281-06053	—	—	—	287-06053			
400		340	6	150	40	599-06054	—	—	—	281-06954	—	—	—	287-06054			
3-Way Mixing Linear		Bronze	Standard	63	54	2.5	65	20	599-06160	277-06160	—	279-06160	—	283-06160	—	285-06160	—
				100	86	3	80	20	599-06161	277-06161	—	279-06161	—	283-06161	—	285-06161	—
	160			140	4	100	40	599-06162	—	—	—	281-06162	—	—	—	287-06162	
	250			215	5	125	40	599-06163	—	—	—	281-06163	—	—	—	287-06163	
	400			340	6	150	40	599-06164	—	—	—	281-06174	—	—	—	287-06174	
	63			54	2.5	65	20	599-06165	277-06165	—	279-06165	—	283-06165	—	285-06165	—	
	100	86	3	80	20	599-06166	277-06166	—	279-06166	—	283-06166	—	285-06166	—			
	160	140	4	100	40	599-06167	—	—	—	281-06167	—	—	—	287-06167			
	250	215	5	125	40	599-06168	—	—	—	281-06168	—	—	—	287-06168			
	400	340	6	150	40	599-06169	—	—	—	281-06169	—	—	—	287-06169			





**Table 4. Two-Way and Three-Way, Flanged Valves, ANSI Class 250.**

Characteristic	Trim	Packing	Flow Rate		Valve Size		Stroke	Pneumatic				Pneumatic with Factory Mounted Positioner				
								20 mm		40 mm		20 mm		40 mm		
			Cv	Kvs	In	mm		Description	8-inch		12-inch	8-inch		12-inch		
									Standard	Hi-Temp		Standard	Hi-Temp			
			Technical Instructions								155-161P25		155-162P25		155-161P25	
Actuator P/N								599-01050	599-01051	599-01010	599-01000	599-01050 & 599-00426	599-01051 & 599-00426	599-01010 & 599-00423	599-01000 & 599-00423	
Valve P/N								Actuator Codes								
								277	278	279	281	283	284	285	287	
Normally Open	2-Way Equal Percentage	Bronze	63	54	2.5	65	20	599-05940	277-05940	—	279-05940	—	283-05940	—	285-05940	—
			100	86	3	80	20	599-05941	277-05941	—	279-05941	—	283-05941	—	285-05941	—
			160	140	4	100	40	599-05942	—	—	—	281-05942	—	—	—	287-05942
			250	215	5	125	40	599-05943	—	—	—	281-05943	—	—	—	287-05943
			400	340	6	150	40	599-05944	—	—	—	281-05944	—	—	—	287-05944
		63	54	2.5	65	20	599-05920	277-05920	—	279-05920	—	283-05920	—	—	285-05920	—
		100	86	3	80	20	599-05921	277-05921	—	279-05921	—	283-05921	—	—	285-05921	—
		160	140	4	100	40	599-05922	—	—	—	281-05922	—	—	—	287-05922	
		250	215	5	125	40	599-05923	—	—	—	281-05923	—	—	—	287-05923	
		400	340	6	150	40	599-05924	—	—	—	281-05924	—	—	—	287-05924	
	63	54	2.5	65	20	599-06140	277-06140	—	279-06140	—	283-06140	—	—	285-06140	—	
	100	86	3	80	20	599-06141	277-06141	—	279-06141	—	283-06141	—	—	285-06141	—	
	160	140	4	100	40	599-06142	—	—	—	281-06142	—	—	—	287-06142		
	250	215	5	125	40	599-06143	—	—	—	281-06143	—	—	—	287-06143		
	400	340	6	150	40	599-06144	—	—	—	281-06144	—	—	—	287-06144		
	63	54	2.5	65	20	599-06120	277-06120	278-06120	279-06120	—	283-06120	284-06120	285-06120	—		
	100	86	3	80	20	599-06121	277-06121	278-06120	279-06121	—	283-06121	284-06121	285-06121	—		
	160	140	4	100	40	599-06122	—	—	—	281-06122	—	—	—	287-06122		
	250	215	5	125	40	599-06123	—	—	—	281-06123	—	—	—	287-06123		
	400	340	6	150	40	599-06124	—	—	—	281-06124	—	—	—	287-06124		
Normally Closed	2-Way Equal Percentage	Bronze	63	54	2.5	65	20	599-05950	277-05950	—	279-05950	—	283-05950	—	285-05950	—
			100	86	3	80	20	599-05951	277-05951	—	279-05951	—	283-05951	—	285-05951	—
			160	140	4	100	40	599-05952	—	—	—	281-05952	—	—	—	287-05952
			250	215	5	125	40	599-05953	—	—	—	281-05953	—	—	—	287-05953
			400	340	6	150	40	599-05954	—	—	—	281-05954	—	—	—	287-05954
		63	54	2.5	65	20	599-05930	277-05930	—	279-05930	—	283-05930	—	—	285-05930	—
		100	86	3	80	20	599-05931	277-05931	—	279-05931	—	283-05931	—	—	285-05931	—
		160	140	4	100	40	599-05932	—	—	—	281-05932	—	—	—	287-05932	
		250	215	5	125	40	599-05933	—	—	—	281-05933	—	—	—	287-05933	
		400	340	6	150	40	599-05934	—	—	—	281-05934	—	—	—	287-05934	
	63	54	2.5	65	20	599-06150	277-06150	—	279-06150	—	283-06150	—	—	285-06150	—	
	100	86	3	80	20	599-06151	277-06151	—	279-06151	—	283-06151	—	—	285-06151	—	
	160	140	4	100	40	599-06152	—	—	—	281-06152	—	—	—	287-06152		
	250	215	5	125	40	599-06153	—	—	—	281-06153	—	—	—	287-06153		
	400	340	6	150	40	599-06154	—	—	—	281-06154	—	—	—	287-06154		
	63	54	2.5	65	20	599-06130	277-06130	278-06130	279-06130	—	283-06130	284-06130	285-06130	—		
	100	86	3	80	20	599-06131	277-06131	278-06131	279-06131	—	283-06131	284-06131	285-06131	—		
	160	140	4	100	40	599-06132	—	—	—	281-06132	—	—	—	287-06132		
	250	215	5	125	40	599-06133	—	—	—	281-06133	—	—	—	287-06133		
	400	340	6	150	40	599-06134	—	—	—	281-06134	—	—	—	287-06134		
3-Way Mixing	Linear	Bronze	63	54	2.5	65	20	599-06170	277-06170	—	279-06170	—	283-06170	—	285-06170	—
			100	86	3	80	20	599-06171	277-06171	—	279-06171	—	283-06171	—	285-06171	—
			160	140	4	100	40	599-06172	—	—	—	281-06172	—	—	—	287-06172
			250	215	5	125	40	599-06173	—	—	—	281-06173	—	—	—	287-06173
			400	340	6	150	40	599-06174	—	—	—	281-06174	—	—	—	287-06174
	63	54	2.5	65	20	599-06175	277-06175	—	279-06175	—	283-06175	—	—	285-06175	—	
	100	86	3	80	20	599-06176	277-06176	—	279-06176	—	283-06176	—	—	285-06176	—	
	160	140	4	100	40	599-06177	—	—	—	281-06177	—	—	—	287-06177		
	250	215	5	125	40	599-06178	—	—	—	281-06178	—	—	—	287-06178		
	400	340	6	150	40	599-06179	—	—	—	281-06179	—	—	—	287-06179		

Note: Spring start point NO = 3 to 8 psi (21 to 55 kPa), NC = 10 to 15 psi (69 to 103 kPa), 3-Way = 8 to 13 psi (55 to 90 kPa).

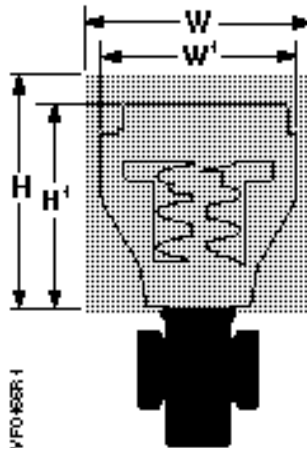
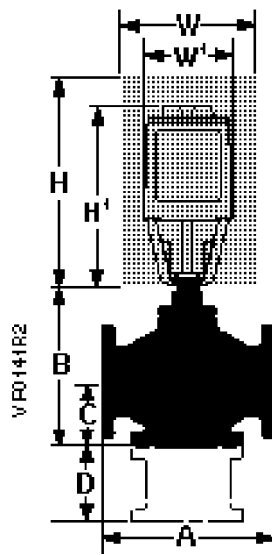


Figure 3. Actuator Dimensions.

Table 5. Dimensions of the Actuator and Recommended Service Envelope.  
 Dimensions in Inches (Millimeters).

Actuator	Actuator Prefix Code	Actual Height of Actuator H1	Service Height H	Actual Width or Diameter of Actuator W1	Service Width W
8-inch Pneumatic	277, 278, 283, 284	14-1/8 (359)	26 (660)	8-3/4 (222) diameter	21 (533)
12-inch Pneumatic	279, 281, 285, 287	17-7/8 (454)	30 (762)	15-1/8 (384) diameter	27 (686)
SKB/C with handle closed	289, 290, 291, 292, 293, 294	14-3/4 (375)	22-3/4 (578)	7 (178) width x 8-15/16 (226) depth	25 (635)
SKD	267, 274, 275, 276	11-13/16 (300)	19-3/4 (500)	5 (127) width x 6-5/8 (169) depth	14-1/2 (360)

**Table 6. Three-Way Valve Dimensions.**



Nominal Valve Size Inches (mm)	Dimensions in Inches (Millimeters)					Weight lb (kg)	
	A		B	C	D Service Flange	ANSI Class 125	ANSI Class 250
	ANSI Class 125	ANSI Class 250					
2-1/2 (65)	10-7/8 (276.4)	11-1/2 (292)	9-3/8 (239.2)	3-3/4 (95)	6-1/2 (165)	104 (47)	117 (53)
3 (80)	11-3/4 (298.5)	12-1/2 (318)	10-3/4 (272)	4-3/8 (111)	7 (178)	114 (52)	132 (60)
4 (100)	13-7/8 (352.4)	14-1/2 (368)	12-1/2 (317.6)	5-1/8 (131.6)	7-1/2 (191)	146 (66)	174 (79)
5 (125)	15-3/4 (400)	16-5/8 (422)	13-3/4 (349.2)	5-3/4 (146.2)	8-1/2 (216)	170 (77)	215 (99)
6 (150)	17-3/4 (451)	18-5/8 (473)	15-1/2 (393)	6-5/8 (167)	9-1/2 (241)	199 (90)	261 (119)

**Figure 4. Dimensions.**

**Table 7. Two-Way Valve Dimensions.**

Valve Action	Nominal Valve Size Inches (mm)	ANSI Class 125				ANSI Class 250			
		Dimensions in Inches (mm)			Weight lb (kg)	Dimensions in Inches (mm)			Weight lb (kg)
		A	B	C		A	B	C	
Normally Open	2-1/2 (65)	10-7/8 (276)	11 (281)	4-7/8 (123)	107 (49)	11-1/2 (292)	11 (281)	4-7/8 (123)	121 (55)
	3 (80)	11-3/4 (299)	12-1/4 (312)	5-5/16 (135)	118 (53)	12-1/2 (318)	12-1/4 (312)	5-5/16 (135)	139 (63)
	4 (100)	13-7/8 (352)	13-9/16 (345)	6-5/16 (160)	153 (70)	14-1/2 (368)	13-5/8 (344.7)	6-5/16 (160)	183 (83)
	5 (125)	15-3/4 (400)	15-3/16 (385)	7 (177)	176 (80)	16-5/8 (422)	15-3/16 (385)	7 (177)	222 (101)
	6 (150)	17-3/4 (451)	16-3/4 (426)	7-7/8 (200)	211 (96)	18-5/8 (473)	16-3/4 (426)	7-7/8 (200)	277 (126)
Normally Closed	2-1/2 (65)	10-7/8 (276)	10-5/8 (269)	4-7/8 (125)	107 (48)	11-1/2 (292)	11 (279)	5-3/8 (135)	120 (55)
	3 (80)	11-3/4 (299)	11-15/16 (303)	5-5/8 (142)	117 (53)	12-1/2 (318)	12-7/16 (315)	6 (154)	136 (62)
	4 (100)	13-7/8 (352)	13-15/16 (354)	6-5/8 (168)	154 (70)	14-1/2 (368)	14-3/8 (364)	7 (178)	184 (84)
	5 (125)	15-3/4 (400)	15-1/4 (388)	7-1/2 (185)	175 (79)	16-5/8 (422)	15-3/4 (399)	7-3/4 (196)	221 (101)
	6 (150)	17-3/4 (451)	17-1/16 (433)	8-3/16 (207)	210 (95)	18-5/8 (473)	17-1/2 (444)	8-5/8 (218)	275 (125)

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