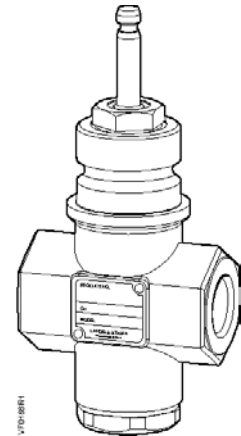


Flowrite™ 599 Series

Two-Way Valves, 1/2 to 2-inch Bronze Body, ANSI 250



Description	The Flowrite 599 Series two-way valves are designed to work with either a pneumatic or electronic actuator with a 3/4-inch (20 mm) stroke. They are available in ANSI Class 250 for normally open or normally closed action.
Features	<ul style="list-style-type: none"> • ANSI Leakage Class IV (0.01% of Cv) • Cartridge type packing • Choice of brass or stainless steel trim • Direct-coupled universal bonnet • UFxUF connections available • Choice to two flow characteristics
Application	Flowrite valves are generally recommended for water, steam, and 50% water-glycol solutions.
Product Numbers	See Tables 1 and 2.
Ordering a Valve Plus Actuator Assembly	<p>To order a complete valve plus actuator assembly from the factory, combine the actuator prefix code with the suffix of the valve assembly product number. See <i>Flowrite Technical Bulletins</i> (155-772 and 155-776) for complete selection procedure and ordering codes.</p> <p>Valve assemblies can be ordered using the numbers in Tables 1 and 2.</p>

Specifications	Line size	1/2 to 2-inches (15 to 50 mm)		
	Capacity	See Tables 3 through 6 and Figure 3		
Material	Body style	Globe style control valve with four connection options		
		See Tables 1 and 2		
	Seat style	Single seat, metal-to-metal		
	Action	Normally Open (NO) Normally Closed (NC)		
	Stem travel (stroke)	3/4-inch (20 mm)		
	Valve body rating	ANSI Class 250; see Table 7		
	Body	UNS CA 844 bronze		
	Body trim	See Tables 1 and 2		
	Stem	Stainless steel ASTM A582 Type 303		
	Packing			
	Normal duty packing	EPDM O-ring		
	Steam packing	Teflon® V-ring		
	Operating	Controlled medium	Saturated steam, water, 50% water-glycol solutions	
Medium temperature range				
Normal duty packing		20°F to 250°F (-7°C to 120°C)		
Steam packing		337°F (170°C) maximum		
Maximum inlet pressure				
Water		See Table 7		
Steam		100 psig (690 kPa)		
Maximum recommended differential pressure for modulating service				
		Brass trim	Stainless steel trim	
Liquid		25 psi (173 kPa)	50 psi (345 kPa)	
Steam		15 psi (103 kPa)	50 psi (345 kPa)	
Rangeability		>100:1		
Close-off pressures		See Tables 8, 9 and 10 and Figure 4		
Close-off ratings	According to ANSI/FCI 70-2			
Leakage rate	Class IV (0.01% of Cv)			
Flow characteristics	See Tables 1 and 2			
Mounting location	NEMA 1 (interior only)			
Miscellaneous	Canadian Registration Numbers	0H7645.5 0C0838.9		
	Dimensions	See Tables 11 and 12 and Figure 6		
	Valve Weight	See Table 14		

Accessories

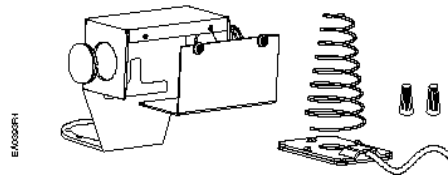


Figure 1. Packing Heating Element For Use with SKD and SQX Actuators.

599-00417 Packing heating element.

The heater allows the stem to move freely in valves that control fluids at temperatures below 32°F (0°C). It reduces ice crystal formation on the stem, which can damage the packing.

Operating Voltage	24 Vac
Heating Output	20W

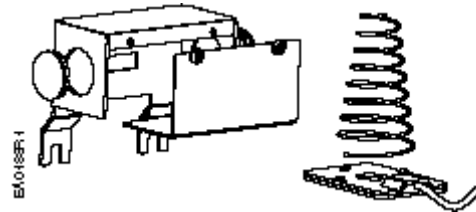


Figure 2. Packing Heating Element For Use with SKB/C and 8-inch Actuators.

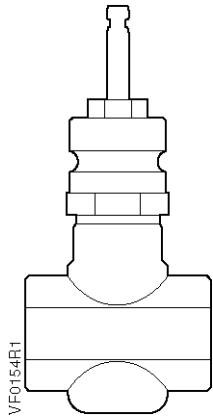
599-00418: Packing heating element.

The element allows the stem to move freely in valves that control fluids at temperatures below 32°F (0°C). It prevents ice crystal formation on the stem, which can damage the packing.

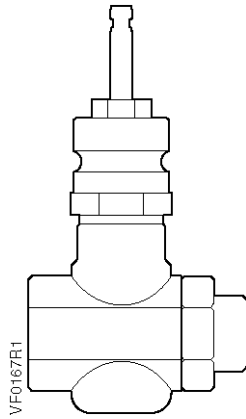
Operating Voltage	24 Vac
Heating Output	20W

Service Kits

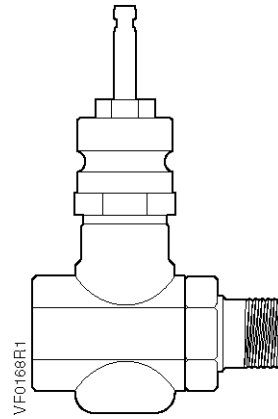
Valve packing kit	
Normal duty packing	599-03390
Steam packing	599-03391
Rebuild/repack kits	See Tables 15 and 16
Sealing rings for union valves (package of 25)	
1/2-inch (15 mm)	599-03394
3/4-inch (20 mm)	599-03395
1 inch (25 mm)	599-03396
1-1/4 inch (32 mm)	599-03397
1-1/2 inch (40 mm)	599-03398
2 inch (50 mm)	599-03399
Union Tailpiece kit (one tailpiece, one union nut, one gasket.)	
1/2-inch (15 mm) male	599-09181
3/4-inch (20 mm) male	599-09182
1 inch (25 mm) male	599-09183
1-1/4 inch (32 mm) male	599-09184
1/2-inch (40 mm) female	599-09185
3/4-inch (20 mm) female	599-09186
1 inch (25 mm) female	599-09187
1-1/4 inch (32 mm) female	599-09188
1-1/2 inch (40 mm) female	599-09189
2 inch (50 mm) female	599-09190



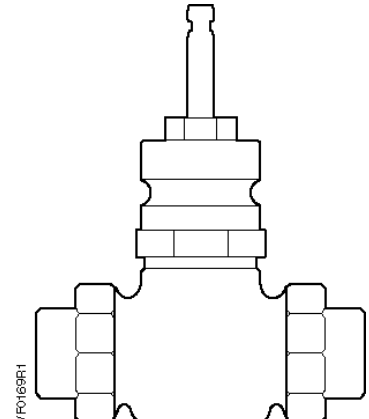
Female NPT x Female NPT FxF



Female NPT x Union Female FxUF



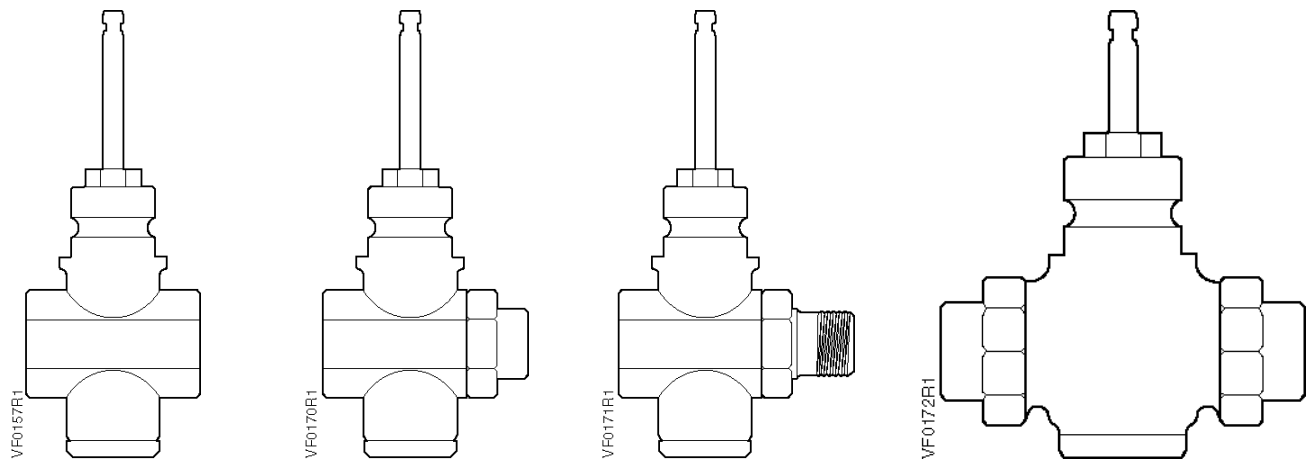
Female NPT x Union Male FxUM



Union Female x Union Female UFxUF

Table 1. Normally Open Valves.

Flow Rate		Nominal Line Size		Connection	Equal Percentage		Linear	
					Stainless Steel Trim	Brass Trim	Stainless Steel Trim	
C _v	(K _{vs})	inch	(mm)		Normal Duty Packing		Normal Duty Packing	Steam Packing
1	(0.85)	1/2	(15)	FxF	599-03108	599-03162	599-03000	599-03054
				FxUF	599-03117	599-03171	599-03009	599-03063
				FxUM	599-03252	599-03270	599-03216	599-03234
1.6	(1.37)	1/2	(15)	FxF	599-03109	599-03163	599-03001	599-03055
				FxUF	599-03118	599-03172	599-03010	599-03064
				FxUM	599-03253	599-03271	599-03217	599-03235
2.5	(2.15)	1/2	(15)	FxF	599-03110	599-03164	599-03002	599-03056
				FxUF	599-03119	599-03173	599-03001	599-03065
				FxUM	599-03254	599-03272	599-03218	599-03236
4	(3.44)	1/2	(15)	FxF	599-03111	599-03165	599-03003	599-03057
				FxUF	599-03120	599-03174	599-03012	599-03066
				FxUM	599-03255	599-03273	599-03219	599-03237
6.3	(5.43)	3/4	(20)	FxF	599-03112	599-03166	599-03004	599-03058
				FxUF	599-03121	599-03175	599-03013	599-03067
				FxUM	599-03256	599-03274	599-03220	599-03238
10	(8.6)	1	(25)	FxF	599-03113	599-03167	599-03005	599-03059
				FxUF	599-03122	599-03176	599-03014	599-03068
				FxUM	599-03257	599-03275	599-03221	599-03239
16	(13.8)	1-1/4	(32)	FxF	599-03114	599-03168	599-03006	599-03060
				UFxUF	599-03123	599-03177	599-03015	599-03069
				FxUM	—	599-03276	—	—
25	(21.5)	1-1/2	(40)	FxF	599-03115	599-03169	599-03007	599-03061
				UFxUF	599-03124	599-03178	599-03016	599-03070
40	(34.4)	2	(50)	FxF	599-03116	599-03170	599-03008	599-03062
				UFxUF	599-03125	599-03179	599-03017	599-03071



Female NPT x Female NPT FxF

Female NPT x Union Female FxUF

Female NPT x Union Male FxUM

Union Female x Union Female UFxUF

Table 2. Normally Closed Valves.

Flow Rate		Nominal Line Size		Connection	Equal Percentage		Linear	
					Stl. Steel Trim	Brass Trim	Stainless Steel Trim	
Cv	(Kvs)	Inch	(mm)		Normal Duty Packing		Normal Duty Packing	Steam Packing
1	(0.85)	1/2	(15)	FxF	599-03126	599-03180	599-03018	599-03072
				FxUF	599-03135	599-03189	599-03027	599-03081
				FxUM	599-03261	599-03279	599-03225	599-03243
1.6	(1.37)	1/2	(15)	FxF	599-03127	599-03181	599-03019	599-03073
				FxUF	599-03136	599-03190	599-03028	599-03082
				FxUM	599-03262	599-03280	599-03226	599-03244
2.5	(2.15)	1/2	(15)	FxF	599-03128	599-03182	599-03020	599-03074
				FxUF	599-03137	599-03191	599-03029	599-03083
				FxUM	599-03263	599-03281	599-03227	599-03245
4	(3.44)	1/2	(15)	FxF	599-03129	599-03183	599-03021	599-03075
				FxUF	599-03138	599-03192	599-03030	599-03084
				FxUM	599-03264	599-03282	599-03228	599-03246
6.3	(5.43)	3/4	(20)	FxF	599-03130	599-03184	599-03022	599-03076
				FxUF	599-03139	599-03193	599-03031	599-03085
				FxUM	599-03265	599-03283	599-03229	599-03247
10	(8.6)	1	(25)	FxF	599-03131	599-03185	599-03023	599-03077
				FxUF	599-03140	599-03194	599-03032	599-03086
				FxUM	599-03266	599-03284	599-03230	599-03248
16	(13.8)	1-1/4	(32)	FxF	599-03132	599-03186	599-03024	599-03078
				UFxUF	599-03141	599-03195	599-03033	599-03087
25	(21.5)	1-1/2	(40)	FxF	599-03133	599-03187	599-03025	599-03079
				UFxUF	599-03142	599-03196	599-03034	599-03088
40	(34.4)	2	(50)	FxF	599-03134	599-03188	599-03026	599-03080
				UFxUF	599-03143	599-03197	599-03035	599-03089

Table 3. Maximum Water Capacity - U.S. Gallons per Minute.

Valve Size in inches	Pressure Differential - psi															
	Cv\1	2	3	4	5	6	8	10	15	20	25	30	40	50	60	75
1/2	1.0	1.4	1.7	2.0	2.2	2.5	2.8	3.2	3.9	4.5	5.0	5.5	6.3	7.1	7.8	8.7
	1.6	2.3	2.8	3.2	3.6	3.9	4.5	5.1	6.2	7.2	8.0	8.8	10.1	11.3	12.4	13.9
	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
	4	5.7	7	8.0	8.9	10	11.3	12.6	15.5	17.9	20.0	21.9	25	28	31	35
3/4	6	8.9	10.9	12.6	14.1	15.4	17.8	20	24	28	32	35	40	45	49	55
1	10	14.1	17.3	20	22	24	28	32	39	45	50	55	63	71	77	87
1-1/4	16	23	28	32	36	39	45	51	62	72	80	88	101	113	124	139
1-1/2	25	35	43	50	56	61	71	79	97	112	125	137	158	177	194	217
2	40	57	69	80	89	98	113	126	155	179	200	219	253	283	310	346

Table 4. Maximum Water Capacity - Cubic Meters per Hour (m³/hr).

Valve Size inches mm	Pressure Differential - kPa														
	1	10	20	30	40	50	60	80	Kvs/100	150	200	300	400	500	
15	0.09	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.5	1.7	1.9	
	0.14	0.4	0.6	0.8	0.9	1.0	1.1	1.2	1.4	1.7	1.9	2.4	2.7	3.1	
	0.2	0.7	1.0	1.2	1.4	1.5	1.7	1.9	2.2	2.6	3.0	3.7	4.3	4.8	
	0.3	1.1	1.5	1.9	2.2	2.4	2.7	3.1	3.4	4.2	4.9	6.0	6.9	7.7	
20	0.5	1.7	2.4	3.0	3.4	3.8	4.2	4.9	5.4	6.7	7.7	9.4	10.9	12.1	
25	0.9	2.7	3.8	4.7	5.4	6.1	6.7	7.7	8.6	10.5	12.2	14.9	17.2	19.2	
32	1.4	4.4	6.2	7.6	8.7	9.8	10.7	12.3	13.8	16.9	19.5	23.9	27.6	30.9	
40	2.2	6.8	9.6	11.8	13.6	15.2	16.7	19.2	22	26	30	37	43	48	
50	3.4	10.9	15.4	18.8	22	24	27	31	34	42	49	60	69	77	

Table 5. Steam Capacity - Pounds per Hour.

Line Size inches	Inlet Pressure - psig																															
	2				5				10				5				25				50				75				100			
	Pressure Differential - psi																															
	1	2	3	4	5	6	8	10	9	12	15	5	15	20	15	30	32.5	20	30	40	45	30	40	50	57.5							
1/2	12.0	16.6	22	25	28	34	38	42	45	50	54	41	65	72	87	115	118	119	141	157	163	162	183	199	209							
	19.1	27	35	40	44	54	61	67	72	80	86	65	104	116	139	183	188	109	225	251	261	260	292	318	334							
	30	42	55	62	69	85	96	104	112	125	135	101	163	181	217	287	294	296	351	392	408	406	457	497	522							
	48	67	88	100	110	136	153	167	179	200	216	162	261	289	348	459	471	474	562	627	653	650	731	796	835							
3/4	75	105	138	157	174	213	241	263	282	316	341	255	411	455	548	722	742	747	886	988	1029	1023	1152	1253	1315							
1	120	166	219	250	275	339	382	417	447	501	541	405	653	723	870	1147	1178	1186	1406	1568	1633	1624	1828	1989	2088							
1-1/4	191	266	351	400	441	542	611	667	716	801	865	648	1044	1156	1392	1835	1884	1897	2249	2509	2612	2599	2925	3182	3340							
1-1/2	299	416	549	625	689	847	955	1042	1118	1252	1351	1013	1632	1806	2175	2867	2944	2964	3515	3920	4081	4061	4570	4972	5219							
2	478	666	878	1000	1102	1356	1529	1667	1789	2003	2162	1620	2611	2890	3480	4587	4710	4743	5624	6272	6530	6497	7311	7956	8350							

Table 6. Steam Capacity - Kilograms per Hour.

Line Size mm	Inlet Pressure - kPa															
	100				150				200				500			
	Pressure Differential - kPa															
	10	20	50	15	30	75	20	40	100	50	100	250				
15	6.04	8.54	13.50	9.07	12.8	20.2	12.11	17.13	27.08	30.3	42.9	67.8				
	9.66	13.6	21.61	14.5	20.5	32.4	19.37	27.40	43.32	48.51	68.60	108.47				
	15	21	34	23	32	51	30	43	68	76	107	169				
	24	34	54	36	51	81	48	69	108	121	172	271				
20	38	54	85	57	81	128	76	108	171	191	270	427				
25	60	85	135	91	128	203	121	171	271	303	429	678				
32	97	137	216	145	205	325	194	274	433	485	686	1085				
40	151	214	338	227	321	507	303	428	677	758	1072	1695				
50	242	342	540	363	513	812	484	685	1083	1213	1715	2712				

Table 7. Body Temperature-Pressure Rating.

Valve Body	Temperature		Pressure
	°F	°C	psig (kPa)
Bronze	-20 to +150	(-30 to 66)	400 (2758)
	+200	(93)	385 (2655)
	+250	(121)	365 (2586)
	+300	(149)	335 (2300)
	+350	(177)	300 (2068)

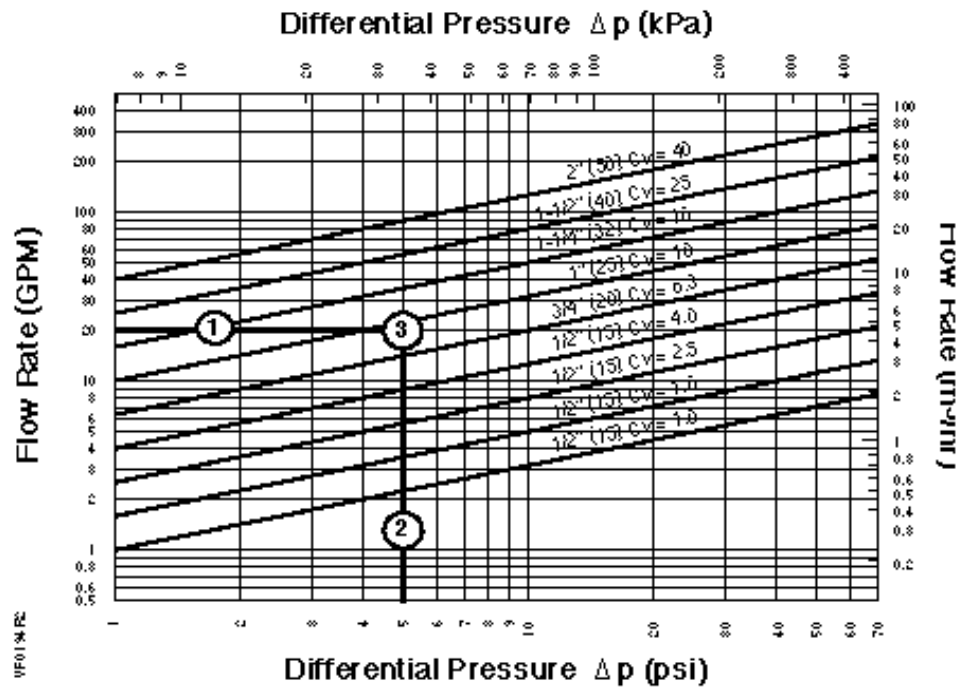


Figure 3. Water Capacity Graph.

Selection Example

Select a valve given:

1. Required flow = 20 gpm.
2. Desired pressure drop = 5 psi.
3. Select a 1-inch (25 mm) valve, Cv 10.

Table 8. Maximum Available Close-off Pressures for Pneumatic Actuators, with Normally Open Valves.

Action	Valve Size Inch (mm)	Spring Range					10 to 15 psi (69 to 103 kPa)		
		3 to 8 psi (21 to 55 kPa)					4-Inch Actuator	8-Inch Actuator	12-Inch Actuator
		4-Inch Actuator	8-Inch Actuator		12-Inch Actuator				
		15 psi (103 kPa)	15 psi (103 kPa)	30 psi (207 kPa)	15 psi (103 kPa)	30 psi (207 kPa)	0 psi (0 kPa)	0 psi (0 kPa)	0 psi (0 kPa)
Normally Open	1/2 (15)	142 (979)	250 (1724)	250 (1724)	—	—	—	—	—
	3/4 (20)	80 (552)	231 (1593)	250 (1724)	—	—	—	—	—
	1 (25)	52 (359)	150 (1034)	250 (1724)	250 (1724)	250 (1724)	—	—	—
	1-1/4 (32)	32 (221)	93 (641)	250 (1724)	250 (1724)	250 (1724)	—	—	—
	1-1/2 (40)	20 (138)	60 (414)	198 (1365)	205(1413)	250 (1724)	—	—	—
	2 (50)	12 (83)	37 (255)	123 (848)	130 (896)	250 (1724)	—	—	—
Normally Closed	1/2 (15)	—	—	—	—	—	236 (1627)	250 (1724)	—
	3/4 (20)	—	—	—	—	—	155 (1069)	250 (1724)	—
	1 (25)	—	—	—	—	—	91 (627)	250 (1724)	250 (1724)
	1-1/4 (32)	—	—	—	—	—	52 (359)	148 (1020)	250 (1724)
	1-1/2 (40)	—	—	—	—	—	32 (331)	92 (634)	250 (1724)
	2 (50)	—	—	—	—	—	20 (138)	55 (379)	185 (1776)

Table 9. Close-off Pressures for Electronic Actuators.

Action	Valve Size Inches (mm)	SQX psi (kPa)	Rack & Pinion psi (kPa)	SKD psi (kPa)	SKB psi (kPa)
Normally Open	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)
	3/4 (20)	173 (1193)	231 (1593)	250 (1724)	250 (1724)
	1 (25)	112 (772)	149 (1028)	201 (1386)	250 (1724)
	1-1/4 (32)	69 (476)	92 (634)	124 (855)	250 (1724)
	1-1/2(40)	44 (303)	59 (407)	80 (552)	250 (1724)
	2 (50)	27 (186)	36 (248)	49 (338)	201 (1386)
Normally Closed	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)
	3/4 (20)	221 (1524)	250 (1724)	250 (1724)	250 (1724)
	1 (25)	130 (896)	173 (1193)	203 (1400)	250 (1724)
	1-1/4 (32)	75 (517)	100 (690)	117 (807)	250 (1724)
	1-1/2(40)	46 (317)	61 (421)	73 (503)	208 (1334)
	2 (50)	28 (193)	37 (255)	44 (303)	126 (869)

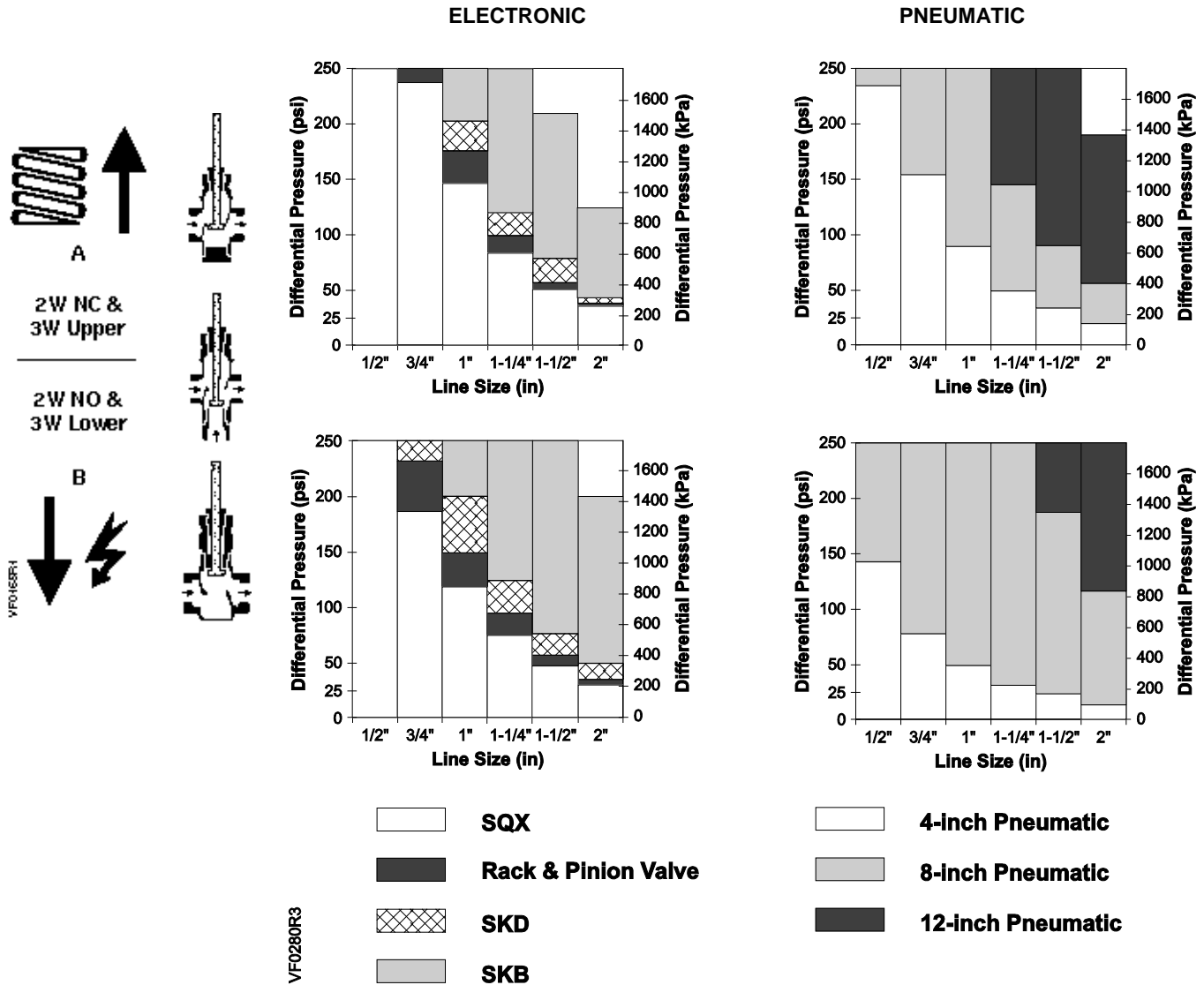


Figure 4. Close-off Pressures.

Operation

Figure 5 shows the normally open valve in the open or full flow position and the normally closed valve in the closed or zero flow position. The actuator spring provides the necessary force to hold the stem in the raised or normal position.

In the event of power failure, a spring return actuator returns the valve to its normal position. Non-spring return actuators will hold the last commanded position. See the *Technical Instructions* of the various actuators for additional information.

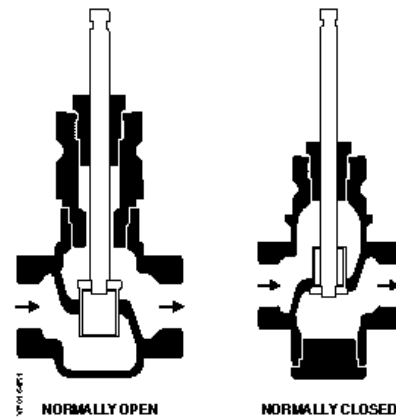


Figure 5.

Sizing

The sizing of a valve is important for correct system operation. An undersized valve will not have sufficient capacity at maximum load. An oversized valve can initiate cycling and the seat and throttling plug can be damaged because of the restricted opening. Correct sizing of the control valve for *actual expected conditions* is considered essential for good control.

The following variables must be determined:

- The medium to be controlled, such as steam, water, etc.
- The maximum inlet temperature and pressure of the medium at the valve.
- The pressure differential that will exist across the valve under maximum load demand.
- The maximum capacity the valve must deliver.
- The maximum line pressure differential the valve actuator must close against.
- See the *Control Valve Selection and Sizing (AB-1) section of HVAC Systems/Controls Reference Data (125-1853)* for further recommendations.
- See Tables 3 through 6 for valve capacities.

Mounting and Installation

- Install the valve so that the flow follows the direction of the arrow indicated on the valve body.
- For best performance, install the valve assembly with the actuator above the valve body. The valve and actuator can be installed in any position between vertical and horizontal. Siemens Building Technologies does not recommend installing the valve assembly so that the actuator is below horizontal or upside down.
- Allow sufficient space for servicing the valve and actuator. See Table 12 for valve body dimensions. See Figure 6 and Table 11 for dimensions of the service envelope recommended around the actuator.

NOTE: Instructions for field mounting an actuator, wiring diagrams, and start-up are covered in the Technical Instructions and Installation Instructions for each actuator.

Dimensions, continued

The letters in Figure 6 refer to actuator and service envelope dimensions in Table 11. See Table 12 for valve body dimensions.

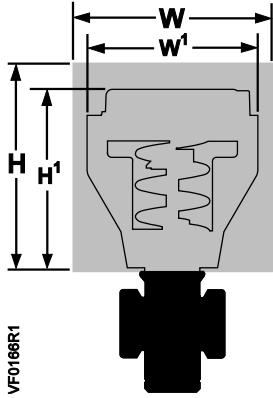


Figure 6.

Table 10. 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
4-inch Pneumatic	268, 269 270	5-3/4 (146)	14 (350)	5-1/2 (137) diameter	18 (450)
8-inch Pneumatic	277, 278 283, 284	14-1/8 (359)	26 (660)	8-3/4 (222) diameter	21 (533)
12-inch Pneumatic	279, 285	17-7/8 (454)	30 (762)	15-1/8 (384) diameter	27 (686)
SQX	271, 272 273	8-7/8 (226)	17 (430)	5-17/32 (140) Width 4-3/8 (111) Depth	13-1/2 (340)
Rack and Pinion	298, 299	14-1/2 (368)	24-1/2 (622)	5 (127) Width* 5-1/8 (131) Depth	13 (331)
SKD	274, 275 276	11-13/16 (300)	19-3/4 (500)	5 (127) Width 6-5/8 (169) Depth	14-1/2 (360)
SKB	289, 291, 290	14-3/4 (375)	22-3/4 (578)	7 (178) Width x 8-15/16 (226) Depth	25 (635)

**Dimensions,
 Continued**

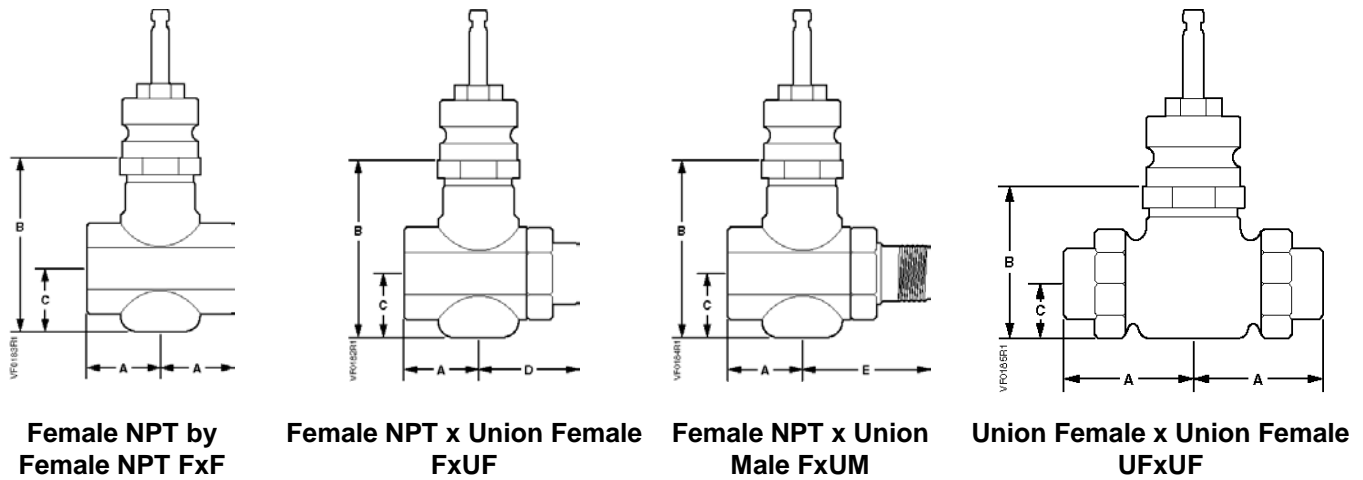


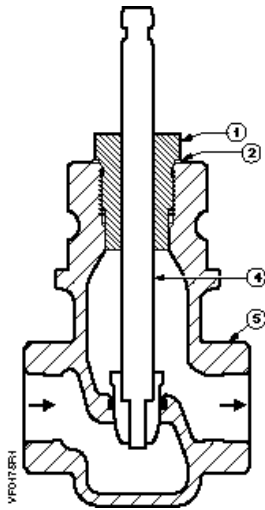
Table 11. 2-Way Valve Dimensions in Inches (Millimeters).

Valve Action	Valve Size	A		B	C	D FxUF	E FxUM
		FxF, FxUF, and FxUM	UFxUF				
Normally Open	1/2 (15)	1-7/16 (36)	—	2-15/16 (74)	1-1/4 (31)	2-5/16 (59)	2-7/8 (73)
	3/4 (20)	1-11/16 (43)	—	3-15/16 (99)	1-7/16 (36)	2-5/8 (67)	3-3/16 (81)
	1 (25)	2 (50)	—	3-3/4 (96)	1-1/4 (32)	3 (76)	3-1/2 (89)
	1-1/4 (32)	2-1/2* (62)*	3-3/4 (95)	4-1/4** (108)**	2** (51)**	—	4-3/8 (111)
	1-1/2 (40)	2-9/16* (65)*	3-15/16 (99)	4-1/4** (108)**	2** (51)**	—	—
	2 (50)	3-1/8* (79)*	4-9/16 (115)	4-9/16** (116)**	2-1/4** (57)**	—	—
Normally Closed	1/2 (15)	1-7/16 (36)	—	3-13/16 (97)	2-3/16 (55)	2-5/16 (59)	2-7/8 (73)
	3/4 (20)	1-11/16 (43)	—	3-13/16 (97)	2-3/16 (55)	2-5/8 (67)	3-3/16 (81)
	1 (25)	2 (50)	—	3-13/16 (97)	2-3/16 (55)	3 (76)	3-1/2 (89)
	1-1/4 (32)	2-1/2* (62)*	3-3/4 (95)	3-13/16 (97)	2-3/16 (55)	—	—
	1-1/2 (40)	2-9/16* (65)*	3-15/16 (99)	3-7/8 (99)	2-1/4 (58)	—	—
	2 (50)	3-1/8* (79)*	4-9/16 (115)	4-1/2 (114)	2-9/16 (65)	—	—

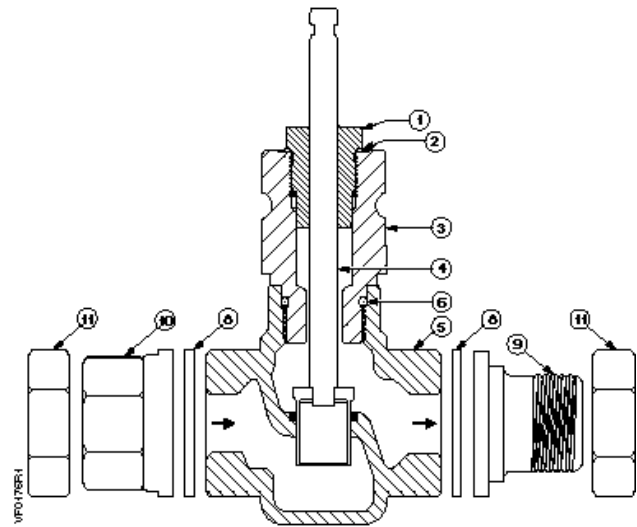
* FxUF is not available as standard in 1-1/4, 1-1/2, and 2-inch valves.

FxUM is not available as standard in 1-1/2, and 2-inch-valves.

** This dimension is determined by the union nut.



1/2-inch (15 mm) Valve Size.



3/4-inch to 2-inch (20 to 50 mm) Valve Size.

Figure 7. Normally Open.

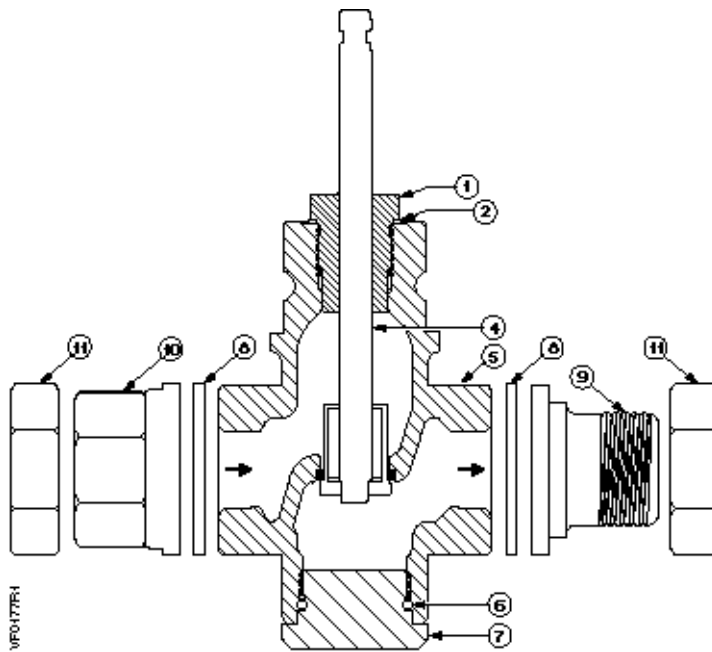


Figure 8. Normally Closed
1/2-inch to 2-inch (15 to 50 mm) Valve Size.

Parts List

Table 12. Parts List for 2-Way Bronze Valves. See Figures 7 and 8.

Item	Part Name	Part Number	Quantity				Material
			FxF	FxUF	FxUM	UFxUF	
1	Packing Cartridge Assembly	—	1	1	1	1	—
2	Gasket	—	1	1		1	Copper
3	Normally Open 3/4-inch to 2-inch Bonnet	—	1	1	1	1	Brass
4	Stem and Plug Assembly	—	1	1	1	1	Bronze or Stainless Steel
5	Valve Body	—	1	1	1	1	Bronze
6	O-ring		1	1	1	1	EPDM
7	Normally closed Cap	—	1	1	1	1	Brass
8	Gasket	—	—	1	1	2	Fiber
9	NPT Male union tail piece	—	—	—	1	—	Brass
10	Female tail piece	—	—	1	—	2	Brass
11	Union Nut	—	—	1	1	2	Brass
—	Packing Kit Normal Duty Service Steam Service	599-03390 599-03391	—	—	—	—	Items 1 and 2
—	Rebuild/Repack Kit Normally Closed	See Tables 15 and 16	—	—	—	—	Items 1, 2, 4, and 6
—	Rebuild/Repack Kit Normally Open	See Tables 15 and 16	—	—	—	—	Items 1, 2, 4, and 6

**Valve Assembly
 Weight**

Table 13. Weight in Pounds (Kilograms).

Valve Size	Normally Closed				Normally Open			
	FxF	FxUF	FxUM	UFxUF	FxF	FxUF	FxUM	UFxUF
.50 (15)	3 (1.4)	4 (1.8)	4 (1.8)	— —	3 (1.4)	3 (1.4)	3 (1.4)	— —
.75 (20)	4 (1.8)	4 (1.8)	5 (2.3)	— —	4 (1.8)	4 (1.8)	5 (2.3)	— —
1.0 (25)	5 (2.3)	5 (2.3)	5 (2.3)	— —	5 (2.3)	6 (2.7)	6 (2.7)	— —
1.25 (32)	7 (3.2)	— —	— —	9 (4.1)	7 (3.2)	— —	8 (3.6)	9 (4.1)
1.50 (40)	8 (3.6)	— —	— —	11 (5)	9 (4.1)	— —	— —	11 (5)
2.0 (50)	16 (7.3)	— —	— —	16 (7.3)	13 (5.9)	— —	— —	16 (7.3)

Service Kit NOTE: To select the service kit, know your valve body assembly number, model number and the type of connection. Read down the *Connection* column until you find the valve body assembly number and then read to the far right to identify the correct kit. The valve body assembly number and model number are stamped on the tag on the valve body.

Table 14. Rebuild/Repack Service Kits Part Numbers. See Table 13 for Items in Kit.

Flow	Action	Valve Size	Connection				Valve Description	Model 1 Kit No.	Model 2 Kit No.
			FxF	FxUF	UFxUF	FxUM			
Linear	Normally Open	1/2 Inch	599-03000	599-03009	—	599-03216	Stainless steel 1.0 Cv O-ring	599-03300	—
			599-03001	599-03010	—	599-03217	Stainless steel 1.6 Cv O-ring	599-03301	—
			599-03002	599-03011	—	599-03218	Stainless steel 2.5 Cv O-ring	599-03302	—
			599-03003	599-03012	—	599-03219	Stainless steel 4.0 Cv O-ring	599-03303	—
		3/4-Inch	599-03004	599-03013	—	599-03220	Stainless steel O-ring	599-03304	—
		1-Inch	599-03005	599-03014	—	599-03221	Stainless steel O-ring	599-03305	—
		1-1/4 Inch	599-03006	—	599-03015	—	Stainless steel O-ring	599-03306	599-09201
		1-1/2-Inch	599-03007	—	599-03016	—	Stainless steel O-ring	599-03307	599-09202
	2-Inch	599-03008	—	599-03017	—	Stainless steel O-ring	599-03308	599-09203	
	Normally Closed	1/2-Inch	599-03018	599-03027	—	599-03225	Stainless steel 1.0 Cv O-ring	599-03309	—
			599-03019	599-03028	—	599-03226	Stainless steel 1.6 Cv O-ring	599-03310	—
			599-03020	599-03029	—	599-03227	Stainless steel 2.5 Cv O-ring	599-03311	—
			599-03021	599-03030	—	599-03228	Stainless steel 4.0 Cv O-ring	599-03312	—
		3/4-Inch	599-03022	599-03031	—	599-03229	Stainless steel O-ring	599-03313	—
		1-Inch	599-03023	599-03032	—	599-03230	Stainless steel O-ring	599-03314	—
		1-1/4 Inch	599-03024	—	599-03033	—	Stainless steel O-ring	599-03315	599-09213
		1-1/2-Inch	599-03025	—	599-03034	—	Stainless steel O-ring	599-03316	599-09214
	2-Inch	599-03026	—	599-03035	—	Stainless steel O-ring	599-03317	599-09215	
	Normally Open	1/2-Inch	599-03054	599-03063	—	599-03234	Stainless steel 1.0 Cv Steam	599-03318	—
			599-03055	599-03064	—	599-03235	Stainless steel 1.6 Cv Steam	599-03319	—
			599-03056	599-03065	—	599-03236	Stainless steel 2.5 Cv Steam	599-03320	—
			599-03057	599-03066	—	599-03237	Stainless steel 4.0 Cv Steam	599-03321	—
		3/4-Inch	599-03058	599-03067	—	599-03238	Stainless steel Steam	599-03322	—
		1-Inch	599-03059	599-03068	—	599-03239	Stainless steel Steam	599-03323	—
		1-1/4 Inch	599-03060	—	599-03069	—	Stainless steel Steam	599-03324	599-09204
		1-1/2-Inch	599-03061	—	599-03070	—	Stainless steel Steam	599-03325	599-09205
	2-Inch	599-03062	—	599-03071	—	Stainless steel Steam	599-03326	599-09206	
	Normally Closed	1/2-Inch	599-03072	599-03081	—	599-03243	Stainless steel 1.0 Cv Steam	599-03327	—
			599-03073	599-03082	—	599-03244	Stainless steel 1.6 Cv Steam	599-03328	—
			599-03074	599-03083	—	599-03245	Stainless steel 2.5 Cv Steam	599-03329	—
			599-03075	599-03084	—	599-03246	Stainless steel 4.0 Cv Steam	599-03330	—
		3/4-Inch	599-03076	599-03085	—	599-03247	Stainless steel Steam	599-03331	—
1-Inch		599-03077	599-03086	—	599-03248	Stainless steel Steam	599-03332	—	
1-1/4 Inch		599-03078	—	599-03087	—	Stainless steel Steam	599-03333	599-09216	
1-1/2-Inch		599-03079	—	599-03088	—	Stainless steel Steam	599-03334	599-09217	
2-Inch	599-03080	—	599-03089	—	Stainless steel Steam	599-03335	599-09218		

Service Kits, Continued

Table 15. Rebuild/Repack Service Kits Part Numbers Continued. See Table 13 for Items in Kit.

Flow	Action	Valve Size	Connection				Valve Description	Model 1 Kit No.	Model 2 Kit No.
			FxF	FxUF	UFxUF	FxUM			
Equal Percentage	Normally Open	1/2 Inch	599-03108	599-03117	—	599-03252	Stainless steel 1.0 Cv O-ring	599-03336	—
			599-03109	599-03118	—	599-03253	Stainless steel 1.6 Cv O-ring	599-03337	—
			599-03110	599-03119	—	599-03254	Stainless steel 2.5 Cv O-ring	599-03338	—
			599-03111	599-03120	—	599-03255	Stainless steel 4.0 Cv O-ring	599-03339	—
		3/4-Inch	599-03112	599-03121	—	599-03256	Stainless steel O-ring	599-03340	—
		1-Inch	599-03113	599-03122	—	599-03257	Stainless steel O-ring	599-03341	—
		1-1/4-Inch	599-03114	—	599-03123	—	Stainless steel O-ring	599-03342	599-09207
		1-1/2-Inch	599-03115	—	599-03124	—	Stainless steel O-ring	599-03343	599-09208
		2-Inch	599-03116	—	599-03125	—	Stainless steel O-ring	599-03344	599-09209
	Normally Closed	1/2-Inch	599-03126	599-03135	—	599-03261	Stainless steel 1.0 Cv O-ring	599-03345	—
			599-03127	599-03136	—	599-03262	Stainless steel 1.6 Cv O-ring	599-03346	—
			599-03128	599-03137	—	599-03263	Stainless steel 2.5 Cv O-ring	599-03347	—
			599-03129	599-03138	—	599-03264	Stainless steel 4.0 Cv O-ring	599-03348	—
		3/4-Inch	599-03130	599-03139	—	599-03265	Stainless steel O-ring	599-03349	—
		1-inch	599-03131	599-03140	—	599-03266	Stainless steel O-ring	599-03350	—
		1-1/4 Inch	599-03132	—	599-03141	—	Stainless steel O-ring	599-03351	599-09219
		1-1/2-Inch	599-03133	—	599-03142	—	Stainless steel O-ring	599-03352	599-09220
		2-Inch	599-03134	—	599-03143	—	Stainless steel O-ring	599-03353	599-09221
	Normally Open	1/2-Inch	599-03162	599-03171	—	599-03270	Bronze 1.0 Cv O-ring	599-03354	—
			599-03163	599-03172	—	599-03271	Bronze 1.6 Cv O-ring	599-03355	—
			599-03164	599-03173	—	599-03272	Bronze 2.5 Cv O-ring	599-03356	—
			599-03165	599-03174	—	599-03273	Bronze 4.0 Cv O-ring	599-03357	—
		3/4-Inch	599-03166	599-03175	—	599-03274	Bronze O-ring	599-03358	—
		1-Inch	599-03167	599-03176	—	599-03275	Bronze O-ring	599-03359	—
		1-1/4-Inch	599-03168	—	599-03177	599-03276	Bronze O-ring	599-03360	599-09210
		1-1/2-Inch	599-03169	—	599-03178	—	Bronze O-ring	599-03361	599-09211
		2-Inch	599-03170	—	599-03179	—	Bronze O-ring	599-03362	599-09212
	Normally Closed	1/2-Inch	599-03180	599-03189	—	599-03279	Bronze 1.0 Cv O-ring	599-03363	—
			599-03181	599-03190	—	599-03280	Bronze 1.6 Cv O-ring	599-03364	—
			599-03182	599-03191	—	599-03281	Bronze 2.5 Cv O-ring	599-03365	—
			599-03183	599-03192	—	599-03282	Bronze 4.0 Cv O-ring	599-03366	—
		3/4-Inch	599-03184	599-03193	—	599-03283	Bronze O-ring	599-03367	—
		1-Inch	599-03185	599-03194	—	599-03284	Bronze O-ring	599-03368	—
		1-1/4-Inch	599-03186	—	599-03195	—	Bronze O-ring	599-03369	599-09222
		1-1/2-Inch	599-03187	—	599-03196	—	Bronze O-ring	599-03370	599-09223
		2-Inch	599-03188	—	599-03197	—	Bronze O-ring	599-03371	599-09224

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