

## 599 Series 2-Way Ball Valves

### Description

The 599 Series two-way Ball Valves are coupled with OpenAir™ actuators to provide modified equal percentage flow control. The Ball Valves are 1/4-turn rotary control valves.


### Product Numbers

Use the product numbers in Table 1 or Table 2 to order a valve and actuator assembly. The product number consists of a 3-digit actuator prefix code, a hyphen, and a 5-digit valve body suffix code.

### Features


- Universal mounting plate
- Leak-proof shutoff
- 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 Fail-In-Place Assemblies.**

Valve Body Product Number *	Line Size Inches (mm)	Close-Off ΔP in psi (kPa)	Cv (Kvs)	Fail-in-Place							
											
				Control & Actuator Prefix Code							
				3-Position				0 to 10 Vdc			
				GDE 131.1P	GLB 131.1P	GDE 131.1Q	GLB 131.1Q	GDE 161.1P	GLB 161.1P	GDE 161.1Q	GLB 161.1Q
				12-inch (.3m) Wires		Conduit Adapter & 6-foot (1.8m) Wires		12-inch (.3m) Wires		Conduit Adapter & 6-foot (1.8m) Wires	
171A	171B	173A	173B	171C	171D	173C	173D				
599-10203	1/2 (15)	130 (896)	0.4 (0.34)	171A-10203	173A-10203	171C-10203	173C-10203				
599-10204			0.63 (0.54)	171A-10204	173A-10204	171C-10204	173C-10204				
599-10205			1.6 (1.4)	171A-10205	173A-10205	171C-10205	173C-10205				
599-10206			2.5 (2.2)	171A-10206	173A-10206	171C-10206	173C-10206				
599-10207			4 (3.5)	171A-10207	173A-10207	171C-10207	173C-10207				
599-10208 *			10 (8.6)	171A-10208	173A-10208	171C-10208	173C-10208				
599-10209	3/4 (20)	130 (896)	10 (8.6)	171A-10209	173A-10209	171C-10209	173C-10209				
599-10210 *			25 (22)	171A-10210	173A-10210	171C-10210	173C-10210				
599-10211	1 (25)	100 (689)	10 (8.6)	171A-10211	173A-10211	171C-10211	173C-10211				
599-10212			25 (22)	171A-10212	173A-10212	171C-10212	173C-10212				
599-10213			16 (14)	171A-10213	173A-10213	171C-10213	173C-10213				
599-10214 *			63 (54)	171A-10214	173A-10214	171C-10214	173C-10214				
599-10215	1-1/4 (30)	100 (689)	16 (14)	171A-10215	173A-10215	171C-10215	173C-10215				
599-10216			40 (35)	171A-10216	173A-10216	171C-10216	173C-10216				
599-10217 *			100 (86)	171A-10217	173A-10217	171C-10217	173C-10217				
599-10218	1-1/2 (40)	70 (482)	25 (22)	171B-10218	173B-10218	171D-10218	173D-10218				
599-10219 *			63 (54)	171B-10219	173B-10219	171D-10219	173D-10219				
599-10220			40 (35)	171B-10220	173B-10220	171D-10220	173D-10220				
599-10221 *			160 (138)	171B-10221	173B-10221	171D-10221	173D-10221				
599-10222	2 (50)	70 (482)	40 (35)	171B-10222	173B-10222	171D-10222	173D-10222				
599-10223 *			100 (86)	171B-10223	173B-10223	171D-10223	173D-10223				
599-10224			63 (54)	171B-10224	173B-10224	171D-10224	173D-10224				
599-10225 *			250 (215)	171B-10225	173B-10225	171D-10225	173D-10225				

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

**Table 2. Product Number Fail Safe Assemblies.**

Valve Body Product Number *	Line Size Inches (mm)	Close-Off $\Delta P$ in psi (kPa)	Cv (Kvs)	Fail-Safe***					
									
				Control & Actuator Prefix Code **					
				2-Position		3-Position		0 to 10 Vdc	
				GMA121.1P		GMA131.1U		GMA161.1P	
				N.O.	N.C.	N.O.	N.C.	N.O.	N.C.
171E	172E	171F	172F	171G	172G				
599-10203	1/2 (15)	130 (896)	0.4 (0.34)	171E-10203	172E-10203	171F-10203	172F-10203	171G-10203	172G-10203
599-10204			0.63 (0.54)	171E-10204	172E-10204	171F-10204	172F-10204	171G-10204	172G-10204
599-10205			1.6 (1.4)	171E-10205	172E-10205	171F-10205	172F-10205	171G-10205	172G-10205
599-10206			2.5 (2.2)	171E-10206	172E-10206	171F-10206	172F-10206	171G-10206	172G-10206
599-10207			4 (3.5)	171E-10207	172E-10207	171F-10207	172F-10207	171G-10207	172G-10207
599-10208 *			10 (8.6)	171E-10208	172E-10208	171F-10208	172F-10208	171G-10208	172G-10208
599-10209	3/4 (20)	130 (896)	10 (8.6)	171E-10209	172E-10209	171F-10209	172F-10209	171G-10209	172G-10209
599-10210 *			25 (22)	171E-10210	172E-10210	171F-10210	172F-10210	171G-10210	172G-10210
599-10211	1 (25)	100 (689)	10 (8.6)	171E-10211	172E-10211	171F-10211	172F-10211	171G-10211	172G-10211
599-10212			25 (22)	171E-10212	172E-10212	171F-10212	172F-10212	171G-10212	172G-10212
599-10213			16 (14)	171E-10213	172E-10213	171F-10213	172F-10213	171G-10213	172G-10213
599-10214 *			63 (54)	171E-10214	172E-10214	171F-10214	172F-10214	171G-10214	172G-10214
599-10215			16 (14)	171E-10215	172E-10215	171F-10215	172F-10215	171G-10215	172G-10215
599-10216			1-1/4 (30)	100 (689)	40 (35)	171E-10216	172E-10216	171F-10216	172F-10216
599-10217 *	100 (86)	171E-10217			172E-10217	171F-10217	172F-10217	171G-10217	172G-10217
599-10218	1-1/2 (40)	70 (482)	25 (22)	171E-10218	172E-10218	171F-10218	172F-10218	171G-10218	172G-10218
599-10219 *			63 (54)	171E-10219	172E-10219	171F-10219	172F-10219	171G-10219	172G-10219
599-10220			40 (35)	171E-10220	172E-10220	171F-10220	172F-10220	171G-10220	172G-10220
599-10221 *			160 (138)	171E-10221	172E-10221	171F-10221	172F-10221	171G-10221	172G-10221
599-10222	2 (50)	70 (482)	40 (35)	171E-10222	172E-10222	171F-10222	172F-10222	171G-10222	172G-10222
599-10223 *			100 (86)	171E-10223	172E-10223	171F-10223	172F-10223	171G-10223	172G-10223
599-10224			63 (54)	171E-10224	172E-10224	171F-10224	172F-10224	171G-10224	172G-10224
599-10225 *			250 (215)	171E-10225	172E-10225	171F-10225	172F-10225	171G-10225	172G-10225

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

\*\* When ordered as an assembly, the actuator is provided with 6-inch (152 mm) wires.

\*\*\*Fail-safe ball valve assemblies fail to A►AB open and B►AB closed.

## Typical Specifications


Ball valves shall have female NPT type fittings and shall be 1/2-inch to 2-inch (15 mm to 50-mm) line and ball sizes. The valves shall have a forged brass body, nickel-plated brass ball, and reinforced EPDM O-ring seals. Valves may contain a glass-filled polymer flow optimizer to provide a modified 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>Static Pressure</b>	360 psi (2482 kPa)	<b>Ball Seals</b>	Reinforced Teflon® seals with EPDM O-rings
<b>Media Temperature</b>	35°F to 250°F (2°C to 120°C)	<b>End Connections</b>	Female NPT
<b>Controlled Medium</b>	Water, glycol solutions to 50%	<b>Stem</b>	Brass
<b>Body</b>	Forged Brass ASTM B283	<b>Stem Seals</b>	EPDM O-rings
<b>Ball</b>	Nickel-plated brass ball	<b>Angle of Rotation</b>	0° to 90°
<b>Flow Optimizer</b>	Glass-filled polymer		

**Table 3. Two-Way, Full-Port (no Flow Optimizer) Ball Valve Product Numbers and Flow Coefficients.**

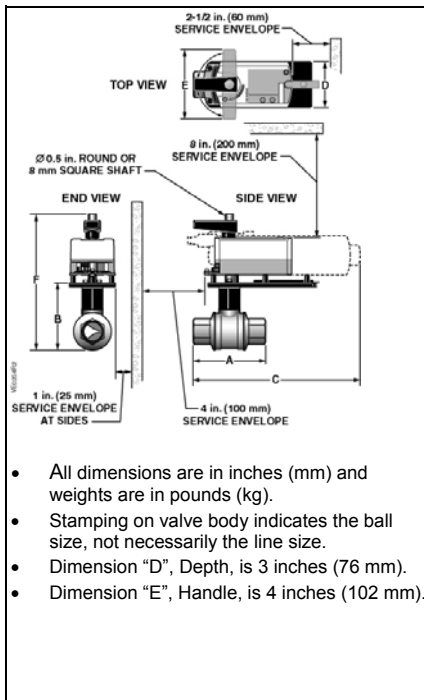
Valve Line Size in Inches (mm)	Valve Product Number	Effective (Installed) Cv (Kvs)										
		Supply Line Size in Inches (mm)										
		1/2 (13)	3/4 (20)	1 (25)	1-1/4 (32)	1-1/2 (38)	2 (51)	2-1/2 (63)	3 (76)	4 (102)	5 (127)	6 (152)
1/2 (15)	599-10208	10.00 (8.62)	6.94 (5.93)	6.19 (5.29)	—	—	—	—	—	—	—	—
3/4 (20)	599-10210	—	25.00 (21.55)	18.66 (15.95)	15.35 (13.12)	—	—	—	—	—	—	—
1 (25)	599-10214	—	—	63.00 (54.31)	39.78 (34.00)	33.56 (28.69)	—	—	—	—	—	—
1-1/4 (30)	599-10217	—	—	—	100.00 (86.21)	69.19 (59.13)	51.45 (43.98)	—	—	—	—	—
1-1/2 (40)	599-10219	—	—	—	—	63.00 (54.31)	55.34 (47.30)	51.00 (43.59)	—	—	—	—
	599-10221	—	—	—	—	160.00 (137.93)	93.80 (80.17)	76.34 (65.25)	—	—	—	—
2 (50)	599-10223	—	—	—	—	—	100.00 (86.21)	94.30 (80.60)	86.12 (73.61)	—	—	—
	599-10225	—	—	—	—	—	250.00 (215.52)	187.47 (160.23)	140.26 (119.88)	—	—	—

 = Valve may be oversized.

 = Optimal valve size.

 = Valve may be undersized.
**Table 4. Dimensions.**

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



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

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Document No. 154-038  
 Country of Origin: US  
**Page 3**

## 599 Series 3-Way Ball Valves

### Description

The 599 Series three-way Ball Valves are coupled with OpenAir™ actuators to provide modified equal percentage flow control. The Ball Valves are 1/4-turn rotary control valves.


### 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 3-digit prefix code, a hyphen, and a 5-digit suffix code. The prefix specifies an actuator. The suffix specifies the valve body.

### Features

- Universal mounting plate
- Leak-proof shutoff
- 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 *	Line Size Inches (mm)	Close-Off ΔP in psi (kPa)	Cv (Kvs)	Fail-in-Place			
							
				Control & Actuator Prefix Code			
				3-Position		0 to 10 Vdc,	
				GDE131.1P 171A	GLB131.1P 171B	GDE131.1Q 173A	GLB131.1Q 173B
12-inch (.3m) Wires		Conduit Adapter & 6-ft (1.8m) Wires		12-inch (.3m) Wires		Conduit Adapter & 6-ft (1.8m) Wires	
599-10250	1/2 (15)	50 (345)	0.4 (0.34)	171A-10250	173A-10250	171C-10250	173C-10250
599-10251			0.63 (0.54)	171A-10251	173A-10251	171C-10251	173C-10251
599-10252			1.0 (0.86)	171A-10252	173A-10252	171C-10252	173C-10252
599-10253			2.5 (2.2)	171A-10253	173A-10253	171C-10253	173C-10253
599-10254			4 (3.5)	171A-10254	173A-10254	171C-10254	173C-10254
599-10255 *	3/4 (20)		10 (8.6)	171A-10255	173A-10255	171C-10255	173C-10255
599-10256 *			16 (14)	171A-10256	173A-10256	171C-10256	173C-10256
599-10257	1 (25)		10 (8.6)	171A-10257	173A-10257	171C-10257	173C-10257
599-10258			16 (14)	171A-10258	173A-10258	171C-10258	173C-10258
599-10259 *			25 (22)	171A-10259	173A-10259	171C-10259	173C-10259
599-10260	1-1/4 (30)	40 (276)	16 (14)	171A-10260	173A-10260	171C-10260	173C-10260
599-10261 *			40 (35)	171A-10261	173A-10261	171C-10261	173C-10261
599-10262	1-1/2 (40)		16 (14)	171B-10262	173B-10262	171D-10262	173D-10262
599-10263			25 (22)	171B-10263	173B-10263	171D-10263	173D-10263
599-10264 *			63 (54)	171B-10264	173B-10264	171D-10264	173D-10264
599-10265	2 (50)		25 (22)	171B-10265	173B-10265	171D-10265	173D-10265
599-10266			40 (35)	171B-10266	173B-10266	171D-10266	173D-10266
599-10267 *			100 (86)	171B-10267	173B-10267	171D-10267	173D-10267

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


### 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, nickel-plated brass ball, and EPDM O-ring seals. Valves may contain a glass-filled polymer flow optimizer to provide a modified 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>Static Pressure</b>	360 psi (2482 kPa)
<b>Controlled Medium and Temperature</b>	Water, glycol solutions to 50% 35°F to 250°F (2°C to 121°C)
<b>Body</b>	Forged Brass ASTM B283
<b>Flow Optimizer</b>	Glass-filled polymer
<b>Ball</b>	Nickel-plated brass ball
<b>Ball Seals</b>	Reinforced PTFE seals with EPDM O-rings
<b>Stem Seals</b>	EPDM O-rings
<b>Stem and Female End Connections</b>	Brass
<b>Angle of Rotation</b>	0 to 90°

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

Valve Body Product Number *	Line Size Inches (mm)	Close-Off ΔP in psi (kPa)	Cv (Kvs)	Fail-Safe		
						
				Control & Actuator Prefix Code **		
				2-Position, GMA121.1P 171E	3-Position, GMA131.1U 171F	0 to 10 Vdc, GMA161.1P 171G
599-10250	1/2 (15)	50 (345)	0.4 (0.34)	171E-10250	171F-10250	171G-10250
599-10251			0.63 (0.54)	171E-10251	171F-10251	171G-10251
599-10252			1.0 (0.86)	171E-10252	171F-10252	171G-10252
599-10253			2.5 (2.2)	171E-10253	171F-10253	171G-10253
599-10254			4 (3.5)	171E-10254	171F-10254	171G-10254
599-10255 *	3/4 (20)	50 (345)	10 (8.6)	171E-10255	171F-10255	171G-10255
599-10256 *			16 (14)	171E-10256	171F-10256	171G-10256
599-10257			10 (8.6)	171E-10257	171F-10257	171G-10257
599-10258	1 (25)	50 (345)	16 (14)	171E-10258	171F-10258	171G-10258
599-10259 *			25 (22)	171E-10259	171F-10259	171G-10259
599-10260	1-1/4 (30)	40 (276)	16 (14)	171E-10260	171F-10260	171G-10260
599-10261 *			40 (35)	171E-10261	171F-10261	171G-10261
599-10262	1-1/2 (40)		16 (14)	171E-10262	171F-10262	171G-10262
599-10263			25 (22)	171E-10263	171F-10263	171G-10263
599-10264 *			63 (54)	171E-10264	171F-10264	171G-10264
599-10265	2 (50)	25 (22)	171E-10265	171F-10265	171G-10265	
599-10266		40 (35)	171E-10266	171F-10266	171G-10266	
599-10267 *		100 (86)	171E-10267	171F-10267	171G-10267	

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

\*\* When ordered as an assembly, the actuator is provided with 6-inch (152mm) wires.

**Table 2. 3-Way, Full-Port (no Flow Optimizer) Ball Valve Product Numbers and Flow Coefficients.**

Valve Line Size in Inches (mm)	Valve 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)	599-10255	10.00 (8.62)	6.94 (5.93)	6.19 (5.29)	--	--	--	--	--	--	--	--
3/4 (20)	599-10256	--	16.00 (13.79)	13.9 (11.98)	12.4 (10.69)	--	--	--	--	--	--	--
1 (25)	599-10259	--	--	25.00 (21.55)	22.5 (19.40)	21.2 (18.27)	--	--	--	--	--	--
1-1/4 (30)	599-10261	--	--	--	40.00 (34.48)	36.9 (31.81)	33.3 (28.70)	--	--	--	--	--
1-1/2 (40)	599-10264	--	--	--	--	63.00 (54.31)	55.3 (47.67)	51.00 (43.96)	--	--	--	--
2 (50)	599-10267	--	--	--	--	--	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.**

Line Size In. (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)	599-10250 through 599-10255	3-1/2 (89)	7 (178)	7-5/8 (194)	3-1/4 (83)	2-3/8 (60)	9-3/8 (238)	1.60 (0.73)
3/4 (20)	599-10256	2-3/4 (70)	6-1/2 (165)	7-1/8 (181)	3-1/4 (83)	2 (51)	8-3/4 (222)	1.64 (0.74)
1 (25)	599-10257	3 (76)	6-3/4 (171)	7-3/8 (187)	3-3/4 (95)	2-1/2 (64)	9-3/4 (248)	2.26 (1.03)
	599-10258	4-1/2 (114)	7-3/4 (197)	8-3/8 (213)	4 (102)	3-1/4 (83)	10-3/4 (273)	3.56 (1.61)
	599-10259	4-1/2 (114)	7-3/4 (197)	8-3/8 (213)	4 (102)	3-1/4 (83)	10-3/4 (273)	3.56 (1.61)
1-1/4 (30)	599-10260	3-5/8 (91)	7-1/4 (184)	7-7/8 (200)	4 (102)	2-3/4 (70)	10-1/4 (260)	3.50 (1.59)
	599-10261	3-5/8 (91)	7-1/4 (184)	7-7/8 (200)	4 (102)	2-3/4 (70)	10-1/4 (260)	3.50 (1.59)
1-1/2 (40)	599-10262	4-1/2 (114)	7-3/4 (197)	8-3/8 (213)	4 (102)	3-1/4 (83)	10-3/4 (273)	3.56 (1.61)
	599-10263	4 (102)	7-1/4 (184)	7-7/8 (200)	4-1/2 (114)	3-1/4 (83)	11 (279)	5.16 (2.34)
	599-10264	4 (102)	7-1/4 (184)	7-7/8 (200)	4-1/2 (114)	3-1/4 (83)	11 (279)	5.16 (2.34)
2 (50)	599-10265	4 (102)	7-1/4 (184)	7-7/8 (200)	4-1/2 (114)	3-1/4 (83)	11 (279)	5.16 (2.34)
	599-10266	5 (127)	7-3/4 (197)	8-3/8 (213)	5-3/4 (146)	3-3/4 (95)	12-1/4 (311)	8.50 (3.86)
	599-10267	5 (127)	7-3/4 (197)	8-3/8 (213)	5-3/4 (146)	3-3/4 (95)	12-1/4 (311)	8.50 (3.86)

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

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