

Three-Way, Plated Brass Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators with Switches

Description

VG1000 Series Ball Valves are designed to regulate the flow of hot or chilled water and, for some models, low pressure steam in response to the demand of a controller in Heating, Ventilating, and Air Conditioning (HVAC) systems. Available in sizes 1/2 through 2 in. (DN15 through DN50), this family of two-way and three-way forged brass valves is factory or field mounted to Johnson Controls® VA9104, M9106, M9109, and M9100 Series Non-Spring Return and VA2202, M9206, and M9210 Series Spring Return Electric Actuators for on/off, floating, or proportional control.

Refer to the *VG1000 Series Forged Brass Ball Valves Product Bulletin (LIT-977132)* for important product application information.

Features

- forged brass body provides 580 psig static pressure rating
- chrome-plated brass ball and stem assembly standard — handles both chilled water and hot water applications with a fluid temperature range of 23 to 203°F (-5 to 95°C)
- graphite reinforced Polytetrafluoroethylene (PTFE) Seats include 15% graphite-reinforced ball seals, providing better wear resistance
- 500:1 rangeability provides accurate control under all load conditions
- maintenance-free design performs without failure in excess of 200,000 full stroke cycles in iron-oxide contaminated water



Three-Way, Spring Return, Plated Brass Ball and Stem Ball Valve Assemblies with End Switches

Repair Information

If the VG1000 Series Ball Valve fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls representative.

Selection Charts

Three-Way – Spring Return Counterclockwise – Port A (Coil) Open – with End Switches¹

| Valve | Size, in. | Cv | Closeoff psig | AC 24 V | | | AC 120 V |
|----------|-----------|------------------------|-----------------|---|---|---|---|
| | | | | Floating | DC 0 to 10 V Proportional | On/Off | On/Off |
| | | | | VA2202-AGB-2 M9206-AGC-2S M9210-AGC-3 | VA2202-GGB-2 M9206-GGB-2S M9210-GGB-3 | VA2202-BGB-2 M9206-BGB-2S M9210-BGC-3 | VA2202-BAB-2 M9206-BAB-2S M9210-BAC-3 |
| VG1841AD | 1/2 | 1.2/0.7 ² | 200 | VG1841AD+22TAGB | VG1841AD+22TGGB | VG1841AD+22TBGB | VG1841AD+22TBAB |
| VG1841AE | | 1.9/1.2 ² | | VG1841AE+22TAGB | VG1841AE+22TGGB | VG1841AE+22TBGB | VG1841AE+22TBAB |
| VG1841AF | | 2.9/1.9 ² | | VG1841AF+22TAGB | VG1841AF+22TGGB | VG1841AF+22TBGB | VG1841AF+22TBAB |
| VG1841AG | | 4.7/2.9 ² | | VG1841AG+22TAGB | VG1841AG+22TGGB | VG1841AG+22TBGB | VG1841AG+22TBAB |
| VG1841AL | | 7.4/4.7 ² | | VG1841AL+22TAGB | VG1841AL+22TGGB | VG1841AL+22TBGB | VG1841AL+22TBAB |
| VG1841AN | 11.7/5.8 | VG1841AN+22TAGB | VG1841AN+22TGGB | VG1841AN+22TBGB | VG1841AN+22TBAB | | |
| VG1841BG | 3/4 | 4.7/2.9 ² | 200 | VG1841BG+22TAGB | VG1841BG+22TGGB | VG1841BG+22TBGB | VG1841BG+22TBAB |
| VG1841BL | | 7.4/4.7 ² | | VG1841BL+22TAGB | VG1841BL+22TGGB | VG1841BL+22TBGB | VG1841BL+22TBAB |
| VG1841BN | | 11.7/5.8 | | VG1841BN+22TAGB | VG1841BN+22TGGB | VG1841BN+22TBGB | VG1841BN+22TBAB |
| VG1841CL | 1 | 7.4/4.7 ² | 200 | VG1841CL+936AGC | VG1841CL+936GGC | VG1841CL+936BGB | VG1841CL+936BAB |
| VG1841CN | | 11.7/7.4 ² | | VG1841CN+936AGC | VG1841CN+936GGC | VG1841CN+936BGB | VG1841CN+936BAB |
| VG1841CP | | 18.7/9.4 | | VG1841CP+936AGC | VG1841CP+936GGC | VG1841CP+936BGB | VG1841CP+936BAB |
| VG1841DN | 1-1/4 | 11.7/7.4 ² | 200 | VG1841DN+936AGC | VG1841DN+936GGC | VG1841DN+936BGB | VG1841DN+936BAB |
| VG1841DP | | 18.7/9.4 ² | | VG1841DP+936AGC | VG1841DP+936GGC | VG1841DP+936BGB | VG1841DP+936BAB |
| VG1841DR | | 29.2/14.6 | | VG1841DR+936AGC | VG1841DR+936GGC | VG1841DR+936BGB | VG1841DR+936BAB |
| VG1841EP | 1-1/2 | 18.7/11.7 ² | 200 | VG1841EP+936AGC | VG1841EP+936GGC | VG1841EP+936BGB | VG1841EP+936BAB |
| VG1841ER | | 29.2/14.6 ² | | VG1841ER+936AGC | VG1841ER+936GGC | VG1841ER+936BGB | VG1841ER+936BAB |
| VG1841ES | | 46.8/23.4 | | VG1841ES+936AGC | VG1841ES+936GGC | VG1841ES+936BGB | VG1841ES+936BAB |
| VG1841FR | 2 | 29.2/18.7 ² | 200 | VG1841FR+92JAGC | VG1841FR+92JGGC | VG1841FR+92JBGC | VG1841FR+92JBAC |
| VG1841FS | | 46.8/29.2 ² | | VG1841FS+92JAGC | VG1841FS+92JGGC | VG1841FS+92JBGC | VG1841FS+92JBAC |
| VG1841FT | | 73.7/36.8 | | VG1841FT+92JAGC | VG1841FT+92JGGC | VG1841FT+92JBGC | VG1841FT+92JBAC |

1. VA2202-xxB and M9206-BxB have a single end switch. M9206-xGC and M9210-xGC have two end switches.

2. Cv has a characterizing disk.

VG1000 Series Three-Way, Plated Brass Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators with Switches (Continued)

Three-Way – Spring Return Clockwise – Port B (Bypass) Open – with End Switches¹

| Valve | Size, in. | Cv | Closeoff psig | 24 VAC | | | 120 VAC |
|----------|-----------|------------------------|---------------|---|---|---|---|
| | | | | Floating | 0 to 10 VDC Proportional | On/Off | On/Off |
| | | | | VA2202-AGB-2 M9206-AGC-2S M9210-AGC-3 | VA2202-GGB-2 M9206-GGB-2S M9210-GGB-3 | VA2202-BGB-2 M9206-BGB-2S M9210-BGC-3 | VA2202-BAB-2 M9206-BAB-2S M9210-BAC-3 |
| VG1841AD | 1/2 | 1.2/0.7 ² | 200 | VG1841AD+24TAGB | VG1841AD+24TGGB | VG1841AD+24TBGB | VG1841AD+24TBAB |
| VG1841AE | | 1.9/1.2 ² | | VG1841AE+24TAGB | VG1841AE+24TGGB | VG1841AE+24TBGB | VG1841AE+24TBAB |
| VG1841AF | | 2.9/1.9 ² | | VG1841AF+24TAGB | VG1841AF+24TGGB | VG1841AF+24TBGB | VG1841AF+24TBAB |
| VG1841AG | | 4.7/2.9 ² | | VG1841AG+24TAGB | VG1841AG+24TGGB | VG1841AG+24TBGB | VG1841AG+24TBAB |
| VG1841AL | | 7.4/4.7 ² | | VG1841AL+24TAGB | VG1841AL+24TGGB | VG1841AL+24TBGB | VG1841AL+24TBAB |
| VG1841AN | | 11.7/5.8 | | VG1841AN+24TAGB | VG1841AN+24TGGB | VG1841AN+24TBGB | VG1841AN+24TBAB |
| VG1841BG | 3/4 | 4.7/2.9 ² | 200 | VG1841BG+24TAGB | VG1841BG+24TGGB | VG1841BG+24TBGB | VG1841BG+24TBAB |
| VG1841BL | | 7.4/4.7 ² | | VG1841BL+24TAGB | VG1841BL+24TGGB | VG1841BL+24TBGB | VG1841BL+24TBAB |
| VG1841BN | | 11.7/5.8 | | VG1841BN+24TAGB | VG1841BN+24TGGB | VG1841BN+24TBGB | VG1841BN+24TBAB |
| VG1841CL | 1 | 7.4/4.7 ² | 200 | VG1841CL+956AGC | VG1841CL+956GGC | VG1841CL+956BGB | VG1841CL+956BAB |
| VG1841CN | | 11.7/7.4 ² | | VG1841CN+956AGC | VG1841CN+956GGC | VG1841CN+956BGB | VG1841CN+956BAB |
| VG1841CP | | 18.7/9.4 | | VG1841CP+956AGC | VG1841CP+956GGC | VG1841CP+956BGB | VG1841CP+956BAB |
| VG1841DN | 1-1/4 | 11.7/7.4 ² | 200 | VG1841DN+956AGC | VG1841DN+956GGC | VG1841DN+956BGB | VG1841DN+956BAB |
| VG1841DP | | 18.7/9.4 ² | | VG1841DP+956AGC | VG1841DP+956GGC | VG1841DP+956BGB | VG1841DP+956BAB |
| VG1841DR | | 29.2/14.6 | | VG1841DR+956AGC | VG1841DR+956GGC | VG1841DR+956BGB | VG1841DR+956BAB |
| VG1841EP | 1-1/2 | 18.7/11.7 ² | 200 | VG1841EP+956AGC | VG1841EP+956GGC | VG1841EP+956BGB | VG1841EP+956BAB |
| VG1841ER | | 29.2/18.7 ² | | VG1841ER+956AGC | VG1841ER+956GGC | VG1841ER+956BGB | VG1841ER+956BAB |
| VG1841ES | | 46.8/23.4 | | VG1841ES+956AGC | VG1841ES+956GGC | VG1841ES+956BGB | VG1841ES+956BAB |
| VG1841FR | 2 | 29.2/18.7 ² | 200 | VG1841FR+94JAGC | VG1841FR+94JGGC | VG1841FR+94JBGC | VG1841FR+94JBAC |
| VG1841FS | | 46.8/29.2 ² | | VG1841FS+94JAGC | VG1841FS+94JGGC | VG1841FS+94JBGC | VG1841FS+94JBAC |
| VG1841FT | | 73.7/36.8 | | VG1841FT+94JAGC | VG1841FT+94JGGC | VG1841FT+94JBGC | VG1841FT+94JBAC |

1. VA2202-xxB and M9206-BxB have a single end switch. M9206-xGC and M9210-xGC have two end switches.

2. Cv has a characterizing disk.

VG1000 Series Three-Way, Plated Brass Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators with Switches (Continued)

Technical Specifications

| VG1000 Series Three-Way, Spring Return, Plated Brass Ball and Stem Ball Valve Assemblies with End Switches | | |
|--|---------------------------------|---|
| Service¹ | | Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for HVAC Systems |
| Fluid Temperature Limits | Water | 23 to 203°F (-5 to 95°C) |
| | Steam | Not Rated for Steam Service |
| Valve Body Pressure Rating | Water | 580 psig (3,996 kPa) (PN40) |
| | Steam | 15 psig (103 kPa) Saturated Steam |
| Maximum Closeoff Pressure | | 200 psig (1,378 kPa) |
| Maximum Recommended Operating Pressure Drop | | 50 psi Maximum Differential Pressure for Valves with Characterized Flow Control Disk and 30 psi Maximum for Quiet Service Ball Valves |
| Flow Characteristics | Three-Way | Equal Percentage Flow Characteristics of In-line Port A (Coil) and Linear Flow Characteristics of Angle Port B (Bypass) |
| Rangeability² | | Greater than 500:1 |
| Minimum Ambient Operating Temperature | -25°F (-32°C) | M9206 Series Spring Return Actuators |
| | -22°F (-30°C) | VA2202 and M2202 Series Spring Return Actuators |
| | -40°F (-40°C) | M9210 Series Spring Return Actuators |
| Maximum Ambient Operating Temperature³(Limited by the Actuator and Linkage) | Direct Mount | 122°F (50°C): VA2202 Series Spring Return Actuators |
| | M2000-500 Linkage | 122°F (50°C): M2202 Series Spring Return Actuators |
| | M9000-520 Linkage | 140°F (60°C): M9206 Series Spring Return Actuators |
| | M9000-51x Series Linkage | 131°F (55°C): M9210 Series Spring Return Actuators |
| Leakage | | 0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4, for Characterized Port |
| | | 1% of Maximum Flow for Three-Way Bypass Port |
| End Connections | | National Pipe Thread (NPT) |
| Materials | Body | Forged Brass |
| | Ball | Chrome-Plated Brass |
| | Blowout-Proof Stem | Nickel-Plated Brass |
| | Seats | Graphite-Reinforced Polytetrafluoroethylene (PTFE) with Ethylene Propylene Diene Monomer (EPDM) O-Ring Backing |
| | Stem Seals | EPDM Double O-Rings |
| | Characterizing Disk | Amodel® As-1145hs Polyphthalamide Resin |

1. Refer to VDI 2035 Standard for recommended proper water treatment.

2. Rangeability is defined as the ratio of maximum controllable flow to minimum controllable flow.

3. In steam applications, install the valve with the stem horizontal to the piping, and wrap the valve and piping with insulation.