

## 599 Series 3-Way Ball Valves

### 3-Way Ball Valves





#### Description

The 599 Series 3-way Ball Valves can be coupled to any commercially available actuator to provide three-way mixing or diverting flow control. The ball valves are 1/4-turn rotary control valves and are available in 1/2-inch to 2-inch line sizes.

#### Features

- ANSI 250 valve body rating.
- 200 psi close-off with ANSI Class IV leakage for all line sizes and actuators.
- Available with chrome-plated brass ball and brass stem or stainless steel ball and stem.
- Can be used as either a mixing or a diverting valve.
- Blow-out proof stem withstands high pressure.
- Universal actuator mounting.
- Actuator and bracket can be rotated (90-degree increments).
- Standoffs provide a thermal barrier between the actuator and the valve.
- Operating handle for manual operation.

#### Warning/Caution Notations

<b>WARNING:</b>		Personal injury/loss of life may occur if you do not perform a procedure as specified.
<b>CAUTION:</b>		Equipment damage may occur if you do not perform a procedure as specified.

#### Product Numbers

See *TB 253 599 Series Ball Valve and Actuator Assemblies Selection Technical Bulletin (155-704P25)* for selection procedures and ordering numbers for Siemens valve and actuator.

## 599 Series 3-Way Ball Valves

### Specifications

Valve body rating	ANSI 250/600 WOG
Static pressure	360 psi (2482 kPa)
Media temperature	
1/2-inch to 1-1/2 inch	35°F to 250°F (2°C to 121°C)
1-1/2 inch and 2-inch	35°F to 230°F (2°C to 110°C)
Controlled media	Water, glycol solutions to 50%
Body	Forged Brass ASTM B283
Flow optimizer	Glass-filled polymer
Ball	Chrome-plated brass or Stainless Steel
Ball seals	Reinforced PTFE seals with EPDM O-rings
Female end connections	Brass
Stem	Brass or Stainless Steel
Stem seals	EPDM O-rings
Angle of rotation	0 to 90°
Flow coefficients	See Table 1 and Table 2.
Close-off ratings	See Table 1 Close-off ratings per ANSI/FCI 70-2: Class IV for A-AB, Class III for B-AB
Maximum operating differential pressure	60 psi (35 psi for 2" valves)
Flow rates	See Table 1.
Dimensions and service envelope	See Figure 4 and Table 3.

## 599 Series 3-Way Ball Valves

Table 1. 3-Way Ball Valve Product Numbers, Close-off Ratings, and Flow Rates.

Valve Product Number	Valve Line Size Inches (MM)	Close-Off $\Delta P$ in psi (kPa)	Cv	Flow Rate, gpm @ Differential Pressure $\Delta p$ , psi									
			1	2	3	4	5	10	15	20	25	30	
599-10350(S)	1/2 (15)	200 (1379)	0.4	0.57	0.69	0.80	0.89	1.3	1.6	1.8	2.0	2.2	
599-10351(S)			0.63	0.89	1.1	1.3	1.4	2	2.4	2.8	3.2	3.5	
599-10352(S)			1.0	1.4	1.7	2	2.2	3.2	3.9	4.5	5	5.5	
599-10353(S)			1.6	2.3	2.8	3.2	3.6	5.1	6.2	7.2	8	8.8	
599-10354(S)			2.5	3.5	4.3	5	5.6	7.9	9.7	11.2	12.5	13.7	
599-10355(S)			4	5.7	6.9	8	8.9	13	16	18	20	22	
599-10356(S)			6.3	8.9	11	13	14	20	24	28	32	35	
599-10357(S)*			10	14	17	20	22	32	39	45	50	55	
599-10358(S)	3/4 (20)	200 (1379)	6.3	8.9	11	13	14	20	24	28	32	35	
599-10359(S)			10	14	17	20	22	32	39	45	50	55	
599-10360(S)*			16	23	28	32	36	51	62	72	80	88	
599-10361(S)	1 (25)	200 (1379)	10	14	17	20	22	32	39	45	50	55	
599-10362(S)			16	23	28	32	36	51	62	72	80	88	
599-10363(S)*			25	35	43	50	56	79	97	112	125	137	
599-10364(S)	1-1/4 (32)	200 (1379)	16	23	28	32	36	51	62	72	80	88	
599-10365(S)			25	35	43	50	56	79	97	112	125	137	
599-10366(S)*			40	57	69	80	89	126	155	179	200	219	
599-10367(S)	1-1/2 (40)	200 (1379)	25	35	43	50	56	79	97	112	125	137	
599-10368(S)			40	57	69	80	89	126	155	179	200	219	
599-10369(S)*			63	89	109	126	141	199	244	282	315	345	
599-10370(S)	2 (50)	200 (1379)	40	57	69	80	89	126	155	179	200	219	
599-10371(S)			63	89	109	126	141	199	244	282	315	345	
599-10372(S)			100	141	173	200	224	316	387	447	500	548	

\*Denotes a full-port valve without flow optimizer insert.  
 Add "S" suffix for Stainless Steel ball and stem.

**NOTE:** Maximum operating differential pressure = 60 psi for 1/2" to 1-1/2"; 35 psi for 2" valves.


Available from Valve Solutions, Inc with any commercially available actuator as a complete package. Contact for actuator specifications and package quotations


## 599 Series 3-Way Ball Valves


Use Table 2 to determine the effective Cv when using a full-port ball valve where the ball size and the lines size differ.

**Table 2. Full-Port (No Flow Characterizer) Ball Valve Product Numbers and Flow Coefficients**

Valve Product Number	Valve Line Size in Inches (mm)	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)
599-10357 or 599-10357S	1/2 (15)	10 (8.62)	6.94 (5.93)	6.19 (5.29)	—	—	—	—	—	—	—	—
599-10360 or 599-10360S	3/4 (20)	—	16.00 (13.79)	13.9 (11.98)	12.4 (10.69)	—	—	—	—	—	—	—
599-10363 or 599-10363S	1 (25)	—	—	25.00 (21.55)	22.5 (19.40)	21.2 (18.27)	—	—	—	—	—	—
599-10366 or 599-10366S	1-1/4 (32)	—	—	—	40.00 (34.48)	36.9 (31.81)	33.3 (28.70)	—	—	—	—	—
599-10369 or 599-10369S	1-1/2 (40)	—	—	—	—	63.00 (54.31)	55.3 (47.67)	51.00 (43.96)	—	—	—	—
599-10372 or 599-10372S	2 (50)	—	—	—	—	—	100 (86.21)	94.30 (81.29)	86.1 (74.23)	—	—	—

 = Valve may be oversized.

 = Optimal valve size.

 = Valve may be undersized

### Application

Ball valves can control hot or chilled water and up to 50% glycol solution in mixing applications for air handlers, convectors, fan coil units, unit conditioners, radiation, and reheat coils. Three-way ball valves can be piped for either mixing or diverting applications.

## 599 Series 3-Way Ball Valves

### Operation

The parabolic shape of the control port (A – AB) flow optimizer orifice (Figure 1) provides a slowly opening valve. Equal movements of the valve stem, at any point of the flow range, change the existing flow an equal percentage regardless of the existing flow. The ball valve equal percentage flow characteristic (Figure 2) mirrors the flow characteristic of a coil, resulting in linear heat transfer.

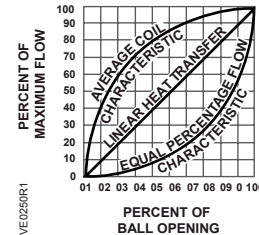
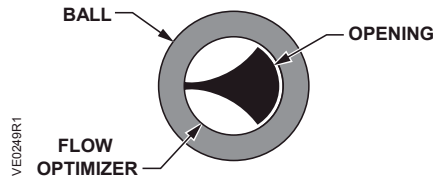


Figure 1. Ball Valve Flow Optimizer. Figure 2. Ball Valve Equal Percentage

### Mounting and Installation

- Install the valve so that the flow follows the direction of the arrow cast on the valve body

**NOTE:** Valves with body part numbers -103xx may be installed as diverting valves.

- For added flexibility, the actuator can be installed in any of the four (4) rotation angles relative to the valve body. See Figure 3.
- For best performance, install the valve assembly with the actuator above the valve body.
- The valve and actuator assembly can be installed in a horizontal pie in any position between vertical and 90 degrees. Do not install the valve assembly so that the actuator is below horizontal or upside-down.
- The ball valve also can be installed vertically.
- Allow sufficient space for servicing the valve and actuator. See Figure 4 for valve body dimensions and service envelope.

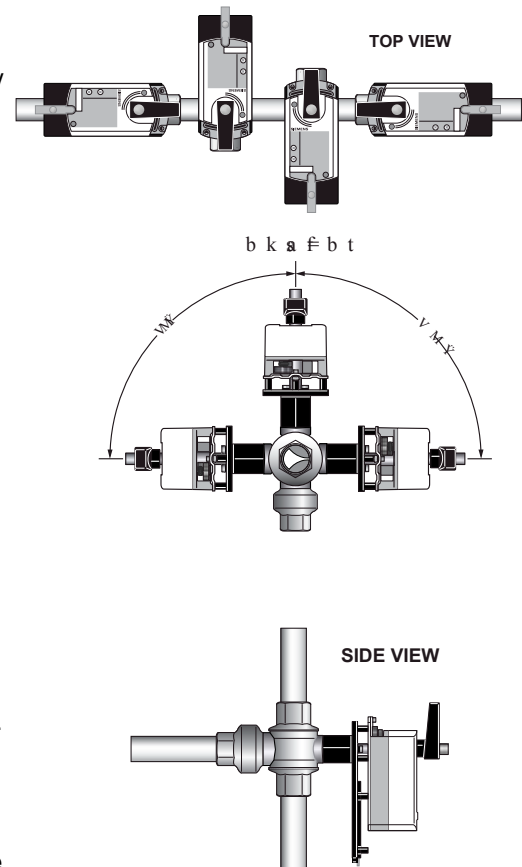


Figure 3. Mounting Positions.

### Service

Replace the valve if inoperable.

Available from Valve Solutions, Inc with any commercially available actuator as a complete package. Contact for actuator specifications and package quotations

## 599 Series 3-Way Ball Valves

All Sizes

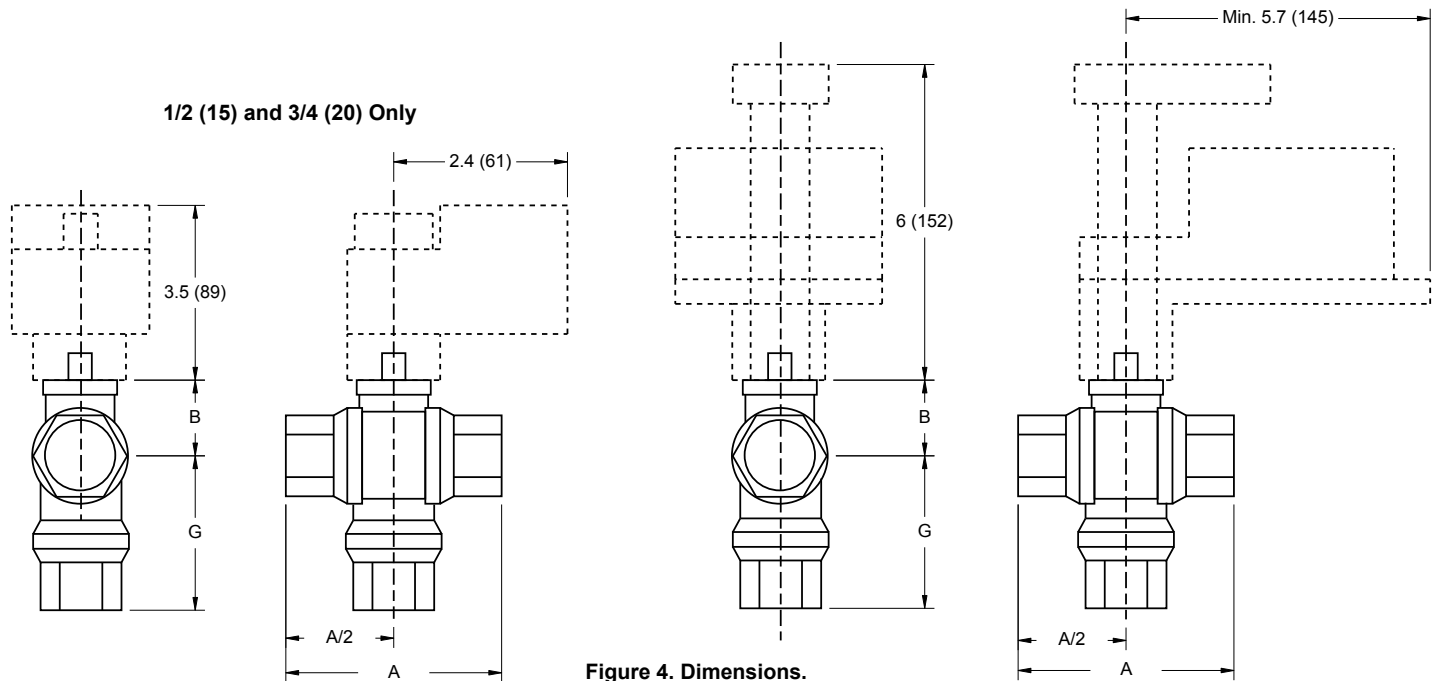


Figure 4. Dimensions.

Table 3. Dimensions

Line Size Inches (mm)	Product Number	A Length	B Height	G Height	Weight lbs (kg)
1/2(15)	599-10350(S) through 599-10357(S)	2-9/16 (65)	1-3/16 (30)	1-3/8 (35)	1.50 (0.68)
3/4(20)	599-10358(S)	2-3/4 (70)	1-3/16 (30)	1-3/8 (35)	1.60 (0.73)
	599-10359(S) 599-10360(S)	3-1/8 (79)	1-3/16 (30)	1-11/16 (43)	2.20 (1.00)
1(25)	599-10361(S)	3-1/4 (83)	1-11/16 (43)	1-11/16 (43)	2.37 (1.08)
	599-10362(S) 599-10363(S)	3-13/16 (77)	1-15/16 (49)	2 (51)	2.74 (1.24)
1-1/4(32)	599-10364(S) 599-10365(S)	3-5/8 (92)	1-15/16 (49)	2-1/8 (54)	2.85 (1.29)
	599-10366(S)	3-15/16 (100)	1-15/16 (49)	2-5/16 (59)	4.30 (1.95)
1-1/2(40)	599-10367(S) 599-10368(S)	3-15/16 (100)	1-15/16 (49)	2-5/16 (59)	3.90 (1.76)
	599-10369(S)	4-5/8 (117)	2-7/16 (62)	2-13/16 (71)	7.83 (17.16)
2(50)	599-10370(S)	4-5/8 (117)	2-7/16 (62)	2-7/8 (73)	6.70 (3.04)
	599-10371(S) 599-10372(S)		3-11/16 (94)		