
Zone Valve and Electric Actuator Assembly Selection



Description

This Technical Bulletin aids in selecting a 599 Series Zone Valve and an electronic actuator assembly.

Figure 1 provides a graph of water capacity for selecting the proper valve size. Tables 1, 2 and 3 provide maximum water capacity and close-off pressures for assistance in the selection of a valve and actuator according to specifications.

Tables 4 and 5 identify the electronic actuator/valve assembly product numbers. The tables show all possible combinations of Zone Valves and compatible actuators that can be ordered as complete valve/actuator assemblies from the factory.

Table 6 contains the dimensions of all valves. Tables 7, 8 and 9 provide the dimensions and service envelopes required for each valve/actuator assembly.

Using the Valve and Actuator Selection Graph

Use Figure 1, the Water Capacity Graph, to select a valve size as follows:

1. Locate the specified flow rate on the vertical axis.
2. Follow across on the horizontal axis to the point of intersection with the specified pressure drop.
3. Choose the valve size from the heavy diagonal lines across the graph.

See Table 3 to find the close-off pressures for valves relative to their size.

Using the Valve and Actuator Assembly Tables

Use the Product Number Tables 4 and 5 to select a valve and actuator assembly as follows:

Read the tables from left to right and select the appropriate valve specifications to identify the row with the required valve body.

1. Read across the top of the tables and select the appropriate actuator specifications to identify the column with the required actuator.
 2. Read down the actuator column and read across the valve body row. The column/row intersection determines the appropriate valve and actuator assembly. The valve and actuator assembly product number is the actuator prefix code added to the valve body suffix.
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Selection Examples

In an ANSI 125 piping system, a two-way, normally closed, female-by-female, NPT threaded valve delivers 6 gpm (0.52 m³/hr) chilled water with no more than 6-psi (41.4 kPa) pressure drop across the fully open valve.

Specifications

The actuator shall receive 120 Vac power; accept a two-position control signal and provide normally closed operation. The actuator closes off tightly against a pump head pressure of 14.5 psi (100 kPa, 1 bar).

Valve Sizing

See Figure 1, the Water Capacity Graph, to select the valve size as follows:

1. Locate the required flow rate by finding gpm (m³/hr) on the vertical axis①.
2. Follow across the horizontal axis and find the psi (kPa) maximum allowable pressure drop across the open valve②.
3. Select the valve line size that will ensure proper flow③.

Assembly**(Product Number)****Selection: An Example**

Use Table 4 to select a valve and actuator assembly as follows:

1. Read the table from left to right and select a NPT connection. Select a 0.50-inch (15 mm), 2.5 Cv (2.0 Kvs) valve. The valve body part number is 599-00211.
2. Read across the top of the table and select a normally closed, 120 Vac actuator prefix code. The prefix number is 240.
3. Read down the SFA11U actuator column and across the 0.50-inch (15 mm) valve body row to select 240-00211. The column/row intersection determines the appropriate valve and actuator assembly.

Alternatively, the valve and actuator can be ordered separately.

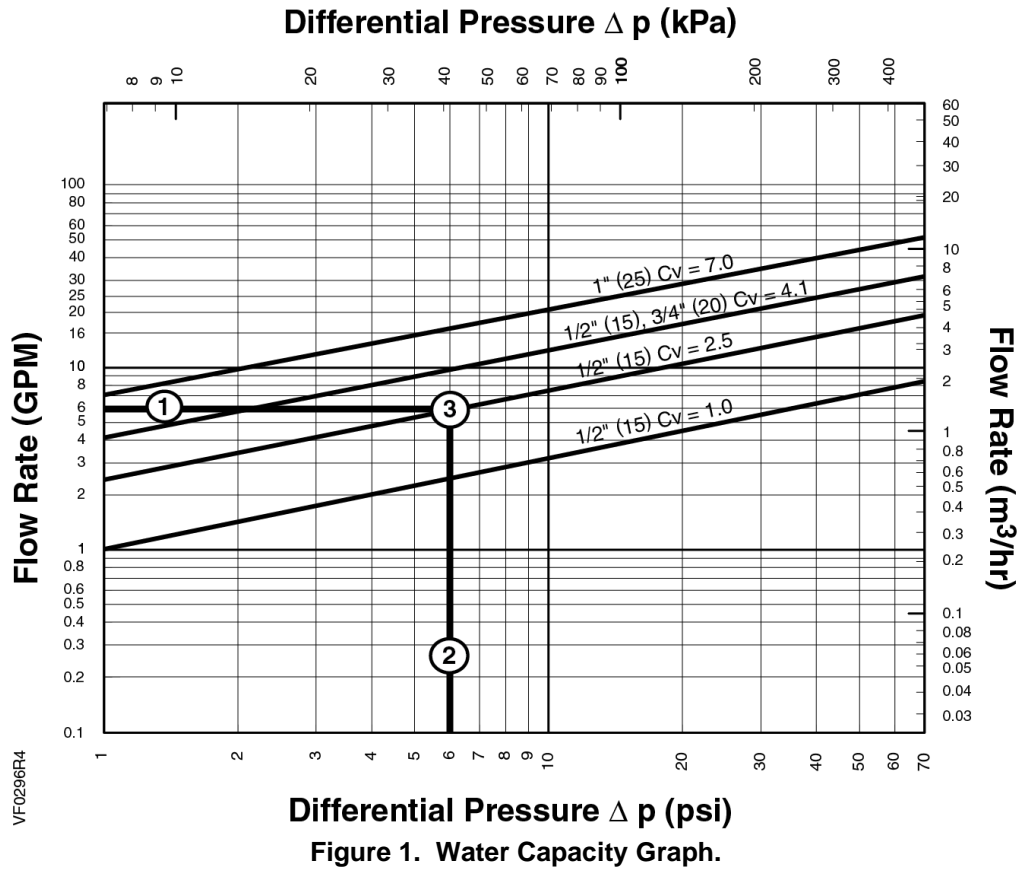


Table 1. Maximum Water Capacity - U.S. Gallons per Minute (AB→A).

Valve Size Inches	Pressure Differential - psi															
	Cv1	2	3	4	5	6	8	10	15	20	25	30	40	50	60	75
.50	1.0	1.4	1.7	2.0	2.2	2.4	2.8	3.2	3.9	4.4	5.0	5.5	6.3	7.1	7.7	8.7
.50	2.5	3.5	4.3	5.0	5.6	6.1	7.1	7.9	9.7	11.2	12.5	13.7	15.8	17.7	19.4	22.0
.50/.75	4.1	5.7	7.1	8.2	9.2	10.0	11.6	13.0	15.9	18.3	20.5	22.4	25.9	29.0	31.8	35.5
1.00	7.0	9.9	12.1	14.0	15.6	17.1	19.8	22.1	27.1	31.3	35.0	38.3	44.3	49.5	54.2	60.6

Table 2. Maximum Water Capacity - Cubic Meters per Hour (m³/hr) (AB→A).

Valve Size Mm	Pressure Differential - kPa														
	1	10	20	30	40	50	60	80	Kvs/100	150	200	300	400	500	
15	0.9	0.27	0.38	0.47	0.54	0.60	0.66	0.76	0.85	1.04	4.20	1.47	1.70	1.90	
15	0.21	0.68	0.96	1.17	1.35	1.51	1.66	1.91	2.15	2.60	3.00	3.70	4.30	4.80	
15/20	0.35	1.12	1.59	1.94	2.24	2.51	2.75	3.17	3.50	4.34	5.01	6.14	7.09	7.93	
25	0.60	1.91	2.71	3.32	3.83	4.28	4.69	5.41	6.00	7.41	8.56	10.48	12.11	13.54	

Table 3. 599 Series Zone Valve Body Maximum Close-Off Pressures (PSI).

Line Size Inch (mm)	Cv	SFA	SFP	SSP	SSE/SSF
.50 (15)	1	87	80	94	125
	2.5 and 4	51	44	65	75
.75 (20)	4.1	51	44	65	75
1.00 (25)	7	29	25	36	50

Table 4. Product Numbers: 2-Way Zone Valve/Electric Actuator Assemblies.

Vac/dC Connection	Line Size		Flow Rate		Valve Body	120 Vac		24 Vac, 24 Vac/dc				
						Fail Safe (SR)		Fail Safe (SR)		Fail-in-Place		
						2-Position		2-Position		3-Position	0 to 10 Vdc Modulating	
						Normally Closed	Normally Open	Normally Closed	Normally Open	Normally Closed	Normally Closed	Normally Open
	Inch	Mm	Cv	Kvs		SFA11U	SFP11U	SFA71U	SFP71U	SSA81U	SSE161.05U	SSF161.05U
				Actuator Code 240	Actuator Code 241	Actuator Code 242	Actuator Code 243	Actuator Code 244	Actuator Code 245	Actuator Code 248		
NPT	.50	15	1.0	0.85	599-00210	240-00210	241-00210	242-00210	243-00210	244-00210	245-00210	248-00210
	.50	15	2.5	2.0	599-00211	240-00211	241-00211	242-00211	243-00211	244-00211	245-00211	248-00211
	.50	15	4.0	3.4	599-00214	240-00214	241-00214	242-00214	243-00214	244-00214	245-00214	248-00214
	.75	20	4.1	3.5	599-00212	240-00212	241-00212	242-00212	243-00212	244-00212	245-00212	248-00212
	1.00	25	7.0	6.0	599-00213	240-00213	241-00213	242-00213	243-00213	244-00213	245-00213	248-00213
Sweat	.50	15	1.0	0.85	599-00510	*	*	*	*	*	*	*
	.50	15	2.5	2.0	599-00511	*	*	*	*	*	*	*
	.50	15	4.0	3.4	599-00514	*	*	*	*	*	*	*
	.75	20	4.1	3.5	599-00512	*	*	*	*	*	*	*
	1.00	25	7.0	6.0	599-00513	*	*	*	*	*	*	*

* Order valve and actuator separately.

Table 5. Product Numbers: 3-Way Diverting Zone Valves /Electric Valve Assemblies.

Connection	Line Size		Flow Rate AB→A		Valve Body	120 Vac		24 Vac, 24 Vac/dc				
						2-Position		2-Position		3-Position	0 to 10 Vdc Modulating	
						Fail AB▶B	Fail AB▶A	Fail AB▶B	Fail AB▶A	Fail-In-Place		
						SFA11U	SFP11U	SFA71U	SFP71U	SSA81U	SSE161.05U	SSF161.05U
	Inch	Mm	Cv	Kvs		Actuator Code 240	Actuator Code 241	Actuator Code 242	Actuator Code 243	Actuator Code 244	Actuator Code 245	Actuator Code 248
NPT	.50	15	1.0	0.85	599-00230	240-00230	241-00230	242-00230	243-00230	244-00230	245-00230	248-00230
	.50	15	2.5	2.0	599-00231	240-00231	241-00231	242-00231	243-00231	244-00231	245-00231	248-00231
	.50	15	4.0	3.4	599-00234	240-00234	241-00234	242-00234	243-00234	244-00234	245-00234	248-00234
	.75	20	4.1	3.5	599-00232	240-00232	241-00232	242-00232	243-00232	244-00232	245-00232	248-00232
	1.00	25	7.0	6.0	599-00233	240-00233	241-00233	242-00233	243-00233	244-00233	245-00233	248-00233
Sweat	.50	15	1.0	0.85	599-00530	*	*	*	*	*	*	*
	.50	15	2.5	2.0	599-00531	*	*	*	*	*	*	*
	.50	15	4.0	3.4	599-00534	*	*	*	*	*	*	*
	.75	20	4.1	3.5	599-00532	*	*	*	*	*	*	*
	1.00	25	7.0	6.0	599-00533	*	*	*	*	*	*	*

* Order valve and actuator separately.

NOTE: For more information, see *599 Series Zone Valve Bodies: Two-Way and Three-Way Technical Instructions (155-320P25)*, *599 Series Zone Valve Actuator SF Series Electronic Valve Actuator, 2-Position Control Technical Instructions (155-321P25)*, *599 Series Zone Valve Actuator SSA81U 24 Vac Electronic Valve Actuator: Floating Control Fail-in-Place Technical Instructions (155-710)*, and *Electromotoric Actuator SSE161.05U/SSF161.05U Data Sheet (A6V12681514)*.

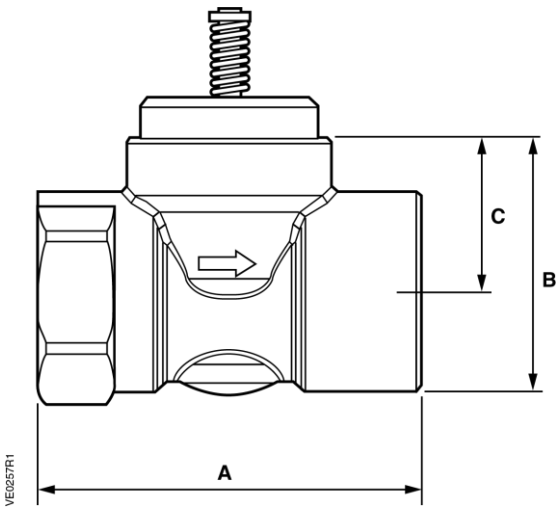


Figure 2. 2-Way Zone Valve, Normally Open.

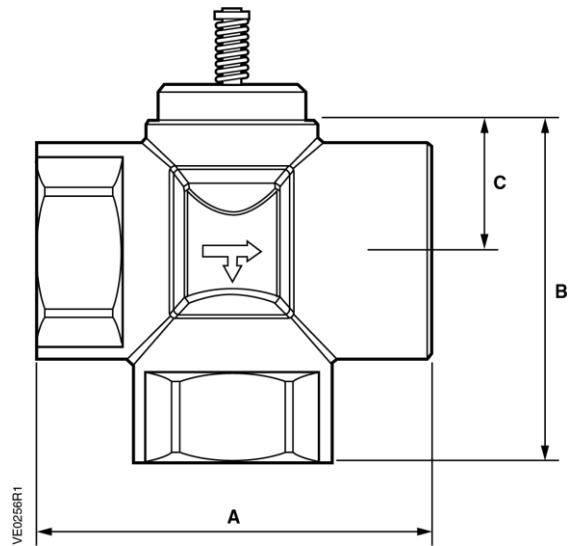
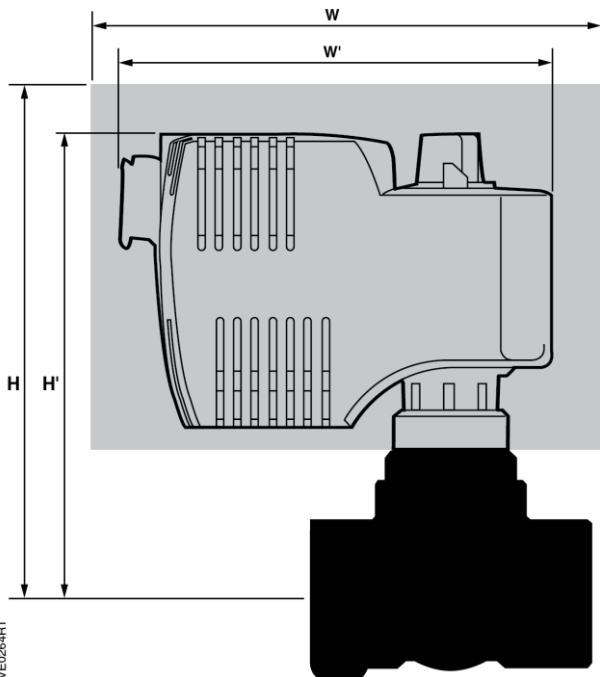


Figure 3. 3-Way Diverting Zone Valve.

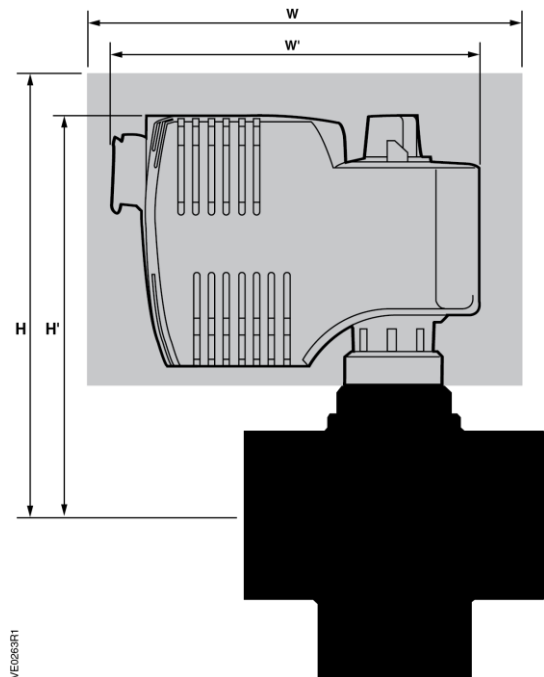
Table 6. Valve Dimensions.

Connection Type	Valve Size Inch (mm)	2-Way Valve				3-Way Valve			
		A	B	C	Weight lb. (kg)	A	B	C	Weight lb (kg)
NPT	0.50 (15)	2.76 (70)	1.56 (39,5)	0.96 (24,5)	0.73 (0,33)	2.76 (70)	2.34 (59,5)	0.96 (24,5)	0.90 (0,40)
	0.75 (20)	2.76 (70)	1.67 (42,5)		0.84 (0,38)	2.76 (70)	2.34 (59,5)		1.07 (0,49)
	1.0 (25)	3.50 (89)	1.83 (46,5)		1.46 (0,66)	3.50 (89)	2.64 (67)		1.80 (0,81)
Sweat	0.50 (15)	2.60 (66)	1.50 (38)	0.96 (24,5)	0.60 (0,27)	2.60 (66)	2.26 (57,5)	0.96 (24,5)	0.71 (0,32)
	0.75 (20)	2.76 (70)	1.63 (41,5)		0.71 (0,32)	2.76 (70)	2.34 (59,5)		0.86 (0,39)
	1.0 (25)	3.50 (89)	1.77 (45)		1.12 (0,51)	3.50 (89)	2.65 (67)		1.31 (0,60)

Dimensions



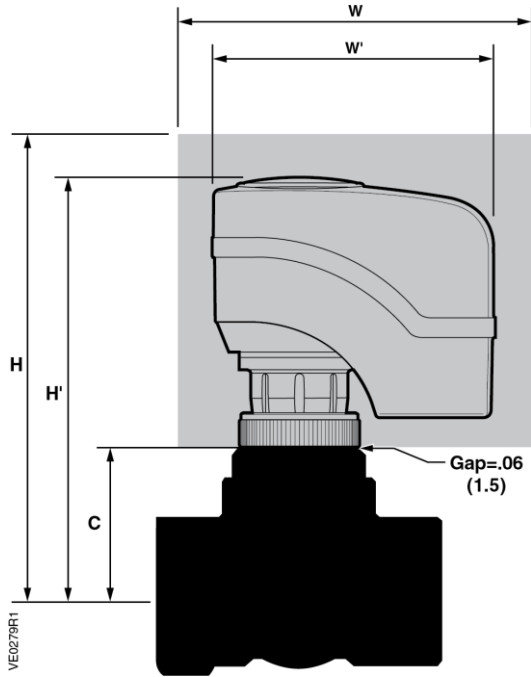
**Figure 4. SFA/P Series Actuator:
 Service Envelope for 2-Way Valve Assembly.**



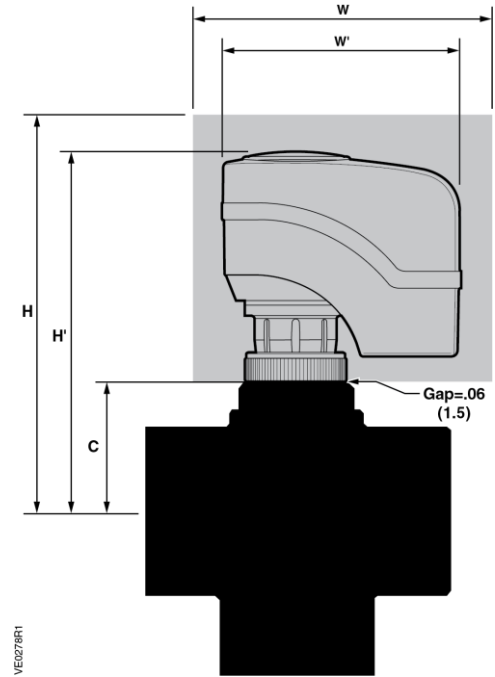
**Figure 5. SFA/P Series Actuator:
 Service Envelope for 3-Way Valve Assembly.**

Table 7. SFA/P Actuator Dimensions and Recommended Service Envelope in Inches (Millimeters).

Actuator Prefix Codes	Valve Line Size	Valve Centerline to Top of Actuator H1		Service Height H		Width or Diameter of Actuator W1		Service Width W	
		2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way
		240	.50 (15)						
241	.75 (20)	4.38	4.38	12.38	12.38	4.38	4.38	12.38	12.38
242		(112)	(112)	(315)	(315)	(112)	(112)	(315)	(315)
243	1.00 (25)								



**Figure 6. SSA81U Actuator:
 Service Envelope for 2-Way Valve Assembly.**



**Figure 7. SSA81U Actuator:
 Service Envelope for 3-Way Service Envelope.**

Table 8. SSA Actuator Dimensions and Recommended Service Envelope in Inches (Millimeters).

Actuator Prefix Codes	Valve Line Size	Valve Centerline to Top of Actuator H1		Service Height H		Valve Centerline to Actuator Coupling C		Width or Diameter of Actuator W1		Service Width W	
		2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way
244 245	.50 (15)	4.26 (108)	4.26 (108)	12.26 (311)	12.26 (311)	1.00 (25)	1.00 (25)	3.26 (83)	3.26 (83)	11.26 (286)	11.26 (286)
	.75 (20)										
	1.00 (25)										

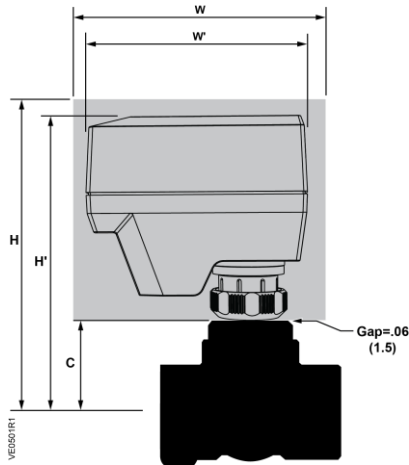


Figure 8. Electric Actuator SSE/F Series with 2-Way Valve: Assembly Service Envelope.

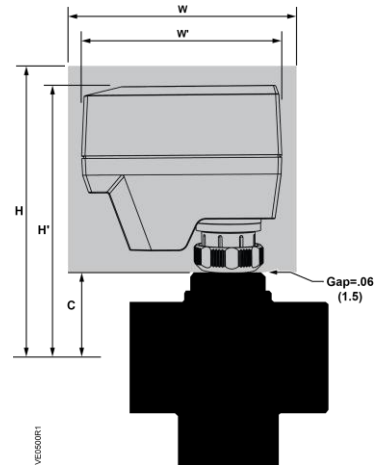


Figure 9. Electric Actuator SSE/F Series with 3-Way Valve: Assembly Service Envelope.

Table 9. SSE/F Electric Actuator/Valve Assembly Dimensions and Recommended Service Envelope in Inches (mm).

Actuator Prefix Codes	Valve Line Size	Valve Centerline to Top of Actuator H1		Service Height H		Valve Centerline to Actuator Coupling C		Width or Diameter of Actuator W1		Service Width W	
		2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way
245 248	.50 (15)	4.7 (118)	4.7 (118)	12.7 (321)	12.7 (321)	1.00 (25)	1.00 (25)	4.1 (104.4)	4.1 (104.4)	12.1 (307.4)	12.1 (307.4)
	.75 (20)										
	1.00 (25)										

Disposal



The actuators are considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the actuators through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Do not dispose of valves as household waste.

- Special handling of individual components may be mandated by law or make ecological sense.
- Observe all local and currently applicable laws and regulations.

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