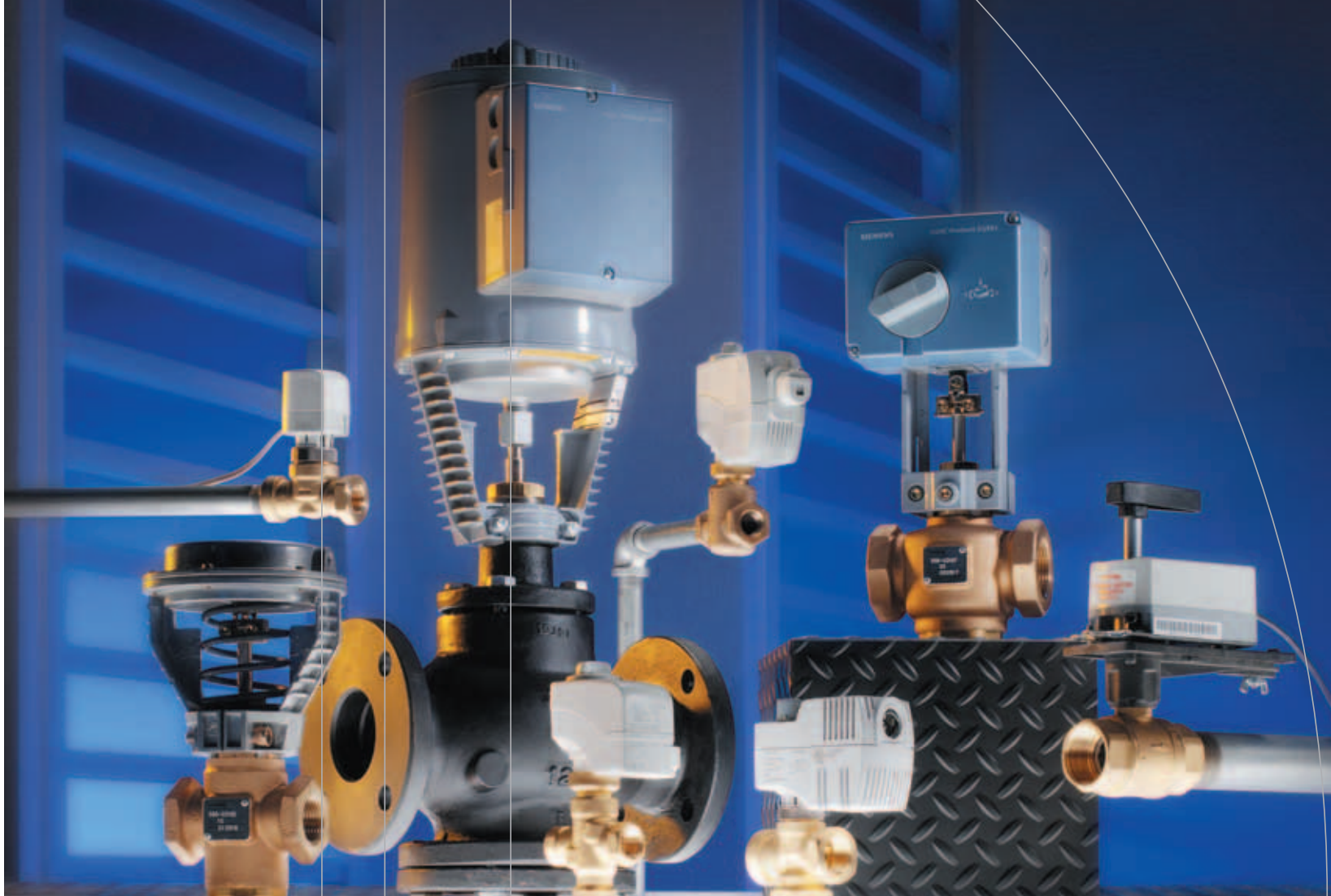




SIEMENS

Building Technologies

Valve and Valve Actuator
Selection Guide

www.sbt.siemens.com/hvp/components

Building Technologies

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More experience

150 years of industry innovations

A leader in the Heating, Ventilation and Air Conditioning (HVAC) industry, Siemens Building Technologies delivers the products and services that you depend on for outstanding quality, reliability and performance.

Need it fast? Same day shipping is no problem for rush orders. Helpful customer service representatives can input your order and ship standard delivery within three business days.

Locate information fast online. Technical documentation and installation instructions are at your fingertips as well as helpful tools and order tracking.

Quality first. All Siemens valves and valve actuators are 100% factory-assembled and tested for quality and reliability in our state-of-the-art, ISO9001-2000 and ISO14000 manufacturing facility.

Delivered ready to install. Designed for flexible configurations and fast installation, the Powermite and Flowrite™ Globe Valves and Valve Actuators meet most application needs. Ball and Butterfly Valves address specific control challenges with the same reliability and performance. Valves are assembled and tagged for delivery direct to location at job-site free of charge.

Customer Care is a phone call away. For technical support, ordering and pricing, call 1.888.593.7876.



Siemens delivers

Meet your toughest control challenges head on



	Zone	Globe		Ball	Butterfly
Brand	Siemens 599 Series	Powermite 599 Series	Flowrite 599 Series	Siemens 599 Series	Siemens
Size	1/2 to 1"	1/2 to 1-1/2"	1/2 to 6"	1/2 to 2"	2 to 20"
Applications	- Fan Coils - Unit Ventilators - On/Off Control	- VAV Reheat - Small Terminal Units - Steam to 15 psi	- Air Handling Units - Central Plant Equipment - High Temp. Steam Equipment	- Small Air Handling Units - Large Terminal Units - Central Plant	- Tower Bypass - Isolation - Central Plant Equipment
Actuation	Electronic Thermic	Electronic Pneumatic	Electronic Pneumatic	Electronic	Electronic Pneumatic

To build a complete assembly:

- Under Valve Body, work **left-to-right across the row** to select:
 - Trim/Connection/Action/Characteristic/Packing
 - Flow Rate (Cv)
 - Line Size
- For the Actuator, work from **top-to-bottom** to select:
 - Fail-in-Place/Fail Safe
 - Signal
- At the intersection of the Valve row and the Actuator column locate the desired close-off value and price.
- Create the assembly part number by combining the Actuator Prefix Code (APC) in the Actuator column with the Part No. in the Part No. column.

These selection tables only contain NPT or FXF end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

Electronic

Electronic				NC		NO		NC		NO		Fail-in-Place		
Actuator Valve Body 599				2P 120 Vac		2P 24 Vac		3P 24 Vac	0-10 Vdc Mod 24 Vac					
										Part No.				
				SFA11U	SFP11U	SFA71U	SFP71U	SSA81	SSA61					
Conn.	Line Size in. (mm)	Flow Rate Cv (Kvs)	APC 240	APC 241	APC 242	APC 243	APC 244	APC 245						
			Close-off psi (kPa)											
2-way	NPT	0.50 15	1.0 0.85	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00210	
		0.50 15	2.5 2.0	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00211	
		0.50 15	4.0 3.4	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00214	
		0.75 20	4.1 3.5	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00212	
		1.00 25	7.0 6.0	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	___ 00213	
	Sweat	0.50 15	1.0 0.85	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00510	
		0.50 15	2.5 2.0	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00511	
		0.50 15	4.0 3.4	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00514	
		0.75 20	4.1 3.5	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00512	
		1.00 25	7.0 6.0	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	___ 00513	
3-way	NPT	0.50 15	1.0 0.85	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00230	
		0.50 15	2.5 2.0	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00231	
		0.50 15	4.0 3.4	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00234	
		0.75 20	4.1 3.5	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00232	
		1.00 25	7.0 6.0	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	___ 00233	
	Sweat	0.50 15	1.0 0.85	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00530	
		0.50 15	2.5 2.0	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00531	
		0.50 15	4.0 3.4	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00534	
		0.75 20	4.1 3.5	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	44 (303)	___ 00532	
		1.00 25	7.0 6.0	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	22 (152)	___ 00533	

Table Note

*Flow rate is for AB→A.

1/2 to 1" Siemens 599 Series

zone

Thermic

Metric					NC	NO	Fail AB→B	Fail AB→A	
Actuator Valve Body 599					2P 24 Vac				Part No.
									
					STA71	STP71	STA71	STP71	
Conn.	Line Size in. (mm)	Flow Rate Cv (Kvs)	APC	APC	APC	APC			
			246	247	246	247			
					Close-off psi (kPa)				
2-way	NPT	0.50 15	1.0 0.85	44 (303)	44 (303)	—	—	___ 00210	
		0.50 15	2.5 2.0	44 (303)	44 (303)	—	—	___ 00211	
		0.50 15	4.0 3.4	44 (303)	44 (303)	—	—	___ 00214	
		0.75 20	4.1 3.5	44 (303)	44 (303)	—	—	___ 00212	
		1.00 25	7.0 6.0	22 (152)	22 (152)	—	—	___ 00213	
	Sweat	0.50 15	1.0 0.85	44 (303)	44 (303)	—	—	___ 00510	
		0.50 15	2.5 2.0	44 (303)	44 (303)	—	—	___ 00511	
		0.50 15	4.0 3.4	44 (303)	44 (303)	—	—	___ 00514	
		0.75 20	4.1 3.5	44 (303)	44 (303)	—	—	___ 00512	
		1.00 25	7.0 6.0	22 (152)	22 (152)	—	—	___ 00513	
3-way	NPT	0.50 15	1.0 0.85	—	—	44 (303)	44 (303)	___ 00230	
		0.50 15	2.5 2.0	—	—	44 (303)	44 (303)	___ 00231	
		0.50 15	4.0 3.4	—	—	44 (303)	44 (303)	___ 00234	
		0.75 20	4.1 3.5	—	—	44 (303)	44 (303)	___ 00232	
		1.00 25	7.0 6.0	—	—	22 (152)	22 (152)	___ 00233	
	Sweat	0.50 15	1.0 0.85	—	—	44 (303)	44 (303)	___ 00530	
		0.50 15	2.5 2.0	—	—	44 (303)	44 (303)	___ 00531	
		0.50 15	4.0 3.4	—	—	44 (303)	44 (303)	___ 00534	
		0.75 20	4.1 3.5	—	—	44 (303)	44 (303)	___ 00532	
		1.00 25	7.0 6.0	—	—	22 (152)	22 (152)	___ 00533	

Complete Assembly
APC + Part No.
Valve Body Only
599 + Part No.

Key
APC Actuator Prefix Code
F Female NPT
* Order Separately
— Not Available

1/2 to 1" Powermite MZ

globe

Electronic

Electronic				Fail-in-Place		Part No.
Actuator Valve Body			3P	0-10 V		
			 SSB81U	 SSB61U		
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 254	APC 255		
			Close-off psi (kPa)			
2-way	Normally Closed	0.4 (0.24)	1/2 (15)	70 (482)	70 (482)	___01100
		0.63 (0.54)	1/2 (15)	70 (482)	70 (482)	___01102
		1 (0.85)	1/2 (15)	70 (482)	70 (482)	___01104
		1.6 (1.37)	1/2 (15)	70 (482)	70 (482)	___01106
		2.5 (2.14)	1/2 (15)	40 (276)	40 (276)	___01108
		4 (3.42)	1/2 (15)	40 (276)	40 (276)	___01110
		6.3 (5.38)	3/4 (20)	30 (207)	30 (207)	___01112
		10 (8.55)	1 (25)	30 (207)	30 (207)	___01114
	Normally Open	0.4 (0.24)	1/2 (15)	60 (414)	60 (414)	___01115
		0.63 (0.54)	1/2 (15)	60 (414)	60 (414)	___01117
		1 (0.85)	1/2 (15)	60 (414)	60 (414)	___01119
		1.6 (1.37)	1/2 (15)	60 (414)	60 (414)	___01121
		2.5 (2.14)	1/2 (15)	35 (241)	35 (241)	___01123
		4 (3.42)	1/2 (15)	35 (241)	35 (241)	___01126
		6.3 (5.38)	3/4 (20)	30 (207)	30 (207)	___01129
		10 (8.55)	1 (25)	30 (207)	30 (207)	___01131
3-way	Mixing	0.4 (0.24)	1/2 (15)	70 (482)	70 (482)	___01132
		0.63 (0.54)	1/2 (15)	70 (482)	70 (482)	___01133
		1 (0.85)	1/2 (15)	70 (482)	70 (482)	___01134
		1.6 (1.37)	1/2 (15)	70 (482)	70 (482)	___01135
		2.5 (2.14)	1/2 (15)	40 (276)	40 (276)	___01136
		4 (3.42)	1/2 (15)	40 (276)	40 (276)	___01137
		6.3 (5.38)	3/4 (20)	30 (207)	30 (207)	___01138
		10 (8.55)	1 (25)	30 (207)	30 (207)	___01139

Complete Assembly
APC + Part No.
Valve Body Only
599 + Part No.

1/2 to 1" Powermite MT

globe

Pneumatic

Pneumatic			Fail-Safe						
Actuator Valve Body			3-8 psi (21-55 kPa)		8-13 psi (55-90 kPa)		10-15 psi (69-103 kPa)		
				Part No.		Part No.		Part No.	
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	599-01088		599-01088		599-01088		
			APC 257		APC 258		APC 256		
Close-off psi (kPa)									
2-way	Normally Closed	0.4 (0.34)	1/2 (15)	40 (276)	25702000B	95 (655)	25802000C	120 (827)	25602000
		0.63 (0.54)	1/2 (15)	40 (276)	25702002B	95 (655)	25802002C	120 (827)	25602002
		1 (0.85)	1/2 (15)	40 (276)	25702004B	95 (655)	25802004C	120 (827)	25602004
		1.6 (1.37)	1/2 (15)	40 (276)	25702006B	95 (655)	25802006C	120 (827)	25602006
		2.5 (2.14)	1/2 (15)	28 (193)	25702008B	50 (345)	25802008C	65 (448)	25602008
		4 (3.42)	1/2 (15)	28 (193)	25702010B	50 (345)	25802010C	65 (448)	25602010
		6.3 (5.38)	3/4 (20)	18 (124)	25702012B	40 (276)	25802012C	50 (345)	25602012
	10 (8.55)	1 (25)	18 (124)	25702014B	40 (276)	25802014C	50 (345)	25602014	
	Normally Open	0.4 (0.34)	1/2 (15)	95 (655)	25702030	45 (310)	25802030C	20 (138)	25602030A
		0.63 (0.54)	1/2 (15)	95 (655)	25702032	45 (310)	25802032C	20 (138)	25602032A
		1 (0.85)	1/2 (15)	95 (655)	25702034	45 (310)	25802034C	20 (138)	25602034A
		1.6 (1.37)	1/2 (15)	95 (655)	25702036	45 (310)	25802036C	20 (138)	25602036A
		2.5 (2.14)	1/2 (15)	45 (310)	25702038	25 (172)	25802038C	10 (69)	25602038A
		4 (3.42)	1/2 (15)	45 (310)	25702041	25 (172)	25802041C	10 (69)	25602041A
6.3 (5.38)		3/4 (20)	35 (241)	25702044	10 (69)	25802044C	—	25602044A	
10 (8.55)	1 (25)	35 (241)	25702046	10 (69)	25802046C	—	25602046A		
3-way	Mixing*	0.4 (0.34)	1/2 (15)	40 (276)	25702064B	95 (655)	25802064	120 (827)	25602064A
		0.63 (0.54)	1/2 (15)	40 (276)	25702065B	95 (655)	25802065	120 (827)	25602065A
		1 (0.85)	1/2 (15)	40 (276)	25702066B	95 (655)	25802066	120 (827)	25602066A
		1.6 (1.37)	1/2 (15)	40 (276)	25702067B	95 (655)	25802067	120 (827)	25602067A
		2.5 (2.14)	1/2 (15)	28 (193)	25702068B	50 (345)	25802068	65 (448)	25602068A
		4 (3.42)	1/2 (15)	28 (193)	25702069B	50 (345)	25802069	65 (448)	25602069A
		6.3 (5.38)	3/4 (20)	18 (124)	25702070B	40 (276)	25802070	50 (345)	25602070A
		10 (8.55)	1 (25)	18 (124)	25702071B	40 (276)	25802071	50 (345)	25602071A

These selection tables only contain FxF end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of Master HVAC Products Catalog.

Complete Assembly
APC + Part No.
Valve Body Only
599 + Part No.

Table Note

*Values are for the upper port NC.

Values in chart are for 15 psi supplied to the actuator.

1/2 to 1-1/2" Powermite MT

globe

Electronic

Electronic			Fail-in-Place			Fail-Safe				Part No.	
Actuator Valve Body			3P	0-10 V		3P		0-10 V			
											
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 259	APC 261	APC 264	APC 260	APC 266	APC 262	APC 265		
Close-off psi (kPa)											
2-way	Normally Closed	0.4 (0.24)	1/2 (15)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	___ 02000
		0.63 (0.54)	1/2 (15)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	___ 02002
		1 (0.85)	1/2 (15)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	___ 02004
		1.6 (1.37)	1/2 (15)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	___ 02006
		2.5 (2.14)	1/2 (15)	50 (345)	50 (345)	50 (345)	50 (345)	50 (345)	50 (345)	50 (345)	___ 02008
		4 (3.42)	1/2 (15)	50 (345)	50 (345)	50 (345)	50 (345)	50 (345)	50 (345)	50 (345)	___ 02010
		6.3 (5.38)	3/4 (20)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	___ 02012
		10 (8.55)	1 (25)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	___ 02014
	Normally Open	16 (13.8)	1-1/4 (32)	21 (145)	21 (145)	21 (145)	21 (145)	21 (145)	21 (145)	21 (145)	___ 02085
		25 (21.5)	1-1/2 (40)	—	—	13 (90)	—	13 (90)	—	13 (90)	___ 02088
		0.4 (0.34)	1/2 (15)	120 (828)	120 (828)	160 (1103)	120 (828)	160 (1103)	120(828)	160 (1103)	___ 02030
		0.63 (0.54)	1/2 (15)	120 (828)	120 (828)	160 (1103)	120 (828)	160 (1103)	120(828)	160 (1103)	___ 02032
		1 (0.85)	1/2 (15)	120 (828)	120 (828)	160 (1103)	120 (828)	160 (1103)	120(828)	160 (1103)	___ 02034
		1.6 (1.37)	1/2 (15)	120 (828)	120 (828)	160 (1103)	120 (828)	160 (1103)	120(828)	160 (1103)	___ 02036
		2.5 (2.14)	1/2 (15)	65 (448)	65 (448)	85 (586)	65 (448)	85 (586)	65 (448)	85 (586)	___ 02038
		4 (3.42)	1/2 (15)	65 (448)	65 (448)	85 (586)	65 (448)	85 (586)	65 (448)	85 (586)	___ 02041
		6.3 (5.38)	3/4 (20)	55 (379)	55 (379)	70 (482)	55 (379)	70 (482)	55 (379)	70 (482)	___ 02044
		10 (8.55)	1 (25)	55 (379)	55 (379)	70 (482)	55 (379)	70 (482)	55 (379)	70 (482)	___ 02046
		16 (13.8)	1-1/4 (30)	20 (138)	20 (138)	28 (193)	20 (138)	28 (193)	20 (138)	28 (193)	___ 02084
		25 (21.5)	1-1/2 (40)	10 (68)	10 (68)	14 (96)	10 (68)	14 (96)	10 (68)	14 (96)	___ 02087
3-way	Mixing*	0.4 (0.34)	1/2 (15)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	___ 02064
		0.63 (0.54)	1/2 (15)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	___ 02065
		1 (0.85)	1/2 (15)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	___ 02066
		1.6 (1.37)	1/2 (15)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	95 (655)	___ 02067
		2.5 (2.14)	1/2 (15)	50 (345)	50 (345)	50 (345)	55 (379)	50 (345)	50 (345)	50 (345)	___ 02068
		4 (3.42)	1/2 (15)	50 (345)	50 (345)	50 (345)	55 (379)	50 (345)	50 (345)	50 (345)	___ 02069
		6.3 (5.38)	3/4 (20)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	___ 02070
		10 (8.55)	1 (25)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	40 (276)	___ 02071
		16 (13.8)	1-1/4 (32)	10 (69)	10 (69)	10 (69)	10 (69)	10 (69)	10 (69)	10 (69)	___ 02086
		25 (21.5)	1-1/2 (40)	—	—	7 (48)	—	7 (48)	—	7 (48)	___ 02089

Complete Assembly

APC + Part No.

Valve Body Only

599 + Part No.

Table Note

*Values are for the upper port NC.

Values in chart are for 15 psi supplied to the actuator.

For Fail-in-Place actuators at 0V valve is closed.

These selection tables only contain FXF end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

1/2 to 2" Flowrite 599 Series

globe

Pneumatic

Pneumatic			Spring Return								Part No.
Actuator Valve Body			4" 3-8 psi (21-55 kPa)	4" 5-10 psi (34-69 kPa)	4" 10-15 psi (69-103 kPa)	8"	8" High Temp.	8" with Positioner	8" High Temp. with Positioner		
											
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 268	APC 269	APC 270	APC 277	APC 278	APC 283	APC 284		
Close-off psi (kPa)											
2-way	Normally Closed	1 (0.9)	1/2 (15)	*	*	236 (1627)	250 (1724)	*	250 (1724)	*	___ 03180
		1.6 (1.4)	1/2 (15)	*	*	236 (1627)	250 (1724)	*	250 (1724)	*	___ 03181
		2.5 (2.2)	1/2 (15)	*	*	236 (1627)	250 (1724)	*	250 (1724)	*	___ 03182
		4 (3.4)	1/2 (15)	*	*	236 (1627)	250 (1724)	*	250 (1724)	*	___ 03183
		6.3 (5.4)	3/4 (20)	*	*	155 (1069)	250 (1724)	*	250 (1724)	*	___ 03184
		10 (8.6)	1 (25)	*	*	91 (627)	250 (1724)	*	250 (1724)	*	___ 03185
		16 (14)	1-1/4 (32)	*	*	52 (359)	148 (1020)	*	148 (1020)	*	___ 03186
		25 (22)	1-1/2 (40)	*	*	32 (331)	92 (634)	*	92 (634)	*	___ 03187
		40 (34)	2 (50)	*	*	20 (138)	55 (379)	*	55 (379)	*	___ 03188
	Normally Open	1 (0.9)	1/2 (15)	142 (979)	*	*	250 (1724)	—	250 (1724)	—	___ 03162
		1.6 (1.4)	1/2 (15)	142 (979)	*	*	250 (1724)	—	250 (1724)	—	___ 03163
		2.5 (2.2)	1/2 (15)	142 (979)	*	*	250 (1724)	—	250 (1724)	—	___ 03164
		4 (3.4)	1/2 (15)	142 (979)	*	*	250 (1724)	—	250 (1724)	—	___ 03165
		6.3 (5.4)	3/4 (20)	80 (552)	*	*	231 (1593)	—	231 (1593)	—	___ 03166
		10 (8.6)	1 (25)	52 (359)	*	*	150 (1034)	—	150 (1034)	—	___ 03167
		16 (14)	1-1/4 (32)	32 (221)	*	*	93 (641)	—	93 (641)	—	___ 03168
3-way	Mixing	25 (22)	1-1/2 (40)	20 (138)	*	*	60 (414)	—	60 (414)	—	___ 03169
		40 (34)	2 (50)	12 (83)	*	*	37 (255)	—	37 (255)	—	___ 03170
		1 (0.9)	1/2 (15)	*	236 (1627)	*	250 (1724)	—	250 (1724)	—	___ 03198
		1.6 (1.4)	1/2 (15)	*	236 (1627)	*	250 (1724)	—	250 (1724)	—	___ 03199
		2.5 (2.2)	1/2 (15)	*	236 (1627)	*	250 (1724)	—	250 (1724)	—	___ 03200
		4 (3.4)	1/2 (15)	*	236 (1627)	*	250 (1724)	—	250 (1724)	—	___ 03201
		6.3 (5.4)	3/4 (20)	*	155 (1069)	*	250 (1724)	—	250 (1724)	—	___ 03202
		10 (8.6)	1 (25)	*	91 (627)	*	250 (1724)	—	250 (1724)	—	___ 03203
		16 (14)	1-1/4 (32)	*	52 (359)	*	148 (1020)	—	148 (1020)	—	___ 03204
		25 (22)	1-1/2 (40)	*	32 (331)	*	92 (634)	—	92 (634)	—	___ 03205
		40 (34)	2 (50)	*	20 (138)	*	55 (379)	—	55 (379)	—	___ 03206

Ordering Note

Order valve and actuator separately.

Complete Assembly

APC + Part No.

Valve Body Only

599 + Part No.

These selection tables only contain FFX end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

1/2 to 2" Flowrite 599 Series

globe

These selection tables only contain FXF end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

Electronic NSR

Electronic NSR			Non-Spring Return						Part No.
Actuator Valve Body			3P 30 sec.	3P 120 sec.	3P	0-10 V/4-20 mA	0-10 V		
									
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 273	APC 272	APC 275	APC 271	APC 295		
Close-off psi (kPa)									
2-way	Normally Closed	1 (0.9)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03180
		1.6 (1.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03181
		2.5 (2.2)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03182
		4 (3.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03183
		6.3 (5.4)	3/4 (20)	221 (1524)	221 (1524)	250 (1724)	221 (1524)	238 (1640)	--- 03184
		10 (8.6)	1 (25)	130 (896)	130 (896)	203 (1400)	130 (896)	140 (965)	--- 03185
		16 (14)	1-1/4 (32)	75 (517)	75 (517)	117 (807)	75 (517)	81 (558)	--- 03186
		25 (22)	1-1/2 (40)	46 (317)	46 (317)	73 (503)	46 (317)	50 (345)	--- 03187
	Normally Open	40 (34)	2 (50)	28 (193)	28 (193)	44 (303)	28 (193)	31 (214)	--- 03188
		1 (0.9)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03162
		1.6 (1.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03163
		2.5 (2.2)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03164
		4 (3.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03165
		6.3 (5.4)	3/4 (20)	173 (1193)	173 (1193)	250 (1724)	173 (1193)	186 (1282)	--- 03166
		10 (8.6)	1 (25)	112 (772)	112 (772)	201 (1386)	112 (772)	121 (834)	--- 03167
		16 (14)	1-1/4 (32)	69 (476)	69 (476)	124 (855)	69 (476)	75 (517)	--- 03168
3-way	Mixing	25 (22)	1-1/2 (40)	44 (303)	44 (303)	80 (552)	44 (303)	48 (331)	--- 03169
		40 (34)	2 (50)	27 (186)	27 (186)	49 (338)	27 (186)	30 (207)	--- 03170
		1 (0.9)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03198
		1.6 (1.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03199
		2.5 (2.2)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03200
		4 (3.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03201
		6.3 (5.4)	3/4 (20)	221 (1524)	221 (1524)	250 (1724)	221 (1524)	238 (1640)	--- 03202
		10 (8.6)	1 (25)	130 (896)	130 (896)	203 (1400)	130 (896)	140 (965)	--- 03203
		16 (14)	1-1/4 (32)	75 (517)	75 (517)	117 (807)	75 (517)	81 (558)	--- 03204
		25 (22)	1-1/2 (40)	46 (317)	46 (317)	73 (503)	46 (317)	50 (345)	--- 03205
		40 (34)	2 (50)	28 (193)	28 (193)	44 (303)	28 (193)	31 (214)	--- 03206

Complete Assembly

APC + Part No.

Valve Body Only

599 + Part No.

1/2 to 2" Flowrite 599 Series

globe

Electronic SR

Electronic SR			Spring Return					Part No.	
Actuator Valve Body			2P	3P	0-10 V	0-10 V/4-20 mA	0-10 V		
			 599-03611	 SKD82.51U	 599-03609	 SKD62U	 599-10022		
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 299	APC 276	APC 298	APC 274	APC 296		
			Close-off psi (kPa)						
2-way	Normally Closed	1 (0.9)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03180
		1.6 (1.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03181
		2.5 (2.2)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03182
		4 (3.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03183
		6.3 (5.4)	3/4 (20)	221 (1524)	221 (1524)	221 (1524)	221 (1524)	238 (1640)	--- 03184
		10 (8.6)	1 (25)	130 (896)	130 (896)	130 (896)	130 (896)	140 (965)	--- 03185
		16 (14)	1-1/4 (32)	75 (517)	75 (517)	75 (517)	75 (517)	81 (558)	--- 03186
		25 (22)	1-1/2 (40)	46 (317)	46 (317)	46 (317)	46 (317)	50 (345)	--- 03187
		40 (34)	2 (50)	28 (193)	28 (193)	28 (193)	28 (193)	31 (214)	--- 03188
	Normally Open	1 (0.9)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03162
		1.6 (1.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03163
		2.5 (2.2)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03164
		4 (3.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03165
		6.3 (5.4)	3/4 (20)	173 (1193)	250 (1724)	173 (1193)	250 (1724)	186 (1282)	--- 03166
		10 (8.6)	1 (25)	112 (772)	201 (1386)	112 (772)	201 (1386)	121 (834)	--- 03167
		16 (14)	1-1/4 (32)	69 (476)	124 (855)	69 (476)	124 (855)	75 (517)	--- 03168
		25 (22)	1-1/2 (40)	44 (303)	80 (552)	44 (303)	80 (552)	48 (331)	--- 03169
		40 (34)	2 (50)	27 (186)	49 (338)	27 (186)	49 (338)	30 (207)	--- 03170
3-way	Mixing	1 (0.9)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03198
		1.6 (1.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03199
		2.5 (2.2)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03200
		4 (3.4)	1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	--- 03201
		6.3 (5.4)	3/4 (20)	221 (1524)	250 (1724)	221 (1524)	250 (1724)	238 (1640)	--- 03202
		10 (8.6)	1 (25)	130 (896)	203 (1400)	130 (896)	203 (1400)	140 (965)	--- 03203
		16 (14)	1-1/4 (32)	75 (517)	117 (807)	75 (517)	117 (807)	81 (558)	--- 03204
		25 (22)	1-1/2 (40)	46 (317)	73 (503)	46 (317)	73 (503)	50 (345)	--- 03205
		40 (34)	2 (50)	28 (193)	44 (303)	28 (193)	44 (303)	31 (214)	03206

These selection tables only contain FXF end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

2-1/2 to 6" Flowrite 599 Series ANSI 125

globe

These selection tables only contain flange end connections with standard bronze trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

Pneumatic			Spring Return				Part No.	
			20 mm Stroke			40 mm Stroke		
Actuator Valve Body			8"	8" Hi-Temp.	12"	12"		
								
			599-01050	599-01051	599-01010	599-01000		
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 277	APC 278	APC 279	APC 281		
			Close-off psi (kPa)					
2-way	Normally Closed	63 (54)	2-1/2 (65)	36 (248)	*	114 (786)	—	--- 05990
		100 (86)	3 (80)	23 (158)	*	74 (610)	—	--- 05991
		160 (140)	4 (100)	—	—	—	46 (317)	--- 05992
		250 (215)	5 (125)	—	—	—	29 (199)	--- 05993
		400 (340)	6 (150)	—	—	—	20 (137)	--- 05994
	Normally Open	63 (54)	2-1/2 (65)	31 (213)	*	95 (655)	—	--- 05980
		100 (86)	3 (80)	20 (138)	*	63 (434)	—	--- 05981
		160 (140)	4 (100)	—	—	—	40 (275)	--- 05982
		250 (215)	5 (125)	—	—	—	26 (179)	--- 05983
		400 (340)	6 (150)	—	—	—	18 (124)	--- 05984
3-way	Mixing	63 (54)	2-1/2 (65)	36 (248)	*	114 (786)	—	--- 06160
		100 (86)	3 (80)	23 (158)	*	74 (610)	—	--- 06161
		160 (140)	4 (100)	—	—	—	46 (317)	--- 06162
		250 (215)	5 (125)	—	—	—	29 (199)	--- 06163
		400 (340)	6 (150)	—	—	—	20 (137)	--- 06164

Pneumatic w/ Factory-Mounted Positioner

Pneumatic w/ Factory-Mounted Positioner				Spring Return				Part No.
				20 mm Stroke			40 mm Stroke	
Actuator Valve Body				8" with positioner	8" Hi-Temp. with positioner	12" with positioner	12" with positioner	
								
				599-01050	599-01051	599-01010	599-01000	
2-way	Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 283	APC 284	APC 285	APC 287	
				Close-off psi (kPa)				
	Normally Closed	63 (54)	2-1/2 (65)	36 (248)	*	114 (786)	—	___ 05990
		100 (86)	3 (80)	23 (158)	*	74 (610)	—	___ 05991
		160 (140)	4 (100)	—	—	—	46 (317)	___ 05992
		250 (215)	5 (125)	—	—	—	29 (199)	___ 05993
		400 (340)	6 (150)	—	—	—	20 (137)	___ 05994
	Normally Open	63 (54)	2-1/2 (65)	31 (213)	*	95 (655)	—	___ 05980
		100 (86)	3 (80)	20 (138)	*	63 (434)	—	___ 05981
		160 (140)	4 (100)	—	—	—	40 (275)	___ 05982
250 (215)		5 (125)	—	—	—	26 (179)	___ 05983	
400 (340)		6 (150)	—	—	—	18 (124)	___ 05984	
3-way	Mixing	63 (54)	2-1/2 (65)	36 (248)	*	114 (786)	—	___ 06160
		100 (86)	3 (80)	23 (158)	*	74 (610)	—	___ 06161
		160 (140)	4 (100)	—	—	—	46 (317)	___ 06162
		250 (215)	5 (125)	—	—	—	29 (199)	___ 06163
		400 (340)	6 (150)	—	—	—	20 (137)	___ 06164

Complete Assembly
APC + Part No.

Valve Body Only
599 + Part No.

Ordering Note

*Order valve and actuator separately.

2-1/2 to 6" Flowrite 599 Series ANSI 125

globe

Electronic			Non-Spring Return					Part No.	
Actuator Valve Body			3P			0-10 V			
						Lo	Hi		
									
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 275	APC 290	APC 293	APC 295	APC 297		
			Close-off psi (kPa)						
2-way	Normally Closed	63 (54)	2-1/2 (65)	34 (234)	97 (668)	—	50 (344)	—	___05990
		100 (86)	3 (80)	22 (152)	63 (434)	—	32 (220)	—	___05991
		160 (140)	4 (100)	—	—	39 (268)	—	20 (137)	___05992
		250 (215)	5 (125)	—	—	25 (172)	—	—	___05993
		400 (340)	6 (150)	—	— 17	(117)	—	—	___05994
	Normally Open	63 (54)	2-1/2 (65)	38 (262)	153 (518)	—	48 (330)	—	___05980
		100 (86)	3 (80)	25 (172)	101 (342)	—	32 (220)	—	___05981
		160 (140)	4 (100)	—	—	65 (448)	—	21 (144)	___05982
		250 (215)	5 (125)	—	—	42 (289)	—	—	___05983
		400 (340)	6 (150)	—	—	29 (199)	—	—	___05984
3-way	Mixing	63 (54)	2-1/2 (65)	34 (234)	34 (234)	—	50 (344)	—	___06160
		100 (86)	3 (80)	22 (152)	22 (152)	—	32 (220)	—	___06161
		160 (140)	4 (100)	—	—	39 (268)	—	20 (137)	___06162
		250 (215)	5 (125)	—	—	25 (172)	—	—	___06163
		400 (340)	6 (150)	—	—	17 (117)	—	—	___06164

These selection tables only contain flange end connections with standard trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

Complete Assembly
APC + Part No.
Valve Body Only
599 + Part No.

Electronic			Spring Return							Part No.	
Actuator Valve Body			3P			0-10 V/4-20 mA		0-10 V	0-10 V/4-20 mA		
											
			SKD82.51U	SKB82.51U	SKC82.61U	SKD62U	SKB62U	599-10022	SKC62U		
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 276	APC 289	APC 292	APC 274	APC 291	APC 296	APC 294		
			Close-off psi (kPa)								
2-way	Normally Closed	63 (54)	2-1/2 (65)	34 (234)	97 (668)	—	34 (234)	97 (668)	24 (165)	—	--- 05990
		100 (86)	3 (80)	22 (152)	63 (434)	—	22 (152)	63 (434)	15 (103)	—	--- 05991
		160 (140)	4 (100)	—	—	39 (268)	—	—	—	39 (268)	--- 05992
		250 (215)	5 (125)	—	—	25 (172)	—	—	—	25 (172)	--- 05993
		400 (340)	6 (150)	—	—	17 (117)	—	—	—	17 (117)	--- 05994
	Normally Open	63 (54)	2-1/2 (65)	38 (262)	153 (518)	—	38 (262)	153 (518)	23 (158)	—	--- 05980
		100 (86)	3 (80)	25 (172)	101 (342)	—	25 (172)	101 (342)	16 (110)	—	--- 05981
		160 (140)	4 (100)	—	—	65 (448)	—	—	—	65 (448)	--- 05982
		250 (215)	5 (125)	—	—	42 (289)	—	—	—	42 (289)	--- 05983
		400 (340)	6 (150)	—	—	29 (199)	—	—	—	29 (199)	--- 05984
3-way	Mixing	63 (54)	2-1/2 (65)	34 (234)	97 (668)	—	34 (234)	97 (668)	24 (165)	—	--- 06160
		100 (86)	3 (80)	22 (152)	63 (434)	—	22 (152)	63 (434)	15 (103)	—	--- 06161
		160 (140)	4 (100)	—	—	39 (268)	—	—	—	39 (268)	--- 06162
		250 (215)	5 (125)	—	—	25 (172)	—	—	—	25 (172)	--- 06163
		400 (340)	6 (150)	—	—	17 (117)	—	—	—	17 (117)	--- 06164

2-1/2 to 6" Flowrite 599 Series ANSI 250

globe

These selection tables only contain flange end connections with standard trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

Complete Assembly

APC + Part No.

Valve Body Only

599 + Part No.

Ordering Note

*Order valve and actuator separately.

Pneumatic			Spring Return				Part No.		
			20 mm Stroke			40 mm Stroke			
Actuator Valve Body			8"	8" Hi-Temp.	12"	12"			
									
			599-01050	599-01051	599-01010	599-01000			
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 277	APC 278	APC 279	APC 281			
			Close-off psi (kPa)						
2-way	Normally Closed	63 (54)	2-1/2 (65)	36 (248)	*	114 (786)	—	---	05950
		100 (86)	3 (80)	23 (158)	*	74 (610)	—	---	05951
		160 (140)	4 (100)	—	—	—	46 (317)	---	05952
		250 (215)	5 (125)	—	—	—	29 (199)	---	05953
		400 (340)	6 (150)	—	—	—	20 (137)	---	05954
	Normally Open	63 (54)	2-1/2 (65)	31 (213)	*	95 (655)	—	---	05940
		100 (86)	3 (80)	20 (138)	*	63 (434)	—	---	05941
		160 (140)	4 (100)	—	—	—	40 (275)	---	05942
		250 (215)	5 (125)	—	—	—	26 (179)	---	05943
		400 (340)	6 (150)	—	—	—	18 (124)	---	05944
3-way	Mixing	63 (54)	2-1/2 (65)	36 (248)	*	114 (786)	—	---	06170
		100 (86)	3 (80)	23 (158)	*	74 (610)	—	---	06171
		160 (140)	4 (100)	—	—	—	46 (317)	---	06172
		250 (215)	5 (125)	—	—	—	29 (199)	---	06173
		400 (340)	6 (150)	—	—	—	20 (137)	---	06174

Pneumatic w/ Factory Mounted Positioner

Pneumatic w/ Factory Mounted Positioner				Spring Return				Part No.
				20 mm Stroke			40 mm Stroke	
Actuator Valve Body			8" with positioner	8" Hi-Temp. with positioner	12" with positioner	12" with positioner		
								
			599-01050	599-01051	599-01010	599-01000		
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 283	APC 284	APC 285	APC 287		
			Close-off psi (kPa)					
2-way	Normally Closed	63 (54)	2-1/2 (65)	36 (248)	*	114 (786)	—	05950
		100 (86)	3 (80)	23 (158)	*	74 (610)	—	05951
		160 (140)	4 (100)	—	—	—	46 (317)	05952
		250 (215)	5 (125)	—	—	—	29 (199)	05953
		400 (340)	6 (150)	—	—	—	20 (137)	05954
	Normally Open	63 (54)	2-1/2 (65)	31 (213)	*	95 (655)	—	05940
		100 (86)	3 (80)	20 (138)	*	63 (434)	—	05941
		160 (140)	4 (100)	—	—	—	40 (275)	05942
		250 (215)	5 (125)	—	—	—	26 (179)	05943
		400 (340)	6 (150)	—	—	—	18 (124)	05944
3-way	Mixing	63 (54)	2-1/2 (65)	36 (248)	*	114 (786)	—	06170
		100 (86)	3 (80)	23 (158)	*	74 (610)	—	06171
		160 (140)	4 (100)	—	—	—	46 (317)	06172
		250 (215)	5 (125)	—	—	—	29 (199)	06173
		400 (340)	6 (150)	—	—	—	20 (137)	06174

2-1/2 to 6" Flowrite 599 Series ANSI 250

globe

Electronic

Electronic			Non-Spring Return					Part No.
Actuator Valve Body			3P			0-10 V		
								
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 275	APC 290	APC 293	APC 295	APC 297	
			Close-off psi (kPa)					
2-way	Normally Closed	63 (54) 2-1/2 (65)	34 (234)	97 (668)	—	50 (344)	—	___05950
		100 (86) 3 (80)	22 (152)	63 (434)	—	32 (220)	—	___05951
		160 (140) 4 (100)	—	—	39 (268)	—	20 (137)	___05952
		250 (215) 5 (125)	—	—	25 (172)	—	—	___05953
		400 (340) 6 (150)	—	—	17 (117)	—	—	___05954
	Normally Open	63 (54) 2-1/2 (65)	38 (262)	153 (518)	—	48 (330)	—	___05940
		100 (86) 3 (80)	25 (172)	101 (342)	—	32 (220)	—	___05941
		160 (140) 4 (100)	—	—	65 (448)	—	21 (144)	___05942
		250 (215) 5 (125)	—	—	42 (289)	—	—	___05943
		400 (340) 6 (150)	—	—	29 (199)	—	—	___05944
3-way	Mixing	63 (54) 2-1/2 (65)	34 (234)	97 (688)	—	50 (344)	—	___06170
		100 (86) 3 (80)	22 (152)	63 (434)	—	32 (220)	—	___06171
		160 (140) 4 (100)	—	—	39 (268)	—	20 (137)	___06172
		250 (215) 5 (125)	—	—	25 (172)	—	—	___06173
		400 (340) 6 (150)	—	—	17 (117)	—	—	___06174

These selection tables only contain flange end connections with standard trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

Complete Assembly
APC + Part No.
Valve Body Only
599 + Part No.

Electronic

Electronic			Spring Return							Part No.
Actuator Valve Body			3P			0-10 V/4-20 mA		0-10 V	0-10 V/4-20 mA	
										
Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 276	APC 289	APC 292	APC 274	APC 291	APC 296	APC 294	
			Close-off psi (kPa)							
2-way	Normally Closed	63 (54) 2-1/2 (65)	34 (234)	97 (668)	—	34 (234)	97 (668)	24 (165)	—	---05950
		100 (86) 3 (80)	22 (152)	63 (434)	—	22 (152)	63 (434)	15 (103)	—	---05951
		160 (140) 4 (100)	—	—	39 (268)	—	—	—	39 (268)	---05952
		250 (215) 5 (125)	—	—	25 (172)	—	—	—	25 (172)	---05953
		400 (340) 6 (150)	—	—	17 (117)	—	—	—	17 (117)	---05954
	Normally Open	63 (54) 2-1/2 (65)	38 (262)	153 (518)	—	38 (262)	153 (518)	23 (158)	—	---05940
		100 (86) 3 (80)	25 (172)	101 (342)	—	25 (172)	101 (342)	16 (110)	—	---05941
		160 (140) 4 (100)	—	—	65 (448)	—	—	—	65 (448)	---05942
		250 (215) 5 (125)	—	—	42 (289)	—	—	—	42 (289)	---05943
		400 (340) 6 (150)	—	—	29 (199)	—	—	—	29 (199)	---05944
3-way	Mixing	63 (54) 2-1/2 (65)	34 (234)	97 (668)	—	34 (234)	97 (668)	24 (165)	—	---06170
		100 (86) 3 (80)	22 (152)	63 (434)	—	22 (152)	63 (434)	15 (103)	—	---06171
		160 (140) 4 (100)	—	—	39 (268)	—	—	—	39 (268)	---06172
		250 (215) 5 (125)	—	—	25 (172)	—	—	—	25 (172)	---06173
		400 (340) 6 (150)	—	—	17 (117)	—	—	—	17 (117)	---06174

1/2 to 2" Siemens 599 Series

ball

Electronic

Electronic			Fail-in-Place				Fail-Safe			Part No.
Actuator 2-way Valve Body		3P		0-10 Vdc		2P	3P	0-10 Vdc		
										
Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 171A	APC 171B	APC 171C	APC 171D	APC 171E	APC 171F	APC 171G		
		Close-off psi (kPa)								
2-way Normally Open**	0.4 (0.34)	1/2 (15)	130 (869)	— —	130 (869)	— —	130 (869)	130 (869)	130 (869)	----- 10203
	0.63 (0.54)	1/2 (15)	130 (869)	— —	130 (869)	— —	130 (869)	130 (869)	130 (869)	----- 10204
	1.6 (1.4)	1/2 (15)	130 (869)	— —	130 (869)	— —	130 (869)	130 (869)	130 (869)	----- 10205
	2.5 (2.2)	1/2 (15)	130 (869)	— —	130 (869)	— —	130 (869)	130 (869)	130 (869)	----- 10206
	4 (3.5)	1/2 (15)	130 (869)	— —	130 (869)	— —	130 (869)	130 (869)	130 (869)	----- 10207
	10 (8.6)	1/2 (15)	130 (869)	— —	130 (869)	— —	130 (869)	130 (869)	130 (869)	----- 10208*
	10 (8.6)	3/4 (20)	130 (869)	— —	130 (869)	— —	130 (869)	130 (869)	130 (869)	----- 10209
	25 (22)	3/4 (20)	130 (869)	— —	130 (869)	— —	130 (869)	130 (869)	130 (869)	----- 10210*
	10 (8.6)	1 (25)	100 (689)	— —	100 (689)	— —	100 (689)	100 (689)	100 (689)	----- 10211
	25 (22)	1 (25)	100 (689)	— —	100 (689)	— —	100 (689)	100 (689)	100 (689)	----- 10212
	16 (14)	1 (25)	100 (689)	— —	100 (689)	— —	100 (689)	100 (689)	100 (689)	----- 10213
	63 (54)	1 (25)	100 (689)	— —	100 (689)	— —	100 (689)	100 (689)	100 (689)	----- 10214*
	16 (14)	1-1/4 (30)	100 (689)	— —	100 (689)	— —	100 (689)	100 (689)	100 (689)	----- 10215
	40 (35)	1-1/4 (30)	100 (689)	— —	100 (689)	— —	100 (689)	100 (689)	100 (689)	----- 10216
	100 (86)	1-1/4 (30)	100 (689)	— —	100 (689)	— —	100 (689)	100 (689)	100 (689)	----- 10217*
	25 (22)	1-1/2 (40)	— —	70 (482)	— —	70 (482)	70 (482)	70 (482)	70 (482)	----- 10218
	63 (54)	1-1/2 (40)	— —	70 (482)	— —	70 (482)	70 (482)	70 (482)	70 (482)	----- 10219*
	40 (35)	1-1/2 (40)	— —	70 (482)	— —	70 (482)	70 (482)	70 (482)	70 (482)	----- 10220
	160 (138)	1-1/2 (40)	— —	70 (482)	— —	70 (482)	70 (482)	70 (482)	70 (482)	----- 10221*
	40 (35)	2 (50)	— —	70 (482)	— —	70 (482)	70 (482)	70 (482)	70 (482)	----- 10222
	100 (86)	2 (50)	— —	70 (482)	— —	70 (482)	70 (482)	70 (482)	70 (482)	----- 10223*
	63 (54)	2 (50)	— —	70 (482)	— —	70 (482)	70 (482)	70 (482)	70 (482)	----- 10224
	250 (214)	2 (50)	— —	70 (482)	— —	70 (482)	70 (482)	70 (482)	70 (482)	----- 10225*

Ordering Note

When ordered as an assembly, the OpenAir actuator is provided with 12-inch (305 mm) wires.

Table Notes

*Denotes a full-port valve with no flow optimizer insert.

**Can easily be changed to Normally Closed in the field.

Complete Assembly

APC + Part No.

Valve Body Only

599 + Part No.

1/2 to 2" Siemens 599 Series

ball

Electronic

Electronic			Fail-Safe			
Actuator		2-way Valve Body	2P	3P	0-10 Vdc	Part No.
						
Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 172E	APC 172F	APC 172G		
		Close-off psi (kPa)				
2-way Normally Closed	0.4 (0.34)	1/2 (15)	130 (869)	130 (869)	130 (869)	10203
	0.63 (0.54)	1/2 (15)	130 (869)	130 (869)	130 (869)	10204
	1.6 (1.4)	1/2 (15)	130 (869)	130 (869)	130 (869)	10205
	2.5 (2.2)	1/2 (15)	130 (869)	130 (869)	130 (869)	10206
	4 (3.5)	1/2 (15)	130 (869)	130 (869)	130 (869)	10207
	10 (8.6)	1/2 (15)	130 (869)	130 (869)	130 (869)	10208*
	10 (8.6)	3/4 (20)	130 (869)	130 (869)	130 (869)	10209
	25 (22)	3/4 (20)	130 (869)	130 (869)	130 (869)	10210*
	10 (8.6)	1 (25)	100 (689)	100 (689)	100 (689)	10211
	25 (22)	1 (25)	100 (689)	100 (689)	100 (689)	10212
	16 (14)	1 (25)	100 (689)	100 (689)	100 (689)	10213
	63 (54)	1 (25)	100 (689)	100 (689)	100 (689)	10214*
	16 (14)	1-1/4 (30)	100 (689)	100 (689)	100 (689)	10215
	40 (35)	1-1/4 (30)	100 (689)	100 (689)	100 (689)	10216
	100 (86)	1-1/4 (30)	100 (689)	100 (689)	100 (689)	10217*
	25 (22)	1-1/2 (40)	70 (482)	70 (482)	70 (482)	10218
	63 (54)	1-1/2 (40)	70 (482)	70 (482)	70 (482)	10219*
	40 (35)	1-1/2 (40)	70 (482)	70 (482)	70 (482)	10220
	160 (138)	1-1/2 (40)	70 (482)	70 (482)	70 (482)	10221*
	40 (35)	2 (50)	70 (482)	70 (482)	70 (482)	10222
	100 (86)	2 (50)	70 (482)	70 (482)	70 (482)	10223*
	63 (54)	2 (50)	70 (482)	70 (482)	70 (482)	10224
	250 (214)	2 (50)	70 (482)	70 (482)	70 (482)	10225*

Complete Assembly

APC + Part No.

Valve Body Only

599 + Part No.

Ordering Note

When ordered as an assembly, the OpenAir actuator is provided with 12-inch (305 mm) wires.

Table Note

*Denotes a full-port valve with no flow optimizer insert.

1/2 to 2" Siemens 599 Series

ball

Electronic			Fail-in-Place				Fail-Safe			Part No.
Actuator Valve Body		3P		0-10 Vdc		2P	3P	0-10 Vdc		
										
		GDE131.1P	GLB131.1P	GDE161.1P	GLB161.1P	GMA121.1P	GMA131.1U	GMA161.1P		
Flow Rate Cv (Kvs)	Line Size in. (mm)	APC 171A	APC 171B	APC 171C	APC 171D	APC 171E	APC 171F	APC 171G		
Close-off psi (kPa)										
3-way Normally Closed	0.4 (0.34)	1/2 (15)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10250
	0.63 (0.54)	1/2 (15)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10251
	1.0 (0.86)	1/2 (15)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10252
	2.5 (2.2)	1/2 (15)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10253
	4 (3.5)	1/2 (15)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10254
	10 (8.6)	1/2 (15)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10255
	16 (14)	3/4 (20)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10256
	10 (8.6)	1 (25)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10257
	16 (14)	1 (25)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10258
	25 (22)	1 (25)	50 (345)	— —	50 (345)	— —	50 (345)	50 (345)	50 (345)	----- 10259
	16 (14)	1-1/4 (30)	40 (276)	— —	40 (276)	— —	40 (276)	40 (276)	40 (276)	----- 10260
	40 (35)	1-1/4 (30)	40 (276)	— —	40 (276)	— —	40 (276)	40 (276)	40 (276)	----- 10261
	16 (14)	1-1/2 (40)	— —	40 (276)	— —	40 (276)	40 (276)	40 (276)	40 (276)	----- 10262
	25 (22)	1-1/2 (40)	— —	40 (276)	— —	40 (276)	40 (276)	40 (276)	40 (276)	----- 10263
	63 (54)	1-1/2 (40)	— —	40 (276)	— —	40 (276)	40 (276)	40 (276)	40 (276)	----- 10264
	25 (22)	2 (50)	— —	40 (276)	— —	40 (276)	40 (276)	40 (276)	40 (276)	----- 10265
40 (35)	2 (50)	— —	40 (276)	— —	40 (276)	40 (276)	40 (276)	40 (276)	----- 10266	
100 (86)	2 (50)	— —	40 (276)	— —	40 (276)	40 (276)	40 (276)	40 (276)	----- 10267	

Ordering Note

When ordered as an assembly, the OpenAir actuator is provided with 12-inch (305 mm) wires.

Table Note

*Denotes a full-port valve with no flow optimizer insert.

Complete Assembly

APC + Part No.

Valve Body Only

599 + Part No.

2 to 12" **Siemens** butterfly

2-way Pneumatic SR

Normally Closed (Fail Closed)				Normally Open (Fail Open)	
Cv		150 psi Close-off	100 psi Close-off - 4-6 50 psi Close-off - 8-12	150 psi Close-off	100 psi Close-off - 4-6 50 psi Close-off - 8-12
	Size	Part No.	Part No.	Part No.	Part No.
60	2"	BV2W02FS2LCXXXX	—	BV2W02FS2LOXXXX	—
151	2-1/2"	BV2W25FS2LCXXXX	—	BV2W25FS2LOXXXX	—
262	3"	BV2W03FS2LCXXXX	—	BV2W03FS2LOXXXX	—
647	4"	BV2W04FS2LCXXXX	BV2W04US2LCXXXX	BV2W04FS2LOXXXX	BV2W04US2LOXXXX
1141	5"	BV2W05FS2LCXXXX	BV2W05US2LCXXXX	BV2W05FS2LOXXXX	BV2W05US2LOXXXX
1160*/1580	6"	BV2W06FS2LCXXXX	BV2W06US2LCXXXX	BV2W06FS2LOXXXX	BV2W06US2LOXXXX
1754*	8"	—	BV2W08US2LCXXXX	—	BV2W08US2LOXXXX
2524*	10"	—	BV2W10US2LCXXXX	—	BV2W10US2LOXXXX
3470*	12"	—	BV2W12US2LCXXXX	—	BV2W12US2LOXXXX
60	2"	BV2W02FS2LCPXXX	—	BV2W02FS2LOPXXX	—
151	2-1/2"	BV2W25FS2LCPXXX	—	BV2W25FS2LOPXXX	—
262	3"	BV2W03FS2LCPXXX	—	BV2W03FS2LOPXXX	—
647	4"	BV2W04FS2LCPXXX	BV2W04US2LCPXXX	BV2W04FS2LOPXXX	BV2W04US2LOPXXX
1141	5"	BV2W05FS2LCPXXX	BV2W05US2LCPXXX	BV2W05FS2LOPXXX	BV2W05US2LOPXXX
1160*/1580	6"	BV2W06FS2LCPXXX	BV2W06US2LCPXXX	BV2W06FS2LOPXXX	BV2W06US2LOPXXX
1754*	8"	—	BV2W08US2LCPXXX	—	BV2W08US2LOPXXX
2524*	10"	—	BV2W10US2LCPXXX	—	BV2W10US2LOPXXX
3470*	12"	—	BV2W12US2LCPXXX	—	BV2W12US2LOPXXX
60	2"	BV2W02FS2LCTXXX	—	BV2W02FS2LOTXXX	—
151	2-1/2"	BV2W25FS2LCTXXX	—	BV2W25FS2LOTXXX	—
262	3"	BV2W03FS2LCTXXX	—	BV2W03FS2LOTXXX	—
647	4"	BV2W04FS2LCTXXX	BV2W04US2LCTXXX	BV2W04FS2LOTXXX	BV2W04US2LOTXXX
1141	5"	BV2W05FS2LCTXXX	BV2W05US2LCTXXX	BV2W05FS2LOTXXX	BV2W05US2LOTXXX
1160*/1580	6"	BV2W06FS2LCTXXX	BV2W06US2LCTXXX	BV2W06FS2LOTXXX	BV2W06US2LOTXXX
1754*	8"	—	BV2W08US2LCTXXX	—	BV2W08US2LOTXXX
2524*	10"	—	BV2W10US2LCTXXX	—	BV2W10US2LOTXXX
3470*	12"	—	BV2W12US2LCTXXX	—	BV2W12US2LOTXXX
60	2"	BV2W02FS2LCUXXX	—	BV2W02FS2LOUXXX	—
151	2-1/2"	BV2W25FS2LCUXXX	—	BV2W25FS2LOUXXX	—
262	3"	BV2W03FS2LCUXXX	—	BV2W03FS2LOUXXX	—
647	4"	BV2W04FS2LCUXXX	BV2W04US2LCUXXX	BV2W04FS2LOUXXX	BV2W04US2LOUXXX
1141	5"	BV2W05FS2LCUXXX	BV2W05US2LCUXXX	BV2W05FS2LOUXXX	BV2W05US2LOUXXX
1580	6"	BV2W06FS2LCUXXX	BV2W06US2LCUXXX	BV2W06FS2LOUXXX	BV2W06US2LOUXXX
1754	8"	—	BV2W08US2LCUXXX	—	BV2W08US2LOUXXX
2524	10"	—	BV2W10US2LCUXXX	—	BV2W10US2LOUXXX
3470	12"	—	BV2W12US2LCUXXX	—	BV2W12US2LOUXXX

Table Note

*6-inch 150 psi and 8-, 10- and 12-inch only rotate to 70° max.

These selection tables only contain lug end connections with standard trim.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

2 to 12" **Siemens** butterfly

2-way Pneumatic SR

		Assembly A		Assembly A		Assembly B		Assembly B	
Cv		150 psi Close-off		100 psi Close-off - 4-6 50 psi Close-off - 8-12		150 psi Close-off		100 psi Close-off - 4-6 50 psi Close-off - 8-12	
Run	Size	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
58	54	2"	BV3W02FS2LAXXXX	—	BV3W02FS2LBXXXX	—	—	—	—
135	114	2-1/2"	BV3W25FS2LAXXXX	—	BV3W25FS2LBXXXX	—	—	—	—
165	148*	3"	BV3W03FS2LAXXXX	—	BV3W03FS2LBXXXX	—	—	—	—
419	348*	4"	BV3W04FS2LAXXXX	BV3W04US2LAXXXX	BV3W04FS2LBXXXX	BV3W04US2LBXXXX	BV3W04US2LBXXXX	BV3W04US2LBXXXX	BV3W04US2LBXXXX
740	600*	5"	BV3W05FS2LAXXXX	BV3W05US2LAXXXX	BV3W05FS2LBXXXX	BV3W05US2LBXXXX	BV3W05US2LBXXXX	BV3W05US2LBXXXX	BV3W05US2LBXXXX
1051	867*	6"	BV3W06FS2LAXXXX	BV3W06US2LAXXXX	BV3W06FS2LBXXXX	BV3W06US2LBXXXX	BV3W06US2LBXXXX	BV3W06US2LBXXXX	BV3W06US2LBXXXX
1661	1424*	8"	—	BV3W08US2LAXXXX	—	—	BV3W08US2LBXXXX	—	BV3W08US2LBXXXX
2439	2132*	10"	—	BV3W10US2LAXXXX	—	—	BV3W10US2LBXXXX	—	BV3W10US2LBXXXX
3401	3019*	12"	—	BV3W12US2LAXXXX	—	—	BV3W12US2LBXXXX	—	BV3W12US2LBXXXX
Base Model									
		Assembly C		Assembly C		Assembly D		Assembly D	
58	54	2"	BV3W02FS2LCXXXX	—	BV3W02FS2LDXXXX	—	—	—	—
135	114	2-1/2"	BV3W25FS2LCXXXX	—	BV3W25FS2LDXXXX	—	—	—	—
165	148*	3"	BV3W03FS2LCXXXX	—	BV3W03FS2LDXXXX	—	—	—	—
419	348*	4"	BV3W04FS2LCXXXX	BV3W04US2LCXXXX	BV3W04FS2LDXXXX	BV3W04US2LDXXXX	BV3W04US2LDXXXX	BV3W04US2LDXXXX	BV3W04US2LDXXXX
740	600*	5"	BV3W05FS2LCXXXX	BV3W05US2LCXXXX	BV3W05FS2LDXXXX	BV3W05US2LDXXXX	BV3W05US2LDXXXX	BV3W05US2LDXXXX	BV3W05US2LDXXXX
1051	867*	6"	BV3W06FS2LCXXXX	BV3W06US2LCXXXX	BV3W06FS2LDXXXX	BV3W06US2LDXXXX	BV3W06US2LDXXXX	BV3W06US2LDXXXX	BV3W06US2LDXXXX
1661	1424*	8"	—	BV3W08US2LCXXXX	—	—	BV3W08US2LDXXXX	—	BV3W08US2LDXXXX
2439	2132*	10"	—	BV3W10US2LCXXXX	—	—	BV3W10US2LDXXXX	—	BV3W10US2LDXXXX
3401	3019*	12"	—	BV3W12US2LCXXXX	—	—	BV3W12US2LDXXXX	—	BV3W12US2LDXXXX
Positioner									
		Assembly A		Assembly A		Assembly B		Assembly B	
58	54	2"	BV3W02FS2LAPXXX	—	BV3W02FS2LBPXXX	—	—	—	—
135	114	2-1/2"	BV3W25FS2LAPXXX	—	BV3W25FS2LBPXXX	—	—	—	—
165	148*	3"	BV3W03FS2LAPXXX	—	BV3W03FS2LBPXXX	—	—	—	—
419	348*	4"	BV3W04FS2LAPXXX	BV3W04US2LAPXXX	BV3W04FS2LBPXXX	BV3W04US2LBPXXX	BV3W04US2LBPXXX	BV3W04US2LBPXXX	BV3W04US2LBPXXX
740	600*	5"	BV3W05FS2LAPXXX	BV3W05US2LAPXXX	BV3W05FS2LBPXXX	BV3W05US2LBPXXX	BV3W05US2LBPXXX	BV3W05US2LBPXXX	BV3W05US2LBPXXX
1051	867*	6"	BV3W06FS2LAPXXX	BV3W06US2LAPXXX	BV3W06FS2LBPXXX	BV3W06US2LBPXXX	BV3W06US2LBPXXX	BV3W06US2LBPXXX	BV3W06US2LBPXXX
1661	1424*	8"	—	BV3W08US2LAPXXX	—	—	BV3W08US2LBPXXX	—	BV3W08US2LBPXXX
2439	2132*	10"	—	BV3W10US2LAPXXX	—	—	BV3W10US2LBPXXX	—	BV3W10US2LBPXXX
3401	3019*	12"	—	BV3W12US2LAPXXX	—	—	BV3W12US2LBPXXX	—	BV3W12US2LBPXXX
		Assembly C		Assembly C		Assembly D		Assembly D	
58	54	2"	BV3W02FS2LCPXXX	—	BV3W02FS2LDPXXX	—	—	—	—
135	114	2-1/2"	BV3W25FS2LCPXXX	—	BV3W25FS2LDPXXX	—	—	—	—
165	148*	3"	BV3W03FS2LCPXXX	—	BV3W03FS2LDPXXX	—	—	—	—
419	348*	4"	BV3W04FS2LCPXXX	BV3W04US2LCPXXX	BV3W04FS2LDPXXX	BV3W04US2LDPXXX	BV3W04US2LDPXXX	BV3W04US2LDPXXX	BV3W04US2LDPXXX
740	600*	5"	BV3W05FS2LCPXXX	BV3W05US2LCPXXX	BV3W05FS2LDPXXX	BV3W05US2LDPXXX	BV3W05US2LDPXXX	BV3W05US2LDPXXX	BV3W05US2LDPXXX
1051	867*	6"	BV3W06FS2LCPXXX	BV3W06US2LCPXXX	BV3W06FS2LDPXXX	BV3W06US2LDPXXX	BV3W06US2LDPXXX	BV3W06US2LDPXXX	BV3W06US2LDPXXX
1661	1424*	8"	—	BV3W08US2LCPXXX	—	—	BV3W08US2LDPXXX	—	BV3W08US2LDPXXX
2439	2132*	10"	—	BV3W10US2LCPXXX	—	—	BV3W10US2LDPXXX	—	BV3W10US2LDPXXX
3401	3019*	12"	—	BV3W12US2LCPXXX	—	—	BV3W12US2LDPXXX	—	BV3W12US2LDPXXX

Table Note

*3-through 12-inch valves only rotate 70° max.

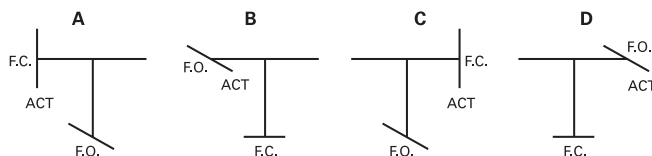
3-way Assembly Configurations

Key

F.C. Fail Closed

F.O. Fail Open

ACT Actuator Location



2 to 12" Siemens butterfly

3-way Pneumatic SR

		Assembly A		Assembly A		Assembly B		Assembly B	
Cv		150 psi Close-off		100 psi Close-off - 4-6 50 psi Close-off - 8-12		150 psi Close-off		100 psi Close-off - 4-6 50 psi Close-off - 8-12	
Run	Size	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
58	54	2"	BV3W02FS2LATXXX	—	BV3W02FS2LBTXXX	—	—	—	—
135	114	2-1/2"	BV3W25FS2LATXXX	—	BV3W25FS2LBTXXX	—	—	—	—
165	148*	3"	BV3W03FS2LATXXX	—	BV3W03FS2LBTXXX	—	—	—	—
419	348*	4"	BV3W04FS2LATXXX	BV3W04US2LATXXX	BV3W04FS2LBTXXX	BV3W04US2LBTXXX	BV3W04US2LBTXXX	BV3W04US2LBTXXX	BV3W04US2LBTXXX
740	600*	5"	BV3W05FS2LATXXX	BV3W05US2LATXXX	BV3W05FS2LBTXXX	BV3W05US2LBTXXX	BV3W05US2LBTXXX	BV3W05US2LBTXXX	BV3W05US2LBTXXX
1051	867*	6"	BV3W06FS2LATXXX	BV3W06US2LATXXX	BV3W06FS2LBTXXX	BV3W06US2LBTXXX	BV3W06US2LBTXXX	BV3W06US2LBTXXX	BV3W06US2LBTXXX
1661	1424*	8"	—	BV3W08US2LATXXX	—	—	BV3W08US2LBTXXX	BV3W08US2LBTXXX	BV3W08US2LBTXXX
2439	2132*	10"	—	BV3W10US2LATXXX	—	—	BV3W10US2LBTXXX	BV3W10US2LBTXXX	BV3W10US2LBTXXX
3401	3019*	12"	—	BV3W12US2LATXXX	—	—	BV3W12US2LBTXXX	BV3W12US2LBTXXX	BV3W12US2LBTXXX
		Assembly C		Assembly C		Assembly D		Assembly D	
58	54	2"	BV3W02FS2LCTXXX	—	BV3W02FS2LDTXXX	—	—	—	—
135	114	2-1/2"	BV3W25FS2LCTXXX	—	BV3W25FS2LDTXXX	—	—	—	—
165	148*	3"	BV3W03FS2LCTXXX	—	BV3W03FS2LDTXXX	—	—	—	—
419	348*	4"	BV3W04FS2LCTXXX	BV3W04US2LCTXXX	BV3W04FS2LDTXXX	BV3W04US2LDTXXX	BV3W04US2LDTXXX	BV3W04US2LDTXXX	BV3W04US2LDTXXX
740	600	5"	BV3W05FS2LCTXXX	BV3W05US2LCTXXX	BV3W05FS2LDTXXX	BV3W05US2LDTXXX	BV3W05US2LDTXXX	BV3W05US2LDTXXX	BV3W05US2LDTXXX
1051	867*	6"	BV3W06FS2LCTXXX	BV3W06US2LCTXXX	BV3W06FS2LDTXXX	BV3W06US2LDTXXX	BV3W06US2LDTXXX	BV3W06US2LDTXXX	BV3W06US2LDTXXX
1661	1424*	8"	—	BV3W08US2LCTXXX	—	—	BV3W08US2LDTXXX	BV3W08US2LDTXXX	BV3W08US2LDTXXX
2439	2132*	10"	—	BV3W10US2LCTXXX	—	—	BV3W10US2LDTXXX	BV3W10US2LDTXXX	BV3W10US2LDTXXX
3401	3019*	12"	—	BV3W12US2LCTXXX	—	—	BV3W12US2LDTXXX	BV3W12US2LDTXXX	BV3W12US2LDTXXX
		Assembly A		Assembly A		Assembly B		Assembly B	
58	54	2"	BV3W02FS2LAUXXX	—	BV3W02FS2LBUXXX	—	—	—	—
135	114	2-1/2"	BV3W25FS2LAUXXX	—	BV3W25FS2LBUXXX	—	—	—	—
165	148*	3"	BV3W03FS2LAUXXX	—	BV3W03FS2LBUXXX	—	—	—	—
419	348*	4"	BV3W04FS2LAUXXX	BV3W04US2LAUXXX	BV3W04FS2LBUXXX	BV3W04US2LBUXXX	BV3W04US2LBUXXX	BV3W04US2LBUXXX	BV3W04US2LBUXXX
740	600*	5"	BV3W05FS2LAUXXX	BV3W05US2LAUXXX	BV3W05FS2LBUXXX	BV3W05US2LBUXXX	BV3W05US2LBUXXX	BV3W05US2LBUXXX	BV3W05US2LBUXXX
1051	867*	6"	BV3W06FS2LAUXXX	BV3W06US2LAUXXX	BV3W06FS2LBUXXX	BV3W06US2LBUXXX	BV3W06US2LBUXXX	BV3W06US2LBUXXX	BV3W06US2LBUXXX
1661	1424*	8"	—	BV3W08US2LAUXXX	—	—	BV3W08US2LBUXXX	BV3W08US2LBUXXX	BV3W08US2LBUXXX
2439	2132*	10"	—	BV3W10US2LAUXXX	—	—	BV3W10US2LBUXXX	BV3W10US2LBUXXX	BV3W10US2LBUXXX
3401	3019*	12"	—	BV3W12US2LAUXXX	—	—	BV3W12US2LBUXXX	BV3W12US2LBUXXX	BV3W12US2LBUXXX
		Assembly C		Assembly C		Assembly D		Assembly D	
58	54	2"	BV3W02FS2LCUXXX	—	BV3W02FS2LDUXXX	—	—	—	—
135	114	2-1/2"	BV3W25FS2LCUXXX	—	BV3W25FS2LDUXXX	—	—	—	—
165	148*	3"	BV3W03FS2LCUXXX	—	BV3W03FS2LDUXXX	—	—	—	—
419	348*	4"	BV3W04FS2LCUXXX	BV3W04US2LCUXXX	BV3W04FS2LDUXXX	BV3W04US2LDUXXX	BV3W04US2LDUXXX	BV3W04US2LDUXXX	BV3W04US2LDUXXX
740	600	5"	BV3W05FS2LCUXXX	BV3W05US2LCUXXX	BV3W05FS2LDUXXX	BV3W05US2LDUXXX	BV3W05US2LDUXXX	BV3W05US2LDUXXX	BV3W05US2LDUXXX
1051	867*	6"	BV3W06FS2LCUXXX	BV3W06US2LCUXXX	BV3W06FS2LDUXXX	BV3W06US2LDUXXX	BV3W06US2LDUXXX	BV3W06US2LDUXXX	BV3W06US2LDUXXX
1661	1424*	8"	—	BV3W08US2LCUXXX	—	—	BV3W08US2LDUXXX	BV3W08US2LDUXXX	BV3W08US2LDUXXX
2439	2132*	10"	—	BV3W10US2LCUXXX	—	—	BV3W10US2LDUXXX	BV3W10US2LDUXXX	BV3W10US2LDUXXX
3401	3019*	12"	—	BV3W12US2LCUXXX	—	—	BV3W12US2LDUXXX	BV3W12US2LDUXXX	BV3W12US2LDUXXX

120 V EP Valve

24 V EP Valve

Table Note

*3-through 12-inch valves only rotate 70° max.

These selection tables only contain lug end connections with standard trim.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

2 to 12" Siemens

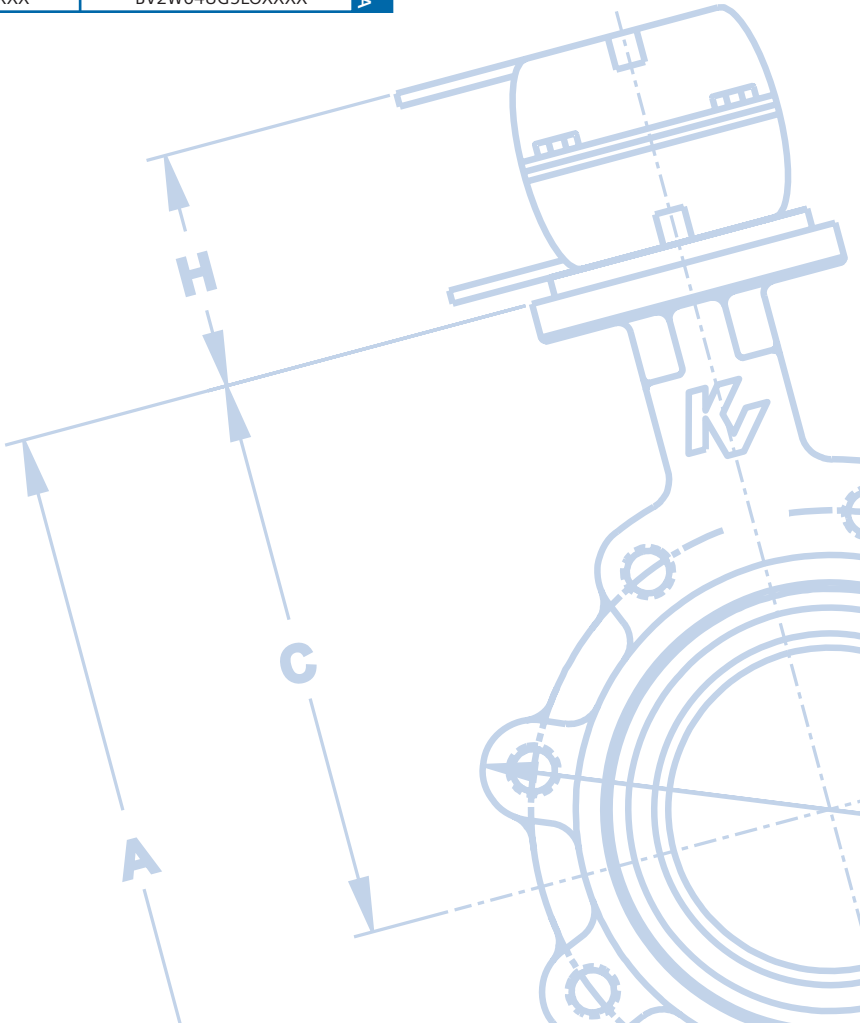
butterfly

These selection tables only contain lug end connections with standard trim.

For complete selection, refer to the current edition of Master HVAC Products Catalog.

2-way Electric SR

		Normally Closed (Fail Closed)	Normally Open (Fail Open)	
		100 psi Close-off	100 psi Close-off	
Cv	Size	Part No.	Part No.	
60	2"	BV2W02UG1LCXXX	BV2W02UG1LOXXX	120 Vac On/Off
151	2-1/2"	BV2W25UG1LCXXX	BV2W25UG1LOXXX	
262	3"	BV2W03UG1LCXXX	BV2W03UG1LOXXX	
647	4"	BV2W04UG1LCXXX	BV2W04UG1LOXXX	
60	2"	BV2W02UG2LCXXX	BV2W02UG2LOXXX	24 Vac On/Off
151	2-1/2"	BV2W25UG2LCXXX	BV2W25UG2LOXXX	
262	3"	BV2W03UG2LCXXX	BV2W03UG2LOXXX	
647	4"	BV2W04UG2LCXXX	BV2W04UG2LOXXX	
60	2"	BV2W02UG3LCXXX	BV2W02UG3LOXXX	24 Vac Floating
151	2-1/2"	BV2W25UG3LCXXX	BV2W25UG3LOXXX	
262	3"	BV2W03UG3LCXXX	BV2W03UG3LOXXX	
647	4"	BV2W04UG3LCXXX	BV2W04UG3LOXXX	
60	2"	BV2W02UG4LCXXX	BV2W02UG4LOXXX	24 Vac Mod. 0-10 V
151	2-1/2"	BV2W25UG4LCXXX	BV2W25UG4LOXXX	
262	3"	BV2W03UG4LCXXX	BV2W03UG4LOXXX	
647	4"	BV2W04UG4LCXXX	BV2W04UG4LOXXX	
60	2"	BV2W02UG5LCXXX	BV2W02UG5LOXXX	24 Vac Mod. 4-20 mA
151	2-1/2"	BV2W25UG5LCXXX	BV2W25UG5LOXXX	
262	3"	BV2W03UG5LCXXX	BV2W03UG5LOXXX	
647	4"	BV2W04UG5LCXXX	BV2W04UG5LOXXX	



2 to 12" Siemens

butterfly

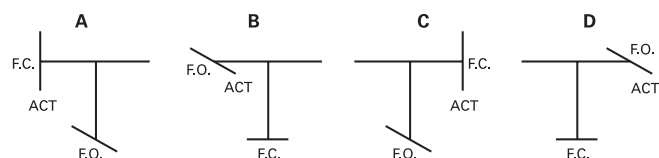
3-way Electric SR

			Assembly A	Assembly B	Assembly C	Assembly D	
Cv			100 psi Close-off	100 psi Close-off	100 psi Close-off	100 psi Close-off	
Run	Branch	Size	Part No.	Part No.	Part No.	Part No.	
58	54	2"	BV3W02UG1LAXXXX	BV3W02UG1LBXXXX	BV3W02UG1LCXXXX	BV3W02UG1LDXXXX	120 Vac On/Off
135	114	2-1/2"	BV3W25UG1LAXXXX	BV3W25UG1LBXXXX	BV3W25UG1LCXXXX	BV3W25UG1LDXXXX	
229	188	3"	BV3W03UG1LAXXXX	BV3W03UG1LBXXXX	BV3W03UG1LCXXXX	BV3W03UG1LDXXXX	
511	385	4"	BV3W04UG1LAXXXX	BV3W04UG1LBXXXX	BV3W04UG1LCXXXX	BV3W04UG1LDXXXX	
58	54	2"	BV3W02UG2LAXXXX	BV3W02UG2LBXXXX	BV3W02UG2LCXXXX	BV3W02UG2LDXXXX	24 Vac On/Off
135	114	2-1/2"	BV3W25UG2LAXXXX	BV3W25UG2LBXXXX	BV3W25UG2LCXXXX	BV3W25UG2LDXXXX	
229	188	3"	BV3W03UG2LAXXXX	BV3W03UG2LBXXXX	BV3W03UG2LCXXXX	BV3W03UG2LDXXXX	
511	385	4"	BV3W04UG2LAXXXX	BV3W04UG2LBXXXX	BV3W04UG2LCXXXX	BV3W04UG2LDXXXX	
58	54	2"	BV3W02UG3LAXXXX	BV3W02UG3LBXXXX	BV3W02UG3LCXXXX	BV3W02UG3LDXXXX	24 Vac Floating
135	114	2-1/2"	BV3W25UG3LAXXXX	BV3W25UG3LBXXXX	BV3W25UG3LCXXXX	BV3W25UG3LDXXXX	
229	188	3"	BV3W03UG3LAXXXX	BV3W03UG3LBXXXX	BV3W03UG3LCXXXX	BV3W03UG3LDXXXX	
511	385	4"	BV3W04UG3LAXXXX	BV3W04UG3LBXXXX	BV3W04UG3LCXXXX	BV3W04UG3LDXXXX	
58	54	2"	BV3W02UG4LAXXXX	BV3W02UG4LBXXXX	BV3W02UG4LCXXXX	BV3W02UG4LDXXXX	24 Vac Mod. 0-10 V
135	114	2-1/2"	BV3W25UG4LAXXXX	BV3W25UG4LBXXXX	BV3W25UG4LCXXXX	BV3W25UG4LDXXXX	
229	188	3"	BV3W03UG4LAXXXX	BV3W03UG4LBXXXX	BV3W03UG4LCXXXX	BV3W03UG4LDXXXX	
511	385	4"	BV3W04UG4LAXXXX	BV3W04UG4LBXXXX	BV3W04UG4LCXXXX	BV3W04UG4LDXXXX	
58	54	2"	BV3W02UG5LAXXXX	BV3W02UG5LBXXXX	BV3W02UG5LCXXXX	BV3W02UG5LDXXXX	24 Vac Mod. 4-20 mA
135	114	2-1/2"	BV3W25UG5LAXXXX	BV3W25UG5LBXXXX	BV3W25UG5LCXXXX	BV3W25UG5LDXXXX	
229	188	3"	BV3W03UG5LAXXXX	BV3W03UG5LBXXXX	BV3W03UG5LCXXXX	BV3W03UG5LDXXXX	
511	385	4"	BV3W04UG5LAXXXX	BV3W04UG5LBXXXX	BV3W04UG5LCXXXX	BV3W04UG5LDXXXX	

These selection tables only contain lug end connections with standard trim.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

3-way Assembly Configurations



Key

F.C. Fail Closed
F.O. Fail Open
ACT Actuator Location

2 to 12" **Siemens** butterfly

2-way Electric NSR

These selection tables only contain lug end connections with standard trim.

For complete selection, refer to the current edition of Master HVAC Products Catalog.

		Non-Fail Safe	Non-Fail Safe
		150 psi Close-off, 120 Vac	2-6 100 psi Close-off, 24 Vac 8-12 50 psi Close-off, 120 Vac
Cv	Size	Part No.	Part No.
60	2"	BV2W02FE2LNXXXX	BV2W02UG6LNXXXX
151	2-1/2"	BV2W25FE2LNXXXX	BV2W25UG6LNXXXX
262	3"	BV2W03FE2LNXXXX	BV2W03UG6LNXXXX
647	4"	BV2W04FE2LNXXXX	BV2W04UG6LNXXXX
1141	5"	BV2W05FE2LNXXXX	BV2W05UG6LNXXXX
1580	6"	BV2W06FE2LNXXXX	BV2W06UG6LNXXXX
2892	8"	BV2W08FE2LNXXXX	BV2W08UE2LNXXXX
4593	10"	BV2W10FE2LNXXXX	BV2W10UE2LNXXXX
6682	12"	BV2W12FE2LNXXXX	BV2W12UE2LNXXXX
60	2"	BV2W02FEMLNXXHX	BV2W02UG7LNXXXX
151	2-1/2"	BV2W25FEMLNXXHX	BV2W25UG7LNXXXX
262	3"	BV2W03FEMLNXXHX	BV2W03UG7LNXXXX
647	4"	BV2W04FEMLNXXHX	BV2W04UG7LNXXXX
1141	5"	BV2W05FEMLNXXHX	BV2W05UG7LNXXXX
1580	6"	BV2W06FEMLNXXHX	BV2W06UG7LNXXXX
2892	8"	BV2W08FEMLNXXHX	BV2W08UEMLNXXHX
4593	10"	BV2W10FEMLNXXHX	BV2W10UEMLNXXHX
6682	12"	BV2W12FEMLNXXHX	BV2W12UEMLNXXHX
60	2"	BV2W02FEPLNXXHX	BV2W02UG8LNXXXX
151	2-1/2"	BV2W25FEPLNXXHX	BV2W25UG8LNXXXX
262	3"	BV2W03FEPLNXXHX	BV2W03UG8LNXXXX
647	4"	BV2W04FEPLNXXHX	BV2W04UG8LNXXXX
1141	5"	BV2W05FEPLNXXHX	BV2W05UG8LNXXXX
1580	6"	BV2W06FEPLNXXHX	BV2W06UG8LNXXXX
2892	8"	BV2W08FEPLNXXHX	BV2W08UEPLNXXHX
4593	10"	BV2W10FEPLNXXHX	BV2W10UEPLNXXHX
6682	12"	BV2W12FEPLNXXHX	BV2W12UEPLNXXHX

Floating/2-position

Modulating 0-10 V

Modulating 4-20 mA

2 to 12" **Siemens** butterfly

3-way Electric NSR

			Assembly A	Assembly A	Assembly B	Assembly B
Cv			150 psi Close-off, 120 Vac	100 psi Close-off, 24 Vac 50 psi Close-off, 120 Vac	150 psi Close-off, 120 Vac	100 psi Close-off, 24 Vac 50 psi Close-off, 120 Vac
Run	Branch	Size	Part No.	Part No.	Part No.	Part No.
58	54	2"	BV3W02FE2LAXXXX	BV3W02UG6LAXXXX	BV3W02FE2LBXXXX	BV3W02UG6LBXXXX
135	114	2-1/2"	BV3W25FE2LAXXXX	BV3W25UG6LAXXXX	BV3W25FE2LBXXXX	BV3W25UG6LBXXXX
229	188	3"	BV3W03FE2LAXXXX	BV3W03UG6LAXXXX	BV3W03FE2LBXXXX	BV3W03UG6LBXXXX
511	385	4"	BV3W04FE2LAXXXX	BV3W04UG6LAXXXX	BV3W04FE2LBXXXX	BV3W04UG6LBXXXX
870	642	5"	BV3W05FE2LAXXXX	BV3W05UG6LAXXXX	BV3W05FE2LBXXXX	BV3W05UG6LBXXXX
1242	935	6"	BV3W06FE2LAXXXX	BV3W06UG6LAXXXX	BV3W06FE2LBXXXX	BV3W06UG6LBXXXX
2254	1688	8"	BV3W08FE2LAXXXX	BV3W08UE2LAXXXX	BV3W08FE2LBXXXX	BV3W08UE2LBXXXX
3570	2667	10"	BV3W10FE2LAXXXX	BV3W10UE2LAXXXX	BV3W10FE2LBXXXX	BV3W10UE2LBXXXX
5240	3938	12"	BV3W12FE2LAXXXX	BV3W12UE2LAXXXX	BV3W12FE2LBXXXX	BV3W12UE2LBXXXX
			Assembly C	Assembly C	Assembly D	Assembly D
58	54	2"	BV3W02FE2LCXXXX	BV3W02UG6LCXXXX	BV3W02FE2LDXXXX	BV3W02UG6LDXXXX
135	114	2-1/2"	BV3W25FE2LCXXXX	BV3W25UG6LCXXXX	BV3W25FE2LDXXXX	BV3W25UG6LDXXXX
229	188	3"	BV3W03FE2LCXXXX	BV3W03UG6LCXXXX	BV3W03FE2LDXXXX	BV3W03UG6LDXXXX
511	385	4"	BV3W04FE2LCXXXX	BV3W04UG6LCXXXX	BV3W04FE2LDXXXX	BV3W04UG6LDXXXX
870	642	5"	BV3W05FE2LCXXXX	BV3W05UG6LCXXXX	BV3W05FE2LDXXXX	BV3W05UG6LDXXXX
1242	935	6"	BV3W06FE2LCXXXX	BV3W06UG6LCXXXX	BV3W06FE2LDXXXX	BV3W06UG6LDXXXX
2254	1688	8"	BV3W08FE2LCXXXX	BV3W08UE2LCXXXX	BV3W08FE2LDXXXX	BV3W08UE2LDXXXX
3570	2667	10"	BV3W10FE2LCXXXX	BV3W10UE2LCXXXX	BV3W10FE2LDXXXX	BV3W10UE2LDXXXX
5240	3938	12"	BV3W12FE2LCXXXX	BV3W12UE2LCXXXX	BV3W12FE2LDXXXX	BV3W12UE2LDXXXX

Floating 2-position

3-way Assembly Configurations



Key

F.C. Fail Closed
F.O. Fail Open
ACT Actuator Location

These selection tables only contain lug end connections with standard trim.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

2 to 12" Siemens butterfly

3-way Electric NSR

			Assembly A		Assembly A		Assembly B		Assembly B	
Cv			150 psi Close-off		100 psi Close-off, 24 Vac 50 psi Close-off, 120 Vac		150 psi Close-off, 120 Vac		100 psi Close-off, 24 Vac 50 psi Close-off, 120 Vac	
Run	Branch	Size	Part No.	Fig.	Part No.	Fig.	Part No.	Fig.	Part No.	Fig.
58	54	2"	BV3W02FEMLAXXHX	6	BV3W02UG7LAXXXX	4	BV3W02FEMLBXXHX	6	BV3W02UG7LBXXXX	4
135	114	2-1/2"	BV3W25FEMLAXXHX	6	BV3W25UG7LAXXXX	4	BV3W25FEMLBXXHX	6	BV3W25UG7LBXXXX	4
229	188	3"	BV3W03FEMLAXXHX	6	BV3W03UG7LAXXXX	4	BV3W03FEMLBXXHX	6	BV3W03UG7LBXXXX	4
511	385	4"	BV3W04FEMLAXXHX	6	BV3W04UG7LAXXXX	4	BV3W04FEMLBXXHX	6	BV3W04UG7LBXXXX	4
870	642	5"	BV3W05FEMLAXXHX	6	BV3W05UG7LAXXXX	4	BV3W05FEMLBXXHX	6	BV3W05UG7LBXXXX	4
1242	935	6"	BV3W06FEMLAXXHX	6	BV3W06UG7LAXXXX	4	BV3W06FEMLBXXHX	6	BV3W06UG7LBXXXX	4
2254	1688	8"	BV3W08FEMLAXXHX	6	BV3W08UEMLAXXHX	6	BV3W08FEMLBXXHX	6	BV3W08UEMLBXXHX	6
3570	2667	10"	BV3W10FEMLAXXHX	6	BV3W10UEMLAXXHX	6	BV3W10FEMLBXXHX	6	BV3W10UEMLBXXHX	6
5240	3938	12"	BV3W12FEMLAXXHX	6	BV3W12UEMLAXXHX	6	BV3W12FEMLBXXHX	6	BV3W12UEMLBXXHX	6
			Assembly C		Assembly C		Assembly D		Assembly D	
58	54	2"	BV3W02FEMLCXXHX	6	BV3W02UG7LCXXXX	4	BV3W02FEMLDXXHX	6	BV3W02UG7LDXXXX	4
135	114	2-1/2"	BV3W25FEMLCXXHX	6	BV3W25UG7LCXXXX	4	BV3W25FEMLDXXHX	6	BV3W25UG7LDXXXX	4
229	188	3"	BV3W03FEMLCXXHX	6	BV3W03UG7LCXXXX	4	BV3W03FEMLDXXHX	6	BV3W03UG7LDXXXX	4
511	385	4"	BV3W04FEMLCXXHX	6	BV3W04UG7LCXXXX	4	BV3W04FEMLDXXHX	6	BV3W04UG7LDXXXX	4
870	642	5"	BV3W05FEMLCXXHX	6	BV3W05UG7LCXXXX	4	BV3W05FEMLDXXHX	6	BV3W05UG7LDXXXX	4
1242	935	6"	BV3W06FEMLCXXHX	6	BV3W06UG7LCXXXX	4	BV3W06FEMLDXXHX	6	BV3W06UG7LDXXXX	4
2254	1688	8"	BV3W08FEMLCXXHX	6	BV3W08UEMLCXXHX	6	BV3W08FEMLDXXHX	6	BV3W08UEMLDXXHX	6
3570	2667	10"	BV3W10FEMLCXXHX	6	BV3W10UEMLCXXHX	6	BV3W10FEMLDXXHX	6	BV3W10UEMLDXXHX	6
5240	3938	12"	BV3W12FEMLCXXHX	6	BV3W12UEMLCXXHX	6	BV3W12FEMLDXXHX	6	BV3W12UEMLDXXHX	6
			Assembly A		Assembly A		Assembly B		Assembly B	
58	54	2"	BV3W02FEPLAXXHX	6	BV3W02UG8LAXXXX	4	BV3W02FEPLBXXHX	6	BV3W02UG8LBXXXX	4
135	114	2-1/2"	BV3W25FEPLAXXHX	6	BV3W25UG8LAXXXX	4	BV3W25FEPLBXXHX	6	BV3W25UG8LBXXXX	4
229	188	3"	BV3W03FEPLAXXHX	6	BV3W03UG8LAXXXX	4	BV3W03FEPLBXXHX	6	BV3W03UG8LBXXXX	4
511	385	4"	BV3W04FEPLAXXHX	6	BV3W04UG8LAXXXX	4	BV3W04FEPLBXXHX	6	BV3W04UG8LBXXXX	4
870	642	5"	BV3W05FEPLAXXHX	6	—	4	BV3W05FEPLBXXHX	6	—	4
1242	935	6"	BV3W06FEPLAXXHX	6	—	4	BV3W06FEPLBXXHX	6	—	4
2254	1688	8"	BV3W08FEPLAXXHX	6	BV3W08UEPLAXXHX	6	BV3W08FEPLBXXHX	6	BV3W08UEPLBXXHX	6
3570	2667	10"	BV3W10FEPLAXXHX	6	BV3W10UEPLAXXHX	6	BV3W10FEPLBXXHX	6	BV3W10UEPLBXXHX	6
5240	3938	12"	BV3W12FEPLAXXHX	6	BV3W12UEPLAXXHX	6	BV3W12FEPLBXXHX	6	BV3W12UEPLBXXHX	6
			Assembly C		Assembly C		Assembly D		Assembly D	
58	54	2"	BV3W02FEPLCXXHX	6	BV3W02UG8LCXXXX	4	BV3W02FEPLDXXHX	6	BV3W02UG8LDXXXX	4
135	114	2-1/2"	BV3W25FEPLCXXHX	6	BV3W25UG8LCXXXX	4	BV3W25FEPLDXXHX	6	BV3W25UG8LDXXXX	4
229	188	3"	BV3W03FEPLCXXHX	6	BV3W03UG8LCXXXX	4	BV3W03FEPLDXXHX	6	BV3W03UG8LDXXXX	4
511	385	4"	BV3W04FEPLCXXHX	6	BV3W04UG8LCXXXX	4	BV3W04FEPLDXXHX	6	BV3W04UG8LDXXXX	4
870	642	5"	BV3W05FEPLCXXHX	6	—	4	BV3W05FEPLDXXHX	6	—	4
1242	935	6"	BV3W06FEPLCXXHX	6	—	4	BV3W06FEPLDXXHX	6	—	4
2254	1688	8"	BV3W08FEPLCXXHX	6	BV3W08UEPLCXXHX	6	BV3W08FEPLDXXHX	6	BV3W08UEPLDXXHX	6
3570	2667	10"	BV3W10FEPLCXXHX	6	BV3W10UEPLCXXHX	6	BV3W10FEPLDXXHX	6	BV3W10UEPLDXXHX	6
5240	3938	12"	BV3W12FEPLCXXHX	6	BV3W12UEPLCXXHX	6	BV3W12FEPLDXXHX	6	BV3W12UEPLDXXHX	6

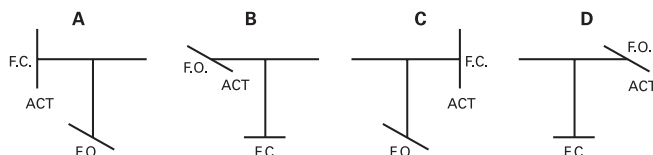
Modulating 0-10 V

Modulating 4-20 mA

These selection tables only contain lug end connections with standard trim.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

3-way Assembly Configurations



Key
F.C. Fail Closed
F.O. Fail Open
ACT Actuator Location

Submittal summary quick reference

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Submittal summary **siemens 599 Series**

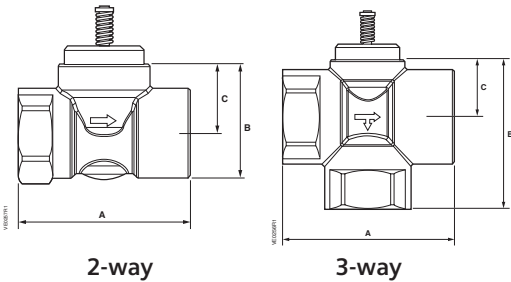
1/2 to 1-inch Two- and Three-way Zone Valves

The 599 Series Two-way and Three-way Zone Valves with a 1/10-inch (2.5 mm) stroke. The 599 Series Zone Valves work with any SF Series, or SSA Series electric actuator, or with the ST Series Thermic actuator. The actuators accept one of either 24 Vac, 120 Vac, 208 Vac or 277 Vac power supply signal to provide two-position, three-position or 0 to10 Vdc control.

Features

- All metal plug and seat for superior control
- Direct-coupled universal bonnet—install actuators without tools
- Sweat or NPT end connections
- Order separately or with an actuator as a complete assembly

Specifications	
Line size	1/2 to 1-inch (15 to 25 mm)
Body style	Globe
Action	
2-way	NO/NC determined by actuator
3-way	Diverting/Mixing (limited application)
Valve body rating	ANSI Class 125
Stem travel (stroke)	1/10-inch (2.5 mm)
Materials	
Body	Brass
Body trim	Brass
Stem	Stainless steel ASTM A582 Type 303
Packing	Ethylene propylene O-ring
Controlled medium	Water, glycol solutions to 50%
Medium temperature range	34 to 230°F (1 to 110°C)
Maximum inlet pressure	125 psig
Leakage rate	ANSI Class III
Close-off ratings	According to ANSI/FCI 70-2
Flow characteristic	Linear



Dimensions

Conn.	Valve Size in. (mm)	2-way Valve				3-way Valve			
		A	B	C	Weight lb. (kg)	A	B	C	Weight lb. (kg)
NPT	0.5 (15)	2.76 (70)	1.63 (41.5)	1.00 (25.4)	0.82 (0.37)	2.76 (70)	2.34 (59.5)	1.00 (25.4)	1.08 (0.49)
	0.75 (20)	2.76 (70)	1.77 (45)	1.00 (25.4)	0.99 (0.45)	2.76 (70)	2.34 (59.5)	1.00 (25.4)	1.26 (0.57)
	1.0 (25)	3.50 (89)	2.10 (54)	1.00 (25.4)	1.68 (0.76)	3.50 (89)	2.85 (67.3)	1.00 (25.4)	2.14 (0.97)
Sweat	0.5 (15)	2.66 (66)	1.48 (38)	1.00 (25.4)	0.60 (0.27)	2.66 (68)	2.26 (57.5)	1.00 (25.4)	0.71 (0.32)
	0.75 (20)	2.76 (70)	1.63 (41.5)	1.00 (25.4)	0.71 (0.32)	2.76 (0.70)	2.34 (59.5)	1.00 (25.4)	0.86 (0.39)
	1.00 (25)	3.50 (89)	1.77 (45)	1.00 (25.4)	1.06 (0.48)	3.50 (89)	2.65 (67)	1.00 (25.4)	1.24 (0.56)

Table expressed in inches (mm).

Zone Valve Bodies

	Nominal Line Size		Flow Rate		Part No.	
	Inch	Mm	Cv	(Kvs)	NPT	Sweat
Two-way Valve Bodies	0.5	15	1.0	(0.85)	599-00210	599-00510
	0.5	15	2.5	(2.15)	599-00211	599-00511
	0.5	15	4.0	(3.4)	599-00214	599-00514
	0.75	20	4.1	(3.5)	599-00212	599-00512
	1.00	25	7.0	(6.0)	599-00213	599-00513
Three-way Valve Bodies	0.5	15	1.0	(0.85)	599-00230	599-00530
	0.5	15	2.5	(2.15)	599-00231	599-00531
	0.5	15	4.0	(3.4)	599-00234	599-00534
	0.75	20	4.1	(3.5)	599-00232	599-00532
	1.00	25	7.0	(6.0)	599-00233	599-00533

Zone Valve Actuators

Description			Part No.	Actuator Prefix Code
	2-way Valves	3-way Valves		
	120 Vac, 2-position NC	120 Vac, 2-position Fail AB+B	SFA11U	240
	120 Vac, 2-position NO	120 Vac, 2-position Fail AB+A	SFP11U	241
	24 Vac, 2-position NC	24 Vac, 2-position Fail AB+B	SFA71U	242
	24 Vac, 2-position NO	24 Vac, 2-position Fail AB+A	SFP71U	243
	24 Vac 3-position	24 Vac, 3-position	SSA81	244
	24 Vac, 0 to 10 Vdc, Modulating	24 Vac, 0-10 Vdc, Modulating	SSA61	245
	24 Vac/dc, 2-position NC	24 Vac/dc, 2-position Fail AB+B	STA71	246
	24 Vac/dc, 2-position NO	24 Vac/dc, 2-position Fail AB+A	STP71	247

Submittal summary

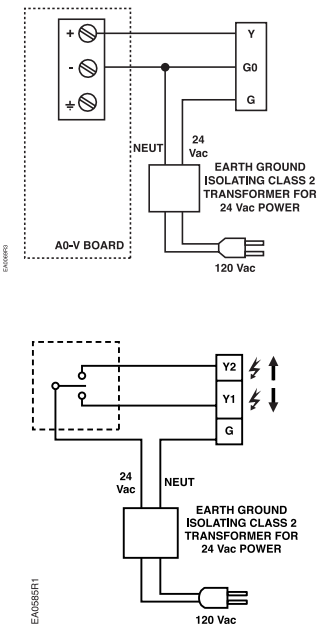
Siemens 599 Series

zone

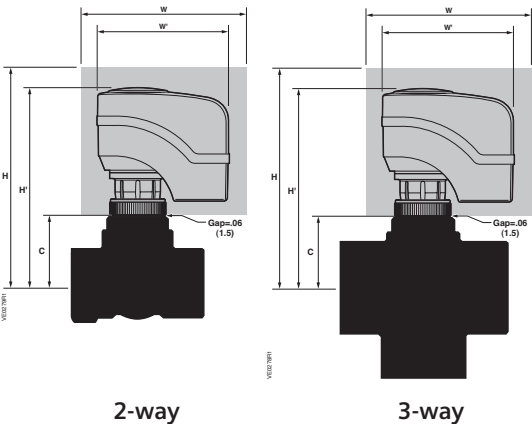
SSA Series Valve Actuator,
24 Vac 3-position or 0-10 V Control

The 599 Series SSA Electronic Valve Actuator requires a 24 Vac power supply and receives a 0 to 10 Vdc signal or a three-position control signal to control a valve. This actuator is designed to work with the 599 Series Zone Control Valves with a 1/10-inch (2.5 mm) stroke and a threaded valve bonnet that fits the actuator.

Wiring diagrams



Specifications	
Power supply	
Operating voltage	24 Vac ±20%
Frequency	50/60 Hz
Power consumption	
SSA81	0.8 VA
SSA61	2.0 VA
Agency certifications	CE Conformance
EMC directive	89/336/EEC
Low voltage direction	73/23/EEC
Function	
Running time	
SSA61	34 sec.
SSA81	150 sec.
Nominal stroke	1/10-inch (2.5 mm)
Nominal force	24 lb. (105N)
Ambient temperature	
Operation	41 to 122°F (5 to 50°C)
Transport and storage	-13 to +158°F (-25 to +70°C)
Medium temperature	32 to 212°F (0 to +100°C)
Dimensions	3.4" H X 4.4" W X 2.3" D (85.2 mm H X 111 mm W X 58 mm D)
Shipping weight	9 oz. (0.25 kg)



Part Nos.	Description	Part No.	Actuator Prefix Code
	24 Vac, 0-10 V, Normally Closed	SSA61	245
	24 Vac, 3-position, Normally Closed	SSA81	244

Valve Line Size	Valve Centerline to Top of Acuator H'		Service Height H		Valve Centerline to Actuator Coupling C		Width or Diameter of Actuator W'		Service Width W	
	2-way	3-way	2-way	3-way	2-way	3-way	2-way	3-way	2-way	3-way
0.5 (15)	4.26 (108.2)	4.26 (108.2)	12.26 (311.4)	12.26 (311.4)	1.00 (25.4)	1.00 (25.4)	3.26 (82.8)	3.26 (82.8)	11.26 (286.0)	11.26 (286.0)
0.75 (20)	4.26 (108.2)	4.26 (108.2)	12.26 (311.4)	12.26 (311.4)	1.00 (25.4)	1.00 (25.4)	3.26 (82.8)	3.26 (82.8)	11.26 (286.0)	11.26 (286.0)
1.00 (25)	4.26 (108.2)	4.26 (108.2)	12.26 (311.4)	12.26 (311.4)	1.00 (25.4)	1.00 (25.4)	3.26 (82.8)	3.26 (82.8)	11.26 (286.0)	11.26 (286.0)

Table expressed in inches (mm).

SF Series Electronic Valve Actuator, 24/120/208/277 Vac 2-position Control

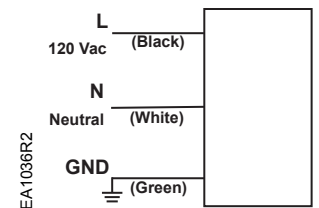
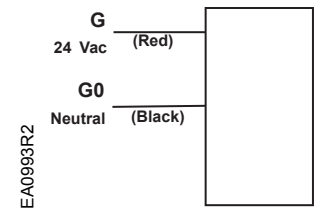


Specifications

Power supply	
Operating voltage	24 Vac $\pm 20\%$, 120 Vac $\pm 20\%$, 208 Vac, 277 Vac
Frequency	
24 Vac.....	50/60 Hz
120, 208, 277 Vac.....	60 Hz
Power consumption	
24/120 Vac.....	9.8 VA
208/277 Vac.....	10 VA
Function	
Running time.....	35 seconds
24/120 Vac.....	35 seconds
208/277 Vac.....	40 seconds
Nominal stroke	1/10-in. (2.5 mm)
Nominal force	24 lb. (105N)
Agency certifications	
UL listed to UL873	
cUL certified to Canadian Standard C22.2 No. 24-93	
Ambient temperature	
Operation	41 to 122°F (5 to 50°C)
Transport and storage	-13 to +158°F (-25 to +70°C)
Mounting location	
NEMA 1 (interior only)	
Noise	
<35 db	
Medium temperature	
34 to 230°F (1 to 110°C)	
Dimensions.....	
3.4" H X 4.4" W X 2.3" D	
(85.2 mm H X 111 mm W X 58 mm D)	
Shipping weight	
1.18 lb. (0.54 kg)	

The SF Series of Electronic Valve Actuators accepts 24 Vac, 120 Vac, 208 Vac or 277 Vac power supply signal to provide two-position control. This actuator works with Siemens 599 Series Zone Valves with 1/10-inch (2.5 mm) stroke.

Wiring diagrams

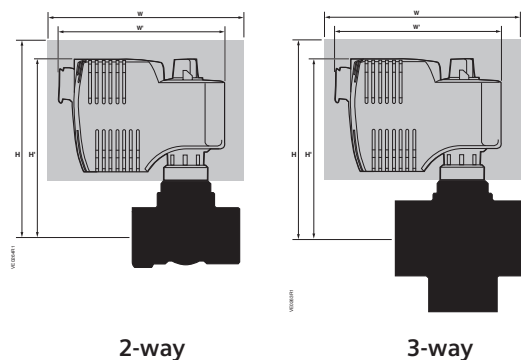


Part Nos.	Description	Part No.	Actuator Prefix Code	
	24 Vac	SFP71U	243	Normally Open
	120 Vac	SFP11U	241	
	208 Vac	SFP208U/25	*	
	277 Vac	SFP277U/25	*	
	24 Vac	SFA71U	242	Normally Closed
	120 Vac	SFA11U	240	
	208 Vac	SFA208U/25	*	
	277 Vac	SFA277U/25	*	

Ordering Note

- Part numbers with "/25" come with 8.2 ft. (2.5 m) leads.

*Actuator only; not available as an assembly



Valve Line Size	Valve Centerline to Top of Acuator H ¹		Service Height H		Width or Diameter of Actuator W ¹		Service Width W	
	2-way	3-way	2-way	3-way	2-way	3-way	2-way	3-way
0.5 (15)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)
0.75 (20)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)
1.00 (25)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)

Table expressed in inches (mm).

Submittal summary

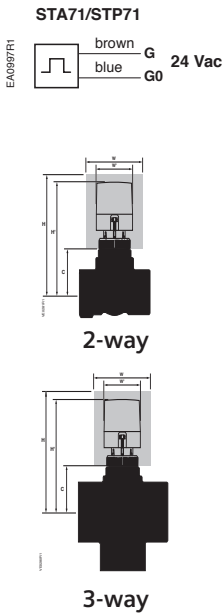
Siemens 599 Series

zone

Thermic Valve Actuator,
24 Vac/dc 2-position Control

The Siemens 599 Series Thermic Actuators require a 24 Vac/Vdc control signal to provide 2-position, NO or NC, control. This actuator is designed to work with the Siemens 599 Series Zone Valves with a 1/10-inch (2.5 mm) stroke.

Wiring diagram



Specifications	
Power supply	
Supply voltage.....	24 Vac, 50 to 60 Hz or 24 Vdc
Power consumption.....	Normal operation 2.5W; Power on 6 VA
Switch-on current (transient)	250 mA
Primary fuse	External
Control signal	
Supply voltage.....	On/off
Stroke	1/10-in. (2.5 mm)
Manual adjustment.....	None
Position when de-energized	
STA71.....	Actuator shaft extended, valve closed
STP71	Actuator shaft retracted, valve open
Nominal force	24 lb. (105N)
Maintenance	None required
Conditions of use.....	Indoors
Operation	
Temperature.....	41 to 122°F (5 to 50°C)
Humidity	5 to 85% RH
Storage	
Temperature.....	41 to 122°F (5 to 50°C)
Humidity	5 to 95% RH
Transport	
Temperature.....	-4 to +140°F (-20 to +60°C)
Humidity	5 to 95% RH
Mounting	
Method	Hand-tightened firmly onto the valve
Orientation.....	Upright to horizontal
Agency approvals.....	Conforms to CE requirements
Dimensions (HXW).....	2.44" H X 1.71" W (62 mm H X 43.5 mm W)
Shipping weight	0.33 lb. (0.15 kg)



Part Nos.	Description	Part No.	Actuator Prefix Code
	24 Vac/Vdc, Normally Closed	STA71	246
	24 Vac/Vdc, Normally Open	STP71	247

Valve Line Size	Valve Centerline to Top of Acuator H'		Service Height H		Valve Centerline to Actuator Coupling C		Width or Diameter of Actuator W'		Service Width W	
	2-way	3-way	2-way	3-way	2-way	3-way	2-way	3-way	2-way	3-way
0.5 (15)	3.44 (87.4)	3.44 (87.4)	7.44 (189)	7.44 (189)	1.00 (25.4)	1.00 (25.4)	1.86(47.3)	1.86 (47.3)	9.86 (251)	9.86 (251)
0.5 (15)	3.44 (87.4)	3.44 (87.4)	7.44 (189)	7.44 (189)	1.00 (25.4)	1.00 (25.4)	1.86(47.3)	1.86 (47.3)	9.86 (251)	9.86 (251)
0.75 (20)	3.44 (87.4)	3.44 (87.4)	7.44 (189)	7.44 (189)	1.00 (25.4)	1.00 (25.4)	1.86(47.3)	1.86 (47.3)	9.86 (251)	9.86 (251)
1.00 (25)	3.44 (87.4)	3.44 (87.4)	7.44 (189)	7.44 (189)	1.00 (25.4)	1.00 (25.4)	1.86(47.3)	1.86 (47.3)	9.86 (251)	9.86 (251)

Table expressed in inches (mm).

For more information

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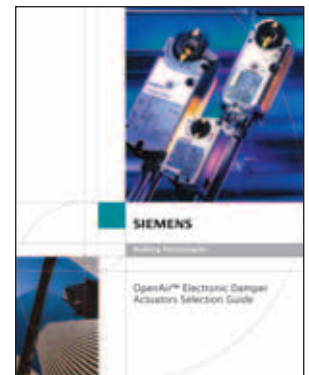
Master HVAC Products Catalog, Edition 4.0

The *Master HVAC Products Catalog* provides in-depth information on all of Siemens HVAC products, technical training and engineering information. For ordering information for all Siemens Valves and Valve Actuators, refer to the *Master HVAC Products Catalog*.



OpenAir Selection Guide

This guide contains complete information for easy look-up when preparing submittals and selecting OpenAir products.



www.sbt.siemens.com/hvp/components

More information is available for sizing, selection and ordering Siemens valves and valve actuators. For your convenience, you can also view and print the *Master HVAC Products Catalog* and technical installation instructions.

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Submittal summary **Powermite MZ Series**

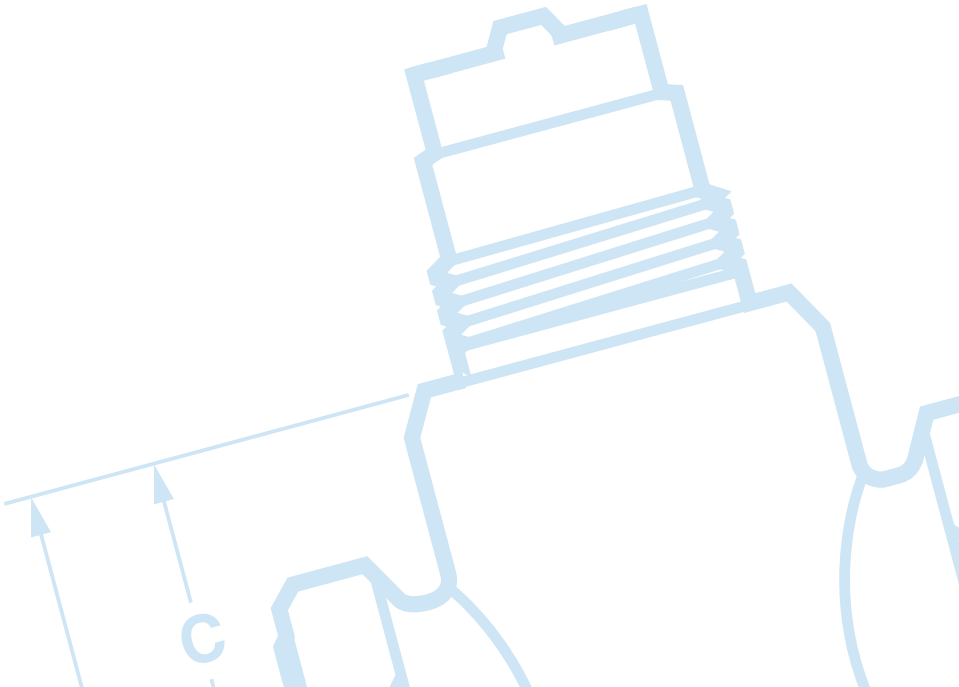
1/2 to 1-inch Zone Control Two- and Three-way Globe Valves

The Powermite 599 Series ANSI Class 250 MZ Series Valve bodies work with the SSB electronic actuator with a 7/32-inch (5.5 mm) stroke. Typical applications include control of hot or chilled water, glycol solutions up to 50%, or steam up to 15 psi (103 kPa). Compatible actuators deliver a minimum of 45 lbs. (200 N) of force.

Features

- Direct-coupled universal bonnet/No tools required for installation
- ANSI Leakage Class IV (0.01% of Cv)
- ANSI Class 250 body
- Variety of actuators available
 - 0 to 10 V NSR
 - Floating Control
- Choice of end connections
- 100:1 Rangeability
- Orderable separately or as a complete assembly

Specifications	
Line size	1/2 to 1-inch (15 to 25 mm)
Body	Globe style, Forged Brass C3770 or UNS CA 844 bronze, ANSI Class 250
Trim	Brass
Stem	Stainless steel ASTM A582 Type 303, 7/32-inch (5.5-mm) stroke
Seat	Metal-to-metal
Packing	Ethylene propylene O-ring
Mounting location	NEMA 1 (interior only)
Flow characteristics	
Two-way	Modified Equal Percentage
Three-way	Modified Equal Percentage
Close-off ratings	According to ANSI/FCI 70-2
Controlled medium	
Two-way	Water, steam, glycol solutions to 50%
Three-way	Water, glycol solutions to 50%
Medium temperature	35 to 250°F (2 to 120°C)
Max. differential pressure for modulating service	
Liquid 2w and 3w	25 psi (173 kPa)
Steam 2w only	15 psi (103 kPa)
Rangeability	Cv <1 = >50:1, Cv >1 = >100:1
Leakage rate	Class IV (0.01% of Cv)



MZ Series Valve Bodies

Action/ Trim		Flow Rate Cv (Kvs)	Line Size in.(mm)	Part No.
2-way	Normally Closed (NC)	0.4 (0.34)	1/2 (15)	599-01100
		0.63 (0.54)	1/2 (15)	599-01102
		1 (0.85)	1/2 (15)	599-01104
		1.6 (1.37)	1/2 (15)	599-01106
		2.5 (2.14)	1/2 (15)	599-01108
		4 (3.42)	1/2 (15)	599-01110
		6.3 (5.38)	3/4 (20)	599-01112
		10 (8.55)	1 (25)	599-01114
	Normally Open (NO)	0.4 (0.34)	1/2 (15)	599-01115
		0.63 (0.54)	1/2 (15)	599-01117
		1 (0.85)	1/2 (15)	599-01119
		1.6 (1.37)	1/2 (15)	599-01121
		2.5 (2.14)	1/2 (15)	599-01123
		4 (3.42)	1/2 (15)	599-01126
		6.3 (5.38)	3/4 (20)	599-01129
		10 (8.55)	1 (25)	599-01131
3-way	Water Mix	0.4 (0.34)	1/2 (15)	599-01132
		0.63 (0.54)	1/2 (15)	599-01133
		1 (0.85)	1/2 (15)	599-01134
		1.6 (1.37)	1/2 (15)	599-01135
		2.5 (2.14)	1/2 (15)	599-01136
		4 (3.42)	1/2 (15)	599-01137
		6.3 (5.38)	3/4 (20)	599-01138
		10 (8.55)	1 (25)	599-01139

MZ Series Valve Actuators

Description		Part No.	Actuator Prefix Code
	24 V, 3P NSR	SSB81U	254
	24 V, 0-10V NSR	SSB61U	255

Electro-Mechanical

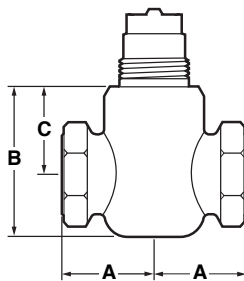
For Complete Assembly Refer to
page
8

There are no repair parts for this product. Replace the entire valve body if inoperative.

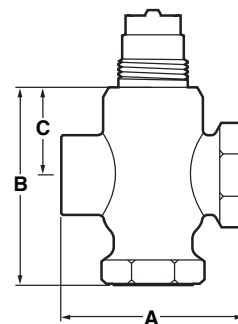
These selection tables only contain FXX end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

	Size in. (mm)	Dimensions in. (mm)			Weight lb. (kg)
		A	B	C	
2-way	1/2 (15)	1-3/8 (35)	2-1/4 (57)	1-5/16 (33)	1.3 (0.6)
	3/4 (20)	1-5/8 (41)	2-3/8 (59)	1-5/16 (33)	1.8 (0.8)
	1 (25)	1-15/16 (49)	2-3/4 (69)	1-9/16 (39)	2.6 (1.2)
3-way	1/2 (15)	2-3/4 (69)	2-1/4 (74)	1-5/16 (33)	1.5 (0.7)
	3/4 (20)	3-1/4 (83)	3-9/16 (90)	1-5/16 (33)	2.3 (1.05)
	1 (25)	3-7/8 (98)	3-15/16 (99)	1-9/16 (39)	3.3 (1.5)



2-way



3-way

Submittal summary

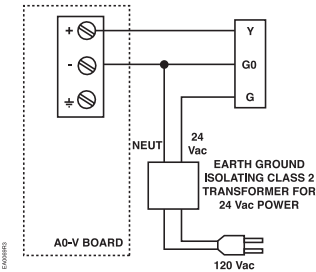
Powermite MZ Series

globe

SSB Valve Actuator,
24 Vac Proportional Control

The Powermite SSB61U Electronic Valve Actuator requires a 24 Vac supply and receives a 0 to 10 Vdc control signal to proportionally control a valve. This actuator is designed to work with Powermite 599 MZ Series Valves with a 7/32-inch (5.5 mm) stroke and a threaded valve bonnet that fits the actuator.

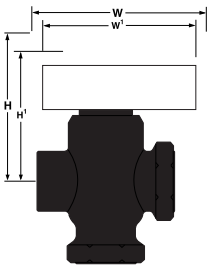
Wiring diagram



Specifications	
Operating voltage	24 Vac ± 20% or 24 Vdc ± 25%
Frequency	50/60 Hz
Power consumption	2.0 VA
Function	
Running time	75 sec.
Nominal stroke	7/32" (5.5 mm)
Nominal force	45 lb. (200 N)
Agency approvals	UL873 CSA C22.2 No. 24-93
Ambient temperature	
Operation	34 to 122°F (1 to 50°C)
Transport and storage	-13 to +158°F (-25 to +70°C)
Medium temperature	34 to 230°F (1 to 110°C)
Mounting location	NEMA 1 (interior only)



Part No.	Description	Part No.	Actuator Prefix Code
	0 to 10 V	SSB61U	255



Dimensions				
Valve Line Size	Center Line to Top of Actuator	Service Height	Actual Width	Service Width
	H'	H	W'	W
1/2" (15mm)	5-1/8" (130mm)	13-1/8" (330mm)	3-1/4" (83mm)	11-1/4" (282mm)
3/4" (20mm)	5-1/8" (130mm)	13-1/8" (330mm)	3-1/4" (83mm)	11-1/4" (282mm)
1" (25mm)	5-3/8" (136mm)	13-3/8" (335mm)	3-1/4" (83mm)	11-1/4" (282mm)

Submittal summary **Powermite MZ Series**

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SSB Valve Actuator, 24 Vac 3-position (floating) Control

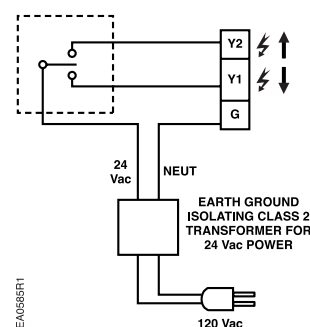


Specifications

Operating voltage	24 Vac $\pm$ 20%
Frequency	50/60 Hz
Power consumption	0.8 VA
Function	
Running time	150 sec.
Nominal stroke	7/32" (5.5 mm)
Nominal force.....	45 lb. (200 N)
Agency approvals	UL873
	CSA C22.2 No. 24-93
Ambient temperature	
Operation.....	34 to 122°F (1 to 50°C)
Transport and storage.....	-13 to +158°F (-25 to +70°C)
Medium temperature	34 to 230°F (1 to 110°C)
Mounting location	NEMA 1 (interior only)

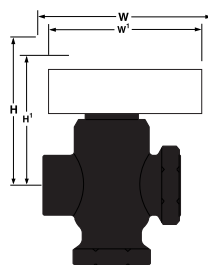
The Powermite SSB81U Electronic Valve Actuator requires a 24 Vac supply floating control signal to provide three-position control. This actuator is designed to work with Powermite 599 MZ Series Valves with a 7/32-inch (5.5 mm) stroke and a threaded valve bonnet that fits the actuator.

Wiring diagram



Part No.	Description	Part No.	Actuator Prefix Code
	3-position	SSB81U	254

Dimensions				
Valve Line Size	Center Line to Top of Actuator	Service Height	Actual Width	Service Width
	H'	H	W'	W
1/2" (15mm)	5-1/8" (130mm)	13-1/8" (330mm)	3-1/4" (83mm)	11-1/4" (282mm)
3/4" (20mm)	5-1/8" (130mm)	13-1/8" (330mm)	3-1/4" (83mm)	11-1/4" (282mm)
1" (25mm)	5-3/8" (136mm)	13-3/8" (335mm)	3-1/4" (83mm)	11-1/4" (282mm)



Submittal summary **Powermite MT Series**

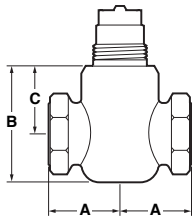
1/2 to 1-1/2 inch Terminal Unit Two- and Three-way Globe Valves

The Powermite 599 Series ANSI Class 250 MT Series Two- and Three-way Valve bodies work with any MT Series pneumatic or electronic actuator with a 7/32-inch (5.5-mm) stroke. They are suitable for normally open or normally closed control. Typical applications include control of hot or chilled water, glycol solutions up to 50%, or steam up to 15 psi (103 kPa). Compatible actuators deliver a minimum of 67 lbs. (300 N) of force.

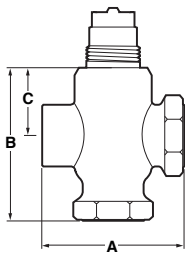
Features

- Direct-coupled universal bonnet/ No tools required for installation
- Choice of brass or stainless steel trim
- ANSI Leakage Class IV (0.01% of Cv)
- ANSI Class 250 body
- Available in 3 to 8 psi, 8 to 13 psi or 10 to 15 psi spring ranges with pneumatic actuation
- Rated for 15 psig steam
- Interchangeable pneumatic or electronic actuators
- Orderable as valve only or complete valve/actuator assembly

Specifications	
Line size	1/2 to 1-1/2-inch (15 to 25 mm)
Body	Globe style, Forged Brass C3770 or UNS CA 844 bronze, ANSI Class 250
Trim	Brass
Stem	Stainless steel ASTM A582 Type 303, 7/32-inch (5.5-mm) stroke
Seat	Metal-to-metal
Packing	Ethylene propylene O-ring
Close-off ratings	According to ANSI/FCI 70-2
Controlled medium	Water, steam, glycol solutions to 50%
Medium temperature	35 to 250°F (2 to 120°C)
Max. differential pressure for modulating service	
Liquid	25 psi (173 kPa)
Steam	15 psi (103 kPa)
Rangeability	Cv <1 = >50:1, Cv >1 = >100:1
Leakage rate	Class IV (0.01% of Cv)
Flow characteristics	Modified equal percentage
Mounting location	NEMA 1 (interior only)



2-way



3-way

	Size in. (mm)	Dimensions in. (mm)			Weight lb. (kg)
		A	B	C	
2-way (NC)	1/2 (15)	1-3/8 (35)	2-1/4 (57)	1-5/16 (33)	1.3 (0.6)
	3/4 (20)	1-5/8 (41)	2-3/8 (59)	1-5/16 (33)	1.8 (0.8)
	1 (25)	1-15/16 (49)	2-3/4 (69)	1-9/16 (39)	2.6 (1.2)
	1-1/4 (32)	2-1/2 (64)	3-7/8 (98)	1-11/16 (43)	4 (1.8)
	1-1/2 (40)	2-9/16 (65)	3-7/8 (98)	1-5/8 (41)	5 (2.3)
2-way (NO)	1/2 (15)	1-3/8 (35)	2-1/4 (57)	1-5/16 (33)	1.3 (0.6)
	3/4 (20)	1-5/8 (41)	2-3/8 (59)	1-5/16 (33)	1.8 (0.8)
	1 (25)	1-15/16 (49)	2-3/4 (69)	1-9/16 (39)	2.6 (1.2)
	1-1/4 (32)	2-1/2 (64)	4-1/4 (108)	2-3/16 (56)	4 (1.8)
	1-1/2 (40)	2-9/16 (65)	4-1/4 (108)	2-1/4 (57)	5 (2.3)
3-way	1/2 (15)	2-3/4 (70)	2-15/16 (74)	1-5/16 (33)	1.5 (0.7)
	3/4 (20)	3-1/4 (83)	3-9/16 (90)	1-5/16 (33)	2.3 (1.05)
	1 (25)	3-7/8 (98)	3-15/16 (99)	1-9/16 (39)	3.3 (1.5)
	1-1/4 (32)	4-15/16 (125)	4-1/4 (109)	1-11/16 (43)	4.0 (1.8)
	1-1/2 (40)	5-1/8 (130)	4-1/2 (114)	1-5/8 (41)	5.0 (2.3)

MT Series Valve Bodies

	Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	Part No.
2-way	Normally Closed (NC)	0.4 (0.34)	1/2 (15)	599-02000
		0.63 (0.54)	1/2 (15)	599-02002
		1 (0.85)	1/2 (15)	599-02004
		1.6 (1.37)	1/2 (15)	599-02006
		2.5 (2.14)	1/2 (15)	599-02008
		4 (3.42)	1/2 (15)	599-02010
		6.3 (5.38)	3/4 (20)	599-02012
		10 (8.55)	1 (25)	599-02014
	Normally Open (NO)	16 (13.8)	1-1/4 (32)	599-02085*
		25 (21.5)	1-1/2 (40)	599-02088*
		0.4 (0.34)	1/2 (15)	599-02030
		0.63 (0.54)	1/2 (15)	599-02032
		1 (0.85)	1/2 (15)	599-02034
		1.6 (1.37)	1/2 (15)	599-02036
		2.5 (2.14)	1/2 (15)	599-02038
		4 (3.42)	1/2 (15)	599-02041
		6.3 (5.38)	3/4 (20)	599-02044
		10 (8.55)	1 (25)	599-02046
3-way	Mixing	16 (13.8)	1-1/4 (32)	599-02084*
		25 (21.5)	1-1/2 (40)	599-02087*
		0.4 (0.34)	1/2 (15)	599-02064
		0.63 (0.54)	1/2 (15)	599-02065
		1 (0.85)	1/2 (15)	599-02066
		1.6 (1.37)	1/2 (15)	599-02067
		2.5 (2.14)	1/2 (15)	599-02068
		4 (3.42)	1/2 (15)	599-02069
		6.3 (5.38)	3/4 (20)	599-02070
		10 (8.55)	1 (25)	599-02071
		16 (13.8)	1-1/4 (32)	599-02086*
		25 (21.5)	1-1/2 (40)	599-02089*

*Can only be assembled with Electro-mechanical actuators

MT Series Valve Actuators

Description	Part No.	Actuator Prefix Code	
 2"	10-15 psi (69-103 kPa)	599-01088	256
	3-8 psi (21-55 kPa)	599-01088	257
	8-13 psi (55-90 kPa)	599-01088	258
 24 V	24 V	SSC61U SSC61.5U	261 262
	24 V	SSC81U SSC81.5U	259 260
	24 V 0-10 V NSR	SQS65U	264
	24 V 0-10 V SR	SQS65.5U	265
	24 V 3P SR	SQS85.53U	266

These selection tables only contain FFX end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

Submittal summary

Powermite MT Series

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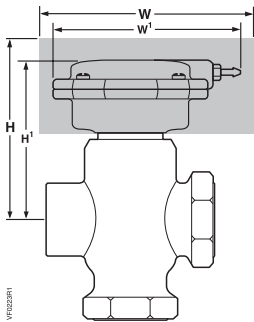
2-inch Pneumatic Valve Actuator

The Powermite Two-inch Pneumatic Valve Actuator is designed for use with the 1/2 to 1-inch Powermite 599 MT Series Terminal Unit Valves with a 7/32-inch (5.5 mm) stroke.

Specifications	
Effective diaphragm area	3.4 in. ² (22 cm ²)
Diaphragm material	Silicone
Nominal spring range	Valve dependent
Span	5 psi (34 kPa)
Nominal stroke	7/32" (5.5 mm)
Max. diaphragm pressure	35 psi (241 kPa)
Air connection	1/8" NPT fitting for 1/4" (6 mm) OD polyethylene tubing
Ambient temperature	
transportation	-40 to +180°F (-40 to +82°C)
Mounting location	NEMA 1 (interior only)
Shipping weight	0.43 lb. (0.2 kg)



Part Nos.	Description	Part No.	Actuator Prefix Code
	8-13 psi (55-90 kPa) SR	599-01088	258
	10-15 psi (69-103 kPa) SR	599-01088	256
	3-8 psi (21-55 kPa) SR	599-01088	257
Ordering Note Spring is inside bonnet assembly of valve body. Use the Valve Selection Charts in the Powermite Reference Section to determine spring range.			



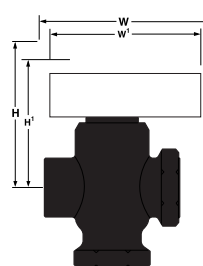
Dimensions				
Valve Line Size	Center Line to Top of Actuator	Service Height	Actual Width of Actuator	Service Width
	H ¹	H	W ¹	W
1/2" (15 mm)	3-1/16" (78 mm)	11" (280 mm)	4" (100 mm)	10" (250 mm)
3/4" (20 mm)	3-1/16" (78 mm)	11" (280 mm)	4" (100 mm)	10" (250 mm)
1" (25 mm)	3-5/16" (84 mm)	11-1/4" (285 mm)	4" (100 mm)	10" (250 mm)

Powermite MT Series

If inoperative, replace the unit.

Operating voltage	24 Vac + 20%
Frequency	50/60 Hz + 2 Hz
Power supply	Earth Ground, isolating Class 2, 24 Vac Transformer
Power consumption	2 VA
Control signal (Y) voltage.....	0 to 10 Vdc (default) or 0 to 20 mA with external 500 ohm, 0.2W resistor
Current.....	0.1 mA
Running time at 50/60 Hz	30 sec. + 10%
Fail-safe (SSC61.5U only)	~25 sec.
Nominal stroke	7/32" (5.5 mm)
Nominal force	67 lbs. (300 N), +20%, -0%
Stroke/signal relationship	Linear
Fail-safe (SSC61.5U only)	Non-mechanical, electronic return fails to stem up (0 position)
Agency certification	UL873 Listed, Certified to Canadian Standard C22.2 No. 24-93
Ambient temperature operation.....	41 to 122°F (5 to 50°C) with 15 psi steam media
Transport and storage.....	-13 to 158°F (-25 to +70°C)
Ambient humidity	0 to 90% RH, non-condensing
Medium temperature	41 to 248°F (5 to 120°C)
Wiring connection	Plenum cable or 3/8-inch flex conduit
Shipping weights	
SSC61U	1.1 lb. (0.5 kg)
SSC61.5U	1.3 lb. (0.6 kg)

Wiring diagrams

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Submittal summary

Powermite MT Series

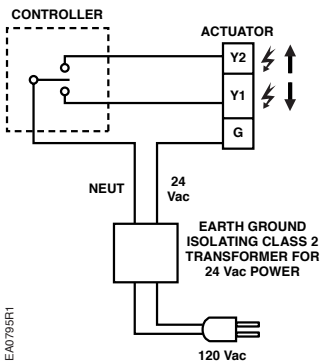
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SSC Electronic Valve Actuator

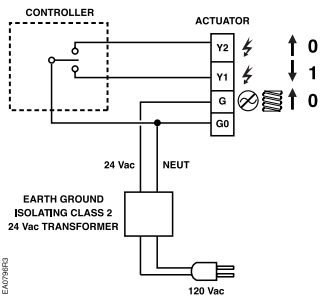
24 Vac 3-position (floating) Control

The Powermite 599 Series MT Series SSC81U and SSC81.5U Electronic Valve Actuators require a 24 Vac supply and provide a 3-position (floating) control signal. These actuators control Powermite 599 MT Series Valves with a 7/32-inch (5.5 mm) stroke and a threaded valve bonnet that fits the actuators.

Wiring diagrams



Fail-in-Place



Fail-Safe

Specifications	
Operating voltage	24 Vac + 20%
Frequency	50/60 Hz + 2 Hz
Power supply	Earth Ground, isolating Class 2, 24 Vac Transformer
Note: Do not power more than 10 actuators with one transformer.	
Power consumption	
SSC81U	0.8 VA
SSC81.5U	3 VA at ultra cap load, 2 VA at normal drift
Control signal	
Y2	Retracts actuator shaft
Y1	Extends actuator shaft
G	System potential
G0 (SSC81.5U only)	System Neutral
Running time	
SSC81U	150 sec. +2% at 50 Hz 125 sec. +2% at 60 Hz
SSC81.5U	125 sec. +2% at 50/60 Hz
Fail-safe (SSC81.5U only)	~30 sec.
Nominal stoke	7/32-inch (5.5 mm)
Nominal force	67 lbs. (300N) +20%, -0%
Stroke/signal relationship	Linear
Fail-safe (SSC81.5U only)	Non-mechanical, electronic return fails to stem up (0 position)
Agency certification	UL873 Listed, Certified to Canadian Standard C22.2 No. 24-93
Ambient temperature	
Operation	41 to 122°F (5 to 50°C) with 15 psi steam media
Transport and storage	-13 to 158°F (-25 to +70°C)
Ambient humidity	0 to 90% RH, non-condensing
Medium temperature	41 to 248°F (5 to 120°C)
Wiring connection	Plenum cable or 3/8-inch flex conduit
Shipping weights	
SSC81U	1.1 lbs. (0.5 kg)
SSC81.5U	1.3 lbs. (0.6 kg)



Part Nos.	Description	Part No.	Actuator Prefix Code
	Fail-in-Place	SSC81U	259
	Fail-Safe	SSC81.5U	260

If inoperative, replace the unit.

Submittal summary **Powermite MT Series**

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SQS Electronic Valve Actuator, 24 Vac Proportional Control

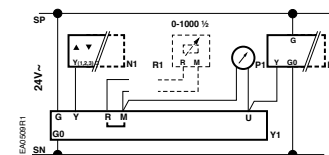


Specifications

Operating voltage	
60 Hz	24 Vac, +20%, -15%
50 Hz	24 Vac, ± 20%
Frequency	50/60 Hz
Power consumption	
SQS65	4.5 VA
SQS65.5	7 VA
Control signal (Y)	
Voltage	0 to 10 Vdc
Current	0.1 mA
Input impedance	100 K Ohms
Control signal (R)	
Resistance	0 to 1000 Ohms
Position output (U)	
Voltage	0 to 10 Vdc
Current	0.5 mA max. running time
Running time	
at 60 Hz	30 sec.
at 50 Hz	35 sec.
Fail-safe (SQS65.5 only)	8 sec.
Nominal stroke	7/32" (5.5 mm)
Nominal force	90 lb. (400 N)
Agency approvals	UL873 CSA C22.2 No. 24-93
Ambient temperature	
Operation	5 to 122°F (-15 to +50°C)
Transport and storage	-13 to +149°F (-25 to +65°C)
Ambient humidity	0 to 90% RH, non-condensing
Medium temperature	41 to 248°F (5 to 120°C)
Mounting location	NEMA 1 (interior only)
Shipping weights	
SQS65	1.1 lb. (0.5 kg)
SQS65.5	1.3 lb. (0.6 kg)

The Powermite SQS65 and SQS65.5 Electronic Valve Actuators require a 24 Vac supply and receive a 0 to 10 Vdc or a 0 to 1000 Ohm control signal to proportionally control a valve. This actuator is designed to work with Powermite 599 MT Series Valves with a 7/32-inch (5.5 mm) stroke.

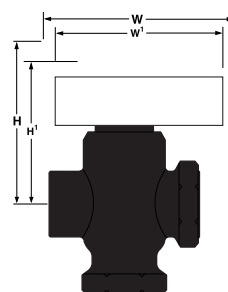
Wiring diagram



Part Nos.	Description	Part No.	Actuator Prefix Code
	Fail-in-Place	SQS65U	264
	Fail-Safe	SQS65.5U	265

There are no repair parts for this product. Replace the entire actuator if inoperative.

Valve Line Size	Center Line to Top of Actuator		Service Height		Actual Width of Actuator	Service Width
	H'		H		W'	W
	NO	NC	NO	NC		
1/2" (15 mm)	6-1/16" (153 mm)		14" (355 mm)		5-1/16" (128 mm)	9" (225 mm)
3/4" (20 mm)	6-1/16" (153 mm)		14" (355 mm)		5-1/16" (128 mm)	9" (225 mm)
1" (25 mm)	6-5/16" (159 mm)		14-1/2" (370 mm)		5-1/16" (128 mm)	9" (225 mm)
1-1/4" (32 mm)	7-11/16" (195 mm)	7-3/16" (183 mm)	15-1/2" (394 mm)	9" (225 mm)	5-1/16" (128 mm)	9" (225 mm)
1-1/2" (38 mm)	7-3/4" (197 mm)	7-1/8" (181 mm)	15-1/2" (394 mm)	9" (225 mm)	5-1/16" (128 mm)	9" (225 mm)



Submittal summary

Powermite MT Series

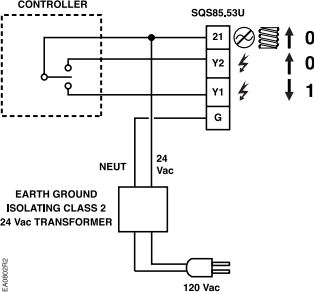
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SQS Electronic Valve Actuator,

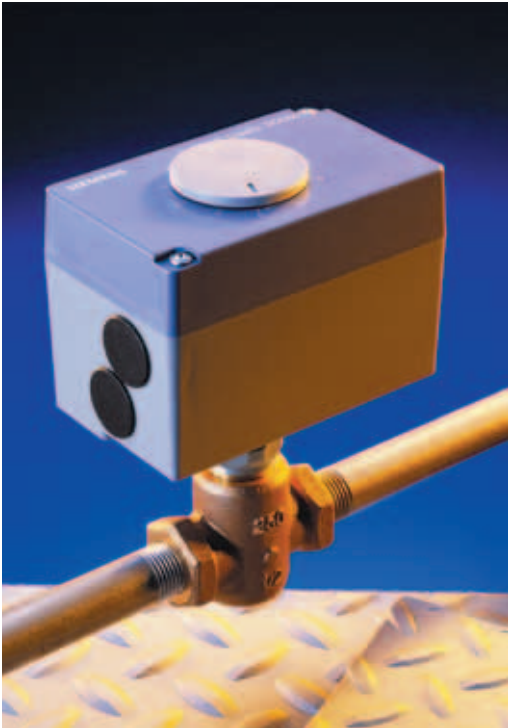
24 Vac, 3-position (floating) Control

The Powermite 599 Series MT Series SQS electronic valve actuator requires a 24 Vac supply and receives a floating control signal to provide three-position control. This actuator works with Powermite 599 Series MT Series terminal unit valves with a 7/32-inch (5.5 mm) stroke.

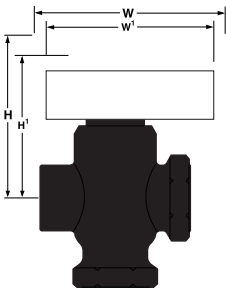
Wiring diagram



Specifications	
Operating voltage	
60 Hz	24 Vac, + 20%, -15%
50 Hz	24 Vac, ± 20%
Frequency	50/60 Hz
Power supply	Earth ground, isolating Class 2, 24 Vac transformer
Do not power more than 10 actuators with one transformer.	
Power consumption	5 VA
Control signal	3-position, floating
Y1	Power extends actuator shaft (0 to 1)
Y2	Power retracts actuator shaft (1 to 0)
G	24 Vac operating voltage, system potential
Z1	24 Vac operating voltage, system neutral
Running time	
at 60 Hz	30 sec.
at 50 Hz	35 sec.
Nominal stroke	7/32" (5.5 mm)
Nominal force	90 lbs. (400 N)
Fail-safe	Mechanical spring
Fail-safe return time	8 sec.
Agency approvals	UL873 CSA C22.2 No. 2A-93
Ambient temperature	
Operation	5 to 122°F (-15 to +50°C)
Transport and storage	-13 to +149°F (-25 to +65°C)
Ambient humidity	0 to 90% RH, non-condensing
Medium temperature	41 to 248°F (5 to 120°C)
Mounting location	NEMA 1 (interior only)
Shipping weight	1.3 lb. (0.6 kg)



Part No.	Description	Part No.	Actuator Prefix Code
	3-position	SQS85.53U	266



Valve Line Size	Center Line to Top of Actuator		Service Height		Actual Width of Actuator	Service Width
	H'		H		W'	W
	NO	NC	NO	NC		
1/2" (15 mm)	6-1/16" (153 mm)		14" (355 mm)		5-1/16" (128 mm)	9" (225 mm)
3/4" (20 mm)	6-1/16" (153 mm)		14" (355 mm)		5-1/16" (128 mm)	9" (225 mm)
1" (25 mm)	6-5/16" (159 mm)		14-1/2" (370 mm)		5-1/16" (128 mm)	9" (225 mm)
1-1/4" (32 mm)	7-11/16" (195 mm)	7-3/16" (183 mm)	15-1/2" (394 mm)	9" (225 mm)	5-1/16" (128 mm)	9" (225 mm)
1-1/2" (38 mm)	7-3/4" (197 mm)	7-1/8" (181 mm)	15-1/2" (394 mm)	9" (225 mm)	5-1/16" (128 mm)	9" (225 mm)

Universal Valve Retrofit Kit



The Universal Valve Retrofit Kit allows you to install a state-of-the-art Flowrite 599 Series electronic actuator, regardless of the valve's manufacturer. This kit contains all the parts needed to adapt a valve to Flowrite 599 Series electronic actuators, including SKB, SKC, SKD or SQX.

Kit includes: Bonnet adapter, bonnet adapter insert, stem adapter jam nut and square head set screws.

Features

- Easy installation
- Works with electronic or pneumatic actuators
- Installs on most manufacturers' valves

Ordering Information

Brand	Valve Part No.	Kit Part No.
Siemens	658-XXXX and 339-XXXX	ARK10
	591-XXXX and 598-XXXX	ARK11
Honeywell	V3XXXX (2-1/2-3")	ARK16
	V3XXXX (4-6")	ARK18
	V501X (A, B, C, F, G, N) (1/2-3")	ARK17
	V501X (A, B, C) (4-6")	ARK21
Johnson Controls	VG2XXX (1-5/16" bonnet)	ARK12
	VG7XXX (1-2")	ARK13
	VG7XXX (1/2-3/4")	ARK19
Siebe	VB7XXX and VB9XXX (threaded and flanged)	ARK14

Submittal summary Flowrite 599 Series

1/2 to 2-inch, Two- and Three-way Globe Valves

The Flowrite 599 Series ANSI Class 250 Two- and Three-way Valve bodies work with a Flowrite Series actuator with a 3/4-inch (20 mm) stroke. They are suitable for normally open or normally closed control. Typical applications include control of hot or chilled water, glycol solutions up to 50%, or steam up to 15 psi (103 kPa).

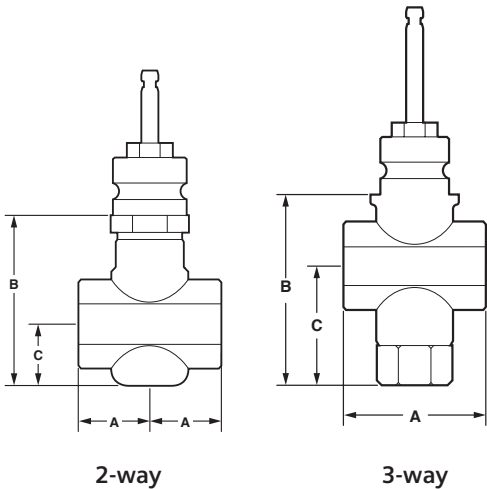
Features

- High pressure, high temperature
- Direct-coupled universal bonnet
- Equal percentage flow characteristics and brass trim
- ANSI Class IV Leakage (0.01% of Cv)

Specifications	
Line Size	1/2 to 2-inch (15 to 50 mm)
Body	Globe style, UNS CA 844 bronze, ANSI Class 250
Trim	Bronze
Stem	Stainless steel ASTM A582 Type 303, 3/4-inch (20-mm) stroke
Seat	Single seat, metal-to-metal
Packing	
Normal duty	Ethylene propylene O-ring
Close-off ratings	According to ANSI/FCI 70-2
Controlled medium	Water, steam, glycol solutions to 50%
Medium temperature	
Normal duty	20 to 250°F (-7 to +120°C)
Max. differential pressure for modulating service	
Liquid	25 psi (173 kPa)
Steam	15 psi (103 kPa)
Rangeability	>100:1
Leakage rate	Class IV (0.01% of Cv)
Flow characteristics	Equal Percentage
Mounting location	NEMA 1 (interior only)



	Size in. (mm)	Dimensions in. (mm)			Weight lb. (kg)
		A	B	C	
2-way (NC)	1/2 (15)	1-7/16 (36)	3-13/16 (97)	2-13/16 (55)	3 (1.4)
	3/4 (20)	1-11/16 (43)	3-13/16 (97)	2-13/16 (55)	4 (1.8)
	1 (25)	2 (50)	3-13/16 (97)	2-13/16 (55)	5 (2.3)
	1-1/4 (32)	2-1/2 (62)	3-13/16 (97)	2-13/16 (55)	7 (3.2)
	1-1/2 (40)	2-9/16 (65)	3-7/8 (99)	2-1/4 (58)	8 (3.6)
	2 (50)	3-1/8 (79)	4-3/16 (106)	2-9/16 (65)	16 (7.3)
2-way (NO)	1/2 (15)	1-7/16 (36)	2-15/16 (74)	1-1/4 (32)	3 (1.4)
	3/4 (20)	1-11/16 (43)	3-15/16 (99)	1-7/16 (36)	4 (1.8)
	1 (25)	2 (50)	3-3/4 (96)	1-1/4 (32)	5 (2.3)
	1-1/4 (32)	2-1/2 (62)	4-1/8 (104)	1-5/8 (40)	7 (3.2)
	1-1/2 (40)	2-9/16 (65)	4-1/4 (109)	1-3/4 (44)	9 (4.1)
	2 (50)	3-1/8 (79)	4-9/16 (116)	2 (50)	13 (5.9)
3-way	1/2 (15)	2-7/8 (72)	4-5/16 (110)	2-11/16 (68)	3 (1.4)
	3/4 (20)	3-3/8 (85)	4-5/16 (110)	2-3/4 (69)	4 (1.8)
	1 (25)	3-15/16 (100)	4-1/2 (114)	2-7/8 (72)	5 (2.3)
	1-1/4 (32)	4-15/16 (125)	4-5/8 (116)	2-15/16 (74)	7 (3.2)
	1-1/2 (40)	5-1/8 (130)	4-5/8 (116)	3 (76)	9 (4.1)
	2 (50)	6-1/4 (158)	4-3/4 (121)	3-3/16 (81)	13 (5.9)



Flowrite 599 Series Valve Bodies

	Flow Rate Cv (Kvs)	Line Size in. (mm)	Stroke (in.)	Normally Open Part No.	Normally Closed Part No.
2-way	1 (0.9)	1/2 (15)	3/4	599-03162	599-03180
	1.6 (1.4)	1/2 (15)	3/4	599-03163	599-03181
	2.5 (2.2)	1/2 (15)	3/4	599-03164	599-03182
	4 (3.4)	1/2 (15)	3/4	599-03165	599-03183
	6.3 (5.4)	3/4 (20)	3/4	599-03166	599-03184
	10 (8.6)	1 (25)	3/4	599-03167	599-03185
	16 (14)	1-1/4 (32)	3/4	599-03168	599-03186
	25 (22)	1-1/2 (40)	3/4	599-03169	599-03187
3-way	40 (34)	2 (50)	3/4	599-03170	599-03188
	1 (0.9)	1/2 (15)	3/4	—	599-03198
	1.6 (1.4)	1/2 (15)	3/4	—	599-03199
	2.5 (2.2)	1/2 (15)	3/4	—	599-03200
	4 (3.4)	1/2 (15)	3/4	—	599-03201
	6.3 (5.4)	3/4 (20)	3/4	—	599-03202
	10 (8.6)	1 (25)	3/4	—	599-03203
	16 (14)	1-1/4 (32)	3/4	—	599-03204
	25 (22)	1-1/2 (40)	3/4	—	599-03205
	40 (34)	2 (50)	3/4	—	599-03206

These selection tables only contain FFX end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

Complete Assembly
APC + Part No.
Valve Body Only
599 + Part No.

Flowrite 599 Series Valve Bodies

	Description	Part No.	Actuator Prefix Code	
 4"	3-8 psi (21-55 kPa)	599-01081	268	Pneumatic
	5-10 psi (34-69 kPa)	599-01082	269	
	10-15 psi (69 -103 kPa)	599-01083	270	
 8"	Normal Temp.	599-01050	277	Pneumatic
	High-Temp.	599-01051	278	
 8"	Normal Temp.	599-01050 + 599-00426	283	Pneumatic w/ Positioner
	High-Temp.	599-01051 + 599-00426	284	
	24 V, 0-10 V 4-20 mA SR	SKD62U	274	Electro-Hydraulic
	24 V, 3P NSR	SKD82.50U	275	
	24 V, 3P SR	SKD82.51U	276	
	24 V, 1-10 V 4-20 mA NSR	SQX62U	271	Electro-Mechanical
	24 V, 3P 120 sec. NSR	SQX82.00U	272	
	24 V, 3P 30 sec. NSR	SQX82.03U	273	
	24 V, 0-10 V Lo NSR	599-10021	295	Electro-Mechanical
	24 V, 0-10 V Lo SR	599-10022	296	
	24 V, 0-10 V	599-03609	298	Electro-Mechanical
	24 V, 2P	599-03611	299	

For Complete Assembly Refer to
page 11

Submittal summary **Flowrite 599 Series**

2-1/2 to 6-inch, Flanged Iron ANSI Class 125/250 Two- and Three-way Valves

The Flowrite VF 599 Series ANSI Class 125/250 Valve bodies work with a Flowrite Series actuator with a 3/4-inch (20 mm) or 1-1/2 inch (40 mm) stroke. Typical applications include control of hot or chilled water, glycol solutions up to 50%, or steam up to 15 psi (103 kPa).

Features

- Direct-coupled universal bonnet
- Equal percentage flow characteristic and bronze trim
- ANSI Class IV Leakage (0.01% of Cv)

Specifications

Line size	2-1/2 to 6-inch (65 to 150 mm)
Body	Flanged style, cast iron ASTM A126 Class B, ANSI Class 125
Trim	Bronze
Stem	Stainless steel ASTM A582 Type 303
Stem travel	
2-1/2 and 3-inch	3/4-inch (20 mm) stroke
4, 5, and 6-inch	1-1/2 inch (40 mm) stroke
Seat	Metal-to-metal
Packing	
Normal duty	EDPM O-ring
Close-off ratings	According to ANSI/FCI 70-2
Controlled medium ..	Water, steam, glycol solutions to 50%
Medium temperature	
Normal duty	20 to 250°F (-7 to +120°C)
Max. differential pressure for modulating service	25 psi (173 kPa)
Rangeability	>100:1
Leakage rate	Class IV (0.01% of Cv)
Flow characteristic	Equal percentage or linear
Mounting location	NEMA 1 (interior only)

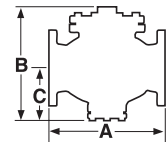


Flanged Iron Valve Bodies

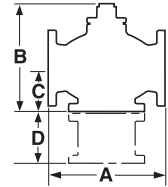
	Action	Flow Rate Cv (Kvs)	Line Size in. (mm)	Stroke (in.)	ANSI Class 250 Part No.	ANSI Class 125 Part No.
2-way	Normally Closed	63 (54)	2-1/2 (65)	3/4	599-05950	599-05990
		100 (86)	3 (80)	3/4	599-05951	599-05991
		160 (140)	4 (100)	1-1/2	599-05952	599-05992
		250 (215)	5 (125)	1-1/2	599-05953	599-05993
		400 (340)	6 (150)	1-1/2	599-05954	599-05994
	Normally Open	63 (54)	2-1/2 (65)	3/4	599-05940	599-05980
		100 (86)	3 (80)	3/4	599-05941	599-05981
		160 (140)	4 (100)	1-1/2	599-05942	599-05982
		250 (215)	5 (125)	1-1/2	599-05943	599-05983
		400 (340)	6 (150)	1-1/2	599-05944	599-05984
3-way	Mixing	63 (54)	2-1/2 (65)	3/4	599-06170	599-06160
		100 (86)	3 (80)	3/4	599-06171	599-06161
		160 (140)	4 (100)	1-1/2	599-06172	599-06162
		250 (215)	5 (125)	1-1/2	599-06173	599-06163
		400 (340)	6 (150)	1-1/2	599-06174	599-06164

Two-way Valves

Valve Size in. (mm)	ANSI Class 125				ANSI Class 250				
	Dimensions in. (mm)			Weight lb. (kg)	Dimensions in. (mm)			Weight lb. (kg)	
A	B	C		A	B	C			
2-1/2 (65)	10-7/8 (276)	10-5/8 (269)	4-7/8 (125)	58 (26)	11-1/2 (292)	11 (279)	5-3/8 (135)	74 (34)	Normally Closed
3 (80)	11-3/4 (299)	11-15/16 (303)	5-5/8 (142)	75 (34)	12-1/2 (318)	12-7/16 (315)	6 (154)	98 (44)	
4 (100)	13-7/8 (352)	13-15/16 (354)	6-5/8 (168)	123 (56)	14-1/2 (368)	14-3/8 (364)	7 (178)	159 (72)	
5 (125)	15-3/4 (400)	15-1/4 (338)	7-1/2 (185)	153 (69)	16-5/8 (422)	15-3/4 (399)	7-3/4 (196)	207 (94)	
6 (150)	17-3/4 (451)	17-1/16 (433)	8-3/16 (207)	209 (95)	18-5/8 (473)	17-1/2 (444)	8-5/8 (218)	299 (136)	
2-1/2 (65)	10-7/8 (276)	11 (281)	4-7/8 (123)	60 (27)	11-1/2 (292)	11 (281)	4-7/8 (123)	76 (34)	Normally Open
3 (80)	11-3/4 (299)	12-1/4 (312)	5-5/16 (135)	76 (34)	12-1/2 (318)	12-1/4 (312)	5-5/16 (135)	99 (45)	
4 (100)	13-7/8 (352)	13-9/16 (345)	6-5/16 (160)	124 (56)	14-1/2 (368)	13-5/8 (345)	6-5/16 (160)	160 (73)	
5 (125)	15-3/4 (400)	15-3/16 (385)	7 (177)	155 (70)	16-5/8 (422)	15-3/16 (385)	7 (177)	208 (94)	
6 (150)	17-3/4 (451)	16-3/4 (426)	7-7/8 (200)	212 (96)	18-5/8 (473)	16-3/4 (426)	7-7/8 (200)	302 (137)	



2-way



3-way

Flowrite Series 599 Valve Actuators

Description	Part No.	Actuator Prefix Code	
 8"	20 mm Stroke	599-01050	277
	20 mm Stroke/Hi-Temp.	599-01051	278
 12"	20 mm Stroke	599-01010	279
	40 mm Stroke/Hi-Temp.	599-01000	281
 8"	20 mm Stroke	599-01050 + 599-00426	283
	20 mm Stroke/Hi-Temp.	599-01051 + 599-00426	284
 12"	20 mm Stroke	599-01010 + 599-00423	285
	40 mm Stroke/Hi-Temp.	599-01000 + 599-00423	287
 24 V, 3P SR	24 V, 3P SR	SKD82.51U	276
	24V, 3P NSR	SKD82.50U	275
	24 V, 0-10 V 4-20 mA SR	SKD62U	274
 24 V, 3P SR	24 V, 3P SR	SKB82.51U	289
	24V, 3P NSR	SKB82.50U	290
	24 V, 0-10 V 4-20 mA SR	SKB62U	291
	24 V, 3P SR	SKC82.61U	292
	24V, 3P NSR	SKC82.60U	293
	24 V, 0-10 V 4-20 mA SR	SKC62U	294
 24 V, 0-10 V Lo NSR	24 V, 0-10 V Lo NSR	599-10021	295
	24 V, 0-10 V Lo SR	599-10022	296
	24 V, 0-10 V Lo NSR	599-10023	297

Three-way Valves

Valve Size in. (mm)	Dimensions in. (mm)				
	A*		B	C	D
	ANSI Class 125	ANSI Class 250			Service Flange
2-1/2 (65)	10-7/8 (276)	11-1/2 (292)	9-3/8 (239)	3-3/4 (95)	6.5 (165)
3 (80)	11-3/4 (299)	12-1/2 (318)	10-3/4 (272)	4-3/8 (111)	7 (178)
4 (100)	13-7/8 (352)	14-1/2 (368)	12-1/2 (317)	5-1/8 (131)	7.5 (191)
5 (125)	15-3/4 (400)	16-5/8 (422)	13-3/4 (349)	5-3/4 (146)	8.5 (216)
6 (150)	17-3/4 (451)	18-5/8 (473)	15-1/2 (393)	6-5/8 (167)	9.5 (241)

*Optional service flange.

Valve Size in. (mm)	Weight lb. (kg)	
	ANSI Class 125	ANSI Class 250
2-1/2 (65)	50 (23)	63 (29)
3 (80)	65 (30)	82 (37)
4 (100)	110 (50)	134 (61)
5 (125)	136 (62)	176 (80)
6 (150)	141 (64)	258 (117)

These selection tables only contain FXF end connections with brass trim and equal percentage flow characteristics.

For complete selection, refer to the current edition of *Master HVAC Products Catalog*.

Complete Assembly
APC + Part No.
Valve Body Only
599 + Part No.

For Complete Assembly Refer to
page
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Submittal summary

Flowrite 599 Series

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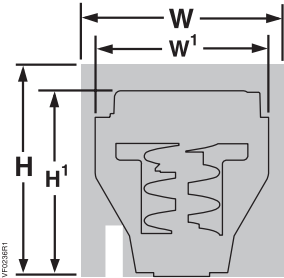
4-inch Pneumatic Valve Actuator

Designed for use with the Flowrite 599 Series valves, the Flowrite 599 4-inch Pneumatic Valve Actuator has a 3/4-inch (20 mm) stroke and is available in three spring ranges.

Specifications	
Effective diaphragm area	11in. ² (71 cm ²)
Diaphragm material	Silicone
Nominal stroke	3/4" (20 mm)
Max. diaphragm pressure	35 psi (241 kPa)
Air connection	1/8" NPT
Ambient operating and storage temperature	0 to 180°F (-18 to +85°C)
Mounting location	NEMA 1 (interior only)
Shipping weight	2.5 lb. (1.1 kg)



Part Nos.	Nominal Spring Range	Part No.	Actuator Prefix Code
	3 to 8 psi (21 to 55 kPa)	599-01081	268
	5 to 10 psi (34 to 69 kPa)	599-01082	269
	10 to 15 psi (69 to 103 kPa)	599-01083	270



Dimensions in. (mm)				
Actuator	Height of Actuator H¹	Service Height H	Width/Diameter of Actuator W¹	Service Width W
4 (100)	5-3/4 (146)	14 (350)	5-1/2 (134) Dia.	18 (450)

Table Note

1. Recommended service dimensions to allow access to the product.

Submittal summary **Flowrite 599 Series**

8-inch Pneumatic Valve Actuator



Specifications	
Effective diaphragm area	28 in. ² (180 cm ²)
Diaphragm material	Buna-N
Temperature range	
Normal duty service.....	25 to 300°F (-4 to +149°C)
High temperature service	200 to 366°F (93 to 186°C)
Nominal spring range	
Fixed span.....	5 psi (34 kPa)
Adjustable start point	3 to 10 psi (21 to 69 kPa)
Factory setting.....	3 to 8 psi (21 to 55 kPa)
Nominal stroke	3/4" (20 mm)
Max. diaphragm pressure	35 psi (241 kPa)
Air connection	1/8" NPT
Ambient operating and storage temperature	
35 to 180°F (2 to 85°C)	
Mounting location	NEMA 1 (interior only))
Shipping weight	8.7 lb. (4 kg)

Designed for use with the Flowrite 599 Series valves, the Flowrite 599 Series 8-inch Pneumatic Valve Actuator has a 3/4-inch (20 mm) stroke and is available with two diaphragm options for normal duty and high temperature service.

Part Nos.	Description	Part No.	Actuator Prefix Code	
	Actuator	599-01050	277	
	Actuator with factory-mounted positioner	599-01050 + 599- 00426	283	
	Actuator	599-01051	278	
	Actuator with factory-mounted positioner	599-01051 + 599-00426	284	

Dimensions in. (mm)				
Actuator	Height of Actuator H¹	Service Height H	Width/Diameter of Actuator W¹	Service Width W
8 (171)	14-1/8 (359)	26 (660)	8-3/4 (222) Dia.	21 (450)

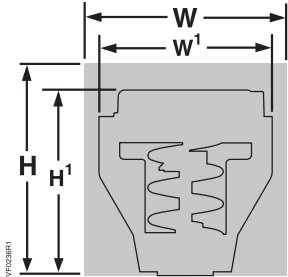


Table Note

1. Recommended service dimensions to allow access to the product.

Submittal summary

Flowrite 599 Series

globe

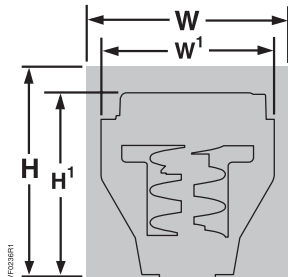
12-inch Pneumatic Valve Actuator

Designed for use with the Flowrite 599 Series valves, the Flowrite 599 Series 12-inch Pneumatic Valve Actuator is available with two stem strokes, 3/4-inch (20 mm) stroke and 1-1/2-inch (40 mm).

Specifications	
Effective diaphragm area	90 in. ² (580 cm ²)
Diaphragm material	Buna-N
Nominal spring range	
Fixed span	5 psi (34 kPa)
Adjustable start point	3 to 10 psi (21 to 69 kPa)
Factory setting	3 to 8 psig (21 to 55 kPa)
Nominal stroke	3/4 or 1-1/2" (20 or 40 mm)
Max. diaphragm pressure	35 psi (241 kPa)
Air connection	1/4" NPT
Medium Temperature	25 to 386°F (-4 to +186°C)
Ambient operating and storage temperature	35 to 180°F (2 to 85°C)
Mounting location	NEMA 1 (interior only)
Shipping weight	53.0 lb. (24.0 kg)



Part Nos.	Description	Part No.	Actuator Prefix Code	Normal Duty
	Actuator	599-01010	279	
	Actuator with factory-mounted positioner	599-01010 + 599-00423	285	High Temp.
	Actuator	599-01000	281	
	Actuator with factory-mounted positioner	599-01000 + 599-00423	287	



Dimensions in. (mm)				
Actuator	Height of Actuator H ¹	Service Height H	Width/Diameter of Actuator W ¹	Service Width W
12 (305)	17-7/8 (454)	30 (762)	15-1/8 (384) Dia.	27 (686)

Table Note
1. Recommended service dimensions to allow access to the product.

Submittal summary **Flowrite 599 Series**

globe

SQX Valve Actuator, 24 Vac Proportional Control



Part No.	Description	Part No.	Actuator Prefix Code
	24 Vac Proportional	SQX62U	271

Specifications

Operating voltage 24 Vac $\pm$ 20%
 Frequency 50/60 Hz
 Power consumption 18 VA

Control signals

Control input (Y)
 Voltage 0 to 10 Vdc
 Current 0.1 mA max.

Control input (R)
 Current 4 to 20 mA
 Max. impedance 250 Ohms

Control output (U)
 Voltage 0 to 10 Vdc
 Current 0.5 mA max.

Control output (U)
 Current 4 to 20 mA
 Max. impedance 250 Ohms

Function

Nominal stroke 3/4" (20 mm)
 Run time 35 sec.
 Nominal force 150 lb. (700 N)

Agency approvals UL873
 CSA C22.2 No. 24-93

Operating and storage temperature

Operating temperature 5 to 131°F (-15 to +55°C)
 Transport and storage
 Temperature -22 to +149°F (-30 to +65°C)
 Ambient humidity 0 to 90% RH, non-condensing
 Media temperature to 285°F (140°C)

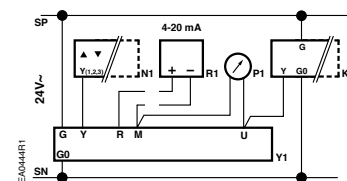
Conduit opening 1/2" (13 mm) NPSM

Mounting location NEMA 1 (interior only)

Shipping weight 3.5 lb. (1.6 kg)

Designed for use with the Flowrite 599 Series with a 3/4-inch (20 mm) stroke, the Flowrite 599 Series SQX Electronic Actuator requires a 24 Vac supply, and receives a 0 to 10 Vdc or 4 to 20 mA control signal to proportionally control the valve; available as fail-in-place only.

Wiring diagram



Dimensions in. (mm)			
Height of Actuator H ¹	Service Height H	Width/Diameter of Actuator W ¹	Service Width W
8-7/8 (226)	17 (430)	5-17/32 (140) Width x 4-3/8 (111) Depth	13-1/2 (340)

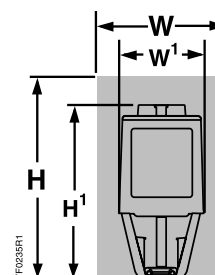


Table Note

1. Recommended service dimensions to allow access to the product.

Submittal summary

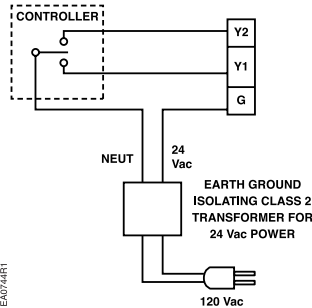
Flowrite 599 Series

globe

SQX Valve Actuator, 24 Vac
3-position (floating) Control

Designed for use with the Flowrite 599 Series and other standard valves with a 3/4-inch (20 mm) stroke, the Flowrite 599 Series SQX Electronic Valve Actuator receives a 3-position control signal to proportionally control the valve; available with fail-in-place only.

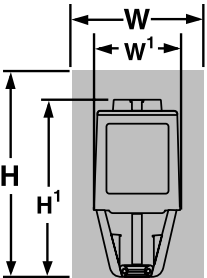
Wiring diagram



Specifications	
Operating voltage	24 Vac ±20%
Frequency	50/60 Hz
Power consumption	6.5 VA
Control signal	3-position (floating)
Function	
Nominal stroke	3/4" (20 mm)
Run time	
SQX82.00U	
@ 60 Hz	120 sec.
@ 50 Hz	150 sec.
SQX82.03U	
@ 60 Hz	30 sec.
@ 50 Hz	35 sec.
Nominal force	150 lb. (700 N)
Agency approvals	UL873
	CSA C22.2 No. 24-93
Operating	
Operating temperature	5 to 131°F (-15 to +55°C)
Transport and storage	
Temperature	-22 to +149°F (-30 to +65°C)
Ambient humidity	0 to 90% RH, non-condensing
Media temperature	to 285°F (140°C)
Conduit opening	1/2" (13 mm) NPSM
Mounting location	NEMA 1 (interior only)
Shipping weight	3.5 lb. (1.6 kg)



Part Nos.	Run Time (@ 60 Hz)	Part No.	Actuator Prefix Code
	120 seconds	SQX82.00U	272
	30 seconds	SQX82.03U	273



Dimensions in. (mm)			
Height of Actuator H¹	Service Height H	Width/Diameter of Actuator W¹	Service Width W
8-7/8 (226)	17 (430)	5-17/32 (140) Width x 4-3/8 (111) Depth	13-1/2 (340)

Table Note

1. Recommended service dimensions to allow access to the product.

Submittal summary **Flowrite 599 Series**

globe

SKD Valve Actuator, 24 Vac Proportional Control



Part Nos.	Description	Part No.	Actuator Prefix Code
	24 Vac Proportional Control	SKD62U	274
	24 Vac, Proportional advanced features	SKD62UA	—

Specifications

Operating voltage	24 Vac $\pm 20\%$
Frequency	50/60 Hz
Power consumption	18 VA
Control signals	
Control input (Y)	
Voltage.....	0 to 10 Vdc
Current.....	0.1 mA max.
Control input (R)	
Resistance.....	0 to 1000 Ohms
Voltage.....	0 to 1.6 V
Control input (R)	
Current	4 to 20 mA
Max. impedance	250 Ohms
Control output (U)	
Voltage.....	0 to 10 Vdc
Current.....	0.5 mA max.
Control output (U)	
Current	4 to 20 mA
Max. impedance	250 Ohms

Function

Nominal Stroke	3/4" (20 mm)
Run time with control operation (full stroke)	
Power stroke, 0 to 100%.....	30 sec.
Return stroke, 100 to 0%.....	15 sec.
Nominal force	
NC and 3-way upper	
Stroke.....	0%
Force.....	225 lbs. (1000 N)
NO and 3-way by pass	
Stroke.....	0%
Force.....	258 lbs. (1150 N)

Agency approvalsUL873
CSA C22.2 No. 24-93

Operating

Ambient temperature	5 to 130°F (-15 to +55°C)
Media temperature	14 to 300°F (-10 to +150°C)

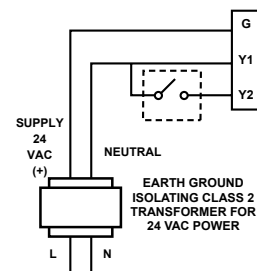
Conduit opening 1/2" (13 mm) NPSM

Mounting locationNEMA 1 (interior only)

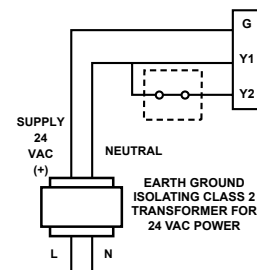
Shipping weight7.5 lb. (3.4 kg)

Designed for use with the Flowrite 599 Series and other standard valves with a 3/4-inch (20 mm) stroke, the Flowrite 599 Series SKD Electronic Valve Actuator receives a 0 to 10 Vdc or 4 to 20 mA control signal to proportionally control the valve.

Wiring diagrams



SKD62

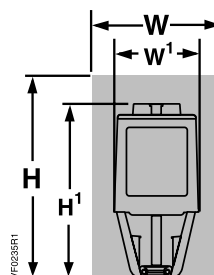


SKD62UA

Dimensions in. (mm)			
Height of Actuator H'	Service Height H	Width/Diameter of Actuator W'	Service Width W
11-13/16 (300)	19-3/4 (430)	6-5/8 (170)	14-1/2 (360)

Table Note

1. Recommended service dimensions to allow access to the product.



Submittal summary

Flowrite 599 Series

globe

SKD Valve Actuator,

24 Vac 3-position (floating) Control

Designed for use with the Flowrite 599 Series and other standard valves with a 3/4-inch (20 mm) stroke, the Flowrite 599 Series SKD Electronic Valve Actuator requires 24 Vac supply to provide three-position (floating) control of a valve.

Specifications

Operating voltage 24 Vac ± 20%

Frequency 50/60 Hz

Power consumption

SKD82.50U..... 10 VA

SKD82.51U..... 15 VA

Control signal.....3-position (floating)

Function

Nominal stroke 3/4" (20 mm)

Run time with control operation (full stroke)

SKD82.50U

Power stroke, 0 to 100% @ 50 Hz 144 sec.

Return stroke, 100 to 0% @ 50 Hz 144 sec.

Power stroke, 0 to 100% @ 60 Hz 90 sec.

Return stroke, 100 to 0% @ 60 Hz 90 sec.

Fail safe 8 sec.

SKD82.51U

Power stroke, 0 to 100% @ 50 Hz 144 sec.

Return stroke, 100 to 0% @ 50 Hz 144 sec.

Fail-safe..... 8 sec.

Nominal force

NC and 3-way upper

Stroke 0%

Force..... 225 lbs. (1000 N)

NO and 3-way by pass

Stroke 100%

Force..... 258 lbs. (1150 N)

Agency approvals UL873

CSA C22.2 No. 24-93

Operating

Ambient temperature5 to 130°F (-15 to +55°C)

Media temperature14 to 300°F (-10 to +150°C)

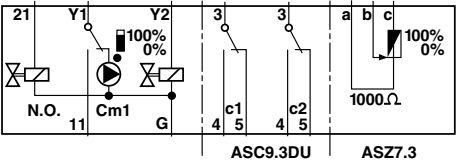
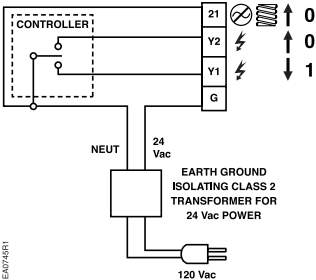
Conduit opening 1/2" (13 mm) NPSM

Mounting location NEMA 1 (interior only)

Shipping weight7.5 lb. (3.4 kg)



Wiring diagrams



SKD82.51U

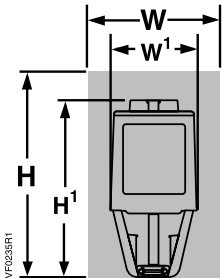
For NS SKD82.50U, refer to the installation instructions, 129-217.

Part Nos.	Description	Part No.	Actuator Prefix Code
	Fail-in-Place/NSR	SKD82.50U	275
	Fail-Safe/SR	SKD82.51U	276

Dimensions in. (mm)			
Height of Actuator H'	Service Height H	Width/Diameter of Actuator W'	Service Width W
11-13/16 (300)	19-3/4 (430)	6-5/8 (170) Width	14-1/2 (360)

Table Note

1. Recommended service dimensions to allow access to the product.



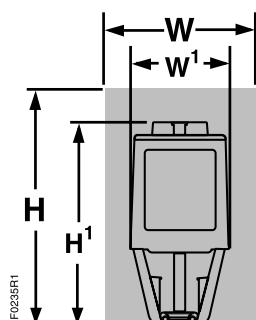
Submittal summary **Flowrite 599 Series**

globe

SKB/SKC Valve Actuator, 24 Vac Proportional Control



Part Nos.	Description	Part No.	Actuator Prefix Code
	Standard	SKB62U	291
	Advanced	SKB62UA	—
	Standard	SKC62U	294
	Advanced	SKC62UA	—

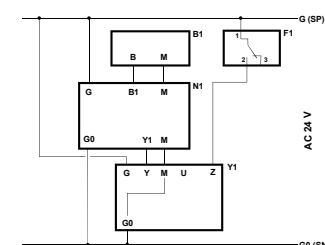


Specifications

Nominal stroke	
SKB62U	3/4" (20 mm)
SKC62U	1-1/2" (40 mm)
Operating voltage	24 Vac ± 20%
Frequency	50/60 Hz
Power consumption	
SKB62U	18 VA
SKC62U	28 VA
Control signals	
Control input (Y)	
Voltage	0 to 10 Vdc
Current	0.1 mA max.
Control input (R)	
Resistance	0 to 1000 Ohms
Voltage	0 to 1.6 V
Control input (R)	
Current	4 to 20 mA
Max. impedance	250 Ohms
Control output (U)	
Voltage	0 to 10 Vdc
Current	0.5 mA max.
Control output (U)	
Current	4 to 20 mA
Max. impedance	250 Ohms
Run Time with control operation (full stroke)	
Opening	2 min.
Closing with spring	
SKB62U	15 sec.
SKC62U	20 sec.
Conduit opening	1/2" (13 mm) NPSM
Nominal force	
NC and 3-way upper	
Stroke	0%
Force	610 lbs. (2684 N)
NO and 3-way bypass	
Stroke	100%
Force	1000 lbs. (4400 N)
Agency approvals	UL873 CSA C22.2 No. 24-93
Enclosure	NEMA 1 (interior only)
Operating	
Ambient temperature	5 to 130°F (-15 to +55°C)
Media temperature	14 to 300°F (-10 to +150°C)
Mounting location	NEMA 1 (interior only)
Shipping weight	
SKB62U	18.5 lb. (8.4 kg)
SKC62U	21.4 lb. (9.7 kg)

Designed for use with the Flowrite 599 Series and other standard valves with a 3/4-inch and 1-1/2-inch (20 and 40 mm) strokes, the Flowrite 599 Series SKB/SKC Electronic Valve Actuator receives a 0 to 10 Vdc or 4 to 20 mA control signal to proportionally control the valve.

Wiring diagram



Dimensions in. (mm)

Height of Actuator H'	Service Height H	Width/Diameter of Actuator W'	Service Width W
14-3/4 (375)	22-3/4 (578)	7 (178) Width x 8-15/16 (226) Depth	25 (635)

Table Note 1. Recommended service dimensions to allow access to the product.

Submittal summary

Flowrite 599 Series

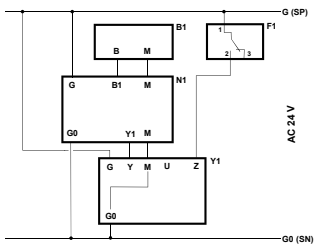
globe

SKB/SKC Valve Actuator,

24 Vac 3-position (floating) Control

Designed for use with the Flowrite 599 Series and other standard valves with 3/4-inch and 1-1/2-inch (20 mm and 40 mm) strokes, the Flowrite 599 Series SKB/C Electronic Valve Actuator requires a 24 Vac supply to control the valve.

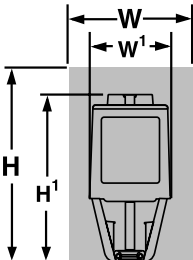
Wiring diagram



Specifications	
Operating voltage	24 Vac $\pm$ 20%
Frequency	50/60 Hz
Power consumption	
SKB82.50U	10 VA
SKB82.51U	15 VA
SKC82.60U	19 VA
SKC82.61U	20 VA
Control signal	3-position (floating)
Nominal stroke	
SKB	3/4" (20 mm)
SKC	1-1/2" (40 mm)
Run time with control	
Operation (full stroke)	2 min. opening and closing
Fail-safe time (on power failure)	
SKB82.51U	10 sec.
SKB82.61U	18 sec.
Nominal force	
NC and 3-way upper	
Stroke	0%
Force	610 lbs. (2684 N)
NO and 3-way by pass	
Stroke	100%
Force	1000 lbs. (4400 N)
Agency approvals	UL873 CSA C22.2 No. 24-93
Enclosure	NEMA 1 (interior only)
Operating	
Ambient temperature	5 to 130°F (-15 to +55°C)
Media temperature	14 to 300°F (-10 to +150°C)
Mounting location	NEMA 1 (interior only)
Shipping weight	
SKB82	18.5 lb. (8.4 kg)
SKC82	21.4 lb. (9.7 kg)



Part Nos.	Stroke	Part Nos.	Actuator Prefix Code	Spring Return
	3/4" (20 mm)	SKB82.51U	289	
	1-1/2" (40 mm)	SKC82.61U	292	Non-Spring Return
	3/4" (20 mm)	SKB82.50U	290	
	1-1/2" (40 mm)	SKC82.60U	293	



Dimensions in. (mm)			
Height of Actuator H ¹	Service Height H	Width/Diameter of Actuator W ¹	Service Width W
14-3/4 (375)	22-3/4 (578)	7 (178) Width x 8-15/16 (226) Depth	25 (635)

Table Note

1. Recommended service dimensions to allow access to the product.

Submittal summary **Flowrite 599 Series**

globe

Electro-mechanical Valve Actuator, 0-10 V Linkage Coupled



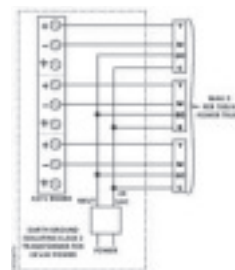
Specifications

Operating voltage	24 Vac $\pm 10\%$
Frequency	50/60 Hz
Power consumption	20 VA
Run time full stroke	
Fail-safe	
60 Hz	60 sec.
50 Hz	75 sec.
Fail-in-place	
60 Hz	120 sec.
50 Hz	144 sec.
Input signal (as shipped)	0 to 10 Vdc
Adjustable start V	0 to 10 Vdc
Adjustable span ΔV	3 to 16 Vdc
Input Impedance	100 K Ohm
Position resolution	70°
Enclosure	Die-cast Magnesium
Nominal force	
Fail-safe	160 lb. (712 N)
Fail-in-place	
3/4" (20 mm) stroke	160 lb. (712 N)
1-1/2" (40 mm) stroke	320 lb. (1424 N)
Operating	
Ambient temperature	0 to 120°F (-18 to +49°C)
Storage	-40 to +150°F (-40 to +66°C)
Conduit opening (4)	7/8" (22 mm)
Mounting location	NEMA 1 (interior only)
Shipping weights	
Spring return	13.0 lb. (5.9 kg)
Non-Spring return	11.0 lb. (5 kg)

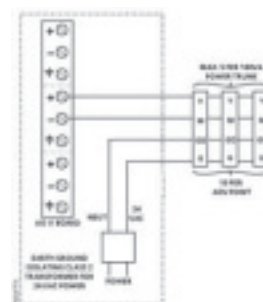
The Flowrite 599 Electro-mechanical Valve Actuator is designed for use with the Flowrite 599 Series Valves from 1/2-inch through 4-inch (18 mm to 100 mm) line sizes.

The linkage fastens the valve body and actuator together and transforms the angular movement of the actuator output shaft to the straight-line motion required to control the valve.

Wiring diagrams



Field panel wiring for modulating control-parallel wiring



Field panel wiring for modulating control-series wiring

Part Nos.	Nominal Stroke	Part Nos.			Actuator Prefix Code	
		Actuator Only	Linkage Only	Actuator & Linkage		
	3/4" (20 mm)	338-001	599-10030	599-10022	296	Spring Return
	3/4" (20 mm)	338-012	599-10030	599-10021	295	Non-Spring Return
	1-1/2" (40 mm)	338-014	599-10031	599-10023	297	

Dimensions in. (mm)			
Height of Actuator H ¹	Service Height H	Width/Diameter of Actuator W ¹	Service Width W
11 (280)	22 (559)	5-3/4 (144) Width x 8-7/8 (235) Depth	25-3/4 (654)

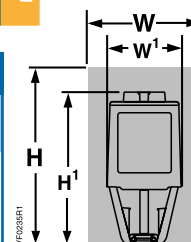


Table Note

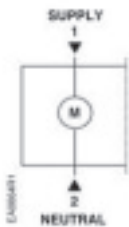
1. Recommended service dimensions to allow access to the product.

Submittal summary **Flowrite 599 Series**

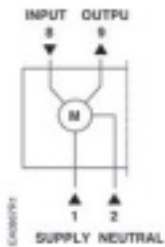
Electronic Rack and Pinion, 24 Vac Proportional Control

The Flowrite Electronic Rack and Pinion is designed for use with 1/2- to 3-inch Flowrite 599 Series two- and three-way valves with a 3/4-inch stroke. A linkage fastens the actuator and the valve body together and transforms the angular movement of the actuator output shaft to the linear motion required to position the valve.

Wiring diagrams



GCA121



GCA161

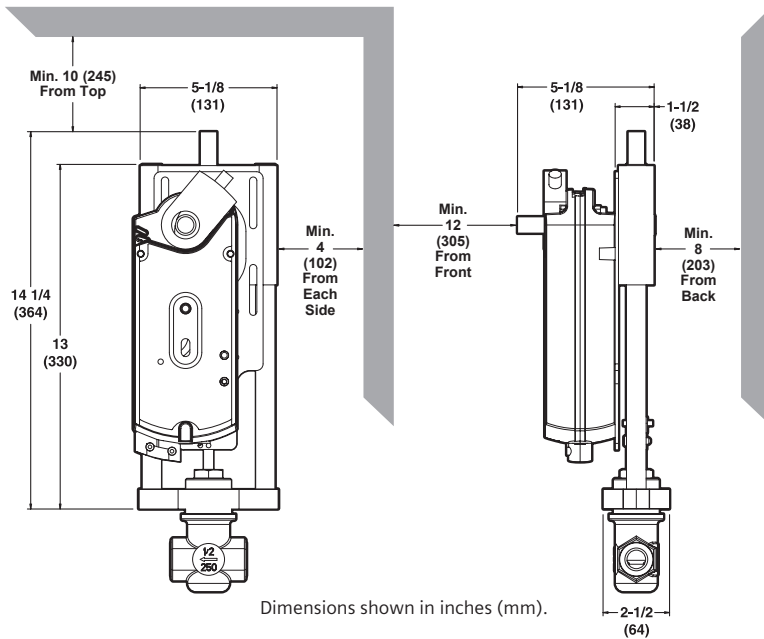
Specifications	
Power supply	
Operating voltage	24 Vac, +20%, -15%
Frequency	50/60 Hz
Power consumption 599-03609 assembly (with GCA161.1U actuator) ...	9 VA running, 5 VA holding
599-03611 assembly (with GCA121.1U actuator) ...	8 VA running, 3 VA holding
Equipment rating	Class 2, in accordance with UL/CSA
Control signal	599-03609 assembly with GCA161.1 actuator
Input signal	
Voltage input	0 to 10 Vdc (max. 35 Vdc)
Input resistance	100K Ohms
Current input	4 to 20 mA
Input resistance	500 Ohms
Position output feedback signal	0 to 10 Vdc, ±1 mA maximum
Mounting	
Nominal angle of rotation	90°
Maximum angular rotation	95°
Noise level	<45 dBA (running)
Enclosure	NEMA 2 in vertical to horizontal 90°
Ambient operating temperature	-25 to +130° F (-32 to +55°C)
Storage and transport temperature	-25 to +158° F (-32 to +70°C)
Ambient humidity	95% RH, non-condensing
Agency certification	UL873 C-UL certified to Canadian Standard C22.2 No. 24-93
Pre-connected cable	18 AWG, 3 ft. (0.9 m)



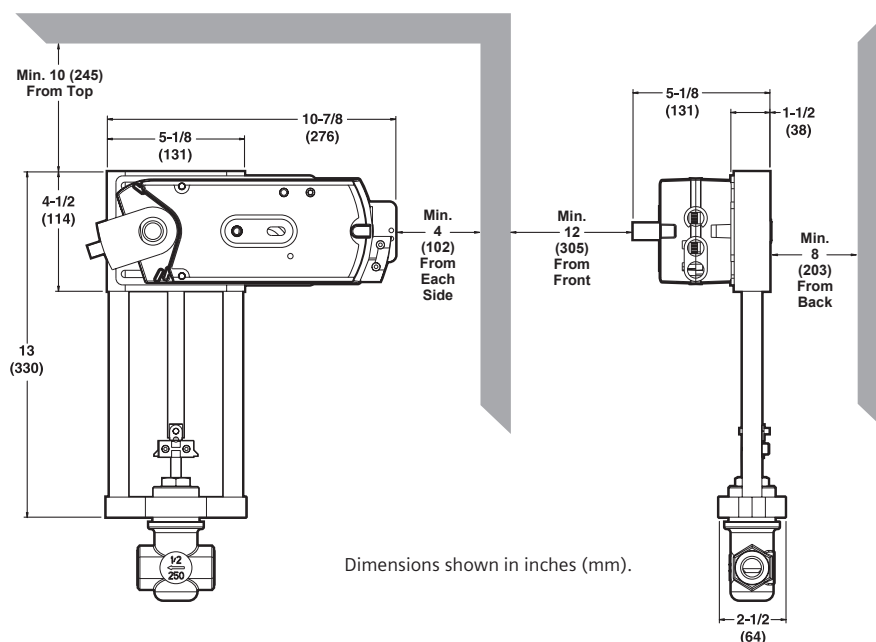
Part Nos.	Description	Part No.	Actuator Prefix Code
	0 to 10 Vdc, SR	599-03609	298
	2-position, SR	599-03611	299
	Bracket Only	599-03610	—

Table Note
The linkage, OpenAir Actuator, and Flowrite Valve are available as an assembly.

Dimensions



Normal Duty Application as Shipped from Factory



High Temperature/Field Adjusted for Steam Applications >15psi

Submittal summary **Siemens 599 Series**

1/2 to 2-inch, Two- and Three-way Ball Valves

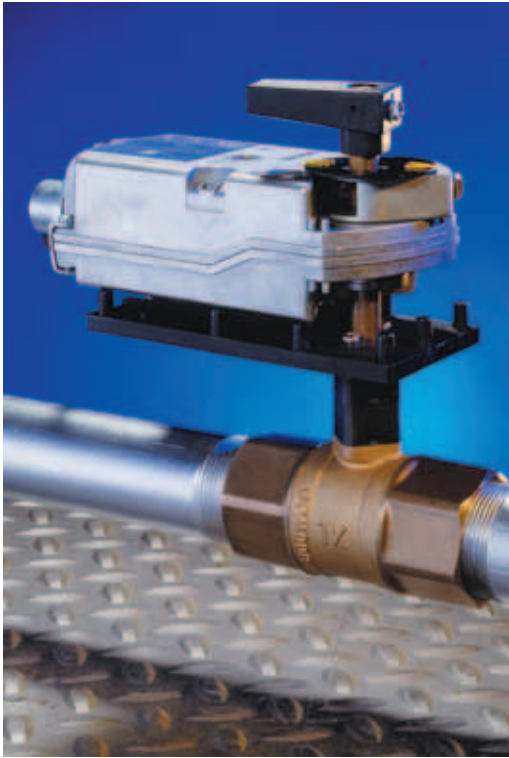
The Powermite 599 Series Two- and Three-way Characterized Ball Valves are coupled with OpenAir Actuators to provide modified equal percentage flow control. The Ball Valves are 1/4-turn rotary control valves.

Features

- Universal mounting plate
- Leak-proof shutoff with characterized ball
- Blow-out proof stem with-stands high pressure
- Standoffs provide a thermal barrier between the actuator and the mounting plate

Specifications

Static pressure	360 psi (2482 kPa)
Media temperature	35 to 250°F (2 to 120°C)
Controlled medium	Water, glycol solutions to 50%
Body	Forged Brass ASTM B283
Ball	Nickel-plated brass ball
Flow optimizer	Glass-filled polymer
Ball seals	Reinforced Teflon® seals with EPDM O-rings
End connections	Female NPT
Stem	Brass
Stem seals	EDPM O-rings
Angle of rotation	0 to 90°



Two-way Ball Valves

Part Nos.	Valve Part No.	Flow Rate Cv (Kvs)	Line Size in. (mm)	Fail-in-Place 		Fail-Safe 					
				3-position GDE/GLB	0-10 Vdc GDE/GLB	2-position GMA		3-position GMA		0-10 Vdc GMA	
						NO	NC	NO	NC	NO	NC
	599-10203	0.4 (0.34)	1/2 (15)	171A-10203	171C-10203	171E-10203	172E-10203	171F-10203	172F-10203	171G-10203	172G-10203
	599-10204	0.63 (0.54)	1/2 (15)	171A-10204	171C-10204	171E-10204	172E-10204	171F-10204	172F-10204	171G-10204	172G-10204
	599-10205	1.6 (1.4)	1/2 (15)	171A-10205	171C-10205	171E-10205	172E-10205	171F-10205	172F-10205	171G-10205	172G-10205
	599-10206	2.5 (2.2)	1/2 (15)	171A-10206	171C-10206	171E-10206	172E-10206	171F-10206	172F-10206	171G-10206	172G-10206
	599-10207	4 (3.5)	1/2 (15)	171A-10207	171C-10207	171E-10207	172E-10207	171F-10207	172F-10207	171G-10207	172G-10207
	599-10208*	10 (8.6)	1/2 (15)	171A-10208	171C-10208	171E-10208	172E-10208	171F-10208	172F-10208	171G-10208	172G-10208
	599-10209	10 (8.6)	3/4 (20)	171A-10209	171C-10209	171E-10209	172E-10209	171F-10209	172F-10209	171G-10209	172G-10209
	599-10210*	25 (22)	3/4 (20)	171A-10210	171C-10210	171E-10210	172E-10210	171F-10210	172F-10210	171G-10210	172G-10210
	599-10211	10 (8.6)	1 (25)	171A-10211	171C-10211	171E-10211	172E-10211	171F-10211	172F-10211	171G-10211	172G-10211
	599-10212	25 (22)	1 (25)	171A-10212	171C-10212	171E-10212	172E-10212	171F-10212	172F-10212	171G-10212	172G-10212
	599-10213	16 (14)	1 (25)	171A-10213	171C-10213	171E-10213	172E-10213	171F-10213	172F-10213	171G-10213	172G-10213
	599-10214*	63 (54)	1 (25)	171A-10214	171C-10214	171E-10214	172E-10214	171F-10214	172F-10214	171G-10214	172G-10214
	599-10215	16 (14)	1-1/4 (30)	171A-10215	171C-10215	171E-10215	172E-10215	171F-10215	172F-10215	171G-10215	172G-10215
	599-10216	40 (35)	1-1/4 (30)	171A-10216	171C-10216	171E-10216	172E-10216	171F-10216	172F-10216	171G-10216	172G-10216
	599-10217*	100 (86)	1-1/4 (30)	171A-10217	171C-10217	171E-10217	172E-10217	171F-10217	172F-10217	171G-10217	172G-10217
	599-10218	25 (22)	1-1/2 (40)	171B-10218	171D-10218	171E-10218	172E-10218	171F-10218	172F-10218	171G-10218	172G-10218
	599-10219*	63 (54)	1-1/2 (40)	171B-10219	171D-10219	171E-10219	172E-10219	171F-10219	172F-10219	171G-10219	172G-10219
	599-10220	40 (35)	1-1/2 (40)	171B-10220	171D-10220	171E-10220	172E-10220	171F-10220	172F-10220	171G-10220	172G-10220
	599-10221*	160 (138)	1-1/2 (40)	171B-10221	171D-10221	171E-10221	172E-10221	171F-10221	172F-10221	171G-10221	172G-10221
	599-10222	40 (35)	2 (50)	171B-10222	171D-10222	171E-10222	172E-10222	171F-10222	172F-10222	171G-10222	172G-10222
	599-10223*	100 (86)	2 (50)	171B-10223	171D-10223	171E-10223	172E-10223	171F-10223	172F-10223	171G-10223	172G-10223
	599-10224	63 (54)	2 (50)	171B-10224	171D-10224	171E-10224	172E-10224	171F-10224	172F-10224	171G-10224	172G-10224
	599-10225*	250 (214)	2 (50)	171B-10225	171D-10225	171E-10225	172E-10225	171F-10225	172F-10225	171G-10225	172G-10225

Ordering Note

When ordered as an assembly, the OpenAir actuator is provided with 12-inch (305 mm) wires.

Table Note

*Denotes a full-port valve with no flow optimizer insert.

1/2 to 2-inch, Two- and Three-way Ball Valves (continued)

Three-way Ball Valves

Part Nos.	Valve Part No.	Flow Rate Cv (Kvs)	Line Size in. (mm)	Fail-in-Place 		Fail-Safe 		
				Control & Actuator Prefix Code				
				3-position GDE/GLB	0-10 Vdc GDE/GLB	2-position GMA	3-position GMA	0-10 Vdc GMA
	599-10250	0.4 (34)	1/2 (15)	171A- 10250	171C- 10250	171E- 10250	171F- 10250	171G- 10250
	599-10251	0.63 (0.54)	1/2 (15)	171A- 10251	171C- 10251	171E- 10251	171F- 10251	171G- 10251
	599-10252	1.0 (0.86)	1/2 (15)	171A- 10252	171C- 10252	171E- 10252	171F- 10252	171G- 10252
	599-10253	2.5 (2.2)	1/2 (15)	171A- 10253	171C- 10253	171E- 10253	171F- 10253	171G- 10253
	599-10254	4 (3.5)	1/2 (15)	171A- 10254	171C- 10254	171E- 10254	171F- 10254	171G- 10254
	599-10255*	10 (8.6)	1/2 (15)	171A- 10255	171C- 10255	171E- 10255	171F- 10255	171G- 10255
	599-10256*	16 (14)	3/4 (20)	171A- 10256	171C- 10256	171E- 10256	171F- 10256	171G- 10256
	599-10257	10 (8.6)	1 (25)	171A- 10257	171C- 10257	171E- 10257	171F- 10257	171G- 10257
	599-10258	16 (14)	1 (25)	171A- 10258	171C- 10258	171E- 10258	171F- 10258	171G- 10258
	599-10259*	25 (22)	1 (25)	171A- 10259	171C- 10259	171E- 10259	171F- 10259	171G- 10259
	599-10260	16 (14)	1-1/4 (30)	171A- 10260	171C- 10260	171E- 10260	171F- 10260	171G- 10260
	599-10261*	25 (22)	1-1/4 (30)	171A- 10261	171C- 10261	171E- 10261	171F- 10261	171G- 10261
	599-10262	63 (54)	1-1/2 (40)	171B- 10262	171D- 10262	171E- 10262	171F- 10262	171G- 10262
	599-10263	25 (22)	1-1/2 (40)	171B- 10263	171D- 10263	171E- 10263	171F- 10263	171G- 10263
	599-10264*	63 (54)	1-1/2 (40)	171B- 10264	171D- 10264	171E- 10264	171F- 10264	171G- 10264
	599-10265	25 (22)	2 (50)	171B- 10265	171D- 10265	171E- 10265	171F- 10265	171G- 10265
	599-10266	40 (35)	2 (50)	171B- 10266	171D- 10266	171E- 10266	171F- 10266	171G- 10266
	599-10267*	100 (86)	2 (50)	171B- 10267	171D- 10267	171E- 10267	171F- 10267	171G- 10267

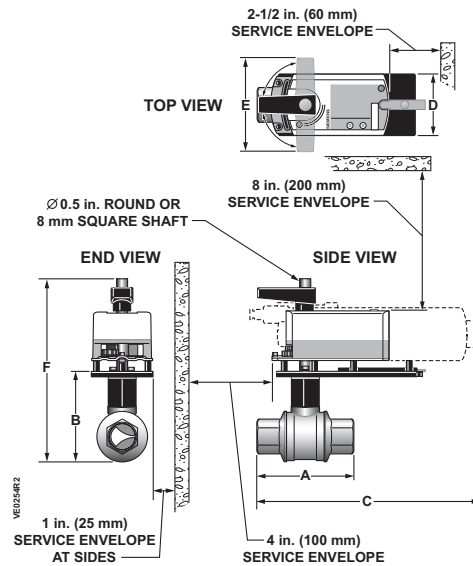
Ordering Note

When ordered as an assembly, the OpenAir actuator is provided with 12-inch (305 mm) wires.

Table Note

*Denotes a full-port valve with no flow optimizer insert.

Dimensions



Dimensions shown in inches (mm).

Two-way Ball Valves

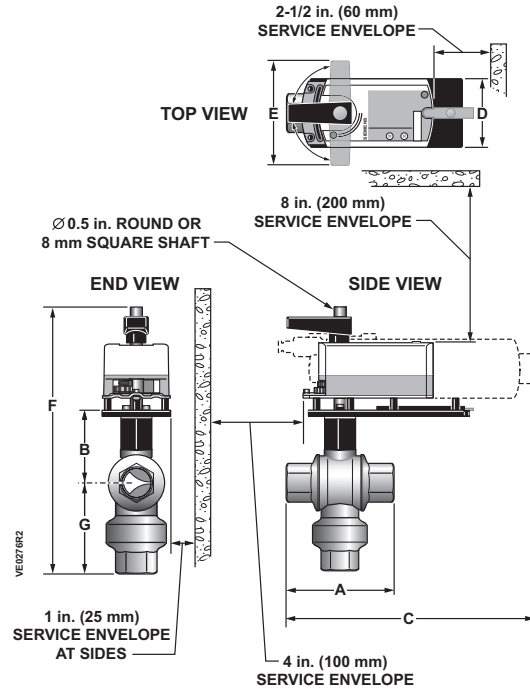
Line Size	Ball Size	Part Nos.	A Length	C Length* Codes 171A-D	C Length* Codes 171E-G & 172E-G	B Height	F Height	Weight
1/2" (15 mm) 1/2"	(15 mm)	599-10203 to 10208	2-3/8" (60 mm)	6-7/16" (163 mm)	7-1/16" (179 mm)	3-7/16" (87 mm)	8-1/8" (206 mm)	1.0 lb. (0.45 kg)
3/4" (20 mm) 3/4"	(20 mm)	599-10209 599-10210	2-3/8" (60 mm)	6-7/16" (163 mm)	7-1/16" (179 mm)	3-11/16" (94 mm)	8-5/16" (211 mm)	1.0 lb. (0.45 kg)
1" (25 mm) 3/4"	(20 mm)	599-10211	2-3/4" (70 mm)	6-5/8" (167 mm)	7-1/4" (184 mm)	3-11/16" (94 mm)	8-5/16" (211 mm)	1.0 lb. (0.45 kg)
1" (25 mm) 1"	(25 mm)	599-10213 to 10214	3" (77 mm)	6-3/4" (171 mm)	7-3/8" (187 mm)	4" (100 mm)	8-11/16" (220 mm)	1.4 lb. (0.64 kg)
1" (25 mm) 1-1/4"	(30 mm)	599-10212	4-1/4" (109 mm)	7-7/16" (189 mm)	8-1/16" (205 mm)	4-1/2" (113 mm)	8-7/8" (226 mm)	2.4 lb. (1.1 kg)
1-1/4" (30 mm) 1"	(25 mm)	599-10215	3" (76 mm)	6-3/4" (171 mm)	7-3/8" (187 mm)	4" (100 mm)	8-11/16" (220 mm)	1.4 lb. (0.64 kg)
1-1/4" (30 mm) 1-1/4"	(30 mm)	599-10216 599-10217	3-1/16" (81 mm)	6-13/16" (173 mm)	7-7/16" (189 mm)	4-1/2" (113 mm)	9-1/8" (231 mm)	2.4 lb. (1.1 kg)
1-1/2" (40 mm) 1-1/4"	(30 mm)	599-10218 599-10219	3-7/16" (87 mm)	6-15/16" (176 mm)	7-9/16" (192 mm)	4" (100 mm)	9-1/8" (231 mm)	2.4 lb. (1.1 kg)
1-1/2" (40 mm) 1-1/2"	(40 mm)	599-10220 599-10221	3-3/4" (94 mm)	7-1/16" (179 mm)	7-11/16" (195 mm)	5-3/16" (132 mm)	8-7/8" (226 mm)	3.2 lb. (1.5 kg)
2" (50 mm) 1-1/2"	(40 mm)	599-10222 599-10223	4" (101 mm)	7-1/8" (183 mm)	7-3/4" (196 mm)	5-3/16" (132 mm)	8-7/8" (226 mm)	3.2 lb. (1.5 kg)
2" (50 mm) 2"	(50 mm)	599-10224 599-10225	4-7/16" (112 mm)	7-7/16" (189 mm)	8-1/16" (205 mm)	5-3/4" (146 mm)	10-1/2" (266 mm)	5.0 lb. (2.3 kg)

Table Notes

*Dimension "C" is maximum length, measured from the actuator, end fitting, or mounting plate, whichever extends the furthest.

1. Stamping on valve body indicates the ball size, not necessarily the line fitting size.
2. All dimensions are in inches (mm) and weights are in pounds (kg).
3. Dimension "D", Depth, is 3 inches (76 mm).
4. Dimension "E", Handle, is 4 inches (102 mm).

1/2 to 2-inch, Two- and Three-way Ball Valves (continued)



Three-way Ball Valves

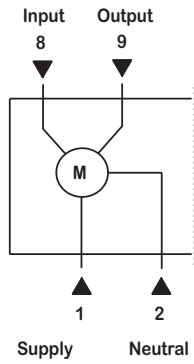
Line Size	Ball Size	Part Nos.	A Length	C Length* Actuator Codes 171A-D	C Length* Actuator Codes 171E-G	B Height	G Height	F Depth	Weight
1/2" (15 mm)	3/4" (20 mm)	599-10250 to 599-10255	3-1/2" (89 mm)	7" (178 mm)	7-5/8" (194 mm)	3-1/4" (83 mm)	2-3/8" (60 mm)	9-3/8" (238 mm)	1.60 lb. (0.73 kg)
3/4" (20 mm)	3/4" (20 mm)	599-10256	2-3/4" (70 mm)	6-1/2" (165 mm)	7-1/8" (181 mm)	3-1/4" (83 mm)	2" (51 mm)	8-3/4" (222 mm)	1.64 lb. (0.74 kg)
1" (25 mm)	1" (25 mm)	599-10257	3" (76 mm)	6-3/4" (171 mm)	7-3/8" (187 mm)	3-3/4" (95 mm)	2-1/2" (64 mm)	9-3/4" (248 mm)	2.26 lb. (1.03 kg)
1" (25 mm)	1-1/4" (30 mm)	599-10258	4-1/2" (114 mm)	7-3/4" (197 mm)	8-3/8" (213 mm)	4" (102 mm)	3-1/4" (83 mm)	10-3/4" (273 mm)	3.56 lb. (1.61 kg)
1-1/4" (30 mm)	1-1/4" (30 mm)	599-10259	4-1/2" (114 mm)	7-3/4" (197 mm)	8-3/8" (213 mm)	4" (102 mm)	3-1/4" (83 mm)	10-3/4" (273 mm)	3.56 lb. (1.61 kg)
1-1/4" (30 mm)	1-1/4" (30 mm)	599-10260	3-5/8" (91 mm)	7-1/4" (184 mm)	7-7/8" (200 mm)	4" (102 mm)	2-3/4" (70 mm)	10-1/4" (260 mm)	3.50 lb. (1.59 kg)
1-1/4" (30 mm)	1-1/4" (30 mm)	599-10261	3-5/8" (91 mm)	7-1/4" (184 mm)	7-7/8" (200 mm)	4" (102 mm)	2-3/4" (70 mm)	10-1/4" (260 mm)	3.50 lb. (1.59 kg)
1-1/2" (40 mm)	1-1/4" (30 mm)	599-10262	4-1/2" (114 mm)	7-3/4" (197 mm)	8-3/8" (213 mm)	4" (102 mm)	3-1/4" (83 mm)	10-3/4" (273 mm)	3.56 lb. (1.61 kg)
1-1/2" (40 mm)	1-1/2" (40 mm)	599-10263	4" (102 mm)	7-1/4" (184 mm)	7-7/8" (200 mm)	4-1/2" (114 mm)	3-1/4" (83 mm)	11" (279 mm)	5.16 lb. (2.34 kg)
1-1/2" (40 mm)	1-1/2" (40 mm)	599-10264	4" (102 mm)	7-1/4" (184 mm)	7-7/8" (200 mm)	4-1/2" (114 mm)	3-1/4" (83 mm)	11" (279 mm)	5.16 lb. (2.34 kg)
2" (50 mm)	1-1/2" (40 mm)	599-10265	4" (102 mm)	7-1/4" (184 mm)	7-7/8" (200 mm)	4-1/2" (114 mm)	3-1/4" (83 mm)	11" (279 mm)	5.16 lb. (2.34 kg)
2" (50 mm)	2" (50 mm)	599-10266	5" (127 mm)	7-3/4" (197 mm)	8-3/8" (213 mm)	5-3/4" (146 mm)	3-3/4" (95 mm)	12-1/4" (311 mm)	8.50 lb. (3.86 kg)
2" (50 mm)	2" (50 mm)	599-10267	5" (127 mm)	7-3/4" (197 mm)	8-3/8" (213 mm)	5-3/4" (146 mm)	3-3/4" (95 mm)	12-1/4" (311 mm)	8.50 lb. (3.86 kg)

Table Notes

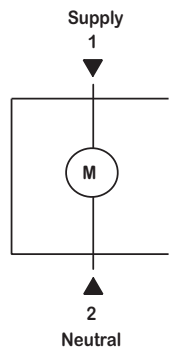
*Dimension "C" is maximum length, measured from the actuator, end fitting, or mounting plate, whichever extends the furthest.

1. Stamping on valve body indicates the ball size, not necessarily the line fitting size.
2. All dimensions are in inches (mm) and weights are in pounds (kg).
3. Dimension "D", Depth, is 3 inches (76 mm).
4. Dimension "E", Handle, is 4 inches (102 mm).

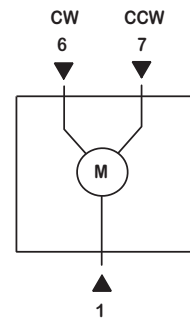
Wiring diagrams



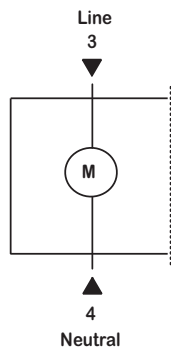
Modulating (0 to 10 Vdc), 24 Vac
(Applies to all)



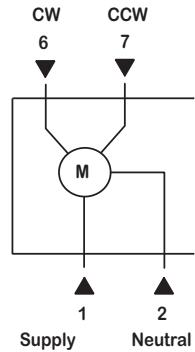
2-position, 24 Vac
(GMA, 2-position)



3-position, 24 Vac-NSR (GDE/GLB)



2-position, 120 Vac (GMA)



3-position, 24 Vac-SR (GMA)

Resilient Seat Butterfly Valves with Electric Actuators

Butterfly Valve assemblies provide excellent flow control of hot water, chilled water, condenser water, thermal storage systems, and steam applications. Valves are available in two-way and three-way arrangements for two-position (On/Off) and modulating control.

Features

- Molded-in resilient seat provides bubble-tight shutoff to 150 psi.
- Temperature rating for standard EPDM seat: -40 to +250°F.
- Lugged body is drilled and tapped for isolation and removal of downstream piping at full rated pressure.
- Round, polished disc and hub edge provides 360° concentric seating, minimum flow restriction, lower torques and longer seat life.
- Upper and lower inboard bronze bearings ensure longer service life with low operating torques.
- Thru-stem design provides high strength and positive disc control with standardized end connection for operator interchangeability.
- Extended neck allows adequate clearance for flanges and insulation.
- Bi-directional, select adjusting stem seat is suitable for vacuum and pressure while preventing external contamination of the stem area.
- Heavy-duty corrosion resistant top bushing absorbs actuator side thrust.
- Cast-in top plate is an integral part of the body and is standardized to allow direct mounting of actuators.
- Each valve is factory tested to 110 percent of specified pressure rating.
- Available in multiple configurations to match jobsite needs.
- Modulating and two-position actuators.

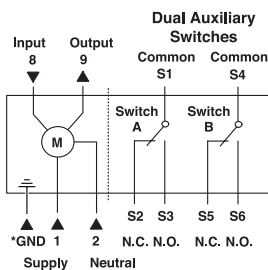


butterfly

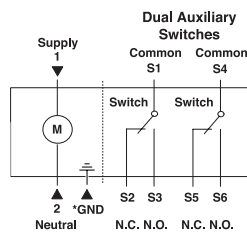
Specifications

Valve body		Equipment rating: input & output signal	
Body	Cast Iron, ASTM-A 126 Class B	OpenAir	Class 2
Disc	Aluminum Bronze, ASTM-A 148 UNS C95100 Grade A	EPI	Class 2
Stem	Stainless Steel, ASTM-A 743 CF8M	Auxiliary limit switches	
Molded-in liner	EPDM	EPI	2 SPDT Switches/10A @ 125 Vac (Standard)
Inboard bearings	Bronze	Feedback potentiometer	
Upper brushings	Polyester	OpenAir	Option
Upper Stem Seal	NBR	Runtime for 90°	
Electronic actuator		OpenAir	90 seconds
Operating voltage		EPI3	17 seconds
OpenAir GCA121/161	24 Vac±20%	EPI151	60 seconds
EPI	120 Vac±10%	Nominal angle of rotation	
Frequency		OpenAir	90°
OpenAir	50/60 Hz	EPI	90°
EPI	50/60 Hz	Ambient temperature	
Power consumption		Operating	
Running Max.		OpenAir GCA	-25 to +130°F (-32 to +55°C)
OpenAir GCA161	9 VA	EPI	-20 to +140°F (-32 to +55°C)
OpenAir GCA121	8 VA	Storage	
EPI3	60 VA	OpenAir	-40 to 158°F (-40° to +70°C)
EPI151	300 VA	EPI	-40 to +185°F (-40° to +85°C)
Holding max.		Ambient humidity	
OpenAir GCA161	5 VA	OpenAir	95% RH
OpenAir GCA121	3 VA	EPI	0-90%, non-condensing
Positive input signal		Housing enclosure	
OpenAir	0 to 10 Vdc (max. 35 Vdc)	OpenAir	NEMA 1
EPI	4-20 mA (Option)	EPI	NEMA 4
Equipment rating: operating voltage		Agency approvals	
OpenAir GCA	Class 2	OpenAir	UL873, C-UL (C22.2 No. 24-93)
EPI	Class 1	EPI	FM, CSA Approvals (optional)

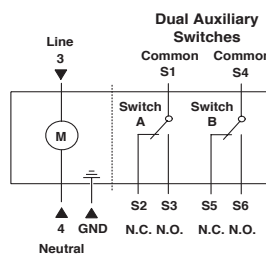
OpenAir wiring diagrams



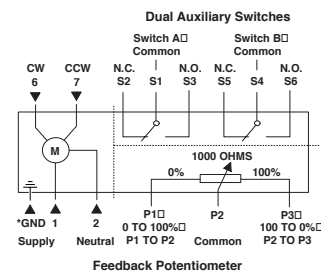
Modulating (0 to 10 Vdc),
24 Vac



2-position, 24 Vac



2-position, 120 Vac



3-position, 24 Vac

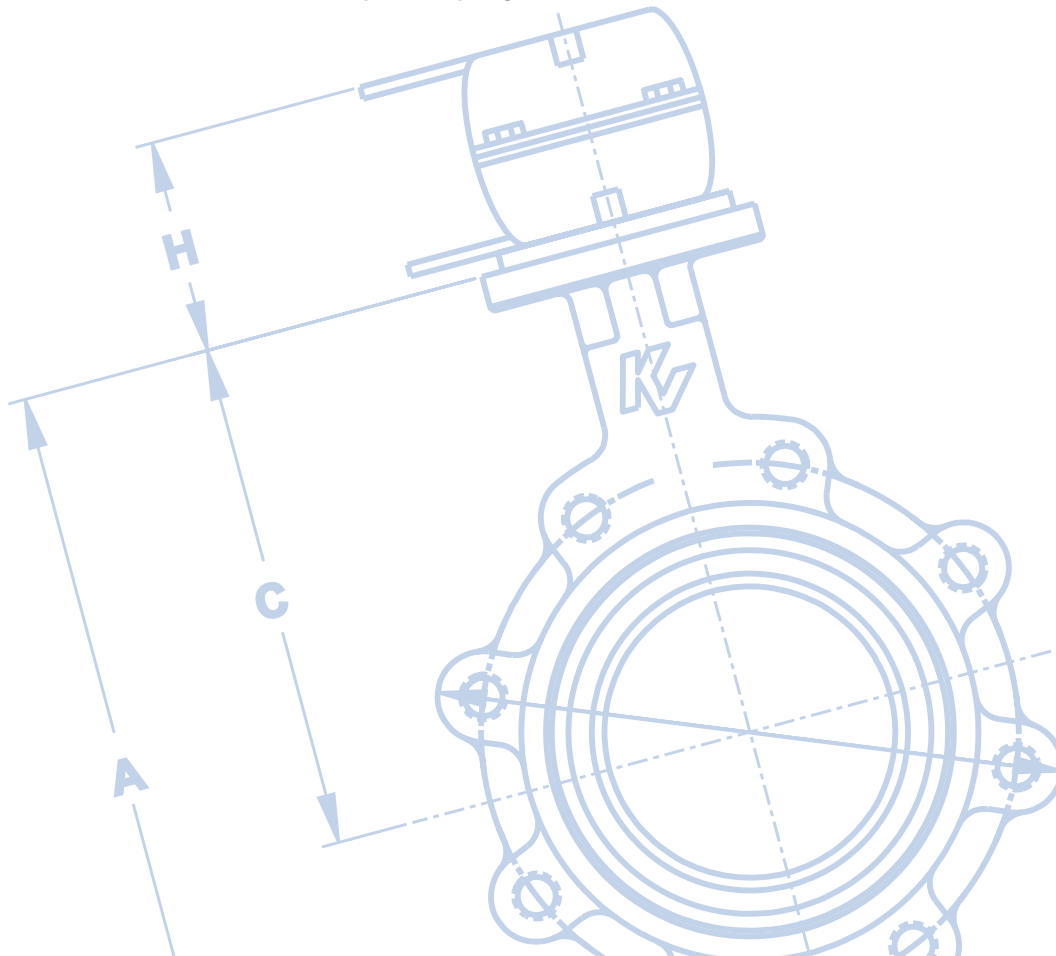
Resilient Seat Butterfly Valves with Electric Actuator (continued)



Non-Spring Return Electronic Actuator



OpenAir Spring Return Electronic Actuator

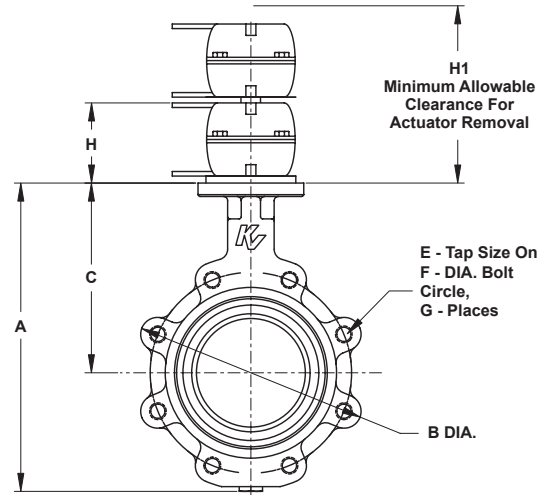
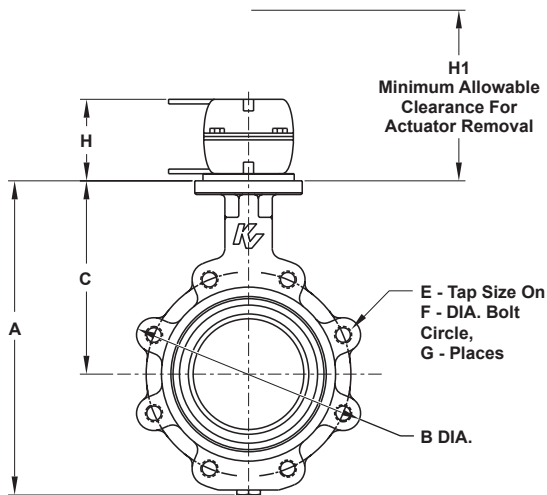
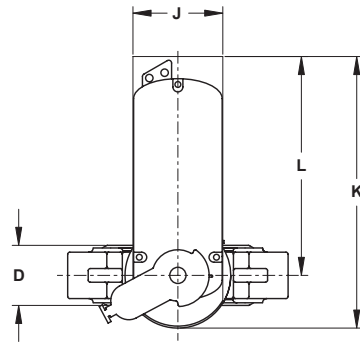
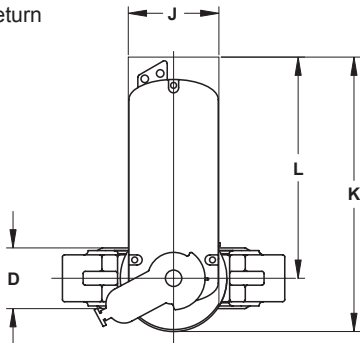


2-way OpenAir Electric Actuator Valve Assemblies

Size	A	B	C	D	E Tap Size	F Bolt Circle	G # Bolts	H	H1	H2	J	K	L	Notes
2"	8.5" (216 mm)	6" (153 mm)	5.31" (135 mm)	1.69" (43 mm)	0.625-11 UNC-2B	4.75" (121 mm)	4	3.25" (83 mm)	5.25" (133 mm)	—	4.00" (102 mm)	10.35" (263 mm)	8.35" (212 mm)	1, 2, 4, 5
2.5"	9.31" (236 mm)	6.75" (172 mm)	5.98" (135 mm)	1.81" (46 mm)	0.625-11 UNC-2B	5.50" (140 mm)	4	3.25" (83 mm)	5.25" (133 mm)	—	4.00" (102 mm)	10.35" (263 mm)	8.35" (212 mm)	1, 2, 4, 5
3"	10" (254 mm)	7.25" (184 mm)	6.31" (160 mm)	1.81" (46 mm)	0.625-11 UNC-2B	6.00" (152 mm)	4	3.25" (83 mm)	5.25" (133 mm)	—	4.00" (102 mm)	10.35" (263 mm)	8.35" (212 mm)	1, 2, 4, 5
4"	11.38" (288 mm)	8.81" (223 mm)	7.14" (180 mm)	2.06" (52 mm)	0.625-11 UNC-2B	6.00" (152 mm)	4	3.25" (83 mm)	5.25" (133 mm)	—	4.00" (102 mm)	10.35" (263 mm)	8.35" (212 mm)	1, 2, 5
4"	11.13" (283 mm)	8.75" (222 mm)	7.00" (178 mm)	2.00" (51 mm)	0.625-11 UNC-2B	7.50" (191 mm)	8	3.25" (83 mm)	9.00" (229 mm)	7.00" (178 mm)	4.00" (102 mm)	14.84" (377 mm)	12.84" (327 mm)	1, 2, 3, 4
5"	12.13" (307 mm)	19" (254 mm)	7.50" (191 mm)	2.13" (54 mm)	0.625-11 UNC-2B	8.50" (216 mm)	8	3.25" (83 mm)	9.00" (229 mm)	7.00" (178 mm)	4.00" (102 mm)	14.84" (377 mm)	12.84" (327 mm)	1, 2, 3, 5
6"	13.25" (337 mm)	11.00" (279 mm)	8.00" (203 mm)	2.13" (54 mm)	0.625-11 UNC-2B	9.50" (241 mm)	8	3.25" (83 mm)	9.00" (229 mm)	7.00" (178 mm)	4.00" (102 mm)	14.84" (377 mm)	12.84" (327 mm)	1, 2, 3, 5

Table Notes

1. 100 psi shutoff pressure
2. Undercut assemblies
3. Tandem actuators
4. Spring return
5. Non-spring return



2-way Valve Application with One OpenAir Actuator.

2-way Valve Application with Two OpenAir Actuators.

Resilient Seat Butterfly Valves with Electric Actuator (continued)

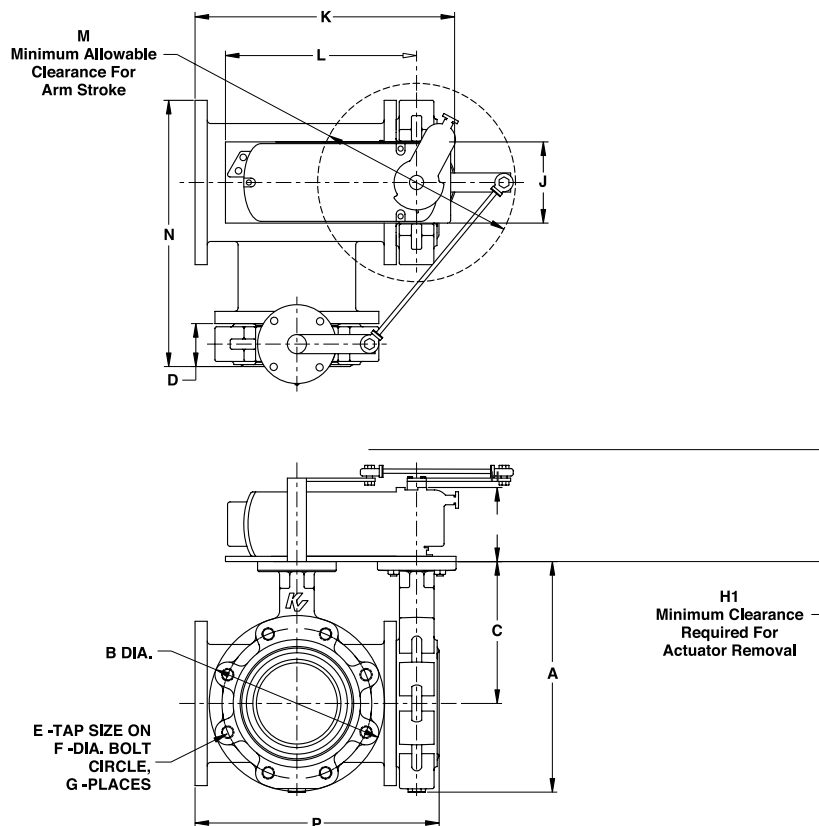
3-way OpenAir Electric Actuator Valve Assemblies

Size	A	B	C	D	E Tap Size	F Bolt Circle	G # Bolts	H	H1	H2	J	K	L	M
2"	8.50" (216 mm)	6.00" (153 mm)	5.31" (135 mm)	1.69" (43 mm)	0.625-11 UNC-2B	4.75" (121 mm)	4	3.25" (83 mm)	5.25" (133 mm)	—	4.00" (102 mm)	11.84" (301 mm)	8.35" (212 mm)	7.25" (184 mm)
2.5"	9.31" (236 mm)	6.75" (172 mm)	5.94" (150 mm)	1.81" (46 mm)	0.625-11 UNC-2B	5.50" (140 mm)	4	3.25" (83 mm)	5.25" (133 mm)	—	4.00" (102 mm)	13.41" (341 mm)	8.35" (212 mm)	7.25" (184 mm)
3"	10.00" (254 mm)	7.25" (184 mm)	6.31" (160 mm)	1.81" (46 mm)	0.625-11 UNC-2B	6.0" (152 mm)	4	3.25" (83 mm)	5.25" (133 mm)	—	4.00" (102 mm)	13.98" (355 mm)	8.35" (212 mm)	7.25" (184 mm)
3"	10.00" (254 mm)	7.25" (184 mm)	6.31" (160 mm)	1.81" (46 mm)	0.625-11 UNC-2B	6.00" (152 mm)	4	3.25" (83 mm)	9.00" (229 mm)	7.00" (178 mm)	4.00" (102 mm)	13.98" (355 mm)	8.35" (212 mm)	7.25" (184 mm)
4"	11.38" (288 mm)	8.81" (223 mm)	7.13" (180 mm)	2.06" (52 mm)	0.625-11 UNC-2B	7.50" (191 mm)	8	3.25" (83 mm)	5.25" (133 mm)	—	4.00" (102 mm)	16.06" (408 mm)	8.35" (212 mm)	7.25" (184 mm)
4"	11.13" (283 mm)	8.75" (222 mm)	7.00" (178 mm)	2.00" (51 mm)	0.625-11 UNC-2B	7.50" (191 mm)	8	3.25" (83 mm)	9.00" (229 mm)	7.00" (178 mm)	4.00" (102 mm)	16.06" (408 mm)	16.0" (212 mm)	6.36" (184 mm)
5"	12.19" (310 mm)	10.00" (254 mm)	7.50" (191 mm)	2.13" (54 mm)	0.750-10 UNC-2B	8.50" (216 mm)	8	3.25" (83 mm)	9.00" (229 mm)	7.00" (178 mm)	4.00" (102 mm)	18.06" (459 mm)	8.35" (212 mm)	7.25" (184 mm)
6"	13.25" (337 mm)	11.00" (279 mm)	8.00" (203 mm)	2.13" (54 mm)	0.750-10 UNC-2B	9.50" (241 mm)	8	3.25" (83 mm)	9.00" (229 mm)	7.00" (178 mm)	4.00" (102 mm)	4.00" (102 mm)	19.06" (484 mm)	7.25" (184 mm)

Size	N	P	Notes
2"	9.22" (234 mm)	10.69" (272 mm)	1, 2, 4, 5
2.5"	10.31" (266 mm)	12.31" (313 mm)	1, 2, 4, 5
3"	11.44" (291 mm)	12.88" (327 mm)	1, 2, 5
3"	11.44" (291 mm)	12.88" (327 mm)	1, 2, 3, 4
4"	13.06" (332 mm)	15.06" (383 mm)	1, 2, 5
4"	13.06" (332 mm)	15.06" (383 mm)	1, 2, 3, 4
5"	14.44" (367 mm)	17.13" (435 mm)	1, 2, 3, 5
6"	15.38" (391 mm)	18.13" (460 mm)	1, 2, 3, 5

Table Notes

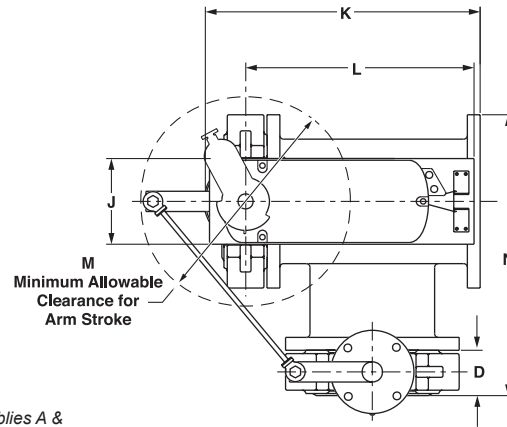
- 100 psi shutoff pressure
- Undercut assemblies
- Tandem actuators
- Spring return
- Non-spring return



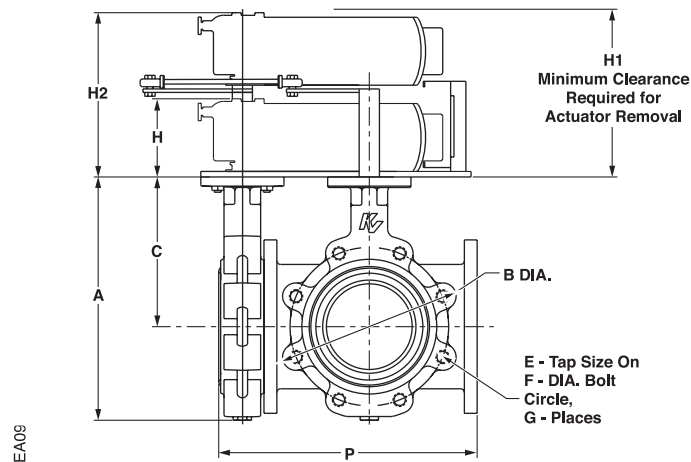
3-way Valve Application with One OpenAir Actuator.

Drawings shown are for Assemblies A & B. For Assemblies C & D, the valve and actuator are on the left-hand side of the run of tee.

butterfly



Drawings shown are for Assemblies A & B. For Assemblies C & D, the valve and actuator are on the right-hand side of the run of tee.



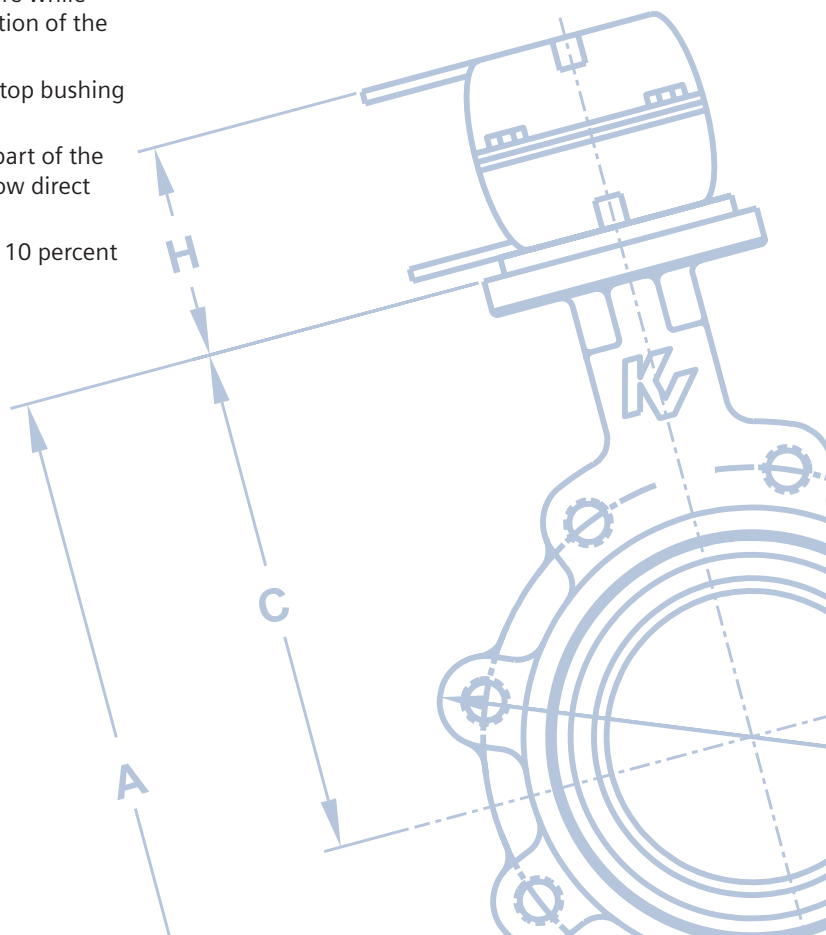
3-way Valve Application with Two OpenAir Actuators.

Resilient Seat Butterfly Valves with Pneumatic Actuators

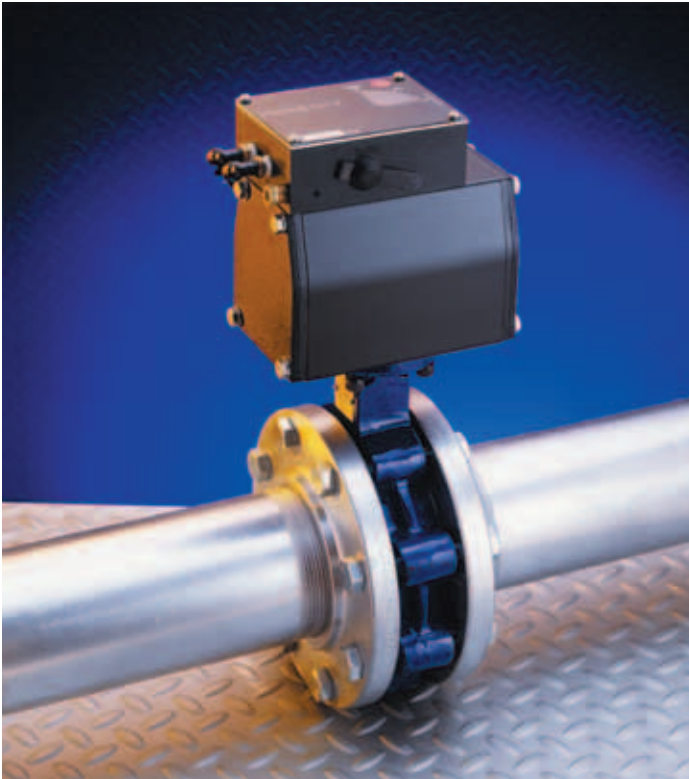
Butterfly Valve assemblies provide excellent flow control of hot water, chilled water, condenser water, thermal storage systems, and steam applications. Valves are available in two-way and three-way arrangements for two-position (On/Off) and modulating control.

Features

- Molded-in resilient seat provides bubble-tight shutoff to 150 psi.
- Temperature rating for standard EPDM seat: -40 to +250°F.
- Lugged body is drilled and tapped for isolation and removal of downstream piping at full rated pressure.
- Round, polished disc and hub edge provides 360° concentric seating, minimum flow restriction, lower torques and longer seat life.
- Upper and lower inboard bronze bearings ensure longer service life with low operating torques.
- Thru-stem design provides high strength and positive disc control with standardized end connection for operator interchangeability.
- Extended neck allows adequate clearance for flanges and insulation.
- Bi-directional, select adjusting stem seat is suitable for vacuum and pressure while preventing external contamination of the stem area.
- Heavy-duty corrosion resistant top bushing absorbs actuator side thrust.
- Cast-in top plate is an integral part of the body and is standardized to allow direct mounting of actuators.
- Each valve is factory tested to 110 percent of specified pressure rating.



butterfly



Non-Spring Return Pneumatic Actuator



Spring Return Pneumatic Actuator

Specifications

Valve body

Body.....Cast Iron, ASTM-A 126 Class B
Disc.....Aluminum Bronze/SS, ASTM-A 148 UNS C95100
Grade A

Stem..... 416/SS, ASTM-A 743 CF8M

Molded-in liner..... EPDM

Inboard bearings.....Bronze

Upper brushings..... Polyester

Upper stem seal..... NBR

Pneumatic actuator

Effective diaphragm

Model 331-2792..... 17.9 in.² (115 cm²)

Model MP920..... 24.8 in.² (160 cm²)

Stroke

Model 331-2792..... 4 in. (102 mm)

Model MP920..... 6 in. (150 mm)

Max. air pressure

Model 331-2792..... 39 psig (207 kPa)

Model MP920..... 29 psig (200 kPa)

Ambient temperature range

Operating.....-20 to +160°F (-29 to +71°C)

Storage.....-20 to +160°F (-29 to +71°C)

Materials

Housing

Model 331-2792..... Aluminum

Model MP920..... Enamel Painted Steel

Diaphragm

Model 331-2792..... Ozone resistant rubber

Model MP920..... Neoprene

Spring

.....Steel

Air connection

Model 331-2792..... 1/8-in. NPT Female

Model MP920..... 1/4-in. barb

Type of mounting

.....Pivot

Nominal spring rating

.....8 to 13 psi (55 to 90 kPa)

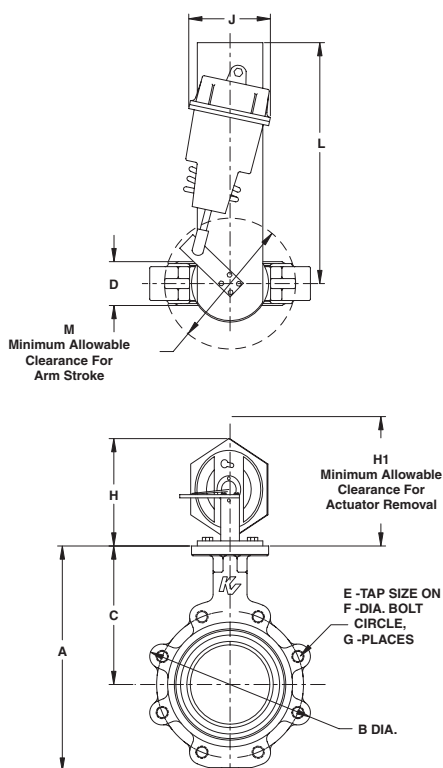
Resilient Seat Butterfly Valves with Pneumatic Actuator (continued)

2-way Valve Assemblies with Pneumatic Actuators

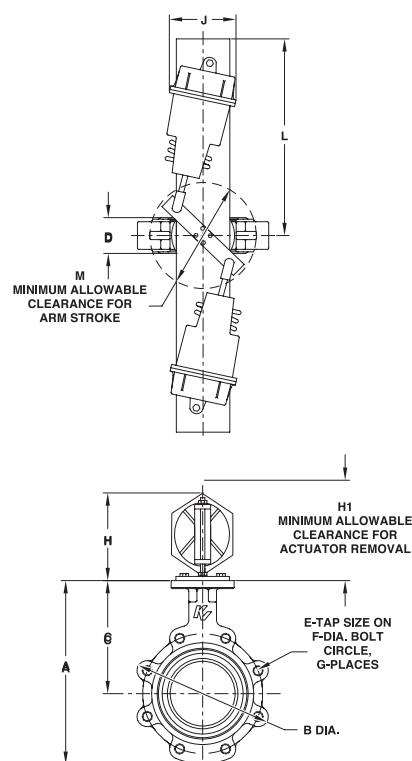
Valve Size	A Valve Height	B Body O.D.	C C _L Pipe To Top Plate	D Face/ Face	E Tap Size	F Bolt Circle	G # Bolts	H Actuator Height	H1 Actuator Removal Clearance	J Actuator Width	L C _L Length	M Stroke Clearance	Notes
2"	8.50" (216 mm)	6.00" (153)	5.31" (135 mm)	1.69" (43 mm)	0.625-11 UNC-2B	4.75" (121 mm)	4	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	5.0" (127 mm)	3, 4
2.5"	9.31" (236 mm)	6.75" (172 mm)	5.98 (150 mm)	1.81 (46 mm)	0.625-11 UNC-2B	5.50" (140 mm)	4	7.75 (197 mm)	9.75" (248 mm)	7.13 (181 mm)	18.00 (457 mm)	5.0 (127 mm)	3, 4
3"	10.00" (254 mm)	7.25" (184 mm)	6.31" (160 mm)	1.81" (46 mm)	0.625-11 UNC-2B	6.00" (152 mm)	4	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	5.0" (127 mm)	3, 4
4"	11.38" (288 mm)	8.81" (223 mm)	7.13" (180 mm)	2.06" (52 mm)	0.625-11 UNC-2B	7.50" (191 mm)	8	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	5.0" (127 mm)	3, 4
5"	12.81" (325 mm)	10.00" (254 mm)	7.69" (195 mm)	2.25" (56 mm)	0.750-10 UNC-2B	8.50" (216 mm)	8	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	5.0" (127 mm)	3, 5
5"	12.81" (325 mm)	10.00" (254 mm)	7.69" (195 mm)	2.25" (56 mm)	0.750-10 UNC-2B	8.50" (216 mm)	8	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	5.0" (127 mm)	4
6"	13.94" (354 mm)	11.00" (279 mm)	8.31" (210 mm)	2.25" (56 mm)	0.750-10 UNC-2B	9.50" (241 mm)	8	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	5.0" (127 mm)	3, 5, 6
6"	13.94" (354 mm)	11.00" (279 mm)	8.31" (210 mm)	2.25" (56 mm)	0.750-10 UNC-2B	9.50" (241 mm)	8	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	5.0" (127 mm)	4
8"	16.19" (411 mm)	13.25" (336 mm)	9.50" (249 mm)	2.50" (64 mm)	0.750-10 UNC-2B	11.75" (298 mm)	8	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	7.5" (191 mm)	1, 4, 5, 6
10"	19.00" (483 mm)	15.88" (403 mm)	10.75" (273 mm)	2.50" (64 mm)	0.875-9- UNC-2B	14.25" (362 mm)	12	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	7.5" (191 mm)	1, 4, 5, 6
12"	21.63" (549 mm)	18.63" (473 mm)	12.25" (311 mm)	3.00" (76 mm)	0.875-9- UNC-2B	17.00" (432 mm)	12	9.25" (235 mm)	11.25" (286 mm)	8.25" (210 mm)	17.75" (451 mm)	7.5" (191 mm)	1, 4, 5, 6

Table Notes

- 50 psi shutoff pressure
- For complete assembly details, consult Master HVAC catalog.
- Fullcut assemblies (150 psi shutoff)
- Undercut assemblies (100 psi shutoff) 2-6 inches; (50 psi shutoff) 8-12 inches
- Two actuators included in assembly
- Maximum angle of disc opening is 70°



2-way Valve Application with One Actuator.



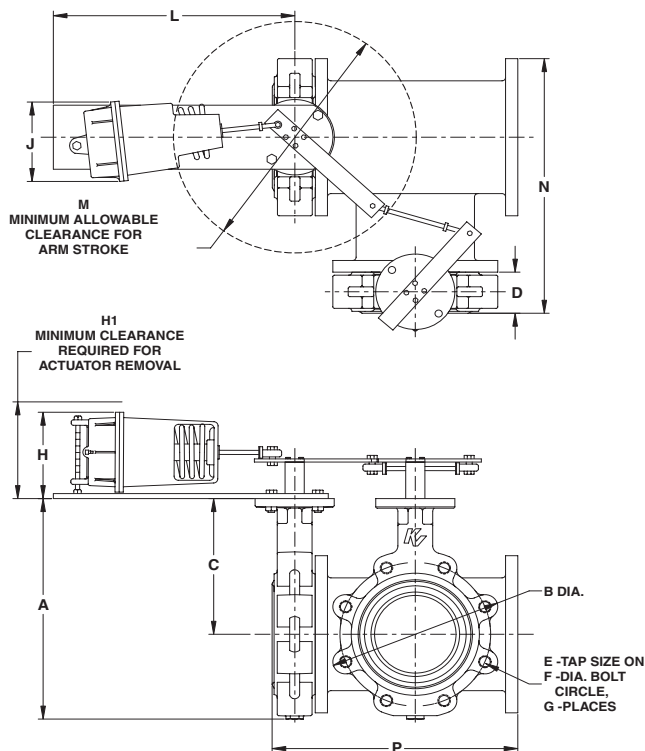
2-way Valve Application with Two Actuators.

3-way Valve Assemblies with Pneumatic Actuators

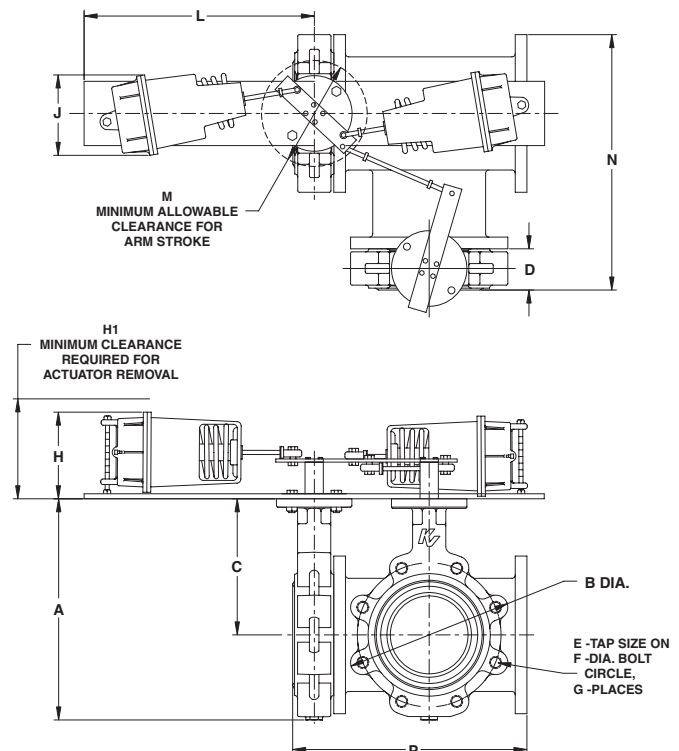
Valve Size	A	B	C C _L Pipe To Top Plate	D	E	F	G	H	H1 Actuator Removal Clearance	J	L	M	N	P	Notes
2"	8.50" (216 mm)	6.00" (153 mm)	5.31" (135 mm)	1.69" (43)	0.625-11 UNC-2B	4.75" (121 mm)	4	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	8.38" (213 mm)	9.22" (234 mm)	10.69" (272 mm)	3, 4
2.5"	9.31" (236 mm)	6.75" (172 mm)	5.94" (150 mm)	1.81" (46 mm)	0.625-11 UNC-2B	5.50" (140 mm)	4	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	8.38" (213 mm)	10.31" (262 mm)	12.31" (313 mm)	3, 4
3"	10.00" (254 mm)	7.25" (184 mm)	6.31" (160 mm)	1.81" (46 mm)	0.625-11 UNC-2B	6.00" (152 mm)	4	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	10.38" (265 mm)	11.44" (291 mm)	12.88" (327 mm)	3, 4, 6
4"	11.38" (288 mm)	8.81" (223 mm)	7.13" (180 mm)	2.06" (52 mm)	0.625-11 UNC-2B	7.50" (191 mm)	8	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	7.25" (184 mm)	13.13" (333 mm)	15.13" (384 mm)	3, 4, 5, 6
5"	12.19" (310 mm)	10.00" (254 mm)	7.69" (195 mm)	2.25" (56 mm)	0.750-10 UNC-2B	8.50" (216 mm)	8	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	8.69" (221 mm)	14.56" (370 mm)	17.25" (438 mm)	3, 4, 5, 6
6"	13.94" (354 mm)	11.00" (279 mm)	8.31" (210 mm)	2.25" (56 mm)	0.750-10 UNC-2B	9.50" (241 mm)	8	7.75" (197 mm)	9.75" (248 mm)	7.13" (181 mm)	18.00" (457 mm)	10.38" (264)	15.50" (394 mm)	18.25" (464 mm)	4, 5, 6
6"	13.94" (354 mm)	13.25" (337 mm)	8.31" (210 mm)	2.25" (56 mm)	0.750-10 UNC-2B	9.50" (241 mm)	8	9.25" (235 mm)	11.25" (286 mm)	8.25" (210 mm)	20.00" (508 mm)	15.00" (381)	15.50" (394 mm)	18.25" (464 mm)	3, 5, 6
8"	16.19" (411 mm)	13.25" (337 mm)	9.50" (241 mm)	2.50" (64 mm)	0.750-10 UNC-2B	11.75" (298 mm)	8	9.25" (235 mm)	11.25" (286 mm)	8.25" (210 mm)	20.00" (508 mm)	15.00" (381)	17.81" (452 mm)	20.50" (521 mm)	4, 5, 6
10"	19.00" (483 mm)	15.88" (403 mm)	10.75" (273 mm)	2.50" (64 mm)	0.875-9- UNC-2B	14.25" (362 mm)	12	9.25" (235 mm)	11.25" (286 mm)	8.25" (210 mm)	20.00" (508 mm)	15.00" (381)	21.38" (543 mm)	24.25" (622 mm)	4, 5, 6
12"	21.63" (549 mm)	18.63" (473 mm)	12.25" (311 mm)	3.00" (76 mm)	0.875-9- UNC-2B	17.00" (432 mm)	12	9.25" (235 mm)	11.25" (286 mm)	8.25" (210 mm)	20.00" (508 mm)	15.00" (381)	23.41" (595 mm)	27.00" (686 mm)	4, 5, 6

Table Notes

- 50 psi shutoff pressure
- For complete assembly details, consult master catalog
- Full cut assemblies (150 psi shutoff)
- Undercut assemblies (100 psi shutoff) 2-6 inches; (50 psi shutoff) 8-12 inches
- Two actuators included in assembly
- Maximum angle of disc opening is 70°



3-way Valve Application with One Actuator.



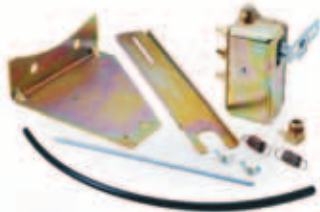
3-way Valve Application with Two Actuators.

Drawings shown are for Assemblies A & B. For Assemblies C & D, the valve and actuator are on right-hand side of the run of tee.

Accessories

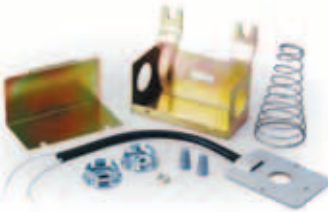
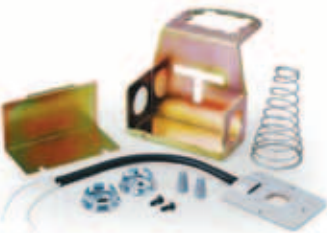
Description	Product Group	Quantity	Part No.
 1/2" Conduit Adaptor For use when a plenum-rated connection is required.	Powermite 599 Series SQS, SQX, SKD & SKB/C	1	544-023
 Conduit Connector For use when a plenum-rated connection is required.	Powermite 599 Series SSB61U/81U	1	ASY97
 Terminal Plug Labeled Y1-G-Y2.	Powermite 599 Series SSB81U	1	ASY99
 Terminal Plug Labeled G-G0-Y.	Powermite 599 Series SSB61U	1	ASY100
 Replacement Screws For use with conduit or terminal connectors.	Powermite 599 Series SSB61U/81U	1	ASY98
 Protective Black Knob Protects bonnet and threads. Allows manual operation prior to actuator mounting.	Powermite 599 Series MT	1	4 268 8895 0
 Diaphragm Kit Contains five diaphragms and mounting screws.	Powermite 599 Series MT	Package of 5	656-736
 Auxiliary Switch Sends a signal to indicate that the valve is in the 0% stroke position; switching point is fixed at the 0% stroke position.	Flowrite 599 Series SKD, SKB/C62	1	ASC1.6

These accessories are for new installations. For complete selection, refer to the current edition of the *Master HVAC Products Catalog*.

Description	Product Group	Quantity	Part No.
 Double Auxiliary Switch Adjustable cams can be set to provide a signal at a desired stroke position. • SKB/C62 • SKD	Flowrite 599 Series	1	ASC9.3BCU ASC9.3DU
 Double Auxiliary Switch Adjustable cams can be set to provide a signal at a desired stroke position.	Flowrite 599 Series SQX	1	ASC9.4U
 Auxiliary Potentiometer Used for remote indication of valve stem position.	Flowrite 599 Series SKD & SKB/C	1	ASZ7.3
 Positioning Relay and Mounting Kit • 8-inch • 12-inch	Flowrite 599 Series	1	599-00426 599-00423
 Positioning Relay Provides positive positioning of a pneumatic valve actuator.	Pneumatic Valve Actuators	1	147-2000

These accessories are for new installations. For complete selection, refer to the current edition of the *Master HVAC Products Catalog*.

Accessories (continued)

Description	Product Group	Quantity	Part No.
 Rack and Pinion Bracket for OpenAir™ Actuation	Flowrite 599 Series	1	599-03610
 Weathershield	Flowrite 599 Series SKB/C	1	599-10065
 Weathershield	Flowrite 599 Series SKD, SQX	1	599-10071
 Packing Heating Element	Flowrite 599 Series SKB/C	1	599-00418
 Packing Heating Element	Flowrite 599 Series SKD/SQX	1	599-00417

These accessories are for new installations. For complete selection, refer to the current edition of the *Master HVAC Products Catalog*.

Description		Product Group	Quantity	Part No.			
	3-way Valve Service Flange Allows easy access to the stem and plug assembly without removing the valve.	Flowrite 599 Series 2-1/2 to 6" Valve Bodies	1	See table below.			
Flange Gaskets and Gasket Service Kit Includes one gasket and the number and size of bolts needed for replacement.							

These accessories are for new installations.
 For complete selection, refer to the current edition of the *Master HVAC Products Catalog*.

Zone Siemens 599 Series

More options for zone control

- 2-way Normally Open/ Normally Closed
- 3-way Mixing/Diverting
- Applications include: hot or chilled water for zones with radiators, fan coil units, VAV, etc.
- Cv values from 1.0 to 7.0

2-position (On/Off), 3-position (Floating) or proportional (modulating 0-10V) actuators

NPT or Sweat connections available for all line sizes from 1/2 to 1"

ANSI Class 125 pressure rating

Visual position indication on all zone valve actuators

Change from Normally Open to Normally Closed by simply changing out the actuator

Direct-coupled design – no tools required for installation

Proven linear stroke globe valve design with metal-to-metal seating for tight, secure seal – no "water hammer" effects caused by rubber paddles or flappers.

Low ANSI Class III Leakage

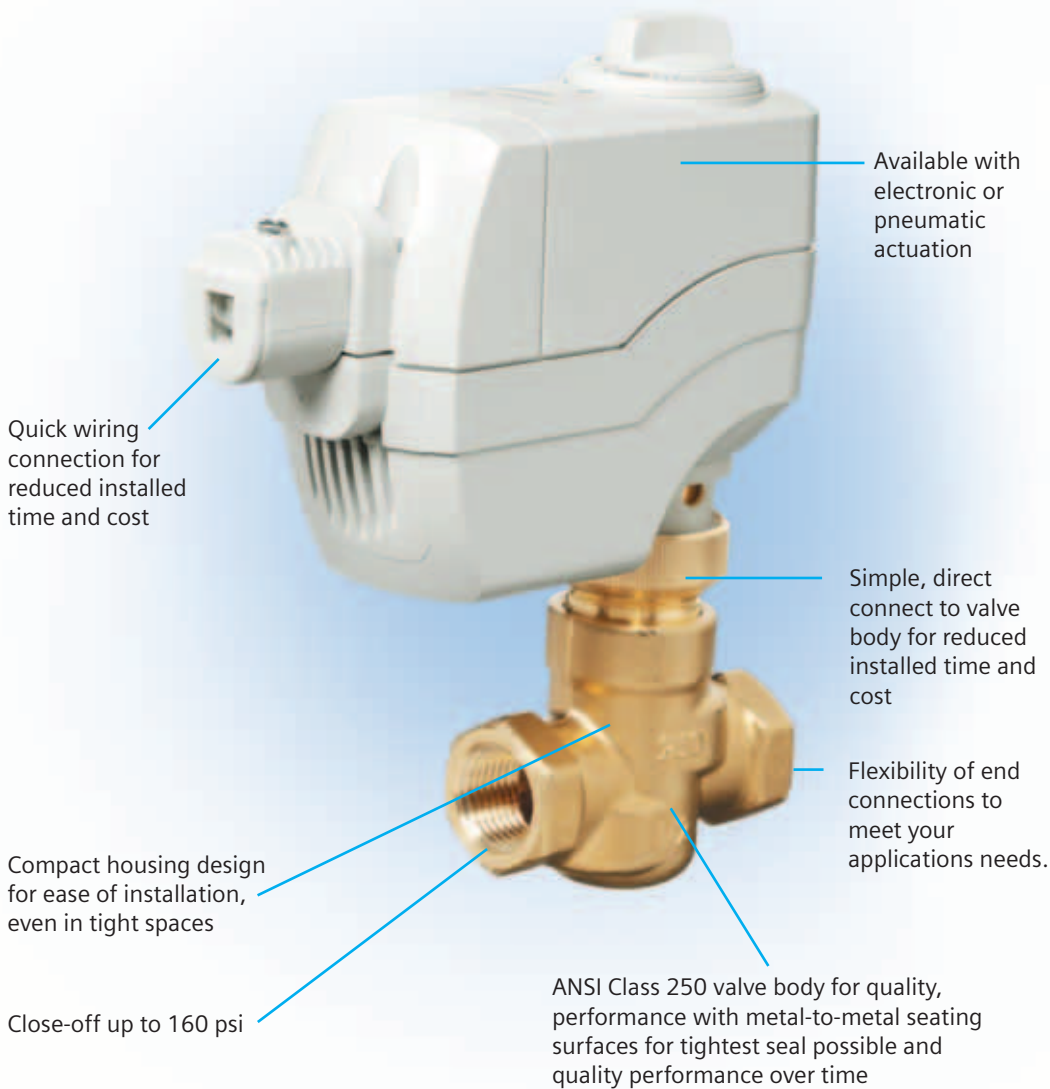
Factory-assembled to job site specification at no additional charge for reduced installation time and cost.

Standard 2.5 mm stroke

100% factory tested for all vales and valve actuators for quality assurance

Globe Powermite 599 Series

Specify, configure, install—simple!



- 2-way Normally Open/Normally Closed/3-way Mixing
- Applications include: hot water, chilled water or low pressure steam up to 15 psig
- Cv values from 0.4 to 25

100:1 resolution with <2 % hysteresis for greater control

Low leakage 0.01 percent of flow, ANSI Class IV, reduces operating cost

Factory-assembled to jobsite specifications at no additional charge for reduced installation time

Standard 5.5 mm stroke

100% factory testing on all valves and valve actuators for quality assurance

Globe Flowrite 599 Series

Industrial quality at a commercial price



- 2-way Normally Open/Normally Closed/3-way Mixing
- Applications include: chilled water, hot water and steam control
- Cv values from 1.0 to 40

Standardized bonnet, stem and stroke on all valve bodies with over 2,600 combinations available

Simple, direct connect to valve body for reduced installed time and cost

Cartridge-type packaging for quick, easy servicing

Unique throttling plug provides 100:1 high rangeability

Low leakage 0.01 percent of flow, ANSI Class IV, reduces operating costs

Extensive choice of end connections and trim

Unique basket trim design of plug precisely aligns plug for smooth, quiet operation

Available with electronic or pneumatic actuation

Quick wiring connections for reduced installed time and cost

Mix and match valve assemblies to meet jobsite needs

Direct-coupled valves/valve actuators for quick installation with standard hex wrench

Factory-assembled to jobsite specifications at no additional charge for reduced installation time

100% factory testing on all valves and valve actuators for quality assurance

Flanged Iron Globe **Flowrite 599 Series**

Rugged performance, competitively priced



- 2-way Normally Open/Normally Closed/3-way Mixing
- Applications include: chilled water, hot water and steam control
- Cv values from 63 to 400

Mix and match valve assemblies to meet jobsite needs

Low leakage 0.01 percent of flow, ANSI Class IV, reduces operating costs

100% factory testing on all valves and valve actuators for quality assurance

Factory-assembled to jobsite specifications at no additional charge for reduced installation time

Available with electronic or pneumatic actuation

Over 2,600 electronic and pneumatic valve and valve actuator combinations to meet every application need

Ball Siemens 599 Series

More close-off force



Integral flow insert is designed into the valve to ensure reliability, reduce noise and vibration, and extended life.

- 2-way Normally Open, Normally Closed and Three-way
- Applications include: water to water/glycol solutions where tight shutoff is required
- Two-position, three-position or modulating control

Universal mounting bracket rotates for ease of installation and service

Patented flow optimizer provides "equal percentage" flow characteristic for accurate control

Globe quality with high performance, OpenAir actuation

Built-in conduit connection for lower installed cost

Compact housing design easy installation, even in tight spaces

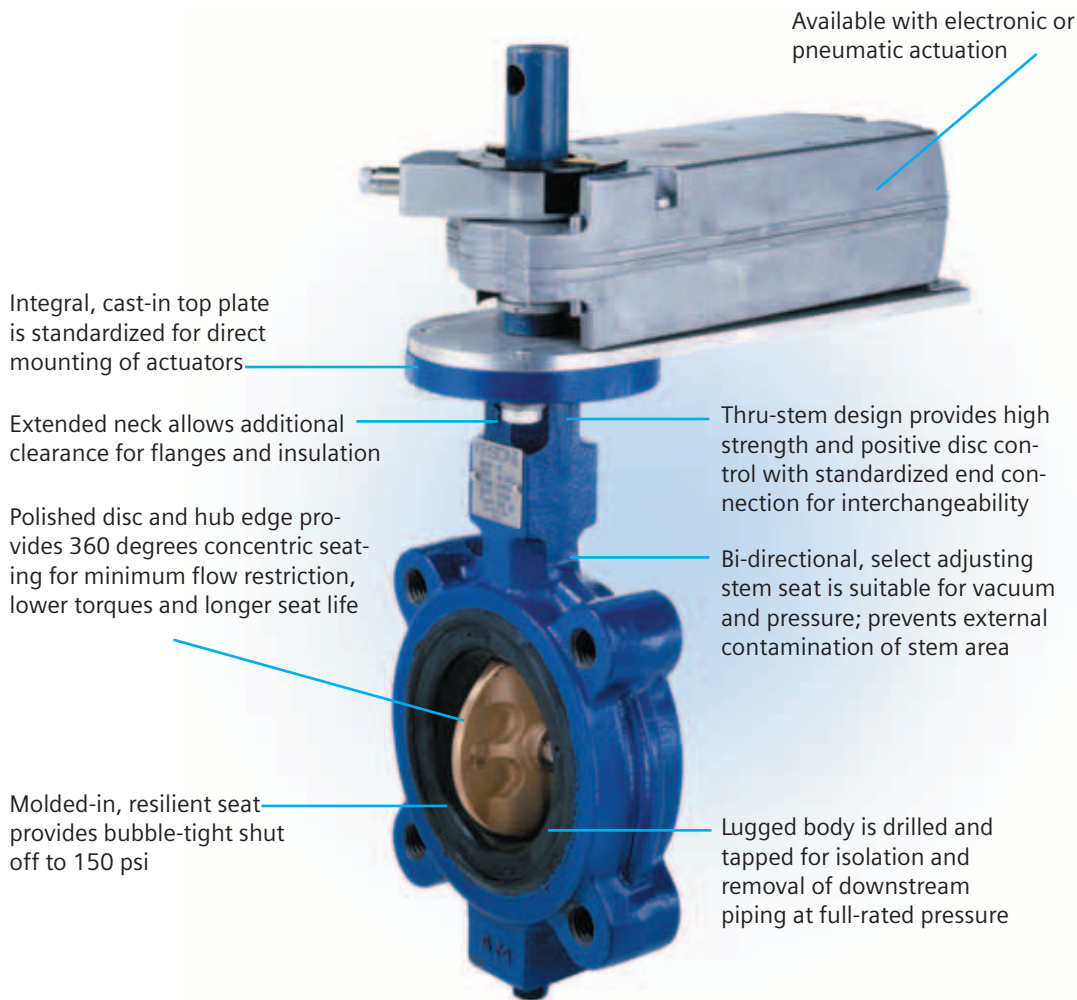
Available factory-assembled with OpenAir Electronic Actuators for precise control

100% factory testing on all valves and valve actuators for quality assurance

Factory-assembled to jobsite specifications at no additional charge for reduced installation time

Resilient Seat Butterfly **siemens**

High torque for extreme control



- 2-way/3-way
- Applications include: flow control of hot or chilled water, condenser water, thermal storage systems or steam
- Operating temperatures up to 250°F (120°C)
- Up to 20-inch and Cv of 15,000

Upper and lower inboard bronze bearings ensure longer service life with low operating torques

Heavy-duty corrosion resistant top bushing absorbs actuator side thrust

High torque in all pipe sizes from 2 to 20-inches

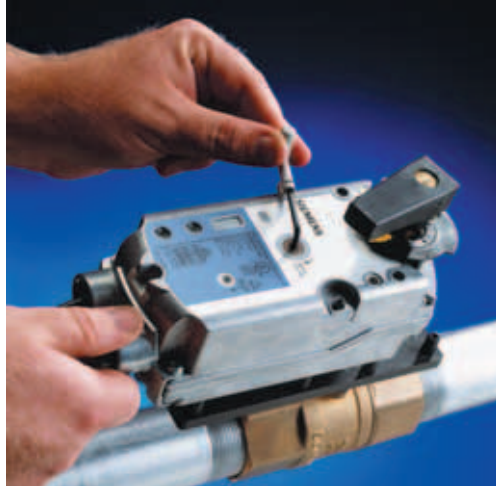
Factory-tested to 110% of specified pressure rating

Factory-assembled to jobsite specifications at no additional charge for reduced installation time

Tech tips

Manual Override

Designed for flexibility, use the manual override feature on Powermite and Flowrite 599 Series Valves to quickly and easily commission jobs in the field.



Siemens Ball Valves with OpenAir Actuator

Use a 3 mm hex wrench in the center of the position indicator.

Turn counter clockwise.



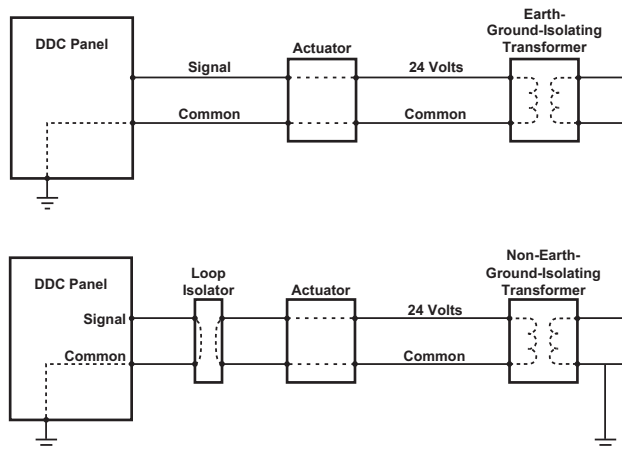
Flowrite Globe Valves

Turn the manual setting knob clockwise for manual operation. While turning, a red indicator will become visible as shown above.

Each complete revolution (360°) is equal to 3/32" (2.5 mm) stroke. Return to the full counterclockwise position for automatic operation.

Ground Loops

When powering an actuator from a different source than the device that is generating the control signal, an earth-ground isolating transformer or a loop isolator should be used. Using an earth-ground isolating transformer or loop isolator eliminates the potential for ground loops or stray voltage that can cause erratic actuator behavior.



reference

Service Flange for Globe Valve



Service flange installed on Three-way Iron Body



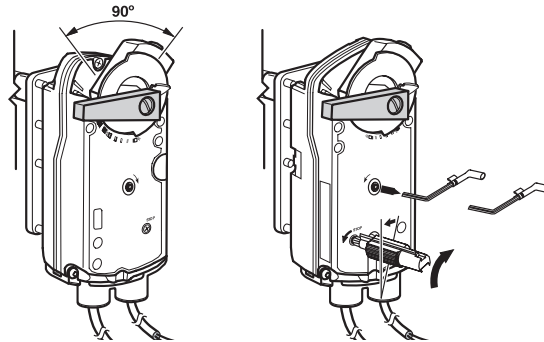
Service flange being removed for service on valve

The service flange for the 3-way Flowrite Globe Valve allows servicing of a stem and plug on flange valves—without removing the valve.

Tech tips (continued)

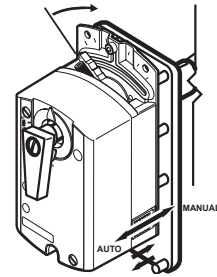
Changing a Ball Valve from Normally Open to Normally Closed

Spring Return Valves



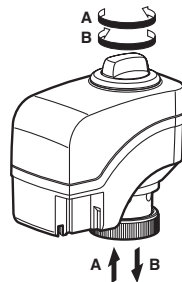
All spring return ball valves ship from the factory normally open. A spring return actuated ball valve can be changed to a normally closed valve by loosening the shaft adapter, rotating the actuator manually 90 degrees, removing and flipping over the actuator, and tightening the shaft adaptor to the stem. You can manually position the valve further through the use of a hex key and locking pin for commissioning if needed.

Non-spring Return Valves



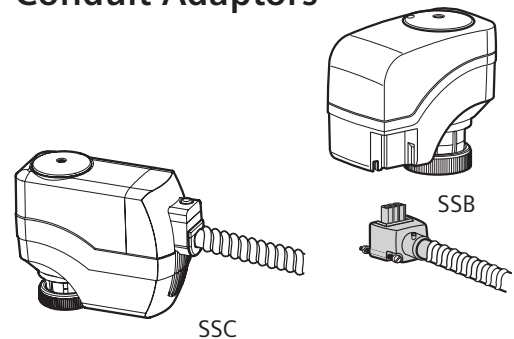
All of our non-spring return ball valves ship from our factory full open at full CCW (for three position actuators) or 0 V (modulating actuators). A non-spring return actuator can be changed to be fully closed at CCW or by adjusting the wiring from the controller.

Resetting an Actuator that has been Powered off of a Valve



SSB, SSC, and the SQX62U actuators incorporate a feature that allows them to precisely calibrate themselves to the particular valve body they are attached to. If applying power to the actuator when a valve body is not connected, the actuator will respond to the control signal and the shaft will extend until it reached its maximum end stop. Subsequently, it will not respond to any signal. If this occurs, recalibrate by following the directions on the technical instructions for the actuator.

Conduit Adaptors



SSB and SSC actuators can accommodate 3/8" flexible conduit where local codes dictate. Accessory ASY97 can be ordered for the SSB model, while the connection is standard on the SSC actuator.

reference

Terminal designations for OpenAir actuators

Control Type	Belimo		Siemens		
	Function	Terminal Designation	Standard Symbol	Wire Designation	Color
Spring Return (GCA/GMA)					
2-position	Neutral	1	4	N	White
120 Vac	Hot	2	3	L	Black
2-position	Supply (SP)	2	1	G	Red
24 Vac	Neutral (SN)	1	2	G0	Black
3-position	Supply (SP)	2	1	G	Red
24 Vac	Neutral (SN)	1	2	G0	Black
	Control signal clockwise	3	6	Y1	Violet
	Control signal counterclockwise	4	7	Y2	Orange
Non-Spring Return (GDE/GLB/GEB/GBB/GIB)					
3-position	Supply (SP)	1	1	G	Red
24 Vac	Control signal clockwise	2	6	Y1	Violet
GDE/GLB/GEB/GBB/GIB	Control signal counterclockwise	3	7	Y2	Orange
SR/NSR					
Modulating	Supply (SP)	2	1	G	Red
0-10 V	Neutral (SN)	1	2	G0	Black
All	0 to 10 Vdc/2 to 10 Vdc input signal	3	8	Y	Gray
	Output for 0 to 10 Vdc position indication	5	9	U	Pink

Function	Standard Symbol	Terminal Designation	Color
Switch A Common	S1	Q11	Gray/Red
Switch A NC	S2	Q12	Gray/Blue
Switch A NO	S3	Q14	Gray/Pink
Switch B Common	S4	Q21	Black/Red
Switch B NC	S5	Q22	Black/Blue
Switch B NO	S6	Q24	Black/Pink
Position Feedback 0 to 100%	P1	a	White/Red
Position Feedback Common	P2	b	White/Blue
Position Feedback 100 to 0%	P3	c	White/Pink

Switches and feedback

Electronic Actuators

Control Type	Part No.	Function	Terminal Designation
3-position 24 Vac	SKB82.50U	Supply (SP)	G
	SKC82.60U	Drive Inward	Y1
	SKD82.50U	Drive Outward	Y2
	SQX82.00U		
	SQX82.03U		
	SSC81U		
	SSB81U		
3-position 24 Vac	SKB82.51U	System Potential - 24 Vac (+)	G
	SKC82.61U	Drive Inward	Y1
	SKD82.51U	Drive Outward	Y2
	SQS85.53U	Neutral (SN)	Z1
	SSC81.5U		
Modulating 0-10 V	SSB61U	Supply (SP)	G
	SSC61.5U	Neutral (SN)	G0
	SSC61U	0 to 10 Vdc Control signal	Y
Modulating 0 to 10 V	599-10021	System Potential - 24 Vac (+)	G
	599-10022	Neutral (SN)	G0
	599-10023	0 to 10 Vdc Control signal	Y
		Feedback - 0 to 10 V	M
Modulating 0 to 10 V 4 to 20 mA	SKB62U	System Potential - 24 Vac (+)	G
	SKC62U	Neutral (SN)	G0
	SKD62U	0 to 10 Vdc Control signal	Y
	SQS65.5U	Feedback	M
	SQS65U	4 to 20 mA Control signal	R
	SQX62U	Feedback - 0 to 10 V or 4 to 20 mA	U

F

B

Sizing and Selection of Control Valves

The control valve is the most important single element in any fluid handling system, because it regulates the flow of fluid to the process. To properly select a control valve, a general knowledge of the process and components is usually necessary. This reference section can help you select and size the control valve that most closely matches the process requirements.

The sizing of a valve is very important if it is to render good service. If it is undersized, it will not have sufficient capacity. If it is oversized, the controlled variable may cycle, and the seat, and disc will be subject to wire drawing because of the restricted opening.

Systems are designed for the most adverse conditions expected (i.e., coldest weather, greatest load, etc.). In addition, system components (boiler, chiller, pumps, coils, etc.) are limited to sizes available and frequently have a greater capacity than system requirements. Correct sizing of the control valve for actual expected conditions is considered essential for good control.

Technical Comparison Between Globe and Ball Valves

Technically, the globe valve has a stem and plug, which strokes linearly, commonly referred to as “stroke” valves. The ball valve has a stem and ball, which turns horizontally, commonly referred to as “rotational” valves.

Early ball valves used a full port opening, allowing large amounts of water to pass through the valve. (See figure below.) This gave HVAC controls contractors the ability to select a ball valve two to three pipe sizes smaller than the piping line size. Compared to traditional globe valves that would be only one pipe size smaller than the line size, this was often a more cost-effective device-level solution. In addition, the ball valve could be actuated by a damper actuator, rather than expensive box-style “Mod” motors.

Pricing Comparison

Today, with equivalent pricing between ball and globe valves, the full port ball valve is falling out of favor for most HVAC control applications. This is also due to its poor installed flow characteristic that leads to its inability to maintain proper control. New “flow optimized” or characterized ball valves, specifically designed for modulating applications, have been developed. Characterized ball valves are sized the same way as globe valves. They provide an equal

percentage flow characteristic, enabling stable control of fluids. Additionally, there are more cost-effective valve actuators now available for globe valves. Better control and more-competitive pricing now puts globe valves on the same playing field as characterized ball valves.

Most Cost-effective by Application

Let’s look at a cost comparison as it relates to the decision to select ball or globe valves. For terminal unit applications requiring less than 25 GPM, the globe valve is a more cost-effective choice. However, on larger coils the characterized ball valve is the more cost-effective solution.

From a practical standpoint, many jobs will use mostly one type or the other. If the majority of valves on a project tend to be terminal unit valves, then globe valves would offer better control at a lower price. If the majority of the valves are for AHU’s (1-1/4” or larger) characterized Ball Valves are the preferred solution from a pure cost standpoint.

Different tolerances to temperature, pressure and steam should also be considered in the selection process.

Selection Guidelines

Globe Valve

- Lower cost
- Close off of 50 psi or less (typical for most HVAC applications)
- High differential pressure across valve
- Rebuilding of the valve is desired
- Better control performance
- Better low flow (partial load) performance
- Use for steam, water or water/glycol media
- Smaller physical profile than a comparable ball valve

Characterized Ball Valve

- Tight shutoff or high close offs of around 100 psi* are required
- Isolation or two position control**
- Cv ranges from 16 to 250 (equates to line sizes 1-1/4” to 2-1/2”)
- Use for water or water/glycol solution only

Globe vs. Ball

*This equates to a pump head pressure of approximately 230 ft. Not very common HVAC applications

** Valve can be line sized to minimize pressure losses; butterfly valves are also used for these applications.

Sizing and Selection of Control Valves (continued)

Sizing

Pressure Drop for Water Flow

A pressure drop must exist across a control valve if flow is to occur. The greater the drop, the greater the flow at any fixed opening. The pressure drop across a valve also varies with the disc position—from minimum when fully open, to 100% of the system drop when fully closed.

To size a valve properly, it is necessary to know the full flow pressure drop across it. The pressure drop across a valve is the difference in pressure between the inlet and outlet under flow conditions. When it is specified by the engineer and the required flow is known, the selection of a valve is simplified. When this pressure drop is not known, it must be computed or assumed.

If the pressure drop across the valve when fully open is not a large enough percentage of the total system drop, there will be little change in fluid flow until the valve actually closes, forcing the valve's characteristic toward a quick opening form.

Figure 1 shows flow-lift curves for a linear valve with various percentages of design pressure drop. Note the improved characteristic as pressure drop approaches 100% of system pressure drop at full flow.

It is important to realize that the flow characteristic for any particular valve, such as the linear characteristic shown in Figure 1 is applicable only if the pressure drop remains nearly constant across the valve for full stem travel. In most systems, however, it is impractical to take 100% of the system drop across the valve.

A good working rule is, "at maximum flow, 25 to 50% of the total system pressure drop should be absorbed by the control valve." Although this generally results in larger pump sizes, it should be pointed out that the initial equipment cost is offset by a reduction in control valve size, and results in improved controllability of the system. Reasonably good control can be accomplished with pressure drops of 15 to 30% of total system pressures. A drop of 15% can be used if the variation in flow is small.

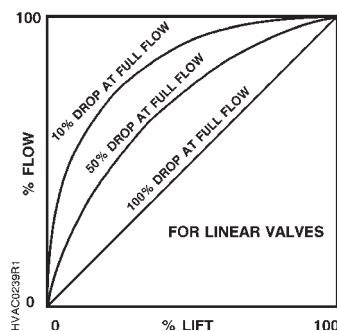


Figure 1.

Recommended Pressure Drops for Valve Sizing — Water

1. With a differential pressure less than 20 psig, use a pressure drop equal to 5 psi.
2. With a differential pressure greater than 20 psig, use a pressure drop equal to 25% of total system pressure drop (maximum pump head), but not exceeding the maximum rating of the valve.

Pressure Drop for Steam

The same methodology should be applied for selecting a valve for steam where the most important consideration is the pressure drop.

First, the correct maximum capacity of the coil must be determined. Ideally, there should be no safety factor in this determination and it should be based on the actual BTU heating requirements. The valve size must be based on the actual supply pressure at the valve. When the valve is fully open, the outlet pressure will assume a value such that the valve capacity and coil condensing rate are in balance. If this outlet valve pressure is relatively large (small pressure drop), then as the valve closes, there will be no appreciable reduction in flow until the valve is nearly closed. To achieve better controllability, the smallest valve (largest pressure drop) should be selected. With the valve outlet pressure much less than the inlet pressure, a large pressure drop results. There will now be an immediate reduction in capacity as the valve throttles. For steam valves, generally the largest possible pressure drop should be taken, without exceeding the critical pressure ratio. Therefore, the steam pressure drop should approach 50% of the absolute inlet pressure.

Examining the pressure drops under "Recommended Pressure Drops for Valve Sizing — Steam", you might be concerned about the steam entering the coil at 0 psig when a large drop is taken across the control valve. Steam flow through the coil will still drop to vacuum pressures due to condensation of the steam. Consequently, a pressure differential will still exist. In this case, proper steam trapping and condensation piping is essential.

reference

Recommended Pressure Drops for Valve Sizing — Steam

1. With gravity flow condensate removal and inlet pressure less than 15 psig, use a pressure drop equal to the inlet gauge pressure.
2. With vacuum return system up to 7" Hg vacuum and an inlet pressure less than 2 psig, a pressure drop of 2 psig should be used. With an inlet pressure of 2 to 15 psig, use a pressure drop equal to the inlet gauge pressure.
3. With an inlet pressure greater than 15 psig, use a pressure drop equal to 50% of inlet absolute pressure. Example: Inlet pressure is 20 psig (35 psig). Use a pressure drop of 17.5 psi.
4. When a coil size is selected on the basis that line pressure and temperature is available in the coil of a heating and ventilating application, a very minimum pressure drop is desired. In this case, use the following pressure drop:

Initial Pressure	Pressure Drop
15 psi	5 psi
50 psi	7.5 psi
100 psi	10 psi
Over 100 psi	10% of line pressure

The Most Important Variables to Consider When Sizing a Valve:

1. What medium will the valve control? Water? Air? Steam? What effects will specific gravity and viscosity have on the valve size?
2. What will the inlet pressure be under maximum load demand? What is the inlet temperature?
3. What pressure drop (differential) will exist across the valve under maximum load demand?
4. What maximum capacity should the valve handle?
5. What is the maximum pressure differential the valve top must close against?

When these are known, a valve can be selected by formula (Cv method) or water and steam capacities tables which can be found in the Valves section. The valve size should not exceed the line size, and it should preferably be one to two sizes smaller.

Valve Sizing and Selection Example

Select a valve to control a chilled water coil that must have a flow of 35 GPM with a valve differential pressure (ΔP) of 5 psi.

Determine the valve C_v using the formula for liquids.

$$C_v = Q \sqrt{\frac{S}{P}} = 35 \text{ GPM} \sqrt{\frac{1}{5 \text{ psi}}} = 15.6$$

Select a valve that is suitable for this application and has a C_v as close as possible to the calculated value.

One choice is 277-03186: a 1-1/4" NC valve with a C_v of 16. Refer to Flowrite Valves Reference section.

Valve Selection Criteria

1. Flow characteristic—Modified Equal Percentage which provides good control for a water coil.
2. Body rating and material—Suitable for water plus a soft disc which provides tight shut-off.
3. Valve type and action—A single seat NC valve with an adjustable spring range which can be sequenced with a NO valve used for heating.
4. Valve actuator—Actuator close-off rating is higher than the system P.
5. Valve line size—Its C_v is close to and slightly larger than the calculated C_v (15.6).
6. For Ball Valves—Select a ball the same size as the line size.

Sizing and Selection of Control Valves (continued)

Valve Body Rating
The temperature-pressure ratings for ANSI Classes 125 and 250 valve bodies made of bronze or cast iron are shown.

2-Way, Full-Port (no flow optimizer) Ball Valve Part Numbers and Flow Coefficients

Valve Line Size in. (mm)	Ball Size in. (mm)	Valve Part No.	Effective (Installed) Cv (Kvs)											
			Supply Line Size in Inches (mm)											
			1/2 (13)	3/4 (20)	1 (25)	1-1/4 (32)	1-1/2 (38)	2 (51)	2-1/2 (63)	3 (76)	4 (102)	5 (127)	6 (152)	
1/2 (15)	1/2 (15)	599-10208	10.0 (8.62)	6.94 (5.93)	6.19 (5.29)									
3/4 (20)	3/4 (20)	599-10210		25.00 (21.55)	18.66 (15.99)	15.35 (13.12)								
1 (25)	1 (25)	599-10214			63.00 (54.31)	39.78 (34.00)	33.56 (28.69)							
1-1/4 (30)	1-1/4 (30)	599-10217				100.00 (86.21)	69.19 (5.13)	51.45 (43.98)						
1-1/2 (40)	1-1/4 (30)	599-10219					63.00 (54.31)	55.34 (47.30)	51.00 (43.59)					
1-1/2 (40)	1-1/2 (40)	599-10221					160.00 (137.93)	93.80 (80.17)	76.34 (65.25)					
2 (50)	1-1/4 (30)	599-10223						100.00 (86.21)	94.30 (80.60)	86.12 (73.61)				
2 (50)	2 (50)	599-10225						250.00 (215.52)	187.47 (160.23)	140.26 (119.88)				

Key

Valve may be oversized.

Optimal valve size.

Valve may be undersized.

Description	Temperature	Pressure	
		ANSI Class 125	ANSI Class 250
Bronze Screwed Bodies Specification #B16.15-1978 ANSI Amer. Std.; USA; ASME	-20 to + 150°F (-30 to + 66°C)	200 psig (1378 kPa)	400 psig (2758 kPa)
	-20 to + 200°F (-30 to + 93°C)	190 psig (1310 kPa)	385 psig (2655 kPa)
	-20 to + 250°F (-30 to + 121°C)	180 psig (1241 kPa)	265 psig (2586 kPa)
	-20 to + 300°F (-30 to + 149°C)	165 psig (1138 kPa)	335 psig (2300 kPa)
	-20 to + 350°F (-30 to + 177°C)	150 psig (1034 kPa)	300 psig (2068 kPa)
	-20 to + 400°F (-30 to + 204°C)	125 psig (862 kPa)	250 psig (1724 kPa)
Cast Iron Flanged Bodies Class A-sizes 1 to 12 Specification #B16.1 1975 ANSI Amer. Std.; USA; ASME	-20 to + 150°F (-30 to + 66°C)	175 psig (1206 kPa)	400 psig (2758 kPa)
	-20 to + 200°F (-30 to + 93°C)	165 psig (1138 kPa)	370 psig (2551 kPa)
	-20 to + 225°F (-30 to + 106°C)	155 psig (1069kPa)	355 psig (2448 kPa)
	-20 to + 250°F (-30 to + 121°C)	150 psig (1034 kPa)	340 psig (2344 kPa)
	-20 to + 275°F (-30 to + 135°C)	145 psig (1000 kPa)	325 psig (2241 kPa)
	-20 to + 300°F (-30 to + 149°C)	140 psig (965 kPa)	310 psig (2137 kPa)
	-20 to + 325°F (-30 to + 163°C)	130 psig (896 kPa)	295 psig (2034 kPa)
	-20 to + 350°F (-30 to + 177°C)	125 psig (862 kPa)	280 psig (1931 kPa)
	-20 to + 375°F (-30 to + 191°C)	—	265 psig (1827 kPa)
	-20 to + 400°F (-30 to + 204°C)	—	250 psig (1734 kPa)

reference

Valve Sizing Formulas

The following definitions apply in the following formulas:

C_v	Valve flow coefficient, U.S. GPM with $P = 1$ psi
P_1	Inlet pressure at maximum flow, psia (abs.)
P_2	Outlet pressure at maximum flow, psia (abs.)
ΔP	$P_1 - P_2$ at maximum flow, psi
Q	Fluid flow, U.S. GPM
Q_a	Air or gas flow, standard cubic feet per hour (SCFH) at 14.7 psig and 60°F
W	Steam flow, pounds per hour (lb./hr.)
S	Specific gravity of fluid relative to water @ 60°F
G	Specific gravity of gas relative to air at 14.7 psig and 60°F
T	Flowing air or gas temperature (°F)
K	$1 + (0.0007 \times \text{°F superheat})$, for steam
V_2	Specific volume, cubic feet per pound, at outlet pressure P_2 and absolute temperature $(T + 460)$
K_r	Viscosity correction factor for fluids

	Remarks:
1. For liquids (water, oil, etc.): $C_v = Q \sqrt{\frac{S}{\Delta P}}$ $C_v = K_r Q \sqrt{\frac{S}{\Delta P}}$	Specific gravity correction is negligible for water below 200°F (use $S=1.0$). Use actual specific gravity S of other liquids at actual flow temperature. Use this for fluids with viscosity correction fact. Use actual specific gravity S for fluids at actual flow temperature.
2. For gases (air, natural gas, propane, etc.): $C_v = \frac{Q_a \sqrt{G(T+460)}}{1360 \sqrt{\Delta P(P_2)}}$ $C_v = \frac{Q_a \sqrt{G(T+460)}}{660 P_1}$	Use this when P_2 is greater than $1/2 P_1$. Use this when P_2 is less than or equal to $1/2 P_1$.
3. For steam (saturated or superheated): $C_v = \frac{WK}{2.1 \sqrt{P(P_1 \Delta + P_2)}}$ $C_v = \frac{WK}{1.82 P_1}$	Use this when P_2 is greater than $1/2 P_1$. Use this when P_2 is less than or equal to $1/2 P_1$.
4. For vapors other than steam: $C_v = \frac{WK}{63.4} \sqrt{\frac{V_2}{\Delta P}}$	When P_2 is less than or equal to $1/2 P_1$, use the value of $1/2 P_1$ in place of P and use P_2 corresponding to $1/2 P_1$ when determining specific volume V_2 .

Sizing and Selection of Control Valves (continued)

Viscosity Factors

The relationship between kinematic and absolute viscosity:

$$\text{Centistoke} = \frac{\text{Centipoise}}{\text{Specific Gravity}}$$

Specific Gravity of Water

Temp T(°F)	Abs. Pressure	Specific Gravity — S (W=62.4 lb./ft. ³ @ 60°F)	$\sqrt{S}$
60	—	1.000	1.000
100	—	0.993	0.999
150	—	0.981	0.985
200	—	0.963	0.981
250	30	0.942	0.971
300	67	0.920	0.959
350	135	0.891	0.944
400	247	0.860	0.927
450	423	0.827	0.910

Saybolt* Univ Seconds (S.S.U.)	Engler Time Seconds	Kinematic Viscosity	C _v Correction Factors (K _r)
46,350	—	10,000	—
37,080	—	8,000	—
27,810	—	6,000	—
18,540	—	4,000	—
13,900	—	3,000	—
11,590	—	2,500	—
9,270	—	2,000	1.93
6,950	10,800	1,500	1.90
4,635	7,100	1,000	1.82
3,708	5,700	800	1.78
2,781	4,250	600	1.74
1,854	2,820	400	1.67
1,390	2,120	300	1.63
1,159	1,760	250	1.61
927	1,400	200	1.57
695	1,050	150	1.43
464	700	100	1.45
371	555	80	1.42
278	420	60	1.37
186	290	40	1.30
141	225	30	1.25
119	191	25	1.22
97.8	157	20	1.20
77.4	127	15	1.16
58.9	97	10	1.11
52.1	85.5	8	1.08
45.6	76.0	6	1.07
39.1	67.5	4	1.05
36.0	62.5	3	1.03
32.6	58.0	2	—
31.6	55.5	1.5	—
31.3 ← Pure water at 60°F → 1.1			—

Sizing Formulas and Tables

Process Formulas

For Heating or Cooling Water:

$$\text{GPM} = \frac{\text{Btu/hr.}}{(\text{°F water temp. rise or drop} \times 500)}$$

$$\text{GPM} = \frac{\text{CFM} \times .009 \times H}{\text{°F water temperature change}}$$

(H = change in enthalpy of air expressed in Btu/lb. of air)

For Heating Water with Steam:

$$\text{lbs. steam/hr.} = 0.50 \times \text{GPM} \times (\text{°F water temp. rise})$$

For Heating or Cooling Water:

$$\text{GPM}_1 = \text{GPM}_2 \times \frac{(\text{°F water}_2 \text{ temp. rise or drop})}{\text{°F water}_1 \text{ temp. drop}}$$

For Heating Air with Steam Coils:

$$\text{lbs. steam/hr.} = 1.08 \times (\text{°F air temp. rise}) \times \frac{\text{CFM}}{1000}$$

For Heating Air with Water Coils:

$$\text{GPM} = 2.16 \times \frac{\text{CFM} \times (\text{°F air temp. rise})}{1000 \times (\text{°F water}_1 \text{ temp. drop})}$$

For Radiation:

$$\text{lbs. steam/hr.} = 0.24 \times \text{ft.}^2 \text{ EDR (Low pressure steam)}$$

EDR = Equivalent Direct Radiation

$$1 \text{ EDR (steam)} = 240 \text{ BTU/Hr. (Coil Temp.} = 215^\circ\text{F)}$$

$$1 \text{ EDR (water)} = 200 \text{ BTU/Hr. (Coil Temp.} = 197^\circ\text{F)}$$

$$\text{GPM} = \frac{\text{ft.}^2 \text{ EDR}}{50} \quad (\text{Assume } 20^\circ\text{F water TD})$$

Chart Note

*Redwood time (seconds) approximately same as S.S.U.

reference

Powermite 599 Series Globe Close-off Pressures

MZ Series

Line Size	2-way	3-way	
	Electronic		
1/2", Cv ≤ 1.6	70 psi (482 kPa)	70 psi (482 kPa)	Normally Closed
1/2", Cv ≤ 4	40 psi (276 kPa)	40 psi (276 kPa)	
3/4 to 1" Cv ≤ 10	30 psi (207 kPa)	30 psi (207 kPa)	
1/2", Cv ≤ 1.6	60 psi (414 kPa)	25 psi (172 kPa)	Normally Open
1/2", Cv ≤ 4	35 psi (241 kPa)	15 psi (103 kPa)	
3/4 to 1", Cv ≤ 10	30 psi (207 kPa)	10 psi (69 kPa)	

For 3-way valve close-offs, use this chart to determine upper port (NC) and bottom port (NO).

MT Series

	Line Size	Pneumatic			Electronic		
		599-01088			SQS	SSC	
		3-8 psi	8-13 psi	10-15 psi			
2-way	1/2", Cv ≤ 1.6	40 psi (276 kPa)	95 psi (655 kPa)	95 psi (655 kPa)	95 psi (655 kPa)	95 psi (655 kPa)	Normally Closed
	1/2", Cv ≤ 4	28 psi (193 kPa)	50 psi (345 kPa)	50 psi (345 kPa)	50 psi (345 kPa)	50 psi (345 kPa)	
	3/4 to 1" Cv ≤ 10	18 psi (124 kPa)	40 psi (276 kPa)	40 psi (276 kPa)	40 psi (276 kPa)	40 psi (276 kPa)	
	1-1/4", Cv 16	—	—	—	21 psi (145 kPa)	21 psi (145 kPa)	
	1-1/2", Cv 25	—	—	—	13 psi (90 kPa)	—	
	1/2", Cv ≤ 1.6	95 psi (655 kPa)	45 psi (310 kPa)	20 psi (138 kPa)	160 psi (1103 kPa)	120 psi (868 kPa)	Normally Open
	1/2", Cv ≤ 4	45 psi (310 kPa)	25 psi (172 kPa)	15 psi (69 kPa)	85 psi (586 kPa)	65 psi (448 kPa)	
	3/4 to 1", Cv ≤ 10	35 psi (241 kPa)	10 psi (69 kPa)	—	70 psi (482 kPa)	55 psi (379 kPa)	
	1-1/4", Cv 16	—	—	—	28 psi (193 kPa)	20 psi (138 kPa)	
	1-1/2", Cv 25	—	—	—	14 psi (96 kPa)	10 psi (68 kPa)	

Close-off pressures at 20 psi actuator pressure.

	Line Size	Pneumatic			Electronic		
		599-01088			SQS	SSC	
		3-8 psi	8-13 psi	10-15 psi			
3-way	1/2", Cv ≤ 1.6	40 psi (276 kPa)	95 psi (655 kPa)	120 psi (827 kPa)	95 psi (655 kPa)	95 psi (655 kPa)	Normally Closed
	1/2", Cv ≤ 4	28 psi (193 kPa)	50 psi (345 kPa)	65 psi (448 kPa)	50 psi (345 kPa)	50 psi (345 kPa)	
	3/4 to 1" Cv ≤ 10	18 psi (124 kPa)	40 psi (276 kPa)	50 psi (345 kPa)	40 psi (276 kPa)	40 psi (276 kPa)	
	1-1/4", Cv 16	—	—	—	10 psi (69 kPa)	10 psi (69 kPa)	
	1-1/2", Cv 25	—	—	—	7 psi (48 kPa)	—	
	1/2", Cv ≤ 1.6	95 psi (655 kPa)	45 psi (310 kPa)	20 psi (138 kPa)	160 psi (1103 kPa)	95 psi (655 kPa)	Normally Open
	1/2", Cv ≤ 4	45 psi (310 kPa)	25 psi (172 kPa)	10 psi (69 kPa)	85 psi (586 kPa)	55 psi (379 kPa)	
	3/4 to 1", Cv ≤ 10	35 psi (241 kPa)	10 psi (69 kPa)	—	70 psi (482 kPa)	40 psi (276 kPa)	
	1-1/4", Cv 16	—	—	—	10 psi (69 kPa)	10 psi (69 kPa)	
	1-1/2", Cv 25	—	—	—	7 psi (48 kPa)	—	

For 3-way valve close-offs, use this chart to determine upper (NC) and bottom port (NO).

Close-off pressures at 20 psi actuator pressure.

Sizing and Selection of Control Valves (continued)

Siemens 599 Series Ball Close-off Pressures

Valve	Line	Close-Off	
Part No.	Size Inches	ΔP in psi (Kvs)	
	in. (mm)	Cv (Kvs)	Cv (Kvs)
599-10203	1/2 (15)	130 (896)	0.4 (0.34)
599-10204	1/2 (15)	130 (896)	0.63 (0.54)
599-10205	1/2 (15)	130 (896)	1.6 (1.4)
599-10206	1/2 (15)	130 (896)	2.5 (2.2)
599-10207	1/2 (15)	130 (896)	4 (3.5)
599-10208*	1/2 (15)	130 (896)	10 (8.6)
599-10209	3/4 (20)	130 (896)	10 (8.6)
599-10210*	3/4 (20)	130 (896)	25 (22)
599-10211	1 (25)	3/4 (689)	10 (8.6)
599-10212	1 (25)	100 (689)	25 (22)
599-10213	1 (25)	100 (689)	16 (14)
599-10214*	1 (25)	100 (689)	63 (54)
599-10215	1-1/4 (30)	100 (689)	16 (14)
599-10216	1-1/4 (30)	100 (689)	40 (35)
599-10217*	1-1/4 (30)	100 (689)	100 (86)
599-10218	1-1/2 (40)	70 (482)	25 (22)
599-10219*	1-1/2 (40)	70 (482)	63 (54)
599-10220	1-1/2 (40)	70 (482)	40 (35)
599-10221*	1-1/2 (40)	70 (482)	160 (138)
599-10222	2 (50)	70 (482)	40 (35)
599-10223*	2 (50)	70 (482)	100 (86)
599-10224	2 (50)	70 (482)	63 (54)
599-10225*	2 (50)	70 (482)	250 (215)

* Denotes a full-port valve with no flow optimizer insert.

Flowrite 599 Series Globe Close-off Pressures

Electronic

Valve Size in. (mm)	SQX62 APC 271	SQX82 APC 272, 273	Rack & Pinion APC 298, 299	SKD APC 274, 275, 276	SKB APC 289-291	SKC APC 292-294	EI/Mech APC 296	EI/Mech APC 295, 297	
1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	—	250 (1724)	250 (1724)	Normally Closed
3/4 (20)	221 (1524)	221 (1524)	250 (1724)	250 (1724)	250 (1724)	—	238 (1640)	238 (1640)	
1 (25)	130 (896)	130 (896)	173 (1193)	203 (1400)	250 (1724)	—	140 (965)	140 (965)	
1-1/4 (32)	75 (517)	75 (517)	100 (690)	117 (807)	250 (1724)	—	81 (558)	81 (558)	
1-1/2 (40)	46 (317)	46 (317)	61 (421)	73 (503)	208 (1434)	—	50 (345)	50 (345)	
2 (50)	28 (193)	28 (193)	37 (255)	44 (303)	126 (869)	—	31 (214)	31 (214)	
2-1/2 (65)	25 (172)	25 (172)	25 (172)	34 (234)	97 (668)	—	24 (165)	50 (344)	
3 (80)	18 (124)	18 (124)	18 (124)	22 (152)	63 (434)	—	15 (103)	32 (220)	
4 (100)	—	—	—	—	—	39 (268)	10 (68)	20 (137)	
5 (125)	—	—	—	—	—	25 (172)	—	—	
6 (150)	—	—	—	—	—	17 (117)	—	—	
1/2 (15)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	250 (1724)	—	250 (1724)	250 (1724)	Normally Open
3/4 (20)	173 (1193)	173 (1193)	231 (1593)	250 (1724)	250 (1724)	—	186 (1282)	186 (1282)	
1 (25)	112 (772)	112 (772)	149 (1028)	201 (1386)	250 (1724)	—	121 (834)	121 (834)	
1-1/4 (32)	69 (476)	69 (476)	92 (634)	124 (855)	250 (1724)	—	75 (517)	75 (517)	
1-1/2 (40)	44 (303)	44 (303)	59 (407)	80 (552)	250 (1724)	—	48 (331)	48(331)	
2 (50)	27 (186)	27 (186)	36 (248)	49 (338)	201 (1386)	—	30(207)	30(207)	
2-1/2 (65)	25 (172)	25 (172)	25 (172)	38 (262)	153 (518)	—	23 (158)	48 (330)	
3 (80)	18 (124)	18 (124)	18 (124)	25 (172)	101 (342)	—	16 (110)	32 (220)	
4 (100)	—	—	—	—	—	65 (448)	10 (68)	21 (144)	
5 (125)	—	—	—	—	—	42 (289)	—	—	
6 (150)	—	—	—	—	—	29 (199)	—	—	

Pneumatic

Valve Size in. (mm)	Spring Range									
	3 to 8 psi (21 to 55 kPa)					10 to 15 psi (69 to 103 kPa)				
	4"	8"		12"		4"	8"	12"		
	Actuator	Actuator		Actuator		Actuator	Actuator	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)	15 psi (103 kPa)	30 psi (207 kPa)	
1/2 (15)	—	—	—	—	—	236 (1627)	250 (1724)	—	—	Normally Closed
3/4 (20)	—	—	—	—	—	155 (1069)	250 (1724)	—	—	
1 (25)	—	—	—	—	—	91 (627)	250 (1724)	—	—	
1-1/4 (32)	—	—	—	—	—	52 (359)	148 (1020)	—	—	
1-1/2 (40)	—	—	—	—	—	32 (331)	92 (634)	—	—	
2 (50)	—	—	—	—	—	20 (138)	55 (379)	187 (1288)	—	
2-1/2 (65)	—	—	—	—	—	—	36 (248)	114 (786)	114 (786)	
3 (80)	—	—	—	—	—	—	23 (158)	74 (610)	74 (510)	
4 (100)	—	—	—	—	—	—	—	46 (317)	46 (317)	
5 (125)	—	—	—	—	—	—	—	29 (199)	29 (199)	
6 (150)	—	—	—	—	—	—	—	20 (137)	20 (137)	
1/2 (15)	142 (979)	250 (1724)	250 (1724)	—	—	—	—	—	—	Normally Open
3/4 (20)	80 (552)	231 (1593)	250 (1724)	—	—	—	—	—	—	
1 (25)	52 (359)	150 (1034)	250 (1724)	—	—	—	—	—	—	
1-1/4 (32)	32 (221)	93 (641)	250 (1724)	—	—	—	—	—	—	
1-1/2 (40)	20 (138)	60 (414)	198 (1365)	—	—	—	—	—	—	
2 (50)	12 (83)	37 (255)	123 (848)	—	—	—	—	—	—	
2-1/2 (65)	—	31 (213)	100 (689)	95 (655)	304 (2096)	—	—	—	—	
3 (80)	—	20 (138)	66 (444)	63 (434)	200 (1378)	—	—	—	—	
4 (100)	—	—	—	40 (275)	129 (889)	—	—	—	—	
5 (125)	—	—	—	26 (179)	82 (565)	—	—	—	—	
6 (150)	—	—	—	18 (124)	57 (393)	—	—	—	—	

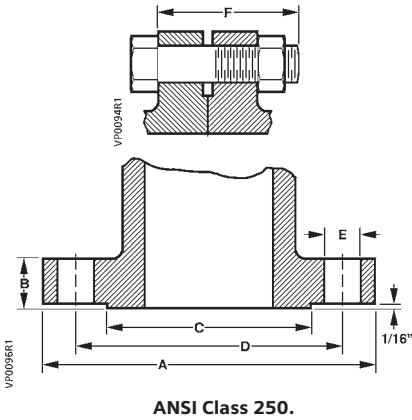
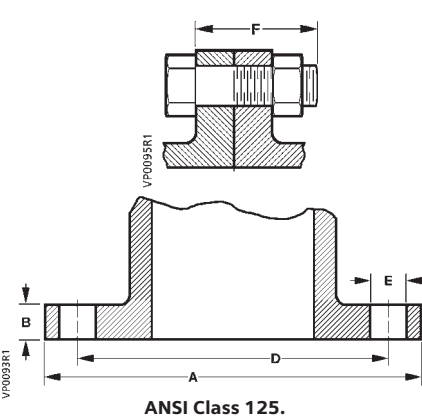
Table Notes

- All valves within table are in psi (kPa) unless otherwise indicated.
- For 3-way valve close-offs, use this chart to determine upper port (NC) and bottom port (NO).

Sizing and Selection of Control Valves (continued)

Cast Iron Flanges

2-1/2 to 8-inch Cast Iron Flange Dimensions (as defined by ANSI standard B16.1)



ANSI Class 125

Nominal Pipe Size	Flanges		Drilling		Bolting		Length of Machine Bolts
	Flange Diameter	Flange Thickness	Diameter of Bolt Circle	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	
	A	B	D	E			F
2-1/2"	7"	11/16"	5-1/2"	3/4"	4	5/8"	2-1/2"
3"	7-1/2"	3/4"	6"	3/4"	4	5/8"	2-1/2"
4"	9"	15/16"	7-1/2"	3/4"	8	5/8"	3"
5"	10"	15/16"	8-1/2"	7/8"	8	3/4"	3"
6"	11"	1"	9-1/2"	7/8"	8	3/4"	3-1/4"
8"	13-1/2"	1-1/8"	11-3/4"	7/8"	8	7/8"	3-1/2"

ANSI Class 250

Nominal Pipe Size	Flanges			Drilling		Bolting		Length of Machine Bolts
	Flange Diameter	Flange Thickness	Diameter of Raised Face	Diameter of Bolt Circle	Diameter of Bolt Holes	Number of Bolts	Diameter of Bolts	
	A	B	C	D	E			F
2-1/2"	7-1/2"	1"	4-15/16"	5-7/8"	7/8"	8	3/4"	3-1/4"
3"	8-1/4"	1-1/8"	5-11/16"	6-5/8"	7/8"	8	3/4"	3-1/5"
4"	10"	1-1/4"	6-15/16"	7-7/8"	7/8"	8	3/4"	3-3/4"
5"	11"	1-3/8"	8-5/16"	9-1/4"	7/8"	8	3/4"	4"
6"	12-1/2"	1-7/16"	9-11/16"	10-5/8"	7/8"	12	3/4"	4"
8"	15"	1-5/8"	11-15/16"	13"	1"	12	7/8"	4-1/2"

reference

Steam Saturation Pressure–Temperature Table

Vacuum Inches Hg	Absolute Pressure psi	Temperature degrees Fahrenheit
29.74	0.0886	32
29.67	0.1217	40
29.56	0.1780	50
29.40	0.2562	60
29.18	0.3626	70
28.89	0.505	80
28.50	0.696	90
28.00	0.946	100.00
27.88	1	101.83
25.85	2	126.15
23.81	3	141.52
21.78	4	153.01
19.74	5	162.28
17.70	6	170.06
15.67	7	176.85
13.63	8	182.86
11.60	9	188.27
9.56	10	193.22
7.52	11	197.75
5.49	12	201.96
3.45	13	205.87
1.42	14	209.55

Gauge Pressure psi	Absolute Pressure psi	Temperature degrees Fahrenheit
0.0	14.70	212.0
0.3	15	213.0
1.3	16	216.3
2.3	17	219.4
3.3	18	222.4
4.3	19	225.2
5.3	20	228.0
6.3	21	230.6
7.3	22	233.1
8.3	23	235.5
9.3	24	237.8
10.3	25	240.1
11.3	26	242.2
12.3	27	244.4
13.3	28	246.4
14.3	29	248.4
15.3	30	250.3
16.3	31	252.2
17.3	32	254.1
18.3	33	255.8
19.3	34	257.6
20.3	35	259.3
21.3	36	261.0
22.3	37	262.6
23.3	38	264.2
24.3	39	265.8
25.3	40	267.3
26.3	41	268.7
27.3	42	270.2
28.3	43	271.7
29.3	44	273.1

Gauge Pressure psi	Absolute Pressure psi	Temperature degrees Fahrenheit
30.3	45	274.5
31.3	46	275.8
32.3	47	277.2
33.3	48	278.5
34.3	49	279.8
35.3	50	281.0
36.3	51	282.3
37.3	52	283.5
38.3	53	284.7
39.3	54	285.9
40.3	55	287.1
41.3	56	288.2
42.3	57	289.4
43.3	58	290.5
44.3	59	291.6
45.3	60	292.7
46.3	61	293.8
47.3	62	294.9
48.3	63	295.9
49.3	64	297.0
50.3	65	298.0
51.3	66	299.0
52.3	67	300.0
53.3	68	301.0
54.3	69	302.0
55.3	70	302.9
56.3	71	303.9
57.3	72	304.8
58.3	73	305.8
59.3	74	306.7
60.3	75	307.6
61.3	76	308.5
62.3	77	309.4
63.3	78	310.3
64.3	79	311.2
65.3	80	312.0
66.3	81	312.9
67.3	82	313.8
68.3	83	314.6
69.3	84	315.4
70.3	85	316.3
71.6	86	317.1
72.3	87	317.9
73.3	88	318.7
74.3	89	319.5
75.3	90	320.3
76.3	91	321.1
77.3	92	321.8
78.3	93	322.6
79.3	94	323.4
80.3	95	324.1
81.3	96	324.9
82.3	97	325.6
83.3	98	326.4
84.3	99	327.1
85.3	100	327.8
87.3	102	329.3
89.3	104	330.7
91.3	106	332.0
93.3	108	333.4
95.3	110	334.8

Gauge Pressure psi	Absolute Pressure psi	Temperature degrees Fahrenheit
97.3	112	336.1
99.3	114	337.4
101.3	116	338.7
103.3	118	340.0
105.3	120	341.3
107.3	122	342.5
109.3	124	343.8
111.3	126	345.0
113.3	128	346.2
115.3	130	347.4
117.3	132	348.5
119.3	134	349.7
121.3	136	350.8
123.3	138	352.0
125.3	140	353.1
127.3	142	354.2
129.3	144	355.3
131.3	146	356.3
133.3	148	357.4
135.3	150	358.5
137.3	152	359.5
139.3	154	360.5
141.3	156	361.6
143.3	158	362.6
145.3	160	363.6
147.3	162	364.6
149.3	164	365.6
151.3	166	366.5
153.3	168	367.5
155.3	170	368.5
157.3	172	369.4
159.3	174	370.4
161.3	175	371.3
163.3	178	372.2
165.3	180	373.1
167.3	182	374.0
169.3	184	374.9
171.3	186	375.8
173.3	188	376.7
175.3	190	377.6
177.3	192	378.5
179.3	194	379.3
181.3	196	380.2
183.3	198	381.0
185.3	200	381.9
190.3	205	384.0
195.3	210	386.0
200.3	215	388.0
205.3	220	389.9
210.3	225	391.9
215.3	230	393.8
220.3	235	395.6
225.3	240	397.4
230.3	245	399.3
235.3	250	401.1
245.3	260	404.5
255.3	270	407.9
265.3	280	411.2
275.3	290	414.4
285.3	300	417.5

Sizing and Selection of Control Valves (continued)

Butterfly Valves Introduction

When selecting a butterfly valve for water applications you must first determine the requirements of the valve assembly. The first question to ask is, "Will the valve be used for "Isolation" or "Proportional Control" of the fluid?" and "Does the application require a 2-way or 3-way assembly?"

2-way and 3-way Isolation Valves

When selecting a valve for isolation purposes, it is seldom necessary to calculate flow requirements beyond the published C_v 's (flow coefficients) of the valve. These valves are typically line size and require the lowest pressure drop available in the full open position. It may be possible to supply a valve smaller than the actual line size and still obtain a low-pressure drop. However, the cost of reducing flanges will typically offset any savings incurred by reducing the valve size. The following charts, Tables 1 & 2, provide flow coefficients for the Keystone Figure 222 and AR2 valve assemblies.

2-way and 3-way Proportional Control Valves

Control Valves are the most important element of a fluid handling system and proper selection of these valves is crucial for efficient operation of the process. When sizing butterfly valves for control, it is imperative to have certain requirements of the system.

You must have:

- **Maximum flow requirement:** This would be equivalent to the design flow and provided or converted to gallons per minute.
- **Maximum pressure drop allowed:** The Consulting Engineer usually provides this factor and are typically 3 to 5 pounds max. However, the pressure drop should never exceed one half of the inlet pressure.

Without these two factors, selection of a control valve would be simply a guess.

Sizing Example

With this information and assuming the media is water or a similar media (glycol/water mix), a control valve can be properly sized for the application by following these steps:

1. **Calculate the required C_v :** Using the following formula and the information required above, you could calculate the flow coefficient (C_v) of the control valve.

$$C_v = \frac{\text{GPM}}{\sqrt{\Delta P}}$$

Whereas: GPM = The maximum flow requirement

P = The max. pressure drop (5 psi)

Example

The line size is 6" and the required flow is 600 GPM with a maximum pressure drop of 5 psi. The square root of 5 is equal to 2.236. When divided into 600, the required C_v for this application is: 268.336.

2. **Select your valve size:** Using the Flow Coefficients (C_v 's), select the appropriate valve size. If your required C_v is in between valve sizes, choose the larger size valve. When selecting a 3-way assembly, the C_v of the run should be selected.

Example

The line size is 6" and the calculated required C_v is 268.336. The valve selected is a 4" with a rated C_v of 647.

Butterfly valves are high capacity valves and require very little pressure drop to control flow, which allows for reduction from the line size when sizing valves. This pipe reduction affects the flow characteristics and will reduce the effective C_v of the valve. This phenomenon is known as the piping geometry factor (F_p), which brings us to the final step in valves sizing.

reference

2-way Flow Coefficients (Cv's)

Size	Degrees Open								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	0	1.3	5	14	26	40	52	59	60
2-1/2"	0	1.4	6	21	44	74	107	138	151
3"	0.7	1.5	8	29	67	115	175	234	262
4"	1.7	15	48	107	196	318	463	589	647
5"	3	32	99	206	362	579	832	1045	1141
6"	4	47	145	295	510	810	1160	1450	1580
8"	6	84	239	450	751	1190	1754	2385	2892
10"	9	133	360	652	1064	1683	2524	3596	4593
12"	12	192	509	899	1449	2288	3470	5085	6682
14"	75	340	770	1400	2200	3400	5600	7900	10000
16"	100	440	1000	1800	2800	4500	7400	10800	13000
18"	130	570	1300	2300	3600	5800	9600	15000	18000
20"	150	710	1600	2900	4600	7200	12000	18400	22000

Table Note

- Flow Coefficients (Cv) = The amount of water in gallons per minute, at 60°F that will pass through a given orifice with a one pound pressure drop.

3- way Flow Coefficients (Cv's)

Size	Degrees Open									
	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
Run	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
Branch	90°	80°	70°	60°	50°	40°	30°	20°	10°	0°
2"	54	53	49	43	38	40	44	52	57	58
2-1/2"	114	108	93	74	52	64	78	102	126	135
3"	188	178	148	114	55	95	120	165	210	229
4"	385	374	348	313	150	295	345	419	482	511
5"	642	627	600	563	270	549	630	740	829	870
6"	935	909	867	809	483	780	895	1051	1180	1242
8"	1688	1573	1424	1271	796	1175	1367	1661	1994	2254
10"	2667	2430	2132	1856	1142	1685	1971	2439	3046	3570
12"	3938	3531	3019	2579	1629	2312	2715	3401	4368	5240
14"	5109	4825	4416	3719	2433	3514	3992	5259	6342	7173
16"	6735	6462	5832	4904	3213	4498	5265	6943	8567	9410
18"	9060	8724	7650	6372	4433	5778	6815	9056	11695	12785
20"	11229	10799	9545	7901	5619	7339	8449	11309	14423	15770

Table Notes

- Three-way valve assemblies Cv's are corrected from published two-way Cv's to account for line losses generated by the tee, and are calculated values only. The pipe friction losses are a function of fluid velocity through the pipe and the three-way Cv's listed are apparent for full flow through the pipe. Operation at less than full capacity (lower velocity) will increase the actual Cv's

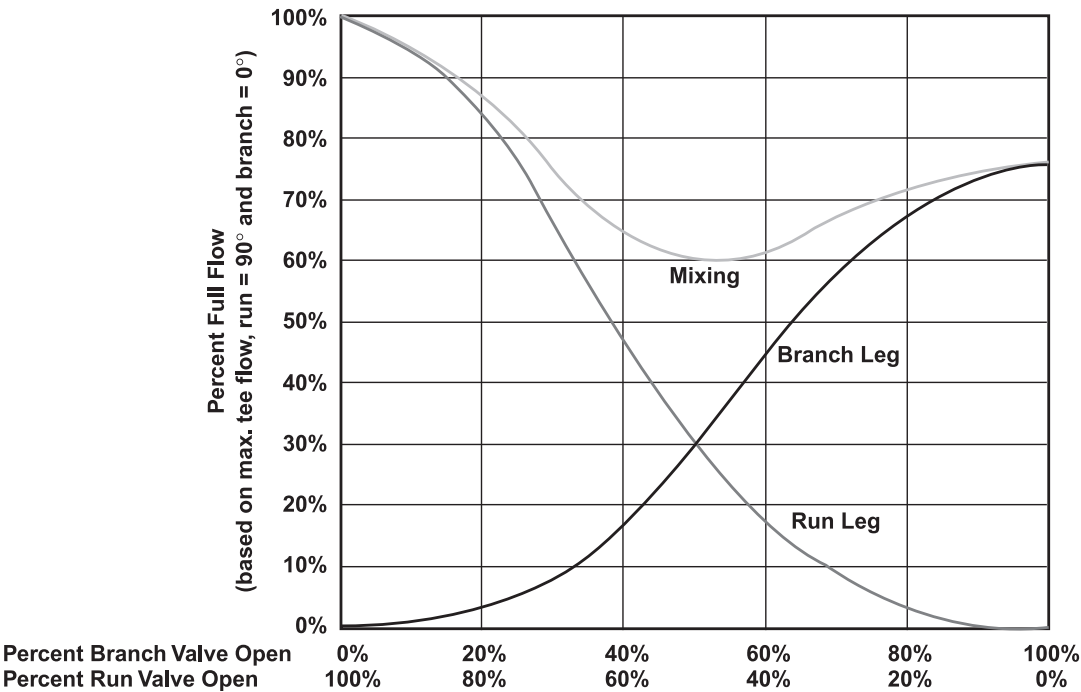
Sizing and Selection of Control Valves (continued)

3. Piping Geometry Factor:
 Reducing pipe sizes for installation of a smaller than pipe size valves will reduce the effective Cv of the valve. The greater the pipe reduction, the greater loss of Cv. Using the Adjusted Cv's for Piping Geometry Factors chart, verify that the corrected Cv, for the valve size selected, meets or exceeds the required Cv calculated in step 2.
Note: 3-way Cv's have already been adjusted.

Adjusted Cv's for Piping Geometry Factors

Size	Pipe Size													
	2-1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"
2"	47	38												
2-1/2"		125	79											
3"			189	149										
4"				505	408									
5"					947	685								
6"						1138	916							
8"							2256	1822						
10"								3812	3123					
12"									5747	4811				
14"										8900	7600			
16"											11830	10140		
18"												16560	14580	
20"													20460	18260

6-inch 3-way Assembly at Constant Valve Differential Pressure (corrected for tee loss)



Glossary

reference

ANSI Class

ANSI or American National Standards Institute coordinates standards development, publishes standards and operates a voluntary certification program. The ANSI class is the temperature and pressure rating of a valve.

Characterized Port

A valve port that modifies the flow characteristic for modulation; usually an equal percentage characteristic is produced.

Close-off Pressure

The maximum differential pressure that an actuator will hold a valve closed against allowing only the publish leakage rate to pass through.

Cv

Flow coefficient. Flow rate in gallons of 60°F water that passes through a valve in one minute at a one pound pressure drop.

Differential Pressure

Differential Pressure is the difference between the pressures immediately upstream and downstream of a valve.

Direct Acting

Direct Acting is a valve that increases flow with an increase in signal.

Equal Percentage

In valves, this usually refers to a deep logarithmic response curve. Globe valves and characterized ball valves have equal percentage curves. Standard ball valves and butterfly valves have shallow logarithmic curves, not normally considered to be equal percentage.

Linear Characteristic

A valve response curve is linear if an equal amount of lift, rotation, or signal change always produces the same change in flow quantity.

Normally Closed (NC)

A valve that is closed when the signal to the actuator is low or when power is lost.

Normally Open (NO)

A valve that is open when the signal to the actuator is low or when power is lost.

Rangeability

Used to compare the control quality of any two valves, Rangeability is the ratio of maximum controllable flow to minimum controllable flow at a constant pressure drop for equal percentage valve bodies. The term, rangeability, is not applicable to valves with a linear flow characteristic. A rangeability of 100:1 means that the valve controls equally well when flow is 100 times the minimum controllable flow as it does at the minimum

controllable flow, plus the flow follows the equal percentage curve +/- a 10% tolerance. With this ratio, the minimum flow rate at which a valve's flow control remains on the equal percentage curve can be calculated. Siemens ball valve bodies have a rangeability of 500:1.

For example, a valve with 100:1 rangeability, a Cv of 10, and at a 1 psi pressure drop across the valve, the minimum flow through the valve that still follows the equal percentage curve within 10% tolerance is 0.1 GPM. Below 0.1 GPM, the valve will still control. Flow, however, will not follow the equal percentage curve.

Resolution

Resolution is the least interval between two adjacent discrete positions that can be distinguished from one another. This gives the number of discrete positions an actuator can achieve within a given control signal. It is usually expressed as a percentage of span.

For example, an actuator with 100 discrete positions across its 0 to 10 Volt control signal has a resolution of 100:1 or 1%. An actuator with a 50 discrete positions has a resolution of 50:1 or 2%. Powermite, Flowrite and OpenAir actuators all have a resolution of 100:1 or 1%. Other actuators that operate over on a 2 to 10 Volt signal may have an overall resolution that is smaller, due to the smaller operating signal range. The term resolution only applies to the actuator.

Reverse Acting

Reverse acting is a valve that decreases flow with an increase in signal. This is a function of the actuator.

Static Pressure

Static pressure refers to the system pressure in a closed loop.

Turndown Ratio

A ratio of maximum usable flow to minimum controllable flow at a constant pressure drop. This is the ratio that takes both valve and valve actuator into account when installed in a system. The key is maximum usable flow. This may differ from the maximum controllable flow used to calculate the rangeability. The maximum usable flow is the maximum flow that generally occurs in a given system. It will vary from application to application. When selecting a valve, select valves and actuators that provide the greatest turndown ratio for a given application.

For example, if a valve has a maximum controllable flow of 50 GPM, maximum usable flow of 30 GPM and a minimum controllable flow of 1 GPM, then the rangeability is 50:1 and the turndown ratio is 30:1 at a given pressure drop.

notes

For more information on
Siemens valves and valve
actuators or for assistance in
selection or sizing,
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