

SIEMENS

599 Series

Technical Instructions

Document No. 155-703P25

VF 599-9

July 7, 2014

2-Way Ball Valves



Description



The 599 Series 2-way Ball Valves are coupled with OpenAir™ actuators to provide equal percentage 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.
- Blow-out proof stem withstands high pressure.
- Universal mounting plate.
- Actuator and plate can be rotated (90 degree increments).
- Standoffs provide a thermal barrier between the actuator and the mounting plate.
- Operating handle for manual operation.

Application

Ball valves can control hot or chilled water and up to 50% water-glycol solution in air handling units, convectors, fan coil units, unit conditioners, radiators, and reheat coils.

| | | |
|-----------------|---|---|
| WARNING: |  | Personal injury or loss of life may occur if you do not perform a procedure as specified. |
| CAUTION: |  | Equipment damage may occur if you do not perform a procedure as specified. |

Product Numbers

See Table 2 through Table 10.

Accessories/Kits

- | | |
|-----------|---|
| 599-10078 | Ball Valve Bracket Kit (includes bracket, mounting screws, shaft and handle) |
| 599-10080 | Ball Valve Weather Shield (provides NEMA 3R protection) |

| | | |
|-----------------------|--------------------------------------|--|
| Specifications | Body | Brass: ASTM B283, C37700 |
| | Ball | Chrome-plated brass or stainless steel |
| | Material | |
| | Ball seals | Glass filled PTFE with EPDM O-rings |
| | Flow characterizer | Glass filled PTFE |
| | End connections | Female NPT |
| | Stem | Brass or stainless steel |
| | Stem seals | EPDM O-rings |
| Operating | Valve body rating | ANSI 250/600 WOG |
| | Media temperature | 35°F to 250°F (2°C to 121°C) |
| | Controlled medium | Water, water-glycol solutions to 50% |
| | Angle of rotation | 0° to 90° |
| | Close-off rating | 200 psi (ANSI Class IV) |
| Miscellaneous | Canadian Registration Number | OC8213.5ADD4 |
| | Mounting location | NEMA 1 (interior only) NEMA 3R (with weathershield) |
| | Dimensions, service envelope, weight | See Figure 5 and Table 12. |

Ordering a Valve/Actuator Assembly

To order a complete valve plus actuator assembly from the factory, combine an actuator prefix code (see Table 1) with the suffix of the valve assembly product number.

Table 1. Actuator Prefix Codes.

| Actuator Prefix Code | OpenAir Actuator * | Control |
|----------------------|--------------------|---|
| 171A | GDE131.1P | Floating, fail-in-place |
| 171B | GLB131.1P | Floating, fail-in-place |
| 171C | GDE161.1P | 0 to 10 Vdc, fail-in-place |
| 171D | GLB161.1P | 0 to 10 Vdc, fail-in-place |
| 171E | GMA121.1P | 2-position, fail-safe, normally open |
| 171F | GMA131.1P | Floating, fail-safe, normally open |
| 171G | GMA161.1P | 0 to 10 Vdc, fail-safe, normally open |
| 171H | GQD121.1P | 2-position, fail-safe, normally open |
| 171J | GQD131.1P | Floating, fail-safe, normally open |
| 171K | GQD151.1P | 2 to 10 Vdc fail-safe, normally open |
| 171L | GQD221.1U | 120V, 2-position, fail-safe, normally open |
| 171M | GMA221.1U | 120V, 2-position, fail-safe, normally open |
| 171N | GQD126.1P | 2-position, fail-safe, normally open, dual auxiliary switches |
| 171P | GMA126.1P | 2-position, fail-safe, normally open, dual auxiliary switches |
| 172E | GMA121.1P | 2-position, fail-safe, normally closed |
| 172F | GMA131.1P | Floating, fail-safe, normally closed |
| 172G | GMA161.1P | 0 to 10 Vdc, fail-safe, normally closed |
| 172H | GQD121.1P | 2-position, fail-safe, normally closed |
| 172J | GQD131.1P | Floating, fail-safe, normally closed |
| 172K | GQD151.1P | 2 to 10 Vdc fail-safe, normally closed |
| 172L | GQD221.1U | 120V, 2-position, fail-safe, normally closed |
| 172M | GMA221.1U | 120V, 2-position, fail-safe, normally closed |
| 172N | GQD126.1P | 2-position, fail-safe, normally closed, dual auxiliary switches |

| Actuator Prefix Code | OpenAir Actuator * | Control |
|----------------------|--------------------|---|
| 172P | GMA126.1P | 2-position, fail-safe, normally closed, dual auxiliary switches |
| 173A | GDE131.1Q** | Floating, fail-in-place |
| 173B | GLB131.1Q** | Floating, fail-in-place |
| 173C | GDE161.1Q** | 0 to 10 Vdc, fail-in-place |
| 173D | GLB161.1Q** | 0 to 10 Vdc, fail-in-place |

*When ordered as an assembly, the actuator is provided with 3-foot (.9 m) wires.

**When ordered as an assembly, the actuator is provided with conduit adapter and 6-foot (1.8 m) wires.

See TB253 *599 Series Ball Valve and Actuator Assemblies Selection Technical Bulletin* (155-704P25) for complete selection procedures and ordering numbers for both two-way and three-way ball valve assemblies.

Individual two-way ball valves can be ordered using the product numbers in Table 2 through Table 5 for valves with a chrome-plated ball and brass stem or Table 6 through Table 9 for valves with stainless steel ball and stem.

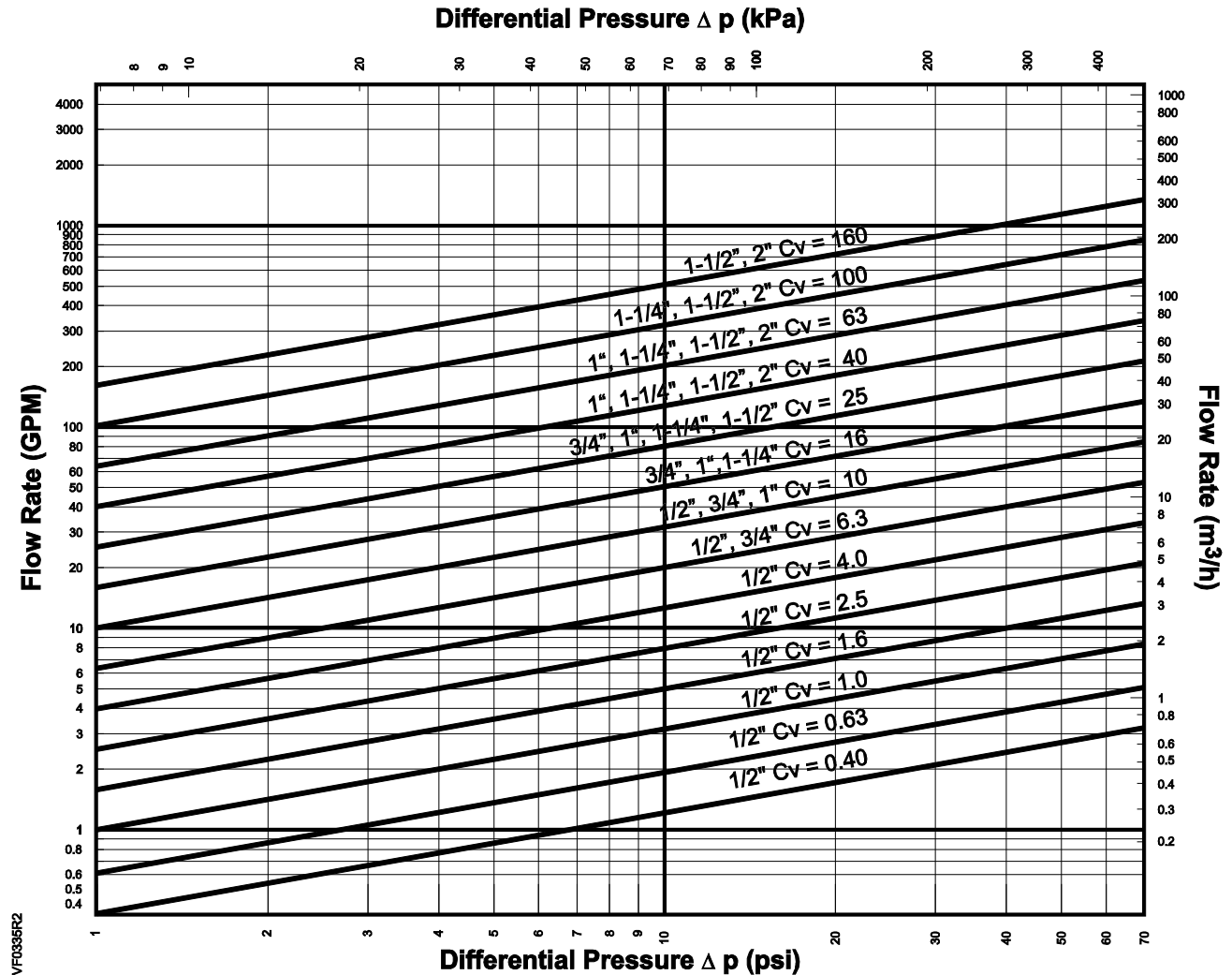




Figure 1.

Table 2. Fail-In-Place Assemblies: Chrome-Plated Ball with Brass Stem.

| Valve Body Product Number * | Valve Size Inches (mm) | Flow Rate Cv (Kvs) | Close-Off ΔP in psi (kPa) | Fail-in-Place | | | | | | | |
|-----------------------------|------------------------|--------------------|---------------------------|--|-------------|--|-------------|--------------------|------------|--|------------|
| | | | |  | | | | | | | |
| | | | | Floating | | | | 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 |
| | | | | 3 foot (.9 m) Wires | | Conduit Adapter & 6-foot (1.8 m) Wires | | 3 foot (.9m) Wires | | Conduit Adapter & 6-foot (1.8 m) Wires | |
| | | | | Actuator Prefix Code | | | | | | | |
| 171A | 171B | 173A | 173B | 171C | 171D | 173C | 173D | | | | |
| 599-10300 | 1/2 (15) | 0.4 (0.34) | 200 (1379) | 171A-10300 | 173A-10300 | 171C-10300 | 173C-10300 | | | | |
| 599-10301 | | 0.63 (0.54) | | 171A-10301 | 173A-10301 | 171C-10301 | 173C-10301 | | | | |
| 599-10302 | | 1.0 (0.9) | | 171A-10302 | 173A-10302 | 171C-10302 | 173C-10302 | | | | |
| 599-10303 | | 1.6 (1.4) | | 171A-10303 | 173A-10303 | 171C-10303 | 173C-10303 | | | | |
| 599-10304 | | 2.5 (2.2) | | 171A-10304 | 173A-10304 | 171C-10304 | 173C-10304 | | | | |
| 599-10305 | | 4.0 (3.4) | | 171A-10305 | 173A-10305 | 171C-10305 | 173C-10305 | | | | |
| 599-10306 | | 6.3 (5.4) | | 171A-10306 | 173A-10306 | 171C-10306 | 173C-10306 | | | | |
| 599-10307* | | 10 (8.6) | | 171A-10307* | 173A-10307* | 171C-10307* | 173C-10307* | | | | |
| 599-10308 | 3/4 (20) | 6.3 (5.4) | | 171A-10308 | 173A-10308 | 171C-10308 | 173C-10308 | | | | |
| 599-10309 | | 10 (8.6) | | 171A-10309 | 173A-10309 | 171C-10309 | 173C-10309 | | | | |
| 599-10310 | | 16 (14) | | 171A-10310 | 173A-10310 | 171C-10310 | 173C-10310 | | | | |
| 599-10311* | | 25 (22) | | 171A-10311* | 173A-10311* | 171C-10311* | 173C-10311* | | | | |
| 599-10312 | 1 (25) | 10 (9.0) | | 171A-10312 | 173A-10312 | 171C-10312 | 173C-10312 | | | | |
| 599-10313 | | 16 (14) | | 171A-10313 | 173A-10313 | 171C-10313 | 173C-10313 | | | | |
| 599-10314 | | 25 (22) | | 171A-10314 | 173A-10314 | 171C-10314 | 173C-10314 | | | | |
| 599-10315 | | 40 (34) | | 171A-10315 | 173A-10315 | 171C-10315 | 173C-10315 | | | | |
| 599-10316* | | 63 (54) | | 171A-10316* | 173A-10316* | 171C-10316* | 173C-10316* | | | | |
| 599-10317 | | 1-1/4 (32) | | 16 (14) | 171A-10317 | 173A-10317 | 171C-10317 | 173C-10317 | | | |
| 599-10318 | 25 (22) | | | 171A-10318 | 173A-10318 | 171C-10318 | 173C-10318 | | | | |
| 599-10319 | 40 (34) | | | 171A-10319 | 173A-10319 | 171C-10319 | 173C-10319 | | | | |
| 599-10320 | 63 (54) | | | 171A-10320 | 173A-10320 | 171C-10320 | 173C-10320 | | | | |
| 599-10321* | 100 (90) | | | 171A-10321* | 173A-10321* | 171C-10321* | 173C-10321* | | | | |
| 599-10322 | 1-1/2 (40) | 25 (22) | | 171B-10322 | 173B-10322 | 171D-10322 | 173D-10322 | | | | |
| 599-10323 | | 40 (34) | | 171B-10323 | 173B-10323 | 171D-10323 | 173D-10323 | | | | |
| 599-10324* | | 63 (54) | | 171B-10324* | 173B-10324* | 171D-10324* | 173D-10324* | | | | |
| 599-10325 | | 100 (90) | | 171B-10325 | 173B-10325 | 171D-10325 | 173D-10325 | | | | |
| 599-10326* | | 160 (140) | | 171B-10326* | 173B-10326* | 171D-10326* | 173D-10326* | | | | |
| 599-10327 | | 2 (50) | | 40 (34) | 171B-10327 | 173B-10327 | 171D-10327 | 173D-10327 | | | |
| 599-10328 | 63 (54) | | | 171B-10328 | 173B-10328 | 171D-10328 | 173D-10328 | | | | |
| 599-10329* | 100 (90) | | | 171B-10329* | 173B-10329* | 171D-10329* | 173D-10329* | | | | |
| 599-10330* | 160 (140) | | 171B-10330* | 173B-10330* | 171D-10330* | 173D-10330* | | | | | |


* Denotes a full-port valve without flow characterizer insert.

Table 3. Fail-Safe Assemblies: Chrome-Plated Ball with Brass Stem (1/2-Inch and 3/4-Inch).

| Valve Body Product Number* | Valve Size Inches (mm) | Flow Rate Cv (Kvs) | Close-off ΔP in psi (kPa) | Fail-Safe | | | | | | | |
|----------------------------|------------------------|--------------------|---------------------------|---|-------------|-----------------------|-------------|--------------------------|-------------|------|--|
| | | | |  | | | | | | | |
| | | | | 2-Position GQD121.1P | | Floating GQD131.1P | | 2 to 10 Vdc GQD151.1P | | | |
| | | | | N.O. | N.C. | N.O. | N.C. | N.O. | N.C. | | |
| | | | | Actuator Prefix Code | | | | | | | |
| 171H | | 172H | | 171J | | 172J | | 171K | | 172K | |
| 599-10300 | 1/2 (15) | 0.4 (0.34) | 200 (1379) | 171H-10300 | 172H-10300 | 171J-10300 | 172J-10300 | 171K-10300 | 172K-10300 | | |
| 599-10301 | | 0.63 (0.54) | | 171H-10301 | 172H-10301 | 171J-10301 | 172J-10301 | 171K-10301 | 172K-10301 | | |
| 599-10302 | | 1.0 (0.9) | | 171H-10302 | 172H-10302 | 171J-10302 | 172J-10302 | 171K-10302 | 172K-10302 | | |
| 599-10303 | | 1.6 (1.4) | | 171H-10303 | 172H-10303 | 171J-10303 | 172J-10303 | 171K-10303 | 172K-10303 | | |
| 599-10304 | | 2.5 (2.2) | | 171H-10304 | 172H-10304 | 171J-10304 | 172J-10304 | 171K-10304 | 172K-10304 | | |
| 599-10305 | | 4.0 (3.4) | | 171H-10305 | 172H-10305 | 171J-10305 | 172J-10305 | 171K-10305 | 172K-10305 | | |
| 599-10306 | | 6.3 (5.4) | | 171H-10306 | 172H-10306 | 171J-10306 | 172J-10306 | 171K-10306 | 172K-10306 | | |
| 599-10307* | 10 (8.6) | 171H-10307* | | 172H-10307* | 171J-10307* | 172J-10307* | 171K-10307* | 172K-10307* | | | |
| 599-10308 | 3/4 (20) | 6.3 (5.4) | | 171H-10308 | 172H-10308 | 171J-10308 | 172J-10308 | 171K-10308 | 172K-10308 | | |
| 599-10309 | | 10 (8.6) | | 171H-10309 | 172H-10309 | 171J-10309 | 172J-10309 | 171K-10309 | 172K-10309 | | |
| 599-10310 | | 16 (14) | | 171H-10310 | 172H-10310 | 171J-10310 | 172J-10310 | 171K-10310 | 172K-10310 | | |
| 599-10311* | | 25 (22) | | 171H-10311* | 172H-10311* | 171J-10311* | 172J-10311* | 171K-10311* | 172K-10311* | | |



*Denotes a full-port valve without flow characterizer insert.

Table 4. Fail-Safe Assemblies: Chrome-Plated Ball with Brass Stem (1-Inch to 2-Inch).

| Valve Body Product Number * | Valve Size Inches (mm) | Flow Rate Cv (Kvs) | Close-off ΔP in psi (kPa) | Fail-Safe | | | | | | | |
|-----------------------------|------------------------|--------------------|---------------------------|--|-------------|-----------------------|-------------|--------------------------|-------------|------|--|
| | | | |  | | | | | | | |
| | | | | 2-Position GMA121.1P | | Floating GMA131.1P | | 0 to 10 Vdc GMA161.1P | | | |
| | | | | N.O. | N.C. | N.O. | N.C. | N.O. | N.C. | | |
| | | | | Actuator Prefix Code | | | | | | | |
| 171E | | 172E | | 171F | | 172F | | 171G | | 172G | |
| 599-10312 | 1 (25) | 10 (9.0) | 200 (1379) | 171E-10312 | 172E-10312 | 171F-10312 | 172F-10312 | 171G-10312 | 172G-10312 | | |
| 599-10313 | | 16 (14) | | 171E-10313 | 172E-10313 | 171F-10313 | 172F-10313 | 171G-10313 | 172G-10313 | | |
| 599-10314 | | 25 (22) | | 171E-10314 | 172E-10314 | 171F-10314 | 172F-10314 | 171G-10314 | 172G-10314 | | |
| 599-10315 | | 40 (34) | | 171E-10315 | 172E-10315 | 171F-10315 | 172F-10315 | 171G-10315 | 172G-10315 | | |
| 599-10316* | | 63 (54) | | 171E-10316* | 172E-10316* | 171F-10316* | 172F-10316* | 171G-10316* | 172G-10316* | | |
| 599-10317 | 1-1/4 (32) | 16 (14) | | 171E-10317 | 172E-10317 | 171F-10317 | 172F-10317 | 171G-10317 | 172G-10317 | | |
| 599-10318 | | 25 (22) | | 171E-10318 | 172E-10318 | 171F-10318 | 172F-10318 | 171G-10318 | 172G-10318 | | |
| 599-10319 | | 40 (34) | | 171E-10319 | 172E-10319 | 171F-10319 | 172F-10319 | 171G-10319 | 172G-10319 | | |
| 599-10320 | | 63 (54) | | 171E-10320 | 172E-10320 | 171F-10320 | 172F-10320 | 171G-10320 | 172G-10320 | | |
| 599-10321* | | 100 (90) | | 171E-10321* | 172E-10321* | 171F-10321* | 172F-10321* | 171G-10321* | 172G-10321* | | |
| 599-10322 | 1-1/2 (40) | 25 (22) | | 171E-10322 | 172E-10322 | 171F-10322 | 172F-10322 | 171G-10322 | 172G-10322 | | |
| 599-10323 | | 40 (34) | | 171E-10323 | 172E-10323 | 171F-10323 | 172F-10323 | 171G-10323 | 172G-10323 | | |
| 599-10324* | | 63 (54) | | 171E-10324* | 172E-10324* | 171F-10324* | 172F-10324* | 171G-10324* | 172G-10324* | | |
| 599-10325 | | 100 (90) | | 171E-10325 | 172E-10325 | 171F-10325 | 172F-10325 | 171G-10325 | 172G-10325 | | |
| 599-10326* | | 160 (140) | | 171E-10326* | 172E-10326* | 171F-10326* | 172F-10326* | 171G-10326* | 172G-10326* | | |
| 599-10327 | 2 (50) | 40 (34) | | 171E-10327 | 172E-10327 | 171F-10327 | 172F-10327 | 171G-10327 | 172G-10327 | | |
| 599-10328 | | 63 (54) | | 171E-10328 | 172E-10328 | 171F-10328 | 172F-10328 | 171G-10328 | 172G-10328 | | |
| 599-10329* | | 100 (90) | | 171E-10329* | 172E-10329* | 171F-10329* | 172F-10329* | 171G-10329* | 172G-10329* | | |
| 599-10330* | | 160 (140) | | 171E-10330* | 172E-10330* | 171F-10330* | 172F-10330* | 171G-10330* | 172G-10330* | | |


* Denotes a full-port valve without flow characterizer insert.

Table 5. Fail-Safe Assemblies: Full-Port, Chrome-Plated Ball and Brass Stem, 120V.

| Valve Body Product Number* | Valve Size Inches (mm) | Flow Rate Cv (Kvs) | Close-off ΔP in psi (kPa) | Fail-Safe, 120V | | | |
|----------------------------|------------------------|--------------------|---------------------------|---|-------------|---|-------------|
| | | | |  | |  | |
| | | | | 2-Position | | | |
| | | | | GQD221.1U | | GMA221.1U | |
| | | | | N.O. | N.C. | N.O. | N.C. |
| | | | | Actuator Prefix Code | | | |
| 171L | | 172L | | 171M | | 172M | |
| 599-10307* | 1/2 (15) | 10 (9) | 200 (1379) | 171L-10307* | 172L-10307* | — | — |
| 599-10311* | 3/4 (20) | 25 (22) | | 171L-10311* | 172L-10311* | — | — |
| 599-10316* | 1 (25) | 63 (54) | | — | — | 171M-10316* | 172M-10316* |
| 599-10321* | 1-1/4 (32) | 100 (90) | | — | — | 171M-10321* | 172M-10321* |
| 599-10326* | 1-1/2 (40) | 160 (140) | | — | — | 171M-10326* | 172M-10326* |
| 599-10330* | 2 (50) | | | — | — | 171M-10330* | 172M-10330* |


* Denotes a full-port valve without flow characterizers insert.

Table 6. Fail-In-Place Assemblies: Stainless Steel Ball and Stem.

| Valve Body Product Number * | Valve Size Inches (mm) | Flow Rate Cv (Kvs) | Close-off ΔP in psi (kPa) | Fail-in-Place | | | | | | | | | | | |
|-----------------------------|------------------------|--------------------|---------------------------|--|--------------|--|--------------|---------------------|------------|--|------------|------|--|------|--|
| | | | |  | | | | | | | | | | | |
| | | | | Floating | | | | 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 | | | | |
| | | | | 3 foot (.9 m) Wires | | Conduit Adapter & 6-foot (1.8 m) Wires | | 3 foot (.9 m) Wires | | Conduit Adapter & 6-foot (1.8 m) Wires | | | | | |
| | | | | Actuator Prefix Code | | | | | | | | | | | |
| 171A | | 171B | | 173A | | 173B | | 171C | | 171D | | 173C | | 173D | |
| 599-10300S | 1/2 (15) | 0.4 (0.34) | 200 (1379) | 171A-10300S | 173A-10300S | 171C-10300S | 173C-10300S | | | | | | | | |
| 599-10301S | | 0.63 (0.54) | | 171A-10301S | 173A-10301S | 171C-10301S | 173C-10301S | | | | | | | | |
| 599-10302S | | 1.0 (0.9) | | 171A-10302S | 173A-10302S | 171C-10302S | 173C-10302S | | | | | | | | |
| 599-10303S | | 1.6 (1.4) | | 171A-10303S | 173A-10303S | 171C-10303S | 173C-10303S | | | | | | | | |
| 599-10304S | | 2.5 (2.2) | | 171A-10304S | 173A-10304S | 171C-10304S | 173C-10304S | | | | | | | | |
| 599-10305S | | 4.0 (3.4) | | 171A-10305S | 173A-10305S | 171C-10305S | 173C-10305S | | | | | | | | |
| 599-10306S | | 6.3 (5.4) | | 171A-10306S | 173A-10306S | 171C-10306S | 173C-10306S | | | | | | | | |
| 599-10307S* | 10 (8.6) | 171A-10307S* | | 173A-10307S* | 171C-10307S* | 173C-10307S* | | | | | | | | | |
| 599-10308S | 3/4 (20) | 6.3 (5.4) | | 171A-10308S | 173A-10308S | 171C-10308S | 173C-10308S | | | | | | | | |
| 599-10309S | | 10 (8.6) | | 171A-10309S | 173A-10309S | 171C-10309S | 173C-10309S | | | | | | | | |
| 599-10310S | | 16 (14) | | 171A-10310S | 173A-10310S | 171C-10310S | 173C-10310S | | | | | | | | |
| 599-10311S* | | 25 (22) | | 171A-10311S* | 173A-10311S* | 171C-10311S* | 173C-10311S* | | | | | | | | |
| 599-10312S | 1 (25) | 10 (9.0) | | 171A-10312S | 173A-10312S | 171C-10312S | 173C-10312S | | | | | | | | |
| 599-10313S | | 16 (14) | | 171A-10313S | 173A-10313S | 171C-10313S | 173C-10313S | | | | | | | | |
| 599-10314S | | 25 (22) | | 171A-10314S | 173A-10314S | 171C-10314S | 173C-10314S | | | | | | | | |
| 599-10315S | | 40 (34) | | 171A-10315S | 173A-10315S | 171C-10315S | 173C-10315S | | | | | | | | |
| 599-10316S* | | 63 (54) | | 171A-10316S* | 173A-10316S* | 171C-10316S* | 173C-10316S* | | | | | | | | |
| 599-10317S | | 1-1/4 (32) | | 16 (14) | 171A-10317S | 173A-10317S | 171C-10317S | 173C-10317S | | | | | | | |
| 599-10318S | | | | 25 (22) | 171A-10318S | 173A-10318S | 171C-10318S | 173C-10318S | | | | | | | |
| 599-10319S | 40 (34) | | | 171A-10319S | 173A-10319S | 171C-10319S | 173C-10319S | | | | | | | | |
| 599-10320S | 63 (54) | | | 171A-10320S | 173A-10320S | 171C-10320S | 173C-10320S | | | | | | | | |
| 599-10321S* | 100 (90) | 171A-10321S* | 173A-10321S* | 171C-10321S* | 173C-10321S* | | | | | | | | | | |
| 599-10322S | 1-1/2 (40) | 25 (22) | 171B-10322S | 173B-10322S | 171D-10322S | 173D-10322S | | | | | | | | | |
| 599-10323S | | 40 (34) | 171B-10323S | 173B-10323S | 171D-10323S | 173D-10323S | | | | | | | | | |
| 599-10324S* | | 63 (54) | 171B-10324S* | 173B-10324S* | 171D-10324S* | 173D-10324S* | | | | | | | | | |
| 599-10325S | | 100 (90) | 171B-10325S | 173B-10325S | 171D-10325S | 173D-10325S | | | | | | | | | |
| 599-10326S* | 160 (140) | 171B-10326S* | 173B-10326S* | 171D-10326S* | 173D-10326S* | | | | | | | | | | |
| 599-10327S | 2 (50) | 40 (34) | 171B-10327S | 173B-10327S | 171D-10327S | 173D-10327S | | | | | | | | | |
| 599-10328S | | 63 (54) | 171B-10328S | 173B-10328S | 171D-10328S | 173D-10328S | | | | | | | | | |
| 599-10329S* | | 100 (90) | 171B-10329S* | 173B-10329S* | 171D-10329S* | 173D-10329S* | | | | | | | | | |
| 599-10330S* | | 160 (140) | 171B-10330S* | 173B-10330S* | 171D-10330S* | 173D-10330S* | | | | | | | | | |


*Denotes a full-port valve without flow characterizer insert.

Table 7. Fail-Safe Assemblies: Stainless Steel Ball and Stem (1/2-inch and 3/4-inch).

| Valve Body Product Number* | Flow Rate Cv (Kvs) | Valve Size Inches (mm) | Close-off ΔP in psi (kPa) | Fail-Safe | | | | | | | |
|----------------------------|--------------------|------------------------|---------------------------|--|--------------|--------------|--------------|--------------|--------------|-------------|--|
| | | | |  | | | | | | | |
| | | | | 2-Position | | Floating | | 2 to 10 Vdc | | | |
| | | | | GQD121.1P | | GQD131.1P | | GQD151.1P | | | |
| | | | | N.O. | N.C. | N.O. | N.C. | N.O. | N.C. | | |
| | | | | Actuator Prefix Code | | | | | | | |
| 171H | | 172H | | 171J | | 172J | | 171K | | 172K | |
| 599-10300S | 0.4 (0.34) | 1/2 (15) | 200 (1379) | 171H-10300S | 172H-10300S | 171J-10300S | 172J-10300S | 171K-10300S | 172K-10300S | | |
| 599-10301S | 0.63 (0.54) | | | 171H-10301S | 172H-10301S | 171J-10301S | 172J-10301S | 171K-10301S | 172K-10301S | | |
| 599-10302S | 1.0 (0.9) | | | 171H-10302S | 172H-10302S | 171J-10302S | 172J-10302S | 171K-10302S | 172K-10302S | | |
| 599-10303S | 1.6 (1.4) | | | 171H-10303S | 172H-10303S | 171J-10303S | 172J-10303S | 171K-10303S | 172K-10303S | | |
| 599-10304S | 2.5 (2.2) | | | 171H-10304S | 172H-10304S | 171J-10304S | 172J-10304S | 171K-10304S | 172K-10304S | | |
| 599-10305S | 4.0 (3.4) | | | 171H-10305S | 172H-10305S | 171J-10305S | 172J-10305S | 171K-10305S | 172K-10305S | | |
| 599-10306S | 6.3 (5.4) | | | 171H-10306S | 172H-10306S | 171J-10306S | 172J-10306S | 171K-10306S | 172K-10306S | | |
| 599-10307S* | 10 (8.6) | | | 171H-10307S* | 172H-10307S* | 171J-10307S* | 172J-10307S* | 171K-10307S* | 172K-10307S* | | |
| 599-10308S | 6.3 (5.4) | | | 3/4 (20) | 171H-10308S | 172H-10308S | 171J-10308S | 172J-10308S | 171K-10308S | 172K-10308S | |
| 599-10309S | 10 (8.6) | | | | 171H-10309S | 172H-10309S | 171J-10309S | 172J-10309S | 171K-10309S | 172K-10309S | |
| 599-10310S | 16 (14) | 171H-10310S | | | 172H-10310S | 171J-10310S | 172J-10310S | 171K-10310S | 172K-10310S | | |
| 599-10311S* | 25 (22) | 171H-10311S* | | | 172H-10311S* | 171J-10311S* | 172J-10311S* | 171K-10311S* | 172K-10311S* | | |



*Denotes a full-port valve without flow characterizer insert.

Table 8. Fail-Safe Assemblies: Stainless Steel Ball and Stem (1-inch to 2-inch).

| Valve Body Product Number * | Valve Size Inches (mm) | Flow Rate Cv (Kvs) | Close-off ΔP in psi (kPa) | Fail-Safe | | | | | | | |
|-----------------------------|------------------------|--------------------|---------------------------|--|--------------|--------------|--------------|--------------|--------------|-------------|--|
| | | | |  | | | | | | | |
| | | | | 2-Position | | Floating | | 0 to 10 Vdc | | | |
| | | | | GMA121.1P | | GMA131.1P | | GMA161.1P | | | |
| | | | | N.O. | N.C. | N.O. | N.C. | N.O. | N.C. | | |
| | | | | Actuator Prefix Code | | | | | | | |
| 171E | | 172E | | 171F | | 172F | | 171G | | 172G | |
| 599-10312S | 1 (25) | 10 (9.0) | 200 (1379) | 171E-10312S | 172E-10312S | 171F-10312S | 172F-10312S | 171G-10312S | 172G-10312S | | |
| 599-10313S | | 16 (14) | | 171E-10313S | 172E-10313S | 171F-10313S | 172F-10313S | 171G-10313S | 172G-10313S | | |
| 599-10314S | | 25 (22) | | 171E-10314S | 172E-10314S | 171F-10314S | 172F-10314S | 171G-10314S | 172G-10314S | | |
| 599-10315S | | 40 (34) | | 171E-10315S | 172E-10315S | 171F-10315S | 172F-10315S | 171G-10315S | 172G-10315S | | |
| 599-10316S* | | 63 (54) | | 171E-10316S* | 172E-10316S* | 171F-10316S* | 172F-10316S* | 171G-10316S* | 172G-10316S* | | |
| 599-10317S | 1-1/4 (32) | 16 (14) | | 171E-10317S | 172E-10317S | 171F-10317S | 172F-10317S | 171G-10317S | 172G-10317S | | |
| 599-10318S | | 25 (22) | | 171E-10318S | 172E-10318S | 171F-10318S | 172F-10318S | 171G-10318S | 172G-10318S | | |
| 599-10319S | | 40 (34) | | 171E-10319S | 172E-10319S | 171F-10319S | 172F-10319S | 171G-10319S | 172G-10319S | | |
| 599-10320S | | 63 (54) | | 171E-10320S | 172E-10320S | 171F-10320S | 172F-10320S | 171G-10320S | 172G-10320S | | |
| 599-10321S* | | 100 (90) | | 171E-10321S* | 172E-10321S* | 171F-10321S* | 172F-10321S* | 171G-10321S* | 172G-10321S* | | |
| 599-10322S | | 25 (22) | | 171E-10322S | 172E-10322S | 171F-10322S | 172F-10322S | 171G-10322S | 172G-10322S | | |
| 599-10323S | 1-1/2 (40) | 40 (34) | | 171E-10323S | 172E-10323S | 171F-10323S | 172F-10323S | 171G-10323S | 172G-10323S | | |
| 599-10324S* | | 63 (54) | | 171E-10324S* | 172E-10324S* | 171F-10324S* | 172F-10324S* | 171G-10324S* | 172G-10324S* | | |
| 599-10325S | | 100 (90) | | 171E-10325S | 172E-10325S | 171F-10325S | 172F-10325S | 171G-10325S | 172G-10325S | | |
| 599-10326S* | | 160 (140) | | 171E-10326S* | 172E-10326S* | 171F-10326S* | 172F-10326S* | 171G-10326S* | 172G-10326S* | | |
| 599-10327S | | 40 (34) | | 171E-10327S | 172E-10327S | 171F-10327S | 172F-10327S | 171G-10327S | 172G-10327S | | |
| 599-10328S | | 2 (50) | | 63 (54) | 171E-10328S | 172E-10328S | 171F-10328S | 172F-10328S | 171G-10328S | 172G-10328S | |
| 599-10329S* | 100 (90) | | | 171E-10329S* | 172E-10329S* | 171F-10329S* | 172F-10329S* | 171G-10329S* | 172G-10329S* | | |
| 599-10330S* | 160 (140) | | | 171E-10330S* | 172E-10330S* | 171F-10330S* | 172F-10330S* | 171G-10330S* | 172G-10330S* | | |



* Denotes a full-port valve without flow characterizer insert.

Table 9. Fail-Safe Assemblies: Full-Port, Stainless Steel Ball and Stem, 120V.

| Valve Body Product Number* | Valve Size Inches (mm) | Flow Rate Cv (Kvs) | Close-off ΔP in psi (kPa) | Fail-Safe, 120V | | | |
|----------------------------|------------------------|--------------------|-----------------------------------|---|--------------|---|--------------|
| | | | |  | |  | |
| | | | | 2-Position | | | |
| | | | | GQD221.1U | | GMA221.1U | |
| | | | | N.O. | N.C. | N.O. | N.C. |
| | | | | Actuator Prefix Code | | | |
| 171L | 172L | 171M | 172M | | | | |
| 599-10307S* | 1/2 (15) | 10 (9) | 200 (1379) | 171L-10307S* | 172L-10307S* | — | — |
| 599-10311S* | 3/4 (20) | 25 (22) | | 171L-10311S* | 172L-10311S* | — | — |
| 599-10316S* | 1 (25) | 63 (54) | | — | — | 171M-10316S* | 172M-10316S* |
| 599-10321S* | 1-1/4 (32) | 100 (90) | | — | — | 171M-10321S* | 172M-10321S* |
| 599-10326S* | 1-1/2 (40) | 160 (140) | | — | — | 171M-10326S* | 172M-10326S* |
| 599-10330S* | 2 (50) | | | — | — | 171M-10330S* | 172M-10330S* |

* Denotes a full-port valve without flow characterizers insert.

Table 10. Fail-Safe Assemblies: Full-Port, Stainless Steel Ball and Stem, 24V with Dual Auxiliary Switches.

| Valve Body Product Number* | Valve Size Inches (mm) | Flow Rate Cv (Kvs) | Close-off ΔP in psi (kPa) | Fail-Safe, 24V | | | |
|----------------------------|------------------------|--------------------|-----------------------------------|--|--------------|--|--------------|
| | | | |  | |  | |
| | | | | 2-Position | | | |
| | | | | GQD126.1P | | GMA126.1P | |
| | | | | N.O. | N.C. | N.O. | N.C. |
| | | | | Actuator Prefix Code | | | |
| 171N | 172N | 171P | 172P | | | | |
| 599-10307S* | 1/2 (15) | 10 (9) | 200 (1379) | 171N-10307S* | 172N-10307S* | — | — |
| 599-10311S* | 3/4 (20) | 25 (22) | | 171N-10311S* | 172N-10311S* | — | — |
| 599-10316S* | 1 (25) | 63 (54) | | — | — | 171P-10316S* | 172P-10316S* |
| 599-10321S* | 1-1/4 (32) | 100 (90) | | — | — | 171P-10321S* | 172P-10321S* |
| 599-10326S* | 1-1/2 (40) | 160 (140) | | — | — | 171P-10326S* | 172P-10326S* |
| 599-10330S* | 2 (50) | | | — | — | 171P-10330S* | 172P-10330S* |

* Denotes a full-port valve without flow characterizer insert.

NOTE: Use Table 11 to determine the effective Cv when using a full-port ball valve where the ball size and the line sizes differ.

Table 11. Full-Port (No Flow Characterizer) 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) | 599-10307 599-10307S | 10.00 (8.62) | 6.94 (5.93) | 6.19 (5.29) | — | — | — | — | — | — | — | — |
| 3/4 (20) | 599-10311 599-10311S | — | 25.00 (21.55) | 18.66 (15.95) | 15.35 (13.12) | — | — | — | — | — | — | — |
| 1 (25) | 599-10316 599-10316S | — | — | 63.00 (54.31) | 39.78 (34.00) | 33.56 (28.69) | — | — | — | — | — | — |
| 1-1/4 (32) | 599-10321 599-10321S | — | — | — | 100.00 (86.21) | 69.19 (59.13) | 51.45 (43.98) | — | — | — | — | — |
| 1-1/2 (40) | 599-10324 599-10324S | — | — | — | — | 63.00 (54.31) | 55.34 (47.30) | 51.00 (43.59) | — | — | — | — |
| | 599-10326 599-10326S | — | — | — | — | 160.00 (137.93) | 93.80 (80.17) | 76.34 (65.25) | — | — | — | — |
| 2 (50) | 599-10329 599-10329S | — | — | — | — | — | 100.00 (86.21) | 94.30 (80.60) | 86.12 (73.61) | — | — | — |

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

Operation

The parabolic shape of the flow characterizer orifice (Figure 2) 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 3) mirrors the flow characteristic of a coil, resulting in linear heat transfer.

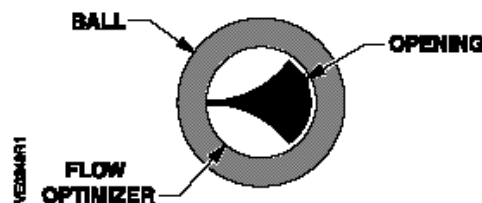


Figure 2. Ball Valve Flow Characterizer.

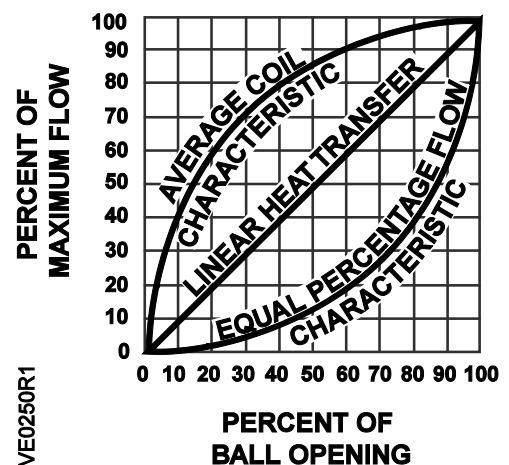


Figure 3. Ball Valve Equal Percentage Flow Control.

Mounting and Installation

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

For added flexibility, the actuator mounting plate can be installed in any of the four (4) rotation angles relative to the valve body.

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 pipe in any position between vertical and 90°.

The ball valve also can be installed vertically.



CAUTION:

Do not install the valve assembly so that the actuator is below horizontal or upside-down.

See *Ball Valve Bracket Kit Installation Instructions* 129-496 for complete and proper installation and mounting instructions.

Allow sufficient space for servicing the valve and actuator. See Figure 5 and Table 12 for valve body dimensions and service envelope.

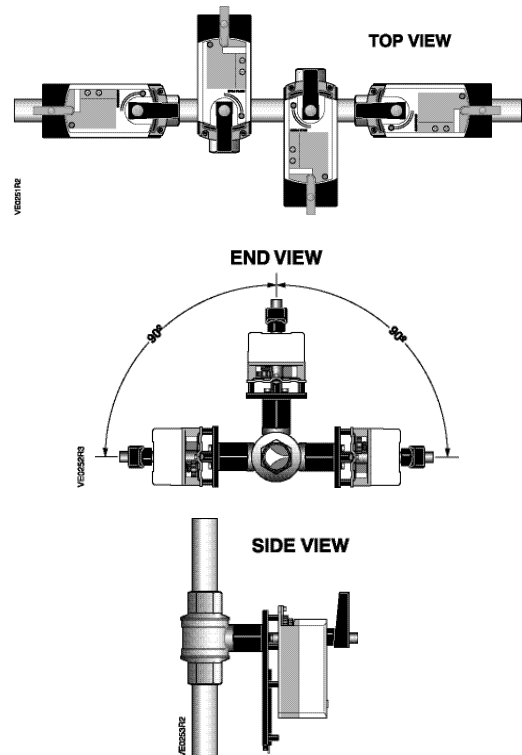


Figure 4. Mounting Positions.

Service

Replace the valve or actuator if inoperable.

Dimensions

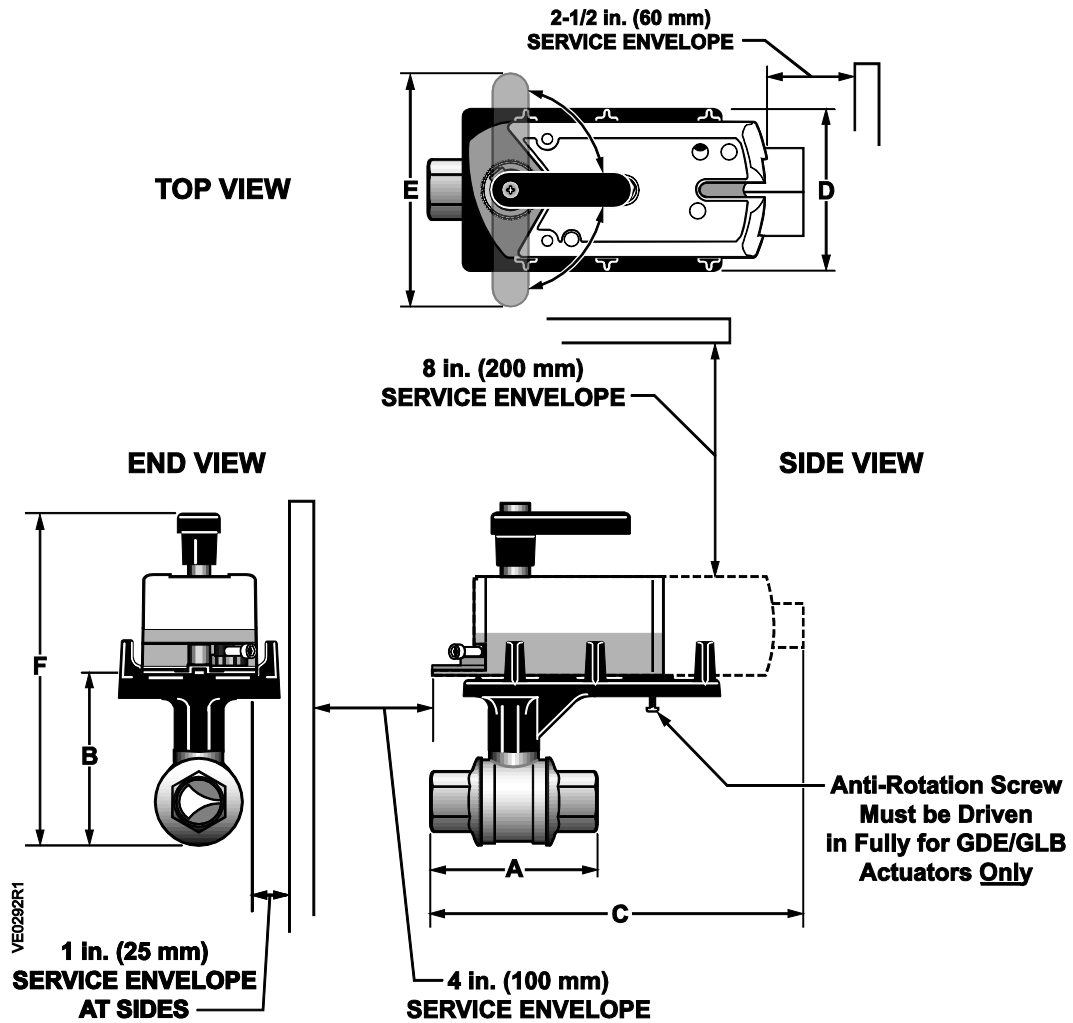


Figure 5. Dimensions with Actuator Mounted on Bracket.

NOTES:

- All dimensions are in inches (mm) and weights are in pounds (kg).
- Dimension D, Depth, is 3.7 inches (94.5mm).
- Dimension E, Handle, is 5.3 inches (135.9 mm).

Dimensions, Continued

Table 12. Dimensions in Inches (Millimeters) and Weights in Pounds (Kg).

| Line Size Inch (mm) | Cv Range | A Length | C Length * Actuator Codes 171A-D, 173A-D GDE/GLB | C Length * Actuator Codes 171H,J,K,L, N GQD | C Length* Actuator Codes 171E,F,G,M,P 172E,F,G,M,P Fail-Safe GMA | F Height | Valve and Bracket Weight lbs (kg) |
|---------------------------|--------------|---------------|--|---|---|---------------|--|
| 1/2 (15) | 0.4 to 10.0 | 2-7/16 (61) | 6-11/16 (170) | 6 (153) | – | 7-5/8 (193) | 1.1 (0.50) |
| 3/4 (20) | 6.3 to 25 | 2-3/4 (70) | | 6 (153) | – | 8 (203) | 1.4 (0.60) |
| 1 (25) | 10 | 3 (77) | | – | 8 (203) | 8 (203) | 1.6 (0.73) |
| | 16, 40, 63 | 3-1/4 (82) | | – | 8-3/8 (213) | 8-5/16 (212) | 1.8 (0.82) |
| | 25 | 3-7/8 (98) | | 7 (178) | – | 8-11/16 (221) | 8-13/16 (223) |
| 1-1/4 (32) | 16 | 3-3/8(86) | | 6-11/16 (170) | – | 8-7/16 (214) | 8-3/8 (213) |
| | 25 to 100 | 3-11/16 (94) | 6-15/16 (176) | – | 8-11/16 (221) | 8-13/16 (223) | 2.5 (1.1) |
| 1-1/2 (40) | 25, 63 | 3-5/8 (92) | | – | 8-7/16 (214) | 8-13/16 (223) | 1.8 (0.82) |
| | 40, 100, 160 | 3-15/16 (100) | | 7-1/16 (180) | – | 8-3/4 (223) | 9-1/4 (235) |
| 2 (50) | 40, 100 | 4 (102) | – | | 9-3/8 (238) | | 3.1 (1.41) |
| | 63 | 4-5/8 (118) | – | | 9-1/8 (223) | 10-1/16 (255) | 5.25 (2.38) |
| | 160 | | 7-1/2 (190) | – | | | 5.3 (2.40) |

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

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