

## 599 Series 3-Way Ball Valves

### Description

The 599 Series three-way Ball Valves are coupled with OpenAir™ actuators to provide equal percentage flow control in either mixing or diverting applications. The Ball Valves are 1/4-turn rotary control valves and are available in 1/2-inch to 2-inch line sizes.


### Product Numbers

Use the product numbers in Table 1 or Table 2 to order the valve and the actuator assembled together. The product number consists of a 4-digit prefix code, a hyphen, and a 5- or 6-digit suffix code. The prefix specifies an actuator. The suffix specifies the valve body.

### Features

- ANSI 250 valve body rating.
- Available in either chrome-plated brass ball/brass stem or stainless steel ball and stem
- May be used as either mixing or diverting valves
- Shutoff up to 200 psi
- Universal mounting plate
- Blow-out proof stem withstands high pressure
- Actuator and plate can be rotated
- Standoffs provide a thermal barrier between the actuator and the mounting plate
- Operating handle can manually operate valve

**Table 1. Product Numbers for Fail-In-Place Assemblies.**

Valve Body Product Number *	Valve Size Inches (mm)	Close-Off ΔP in psi (kPa)	Flow Rate Cv (Kvs)	Fail-in-Place							
				 Control & Actuator Prefix Code							
				3-Position		0 to 10 Vdc,					
				GDE131.1P 171A	GLB131.1P 171B	GDE161.1Q 173A	GLB161.1Q 173B	GDE161.1P 171C	GLB161.1P 171D	GDE161.1Q 173C	GLB161.1Q 173D
				3-foot (.9 m) Wires		Conduit Adapter & 6-ft (1.8 m) Wires		3-foot (.9 m) Wires		Conduit Adapter & 6-ft (1.8 m) Wires	
599-10350(S)	1/2 (15)	200 (1379)	0.4 (0.34)	171A-10350(S)	173A-10350(S)	171C-10350(S)	173C-10350(S)				
599-10351(S)			0.63 (0.54)	171A-10351(S)	173A-10351(S)	171C-10351(S)	173C-10351(S)				
599-10352(S)			1.0 (0.86)	171A-10352(S)	173A-10352(S)	171C-10352(S)	173C-10352(S)				
599-10353(S)			1.6 (1.4)	171A-10353(S)	173A-10353(S)	171C-10353(S)	173C-10353(S)				
599-10354(S)			2.5 (2.2)	171A-10354(S)	173A-10354(S)	171C-10354(S)	173C-10354(S)				
599-10355(S)			4 (3.5)	171A-10355(S)	173A-10355(S)	171C-10355(S)	173C-10355(S)				
599-10356(S)			6.3 (5.5)	171A-10356(S)	173A-10356(S)	171C-10356(S)	173C-10356(S)				
599-10357(S)*			10 (8.6)	171A-10357(S)*	173A-10357(S)*	171C-10357(S)*	173C-10357(S)*				
599-10358(S)	3/4 (20)	200 (1379)	6.3 (5.5)	171A-10358(S)	173A-10358(S)	171C-10358(S)	173C-10358(S)				
599-10359(S)			10 (8.6)	171A-10359(S)	173A-10359(S)	171C-10359(S)	173C-10359(S)				
599-10360(S)*			16 (14)	171A-10360(S)*	173A-10360(S)*	171C-10360(S)*	173C-10360(S)*				
599-10361(S)	1 (25)	200 (1379)	10 (8.6)	171A-10361(S)	173A-10361(S)	171C-10361(S)	173C-10361(S)				
599-10362(S)			16 (14)	171A-10362(S)	173A-10362(S)	171C-10362(S)	173C-10362(S)				
599-10363(S)*			25 (22)	171A-10363(S)*	173A-10363(S)*	171C-10363(S)*	173C-10363(S)*				
599-10364(S)	1-1/4 (32)	200 (1379)	16 (14)	171A-10364(S)	173A-10364(S)	171C-10364(S)	173C-10364(S)				
599-10365(S)			25 (22)	171A-10365(S)	173A-10365(S)	171C-10365(S)	173C-10365(S)				
599-10366(S)*			40 (35)	171A-10366(S)*	173A-10366(S)*	171C-10366(S)*	173C-10366(S)*				
599-10367(S)	1-1/2 (40)	200 (1379)	25 (22)	171B-10367(S)	173B-10367(S)	171D-10367(S)	173D-10367(S)				
599-10368(S)			40 (35)	171B-10368(S)	173B-10368(S)	171D-10368(S)	173D-10368(S)				
599-10369(S)*			63 (54)	171B-10369(S)*	173B-10369(S)*	171D-10369(S)*	173D-10369(S)*				
599-10370(S)	2 (50)	200 (1379)	40 (35)	171B-10370(S)	173B-10370(S)	171D-10370(S)	173D-10370(S)				
599-10371(S)			63 (54)	171B-10371(S)	173B-10371(S)	171D-10371(S)	173D-10371(S)				
599-10372(S)*			100 (86)	171B-10372(S)*	173B-10372(S)*	171D-10372(S)*	173D-10372(S)*				

\* Denotes a full-port valve without flow optimizer insert.

S – Suffix denotes stainless steel ball and stem

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


### Typical Specifications

Ball valves shall have female NPT type fittings and shall be 1/2 to 2-inch (15 to 50-mm) line and ball sizes. The valves shall have a forged brass body, chrome-plated brass or stainless steel ball, and EPDM O-ring seals. Valves may contain a glass-filled polymer flow optimizer to provide an equal percentage control characteristic. This flow optimizer should be an integral part of the ball assembly. Ball valves shall utilize a 90-degree rotation for control. They shall provide automated flow control of hot or chilled water and up to 50% glycol solution for HVAC control applications.

### Technical Data

<b>Valve Body Rating</b>	ANSI 250/600 WOG
<b>Static Pressure</b>	360 psi (2482 kPa)
<b>Maximum Operating Differential Pressure</b>	60 psi (414 kPa) for 1/2" to 1-1/2" valves 35 psi (345 kPa) for 2" valves
<b>Controlled Media</b>	Water, glycol solutions to 50%
<b>Media Temperature</b>	
1/2-inch to 1-1/4 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)
<b>Body</b>	Forged Brass ASTM B283
<b>Flow Optimizer</b>	Glass-filled polymer
<b>Ball</b>	Chrome-plated brass or stainless steel
<b>Stem</b>	Brass or stainless steel
<b>Ball Seals</b>	Reinforced PTFE seals with EPDM O-rings
<b>Stem Seals</b>	EPDM O-rings
<b>Angle of Rotation</b>	0 to 90°

**Table 2. Product Numbers for Fail-Safe Assemblies.**

Valve Body Product Number *	Valve Size Inches (mm)	Close-Off ΔP in psi (kPa)	Flow Rate Cv (Kvs)	Fail-Safe		
						
				Control & Actuator Prefix Code		
				2-Position, GMA121.1P 171E	3-Position, GMA131.1P 171F	0 to 10 Vdc, GMA161.1P 171G
599-10350(S)	1/2 (15)	200 (1379)	0.4 (0.34)	171E-10350(S)	171F-10350(S)	171G-10350(S)
599-10351(S)			0.63 (0.54)	171E-10351(S)	171F-10351(S)	171G-10351(S)
599-10352(S)			1.0 (0.86)	171E-10352(S)	171F-10352(S)	171G-10352(S)
599-10353(S)			1.6 (1.4)	171E-10353(S)	171F-10353(S)	171G-10353(S)
599-10354(S)			2.5 (2.2)	171E-10354(S)	171F-10354(S)	171G-10354(S)
599-10355(S)			4 (3.5)	171E-10355(S)	171F-10355(S)	171G-10355(S)
599-10356(S)			6.3 (5.5)	171E-10356(S)	171F-10356(S)	171G-10356(S)
599-10357(S)*			10 (8.6)	171E-10357(S)*	171F-10357(S)*	171G-10357(S)*
599-10358(S)	3/4 (20)	200 (1379)	6.3 (5.5)	171E-10358(S)	171F-10358(S)	171G-10358(S)
599-10359(S)			10 (8.6)	171E-10359(S)	171F-10359(S)	171G-10359(S)
599-10360(S)*			16 (14)	171E-10360(S)*	171F-10360(S)*	171G-10360(S)*
599-10361(S)	1 (25)	200 (1379)	10 (8.6)	171E-10361(S)	171F-10361(S)	171G-10361(S)
599-10362(S)			16 (14)	171E-10362(S)	171F-10362(S)	171G-10362(S)
599-10363(S)*			25 (22)	171E-10363(S)*	171F-10363(S)*	171G-10363(S)*
599-10364(S)	1-1/4 (32)	200 (1379)	16 (14)	171E-10364(S)	171F-10364(S)	171G-10364(S)
599-10365(S)			25 (22)	171E-10365(S)	171F-10365(S)	171G-10365(S)
599-10366(S)*			40 (35)	171E-10366(S)*	171F-10366(S)*	171G-10366(S)*
599-10367(S)	1-1/2 (40)	200 (1379)	25 (22)	171E-10367(S)	171F-10367(S)	171G-10367(S)
599-10368(S)			40 (35)	171E-10368(S)	171F-10368(S)	171G-10368(S)
599-10369(S)*			63 (54)	171E-10369(S)*	171F-10369(S)*	171G-10369(S)*
599-10370(S)	2 (50)	200 (1379)	40 (35)	171E-10370(S)	171F-10370(S)	171G-10370(S)
599-10371(S)			63 (54)	171E-10371(S)	171F-10371(S)	171G-10371(S)
599-10372(S)*			100 (86)	171E-10372(S)*	171F-10372(S)*	171G-10372(S)*

\* Denotes a full-port valve without flow optimizer insert.

S – Suffix denotes stainless steel ball and stem

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

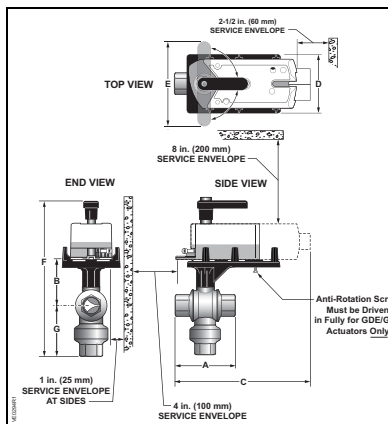
**Table 2. 3-Way, Full-Port (Without Flow Optimizer) Ball Valve Product Numbers and Flow Coefficients.**

Valve Size in Inches (mm)	Valve Body Product Number	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)	599-10357(S)	10.00 (8.62)	6.94 (5.93)	6.19 (5.29)	--	--	--	--	--	--	--	--
3/4 (20)	599-10360(S)	--	16.00 (13.79)	13.9 (11.98)	12.4 (10.69)	--	--	--	--	--	--	--
1 (25)	599-10363(S)	--	--	25.00 (21.55)	22.5 (19.40)	21.2 (18.27)	--	--	--	--	--	--
1-1/4 (32)	599-10366(S)	--	--	--	40.00 (34.48)	36.9 (31.81)	33.3 (28.70)	--	--	--	--	--
1-1/2 (40)	599-10369(S)	--	--	--	--	63.00 (54.31)	55.3 (47.67)	51.00 (43.96)	--	--	--	--
2 (50)	599-10372(S)	--	--	--	--	--	100 (86.21)	94.3 (81.29)	86.1 (74.23)	--	--	--

 = Valve may be oversized.  = Optimal valve size.  = Valve may be undersized.

**Table 3. Dimensions in Inches (Millimeters).**

Line Size Inches (mm)	Product Number	A Length	C Length * for Actuator Codes 171A-D Codes 173A-D	C Length * for Actuator Codes 171E-G	B Height	G Height	F Height	Weight
1/2 (15)	599-10350(S) through 599-10357(S)	2-9/16 (65)	6-11/16 (170)	8-3/8 (213)	3-1/4 (83)	1-3/8 (35)	8-5/8 (219)	1.50 (0.68)
3/4 (20)	599-10358(S)	2-3/4 (70)	6-11/16 (170)	8-3/8 (213)	3-1/4 (83)	1-3/8 (35)	8-5/8 (219)	1.60 (0.73)
	599-10359(S) 599-10360(S)	3-1/8 (79)	6-11/16 (170)	8-3/8 (213)	3-1/4 (83)	1-11/16 (43)	8-5/8 (219)	2.20 (1.00)
1 (25)	599-10361(S)	3-1/4 (83)	6-11/16 (170)	8-3/8 (213)	3-3/4 (95)	1-11/16 (43)	9-1/8 (232)	2.37 (1.08)
	599-10362(S) 599-10363(S)	3-13/16 (77)	6-15/16 (176)	8-5/8 (219)	4 (102)	2 (51)	9-5/8 (244)	2.74 (1.24)
1-1/4 (32)	599-10364(S) 599-10365(S)	3-5/8 (92)	6-7/8 (174)	8-9/16 (217)	4 (102)	2-1/8 (54)	9-3/4 (248)	3.50 (1.59)
	599-10366(S)	3-15/16 (100)	7 (178)	8-11/16 (221)	4 (102)	2-5/16 (59)	10-1/4 (260)	4.30 (1.95)
1-1/2 (40)	599-10367(S) 599-10368(S)	3-15/16 (100)	7 (178)	8-11/16 (221)	4 (102)	2-5/16 (59)	10-1/4 (260)	3.90 (1.76)
	599-10369(S)	4-5/8 (117)	7-1/4 (184)	7-7/8 (200)	4-1/2 (114)	2-13/16 (71)	11 (279)	7.83 (17.16)
2 (50)	599-10370(S)	4-5/8 (117)	7-1/4 (184)	8-11/16 (221)	4-1/2 (114)	2-7/8 (73)	10-3/8 (264)	6.70 (3.04)
	599-10371(S) 599-10372(S)	4-5/8 (117)	7-1/4 (184)	9-1/16 (230)	5-3/4 (146)	2-7/8 (73)	11-3/16 (284)	6.70 (3.04)



TOP VIEW: 2-1/2 in. (60 mm) SERVICE ENVELOPE

END VIEW: 1 in. (25 mm) SERVICE ENVELOPE AT SIDES

SIDE VIEW: 8 in. (200 mm) SERVICE ENVELOPE

4 in. (100 mm) SERVICE ENVELOPE

Anti-Rotation Screw Must be Driven in Fully for GDE/GLB Actuators Only

- All dimensions are in inches (mm) and weights are in pounds (kg).
- Stamping on valve body indicates the ball size, not necessarily the line size.
- Dimension "C" is maximum length, measured from the actuator, end fitting, or mounting plate, whichever extends the furthest.
- Dimension "D", Depth, is 3 inches (76 mm).
- Dimension "E", Handle, is 4 inches (102 mm).

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