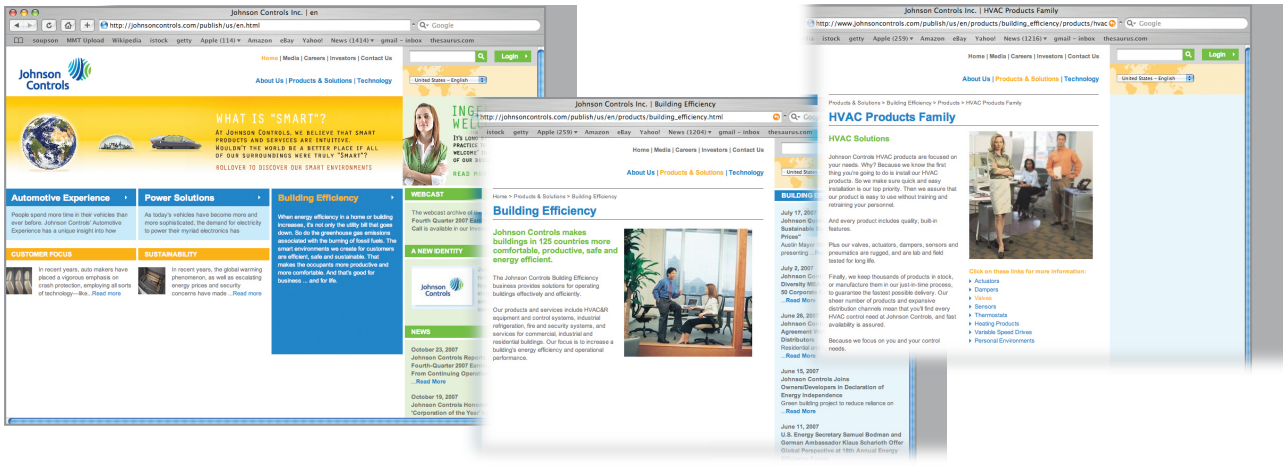


Valves and Actuators Catalog

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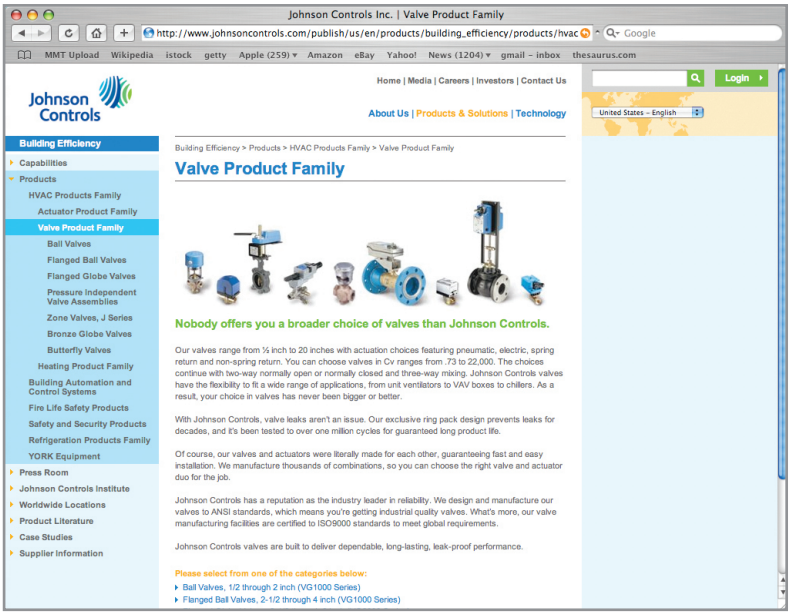
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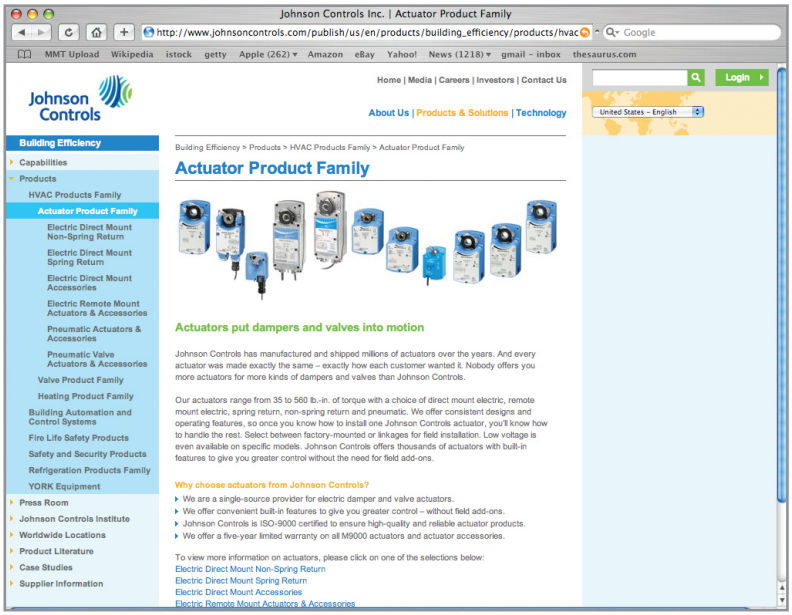
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Johnson Controls

M9102-xGA-2S, -3S and M9104-xGA-2S, -3S Series LIT-1900247

Electric Non-spring Return Actuators

Description

The M9102 and M9104 Series Actuators are direct-mount, non-spring return electric actuators that operate on AC 24 V power. These synchronous motor-driven actuators provide floating control (AGA), floating control with automatic shut-off (IGA), and proportional control with selectable DC 0...10 V or DC 2...10 V (GGA). The -2S models are equipped with plenum cables, and the -3S models are equipped with terminal blocks.

All models are compact in size, and are easily installed on Variable Air Volume (VAV) boxes, Variable Volume and Temperature (VVT) two-position zone applications, or small- to medium-sized dampers with a round shaft up to 1/2 in. (13 mm) in diameter or a 3/8 in. (10 mm) square shaft.

The M9102 Series Electric Non-Spring Return Actuators provide a running torque of 18 lb·in (2 N·m), and the nominal travel time is 30 seconds at 60 Hz (36 seconds at 50 Hz) for 90° of rotation. The M9104 Series Electric Non-Spring Return Acuators provide a running torque of 35 lb·in (4 N·m), and the nominal travel time is 60 seconds at 60 Hz (72 seconds at 50 Hz) for 90° of rotation.

Features

- simple direct coupling reduces installation and commissioning time and improves reliability by eliminating damper linkages; single screw coupling provides three-point shaft gripping.
- small, compact design allows installation in tight-fitting locations designed for zone damper actuator applications
- on-off, floating and proportional control inputs
- 30 or 60 second running time at 60 Hz
- long life brushless synchronous drive motor technology provides constant running time independent of load
- 18 lb-in (2 Nm) and 35 lb-in (4 Nm) torque rating
- whisper quiet 35 dBA noise rating
- magnetic clutch provides over torque protection over the entire range of rotation
- -4 to 125 °F (-20 to 52 ° C) ambient temperature rating
- 100,000 full stroke cycle, 1,500,000 reposition rating
- manual gear release simplifies setup and field adjustments
- position feedback (GGX models) provides simple, closed-loop control with accurate position sensing

Applications

The M9102 and M9104 Series Electric Non-Spring Return Actuators are designed to position balancing, control, round, and zone dampers in Heating, Ventilating, and Air Conditioning (HVAC) systems. These electric actuators are also designed to position blades in a VAV box, or they can be used in VVT two-position zone applications. Each actuator mounts directly to the surface in any convenient orientation using a single No. 10 self-drilling sheet metal screw (included with the actuator). No additional linkages or couplers are required. Electrical connections on the actuator are clearly labeled to simplify installation.



M9104 Series
Electric Non-spring Return Actuator

Repair Information

If the M9102/M9104 Electric Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Selection Charts

M9102-xGA-2S, -3S and M9104-xGA-2S, -3S Series Electric Non-spring Return Actuators

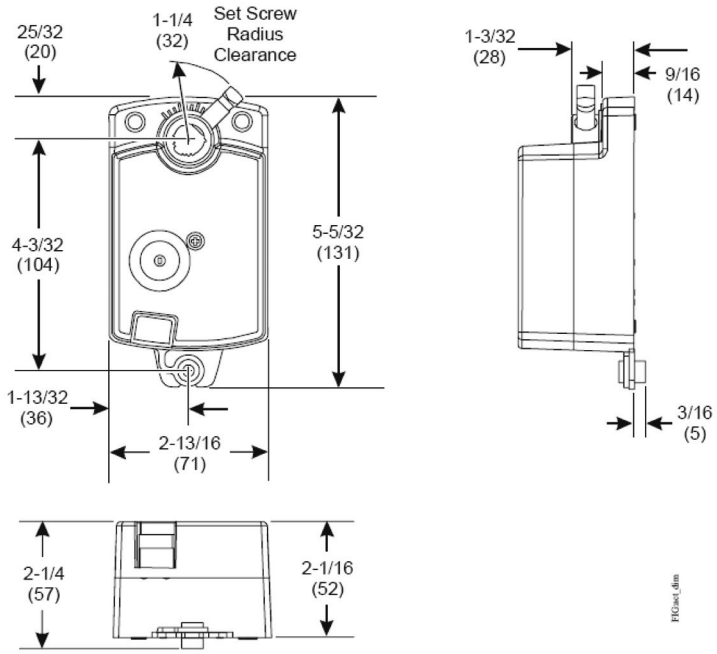
Code Number	Control Type	Torque / Timing / Voltage	Auxiliary Switches	Comments
M9102-AGA-2S	Floating without Timeout	18 lb-in (2 Nm) 30 second at 60 Hz AC 24 V 50/60 Hz	None	48 in. (1.2 m) 18 AWG UL CMP Plenum Cable
M9102-AGA-3S				M3 Screw Terminals
M9102-IGA-2S	On-Off / Floating with Timeout			48 in. (1.2 m) 18 AWG UL CMP Plenum Cable
M9102-IGA-3S				M3 Screw Terminals
M9104-AGA-2S	Floating without Timeout	35 lb-in (4 Nm) 60 second at 60 Hz AC 24 V 50/60 Hz	None	48 in. (1.2 m) 18 AWG UL CMP Plenum Cable
M9104-AGA-3S				M3 Screw Terminals
M9104-IGA-2S	On-Off / Floating with Timeout			48 in. (1.2 m) 18 AWG UL CMP Plenum Cable
M9104-IGA-3S				M3 Screw Terminals
M9104-GGA-2S	DC 0(2)…10V DC 0(4)…20 mA Proportional			48 in. (1.2 m) 18 AWG UL CMP Plenum Cable
M9104-GGA-3S				M3 Screw Terminals

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M9102-xGA-2S, -3S and M9104-xGA-2S, -3S Series Electric Non-spring Return Actuators (Continued)

Accessories for M9102/M9104 Electric Actuators

Code Number	Description
DMPR-KC003	Square Head Blade Pin Extension without Bracket
DMPR-KC010	Adjustable Blade Position Indicator Switch Kit with total switching load limited to 2000 VA for the following applications: Pilot Duty: AC 24 V, 50 VA; AC 125/250/277 V, 125 VA Motor Load: AC 125/250/277 V, 1/3 hp Resistive Load: AC 125 V, 11 A; AC 250 V, 8 A; AC 277 V, 7 A (all maximum values)
DMPR-KC011	Hex Head Blade Pin Extension without Bracket
DMPR-KC012	Hex Head Blade Pin Extension with Bracket
DMPR-KR003	Sleeve Pin Kit for use with Johnson Controls round dampers with a 5/16 in. (8 mm) shaft; furnished with the damper and may be ordered separately
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators



M9102/M9104 Series Electric Non-Spring Return Actuator Dimensions, in. (mm)

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M9102-xGA-2S, -3S and M9104-xGA-2S, -3S Series Electric Non-spring Return Actuators (Continued)

Technical Specifications

M9102-xGA-2S, -3S and M9104-xGA-2S, -3S Series Electric Non-spring Return Actuators	
Power Requirement	AGA: AC 19...30 V at 50/60 Hz, 2.1 VA supply, Class 2 IGA: AC 19...30 V at 50/60 Hz, 3.0 VA supply, Class 2 GGA: AC 19...30 V at 50/60 Hz, 3.6 VA supply, Class 2
Control Type	AGA: Floating IGA: On-Off / Floating GGA: DC 0(2)…10 V or DC 0(4)…20 mA proportional
Input Signal	AGx: AC 19...30 V at 50/60 Hz IGA: AC 19...30 V at 50/60 Hz GGA: DC 0(2)...10 V GGA: DC 0(4)...20 mA with 500 ohm field supplied resistor
Input Signal Adjustments	AGx: CW and COM Terminals, CW rotation; CCW and COM Terminals, CCW rotation GGx Selectable DC 0(2)...10 V Factory Setting: DC 0...10 V, CW rotation with signal increase Action is selectable Direct (CW) or Reverse (CCW) with signal increase.
Input Impedance	AGA: 250 Ohm (30 second model), 200 Ohm (60 second model) IGA: 250 Ohm (30 second model), 200 Ohm (60 second model) GGA: Voltage Input, 150,000 ohms
Feedback Signal	GGx: DC 0...10 V or DC 2...10 V for 90° (10 VDC at 1 mA); Corresponds to input signal span selection
Auxiliary Switch Rating	No auxiliary switches are available
Torque Rating	M9102: 18 lb·in (2 N·m) M9104: 35 lb·in (4 N·m)
Cycle Life	100,000 full cycles; 2,500,000 repositions rated at 80 lb·in (9 N·m)
Audible Noise Rating	35 dBA maximum at 39.4 in. (1 m)
Rotation Range	93°, CW or CCW
Rotation Time	M9102: 30 seconds at 60 Hz and 36 seconds at 50 Hz for 90° M9104: 60 seconds at 60 Hz and 72 seconds at 50 Hz for 90°
Electrical Connection	M910x-xGA-2S: 48 in. (1.2 m) 18 AWG UL CMP Plenum Cable with 1/4 in. (6 mm) Stripped Wire Leads M910x-xGA-3S: M3 Screw Terminals
Mechanical Connection	3/8 to 1/2 in. (10 to 12.7 mm) round shaft or 3/8 in. (10 mm) square shaft
Enclosure Rating	M910x-xGA-2S: NEMA 2, IP42 M910x-xGA-3S: NEMA 1, IP40
Ambient Operating Rating	-4 to 140°F (-20 to 60°C); 90% RH Maximum, Noncondensing
Ambient Storage Rating	-20 to 150°F (-29 to 66°C); 90% RH Maximum, Noncondensing
Shipping Weight	1.0 lb (0.5 kg)
Agency Compliance	UL Listed, File E27734, CCN XAPX (United States) and XAPX7 (Canada) Actuator Housing is Plenum Rated per CSA C22.2 No. 236/UL 1995, Heating and Cooling Equipment CE Mark, EMC Directive 89/336/EEC C-Tick Mark Australia/NZ Emissions Compliant

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M9104-AGx-2N

LIT-1922585

Electric Non-spring Return Actuators

Description

The M9104-AGA-2N synchronous motor-driven actuator provides floating (3-wire) control an is easily installed on a Variable Air Volume (VAV) box damper or a small or medium-sized damper with a round damper shaft up to 1/2 in. (13 mm) in diameter or a 3/8 in. (10 mm) square shaft. This compact, non-spring return actuator has a 35 lb·in (4 N·m) running torque and 40 lb·in (4.5 N·m) minimum stall torque in a compact, easy-to-install package. It has a nominal 90 second travel time for 90° of rotation at 60 Hz (108 seconds at 50 Hz) for 90° of rotation.

The M9104-AGS-2N Actuator/Transmitter combines an M9104-AGA-2N with a pre-wired DPT-2015 Differential Pressure Transmitter that has a 0 to 1.5 inch W.C. (0 to 374 Pa) differential pressure range.

Features

- 30 dBA rating meets audible noise requirements for open ceilings
- synchronous drive provides constant rotation time that is independent of load
- 100,000 cycle rating extends actuator life due to improved technology
- direct shaft mount with single-screw coupler simplifies installation and provides 3-point shaft gripping
- magnetic clutch provides torque protection for the actuator gear train and damper
- adjustable rotation stops allow application versatility with 30 to 90° clockwise (CW) or counterclockwise (CCW) rotation
- manual gear release simplifies setup and field adjustments
- screw terminal connection makes wiring easy

Applications

The M9104-AGx-2N actuator is used to position balancing, control, round, and zone dampers in typical HVAC applications. It is also used to position the blades in a VAV box.

The actuator mounts directly to the surface of a VAV box, round damper, or small rectangular damper with a single No. 10 self-drilling sheet metal screw (included). There are no additional linkages or couplers required. Clearly labeled electrical terminals simplify installation. Refer to the damper or VAV box manufacturer's information to select the proper timing for the actuator.

When combined with a VAV controller, the actuator provides reliable, integrated damper control. See the *M9104-AGx-2N Series Electric Non-spring Return Actuators Application Note, LIT-2681110* for various configurations with and without the DPT-2015 differential pressure transmitter.

For more information, refer to the *M9104-AGx-2N Electric Non-spring Return Actuators Product Bulletin LIT-2681121*, or the *M9104-AGx-2N Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-631*.



M9104-AGA-2N

Repair Information

If the M9104-AGx-2N Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Selection Charts

M9104-AGx-2N Electric Non-spring Return Actuators

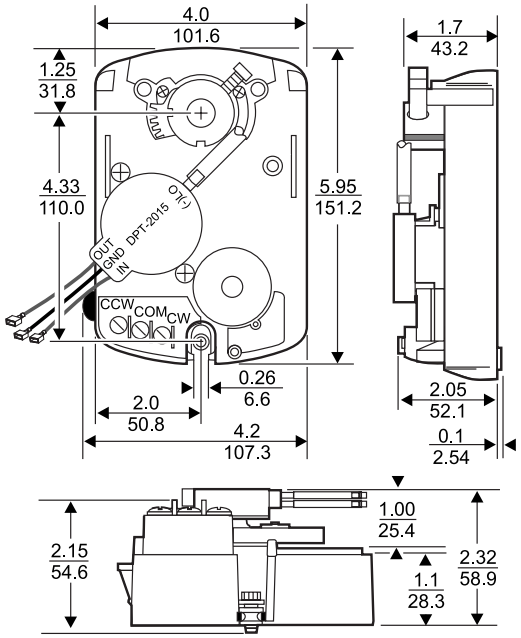
Code Number	Control Type	Torque / Timing / Voltage	Auxiliary Switches	Comments
M9104-AGA-2N	Floating	35 lb-in (4 Nm) 90 Seconds at 60 Hz AC 24 V 50/60 Hz	None	Actuator only
M9104-AGS-2N		35 lb-in (4 Nm) 90 Seconds at 60 Hz AC 24 V 50/60 Hz		Actuator includes a DPT-2015 and CBL-2000-1

Accessories for M9104-AGx-2N Actuators

Code Number	Description
CBL-2000-1	20 in. (0.5 m) wiring harness [Underwriters Laboratories, Inc.® (UL) accepted for plenum use] supplied with the M9104-AGS-2N and may be ordered separately; connects the M9104 and DPT-2015 to the VAV controller
CBL-2000-2	20 in. (0.5 m) plenum-rated wiring harness
CBL-2000-3	72 in. (1.8 m) plenum-rated wiring harness
DPT-2015-0	0 to 1.5 in. W.C. (0 to 374 Pa) differential pressure transmitter supplied with the M9104-AGS-2N and may be ordered separately
DMPR-KC003	Blade Pin Extension without Bracket supplied with CD-1300 dampers and may be ordered separately
DMPR-KR003	Sleeve Pin Kit supplied with round dampers that have a 5/16 in. (8 mm) shaft and may be ordered separately
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators.

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M9104-AGx-2N Electric Non-spring Return Actuators (Continued)



Note: All dimensions are nominal unless otherwise specified.

Dimensions, in. (mm)

Technical Specifications

M9104-AGx-2N Electric Non-spring Return Actuators	
Power Requirements	M9104-AGx-2N: 20 to 30 VAC at 50 or 60 Hz, 2.1 VA maximum, Class 2 DPT-2015: 15 VDC (14.5 to 17 VDC, unregulated); 15 mA maximum
Input Signal	M9104-AGx-2N: 24 VAC (20 to 30 VAC) at 50 or 60 Hz
Motor Input Impedance	M9104-AGx-2N: 250 ohms, nominal
DPT-2015-0	Pressure Range: 0 to 1.5 in. W.C. (0 to 374 Pa) Over Pressure Limit: 15 in. W.C. (3.74 kPa) Output Voltage: 0.5 to 4.5 VDC with 25,000 ohm minimum load impedance
Audible Noise Rating	30 dBA maximum at 1 m
Mechanical Output	Running Torque: 35 lb·in (4 N·m)
Rotation Range	Adjustable from 30 to 90°, CW or CCW
Rotation Time	Nominal 90 seconds at 60 Hz for 90°; Nominal 108 seconds at 50 Hz for 90°
Cycles	100,000 full cycles, 2,500,000 repositions rated at 35 lb·in (4 N·m)
Electrical Connection	No. 6-32 screw terminals on the M9104 actuator; 1/4 in. spade terminals on the DPT-2015
Pressure Connection	6 in. (152 mm) length of silicone tubing with barbed fittings for 1/4 in. (6.35 mm) O.D. tubing
Enclosure	NEMA 1, IP30
Ambient Operating Conditions	M9104-AGA-2N: 32 to 125°F (0 to 52°C); 90% RH maximum, non-condensing M9104-AGS-2N: 32 to 125°F (0 to 52°C); 90% RH maximum, non-condensing 60 to 100°F (16 to 38°C); 90% RH maximum, non-condensing for DPT rated accuracy (See *DPT-2015 Differential Pressure Transmitter for VAV Box Applications Installation Instructions,* Part No. 24-7547-18.)
Ambient Storage Conditions	-20 to 150°F (-29 to 66°C); 90% RH maximum, non-condensing
Dimensions (H x W x D)	M9104-AGA-2N: 5.95 x 4.2 x 2.15 in. (151.2 x 107.3 x 54.6 mm) M9104-AGS-2N: 5.95 x 4.2 x 2.32 in. (151.2 x 107.3 x 58.9 mm) with the DPT-2015
Shipping Weight	M9104-AGA-2N: 2.0 lb (0.91 kg) M9104-AGS-2N: 2.2 lb (0.99 kg) with the DPT-2015
Agency Compliance (M9104)	UL 873 Listed, File E27734, CCN XAPX CSA Certified C22.2 No. 139, File LR85083, Class 3221 02 CE Mark, EMC Directive 89/336/EEC

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M9106-xGx-2 Series

LIT-1900118

Electric Non-spring Return Actuators

Description

The M9106-xGx-2 Series direct-mount electric actuators operate on AC 24 V power and are available for use with on-off, floating, or proportional controllers. These non-spring return actuators are easily installed on a Variable Air Volume (VAV) box, a damper with a round shaft up to 1/2 inch (13 mm) in diameter or a square shaft up to 3/8 inch (10 mm). The M9106 with a M9000-520 linkage can also be used to position VG1000 series ½" (DN15) to 1-1/2" (DN40) ball valves.

The M9106 models have 53 lb·in (6 N·m) running torque. They have a nominal 60-second travel time for 90° of rotation at 60 Hz (72 seconds at 50 Hz) with a load-independent rotation time.

The M9106-xGC-2 models are available with integral auxiliary switches to perform switching functions at any angle within the selected rotation range. GGx models feature DC 0(2)...10 V position feedback, and the AGF models provide 10,000 ohm position feedback.

Features

- simple direct coupling reduces installation and commissioning time and improves reliability by eliminating damper linkages. Single screw coupling provides three-point shaft gripping.
- designed for zone damper and ball valve actuator applications
- small, compact design — allows installation in tight-fitting locations
- on-off, floating and proportional control inputs
- 60 second running time at 60 Hz
- long life brushless synchronous drive motor technology – provides constant running time independent of load
- robust 53 lb-in (6 Nm) torque rating
- whisper quiet 35 dBA noise rating
- magnetic clutch – provides over torque protection over the entire range of rotation
- -4 to 125 °F (-20 to 52 ° C) ambient temperature rating
- 100,000 full stroke cycle, 2,500,000 reposition rating
- manual gear release simplifies setup and field adjustments
- ½" NPT threaded conduit opening meets electrical code requirements and allows the use of flexible armored cable
- position feedback (GGX models) provides simple, closed-loop control with accurate position sensing.
- adjustable rotation stops allow application versatility with 30 to 90° clockwise or counterclockwise rotation

Applications

The M9106 actuators are used to position balancing, control, round, and zone dampers in typical HVAC applications. The M9106 can also be used with a M9000-520 linkage to control ½" (DN15) to 1-1/2" (DN40) VG1000 series ball valves. M9106 mounts directly on the duct surface, round damper, or small rectangular damper with an anti-rotation bracket and two sheet metal screws (included). Additional linkages or couplers are not required. Refer to the damper or VAV box manufacturer's information to select the proper timing for the actuator. Refer to the appropriate application note for specific wiring diagrams and information. For more information, refer to the *M9106-xGx-2 Electric Non-spring Return Actuators Product Bulletin, LIT-2681123* or the *M9106-xGx-2 Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-1085*.



M906-xGx-2 Series
Electric Non-spring Return Actuator

Repair Information

If the M9106-xGx-2 Electic Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Selection Charts

M9106-xGx-2 Electric Non-spring Return Actuators

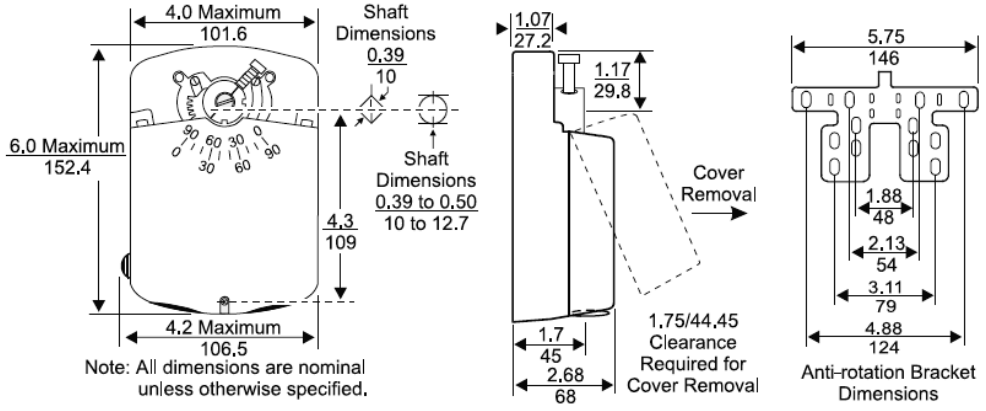
Code Number	Control Type	Torque / Voltage	Auxiliary Switches	Comments
M9106-AGA-2	Floating	53 lb-in (6 Nm) 60 sec timing at 60 Hz AC 24 V 50/60 Hz	None	
M9106-AGC-2			2-SPDT	
M9106-AGF-2	Floating with resistive feedback		None	10,000 Ohm Feedback Pot
M9106-GGA-2	DC 0(2)…10 V DC 0(4)…mA proportional		None	DC 0(2)…10 V Feedback
M9106-GGC-2			2-SPDT	
M9106-IGA-2	On-Off / Floating with timeout		None	Adjustable timing 1, 1.5, 2, 5.5 or 11 min.
M9106-IGC-2			2-SPDT	

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M9106-xGx-2 Series Electric Non-spring Return Actuators (Continued)

Accessories for M9106-xGx-2 Actuators

Code Number	Description
CBL-2000-1	20 in. (0.5 m) Wiring Harness, UL accepted for plenum use, connects the M9106 and DPT-2015 to the VAV controller
CBL-2000-2	20 in. (0.5 m) Plenum Rated Wiring Harness
CBL-2000-3	72 in. (1.8 m) Plenum Rated Wiring Harness
DPT-2015-0	0 to 1.5 in. W.C. (0 to 374 Pa) differential pressure transmitter
DMPR-KC003	Square Head Blade Pin Extension without Bracket supplied with Johnson Controls CD-1300 dampers and may be ordered separately for all direct mount applications
DMPR-KC010	Adjustable Blade Position Indicator Switch Kit with total switching load limited to 2000 VA for the following applications: Pilot Duty: AC 24 V, 50 VA; AC 125/250/277 V, 125 VA Motor Load: AC 125/250/277 V, 1/3 hp Resistive Load: AC 125 V, 11 A; AC 250 V, 8 A; AC 277 V, 7 A (all maximum values)
DMPR-KC011	Hex Head Blade Pin Extension without Bracket
DMPR-KC012	Hex Head Blade Pin Extension with Bracket
DMPR-KC213	Damper Jackshaft ½" Diameter, 1 Panel
DMPR-KC214	Damper Jackshaft ½" Diameter, 2 Panel
DMPR-KR003	Sleeve Pin Kit for use with Johnson Controls round dampers with a 5/16 in. (8 mm) shaft; Furnished with the damper and may be ordered separately
M9000-105	Pluggable 3-Terminal Block
M9000-106	Pluggable 4-Terminal Block
M9000-160	Replacement anti-rotation bracket for M9106 Series actuators
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators
M9000-520	Valve Linkage Kit for field mounting an M9106 actuator to a 1/2 in. (DN15) to 1-1/2" (DN40) VG1000 Series ball valve



Dimensions, in./mm

M9106-xGx-2 Series Electric Non-spring Return Actuators (Continued)

Technical Specifications

M9106-xGx-2 Electric Non-spring Return Actuators	
Power Requirement	AGx: AC 20...30 V at 50/60 Hz, 2.5 VA supply, Class 2 IGx: AC 20...30 V at 50/60 Hz, 2.8 VA supply, Class 2 GGx: AC 20...30 V at 50/60 Hz, 3.2 VA supply, Class 2
Control Type	AGx: Floating IGx: On-Off, Floating GGx: DC 0(2)…10 V or DC 0(4)…20 mA proportional
Input Signal	AGx and IGx: AC 20...30 V at 50/60 Hz GGx: DC 0...10 V or DC 0(4)...20 mA
Input Signal Adjustments:	AGx and IGx: CW and COM Terminals, CW rotation; CCW and COM Terminals, CCW rotation GGx (Voltage Input or Current Input): Jumper Selectable: DC 0(2) to 10 V or DC 0(4)...20 mA Factory Setting: DC 0...10 V, CW rotation with signal increase Action is jumper selectable Direct (CW) or Reverse (CCW) with signal increase.
Input Impedance	AGx: 200 ohms, nominal IGx: 160 ohms, nominal GGx: Voltage Input, 150,000 ohms; Current Input, 500 ohms
Feedback Signal	AGF: 10,000 ohm potentiometer, 1 W GGx: DC 0...10 V or DC 2...10 V for 90° (1 mA); Corresponds to input signal span selection
Auxiliary Switch Rating	xGC: Two Single-Pole, Double-Throw (SPDT) switches rated at AC 24 V, 1.5 A inductive, 3.0 A resistive, 35 VA maximum per switch, Class 2
Torque Rating	1, 1.5, and 2 min. settings: 53 lb·in (6 N·m) 5.5 and 11 min. settings: 35 lb·in (4 N·m)
Cycle Life	100,000 full cycles; 2,500,000 repositions rated at 53 lb·in (6 N·m)
Audible Noise Rating	35 dBA maximum at 39.4 in. (1 m)
Rotation Range	Adjustable from 30 to 90°, CW or CCW
Rotation Time	IGx: Adjustable with switch settings (factory set for 1 min.) 60, 90, 120, 330, or 660 sec (1, 1.5, 2, 5.5 or 11 min.) at 60 Hz and 72, 108, 144, 396, or 792 sec at 50 Hz All Other Models: Nominal 60 seconds at 60 Hz and 72 seconds at 50 Hz for 90°
Electrical Connection	1/4 in. spade terminals (To order optional pluggable terminal blocks, see Accessories chart.)
Mechanical Connection	3/8 to 1/2 in. (10 to 12.7 mm) round shaft or 3/8 in. (10 mm) square shaft
Enclosure Rating	NEMA 2, IP32
Ambient Operating Rating	-4 to 125°F (-20 to 52°C); 90% RH maximum, non-condensing
Ambient Storage Rating	IGx: -40 to 186°F (-40 to 86°C); 90% RH maximum, non-condensing All Other Models: -40 to 176°F (-40 to 80°C); 90% RH maximum, non-condensing
Shipping Weight	2.4 lb (1.08 kg)
Agency Compliance	UL 873 Listed, File E27734, CCN XAPX CSA C22.2 No. 139 Certified, File LR85083, Class 3221 02 CE Mark, EMC Directive 89/336/EEC

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M9106-AGx-2N0x Series

LIT-1900119

Electric Non-spring Return Actuators

Description

The M9106-AGA-2N0x synchronous motor-driven actuators provide floating (3-wire) control and are easily installed on a Variable Air Volume (VAV) box. They may also be installed on a small or medium-sized damper with a round shaft up to 1/2 inch (13 mm) in diameter or a 3/8 inch (10 mm) square shaft.

These compact, non-spring return actuators have 53 lb·in (6 N·m) running torque in a compact easy-to-install package. The actuators are available with either a nominal 60-second travel time at 60 Hz (72 seconds at 50 Hz) or a nominal 120-second travel time at 60 Hz (144 seconds at 50 Hz) for 90° of rotation.

The M9106-AGS-2N02 Actuator/Transmitter combines an M9106-AGA-2N02 with a prewired DPT-2015 Differential Pressure Transmitter that has a 0 to 1.5 in. W.C. (0 to 374 Pa) differential pressure range.

Features

- simple direct coupling reduces installation and commissioning time by eliminating damper linkages
- whisper quiet 35 dBA rating meets audible requirements for open ceilings
- long life brushless synchronous drive
- motor technology provides constant rotation time independent of load
- 100,000 cycle rating, 2,500,000 repositions
- direct shaft mount with single-screw coupler simplifies installation and provides 3-point shaft gripping
- magnetic clutch provides torque protection for the actuator gear train and damper
- manual gear release simplifies setup and field adjustments

Applications

The actuators are used to position balancing, control, round, and zone dampers in typical HVAC applications. They are also used to position the blades in a VAV box. The actuators mount directly to the surface of a VAV box, round damper, or small rectangular damper with a single No. 10 self-drilling sheet metal screw (included). There are no additional linkages or couplers required. Clearly labeled electrical terminals simplify installation. Refer to the damper or VAV box manufacturer's information to select the proper timing for the actuator.

Note: The damper rotation time must be defined at the controller, and the damper point definition must match the rotation time of the actuator.

When combined with a VAV controller, the actuator provides reliable integrated damper control. See the *M9106-AGx-2N0x Series Electric Non-spring Return Actuators Application Note, LIT-2681116* for various configurations with and without the DPT-2015 differential pressure transmitter.

For more information, refer to the *M9106-AGx-2N0x Electric Non-spring Return Actuators Product Bulletin, LIT-2681126* or the *M9106-AGx-2N0x Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-1077*.



M9106-AGS-2N0x Series
Electric Non-spring Return Actuator

Repair Information

If the M9106-AGS-2N0x Electic Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Selection Charts

M9106-AGx-2N0x Electric Non-spring Return Actuators

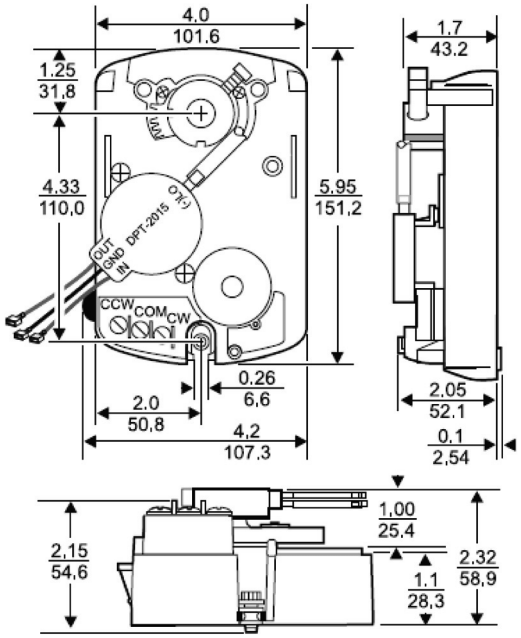
Code Number	Control Type	Torque / Timing / Voltage	Auxiliary Switches	Comments
M9106-AGA-2N01	Floating	53 lb-in (6 Nm) 60 Seconds at 60 Hz AC 24 V 50/60 Hz	None	Actuator only
M9106-AGA-2N02		53 lb-in (6 Nm) 120 Seconds at 60 Hz AC 24 V 50/60 Hz		
M9106-AGS-2N02		53 lb-in (6 Nm) 120 Seconds at 60 Hz AC 24 V 50/60 Hz		Actuator includes a DPT-2015 and CBL-2000-1

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M9106-AGx-2N0x Series Electric Non-spring Return Actuators (Continued)

Accessories for M9106-AGx-2N0x Actuators

Code Number	Description
CBL-2000-1	20 in. (0.5 m) wiring harness, UL accepted for plenum use, supplied with the M9106-AGS-2N02 and may be ordered separately; connects the M9106 and DPT-2015 to the VAV controller
CBL-2000-2	20 in. (0.5 m) plenum-rated wiring harness; Underwriters Laboratories, Inc.® (UL) accepted for plenum use; connects the M9101 and DPT-2015-0 to the VAV controller
CBL-2000-3	72 in. (1.8 m) plenum-rated wiring harness
DPT-2015-0	0 to 1.5 in. W.C. (0 to 374 Pa) differential pressure transmitter
DMPR-KC003	Blade Pin Extension without Bracket supplied with Johnson Controls CD-1300 dampers and may be ordered separately for all direct mount applications
DMPR-KC011	Hex Head Blade Pin Extension without Bracket
DMPR-KC012	Hex Head Blade Pin Extension with Bracket
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators



Dimensions, in. (mm)

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M9106-AGx-2N0x Series Electric Non-spring Return Actuators (Continued)

Technical Specifications

M9106-AGx-2N0x Electric Non-spring Return Actuators	
Power Requirement	M9106-AGA-2N01: AC 20...30 V at 50/60 Hz, 2.5 VA supply, Class 2 M9106-AGx-2N02: AC 20...30 V at 50/60 Hz, 2.1 VA supply, Class 2 DPT-2015: DC 15 V (DC 14.5...17 V) unregulated; 15 mA, maximum
Control Type	Floating
Input Signal	M9106-AGx-2N0x: 24 V (AC 20...30 V) at 50 or 60 Hz
DPT 2015-0	Pressure Range: 0 to 1.5 in. W.C. (0 to 374 Pa) Over Pressure Limit: 15 in. W.C. (3.74 kPa) Output Voltage: 0.5 to 4.5 VDC with 25,000 ohm minimum load impedance
Input Impedance	M9106-AGA-2N01: 200 ohms, nominal M9106-AGx-2N02: 250 ohms, nominal
Feedback Signal	N/A
Auxiliary Switch Rating	N/A
Torque Rating	53 lb·in. (6 N·m)
Cycle Life	100,000 full cycles; 2,500,000 repositions rated at 53 lb·in. (6 N·m)
Audible Noise Rating	35 dBA maximum at 39.4 in. (1 m)
Rotation Range	Adjustable from 30 to 90°, CW or CCW
Rotation Time	M9106-AGx-2N01: Nominal 60 seconds at 60 Hz and 72 seconds at 50 Hz for 90° M9106-AGS-2N02: Nominal 120 seconds at 60 Hz and 144 seconds at 50 Hz for 90°
Electrical Connection	No. 6-32 screw terminals
Mechanical Connection	3/8 to 1/2 in. (10 to 12.7 mm) round shaft or 3/8 in. (10 mm) square shaft
Enclosure Rating	NEMA1, IP30
Ambient Operating Rating	M9106-AGA-2N0x: 32 to 125°F (0 to 52°C); 90% RH maximum, non-condensing M9106-AGS-2N02: 32 to 125°F (0 to 52°C); 90% RH maximum, non-condensing 60 to 100°F (16 to 38°C); 90% RH maximum, non-condensing for DPT rated accuracy (See *DPT-2015* Differential Pressure Transmitter for VAV Box Applications Installation Instructions, Part No. 24-7547-18.)
Ambient Storage Rating	-20 to 150°F (-29 to 66°C); 90% RH maximum, non-condensing
Shipping Weight	M9106-AGA-2N0x: 2.0 lb (0.91 kg) M9106-AGS-2N02: 2.2 lb (0.99 kg) with the DPT-2015
Agency Compliance	UL 873 Listed, File E27734, CCN XAPX CSA C22.2 No. 139 Certified, File LR85083, Class 3221 02 CE Mark, EMC Directive 89/336/EEC

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M9109-xGx-2 Series

LIT-1900154

Electric Non-spring Return Actuators

Description

The M9109 Series direct-mount electric actuators operate on AC 24 V power and are available for use with floating or proportional controllers. These non-spring return actuators are easily installed on a Variable Air Volume (VAV) box, a round damper shaft up to 1/2 inch (13 mm) in diameter, or a 3/8 inch (10 mm) square shaft. The M9109 with a M9000-520 linkage can be used to control 2" (DN50) VG1000 series ball valves.

The M9109 models have 80 lb·in (9 N·m) running torque. They have a nominal 60-second travel time for 90° of rotation at 60 Hz (72 seconds at 50 Hz) with a load-independent rotation time. The M9109-xGC-2 models are available with integral auxiliary switches to perform switching functions at any angle within the selected rotation range.

Applications

The M9109 is used to position balancing, control, round, and zone dampers in typical HVAC applications. It can also be used with a M9000-520 linkage to control VG1000 series ball valves. The M9109 mounts directly on the duct surface, round damper, or small rectangular damper with an anti-rotation bracket and two sheet metal screws (included). Additional linkages or couplers are not required. For more information, refer to the *M9109 Series Electric Non-spring Return Actuators Product Bulletin, LIT-120112* or the *M9109 Series Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-1190*.

Features

- simple direct coupling reduces installation and commissioning time and improves reliability by eliminating damper linkages. Single screw coupling provides three-point shaft gripping.
- designed for zone damper and ball valve actuator applications
- small, compact design — allows installation in tight-fitting locations
- designed for zone damper and ball valve actuator applications
- floating and proportional control inputs
- 60 second running time at 60 Hz
- long life brushless synchronous drive motor technology – provides constant running time independent of load
- robust 80 lb-in (9 Nm) torque rating
- whisper quiet 35 dBA noise rating
- magnetic clutch – provides over torque protection over the entire range of rotation
- -4 to 125 °F (-20 to 52 ° C) ambient temperature rating
- 100,000 full stroke cycle , 2,500,000 reposition rating
- manual gear release simplifies setup and field adjustments
- ½" NPT threaded conduit opening meets electrical code requirements and allows the use of flexible armored cable
- position feedback (GGX models) provides simple, closed-loop control with accurate position sensing.
- adjustable rotation stops allow application versatility with 30 to 90° clockwise or counterclockwise rotation



M9109-xGx-2 Series
Electric Non-spring Return Actuator

Repair Information

If the M9109-xGx-2 Electic Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Selection Charts

M9109-xGx-2 Series Electric Non-spring Return Actuators

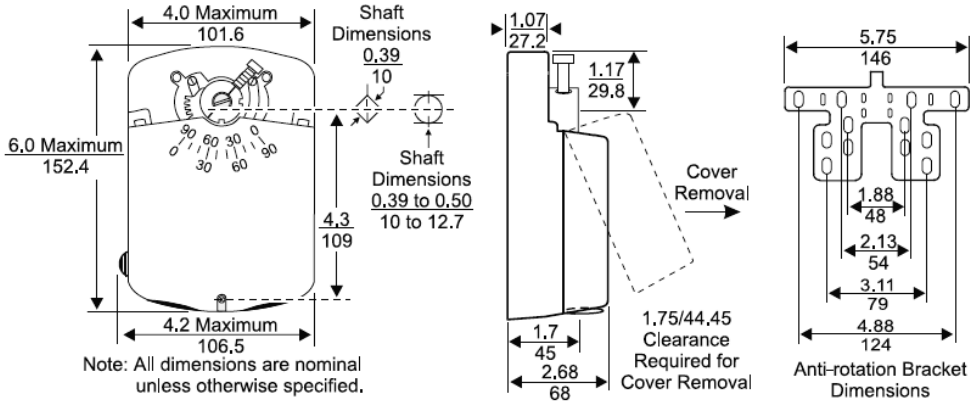
Code Number	Control Type	Torque / Timing / Voltage	Auxiliary Switches	Comments
M9109-AGA-2	Floating	80 lb-in (9 Nm) 60 second timing at 60 Hz AC 24 V 50/60 Hz	None	
M9109-AGC-2			2-SPDT	
M9109-GGA-2	DC 0(2)…10 V DC 0(4)…20 mA proportional		None	DC 0(2)…10 V Feedback
M9109-GGC-2			2-SPDT	

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M9109-xGx-2 Series Electric Non-spring Return Actuators (Continued)

Accessories for M9109-xGx-2 Series Electric Non-spring Return Actuators

Code Number	Description
DMPR-KC003	Square Head Blade Pin Extension without Bracket
DMPR-KC010	Adjustable Blade Position Indicator Switch Kit with total switching load limited to 2000 VA for the following applications: Pilot Duty: AC 24 V, 50 VA; AC 125/250/277 V, 125 VA Motor Load: AC 125/250/277 V, 1/3 hp Resistive Load: AC 125 V, 11 A; AC 250 V, 8 A; AC 277 V, 7 A (all maximum values)
DMPR-KC011	Hex Head Blade Pin Extension without Bracket
DMPR-KC012	Hex Head Blade Pin Extension with Bracket
DMPR-KC213	Damper Jackshaft ½" Diameter, 1 Panel
DMPR-KC214	Damper Jackshaft ½" Diameter, 2 Panel
DMPR-KR003	Sleeve Pin Kit for use with Johnson Controls round dampers with a 5/16 in. (8 mm) shaft; furnished with the damper and may be ordered separately
M9000-105	Pluggable 3-Terminal Block
M9000-106	Pluggable 4-Terminal Block
M9000-160	Replacement anti-rotation bracket for M9106 and M9109 Series actuators
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators
M9000-520	Valve Linkage Kit for field mounting an M9106 actuator to a 1/2 in. (DN15) to 1-1/2" (DN40) VG1000 Series ball valve



Dimensions, in./mm

M9109-xGx-2 Series Electric Non-spring Return Actuators (Continued)

Technical Specifications

M9109-xGx-2 Series Electric Non-spring Return Actuators	
Power Requirement	AGx: AC 20...30 V at 50/60 Hz, 2.5 VA supply, Class 2
	GGx: AC 20...30 V at 50/60 Hz, 3.2 VA supply, Class 2
Control Type	AGx: Floating GGx: DC 0(2)…10 V or DC 0(4)…20 mA proportional
Input Signal	AGx: AC 20...30 V at 50/60 Hz GGx: DC 0(2)...10 V or DC 0(4)...20 mA
Input Signal Adjustments:	AGx: CW and COM Terminals, CW rotation; CCW and COM Terminals, CCW rotation GGx (Voltage Input or Current Input): Jumper Selectable: DC 0(2)...10 V or DC 0(4)...20 mA Factory Setting: DC 0...10 V, CW rotation with signal increase Action is jumper selectable Direct (CW) or Reverse (CCW) with signal increase.
Input Impedance	AGx: 200 ohms, nominal GGx: Voltage Input, 150,000 ohms; Current Input, 500 ohms
Feedback Signal	AGF: 10,000 ohm potentiometer, 1 W GGx: DC 0...10 V or DC 2...10 V for 90° (10 VDC at 1 mA); Corresponds to input signal span selection
Auxiliary Switch Rating	xGC: Two Single-Pole, Double-Throw (SPDT) switches rated at AC 24 V, 1.5 A inductive, 3.0 A resistive, 35 VA maximum per switch, Class 2
Torque Rating	80 lb·in (9 N·m)
Cycle Life	100,000 full cycles; 2,500,000 repositions rated at 80 lb·in (9 N·m)
Audible Noise Rating	35 dBA maximum at 39.4 in. (1 m)
Rotation Range	Adjustable from 30 to 90°, CW or CCW
Rotation Time	60 seconds at 60 Hz and 72 seconds at 50 Hz for 90°
Electrical Connection	1/4 in. spade terminals (To order optional pluggable terminal blocks, see Accessories chart.)
Mechanical Connection	3/8 to 1/2 in. (10 to 12.7 mm) round shaft or 3/8 in. (10 mm) square shaft
Enclosure Rating	NEMA 2, IP32
Ambient Operating Rating	-4 to 125°F (-20 to 52°C); 90% RH maximum, non-condensing
Ambient Storage Rating	-40 to 176°F (-40 to 80°C); 90% RH maximum, non-condensing
Shipping Weight	2.4 lb (1.08 kg)
Agency Compliance	UL 873 Listed, File E27734, CCN XAPX CSA C22.2 No. 139 Certified, File LR85083, Class 3221 02 CE Mark, EMC Directive 89/336/EEC

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M9108, M9116, M9124 and M9132 Series

LIT-1922030

Electric Non-spring Return Actuators

Description

The M91xx Series includes M9108, M9116, M9124 and M9132 models. All of these direct-mount line of electric actuators operate on AC/DC 24 V power. The M91xx actuators are available for use with on-off, floating, proportional, or resistive controllers. These bidirectional actuators do not require a damper linkage, and are easily installed on a damper with a round shaft up to a 3/4 in. (20 mm) in diameter or a square shaft up to 5/8 in. (16 mm). They may be direct or remote mounted to a damper, or mounted to a valve using one of the M9000-5xx Valve Linkage Kits.

A single M91xx model delivers up to 280 lb·in (32 N·m) of torque. Two AGx, GGx, or HGx models in tandem deliver twice the torque or 560 lb·in (64 N·m). The angle of rotation is mechanically adjustable from 0 to 90° in 5-degree increments. Integral auxiliary switches are available to indicate end-stop position or to perform switching functions at any angle within the selected rotation range. Position feedback is available through switches, a potentiometer, or a DC 0(2)...10 V signal.

Features

- simple direct coupling reduces installation and commissioning time while improving reliability by eliminating damper linkages
- six torques: 70 to 560 lb·in (8 to 64 N·m) offer the most suitable choice for the application
- four control inputs meet the needs of most applications
- output position feedback provides simple closed-loop control with accurate position sensing
- electronic stall detection ensures higher reliability by deactivating the actuator motor when a stall condition is detected
- master/slave operation allows synchronized control for two actuators
- stacked for tandem applications
- zero and span adjustment (HGx models) allows sequential operation of dampers from a single input signal of DC 0(2)...10 V, DC 0(4)...20 V, or DC 0(4)...20 mA
- jumper-selectable rotation direction and manual gear release simplify installation, setup, and field adjustments
- NPT threaded housing provides easy connection for electrical fittings
- manual gear release simplifies damper / valve setup and commissioning

Applications

M91xx actuators are designed to position air dampers and valves in HVAC systems. Applications include: positioning return air or exhaust dampers, controlling face and bypass dampers, positioning blades for variable volume fans, positioning VF4000 and VF5000 series butterfly valves, positioning VG1000 Series ball valves and VG7000 Series globe valves when used with the M9000-5xx Series Valve Linkages. Two each of the following models provide twice the amount of running torque of a single unit when mounted in tandem: M9116-GGx or HGx, M9124-AGx, GGx or HGx, and M9132-AGx or GGx.

Refer to the manufacturer's information to properly size the damper, valve, and/or actuator. Spring return actuators, such as Johnson Controls M9206 and M9216 Series actuators, are recommended for use with outdoor air dampers in cold climates. These compact M91xx actuators use a DC motor with stall detection circuitry that operates throughout the entire stroke. The GGx, HGx, and JGx models employ noise-filtering techniques on the control signal to eliminate repositioning due to line noise. Rotation is mechanically limited to 93° by integral end-stops. The position of the actuator is visually indicated from 0 to 90° on the cover. An anti-rotation bracket prevents lateral movement of the actuator. Pressing the spring-loaded gear release on the actuator cover disengages the gear train for manual repositioning of the coupler. For more information, refer to the *M9108, M9116, M9124, M9132 Series Electric Non-spring Return Actuators Product Bulletin, LIT-2681058* or the *M9108, M9116, M9124, M9132 Series Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-399*.



M9116 Series
Electric Non-spring Return Actuataors

Selection Charts

M9108, M9116, M9124, and M9132 Electric Non-spring Return Actuators (Part 1 of 2)

Code Number	Control Type	Torque / Voltage	Auxiliary Switches	Comments
M9108 Electric Non-spring Return Actuators				
M9108-AGA-2	On-Off, Floating	70 lb-in (8 Nm) 25 to 50 seconds timing AC 24 V 50/60 Hz DC 24 V	None	
M9108-AGC-2			2-SPDT	
M9108-AGD-2			None	135 ohm potentiometer
M9108-AGE-2			2-SPDT	1000 ohm potentiometer
M9108-GGA-2	DC 0(2)…10 V DC 0(4)…mA proportional	70 lb-in (8 Nm) 25 to 50 seconds timing AC 24 V 50/60 Hz DC 24 V	None	DC 0(2)…10 V Feedback
M9108-GGC-2			2-SPDT	
M9108-HGA-2	DC 0…10 V DC 0…20 mA proportional Adjustable start and span		None	DC 0...10 V Feedback
M9108-HGC-2			2-SPDT	
M9108-JGA-2	100 to 10,000 ohm potentiometer		None	
M9108-JGC-2			2-SPDT	

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M9108, M9116, M9124 and M9132 Series Electric Non-spring Return Actuators (Continued)

M9108, M9116, M9124, and M9132 Electric Non-spring Return Actuators (Part 2 of 2)

Code Number	Control Type	Torque / Voltage	Auxiliary Switches	Comments
M9116 Electric Non-spring Return Actuators				
M9116-AGA-2	On-Off, Floating	140 lb-in (16 Nm) 70 to 115 seconds timing AC 24 V 50/60 Hz DC 24 V	None	
M9116-AGC-2			2-SPDT	
M9116-AGD-2			None	135 ohm potentiometer
M9116-AGE-2			2-SPDT	1000 ohm potentiometer
M9116-GGA-2	DC 0(2)…10 V DC 0(4)…mA proportional		None	DC 0(2)…10 V Feedback
M9116-GGC-2			2-SPDT	
M9116-HGA-2	DC 0…10 V DC 0…20 mA proportional Adjustable start and span		None	DC 0...10 V Feedback
M9116-HGC-2			2-SPDT	
M9116-JGA-2	100 to 10,000 ohm potentiometer		None	
M9116-JGC-2			2-SPDT	
M9124 Electric Non-spring Return Actuators				
M9124-AGA-2	On-Off, Floating	210 lb-in (24 Nm) 115 to 175 seconds timing AC 24 V 50/60 Hz DC 24 V	None	
M9124-AGC-2			2-SPDT	
M9124-AGD-2			None	135 ohm potentiometer
M9124-AGE-2			2-SPDT	1000 ohm potentiometer
M9124-GGA-2	DC 0(2)…10 V DC 0(4)…mA proportional		None	DC 0(2)…10 V Feedback
M9124-GGC-2			2-SPDT	
M9124-HGA-2	DC 0…10 V DC 0…20 mA proportional Adjustable start and span		None	DC 0...10 V Feedback
M9124-HGC-2			2-SPDT	
M9124-JGA-2	100 to 10,000 ohm potentiometer		None	
M9124-JGC-2			2-SPDT	
M9132 Electric Non-spring Return Actuators				
M9132-AGA-2	On-Off, Floating	280 lb-in (32 Nm) 115 to 205 seconds timing AC 24 V 50/60 Hz DC 24 V	None	
M9132-AGC-2			2-SPDT	
M9132-AGE-2			None	1000 ohm potentiometer
M9132-GGA-2	DC 0(2)…10 V DC 0(4)…mA proportional		None	DC 0(2)…10 V Feedback
M9132-GGC-2			2-SPDT	

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M9108, M9116, M9124 and M9132 Series Electric Non-spring Return Actuators (Continued)

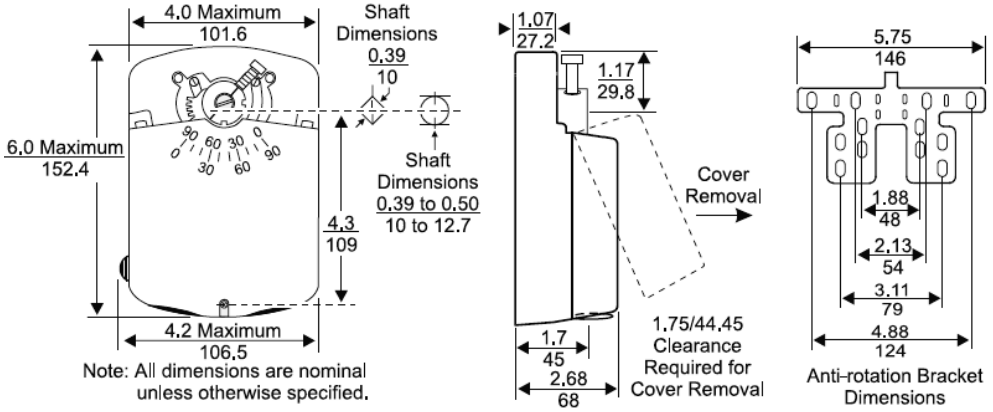
Accessories for M9108, M9116, M9124, and M9132 Series Actuators

Code Number	Description
DMPR-KR003[1]	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
DMPR-KC003[1]	Square Head Blade Pin Extension without Bracket for Johnson Controls CD-1300 direct-mount applications
DMPR-KC011	Hex Head Blade Pin Extension without Bracket
DMPR-KC012	Hex Head Blade Pin Extension with Bracket
DMPR-KC210	Damper Jackshaft 1" Diameter, 1 Panel
DMPR-KC211	Damper Jackshaft 1" Diameter, 2 Panel
DMPR-KC212	Damper Jackshaft 1" Diameter, 3 Panel
DMPR-KC213	Damper Jackshaft ½" Diameter, 1 Panel
DMPR-KC214	Damper Jackshaft ½" Diameter, 2 Panel
M9000-103	14 VA Transformer, 120/24 VAC, 60 Hz, Class 2
M9000-104	14 VA Transformer, 230/24 VAC, 60 Hz, Class 2
M9000-105	Pluggable 3-terminal block
M9000-151	Base Mount Linkage Kit for remote inside duct mounting (not intended for M9132 actuators or any tandem application)
M9000-153	Crank Arm Kit for remote mounting (not intended for M9132 actuators or any tandem application)
M9000-154	1 in. Jackshaft Coupler for mounting on a 1 in. diameter damper shaft
M9000-155	Manual Handle for positioning a damper or valve when power is removed from an M91xx actuator
M9000-158	Mounting Kit to tandem mount two M9116 GGx or HGx models; two M9124 AGx, GGx, or HGx; or two M9132 AGx or GGx models on a damper
M9000-160	Replacement anti-rotation bracket for M91xx Series actuators
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators.
M9000-500	Valve Linkage Kit for mounting M9116 actuators to 1/2 to 2 in. VG7000 Series globe valves
M9000-516	Valve Linkage Kit for mounting M9108 and M9116 to 1/2 through 2 in. 2-way and 3-way VG1000 Series ball valves
M9000-518	Valve Linkage Kit for mounting M9124 actuators to 2-1/2 in. to 4 in. VG1xA5 Series flange body ball valves and M9116 actuators to VG1x43 1-1/2 in. valves

1. Furnished with the damper and may be ordered separately.

Repair Information

If the M9108, M9116, M9142, or M9132 Electic Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.



Dimensions, in./mm

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M9108, M9116, M9124 and M9132 Series Electric Non-spring Return Actuators (Continued)

Technical Specifications

M9108, M9116, M9142, and M9132 Series Non-spring Return Actuators	
Power Requirement	M9108- and M9116-AGx: AC 20...30 V at 50/60 Hz or DC 24 V ±10%; 6.5 VA supply minimum All Other Models: AC 20...30 V at 50/60 Hz or DC 24 V ±10%; 7.5 VA supply minimum
Control Type	AGx: On-Off and Floating GGx: DC 0(2)…10 V or DC 0(4)…20 mA proportional HGx: DC 0…10 V or DC 0…20 mA proportional with adjustable start and span JGx: Proportional from 100 to 10,000 ohm potentiometer controller
Input Signal	AGx: V 24 AC at 50/60 Hz or DC 24 V GGx and HGx: DC 0(2)...10 V, DC 0(4)...20 V, or DC 0(4)...20 mA JGx: Potentiometer value is 100 ohms minimum to 10,000 ohms maximum
Input Signal Adjustments	AGx: Factory Setting, Terminals 1 and 2, CW rotation; Terminals 1 and 3, CCW rotation GGx and HGx (Voltage Input or Current Input): Jumper selectable: DC 0(2)...10 V, DC 0(4)...20 V, or DC 0(4)...20 mA Adjustable: Zero, DC 0...6 V, DC 0...12 V, or DC 0...12 mA Span, DC 2...10 V, DC 4...20 V, or DC 4...20 mA Factory Setting: DC 0...10 V, DC 0..20 mA, CW rotation with signal increase GGx, HGx, and JGx: Action is jumper selectable Direct (CW) or Reverse (CCW) with signal increase.
Input Impedance	GGx and HGx: Voltage Input, 205,000 ohms for 0 (2) to 10 V and 410,000 ohms for 0 (4) to 20 V; Current Input, 500 ohms JGx: 1.8 Megohms
Feedback Signal	AGD: 135 ohm feedback potentiometer AGE: 1,000 ohm feedback potentiometer GGx and HGx: DC 0...10 V or DC 2...10 V for 90° (10 VDC at 1 mA) Corresponds to input signal span selection. JGx: DC 0...10 V for 90° (10 VDC at 1 mA)
Auxiliary Switch Rating	xGC: Two Single-Pole, Double-Throw (SPDT) switches rated at 24 VAC 1.5 A inductive, 3.0 A resistive, 35 VA maximum per switch, Class 2
Torque Rating	M9108: 70 lb·in (8 N·m) for one unit; not intended for tandem use M9116: 140 lb·in (16 N·m) for one unit, 280 lb·in (32 N·m) for two in tandem (GGx, HGx) M9124: 210 lb·in (24 N·m) for one unit, 420 lb·in (48 N·m) for two in tandem (AGx, GGx, HGx) M9132: 280 lb·in (32 N·m) for one unit, 560 lb·in (64 N·m) for two in tandem (AGx, GGx)
Cycle Life	M9108, M9116 and M9124 60,000 cycles at rated load M9132 30,000 cycles at rated load
Audible Noise Rating	45 dBA at 1 m
Rotation Range	0 to 90° in 5-degree increments, mechanically limited to 93° - rotation range is adjusted by repositioning the output hub
Rotation Time	M9108: 30 seconds at 50% rated load, 25 to 50 seconds for 0 to 70 lb·in (0 to 8 N·m) M9116: 80 seconds at 50% rated load, 70 to 115 seconds for 0 to 140 lb·in (0 to 16 N·m) M9124: 130 seconds at 50% rated load, 115 to 175 seconds for 0 to 210 lb·in (0 to 24 N·m) M9132: 140 seconds at 50% rated load, 115 to 205 seconds for 0 to 280 lb·in (0 to 32 N·m)
Electrical Connection	M9124- and M9132-AGx: 1/4 in. spade terminals with pluggable 3-terminal blocks (See Accessories chart.) All Other Models: Screw terminals for 22 to 14 AWG; maximum of two 18, 20, or 22 AWG per terminal
Mechanical Connection	3/8 to 3/4 in. (10 to 20 mm) diameter round shaft or 3/8 to 5/8 in. (10 to 16 mm) square shaft 1 in. (25.4 mm) diameter jackshaft with M9000-154 coupler
Enclosure Rating	NEMA 2, IP42
Ambient Operating Rating	-4 to 122°F (-20 to 50°C); 0 to 95% RH, non-condensing
Ambient Storage Rating	-40 to 186°F (-40 to 86°C); 0 to 95% RH, non-condensing
Shipping Weight	2.9 lb (1.3 kg)
Agency Compliance	UL 873 Listed, File E27734, CCN XAPX CSA C22.2 No. 139 Certified, File LR85083, Class 3221 02 CE Mark, EMC Directive 89/336/EEC

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M2202 Series

LIT-1900388

Electric Spring Return Actuators

Description

The M2202-xxx-2 Series electric spring return actuators are designed for On-Off, Floating, or Proportional control of dampers in Heating, Ventilating, and Air Conditioning (HVAC) systems. The actuator is mounted directly to a damper shaft (up to 1/2 in. diameter) by means of a removable coupler. An optional crank arm, mounting brackets, and weather shields are available to meet various installation requirements.

Features

- simple direct coupling reduces installation and commissioning time while improving reliability by eliminating damper linkages
- reversible mounting design enables the actuator to spring return in either direction
- removable coupler adapts to a shorter damper shaft
- electronic stall detection throughout entire rotation range extends the life of the actuator by deactivating the actuator motor when an overload condition is detected
- integral 39 in. (1 m) cables with colored conductors simplify field wiring
- integral auxiliary switch (xxB Models) provide one adjustable switch point with line voltage capability



M2202-xxx-2 Series
Electric Spring Return Actuator

Repair Information

If the M2202 Electric Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Applications

The M2202-xxx-2 Series Electric Spring Return Actuators provide reliable control of dampers in Heating, Ventilating, and Air Conditioning (HVAC) Systems. The M2202-xxx-3 Series Actuators are available for use with on/off, floating, and proportional controllers.

Selection Charts

M2202-xxx-2 Series Electric Spring Return Actuators

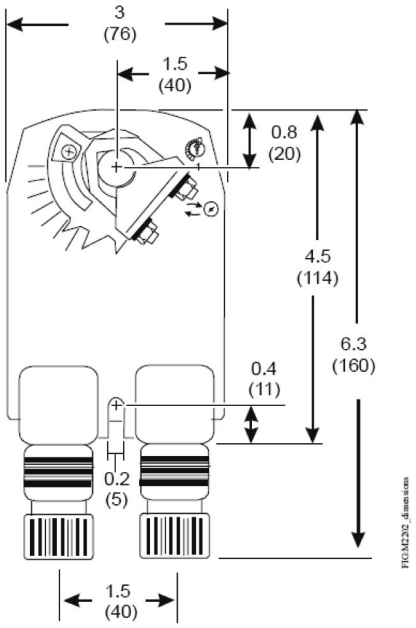
Code Number	Control Type	Torque / Voltage / Timing	Auxiliary Switches	Comments
M2202-AGA-2	On-Off, Floating	18 lb-in (2 Nm) AC/DC 24 V 50/60 Hz 95 Seconds Running <25 Seconds Spring	None	36” (.9 m) cable with colored conductors
M2202-AGB-2			1-SPDT	2 - 36” (.9 m) cable with colored conductors
M2202-BAA-2	On-Off	18 lb-in (2 Nm) AC 100…240 V 50/60 Hz <75 Seconds Running <25 Seconds Spring	None	36” (.9 m) cable with colored conductors
M2202-BAB-2			1-SPDT	2 - 36” (.9 m) cable with colored conductors
M2202-BGA-2		18 lb-in (2 Nm) AC/DC 24 V 50/60 Hz <75 Seconds Running <25 Seconds Spring	None	36” (.9 m) cable with colored conductors
M2202-BGB-2			1-SPDT	2 - 36” (.9 m) cable with colored conductors
M2202-GGA-2	DC 2…10 V Proportional	18 lb-in (2 Nm) AC/DC 24 V 50/60 Hz 95 Seconds Running <25 Seconds Spring	None	36” (.9 m) cable with colored conductors
M2202-GGB-2			1-SPDT	2 - 36” (.9 m) cable with colored conductors

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M2202 Series Electric Spring Return Actuators (Continued)

Accessories for M2202-xxx-2 Series Actuators

Code Number	Description
M2202-502	Anti-rotation bracket
M2202-503	Crank arm for 1/2” round shaft
M2202-504	Universal mounting kit, hollow pillars and hardware
M2202-505	Weather shield, metal
M2202-506	Weather shield, polycarbonate
M2202-510	Universal mounting kit without crank arm
M2202-511	L bracket for foot mounting



M2202-xxx-2 Series Actuators
Mounting Dimensions, in. (mm)

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M2202 Series Electric Spring Return Actuators (Continued)

Technical Specifications

M2202-xxx-2 Series Electric Spring Return Actuators		
Power Requirement	**AGx:** **BAx:** **BGx:** **GGx:**	AC 24 V, ±20% 50/60 Hz, 2.5 Watt Running, 1 Watt Holding, AC 100…240 V 50/60Hz, +10%, -15%, 2.5 Watt Running, 1.3 Watt Holding AC 24 V, ±20% 50/60 Hz, DC 24 V ±10%, 2.5 Watt Running, 1.3 Watt Holding, AC 24 V, ±20% 50/60 Hz, DC 24 V ±10%, 2.5 Watt Running, 1 Watt Holding,
Transformer Sizing Requirements	**AGx and GGx:** **BGx:**	4 VA (Class 2 Power Source) 5 VA (Class 2 Power Source)
Control Type	**AGx:** **Bxx:** **GGx:**	On-Off, Floating On-Off DC 2…10 V Proportional, DC 4…20 mA with field furnished 500 Ohm resistor
Input Signal	**AGx:** **BAx:** **BGx:** **GGx**	AC 24 V, ±20% 50/60 Hz AC 85…265 V 50/60Hz AC 24 V, ±20% 50/60 Hz, DC 24 V ±10% AC 24 V, ±20% 50/60 Hz, DC 24 V ±10%
Input Signal Adjustments	**AGx and GGx:**	Direct Acting / Reverse Acting Switch
Input Impedance	**AGx:** **GGx:**	1000 Ohms 100,000 Ohms
Feedback Signal	**GGx:**	DC 2…10 V
Auxiliary Switch Rating	**xxC:**	One SPDT, 3A @ 250 VAC, adjustable 0 to 95°
Spring Return	**All Models**	Reversible with CW/CCW Mounting
Torque Rating	**All Models**	18 lb-in (2 Nm)
Cycle Life	**AGx, GGx, and HGx:**	60,000 full stroke cycles; 1,500,000 repositions rated at 18 lb·in (2 N·m)
	BGx:	60,000 full stroke cycles
Audible Noise Rating AGx, GGx	**Running**	< 35 db (A)
	Holding	< 35 db (A)
	Spring Return	<62 dB (A)
Audible Noise Rating Bxx	**Running**	< 50 db (A)
	Holding	< 35 db (A)
	Spring Return	< 62 db (A)
Rotation Range	**All Models**	Adjustable from 37 to 100%, mechanically limited to 95°
Rotation Time Running	**AGx and GGx:** **BGx:**	95 Seconds <75 Seconds
Rotation Time Spring Return	**AGx, BGx, and GGx:**	< 25 sec @-4°F to +122°F [-20°C to +50°C] < 60 sec @-22°F [-30°C]
Electrical Connection	**Actuators AGx and GGx:**	36” (.9 m) Plenum Rated Cable
	Actuator Bxx:	36” (.9 m) Appliance Cable
	Aux Switch	36” (.9 m) Appliance Cable
Conduit Connectors	**All Models**	1/2 in. National Pipe Straight Loose (NPSL) – Internal Thread
Mechanical Connection	**Standard Shaft Clamp Included with Actuator**	1/4 to 1/2 in. (10 to 12.7 mm) diameter round shaft 1/4 to 5/16 in. (10 mm) square shaft
Enclosure Rating		NEMA 2, IP42
Ambient Operating Rating		-22 to 122°F (-30 to 50°C); 5 to 90% RH, noncondensing
Ambient Storage Rating		-40 to 176°F (-40 to 80°C); 5 to 95% RH, noncondensing
Shipping Weight	**xxA:**	1.4 lb (0.65 kg)
	xxB:	1.5 lb (0.7 kg)
Agency Compliance	**USA**	UL listed according to UL 60730-1, UL 60730-2-14 (XAPX)
	European Union	CE Mark, Low Voltage Directive (73/23/EEC), -xAx and -xxB models only CE Mark, EMC Directive (89/336/EEC), all models
	Canada	cUL listed according to CAN/CSA C22.2 No.24 (XAPX7)

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M9206 Series

LIT-1900249

Electric Spring Return Actuators

Description

The M9206-xxx-2S Series Actuators are direct-mount, spring return electric actuators intended for use with on/off, floating, or proportional controllers. BGx models operate on AC 24 V power, AGx and GGx models operate on AC/DC 24 V power, and BAx models operate on AC 120 V power. These bidirectional actuators do not require a damper linkage, and are easily installed on a damper with a round shaft up to 1/2 in. (13 mm) in diameter, or a square shaft up to 3/8 in. (10 mm). They may also be mounted onto Johnson Controls® VG1000 Series Forged Brass Ball Valves using the M9000-513 or M9000-520 Ball Valve Linkage Kit.

The M9206-xxx-2S Series Electric Spring Return Actuators provide a running torque of 53 lb·in (6 N·m). The rotation range is mechanically adjustable. An integral line voltage auxiliary switch is available on the xxB models to indicate end-stop position, or to perform switching functions within the selected rotation range. Position feedback is provided on proportional control models through a proportional DC voltage signal.

Features

- simple direct coupling reduces installation and commissioning time while improving reliability by eliminating damper linkages. Single screw coupling provides three-point shaft gripping.
- reversible mounting design enables the actuator to spring return in either direction
- removable coupler adapts to a shorter damper shaft
- electronic stall detection throughout entire rotation range extends the life of the actuator by deactivating the actuator motor when an overload condition is detected
- integral 48 in. (1.2 m) halogen-free cables with colored and numbered conductors simplify field wiring
- integral auxiliary switches (xxB Models) provide one adjustable switch point with line voltage capability
- automatic stroke calibration at installation reduces installation time and costs

Applications

The M9206-xxx-2S Series Electric Spring Return Actuators are designed to position air dampers and valves in Heating, Ventilating, and Air Conditioning (HVAC) systems. Applications include: positioning return air, exhaust air, or outside air dampers; positioning face and bypass dampers, and positioning VG1000 Series Forged Brass Ball Valves using the M9000-513 or M9000-520 Ball Valve Linkage Kit. Refer to the manufacturer's information to properly size the damper, ball valve, and/or electric actuator.



M9206 Series
Electric Spring Return Actuator

Selection Charts

M9206 Series Electric Spring Actuators

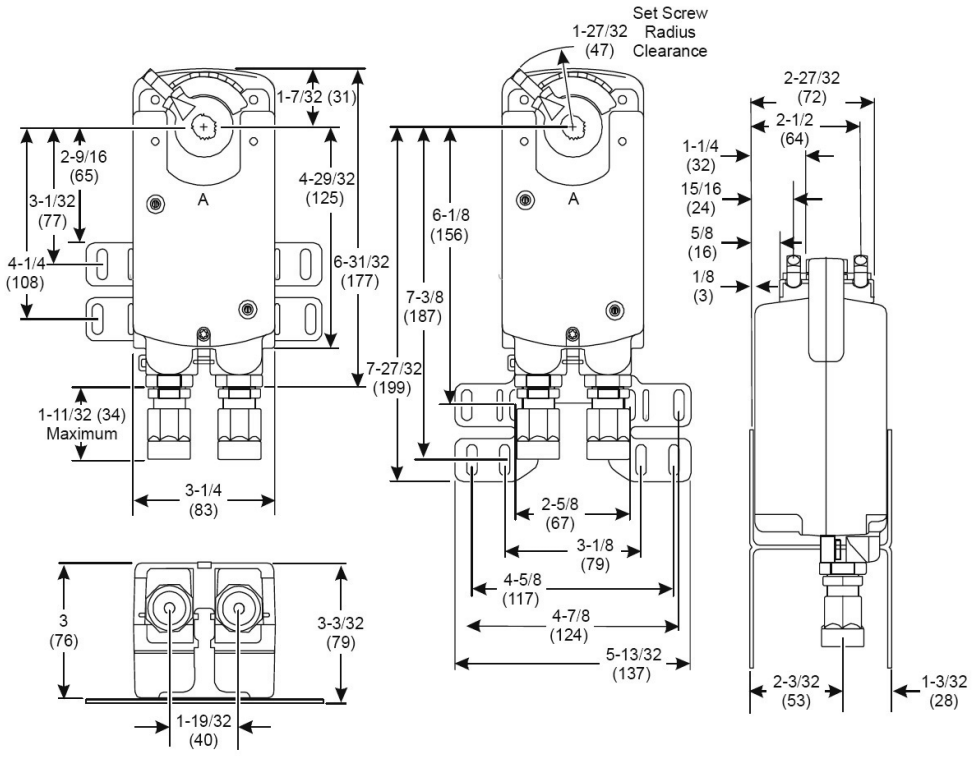
Code Number	Control Type	Torque / Voltage / Timing	Auxiliary Switches	Comments
M9206-AGA-2S	On-Off, Floating	53 lb-in (6 Nm) AC/DC 24 V 50/60 Hz 60 or 90 Seconds	None	48 in. (1.2 m) 18 AWG Plenum Rated UL CMP Cable
M9206-AGB-2S			1-SPDT	48 in. (1.2 m) 18 AWG Plenum Rated UL CMP Cable Aux Switch 48in. (1.2m)18 AWG H.F. AWM Cable
M9206-BAA-2S	On-Off	53 lb-in (6 Nm) AC 120 V 60 Hz 10 to 40 Seconds	None	48in. (1.2m)18 AWG H.F. AWM Cable
M9206-BAB-2S			1-SPDT	48in. (1.2m)18 AWG H.F. AWM Cable(s)
M9206-BGA-2S		53 lb-in (6 Nm) AC 24 V 50/60 Hz 10 to 40 Seconds	None	48in. (1.2m)18 AWG H.F. AWM Cable
M9206-BGB-2S			1-SPDT	48in. (1.2m)18 AWG H.F. AWM Cable(s)
M9206-GGA-2S	DC 0(2)…10 V Proportional	53 lb-in (6 Nm) AC/DC 24 V 50/60 Hz 25 to 40 Seconds	None	48 in. (1.2 m) 18 AWG UL CMP Plenum Cable(s) with 1/4 in. (6 mm) Stripped Wire Leads
M9206-GGB-2S			1-SPDT	48 in. (1.2 m) 18 AWG Plenum Rated UL CMP Cable Aux Switch 48in. (1.2m)18 AWG H.F. AWM Cable

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M9206 Series Electric Spring Return Actuators (Continued)

Accessories for M9206 Series Electric Actuators

Code Number	Description
DMPR-KR003	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
DMPR-KC003	Square Head Blade Pin Extension without Bracket for Johnson Controls CD-1300 direct-mount applications
DMPR-KC011	Hex Head Blade Pin Extension without Bracket
DMPR-KC012	Hex Head Blade Pin Extension with Bracket
DMPR-KC213	Damper Jackshaft ½" Diameter, 1 Panel
DMPR-KC214	Damper Jackshaft ½" Diameter, 2 Panel
M9000-161	Replacement Anti-Rotation Bracket for M9206-xxx-2S Series Electric Spring Return Actuators
M9000-165	Mounting Kit Used to Mount M9206-xxx-2S Series Electric Spring Return Actuators in Remote-Mount, Linkage-Driven Applications
M9000-200	Commissioning Tool that Provides a Control Signal to Drive 24 V On/Off, Floating, Proportional, and/or Resistive Electric Actuators
M9000-513	Linkage Kit Used to Mount M9206-xxx-2S Series Electric Spring Return Actuators to Johnson Controls 1/2 and 3/4 in. (DN15 and DN20) VG1243 Series, and 1/2 in. (DN15) VG1644 Series Forged Brass Ball Valves
M9000-520	Linkage Kit Used to Mount M9206-xxx-2S Series Electric Spring Return Actuators to Johnson Controls 1/2 through 1-1/2 in. (DN15 through DN40) VG12x1, VG12x5, VG18x1, and VG18x5 Series Forged Brass Ball Valves
M9206-600	Replacement Coupler, Set Screw, and Locking Clip Kit for Mounting M9206-xxx-2S Series Electric Spring Return Actuators to a Round Shaft Up to 1/2 in. (13 mm) or a Square Shaft Up to 3/8 in. (10 mm)
M9206-601	Replacement Coupler, Set Screw, and Locking Clip Kit for Mounting M9206-xxx-2S Series Electric Spring Return Actuators to a Round Shaft Up to 5/8 in. (16 mm) or a Square Shaft Up to 9/16 in. (14 mm)
M9206-602	Replacement Locking Clips for M9206-xxx-2S Series Electric Spring Return Actuators (Five per Bag)
Y65A13-0	40 VA Transformer, AC 120/24 V, 60 Hz, Class 2
Y65S13-0	40 VA Transformer, AC 240/24 V, 60 Hz, Class 2



M9206-xxx-2S Series Electric Spring Return Actuator Dimensions, in. (mm)

Repair Information

If the M2202 Electric Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M9206 Series Electric Spring Return Actuators (Continued)

Technical Specifications

M9206 Series Electric Spring Return Actuators		
Power Requirement	**AGx:**	AC 24 V ±25% at 50/60 Hz, Class 2, Typical 12.0 VA Running, 6.0 VA Holding Position; DC 24 V ±10%, Class 2, Typical 5.6 W Running, 2.2 W Holding Position
	BGx:	AC 24 V ±25% at 50/60 Hz, Class 2, Typical 9.8 VA Running, 5.8 VA Holding Position
	BAx:	AC 120 V ±10% at 60 Hz, Typical 10.0 VA Running, 9.2 VA Holding Position
	GGx:	AC 24 V ±25% at 50/60 Hz, Class 2, Typical 12.0 VA Running, 5.0 VA Holding Position; DC 24 V ±10%, Class 2, Typical 5.6 W Running, 2.2 W Holding Position
Transformer Sizing Requirements	**AGx, BGx, and GGx:**	14 VA Minimum per Actuator
Control Type	**AGx:**	On-Off, Floating
	Bxx:	Floating
	GGx:	DC 0(2)…10 V Proportional
Input Signal	**AGx:**	AC 18...30 V at 50/60 Hz or DC 24 V ±10%, Class 2
	BAx:	AC 102...132 V at 60 Hz
	BGx:	AC 18...30 V at 50/60 Hz, Class 2
	GGx:	DC 0(2)...10 V or DC 0(4)...20 mA with Field Furnished 500 ohm Resistor
Input Signal Adjustments	**GGx:**	Factory Set at DC 0...10 V, CW Rotation with Signal Increase; Selectable DC 0 (2) to 10 V or 0 (4) to 20 mA with Field Furnished 500 ohm, 0.25 W Minimum Resistor; Switch Selectable Direct or Reverse Action with Signal Increase
Input Impedance	**GGx:**	Voltage Input: 200,000 ohms; Current Input: 500 ohms with Field Furnished 500 ohm Resistor
Feedback Signal	**GGx:**	DC 0(2)...10 V for Desired Rotation Range Up to 90°; Corresponds to Rotation Limits
Auxiliary Switch Rating	**xxB:**	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch; AC 24 V, 50 VA Pilot Duty; AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty; AC 240 V, 2.9 A Inductive, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty
Spring Return		Direction is Selectable with Mounting Position of Actuator: CCW Actuator Face Away from Damper/Valve for CCW Spring Return; CW Actuator Face Away from Damper/Valve for CW Spring Return
Torque Rating	**All Models**	53 lb·in (6 N·m)
Cycle Life	**AGx and GGx:**	60,000 Full Stroke Cycles, 1,500,000 Repositions Rated at 53 lb·in (6 N·m)
	BGx:	60,000 Full Stroke Cycles at 53 lb·in (6 N·m)
Audible Noise Rating	**AGx, GGx, HGx:**	51 dBA Nominal at 39-13/32 in. (1 m)
	BBx:	55 dBA Nominal at 39-13/32 in. (1 m)
Rotation Range	**All Models**	Adjustable from 34.5 to 90° CW or CCW; Mechanically Limited to 93°
Rotation Time Running	**AGx:**	Selectable 60 or 90 Seconds ±10% at Nominal Conditions, Load Independent; Factory Set at 90 Seconds
	BGx:	10 to 40 Seconds for 0 to 53 lb·in (6 N·m) at All Operating Conditions
	GGx:	25 to 40 Seconds for 0 to 53 lb·in (6 N·m) at All Operating Conditions
Rotation Time Spring Return	**AGx, GGx:**	Nominal 35 Seconds; 90 Seconds Maximum
	BGx:	Nominal 35 Seconds; 70 Seconds Maximum
Electrical Connection	**Actuator AGx and GGx:**	48 in. (1.2 m) 18 AWG Plenum Rated UL CMP Cable
	Actuator Bxx:	48in. (1.2m)18 AWG Halogen Free AWM Cable
	Aux Switch	48in. (1.2m)18 AWG Halogen Free AWM Cable
Conduit Connectors	**AGA, BGA, and GGA:**	1/2 in. National Pipe Straight Loose (NPSL) – Internal Thread
	AGA, BGA, and GGA:	Two - 1/2 in. National Pipe Straight Loose (NPSL) – Internal Thread
Mechanical Connection		3/8 to 1/2 in. (10 to 13 mm) Diameter Round Shaft or 3/8 in. (10 mm) Square Shaft
Enclosure Rating		NEMA 2, IP42
Ambient Operating Rating		-25 to 140°F (-32 to 60°C); 90% RH Maximum, Noncondensing
Ambient Storage Rating		-40 to 185°F (-40 to 85°C); 95% RH Maximum, Noncondensing
Shipping Weight		3.5 lb (1.6 kg)
Agency Compliance	**North America**	UL Listed, File E27734, CCN XAPX (United States) and XAPX7 (Canada), Actuator Housing is Plenum Rated per CSA C22.2 No. 236/UL 1995, Heating and Cooling Equipment
	xxA: European Union	CE Mark, EMC Directive 89/336/EEC
	xxB: European Union	CE Mark, Low Voltage Directive 73/23/EEC
	Australia	C-Tick Mark, Australia/NZ Emmissions Compliant

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M9210 Series

LIT-1900357

Electric Spring Return Actuators

Description

The M9210-xxx-3 Series Actuators are direct mount, spring return electric actuators that operate with these available power options:

- AC 24 V at 50/60 Hz or DC 24 V (AGx, BGx, GGx, HGx)
- AC 120 V at 60 Hz (BAx)
- AC 230 V at 50/60 Hz (BDx)

These bidirectional actuators do not require a damper linkage, and are easily installed on dampers with 1/2 to 3/4 in. or 12 to 19 mm round shafts, or 3/8 and 1/2 in. or 10, 12, and 14 mm square shafts using the standard shaft clamp included with the actuator. An optional M9220-600 Jackshaft Coupler Kit is available for 3/4 to 1-1/16 in. or 19 to 27 mm round shafts, or 5/8 and 3/4 in. or 16, 18, and 19 mm square shafts.

The M9210-xxx-3 Series Electric Spring Return Actuators provide running and spring return torques of 89 lb·in (10 N·m). Integral line voltage auxiliary switches are available on the xxC models to indicate end-stop position, or to perform switching functions within the selected rotation range.

Refer to the *M9210-xxx-3 Series Electric Spring Return Actuators Product Bulletin (LIT-12011056)* for important product application information.

Repair Information

If the M9210 Electric Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Features

- simple direct coupling reduces installation and commissioning time while improving reliability by eliminating damper linkages
- reversible mounting design enables the actuator to spring return in either direction
- removable coupler adapts to a shorter damper shaft
- electronic stall detection throughout entire rotation range extends the life of the actuator by deactivating the actuator motor when an overload condition is detected
- integral 48 in. (1.2 m) halogen-free cables with colored and numbered conductors simplify field wiring
- integral auxiliary switches (xxC Models) provide one fixed and one adjustable switch point with line voltage capability
- NEMA 2 (IP54) rated aluminum enclosure protects the internal components of the actuator from dirt and moisture
- easy-to-use locking manual override with auto release and crank storage allows for manual positioning of the actuator hub
- integral connectors for 3/8 in. flexible metal conduit simplifies installation and field wiring



M9210 Series
Electric Spring Return Actuator

Applications

The M9210-xxx-3 Series Electric Spring Return Actuators provide reliable control of dampers and valves in Heating, Ventilating, and Air Conditioning (HVAC) Systems. The M9210-xxx-3 Series Actuators are available for use with on/off, floating, and proportiaonal controllers.

Selection Charts

M9210 Series Electric Spring Actuators

Code Number	Control Type	Torque / Voltage / Timing	Auxiliary Switches	Comments
M9210-AGA-3	On-Off, Floating	AC 24 V 50/60 Hz 89 lb-in (10 Nm) 150 Seconds	None	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm2) Wire Leads
M9210-AGC-3			2-SPDT	
M9210-BAA-3	On-Off	AC 120 V 60 Hz 89 lb-in (10 Nm) 24 to 57 Seconds	None	
M9210-BAC-3			2-SPDT	
M9210-BDA-3		AC 230 V 50/60 Hz 89 lb-in (10 Nm) 24 to 57 Seconds	None	
M9210-BDC-3			2-SPDT	
M9210-BGA-3	On-Off	AC 24 V 50/60 Hz 89 lb-in (10 Nm) 24 to 57 Seconds	None	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm2) Wire Leads
M9210-BGC-3			2-SPDT	
M9210-GGA-3	DC 0(2)…10 V Proportional	AC 24 V 50/60 Hz 89 lb-in (10 Nm) 150 Seconds	None	
M9210-GGC-3			2-SPDT	
M9210-HGA-3	DC 0…20 V with Programmable Start and Span		None	
M9210-HGC-3			2-SPDT	

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M9210 Series Electric Spring Return Actuators (Continued)

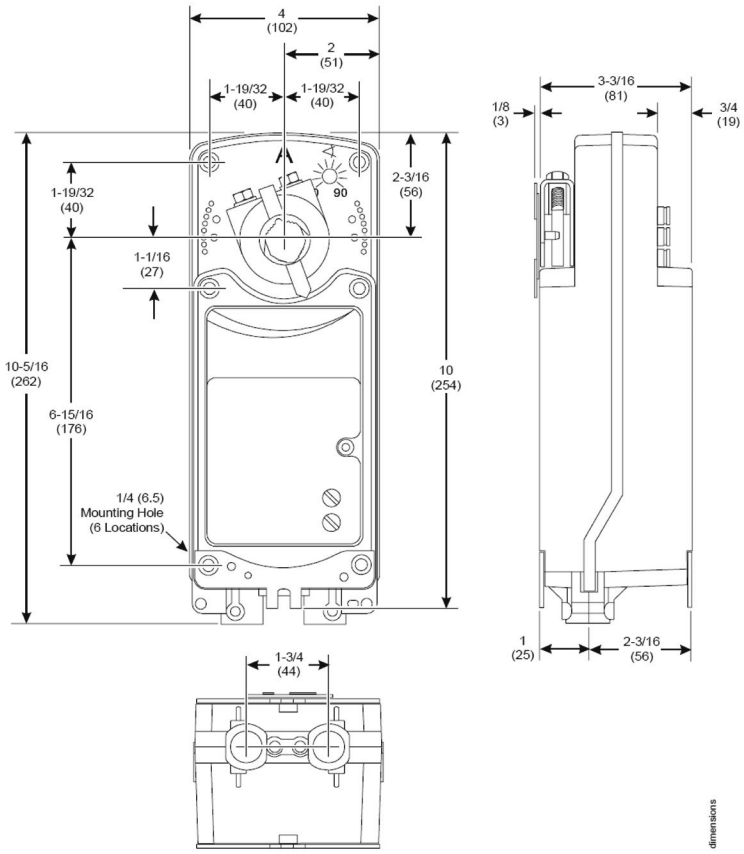
Accessories for M9210 Series Actuators

Code Number	Description
DMPR-KR003[1]	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
DMPR-KC003[1]	Square Head Blade Pin Extension without Bracket for Johnson Controls CD-1300 direct-mount applications
DMPR-KC011	Hex Head Blade Pin Extension without Bracket
DMPR-KC012	Hex Head Blade Pin Extension with Bracket
DMPR-KC210	Damper Jackshaft 1” Diameter, 1 Panel
DMPR-KC211	Damper Jackshaft 1” Diameter, 2 Panel
DMPR-KC212	Damper Jackshaft 1” Diameter, 3 Panel
DMPR-KC213	Damper Jackshaft ½” Diameter, 1 Panel
DMPR-KC214	Damper Jackshaft ½” Diameter, 2 Panel
M9000-517	Valve Linkage Kit for mounting M9210 actuators to 2 in. VG1000 Series body ball valves.
M9000-153	Crank Arm
M9000-170	Remote Mounting Kit, Horizontal. Kit includes Mounting Bracket, M9000-153 Crank Arm, Ball Joint, and Mounting Bolts.
M9000-171	Remote Mounting Kit, Vertical. Kit includes Mounting Bracket, M9000-153 Crank Arm, Ball Joint, and Mounting Bolts.
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators.
M9000-604	Replacement Anti-rotation Bracket Kit (with Screws) for M9210-xxx-3 Series Proportional Electric Spring Return Actuators
M9220-600	1 in. (25 mm) Jackshaft Coupler Kit (with Locking Clip) for Mounting M9210-xxx-3 Series Proportional Electric Spring Return Actuators on Dampers with 3/4 to 1-1/16 in. or 19 to 27 mm Round Shafts, or 5/8 and 3/4 in. or 16, 18, and 19 mm Square Shafts
M9220-601	Replacement Coupler Kit (with Locking Clip) for Mounting M9210-xxx-3 Series Proportional Electric Spring Return Actuators on Dampers with 1/2 to 3/4 in. or 12 to 19 mm Round Shafts, or 3/8 and 1/2 in. or 10, 12, and 14 mm Square Shafts
M9220-602	Replacement Locking Clips for M9210-xxx-3 Series Proportional Electric Spring Return Actuators (Five per Bag)
M9220-603	Adjustable Stop Kit for M9210-xxx-3 Series Proportional Electric Spring Return Actuators
M9220-604	Replacement Manual Override Cranks for M9210-xxx-3 Series Proportional Electric Spring Return Actuators (Five per Bag)
M9220-610	Replacement Shaft Gripper, 10 mm Square Shaft with Locking Clip
M9220-612	Replacement Shaft Gripper, 12 mm Square Shaft with Locking Clip
M9220-614	Replacement Shaft Gripper, 14 mm Square Shaft with Locking Clip

1. Furnished with the damper and may be ordered separately.

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M9210 Series Electric Spring Return Actuators (Continued)



M9210-xxx-3 Series
Electric Spring Return Actuator Dimensions, in. (mm)

Technical Specifications

M9210 Series Electric Spring Actuators (Part 1 of 2)		
Power Requirement	**AGx, GGx, HGx:**	AC 24 V (19.2...30 V) at 50/60 Hz: Class 2, 9.6 VA Running, 6 VA Holding Position; DC 24 V (21.6...26.4 V); Class 2, 4.4 W Running, 2.1 W Holding Position
	BAx:	Nominal AC 120 V at 60 Hz: 0.20 A Running, 0.12 A Holding Position
	BDx:	Nominal AC 230 V at 50/60 Hz: 0.12 A Running, 0.09 A Holding Position
	BGx:	AC 24 V (19.2...30 V) at 50/60 Hz: Class 2, 17.7 VA Running, 5.1 VA Holding Position; DC 24 V (21.6...26.4 V): Class 2, 15.6 W Running, 2.6 W Holding Position
Transformer Sizing Requirements	**AGx, GGx, HGx:**	15 VA Minimum per Actuator
	BGx:	20 VA Minimum per Actuator
Control Type	**AGx:** **Bxx:** **GGx:** **HGx:**	On-Off, and Floating On-Off GGx: DC 0(2)…10 V or DC 0(4)…20 mA proportional with external 500 Ohm resistor HGx: DC 0…10 V or DC 0…20 mA proportional with adjustable start and span
Input Signal	**AGx:** **BAx:** **BDx:** **BGx:** **GGx** **HGx:**	AC 24 V at 50/60 Hz or DC 24 V AC 120 V at 60 Hz AC 230 V at 50/60 Hz AC 24 V at 50/60 Hz DC 0(2)...10 V or DC 0(4)...20 mA with 500 ohm resistor DC 0...20 V

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M9210 Series Electric Spring Return Actuators (Continued)

M9210 Series Electric Spring Actuators (Part 2 of 2)		
Input Signal Adjustments:	**AGx:**	Switch Selectable Direct or Reverse Action
	GGx:	Factory Set at DC 0...10 V, CW Rotation with Signal Increase; Selectable DC 0(2)...10 V or DC 0(4)...20 mA with Field Furnished 500 ohm, 0.25 W minimum resistor; Switch Selectable Direct or Reverse Action with Signal Increase
	HGx:	Factory Set DC 0...10 V, CW Rotation with Signal Increase; Selectable DC 0...10 V or DC 0...20 mA with Field Furnished 500 ohm, 0.25 W minimum resistor; Start Point Programmable DC 0...10 V; Span Programmable DC 2...10 V; Switch Selectable Direct or Reverse Action with Signal Increase
Input Impedance	**GGx:** **HGx:**	Voltage Input: 200,000 ohms; Current Input: 500 ohms with Field Furnished 500 ohm Resistor
Feedback Signal	**GGx:**	DC 0(2)...10 V for Desired Rotation Range up to 90°; Corresponds to Rotation Limits, 500 mA maximum
	HGx:	DC 0...20 V for Desired Rotation Range up to 90°; Corresponds to Rotation Limits, 500 mA maximum
Auxiliary Switch Rating	**xxC:**	Two Single-Pole, Double-Throw (SPDT), Double-Insulated Switches with Gold Flash Contacts: AC 24 V, 50 VA Pilot Duty; AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty; AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty
Spring Return		Direction is Selectable with Mounting Position of Actuator: Side A, Actuator Face Away from Damper for CCW Spring Return; Side B, Actuator Face Away from Damper for CW Spring Return
Torque Rating	**All Models**	89 lb·in (10 N·m)
Cycle Life	**AGx, GGx, HGx:**	60,000 Full Stroke Cycles; 1,500,000 Repositions at Rated Torque
	BGx:	60,000 Full Stroke Cycles at Rated Torque
Audible Noise Rating AGx, GGx, HGx	**Running**	<40 dBA at 39-13/32 in. (1 m)
	Holding	<20 dBA at 39-13/32 in. (1 m)
	Spring Return	<55 dBA at 39-13/32 in. (1 m)
Audible Noise Rating Bxx	**Running**	<66 dBA at 39-13/32 in. (1 m)
	Holding	<18 dBA at 39-13/32 in. (1 m)
	Spring Return	<66 dBA at 39-13/32 in. (1 m)
Rotation Range	**All Models**	Adjustable from 30 to 90° CW or CCW with Optional M9210-603 Adjustable Stop Kit; Mechanically Limited to 90°
Rotation Time Running	**AGx, GGx, HGx:**	150 Seconds for 0 to 89 lb·in (0 to 10 N·m) at All Operating Conditions; Independent of Load
	BGx:	24 to 57 Seconds for 0 to 89 lb·in (0 to 10 N·m) at All Operating Conditions; 35 Seconds Nomimal at Full Rated Load
Rotation Time Spring Return	**AGx, GGx, HGx:**	26 Seconds for 0 to 89 lb·in (0 to 10 N·m) at Room Temperature
	BGx:	11 to 15 Seconds for 0 to 89 lb·in (0 to 10 N·m) at Room Temperature; 35 Seconds Maximum for 0 to 89 lb·in (0 to 10 N·m) at -22°F (-30°C) 130 Seconds Maximum for 0 to 89 lb·in (0 to 10 N·m) at -40°F (-40°C)
Electrical Connection	**Actuator**	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm2) Wire Leads
	Aux Switch	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm2) Wire Leads
Conduit Connectors		Integral Connectors for 3/8 in. (10 mm) Flexible Metal Conduit
Mechanical Connection	**Standard Shaft Clamp Included with Actuator**	1/2 to 3/4 in. or 12 to 19 mm Diameter Round Shafts, or 3/8 and 1/2 in. or 10, 12, and 14 mm Square Shafts
	Optional M9220-600 Jackshaft Coupler Kit	3/4 to 1-1/16 in. or 19 to 27 mm Diameter Round Shafts, or 5/8 and 3/4 in. or 16, 18, and 19 mm Square Shafts
Enclosure Rating		NEMA 2 (IP54) for All Mounting Orientations, Aluminum Enclosure
Ambient Operating Rating		-40 to 131°F (-40 to 55°C); 90% RH Maximum, Noncondensing
Ambient Storage Rating		-85 to 185°F (-65 to 85°C); 95% RH Maximum, Noncondensing
Shipping Weight	**xGx:**	6.4 lb (2.9 kg)
	BAx, BDx:	7.6 lb (3.5 kg)
Agency Compliance	**North America**	UL Listed, File E27734, CCN XAPX (United States) and XAPX7 (Canada)
	European Union	CE Mark, EMC Directive 89/336/EEC (M9210-xGA-3 Models)
	Australia	C-Tick Mark, Australia/NZ Emissions Compliant (M9210-xGx-3 and M9210-BDx Models)

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M9220 Series

LIT-1900358

Electric Spring Return Actuators

Description

The M9220-xxx-3 Series Actuators are direct mount, spring return electric actuators that operate with these available power options:

- AC 24 V at 50/60 Hz or DC 24 V (AGx, BGx, GGx, HGx)
- AC 120 V at 60 Hz (BAx)
- AC 230 V at 50/60 Hz (BDx)

These bidirectional actuators do not require a damper linkage, and are easily installed on dampers with 1/2 to 3/4 in. or 12 to 19 mm round shafts, or 3/8 and 1/2 in. or 10, 12, and 14 mm square shafts using the standard shaft clamp included with the actuator. An optional

M9220-600 Jackshaft Coupler Kit is available for 3/4 to 1-1/16 in. or 19 to 27 mm round shafts, or 5/8 and 3/4 in. or 16, 18, and 19 mm square shafts.

A single M9220-xxx-3 Series Electric Spring Return Actuator provides a running and spring return torque of 177 lb·in (20 N·m). Two or three models mounted in tandem deliver twice or triple the torque. Integral line voltage auxiliary switches are available on the xxC models to indicate end-stop position, or to perform switching functions within the selected rotation range. Refer to the *M9220-xxx-3 Series Electric Spring Return Actuators Product Bulletin (LIT-12011057)* for important product application information.

Repair Information

If the M9220 Electric Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Features

- simple direct coupling reduces installation and commissioning time while improving reliability by eliminating damper linkages
- reversible mounting design enables the actuator to spring return in either direction
- removable coupler adapts to a shorter damper shaft
- electronic stall detection throughout entire rotation range extends the life of the actuator by deactivating the actuator motor when an overload condition is detected
- integral 48 in. (1.2 m) halogen-free cables with colored and numbered conductors simplify field wiring
- integral auxiliary switches (xxC Models) provide one fixed and one adjustable switch point with line voltage capability
- NEMA 2 (IP54) rated aluminum enclosure protects the internal components of the actuator from dirt and moisture
- easy-to-use locking manual override with auto release and crank storage allows for manual positioning of the actuator hub
- integral connectors for 3/8 in. flexible metal conduit simplifies installation and field wiring

Applications

The M9220-xxx-3 Series Electric Spring Return Actuators provide reliable control of dampers and valves in Heating, Ventilating, and Air Conditioning (HVAC) Systems. The M9220-xxx-3 Series Actuators are available for use with on/off, floating, and proportiaonal controllers.



M9220 Series
Electric Spring Return Actuator

Selection Charts

M9220 Series Electric Spring Return Actuators

Code Number	Control Type	Torque / Voltage / Timing	Auxiliary Switches	Comments
M9220-AGA-3	On-Off, Floating	AC 24 V 50/60 Hz 177 lb-in (20 Nm) 150 Seconds	None	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm2) Wire Leads
M9220-AGC-3			2-SPDT	
M9220-BAA-3	On-Off	AC 120 V 60 Hz 177 lb-in (20 Nm) 24 to 57 Seconds	None	
M9220-BAC-3			2-SPDT	
M9220-BDA-3		AC 230 V 50/60 Hz 177 lb-in (20 Nm) 24 to 57 Seconds	None	
M9220-BDC-3			2-SPDT	
M9220-BGA-3	On-Off	AC 24 V 50/60 Hz 177 lb-in (20 Nm) 24 to 57 Seconds	None	
M9220-BGC-3			2-SPDT	
M9220-GGA-3	DC 0(2)…10 V Proportional	AC 24 V 50/60 Hz 177 lb-in (20 Nm) 150 Seconds	None	
M9220-GGC-3			2-SPDT	
M9220-HGA-3	DC 0…20 V with Programmable Start and Span		None	
M9220-HGC-3			2-SPDT	

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M9220 Series Electric Spring Return Actuators (Continued)

Accessories for M9220 Series Electric Actuators

Code Number	Description
DMPR-KR003[1]	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
DMPR-KC003[1]	Square Head Blade Pin Extension without Bracket for Johnson Controls CD-1300 direct-mount applications
DMPR-KC011	Hex Head Blade Pin Extension without Bracket
DMPR-KC012	Hex Head Blade Pin Extension with Bracket
DMPR-KC210	Damper Jackshaft 1” Diameter, 1 Panel
DMPR-KC211	Damper Jackshaft 1” Diameter, 2 Panel
DMPR-KC212	Damper Jackshaft 1” Diameter, 3 Panel
DMPR-KC213	Damper Jackshaft ½” Diameter, 1 Panel
DMPR-KC214	Damper Jackshaft ½” Diameter, 2 Panel
M9000-519	Valve Linkage Kit for mounting M9220 actuators to 2-1/2 in. to 4 in. VG1xA5 Series flange body ball valves.
M9000-153	Crank Arm
M9000-170	Remote Mounting Kit, Horizontal. Kit includes Mounting Bracket, M9000-153 Crank Arm, Ball Joint, and Mounting Bolts.
M9000-171	Remote Mounting Kit, Vertical. Kit includes Mounting Bracket, M9000-153 Crank Arm, Ball Joint, and Mounting Bolts.
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators.
M9000-53x	Valve Linkage Kit for mounting M9220 actuators to 2-1/2 to 6 in. VG2000 Series globe valves
M9000-604	Replacement Anti-rotation Bracket Kit (with Screws) for M9220-xxx-3 Series Proportional Electric Spring Return Actuators
M9220-600	1 in. (25 mm) Jackshaft Coupler Kit (with Locking Clip) for Mounting M9220-xxx-3 Series Proportional Electric Spring Return Actuators on Dampers with 3/4 to 1-1/16 in. or 19 to 27 mm Round Shafts, or 5/8 and 3/4 in. or 16, 18, and 19 mm Square Shafts
M9220-601	Replacement Coupler Kit (with Locking Clip) for Mounting M9220-xxx-3 Series Proportional Electric Spring Return Actuators on Dampers with 1/2 to 3/4 in. or 12 to 19 mm Round Shafts, or 3/8 and 1/2 in. or 10, 12, and 14 mm Square Shafts
M9220-602	Replacement Locking Clips for M9220-xxx-3 Series Proportional Electric Spring Return Actuators (Five per Bag)
M9220-603	Adjustable Stop Kit for M9220-xxx-3 Series Proportional Electric Spring Return Actuators
M9220-604	Replacement Manual Override Cranks for M9220-xxx-3 Series Proportional Electric Spring Return Actuators (Five per Bag)
M9220-610	Replacement Shaft Gripper, 10 mm Square Shaft with Locking Clip
M9220-612	Replacement Shaft Gripper, 12 mm Square Shaft with Locking Clip
M9220-614	Replacement Shaft Gripper, 14 mm Square Shaft with Locking Clip

1. Furnished with the damper and may be ordered separately.

Technical Specifications

M9220 Series Electric Spring Return Actuators (Part 1 of 2)		
Power Requirements	**AGx, GGx, and HGx:**	AC 24 V (AC 19.2...30 V) at 50/60 Hz: Class 2, 15.6 VA Running, 7.7 VA Holding Position; DC 24 V (DC 21.6...26.4 V): Class 2, 7.5 W Running, 2.9 W Holding Position
	BAx:	Nominal AC 120 V at 60 Hz: 0.25 A Running, 0.13 A Holding Position
	BDx:	Nominal AC 230 V at 50/60 Hz: 0.15 A Running, 0.09 A Holding Position
	BGx:	AC 24 V (AC 19.2...30 V) at 50/60 Hz: Class 2, 24.6 VA Running, 7.7 VA Holding Position; DC 24 V (DC 21.6...26.4 V): Class 2, 17.6 W Running, 2.8 W Holding Position
Transformer Sizing Requirements	**AGx, GGx, and HGx:**	20 VA Minimum per Actuator
	BGx:	25 VA Minimum per Actuator
Control Type	**AGx:** **Bxx:** **GGx:** **HGx:**	On-Off, and Floating On-Off DC 0(2)…10 VDC or DC 0(4)…20 mA proportional with external 500 Ohm resistor DC 0…10 VDC or DC 0…20 mA proportional with adjustable start and span
Input Signal	**AGx:** **BAx:** **BDx:** **BGx:** **GGx** **HGx:**	AC 24 V at 50/60 Hz or DC 24 V AC 120 V at 60 Hz AC 230 V at 50/60 Hz AC 24 V at 50/60 Hz DC 0(2)...10 V or DC 0(4)...20 mA with 500 ohm resistor DC 0...20 V
Input Signal Adjustments	**AGx:**	Switch Selectable Direct or Reverse Action
	GGx:	Factory Set at DC 0(2)...10 V, CW Rotation with Signal Increase; Selectable DC 0(2)...10 V or DC 0(4)...20 mA with Field Furnished 500 ohm, 0.25 W minimum resistor; Switch Selectable Direct or Reverse Action with Signal Increase
	HGx:	Factory Set DC 0...10 V, CW Rotation with Signal Increase; Selectable DC 0...10 V or DC 0...20 mA with Field Furnished 500 ohm, 0.25 W minimum resistor; Start Point Programmable DC 0...10 V; Span Programmable DC 2...10 V; Switch Selectable Direct or Reverse Action with Signal Increase
Input Impedance	**GGx:** **HGx:**	Voltage Input: 200,000 ohms; Current Input: 500 ohms with Field Furnished 500 ohm Resistor

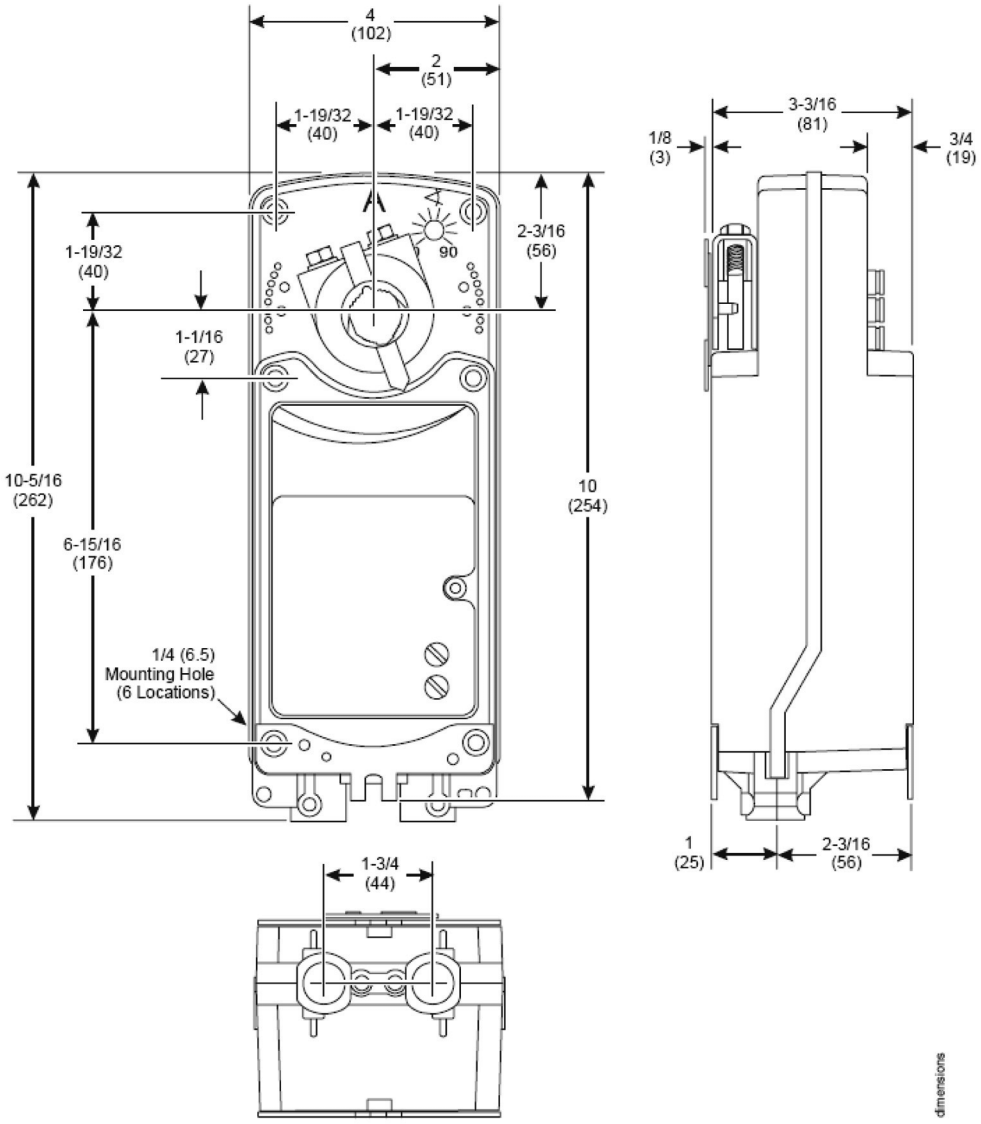
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M9220 Series Electric Spring Return Actuators (Continued)

M9220 Series Electric Spring Return Actuators (Part 2 of 2)		
Feedback Signal	**GGx:**	DC 0(2)....10 V for Desired Rotation Range up to 90°; Corresponds to Rotation Limits, 500 mA maximum
	HGx:	DC 0...20 V for Desired Rotation Range up to 90°; Corresponds to Rotation Limits, 500 mA maximum
Auxiliary Switch Rating	**xxC:**	Two Single-Pole, Double-Throw (SPDT), Double-Insulated Switches with Gold Flash Contacts: AC 24 V, 50 VA Pilot Duty; AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty; AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty
Spring Return		Direction is Selectable with Mounting Position of Actuator: Side A, Actuator Face Away from Damper for CCW Spring Return; Side B, Actuator Face Away from Damper for CW Spring Return
Torque Rating	**All Models**	177 lb·in (20 N·m) for a Single Actuator; 354 lb·in (40 N·m) for Two Models Mounted in Tandem 531 lb·in (60 N·m) for Three Models Mounted in Tandem
Cycle Life	**AGx, GGx, and HGx:**	60,000 Full Stroke Cycles; 1,500,000 Repositions at Rated Torque
	BGx:	60,000 Full Stroke Cycles at Rated Torque (Maximum Cycle Rate for Life Testing: 15 Cycles Per Hour to Avoid Over Heating the Motor)
Audible Noise Rating AGx, GGx, HGx	**Running**	<40 dBA at 39-13/32 in. (1 m)
	Holding	<20 dBA at 39-13/32 in. (1 m)
	Spring Return	<55 dBA at 39-13/32 in. (1 m)
Audible Noise Rating Bxx	**Running**	<66 dBA at 39-13/32 in. (1 m)
	Holding	<18 dBA at 39-13/32 in. (1 m)
	Spring Return	<66 dBA at 39-13/32 in. (1 m)
Rotation Range	**All Models**	Adjustable from 30 to 90° CW or CCW with Optional M9220-603 Adjustable Stop Kit; Mechanically Limited to 90°
Rotation Time Running	**AGx, GGx, and HGx:**	150 Seconds for 0 to 177 lb·in (0 to 20 N·m) at All Operating Conditions; Independent of Load
	BGx:	24 to 67 Seconds for 0 to 177 lb·in (0 to 20 N·m) at All Operating Conditions; 35 Seconds Nominal at Full Rated Load
Rotation Time Spring Return	**AGx, GGx, and HGx:**	20 Seconds for 0 to 177 lb·in (0 to 20 N·m) at Room Temperature
	BGx:	11 to 15 Seconds for 0 to 177 lb·in (0 to 20 N·m) at Room Temperature; 35 Seconds Maximum for 0 to 177 lb·in (0 to 20 N·m) at -22°F (-30°C) 160 Seconds Maximum for 0 to 177 lb·in (0 to 20 N·m) at -40°F (-40°C
Electrical Connection	**Actuator**	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm2) Wire Leads
	Aux Switch	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm2) Wire Leads
Conduit Connectors		Integral Connectors for 3/8 in. (10 mm) Flexible Metal Conduit
Mechanical Connection	**Standard Shaft Clamp Included with Actuator**	1/2 to 3/4 in. or 12 to 19 mm Diameter Round Shafts, or 3/8 and 1/2 in. or 10, 12, and 14 mm Square Shafts
	Optional M9220-600 Jackshaft Coupler Kit	3/4 to 1-1/16 in. or 19 to 27 mm Diameter Round Shafts, or 5/8 and 3/4 in. or 16, 18, and 19 mm Square Shafts
Enclosure Rating		NEMA 2 (IP54) for All Mounting Orientations, Aluminum Enclosure
Ambient Operating Rating		-40 to 131°F (-40 to 55°C); 90% RH Maximum, Noncondensing
Ambient Storage Rating		-85 to 185°F (-65 to 85°C); 95% RH Maximum, Noncondensing
Shipping Weight	**xGx:**	6.4 lb (2.9 kg)
	BAx and BDx:	7.6 lb (3.5 kg)
Agency Compliance	**North America**	UL Listed, File E27734, CCN XAPX (United States) and XAPX7 (Canada)
	European Union	CE Mark, EMC Directive 89/336/EEC (M9220-xGA-3 Models)
	Australia	C-Tick Mark, Australia/NZ Emissions Compliant (M9220-xGx-3 and M9220-BDx Models)

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M9220 Series Electric Spring Return Actuators (Continued)



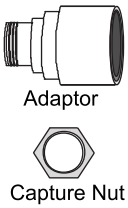
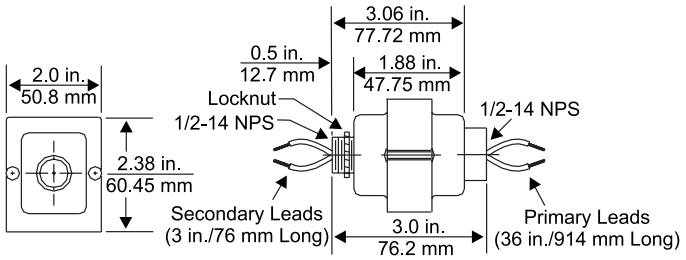
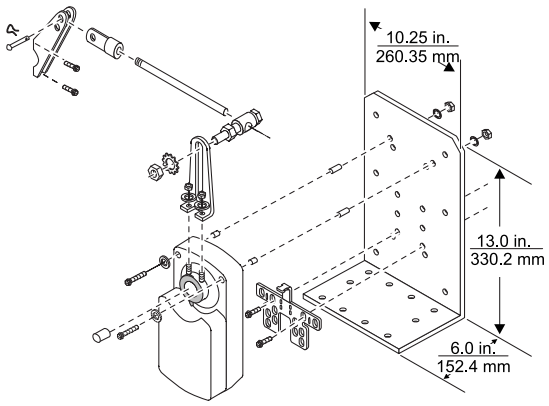
M9220-xxx-3 Series
Electric Spring Return Actuator Dimensions, in. (mm)

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M9000-1xx

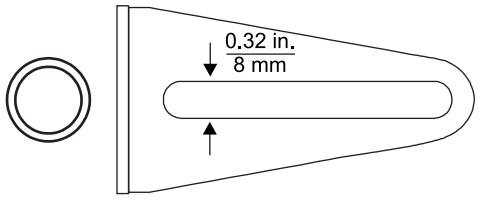
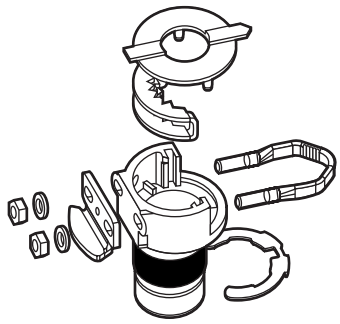
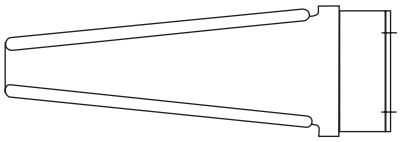
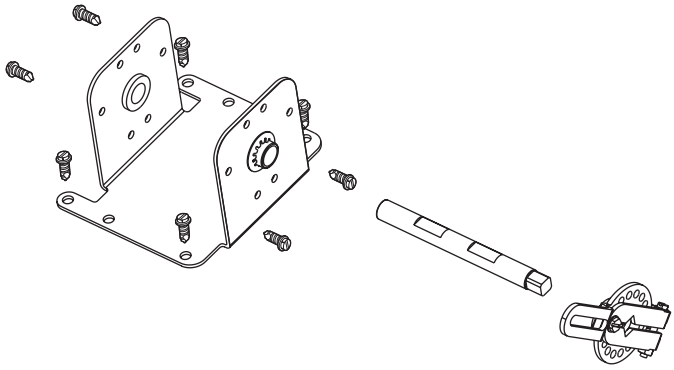
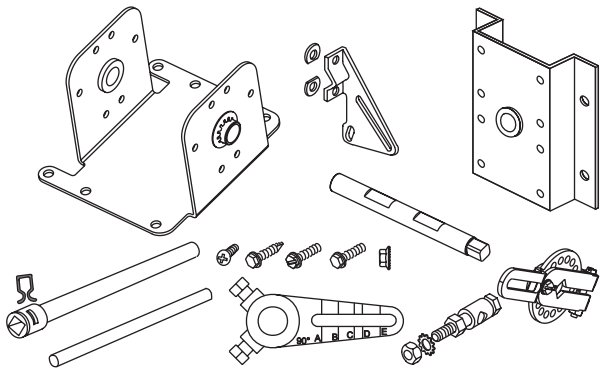
LIT-1900167

Accessories for M9000 Series Electric Actuators

Code Number and Description	
Use the **M9000-100 Conduit Adaptor Kit** with all M9216 Series actuators in applications where codes or contractor requirements specify the use of conduit for wiring. The kit provides the ability to connect the actuator to 1/2 in. Flexible Metallic Tubing (FMT), e.g., flexible conduit, Greenfield, or armored cable. This kit is for low voltage use only, and is not UL or CSA approved. Some M9216 applications may require two kits. For more information, refer to the *M9216 Series Electric Spring Return Actuators Installation Instructions, Part No. 34-636-461* and the *M9000-100 Conduit Adaptor Kit for M9216 Series Electric Spring Return Actuators Packing List, Part No. 34-636-410.*	
The **M9000-103 and M9000-104 are Class 2 transformers** that handle 24 VAC, 14 VA power requirements. The M9000-103 is designed for 120/24 VAC applications, and the M9000-104 is designed for 230/24 VAC applications. These transformers may be used for M9108, M9116, M9124, M9132, and M9216 Series actuator applications and a variety of control applications that require 24 VAC at 60 Hz. For more information, refer to the *M9000-103 and M9000-104 VA Transformers Product/ Technical Bulletin*, *Part No. 34-636-798.*	
The **M9000-105 Pluggable 3-Terminal Block** is intended to replace spade terminals for M9106-AGA, -AGC, -IGA, and -IGC models; M9124 and M9132-AGA, -AGC, -AGD and -AGE models; M9109-AGA and -AGC models; and M9216-GGC models. For more information on the M9124 and M9132 models, refer to the *M9108, M9116, M9124, and M9132 Series Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-399.* Refer to the *M9216 Series Electric Spring Return Actuators Installation Instructions, Part No. 34-636-461* for the M9216 models. Refer to the *M9106 Series Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-1085* for the M9106 models; and the *M9109 Series Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-1190* for the M9109 models.	
The **M9000-106 Pluggable 4-Terminal Block** is intended to replace spade terminals for M9109-GGA and -GGC models; M9106-GGA, and –GGC models; M9216-GGA and -GGC models. For more information, refer to the appropriate M9106 or M9216 literature listed previously.	
The **M9000-151 Base Mount Linkage** provides inside duct mounting for M9108, M9116, M9124, M9216 Series actuators. (Not intended for M9132 Series actuators.) Nominal spring return torque is 100 lb·in at the damper pin. The M9000-151 should only be used on a 3-blade or larger damper. For more information, refer to the *M9000-151 Base Mount Linkage Kit Technical Bulletin, Part No. 34-636-577*.	

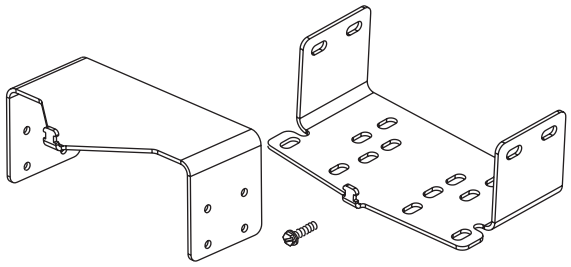
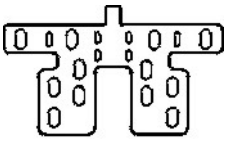
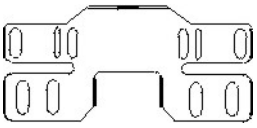
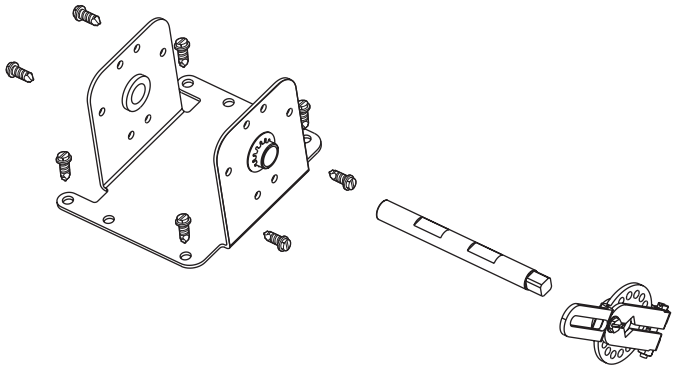
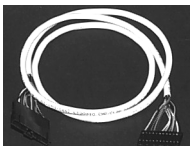
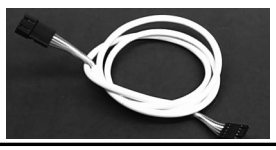
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M9000-1xx Accessories for M9000 Series Electric Actuators (Continued)

Code Number and Description	
The **M9000-153 Crank Arm Kit** is included in the M9000-151 Base Mount Linkage Kit and may be ordered separately. It includes the crank arm and shaft clamp plug for remote mounting M9108, M9116, M9124, and M9216 Series actuators to a 3-blade or larger damper. (Not intended for M9132 Series actuators.) For more information, refer to the M9000-151 literature listed previously.	
The **M9000-154 1 in. Jackshaft Coupler Kit** with a 1.05 in. (26.7 mm) maximum diameter is for use with the M9108, M9116, M9124, M9132, and M9216 Series actuators. This coupler is designed for use with 1 in. jackshafts only. For more information, refer to the *M9000-154 1 in. Jackshaft Coupler Packing List, Part No. 34-636-720.*	
The **M9000-155 Manual Handle** is used to position a damper or valve when power is removed from an M9108, M9116, M9124, or M9132 Series actuator by placing the handle over the u-bolt on the coupler of the actuator. For more information, refer to the appropriate literature listed previously.	
The **M9000-156 Mounting Kit** provides for remote mount, linkage driven application of the M9204 Series economizer damper actuator or the M9206-xGx-2 Series actuator. The M9000-156 is intended for retrofitting a number of Honeywell® economizer damper actuator installations with an M9204 or M9206 actuator, using the existing linkages. When mounted in the M9000-156, the M9204 or M9206 actuator can drive a blade, jackshaft, or crank arm. The M9000-156 may be mounted internally or externally on a duct, damper, or air handling unit. For more information, refer to the *M9000-156 and M9000-165 Mounting Kit Installation Instructions, Part No. 34-1280-33.* (Not for use with M9206-xxx-2S Series Actuators.)	
The **M9000-157 Universal Mounting Kit** provides for remote mount, linkage driven application of the M9204 Series economizer damper actuator or the M9206 Series actuator. When mounted in the M9000-157, the M9204 or M9206 actuator can drive a blade, jackshaft, or crank arm. The M9000-157 may be mounted internally or externally on a duct, damper or air handling unit. The M9000-157 is intended for a new or retrofit damper and actuator assembly. For more information, refer to the *M9000-157 Universal Mounting Kit Installation Bulletin, Part No. 34-1280-76.*	

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M9000-1xx Accessories for M9000 Series Electric Actuators (Continued)

Code Number and Description	
The **M9000-158 Tandem Mounting Kit** is intended for tandem mounting two M9116-GGx or -HGx; M9124-AGx, -GGx, or -HGx; M9132-AGx or -GGx; or M9216-BGx, -GGx, or -HGx actuators. Use two actuators from the same torque and model group for tandem operation. Do not mix actuator models or torque ratings. The M9000-158 is not intended for remote mount applications or for tandem operation of M9104, M9106, M9108, or M9206 Series actuators. The M9000-158 is mounted on the inside or outside of a duct, damper frame, or air handling unit. When mounted with the M9000-158, the M91xx or M9216 actuators are directly coupled to a damper blade pin extension or a jackshaft. For more information, refer to the *M9000-158 Tandem Mounting Kit Installation Instructions, Part No. 34-1282-6.*	
The **M9000-160 Replacement Anti-rotation Bracket** is designed for mounting an M9106, M9108, M9109, M9116, M9124, M9132, or M9216 Series actuator on the inside or outside of a duct or damper frame. For more information, refer to the appropriate literature listed previously.	
The **M9000-161 Replacement Anti-rotation Bracket** is designed for mounting an M9206 Series actuator on the inside or outside of a duct or damper frame. For more information, refer to the *M9206 Series Electric Spring Return Actuators Installation Instructions, Part No. 34-1280-9*.	
The **M9000-165 Mounting Kit** provides for remote mount, linkage driven applications of the M9206-DNx series economizer damper actuator or the M9206-xxx-2S series actuator. When mounted in either kit, the actuator can drive a blade, jackshaft, or crank arm. The Mounting Kit may be mounted internally or externally on a duct, damper or air handling unit. For more information, refer to the *M9000-156 and M9000-165 Mounting Kit Installation Instructions, Part No. 34-1280-33.* (Not for use with the older M9206-xGx-2 Series Actuators, only for use with the -2S series of actuators.)	
The **M9204-600 12-conductor 24 AWG Plenum Rated 3 ft (0.91 m) Extension Cable** is designed to connect a M9204-CNx Series Electric Spring Return Economizer Damper Actuator with an AD-DME300, 400, or 500 Direct Mount Economizer Controller. **Note: Only use one cable per connection. Do not attempt to extend cable length by connecting multiple cables.**	
The **M9206-600 Repair Kit** includes a coupler, set screw, and locking clip for mounting an M9206 actuator to a 3/8 in. to 1/2 in. (10 to 13 mm) round damper shaft or a 3/8 in. (10 mm) square damper shaft. For more information, refer to the M9206 literature listed previously.	
The **M9206-601 Repair Kit** includes a coupler, set screw, and locking clip for mounting an M9206 actuator to a 3/8 to 5/8 in. (10 to 16 mm) round damper shaft or a 3/8 to 9/16 in. (10 to 14 mm) square damper shaft. For more information, refer to the M9206 literature listed previously.	
The **M9206-602 Locking Clip** (bag of five) is a replacement clip for the M9206 actuator coupler. For more information, refer to the M9206 literature listed previously.	
The **M9206-603 5-conductor 22 AWG Plenum Rated 3 ft (0.91 m) Extension Cable** is designed to connect a M9206-DNx Series Electric Spring Return Economizer Damper Actuator with an AD-DME100-0 Direct Mount Economizer controller. **Note: Only use one cable per connection. Do not attempt to extend cable length by connecting multiple cables**.	

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M9000-3x0

LIT-1900237

Weather Shield Enclosures

Description

The M9000-3x0 Weather Shield Enclosures are cost-effective and durable weather shields designed to provide a degree of protection for a single Johnson Controls® M9000 Series Electric Actuator used in control damper, ball valve, and cast-iron flanged valve applications. These weather shield enclosures are manufactured to National Electrical Manufacturers' Association (NEMA) 3R specifications, and protect the electric actuator from corrosion, rain, freezing rain, sleet, and snow. The enclosure can be mounted indoors or outdoors; however, it may not prevent externally formed ice from restricting the motion of the rotary shaft.

Each enclosure is constructed of impact-grade ABS plastic that provides excellent impact resistance. The cover features ultraviolet inhibitors that extend service life by preventing the cover from becoming brittle or damaged by the sun or other environmental elements. The transparent cover provides an unobstructed view of the electric actuator without having to disassemble the enclosure. An appliance cord in the M9000-310 and M9000-330 Weather Shield Enclosure enables installation of control wiring, and a form-fitting seal prevents water or moisture from entering the unit and damaging the actuator.

Refer to the *M9000-3x0 Weather Shield Enclosures Product Bulletin (LIT-1201704)* for important product application information.

Features

- durable construction provides a degree of protection from the elements for a single Johnson Controls M9000 Series Electric Actuator used in control damper, ball valve, and iron-flanged valve applications
- fully enclosed NEMA 3R design protects the electric actuator from corrosion, rain, freezing rain, sleet, and snow
- impact-grade ABS plastic enclosure provides excellent impact resistance
- cover constructed using ultraviolet inhibitors extends service life by preventing the cover from becoming brittle or damaged by the sun or other environmental elements
- transparent cover allows the electric actuator to be fully viewable without having to disassemble the enclosure
- appliance cord enables installation of control wiring (M9000-310 and M9000-330 models)
- strain relief conduit fittings protect the electric actuator from damage by preventing tension on the electrical connection



M9000-3x0 Weather Shield Enclosures Shown Mounted onto a Control Damper, Flanged Ball Valve, Threaded Ball Valve, and Flanged Cast Iron Valve

Repair Information

If the M9000-3x0 Weather Shield Enclosure fails to operate within its specifications, replace the unit. For a replacement enclosure, contact the nearest Johnson Controls representative.

Selection Chart

Code Number	Description
M9000-310[1]	Weather Shield Enclosure for a Single Johnson Controls M9106, M9108, M9109, M9116, M9124, and M9132 Series Electric Non-Spring Return Actuator Used in Control Damper and Iron Flanged Valve Applications
M9000-320[1]	Weather Shield Enclosure for a Single Johnson Controls M9210 and M9220 Series Electric Spring Return Actuator Used in Control Damper and Iron Flanged Valve Applications
M9000-330[1]	Weather Shield Enclosure for a Single Johnson Controls M9108, M9116, and M9124 Series Electric Non-Spring Return Actuator Used with VG1000 Series Ball Valves, 1/2 through 4 in.
M9000-340[1]	Weather Shield Enclosure for a Single Johnson Controls M9210 and M9220 Series Electric Spring Return Actuator Used with VG1000 Series Ball Valves, 1/2 through 4 in.

1. Kit includes one enclosure base and seal assembly, one cover and gasket, and all necessary mounting hardware. One weather shield enclosure is required per electric actuator.

Technical Specifications

M9000-3x0 Weather Shield Enclosures		
Materials	**Enclosure**	Impact-Grade ABS Plastic
	Enclosure Seal	Nitrile
	Cover	Transparent Impact-Grade ABS Plastic with Ultraviolet Inhibitors
	Cover Gasket	Neoprene
Weather Shield Rating		NEMA 3R, IP54
Actuator Ambient Operating Temperature Limits	**M9106 and M9109 (M9000-310 Only)**	-4 to 125°F (-20 to 52°C)
	M9108, M9116, M9124, and M9132	-4 to 122°F (-20 to 50°C)
	M9210 and M9220	-40 to 131°F (-40 to 55°C)
Weather Shield Enclosure Ambient Storage Temperature Limits		-40 to 176°F (-40 to 80°C)
Electrical Connections		Strain Relief Conduit Fittings with 1/2 in. National Pipe Straight Mechanical (NPSM) Exit
Appliance Cord		6 Conductor, 18 AWG Wire Gauge, 43 in. (110 cm)
Shipping Weight	**M9000-310**	2.0 lb (0.9 kg)
	M9000-320	3.3 lb (1.5 kg)
	M9000-330	3.2 lb (1.45 kg)
	M9000-340	4.2 lb (1.9 kg)

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M9000-300

LIT-1900168

Weather Shield Enclosure

Description

The M9000-300 Weather Shield Enclosure is a cost effective and rugged weather shield designed to protect M9000 actuators in outdoor damper applications. The weather shield enclosure is designed to NEMA 4 specifications, and does not allow any moisture to penetrate the custom designed seals.

The weather shield cover is constructed of a sturdy ABS material injected with ultraviolet inhibitors, which prevents the cover from becoming brittle or damaged by the sun or any other outdoor element. In addition, this translucent material allows the actuator to be fully viewable. It includes a gasket, damper bracket, anti-rotation bracket, anti-rotation pin, and a liquid tight conduit connector. The base is constructed of a durable nylon blend that provides flexibility and durability.

For more information on the actuators, refer to the appropriate literature: *M9108, M9116, M9124, and M9132 Series Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-399*; *M9109 Series Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-1190*; *M9216 Series Electric Spring Return Actuators Installation Instructions, Part No. 34-636-461*; *M9106-xGx-2 Series Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-1085*; or the *M9206 Series Electric Spring Return Actuators Installation Instructions, Part No. 34-1280-9*.

Features

- durable construction provides protection for the actuator and is able to withstand outdoor elements
- cost effective method of enclosure allows a NEMA 2 instead of a NEMA 4 actuator to be used in outdoor applications
- easy installation makes previously installed actuators easy to enclose
- translucent ABS material allows the actuator to be viewable without disassembling the weather shield enclosure

Applications

For more information. refer to the *M9000-300 Weather Shield Enclosure Product/Technical Bulletin, LIT-10000055*.

Repair Information

If the M9000-300 Weather Shield Enclosure fails to operate within its specifications, replace the unit. For a replacement enclosure, contact the nearest Johnson Controls® representative.

Technical Specifications

M9000-300 Weather Shield Enclosure	
Material	Top: ABS; Bottom: Nylon blend
Enclosure	NEMA 24, IP55
Dimensions (H x W x D)	8.04 x 14.50 x 7.17 in. (204.2 x 368.3 x 182.1 mm)
Shipping Weight	4.0 lb (1.8 kg)



M9000-300
Shown Mounted on a Control Damper

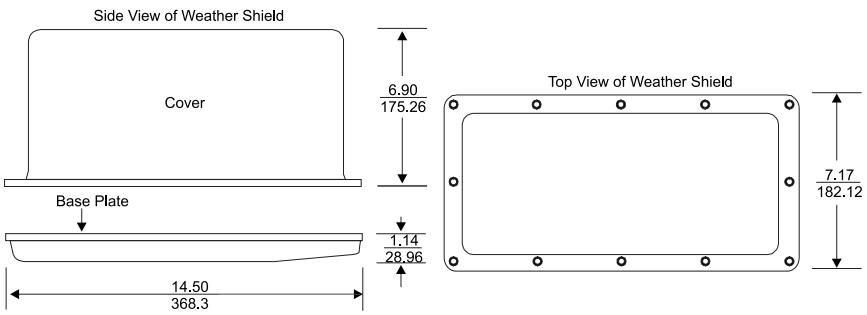
Selection Charts

M9000-300 Weather Shield Enclosure

Code Number	Description
M9000-300	Weather Shield Enclosure

Accessories for M9000-300 Enclosure

Code Number	Description
M9000-301	Damper bracket (steel, zinc coated) measuring 14.00 x 0.75 x 0.08 in. (355.6 x 19.05 x 2.03 mm); Shipping weight: 3.1 lb (1.4 kg)
M9000-302	Standard Heater Kit measuring 2.0 x 1.0 x 0.5 in. (50.8 x 25.4 x 12.7 mm); 12 to 36 VAC/VDC, 10 W; Shipping weight: 1.40 lb (0.64 kg)
M9000-303	Tropical Heater Kit measuring 2.4 x 1.0 x 0.5 in. (61.0 x 25.4 x 12.7 mm); 12 to 36 VAC/VDC, 10 W; Shipping weight: 1.40 lb (0.64 kg)



Dimensions, in. (mm)

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M100 Series

LIT-1924155

Electric Actuators

Description

M100 Series Actuators accurately position valves in HVAC and industrial applications. The M100 actuator family includes five torque ratings, two spring return models, choice of control inputs, and a variety of accessories to cover any application.

Applications

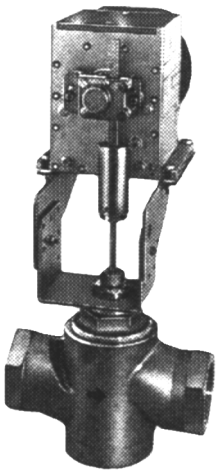
Use with VT Series, Flare Valves, Cage Trim Valves, Iron Valves, and VG7000 Series Valves.

Features

- control inputs include On-Off/Floating control action or proportional control action or proportional control action
- control inputs include On-Off/Floating control action or proportional control action
- proportional units feature interchangeable R81 electronic interface boards enabling a variety of different proportional inputs

Repair Information

If the M100 Series Electric Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.



M100 Series Electric Actuator

Technical Specifications

M100 Series Electric Actuators		
Power	**Non-Spring Return:**	20 VA
	Spring Return:	24 VAC, 50/60 Hz, 25 VA
Operating Conditions	**Non-Spring Return:**	-40 to 125°F (-40 to 52°C), 90% RH
	Spring Return:	-35 to 125°F (-37 to 52°C), 90% RH

Selection Chart

Code Number					Description	
M100	—	—	—		25 lb·in Torque with Spring Return	
M120	—	—	—		35 lb·in Torque, Non-Spring Return	
M130	—	—	—		50 lb·in Torque with Spring Return	
M140	—	—	—		75 lb·in Torque, Non-Spring Return	
M150	—	—	—		150 lb·in Torque, Non-Spring Return	
	A				On-Off / Floating Action	SPDT On-Off or Floating control input, Mechanical limit switches on ends
	C				Proportional	Communicates on the zone bus of a BAS AHU or UNT controller, Digital protocol compatible with DSC1000 system level 1 bus
	E				Proportional	Economizer with changeover relay, refrigeration programming relay, minimum position, mixed air set point and proportional band
	F				Incremental	Used with Johnson Controls DSC-8500 using the FIC-101 Field Interface Card, This unit has no physical travel limits and will move as long as input command is provided
	G				Proportional	VDC/mA input (factory calibrated for 0 to 10 VDC), adjustable zero and span, clockwise action on signal increase, 500-ohm resistor factory installed for mA signal
	H				Proportional	VDC/mA input (factory calibrated for 0 to 10 VDC), adjustable zero and span, counterclockwise action on signal increase, 500-ohm resistor factory installed for mA signal
	J				Proportional	Three-wire, 135-ohm input, 6 to 10 VDC, and 0 to -2 VDC, clockwise action on signal increase
	M				Proportional	Direct interface with Honeywell Series 90™, W973, and W7100 controllers.
	Q				Proportional	Thermistor sensor input, jumper selectable for direct or reverse action
	X				Proportional	Field installation of R81 kit required
		A			120 VAC	
		D			240 VAC [1]	
		G			24 VAC	
		H			24 VAC 1:1 isolation [1.]	
			A		No auxiliary switch	
			B		One SPDT switch S91DJ-1 installed on auxiliary end of M100	
			C		Two SPDT switches S91EJ-1 installed on auxiliary end of M100	
			D		S91 Potentiometer (1000 ohm) installed on auxiliary end of M100	

1. Includes factory-installed, cover-mounted transformer on models M100A, F, G, H, J, M, and Q only.

Note: All reference to direction of rotation is when viewing the load end.
The spring return position is always fully CCW. Travel to angle position is CW.

Use the selection chart to select the desired motor actuator with input control. (Example: To order actuator with 50 lb·in torque, spring return, proportional VDC/mA input, 24 VAC supply without auxiliary switches, use Code Number M130GGA.)

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M100 Series

LIT-1922020

Actuator Replacement Components

Description

The M100 Series Actuator positions dampers, valves, and related equipment in a variety of HVAC and industrial applications.

There are five basic actuator models: the M110, M120, M130, M140, and M150, with torques ranging from 25 to 150 lb·n, two spring return models, choice of control inputs, and a variety of accessories to cover any application. The return-to-normal function is standard on the M110 and M130 spring return models.

The M100 Series Actuator operates on 24 or 120 VAC power, and is available with on-off, floating, or proportional control inputs. The five basic actuators can be ordered as base units without the R81 Plug-in Electronic Interface Boards installed or with the input electronics factory installed. Changeable boards provide greater application versatility, easy conversion for changing requirements, and quick replacement.

Features

- output versatility allows both ends of the output shaft to be used for linkage connections for dampers
- load versatility available in torques of 25, 35, 50, 75, and 150 lb·in. (2.8, 4.0, 5.6, 8.5, and 16.9 N·m)
- travel adjustment located in top wiring compartment, allowing easy screwdriver adjustments
- M100X combines with multiple options to reduce service inventory
- M100 models available to match any control signal protocol including digital for application versatility
- R81 Plug-in Electronic Interface Boards provide faster replacement or conversions and shorter service times
- continuously lubricated gear train assures the longest life cycle cost/benefit in the industry

Applications

The M100 is used to position dampers, valves, and related equipmnet in a variety of HVAC and industrial applications. The actuator moves in response to input signals from a variety of electronic controllers, depending on the model selected.

Damper linkage kits include the Y20DAA-2 and Y20DAB-2 for commercial dampers and Y20DFC-1 for the CD1300 family of dampers.

M100 actuators can be field coupled or factory coupled to Johnson Controls VG and VB Series Valves. 1/2 inch VT Series Valves also require a Y20EBE-2 adapter kit. Specify factory coupling by listing the appropriate Q99 designations on the order. Y20 kits are also available for replacement or conversion of competitive valves.



M100 Series Actuator

The M110 and M130 come equipped with spring return to normal position for switched off conditions or on system power failure. The spring return is a heavy duty spring mechanism that returns the actuator shaft to its zero mechanical position against its rated torque. A brake mechanism will keep the return spring from driving the motor actuator towards its return position during normal reversible operations.

Selection Charts

M100 Replacement Components

Original Code Number	Action	Replacement Code Number	Description
M100A	On-Off / Floating	—	SPDT On-Off or floating control input. Mechanical limit switches on ends. Conversion of this unit to proportional control is not possible.
M100C	Proportional	**R81CAA-2**	Communicates on the Zone Bus of a Metasys AHU or UNT Controller. Digital protocol compatible with Level 1 Bus. Factory calibrated for direct acting, field selectable for reverse acting by switch settings.
M100E	Proportional	**R81EAA-2**	Thermistor sensor input economizer control with changeover relay, refrigeration programming relay, minimum position, mixed air set point and proportional band.
M100F	Incremental with Feedback	**R81FAA-1**	12 VDC incremental control input with position feedback. Used with Johnson Controls DSC-8500 using the FIC-101 Field Interface Card. This unit has no physical travel limits and will move as long as input command is provided.
M100G	Proportional	**R81GAA-2**	0 to 24 VDC, 0 to 24 mA input, adjustable zero and span, jumper selectable clockwise or counterclockwise action on signal increase. Factory set for 4 to 20 mA DC controller, clockwise action and signal increase.
M100J	Proportional	**R81JAA-1**	3-wire 135 to 1000 ohm input, 6 to 10 VDC, and 0 to -2 VDC, clockwise action on signal increase.
M100M	Proportional	**R81MAA-1**	Direct interface with Honeywell Series 90, W973, and W7100 controllers.
M100Q	Proportional	**R81QAA-1 R81QAA-2, or R81QAA-3**	Thermistor sensor input: R81QAA-1, 40 to 90°F (5 to 32°C) R81QAA-2, 15 to 50°F (-10 to 10°C) R81QAA-3, 60 to 120°F (15 to 50°C)
M110 Models	Motor Only	**M110XGA-1**	Field installation of R81 kit required. This unit is not UL listed for use as a new installation.
M120 Models		**M120XGA-1**	
M130 Models		**M130XGA-1**	
M140 Models		**M140XGA-1**	
M150 Models		**M150XGA-1**	

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M100 Series Actuator Replacement Components (Continued)

M110 Actuator Selection Chart

Model	M110 = Actuator, 25 lb·in (2.8 N²m) with Spring Return
Control Input	**A** = SPDT On-Off or Floating **C** = Digital with DSC-1000 **E** = Mixed Air Economizer with changeover and refrigeration relay **G** = VDC/mA, clockwise action **J** = 3-wire 135 ohm, 6 to 10VDC, and 0 to -2 VDC **Q** = Thermister Sensor **X** = Base Model, no circuit board installed
Power Source	**A** = 120 VAC (use with On/Off or Floating control only) **G** = 24 VAC
Feedback	A = No Auxiliary Switch **B** = S91DJ-1 (use with control options A and J only)

M 1 1 0 _ _ - _ _ Ordering Code Number

M120 Actuator Selection Chart

Model	M120 = Actuator, 35 lb·in (4.0 N²m) Non-Spring Return
Control Input	A = SPDT On-Off or Floating C = Digital with DSC-1000 G = VDC/mA, clockwise action J = 3-wire 135 ohm, 6 to 10VDC, and 0 to -2 VDC M = Honeywell Series 90, W973, and W7100 Q = Thermister Sensor X = Base Model, no circuit board installed
Power Source	A = 120 VAC (use with control options A and J only) G = 24 VAC
Feedback	A = No Auxiliary Switch C = S91EJ-1 (use with control options A and J)

M 1 2 0 _ _ - _ _ Ordering Code Number

M130 Actuator Selection Chart

Product	M130 = Actuator, 50 lb·in (5.6 N²m) with Spring Return
Control Input	**A** = SPDT On-Off or Floating **C** = Digital with DSC-1000 **E** = Mixed Air Economizer with changeover and refrigeration relay **F** = DSC-8500 Incrermental **G** = VDC/mA, clockwise action **J** = 3-wire 135 ohm, 6 to 10VDC, and 0 to -2 VDC **M** = Honeywell Series 90, W973, and W7100 **Q** = Thermister Sensor **X** = Base Model, no circuit board installed
Power Source	**A** = 120 VAC (use with On/Off or Floating control only) **G** = 24 VAC
Feedback	**A** = No Auxiliary Switch **B** = S91DJ-1 (use with control options A and J only) **C** = S91EJ-1 (use with control option J only)

M 1 3 0 _ _ - _ _ Ordering Code Number

Example: M130AGA is a 50 in·lb, on/off-floating control, with 24 VAC input and no auxiliary switches.

M140 Actuator Selection Chart

Product	M140 = Actuator, 75 lb·in (8.5 N²m) Non-Spring Return
Control Input	**A** = SPDT On-Off or Floating **C** = Digital with DSC-1000 **G** = VDC/mA, clockwise action **J** = 3-wire 135 ohm, 6 to 10VDC, and 0 to -2 VDC **X** = Base Model, no circuit board installed
Power Source	**A** = 120 VAC (use with control options A and J) **G** = 24 VAC
Feedback	**A** = No Auxiliary Switch **C** = S91EJ-1 (use with On/Off or Floating control only)

M 1 4 0 _ _ - _ _ Ordering Code Number

M150 Actuator Selection Chart

Product	M150 = Actuator, 150 lb·in (17 N²m) Non-Spring Return
Control Input	**A** = SPDT On-Off or Floating **C** = Digital with DSC-1000 **F** = DSC-8500 Incrermental **G** = VDC/mA, clockwise action **J** = 3-wire 135 ohm, 6 to 10VDC, and 0 to -2 VDC **M** = Honeywell Series 90, W973, and W7100 **Q** = Thermister Sensor **X** = Base Model, no circuit board installed
Power Source	**G** = 24 VAC
Feedback	**A** = No Auxiliary Switch **B** = S91DJ-1 (use with control options A, J, and Q) **C** = S91EJ-1 (use with control option J only)

M 1 5 0 G _ - _ _ Ordering Code Number

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M100 Series Actuator Replacement Components (Continued)

Accessories for use with M100 Series Actuators

Code Number	Description
Transformers	
Y65T42-0	120/208/240 VAC Primary, 40 VA, 1/2 in. -14 NPS male hub
Y65F42-0	480VAC Primary, 40 VA, 1/2 in. -14 NPS male hub
Y68AA-1[1]	Cover mounted transformer, 120/24 VAC, 40 VA. For M100A, F, G, J, M, and Q
Y68DA-1[1]	Cover mounted transformer, 240/24 VAC, 40 VA. For M100A, F, G, J, M, and Q
Y68HA-1[1]	Cover mounted isolation transformer, 24 VAC/24 VAC, 40 VA. For M100A, F, G, J, M, and Q
General	
S91DJ-1	Auxiliary switch kit with one SPDT switch
S91EJ-1	Auxiliary switch kit with two SPDT switches
S91PT-1	Auxiliary potentiometer switch kit, 1000 ohms, 1/3 watt
CVR83A-600R	Weather resistant cover
Damper Linkage	
Y20DAA-2	Mounts actuator to top of duct or any flat surface. Contains LVR27A-602, LVR27A-600R, SWL10A-601 and ROD16-3
Y20DAB-2	Mounts actuator to side of duct or wall. Contains LVR27A-602, LVR27A-600R, SWL10A-601 (2 each), ROD16-3, and BKT22A-602
LVR27A-602	Crank arm for use with 3/8 inch (9.5 mm) square drive crank arm for use on all actuators with adjustable radius from 1-11/16 to 2-7/8 inch (37.5 to 78 mm) (Furnished with spring return actuators)
BKT19A-600	Blade arm to connect linkage to damper blade (other than D-1300)
DMPR-KC300	Swivel ball joint, 1/4 - 28 inch UNF stud with hex nut and washer (sold individually)
D-3073-604	Ball joint connector for Y20DFC-1 kit
DMPR-KC102	Push rod, 5/16 inch (8 mm) diameter x 48 inch long plated steel shaft
ROD16-3	Push rod, 5/16 inch (8 mm) diameter x 24 inch long plated steel shaft, 10 per kit
BKT22A-602	Mounting bracket, right angle
Valve Linkage	
Y20EBA-1	Used with selected Honeywell valves and M130/M120 actuators, produces 75 lb (334 N) seating force
Y20EBA-2	Used with selected Honeywell valves and M150 actuators, produces 270 lb (1202 N) seating force
Y20EBA-3[2]	Used with Barber-Coleman valves between 1/2 and 1-1/4 inch and M130/M120 actuator, produces 75 lb (334 N) seating force
Y20EBA-4[2]	Used with Barber-Coleman valves between 1/2 and 1-1/4 inch and M150 actuators, produces 270 lb (1202 N) seating force
Y20EBD-1	Used with M130/M120 actuators, produces 75 lb (334 N) seating force
Y20EBD-2	Used with M140 actuators, produces 150 lb (607 N) seating force
Y20EBD-3	Used with M150 actuators, produces 270 lb (1202 N) seating force
Y20EBD-5	Used with M110 actuators, produces 40 lb (178 N) seating force
Y20EBD-6	Used with M130/M120 actuators, produces 100 lb (449 N) seating force
Y20EBE-1	Stem adaptor used to convert valves with 5/16 inch stems (older Johnson 1/2 to 3 inch)
Y20EBE-2	Mounting kit for VT valves in addition to Y20EBD-5
Y20EBE-3	Hold Down Nut for Barber-Coleman 1/2 and 2 inch valves.
Y20EBE-4	Valve Stem Connector for Barber-Coleman 2-1/2 to 4 inch valves, 5 per pkg
Y20EBE-11	Valve Linkage Adaptor Kit for VG7000 Valves Used with Y20EBD serves linkage kits

1. Y68 transformers cannot be used on M100 models with E, C, and Q interface boards.
2. Larger Barber-Coleman valves should use Y20EBD linkage kits.
   Lock Nut Y20EBE-4 can be used in the place of Barber-Coleman nut No. OYBB-227 and as a replacement for the nut furnished with 2-1/2 inch and larger [VB valves].

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M100 Series Actuator Replacement Components (Continued)

Technical Specifications

M100 Series Actuator		
Power Requirements		24 VAC (20 to 30 VAC) at 50/60 Hz, 25 VA spring return, 20 VA non-spring return
Ambient Conditions	**Operating**	-40° to 125°F (-40° to 52°C), 90% RH non-spring return -35° to 125°F (-37° to 52°C), 90% RH spring return
	Storage	-40° to 125°F (-40° to 52°C), 90% RH
Mechanical Connection		3/8 inch (9.5 mm) square shaft (both ends) Maximum dead weight on output shaft is 200 lb (91 kg) on load end and 10 lb (4.5 kg) on auxiliary end
Mechanical Output		Running Torque, breakaway and stall (minimum):
	M110 **M120** **M130** **M140** **M150**	25 lb-in (2.8 Nm) Spring Return 100 lb-in (11 Nm) 35 lb-in (4.0 Nm) 70 lb-in (7.9 Nm) 50 lb-in (5.6 Nm) Spring Return 200 lb-in (23 Nm) 75 lb-in (8.5 Nm) 150 lb-inb (17 Nm) 150 lb-in. (17 Nm) 200 lb-in (34 Nm)
Rotation Range	**M100A** **M100F** **M100X** **M100C, E, G, J, M, and Q**	Fixed zero, adjustable full travel, 45 to 270°, factory set at 90° 0 to 270°, no internal limits - requires controller limiting Requires R81 electronic kit Fixed zero, adjustable full travel 65 to 270°, factory set at 90°
Rotation Timing		60 seconds for 160° travel nominal 38 seconds for 90° travel nominal 40 seconds for 90° spring return nominal
Cycle Life		200,000 cycles at rated load, non-spring return 150,000 cycles at rated load, spring return
Electrical Connection		1/4 inch spade terminals
Enclosure		NEMA 2, IP52
Agency Compliance **EU Directive Compliance**	**UL**	All models with 24 VAC input, without auxiliary switch kit or potentiometer kit UL 916 Listed, File EE107041, Guide PAZX 24/120 VAC input, including auxiliary switch kit; UL 873 Recognized, File E27734, Guide XAPX2, M100X and R81: No UL Listing
	CSA	24/120 VAC input, including auxiliary switch kit and potentiometer kit C22.2 No. 24 Certified, File LR948, Class 4813 02 M100X and R81: No CSA Certification (CE Mark)

Input Signal Data for M100 Series Actuators (Part 1 of 2)

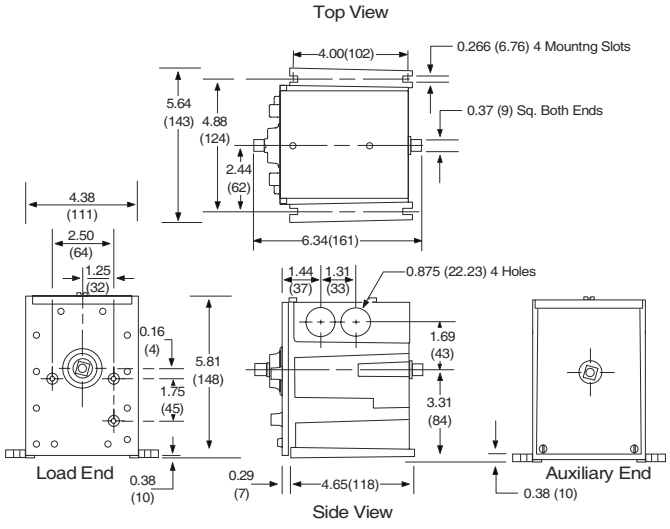
Actuator	Input Signal
M100A	**On/Off Floating Control** **Input Signal:** SPDT On/Off/Floating or 24 VAC Floating Control **Input Signal Adjustments:**None
M100C / R81C	**Digital actuator for use with DSC-1000** **Input Signal:** Digital control input through DSC-1000 Level 1 Bus **Input Signal Adjustments (Switch Selectable):** Master or slave actuator Linear or S-curve flow characteristics Level 1 or Zone Bus communications Address selection **Action (Switch Selectable):** Direct or reverse rotation **Factory Settings:** Master actuator, S-curve flow, L1 bus, L1 address 27, CW rotation on command increase (Direct Action)
M100E / R81E	**Mixed-Air Economizer with outdoor air changeover relay and SPDT refrigeration programming relay** **Input Signal:** Proportional control, thermistor sensor input (use A91 or T91 sensors) **Input Signal Adjustments:** Mixed air setpoint 40 to 90°F (5 to 32°C) Adjustable proportional band 2 to 20°F (1.1 to 11°C) Adjustable minimum position 0 to 70% **Action:** CW rotation on temperature increase (fixed) **Factory Settings:** Setpoint 65°F (32°C) Proportional band 2°F (1.1°C) Minimum position 0% **Programming Relay:** 5 amp resistive, 30 VDC, 120 VAC **Contact Rating:** 3 amp inductive, 1/8 HP at 120 VAC
M100F / R81F	**Incremental actuator with position feedback for use with DSC-8500 system through FIC-101 interface.** No internal travel limits, external control of travel required **Input Signal:** ±12 to 16 VDC incremental input **Input Signal Adjustments:** None **Action:** Positive signal CCW travel; negative signal CW travel **Feedback Signal:** Feedback signal proportional to 300° of actuator rotation (fixed) Separate supply 12 VDC maximum

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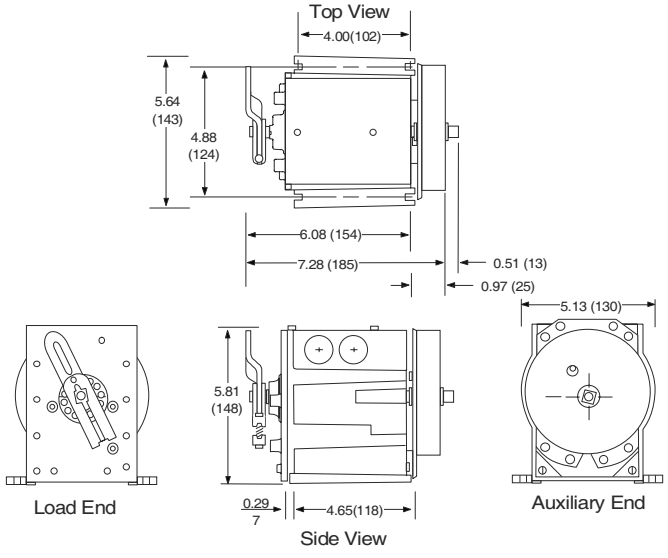
M100 Series Actuator Replacement Components (Continued)

Input Signal Data for M100 Series Actuators (Part 2 of 2)

Actuator	Input Signal	
M100G / R81G	**Proportional Control**	
	Input Signal:	0 to 24 VDC input; 0 to 20 mA input with 500 ohm resistor (included) or 0 to 24 mA DC input with 750 ohm resistor (optional)
	Input Signal Adjustments:	Adjustable zero: 0.25 to 24 VDC Adjustable span: 2 to 18 VDC
	Action:	Direct or reverse (jumper selectable)
	Factory Settings:	4 to 20 mA controller input CW rotation on signal increase (direct action)
	Input Impedance:	44K ohms (VDC input)
M100J / R81J	**Proportional or 3-wire potentiometer control**	
	Input Signal:	Proportional control, 3-wire 135 to 1000 ohm potentiometer input, 0 to -2 VDC input or 0 to 24 VDC with fixed 6V zero and 4V span for 6 to 10 VDC operation
	Input Signal Adjustments:	None
	Action:	0 to 24 VDC (CW rotation on signal increase) 0 to -2 VDC (CCW rotation on signal increase)
M100M / R81M	**Direct interface to Honeywell Series 90 135 ohm slidewire controllers and W973 and W7100 Series Controllers**	
	Input Signal:	Proportional Control, 3-wire 135 to 1000 ohm potentiometer input or 0.5 to 1.4 VDC input
	Input Signal Adjustments:	None
	Action:	0.5 to 1.4 VDC (CCW rotation on signal increase)
M100Q / R81Q	**Proportional with thermistor input**	
	Input Signal:	Proportional control, thermistor sensor input (use A91 or T91 sensors)
	Input Signal Adjustments:	Adjustable proportional band 2 to 30°F (0.1 to 17°C)
	Set point Range (by model):	R81QAA-1 40 to 90°F (5 to 32°C) R81QAA-2 15 to 50°F (-9 to 10°C) R81QAA-3 60 to 120°F (15 to 50°C)
	Action:	Direct or reverse (jumper selectable)
	Factory Settings: Set point (by model):	R81QAA-1 65°F (18°C) R81QAA-2 30°F (-1°C) R81QAA-3 90°F (32°C)
	Proportional Band:	30°F (17°C), CW rotation on temperature increase (direct action)



M120, M140, and M150 Dimensions, in. (mm)



M110 and M130 Dimensions, in. (mm)

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S91 Series

LIT-1922025

Auxiliary Switch and Potentiometer Kits

Description

The S91 Series Auxiliary Switch Kits and Potentiometer Kit mount on the auxiliary end of the M100 Series Actuator to provide switching and feedback functions.

The switch kits may be used to operate relays or contactors, or to directly control small motor loads. The potentiometer kit can be used to provide position feedback or to economically slave additional actuators. The kits are for use in heating, refrigeration, air conditioning, and industrial applications.

The switch kits have one (S91DJ) or two (S91EJ) Single Pole, Double Throw snap-acting switches. The switches are actuated by cams positioned by the actuator's output shaft to open or close the switch contacts at the desired actuator position, from 10 to 150° of actuator travel. Switch actuation points must be field set.

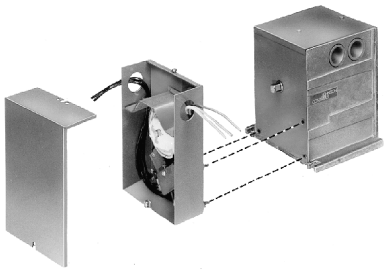
The S91PT contains a 1000 ohm feedback potentiometer which has three screw terminals and 1/4 inch male quick-connect terminals for field wiring. The potentiometer strokes across the entire 1000 ohm band over a fixed span of 300° of rotational travel. The zero point on the potentiometer is adjustable.

Features

- easy field mounting to Johnson Controls M100 Series spring return and non-spring return actuators
- two 7/8 inch diameter holes for 1/2 inch conduit
- long-wearing cam followers for consistent switch operation
- low-cost position feedback

Applications

- capacity control on multi-stage refrigeration machines
- multi-speed fan controls
- staging of multiple nozzles on boilers
- operation of pilot lights
- adding slave actuators to existing M100F Series actuators
- floating control with position feedback into an energy management system
- position feedback into controller monitoring inputs



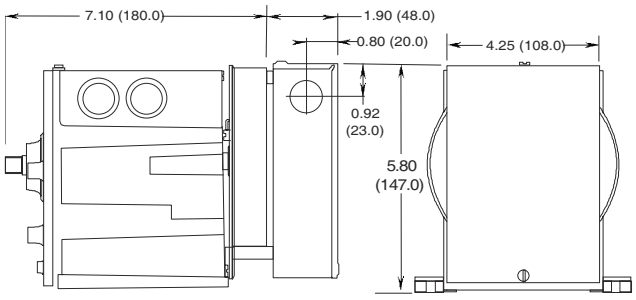
S91 Series Auxiliary Switch and Potentiometer Kits

Repair Information

If the M9000-300 Weather Shield Enclosure fails to operate within its specifications, replace the unit. For a replacement enclosure, contact the nearest Johnson Controls® representative.

Selection Chart

Code Number	Description
S91DJ-1	1 Auxiliary Switch
S91EJ-1	2 Auxiliary Switches
S91PT-1	Potentiometer Kit



Dimensions in. (mm)

Technical Specifications

S91 Series Auxiliary Switch	
Switch Action	One or two Single Pole, Double Throw
Switch Differential	3 to 80°, adjustable
Switch Contact Rating	Total switching load is limited to 2000 VA in any of the following combinations: Pilot Duty: 50 VA at 24 VAC; 125 VA at 120 - 277 VAC Full Load: 7.2A at 120V, 3.6A at 250V, 2.9A at 277V Locked Rotor: 43.2A at 120V, 21.6A at 250V, 17.4A at 277V Non-Inductive: 11.0A at 120V, 8.0A at 250V, 7.2A at 277V
Rotation Range	10 to 150° of actuator travel, adjustable
Electrical Connection	Color coded wire leads, 16 AWG
Mechanical Connection	Couples to M100 auxiliary output shaft
Ambient Conditions	Operating: -40 to 140°F (-40 to 60°C), 90% RH maximum Storage: -40 to 140°F (-40 to 60°C), 90% RH maximum
Agency Compliance	UL Listed, File E27734 Guide XAPX CSA Certified, File LR948, Class 4813 02

S91 Potentiometer Kit	
Feedback Signal	1000 ohms over 300° of actuator travel 30 VAC/DC, 1/3 watt maximum, adjustable zero
Mechanical Connection	Couples to M100 auxiliary output shaft
Ambient Conditions	Operating: 10 to 125°F (-12 to 52°C), 90% RH maximum Storage: -40 to 125°F (-40 to 52°C), 90% RH maximum
Agency Compliance	None
Enclosure	NEMA 1 General Purpose
Electrical Connection	Screw terminals and 1/4 inch spade terminals

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VA2202-xxx-2 Series

LIT-1900389

Electric Spring Return Actuators

Description

VA2202 Series Spring Return Electric Valve Actuators are available in 24 VAC/VDC and 120 VAC ON/OFF control, 24 VAC Floating Control, and 2 to 10 VDC (4 to 20 mA) Proportional Control for use in Heating, Ventilating, and Air Conditioning (HVAC) applications. All models provide 18 lb·in (2 N·m) of output force and feature a NEMA 2 (IP42) housing for indoor use. Versions with a factory-installed Single Pole, Double Throw (SPDT) auxiliary switch are available.

The VA2202 Series actuators are designed for easy mounting in the field to 1/2 and 3/4 in. Johnson Controls® VG1000 Series Ball Valves. The optional available auxiliary switch is adjustable from 5 to 95°.

Features

- Proportional, Floating, and On/Off control models available
- single screw, direct mounting
- optional auxiliary switch available
- reversible mounting design
- compact design



VA2202-xxx-2 Series Electric Spring Return Actuator

Selection Charts

VA2202-xxx-2 Series Electric Spring Return Actuators

Code Number	Voltage	Control	Auxiliary Switch
VA2202-AGA-2	24 VAC	Floating	No
VA2202-AGB-2			Yes
VA2202-BAA-2	120 VAC	On/Off	No
VA2202-BAB-2			Yes
VA2202-BGA-2	24 VAC/VDC		No
VA2202-BGB-2			Yes
VA2202-GGA-2		Proportional, 2-10 VDC	No
VA2202-GGB-2			Yes

Accessories for V2202-xxx-2 Series

Code Number	Description
M2000-500	Linkage Kit Complete, includes adapter plate, coupler, lock washer, screw and pointer

Technical Specifications

VA2202-xxx-2 Series Actuator (Part 1 of 2)		
Power Requirements	**VA2202-AGx-2**	24 VAC ±20% at 50/60 Hz, 4 VA
	VA2202-BAx-2	85 to 265 VAC at 50/60 Hz, 5 VA
	VA2202-BGx-2	24 VAC ±20% at 50/60 Hz, 24 VDC ±10%, 5 VA
	VA2202-GGx-2	24 VAC ±20% at 50/60 Hz, 24 VDC ±10%, 4 VA
Input Signal	**VA2202-AGx-2**	24 VAC ±20% at 50/60 Hz
	VA2202-Bxx-2	(See Power Requirements.)
	VA2202-GGx-2	2 to 10 VDC or 4 to 20 mA (with field furnished 500 ohm resistor)
Input Impedance	**VA2202-AGx**	1,000 ohms (0.6 W)
	VA2202-GGx	Voltage: 100,000 ohms, (0.1 mA)
		Current: 500 ohms (with field furnished 500 ohm 0.25 W minimum resistor)
Electrical Connections	**VA2202-AGA-2 VA2202-GGA-2**	Plenum cable, 36 inch, 18 AWG, 1/2 in. conduit connector
	VA2202-BxA-2	Appliance cable, 36 inch, 18 AWG, 1/2 in. conduit connector
	VA2202-BxB-2 VA2202-xGB-2	Two appliance cables, 36 inch, 18 AWG, 1/2 in. conduit connector
Auxiliary Switch Rating	**VA2202-xxB-2**	One SPDT, 3A @ 250 VAC, adjustable 0 to 95°
Mechanical Connection		1/4 to 1/2 in. (10 to 12.7 mm) diameter round shaft 1/4 to 5/16 in. (10 mm) square shaft
Output Torque		18 lb·in (2 N·m) minimum
Rotation Range		Adjustable from 37 to 100%, mechanically limited to 95°

VA2202-xxx-2 Series Actuator (Part 2 of 2)		
Nominal Run Time	**Powered**	95 seconds maximum
	Spring Return	25 seconds maximum at -4 to 122°F (-20 to 50°C), 60 seconds maximum at -22°F (-30°C)
Cycles		60,000 full stroke cycles; 1,500,000 repositions rated at 16 lb·in (2 N·m)
Enclosure		NEMA 2, IP42
Ambient Conditions	**Operating**	-22 to 122°F (-30 to 50°C); 5 to 90% RH, noncondensing
	Storage	-40 to 176°F (-40 to 80°C); 5 to 95% RH, noncondensing
Valve Fluid Temperature Limits		0 to 212°F (-18 to 100°C)
Compliance	**United States**	UL listed acc. to UL 60730-1, UL 60730-2-14 (XAPX)
	Canada	cUL listed acc. to CAN/CSA C22.2 No.24 (XAPX7)
	Europe	CE Mark, Low Voltage Directive (73/23/EEC), -xAx and -xxB models only CE Mark, EMC Directive (89/336/EEC), all models
Shipping Weight		1.5 lb (0.7 kg)

Repair Information

If the VA2202-xxx-2 Series Electric Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VA-3100 Series

LIT-1900065

Electric Valve Actuators

Description

VA-3100 Series Electric Valve Actuators use a synchronous motor to accurately position Johnson Controls VG2000 Series Cast Iron Flanged Globe Valves in HVAC and industrial applications. These non-spring return electric actuators have a 675 lb (3,000 N) force output for on/off (floating) or proportional control. Integral auxiliary switches are available for indicating end stop position or to perform switching functions. Position feedback is also available through an isolated 2,000 ohm potentiometer. All models feature a manual hand crank for manual positioning of the valve, independent of a power supply.

Features

- synchronous motor with pressure switches provides a constant running speed and establishes fixed closeoff forces
- two-bolt coupler clamp provides quick and easy coupling of the actuator to the valve stem
- on/off (floating) or proportional control allows optimal choice of control signal
- adjustable starting point, span, and action (proportional control model only) provides application flexibility and allows for easy sequencing from only one output signal
- 0 to 10 VDC position feedback signal (proportional control model only) provides accurate valve position indication in response to an input signal up to 10 VDC
- auxiliary switches and feedback potentiometer available on select models provides independent verification of actuator position
- manual hand crank allows for manual positioning of the valve, independent of a power supply



VA-3100 Series
Electric Valve Actuator

Repair Information

If the VA-3100 Series Electric Valve Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Selection Charts

VA-3100 Series Electric Valve Actuators

Description	Actuator Model		
	VA-3100-AGA	VA-3100-AGC	VA-3100-HGC
On/Off (Floating) Control	■	■	—
Proportional Control	—	—	■
Feedback:			
2,000 Ohm Potentiometer	—	■	—
Two Auxiliary Switches	—	■	■
Stem and Valve Size:			
"M" Stem (3/8 in.), 2-1/2 through 4 in. Valves	■	■	■
"N" Stem (1/2 in.), 5 and 6 in. Valves	■	■	■

Accessories for VA-3100 Series (Order Separately)

Code Number	Description	Ship. Wt. lb [a]
VA-3100-101	Auxiliary Switch Cam Adjusting Wrench (Used on VA-3100 Series Electric Actuators – One Wrench is Supplied with Each Actuator)	0.1
VA-3100-500	Mounting Kit for Field Mounting VA-3100 Series Electric Actuators to 2-1/2 through 4 in. VG2000 Series Cast Iron Flanged Globe Valves with 3/8 in. "M" Stem (Kit Includes One Stem Jam Nut, One Yoke Adaptor, One Packing Nut, One 2-1/4 in. Length Stem Adaptor for 2-1/2 in. Valves, and One 2-1/2 in. Length Stem Adaptor for 3 and 4 in. Valves)	3.0
VA-3100-501	Mounting Kit for Field Mounting VA-3100 Series Electric Actuators to 5 and 6 in. VG2000 Series Cast Iron Flanged Globe Valves with 1/2 in. "N" Stem (Kit Includes One Stem Jam Nut, One Yoke Adaptor, One Packing Nut, and One Stem Adaptor)	3.5

a. lb x 0.454 = kg.

Technical Specifications

VA-3100 Series Electric Valve Actuators		
Force Output		675 lb (3,000 N)
Power Requirements	**On/Off (Floating) Control Models**	20 to 28 VAC, 60 Hz; 16 VA Minimum
	Proportional Control Models	20 to 28 VAC, 60 Hz; 18 VA Minimum
Input Signal	**On/Off (Floating) Control Models**	20 to 28 VAC, 60 Hz
	Proportional Control Models	0 to 10 VDC
Input Impedance	**Proportional Control Models Only**	5,600 Ohms
Feedback Signal	**VA-3100-AGC Only**	0 to 2,000 Ohms
	VA-3100-HGC Only	Approximately 9 VDC Span (0.5 VDC with Valve Stem Fully Down; 9.5 VDC with Valve Stem Fully Up)
Switch Contact Rating		5 A, 24 VAC
Maximum Stroke		1-21/32 in. (42 mm)
Nominal Timing for 1 in. Stroke		92 Seconds
Ambient Operating Temperature Limits (Limited by the Actuator)	**On/Off (Floating) Control Models**	14 to 140°F (-10 to 60°C)
	Proportional Control Models	14 to 122°F (-10 to 50°C)
Agency Compliance		UL 873 Listed, File E27734; CSA C22.2 No. 139 Certified; CE Directive (89/336 EU)
Enclosure Rating		NEMA 3/3R, IP 54
Shipping Weight		9.7 lb (4.4 kg)

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VA-4233 Series

LIT-1900125

Electric Valve Actuators

Description

VA-4233 Series Electric Valve Actuators use a stepper motor to accurately position control valves in HVAC applications. In the event of a power failure, a spring in the actuator automatically returns the valve to the full stem-up position. These direct-mount, spring return electric actuators provide a minimum 61 lb (271 N) force output for floating, on/off, or proportional control, and can be easily field mounted or ordered factory coupled to Johnson Controls 1/2 through 1-1/4 in. VG7000 Series Bronze Control Valves, with no additional linkages required.

The VA-4233 Series can also be field mounted to select Barber-Colman® valves, using mounting kits available from Johnson Controls. Proportional control models include an AUTO stroke calibration feature that eliminates the need for manual calibration or adjustment after installation. Integral auxiliary switches are available for indicating end stop position or to perform switching functions. On proportional models, position feedback is also available through a proportional DC voltage signal. All models feature a hand crank for manual positioning of the valve, independent of a power supply.

Features

- designed for use in hot water, chilled water, and steam applications, allowing for universal application
- automatic spring return returns the valve to the full stem-up position, in the event of a power failure
- simple no-linkage mounting with AUTO stroke calibration at installation (VA-4233-GGx models only) reduces installation time and cost
- reversible stroke direction (VA-4233-GGx models only) expands usability by allowing switch-selectable direct or reverse action
- optional auxiliary switches provide adjustable switch points with line voltage capability
- 0 (2) to 10 VDC, 6 to 9 VDC, or 0 (4) to 20 mA input (VA-4233-GGx models only) provides enhanced control solutions
- optional power supply output of 20 VDC at 25 mA (VA-4233-GGx models only) provides power for external devices, making the VA-4233-GGx an ideal replacement for Barber-Colman retrofit installations
- manual hand crank allows for manual positioning of the valve, independent of a power supply



VA-4233 Series Electric Valve Actuator (Shown Mounted on a VG7000 Series Bronze Control Valve)

- integral position indicator provides visual indication of the valve stem position
- 1/2 in. conduit connector with 48 in. wire leads meets national and local code requirements for wiring, and allows easy field wiring on retrofit jobs

Selection Charts

VA-4233 Series Electric Valve Actuators

Description	Actuator Model							
	VA-4233-AGA-2	VA-4233-AGC-2	VA-4233-BGA-2	VA-4233-BGC-2	VA-4233-GGA-2	VA-4233-GGA-2MP	VA-4233-GGC-2	VA-4233-GGC-2MP
Floating Control	■	■	---	---	---	---	---	---
On/Off Control	---	---	■	■	---	---	---	---
Proportional Control	---	---	---	---	■	■	■	■
Feedback: 0 (2) to 10 VDC or 6 to 9 VDC at 2 mA	---	---	---	---	■	■	■	■
Two Auxiliary Switches	---	■	---	■	---	---	■	■
Power Supply Output of 20 VDC at 25 mA	---	---	---	---	---	■	---	■
Automatic Spring Return (Returns Valve to Full Stem-Up Position)	■	■	■	■	■	■	■	■

Accessories for VA-4233 Series (Order Separately)

Code Number	Description
M9000-200	Commissioning Tool (Used when AUTO Stroke Calibrating a VA-4233-GGx Series Electric Valve Actuator Prior to Initial Installation)
VG7000-1016	Bonnet Adaptor (Used when Replacing Johnson Controls M100, V-400, V-500, and MP8000 Series Valve Actuators on VG7000 Series Bronze Control Valves)
V-9999-BC1	Mounting Kit (Used when Mounting a VA-4233-GGx Series Electric Valve Actuator onto a 1/2 through 1-1/4 in. Barber-Colman VB-7xxx Series Valve)

Repair Information

Code Number	Description
VA-4233-600	Manual Hand Crank Kit (Includes Five Manual Hand Cranks)
VA-4233-601 [a]	Hardware Kit (Includes One Manual Hand Crank, One Special Stem Nut, One Jam Nut, and One Yoke Screw)

a. Items included in the hardware kit are also included with each actuator.

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VA-4233 Series Electric Valve Actuators (Continued)

Technical Specifications

VA-4233 Series Electric Valve Actuators		
Control Type	**VA-4233-AGx Models**	Floating Control
	VA-4233-BGx Models	On/Off Control
	VA-4233-GGx Models	Proportional Control
Force Output		Minimum 61 lb (271 N)
Power Requirements		20 to 30 VAC at 50/60 Hz or 24 VDC ± 10%; Class 2, 12 VA
Input Signal	**VA-4233-AGx Models**	20 to 30 VAC at 50/60 Hz or 24 VDC ± 10%, 2 mA
	VA-4233-BGx Models	20 to 30 VAC at 50/60 Hz or 24 VDC ± 10%, 12 VA
	VA-4233-GGx Models	0 (2) to 10 VDC, 6 to 9 VDC, or 0 (4) to 20 mA
Input Signal Adjustments (VA-4233-GGx Models Only)		Factory Set at 0 to 10 VDC; Switch Selectable 0 (2) to 10 VDC, 6 to 9 VDC, or 0 (4) to 20 mA
Direction of Action (VA-4233-GGx Models Only)		Switch Selectable Stem-Up or Stem-Down with Signal Increase
Input Impedance (VA-4233-GGx Models Only)	**Voltage Input**	200,000 Ohms
	Current Input	500 Ohms
Feedback Signal (VA-4233-GGx Models Only)		0 to 10 VDC, 2 to 10 VDC, or 6 to 9 VDC at 2 mA (Corresponding to Input Signal Selection)
Switch Contact Rating (VA-4233-xGC-2 and -2MP Models Only)		Two Single-Pole, Double-Throw (SPDT), Double Insulated Switches: 24 VAC, 50 VA Pilot Duty; 120 VAC, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty; 240 VAC, 2.9 A Resistive, 1/4 hp, 275 VA Pilot Duty
Maximum Stroke		29/32 in. (23 mm)
Nominal Timing for 29/32 in. Stroke		76 Seconds (Proportionally Less for Shorter Strokes)
Nominal Spring Return Timing for 29/32 in. Stroke		4 to 9 Seconds at Room Temperature (Proportionally Less for Shorter Strokes)
Spring Return Direction		Stem Up
Electrical Connections	**Actuator**	48 in. (122 cm) Cable with 20 AWG Wire Leads
	Auxiliary Switches (VA-4233-xGC-2 and -2MP Models Only)	48 in. (122 cm) Cable with 18 AWG Wire Leads
Ambient Temperature Limits	**Operating**	32 to 122°F (0 to 50°C)
	Storage	-85 to 185°F (-65 to 85°C)
Maximum Ambient Humidity Limits		95% RH Non-Condensing (90% RH at 70°F Ambient Temperature and 40°F Fluid Temperature)
Fluid Temperature Limits (Actuator and Valve Assembly)		35 to 250°F (2 to 121°C); 15 psig (103 kPa) Saturated Steam
Acoustic Noise		35 dB(A) Maximum at 39 in. (100 cm) per DIN 1946 and ISO 3745
Agency Compliance		UL 873 Listed, File E27734, CCN XAPX; CSA C22.2 No. 139 Certified, File LR85083, Class 3221 02; CE Mark, EMC Directive 89/336/EEC
Enclosure Rating		NEMA 2, IP 42
Shipping Weight		3.1 lb (1.4 kg)

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VA-6100 Series

LIT-1900066

Electric Valve Actuators

Description

VA-6100 Series Electric Valve Actuators use a synchronous motor to accurately position Johnson Controls VG2000 Series Cast Iron Flanged Globe Valves in HVAC and industrial applications. These non-spring return electric actuators have a 1,350 lb (6,000 N) force output for on/off (floating) or proportional control. Integral auxiliary switches are available for indicating end stop position or to perform switching functions. Position feedback is also available through an isolated 2,000 ohm potentiometer at a fixed stroke of 1-21/32 in. All models feature a manual hand wheel for manual positioning of the valve, independent of a power supply.

Features

- synchronous motor with pressure switches provides a constant running speed and establishes fixed closeoff forces
- two-bolt coupler clamp provides quick and easy coupling of the actuator to the valve stem
- on/off (floating) or proportional control allows optimal choice of control signal
- adjustable starting point, span, and action (proportional control model only) provides application flexibility and allows for easy sequencing from only one output signal
- 0 to 10 VDC or 0 to 20 mA position feedback signal (proportional control model only) provides accurate valve position indication in response to an input signal up to 10 VDC or 20 mA
- auxiliary switches and feedback potentiometer available on select models provides independent verification of actuator position
- manual hand wheel allows for manual positioning of the valve, independent of a power supply

Repair Information

If the VA-3100 Series Electric Valve Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.



VA-6100 Series Electric Valve Actuator

Selection Charts

VA-6100 Series Electric Valve Actuators

Description	Actuator Model	
	VA-6100-AGC	VA-6100-HGC
On/Off (Floating) Control	■	—
Proportional Control	—	■
Feedback:		
2,000 Ohm Potentiometer	■	—
Two Auxiliary Switches	■	■
0 to 10 VDC or 0 to 20 mA Output	—	■
Stem and Valve Size:		
"N" Stem (1/2 in.), 4 through 6 in. Valves	■	■

Accessories for VA-6100 Series (Order Separately)

Code Number	Description	Ship. Wt. lb[1]
VA-3100-501	Mounting Kit for Field Mounting VA-6100 Series Electric Actuators to 5 and 6 in. VG2000 Series Cast Iron Flanged Globe Valves with 1/2 in. "N" Stem (Kit Includes One Stem Jam Nut, One Yoke Adaptor, One Packing Nut, and One Stem Adaptor)	3.5

1. lb x 0.454 = kg.

Technical Specifications

VA-6100 Series Electric Valve Actuators		
Force Output		1,350 lb (6,000 N)
Power Requirements	**VA-6100-AGC Only**	20 to 28 VAC, 60 Hz; 37 VA Minimum
	VA-6100-HGC Only	20 to 28 VAC, 60 Hz; 42 VA Minimum
Input Signal	**VA-6100-AGC Only**	20 to 28 VAC, 60 Hz
	VA-6100-HGC Only	0 to 10 VDC or 0 to 20 mA; Minimum Control Signal Adjustable 0 to 8 VDC or 0 to 16 mA; Maximum Control Signal Adjustable 2 to 10 VDC or 4 to 20 mA[1]
Input Impedance	**VA-6100-HGC Only**	10,000 Ohms with 0 to 10 VDC Input; 500 Ohms with 0 to 20 mA Input
Feedback Signal	**VA-6100-AGC Only**	0 to 2,000 Ohms
	VA-6100-HGC Only	0.35 to 9.65 VDC or 0.7 to 19.3 mA
Switch Contact Rating		5 A, 24 VAC
Maximum Stroke		1-21/32 in. (42 mm)
Nominal Timing for 1-1/2 in. Stroke		111 Seconds
Ambient Operating Temperature Limits (Limited by the Actuator)		-4 to 140°F (-20 to 60°C)
Agency Compliance		UL 873 Listed, File E27734, CCN XAPX; cUL C22.2 No. 24-93 Listed, File E27734, CCN XAPX7
Enclosure Rating		NEMA 4, IP 65
Shipping Weight		16.5 lb (7.5 kg)

1. The maximum control signal must always exceed the minimum control signal by at least 2 VDC or 4 mA.

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VA-715x Series

LIT-1924175

Electric Valve Actuator

Description

The VA-715x Series synchronous, motor-driven actuator provides incremental (three-wire), incremental with feedback, or proportional control of valves with up to 3/4 in. stroke in heating, ventilating, and air conditioning applications.

This compact, non-spring return actuator has a 90 lb (400 N) force minimum, and responds to a variety of input signals.

The VA-715x Series can be easily field mounted or ordered factory coupled to VG7000 Series Bronze Control Valves. In addition, the VA-715x Series can be field mounted to VB-3766, 3966, and 4332 bronze flare valve bodies.

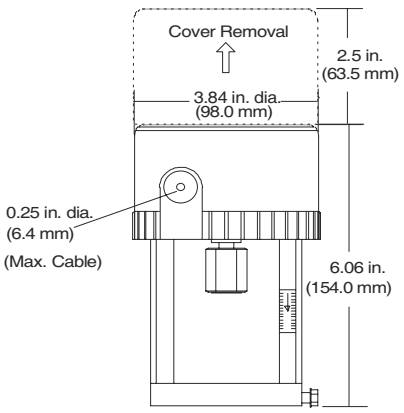
Selection Charts

VA-715x Series Actuators

Code Number	Description
VA-7150-1001	Three-Wire Incremental
VA-7153-1001	Three-Wire Incremental with Position Feedback
VA-7152-1001	Proportional, 0 to 10 VDC

Accessories for VA-715x Series

Code Number	Description
V-9999-670	Bonnet Adaptor (Used for Field Mounting to VT Series Valve Body with Threaded Stem)
Y20EBE-2	Adaptor Kit (Used for Field Mounting to VT Series Valve Body with Slotted Stem)
VA-7150-1900	Conduit Adaptor Kit
V-9999-HW1	Mounting Kit to Mount VA-715x or VA-720x Series Electric Actuators to Honeywell® V75011A, F, G, 1/2 Through 3 in. Single-Seated and V5013F Three-Way Valves
V-9999-BC1	Mounting Kit to Mount VA-715x or VA-720x Series Electric Actuators to Barber-Colman® 1/2 Through 1-1/4 in. VB-9xxx Valve Bodies



Dimensions in. (mm)

Features

- magnetic clutch provides constant output force for positive closeoff of valves, and protects the motor in stall conditions
- selectable direct and reverse action simplifies setup and installation
- durable construction provides a longer cycle life
- compact unit provides 90 lb force output, covering a wide range of applications with just one actuator
- unique yoke design enables easy field mounting to valves, reducing installation and stroke adjustment time

Applications

The VA-715x Series Actuator is used in conjunction with VG7000 Series Valves for hot water and chilled water systems. For VG7000 Series Valve options, refer to *VG7000 Series Brass Trim Globe Valves with VA-715x Series Electric Actuators Catalog Page (LIT-1900084)* on Page 173 and *VG7000 Series Stainless Steel Trim Globe Valves with VA-715x Series Electric Actuators Catalog Page (LIT-1900090)* on Page 184. For field mounting options, refer to *VG7000 Series Bronze Globe Valves for Assembly in the Field Catalog Page (LIT-1924005)* on Page 215.



VA-715x Electric Valve Actuator

Repair Information

If the VA-715x Series Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Technical Specifications

VA-715x Series Electric Valve Actuator	
Power Requirements	24 VAC (20 to 30 VAC), 50/60 Hz
Input Signal	Incremental: 24 VAC, 50/60 Hz Incremental with Position Feedback: 24 VAC, 50/60 Hz Proportional: 0 to 10 VDC
Input Signal Adjustments (Proportional)	Input Signal: 0 to 5, 5 to 10, 0 to 10 VDC (Jumper Selectable) Action: Drive Up (RA) or Drive Down (DA) on Signal Increase (Jumper Selectable) Factory Setting: 0 to 10 VDC Over 3/4 in. (19 mm) Stroke, DA
Input Impedance (Proportional)	100,000 Ohms
Feedback Signal	Proportional: 0 to 2000 Ohm ±25%, 1/4 Watt, Over 25/32 in. (20 mm) Stroke
Mechanical Output	90 lb Force (400 N) Minimum
Stroke Range	5/16 to 25/32 in. (8 to 20 mm)
Nominal Stroke Timing	50 Hz: 85 Seconds 5/16 in. (8 mm) Stroke 135 Seconds 1/2 in. (13 mm) Stroke 200 Seconds 3/4 in. (19 mm) Stroke 60 Hz: 70 Seconds 5/16 in. (8 mm) Stroke 110 Seconds 1/2 in. (13 mm) Stroke 165 Seconds 3/4 in. (19 mm) Stroke
Media Temperature	280°F (138°C) Maximum
Electrical Connection	Screw Terminals for 16 AWG Maximum
Mechanical Connection	For 1/4 - 28 UNF Valve Stem
Enclosure	NEMA 2, IP42
Ambient Conditions	Operating: 0 to 140°F (-18 to 60°C); 10 to 90% RH Non-Condensing 86°F (30°C) Maximum Dew Point Storage: -4 to 150°F (-20 to 65°C); 5 to 90% RH, 86°F (30°C) Maximum Dew Point
Agency Listings	UL 873 Listed, File E27734 CSA C22.2 No. 139 Certified, File LR85083

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VA-720x Series

LIT-1924180

Electric Valve Actuator

Description

The VA-720x Series Electric Actuator provides incremental or proportional control of valves with up to a3/4 in. stroke in heating, ventilating, and air conditioning applications.

The VA-720x is a non-spring return, synchronous, motor-driven electric actuator featuring a 180 lb (800 N) minimum seating force in a compact, easy-to-install package. It accepts incremental control from a three-wire 24 VAC control signal or aproportional DC control signal (up to 10 volts maximum). The VA-7203 also contains a 2000 ohm position feedback potentiometer.

The VA-720x Series can be easily field-mounted to VBC Series Bronze Cage Trim Valves and factory or field mounted to VG7000 Series Bronze Control Valves.

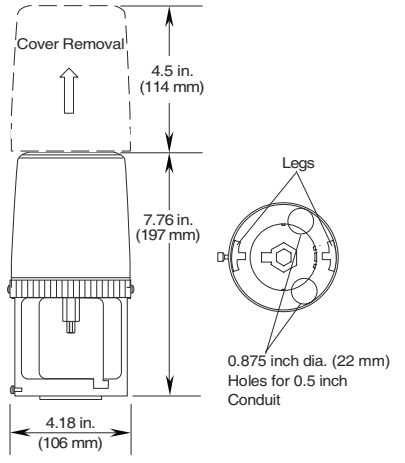
Selection Charts

VA-720x Series Actuators

Code Number	Description
VA-7200-1001	Three-Wire Incremental
VA-7203-1001	Three-Wire Incremental with Position Feedback
VA-7202-1001	Proportional: 0 to 10 VDC; 0 to 20 mA

Accessories for VA-720x Series

Code Number	Description
V-9999-HW1	Mounting Kit to mount VA-715x or VA-720x Series Electric Actuators to Honeywell® V75011A, F, G, 1/2 through 3 in. Single-Seated and V5013F Three-Way Valves
V-9999-BC1	Mounting Kit to mount VA-715x or VA-720x Series Electric Actuators to Barber-Colman® 1/2 through 1-1/4 in. VB-9xxx Valve Bodies
VG7000-1016	Bonnet Adapter for VA7200 Series Electric Actuator on 1 to 2 in. VG7000 Series Valves



Dimensions in. (mm)

Features

- compact unit provides 180 lb force (800 N) output covering a wide range of applications with just one actuator
- magnetic clutch provides constant output force for positive closeoff of valves and protects motor in stall conditions
- durable construction provides longer cycle life
- unique yoke design enables easy field mounting to valves, reducing installation and stroke adjustment time
- selectable direct and reverse action simplifies setup and installation
- built-in resistor for current control provides greater application flexibility

Applications

The VA-720x Series Actuator is used in conjunction with VG7000, VT, Flare, and Bronze Cage Trim Valves for hot water and chilled water systems. For VG7000 Series Valve factory mounted options, refer to *VG7000 Series Brass Trim Globe Valves with VA720x Series Electric Actuators Catalog Page (LIT-1900085)* on Page 176 and *VG7000 Series Stainless Steel Trim Globe Valves with VA-720x Series Electric Actuators Catalog Page (LIT-1900091)* on Page 186. For field mounting options refer to *VG7000 Series Bronze Globe Valves for Assembly in the Field Catalog Page* on Page 215.



VA-720x Electric Valve Actuator

Repair Information

If the VA-720x Series Actuator fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Technical Specifications

VA-720x Series Electric Valve Actuator	
Power Requirements	24 VAC (20 to 30 VAC), 50/60 Hz
Input Signal	Incremental: 24 VAC, 50/60 Hz Proportional: 0 to 10 VDC or 0 to 20 mA (Jumper Selectable)
Input Signal Adjustments (Proportional)	Offset: Adjustable 0 to 8 VDC / 0 to 16 mA Span: 2 to 10 VDC or 4 to 20 mA Action: Drive Up (DA) or Drive Down (DA) on Signal Increase Factory Setting: 0 to 10 VDC, Drive Up (DA), 3/4 in. (19 mm) Stroke
Input Impedance (Proportional)	Voltage: 100,000 Ohms Current: 500 Ohms
Feedback Signal	Proportional: 0 to 2000 Ohm ± 25%, 1/4 Watt, Over 25/32 in. (20 mm) Stroke
Mechanical Output	180 lb Force (800 N) Minimum
Stroke Range	25/32 in. (20 mm) Maximum
Nominal Stroke Timing	50 Hz: 50 Seconds 1/2 in. (13 mm) Stroke 74 Seconds 3/4 in. (19 mm) Stroke 60 Hz: 42 Seconds 1/2 in. (13 mm) Stroke 62 Seconds 3/4 in. (19 mm) Stroke
Media Temperature	280°F (138°C) Maximum
Electrical Connection	Screw Terminals: VA-7200: 24 to 14 AWG VA-7203: 24 to 16 AWG VA-7202: 24 to 16 AWG
Mechanical Connection	For 1/4 - 28 UNF-2B Thread for Valve Stem Connection
Enclosure	NEMA 2, IP42
Ambient Conditions	Operating: 23 to 131°F (-5 to 55°C), 5 to 90% RH Non-Condensing 86°F (30°C) Maximum Dew Point Storage: -4 to 150°F (-20 to 65°C); 5 to 95% RH, 86°F (30°C) Max. Dew Point
Agency Listings	UL 873 Listed, File E27734 CSA C22.2 No. 139 Certified, File LR850853

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VA-9000 Series

LIT-1924185

Electric Rotary Actuators

Description

The VA-9000 Series Electric Rotary Actuators mount directly on VF Series Butterfly Valves. These actuators are available in two different sizes for two-position or modulating service on 16 through 20 in. standard-temperature, standard-pressure butterfly valves, and 10 through 16 in. high-temperature, high-pressure butterfly valves.

Features

- built-in motor overload protection
- output torques from 10,000 or 21,000 lb·in (1,130 or 2,373 N·m)
- visual position indication and manual override on all models
- factory-set limit switches



Two-Way VF Series Valve with VA-9000 Series Actuator

Selection Charts

VA-9000 Series Electric Rotary Actuators

Actuator Code Number	Actuator Sub-Code	Bray Series Number	Service	Output Torque lb·in (N·m)	Stroke Time Seconds	Current Rating Amperes	Valve Size in.	Shipping Weight, lb (kg)
VA-9007-01B	-907	S71-0100 Modulating	Modulating	10,000 (1,130)	60	2.8	14 and 16	36.0 (16.3)
VA-9007-01C							18 and 20	
VA-9007-02B	-927	S71-0100 Two-Position	Two-Position		30		14 and 16	34.0 (15.4)
VA-9007-02C							18 and 20	
VA-9008-01B	-908	S71-0200 Modulating	Modulating	21,000 (2,373)	55	7.2	14 and 16	95.0 (43.1)
VA-9008-01C							18 and 20	
VA-9008-02B	-928	S71-0200 Two-Position	Two-Position		55		14 and 16	93.0 (42.2)
VA-9008-02C							18 and 20	

Accessories and Repair Parts for VA-9000 Series

Code Number	Description
Servo Control Kits	
VA-9420-601	4 to 20 mA for Discontinued VA-9001, VA-9002, VA-9003, VA-9004, VA-9005, and VA-9006 Series Modulating Electric Actuators
VA-9420-601	4 to 20 mA for Discontinued VA-9007 and VA-9008 Series Modulating Electric Actuators (Manufactured Prior to January, 1995)
VA-9420-602	4 to 20 mA for Current VA-9007 and VA-9008 Series Modulating Electric Actuators (Manufactured After January, 1995)
Mounting and Adaptor Kits for Standard-Pressure, Standard-Temperature Two-Way VF Series Butterfly Valves	
VA-9007-1600	Used when Mounting VA-9007 Series Electric Rotary Actuators on 16 in. Standard-Pressure, Standard-Temperature VF Series Butterfly Valves
VA-9007-2000	Used when Mounting VA-9007 Series Electric Rotary Actuators on 18 and 20 in. Standard-Pressure, Standard-Temperature VF Series Butterfly Valves
VA-9008-1600	Used when Mounting VA-9008 Series Electric Rotary Actuators on 16 in. Standard-Pressure, Standard-Temperature VF Series Butterfly Valves
VA-9008-2000	Used when Mounting VA-9008 Series Electric Rotary Actuators on 18 and 20 in. Standard-Pressure, Standard-Temperature VF Series Butterfly Valves
Mounting and Adaptor Kits for Class 150 High-Pressure, High-Temperature Two-Way VF Series Butterfly Valves	
VA-9007-1410	Used when Mounting VA-9007 Series Electric Rotary Actuators on 14 in. Class 150 High-Pressure, High-Temperature VF Series Butterfly Valves
VA-9008-1610	Used when Mounting VA-9007 Series Electric Rotary Actuators on 16 in. Class 150 High-Pressure, High-Temperature VF Series Butterfly Valves
Mounting and Adaptor Kits for Class 300 High-Pressure, High-Temperature Two-Way VF Series Butterfly Valves	
VA-9007-1230	Used when Mounting VA-9007 Series Electric Rotary Actuators on 10 in. Class 300 High-Pressure, High-Temperature VF Series Butterfly Valves
VA-9008-1230	Used when Mounting VA-9008 Series Electric Rotary Actuators on 12 in. Class 300 High-Pressure, High-Temperature VF Series Butterfly Valves
VA-9008-1430	Used when Mounting VA-9008 Series Electric Rotary Actuators on 14 in. Class 300 High-Pressure, High-Temperature VF Series Butterfly Valves
Limit Switch Kit	
VA-900X-601	For All Models of VA-9007 and VA-9008 Series Electric Rotary Actuators
Thermostat/Heater Kit	
VA-900X-602	For All Models of VA-9007 and VA-9008 Series Electric Rotary Actuators
Feedback Potentiometer Kit	
VA-900X-603	0 to 1,000 ohms; For All Models of VA-9007 and VA-9008 Series Electric Rotary Actuators

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VA-9000 Series Electric Rotary Actuators (Continued)

Technical Specifications

VA-9000 Series Electric Rotary Actuators	
Models	VA-900x-01 Modulating
	VA-900x-02 Two-Position
Supply Voltage	120 VAC; 50/60 Hz
Limit Switches	Two, Rated at 15 A Each and Factory Set at 0 and 90° Travel (With LED Indication[1])
Control Signal[2].	4 to 20 mA DC Factory Set
Feedback Potentiometer[2].	1,000 ohms
Input Impedance[2].	390 ohms
Ambient Temperature Limits	-40 to 150°F (-40 to 66°C) Heater/Thermostat Kit[2] Required Below 32°F (0°C)
Agency Listing	CSA Approved
Enclosure	Die-Cast Aluminum NEMA 4 Enclosure; Standard Red Exterior

1. VA-900x-01 Series Modulating Actuators only.
2. Heater/Thermostat is supplied standard for VA-900x-01 Modulating Actuators. Can be ordered as a factory-installed option for VA-900x-02 two-position actuators; use option “D” in *Accessory* field of VF Series Butterfly Valve ordering code.

Dimensions

Code Number	Height	Clearance for Cover Removal
VA-9007-01	16-3/4 in. (425 mm)	10 in. (254 mm)
VA-9007-02		
VA-9008-01	24 in. (610 mm)	
VA-9008-02		

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VA-9070 Series

LIT-1924415

Electric Rotary Actuators

Description

The VA-9070 Series Electric Rotary Actuators are designed for direct mounting on the VF Series Standard-Pressure, Standard-Temperature Butterfly Valves and the VF Series High-Pressure, High-Temperature Butterfly Valves. The VA-9070 Series actuators are available in eight different sizes for two-position and modulating service.

For more detailed information on VA-9070 Series Electric Rotary Actuators, refer to the *Bray® Series 70 Electric Actuator Color Brochure (Bulletin No. B-1016).*

Features

- low profile and lightweight design reduces space requirements and provides ease of installation
- built-in motor overload protection prevents thermal overload of motor
- pre-wired actuator switches to terminal block and field-configurable power and input signals provide ease of wiring without interference from other components; enables field modification of input signal
- patented travel limit switch cam design allows for simple finger or screwdriver adjustment of travel limit cams without interference
- external manual handwheel override ensures positive and fast manual operation without the need for extra tools or levers
- rugged, die-cast aluminum NEMA 4, 4X, IP65 Type enclosure and captive housing screws provide waterproofing and exceptional corrosion, wear, impact, and Ultraviolet (UV) resistance; prevents time-consuming problems due to lost or misplaced bolts
- valve status display provides clear and convenient indication of valve position throughout full range of travel
- optional heater/thermostat prevents condensation build-up and freeze-ups

Repair Information

If the VA-9070 Series Electric Rotary Actuator fails to operate within its specifications, replace the unit. For a replacement VA-9070 actuator, contact the nearest Johnson Controls® representative.



VA-9070 Series Electric Rotary Actuator Mounted on a VF Series Butterfly Valve

Selection Charts

Actuator Selection for Two-Way High Performance VF Series Butterfly Valves

Valve Size (in.)	Torque Required[1] lb·in (N·m)	Actuator Code Number for	
		Two-Position Service	Modulating Service
550 psig Closeoff Pressure			
2-1/2	510 (57.6)	VA-9073-02	VA-9073-01
3	530 (59.9)		
4	730 (82.5)		
5	1,850 (209)	VA-9075-02	VA-9075-01
6	2,300 (260)	VA-9076-02	VA-9076-01
8	4,300 (486)	VA-9077-02	VA-9077-01
240 psig Closeoff Pressure			
2-1/2	300 (33.9)	VA-9072-02	VA-9072-01
3	320 (36.2)		
4	460 (52.0)		
5	1,040 (118)	VA-9074-02	VA-9074-01
6	1,200 (136)	VA-9075-02	VA-9075-01
8	2,100 (237)	VA-9076-02	VA-9076-01
10	4,100 (463)	VA-9077-02	VA-9077-01
12	6,500 (734)	VA-9078-02	VA-9078-01

1. Torque values include a safety factor.

Actuator Selection for Two-Way Standard Performance VF Series Butterfly Valves

Valve Size (in.)	Torque Required lb·in (N·m)	Actuator Code Number for	
		Two-Position Service	Modulating Service
150 or 175 psig (High) Closeoff Pressure[1]			
2	158 (17.9)[2]	VA-9071-02	VA-9071-01
2-1/2	188 (21.2)[2]		
3	225 (25.4)[2]		
4	465 (52.5)[2]	VA-9072-02	VA-9072-01
5	585 (66.1)[2]	VA-9073-02	VA-9073-01
6	705 (79.7)[2]		
8	1,530 (172.9)[2]	VA-9075-02	VA-9075-01
10	3,296 (372.4)[2]	VA-9076-02	VA-9076-01
12	5,165 (583.6)[2]	VA-9077-02	VA-9077-01
14	6,450 (728.8)[2]	VA-9078-02	VA-9078-01
50 psig (Low) Closeoff Pressure[3]			
4	225 (25.4)[2]	VA-9071-02	VA-9071-01
5	390 (44.1)[2]	VA-9072-02	VA-9072-01
6	570 (64.4)[2]		
8	705 (79.7)[2]	VA-9073-02	VA-9073-01
10	1,410 (159.3)[2]	VA-9075-02	VA-9075-01
12	2,595 (293.2)[2]	VA-9076-02	VA-9076-01
14	3,300 (372.9)[2]	VA-9077-02	VA-9077-01
16	4,268 (482.2)[2]		
18	5,267 (595.1)[2]	VA-9078-02	VA-9078-01
20	16,867 (775)[2]		

1. 150 psig (1,034 kPa) for 14 in. valves; 175 psig (1,207 kPa) for 2 through 12 in. valves.
2. Torque values have already been adjusted for 25% safety factor on 2 through 12 in. valves; 10% safety factor on 14 in. valves.
3. 50 psig (345 kPa) for 4 through 20 in. valves.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VA-9070 Series Electric Rotary Actuators (Continued)

Actuator Selection for Three-Way Standard Performance VF Series Butterfly Valves

Valve Size (in.)	Torque Required lb·in (N·m)	Actuator Code Number for	
		Two-Position Service	Modulating Service
175 psig (High) Closeoff Pressure[1]			
2	190 (21.5)[2]	**VA-9071-02**	**VA-9071-01**
2-1/2	225 (25.4)[2]		
3	270 (30.5)[2]		
4	558 (63.0)[2]	**VA-9073-02**	**VA-9073-01**
5	702 (79.3)[2]		
6	846 (95.6)[2]	**VA-9074-02**	**VA-9074-01**
8	1,836 (207.4)[2]	**VA-9075-02**	**VA-9075-01**
10	3,955 (446.9)[2]	**VA-9077-02**	**VA-9077-01**
12	6,198 (700.3)[2]	**VA-9078-02**	**VA-9078-01**
50 psig (Low) Closeoff Pressure[3]			
4	270 (30.5)[2]	**VA-9071-02**	**VA-9071-01**
5	468 (52.9)[2]	**VA-9072-02**	**VA-9072-01**
6	684 (77.3)[2]	**VA-9073-02**	**VA-9073-01**
8	846 (95.6)[2]	**VA-9074-02**	**VA-9074-01**
10	1,692 (191.2)[2]	**VA-9075-02**	**VA-9075-01**
12	3,114 (351.8)[2]	**VA-9077-02**	**VA-9077-01**

1. 175 psig (1,207 kPa) for 2 through 12 in. valves.
2. Torque values have already been adjusted for 25% safety factor for all sizes.
3. 50 psig (345 kPa) for 4 through 12 in. valves.

Accessories

Thermostat/Heater Kit

Code Number	Description
VA-907x-609	Thermostat/Heater kit for all models of VA-9070 Series Two-Position and Modulating Electric Actuators

Mounting and Adaptor Kits for Class 150 High-Pressure, High-Temperature Two-Way VF Series Butterfly Valves

Code Number	Description
VA-9072-410	Mounts VA-9072 Series Electric Actuators on 2-1/2 through 4 in. Valves
VA-9075-610	Mounts VA-9074 Series Electric Actuators on 5 in. and VA-9075 Series Electric Actuators on 6 in. Valves
VA-9078-810	Mounts VA-9076 Series Electric Actuators on 8 in. Valves
VA-9078-1210	Mounts VA-9077 Series Electric Actuators on 10 in. and VA-9078 Series Electric Actuators on 12 in. Valves

Mounting and Adaptor Kits for Class 300 High-Pressure, High-Temperature Two-Way VF Series Butterfly Valves

Code Number	Description
VA-9075-430	Mounts VA-9073 Series Electric Actuators on 2-1/2 through 4 in. Valves
VA-9075-530	Mounts VA-9075 Series Electric Actuators on 5 in. Valves
VA-9075-630	Mounts VA-9076 Series Electric Actuators on 6 in. Valves
VA-9075-830	Mounts VA-9077 Series Electric Actuators on 8 in. Valves

Mounting and Adaptor Kits for Standard-Pressure, Standard-Temperature Two-Way VF Series

Code Number	Description
VA-9072-300	Mounts VA-9071 and VA-9072 Series Two-Position and Modulating Electric Actuators on 2 through 3 in. Valves
VA-9072-400	Mounts VA-9071 and VA-9072 Series Two-Position and Modulating Electric Actuators on 4 in. Valves
VA-9072-600	Mounts VA-9071 and VA-9072 Series Two-Position and Modulating Electric Actuators on 5 through 6 in. Valves
VA-9075-400	Mounts VA-9073, VA-9074, and VA-9075 Series Two-Position and Modulating Electric Actuators on 4 in. Valves
VA-9075-600	Mounts VA-9073, VA-9074, and VA-9075 Series Two-Position and Modulating Electric Actuators on 5 and 6 in. Valves
VA-9075-800	Mounts VA-9073, VA-9074, and VA-9075 Series Two-Position and Modulating Electric Actuators on 8 in. Valves
VA-9075-1200	Mounts VA-9073, VA-9074, and VA-9075 Series Two-Position and Modulating Electric Actuators on 10 and 12 in. Valves
VA-9078-800	Mounts VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators on 8 in. Valves
VA-9078-1200	Mounts VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators on 10 and 12 in. Valves
VA-9078-1600	Mounts VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators on 14 and 16 in. Valves
VA-9078-2000	Mounts VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators on 18 in. Valves
VA-9078-2000	Mounts VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators on 20 in. Valves

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VA-9070 Series Electric Rotary Actuators (Continued)

Technical Specifications

VA-9070 Series Electric Rotary Actuators	
Supply Voltage	120 VAC, 50/60 Hz
Limit Switches	Two Single-Pole, Double-Throw (SPDT) switches rated for 10 amperes (75 to 80% power factor), 1/2 hp 125 VAC and 3/4 hp 250 VAC
Control Signal	4 to 20 mA or 0 to 10 VDC, field-selectable
Ambient Temperature Limits	-40 to 150°F (-40 to 66°C); Heater/Thermostat Kit Required below 32°F (0°C)
Agency Listings	UL File number E200414; CSA reference LR 78858; CE compliant. All VA-9070 actuators are CSA approved under Class 3211 07 Industrial Control Equipment - Miscellaneous Apparatus. The CSA certificate number is LR78858-4 issued July 1996 to Bray Controls for the Series 70 actuators, NEMA 4, and NEMA 4X.

Electrical and Torque Specifications

Johnson Controls Code Number (Bray Series Number)	120 VAC, 50/60 Hz Single Phase Motors: Current Rating at All Speeds	Two-Position and Modulating Speeds for 90 Degree Operation (Total Gear Ratio)[1]	Output Torque lb·in (N·m)	Rim Pull lb (kg)	Valve Sizes for Direct Mount	Net Weight lb (kg)
VA-9071 (S70-003)	2.0 Amperes	30 seconds (5,070:1)	300 (34)	11.4 (5.2)	2 through 6 in.	12.0 (5.4)
VA-9072 (S70-005)			500 (57)	19.0 (8.6)		
VA-9073 (S70-008)	2.3 Amperes	30 seconds (3,340:1)	800 (90)	13.0 (5.9)	2 through 12 in.	28.0 (12.7)
VA-9074 (S70-012)			1,200 (136)	20.0 (9.1)		
VA-9075 (S70-020)			2,000 (226)	33.0 (15.0)		
VA-9076 (S70-030)	3.1 Amperes		3,000 (339)	33.0 (15.0)	8 through 20 in.	48.0 (21.8)
VA-9077 (S70-050)			5,000 (565)	55.0 (25.0)		
VA-9078 (S70-065)			6,500 (734)	72.0 (32.7)		

1. The duty cycle for two-position and modulating operation is 100% at a maximum ambient temperature of 104°F (40°C).

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VA9104-xGA-2S, -3S Series

LIT-1900354

Electric Non-Spring Return Valve Actuators

Description

The VA9104 Series Actuators are direct-mount, non-spring return electric valve actuators that operate on AC 24 V power. Use these synchronous motor-driven actuators to provide accurate positioning on Johnson Controls® VG1000 Series DN15, DN20, and DN25 (1/2, 3/4, and 1 in.) ball valves in Heating, Ventilating, and Air Conditioning (HVAC) applications.

The VA9104 Series Electric Non-Spring Return Actuators provide a running torque of 35 lb·in (4 N·m). The nominal travel time is 60 seconds at 60 Hz (72 seconds at 50 Hz) for 90° of rotation.

Refer to the *VA9104-xGA-2S, -3S Series Electric Non Spring Return Valve Actuators Product Bulletin (LIT-12011050)* for important product application information.

Features

- 35 dBA nominal audible noise rating meets the audible noise requirements for open ceiling environments: whisper quiet operation will not disturb building occupants
- synchronous drive provides a constant rotation time that is independent of the load
- 100,000 cycle rating provides years of trouble-free service
- direct mounting with single screw reduces installation time and cost
- manual override allows for manual positioning of the valve, independent of a power supply
- plenum cable with integral connector for 3/8 in. (10 mm) flexible metal conduit or screw terminal electrical connections make wiring quick and easy while allowing for ceiling plenum applications



VA9104 Series Electric Non-Spring Return Actuator on a VG1000 Series Ball Valve

Selection Charts

VA9104-xGA-2S, -3S Series Electric Non-Spring Return Valve Actuators

Code Number	Control Type	Input Signal	Power Requirements	Electrical Connections
VA9104-AGA-2S	Floating without timeout	AC 19.2 to 30 V, 50/60 Hz	AC 24 V at 50/60 Hz, 2.3 VA	48 in. (1.2 m) 18 AWG UL CMP Plenum Cable with integral connector for 3/8 in. (10 mm) flexible metal conduit
VA9104-AGA-3S				M3 Screw Terminals
VA9104-GGA-2S	Proportional	DC 0 (2) to 10 V, or (0) 4 to 20 mA[1]	AC 24 V at 50/60 Hz, 3.6 VA	48 in. (1.2 m) 18 AWG UL CMP Plenum Cable with integral connector for 3/8 in. (10 mm) flexible metal conduit
VA9104-GGA-3S				M3 Screw Terminals
VA9104-IGA-2S	Floating or On/Off with timeout	AC 19.2 to 30 V, 50/60 Hz	AC 24 V at 50/60 Hz, 3.0 VA	48 in. (1.2 m) 18 AWG UL CMP Plenum Cable with integral connector for 3/8 in. (10 mm) flexible metal conduit
VA9104-IGA-3S				M3 Screw Terminals

1. Milliamp input requires field furnished 500 ohm resistor.

VA9104-xGA-2S, -3S Accessories (Order Separately)

Code Number	Description
M9000-550	Mounting Hardware Replacement kit
M9000-200	Commissioning Tool that Provides a Control Signal to Drive 24 V On/Off, Floating, Proportional, and/or Resistive Electric Actuators

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VA9104-xGA-2S, -3S Series Electric Non-Spring Return Valve Actuators (Continued)

Technical Specifications

VA9104-xGA-2S, -3S Series Electric Non-Spring Return Valve Actuators		
Power Requirements		AC 24 V +25%/-20% at 50/60 Hz, 2.1 VA Supply, Class 2 or Safety Extra-Low Voltage (SELV)
Control Type	**VA9104-AGA-xS**	Floating Control without Timeout[1]
	VA9104-GGA-xS	Proportional Control
	VA9104-IGA-xS	Floating or On/Off Control with Timeout
Input Signal	**VA9104-AGA-xS**	AC 24 V +25%/-20% at 50/60 Hz, Class 2 or SELV without Timeout
	VA9104-GGA-xS	DC 0 (2) to 10 V or 0 (4) to 20 mA with Field Furnished 500 ohm Resistor
	VA9104-IGA-xS	AC 24 V +25%/-20% at 50/60 Hz, Class 2 or SELV with Timeout
Motor Input Impedance	**VA9104-AGA-xS**	200 ohms Nominal
Control Input Impedance	**VA9104-GGA-xS**	Voltage Input: 200,000 ohms Current Input: 500 ohms with Field Furnished 500 ohm Resistor
Running Torque		35 lb·in (4 N·m)
Travel Time		60 Seconds at 60 Hz (72 Seconds at 50 Hz) for 90° of Rotation
Rotation Range		93° ±3°, CW or CCW
Cycles		100,000 Full Stroke Cycles; 2,500,000 Repositions at Rated Running Torque
Audible Noise Rating		35 dBA Nominal at 39-13/32 in. (1 m)
Electrical Connections	**VA9104-xGA-2S**	48 in. (1.2 m) 18 AWG UL CMP Plenum Cable with 1/4 in. (6 mm) Stripped Wire Leads with integral connector for 3/8 in. (10 mm) flexible metal conduit
	VA9104-xGA-3S	M3 Screw Terminals
Enclosure	**VA9104-xGA-2S**	NEMA 2, IP42
	VA9104-xGA-3S	NEMA 1, IP40
Ambient Conditions	**Operating**	-4 to 140°F (-20 to 60°C); 90% RH Maximum, Noncondensing
	Storage	-20 to 150°F (-29 to 66°C); 90% RH Maximum, Noncondensing
Fluid Temperature Limits (Actuator and Valve Assembly)	**Water**	VG1241 and VG1841 Series Valves: 23 to 203°F(-5 to 95°C) VG1245 and VG1845 Series Valves: -22 to 212°F (-30 to 100°C)
	Steam	Not Rated for Steam Service
Compliance	**North America**	UL Listed, File E27734, CCN XAPX (United States) and XAPX7 (Canada)
		Actuator Housing is Plenum Rated per CSA C22.2 No. 236/UL 1995, Heating and Cooling Equipment.
	European Union	CE Mark, EMC Directive 89/336/EEC
	Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant
Shipping Weight		1.25 lb (0.55 kg)

1. To avoid excessive wear or drive time on the motor for the AGx models, use a controller and/or software that provides a timeout function to remove the signal at the end of rotation (stall). The GGx and IGx models have an auto shutoff to avoid excessive wear or drive time on the motor.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

D-3031

LIT-1921005

Pneumatic Piston Damper Actuator

Description

The D-3031 Pneumatic Actuator is designed primarily for damper positioning on small terminal units. Models, furnished with 1 inch (25 mm) stroke, have two movable adjustment stops to facilitate adjusting the stroke in 1/8 inch increments. The D-3031 features a polycarbonate top and body and a threaded 5/16 inch (8 mm) diameter piston rod for convenient linkage attachment.

The D-3031 is the unit replacement for D-160 and D-251 #2S actuators.

Features

- high power to size ratio for locations in confined spaces
- swivel or rigid mounting options for flexible mounting configurations
- optional mounting kits to cover any application and replacement of obsolete units
- barbed fitting for 5/32 inch or 1/4 inch O.D. tubing

Applications

The D-3031 is designed for either swivel or rigid type face mounting to operate power fail open or power fail closed dampers. The actuator can be rotated as required to locate the air connection in the preferred position. Refer to Installation Data D-3031-A for mounting bracket details and arrangements.

The D-3031 has a maximum stroke of 1 inch without stops. Two stroke adjustment stops are provided for limiting the stroke in 1/8 inch increments from 7/8 to 1/2 inch.

Repair Information

The D-3031 is a sealed unit. If the D-3031 Pneumatic Piston Damper Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.



D-3031 Pneumatic Piston Damper Actuator

Selection Charts

D-3031 Pneumatic Piston Damper Actuator

Code Number	Nominal Spring Range, psig (kPa)
D-3031-3	5-10 (35-70)
D-3031-4	8-13 (56-91)
D-3031-18	10 - 15 (70-105)

WARNING: **The following solvents will harm polycarbonate: Acetone, all chlorinated solvents (Perchlorethylene, Trichloroethylene, Chlorothene NU T-9999-3, and others), Benzene, Carbontetrachloride, Ethylacrylate (Leak Detector #7-P), Ethylene Dichloride, Freon (refrigerant and spray can propellent), Hydrochloric Acid (concentrated), Methyl Alcohol, Methylene Chloride, Nitro Cellulose Lacquer, Toluene, some synthetic compressor oils, and Xylene.**

Maximum Actuator Force [1]

Supply Pressure, psig (kPa)	Nominal Spring Range psig (kPa)	Stroke	Force, lb (Newton)	Torque Output for 90° Rotation
15 (105)	5 to 10 (35 to 70)	Power	14 (62.3)	19.5 in·lb (2.2 N·m)
		Return	14 (62.3)	19.5 in·lb (2.24 N·m)
	8 to 13 (56 to 91)	Power	5.6 (24.9)	7.8 in·lb (0.9 N·m)
		Return	22.4 (99.6)	31.4 in·lb (3.6 N·m)
20 (140)	5 to 10 (35 to 70)	Power	28 (124.6)	39.2 in·lb (4.4 N·m)
		Return	14 (62.3)	19.5 in·lb (2.2 N·m)
	8 to 13 (56 to 91)	Power	19.6 (87.2)	27.3 in·lb (3.1 N·m)
		Return	22.4 (99.6)	31.4 in·lb (3.6 N·m)

1. Force calculated using 1.4 lb/psig available actuator force.

Accessories for D-3031 Pneumatic Piston Damper Actuator

Code Number	Description	Weight, lb (Kg)
D-3031-100	Mounting Bracket Kit	3.5 (1.59)
D-3031-101	Type W Mounting Plate	0.8 (0.36)
D-3031-102	Type W Linkage Kit with 5/16 inch crank arm for 45° movement	0.8 (0.36)
DMPR-KC005	Shaft Extension Kit	1.0 (0.45)

Technical Specifications

D-3031 Pneumatic Actuator	
Mounting	Rigid or Swivel Type
Control Pressure	0 to 15 or 20 psig (0 to 105 or 140 kPa), 25 psig maximum (175 kPa maximum)
Stroke	1 inch (25 mm): Adjustable with stops to 7/8, 3/4, 5/8, and 1/2 inch (22, 19, 16, and 13 mm)
Effective Diaphragm Area	2.8 $in.^2$ (18 cm^2)
Spring Ranges	D-3031-3, 5 to 10 psig (35 to 70 kPa) D-3031-4, 8 to 13 psig (56 to 91 kPa)
Piston Rod	Threaded, 5/16 inch diameter
Air Connection	Barbed fitting for 5/32 or 1/4 inch O.D. Polytubing
Ambient Temperature Conditions	–20 to 150°F (–29 to 66°C)
Materials	Actuator and Nuts: Polycarbonate Stops: Nylon Swivel Washers: Oilon Diaphragm: Synthetic Elastomer Rod and Spring: Steel
Dimensions	2-1/2 inch diameter x 4-15/16 inch long (barbed fitting extends 5/16 inch from diameter)

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

D-3062 LIT-1921010

Pneumatic Piston Damper Actuator

Description

The D-3062 Pneumatic Actuator is a multipurpose positioning device used to accurately position small dampers primarily on Variable Air Volume (VAV), terminal units and small ventilating dampers in response to output signals of a pneumatic controller or electro-pneumatic transducer.

The actuator is also recommended for use on other air flow control dampers, in interior locations, with a up to a maximum area of 4 square feet for proportional volume control and 6.25 square feet for two position actuation provided that the torque requirements are compatible with the specific application.

The D-3062 is UL component recognized for use on UL Classified 555/555S smoke and combination fire/smoke dampers, which have been tested and approved to a degradation temperature of 250°F (121°C).

Features

- high power to size ratio for locations in confined spaces
- all-aluminum housing which is lightweight and non-combustible
- telescoping linkage for fast and flexible installation
- front or rear mounting options for flexible mounting configurations
- optional mounting kits to cover any application and replacement of obsolete units

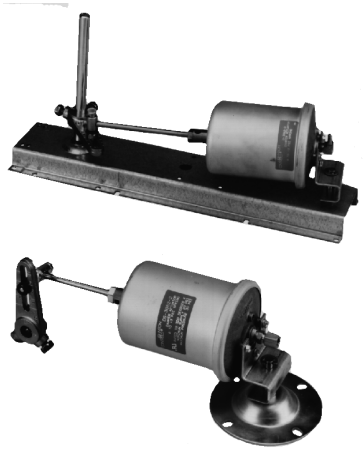
Applications

When used with proportional control, the damper size is limited to 4 square feet maximum.

As a 2-position control, damper size is limited to 6.25 square feet. As determined by testing using Johnson Controls D-1300 dampers, width and height are limited to 30 inches maximum.

Four nominal spring ranges are available: 3-7 psi (D-3062-1), 5-10 psi (D-3062-2), 8-13 psi (D-3062-3), and 11-15 psi (D-3062-4).

The control air pressure for normal HVAC operation is 0-20 psig. The minimum control pressure for safety damper ventilation mode is 20 psi with the maximum pressure of 30 psi. When used for both proportional and smoke applications, a separate air signal should be provided to override normal HVAC operations and enact safety damper functions.



D-3062 Pneumatic Piston Damper Actuators

Note: The D-3062 is not able to be configured for frame mounting in power fail open damper applications.

Repair Information

The D-3062 Damper Actuator has a sealed body, so field repairs cannot be made. If it fails to operate within its specifications, replace the unit. For a replacement damper actuator, contact the nearest Johnson Controls® representative.

Selection Charts

D3062
Pneumatic Piston Damper Actuators

Code Number	Nominal Spring Range, psig (kPa)
D-3062-1	3-7 (21-49)
D-3062-2	5-10 (35-70)
D-3062-3	8-13 (56-91)
D-3062-4	11-15 (77-105)
D-3062-41	8-13 (56-91) with Universal Mounting Kit

Mounting Kits[1] for D-3062 Damper Actuators

Code Number	Description	Weight, lb (Kg)
D-3062-100	Universal Mounting Kit for Type "W" (N.O. or N.C.) and Type "F" (N.C. only). The D-3062-100 mounting kit contains all parts required for the actuator to be mounted inside or outside the duct for use with D-1300 series dampers.	3.5 (1.59)
D-3062-101	Auxiliary Mounting Kit for multi-position swivel mounting.	0.8 (0.36)
D-3062-102	Small Damper Mounting Kit for limited space requirement mounting replaces #2 D-251.	0.8 (0.36)
D-3062-103	Unit Vent Mounting Kit as direct replacement of Johnson Controls D-3000, Robertshaw® M593 Series Actuators, Krueter MCP8030, or Barber-Colman MK693.	1.3 (0.59)
DMPR-KR001	RD-2000 - 9 to 16 inch round damper mounting kit	1.0 (0.45)

1. Mounting kits include bracket, linkage, and all necessary mounting hardware.

Accessories for D-3062 Damper Actuators

Code Number	Description	Weight, lb (Kg)
DMPR-KC050	Crank Arm: 7/16 inch adjustable to 2-3/4 inch radius	0.5 (0.23)
DMPR-KC051	Crank Arm: 3/8 inch adjustable to 2-3/4 inch radius	0.5 (0.23)
DMPR-KC053	Crank Arm: 1/2 inch adjustable to 2-3/4 inch radius	0.5 (0.23)
DMPR-KC300	Swivel Ball Joint	0.5 (0.23)
D-9999-152	Clevis Pin No. 6	0.5 (0.23)
D-9999-153	Twist Lock, Pin No. A	0.5 (0.23)
D-3062-104	Clevis - fork type	0.5 (0.23)
D-3062-106	Rod - 1/4-20 threaded one end	0.5 (0.23)
D-3062-107	Push-Pull Ball Joint and Nut, 5 per bag	1.0 (0.45)
D-3062-108	Rod - spade end	0.5 (0.23)
D-3062-600	Push-Pull Ball Joint	0.5 (0.23)
D-3073-604	Ball Joint - weather resistant	0.5 (0.23)

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

D-3062 Pneumatic Piston Damper Actuator (Continued)

Technical Specifications

D-3062 Pneumatic Actuators	
Stroke	2 inches (51 mm)
Control Air Pressure	0-20 psig for HVAC 20 psig (137 kPa) minimum for safety damper functions 30 psig (205 kPa) maximum
Air Connections	1/8 in. NPT straight barbed fitting for 5/32 or 1/4 in. O.D. polytubing (furnished). Compression fitting for 1/4 in. O.D. copper tubing (F-200-3, order separately).
Ambient Operating Conditions (HVAC)	-20 to 150°F (-29 to 66°C)
Effective Diaphragm Area	6.6 $in.^2$ (43 cm^2)
Materials	Body - Aluminum, Diaphragm - Synthetic elastomer
Dimensions	3-3/16 in. diameter x 6-13/16 in. long
Shipping Weight, lb (Kg)	1.2 (0.54)
Agency Listing	UL Recognized component to 250°F (121°C) with compression fitting for copper tubing File no. R15581

Maximum Actuator Force at 20 psig (140 kPa)

Nominal Spring Range psig (kPa)	Stroke	Force lb (Newton)	Torque Output for 90° Rotation	D-3062-Suffix
3 to 7 (21 to 49)	Power	85.8 (382)	85.8 in·lb (9.69 N·m)	-1
	Return	19.8 (88)	19.8 in·lb (2.24 N·m)	
5 to 10 (35 to 70)	Power	66 (294)	66 in·lb (7.45 N·m)	-2
	Return	33 (147)	33 in·lb (3.73 $N\cdot^2m$)	
8 to 13 (56 to 91)	Power	46.2 (206)	46.2 in·lb (5.22 N·m)	-3 -41
	Return	52.8 (235)	52.8 in·lb (5.96 N·m)	
11 to 15 (77 to 105)	Power	33 (147)	33 in·lb (3.73 N·m)	-4
	Return	72.6 (323)	72.6 in·lb (8.20 N·m)	

Note: Force calculated using 6.6 lb/psig available actuator force.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

D-3153, D-3244, D-3246

LIT-1924045

Pneumatic Actuators for VF Series Butterfly Valves

Description

The D-3153, D-3244, D-3246 Pneumatic Actuators position the VF Butterfly Valve's disc in response to a pneumatic signal from a controller.

Features

Easily field mounted to VF Series 2-way Butterfly Valves.

Applications

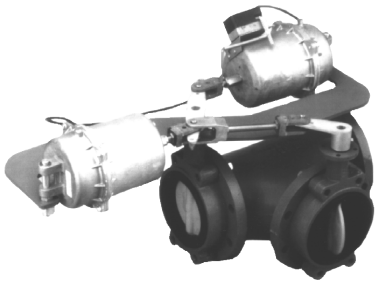
Used with VF Series Electric Butterfly Valves, 2 Through 20 in., Two-Way and Three-Way.

Repair Information

Actuator Series	Replacement Diaphragm
D-3153 Series	D-3153-600
D-3244 and D-3246 Series	D-3244-615



Two-Way VF Butterfly Valve with D-3153 Actuator



Three-Way VF Butterfly Valve with Tandem D-3246 Actuators

Selection Chart .

D-3153, D-3244, D-3246 Pneumatic Actuators for VF Series Butterfly Valves

Code Number	Description	VF Series Butterfly Valve Size
D-3153-5120	Pneumatic Actuator with D-9502 positioner For use with VF Series Butterfly Valves	2, 2.5, 3 in. High Pressure, 4 in. Low Pressure
D-3153-5130	Pneumatic Actuator For use with VF Series Butterfly Valves	2, 2.5, 3 in. High Pressure, 4 in. Low Pressure
D-3244-5100	Pneumatic Actuator with D-9502 positioner For use with VF Series Butterfly Valves	4 in. High Pressure, 5 in. Low Pressure
D-3244-5110	Pneumatic Actuator For use with VF Series Butterfly Valves	4 in. High Pressure, 5 in. Low Pressure
D-3246-5100	Pneumatic Actuator with D-9502 positioner For use with VF Series Butterfly Valves	5 in. High Pressure, 6 in. High or Low Pressure, 8 or 10 in. Low Pressure
D-3246-5110	Pneumatic Actuator For use with VF Series Butterfly Valves	5 in. High Pressure, 6 in. High or Low Pressure, 8 or 10 in. Low Pressure

Technical Specifications

Pneumatic Actuators for VF Series Butterfly Valves	
Maximum Control Pressure	25 psig (175 kPa) maximum except D-3153 without positioner, 30 psig (210 kPa) maximum.
Temperature Limits	-20 to 150° F (-29 to 66° C)
Available Spring Range	8 to 13 psig (56 to 91 kPa)
Air Connection	1/8 in. NPT Barbed Fitting for 5/32 or 1/4 in. O.D. Polytubing.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

D-4070 LIT-1921025

Pneumatic Piston Damper Actuator

Description

The D-4070 Two Stage Pneumatic Actuator is a multipurpose positioning device used to accurately position small dampers primarily on unit ventilators, Variable Air Volumes (VAVs), terminal units, and small ventilating dampers in response to output signals of a pneumatic controller or electro-pneumatic transducer.

The D-4070 was specifically designed to provide ASHRAE Cycle II and W control of unit ventilators where a minimum of outdoor air (15 to 50%) is admitted during the heating and ventilating stage and gradually increased to 100%, if needed, during the cooling and ventilating stage.

The D-4070 is a direct replacement for existing D-3070 actuators and a functional replacement for older D-255 actuators.

Features

- 2-way swivel connection ensures non-binding movement and full power delivery
- glass reinforced polymer housing which is lightweight, corrosion and chemical resistant
- telescoping Linkage for fast and flexible installation
- economical because has 2 springs for two stage operation which functions as two separate actuators
- designed to provide ASHRAE Cycle 11 and W controls of unit ventilators

Applications

The D-4070 has a first stage nominal spring range of 3 to 6 psig (21 to 42 kPa) and can be furnished with a second stage spring range of either 9 to 12 psig (63 to 84 kPa) or 11 to 14 psig (77 to 98 kPa). The control air pressure for normal HVAC operation is 0-20 psig. The total stroke of the D-4070 is 2-3/4 inch (70 mm) and is adjustable from 0 to 50% during the first stage of operation.

The D-4070 incorporates several internal and external features that add functional flexibility.



D-4070 Pneumatic Piston Damper Actuator

A 2-way swivel connection on the actuator cylinder head provides non-binding movement. All actuators have a telescoping piston rod for easy linkage of the damper for attachment points up to 8-3/4 inches (214 mm) away from the face of the actuator . A swivel ball joint and slotted crank arm connector are furnished on all actuators for optional methods of linkage to the damper.

When used with proportional control, the damper size is limited by the torque requirement.

Selection Charts

D-4070 Pneumatic Piston Damper Actuator[1]

Code Number	Nominal Spring Range, psig (kPa)
D-4070-1	3-6 (21-42) First Stage, 9-12 (63-84) Second Stage with Auxiliary Mounting Bracket
D-4070-2	3-6 (21-42) First Stage, 11-14 (35-70) Second Stage with Auxiliary Mounting Bracket
D-4070-6001	3-6 (21-42) First Stage, 9-12 (63-84) Second Stage body only
D-4070-6002	3-6 (21-42) First Stage, 11-14 (35-70) Second Stage body only

1. Check your UV standard equipment sheets for the various models for the unit ventilator manufacturers.
When a unit ventilator manufacturer specifies a D-4070, be sure to select the one that is designed for that unit.

Accessories for D-4070 Damper Actuator

Code Number	Description	Weight, lb (Kg)
D-3073-105	Mounting Post Kit, 5 per kit	0.5 (0.23)
D-3073-604	Ball Joint - weather resistant	0.5 (0.23)
D-3153-103	Rod - 8-3/4 inch (222 mm) replacement	1.0 (0.45)
D-3153-106	Auxiliary Mounting Bracket	1.0 (0.45)
D-3153-111	E-rings for Pivot Post, 10 per kit	0.5 (0.23)
D-3153-112	Mounting Nuts for Pivot Post, 10 per kit	0.5 (0.23)
DMPR-KC050	Crank Arm: 7/16 inch shaft radius adjustable to 2-3/4 inch radius	0.5 (0.23)
DMPR-KC051	Crank Arm: 3/8 inch shaft radius adjustable to 2-3/4 inch radius	0.5 (0.23)
DMPR-KC053	Crank Arm: 1/2 inch shaft radius adjustable to 2-3/4 inch radius	0.5 (0.23)
DMPR-KC054	Blade Arm Kit	1.3 (0.59)
DMPR-KC102	Rod - 4 feet (122 cm)	2.0 (0.91)
DMPR-KC251	Universal Mounting Bracket	3.5 (1.13)
DMPR-KC300	Swivel Ball Joint, 10 per kit	0.5 (0.23)

Technical Specifications

D-4070 2-stage Pneumatic Actuator	
Stroke	2-3/4 in. (70 mm)
Control Air Pressure	0 - 20 psig for HVAC, 25 psig (171 kPa) Maximum
Air Connections	1/8 in. NPT straight barbed fitting for 1/4 in. O.D. polytubing (furnished)
Ambient Storage Condition	-20 to 150°F (-29 to 66°C)
Ambient Operating Conditions	35 to 150°F (2 to 66°C)
Effective Diaphragm Area	6.7 in^2 (45 cm^2)
Housing Material	Glass reinforced polymer, UL 94 HB flame class rating
Diaphragm Material	Synthetic elastomer
Dimensions	3-7/8 in. diameter x 9-15/16 in. long
Shipping Weight	3.5 lb (1.6 kg)

Maximum Force[1] Values at 20 psig (140 kPa) Supply

First Stage Spring Range, psig (kPa)	Second Stage Spring Range, psig (kPa)	Stroke	Force, lb (Newtons)	Torque Output for 90° Rotation
3 to 6 (21 to 42)	9 to 12	Power	53.6 (239)	73.7 in·lb (8.4 N·m)
	(63 to 84)	Return	20.1 (89)	27.6 in·lb (3.1 N·m)
3 to 6 (21 to 42)	11 to 14	Power	40.2 (179)	55.3 in·lb (6.3 N·m)
	(77 to 98)	Return	20.1 (89)	27.6 in·lb (3.1 N·m)

1. Force calculated using 6.7 lb/psig available actuator force.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

D-4073 LIT-1921030

Pneumatic Piston Damper Actuator

Description

The D-4073 Pneumatic Actuator is a multipurpose positioning device used to accurately position small dampers primarily on unit ventilator, Variable Air Volume (VAV), terminal units, and small ventilating dampers in response to output signals of a pneumatic controller or electro-pneumatic transducer.

The actuator is also recommended for use on other air flow control dampers, in interior locations, up to a maximum area of 6.75 square feet for proportional volume control and 11.7 square feet for two position actuation provided that the torque requirements are compatible with the specific application.

The D-4073 is a direct replacement for existing D-3073 actuators and a functional replacement for former D-251 actuators.

Features

- 2-way swivel connection ensures non-binding movement and full power delivery
- glass reinforced polymer housing which is lightweight, corrosion and chemical resistant
- telescoping linkage for fast and flexible installation

Applications

When an 8 to 13 psig spring range is used with proportional control, the damper size is limited to 6.75 square feet maximum. As a two position control, damper size is limited to 11.7 square feet.

Three nominal spring ranges are available: 3 to 7 psi, 5 to 10 psi, and 8 to 13 psi. The control air pressure for normal HVAC operation is 0-20 psig.

The D-4073 incorporates several internal and external features that add functional flexibility. A 2-way swivel connection on the actuator cylinder head provides non-binding movement. All actuators have a telescoping piston rod for easy linkage of the damper for attachment points up to 8-3/4 inches (222 mm) away from the face of the actuator. A swivel ball joint and slotted crank arm connector are furnished on all actuators for optional methods of linkage to the damper.

A stop screw kit is available for special applications to limit the power stroke of the actuator when required. A 4 foot (122 cm) linkage rod is also available for special applications to reach extended linkage when required.



D-4073 Pneumatic Piston Damper Actuator

Where precision sequential operation is desired, or additional positioning power is necessary, use a D-9502 pilot positioner. Up to four more D-4073 actuators may be slaved from one pilot positioner for coupled dampers.

Repair Information

If the D-4173 Pneumatic Piston Damper Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Selection Charts

D-4073 Pneumatic Piston Damper Actuator

Code Number	Nominal Spring Range, psig (kPa)
D-4073-1	8-13 (56-91) with D-9502 and Universal Mounting Bracket
D-4073-2	8-13 (56-91) with Universal Mounting Bracket
D-4073-3	5-10 (35-70) with Universal Mounting Bracket
D-4073-4	8-13 (56-91) with D-9502 and Auxiliary Mounting Bracket
D-4073-5	8-13 (56-91) with Auxiliary Mounting Bracket
D-4073-6	5-10 (35-70) with Auxiliary Mounting Bracket
D-4073-7	3-7 (21-49) with Auxiliary Mounting Bracket
D-4073-6001	3-7 (21-49) body only
D-4073-6002	5-10 (35-70) body only
D-4073-6003	8-13 (56-91) body only

Accessories for D-4073 Damper Actuator

Code Number	Description	Weight, lb (Kg)
D-3073-100	Rubber Boot Kit (includes ball joint and cover)	0.2 (0.10)
D-3153-104	Stop Screw Kit	0.5 (0.23)
D-3073-105	Mounting Post Kit, 5 per kit	0.5 (0.23)
D-3073-604	Ball Joint - weather resistant	0.5 (0.23)
D-3153-103	Rod - 8-3/4 in. (222 mm) replacement	1.0 (0.45)
D-3153-106	Auxiliary Mounting Bracket	1.0 (0.45)
D-3153-111	E-rings for Pivot Post, 10 per kit	0.5 (0.23)
D-3153-112	Mounting Nuts for Pivot Post, 10 per kit	0.5 (0.23)
DMPR-KC050	Crank Arm: 7/16 in. shaft radius adjustable to 2-3/4 in. radius	0.5 (0.23)
DMPR-KC051	Crank Arm: 3/8 in. shaft radius adjustable to 2-3/4 in. radius	0.5 (0.23)
DMPR-KC053	Crank Arm: 1/2 in. shaft radius adjustable to 2-3/4 in. radius	0.5 (0.23)
DMPR-KC054	Blade Arm Kit	1.3 (0.59)
DMPR-KC102	Rod - 4 feet (122 cm)	2.0 (0.91)
DMPR-KC251	Universal Mounting Bracket	3.5 (1.13)
DMPR-KC300	Swivel Ball Joint	0.5 (0.23)
D-9502-12	Proportional Pilot Positioner Kit	2.0 (0.91)

Note: Refer to reference bulletins in the *Pneumatic Control Manual (FAN 717.1)* for models applying to unit ventilators and other types of units.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

D-4073 Pneumatic Piston Damper Actuator (Continued)

Technical Specifications

D-4073 Pneumatic Actuator	
Stroke	3 in. (76 mm)
Control Air Pressure	0-20 psig for HVAC 25 psig (175 kPa) Maximum
Air Connections	1/8 in. NPT straight barbed fitting for 5/32 or 1/4 in. O.D. polytubing (furnished)
Ambient Operating Conditions	-20 to 150°F (-29 to 66°C)
Effective Diaphragm Area	6.7 in^2 (45 cm^2)
Housing Material	Glass reinforced polymer, UL 94 HB flame class rating
Dimensions (H x W x D)	3-7/8 in. diameter x 11 in. long
Shipping Weight, lb (Kg)	**D-4073-1** 7.9 (3.6) **D-4073-3** 6.4 (2.9) **D-4073-5** 4.9 (2.2) **D-4073-7** 4.9 (2.2) **D-4073-2** 6.4 (2.9) **D-4073-4** 6.4 (2.9) **D-4073-6** 4.9 (2.2)

Maximum Force[1] Values at 20 PSIG (140 kPa) Supply

Spring Range, psig (kPa)	Stroke	Force, lb (Newtons)	Torque Output for 90° Rotation
8 to 13 (56 to 91)	Power	47 (209)	71 in·lb (8.0 N·m)
	Return	54 (240)	81 in·lb (9.1 N·m)
5 to 10 (35 to 70)	Power	67 (298)	101 in·lb (11.3 N·m)
	Return	34 (151)	51 in·lb (5.8 N·m)
3 to 7 (21 to 49)	Power	87 (388)	131 in·lb (14.8 N·m)
	Return	20 (89)	30 in·lb (3.4 N·m)

1. Force calculated using 6.7 lb/psig available actuator force.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

DS-3062 LIT-1921760

High Temperature Pneumatic Piston Damper Actuator

Description

The DS-3062 Pneumatic Actuator is a multipurpose positioning device used to accurately position small dampers in high temperature smoke applications (such as Johnson Controls SD -1300 Series) in response to output signals of a pneumatic controller or electro-pneumatic transducer.

The DS-3062 can be used with other dampers up to a maximum area of 4 square feet for proportional volume control and 6.25 square feet for two-position actuation provided that the torque requirements are compatible with the specific application

The DS-3062 is UL component recognized for use on UL Classified 555/555S smoke and combination fire/smoke dampers, which have been tested and approved to a degradation temperature of 350°F (176°C).

Features

- high power to size ratio for locations in confined spaces
- all-aluminum housing which is lightweight and non-combustible
- telescoping linkage for fast and flexible installation
- front or rear mounting options for flexible mounting configurations

Applications

When used with proportional control, the damper size is limited to 4 square feet maximum.

As a 2-position control, damper size is limited to 6.25 square feet. As determined by testing using Johnson Controls D-1300 dampers, width and height are limited to 30 inches maximum.

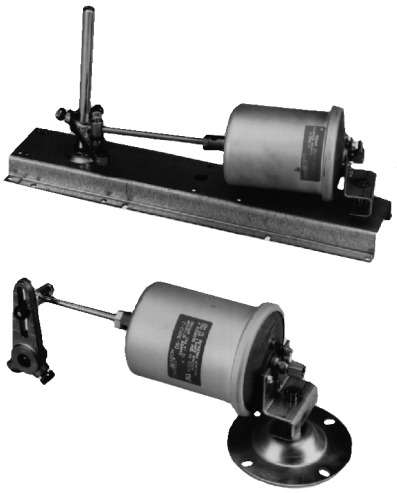
The nominal spring range is 8 to 13 psi.

The control air pressure for normal HVAC operation is 0-20 psig. The minimum control pressure for safety damper ventilation mode is 20 psi with the maximum pressure of 30 psi. When used for both proportional and smoke applications, a separate air signal should be provided to override normal HVAC operations and enact safety damper functions.

Note: The DS-3062-1 is not able to be configured for frame mounting in normally open damper applications

Repair Information

The actuator has a sealed body and field repairs cannot be made. If the DS-3062 Damper Actuator fails to operate within its specifications, replace the unit. For a replacement actuatpr, contact the nearest Johnson Controls® representative.



DS-3062 Pneumatic Actuator

Selection Charts

DS-3062 High Temperature Pneumatic Piston Damper Actuator

Code Number	Nominal Spring Range, psig (kPa)
DS-3062-1	8-13 (56-91) with Universal Mounting Kit

Accessories for DS-3062 Actuator

Code Number	Description	Weight, lb (Kg)
DMPR-KC053	Crank Arm: 1/2 inch adjustable to 2-3/4 inch radius	0.5 (0.23)
DMPR-KC300	Swivel Ball Joint	0.5 (0.23)
D-3062-106	Rod - 1/4-20 threaded one end	0.5 (0.23)
D-3062-107	Push-Pull Ball Joint and Nut, 5 per bag	1.0 (0.45)
D-3073-604	Ball Joint - weather resistant	0.5 (0.23)

Technical Specifications

DS-3062 Pneumatic Actuators	
Stroke	2 inches (51 mm)
Control Air Pressure	0-20 psig for HVAC 20 psig (137 kPa) minimum for safety damper ventilation mode 30 psig (205 kPa) maximum
Air Connections	Compression fitting for 1/4 inch O.D. copper tubing
Ambient Operating Conditions (HVAC)	-20 to 150°F (-29 to 66°C)
Materials	Body - Aluminum, Diaphragm - Synthetic elastomer
Effective Diaphragm Area	6.6 in^2 (43 cm^2)
Dimensions	3-3/16 in. diameter x 6-13/16 in. long
Shipping Weight, lb (Kg)	DS-3062-1- 5.2 (2.4) DS-3062-2 - 2.3 (1.0)
Agency Listing	UL Recognized component to 350°F (176°C) with compression fitting for copper tubing File No. R15581

Maximum Actuator Force[1] at 20 psig (140 kPa)

Nominal Spring Range, psig (kPa)	Stroke	Force, lb (Newton)	Torque Output at 90° Rotation
8 to 13 (56 to 91)	Power	46.2 (206)	46.2 in·lb (5.22 N·m)
	Return	52.8 (235)	52.8 in·lb (5.96 N·m)

1. Force calculated using 6.6 lb/psig available actuator force.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc. www.johnsoncontrols.com

DS-3153 LIT-1921765

High Temperature Pneumatic Piston Damper Actuator

Description

The DS-3153 Pneumatic Actuator is a multipurpose positioning device used primarily for operating smoke ventilating dampers in response to the output signals of a pneumatic controller or electro-pneumatic transducer during life safety applications.

The DS-3153 can be used with dampers up to a maximum area of 16 square feet for proportional volume control and 25 square feet for two position actuation provided that the torque requirements are compatible with the specific application.

The DS-3153 is UL/cUL component recognized for use on UL classified 555/555S smoke and combination fire/smoke dampers which have been tested and approved to a degradation temperature of 350°F.

Features

- high temperature pilot positioner available for additional positioning power and sequential control
- all metal bearings for high temperature exposure
- all-aluminum housing which is lightweight and non-combustible
- telescoping linkage for fast and flexible installation
- 2-way swivel head to ensure full power delivery
- 3-year warranty to provide confidence of company standing behind product

Applications

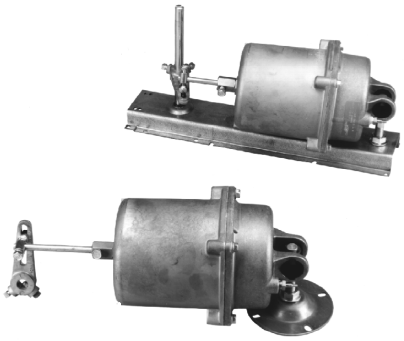
The DS-3153 Pneumatic Actuator is a multipurpose positioning device used primarily for operating UL leakage rated dampers in response to output signals of a pneumatic controller or electro-pneumatic transducer.

The DS-3153 can be used with other dampers up to a maximum area of 16 square feet for proportional volume control and 25 square feet for two position actuation provided that the torque requirements are compatible with the specific application.

The DS-3153 is UL component recognized for use on UL classified 555/555S smoke and combination fire/smoke dampers, which have been tested and approved to a degradation temperature of 350°F (176°C). When used with proportional control, the damper size is limited to 16 square feet maximum. As a 2-position control, damper size is limited to 25 square feet.

The nominal spring range is 8-13 psi. The control air pressure for normal HVAC operation is 0-20 psig. The minimum control pressure for safety damper functions is 20 psig with the maximum pressure of 30 psig. When used for both proportional and safety applications, a separate air signal should be provided to override normal HVAC operation and cause safety damper functions.

Where precision sequential operation is desired, or additional positioning power is necessary, a pilot positioner is available.



DS-3153 High Temperature Pneumatic Piston Damper Actuator

Repair Information

If the DS-3153 Damper Actuator fails to operate within its specifications, replace the unit. For a replacement actuatpr, contact the nearest Johnson Controls® representative.

Selection Charts

DS-3153
High Temperature Pneumatic Piston Damper Actuator

Code Number	Nominal Spring Range, psig (kPa)
DS-3153-1	8-13 (56 to 91) with pilot positioner and universal mounting bracket
DS-3153-2	8-13 (56 to 91) with universal mounting bracket
DS-3153-4	8-13 (56 to 91) with pilot positioner and auxiliary mounting bracket
DS-3153-5	8-13 (56 to 91) with auxiliary mounting bracket

Accessories for DS-3153 Damper Actuator

Code Number	Description	Shipping Weight, lb (Kg)
D-3073-100	Rubber Boot Kit	0.2 (0.91)
D-3073-604	Ball Joint weather resistant	0.3 (0.11)
DMPR-KC054	Blade Arm Kit	1.0 (0.45)
DMPR-KC051	Crank Arm 3/8 inch adjustable to 2-3/4 inch radius	0.5 (0.23)
DMPR-KC050	Crank Arm 7/16 inch adjustable to 2-3/4 inch radius	0.5 (0.23)
DMPR-KC102	Linkage Rod 4 feet (122 cm)	2.0 (0.91)
D-3153-103	Linkage Rod replacement	1.0 (0.45)

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

DS-3153 High Temperature Pneumatic Piston Damper Actuator (Continued)

Technical Specifications

DS-3153 Pneumatic Actuator			
Stroke	3 in. (76 mm)		
Control Air Pressure	0-20 psig for HVAC 20 psig (137 kPa) minimum for safety damper functions 30 psig (205 kPa) maximum		
Force at 20 psig (140kPa) Supply	**Stroke**	**Force lb (Newton)**	**Torque Output at 90° Rotation**
	Power	105 (467)	158 in·lb (18 N·m)
	Return	120 (534)	180 in·lb (20 N·m)
Air Connections	Compression fitting for 1/4 in. O.D. copper tubing (furnished)		
Ambient Operating Conditions	-20 to 150°F (-29 to 66°C)		
Effective Diaphragm Area	15 in^2 (97 cm^2)		
Materials	Body - Die-cast Aluminum, Diaphragm - Synthetic elastomer		
Dimensions	5-1/14 inch diameter x 10 inches long		
Shipping Weight, lb (Kg)	**DS-3153-1** 10.5 (4.8) **DS-3153-2** 10.5 (4.8) **DS-3153-4** 10.5 (4.8) **DS-3153-5** 8.5 (3.9)		
Agency Listing	UL Recognized component to 350°F (176°C) with compression fitting for copper tubing File No. R15581		

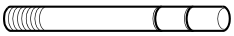
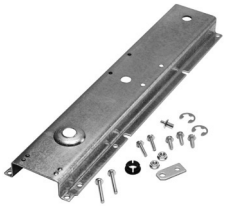
Maximum Force Values at 20 psig (140 kPa) Supply

Spring Range psig (kPa)	Stroke	Force lb	Force Newton	Torque Output for 90° Rotation (in·lb)	Torque Output for 90° Rotation (N·m)
8 to 13 (56 to 91)	Power	105	467	158	18
	Return	120	534	180	20

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1921040

Hardware for Pneumatic Damper Actuators

Product	Code Number	Description and Use
	**D-3073-101** **D-3153-104**	**Stop Screw Kit** for D-4073 Actuator, kit includes 2 #10-24 x 3 in. stop screws and 2 10-24 nuts **Stop Screw Kit**, 1/4-20 x 3 in.
	D-3153-103 **DMPR-KC102**	**Linkage Rod Replacement** for D-3070, D-3073, D-3153, D-4070 or D-4073 Actuators 8 in., 5/16 in. dia 48 in., 5/16 in. dia
	**D-3153-106**	**4 in. Auxiliary Mounting Bracket** for D-3070, D-3073, D-3153, D-4070 or D-4074 Actuators
	**D-3073-105** **D-3153-110**	**Pivot Post Kit** for D-4073 5/kit **Pivot Post Kit** for D-3153 and D-251 No.2, 5 per kit
	**D-3153-111**	**E-Rings for Pivot Post** 10/Kit
	**D-3153-112**	**Mounting Nuts for Pivot Post** 10/Kit
	**D-9502-5** **D-9502-8** **D-9502-9** **D-9502-5** [1] **D-9502-12**	**Positioner Kit** For Field Mounting on Damper Actuators. Kit includes: Positioner, Mounting Plate, Spring, and Mounting Hardware. Kit does not include Tubing. Kit for: No. 5 or D-3244 Actuator D-3153 Actuator D-3153 Two-Stage D-3246 D-3073, D-4073
	**D-3000-1077** **D-251-705**	**Connection Head**, 5/16-30 Thd, For upgrading No. 2 D-251 and D-3000 actuators to ball joint linkage. **Connection Head**, 3/8-20 Thd, For upgrading No. 3 D-251to ball joint linkage.
 **DMPRKC050** **DMPRKC052**	**DMPR-KC050** **DMPR-KC051** **DMPR-KC052** **DMPR-KC053**	**Crankarm** (Slotted) for D-3070, D-3073, D-3153, D-4070 or D-4073 Actuators. For 7/16 in. shaft, radius adjustable to 2-3/4 in. For 3/8 in. shaft, radius adjustable to 2-3/4 in. For 1/2 in. shaft, radius adjustable to 1-11/16 in. For 1/2 in. shaft, radius adjustable to 2-3/4 in.
	**DMPR-KC251**	**Universal Mounting Bracket** for D-3070, D-3073, D-3153, D-4073 or D-4074 Actuators
	**D-3153-608**	**Actuator Swivel Bearing Kit** for D-3070, D-3073, D-3153, D-4070 or D-4073 Actuators 5/Kit
Replacement Diaphrams for discontinued actuators	**D-251-6000** **D-251-6002** **D-251-6003** **D-251-6004** **D-265-601** **D-265-602**	**Diaphragm** for No. 3, package of 25 **Diaphragm** for No. 2, package of 12 **Diaphragm** for No. 4, package of 12 **Diaphragm** for No. 6, package of 6 **Spring** for No. 3, package of 6 **Spring** for No. 4, package of 6
  **D-9999-152** **D-9999-153**	**D-9999-152** **D-9999-153**	**Clevis Pin Kit**, 10 per kit **Twist Lock Clip Kit**, 100 per kit

1. Also order spring number **D-9502-612** and Pilot Spring Bracket number **D-9502-100**.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

MP8000 Series

LIT-1900054

Pneumatic Valve Actuators

Description

MP8000 Series Pneumatic Valve Actuators are designed to accurately position chilled water, hot water, and steam control valves in response to a pneumatic signal from a controller. A pneumatic or electric valve positioner can be ordered separately for use in applications where sequential operation is desired or additional positioning power is necessary. MP8000 Series Actuators have a molded, synthetic rubber diaphragm contained in a sturdy, corrosion-resistant housing that protects against dirt and damage. This molded diaphragm provides a constant effective area throughout the actuator stroke.

Features

- universal-application design allows for use in hot water, chilled water, and steam
- field-reversible action allows for selectable spring-return-up or spring-return-down action on N.O. valves
- strong, corrosion-resistant housing ensures long life
- position indicator, included with every actuator, provides visual indication of valve stem position



MP8000 Series
Pneumatic Valve Actuators

Selection Chart

MP8000 Series Pneumatic Valve Actuators

Actuator Size (sq. in.)	Stroke (in.)	Included Mounting Kit	Actuator Model		
			Spring Range		
			3 to 7 psig	4 to 8 psig	9 to 13 psig
			Spring Return Up		
25	5/16	None	MP821C001	MP821D001	MP821E001
		MP8000-6701	MP821C001B	MP821D001B	MP821E001B
	1/2	None	MP822C001	MP822D001	MP822E001
		MP8000-6702	MP822C001A	MP822D001A	MP822E001A
	3/4	None	MP823C001	MP823D001	MP823E001
		MP8000-6702	MP823C001A	MP823D001A	MP823E001A
		MP8000-6501	MP823C001D	MP823D001D	MP823E001D
		MP8000-6201	MP823C001E	MP823D001E	MP823E001E
			Spring Return Down		
25	5/16	None	MP831C001	MP831D001	MP831E001
	1/2		MP832C001	MP832D001	MP832E001
	3/4		MP833C001	MP833D001	MP833E001
		MP8000-6501	MP833C001D	MP833D001D	MP833E001D
		MP8000-6201	MP833C001E	MP833D001E	MP833E001E
			Spring Return Up		
50	3/4	None	MP843C001	MP843D001	MP843E001
		MP8000-6703	MP843C001C	MP843D001C	MP843E001C
		MP8201-6201	MP843C001F	MP843D001F	MP843E001F
	1	None	MP844C001	MP844D001	MP844E001
	1-1/8		MP845C001	MP845D001	MP845E001
		MP8201-6201	MP845C001F	MP845D001F	MP845E001F
			Spring Return Down		
50	3/4	None	MP853C001	MP853D001	MP853E001
		MP8201-6201	MP853C001F	MP853D001F	MP853E001F
	1	None	MP854C001	MP854D001	MP854E001
	1-1/8		MP855C001	MP855D001	MP855E001
		MP8201-6201	MP855C001F	MP855D001F	MP855E001F

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

MP8000 Series Pneumatic Valve Actuators (Continued)

MP8000 Series Pneumatic Valve Actuators (Continued)

Actuator Size (sq. in.)	Stroke (in.)	Included Mounting Kit	Actuator Model		
			Spring Range		
			3 to 7 psig	4 to 8 psig	9 to 13 psig
			Spring Return Up		
100	1-1/8	None	MP865C001	MP865D001	MP865E001
		MP8000-6203	MP865C001G	MP865D001G	MP865E001G
	1-1/2	None	MP867C001	MP867D001	MP867E001
		MP8000-6203	MP867C001G	MP867D001G	MP867E001G
			Spring Return Down		
100	1-1/8	None	MP875C001	MP875D001	MP875E001
		MP8000-6203	MP875C001G	MP875D001G	MP875E001G
	1-1/2	None	MP877C001	MP877D001	MP877E001
		MP8000-6203	MP877C001G	MP877D001G	MP877E001G

Mounting Kits (For Field Assembly)

Code Number	Description
MP8000-6201	Mounting Kit for MP82, MP83, MP84, or MP85 Series Actuators Mounted to 2-1/2, 3, or 4 in. VG2000, V-5252, V-5462, or V-5842 Cast Iron Flanged Globe Valves with 3/8 in. Stem (Kit Includes: Two Stem Hex Jam Nuts and One Locknut)
MP8000-6203	Mounting Kit for MP86 or MP87 Series Actuators Mounted to 3, 4, 5, or 6 in. VG2000, V-5252, V-5462, or V-5842 Cast Iron Flanged Globe Valves with 1/2 in. Stem (Kit Includes: Two Stem Hex Jam Nuts and One Locknut)
MP8000-6501	Mounting Kit for MP82 or MP83 Series Actuators Mounted to 1-1/2 or 2 in. V-5254, V-5464, or V-5844 Series Cage Trim Valves with 1/4 in. Stem (Kit Includes: One Stem Nut, One Stem Extender, Two Stem Extender Nuts, and One Yoke Nut)
MP8000-6701	Mounting Kit for MP82 or MP83 Series Actuators Mounted to 1/2 or 3/4 in. VG7000 Series Bronze Control Valves with Stainless Steel Trim (Kit Includes: One Stem Nut, One Stem Extender, Two Stem Extender Nuts, and One Yoke Nut)
MP8000-6702	Mounting Kit for MP82 or MP83 Series Actuators Mounted to 1 through 2 in. VG7000 Series Bronze Control Valves with 1/4 in. Stem and Stainless Steel or Brass Trim (Kit Includes: One Stem Nut, One Stem Extender, Two Stem Extender Nuts, and One Yoke Nut)
MP8000-6703	Mounting Kit for MP84 or MP85 Series Actuators Mounted to 1-1/2 or 2 in. VG7000 Series Bronze Control Valves with 3/8 in. Stem and Stainless Steel Trim (Kit Includes: Two Stem Nuts and One Yoke Nut)

Positioners and Positioner Mounting Kits (Order Separately)

Code Number	Description
V-9502-95	Pneumatic Valve Actuator Positioner (Less Spring and Mounting Hardware)
MP8000-6002	Mounting Kit for V-9502-95 Pneumatic Valve Actuator Positioner (Kit Includes All Necessary Mounting Hardware and Six Springs)
EPP-1000-8	Electro-Pneumatic Valve Actuator Positioner (Less Mounting Hardware)
MP8000-6003	Mounting Kit for EPP-1000-8 Electro-Pneumatic Valve Actuator Positioner (Kit Includes All Necessary Mounting Hardware)

Repair Information

Repair Parts (Order Separately)

Code Number	Description
MP8000-6001	Seal Kit for All MP8000 Series Actuators
MP8000-6325	Diaphragm and Seal Kit for MP82 and MP83 Series Actuators
MP8000-6350	Diaphragm and Seal Kit for MP84, MP85, MP86, and MP87 Series Actuators (Two Kits Required for MP86 and MP87 Series Actuators)
MP8000-6012 [1]	Repair Tool Kit (Required for Diaphragm and Seal Replacement)

1. This kit includes a strap handle and polyester strap, stem wrench, and 7/16 in. hex tool.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

MP8000 Series Pneumatic Valve Actuators (Continued)

Technical Specifications

MP8000 Series Pneumatic Valve Actuators		
Effective Diaphragm Area	**MP82/MP83 Series Actuators**	25 sq in. (Size 150)
	MP84/MP85 Series Actuators	50 sq in. (Size 300)
	MP86/MP87 Series Actuators	100 sq in. (Size 600)
Maximum Control Pressure		25 psig (172 kPa)
Air Connection		Barbed Fitting for 1/4 in. O.D. Polytubing
Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Ambient Storage Temperature Limits		-40 to 176°F (-40 to 80°C)
Materials	**Housing**	Die-Formed Carbon Steel (Coated with Corrosion-Resistant Finish)
	Diaphragm	EPDM (Ethylene Propylene Diene Monomer)
	Stem Seals	Nitrile U-Cups
	Bearings	Reinforced Thermoplastic
	Yoke	Formed Steel (Coated with Corrosion-Resistant Finish)
	Spring	Chrome-Silicon Steel (Coated with Corrosion-Resistant Finish)
	Stem Components	Stainless Steel
Shipping Weight	**MP82/MP83 Series Actuators**	14.0 lb (6.4 kg)
	MP84/MP85 Series Actuators	31.0 lb (14.1 kg)
	MP86/MP87 Series Actuators	47.0 lb (21.3 kg)

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V-3000-8011, V-3000-8003

LIT-19024050

Pneumatic Valve Actuators

Description

The V-3000-8011 and V-3000-8003 Pneumatic Valve Actuators are designed to accurately position steam or water valve modulating plugs in response to a pneumatic signal from a controller. A V-9502 Valve Pilot Positioner can be ordered separately (V-3000-8011 only) for use in applications where sequential operation is desired or additional positioning power is necessary. The actuators have a molded synthetic rubber diaphragm design. This molded diaphragm provides a constant effective area throughout the actuator stroke. All parts are protected by a sturdy die-cast aluminum housing.

Features

- universal valve mounting design is compatible for use on all Johnson Controls valves with V-3000 mounting configurations
- rolling diaphragm design provides constant effective diaphragm area throughout stroke for optimal force output
- integral stroke position indicator provides visual reference to valve position

Applications:

Used on the following: VG7000 Series, VTM Series, V-3752 Series, V-3754 Series, V-3762 Series, V-3766 Series, V-3966 Series, V-3974 Series, V-4324 Series, V-4332 Series, V-4334 Series, and V-4440 Series.

The V-3000-8011 and V-3000-8003 can replace the V-3000-1 and V-3000-2; however, the reverse is not true.

Repair Information

If the V-3000 Series Actuator fails to operate within its specifications, replace the unit. See the Accessories chart for replacement diaphragms for the V-3000-8003 enclosed model. For a replacement actuator, contact the nearest Johnson Controls® representative.



Exposed V-3000-8011 Actuator



Enclosed V-3000-8003 Actuator

Selection Charts

V-3000 Series Actuators

Code Number	Description
V-3000-8011	Exposed Yoke
V-3000-8003	Enclosed Yoke

Accessories for V-3000 Series Actuators (Order Separately)

Code Number	Description
For Exposed Model (V-3000-8011)	
V-9502-90	Pilot positioner (less spring) will mount to V-3000-8011 only.
V-9502-6801	Pilot positioner springs: 5/16 in. stroke (8 mm lift) - 3 psi span 1/2 in. stroke (13 mm lift) - 5 psi span 3/4 in. stroke (19 mm lift) - 10 psi span
V-9502-6802	Pilot positioner springs: 5/16 in. stroke (8 mm lift) - 8 psi span 1/2 in. stroke (13 mm lift) - 12 psi span
V-9502-6803	Pilot positioner springs: 3/4 in. stroke (19 mm lift) - 4 psi span
	Valve spring kits: refer to the specific valve product for spring kit code numbers.
For Enclosed Model (V-3000-8003)	
V-3000-6001	Replacement Diaphragm for V-3000-8003 only

Technical Specifications

V-3000 Series Actuators	
Maximum Control Pressure	30 psig (207 kPa)
Air Connection	Barb Fitting: 5/32 or 1/4 x 1/8 NPT
Ambient Operating Temperature Limits	-20 to 150°F (-29 to 66°C)
Maximum Storage Temperature	150°F (66°C)
Effective Diaphragm Area	8 sq. in.
Materials	Housing: Die-cast Aluminum Diaphragm: Synthetic Rubber
Shipping Weight	V-3000-8011: 0.9 lb (0.40 kg) V-3000-8003: 1 lb (0.5 kg)

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-3000 Series

LIT-1924055

Pneumatic Actuator

Description

The V-3000 Pneumatic Actuator can position steam or water valve-modulating plugs in response to a pneumatic signal from a controller.

Features

- molded synthetic rubber diaphragm design provides a constant effective area throughout the valve stem stroke
- die cast aluminum housing coated with corrosion-resistant finish
- remove or reposition actuator by loosening a single set screw
- easily field mounted to the valve bonnet with a single set screw.
- can be mounted to any of the V-3000, V-4000, or VT Series Valves (except V-3854)

Applications

Used on 1/2 in. Flare Valves, VT Series Valves, and 3/4 to 1-1/2 Cage Trim Valves. This actuator is not used with VG7000 Series valves.

Repair Information

If the V3000 Series Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.



Exposed V-3000-1 Actuator

Selection Charts

V-3000 Series Pneumatic Actuator

Code Number	Description
V-3000-1	Exposed Yoke

Accessories for Exposed Model V-3000 (Order Separately)

Code Number	Description
V-3000-10	Valve Position Indicator
V-9502-15	Positioner Kit

Note: Also refer to *V-9000-500 Positioner Catalog Page (LIT-1924095)* on Page 83 and *V-9502 Series Pneumatic Valve Actuator Positioners Catalog Page (LIT-1924100)* on Page 84.

Technical Specifications

V-3000 Series Actuators	
Media Temperature	281°F Maximum
Maximum Control Pressure	30 psig
Available Spring [a] Ranges	3-6, 4-8, and 9-13 psig
Air Connection	1/8 in. NPT Barbed Fitting for 5/32 in. O.D. Polytubing
Size (in.)	3 H x 4-7/16 Diameter

a. A spring is assembled with the valve body, not in the actuator. For spring kits to field mount V-3000-1 to valve bodies, refer to *Valve Spring Kits Sorted by Valve Code Number Catalog Page (LIT-1924395)* on Page 288.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-3801-8001

LIT-1924060

Pneumatic Valve Actuator

Description

The V-3801-8001 Pneumatic Valve Actuator is designed to accurately position steam or water valve modulating plugs in response to a pneumatic signal from a controller. The small oval top makes the V-3801-8001 ideally suited for 1/2 and 3/4 in. VG7000 Series valve applications with restricted mounting space. This actuator has a molded synthetic rubber diaphragm design. The molded diaphragm provides a constant effective area throughout the actuator stroke. All parts are protected by a sturdy die-case aluminum housing.

Features

- compact design fits into restricted mounting spaces
- single set screw design provides easy assembly
- rolling diaphragm design provides constant effective diaphragm area throughout stroke for optimal force output
- easily field mounted to the valve bonnet with a single set screw, refer to the accessories chart.

Applications

The V-3801-8001 Valve Actuator is used on 1/2 and 3/4 in. VG7000 Series Valves. The V-3801-8001 is not recommended for sequencing because its relatively small size and small output force may result in unacceptable spring shift. Where pneumatic sequencing is required, the V-3000-800x Series actuators are recommended. The V-3802-1 and V-3801-8001 are not interchangeable.

Repair Information

If the V-3801-8001 Series Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.



V-3801-8001
Pneumatic Valve Actuator

Selection Charts

V-3801-8001 Pneumatic Valve Actuator

Code Number	Description
V-3801-8001	Pneumatic Valve Actuator

Accessories for V-3801-8001

Code Number	Description
VG7000-1010	Spring kit with 3 to 6 psig spring
VG7000-1011	Spring kit with 4 to 8 psig spring
VG7000-1012	Spring kit with 9 to 13 psig spring
VG7000-1015	Spring kit with 3 springs: 3 to 6, 4 to 8 and 9-13 psig (includes hardware to adapt to one valve)

Technical Specifications

V-3800-8001 Pneumatic Valve Actuator	
Maximum Control Pressure	30 psig (207 kPa)
Air Connection	1/8 in. NPT Barbed Fitting for 1/4 or 5/32 in. O.D. Polytubing
Ambient Operating Temperature Limits	-20 to 150°F (-29 to 66°C) [1]
Maximum Storage Temperatures	150°F (66°C)
Effective Diaphragm Area	4 sq. in.
Materials	Housing: Die-cast Aluminum Diaphragm: Synthetic Rubber
Shipping Weight	0.5 lb (0.23 kg)

1. For use on steam systems with 15 psig (103 kPa) or less inlet pressure.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-3802-1

LIT-19024065

Oval Top Actuator

Description

The V-3802 Pneumatic Oval Top Actuator positions steam or water valve modulating plugs in response to a pneumatic signal from a controller.

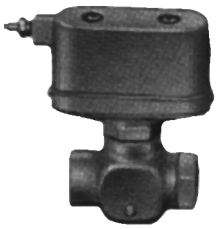
Features

- designed for use where mounting space is restricted
- die cast aluminum housing and a molded, synthetic elastomer diaphragm that provides a constant effective area throughout the valve stem stroke
- comparatively small oval enclosed actuator has sufficient force to handle most seating pressures
- remove or reposition actuator by loosening a single set screw
- easily field mounted to the valve bonnet with a single set screw.

Applications

VT Series Valves only. Also available to replace older, installed V-3800 Series Oval Top Actuators.

Not for use with VG7000 Series valves.



V-3802-1 Compact Actuator on two-way valve

Selection Chart

V-3802 Pneumatic Oval Top Actuators

Code Number	Description
V-3802-1	Pneumatic Oval Top Actuator

Repair Information

Actuator	Replacement Diaphragm
V-3802-1	**V-3100-611**

Technical Specifications

V-3802 Pneumatic Oval Top Actuators	
Media Temperature	281°F Maximum
Maximum Control Pressure	30 psig
Available Spring Ranges	3-6, 4-8, and 9-13 psi [1]
Air Connection	1/8 in. NPT Barbed Fitting for 5/32 in. O.D. Polytubing
Size (in.)	2-7/16 H x 1-5/8 W x 4-31/32 Diameter

1. A spring is assembled with valve body, not in the actuator.
For spring kits to field mount V-3802-1 to valve bodies, refer to *Valve Spring Kits Sorted by Valve Code Number Catalog Page (LIT-1924395)* on Page 288.

V-4000-1

LIT-1924070

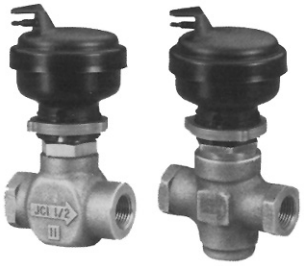
Small Pneumatic Actuator for Small Control Valves

Description

The V-4000-1 Small Pneumatic Actuator accurately positions the modulating plugs of chilled or hot water control valves in response to a pneumatic signal from a controller.

Features

- directly replaces field installed V-3854 and V-3800 models
- tailored for small terminal unit valve applications
- direct replacement for oval top actuators (VT Series and older oval top series)



V-4000-1 Actuators

Selection Chart

Code Number	Description
V-4000-1	Small Pneumatic Actuator

Technical Specifications

V-4000-1 Pneumatic Actuator		
Ambient Temperature Limits		-20 to 150°F (-29 to 66°C)
Relative Humidity		5 to 90% RH
Fluid Operating Temperature Limits		35 to 200°F (2 to 93°C)
Storage Condition Limits		-20 to 150°F (-23 to 66°C) 5 to 95% RH
Dimensions (H x Diameter)		3.27 in. x 2.84 in. Diameter (83.1 mm x 72.1 mm Diameter)
Maximum Control Pressure		30 psig (210 kPa)
Control Signal Air Connection		Dual Barbed Fitting for 5/32 or 1/4 in. O.D. Tubing
Effective Diaphragm Area		4 square inches (2581 square mm)
Materials	**Yoke and Cover**	Glass-Reinforced Nylon
	Piston	Glass-Reinforced Nylon
	Diaphragm	Fabric Reinforced Synthetic Rubber
	Retaining Nut	Chromate-Coated Zinc
Available Spring Ranges		3-6, 4-8, 9-13 psi [1]

1. A spring is assembled with valve body, not in the actuator.
For spring kits to field mount V-4000-1 to valve bodies, refer to *Valve Spring Kits Sorted by Valve Code Number Catalog Page (LIT-1945395)* on Page 288.

Applications

Direct replacement for all oval top (V-3800 Series) actuators (except V-3801-8001 on VG7000 Series valves).

Repair Information

If the V-4000-1 Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-9000 Series

LIT-1924085

Pneumatic Rotary Motion Actuators

Description

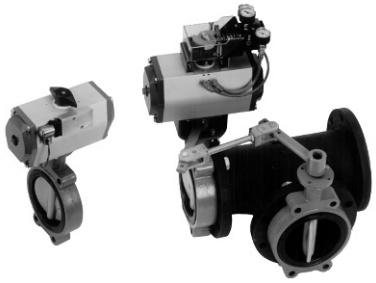
The V-9000 Series Actuators are rotary motion rack and pinion, spring return, and double acting. These actuators are designed for direct mounting on the VF Series Butterfly Valves.

Repair Information

If the V-9000 Pneumatic Rotary Motion Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.

Features

- V-909x Series Actuators are double acting (air-to-open/air-to-close)
- V-919x Series Actuators incorporate spring return action
- furnished either with a factory mounted 24 or 120 VAC solenoid air valve for two-position operation, or a V-9000-500 Positioner for modulating control applications



V-9000 Series Pneumatic Actuators Installed on VF Series Butterfly Valves

Selection Charts

V-909x Series Actuator Non-Spring Return Double Acting

Code Number	Supply Pressure, psig (kPa)[1]					VF Series Code Number	Actuator Air Volume, in.[3]	Shipping Weight, lb[2]
	40 (280)	60 (420)	80 (560)	100 (700)	120 (840)			
V-9092-1	145	221	297	373	449	-020	9.35	3.0
V-9093-1	351	536	721	906	1,091	-030	20.5	5.5
V-9094-1	493	753	1,013	1,272	1,532	-040	28.9	7.3
V-9094-2	1,058	1,615	2,171	2,728	3,285	-042	62.0	16.6
V-9096-1	2,797	4,270	5,742	7,214	8,687	-060	140.6	35.0
V-9097-1	5,783	8,826	11,870	14,914	17,957	-070	309.5	65.0
V-9098-1	14,211	21,691	29,171	36,650	44,130	-080	734.1	144.0

1. b·in x 113 = mN·m.
2. b x 0.454 = kg.

Using the V-919x Series Spring Return Selection Chart below:

Example 1: A normally open valve with 80 psig available air pressure requires 465 lb·in of torque. Use a V-9194-14 with 522 lb·in spring start and 491 lb·in air end torque.

Example 2: A normally closed valve with 60 psig available air pressure requires 705 lb·in of torque. Use a V-9194-24 with 732 lb·in spring end and 883 lb·in air start torque.

Example 3: A three-way valve with 80 psig available air pressure requires 846 lb·in of torque. Use a V-9195-15 with 1,326 lb·in spring end and 1,568 lb·in air end torque.

Selection Chart: V-919x Series Actuator Torque Data (lb·in)[1] Spring Return V-9000 Series Pneumatic Actuators (Part 1 of 2)

Code Number	Suffix	Air Stroke Supply Pressure psig (kPa)										Spring Stroke		Weight (lb)[2]	VF Series Code
		40 (280)		60 (420)		80 (560)		100 (700)		120 (840)					
		NC[3] Start	NO[3] End	NC Start	NO End	NC Start	NO End	NC Start	NO End	NC Start	NO End	NO Start	NC End		
V-9193	**-12**	210	167	395	352	580	537	765	722	950	907	184	141	6.0	**-320**
	-13	156	76	341	261	526	446	711	631	896	816	275	195	6.3	**-330**
	-14	--	--	281	176	466	361	651	546	836	731	360	255	6.6	**-340**
	-16	--	--	--	--	369	185	554	370	739	555	536	352	7.1	**-360**
V-9194	**-12**	310	232	570	492	830	752	1089	1011	1349	1271	261	183	8.0	**-420**
	-13	218	101	478	361	738	621	997	880	1257	1140	392	275	8.4	**-430**
	-14	--	--	386	231	646	491	905	750	1165	1010	522	367	8.8	**-440**
	-15	--	--	294	94	554	354	813	613	1073	873	659	459	9.1	**-450**
	-16	--	--	--	--	462	229	721	488	981	748	784	551	9.5	**-460**
V-9194	**-22**	692	469	1249	1026	1805	1582	2362	2139	2919	2696	589	366	18.1	**-422**
	-23	509	174	1066	731	1622	1287	2179	1844	2736	2401	884	549	18.8	**-423**
	-24	--	--	883	437	1439	993	1996	1550	2553	2107	1178	732	19.5	**-424**
	-25	--	--	700	142	1256	698	1813	1255	2370	1812	1473	915	20.3	**--425**
	-26	--	--	--	--	1073	404	1630	961	2187	1518	1767	1098	21.0	**-426**
V-9195	**-13**	--	--	1357	733	2099	1475	2841	2217	3583	2959	1419	795	22.1	**-530**
	-15	--	--	--	--	1568	529	2310	1271	3052	2013	2365	1326	24.2	**-550**

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V-9000 Series Pneumatic Rotary Motion Actuators (Continued)

Selection Chart: V-919x Series Actuator Torque Data (lb·in)[1] Spring Return V-9000 Series Pneumatic Actuators (Part 2 of 2)

Code Number	Suffix	Air Stroke Supply Pressure psig (kPa)										Spring Stroke		Weight (lb)[2]	VF Series Code
		40 (280)		60 (420)		80 (560)		100 (700)		120 (840)					
		NC[3] Start	NO[3] End	NC Start	NO End	NC Start	NO End	NC Start	NO End	NC Start	NO End	NO Start	NC End		
V-9196	-12	1819	1118	3292	2591	4764	4063	6236	5535	7709	7008	1679	978	39.7	-620
	-13	1399	349	2872	1822	4344	3294	5816	4766	7289	6239	2448	1398	42.1	-630
	-14	--	--	2452	1123	3924	2595	5396	4067	6869	5540	3147	1818	44.5	-640
	-15	--	--	2030	353	3502	1825	4974	3297	6447	4770	3917	2240	46.8	-650
	-16	--	--	--	--	3154	1196	4626	2668	6099	4141	4546	2588	49.2	-660
V-9197	-12	3833	2508	6876	5551	9920	8595	12964	11639	16007	14682	3275	1950	75.1	-720
	-13	2859	868	5902	3911	8946	6955	11990	9999	15033	13042	4915	2924	80.2	-730
	-14	--	--	4930	2275	7974	5319	11018	8363	14061	11406	6551	3896	85.2	-740
	-15		--	3949	638	6993	3682	10037	6726	13080	9769	8188	4877	90.3	-750
	-16		--	--	--	6022	2031	9066	5075	12109	8118	9839	5848	95.3	-760
V-9198	-12	9487	6747	16967	14227	24447	21707	31926	29186	39406	36666	7464	4724	160.2	-820
	-13	7125	3015	14605	10495	22085	17975	29564	25454	37044	32934	11196	7086	168.3	-830
	-14	--	--	12243	6762	19723	14242	27202	21721	34682	29201	14929	9448	176.4	-840
	-15	--	--	9880	3030	17360	10510	24839	17989	32319	25469	18661	11811	184.5	-850
	-16	--	--	--	--	14998	6778	22477	14257	29957	21737	22393	14173	192.6	-860

1. in.lb x 113 = mN.m
2. lb x 0.454 = kg
3. N.C. is the abbreviation for Normally Closed; N.O. is the abbreviation for Normally Open.

Accessories: Solenoid Air Valves

Code Number	Description
V-9000-141[1]	120 VAC Solenoid Air Valve, Four-Way, for Old-Style[2] V-9092 and V-9093 Series Actuators
V-9000-142[1]	120 VAC Solenoid Air Valve, Four-Way, for Old-Style[2] V-9094 through V-9097 Series Actuators
V-9000-146[1]	120 VAC Solenoid Air Valve, Four-Way, for New-Style[3] V-9092 through V-9094-1 and V-9193 through V-9194-1 Series Actuators
V-9000-147[1]	120 VAC Solenoid Air Valve, Four-Way, for New-Style[3] V-9094-2 through V-9098 and V-9194-2 through V-9198 Series Actuators
V-9000-246[1]	24 VAC Solenoid Air Valve, Four-Way, for New-Style[3] V-9092 through V-9094-1 and V-9193 through V-9194-1 Series Actuators
V-9000-247[1]	24 VAC Solenoid Air Valve, Four-Way, for New-Style[3] V-9094-2 through V-9098 and V-9194-2 through V-9198 Series Actuators
V-9000-131[1]	120 VAC Solenoid Air Valve, Three-Way, for Old-Style V-9192, V-9193, and New-Style V-9194-1 Series Actuators
V-9000-132[1]	120 VAC Solenoid Air Valve, Three-Way, for Old-Style V-9194-2 through V-9198 Series Actuators

Technical Specifications, V9000 Solenoid Air Valves	
Voltage Requirements	24 or 120 VAC (See Descriptions Above)
Power Consumption	AC: 5.6 VA; DC: 7.2 Watts
Maximum Pressure	140 psig (980 kPa)
Ambient Temperature Limits	0 to 180°F (-18 to 82°C)
Air Connections	1/4 in. NPT (Internal)
Electrical Connections	18 AWG Leads, 24 in. (61 cm) Long
Enclosure Materials	Die Cast Aluminum Body with NEMA 4 Coil Housing

1. These kits include all mounting hardware.
2. For actuators manufactured before April 1, 1992.
3. For actuators manufactured after April 1, 1992.

For two-position operation of double-acting actuators, a V-9000-140 Series Four-Way Solenoid Air Valve **must be used**. This valve exhausts one chamber of the actuator while the other chamber is pressurized.

For two-position operation of spring return actuators, a V-9000-130 Series Three-Way Solenoid Air Valve **must be used**. This valve provides supply or exhaust air to the inner chamber only of the actuator.

Both styles of solenoid air valves are furnished with a manual override switch and are housed in a sturdy NEMA 4 enclosure.

Note: When a V-9000 Series Rack and Pinion Actuator is ordered as a factory-mounted component of a complete VF Series Butterfly Valve assembly, the appropriate solenoid air valve is automatically furnished with the actuator (unless a high pressure positioner is specified).

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-9000 Series Pneumatic Rotary Motion Actuators (Continued)

Accessories: Speed Controls

Code Number	Description
V-9000-301	Brass Speed Controls (Two) for Old Style[1] V-9192 and V-9193 Series Actuators
V-9000-302	Brass Speed Controls (Two) for Old Style[1] V-9194, V-9195, V-9196, and V-9197 Series Actuators
V-9000-311	Brass Speed Controls (Two) for New Style[2] V-9192 to V-9194-2 Series Actuators
V-9000-312	Brass Speed Controls (Two) for New Style[2] V-9194-2 to V-9198 Series Actuators
V-9000-313	Brass Speed Controls (Two) for Old Style[1] V-9094 to V-9097 and New Style[2] V-9092 to V-9098 Series Actuators
V-9000-314	Brass Speed Controls (Two) for Old Style[1] V-9092 to V-9093 Series Actuators

1. For actuators manufactured before April 1, 1992.
2. For actuators manufactured after April 1, 1992.

The V-9000-300 Series Speed Control Kits are used to regulate the speed at which the two-position actuators stroke. This option should be used in applications where fast changes in valve disc position may result in objectionable pressure surges and/or water hammer throughout the water distribution system. The speed control kits consist of two adjustable orifices which are screwed directly into the exhaust ports of the solenoid air valve.

Note: When a V-9000 Series Rack and Pinion Actuator is ordered as a factory-mounted component of a complete VF Series Butterfly Valve assembly, the speed control can be ordered as a factory installed option. (See option C or option E in the ordering data table of *VF Series Standard-Pressure, Standard Temperature Butterfly Valves Product Bulletin, LIT-977205.*)

Accessories: Positioner Mounting Kit (Order Separately)
V-9000-500 Series Pneumatic Positioners for All Old and New Style V-9000 Series Actuators (Includes Three Gauges)

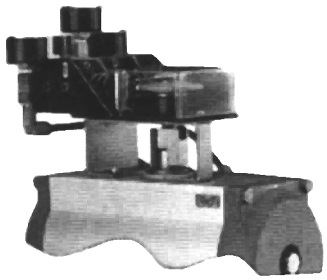
Code Number	Description
V-9000-501[1]	Positioner Mounting Kit for Old-Style V-9x92 and V-9x93 Series Actuators
V-9000-502[1]	Positioner Mounting Kit for Old-Style V-9x94 and V-9x95 Series Actuators
V-9000-503[1]	Positioner Mounting Kit for Old-Style V-9x96 and V-9x97 Series Actuators
V-9000-511[2]	Positioner Mounting Kit for New-Style V-9x92 to V-9x94-1 Series Actuators
V-9000-512[2]	Positioner Mounting Kit for New-Style V-9x94-2 and V-9x95 Series Actuators
V-9000-513[2]	Positioner Mounting Kit for New-Style V-9x96 to V-9x98 Series Actuators

Technical Specifications, V-9000-500 Positioners		
Supply Pressure		40 to 140 psig (280 to 980 kPa); Air Supply Must Be Clean, Dry, and Oil Free
Output Flow Capacity		2,000 scim (546 mL/s) at 60 psig (420 kPa)
Air Consumption		1,200 scim (328 mL/s) at 60 psig (420 kPa)
Control Action		Direct or Reverse; Field Selectable
Operating Range		Factory Set at 3 to 15 psig (21 to 105 kPa) for 90° Rotation; Field Selectable From 3 to 15 psig (21 to 105 kPa) for 65° Rotation or 3 to 9 psig (21 to 63 kPa) or 9 to 15 psig (63 to 105 kPa) for 65° Rotation
Starting Point		Factory Set at Approximately 3 psig (21 kPa)
Air Connections	**Supply**	1/4 in. IPT
	Control Input	1/8 in. IPT
	Outputs	1/8 in. IPT
Ambient Temperature Limits		-5 to 160°F (-21 to 71°C)
Dimensions (in.)		6-3/4 H x 3-1/8 W x 6 L (Width and Length as Measured From Valve Shaft Center)
Materials	**Body**	Aluminum, Anodized
	Diaphragm	Buna-N-Rubber
	Spool	Stainless Steel
	Cover	Polycarbonate

1. For actuators manufactured before April 1, 1992.
2. For actuators manufactured after April 1, 1992.

A V-9000-500 High Pressure Positioner **must be used** for modulating control of both the double acting and spring return actuators. This positioner operates on a force-balance principle and allows for precise positioning over the entire range of the actuator stroke. The unit features non-interactive zero and span adjustments, as well as field selectable direct or reverse action. The V-9000-500 is furnished with supply, input, and output gauges and a visual position indicator.

Note: When a V-9000 Series Rack and Pinion Actuator is ordered as a factory-mounted component of a complete VF Series Butterfly Valve assembly, the high pressure positioner can be ordered as a factory-installed option. (See option B in the ordering data table of *VF Series Standard-Pressure, Standard Temperature Butterfly Valves Product Bulletin, LIT-977205.*)



V-9000-500 Pneumatic Positioner

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-9000 Series Pneumatic Rotary Motion Actuators (Continued)

Accessories: Travel Switch and Mounting Kit for Travel Switch

Code Number	Description
Travel Limit Switches	
V-9000-410	For All V-9000 Series Actuators Manufactured After April 1, 1992
V-9000-411	Includes V-9000-410 Travel Limit Switch and Mounting Kit for V-9x96 through V-9x98 Actuators Manufactured After April 1, 1992[1]
V-9000-400	For All V-9000 Series Actuators Manufactured Before April 1, 1992 (Requires One of the Mounting Kits Listed Below for Initial Installation)
Mounting Kits (For V-9000-400)	
V-9000-401	For V-9x92 and V-9x93 Series Actuators Manufactured Before April 1, 1992
V-9000-402	For V-9x94 and V-9x95 Series Actuators Manufactured Before April 1, 1992
V-9000-403	For V-9x96 and V-9x97 Series Actuators Manufactured Before April 1, 1992

Technical Specifications, V-9000-400 Travel Switches	
Switches	Two Single-Pole, Double-Throw (SPDT)
Electrical Rating	5 Amperes at 120/250 VAC; 5 Amperes at 24 VDC
Body Materials	Die-Cast Aluminum, NEMA 4, 4x Housing

1. Mounting Kits are Not Required for Smaller Sized Actuators (V-9x92 through V-9x95).

For remote binary valve position indication, a V-9000-400 Travel Switch can be mounted to the actuator. The unit includes two SPDT switches in a die cast aluminum NEMA 4 enclosure.

Note: The travel switch and appropriate mounting kit must be ordered separately. The travel switch cannot be used on V-9000 Series Actuators equipped with a high pressure positioner.

Accessories: Pneumatic Rack and Pinion Actuator Adaptor Sleeves[1] for Standard-Pressure, Standard-Temperaure Butterfly Valves

Valve Size, in.	V-9x92	V-9x93	V-9x94-1x	V-9x94-2x	V-9x95	V-9x96	V-9x97	V-9x98
2	None Required	**V-9094-300**	**V-9094-300**	**V-9095-300**	**V-9095-300**	—	—	—
2-1/2	None Required	**V-9094-300**	**V-9094-300**	**V-9095-300**	**V-9095-300**	—	—	—
3	None Required	**V-9094-300**	**V-9094-300**	**V-9095-300**	**V-9095-300**	—	—	—
4	—	**V-9094-400**	**V-9094-400**	**V-9095-400**	**V-9095-400**	—	—	—
5	—	None Required	None Required	**V-9095-600**	**V-9095-600**	**V-9096-600**	—	—
6	—	None Required	None Required	**V-9095-600**	**V-9095-600**	**V-9096-600**	—	—
8	—	—	—	**V-9095-800**	**V-9095-800**	**V-9096-800**	**V-9097-800**	—
10	—	—	—	None Required	None Required	None Required	**V-9097-120**	—
12	—	—	—	None Required	None Required	None Required	**V-9097-120**	—
14	—	—	—	—	—	—	**V-9097-160**	**V-9098-100**
16	—	—	—	—	—	—	**V-9097-160**	**V-9098-100**
18	—	—	—	—	—	—	None Required	**V-9098-200**
20	—	—	—	—	—	—	None Required	**V-9098-200**

1. Adaptor sleeves are required to field mount rack and pinion actuators to VFM valves.

Accessories: Mounting Kits[1] for Field Mounting Industrial-Grade V-9000 Series High Pressure Pneumatic Actuators to Two-Way ANSI Class 150 VF Series High-Pressure, High-Temperature Butterfly Valves

Valve Size, in.	Industrial-Grade V-9000 Series High Pressure Pneumatic Actuator						
	V-9x93	V-9x94-1	V-9x94-2	V-9x95	V-9x96	V-9x97	V-9x98
2-1/2	**V-9094-410**	**V-9094-410**	**V-9095-410**	**V-9095-410**	**---**	**---**	**---**
3	**V-9094-410**	**V-9094-410**	**V-9095-410**	**V-9095-410**	**---**	**---**	**---**
4	**V-9094-410**	**V-9094-410**	**V-9095-410**	**V-9095-410**	**---**	**---**	**---**
5	**---**	**---**	**V-9095-610**	**V-9095-610**	**V-9096-610**	**---**	**---**
6	**---**	**---**	**V-9095-610**	**V-9095-610**	**V-9096-610**	**---**	**---**
8	**---**	**---**	**---**	**V-9095-810**	**V-9096-810**	**V-9097-810**	**---**
10	**---**	**---**	**---**	**---**	**---**	**V-9097-1210**	**---**
12	**---**	**---**	**---**	**---**	**---**	**V-9097-1210**	**---**
14	**---**	**---**	**---**	**---**	**---**	**V-9097-1610**	**V-9098-1610**
16	**---**	**---**	**---**	**---**	**---**	**---**	**V-9098-1610**

1. Mounting Kit Contains a Bracket, Adaptor, and Mounting Hardware.

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V-9000 Series Pneumatic Rotary Motion Actuators (Continued)

Accessories: Mounting Kits[1] for Field Mounting Industrial-Grade V-9000 Series High Pressure Pneumatic Actuators to Two-Way ANSI Class 300 VF Series High-Pressure, High-Temperature Butterfly Valves

Valve Size, in.	Industrial-Grade V-9000 Series High Pressure Pneumatic Actuator						
	V-9x93	V-9x94-1	V-9x94-2	V-9x95	V-9x96	V-9x97	V-9x98
2-1/2	V-9094-430	V-9094-430	V-9095-430	---	---	---	---
3	V-9094-430	V-9094-430	V-9095-430	---	---	---	---
4	---	---	V-9095-430	V-9095-430	---	---	---
5	---	---	V-9095-530	V-9095-530	V-9096-530	---	---
6	---	---	---	V-9095-630	V-9096-630	---	---
8	---	---	---	---	V-9096-830	V-9097-830	---
10	---	---	---	---	---	V-9097-1230	---
12	---	---	---	---	---	V-9097-1230	---
14	---	---	---	---	---	---	V-9098-1430

1. Mounting kit contains a bracket, adaptor, and mounting hardware.

Accessories: Plastic Position Indicators

Actuator Series	Code Number[1]
V-9x92	V-9092-611
V-9x93	V-9093-611
V-9x94-1x	V-9094-6111
V-9x94-2x	V-9094-6112
V-9x95	V-9095-611
V-9x96	V-9096-611
V-9x97	V-9097-611
V-9x98	V-9098-611

1. For actuators manufactured after April 1, 1992.

Technical Specifications

V-9000 Series Pneumatic Rotary Motion Actuators		
Models	**V-909x Series**	Rack and Pinion, Double Acting Actuators
	V-919x Series	Rack and Pinion, Spring Return Actuators
Supply Pressure		Nominal 60 to 80 psig (420 to 560 kPa); Minimum 40 psig (280 kPa); Maximum 140 psig (980 kPa); Air Supply Must Be Clean, Dry, and Oil Free
Ambient Temperature Limits		-13 to 200°F (-25 to 93°C)
Materials	**Body**	Extruded Aluminum, Anodized (Red Paint Color)
	End Caps	Die Cast Aluminum, Polyester Coated (Red Color)
	Pistons	Die Cast Aluminum
	Output Shaft	Carbon Steel, Zinc Plated
	Piston Guides	Acetal
	Springs	Spring Steel, Zinc Plated
	O-Ring Seals	Buna-N-Rubber

Dimensions (in.)

	V-9x92	V-9x93	V-9x94-1	V-9x94-2	V-9x96	V-9x97	V-9x98
Height	4-15/16	5-7/32	5-9/16	6-15/16	9-3/8	11-5/8	13-15/32
Length	6	7-29/32	8-15/16	12-1/8	15-15/32	18-15/16	26-23/32
Width	2-25/32	3-19/32	3-31/32	4-3/4	6-25/32	8-27/32	10-3/4

LIT-1924250

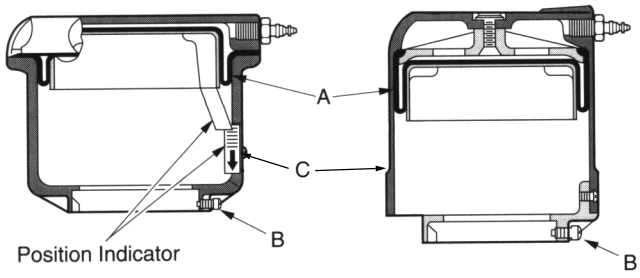
Repair Parts and Replacement Diaphragms for V-3000 Actuators

Description

The repair parts listed can extend the service life of the V-3000 Series actuators. All parts can be replaced without removing the valve from the system.

Selection Chart

Code Number	Callout	Description
V-3000-6000	**A**	Diaphragm for Exposed Actuator (V-3000-1 Only)
V-3000-6001		Diaphragm for Enclosed Actuator (V-3000-2 and V-3000-8003)
V-3100-6043	**B**	10-32 x 1/2 UNF-2A Set Screw (Package of 10)
V-3000-6005	**C**	Spider for V-3008
V-3000-6006		Spider for V-3002
V-3000-6004	**---**	Conversion Kit for #1-1/2 and #2 “Sylphon” Top Actuator



Repair Parts, V-3000 Actuator

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

D-9502 LIT-1921035

Pneumatic Damper Actuator Positioner

Description

The D-9502 Pneumatic Damper Actuator Positioners are precision relay devices used to adjust and maintain damper actuators in exact positions on those applications requiring precise or otherwise special damper positioning.

Selection Charts

D-9502
Pneumatic Damper Actuator Positioner

Code Number	Description
D-9502-5	D-3244 Actuator
D-9502-8	D-3153 Actuator
D-9502-9	D-3153 Actuator, 2-stage
D-9502-12	D-4073 Actuator

Pilot Positioners for Obsolete Actuators

Code Number	Description
D-9502-5	D-251 No. 5 Actuator or D-3246

Repair Information

The pilot positioner has a sealed body so field repairs to the inside cannot be made. For a replacement positioner, contact the nearest Johnson Controls representative.

Repair Parts for D9502 Positioner

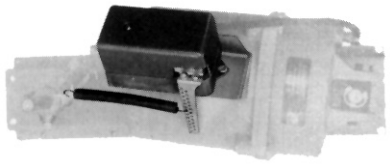
Code Number	Description	Weight lb (Kg)
D-9502-609	Spring for use with D-3153, D-3073, and D-4073	0.8 (0.36)
D-9502-610	Spring for use with D-3244	0.8 (0.36)
D-9502-611	Diaphragm Repair Kit, package quantity of 6	0.8 (0.36)
D-9502-612	Spring for use with D-3246	0.8 (0.36)
D-9502-604	Operating Span Lever Arm Assembly	0.8 (0.36)
C-9506-1	Positioner movement complete less springs and operating span lever arm assembly	1.3 (0.59)

Features

- provides dynamic stabilization and/or sequential control
- includes mounting bracket for direct attachment to actuator body

Applications

The pneumatic damper actuator pilot positioner provides dynamic stabilization and/or sequential control of pneumatic damper actuators. It is available factory installed on D-4070, D-4073, D-3153, and DS-3153 Damper Actuators. On D-3153 Series Actuators, a special positioner mounting kit (D-9502-9) is available for changing basic D-9502 positioner control to two-stage operation.



D-9502 Pneumatic Damper Actuator Positioner

Depending on the type of the actuator used, up to three additional actuators may be controlled by a single positioner/actuator assembly; for example, multiple actuators modulating large or coupled dampers.

Technical Specifications

D-9502 Pneumatic Damper ActuatorPositioner	
Starting Point	Adjustable from 2 to 12 psig (14 to 84 kPa)
Operating Span	Adjustable from 3 to 13 psi (21 to 91 kPa)
Maximum Supply Air Pressure	25 psig (175 kPa) 20 psig (140 kPa) for D-9504-13 only Air supply must be clean, dry and oil free
Air Consumption	5 SCIM (1.4 mL/s)
Output Flow Capacity	1000 SCIM (273 mL/s) 1600 SCIM (437 mL/s) D-9502-13 only
Air Connections	Barbed fittings for 5/32 or 1/4 in. O.D. Polytubing Supply “S” and Pilot “P”: Barbed fittings for 5/32 or 1/4 in O.D. Polytubing D-9502-13 only Output “O”: Compression fitting for 1/4 inch O.D. copper tubing D-9502-13 only
Ambient Operating Conditions	-20 to 150°F (-29 to 66°C) -20 to 250°F (-29 to 121°C) D-9502-13 only based on UL testing for 30 minutes and should not be considered for continuous operation.
Effective Diaphragm Area	15 in^2 (97 cm^2)
Materials	Body - Die-cast Aluminum with Irdite finish Cover - Noryl (D-9502-13 Die cast zinc) Diaphragm - Fabric reinforced rubber
Dimensions (H x W x D)	2-1/4 x 3-7/8 x 2-23/32 in.
Shipping Weight, lb (Kg)	2.0 (0.91)
Agency Listing	UL Recognized component to 350°F (176°C) with compression fitting for copper tubing File No. R15581

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-9000-500

LIT-1924095

Positioner

Description

For modulating control of both spring return and non-spring return actuators (V-9000 Series) used with VF Series Butterfly Valves, a V-9000-500 Positioner is provided as standard equipment on all factory assemblies. This positioner allows precise positioning over the entire range of the actuator stroke.

Features

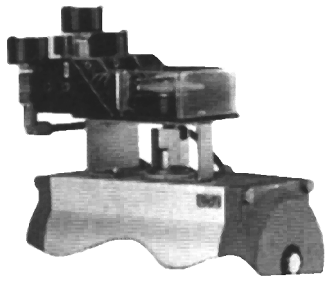
- non-interactive zero and span adjustments as well as field-selectable direct or reverse action
- furnished with supply, input, and output gauges as well as a visual position indicator through the unit's clear polycarbonate cover

Applications

For more information (including mounting kits) refer to *Accessories* in *V-9000 Series Pneumatic Rotary Motion Actuators Catalog Page (LIT-1924085)* on Page 79.

Repair Information

If the V-9000-500 Positioner fails to operate within its specifications, replace the unit. For a replacement positioner, contact the nearest Johnson Controls® representative.



V-9000-500 Positioner

Selection Chart

V-9000-500 Positioner [1]

Code Number	Description
V-9000-500	Positioner

1. The appropriate mounting kit must be ordered separately.

Technical Specifications

V-9000-500 Positioner	
Input Signal	Factory Set at Approximately 3 to 15 psig (21 to 103 kPa) for 90° Rotation
	Field Selectable from 3 to 15 psig (21 to 103 kPa) for 65° Rotation, or 3 to 9 psig (21 to 62 kPa) or 9 to 15 psig (62 to 103 kPa) for 65° Rotation
Supply Presure	40 to 140 psig (276 to 965 kPa)
Air Connections	1/4 in. NPT (Internal) Supply; 1/8 in. NPT (Internal) Control Input and Outputs
Dimensions, H x W x L	6-3/4 x 3-1/8 [1] x 6 [1] in. (171 x 79 [1] x 152 [1] mm)

1. As measured from valve shaft center.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-9502 Series

LIT-1924100

Pneumatic Valve Actuator Positioners

Description

V-9502 Series Pneumatic Valve Actuator Positioners are precision relay devices designed to operate pneumatic valve actuators in applications requiring stable, accurate control. These positioners provide maximum positioning power to resist external forces that might otherwise overcome the positioning power of the actuator. Adjustable operating span (on all pneumatic valve actuators except the V-3000 Series) and starting point also make the V-9502 ideal for valve sequencing applications. The V-9502 Series can be mounted directly to V-3000 Series, 3R, 4R, 5R, 8R, or MP8000 Series pneumatic valve actuators. In many instances, the positioner can be ordered factory installed on these actuator and valve assemblies.

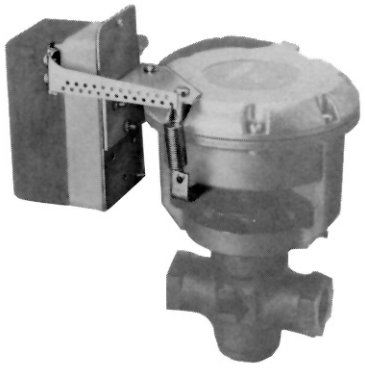
Feedback from the actuator stem (through the positioner spring and lever arm assembly) activates the V-9502 Pneumatic Valve Actuator Positioner to compensate for flow surges in the piping system, and holds the valve at the position dictated by the controller. The V-9502 modulates the stroke of the actuator in relation to a pressure change from the controller. Repositioning is very precise for small changes in the output pressure from the controller.

The span and starting point adjustments of the V-9502 Pneumatic Valve Actuator Positioner determine the operating range. The lower value of the operating range is the control signal pressure at which the actuator just begins to stroke. The upper value of the operating range is the control signal pressure at which the actuator reaches its maximum stroke. The difference between the upper and lower values of the control signal pressure is the operating span.

The operating span of the V-9502 Pneumatic Valve Actuator Positioner is field selectable from 3 to 13 psi (21 to 90 kPa) on 3R, 4R, 5R, 8R, and MP8000 Series pneumatic valve actuators. The operating span is determined by the location of the spring in the positioner operating span lever arm. When the spring is installed in the hole closest to the V-9502 Positioner cover, the spring allows a span of 3 psi (21 kPa). When the spring is installed in the hole furthest from the positioner cover, the spring allows a span of 13 psi (90 kPa).

The operating span for V-3000 Series Pneumatic Valve Actuators is determined by the positioner spring used with the actuator. To change the operating span, simply select a different positioner spring from the *Positioner Springs for V-3000 Actuated VG7000 Series Valves* and the *Positioner Springs for All Other V-3000 Actuated Valves Except VG7000 Series* tables that follow.

The starting point is the input pressure (Pilot **P** pressure) at which the actuator just begins to stroke. The starting point is field adjustable from 2 to 12 psig (14 to 83 kPa) using the starting point adjusting screw located under the V-9502 Positioner cover. Turning the screw clockwise decreases the starting point and turning the screw counterclockwise increases the starting point.



V-9502 Positioner Installed on a Typical V-3000 Type Valve Actuator



V-9502 Positioner Installed on a Rubber Diaphragm Type Valve Actuator

Features

- maximum positioning power compensates for flow surges in the piping system, and holds the valve at the position dictated by the controller
- field-selectable operating span (all pneumatic valve actuators except V-3000 Series) provides application flexibility and allows for easy valve sequencing from a single control signal
- field-adjustable starting point provides accurate control since it can be tailored for the specific application
- can be mounted directly to V-3000 Series, 3R, 4R, 5R, 8R, or MP8000 Series, expanding usability and providing application flexibility

Selection Charts

V-9502 Series Pneumatic Valve Actuator Positioners (Part 1 of 2)

Code Number	Valve Type	Stem Diameter, in. (mm)	Diaphragm Size
V-9502-1[1]	V-5250, V-5460,V-5650, V-5840 Valves	1/4 (6)	3R
V-9502-2[1]		1/4 (6)	4R
V-9502-3[1]		5/16 (8)	4R
V-9502-4[1]		5/16 (8)	5R
V-9502-5[1]		3/8 (10)	5R
V-9502-6[1]		1/2 (13)	8R
V-9502-90[1]	V-3000-8011 Actuated Valves	---	---
V-9502-91[1]	V-3000-8001 Actuated Valves	---	---
V-9502-15[1]	V-3000-1 Actuated Valves	---	---
V-9502-95[2]	MP8000 Actuated VG2000 and VG7000 Series Valves	---	---

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-9502 Series Pneumatic Valve Actuator Positioners (Continued)

V-9502 Series Pneumatic Valve Actuator Positioners (Part 2 of 2)

Code Number	Valve Type	Stem Diameter, in. (mm)	Diaphragm Size
V-9502-23[1]	V-5252, V-5254, V-5462, V-5464, V-5652, V-5842, V-5844 Valves	All	All
V-9502-16[1]	V-5210, V-5216, V-5230, V-5410, V-5416, V-5430, V-5810, V-7216, V-7416 Valves	All	4R, 5R, 8R
V-9502-76[3]	V-400 and V-500 Actuated Valves	---	---
V-9502-8033[1]	V-3000 Actuated V-7216 and V-7416 Valves	---	---

1. Positioner kit includes positioner, interconnecting linkage, and mounting hardware (order positioner spring separately).
2. Positioner kit does not include positioner spring or mounting hardware (order positioner spring and mounting kit separately).
3. Positioner kit does not include positioner spring (order positioner spring separately).

Positioner Springs for 3R, 4R, 5R, and 8R Pneumatic Valve Actuators; or Kieley & Mueller Actuator and Valve Assemblies Manufactured Prior to January, 1975

Code Number	Valve Stroke, in. (mm)
V-510-100	3/16 through 5/16 in. (5 through 8 mm)
V-510-101	3/8 through 7/16 in. (10 through 11 mm)
V-510-102	15/32 through 5/8 in. (12 through 16 mm)
V-510-103	11/16 through 3/4 in. (17 through 19 mm)
V-510-104	13/16 through 1-1/4 in. (21 through 32 mm)
V-510-105	1-3/8 through 1-1/2 in. (35 through 38 mm)
V-510-106	1-5/8 through 2 in. (41 through 51 mm)
V-510-107	2-3/8 through 2-1/2 in. (60 through 64 mm)

Positioner Springs for MP8000 Actuated VG2000 and VG7000 Series Valves

Code Number	Valve Stroke, in. (mm)	Positioner Spring Color Code
V-9502-610	5/16 (8)	Yellow
V-9502-611	1/2 (13)	Blue
V-9502-612	3/4 (19)	White
V-9502-613	1 (25)	Gray
V-9502-614	1-1/4 (32)	Green
V-9502-615	1-1/2 (38)	Red
MP8000-6002[1]	All	All

1. Kit includes all mounting hardware and all six color-coded positioner springs.

Positioner Springs for V-400 and V-500 Actuated VG7000 Series Valves

Code Number	Valve Size, in.	Valve Stroke, in. (mm)
V-9502-8100	1/2 or 3/4	5/16 (8)
V-9502-8102	1 or 1-1/4	1/2 (13)
V-9502-8106	1-1/2 or 2	3/4 (19)

Positioner Springs for V-3000 Actuated VG7000 Series Valves

Code Number	Valve Stroke, in. (mm)	5/16 (8)	3/8 (10)	1/2 (13)	3/4 (19)
V-9502-6801	Spring Span, psig (kPa)	3.0 (21)	---	5.0 (34)	10.0 (70)
V-9502-6802		8.0 (55)	---	12.0 (83)	---
V-9502-6803		---	---	---	4.0 (28)

Positioner Springs for All Other V-3000 Actuated Valves Except VG7000 Series

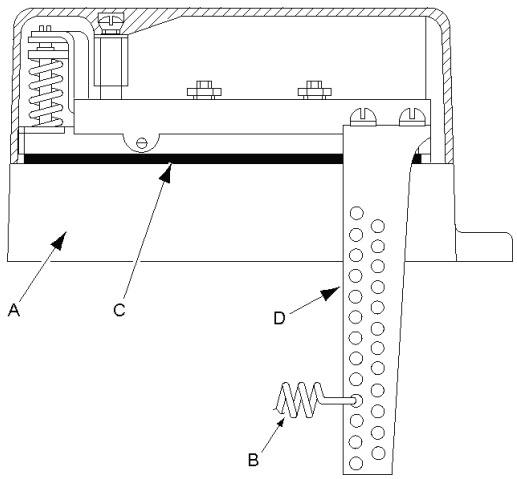
Code Number	Valve Stroke, in. (mm)	5/16 (8)	3/8 (10)	1/2 (13)	3/4 (19)
V-9502-19	Spring Span, psig (kPa)	8.0 (55)	9.5 (65)	12.0 (83)	---
V-9502-20		3.0 (21)	4.0 (28)	5.0 (34)	---
V-9502-100		---	---	3.6 (25)	5.1 (35)
V-9502-101		4.3 (30)	5.2 (36)	7.0 (48)	10.6 (73)

Repair Information

Repair Parts for V-9502 Series Positioner

Code Number	Item	Description	Ship. Wt, lb[1]
C-9506-1	A	Positioner Movement Complete (Less Items **B** and **D**)	1.5
---	B	Positioner Springs (Refer to Positioner Spring Tables)	---
V-9502-600	C	Diaphragm Assembly: Includes Diaphragm, Six Diaphragm Reinforcements, One Seat, Three Nuts, One Spring, Two Metal Balls, One Ball Retainer, Two Screws, and One Gasket. For Old-Style Positioners with Air Connections on Three Sides	0.03
D-9502-611		For New-Style Positioners with Air Connections on One Side	0.03
D-9502-604	D	Positioner Operating Span Lever Arm Assembly	0.01

1. lb x 0.454 = kg.



V-9502 Repair Parts

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-9502 Series Pneumatic Valve Actuator Positioners (Continued)

Technical Specifications

V-9502 Pneumatic Valve Actuator Positioner		
Operating Span		Field Selectable from 3 to 13 psi (21 to 90 kPa) on 3R, 4R, 5R, 8R, and MP8000 Series Pneumatic Valve Actuators; Fixed on V-3000 Series Pneumatic Valve Actuators
Starting Point		Field Adjustable from 2 to 12 psig (14 to 83 kPa)
Supply Pressure		20 psig (138 kPa) Nominal; 25 psig (172 kPa) Maximum
Air Consumption		5 scim (1.4 mL/s)
Output Flow Capacity	**With Dual Barbed Fitting**	1,000 scim (273 mL/s)
	With 1/4 in. Fitting	1,600 scim (437 mL/s)
Air Connections		1/8 in. NPT Dual Barbed Fittings for 5/32 or 1/4 in. O.D. Polytubing
Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Materials	**Body**	Die Cast Aluminum with Iridite Finish
	Cover	Noryl®
	Diaphragm	Fabric-Reinforced Rubber
Shipping Weight		2.0 lb (0.9 kg)

Valve Strokes for All Valves Except Encapsulated Spring Models

Valve Size, in.	Valve Type	Valve Stroke, in. (mm)
1/2 and 3/4	VG7000 Series Valves	5/16 (8)
1 and 1-1/4	VG7000 Series Valves	1/2 (13)
1-1/2 and 2	VG7000 Series Valves	3/4 (19)
1/2 and 3/4	All Except V-3754, V-3974, V-4324, V-4440, and VG7000 Series Valves	5/16 (8)
1 and 1-1/4	All Except V-3754, V-3974, V-4324, V-4440, and VG7000 Series Valves	3/8 (10)
1/2 and 3/4	V-3754, V-3974, and V-4324 Valves	1/2 (13)
1/2 and 5/8	V-4440 Valves	11/16 (17)
1	V-3754, V-3974, and V-4324 Valves	3/4 (19)
1-1/2 and 2	All Angle, Globe, and Three-Way Mixing Valves Except V-3754, V-3974, V-4324, V-5254, V-5464, and V-5844	1/2 (13)
1-1/2 and 2	V-3754, V-3974, V-4324, V-5254, V-5464, and V-5844 Valves	3/4 (19)
2-1/2	Two-Way Normally Open (N.O.) and Normally Closed (N.C.) Valves	3/4 (19)
	Three-Way Mixing and Bypass Valves[1]	3/4 (19)
	Three-Way Mixing and Bypass Valves	9/16 (14)
3	Two-Way N.O. and N.C. Valves	7/8 (22)[2] and 1-1/8 (29)
	Three-Way Mixing and Bypass Valves<superscript>1.	7/8 (22)
	Three-Way Mixing and Bypass Valves	13/16 (21)
4	Two-Way N.O. and N.C. Valves	1-1/8 (29)
	Three-Way Mixing and Bypass Valves<superscript>1.	1-1/8 (29)
	Three-Way Mixing and Bypass Valves	1 (25)
5	Two-Way N.O. and N.C. Valves	1-3/8 (35)
	Three-Way Mixing and Bypass Valves<superscript>1.	1-3/8 (35)
	Three-Way Mixing and Bypass Valves	1-3/16 (30)
6	Two-Way N.O. and N.C. Valves	1-1/2 (38)
	Three-Way Mixing and Bypass Valves<superscript>1.	1-1/2 (38)
	Three-Way Mixing and Bypass Valves	1-7/16 (37)
8	Two-Way N.O. and N.C. Valves	1-1/2 (38)
	Three-Way Mixing Valves	2 (51)

1. For V-5850, V-5852, and V-5820 Series Valves only.
2. With 4R top.

Valve Strokes for V-5252, V-5254, V-5462, V-5464, V-5652, V-5842, and V-5844 Valves

Valve Size, in.	Valve Stroke, in. (mm)
1-1/4	3/8 (10)
1-1/2 and 2[1]	1/2 (13)
2-1/2	3/4 (19)
3 (4R)	3/4 (19)
3 (5R and 8R)	1-1/8 (29)
3 (V-5652)	7/8 (22)
4	1-1/8 (29)
5	1-3/8 (35)
6	1-1/2 (38)

1. V-5254, V-5464, and V-5844 Series Valves have a stroke of 3/4 in. (19 mm).

Valve Strokes for V-5210, V-5216, V-5410, V-5416, V-5810, V-7216, and V-7416 Valves

Valve Size, in.	Valve Stroke, in. (mm)
1/2	5/16 (8)
3/4 and 1	3/8 (10)
1-1/4, 1-1/2, and 2	1/2 (13)
2-1/2	3/4 (19)
3 and 4	1-1/8 (29)

Valve Strokes for V-5230 and V-5430 Valves

Valve Size, in.	Valve Stroke, in. (mm)
1/2 and 3/4[1]	5/16 (8)
1 and 1-1/4	3/8 (10)
1-1/2 and 2	1/2 (13)

1. Up to Cv = 4.7.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924270

Repair Parts For Use With V-9502 Pneumatic Valve Actuator Positioner

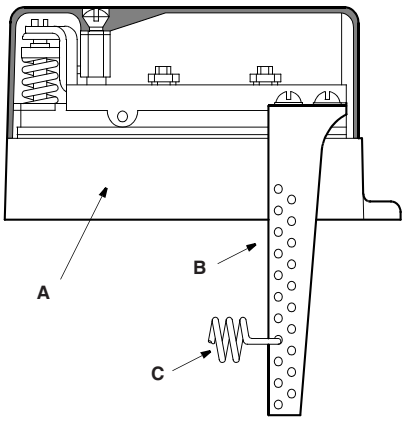
Description

The V-9502 Pneumatic valve positioners can be reconditioned using the parts from the selection chart below.

Selection Chart

Repair Parts For Use With V-9502 Pneumatic Valve Actuator Positioner

Code Number	Callout	Description
C-9506-1	**A**	Positioner Movement Complete Less Items “B” and “C”
D-9502-604	**B**	Operating Span Lever Arm Assembly
Refer to *V-9502 Series Pneumatic Valve Actuator Positioners Catalog Page (LIT-1924100)* on Page 84.	**C**	Springs



Repair Parts, V-9502

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900226

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

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
- 200 psi closeoff pressure rating provides tight shutoff
- Graphite Reinforced Polytetrafluoroethylene (PTFE) Seats includes 15% graphite-reinforced ball seals, providing better wear resistance
- chrome-plated brass ball and stem assembly handles chilled water and hot water with fluid temperature ratings from 23 to 203°F (-5 to 95°C)
- 500:1 rangeability provides accurate control under all load conditions



VG1000 Two-Way Non-Spring Return Plated Brass Ball and Stem Ball Valve Assemblies

Selection Charts

Two-Way Non-Spring Return without Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off Floating without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				VA9104-AGA-xS M9106-AGA-2 M9109-AGA-2	VA9104-IGA-xS M9106-IGA-2	VA9104-GGA-xS M9106-GGA-2 M9109-GGA-2
VG1241AD	1/2	1.2[2]	200	VG1241AD+9T4AGA[3]	VG1241AD+9T4IGA[3]	VG1241AD+9T4GGA[3]
VG1241AE		1.9[2]		VG1241AE+9T4AGA[3]	VG1241AE+9T4IGA[3]	VG1241AE+9T4GGA[3]
VG1241AF		2.9[2]		VG1241AF+9T4AGA[3]	VG1241AF+9T4IGA[3]	VG1241AF+9T4GGA[3]
VG1241AG		4.7[2]		VG1241AG+9T4AGA[3]	VG1241AG+9T4IGA[3]	VG1241AG+9T4GGA[3]
VG1241AL		7.4[2]		VG1241AL+9T4AGA[3]	VG1241AL+9T4IGA[3]	VG1241AL+9T4GGA[3]
VG1241AN		11.7		VG1241AN+9T4AGA[3]	VG1241AN+9T4IGA[3]	VG1241AN+9T4GGA[3]
VG1241BG	3/4	4.7[2]	200	VG1241BG+9T4AGA[3]	VG1241BG+9T4IGA[3]	VG1241BG+9T4GGA[3]
VG1241BL		7.4[2]		VG1241BL+9T4AGA[3]	VG1241BL+9T4IGA[3]	VG1241BL+9T4GGA[3]
VG1241BN		11.7		VG1241BN+9T4AGA[3]	VG1241BN+9T4IGA[3]	VG1241BN+9T4GGA[3]
VG1241CL	1	7.4[2]	200	VG1241CL+9T4AGA[3]	VG1241CL+9T4IGA[3]	VG1241CL+9T4GGA[3]
VG1241CN		11.7[2]		VG1241CN+9T4AGA[3]	VG1241CN+9T4IGA[3]	VG1241CN+9T4GGA[3]
VG1241CP		18.7		VG1241CP+9T4AGA[3]	VG1241CP+9T4IGA[3]	VG1241CP+9T4GGA[3]
VG1241DN	1-1/4	11.7[2]	200	VG1241DN+906AGA	VG1241DN+906IGA	VG1241DN+906GGA
VG1241DP		18.7[2]		VG1241DP+906AGA	VG1241DP+906IGA	VG1241DP+906GGA
VG1241DR		29.2		VG1241DR+906AGA	VG1241DR+906IGA	VG1241DR+906GGA
VG1241EP	1-1/2	18.7[2]	200	VG1241EP+906AGA	VG1241EP+906IGA	VG1241EP+906GGA
VG1241ER		29.2[2]		VG1241ER+906AGA	VG1241ER+906IGA	VG1241ER+906GGA
VG1241ES		46.8		VG1241ES+906AGA	VG1241ES+906IGA	VG1241ES+906GGA
VG1241FR	2	29.2[2]	200	VG1241FR+909AGA	—	VG1241FR+909GGA
VG1241FS		46.8[2]		VG1241FS+909AGA	—	VG1241FS+909GGA
VG1241FT		73.7		VG1241FT+909AGA	—	VG1241FT+909GGA

1. To avoid excessive wear or drive time on the motor for the AGA models, use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall)
2. Cv has a characterizing disk.
3. Code numbers shown are for a VA9104-AGA-3S actuator with M3 screw terminals. To specify a 48 inch plenum rated cable, change the 9T4 to 9A4 in the code number for a VA9104-AGA-2S actuator. Example: VG1241AD+**9T4**AGA becomes VG1241AD+**9A4**AGA. To specify a conduit connection, change the 9T4 to 906 in the code number for a M9106-AGA-2 actuator. Example: VG1241AD+**9T4**AGA becomes VG1241AD+**906**AGA.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

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

Two-Way Non-Spring Return with Two Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off Floating without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				M9106-AGC-2 M9109-AGC-2	M9106-IGC-2	M9106-GGC-2 M9109-GGC-2
VG1241AD	1/2	1.2[2]	200	VG1241AD+906AGC	VG1241AD+906IGC	VG1241AD+906GGC
VG1241AE		1.9[2]		VG1241AE+906AGC	VG1241AE+906IGC	VG1241AE+906GGC
VG1241AF		2.9[2]		VG1241AF+906AGC	VG1241AF+906IGC	VG1241AF+906GGC
VG1241AG		4.7[2]		VG1241AG+906AGC	VG1241AG+906IGC	VG1241AG+906GGC
VG1241AL		7.4[2]		VG1241AL+906AGC	VG1241AL+906IGC	VG1241AL+906GGC
VG1241AN		11.7		VG1241AN+906AGC	VG1241AN+906IGC	VG1241AN+906GGC
VG1241BG	3/4	4.7[2]	200	VG1241BG+906AGC	VG1241BG+906IGC	VG1241BG+906GGC
VG1241BL		7.4[2]		VG1241BL+906AGC	VG1241BL+906IGC	VG1241BL+906GGC
VG1241BN		11.7		VG1241BN+906AGC	VG1241BN+906IGC	VG1241BN+906GGC
VG1241CL	1	7.4[2]	200	VG1241CL+906AGC	VG1241CL+906IGC	VG1241CL+906GGC
VG1241CN		11.7[2]		VG1241CN+906AGC	VG1241CN+906IGC	VG1241CN+906GGC
VG1241CP		18.7		VG1241CP+906AGC	VG1241CP+906IGC	VG1241CP+906GGC
VG1241DN	1-1/4	11.7[2]	200	VG1241DN+906AGC	VG1241DN+906IGC	VG1241DN+906GGC
VG1241DP		18.7[2]		VG1241DP+906AGC	VG1241DP+906IGC	VG1241DP+906GGC
VG1241DR		29.2		VG1241DR+906AGC	VG1241DR+906IGC	VG1241DR+906GGC
VG1241EP		18.7[2]		VG1241EP+906AGC	VG1241EP+906IGC	VG1241EP+906GGC
VG1241ER		29.2[2]		VG1241ER+906AGC	VG1241ER+906IGC	VG1241ER+906GGC
VG1241ES		46.8		VG1241ES+906AGC	VG1241ES+906IGC	VG1241ES+906GGC
VG1241FR	2	29.2[2]	200	VG1241FR+909AGC	—	VG1241FR+909GGC
VG1241FS		46.8[2]		VG1241FS+909AGC	—	VG1241FS+909GGC
VG1241FT		73.7		VG1241FT+909AGC	—	VG1241FT+909GGC

1. To avoid excessive wear or drive time on the motor for the AGC models, use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall).
2. Cv has a characterizing disk.

Technical Specifications

VG1000 Two-Way, Plated Brass Trim Ball Valves with Non-Spring Return Electric Actuators		
Service[1]		Hot Water, Chilled Water, or 50/50 Glycol Solutions for HVAC Systems
Fluid Temperature Limits	**Water**	23 to 203°F (-5 to 95°C)
	Steam	Not Rated for Steam Service
Valve Body Pressure/ Temperature 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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk Maximum Differential Pressure 30 psi: Quiet Service Ball Valves
Flow Characteristics	**Two-Way**	Equal Percentage
Rangeability[2]		Greater than 500:1
Minimum Ambient Operating Temperature		-4°F (-20°C)
Maximum Ambient Operating Temperature[3] (Limited by the Actuator and Linkage)	**M9000-550 Linkage (M9104 only)**	140°F (60°C): VA9104 and M9104 Series Non-Spring Return Actuators
	M9000-520 Linkage	125°F (52°C): M9106 and M9109 Series Non-Spring Return Actuators
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
End Connections		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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900227

Two-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
- 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

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.



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

Selection Charts

Two-Way – Spring Return Valve Open – Normally Open with Switches[1]

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-2 M9210-AGC-3	VA2202-GGB-2 M9206-GGC-2 M9210-GGC-3	VA2202-BGB-2 M9206-BGB-2S M9210-BGC-3	VA2202-BAB-2 M9206-BAB-2S M9210-BAC-3
VG1241AD	1/2	1.2[2]	200	VG1241AD+22TAGB	VG1241AD+22TGGB	VG1241AD+22TBGB	VG1241AD+22TBAB
VG1241AE		1.9[2]		VG1241AE+22TAGB	VG1241AE+22TGGB	VG1241AE+22TBGB	VG1241AE+22TBAB
VG1241AF		2.9[2]		VG1241AF+22TAGB	VG1241AF+22TGGB	VG1241AF+22TBGB	VG1241AF+22TBAB
VG1241AG		4.7[2]		VG1241AG+22TAGB	VG1241AG+22TGGB	VG1241AG+22TBGB	VG1241AG+22TBAB
VG1241AL		7.4[2]		VG1241AL+22TAGB	VG1241AL+22TGGB	VG1241AL+22TBGB	VG1241AL+22TBAB
VG1241AN		11.7		VG1241AN+22TAGB	VG1241AN+22TGGB	VG1241AN+22TBGB	VG1241AN+22TBAB
VG1241BG	3/4	4.7[2]	200	VG1241BG+22TAGB	VG1241BG+22TGGB	VG1241BG+22TBGB	VG1241BG+22TBAB
VG1241BL		7.4[2]		VG1241BL+22TAGB	VG1241BL+22TGGB	VG1241BL+22TBGB	VG1241BL+22TBAB
VG1241BN		11.7		VG1241BN+22TAGB	VG1241BN+22TGGB	VG1241BN+22TBGB	VG1241BN+22TBAB
VG1241CL	1	7.4[2]	200	VG1241CL+936AGC	VG1241CL+936GGC	VG1241CL+936BGB	VG1241CL+936BAB
VG1241CN		11.7[2]		VG1241CN+936AGC	VG1241CN+936GGC	VG1241CN+936BGB	VG1241CN+936BAB
VG1241CP		18.7		VG1241CP+936AGC	VG1241CP+936GGC	VG1241CP+936BGB	VG1241CP+936BAB
VG1241DN	1-1/4	11.7[2]	200	VG1241DN+936AGC	VG1241DN+936GGC	VG1241DN+936BGB	VG1241DN+936BAB
VG1241DP		18.7[2]		VG1241DP+936AGC	VG1241DP+936GGC	VG1241DP+936BGB	VG1241DP+936BAB
VG1241DR		29.2		VG1241DR+936AGC	VG1241DR+936GGC	VG1241DR+936BGB	VG1241DR+936BAB
VG1241EP	1-1/2	18.7[2]	200	VG1241EP+936AGC	VG1241EP+936GGC	VG1241EP+936BGB	VG1241EP+936BAB
VG1241ER		29.2[2]		VG1241ER+936AGC	VG1241ER+936GGC	VG1241ER+936BGB	VG1241ER+936BAB
VG1241ES		46.8		VG1241ES+936AGC	VG1241ES+936GGC	VG1241ES+936BGB	VG1241ES+936BAB
VG1241FR	2	29.2[2]	200	VG1241FR+92JAGC	VG1241FR+92JGGC	VG1241FR+92JBGC	VG1241FR+92JBAC
VG1241FS		46.8[2]		VG1241FS+92JAGC	VG1241FS+92JGGC	VG1241FS+92JBGC	VG1241FS+92JBAC
VG1241FT		73.7		VG1241FT+92JAGC	VG1241FT+92JGGC	VG1241FT+92JBGC	VG1241FT+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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

WVG1000 Series Two-Way, Plated Brass Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators with Switches (Continued)

Two-Way – Spring Return Valve Closed – Normally Closed with Switches[1]

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-2 M9210-AGC-3	VA2202-GGB-2 M9206-GGC-2 M9210-GGC-3	VA2202-BGB-2 M9206-BGB-2S M9210-BGC-3	VA2202-BAB-2 M9206-BAB-2S M9210-BAC-3
VG1241AD	1/2	1.2[2]	200	VG1241AD+24TAGB	VG1241AD+24TGGB	VG1241AD+24TBGB	VG1241AD+24TBAB
VG1241AE		1.9[2]		VG1241AE+24TAGB	VG1241AE+24TGGB	VG1241AE+24TBGB	VG1241AE+24TBAB
VG1241AF		2.9		VG1241AF+24TAGB	VG1241AF+24TGGB	VG1241AF+24TBGB	VG1241AF+24TBAB
VG1241AG		4.7		VG1241AG+24TAGB	VG1241AG+24TGGB	VG1241AG+24TBGB	VG1241AG+24TBAB
VG1241AL		7.4		VG1241AL+24TAGB	VG1241AL+24TGGB	VG1241AL+24TBGB	VG1241AL+24TBAB
VG1241AN		11.7		VG1241AN+24TAGB	VG1241AN+24TGGB	VG1241AN+24TBGB	VG1241AN+24TBAB
VG1241BG	3/4	4.7[2]	200	VG1241BG+24TAGB	VG1241BG+24TGGB	VG1241BG+24TBGB	VG1241BG+24TBAB
VG1241BL		7.4		VG1241BL+24TAGB	VG1241BL+24TGGB	VG1241BL+24TBGB	VG1241BL+24TBAB
VG1241BN		11.7		VG1241BN+24TAGB	VG1241BN+24TGGB	VG1241BN+24TBGB	VG1241BN+24TBAB
VG1241CL	1	7.4	200	VG1241CL+956AGC	VG1241CL+956GGC	VG1241CL+956BGB	VG1241CL+956BAB
VG1241CN		11.7[2]		VG1241CN+956AGC	VG1241CN+956GGC	VG1241CN+956BGB	VG1241CN+956BAB
VG1241CP		18.7		VG1241CP+956AGC	VG1241CP+956GGC	VG1241CP+956BGB	VG1241CP+956BAB
VG1241DN	1-1/4	11.7[2]	200	VG1241DN+956AGC	VG1241DN+956GGC	VG1241DN+956BGB	VG1241DN+956BAB
VG1241DP		18.7[2]		VG1241DP+956AGC	VG1241DP+956GGC	VG1241DP+956BGB	VG1241DP+956BAB
VG1241DR		29.2		VG1241DR+956AGC	VG1241DR+956GGC	VG1241DR+956BGB	VG1241DR+956BAB
VG1241EP	1-1/2	18.7[2]	200	VG1241EP+956AGC	VG1241EP+956GGC	VG1241EP+956BGB	VG1241EP+956BAB
VG1241ER		29.2[2]		VG1241ER+956AGC	VG1241ER+956GGC	VG1241ER+956BGB	VG1241ER+956BAB
VG1241ES		46.8		VG1241ES+956AGC	VG1241ES+956GGC	VG1241ES+956BGB	VG1241ES+956BAB
VG1241FR	2	29.2[2]	200	VG1241FR+94JAGC	VG1241FR+94JGGC	VG1241FR+94JBGC	VG1241FR+94JBAC
VG1241FS		46.8[2]		VG1241FS+94JAGC	VG1241FS+94JGGC	VG1241FS+94JBGC	VG1241FS+94JBAC
VG1241FT		73.7		VG1241FT+94JAGC	VG1241FT+94JGGC	VG1241FT+94JBGC	VG1241FT+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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

WVG1000 Series Two-Way, Plated Brass Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators with Switches (Continued)

Technical Specifications

VG1000 Series Two-Way, Plated Brass Trim Ball Valves with Spring Return Electric Actuators with Switches		
Service[1]		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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: Quiet Service Ball Valves
Flow Characteristics	**Two-Way**	Equal Percentage
Rangeability[2]		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 Temperature[3] **(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
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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900228

Two-Way, Plated Brass Trim, NPT Connection Ball Valves with Spring Return Electric Actuators without 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

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.



Two-Way, Spring Return, Plated Brass Ball and Stem Ball Valve Assemblies without End Switches

Selection Charts

Two-Way – Spring Return Valve Open – Normally Open

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA2202-AGA-2 M9206-AGA-2S M9210-AGA-3	VA2202-GGA-2 M9206-GGA-2S M9210-GGA-3	VA2202-BGA-2 M9206-BGA-2S M9210-BGA-3	VA2202-BAA-2 M9206-BAA-2S M9210-BAA-3
VG1241AD	1/2	1.2[1]	200	VG1241AD+22TAGA	VG1241AD+22TGGA	VG1241AD+22TBGA	VG1241AD+22TBAA
VG1241AE		1.9[1]		VG1241AE+22TAGA	VG1241AE+22TGGA	VG1241AE+22TBGA	VG1241AE+22TBAA
VG1241AF		2.9[1]		VG1241AF+22TAGA	VG1241AF+22TGGA	VG1241AF+22TBGA	VG1241AF+22TBAA
VG1241AG		4.7[1]		VG1241AG+22TAGA	VG1241AG+22TGGA	VG1241AG+22TBGA	VG1241AG+22TBAA
VG1241AL		7.4[1]		VG1241AL+22TAGA	VG1241AL+22TGGA	VG1241AL+22TBGA	VG1241AL+22TBAA
VG1241AN		11.7		VG1241AN+22TAGA	VG1241AN+22TGGA	VG1241AN+22TBGA	VG1241AN+22TBAA
VG1241BG	3/4	4.7[1]	200	VG1241BG+22TAGA	VG1241BG+22TGGA	VG1241BG+22TBGA	VG1241BG+22TBAA
VG1241BL		7.4[1]		VG1241BL+22TAGA	VG1241BL+22TGGA	VG1241BL+22TBGA	VG1241BL+22TBAA
VG1241BN		11.7		VG1241BN+22TAGA	VG1241BN+22TGGA	VG1241BN+22TBGA	VG1241BN+22TBAA
VG1241CL	1	7.4[1]	200	VG1241CL+936AGA	VG1241CL+936GGA	VG1241CL+936BGA	VG1241CL+936BAA
VG1241CN		11.7[1]		VG1241CN+936AGA	VG1241CN+936GGA	VG1241CN+936BGA	VG1241CN+936BAA
VG1241CP		18.7		VG1241CP+936AGA	VG1241CP+936GGA	VG1241CP+936BGA	VG1241CP+936BAA
VG1241DN	1-1/4	11.7[1]	200	VG1241DN+936AGA	VG1241DN+936GGA	VG1241DN+936BGA	VG1241DN+936BAA
VG1241DP		18.7[1]		VG1241DP+936AGA	VG1241DP+936GGA	VG1241DP+936BGA	VG1241DP+936BAA
VG1241DR		29.2		VG1241DR+936AGA	VG1241DR+936GGA	VG1241DR+936BGA	VG1241DR+936BAA
VG1241EP	1-1/2	18.7[1]	200	VG1241EP+936AGA	VG1241EP+936GGA	VG1241EP+936BGA	VG1241EP+936BAA
VG1241ER		29.2[1]		VG1241ER+936AGA	VG1241ER+936GGA	VG1241ER+936BGA	VG1241ER+936BAA
VG1241ES		46.8		VG1241ES+936AGA	VG1241ES+936GGA	VG1241ES+936BGA	VG1241ES+936BAA
VG1241FR	2	29.2[1]	200	VG1241FR+92JAGA	VG1241FR+92JGGA	VG1241FR+92JBGA	VG1241FR+92JBAA
VG1241FS		46.8[1]		VG1241FS+92JAGA	VG1241FS+92JGGA	VG1241FS+92JBGA	VG1241FS+92JBAA
VG1241FT		73.7		VG1241FT+92JAGA	VG1241FT+92JGGA	VG1241FT+92JBGA	VG1241FT+92JBAA

1. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Two-Way, Plated Brass Trim, NPT Connection Ball Valves with Spring Return Electric Actuators without Switches (Continued)

Two-Way – Spring Return Valve Closed – Normally Closed

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA2202-AGA-2 M9206-AGA-2S M9210-AGA-3	VA2202-GGA-2 M9206-GGA-2S M9210-GGA-3	VA2202-BGA-2 M9206-BGA-2S M9210-BGA-3	VA2202-BAA-2 M9206-BAA-2S M9210-BAA-3
VG1241AD	1/2	1.2[1]	200	VG1241AD+24TAGA	VG1241AD+24TGGA	VG1241AD+24TBGA	VG1241AD+24TBAA
VG1241AE		1.9[1]		VG1241AE+24TAGA	VG1241AE+24TGGA	VG1241AE+24TBGA	VG1241AE+24TBAA
VG1241AF		2.9[1]		VG1241AF+24TAGA	VG1241AF+24TGGA	VG1241AF+24TBGA	VG1241AF+24TBAA
VG1241AG		4.7[1]		VG1241AG+24TAGA	VG1241AG+24TGGA	VG1241AG+24TBGA	VG1241AG+24TBAA
VG1241AL		7.4[1]		VG1241AL+24TAGA	VG1241AL+24TGGA	VG1241AL+24TBGA	VG1241AL+24TBAA
VG1241AN		11.7		VG1241AN+24TAGA	VG1241AN+24TGGA	VG1241AN+24TBGA	VG1241AN+24TBAA
VG1241BG	3/4	4.7[1]	200	VG1241BG+24TAGA	VG1241BG+24TGGA	VG1241BG+24TBGA	VG1241BG+24TBAA
VG1241BL		7.4[1]		VG1241BL+24TAGA	VG1241BL+24TGGA	VG1241BL+24TBGA	VG1241BL+24TBAA
VG1241BN		11.7		VG1241BN+24TAGA	VG1241BN+24TGGA	VG1241BN+24TBGA	VG1241BN+24TBAA
VG1241CL	1	7.4[1]	200	VG1241CL+956AGA	VG1241CL+956GGA	VG1241CL+956BGA	VG1241CL+956BAA
VG1241CN		11.7[1]		VG1241CN+956AGA	VG1241CN+956GGA	VG1241CN+956BGA	VG1241CN+956BAA
VG1241CP		18.7		VG1241CP+956AGA	VG1241CP+956GGA	VG1241CP+956BGA	VG1241CP+956BAA
VG1241DN	1-1/4	11.7[1]	200	VG1241DN+956AGA	VG1241DN+956GGA	VG1241DN+956BGA	VG1241DN+956BAA
VG1241DP		18.7[1]		VG1241DP+956AGA	VG1241DP+956GGA	VG1241DP+956BGA	VG1241DP+956BAA
VG1241DR		29.2		VG1241DR+956AGA	VG1241DR+956GGA	VG1241DR+956BGA	VG1241DR+956BAA
VG1241EP	1-1/2	18.7[1]	200	VG1241EP+956AGA	VG1241EP+956GGA	VG1241EP+956BGA	VG1241EP+956BAA
VG1241ER		29.2[1]		VG1241ER+956AGA	VG1241ER+956GGA	VG1241ER+956BGA	VG1241ER+956BAA
VG1241ES		46.8		VG1241ES+956AGA	VG1241ES+956GGA	VG1241ES+956BGA	VG1241ES+956BAA
VG1241FR	2	29.2[1]	200	VG1241FR+94JAGA	VG1241FR+94JGGA	VG1241FR+946JBGA	VG1241FR+94JBAA
VG1241FS		46.8[1]		VG1241FS+94JAGA	VG1241FS+94JGGA	VG1241FS+946JBGA	VG1241FS+94JBAA
VG1241FT		73.7		VG1241FT+94JAGA	VG1241FT+94JGGA	VG1241FT+946JBGA	VG1241FT+94JBAA

1. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Two-Way, Plated Brass Trim, NPT Connection Ball Valves with Spring Return Electric Actuators without Switches (Continued)

Technical Specifications

VG1000 Series Two-Way, Plated Brass Trim Ball Valves with Spring Return Electric Actuators without Switches		
Service[1]		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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: Quiet Service Ball Valves
Flow Characteristics	**Two-Way**	Equal Percentage
Rangeability[2]		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 Temperature[3] **(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
End Connections		National Pipe Thread (NPT)
Materials	**Body**	Forged Brass
	Ball	Chrome-Plated Brass
	Blowout-Proof Stem	Nickel-Plated Brass
	Seats	Graphite-Reinforced 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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900229

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

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 Electriwc 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
- 200 psi closeoff pressure rating provides tight shutoff
- Graphite Reinforced Polytetrafluoroethylene (PTFE) Seats includes 15% graphite-reinforced ball seals, providing better wear resistance
- 500:1 rangeability provides accurate control under all load conditions
- chrome-plated brass ball and stem assembly handles chilled water and hot water with fluid temperature ratings from 23 to 203°F (-5 to 95°C)



VG1000 Series Three Way, Spring Return, Plated Brass Ball and Stem Ball Valve Assemblies without End Switches

Selection Charts

Three-Way Non-Spring Return without Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off Floating without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				VA9104-AGA-xS M9106-AGA-2 M9109-AGA-2	VA9104-IGA-xS M9106-IGA-2	VA9104-GGA-xS M9106-GGA-2 M9109-GGA-2
VG1841AD	1/2	1.2 / 0.7[2]	200	VG1841AD+9T4AGA[3]	VG1841AD+9T4IGA[3]	VG1841AD+9T4GGA[3]
VG1841AE		1.9 / 1.2[2]		VG1841AE+9T4AGA[3]	VG1841AE+9T4IGA[3]	VG1841AE+9T4GGA[3]
VG1841AF		2.9 / 1.9[2]		VG1841AF+9T4AGA[3]	VG1841AF+9T4IGA[3]	VG1841AF+9T4GGA[3]
VG1841AG		4.7 / 2.9[2]		VG1841AG+9T4AGA[3]	VG1841AG+9T4IGA[3]	VG1841AG+9T4GGA[3]
VG1841AL		7.4 / 4.7[2]		VG1841AL+9T4AGA[3]	VG1841AL+9T4IGA[3]	VG1841AL+9T4GGA[3]
VG1841AN		11.7 / 5.8		VG1841AN+9T4AGA[3]	VG1841AN+9T4IGA[3]	VG1841AN+9T4GGA[3]
VG1841BG	3/4	4.7 / 2.9[2]	200	VG1841BG+9T4AGA[3]	VG1841BG+9T4IGA[3]	VG1841BG+9T4GGA[3]
VG1841BL		7.4 / 4.7[2]		VG1841BL+9T4AGA[3]	VG1841BL+9T4IGA[3]	VG1841BL+9T4GGA[3]
VG1841BN		11.7 / 5.8		VG1841BN+9T4AGA[3]	VG1841BN+9T4IGA[3]	VG1841BN+9T4GGA[3]
VG1841CL	1	7.4 / 4.7[2]	200	VG1841CL+9T4AGA[3]	VG1841CL+9T4IGA[3]	VG1841CL+9T4GGA[3]
VG1841CN		11.7 / 7.4[2]		VG1841CN+9T4AGA[3]	VG1841CN+9T4IGA[3]	VG1841CN+9T4GGA[3]
VG1841CP		18.7 / 9.4		VG1841CP+9T4AGA[3]	VG1841CP+9T4IGA[3]	VG1841CP+9T4GGA[3]
VG1841DN	1-1/4	11.7 / 7.4[2]	200	VG1841DN+906AGA	VG1841DN+906IGA	VG1841DN+906GGA
VG1841DP		18.7 / 11.7[2]		VG1841DP+906AGA	VG1841DP+906IGA	VG1841DP+906GGA
VG1841DR		29.2 / 14.6		VG1841DR+906AGA	VG1841DR+906IGA	VG1841DR+906GGA
VG1841EP	1-1/2	18.7 / 11.7[2]	200	VG1841EP+906AGA	VG1841EP+906IGA	VG1841EP+906GGA
VG1841ER		29.2 / 18.7[2]		VG1841ER+906AGA	VG1841ER+906IGA	VG1841ER+906GGA
VG1841ES		46.8 / 23.4		VG1841ES+906AGA	VG1841ES+906IGA	VG1841ES+906GGA
VG1841FR	2	29.2 / 18.7[2]	200	VG1841FR+909AGA	—	VG1841FR+909GGA
VG1841FS		46.8 / 29.2[2]		VG1841FS+909AGA	—	VG1841FS+909GGA
VG1841FT		73.7 / 36.8		VG1841FT+909AGA	—	VG1841FT+909GGA

1. To avoid excessive wear or drive time on the motor for the AGA models, use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall).
2. Cv has a characterizing disk.
3. Code numbers shown are for a VA9104-AGA-3S actuator with M3 screw terminals. To specify a 48 inch plenum rated cable, change the 9T4 to 9A4 in the code number for a VA9104-AGA-2S actuator. Example: VG1841AD+**9T4**AGA becomes VG1841AD+**9A4**AGA. To specify a conduit connection, change the 9T4 to 906 in the code number for a M9106-AGA-2 actuator. Example: VG1841AD+**9T4**AGA becomes VG1841AD+**906**AGA.

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

Three-Way Non-Spring Return with Two Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off Floating without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				M9106-AGC-2 M9109-AGC-2	M9106-IGC-2	M9106-GGC-2 M9109-GGC-2
VG1841AD	1/2	1.2 / 0,7[2]	200	VG1841AD+906AGC	VG1841AD+906IGC	VG1841AD+906GGC
VG1841AE		1.9 / 1.2[2]		VG1841AE+906AGC	VG1841AE+906IGC	VG1841AE+906GGC
VG1841AF		2.9 / 1.9[2]		VG1841AF+906AGC	VG1841AF+906IGC	VG1841AF+906GGC
VG1841AG		4.7 / 2.9[2]		VG1841AG+906AGC	VG1841AG+906IGC	VG1841AG+906GGC
VG1841AL		7.4 / 4.7[2]		VG1841AL+906AGC	VG1841AL+906IGC	VG1841AL+906GGC
VG1841AN		11.7 / 5.8		VG1841AN+906AGC	VG1841AN+906IGC	VG1841AN+906GGC
VG1841BG	3/4	4.7 / 2.9[2]	200	VG1841BG+906AGC	VG1841BG+906IGC	VG1841BG+906GGC
VG1841BL		7.4 / 4.7[2]		VG1841BL+906AGC	VG1841BL+906IGC	VG1841BL+906GGC
VG1841BN		11.7 / 5.8		VG1841BN+906AGC	VG1841BN+906IGC	VG1841BN+906GGC
VG1841CL	1	7.4 / 4.7[2]	200	VG1841CL+906AGC	VG1841CL+906IGC	VG1841CL+906GGC
VG1841CN		11.7 / 7.4[2]		VG1841CN+906AGC	VG1841CN+906IGC	VG1841CN+906GGC
VG1841CP		18.7 / 9.4		VG1841CP+906AGC	VG1841CP+906IGC	VG1841CP+906GGC
VG1841DN	1-1/4	11.7 / 7.4[2]	200	VG1841DN+906AGC	VG1841DN+906IGC	VG1841DN+906GGC
VG1841DP		18.7 / 11.7[2]		VG1841DP+906AGC	VG1841DP+906IGC	VG1841DP+906GGC
VG1841DR		29.2 / 14.6		VG1841DR+906AGC	VG1841DR+906IGC	VG1841DR+906GGC
VG1841EP	1-1/2	18.7 / 11.7[2]	200	VG1841EP+906AGC	VG1841EP+906IGC	VG1841EP+906GGC
VG1841ER		29.2 / 18.7[2]		VG1841ER+906AGC	VG1841ER+906IGC	VG1841ER+906GGC
VG1841ES		46.8 / 23.4		VG1841ES+906AGC	VG1841ES+906IGC	VG1841ES+906GGC
VG1841FR	2	29.2 / 18.7[2]	200	VG1841FR+909AGC	—	VG1841FR+909GGC
VG1841FS		46.8 / 29.2[2]		VG1841FS+909AGC	—	VG1841FS+909GGC
VG1841FT		73.7 / 36.8		VG1841FT+909AGC	—	VG1841FT+909GGC

1. To avoid excessive wear or drive time on the motor for the AGC models, use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall).
2. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

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

Technical Specifications

VG1000 Three-Way, Plated Brass Trim Ball Valves with Non-Spring Return Electric Actuators		
Service[1]		Hot Water, Chilled Water, and 50/50 Glycol Solutions for HVAC Systems
Fluid Temperature Limits	**Water**	23 to 203°F (-5 to 95°C)
	Steam	Not Rated for Steam Service
Valve Body Pressure/Temperature 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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: 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)
Rangeability[2]		Greater than 500:1
Minimum Ambient Operating Temperature		-4°F (-20°C)
Maximum Ambient Operating Temperature[3] **(Limited by the Actuator and Linkage)**	**VA9104 and M9104 with M9000-550 linkage only**	140°F (60°C): VA9104 and M9104 Series Non-Spring Return Actuators
	M9000-520 Linkage	125°F (52°C): M9106 and M9109 Series Non-Spring Return Actuators
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
		1% of Maximum Flow for Three-Way Bypass Port
End Connections		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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900230

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, anwd 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

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.



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

Selection Charts

Three-Way – Spring Return Counterclockwise – Port A (Coil) Open – with End Switches[1]

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

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 Switches[1]

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

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		
Service[1]		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)
Rangeability[2]		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 Temperature[3] **(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.

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VG1000 Series

LIT-1900231

Three-Way, Plated Brass Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators without 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 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

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.



Three-Way, Spring Return, Plated Brass Ball and Stem Ball Valve Assemblies without End Switches

Selection Charts

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

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA2202-AGA-2 M9206-AGA-2S M9210-AGA-3	VA2202-GGA-2 M9206-GGA-2S M9210-GGA-3	VA2202-BGA-2 M9206-BGA-2S M9210-BGA-3	VA2202-BAA-2 M9206-BAA-2S M9210-BAA-3
VG1841AD	1/2	1.2/0.7[1]	200	VG1841AD+22TAGA	VG1841AD+22TGGA	VG1841AD+22TBGA	VG1841AD+22TBAA
VG1841AE		1.9/1.2[1]		VG1841AE+22TAGA	VG1841AE+22TGGA	VG1841AE+22TBGA	VG1841AE+22TBAA
VG1841AF		2.9/1.9		VG1841AF+22TAGA	VG1841AF+22TGGA	VG1841AF+22TBGA	VG1841AF+22TBAA
VG1841AG		4.7/2.9		VG1841AG+22TAGA	VG1841AG+22TGGA	VG1841AG+22TBGA	VG1841AG+22TBAA
VG1841AL		7.4/1.7[1]		VG1841AL+22TAGA	VG1841AL+22TGGA	VG1841AL+22TBGA	VG1841AL+22TBAA
VG1841AN		11.7/5.8		VG1841AN+22TAGA	VG1841AN+22TGGA	VG1841AN+22TBGA	VG1841AN+22TBAA
VG1841BG	3/4	4.7/2.9	200	VG1841BG+22TAGA	VG1841BG+22TGGA	VG1841BG+22TBGA	VG1841BG+22TBAA
VG1841BL		7.4/4.7		VG1841BL+22TAGA	VG1841BL+22TGGA	VG1841BL+22TBGA	VG1841BL+22TBAA
VG1841BN		11.7/5.8		VG1841BN+22TAGA	VG1841BN+22TGGA	VG1841BN+22TBGA	VG1841BN+22TBAA
VG1841CL	1	7.4/4.7[1]	200	VG1841CL+936AGA	VG1841CL+936GGA	VG1841CL+936BGA	VG1841CL+936BAA
VG1841CN		11.7/7.4		VG1841CN+936AGA	VG1841CN+936GGA	VG1841CN+936BGA	VG1841CN+936BAA
VG1841CP		18.7/9.4		VG1841CP+936AGA	VG1841CP+936GGA	VG1841CP+936BGA	VG1841CP+936BAA
VG1841DN	1-1/4	11.7/7.4[1]	200	VG1841DN+936AGA	VG1841DN+936GGA	VG1841DN+936BGA	VG1841DN+936BAA
VG1841DP		18.711.7[1]		VG1841DP+936AGA	VG1841DP+936GGA	VG1841DP+936BGA	VG1841DP+936BAA
VG1841DR		29.2/14.6		VG1841DR+936AGA	VG1841DR+936GGA	VG1841DR+936BGA	VG1841DR+936BAA
VG1841EP	1-1/2	18.711.7	200	VG1841EP+936AGA	VG1841EP+936GGA	VG1841EP+936BGA	VG1841EP+936BAA
VG1841ER		29./18.72[1]		VG1841ER+936AGA	VG1841ER+936GGA	VG1841ER+936BGA	VG1841ER+936BAA
VG1841ES		46.8/23.4		VG1841ES+936AGA	VG1841ES+936GGA	VG1841ES+936BGA	VG1841ES+936BAA
VG1841FR	2	29.2/18.7[1]	200	VG1841FR+92JAGA	VG1841FR+92JGGA	VG1841FR+92JBGA	VG1841FR+92JBAA
VG1841FS		46.8/29.2[1]		VG1841FS+92JAGA	VG1841FS+92JGGA	VG1841FS+92JBGA	VG1841FS+92JBAA
VG1841AD		73.7/36.8		VG1841FT+92JAGA	VG1841FT+92JGGA	VG1841FT+92JBGA	VG1841FT+92JBAA

1. Cv has a characterizing disk

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VG1000 Series Three-Way, Plated Brass Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators without Switches (Continued)

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

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA2202-AGA-2 M9206-AGA-2S M9210-AGA-3	VA2202-GGA-2 M9206-GGA-2S M9210-GGA-3	VA2202-BGA-2 M9206-BGA-2S M9210-BGA-3	VA2202-BAA-2 M9206-BAA-2S M9210-BAA-0
VG1841AD	1/2	1.2/0.7[1]	200	VG1841AD+24TAGA	VG1841AD+24TGGA	VG1841AD+24TBGA	VG1841AD+24TBAA
VG1841AE		1.9/1.2[1]		VG1841AE+24TAGA	VG1841AE+24TGGA	VG1841AE+24TBGA	VG1841AE+24TBAA
VG1841AF		2.9/1.9[1]		VG1841AF+24TAGA	VG1841AF+24TGGA	VG1841AF+24TBGA	VG1841AF+24TBAA
VG1841AG		4.7/2.9[1]		VG1841AG+24TAGA	VG1841AG+24TGGA	VG1841AG+24TBGA	VG1841AG+24TBAA
VG1841AL		7.4/4.7[1]		VG1841AL+24TAGA	VG1841AL+24TGGA	VG1841AL+24TBGA	VG1841AL+24TBAA
VG1841AN		11.7/5.8		VG1841AN+24TAGA	VG1841AN+24TGGA	VG1841AN+24TBGA	VG1841AN+24TBAA
VG1841BG	3/4	4.7/2.9[1]	200	VG1841BG+24TAGA	VG1841BG+24TGGA	VG1841BG+24TBGA	VG1841BG+24TBAA
VG1841BL		7.4/4.7[1]		VG1841BL+24TAGA	VG1841BL+24TGGA	VG1841BL+24TBGA	VG1841BL+24TBAA
VG1841BN		11.7/5.8		VG1841BN+24TAGA	VG1841BN+24TGGA	VG1841BN+24TBGA	VG1841BN+24TBAA
VG1841CL	1	7.4/4.7[1]	200	VG1841CL+956AGA	VG1841CL+956GGA	VG1841CL+956BGA	VG1841CL+956BAA
VG1841CN		11.7/7.4[1]		VG1841CN+956AGA	VG1841CN+956GGA	VG1841CN+956BGA	VG1841CN+956BAA
VG1841CP		18.7/9.4		VG1841CP+956AGA	VG1841CP+956GGA	VG1841CP+956BGA	VG1841CP+956BAA
VG1841DN	1-1/4	11.7/7.4[1]	200	VG1841DN+956AGA	VG1841DN+956GGA	VG1841DN+956BGA	VG1841DN+956BAA
VG1841DP		18.7/11.7[1]		VG1841DP+956AGA	VG1841DP+956GGA	VG1841DP+956BGA	VG1841DP+956BAA
VG1841DR		29.2/14.6		VG1841DR+956AGA	VG1841DR+956GGA	VG1841DR+956BGA	VG1841DR+956BAA
VG1841EP	1-1/2	18.7/11.7[1]	200	VG1841EP+956AGA	VG1841EP+956GGA	VG1841EP+956BGA	VG1841EP+956BAA
VG1841ER		29.2/18.7[1]		VG1841ER+956AGA	VG1841ER+956GGA	VG1841ER+956BGA	VG1841ER+956BAA
VG1841ES		46.8/23.4		VG1841ES+956AGA	VG1841ES+956GGA	VG1841ES+956BGA	VG1841ES+956BAA
VG1841FR	2	29.2/18.7[1]	200	VG1841FR+94JAGA	VG1841FR+94JGGA	VG1841FR+94JBGA	VG1841FR+94JBAA
VG1841FS		46.8/29.2[1]		VG1841FS+94JAGA	VG1841FS+94JGGA	VG1841FS+94JBGA	VG1841FS+94JBAA
VG1841FT		73.7/36.8		VG1841FT+94JAGA	VG1841FT+94JGGA	VG1841FT+94JBGA	VG1841FT+94JBAA

1. Cv has a characterizing disk.

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VG1000 Series Three-Way, Plated Brass Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators without Switches (Continued)

Technical Specifications

VG1000 Three-Way, Plated Brass Trim Ball Valves with Spring Return Electric Actuators without Switches		
Service[1]		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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: 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)
Rangeability[2]		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 Temperature[3] **(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 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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900220

Two-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Non-Spring Return Electric Actuators

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
- 200 psi closeoff pressure rating manages tight shutoff
- 300 Series stainless steel ball and stem assembly tolerates high temperature water or 15 psi saturated steam with fluid temperatures of -22 to 284°F (-30 to 140°C) or where a higher degree of corrosion protection is desired
- 500:1 rangeability provides accurate control under all load conditions

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.



VG1000 Series Two-Way, Non-Spring Return, Stainless Steel Ball and Stem Ball Valve Assemblies

Selection Charts

Two-Way Non-Spring Return without Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off (Floating) without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				VA9104-AGA-xS M9106-AGA-2 M9109-AGA-2	VA9104-IGA-xS M9106-IGA-2	VA9104-GGA-xS M9106-GGA-2 M9109-GGA-2
VG1245AD	1/2	1.2[2]	200	VG1245AD+9T4AGA[3]	VG1245AD+9T4IGA[3]	VG1245AD+9T4GGA[3]
VG1245AE		1.9[2]		VG1245AE+9T4AGA[3]	VG1245AE+9T4IGA[3]	VG1245AE+9T4GGA[3]
VG1245AF		2.9[2]		VG1245AF+9T4AGA[3]	VG1245AF+9T4IGA[3]	VG1245AF+9T4GGA[3]
VG1245AG		4.7[2]		VG1245AG+9T4AGA[3]	VG1245AG+9T4IGA[3]	VG1245AG+9T4GGA[3]
VG1245AL		7.4[2]		VG1245AL+9T4AGA[3]	VG1245AL+9T4IGA[3]	VG1245AL+9T4GGA[3]
VG1245AN		11.7		VG1245AN+9T4AGA[3]	VG1245AN+9T4IGA[3]	VG1245AN+9T4GGA[3]
VG1245BG	3/4	4.7[2]	200	VG1245BG+9T4AGA[3]	VG1245BG+9T4IGA[3]	VG1245BG+9T4GGA[3]
VG1245BL		7.4[2]		VG1245BL+9T4AGA[3]	VG1245BL+9T4IGA[3]	VG1245BL+9T4GGA[3]
VG1245BN		11.7		VG1245BN+9T4AGA[3]	VG1245BN+9T4IGA[3]	VG1245BN+9T4GGA[3]
VG1245CL	1	7.4[2]	200	VG1245CL+9T4AGA[3]	VG1245CL+9T4IGA[3]	VG1245CL+9T4GGA[3]
VG1245CN		11.7[2]		VG1245CN+9T4AGA[3]	VG1245CN+9T4IGA[3]	VG1245CN+9T4GGA[3]
VG1245CP		18.7		VG1245CP+9T4AGA[3]	VG1245CP+9T4IGA[3]	VG1245CP+9T4GGA[3]
VG1245DN	1-1/4	11.7[2]	200	VG1245DN+906AGA	VG1245DN+906IGA	VG1245DN+906GGA
VG1245DP		18.7[2]		VG1245DP+906AGA	VG1245DP+906IGA	VG1245DP+906GGA
VG1245DR		29.2		VG1245DR+906AGA	VG1245DR+906IGA	VG1245DR+906GGA
VG1245EP	1-1/2	18.7[2]	200	VG1245EP+906AGA	VG1245EP+906IGA	VG1245EP+906GGA
VG1245ER		29.2[2]		VG1245ER+906AGA	VG1245ER+906IGA	VG1245ER+906GGA
VG1245ES		46.8		VG1245ES+906AGA	VG1245ES+906IGA	VG1245ES+906GGA
VG1245FR	2	29.2[2]	200	VG1245FR+909AGA	—	VG1245FR+909GGA
VG1245FS		46.8[2]		VG1245FS+909AGA	—	VG1245FS+909GGA
VG1245FT		73.7		VG1245FT+909AGA	—	VG1245FT+909GGA

1. To avoid excessive wear or drive time on the motor for the AGx models, use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall).
2. Cv has a characterizing disk.
3. Code numbers shown are for a VA9104-AGA-3S actuator with M3 screw terminals. To specify a 48 inch plenum rated cable, change the 9T4 to 9A4 in the code number for a VA9104-AGA-2S actuator. Example: VG1245AD+**9T4**AGA becomes VG1245AD+**9A4**AGA. To make a conduit connection or for fluid temperatures greater than 212°F (100°), change the 9T4 to 906 in the code number for an M9106-AGA-2 actuator. Example: VG1245AD+**9T4**AGA becomes VG1245AD+**906**AGA.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Two-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Non-Spring Return Electric Actuators (Continued)

Two-Way Non-Spring Return with Two Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off (Floating) without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				M9106-AGC-2 M9109-AGC-2	M9106-IGC-2	M9106-GGC-2 M9109-GGC-2
VG1245AD	1/2	1.2[2]	200	VG1245AD+906AGC	VG1245AD+906IGC	VG1245AD+906GGC
VG1245AE		1.9[2]		VG1245AE+906AGC	VG1245AE+906IGC	VG1245AE+906GGC
VG1245AF		2.9[2]		VG1245AF+906AGC	VG1245AF+906IGC	VG1245AF+906GGC
VG1245AG		4.7[2]		VG1245AG+906AGC	VG1245AG+906IGC	VG1245AG+906GGC
VG1245AL		7.4[2]		VG1245AL+906AGC	VG1245AL+906IGC	VG1245AL+906GGC
VG1245AN		11.7		VG1245AN+906AGC	VG1245AN+906IGC	VG1245AN+906GGC
VG1245BG	3/4	4.7[2]	200	VG1245BG+906AGC	VG1245BG+906IGC	VG1245BG+906GGC
VG1245BL		7.4[2]		VG1245BL+906AGC	VG1245BL+906IGC	VG1245BL+906GGC
VG1245BN		11.7		VG1245BN+906AGC	VG1245BN+906IGC	VG1245BN+906GGC
VG1245CL	1	7.4[2]	200	VG1245CL+906AGC	VG1245CL+906IGC	VG1245CL+906GGC
VG1245CN		11.7[2]		VG1245CN+906AGC	VG1245CN+906IGC	VG1245CN+906GGC
VG1245CP		18.7		VG1245CP+906AGC	VG1245CP+906IGC	VG1245CP+906GGC
VG1245DN	1-1/4	11.7[2]	200	VG1245DN+906AGC	VG1245DN+906IGC	VG1245DN+906GGC
VG1245DP		18.7[2]		VG1245DP+906AGC	VG1245DP+906IGC	VG1245DP+906GGC
VG1245DR		29.2		VG1245DR+906AGC	VG1245DR+906IGC	VG1245DR+906GGC
VG1245EP	1-1/2	18.7[2]	200	VG1245EP+906AGC	VG1245EP+906IGC	VG1245EP+906GGC
VG1245ER		29.2[2]		VG1245ER+906AGC	VG1245ER+906IGC	VG1245ER+906GGC
VG1245ES		46.8		VG1245ES+906AGC	VG1245ES+906IGC	VG1245ES+906GGC
VG1245FR	2	29.2[2]	200	VG1245FR+909AGC	—	VG1245FR+909GGC
VG1245FS		46.8[2]		VG1245FS+909AGC	—	VG1245FS+909GGC
VG1245FT		73.7		VG1245FT+909AGC	—	VG1245FT+909GGC

1. To avoid excessive wear or drive time on the motor for the AGx models, use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall).
2. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Two-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Non-Spring Return Electric Actuators (Continued)

Technical Specifications

VG1000 Two-Way, Stainless Steel Trim Ball Valves with Non-Spring Return Electric Actuators		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for HVAC Systems
Fluid Temperature Limits	**Water**	-22 to 284°F (-30 to 140°C)
	Steam	15 psig (103 kPa) at 250°F (121°C)
Maximum Actuator Fluid Temperature Limits	**212°F (100°C)**	VA9104 and M9104 with M9000-550 Linkage
	284°F (140°C)	M9106 or M9109 with M9000-520 Linkage
Valve Body Pressure/ Temperature 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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: Quiet Service Ball Valves
Flow Characteristics	**Two-Way**	Equal Percentage
Rangeability[2]		Greater than 500:1
Minimum Ambient Operating Temperature		-4°F (-20°C)
Maximum Ambient Operating Temperature[3] **(Limited by the Actuator and Linkage)**	**M9000-550 Linkage (M9104 Only)**	140°F (60°C): VA9104 and M9104 Series Non-Spring Return Actuators
	M9000-520 Linkage	125°F (52°C): M9106 and M9109 Series Non-Spring Return Actuators
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
End Connections		NPT
Materials	**Body**	Forged Brass
	Ball	300 Series Stainless Steel
	Blowout-Proof Stem	300 Series Stainless Steel
	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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900221

Two-Way, Stainless Steel 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
- 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

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.



Two-Way, Spring Return, Stainless Steel Ball and Stem Ball Valve Assemblies with End Switches

Selection Charts

Two-Way – Spring Return Valve Open – Normally Open[1]

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating with Two Switches	DC 0 to 10 V Proportional with Two Switches	On/Off with End Switch	On/Off with End Switch
				VA2202-AGB-2[2] M9206-AGC-2 M9210-AGC-3	VA2202-GGB-2[2] M9206-GGC-2 M9210-GGB-3	VA2202-BGB-2[2] M9206-BGB-2S M9210-BGC-3	VA2202-BAB-2[2] M9206-BAB-2S M9210-BAC-3
VG1245AD	1/2	1.2[3]	200	VG1245AD+22TAGB	VG1245AD+22TGGB	VG1245AD+22TBGB	VG1245AD+22TBAB
VG1245AE		1.9[3]		VG1245AE+22TAGB	VG1245AE+22TGGB	VG1245AE+22TBGB	VG1245AE+22TBAB
VG1245AF		2.9[3]		VG1245AF+22TAGB	VG1245AF+22TGGB	VG1245AF+22TBGB	VG1245AF+22TBAB
VG1245AG		4.7[3]		VG1245AG+22TAGB	VG1245AG+22TGGB	VG1245AG+22TBGB	VG1245AG+22TBAB
VG1245AL		7.4[3]		VG1245AL+22TAGB	VG1245AL+22TGGB	VG1245AL+22TBGB	VG1245AL+22TBAB
VG1245AN		11.7		VG1245AN+22TAGB	VG1245AN+22TGGB	VG1245AN+22TBGB	VG1245AN+22TBAB
VG1245BG	3/4	4.7[3]	200	VG1245BG+22TAGB	VG1245BG+22TGGB	VG1245BG+22TBGB	VG1245BG+22TBAB
VG1245BL		7.4[3]		VG1245BL+22TAGB	VG1245BL+22TGGB	VG1245BL+22TBGB	VG1245BL+22TBAB
VG1245BN		11.7		VG1245BN+22TAGB	VG1245BN+22TGGB	VG1245BN+22TBGB	VG1245BN+22TBAB
VG1245CL	1	7.4[3]	200	VG1245CL+936AGC	VG1245CL+936GGC	VG1245CL+936BGB	VG1245CL+936BGB
VG1245CN		11.7[3]		VG1245CN+936AGC	VG1245CN+936GGC	VG1245CN+936BGB	VG1245CN+936BGB
VG1245CP		18.7		VG1245CP+936AGC	VG1245CP+936GGC	VG1245CP+936BGB	VG1245CP+936BGB
VG1245DN	1-1/4	11.7[3]	200	VG1245DN+936AGC	VG1245DN+936GGC	VG1245DN+936BGB	VG1245DN+936BGB
VG1245DP		18.7[3]		VG1245DP+936AGC	VG1245DP+936GGC	VG1245DP+936BGB	VG1245DP+936BGB
VG1245DR		29.2		VG1245DR+936AGC	VG1245DR+936GGC	VG1245DR+936BGB	VG1245DR+936BGB
VG1245EP	1-1/2	18.7[3]	200	VG1245EP+936AGC	VG1245EP+936GGC	VG1245EP+936BGB	VG1245EP+936BGB
VG1245ER		29.2[3]		VG1245ER+936AGC	VG1245ER+936GGC	VG1245ER+936BGB	VG1245ER+936BGB
VG1245ES		46.8		VG1245ES+936AGC	VG1245ES+936GGC	VG1245ES+936BGB	VG1245ES+936BGB
VG1245FR	2	29.2[3]	200	VG1245FR+92JAGC	VG1245FR+92JGGC	VG1245FR+92JBGC	VG1245FR+92JBAC
VG1245FS		46.8[3]		VG1245FS+92JAGC	VG1245FS+92JGGC	VG1245FS+92JBGC	VG1245FS+92JBAC
VG1245FT		73.7		VG1245FT+92JAGC	VG1245FT+92JGGC	VG1245FT+92JBGC	VG1245FT+92JBAC

1. VA2202-xxB and M9206-BxB have a single end switch. M9206-xGC and M9210-xGC have two end switches.
2. The VA2202 Series Actuator has a 212°F (100°C) fluid temperature limit. For fluid temperatures greater than 212°F, use an M9206 Series Actuator. To specify an M9206 Actuator, change the 22T (or 24T) in the code number to 936 (or 956). Example: VG1245AD+**22T**BGB becomes VG1245AD+**936**BGB. For Floating and Proportional, change the last **B** to **C**.
3. Cv has a characterizing disk.

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VG1000 Series Two-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators with Switches (Continued)

Two-Way – Spring Return Valve Closed – Normally Closed[1]

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating with Two Switches	DC 0 to 10 V Proportional with Two Switches	On/Off with End Switch	On/Off with End Switch
				VA2202-AGB-2[2] M9206-AGC-2 M9210-AGC-3	VA2202-GGB-2[2] M9206-GGC-2 M9210-GGB-3	VA2202-BGB-2[2] M9206-BGB-2S M9210-BGC-3	VA2202-BAB-2[2] M9206-BAB-2S, M9210-BAC-3
VG1245AD	1/2	1.2[3]	200	VG1245AD+24TAGB	VG1245AD+24TGGB	VG1245AD+24TBGB	VG1245AD+24TBAB
VG1245AE		1.9[3]		VG1245AE+24TAGB	VG1245AE+24TGGB	VG1245AE+24TBGB	VG1245AE+24TBAB
VG1245AF		2.9[3]		VG1245AF+24TAGB	VG1245AF+24TGGB	VG1245AF+24TBGB	VG1245AF+24TBAB
VG1245AG		4.7[3]		VG1245AG+24TAGB	VG1245AG+24TGGB	VG1245AG+24TBGB	VG1245AG+24TBAB
VG1245AL		7.4[3]		VG1245AL+24TAGB	VG1245AL+24TGGB	VG1245AL+24TBGB	VG1245AL+24TBAB
VG1245AN		11.7		VG1245AN+24TAGB	VG1245AN+24TGGB	VG1245AN+24TBGB	VG1245AN+24TBAB
VG1245BG	3/4	4.7[3]	200	VG1245BG+24TAGB	VG1245BG+24TGGB	VG1245BG+24TBGB	VG1245BG+24TBAB
VG1245BL		7.4[3]		VG1245BL+24TAGB	VG1245BL+24TGGB	VG1245BL+24TBGB	VG1245BL+24TBAB
VG1245BN		11.7		VG1245BN+24TAGB	VG1245BN+24TGGB	VG1245BN+24TBGB	VG1245BN+24TBAB
VG1245CL	1	7.4[3]	200	VG1245CL+956AGC	VG1245CL+956GGC	VG1245CL+956BGB	VG1245CL+956BAB
VG1245CN		11.7[3]		VG1245CN+956AGC	VG1245CN+956GGC	VG1245CN+956BGB	VG1245CN+956BAB
VG1245CP		18.7		VG1245CP+956AGC	VG1245CP+956GGC	VG1245CP+956BGB	VG1245CP+956BAB
VG1245DN	1-1/4	11.7[3]	200	VG1245DN+956AGC	VG1245DN+956GGC	VG1245DN+956BGB	VG1245DN+956BAB
VG1245DP		18.7[3]		VG1245DP+956AGC	VG1245DP+956GGC	VG1245DP+956BGB	VG1245DP+956BAB
VG1245DR		29.2		VG1245DR+956AGC	VG1245DR+956GGC	VG1245DR+956BGB	VG1245DR+956BAB
VG1245EP	1-1/2	18.7[3]	200	VG1245EP+956AGC	VG1245EP+956GGC	VG1245EP+956BGB	VG1245EP+956BAB
VG1245ER		29.2[3]		VG1245ER+956AGC	VG1245ER+956GGC	VG1245ER+956BGB	VG1245ER+956BAB
VG1245ES		46.8		VG1245ES+956AGC	VG1245ES+956GGC	VG1245ES+956BGB	VG1245ES+956BAB
VG1245FR	2	29.2[3]	200	VG1245FR+94JAGC	VG1245FR+94JGGC	VG1245FR+94JBGC	VG1245FR+94JBAC
VG1245FS		46.8[3]		VG1245FS+94JAGC	VG1245FS+94JGGC	VG1245FS+94JBGC	VG1245FS+94JBAC
VG1245FT		73.7		VG1245FT+94JAGC	VG1245FT+94JGGC	VG1245FT+94JBGC	VG1245FT+94JBAC

1. VA2202-xxB and M9206-BxB have a single end switch. M9206-xGC and M9210-xGC have two end switches.
2. The VA2202 Series Actuator has a 212°F (100°C) fluid temperature limit. For fluid temperatures greater than 212°F, use an M9206 Series Actuator. To specify an M9206 Actuator, change the 22T (or 24T) in the code number to 936 (or 956). Example VG1245AD+**22T**BGB becomes VG1245AD+**936**BGB. For Floating and Proportional, change the last **B** to **C**.
3. Cv has a characterizing disk.

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VG1000 Series Two-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators with Switches (Continued)

Technical Specifications

VG1000 Series Two-Way, Stainless Steel Trim Ball Valves with Spring Return Electric Actuators with Switches		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for HVAC Systems
Fluid Temperature Limits	**Water**	-22 to 284°F (-30 to 140°C)
	Steam	15 psig (103 kPa) at 250°F (121°C)
Maximum Actuator Fluid Temperature Limits	**212°F (100°C)**	VA2202 and M2202 with M9000-550 Linkage
	284°F (140°C)	M9206 with M9000-550 Linkage M9210 with M9000-517 Linkage
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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: Quiet Service Ball Valves
Flow Characteristics	**Two-Way**	Equal Percentage
Rangeability[2]		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 Temperature[3] **(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	For Fluid Temperature below 212°F (100°C) 131°F (55°C): M9210 Series Spring Return Actuators
		For Fluid Temperature between 212°F (100°C) and 284°F (140°C) 100°F (38°C): All Actuators
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
		1% of Max Flow for Three-Way Bypass Port
End Connections		National Pipe Thread (NPT)
Materials	**Body**	Forged Brass
	Ball	300 Series Stainless Steel
	Blowout-Proof Stem	300 Series Stainless Steel
	Seats	Graphite-Reinforced 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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900222

Two-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators without 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
- 200 psi closeoff pressure rating provides tight shutoff
- graphite reinforced Polytetrafluoroethylene (PTFE) Seats include 15% graphite-reinforced ball seals, providing better wear resistance
- 300 Series stainless steel ball and stem assembly tolerates high temperature water or 15 psi saturated steam with fluid temperatures of -22 to 284°F (-30 to 140°C) or where a higher degree of corrosion protection is desired
- 500:1 rangeability provides accurate control to low flow values

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.



Two-Way, Spring Return, Stainless Steel Ball and Stem Ball Valve Assemblies without End Switches

Selection Charts

Two-Way – Spring Return Valve Open – Normally Open

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA2202-AGA-2[1] M9206-AGA-2S M9210-AGA-3	VA2202-GGA-2[1] M9206-GGA-2S M9210-GGA-3	VA2202-BGA-2[1] M9206-BGA-2S M9210-BGA-3	VA2202-BAA-2[1] M9206-BAA-2S M9210-BAA-3
VG1245AD	1/2	1.2[2]	200	VG1245AD+22TAGA	VG1245AD+22TGGA	VG1245AD+22TBGA	VG1245AD+22TBAA
VG1245AE		1.9[2]		VG1245AE+22TAGA	VG1245AE+22TGGA	VG1245AE+22TBGA	VG1245AE+22TBAA
VG1245AF		2.9[2]		VG1245AF+22TAGA	VG1245AF+22TGGA	VG1245AF+22TBGA	VG1245AF+22TBAA
VG1245AG		4.7[2]		VG1245AG+22TAGA	VG1245AG+22TGGA	VG1245AG+22TBGA	VG1245AG+22TBAA
VG1245AL		7.4[2]		VG1245AL+22TAGA	VG1245AL+22TGGA	VG1245AL+22TBGA	VG1245AL+22TBAA
VG1245AN		11.7		VG1245AN+22TAGA	VG1245AN+22TGGA	VG1245AN+22TBGA	VG1245AN+22TBAA
VG1245BG	3/4	4.7[2]	200	VG1245BG+22TAGA	VG1245BG+22TGGA	VG1245BG+22TBGA	VG1245BG+22TBAA
VG1245BL		7.4[2]		VG1245BL+22TAGA	VG1245BL+22TGGA	VG1245BL+22TBGA	VG1245BL+22TBAA
VG1245BN		11.7		VG1245BN+22TAGA	VG1245BN+22TGGA	VG1245BN+22TBGA	VG1245BN+22TBAA
VG1245CL	1	7.4[2]	200	VG1245CL+936AGA	VG1245CL+936GGA	VG1245CL+936BGA	VG1245CL+936BAA
VG1245CN		11.7[2]		VG1245CN+936AGA	VG1245CN+936GGA	VG1245CN+936BGA	VG1245CN+936BAA
VG1245CP		18.7		VG1245CP+936AGA	VG1245CP+936GGA	VG1245CP+936BGA	VG1245CP+936BAA
VG1245DN	1-1/4	11.7[2]	200	VG1245DN+936AGA	VG1245DN+936GGA	VG1245DN+936BGA	VG1245DN+936BAA
VG1245DP		18.7[2]		VG1245DP+936AGA	VG1245DP+936GGA	VG1245DP+936BGA	VG1245DP+936BAA
VG1245DR		29.2		VG1245DR+936AGA	VG1245DR+936GGA	VG1245DR+936BGA	VG1245DR+936BAA
VG1245EP	1-1/2	18.7[2]	200	VG1245EP+936AGA	VG1245EP+936GGA	VG1245EP+936BGA	VG1245EP+936BAA
VG1245ER		29.2[2]		VG1245ER+936AGA	VG1245ER+936GGA	VG1245ER+936BGA	VG1245ER+936BAA
VG1245ES		46.8		VG1245ES+936AGA	VG1245ES+936GGA	VG1245ES+936BGA	VG1245ES+936BAA
VG1245FR	2	29.2[2]	200	VG1245FR+92JAGA	VG1245FR+92JGGA	VG1245FR+92JBGA	VG1245FR+92JBAA
VG1245FS		46.8[2]		VG1245FS+92JAGA	VG1245FS+92JGGA	VG1245FS+92JBGA	VG1245FS+92JBAA
VG1245FT		73.7		VG1245FT+92JAGA	VG1245FT+92JGGA	VG1245FT+92JBGA	VG1245FT+92JBAA

1. The VA2202 Series Actuator has a 212°F (100°C) fluid temperature limit. For fluid temperatures greater than 212°F, use an M9206 Series Actuator. To specify an M9206 Actuator, change the 22T (or 24T) in the code number to 936 (or 956). Example: VG1245AD+**22T**AGA becomes VG1245AD+**936**AGA.
2. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Two-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators without Switches (Continued)

Two-Way – Spring Return Valve Closed – Normally Closed

Valve	Size in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA2202-AGA-2[1] M9206-AGA-2S M9210-AGA-3	**VA2202-GGA-2[1] M9206-GGA-2S M9210-GGA-3**	**VA2202-BGA-2[1] M9206-BGA-2S M9210-BGA-3**	**VA2202-BAA-2[1] M9206-BAA-2S M9210-BAA-3**
VG1245AD	1/2	1.2[2]	200	VG1245AD+24TAGA	VG1245AD+24TGGA	VG1245AD+24TBGA	VG1245AD+24TBAA
VG1245AE		1.9[2]		VG1245AE+24TAGA	VG1245AE+24TGGA	VG1245AE+24TBGA	VG1245AE+24TBAA
VG1245AF		2.9[2]		VG1245AF+24TAGA	VG1245AF+24TGGA	VG1245AF+24TBGA	VG1245AF+24TBAA
VG1245AG		4.7[2]		VG1245AG+24TAGA	VG1245AG+24TGGA	VG1245AG+24TBGA	VG1245AG+24TBAA
VG1245AL		7.4[2]		VG1245AL+24TAGA	VG1245AL+24TGGA	VG1245AL+24TBGA	VG1245AL+24TBAA
VG1245AN		11.7		VG1245AN+24TAGA	VG1245AN+24TGGA	VG1245AN+24TBGA	VG1245AN+24TBAA
VG1245BG	3/4	4.7[2]	200	VG1245BG+24TAGA	VG1245BG+24TGGA	VG1245BG+24TBGA	VG1245BG+24TBAA
VG1245BL		7.4[2]		VG1245BL+24TAGA	VG1245BL+24TGGA	VG1245BL+24TBGA	VG1245BL+24TBAA
VG1245BN		11.7		VG1245BN+24TAGA	VG1245BN+24TGGA	VG1245BN+24TBGA	VG1245BN+24TBAA
VG1245CL	1	7.4[2]	200	VG1245CL+956AGA	VG1245CL+956GGA	VG1245CL+956BGA	VG1245CL+956BAA
VG1245CN		11.7[2]		VG1245CN+956AGA	VG1245CN+956GGA	VG1245CN+956BGA	VG1245CN+956BAA
VG1245CP		18.7		VG1245CP+956AGA	VG1245CP+956GGA	VG1245CP+956BGA	VG1245CP+956BAA
VG1245DN	1-1/4	11.7[2]	200	VG1245DN+956AGA	VG1245DN+956GGA	VG1245DN+956BGA	VG1245DN+956BAA
VG1245DP		18.7[2]		VG1245DP+956AGA	VG1245DP+956GGA	VG1245DP+956BGA	VG1245DP+956BAA
VG1245DR		29.2		VG1245DR+956AGA	VG1245DR+956GGA	VG1245DR+956BGA	VG1245DR+956BAA
VG1245EP	1-1/2	18.7[2]	200	VG1245EP+956AGA	VG1245EP+956GGA	VG1245EP+956BGA	VG1245EP+956BAA
VG1245ER		29.2[2]		VG1245ER+956AGA	VG1245ER+956GGA	VG1245ER+956BGA	VG1245ER+956BAA
VG1245ES		46.8		VG1245ES+956AGA	VG1245ES+956GGA	VG1245ES+956BGA	VG1245ES+956BAA
VG1245FR	2	29.2[2]	200	VG1245FR+94JAGA	VG1245FR+94JGGA	VG1245FR+94JBGA	VG1245FR+94JBAA
VG1245FS		46.8[2]		VG1245FS+94JAGA	VG1245FS+94JGGA	VG1245FS+94JBGA	VG1245FS+94JBAA
VG1245FT		73.7		VG1245FT+94JAGA	VG1245FT+94JGGA	VG1245FT+94JBGA	VG1245FT+94JBAA

1. The VA2202 Series Actuator has a 212°F (100°C) fluid temperature limit. For fluid temperatures greater than 212°F, use an M9206 Series Actuator. To specify an M9206 Actuator, change the 22T (or 24T) in the code number to 936 (or 956). Example: VG1245AD+**22T**AGA becomes VG1245AD+**936**AGA.
2. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Two-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators without Switches (Continued)

Technical Specifications

VG1000 Two-Way, Stainless Steel Trim Ball Valves with Spring Return Electric Actuators without Switches		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for HVAC Systems
Fluid Temperature Limits	**Water**	-22 to 284°F (-30 to 140°C)
	Steam	15 psig (103 kPa) at 250°F (121°C)
Maximum Actuator Fluid Temperature Limits	**212°F (100°C)**	VA2202 and M2202 with M9000-500 Linkage
	284°F (140°C)	M9206 with M9000-550 Linkage M9210 with M9000-517 Linkage
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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: Quiet Service Ball Valves
Flow Characteristics	**Two-Way**	Equal Percentage
Rangeability[2]		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 Temperature[3] **(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	For Fluid Temperature below 212°F (100°C) 131°F (55°C): M9210 Series Spring Return Actuators
		For Fluid Temperature between 212°F (100°C) and 284°F (140°C) 100°F (38°C): All Actuators
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
		1% of Max Flow for Three-Way Bypass Port
End Connections		National Pipe Thread (NPT)
Materials	**Body**	Forged Brass
	Ball	300 Series Stainless Steel
	Blowout-Proof Stem	300 Series Stainless Steel
	Seats	Graphite-Reinforced 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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900223

Three-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Non-Spring Return Electric Actuators

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
- 200 psi closeoff pressure rating provides tight shutoff
- Graphite-Reinforced Polytetrafluoroethylene (PTFE) Seats includes 15% graphite-reinforced ball seals, providing better wear resistance
- 300 Series stainless steel ball and stem assembly tolerates high temperature water or 15 psi saturated steam with fluid temperatures of -22 to 284°F (-30 to 140°C) or where a higher degree of corrosion protection is desired
- 500:1 rangeability provides accurate control under all load conditions



VG1000 Series Three-Way, Non-Spring Return, Stainless Steel Ball and Stem Ball Valve Assemblies

Selection Charts

Three-Way Non-Spring Return without Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off Floating without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				VA9104-AGA-xS M9106-AGA-2 M9109-AGA-2	VA9104-IGA-xS M9106-IGA-2	VA9104-GGA-xS M9106-GGA-2 M9109-GGA-2
VG1845AD	1/2	1.2 / 0.7[2]	200	VG1845AD+9T4AGA[3]	VG1845AD+9T4IGA[3]	VG1845AD+9T4GGA[3]
VG1845AE		1.9 / 1.2[2]		VG1845AE+9T4AGA[3]	VG1845AE+9T4IGA[3]	VG1845AE+9T4GGA[3]
VG1845AF		2.9 / 1.9[2]		VG1845AF+9T4AGA[3]	VG1845AF+9T4IGA[3]	VG1845AF+9T4GGA[3]
VG1845AG		4.7 / 2.9[2]		VG1845AG+9T4AGA[3]	VG1845AG+9T4IGA[3]	VG1845AG+9T4GGA[3]
VG1845AL		7.4 / 4.7[2]		VG1845AL+9T4AGA[3]	VG1845AL+9T4IGA[3]	VG1845AL+9T4GGA[3]
VG1845AN		11.7 / 5.8		VG1845AN+9T4AGA[3]	VG1845AN+9T4IGA[3]	VG1845AN+9T4GGA[3]
VG1845BG	3/4	4.7 / 2.9[2]	200	VG1845BG+9T4AGA[3]	VG1845BG+9T4IGA[3]	VG1845BG+9T4GGA[3]
VG1845BL		7.4 / 4.7[2]		VG1845BL+9T4IGA[3]	VG1845BL+9T4IGA[3]	VG1845BL+9T4GGA[3]
VG1845BN		11.7 / 5.8		VG1845BN+9T4AGA[3]	VG1845BN+9T4IGA[3]	VG1845BN+9T4GGA[3]
VG1845CL	1	7.4 / 4.7[2]	200	VG1845CL+9T4GA[3]	VG1845CL+9T4IGA[3]	VG1845CL+9T4GGA[3]
VG1845CN		11.7 / 7.4[2]		VG1845CN+9T4GA[3]	VG1845CN+9T4IGA[3]	VG1845CN+9T4GGA[3]
VG1845CP		18.7 / 9.4		VG1845CP+9T4GA[3]	VG1845CP+9T4IGA[3]	VG1845CP+9T4GGA[3]
VG1845DN	1-1/4	11.7 / 7.4[2]	200	VG1845DN+906AGA	VG1845DN+906IGA	VG1845DN+906GGA
VG1845DP		18.7 / 11.7[2]		VG1845DP+906AGA	VG1845DP+906IGA	VG1845DP+906GGA
VG1845DR		29.2 / 14.6		VG1845DR+906AGA	VG1845DR+906IGA	VG1845DR+906GGA
VG1845EP	1-1/2	18.7 / 11.7[2]	200	VG1845EP+906AGA	VG1845EP+906IGA	VG1845EP+906GGA
VG1845ER		29.2 / 18.7[2]		VG1845ER+906AGA	VG1845ER+906IGA	VG1845ER+906GGA
VG1845ES		46.8 / 23.4		VG1845ES+906AGA	VG1845ES+906IGA	VG1845ES+906GGA
VG1845FR	2	29.2 / 18.7[2]	200	VG1845FR+909AGA	—	VG1845FR+909GGA
VG1845FS		46.8 / 29.2[2]		VG1845FS+909AGA	—	VG1845FS+909GGA
VG1845FT		73.7 / 36.8		VG1845FT+909AGA	—	VG1845FT+909GGA

1. To avoid excessive wear or drive time on the motor for the AGA models, use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall).
2. Cv has a characterizing disk.
3. Code numbers shown are for a VA9104-AGA-3S actuator with M3 screw terminals. To specify a 48 inch plenum rated cable, change the 9T4 to 9A4 in the code number for a VA9104-AGA-2S actuator. Example: VG1845AD+**9T4**AGA becomes VG1845AD+**9A4**AGA. To specify a conduit connection or for fluid temperatures greater than 212°F (100°C), change the 9T4 to 906 in the code number for a M9106-AGA-2 actuator. Example: VG1845AD+**9T4**AGA becomes VG1845AD+**906**AGA.

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VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Non-Spring Return Electric Actuators (Continued)

Three-Way Non-Spring Return with Two Switches

Valve	Size, in.	Cv	Closeoff psig	AC 24 V		
				On/Off Floating without Timeout[1]	On/Off (Floating) with Timeout	DC 0 to 10 V Proportional
				M9106-AGC-2 M9109-AGC-2	M9106-IGC-2	M9106-GGC-2 M9109-GGC-2
VG1845AD	1/2	1.2 / 0,7[2]	200	VG1845AD+906AGC	VG1845AD+906IGC	VG1845AD+906GGC
VG1845AE		1.9 / 1.2[2]		VG1845AE+906AGC	VG1845AE+906IGC	VG1845AE+906GGC
VG1845AF		2.9 / 1.9[2]		VG1845AF+906AGC	VG1845AF+906IGC	VG1845AF+906GGC
VG1845AG		4.7 / 2.9[2]		VG1845AG+906AGC	VG1845AG+906IGC	VG1845AG+906GGC
VG1845AL		7.4 / 4.7[2]		VG1845AL+906AGC	VG1845AL+906IGC	VG1845AL+906GGC
VG1845AN		11.7 / 5.8		VG1845AN+906AGC	VG1845AN+906IGC	VG1845AN+906GGC
VG1845BG	3/4	4.7 / 2.9[2]	200	VG1845BG+906AGC	VG1845BG+906IGC	VG1845BG+906GGC
VG1845BL		7.4 / 4.7[2]		VG1845BL+906AGC	VG1845BL+906IGC	VG1845BL+906GGC
VG1845BN		11.7 / 5.8		VG1845BN+906AGC	VG1845BN+906IGC	VG1845BN+906GGC
VG1845CL	1	7.4 / 4.7[2]	200	VG1845CL+906AGC	VG1845CL+906IGC	VG1845CL+906GGC
VG1845CN		11.7 / 7.4[2*]		VG1845CN+906AGC	VG1845CN+906IGC	VG1845CN+906GGC
VG1845CP		18.7 / 9.4		VG1845CP+906AGC	VG1845CP+906IGC	VG1845CP+906GGC
VG1845DN	1-1/4	11.7 / 7.4[2]	200	VG1845DN+906AGC	VG1845DN+906IGC	VG1845DN+906GGC
VG1845DP		18.7 / 11.7[2]		VG1845DP+906AGC	VG1845DP+906IGC	VG1845DP+906GGC
VG1845DR		29.2 / 14.6		VG1845DR+906AGC	VG1845DR+906IGC	VG1845DR+906GGC
VG1845EP	1-1/2	18.7 / 11.7[2]	200	VG1845EP+906AGC	VG1845EP+906IGC	VG1845EP+906GGC
VG1845ER		29.2 / 18.7[2]		VG1845ER+906AGC	VG1845ER+906IGC	VG1845ER+906GGC
VG1845ES		46.8 / 23.4		VG1845ES+906AGC	VG1845ES+906IGC	VG1845ES+906GGC
VG1845FR	2	29.2 / 18.7[2]	200	VG1845FR+909AGC	—	VG1845FR+909GGC
VG1845FS		46.8 / 29.2[2]		VG1845FS+909AGC	—	VG1845FS+909GGC
VG1845FT		73.7 / 36.8		VG1845FT+909AGC	—	VG1845FT+909GGC

1. To avoid excessive wear or drive time on the motor for the AGC models use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall).
2. Cv has a characterizing disk.

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Non-Spring Return Electric Actuators (Continued)

Technical Specifications

VG1000 Three-Way, Stainless Steel Trim Ball Valves with Non-Spring Return Electric Actuators		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for HVAC Systems
Fluid Temperature Limits	**Water**	-22 to 284°F (-30 to 140°C)
	Steam	15 psig (103 kPa) at 250°F (121°C)
Maximum Actuator Fluid Temperature Limits	**212°F (100°C)**	VA9104 and M9104 with M9000-550 Linkage
	284°F (140°C)	M9106 or M9109 with M9000-520 Linkage
Valve Body Pressure/Temperature 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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: 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)
Rangeability[2]		Greater than 500:1
Minimum Ambient Operating Temperature		-4°F (-20°C)
Maximum Ambient Operating Temperature[3] **(Limited by the Actuator and Linkage)**	**M9000-550 Linkage (M9104 only)**	140°F (60°C): VA9104 and M9104 Series Non-Spring Return Actuators
	M9000-520 Linkage	125°F (52°C): M9106 and M9109 Series Non-Spring Return Actuators
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
		1% of Maximum Flow for Three-Way Bypass Port
End Connections		NPT
Materials	**Body**	Forged Brass
	Ball	300 Series Stainless Steel
	Blowout-Proof Stem	300 Series Stainless Steel
	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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900224

Three-Way, Stainless Steel 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
- 300 Series stainless steel ball and stem assembly available tolerates high temperature water or 15 psi saturated steam with fluid temperatures of -22 to 284°F (-30 to 140°C) or where a higher degree of corrosion protection is desired
- ethylene propylene diene monomer (EPDM) double o-ring stem seal provides a leak-free seal; the packing has been tested and is leak-free after 200,000 cycles in iron-oxide contaminated water
- blowout-proof stem protects the user from the risk of injury

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.



Three-Way, Spring Return, Stainless Steel and Stem Ball Valve with End Switches

Selection Charts

Three-Way – Spring Return Counterclockwise – Port A (Coil) Open[1]

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA-2202-AGB-2[2] M9206-AGC-2 M9210-AGC-3	VA-2202-GGB-2[2] M9206-GGC-2 M9210-GGC-3	VA-2202-BGB[2] M9206-BGB-2S M9210-BGC-3	VA-2202-BAB-2[2] M9206-BAB-2S M9210-BAC-3
VG1845AD	1/2	1.2/0.7[3]	200	VG1845AD+22TAGB	VG1845AD+22TGGB	VG1845AD+22TBGB	VG1845AD+22TBAB
VG1845AE		1.9/1.2[3]		VG1845AE+22TAGB	VG1845AE+22TGGB	VG1845AE+22TBGB	VG1845AE+22TBAB
VG1845AF		2.9/1.9[3]		VG1845AF+22TAGB	VG1845AF+22TGGB	VG1845AF+22TBGB	VG1845AF+22TBAB
VG1845AG		4.7/2.9[3]		VG1845AG+22TAGB	VG1845AG+22TGGB	VG1845AG+22TBGB	VG1845AG+22TBAB
VG1845AL		7.4/4.7[3]		VG1845AL+22TAGB	VG1845AL+22TGGB	VG1845AL+22TBGB	VG1845AL+22TBAB
VG1845AN		11.7/5.8		VG1845AN+22TAGB	VG1845AN+22TGGB	VG1845AN+22TBGB	VG1845AN+22TBAB
VG1845BG	3/4	4.7/2.9[3]	200	VG1845BG+22TAGB	VG1845BG+22TGGB	VG1845BG+22TBGB	VG1845BG+22TBAB
VG1845BL		7.4/4.7[3]		VG1845BL+22TAGB	VG1845BL+22TGGB	VG1845BL+22TBGB	VG1845BL+22TBAB
VG1845BN		11.7/5.8		VG1845BN+22TAGB	VG1845BN+22TGGB	VG1845BN+22TBGB	VG1845BN+22TBAB
VG1845CL	1	7.4/4.7[3]	200	VG1845CL+936AGC	VG1845CL+936GGC	VG1845CL+936BGB	VG1845CL+936BAB
VG1845CN		11.7/7.4[3]		VG1845CN+936AGC	VG1845CN+936GGC	VG1845CN+936BGB	VG1845CN+936BAB
VG1845CP		18.7/9.4		VG1845CP+936AGC	VG1845CP+936GGC	VG1845CP+936BGB	VG1845CP+936BAB
VG1845DN	1-1/4	11.7/7.4[3]	200	VG1845DN+936AGC	VG1845DN+936GGC	VG1845DN+936BGB	VG1845DN+936BAB
VG1845DP		18.7/11.7[3]		VG1845DP+936AGC	VG1845DP+936GGC	VG1845DP+936BGB	VG1845DP+936BAB
VG1845DR		29.2/14.6		VG1845DR+936AGC	VG1845DR+936GGC	VG1845DR+936BGB	VG1845DR+936BAB
VG1845EP	1-1/2	18.7/11.7[3]	200	VG1845EP+936AGC	VG1845EP+936GGC	VG1845EP+936BGB	VG1845EP+936BAB
VG1845ER		29.2/18.7[3]		VG1845ER+936AGC	VG1845ER+936GGC	VG1845ER+936BGB	VG1845ER+936BAB
VG1845ES		46.8/23.4		VG1845ES+936AGC	VG1845ES+936GGC	VG1845ES+936BGB	VG1845ES+936BAB
VG1845FR	2	29.2/18.7[3]	200	VG1845FR+92JAGC	VG1845FR+92JGGC	VG1845FR+92JBGC	VG1845FR+92JBAC
VG1845FS		46.8/29.2[3]		VG1845FS+92JAGC	VG1845FS+92JGGC	VG1845FS+92JBGC	VG1845FS+92JBAC
VG1845FT		73.7/36.8		VG1845FT+92JAGC	VG1845FT+92JGGC	VG1845FT+92JBGC	VG1845FT+92JBAC

1. VA2202-xxB and M9206-BxB have a single end switch. M9206-xGC and M9210-xGC have two end switches
2. The VA2202 Series Actuator has a 212°F (100°C) fluid temperature limit. For fluid temperatures greater than 212°F, use an M9206 Series Actuator. To specify an M9206 Actuator, change the 22T (or 24T) in the code number to 936 (or 956). Example: VG1845AD+**22T**BGB becomes VG1845AD+**936**BGB. For Floating and Proportional, change the last **B** to a **C**.
3. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

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

Three-Way – Spring Return Clockwise – Port B (Bypass) Open[1]

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA-2202-AGB-2[2] M9206-AGC-2 M9210-AGC-3	VA-2202-GGB-2 M9206-GGC-2 M9210-GGC-3	VA-2202-BGB M9206-BGB-2S M9210-BGC-3	VA-2202-BAB-2 M9206-BAB-2S M9210-BAC-3
VG1845AD	1/2	1.2/0.7[3]	200	VG1845AD+24TAGB	VG1845AD+24TGGB	VG1845AD+24TBGB	VG1845AD+24TBAB
VG1845AE		1.9/1.2[3]		VG1845AE+24TAGB	VG1845AE+24TGGB	VG1845AE+24TBGB	VG1845AE+24TBAB
VG1845AF		2.9/1.9[3]		VG1845AF+24TAGB	VG1845AF+24TGGB	VG1845AF+24TBGB	VG1845AF+24TBAB
VG1845AG		4.7/2.9[3]		VG1845AG+24TAGB	VG1845AG+24TGGB	VG1845AG+24TBGB	VG1845AG+24TBAB
VG1845AL		7.4/4.7[3]		VG1845AL+24TAGB	VG1845AL+24TGGB	VG1845AL+24TBGB	VG1845AL+24TBAB
VG1845AN		11.7/5.8		VG1845AN+24TAGB	VG1845AN+24TGGB	VG1845AN+24TBGB	VG1845AN+24TBAB
VG1845BG	3/4	4.7/2.9[3]	200	VG1845BG+24TAGB	VG1845BG+24TGGB	VG1845BG+24TBGB	VG1845BG+24TBAB
VG1845BL		7.4/4.7[3]		VG1845BL+24TAGB	VG1845BL+24TGGB	VG1845BL+24TBGB	VG1845BL+24TBAB
VG1845BN		11.7/5.8		VG1845BN+24TAGB	VG1845BN+24TGGB	VG1845BN+24TBGB	VG1845BN+24TBAB
VG1845CL	1	7.4/4.7[3]	200	VG1845CL+956AGC	VG1845CL+956GGC	VG1845CL+956BGB	VG1845CL+956BAB
VG1845CN		11.7/7.4[3]		VG1845CN+956AGC	VG1845CN+956GGC	VG1845CN+956BGB	VG1845CN+956BAB
VG1845CP		18.7/9.4		VG1845CP+956AGC	VG1845CP+956GGC	VG1845CP+956BGB	VG1845CP+956BAB
VG1845DN	1-1/4	11.7/7.4[3]	200	VG1845DN+956AGC	VG1845DN+956GGC	VG1845DN+956BGB	VG1845DN+956BAB
VG1845DP		18.7/11.7[3]		VG1845DP+956AGC	VG1845DP+956GGC	VG1845DP+956BGB	VG1845DP+956BAB
VG1845DR		29.2/14.6		VG1845DR+956AGC	VG1845DR+956GGC	VG1845DR+956BGB	VG1845DR+956BAB
VG1845EP	1-1/2	18.7/11.7[3]	200	VG1845EP+956AGC	VG1845EP+956GGC	VG1845EP+956BGB	VG1845EP+956BAB
VG1845ER		29.2/18.7[3]		VG1845ER+956AGC	VG1845ER+956GGC	VG1845ER+956BGB	VG1845ER+956BAB
VG1845ES		46.8/23.4		VG1845ES+956AGC	VG1845ES+956GGC	VG1845ES+956BGB	VG1845ES+956BAB
VG1845FR	2	29.2/18.7[3]	200	VG1845FR+94JAGC	VG1845FR+94JGGC	VG1845FR+94JBGC	VG1845FR+94JBAC
VG1845FS		46.8/29.2[3]		VG1845FS+94JAGC	VG1845FS+94JGGC	VG1845FS+94JBGC	VG1845FS+94JBAC
VG1845FT		73.7/36.8		VG1845FT+94JAGC	VG1845FT+94JGGC	VG1845FT+94JBGC	VG1845FT+94JBAC

1. VA2202-xxB and M9206-BxB have a single end switch. M9206-xGC and M9210-xGC have two end switches.
2. The VA2202 Series Actuator has a 212°F (100°C) fluid temperature limit. For fluid temperatures greater than 212°F, use an M9206 Series Actuator. To specify an M9206 Actuator, change the 22T (or 24T) in the code number to 936 (or 956). Example: VG1845AD+**22T**BGB becomes VG1845AD+**936**BGB. For Floating and Proportional, change the last **B** to a **C**.
3. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

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

Technical Specifications

VG1000 Three-Way, Stainless Steel Trim Ball Valves with Spring Return Electric Actuators with Switches		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and for some models, 15 psig (103 kPa) Saturated Steam for HVAC Systems
Fluid Temperature Limits	**Water**	-22 to 284°F (-30 to 140°C)
	Steam	15 psig (103 kPa) at 250°F (121°C)
Maximum Actuator Fluid Temperature Limits	**212°F (100°C)**	VA2202 and M2202 with M9000-550 Linkage
	284°F (140°C)	M9206 with M9000-550 Linkage M9210 with M9000-517 Linkage
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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: Quiet Service Ball Valves
Flow Characteristics	**Three-Way**	Equal Percentage Flow Characteristics of In-line Port (Coil) and Linear Flow Characteristics of Angle Port (Bypass)
Rangeability[2]		Greater than 500:1
Minimum Ambient Operating Temperature	**-22°F (-30°C)**	VA2202 and M2202 Series Spring Return Actuators
	-25°F (-32°C)	M9206 Series Spring Return Actuators
	-40°F (-40°C)	M9210 Series Spring Return Actuators
Maximum Ambient Operating Temperature[3] **(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	For Fluid Temperature below 212°F (100°C 131°F (55°C): M9210 Series Spring Return Actuators
		For Fluid Temperature between 212°F (100°C) and 284°F (140°C) 100°F (38°C): All Actuators
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4, for Characterized Port
End Connections		National Pipe Thread (NPT)
Materials	**Body**	Forged Brass
	Ball	300 Series Stainless Steel
	Blowout-Proof Stem	300 Series Stainless Steel
	Seats	Graphite-Reinforced PTFE with 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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900225

Three-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators without 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
- 300 Series stainless steel ball and stem assembly availabe tolerates high temperature water or 15 psi saturated steam with fluid temperatures of -22 to 284°F (-30 to 140°C) or where a higher degree of corrosion protection is desired
- 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

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.



Three-Way, Spring Return, Stainless Steel Ball and Stem Ball Valve Assemblies without End Switches

Selection Charts

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

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA2202-AGA-2[1] M9206-AGA-2S M9210-AGA-3	VA2202-GGA-2[1] M9206-GGA-2S M9210-GGA-3	VA2202-BGA-2[1] M9206-BGA-2S M9210-BGA-3	VA2202-BAA-2[1] M9206-BAA-2S M9210-BAA-3
VG1845AD	1/2	1.2/0.7[2]	200	VG1845AD+22TAGA	VG1845AD+22TGGA	VG1845AD+22TBGA	VG1845AD+22TBAA
VG1845AE		1.9/1.2[2]		VG1845AE+22TAGA	VG1845AE+22TGGA	VG1845AE+22TBGA	VG1845AE+22TBAA
VG1845AF		2.9/1.9[2]		VG1845AF+22TAGA	VG1845AF+22TGGA	VG1845AF+22TBGA	VG1845AF+22TBAA
VG1845AG		4.7/2.9[2]		VG1845AG+22TAGA	VG1845AG+22TGGA	VG1845AG+22TBGA	VG1845AG+22TBAA
VG1845AL		7.4/4.7[2]		VG1845AL+22TAGA	VG1845AL+22TGGA	VG1845AL+22TBGA	VG1845AL+22TBAA
VG1845AN		11.7/5.8		VG1845AN+22TAGA	VG1845AN+22TGGA	VG1845AN+22TBGA	VG1845AN+22TBAA
VG1845BG	3/4	4.7/2.9[2]	200	VG1845BG+22TAGA	VG1845BG+22TGGA	VG1845BG+22TBGA	VG1845BG+22TBAA
VG1845BL		7.4/4.7[2]		VG1845BL+22TAGA	VG1845BL+22TGGA	VG1845BL+22TBGA	VG1845BL+22TBAA
VG1845BN		11.7/5.8		VG1845BN+22TAGA	VG1845BN+22TGGA	VG1845BN+22TBGA	VG1845BN+22TBAA
VG1845CL	1	7.4/4.7[2]	200	VG1845CL+936AGA	VG1845CL+936GGA	VG1845CL+936BGA	VG1845CL+936BAA
VG1845CN		11.7/7.4[2]		VG1845CN+936AGA	VG1845CN+936GGA	VG1845CN+936BGA	VG1845CN+936BAA
VG1845CP		18.7/9.4		VG1845CP+936AGA	VG1845CP+936GGA	VG1845CP+936BGA	VG1845CP+936BAA
VG1845DN	1-1/4	11.7/7.4[2]	200	VG1845DN+936AGA	VG1845DN+936GGA	VG1845DN+936BGA	VG1845DN+936BAA
VG1845DP		18.7/9.4[2]		VG1845DP+936AGA	VG1845DP+936GGA	VG1845DP+936BGA	VG1845DP+936BAA
VG1845DR		29.2/14.6		VG1845DR+936AGA	VG1845DR+936GGA	VG1845DR+936BGA	VG1845DR+936BAA
VG1845EP	1-1/2	18.7/11.7[2]	200	VG1845EP+936AGA	VG1845EP+936GGA	VG1845EP+936BGA	VG1845EP+936BAA
VG1845ER		29.2/18.7[2]		VG1845ER+936AGA	VG1845ER+936GGA	VG1845ER+936BGA	VG1845ER+936BAA
VG1845ES		46.8/23.4		VG1845ES+936AGA	VG1845ES+936GGA	VG1845ES+936BGA	VG1845ES+936BAA
VG1845FR	2	29.2/18.7[2]	200	VG1845FR+92JAGA	VG1845FR+92JGGA	VG1845FR+92JBGA	VG1845FR+92JBAA
VG1845FS		46.8/29.2[2]		VG1845FS+92JAGA	VG1845FS+92JGGA	VG1845FS+92JBGA	VG1845FS+92JBAA
VG1845FT		73.7/36.8		VG1845FT+92JAGA	VG1845FT+92JGGA	VG1845FT+92JBGA	VG1845FT+92JBAA

1. The VA2202 Series Actuator has a 212°F (100°C) fluid temperature limit. For fluid temperatures greater than 212°F, use an M9206 Series Actuator. To specify an M9206 Actuator, change the 22T (or 24T) in the code number to 936 (or 956). Example: VG1845AD+**22T**AGA becomes VG1845AD+**936**AGA.
2. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators without Switches (Continued)

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

Valve	Size, in.	Cv	Closeoff psig	AC 24 V			AC 120 V
				Floating	DC 0 to 10 V Proportional	On/Off	On/Off
				VA-2202-AGA-2[1] M9206-AGA-2 M9210-AGA-3	**VA-2202-GGA-2[1] M9206-GGA-2 M9210-GGA-3**	**VA-2202-BGA[1] M9206-BGA-2S M9210-BGA-3**	**VA-2202-BAA-2[1] M9206-BAA-2S M9210-BAA-3**
VG1845AD	1/2	1.2/0.7[2]	200	VG1845AD+24TAGA	VG1845AD+24TGGA	VG1845AD+24TBGA	VG1845AD+24TBAA
VG1845AE		1.9/1.2[2]		VG1845AE+24TAGA	VG1845AE+24TGGA	VG1845AE+24TBGA	VG1845AE+24TBAA
VG1845AF		2.9/1.9[2]		VG1845AF+24TAGA	VG1845AF+24TGGA	VG1845AF+24TBGA	VG1845AF+24TBAA
VG1845AG		4.7/2.9[2]		VG1845AG+24TAGA	VG1845AG+24TGGA	VG1845AG+24TBGA	VG1845AG+24TBAA
VG1845AL		7.4/4.7[2]		VG1845AL+24TAGA	VG1845AL+24TGGA	VG1845AL+24TBGA	VG1845AL+24TBAA
VG1845AN		11.7/5.8		VG1845AN+24TAGA	VG1845AN+24TGGA	VG1845AN+24TBGA	VG1845AN+24TBAA
VG1845BG	3/4	4.7/2.9[2]	200	VG1845BG+24TAGA	VG1845BG+24TGGA	VG1845BG+24TBGA	VG1845BG+24TBAA
VG1845BL		7.4/4.7[2]		VG1845BL+24TAGA	VG1845BL+24TGGA	VG1845BL+24TBGA	VG1845BL+24TBAA
VG1845BN		11.7/5.8		VG1845BN+24TAGA	VG1845BN+24TGGA	VG1845BN+24TBGA	VG1845BN+24TBAA
VG1845CL	1	7.4/4.7[2]	200	VG1845CL+956AGA	VG1845CL+956GGA	VG1845CL+956BGA	VG1845CL+956BAA
VG1845CN		11.7/7.4[2]		VG1845CN+956AGA	VG1845CN+956GGA	VG1845CN+956BGA	VG1845CN+956BAA
VG1845CP		18.7/9.4		VG1845CP+956AGA	VG1845CP+956GGA	VG1845CP+956BGA	VG1845CP+956BAA
VG1845DN	1-1/4	11.7/7.4[2]	200	VG1845DN+956AGA	VG1845DN+956GGA	VG1845DN+956BGA	VG1845DN+956BAA
VG1845DP		18.7/9.4[2]		VG1845DP+956AGA	VG1845DP+956GGA	VG1845DP+956BGA	VG1845DP+956BAA
VG1845DR		29.2/14.6		VG1845DR+956AGA	VG1845DR+956GGA	VG1845DR+956BGA	VG1845DR+956BAA
VG1845EP	1-1/2	18.7/11.7[2]	200	VG1845EP+956AGA	VG1845EP+956GGA	VG1845EP+956BGA	VG1845EP+956BAA
VG1845ER		29.2/18.7[2]		VG1845ER+956AGA	VG1845ER+956GGA	VG1845ER+956BGA	VG1845ER+956BAA
VG1845ES		46.8/23.4		VG1845ES+956AGA	VG1845ES+956GGA	VG1845ES+956BGA	VG1845ES+956BAA
VG1845FR	2	29.2/18.7[2]	200	VG1845FR+94JAGA	VG1845FR+94JGGA	VG1845FR+94JBGA	VG1845FR+94JBAA
VG1845FS		46.8/29.2[2]		VG1845FS+94JAGA	VG1845FS+94JGGA	VG1845FS+94JBGA	VG1845FS+94JBAA
VG1845FT		73.7/36.8		VG1845FT+94JAGA	VG1845FT+94JGGA	VG1845FT+94JBGA	VG1845FT+94JBAA

1. The VA2202 Series Actuator has a 212°F (100°C) fluid temperature limit.For fluid temperatures greater than 212°F, use an M9206 Series Actuator. To specify an M9206 Actuator, change the 22T (or 24T) in the code number to 936 (or 956). Example VG1845AD+**22T**AGA becomes VG18245AD+**936**AGA.
2. Cv has a characterizing disk.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Three-Way, Stainless Steel Trim, NPT End Connection Ball Valves with Spring Return Electric Actuators without Switches (Continued)

Technical Specifications

VG1000 Three-Way, Stainless Steel Trim Ball Valves with Spring Return Electric Actuators without Switches		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for HVAC Systems
Fluid Temperature Limits	**Water**	-22 to 284°F (-30 to 140°C)
	Steam	15 psig (103 kPa) at 250°F (121°C)
Maximum Actuator Fluid Temperature Limits	**212°F (100°C)**	VA2202 and M2202 with M9000-550 Linkage
	284°F (140°C)	M9206 with M9000-550 Linkage M9210 with M9000-517 Linkage
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		Maximum Differential Pressure 50 psi: Valves with Characterized Flow Control Disk 30 psi: 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)
Rangeability[2]		Greater than 500:1
Minimum Ambient Operating Temperature	**-22°F (-30°C)**	VA2202 and M2202 Series Spring Return Actuators
	-25°F (-32°C)	M9206 Series Spring Return Actuators
	-40°F (-40°C)	M9210 Series Spring Return Actuators
Maximum Ambient Operating Temperature[3] **(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	For Fluid Temperature below 212°F (100°C) 131°F (55°C): M9210 Series Spring Return Actuators
		For Fluid Temperature between 212°F (100°C) and 284°F (140°C) 100°F (38°C): All Actuators
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4, for Characterized Port
		1% of Maximum Flow
End Connections		National Pipe Thread (NPT)
Materials	**Body**	Forged Brass
	Ball	300 Series Stainless Steel
	Blowout-Proof Stem	300 Series Stainless Steel
	Seats	Graphite-Reinforced 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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900418

Flanged Ball Valves

Description

VG1000 Series Flanged Ball Valves are designed to regulate the flow of chilled water, hot water, or 25 pounds per square inch gauge (psi) saturated steam in Heating, Ventilating, and Air Conditioning (HVAC) systems. The two-way valves come in 2-1/2, 3, and 4 in. (DN65, DN80, and DN100) sizes, with American Society of Mechanical Engineers (ASME) Class 150 flanges. Johnson Controls offers valve, linkage, and actuator assemblies for factory or field mounting with either spring return or non-spring return actuators.

Refer to the *VG1000 Series Flanged Ball Valves Product Bulletin (LIT-12011228)* for important product application information.

Features

- 100 psi closeoff pressure rating provides tight shutoff
- 300 stainless steel ball and stem assembly applies to systems with high temperature water (0 to 284°F [-18 to 140°C]) or 25 psi saturated steam
- Amodel® flow characterizing disk provides equal percentage flow characteristics for best temperature control; available in a wide array of Cv ranges to cover a broad variety of applications
- Ethylene Propylene Diene Monomer (EPDM) double o-ring stem seal offers tested leak-free operation for 200,000 cycles in iron oxide-contaminated water
- graphite-reinforced Polytetrafluoroethylene (PTFE) Seats include 15% graphite-reinforced ball seals that last twice as long in iron-oxide contaminated water when compared to virgin Teflon® ball seats
- PTFE thermal spacer provides thermal isolation between the actuator and the valve
- seats Backed with EPDM O-Rings maintain a constant seating force that compensates for expansion, contraction, and seat wear without increasing operating torque
- maintenance-free design performs without failure in excess of 200,000 full stroke cycles in iron-oxide contaminated water
- available with factory-mounted M9124 or M9220 Series Electric Actuator, reducing field installation time and cost
- M9000-330 and M9000-340 weathershields available for field installation — protects the actuator from corrosion, rain, freezing rain, sleet, and snow



VG1000 Flanged Ball Valve Assembly

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

Flanged Stainless Steel Trim Ball Valves with Non-Spring Return Electric Actuators

Valve	Size In.	Cv	Closeoff PSIG	AC 24 V			
				Without Switches		With Two Auxiliary Switches	
				On/Off (Floating)	DC 0 to 10 V Proportional	On/Off (Floating)	DC 0 to 10 V Proportional
				M9124-AGA-2	M9124-GGA-2	M9124-AGC-2	M9124-GGC-2
Two-Way – Non-Spring Return							
VG12A5GS	2-1/2	47	100	VG12A5GS+924AGA	VG12A5GS+924GGA	VG12A5GS+924AGC	VG12A5GS+924GGC
VG12A5GT		74		VG12A5GT+924AGA	VG12A5GT+924GGA	VG12A5GT+924AGC	VG12A5GT+924GGC
VG12A5GU		117		VG12A5GU+924AGA	VG12A5GU+924GGA	VG12A5GU+924AGC	VG12A5GU+924GGC
VG12A5HT	3	47	100	VG12A5HT+924AGA	VG12A5HT+924GGA	VG12A5HT+924AGC	VG12A5HT+924GGC
VG12A5HU		117		VG12A5HU+924AGA	VG12A5HU+924GGA	VG12A5HU+924AGC	VG12A5HU+924GGC
VG12A5HV		176		VG12A5HV+924AGA	VG12A5HV+924GGA	VG12A5HV+924AGC	VG12A5HV+924GGC
VG12A5HW		211		VG12A5HW+924AGA	VG12A5HW+924GGA	VG12A5HW+924AGC	VG12A5HW+924GGC
VG12A5JU	4	117	100	VG12A5JU+924AGA	VG12A5JU+924GGA	VG12A5JU+924AGC	VG12A5JU+924GGC
VG12A5JV		176		VG12A5JV+924AGA	VG12A5JV+924GGA	VG12A5JV+924AGC	VG12A5JV+924GGC

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VG1000 Series Flanged Ball Valves (Continued)

Flanged Stainless Steel Trim Ball Valves with Spring Return Electric Actuators without Switches

Valve	Size, in.	Cv	Closeoff PSIG	AC 24 V, Floating	DC 0 to 10 V, Proportional	AC 24 V, On/Off	AC 120 V, On/Off
				M9220-AGA-3	M9220-GGA-3	M9220-BGA-3	M9220-BAA-3
Two-Way –Spring Return– Valve Open (Normally Open) – without Switches							
VG12A5GS	2-1/2	47	100	VG12A5GS+92NAGA	VG12A5GS+92NGGA	VG12A5GS+92NBGA	VG12A5GS+92NBAA
VG12A5GT		74		VG12A5GT+92NAGA	VG12A5GT+92NGGA	VG12A5GT+92NBGA	VG12A5GT+92NBAA
VG12A5GU		117		VG12A5GU+92NAGA	VG12A5GU+92NGGA	VG12A5GU+92NBGA	VG12A5GU+92NBAA
VG12A5HT	3	47	100	VG12A5HT+92NAGA	VG12A5HT+92NGGA	VG12A5HT+92NBGA	VG12A5HT+92NBAA
VG12A5HU		117		VG12A5HU+92NAGA	VG12A5HU+92NGGA	VG12A5HU+92NBGA	VG12A5HU+92NBAA
VG12A5HV		176		VG12A5HV+92NAGA	VG12A5HV+92NGGA	VG12A5HV+92NBGA	VG12A5HV+92NBAA
VG12A5HW		211		VG12A5HW+92NAGA	VG12A5HW+92NGGA	VG12A5HW+92NBGA	VG12A5HW+92NBAA
VG12A5JU	4	117	100	VG12A5JU+92NAGA	VG12A5JU+92NGGA	VG12A5JU+92NBGA	VG12A5JU+92NBAA
VG12A5JV		176		VG12A5JV+92NAGA	VG12A5JV+92NGGA	VG12A5JV+92NBGA	VG12A5JV+92NBAA
Two-Way –Spring Return – Valve Closed (Normally Closed) – without Switches							
VG12A5GS	2-1/2	47	100	VG12A5GS+94NAGA	VG12A5GS+94NGGA	VG12A5GS+94NBGA	VG12A5GS+94NBAA
VG12A5GT		74		VG12A5GT+94NAGA	VG12A5GT+94NGGA	VG12A5GT+94NBGA	VG12A5GT+94NBAA
VG12A5GU		117		VG12A5GU+94NAGA	VG12A5GU+94NGGA	VG12A5GU+94NBGA	VG12A5GU+94NBAA
VG12A5HT	3	47	100	VG12A5HT+94NAGA	VG12A5HT+94NGGA	VG12A5HT+94NBGA	VG12A5HT+94NBAA
VG12A5HU		117		VG12A5HU+94NAGA	VG12A5HU+94NGGA	VG12A5HU+94NBGA	VG12A5HU+94NBAA
VG12A5HV		176		VG12A5HV+94NAGA	VG12A5HV+94NGGA	VG12A5HV+94NBGA	VG12A5HV+94NBAA
VG12A5HW		211		VG12A5HW+94NAGA	VG12A5HW+94NGGA	VG12A5HW+94NBGA	VG12A5HW+94NBAA
VG12A5JU	4	117	100	VG12A5JU+94NAGA	VG12A5JU+94NGGA	VG12A5JU+94NBGA	VG12A5JU+94NBAA
VG12A5JV		176		VG12A5JV+94NAGA	VG12A5JV+94NGGA	VG12A5JV+94NBGA	VG12A5JV+94NBAA

Flanged Stainless Steel Trim Ball Valves with Spring Return Electric Actuators with Two Switches

Valve	Size, in.	Cv	Closeoff PSIG	AC 24 V, Floating	DC 0 to 10 V, Proportional	AC 24 V, On/Off	AC 120 V, On/Off
				M9220-AGC-3	M9220-GGC-3	M9220-BGC-3	M9220-BAC-3
Two-Way –Spring Return – Valve Open (Normally Open) – with Two Auxiliary Switches							
VG12A5GS	2-1/2	47	100	VG12A5GS+92NAGC	VG12A5GS+92NGGC	VG12A5GS+92NBGC	VG12A5GS+92NBAC
VG12A5GT		74		VG12A5GT+92NAGC	VG12A5GT+92NGGC	VG12A5GT+92NBGC	VG12A5GT+92NBAC
VG12A5GU		117		VG12A5GU+92NAGC	VG12A5GU+92NGGC	VG12A5GU+92NBGC	VG12A5GU+92NBAC
VG12A5HT	3	47	100	VG12A5HT+92NAGC	VG12A5HT+92NGGC	VG12A5HT+92NBGC	VG12A5HT+92NBAC
VG12A5HU		117		VG12A5HU+92NAGC	VG12A5HU+92NGGC	VG12A5HU+92NBGC	VG12A5HU+92NBAC
VG12A5HV		176		VG12A5HV+92NAGC	VG12A5HV+92NGGC	VG12A5HV+92NBGC	VG12A5HV+92NBAC
VG12A5HW		211		VG12A5HW+92NAGC	VG12A5HW+92NGGC	VG12A5HW+92NBGC	VG12A5HW+92NBAC
VG12A5JU	4	117	100	VG12A5JU+92NAGC	VG12A5JU+92NGGC	VG12A5JU+92NBGC	VG12A5JU+92NBAC
VG12A5JV		176		VG12A5JV+92NAGC	VG12A5JV+92NGGC	VG12A5JV+92NBGC	VG12A5JV+92NBAC
Two-Way –Spring Return – Valve Closed (Normally Closed) – with Two Auxiliary Switches							
VG12A5GS	2-1/2	47	100	VG12A5GS+94NAGC	VG12A5GS+94NGGC	VG12A5GS+94NBGC	VG12A5GS+94NBAC
VG12A5GT		74		VG12A5GT+94NAGC	VG12A5GT+94NGGC	VG12A5GT+94NBGC	VG12A5GT+94NBAC
VG12A5GU		117		VG12A5GU+94NAGC	VG12A5GU+94NGGC	VG12A5GU+94NBGC	VG12A5GU+94NBAC
VG12A5HT	3	47	100	VG12A5HT+94NAGC	VG12A5HT+94NGGC	VG12A5HT+94NBGC	VG12A5HT+94NBAC
VG12A5HU		117		VG12A5HU+94NAGC	VG12A5HU+94NGGC	VG12A5HU+94NBGC	VG12A5HU+94NBAC
VG12A5HV		176		VG12A5HV+94NAGC	VG12A5HV+94NGGC	VG12A5HV+94NBGC	VG12A5HV+94NBAC
VG12A5HW		211		VG12A5HW+94NAGC	VG12A5HW+94NGGC	VG12A5HW+94NBGC	VG12A5HW+94NBAC
VG12A5JU	4	117	100	VG12A5JU+94NAGC	VG12A5JU+94NGGC	VG12A5JU+94NBGC	VG12A5JU+94NBAC
VG12A5JV		176		VG12A5JV+94NAGC	VG12A5JV+94NGGC	VG12A5JV+94NBGC	VG12A5JV+94NBAC

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VG1000 Series Flanged Ball Valves (Continued)

Technical Specifications

VG1000 Series Flanged Ball Valves		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 25 psig (172 kPa) Saturated Steam for HVAC Systems
Valve Fluid Temperature Limits		0 to 284°F (-18 to 140°C)
Valve Body Pressure/Temperature Rating	**Water**	ASME Class 150, at: 250 psi -20 to 100°F (29 to 38°C); 235 psi 200°F(93°C); 218 psi 284°F(140°C)
	Steam	25 psig (172 kPa) Saturated Steam for HVAC Systems
Maximum Closeoff Pressure		100 psi (689 kPa)
Maximum Recommended Operating Pressure Drop		30 psi (207 kPa) for quiet service
Flow Characteristics	**Two-Way**	Equal Percentage
Rangeability[2]		Greater than 500:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
End Connections		ASME Class 150 Flange
Minimum Ambient Operating Temperature	**-4°F (-20°C)**	M9124 Series Non-Spring Return Actuators
	-40°F (-40°C)	M9220 Series Spring Return Actuators
Maximum Ambient Operating Temperature[3]	**122°F (50°C)**	M9124 Series Non-Spring Return Actuators
	131°F (55°C)	M9220 Series Spring Return Actuators
Materials	**Body**	Brass
	Flanges	Ductile Iron
	Ball	300 Series Stainless Steel
	Stem	300 Series Stainless Steel
	Seats	Graphite Reinforced PTFE with EPDM O-ring Backing
	Stem Seals	EPDM O-rings
	Flow Control 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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1900417

Flanged Ball Valves for Assembly in the Field

Description

VG1000 Series Flanged Ball Valves are designed to regulate the flow of chilled water, hot water, or 25 pounds per square inch gauge (psi) saturated steam in Heating, Ventilating, and Air Conditioning (HVAC) systems. The two-way valves come in 2-1/2, 3, and 4 in. (DN65, DN80, and DN100) sizes, with American Society of Mechanical Engineers (ASME) Class 150 flanges. Johnson Controls offers valve, linkage, and actuator assemblies for factory or field mounting with either spring return or non-spring return actuators.

Refer to the *VG1000 Series Flanged Ball Valves Product Bulletin (LIT-12011228)* for important product application information.

Features

- 100 psi closeoff pressure rating provides tight shutoff
- 300 stainless steel ball and stem assembly applies to systems with high temperature water (0 to 284°F [-18 to 140°C]) or 25 psi saturated steam
- Amodel® flow characterizing disk provides equal percentage flow characteristics for best temperature control; available in a wide array of Cv ranges to cover a broad variety of applications
- Ethylene Propylene Diene Monomer (EPDM) double o-ring stem seal offers tested leak-free operation for 200,000 cycles in iron-oxide contaminated water
- graphite-reinforced Polytetrafluoroethylene (PTFE) seats include 15% graphite-reinforced ball seals that last twice as long in iron-oxide contaminated water when compared to virgin Teflon® ball seats
- PTFE thermal spacer provides thermal isolation between the actuator and the valve
- seats backed with EPDM O-Rings maintain a constant seating force that compensates for expansion, contraction, and seat wear without increasing operating torque
- maintenance-free design performs without failure in excess of 200,000 full stroke cycles in iron-oxide contaminated water
- available with factory-mounted M9124 or M9220 Series Electric Actuator to reduce field installation time and cost
- M9000-330 and M9000-340 weathershields available for field installation — protects the actuator from corrosion, rain, freezing rain, sleet and snow



VG1000 Flanged Ball Valve for Assembly in the Field

Repair Information

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

Selection Charts:

Available Flanged Ball Valves (for Field Assembly)

Valve	Size, in (mm)	Closeoff psig	Control Disk	Control Port A, Cv (Kv)
VG12A5GS	2-1/2 (DN65)	100	Yes	47 (40)
VG12A5GT				74 (63)
VG12A5GU				117 (100)
VG12A5HT	3 (DN80)	100	Yes	74 (63)
VG12A5HU				117 (100)
VG12A5HV				176 (150)
VG12A5HW			No	211 (180)
VG12A5JU	4 (DN100)	100	Yes	117 (100)
VG12A5JV			No	176 (150)

Available Actuators and Linkages (for Field Assembly)

Control Type	Spring Return	Switches	Actuator	Linkage	Optional Weathershield
AC 24 V On/Off (Floating Control)	No	No	M9124-AGA-2	M9000-518	M9000-330
AC 24 V On/Off (Floating Control)		Two	M9124-AGC-2		
DC 0 (2) to 10 V Proportional Control		No	M9124-GGA-2		
DC 0 (2) to 10 V Proportional Control		Two	M9124-GGC-2		
AC 24 V Three-Wire Floating Control	Yes	No	M9220-AGA-3	M9000-519	M9000-340
AC 24 V Three-Wire Floating Control		Two	M9220-AGC-3		
AC 120 V On/Off Control		No	M9220-BAA-3		
AC 120 V On/Off Control		Two	M9220-BAC-3		
AC 24 V On/Off Control		No	M9220-BGA-3		
AC 24 V On/Off Control		Two	M9220-BGC-3		
DC 0 (2) to 10 V Proportional Control		No	M9220-GGA-3		
DC 0 (2) to 10 V Proportional Control		Two	M9220-GGC-3		

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series Flanged Ball Valves for Assembly in the Field (Continued)

Technical Specifications

VG1000 Series Flanged Ball Valves for Assembly in the Field		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 25 psig (172 kPa) Saturated Steam for HVAC Systems
Valve Fluid Temperature Limits		0 to 284°F (-18 to 140°C)
Valve Body Pressure/Temperature Rating	**Water**	ASME Class 150, at: 250 psi -20 to 100°F (29 to 38°C); 235 psi 200°F(93°C); 218 psi 284°F(140°C)
	Steam	25 psig (172 kPa) Saturated Steam for HVAC Systems
Maximum Closeoff Pressure		100 psi (689 kPa)
Maximum Recommended Operating Pressure Drop		30 psi (207 kPa) for quiet service
Flow Characteristics	**Two-Way**	Equal Percentage
Rangeability[2]		Greater than 500:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
End Connections		ASME Class 150 Flange
Minimum Ambient Operating Temperature	**-4°F (-20°C)**	M9124 Series Non-Spring Return Actuators
	-40°F (-40°C)	M9220 Series Spring Return Actuators
Maximum Ambient Operating Temperature[3]	**122°F (50°C)**	M9124 Series Non-Spring Return Actuators
	131°F (55°C)	M9220 Series Spring Return Actuators
Materials	**Body**	Brass
	Flanges	Ductile Iron
	Ball	300 Series Stainless Steel
	Stem	300 Series Stainless Steel
	Seats	Graphite Reinforced PTFE with EPDM O-ring Backing
	Stem Seals	EPDM O-rings
	Flow Control 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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG1000 Series

LIT-1924515

Forged Brass Ball Valves for Assembly in the Field

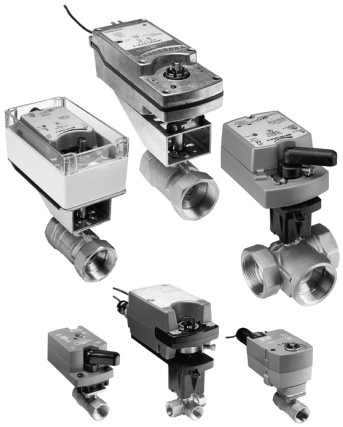
Description

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, M9104, M9106, M9109, and M9100 Series Non-Spring Return and VA2202, M2202, 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

- NPT, sweat ,and press end connections provide the right valve for a broad range of applications — reducing installation time and the need for adapters while increasing system reliability
- 300 Series stainless steel ball and stem assembly tolerates high temperature water or 15 psi saturated steam with fluid temperatures of -22 to 284°F (-30 to 140°C) or where a higher degree of corrosion protection is desired
- Ethylene Propylene Diene Monomer (EPDM) double O-ring steam seal provides a leak-free seal— the packing has been tested and is leak-free after 200,000 cycles in iron-oxide contaminated water
- graphite reinforced Polytetrafluoroethylene (PTFE) seats include 15% graphite-reinforced ball seals, providing better wear resistance
- 200 psi closeoff pressure rating provides tight shutoff
- 500:1 rangeability provides accurate control under all load conditions
- chrome-plated brass ball and stem assembly handles both chilled water and hot water applications with a fluid temperature range of 23 to 203°F (-5 to 95°C)
- blowout-proof stem protects the user from the risk of injury



VG1000 Series Ball Valves Shown with Field Mounted VA9104 and M9000 Series Actuators

Selection Charts

Series Actuators: Valid Ball Valve, Electric Actuator and Linkage Combinations (for Field Assembly)

Valve Size, in. (mm)	Valve Code Number	Actuator Base Code Number[1]	Linkage Kit Code Number	Weathershield Code Number
1/2 (DN15) 3/4 (DN20)	**VG1241A, VG1241B, VG1245A, VG1245B, VG1271A, VG1271B, VG1275A, VG1275B VG1291A, VG1291B, VG1295A, VG1295B VG1841A, VG1841B VG1845A, VG1845B**	**VA9104**	None Required	N/A
		M9104	**M9000-550**	
		M9106	**M9000-520**	
		VA2202	None Required	
		M2202	**M2000-500**	
		M9206	**M9000-520**	
		M9108	**M9000-516**	**M9000-330**
		M9210	**M9000-517**	**M9000-340**
1 (DN25)	**VG1241C, VG1245C, VG1271C, VG1275C VG1291C, VG1295C VG1841C, VG1845C**	**VA9104**	None Required	N/A
		M9104	**M9000-550**	
		M9106 M9206	**M9000-520**	
		VA2202	None Required	
		M2202	**M2000-500**	
		M9108	**M9000-516**	**M9000-330**
		M9210	**M9000-517**	**M9000-340**
1-1/4 (DN32) 1-1/2 (DN40)	**VG1241D, VG1241E VG1245D, VG1245E VG1841D, VG1841E VG1845D, VG1845E**	**M9106 M9206**	**M9000-520**	N/A
		M9108	**M9000-516**	**M9000-330**
		M9210	**M9000-517**	**M9000-340**
2 (DN50)	**VG1241F VG1245F VG1841F VG1845F**	**M9109**	**M9000-520**	N/A
		M9116	**M9000-516**	**M9000-330**
		M9210	**M9000-517**	**M9000-340**

1. VA9104, M9104, M9106, M9109 and M9100 Series Actuators are non-spring return, and VA2202, M2202, M9206 and M9210 Series Actuators are spring return. Note: VA9104, M9104, VA2202, and M2202 have a maximum fluid temperature limit of 212°F (100°C).

Repair Information

Repair Parts

Replacement Part Code Number	Linkage	Replacement Description
—	M9000-51x	Unit replacement
M9000-600	M9000-520	Anti-rotation slider, includes carriage screw, washers, and wing nut
M9000-601		M5 Mounting Screws and Nuts
M9000-602		Drive Shaft
M9000-603		Manual Handle and Mounting Screw
—	M9000-550	Unit Replacement
—	M2000-500	Unit Replacement

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VG1000 Series Forged Brass Ball Valves for Assembly in the Field (Continued)

Available Ball Valves for Field Assembly[1]

Size, in. (mm)	Closeoff (psig)	Control Disc	Control Port Cv (kv)	Bypass Port Cv (kv) *(Three-Way Only)*	Plated Brass Ball and Stem (23 to 203°F Fluid Temperature)		Stainless Steel Ball and Stem (-22 to 284°F Fluid Temperature, 15 psi saturated steam)	
					Two-Way	Three-Way	Two-Way	Three-Way
NPT Threaded End Connection Valves								
1/2 (DN15)	200	Yes	1.2 (1.0)	0.7 (0.6)	**VG1241AD**	**VG1841AD**	**VG1245AD**	**VG1845AD**
			1.9 (1.6)	1.2 (1.0)	**VG1241AE**	**VG1841AE**	**VG1245AE**	**VG1845AE**
			2.9 (2.5)	1.9 (1.6)	**VG1241AF**	**VG1841AF**	**VG1245AF**	**VG1845AF**
			4.7 (4.0)	2.9 (2.5)	**VG1241AG**	**VG1841AG**	**VG1245AG**	**VG1845AG**
			7.4 (6.3)	4.7 (4.0)	**VG1241AL**	**VG1841AL**	**VG1245AL**	**VG1845AL**
		No	11.7 (10.0)	5.8 (5.0)	**VG1241AN**	**VG1841AN**	**VG1245AN**	**VG1845AN**
3/4 (DN20)	200	Yes	4.7 (4.0)	2.9 (2.5)	**VG1241BG**	**VG1841BG**	**VG1245BG**	**VG1845BG**
			7.4 (6.3)	4.7 (4.0)	**VG1241BL**	**VG1841BL**	**VG1245BL**	**VG1845BL**
		No	11.7 (10.0)	5.8 (5.0)	**VG1241BN**	**VG1841BN**	**VG1245BN**	**VG1845BN**
1 (DN25)	200	Yes	7.4 (6.3)	4.7 (4.0)	**VG1241CL**	**VG1841CL**	**VG1245CL**	**VG1845CL**
			11.7 (10.0)	5.8 (5.0)	**VG1241CN**	**VG1841CN**	**VG1245CN**	**VG1845CN**
		No	18.7 (16.0)	9.4 (8.0)	**VG1241CP**	**VG1841CP**	**VG1245CP**	**VG1845CP**
1-1/4 (DN32)	200	Yes	11.7 (10.0)	5.8 (5.0)	**VG1241DN**	**VG1841DN**	**VG1245DN**	**VG1845DN**
			18.7 (16.0)	9.4 (8.0)	**VG1241DP**	**VG1841DP**	**VG1245DP**	**VG1845DP**
		No	29.2 (25.0)	14.6 (12.5)	**VG1241DR**	**VG1841DR**	**VG1245DR**	**VG1845DR**
1-1/2 (DN40)	200	Yes	18.7 (16.0)	9.4 (8.0)	**VG1241EP**	**VG1841EP**	**VG1245EP**	**VG1845EP**
			29.2 (25.0)	14.6 (12.5)	**VG1241ER**	**VG1841ER**	**VG1245ER**	**VG1845ER**
		No	46.8 (40.0)	23.4 (20.0)	**VG1241ES**	**VG1841ES**	**VG1245ES**	**VG1845ES**
2 (DN50)	200	Yes	29.2 (25.0)	14.6 (12.5)	**VG1241FR**	**VG1841FR**	**VG1245FR**	**VG1845FR**
			46.8 (40.0)	23.4 (20.0)	**VG1241FS**	**VG1841FS**	**VG1245FS**	**VG1845FS**
		No	73.7 (63.0)	36.8 (31.5)	**VG1241FT**	**VG1841FT**	**VG1245FT**	**VG1845FT**
Sweat End Connection Valves								
1/2 (DN15)	200	Yes	1.2 (1.0)	0.7 (0.6)	**VG1271AD**	—	**VG1275AD**	—
			1.9 (1.6)	1.2 (1.0)	**VG1271AE**		**VG1275AE**	
			2.9 (2.5)	1.9 (1.6)	**VG1271AF**		**VG1275AF**	
			4.7 (4.0)	2.9 (2.5)	**VG1271AG**		**VG1275AG**	
			7.4 (6.3)	4.7 (4.0)	**VG1271AL**		**VG1275AL**	
		No	11.7 (10.0)	5.8 (5.0)	**VG1271AN**		**VG1275AN**	
3/4 (DN20)	200	Yes	4.7 (4.0)	2.9 (2.5)	**VG1271BG**		**VG1275BG**	
			7.4 (6.3)	4.7 (4.0)	**VG1271BL**		**VG1275BL**	
		No	11.7 (10.0)	5.8 (5.0)	**VG1271BN**		**VG1275BN**	
1 (DN25)	200	Yes	7.4 (6.3)	4.7 (4.0)	**VG1271CL**		**VG1275CL**	
			11.7 (10.0)	5.8 (5.0)	**VG1271CN**		**VG1275CN**	
		No	18.7 (16.0)	9.4 (8.0)	**VG1271CP**		**VG1275CP**	
Press End Connection Valves								
1/2 (DN15)	200	Yes	1.2 (1.0)	0.7 (0.6)	**VG1291AD**	—	**VG1295AD**	—
			1.9 (1.6)	1.2 (1.0)	**VG1291AE**		**VG1295AE**	
			2.9 (2.5)	1.9 (1.6)	**VG1291AF**		**VG1295AF**	
			4.7 (4.0)	2.9 (2.5)	**VG1291AG**		**VG1295AG**	
			7.4 (6.3)	4.7 (4.0)	**VG1291AL**		**VG1295AL**	
		No	11.7 (10.0)	5.8 (5.0)	**VG1291AN**		**VG1295AN**	
3/4 (DN20)	200	Yes	4.7 (4.0)	2.9 (2.5)	**VG1291BG**		**VG1295BG**	
			7.4 (6.3)	4.7 (4.0)	**VG1291BL**		**VG1295BL**	
		No	11.7 (10.0)	5.8 (5.0)	**VG1291BN**		**VG1295BN**	
1 (DN25)	200	Yes	7.4 (6.3)	4.7 (4.0)	**VG1291CL**		**VG1295CL**	
			11.7 (10.0)	5.8 (5.0)	**VG1291CN**		**VG1295CN**	
		No	18.7 (16.0)	9.4 (8.0)	**VG1291CP**		**VG1295CP**	

1. Before retrofitting older valves with VA9104, M9104, VA2202, or M2202 actuators, be sure that the valves have a tapped hole in the center of the valve stem and no threads in the flange holes. These direct mount actuators do not fit with older valves designed without a tapped center stem hole or with threaded flange mounting holes.

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VG1000 Series Forged Brass Ball Valves for Assembly in the Field (Continued)

Technical Specifications

VG1000 Series Forged Brass Ball Valves for Assembly in the Field		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 1 5 psig (103 kPa) Saturated Steam[2] for HVAC Systems
Valve Fluid Temperature Limits	**Water**	VG1241, VG1271, VG1291, and VG1841 Series: 23 to 203×F (-5 to 95×C)
		VG1245, VG1275, VG1295, and VG1845 Series: -22 to 284×F (-30 to 140×C)
		VG1243 Series: 35 to 250°F (2 to 121°C)
	Steam[2]	VG1245 and VG1243 Series: 15 psig (103 kPa) at 250°F (121°C)
		VG1241 Series: Not Rated for Steam Service
Maximum Actuator Fluid Temperature Limits	**212°F (100°C)**	VA2202, VA9104, M2202 with M2000-500 Linkage, and M9104 with M9000-550 Linkage
	284°F (140°C)	M9106, M9109, or M9206 with M9000-550 Linkage, and M9210 with M9000-517 Linkage
Valve Body Pressure/ Temperature Rating	**Water**	VG1241, VG1245, VG1841, and VG1845: 580 psig (3,996 kPa) (PN40) VG1271, VG1275, VG1291, and VG1295: 300 psig (2,067 kPa)
	Steam[2]	15 psig (103 kPa) Saturated Steam
Maximum Closeoff Pressure	**VG1241 and VG1245 Series**	200 psig (1,378 kPa)
	VG1243 Series	150 psig (1,034 kPa)
Maximum Recommended Operating Pressure Drop		Maximum Differential Pressure: 50 psi: Valves with Characterized Flow Control Disk 30 psi: Quiet Service Ball Valves
Flow Characteristics	**Two-Way**	Equal Percentage
	Three-Way	Equal Percentage Flow Characteristics of In-line Port (Coil) and Linear Flow Characteristics of Angle Port (Bypass)
Rangeability[3]		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
	-4°F (-20°C)	VA9104, M9104, M9106, and M9109 Series Non-Spring Return Actuators
	-40°F (-40°C)	M9210 Series Spring Return Actuators
Maximum Ambient Operating Temperature[2] **(Limited by the Actuator and Linkage)**	**Direct Mount**	125°F (52°C): VA9104 Series Non-Spring Return Actuators 122°F (50°C): VA2202 Series Spring Return Actuators
	M9000-550 Linkage	125°F (52°C): M9104 Series Non-Spring Return Actuators
	M9000-520 Linkage	125°F (52°C): M9106 and M9109 Series Non-Spring Return Actuat 140°F (60°C): M9206 Series Spring Return Actuators
	M2000-500 Linkage	122°F (50°C): M2202 Series Spring Return Actuators
	M9000-51x Series Linkage	125°F (52°C): M9106 Series Non-Spring Return Actuators 122°F (50°C): M9100 Series Non-Spring Return Actuators 140°F (60°C): M9206 Series Spring Return Actuators 131°F (55°C): M9210 Series Spring Return Actuators
Valve Body Size/Cv (kv)		See *Selection Charts*.
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4 (Two- and Three-Way Control Port)
		1% of Maximum Flow for Three-Way Bypass Port
End Connections		National Pipe Thread (NPT), 1/2 through 2 in. (DN 15 through DN50) Sweat, 1/2 through 1 in. (DN15 through DN25) Press *(ProPress® compatible),* 1/2 through 1 in. (DN15 through DN25) (The Press End Connections are designed to work with RIDGID® pressing tools.)[4]
Materials	**Body**	Forged Brass
	Ball	VG12x1 and VG18x1 Series: Chrome Plated Brass
		VG12x5 and VG18x5 Series: 300 Series Stainless Steel
	Blowout-Proof Stem	VG12x1 and VG18x1 Series: Nickel Plated Brass
		VG12x5 and VG18x5 Series: 300 Series Stainless Steel
	Seats	Graphite-Reinforced PTFE with 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. In steam applications, install the valve with the stem horizontal to the piping, and wrap the valve and piping with insulation.
3. Rangeability is defined as the ratio of maximum controllable flow to minimum controllable flow.
4. ProPress®is a registered Trademark of Viega.
   RIDGID® is a registered Trademark of the Ridge Tool Company.
   Press Tool™ is a Trademark of the Ridge Tool Company

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M2000-500 and M9000-5xx Series

LIT-1900001

Ball Valve Linkage Kits

Description

M9000-5xx Series Valve Linkage Kits are designed specifically for field mounting Johnson Controls® M9104, M9106, M9109, and M9100 Series Non-Spring Return (NSR) and M9206, M9210, and M9220 Series Spring Return (SR) Electric Actuators to Johnson Controls VG1000 Series Ball Valves in sizes 1/2 through 4 in. (DN15 through DN100). These sturdy linkage kits provide stable actuator mounting while preventing loading on the valve stem and stem seals to ensure longer seal life.

Refer to the appropriate Product Bulletin for the linkage kit you are using for important product application information.

Features

M2000-500 Linkage

- thermoplastic linkage provides superior thermal isolation between valve and actuator, and meets UL 94-5V Flame Class Rating
- compact size and multi-position setup allows the user to position the actuator and linkage kit assembly in 90° increments, relative to the ball valve, facilitating installation in confined locations
- pointer provides an indication of valve position

M9000-51x Linkage

- sturdy aluminum construction provides exceptional strength and stability
- multi-position setup facilitates installation in confined areas

M9000-520 Linkage

- glass-reinforced thermoplastic resin provides superior thermal isolation between the valve and actuator, and meets UL 94-5V Flame Class Rating
- two-position anti-rotation slider accommodates both spring return and non-spring return electric actuators
- multi-position setup allows the actuator and linkage kit assembly to be positioned in 90° increments relative to the ball valve, facilitating installation in confined locations
- manual handle for non-spring return applications allows manual positioning of the actuator when power is disengaged

M9000-550 Linkage

- thermoplastic linkage provides superior thermal isolation between valve and actuator, and meets UL 94-5V Flame Class Rating
- compact size and multi-position setup allows the user to position the actuator and linkage kit assembly in 90° increments relative to the ball valve, facilitating installation in confined locations
- manual handle for non-spring return applications allows manual positioning of the actuator when power is disengaged



VG1000 Ball Valve Assemblies with M9000-5xx and M2000-500 Linkages

Selection Charts

Linkage Kits (Part 1 of 2)

Valve Size, in. (DN)	Valve Code Number	Actuator Base Number[1]	Linkage Kit Code Number	Optional Weathershield
1/2 (DN15)	VG1241Ax, VG1245Ax, VG1841Ax, VG1845Ax	VA9104[2], VA2202	None Required	N/A
		M9104[2]	**M9000-550**	
		M2202	**M2000-500**	
		M9106[2], M9206	**M9000-520**	
		M9108	**M9000-516**	M9000-330
		M9210	**M9000-517**	M9000-340
3/4 (DN20)	VG1241Bx, VG1245Bx, VG1841Bx, VG1845Bx	VA9104[2], VA2202	None Required	N/A
		M9104[2]	**M9000-550**	
		M2202	**M2000-500**	
		M9106[2], M9206	**M9000-520**	
		M9108	**M9000-516**	M9000-330
		M9210	**M9000-517**	M9000-340
1 (DN25)	VG1241Cx, VG1245Cx, VG1841Cx, VG1845Cx	VA9104	None Required	N/A
		M9104	**M9000-550**	
		M9106[2], M9206	**M9000-520**	
		M9108	**M9000-516**	M9000-330
		M9210	**M9000-517**	M9000-340

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M2000-500 and M9000-5xx Series Ball Valve Linkage Kits (Continued)

Linkage Kits (Part 2 of 2)

Valve Size, in. (DN)	Valve Code Number	Actuator Base Number[1]	Linkage Kit Code Number	Optional Weathershield
1-1/4 (DN32)	VG1241Dx, VG1245Dx, VG1841Dx, VG1845Dx	M9106[2], M9206	**M9000-520**	N/A
		M9108	**M9000-516**	M9000-330
		M9210	**M9000-517**	M9000-340
1-1/2 (DN40)	VG1241Ex, VG1245Ex, VG1841Ex, VG1845Ex	M9106[2], M9206	**M9000-520**	N/A
		M9108	**M9000-516**	M9000-330
		M9210	**M9000-517**	M9000-340
2 (DN50)	VG1241Fx, VG1245Fx, VG1841Fx, VG1845Fx	M9109[2]	**M9000-520**	N/A
		M9116	**M9000-516**	M9000-330
		M9210	**M9000-517**	M9000-340
2-1/2 (DN65)	VG12A5Gx	M9124	**M9000-518**	M9000-330
		M9220	**M9000-519**	M9000-340
3 (DN80)	VG12A5Hx	M9124	**M9000-518**	M9000-330
		M9220	**M9000-519**	M9000-340
4 (DN100)	VG12A5Jx	M9124	**M9000-518**	M9000-330
		M9220	**M9000-519**	M9000-340

1. M9104, M9106, M9109, and M9100 Series are Non-Spring Return Actuators; M9206, M9210, and M9220 Series are Spring Return Actuators.
2. To avoid excessive wear or drive time on the motor for the AGx models, use a controller or software that provides a timeout function to remove the signal at the end of rotation (stall). The IGx and GGx models have an auto shutoff to avoid excessive wear or drive time on the motor.

Linkages for Discontinued Series Ball Valves

Valve Size, in. (DN)	Valve Code Number	Actuator Base Number	Linkage Kit Code Number
1/2 (DN15)	VG1243Ax, VG1644AB	M9106	**M9000-514**
		M9206	**M9000-515**
		M9108	**M9000-516**
3/4 (DN20)	VG1243Bx	M9106	**M9000-514**
		M9206	**M9000-515**
		M9108	**M9000-516**
	VG1644BB	M9108	**M9000-516**
		M9210	**M9000-517**
1 (DN25) 1-1/4 (DN32)	VG1243Cx, VG1243Dx	M9116	**M9000-516**
		M9220	**M9000-517**
	VG1644CB, VG1644DB	M9116	**M9000-518**
		M9220	**M9000-519**
1-1/2 (DN40)	VG1243Ex, VG1644EB	M9124	**M9000-518**

Repair Information

Repair Parts

Linkage	Replacement Description	Replacement Part Code Number
M9000-51x	Unit replacement	—
M9000-520	Anti-Rotation Slider, includes carriage screw, washers, and wing nut	**M9000-600**
	M5 Mounting Screws and Nuts	**M9000-601**
	Drive Shaft	**M9000-602**
	Manual Handle and Mounting Screw	**M9000-603**
M2000-500 M9000-550	Unit Replacement	—

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M2000-500 and M9000-5xx Series Ball Valve Linkage Kits (Continued)

Technical Specifications

M2000-500 and M9000-5xx Series Ball Valve Linkage Kits		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for HVAC Systems
Maximum Actuator Fluid Temperature Limit	212°F (100°C)	M2000-500 Linkage: M2202 Series Spring Return Actuators
		M9000-550 Linkage: M9104 Series Non-Spring Return Actuators
	284°F (140°C)	M9000-516 Linkage: M9100 Series Non-Spring Return Actuators
		M9000-517 Linkage: M9210 Series Spring Return Actuators
		M9000-518 Linkage: M9124 Series Non-Spring Return Actuators
		M9000-519 Linkage: M9220 Series Spring Return Actuators
		M9000-520 Linkage: M9106 and M9109 Series Non-Spring Return Actuators and M9206 Series Spring Return Actuators
Maximum Steam Service[2]	Not Rated for Steam Service	M2000-500 Linkage: M2202 Series Spring Return Actuators
		M9000-550 Linkage: M9104 Series Non-Spring Return Actuators
	15 psig Saturated Steam (250°F, 121°C)	M9000-516 Linkage: M9100 Series Non-Spring Return Actuators
		M9000-517 Linkage: M9210 Series Spring Return Actuators
		M9000-520 Linkage: M9106 and M9109 Series Non-Spring Return Actuators and M9206 Series Spring Return Actuators
	25 psig Saturated Steam (267°F, 130°C)	M9000-518 Linkage: M9124 Series Non-Spring Return Actuators
		M9000-519 Linkage: M9220 Series Spring Return Actuators
Minimum Ambient Operating Temperature	-25°F (-32°C)	M9000-520 Linkage: M9206 Series Spring Return Actuators
	-22°F (-30°C)	M2000-500 Linkage: M2202 Series Spring Return Actuators
	-4°F (-20°C)	M9000-510 Linkage: M9216-AGx-2 and M9216-Bxx-2 Spring Return Actuators
		M9000-516 Linkage: M9100 Series Non-Spring Return Actuators
		M9000-518 Linkage: M9124 Series Non-Spring Return Actuators
	-40°F (-40°C)	M9000-517 Linkage: M9210 Series Spring Return Actuators
		M9000-519 Linkage: M9220 Series Spring Return Actuators
Maximum Ambient Operating Temperature	122°F (50°C)	M2000-500 Linkage: M2202 Series Spring Return Actuators
		M9000-516 Linkage: M9100 Series Non-Spring Return Actuators
		M9000-518 Linkage: M9124 Series Non-Spring Return Actuators
	125°F (52°C)	M9000-520 Linkage: M9106 and M9109 Series Non-Spring Return Actuators
	131°F (55°C)	M9000-517 Linkage: M9210 Series Spring Return Actuators
		M9000-519 Linkage: M9220 Series Spring Return Actuators
	140°F (60°C)	M9000-520 Linkage: M9206 Series Spring Return Actuators
		M9000-550 Linkage: M9104 Series Non-Spring Return Actuators
Enclosure		NEMA 3R, IP32
Material	M9000-550, M9000-520	Glass-Reinforced Thermoplastic Resin; UL 94 5V Flame Class Rating
	M9000-51x	Bracket: Aluminum Anti-Rotation Slider: 1018 Steel Drive Shaft: 12L14 Steel Standoff: Thermoplastic Resin Thermal Spacer: Polytetrafluoroethylene (PTFE)
Shipping Weight		1.5 lb (0.68 kg)

1. Refer to VDI 2035 Standard for recommended proper water treatment.
2. In steam applications, install the valve with the stem horizontal to the piping, and wrap the valve and piping with insulation.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900136

M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valves (Less Weather Shield)

Description

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valves are designed specifically for a wide range of Heating, Ventilating, and Air-Conditioning (HVAC) applications including two-position and modulating control of hot, chilled, or condenser water, and 50/50 glycol solutions. These valves are also bidirectional, allowing positive shutoff with the flow in either direction.

Two-way configurations are available in sizes from 2 through 6 in. M9000 electrically actuated non-spring return, non-weather shield models feature an integral handle for manual positioning of the valve, independent of a power supply.

Refer to the *VF Series M9000 Electrically and D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977202)* for important product application information.



Two-Way Valve with M9000 Series Spring Return Electric Actuator (Less Weather Shield)



Two-Way Valve with M9000 Series Non-Spring Return Electric Actuator (Less Weather Shield)

Features

- Low Seating/Unseating Torques
- Bubble-Tight Shutoff
- Pre-Assembled Actuators
- Compatible with All Types of ANSI 125/150 Slip-On and Weld-Neck Flanges
- M9000 Electric Actuators Available with or without a Rugged, Factory-Installed Weather Shield
- M9000 Electric Actuators Available with or without End Switches

Repair Information

If the M9000 Electrically Acuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valve fails to operate within its specifications, refer to the *VF Series M9000 Electrically and D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977202) for a list of repair parts available.*

Selection Charts

Two-Way Valves with M9000 Series Non-Spring Return Electric Actuators (Less Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	On/Off (Floating) Control		0 to 10 VDC Proportional Control	
				M91xx-AGA-2 without End Switches	M91xx-AGC-2 with Two End Switches	M91xx-GGA-2 without End Switches	M91xx-GGC-2 with Two End Switches
2	159	105	200	VF4231AA+916AGA	VF4231AA+916AGC	VF4231AA+916GGA	VF4231AA+916GGC
2-1/2	266	156	200	VF4231BA+916AGA	VF4231BA+916AGC	VF4231BA+916GGA	VF4231BA+916GGC
3	457	240	200	VF4231CA+916AGA	VF4231CA+916AGC	VF4231CA+916GGA	VF4231CA+916GGC
4	860	423	200	VF4231DA+924AGA	VF4231DA+924AGC	VF4231DA+924GGA	VF4231DA+924GGC
5	1320	656	50	VF4231EA+924AGA	VF4231EA+924AGC	VF4231EA+924GGA	VF4231EA+924GGC
5	1320	656	200	VF4231EA2924AGA[2]	VF4231EA2924AGC[2]	VF4231EA2924GGA[2]	VF4231EA2924GGC[2]
6	2020	941	100	VF4231FA2924AGA[2]	VF4231FA2924AGC[2]	VF4231FA2924GGA[2]	VF4231FA2924GGC[2]

1. All valves are rated for dead-end service. Valves rated at 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

Floating Control Two-Way Valves with M9000 Series Spring Return Electric Actuator (Less Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M9220-AGA-3 without End Switches		M9220-AGC-3 with Two End Switches	
				Spring Open	Spring Closed	Spring Open	Spring Closed
2	159	105	200	VF4231AA+92NAGA	VF4431AA+94NAGA	VF4231AA+92NAGC	VF4431AA+94NAGC
2-1/2	266	156	200	VF4231BA+92NAGA	VF4431BA+94NAGA	VF4231BA+92NAGC	VF4431BA+94NAGC
3	457	240	200	VF4231CA+92NAGA	VF4431CA+94NAGA	VF4231CA+92NAGC	VF4431CA+94NAGC
4	860	423	50	VF4231DA+92NAGA	VF4431DA+94NAGA	VF4231DA+92NAGC	VF4431DA+94NAGC
4	860	423	200	VF4231DA292NAGA[2]	VF4431DA294NAGA[2]	VF4231DA292NAGC[2]	VF4431DA294NAGC[2]
5	1320	650	100	VF4231EA292NAGA[2]	VF4431EA294NAGA[2]	VF4231EA292NAGC[2]	VF4431EA294NAGC[2]

1. All valves are rated for dead-end service. Valves rated at 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valves (Less Weather Shield) (Continued)

On/Off Control Two-Way Valves with M9000 Series Spring Return Electric Actuator (Less Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M9220-BGA-3 without End Switches		M9220-BGC-3 with Two End Switches	
				Spring Open	Spring Closed	Spring Open	Spring Closed
2	159	105	200	VF4231AA+92NBGA	VF4431AA+94NBGA	VF4231AA+92NBGC	VF4431AA+94NBGC
2-1/2	266	156	200	VF4231BA+92NBGA	VF4431BA+94NBGA	VF4231BA+92NBGC	VF4431BA+94NBGC
3	457	240	200	VF4231CA+92NBGA	VF4431CA+94NBGA	VF4231CA+92NBGC	VF4431CA+94NBGC
4	860	423	50	VF4231DA+92NBGA	VF4431DA+94NBGA	VF4231DA+92NBGC	VF4431DA+94NBGC
4	860	423	200	VF4231DA292NBGA[2]	VF4431DA294NBGA[2]	VF4231DA292NBGC[2]	VF4431DA294NBGC[2]
5	1320	656	100	VF4231EA292NBGA[2]	VF4431EA294NBGA[2]	VF4231EA292NBGC[2]	VF4431EA294NBGC[2]

1. All valves are rated for dead-end service. Valves rated at 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

0 to 10 VDC Proportional Control Two-Way Valves with M9000 Series Spring Return Electric Actuator (Less Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M9220-GGA-3 without End Switches		M9220-GGC-3 with Two End Switches	
				Spring Open	Spring Closed	Spring Open	Spring Closed
2	159	105	200	VF4231AA+92NGGA	VF4431AA+94NGGA	VF4231AA+92NGGC	VF4431AA+94NGGC
2-1/2	266	156	200	VF4231BA+92NGGA	VF4431BA+94NGGA	VF4231BA+92NGGC	VF4431BA+94NGGC
3	457	240	200	VF4231CA+92NGGA	VF4431CA+94NGGA	VF4231CA+92NGGC	VF4431CA+94NGGC
4	860	423	50	VF4231DA+92NGGA	VF4431DA+94NGGA	VF4231DA+92NGGC	VF4431DA+94NGGC
4	860	423	200	VF4231DA292NGGA[2]	VF4431DA294NGGA[2]	VF4231DA292NGGC[2]	VF4431DA294NGGC[2]
5	1320	656	100	VF4231EA292NGGA[2]	VF4431EA294NGGA[2]	VF4231EA292NGGC[2]	VF4431EA294NGGC[2]

1. All valves are rated for dead-end service. Valves rated at 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

Technical Specifications

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valves[1]		
Service		Hot, Chilled, or Condenser Water, and 50/50 Glycol Solutions (Not Designed for Use in Steam Applications)
Body Styles and Sizes		Two-Way, 2 through 10 in., Fully Lugged
Fluid Temperature Limits		-30 to 250°F (-34 to 121°C)
Maximum Fluid Velocity		30 ft/Second (9 m/Second)
Rangeability		80:1 Minimum
Leakage		Bubble Tight, Bidirectional Shutoff Rated for Dead-End Service (Uni-Directional); Inlet Must Face Pressure
Flow Characteristics		Modified Equal Percentage
Materials	**Body**	Cast Iron, ASTM A126 CL B
	Tee (Three-Way Valves Only)	Cast Iron
	Disk	Aluminum Bronze, ASTM B148
	Seal and Liner	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel
	Bearings	Reinforced Polytetrafluoroethylene (RPTFE)
Ambient Temperature Limits	**Storage**	-20 to 150°F (-29 to 66°C); Preferably 40 to 85°F (4 to 29°C)
	Operating	Spring Return Actuator (M9220 Series): -40 to 131°F (-40 to 55°C)
		Non-Spring Return Actuator (M91xx Series): -4 to 122°F (-20 to 50°C)
Weather Shield Rating		NEMA 4

1. Refer to the appropriate actuator product bulletin for actuator specifications.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series

LIT-1900137

M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Three-Way Butterfly Valves (Less Weather Shield)

Description

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Three-Way Butterfly Valves are designed specifically for a wide range of Heating, Ventilating, and Air Conditioning (HVAC) applications including two-position and modulating control of hot, chilled, or condenser water, and 50/50 glycol solutions. These valves are also bidirectional, allowing positive shutoff with the flow in either direction.

Three-way configurations are available in sizes from 2 through 6 in. M9000 Electrically Actuated non-spring return, non-weather shield models feature an integral handle for manual positioning of the valve, independent of a power supply.

Refer to the *VF Series M9000 Electrically and D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977202)* for important product application information.

Features

- lLow seating/unseating torques
- bubble-tight shutoff
- pre-assembled actuators
- compatible with all types of ANSI 125/150 slip-on and weld-neck flanges
- M9000 electric actuators available with or without a rugged, factory-installed weather shield
- M9000 electric actuators available with or without end switches

Repair Information

If the M9000 Electrically Acuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valve fails to operate within its specifications, refer to the *VF Series M9000 Electrically and D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977202)*.



Three-Way Valve with M9000 Series Electric Actuator (Less Weather Shield)

Selection Charts

On/Off (Floating) Control Three-Way Valves with M9000 Series Non-Spring Return Electric Actuator (Less Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M91xx-AGA-2 without End Switches	M91xx-AGC-2 with Two End Switches
2	159	105	200	VF4831AD+916AGA	VF4831AD+916AGC
2-1/2	266	156	200	VF4831BD+916AGA	VF4831BD+916AGC
3	457	240	200	VF4831CD+916AGA	VF4831CD+916AGC
4	860	423	50	VF4831DD+924AGA	VF4831DD+924AGC
5	1320	656	100	VF4831ED2924AGA[2]	VF4831ED2924AGC[2]
6	2020	941	100	VF4831FD2924AGA[2]	VF4831FD2924AGC[2]

1. All valves are rated for dead-end service. Valves rated for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

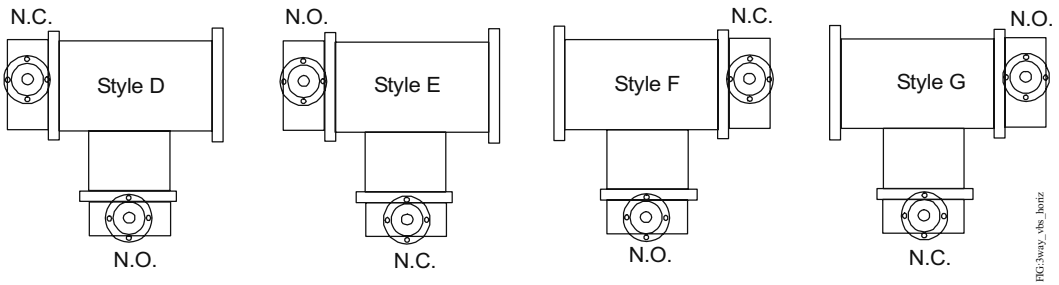
0 to 10 VDC Proportional Control Three-Way Valves with M9000 Series Non-Spring Return Electric Actuator (Less Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M91xx-GGA-2 without End Switches	M91xx-GGC-2 with Two End Switches
2	159	105	200	VF4831AD+916GGA	VF4831AD+916GGC
2-1/2	266	156	200	VF4831BD+916GGA	VF4831BD+916GGC
3	457	240	200	VF4831CD+916GGA	VF4831CD+916GGC
4	860	423	50	VF4831DD+924GGA	VF4831DD+924GGC
5	1320	656	100	VF4831ED2924GGA[2]	VF4831ED2924GGC[2]
6	2020	941	100	VF4831FD2924GGA[2]	VF4831FD2924GGC[2]

1. All valves are rated for dead-end service. Valves rated for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Three-Way Butterfly Valves (Less Weather Shield) (Continued)



Three-Way Valve Body Styles

Floating Control Three-Way Valves[1] with M9000 Series Spring Return Electric Actuators (Less Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[2]	M9220-AGA-3 without End Switches	M9220-AGC-3 with Two End Switches
2	159	105	200	**VF4831AD+92NAGA**	**VF4831AD+92NAGC**
2-1/2	266	156	200	**VF4831BD+92NAGA**	**VF4831BD+92NAGC**
3	457	240	150	**VF4831CD+92NAGA**	**VF4831CD+92NAGC**
4	860	423	175	**VF4831DD292NAGA[3]**	**VF4831DD292NAGC[3]**

1. Code numbers listed are three-way valves in Style D. See *Three-Way Valve Body Styles* diagram. For Styles E, F, or G, change the D in the eighth digit of the code number to the desired style. Example VFxxxxxE+xxxxx, VFxxxxxF+xxxxx, VFxxxxxG+xxxxx.
2. All valves are rated for dead-end service. Valves rated for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
3. Valve assemblies have two actuators mounted in tandem.

On/Off Control Three-Way Valves[1] with M9000 Series Spring Return Electric Actuators (Less Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[2]	M9220-BGA-3 without End Switches	M9220-BGC-3 with Two End Switches
2	159	105	200	**VF4831AD+92NBGA**	**VF4831AD+92NBGC**
2-1/2	266	156	200	**VF4831BD+92NBGA**	**VF4831BD+92NBGC**
3	457	240	150	**VF4831CD+92NBGA**	**VF4831CD+92NBGC**
4	860	423	175	**VF4831DD292NBGA[3]**	**VF4831DD292NBGC[3]**

1. Code numbers listed are three-way valves in Style D. See *Three-Way Valve Body Styles* diagram. For Styles E, F, or G, change the D in the eighth digit of the code number to the desired style. Example VFxxxxxE+xxxxx, VFxxxxxF+xxxxx, VFxxxxxG+xxxxx.
2. All valves are rated for dead-end service. Valves rated at for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
3. Valve assemblies have two actuators mounted in tandem.

Proportional Control Three-Way Valves[1] with M9000 Series Spring Return Electric Actuators (Less Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[2]	M9220-GGA-3 without End Switches	M9220-GGC-3 with Two End Switches
2	159	105	200	**VF4831AD+92NGGA**	**VF4831AD+92NGGC**
2-1/2	266	156	200	**VF4831BD+92NGGA**	**VF4831BD+92NGGC**
3	457	240	150	**VF4831CD+92NGGA**	**VF4831CD+92NGGC**
4	860	423	175	**VF4831DD292NGGA[3]**	**VF4831DD292NGGC[3]**

1. Code numbers listed are three-way valves in Style D. See *Three-Way Valve Body Styles* diagram. For Styles E, F, or G, change the D in the eighth digit of the code number to the desired style. Example VFxxxxxE+xxxxx, VFxxxxxF+xxxxx, VFxxxxxG+xxxxx.
2. All valves are rated for dead-end service. Valves rated for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
3. Valve assemblies have two actuators mounted in tandem.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Three-Way Butterfly Valves (Less Weather Shield) (Continued)

Technical Specifications

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Three-Way Butterfly Valves[1]		
Service		Hot, Chilled, or Condenser Water, and 50/50 Glycol Solutions (Not Designed for Use in Steam Applications)
Body Styles and Sizes		Two-Way and Three-Way, 2 through 10 in., Fully Lugged
Fluid Temperature Limits		-30 to 250°F (-34 to 121°C)
Maximum Fluid Velocity		30 ft/Second (9 m/Second)
Rangeability		80:1 Minimum
Leakage		Bubble Tight, Bidirectional Shutoff Rated for Dead-End Service (Uni-Directional); Inlet Must Face Pressure
Flow Characteristics		Modified Equal Percentage
Materials	**Body**	Cast Iron, ASTM A126 CL B
	Tee (Three-Way Valves Only)	Cast Iron
	Disk	Aluminum Bronze, ASTM B148
	Seal and Liner	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel
	Bearings	Reinforced Polytetrafluoroethylene (RPTFE)
Ambient Temperature Limits	**Storage**	-20 to 150°F (-29 to 66°C); Preferably 40 to 85°F (4 to 29°C)
	Operating	Spring Return Actuator (M9220 Series): -40 to 131°F (-40 to 55°C)
		Non-Spring Return Actuator (M91xx Series): -4 to 122°F (-20 to 50°C)
Weather Shield Rating		NEMA 4

1. Refer to the appropriate actuator product bulletin for actuator specifications.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900138

M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valves With Weather Shield

Description

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves are designed specifcally for a wide range of Heating, Ventilating, and Air Conditioning (HVAC) applications including two-position and modulating control of hot, chilled, or condenser water, and 50/50 glycol solutions. These valves are also bidirectional, allowing positive shutoff with the flow in either direction. Two-way configurations are available in sizes from 2 through 6 inch.

Refer to the *VF Series M9000 Electrically and D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977202)* for important product application information.

Features

- low seating/unseating torques
- bubble-tight shutoff
- pre-assembled actuators
- compatible with all types of ANSI 125/150 slip-on and weld-neck flanges
- M9000 electric actuators available with or without a rugged, factory-installed weather shield
- M9000 electric actuators available with or without end switches

Repair Information

If the M9000 Electrically Acuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valve fails to operate within its specifications, refer to the *VF Series M9000 Electrically and D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977202)* for a list of *repair parts available.*



Two-Way Valve with M9000 Series Electric Actuator (With Weather Shield)

Selection Charts

On/Off (Floating) Control Two-Way Valves with M9000 Series Non-Spring Return Electric Actuators (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M91xx-AGA-2 without End Switches	M91xx-AGC-2 with Two End Switches
2	159	105	200	VF5231AA+916AGA	VF5231AA+916AGC
2-1/2	266	156	200	VF5231BA+916AGA	VF5231BA+916AGC
3	457	240	200	VF5231CA+916AGA	VF5231CA+916AGC
4	860	423	200	VF5231DA+924AGA	VF5231DA+924AGC
5	1320	656	50	VF5231EA+924AGA	VF5231EA+924AGC
5	1320	656	200	VF5231EA2924AGA[2]	VF5231EA2924AGC[2]
6	2020	941	100	VF5231FA2924AGA[2]	VF5231FA2924AGC[2]

1. All valves are rated for dead-end service. Valves rated at 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

0 to 10 VDC Proportional Control Two-Way Valves with M9000 Series Non-Spring Return Electric Actuators (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M91xx-GGA-2 without End Switches	M91xx-GGC-2 with Two End Switches
2	159	105	200	VF5231AA+916GGA	VF5231AA+916GGC
2-1/2	266	156	200	VF5231BA+916GGA	VF5231BA+916GGC
3	457	240	200	VF5231CA+916GGA	VF5231CA+916GGC
4	860	423	200	VF5231DA+924GGA	VF5231DA+924GGC
5	1320	656	50	VF5231EA+924GGA	VF5231EA+924GGC
5	1320	656	200	VF5231EA2924GGA[2]	VF5231EA2924GGC[2]
6	2020	941	100	VF5231FA2924GGA[2]	VF5231FA2924GGC[2]

1. All valves are rated for dead-end service. Valves rated at 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valves With Weather Shield (Continued)

Floating Control Two-Way Valves with M9000 Series Spring Return Electric Actuator (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M9220-AGA-3 without End Switches		M9220-AGC-3 with Two End Switches	
				Spring Open	Spring Closed	Spring Open	Spring Closed
2	159	105	200	VF5231AA+92NAGA	VF5431AA+94NAGA	VF5231AA+92NAGC	VF5431AA+94NAGC
2-1/2	266	156	200	VF5231BA+92NAGA	VF5431BA+94NAGA	VF5231BA+92NAGC	VF5431BA+94NAGC
3	457	240	200	VF5231CA+92NAGA	VF5431CA+94NAGA	VF5231CA+92NAGC	VF5431CA+94NAGC
4	860	423	50	VF5231DA+92NAGA	VF5431DA+94NAGA	VF5231DA+92NAGC	VF5431DA+94NAGC
4	860	423	200	VF5231DA292NAGA[2]	VF5431DA294NAGA[2]	VF5231DA292NAGC[2]	VF5431DA294NAGC[2]
5	1320	656	100	VF5231EA292NAGA[2]	VF5431EA294NAGA[2]	VF5231EA292NAGC[2]	VF5431EA294NAGC[2]

1. All valves are rated for dead-end service. Valves rated at 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

On/Off Control Two-Way Valves with M9000 Series Spring Return Electric Actuator (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M9220-BGA-3 without End Switches		M9220-BGC-3 with Two End Switches	
				Spring Open	Spring Closed	Spring Open	Spring Closed
2	159	105	200	VF5231AA+92NBGA	VF5431AA+94NBGA	VF5231AA+92NBGC	VF5431AA+94NBGC
2-1/2	266	156	200	VF5231BA+92NBGA	VF5431BA+94NBGA	VF5231BA+92NBGC	VF5431BA+94NBGC
3	457	240	200	VF5231CA+92NBGA	VF5431CA+94NBGA	VF5231CA+92NBGC	VF5431CA+94NBGC
4	860	423	50	VF5231DA+92NBGA	VF5431DA+946NBGA	VF5231DA+92NBGC	VF5431DA+94NBGC
4	860	423	200	VF5231DA292NBGA[2]	VF5431DA294NBGA[2]	VF5231DA292NBGC[2]	VF5431DA294NBGC[2]
5	1320	656	100	VF5231EA292NBGA[2]	VF5431EA294NBGA[2]	VF5231EA292NBGC[2]	VF5431EA294NBGC[2]

1. All valves are rated for dead-end service. Valves rated at 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

0 to 10 VDC Proportional Control Two-Way Valves with M9000 Series Spring Return Electric Actuator (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M9220-GGA-3 without End Switches		M9220-GGC-3 with Two End Switches	
				Spring Open	Spring Closed	Spring Open	Spring Closed
2	159	105	200	VF5231AA+92NGGA	VF5431AA+94NGGA	VF5231AA+92NGGC	VF5431AA+94NGGC
2-1/2	266	156	200	VF5231BA+92NGGA	VF5431BA+94NGGA	VF5231BA+92NGGC	VF5431BA+94NGGC
3	457	240	200	VF5231CA+92NGGA	VF5431CA+94NGGA	VF5231CA+92NGGC	VF5431CA+94NGGC
4	860	423	50	VF5231DA+92NGGA	VF5431DA+94NGGA	VF5231DA+92NGGC	VF5431DA+94NGGC
4	860	423	200	VF5231DA292NGGA[2]	VF5431DA294NGGA[2]	VF5231DA292NGGC[2]	VF5431DA294NGGC[2]
5	1320	656	100	VF5231EA292NGGA[2]	VF5431EA294NGGA[2]	VF5231EA292NGGC[2]	VF5431EA294NGGC[2]

1. All valves are rated for dead-end service. Valves rated at 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

Technical Specifications

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves[1]		
Service		Hot, Chilled, or Condenser Water, and 50/50 Glycol Solutions (Not Designed for Use in Steam Applications)
Body Styles and Sizes		Two-Way and Three-Way, 2 through 10 in., Fully Lugged
Fluid Temperature Limits		-30 to 250°F (-34 to 121°C)
Maximum Fluid Velocity		30 ft/Second (9 m/Second)
Rangeability		80:1 Minimum
Leakage		Bubble Tight, Bidirectional Shutoff Rated for Dead-End Service (Uni-Directional); Inlet Must Face Pressure
Flow Characteristics		Modified Equal Percentage
Materials	**Body**	Cast Iron, ASTM A126 CL B
	Tee (Three-Way Valves Only)	Cast Iron
	Disk	Aluminum Bronze, ASTM B148
	Seal and Liner	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel
	Bearings	Reinforced Polytetrafluoroethylene (RPTFE)
Ambient Temperature Limits	**Storage**	-20 to 150°F (-29 to 66°C); Preferably 40 to 85°F (4 to 29°C)
	Operating	Spring Return Actuator (M9220 Series): -40 to 131°F (-40 to 55°C)
		Non-Spring Return Actuator (M91xx Series): -4 to 122°F (-20 to 50°C)
Weather Shield Rating		NEMA 4

1. Refer to the appropriate actuator product bulletin for actuator specifications.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900139

M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Three-Way Butterfly Valves with Weather Shield

Description

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves are designed specifically for a wide range of Heating, Ventilating, and Air Conditioning (HVAC) applications, including two-position and modulating control of hot, chilled, or condenser water, and 50/50 glycol solutions. These valves are also bidirectional, allowing positive shutoff with the flow in either direction.

Three-way assemblies have two valves that are linked together and mounted on a flanged, cast-iron tee. Three-way configurations are available in sizes from 2 through 6 in.

Refer to the *VF Series M9000 Electrically and D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977202)* for important product application information.

Features

- low seating/unseating torques
- bubble-tight shutoff
- pre-assembled actuators
- compatible with all types of ANSI 125/150 slip-on and weld-neck flanges
- M9000 electric actuators available with or without a rugged, factory-installed weather shield
- M9000 electric actuators available with or without end switches

Repair Information

If the M9000 Electrically Acuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valve fails to operate within its specifications, refer to the *VF Series M9000 Electrically and D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977202)* for a list of repair parts available.



M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Three-Way Butterfly Valves with Weather Shield

Selection Charts

On/Off (Floating) Control Three-Way Valves with M9000 Series Non-Spring Return Electric Actuator (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M91xx-AGA-2 without End Switches	M91xx-AGC-2 with Two End Switches
2	159	105	200	VF5831AD+916AGA	VF5831AD+916AGC
2-1/2	266	156	200	VF5831BD+916AGA	VF5831BD+916AGC
3	457	240	150	VF5831CD+916AGA	VF5831CD+916AGC
4	860	423	100	VF5831DD+924AGA	VF5831DD+924AGC
5	1320	656	100	VF5831ED2924AGA[2]	VF5831ED2924AGC[2]
6	2020	941	100	VF5831FD2924AGA[2]	VF5831FD2924AGC[2]

1. All valves are rated for dead-end service. Valves rated for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

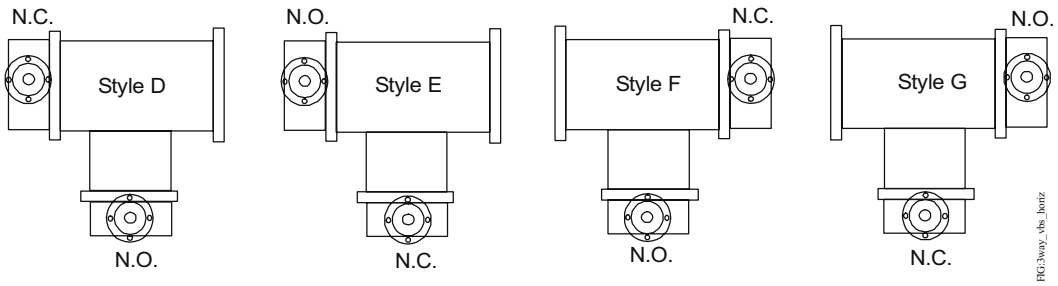
0 to 10 VDC Proportional Control Three-Way Valves with M9000 Series Spring Return Electric Actuator (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[1]	M91xx-GGA-2 without End Switches	M91xx-GGC-2 with Two End Switches
2	159	105	200	VF5831AD+916GGA	VF5831AD+916GGC
2-1/2	266	156	200	VF5831BD+916GGA	VF5831BD+916GGC
3	457	240	150	VF5831CD+916GGA	VF5831CD+916GGC
4	860	423	100	VF5831DD+924GGA	VF5831DD+924GGC
5	1320	656	100	VF5831ED2924GGA[2]	VF5831ED2924GGC[2]
6	2020	941	100	VF5831FD2924GGA[2]	VF5831FD2924GGC[2]

1. All valves are rated for dead-end service. Valves rated for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
2. Valve assemblies have two actuators mounted in tandem.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Three-Way Butterfly Valves with Weather Shield (Continued)



Three-Way Valve Body Styles

Floating Control Three-Way Valves[1] with M9000 Series Spring Return Electric Actuators (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[2]	M9220-AGA-3 without End Switches	M9220-AGC-3 with Two End Switches
2	159	105	200	**VF5831AD+92NAGA**	**VF5831AD+92NAGC**
2-1/2	266	156	200	**VF5831BD+92NAGA**	**VF5831BD+92NAGC**
3	457	240	150	**VF5831CD+92NAGA**	**VF5831CD+92NAGC**
4	860	423	175	**VF5831DD292NAGA[3]**	**VF5831DD292NAGC[3]**

1. Code numbers listed are three-way valves in Style D. See *Three-Way Valve Body Styles*. For Styles E, F, or G, change the D in the eighth digit of the code number to the desired style. Example VFxxxxxE+xxxxx, VFxxxxxF+xxxxx, VFxxxxxG+xxxxx.
2. All valves are rated for dead-end service. Valves rated for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
3. Valve assemblies have two actuators mounted in tandem.

On/Off Control Three-Way Valves[1] with M9000 Series Spring Return Electric Actuators (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[2]	M9220-BGA-3 without End Switches	M9220-BGC-3 with Two End Switches
2	159	105	200	**VF5831AD+92NBGA**	**VF5831AD+92NBGC**
2-1/2	266	156	200	**VF5831BD+92NBGA**	**VF5831BD+92NBGC**
3	457	240	150	**VF5831CD+92NBGA**	**VF5831CD+92NBGC**
4	860	423	175	**VF5831DD292NBGA[3]**	**VF5831DD292NBGC[3]**

1. Code numbers listed are three-way valves in Style D. See *Three-Way Valve Body Styles*. For Styles E, F, or G, change the D in the eighth digit of the code number to the desired style. Example VFxxxxxE+xxxxx, VFxxxxxF+xxxxx, VFxxxxxG+xxxxx.
2. All valves are rated for dead-end service. Valves rated for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
3. Valve assemblies have two actuators mounted in tandem.

Proportional Control Three-Way Valves[1] with M9000 Series Spring Return Electric Actuators (With Weather Shield)

Size, in.	Cv at 90°	Cv at 70°	Closeoff Pressure (psig)[2]	M9220-GGA-3 without End Switches	M9220-GGC-3 with Two End Switches
2	159	105	200	**VF5831AD+92NGGA**	**VF5831AD+92NGGC**
2-1/2	266	156	200	**VF5831BD+92NGGA**	**VF5831BD+92NGGC**
3	457	240	150	**VF5831CD+92NGGA**	**VF5831CD+92NGGC**
4	860	423	175	**VF5831DD292NGGA[3]**	**VF5831DD292NGGC[3]**

1. Code numbers listed are three-way valves in Style D. See *Three-Way Valve Body Styles*. For Styles E, F, or G, change the D in the eighth digit of the code number to the desired style. Example VFxxxxxE+xxxxx, VFxxxxxF+xxxxx, VFxxxxxG+xxxxx.
2. All valves are rated for dead-end service. Valves rated for 150 to 200 psig closeoff have 150 psig maximum dead-end service rating.
3. Valve assemblies have two actuators mounted in tandem.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Two-Way Butterfly Valves With Weather Shield (Continued)

Technical Specifications

VF Series M9000 Electrically Actuated Standard-Pressure, Standard-Temperature Three-Way Butterfly Valves[1]		
Service		Hot, Chilled, or Condenser Water, and 50/50 Glycol Solutions (Not Designed for Use in Steam Applications)
Body Styles and Sizes		Two-Way and Three-Way, 2 through 10 in., Fully Lugged
Fluid Temperature Limits		-30 to 250°F (-34 to 121°C)
Maximum Fluid Velocity		30 ft/Second (9 m/Second)
Rangeability		80:1 Minimum
Leakage		Bubble Tight, Bidirectional Shutoff Rated for Dead-End Service (Uni-Directional); Inlet Must Face Pressure
Flow Characteristics		Modified Equal Percentage
Materials	**Body**	Cast Iron, ASTM A126 CL B
	Tee (Three-Way Valves Only)	Cast Iron
	Disk	Aluminum Bronze, ASTM B148
	Seal and Liner	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel
	Bearings	Reinforced Polytetrafluoroethylene (RPTFE)
Ambient Temperature Limits	**Storage**	-20 to 150°F (-29 to 66°C); Preferably 40 to 85°F (4 to 29°C)
	Operating	Spring Return Actuator (M9220 Series): -40 to 131°F (-40 to 55°C)
		Non-Spring Return Actuator (M91xx Series): -4 to 122°F (-20 to 50°C)
Weather Shield Rating		NEMA 4

1. Refer to the appropriate actuator product bulletin for actuator specifications.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series

LIT-1900144

Two-Way, Industrial-Grade, Non-Spring Return, Electric Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Description

VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are designed for control of hot water, chilled water, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- non-spring return (drive open, drive closed)
- ANSI Class 125/150 flanges
- valve body: cast iron
- disc: ductile iron coated with Nylon 11
- valve stem:
  2 through 12 in. 416 stainless steel;
  14 through 20 in. 304 stainless steel
- seat: EPDM
- fluid temperature rating: -40 to 250°F
- actuator ambient temperature rating: -40 to 150°F
- actuator resolution: 100 positions
- manual opener: standard
- internal heater: standard
- modulating input: 4 to 20 mA or 0 to 10 VDC
- 120 VAC input voltage
- NEMA 4X water-tight, corrosion-resistant enclosure
- thermal overload protection

Repair Information

If the VF Series Two-Way, Industrial Grade, Non-Spring Return, Electrically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



Two-Way Valve with Industrial-Grade Non-Spring Return, VA-907x Series Electric Actuator

Selection Chart

VF Series Two-Way, Industrial Grade, Non-Spring Return, Electrically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Actuator				On/Off	0 to 10 VDC Proportional
Size, in.	Cv at 90°	Cv at 60°	Closeoff		
Two-Way Butterfly Valve Assemblies – 150 or 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	VFC-020HB-721D	VFC-020HB-701N
2-1/2	282	107	175	VFC-025HB-721D	VFC-025HB-701N
3	461	154	175	VFC-030HB-721D	VFC-030HB-701N
4	841	274	175	VFC-040HB-722D	VFC-040HB-702N
5	1,376	428	175	VFC-050HB-723D	VFC-050HB-703N
6	1,850	567	175	VFC-060HB-723D	VFC-060HB-703N
8	3,316	1,081	175	VFC-080HB-725D	VFC-080HB-705N
10	5,430	1,710	175	VFC-100HB-726D	VFC-100HB-706N
12	8,077	2,563	175	VFC-120HB-727D	VFC-120HB-707N
14	10,538	3,384	150	VFC-140HC-728D	VFC-140HC-708N
16	13,966	4,483	150	VFC-160HC-927D	VFC-160HC-907N
18	17,214	5,736	150	VFC-180HC-928D	VFC-180HC-908N
20	22,339	7,144	150	VFC-200HC-928D	VFC-200HC-908N
Two-Way Butterfly Valve Assemblies – 50 psig Closeoff Pressure; Not Rated for Dead-End Service					
4	841	274	50	VFC-040LB-721D	VFC-040LB-701N
5	1,376	428	50	VFC-050LB-722D	VFC-050LB-702N
6	1,850	567	50	VFC-060LB-722D	VFC-060LB-702N
8	3,316	1,081	50	VFC-080LB-723D	VFC-080LB-703N
10	5,430	1,710	50	VFC-100LB-725D	VFC-100LB-705N
12	8,077	2,563	50	VFC-120LB-726D	VFC-120LB-706N
14	10,538	3,384	50	VFC-140LC-727D	VFC-140LC-707N
16	13,966	4,483	50	VFC-160LC-727D	VFC-160LC-707N
18	17,214	5,736	50	VFC-180LC-728D	VFC-180LC-708N
20	22,339	7,144	50	VFC-200LC-728D	VFC-200LC-708N

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series Two-Way, Industrial-Grade, Non-Spring Return, Electric Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies (Continued)

Technical Specifications

VF Series Two-Way, Industrial Grade, Non-Spring Return, Electrically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and 50/50 Glycol Solutions
Fluid Temperature Limits	**Water**	-40 to 250°F (-40 to 121°C)
	Steam	Not Rated for Steam Service
Maximum Closeoff	**2 through 12 in. Type "H"**	175 psig (1,206 kPa) Bidirectional 75 psig (517 kPa) Dead-End Service
	14 through 20 in. Type "H"	150 psig (1,034 kPa) Bidirectional 75 psig (517 kPa) Dead-End Service
	4 through 12 in. Type "L"	50 psig (345 kPa) Bidirectional Not Rated for Dead-End Service
Flow Characteristics		Equal Percentage
Maximum Fluid Velocity		30 ft/second (9 m/second)
End Connection		Fully Lugged, designed to be installed between ANSI 125/150 lb flanges
Actuator Ambient Operating Temperature Limits		-40 to 150°F (-40 to 66°C) Internal Actuator heater is provided standard
Actuator Input Voltage		120 VAC
Actuator Enclosure Rating		NEMA 4X
Materials	**Body**	Cast Iron, Red Epoxy finish
	Disc	Ductile Iron Coated with Nylon 11
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel (2 through 12 in.) 304 Stainless Steel (14 through 20 in.)

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series

LIT-1900147

Three-Way, Industrial-Grade, Non-Spring Return, Electric Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Description

VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are designed for control of hot water, chilled water, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- non-spring return (drive open, drive closed)
- ANSI Class 125/150 flanges
- valve body: cast iron
- disc: ductile iron coated with Nylon 11
- valve stem: 416 stainless steel
- seat: EPDM
- fluid temperature rating: -40 to 250°F
- actuator ambient temperature rating -40 to 150°F
- actuator resolution: 100 positions
- manual opener: standard
- internal heater: standard
- modulating input: 4 to 20 mA or 0 to 10 VDC
- 120 VAC input voltage
- NEMA 4X water-tight, corrosion-resistant enclosure
- thermal overload protection



Three-Way Valve with Industrial-Grade Non-Spring Return, VA-907x Series Electric Actuator

Selection Chart

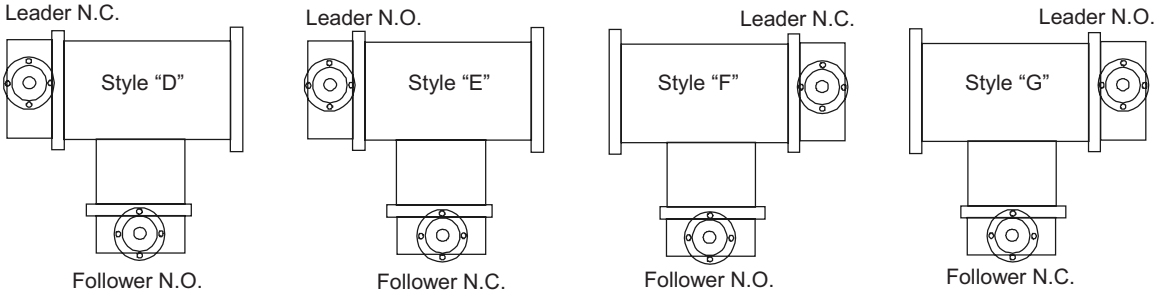
VF Series Three-Way, Industrial Grade, Non-Spring Return, Electrically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Actuator				On/Off	0 to 10 VDC Proportional
Size, in.	Cv at 90°	Cv at 60°	Closeoff		
Three-Way Butterfly Valve Assemblies [1] – 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	**VFD-020HB-721D**	**VFD-020HB-701N**
2-1/2	282	107	175	**VFD-025HB-721D**	**VFD-025HB-701N**
3	461	154	175	**VFD-030HB-721D**	**VFD-030HB-701N**
4	841	274	175	**VFD-040HB-723D**	**VFD-040HB-703N**
5	1,376	428	175	**VFD-050HB-723D**	**VFD-050HB-703N**
6	1,850	567	175	**VFD-060HB-724D**	**VFD-060HB-704N**
8	3,316	1,081	175	**VFD-080HB-725D**	**VFD-080HB-705N**
10	5,430	1,710	175	**VFD-100HB-727D**	**VFD-100HB-707N**
12	8,077	2,563	175	**VFD-120HB-728D**	**VFD-120HB-708N**
Three-Way Butterfly Valve Assemblies [1] – 50 psig Closeoff Pressure; Not Rated for Dead-End Service					
4	841	274	50	**VFD-040LB-721D**	**VFD-040LB-701N**
5	1,376	428	50	**VFD-050LB-722D**	**VFD-050LB-702N**
6	1,850	567	50	**VFD-060LB-723D**	**VFD-060LB-703N**
8	3,316	1,081	50	**VFD-080LB-724D**	**VFD-080LB-704N**
10	5,430	1,710	50	**VFD-100LB-725D**	**VFD-100LB-705N**
12	8,077	2,563	50	**VFD-120LB-727D**	**VFD-120LB-707N**

1. Code numbers listed above are three-way valves, style “D”. For styles “E”, “F”, or “G” change the “D” in the third digit of the code number to the desired style. Example: VFE-xxxxx-xxxx, VFF-xxxxx-xxxx, VFG-xxxxx-xxxx.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series Three-Way, Industrial-Grade, Non-Spring Return, Electric Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies (Continued)



Three-Way Valve Body Styles

Repair Information

If the VF Series Three-Way, Industrial Grade, Non-Spring Return, Electrically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Technical Specifications

VF Series Three-Way, Industrial Grade, Non-Spring Return, Electrically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and 50/50 Glycol Solutions
Fluid Temperature Limits	**Water**	-40 to 250°F (-40 to 121°C)
	Steam	Not Rated for Steam Service
Maximum Closeoff	**2 through 12 in. Type “H”**	175 psig (1,206 kPa) Bidirectional 75 psig (517 kPa) Dead-End Service
	4 through 12 in. Type “L”	50 psig (345 kPa) Bidirectional Not Rated for Dead-End Service
Flow Characteristics		Equal Percentage
Maximum Fluid Velocity		30 ft/second (9 m/second)
End Connection		Fully Lugged, designed to be installed between ANSI 125/150 lb flanges
Actuator Ambient Operating Temperature Limits		-40 to 200°F (-40 to 93°C)
Actuator Input Voltage		120 VAC
Actuator Enclosure Rating		NEMA 4X
Materials	**Body**	Cast Iron, Red Epoxy finish
	Disc	Ductile Iron Coated with Nylon 11
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel (2 through 12 in.) 304 Stainless Steel (14 through 20 in.)
	Tee	Cast Iron

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series

LIT-1900151

Two-Way, Non-Spring Return, Electric Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Description

VF Series High-Pressure, High-Temperature Butterfly Valves are designed for control of hot water, chilled water, steam, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- non-spring return (drive open, drive closed)
- valve body: carbon steel
- disc: stainless steel
- seat: RPTFE
- fluid temperature rating: -20 to 450°F
- actuator ambient temperature rating: -40 to 150°F
- actuator resolution: 100 positions
- manual opener: standard
- internal heater: standard
- modulating input: 4 to 20 mA or 0 to 10 VDC
- 120 VAC input voltage
- NEMA 4X water-tight, corrosion-resistant enclosure
- thermal overload protection

Repair Information

If the VF Series Two-Way, Industrial Grade, Non-Spring Return, Electrically Actuated, High-Pressure, High-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



Two-Way High Performance Valve with Industrial-Grade, Non-Spring Return, VA-907x Series Electric Actuator

Selection Chart

VF Series Two-Way, Industrial Grade, Non-Spring Return, Electrically Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Actuator				On/Off	0 to 10 VDC Proportional
Size, in.	Cv at 90°	Cv at 60°	Closeoff		
Two-Way Butterfly Valve Assemblies – ANSI Class 300 Flanges [1]					
2-1/2	160	78	550 psig	**VFC-025ZE-723D**	**VFC-025ZE-703N**
3	185	123		**VFC-030ZE-723D**	**VFC-030ZE-703N**
4	375	250		**VFC-040ZE-723D**	**VFC-040ZE-703N**
5	790	360		**VFC-050ZE-725D**	**VFC-050ZE-705N**
6	1,000	530		**VFC-060ZE-726D**	**VFC-060ZE-706N**
8	2,000	950		**VFC-080ZE-727D**	**VFC-080ZE-707N**
10	2,650	1,200		**VFC-100ZE-927D**	**VFC-100ZE-907N**
12	4,000	1,690		**VFC-120ZE-928D**	**VFC-120ZE-908N**
14	3,900	1,570		**VFC-140ZE-928D**	**VFC-140ZE-908N**
Two-Way Butterfly Valve Assemblies – ANSI Class 150 Flanges [2]					
2-1/2	160	78	240 psig	**VFC-025VE-722D**	**VFC-025VE-702N**
3	185	123		**VFC-030VE-722D**	**VFC-030VE-702N**
4	375	250		**VFC-040VE-722D**	**VFC-040VE-702N**
5	790	360		**VFC-050VE-724D**	**VFC-050VE-704N**
6	1,350	510		**VFC-060VE-725D**	**VFC-060VE-705N**
8	2,800	1,060		**VFC-080VE-726D**	**VFC-080VE-706N**
10	4,300	1,630		**VFC-100VE-727D**	**VFC-100VE-707N**
12	6,650	2,530		**VFC-120VE-728D**	**VFC-120VE-708N**
14	7,650	2,900		**VFC-140VE-927D**	**VFC-140VE-907N**
16	9,800	3,700		**VFC-160VE-928D**	**VFC-160VE-908N**

1. Maximum closeoff pressure for ANSI Class 300 valves is 740 psig for fluid temperatures below 100°F, and 550 psig for fluid temperatures at 250°F. Maximum steam pressure is 150 psig for On/Off service and 50 psig for modulating service.
2. Maximum closeoff pressure for ANSI Class 150 valves is 280 psig for fluid temperatures below 100°F, and 240 psig for fluid temperatures at 250°F. Maximum steam pressure is 150 psig for On/Off service and 50 psig for modulating service.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series Two-Way, Non-Spring Return, Electric Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies (Continued)

Technical Specifications

VF Series Two-Way, Industrial Grade, Non-Spring Return, Electrically Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and Steam
Fluid Temperature Limits	**Water**	-20 to 500°F (-29 to 260°C)
	Steam	On/Off Applications: 150 psig (1,034 kPa) saturated steam at 366°F (185°C)
		Modulating Applications: 50 psig saturated steam at 298°F (148°C)
Maximum Closeoff	**ANSI Class 150**	280 psig at 100°F 240 psig at 250°F 100 psig at 500°F
	ANSI Class 300	720 psig at 100°F 550 psig at 250°F 100 psig at 500°F
End Connection		Fully Lugged
Actuator Ambient Operating Temperature Limits		-40 to 150°F (-40 to 66°C) Internal Actuator Heater is provided standard
Air Supply Pressure		70 to 90 psig, 80 psig (551 kPa) nominal), 140 psig (965 kPa) maximum
Materials	**Body**	Carbon Steel, ASTM A216 GR WCB/A516 GR 70
	Disc	Stainless Steel, ASTM A 351 GR CF8M
	Stem	17-4 PH Stainless Steel, ASTM A564-Type 630
	Taper Pin (Two Locations)	17-4 PH Stainless Steel, ASTM A564-Type 630 316 Stainless Steel, ASTM 276 Type 316
	Disc Spacer (Two Locations)	316 Stainless Steel, ASTM 276 Type 316
	Gland Ring	216 Stainless Steel, ASTM 276 Type 316
	Stem Seal	One Carbon Fiber Ring and Three TFE Rings
	Thrust Washer	316 Stainless Steel, ASTM 276 Type 316
	Gland Retainer	Carbon Steel, ASTM A216 GR WCB/A516 GR 70
	Stud (Two Locations)	316 Stainless Steel, ASTM A193-B8M
	Lock Washer (Two Locations)	18-8 Stainless Steel
	Hex Nut (Two Locations)	18-8 Stainless Steel
	Seat Assembly	RTFE with Silicone Rubber O-Ring
	Seat Retainer	Carbon Steel, ASTM A516 GR 70
	Cap Screw (Eight Locations)	Alloy Steel
	O-Ring Gasket	PTFE
	Locating Plug®	Carbon Steel, Phosphate Coated
	Bellville Washer and Grounding Washer	18-8 Stainless Steel (For 14 and 16 in. ANSI Class 150 Valves and 14 in. ANSI Class 300 Valves)

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series

LIT-1900148

Two-Way, Industrial-Grade, Manually Operated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Description

VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are designed for control of hot water, chilled water, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- manually operated
- ANSI Class 125/150 flanges
- valve body: cast iron
- disc: ductile iron coated with Nylon 11
- valve stem:
  2 through 12 in. 416 stainless steel;
  14 through 20 in. 304 stainless steel
- seat: EPDM
- fluid temperature rating: -40 to 250°F



Two-Way Valve with Ten-Position Manual Handle



Two-Way Valve with Gear-Operated Manual Hand Wheel

Selection Chart

VF Series Two-Way, Industrial Grade, Manually Operated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Actuator				Ten-Position Manual Handle	Gear-Operated Manual Hand Wheel
Size, in.	Cv at 90°	Cv at 60°	Closeoff		
Two-Way Butterfly Valve Assemblies – 150 or 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	**VFM-020HB-000M**	**VFM-020HB-000G**
2-1/2	282	107	175	**VFM-025HB-000M**	**VFM-025HB-000G**
3	461	154	175	**VFM-030HB-000M**	**VFM-030HB-000G**
4	841	274	175	**VFM-040HB-000M**	**VFM-040HB-000G**
5	1,376	428	175	**VFM-050HB-000M**	**VFM-050HB-000G**
6	1,850	567	175	**VFM-060HB-000M**	**VFM-060HB-000G**
8	3,316	1,081	175	---	**VFM-080HB-000G**
10	5,430	1,710	175	---	**VFM-100HB-000G**
12	8,077	2,563	175	---	**VFM-120HB-000G**
14	10,538	3,384	150	---	**VFM-140HC-000G**
16	13,966	4,483	150	---	**VFM-160HC-000G**
18	17,214	5,736	150	---	**VFM-180HC-000G**
20	22,339	7,144	150	---	**VFM-200HC-000G**

Repair Information

If the VF Series Two-Way, Industrial Grade, Manually Operated, Standard-Pressure, Standard-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Technical Specifications

VF Series Two-Way, Industrial Grade, Manually Operated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and 50/50 Glycol Solutions
Fluid Temperature Limits	**Water**	-40 to 250°F (-40 to 121°C)
	Steam	Not Rated for Steam Service
Maximum Closeoff	**2 through 12 in. Type "H"**	175 psig (1,206 kPa) Bidirectional; 75 psig (517 kPa) Dead-End Service
	14 through 20 in. Type "H"	150 psig (1,034 kPa) Bidirectional; 75 psig (517 kPa) Dead-End Service
Flow Characteristics		Equal Percentage
Maximum Fluid Velocity		30 ft/second (9 m/second)
End Connection		Fully Lugged, designed to be installed between ANSI 125/150 lb flanges
Materials	**Body**	Cast Iron, Red Epoxy finish
	Disc	Ductile Iron Coated with Nylon 11
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel (2 through 12 in.); 304 Stainless Steel (14 through 20 in.)
	Tee	Cast Iron

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900152

Two-Way, Manually Operated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Description

VF Series High-Pressure, High-Temperature Butterfly Valves are designed for control of hot water, chilled water, steam, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- ANSI Class 150 and 300 flanges
- valve body: carbon steel
- disc: stainless steel
- valve stem: stainless steel
- seat: RPTFE
- fluid temperature rating: -20 to 450°F

Repair Information

If the VF Series Two-Way, Industrial Grade, Manually Operated, High-Pressure, High-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



Two-Way High Performance Valve with Manual Gear-Operator

Selection Chart

VF Series Two-Way, Industrial Grade, Manually Operated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Actuator				Ten-Position Manual Handle	Gear-Operated Manual Hand Wheel
Size, in.	Cv at 90°	Cv at 60°	Closeoff		
Two-Way Butterfly Valve Assemblies – ANSI Class 300 Flanges [1]					
2-1/2	160	78	550 psig	**VFM-025ZE-000M**	**VFM-025ZE-000G**
3	185	123		**VFM-030ZE-000M**	**VFM-030ZE-000G**
4	375	250		**VFM-040ZE-000M**	**VFM-040ZE-000G**
5	790	360		**VFM-050ZE-000M**	**VFM-050ZE-000G**
6	1,000	530		**VFM-060ZE-000M**	**VFM-060ZE-000G**
8	2,000	950		---	**VFM-080ZE-000G**
10	2,650	1,200		---	**VFM-100ZE-000G**
12	4,000	1,690		---	**VFM-120ZE-000G**
14	3,900	1,570		---	**VFM-140ZE-000G**
Two-Way Butterfly Valve Assemblies – ANSI Class 150 Flanges [2]					
2-1/2	160	78	240 psig	**VFM-025VE-000M**	**VFM-025VE-000G**
3	185	123		**VFM-030VE-000M**	**VFM-030VE-000G**
4	375	250		**VFM-040VE-000M**	**VFM-040VE-000G**
5	790	360		**VFM-050VE-000M**	**VFM-050VE-000G**
6	1,350	510		**VFM-060VE-000M**	**VFM-060VE-000G**
8	2,800	1,060		---	**VFM-080VE-000G**
10	4,300	1,630		---	**VFM-100VE-000G**
12	6,650	2,530		---	**VFM-120VE-000G**
14	7,650	2,900		---	**VFM-140VE-000G**

1. Maximum closeoff pressure for ANSI Class 300 valves is 740 psig for fluid temperatures below 100°F, and 550 psig for fluid temperatures at 250°F. Maximum steam pressure is 150 psig for On/Off service and 50 psig for modulating service.
2. Maximum closeoff pressure for ANSI Class 150 valves is 280 psig for fluid temperatures below 100°F, and 240 psig for fluid temperatures at 250°F. Maximum steam pressure is 150 psig for On/Off service and 50 psig for modulating service.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series Two-Way, Manually Operated, High-Pressure, High-Temperature Butterfly Valve Assemblies (Continued)

Technical Specifications

VF Series Two-Way, Industrial Grade, Manually Operated, High-Pressure, High-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and Steam
Fluid Temperature Limits	**Water**	-20 to 500°F (-29 to 260°C)
	Steam	On/Off Applications: 150 psig (1,034 kPa) saturated steam at 366°F (185°C)
		Modulating Applications: 50 psig saturated steam at 298°F (148°C)
Maximum Closeoff	**ANSI Class 150**	280 psig at 100°F 240 psig at 250°F 100 psig at 500°F
	ANSI Class 300	720 psig at 100°F 550 psig at 250°F 100 psig at 500°F
End Connection		Fully Lugged
Materials	**Body**	Carbon Steel, ASTM A216 GR WCB/A516 GR 70
	Disc	Stainless Steel, ASTM A 351 GR CF8M
	Stem	17-4 PH Stainless Steel, ASTM A564-Type 630
	Taper Pin (Two Locations)	17-4 PH Stainless Steel, ASTM A564-Type 630 316 Stainless Steel, ASTM 276 Type 316
	Disc Spacer (Two Locations)	316 Stainless Steel, ASTM 276 Type 316
	Gland Ring	216 Stainless Steel, ASTM 276 Type 316
	Stem Seal	One Carbon Fiber Ring and Three TFE Rings
	Thrust Washer	316 Stainless Steel, ASTM 276 Type 316
	Gland Retainer	Carbon Steel, ASTM A216 GR WCB/A516 GR 70
	Stud (Two Locations)	316 Stainless Steel, ASTM A193-B8M
	Lock Washer (Two Locations)	18-8 Stainless Steel
	Hex Nut (Two Locations)	18-8 Stainless Steel
	Seat Assembly	RTFE with Silicone Rubber O-Ring
	Seat Retainer	Carbon Steel, ASTM A516 GR 70
	Cap Screw (Eight Locations)	Alloy Steel
	O-Ring Gasket	PTFE
	Locating Plug®	Carbon Steel, Phosphate Coated
	Bellville Washer and Grounding Washer	18-8 Stainless Steel (For 14 and 16 in. ANSI Class 150 Valves and 14 in. ANSI Class 300 Valves)

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900140

Two-Way, Spring Return, Low Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Description

VF Series D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves are designed specifcally for a wide range of Heating, Ventilating, and Air Conditioning (HVAC) applications including two-position and modulating control of hot, chilled, or condenser water, and 50/50 glycol solutions. These valves are also bidirectional, allowing positive shutoff with the flow in either direction.

Features

- Spring return open or closed
- ANSI Class 125/150 flanges
- Valve body: cast iron
- Disk: aluminum bronze
- Valve stem: stainless steel
- Seat: EPDM
- Fluid temperature rating: -30 to 250°F
- Actuator ambient temperature rating: -20 to 150°F
- Air Supply pressure 20 psi minimum
- Actuator body material: cast aluminum
- Valve assemblies for On/Off applications are valve actuator positioner, 30 psig maximum pressure rating.
- Valve assemblies for proportional applications standard with D-9502 valve actuator positioner, 25 psig maximum air pressure rating

Repair Information

If the VF Series Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



Two-Way Pneumatically Actuated Butterfly Valve Assembly

Selection Chart

Size, in.	Cv at 70°	Closeoff psig	On/Off (Proportional)		Proportional (with Positioner)	
			Spring Open	Spring Closed	Spring Open	Spring Closed
Two-Way Butterfly Valve Assemblies - 200 psig Closeoff Pressure - Rated for 150 psi Dead-End Service						
2	105	175	VF4231AA+3153	VF4431AA+3153	VF4231AA+3153P	VF4431AA+3153P
2-1/2	156	175	VF4231BA+3153	VF4431BA+3153	VF4231BA+3153P	VF4431BA+3153P
3	240	175	VF4231CA+3153	VF4431CA+3153	VF4231CA+3153P	VF4431CA+3153P
4	423	175	VF4231DA+3244	VF4431DA+3244	VF4231DA+3244P	VF4431DA+3244P
5	656	175	VF4231EA+3246	VF4431EA+3246	VF4231EA+3246P	VF4431EA+3246P
6	941	175	VF4231FA+3246	VF4431FA+3246	VF4231FA+3246P	VF4431FA+3246P
8	1,660	175	VF4231GA23246[1]	VF4431GA23246[1]	VF4231GA23246P[1]	VF4431GA23246P[1]
Two-Way Butterfly Valve Assemblies - 50 psig Closeoff Pressure - Rated for 50 psig Dead-End Service						
4	423	50	VF6231DA+3153	VF6431DA+3153	VF6231DA+3153P	VF6431DA+3153P
5	656	50	VF6231EA+3244	VF6431EA+3244	VF6231EA+3244P	VF6431EA+3244P
6	941	50	VF6231FA+3246	VF6431FA+3246	VF6231FA+3246P	VF6431FA+3246P
8	1,660	50	VF6231GA+3246	VF6431GA+3246	VF6231GA+3246P	VF6431GA+3246P
10	2,560	50	VF6231HA23246[1]	VF6431HA23246[1]	VF6231HA23246P[1]	VF6431HA23246P[1]

1. Valve assemblies have two actuators mounted in tandem.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series Two-Way, Spring Return, Low Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies (Continued)

Technical Specifications

VF Series Two-Way, Spring Return, Low Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies		
Service		Hot Water, Chilled Water, Condenser Water, 50/50 Glycol Solutions (Not designed for use in steam applications.)
Fluid Temperature		-30 to 250°F (-34 to 121°C)
Maximum Fluid Velocity		30 ft/s (9 m/s)
Rangeability		80:1 Minimum
Flow Characteristics		Modified Equal Percentage
Leakage		Bubble Tight, Bidirectional Shutoff Rated For Dead-End Service (Unidirectional), **INLET** Must Face Pressure
Materials	**Body, Valve**	Cast Iron, ASTM A126 CL B
	Disk	Aluminum Bronze, ASTM B148
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel
	Bearings	Reinforced Polytetrafluorethylene (RPTFE)
	Body, Actuator	Die Cast Aluminum
	Diaphragm, Actuator	Synthetic Elastomer
	Body, Positioner	Die Cast Aluminum
	Cover, Positioner	Noryl
Actuator Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Ambient Storage Temperature Limits		-20 to 150°F (-29 to 66°C); Preferably 40 to 85°F (4 to 29°C)

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900141

Three-Way, Spring Return, Low Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Description

VF Series D-3000 Pneumatically Actuated Standard-Pressure, Standard-Temperature Butterfly Valves are designed specifically for a wide range of Heating, Ventiliating, and Air Conditioning (HVAC) applications including two-position and modulating control of hot, chilled, or condenser water, and 50/50 glycol solutions. These valves are also bidirectional, allowing positive shutoff with the flow in either direction. Three-way assemblies have two valves that are linked together and mounted on a flanged, cast-iron tee. Three-way configurations are available in sizes 2 through 8 in.

Features

- Spring return open or closed
- ANSI Class 125/150 flanges
- Valve body: cast iron
- Disk: aluminum bronze
- Valve stem: stainless steel
- Seat: EPDM
- Fluid temperature rating: -30 to 250°F
- Actuator ambient temperature rating: -20 to 150°F
- Air supply pressure 20 psi minimum
- Actuator body material: cast aluminum
- Valve assemblies for On/Off applications are valve actuator positioner, 30 psig maximum air pressure rating
- Valve assemblies for proportional application standard with D-9502 valve actuator positioner, 25 psig maximum air pressure rating

Repair Information

If the VF Series Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

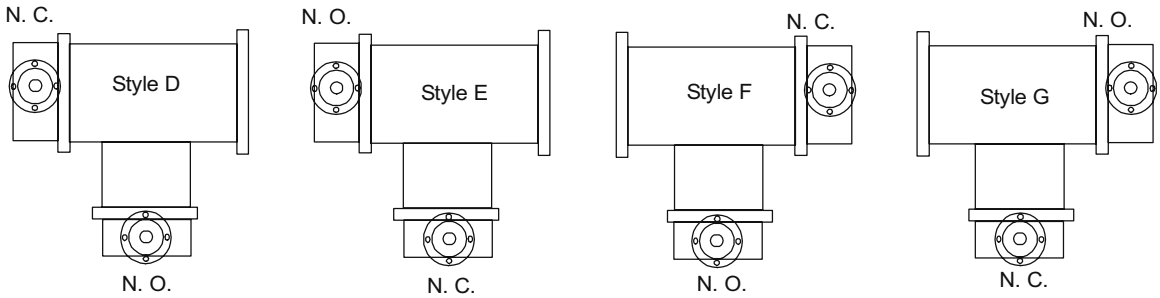


Three-Way Pneumatically Actuated Butterfly Valve Assembly

Selection Chart

Size In.	Cv at 70°	Closeoff psig	On/Off (Proportional)	Proportional (With Positioner)
Three-Way Butterfly Valve Assemblies[1] — 175 psig Closeoff Pressure — Rated for 150 psi Dead-End Service				
2	105	175	**VF4831AD+3153**	**VF4831AD+3153P**
2-1/2	156	175	**VF4831BD+3244**	**VF4831BD+3244P**
3	240	175	**VF4831CD+3244**	**VF4831CD+3244P**
4	423	175	**VF4831DD+3246**	**VF4831DD+3246P**
5	656	175	**VF4831ED+3246**	**VF4831ED+3246P**
6	941	175	**VF4831FD23246[2]**	**VF4831FD23246P[2]**
Three-Way Butterfly Valve Assemblies[1] — 50 psig Closeoff Pressure — Rated for 50 psig Dead-End Service				
4	423	50	**VF6831DD+3244**	**VF6831DD+3244P**
5	656	50	**VF6831ED+3246**	**VF6831ED+3246P**
6	941	50	**VF6831FD+3246**	**VF6831FD+3246P**
8	1,660	50	**VF6831GD23246[2]**	**VF6831GD23246P[2]**

1. Code numbers listed above are three-way valves, Style **D**. For Styles **E**, **F**, or **G**, change the **D** in the eighth digit of the code number to the desired style. Example: VFxxxxx**E**+xxxxxx, VFxxxxx**F**+xxxxxx, VFxxxxx**G**+xxxxxx.
2. Valve assemblies have two actuators mounted in tandem.



Three-Way Valve Body Styles

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series Three-Way, Spring Return, Low Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies (Continued)

Technical Specifications

VF Series Three-Way, Spring Return, Low Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies		
Service		Hot Water, Chilled Water, Condenser Water, 50/50 Glycol Solutions (Not designed for use in steam applications.)
Fluid Temperature		-30 to 250°F (-34 to 121°C)
Maximum Fluid Velocity		30 ft/s (9 m/s)
Rangeability		80:1 Minimum
Flow Characteristics		Modified Equal Percentage
Leakage		Bubble Tight, Bidirectional Shutoff Rated For Dead-End Service (Unidirectional), **INLET** Must Face Pressure
Materials	**Body, Valve**	Cast Iron, ASTM A126 CL B
	Disk	Cast Iron
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel
	Bearings	Reinforced Polytetrafluorethylene (RPTFE)
	Body, Actuator	Die Cast Aluminum
	Diaphragm, Actuator	Synthetic Elastomer
	Body, Positioner	Die Cast Aluminum
	Cover, Positioner	Noryl
Actuator Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Ambient Storage Temperature Limits		-20 to 150°F (-29 to 66°C); Preferably 40 to 85°F (4 to 29°C)

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900142

Two-Way, Industrial-Grade, Spring Return, High Pressure Pneumatic Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Description

VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are designed for control of hot water, chilled water, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- spring return
- ANSI Class 125/150 flanges
- valve body: cast iron
- disc: ductile iron coated with Nylon 11
- valve stem: 2 through 12 in. 416 stainless steel; 14 through 20 in. 304 stainless steel
- seat: EPDM
- fluid temperature rating: -40 to 250°F
- actuator ambient temperature rating: -13 to 200°F
- air supply pressure: 70 to 90 psig (80 psig nominal; 140 psig maximum)
- actuator body material: anodized extruded aluminum
- actuator end caps: polyester coated cast aluminum
- valve assemblies for On/Off applications come standard with a 24 or 120 VAC solenoid valve with speed controls
- valve assemblies for proportional applications come standard with a valve actuator positioner

Repair Information

If the VF Series Two-Way, Industrial Grade, Spring Return, High Pressure Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



Two-Way Valve with Industrial-Grade Spring Return, V-919x Series Spring Return High Pressure Pneumatic Actuator

Selection Chart

VF Series Two-Way, Industrial Grade, Spring Return, High Pressure Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Actuator				On/Off[1]		Proportional (With Positioner)	
Size, in.	Cv at 90°	Cv at 60°	Closeoff	Spring Closed	Spring Open	Spring Closed	Spring Open
Two-Way Butterfly Valve Assemblies – 150 or 175 psig Closeoff Pressure; 75 psig Dead-End Service							
2	144	61	175	VFC-020HB-320C	VFN-020HB-320C	VFC-020HB-320B	VFN-020HB-320B
2-1/2	282	107	175	VFC-025HB-330C	VFN-025HB-320C	VFC-025HB-330B	VFN-025HB-320B
3	461	154	175	VFC-030HB-340C	VFN-030HB-330C	VFC-030HB-340B	VFN-030HB-330B
4	841	274	175	VFC-040HB-450C	VFN-040HB-440C	VFC-040HB-450B	VFN-040HB-440B
5	1,376	428	175	VFC-050HB-432C	VFN-050HB-422C	VFC-050HB-432B	VFN-050HB-422B
6	1,850	567	175	VFC-060HB-442C	VFN-060HB-432C	VFC-060HB-442B	VFN-060HB-432B
8	3,316	1,081	175	VFC-080HB-640C	VFN-080HB-620C	VFC-080HB-640B	VFN-080HB-620B
10	5,430	1,710	175	VFC-100HB-740C	VFN-100HB-720C	VFC-100HB-740B	VFN-100HB-720B
12	8,077	2,563	175	VFC-120HB-750C	VFN-120HB-730C	VFC-120HB-750B	VFN-120HB-730B
14	10,538	3,384	150	VFC-140HC-760C	VFN-140HC-820C	VFC-140HC-760B	VFN-140HC-820B
16	13,966	4,483	150	VFC-160HC-840C	VFN-160HC-830C	VFC-160HC-840B	VFN-160HC-830B
18	17,214	5,736	150	VFC-180HC-850C	VFN-180HC-830C	VFC-180HC-850B	VFN-180HC-830B
20	22,339	7,144	150	VFC-200HC-860C	VFN-200HC-840C	VFC-200HC-860B	VFN-200HC-840B
Two-Way Butterfly Valve Assemblies – 50 psig Closeoff Pressure; Not Rated for Dead-End Service							
4	841	274	50	VFC-040LB-340C	VFN-040LB-330C	VFC-040LB-340B	VFN-040LB-330B
5	1,376	428	50	VFC-050LB-440C	VFN-050LB-340C	VFC-050LB-440B	VFN-050LB-340B
6	1,850	567	50	VFC-060LB-432C	VFN-060LB-422C	VFC-060LB-432B	VFN-060LB-422B
8	3,316	1,081	50	VFC-080LB-442C	VFN-080LB-432C	VFC-080LB-442B	VFN-080LB-432B
10	5,430	1,710	50	VFC-100LB-550C	VFN-100LB-530C	VFC-100LB-550B	VFN-100LB-530B
12	8,077	2,563	50	VFC-120LB-660C	VFN-120LB-630C	VFC-120LB-660B	VFN-120LB-630B
14	10,538	3,384	50	VFC-140LC-740C	VFN-140LC-720C	VFC-140LC-740B	VFN-140LC-720B
16	13,966	4,483	50	VFC-160LC-740C	VFN-160LC-730C	VFC-160LC-740B	VFN-160LC-730B
18	17,214	5,736	50	VFC-180LC-750C	VFN-180LC-730C	VFC-180LC-750B	VFN-180LC-730B
20	22,339	7,144	50	VFC-200LC-830C	VFN-200LC-820C	VFC-200LC-830B	VFN-200LC-820B

1. On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the “C” at the end of the code number to an “E”.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series Two-Way, Industrial-Grade, Spring Return, High Pressure Pneumatic Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies (Continued)

Technical Specifications

VF Series Two-Way, Industrial Grade, Spring Return, High Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and 50/50 Glycol Solutions
Fluid Temperature Limits	**Water**	-40 to 250°F (-40 to 121°C)
	Steam	Not Rated for Steam Service
Maximum Closeoff	**2 through 12 in. Type "H"**	175 psig (1,206 kPa) Bidirectional 75 psig (517 kPa) Dead-End Service
	14 through 20 in. Type "H"	150 psig (1,034 kPa) Bidirectional 75 psig (517 kPa) Dead-End Service
	4 through 12 in. Type "L"	50 psig (345 kPa) Bidirectional Not Rated for Dead-End Service
Flow Characteristics		Equal Percentage
Maximum Fluid Velocity		30 ft/second (9 m/second)
End Connection		Fully Lugged, designed to be installed between ANSI 125/150 lb flanges
Actuator Ambient Operating Temperature Limits		-40 to 200°F (-40 to 93°C)
Air Supply Pressure		70 to 90 psig, 80 psig (551 kPa) nominal), 140 psig (965 kPa) maximum
Materials	**Body**	Cast Iron, Red Epoxy finish
	Disc	Ductile Iron Coated with Nylon 11
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel (2 through 12 in.) 304 Stainless Steel (14 through 20 in.)

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900143

Two-Way, Industrial-Grade, Non-Spring Return, High Pressure Pneumatic Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Description

VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are designed for control of hot water, chilled water, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- non-spring return (drive open, drive closed)
- ANSI Class 125/150 flanges
- valve body: cast iron
- disc: ductile iron coated with Nylon 11
- valve stem:
  2 through 12 in. 416 stainless steel;
  14 through 20 in. 304 stainless steel
- seat: EPDM
- fluid temperature rating: -40 to 250°F
- actuator ambient temperature rating: -13 to 200°F
- air supply pressure: 70 to 90 psig (80 psig nominal; 140 psig maximum)
- actuator body material: anodized extruded aluminum
- actuator end caps: polyester coated cast aluminum
- valve assemblies for On/Off applications come with a 24 or 120 VAC solenoid valve with speed controls
- valve assemblies for proportional applications come with a valve actuator positioner

Repair Information

If the VF Series Two-Way, Industrial Grade, Non-Spring Return, High Pressure Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



Two-Way Valve with Industrial Grade, Non-Spring Return, V-909x Series High Pressure Pneumatic Actuator

Selection Chart

VF Series Two-Way, Industrial Grade, Non-Spring Return, High Pressure Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Actuator				On/Off[1]	Proportional (With Positioner)
Size, in.	Cv at 90°	Cv at 60°	Closeoff		
Two-Way Butterfly Valve Assemblies – 150 or 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	**VFC-020HB-020C**	**VFC-020HB-020B**
2-1/2	282	107	175	**VFC-025HB-020C**	**VFC-025HB-020B**
3	461	154	175	**VFC-030HB-020C**	**VFC-030HB-020B**
4	841	274	175	**VFC-040HB-030C**	**VFC-040HB-030B**
5	1,376	428	175	**VFC-050HB-030C**	**VFC-050HB-030B**
6	1,850	567	175	**VFC-060HB-030C**	**VFC-060HB-030B**
8	3,316	1,081	175	**VFC-080HB-042C**	**VFC-080HB-042B**
10	5,430	1,710	175	**VFC-100HB-060C**	**VFC-100HB-060B**
12	8,077	2,563	175	**VFC-120HB-060C**	**VFC-120HB-060B**
14	10,538	3,384	150	**VFC-140HC-060C**	**VFC-140HC-060B**
16	13,966	4,483	150	**VFC-160HC-070C**	**VFC-160HC-070B**
18	17,214	5,736	150	**VFC-180HC-070C**	**VFC-180HC-070B**
20	22,339	7,144	150	**VFC-200HC-080C**	**VFC-200HC-080B**
Two-Way Butterfly Valve Assemblies – 50 psig Closeoff Pressure; Not Rated for Dead-End Service					
4	841	274	50	**VFC-040LB-030C**	**VFC-040LB-030B**
5	1,376	428	50	**VFC-050LB-030C**	**VFC-050LB-030B**
6	1,850	567	50	**VFC-060LB-030C**	**VFC-060LB-030B**
8	3,316	1,081	50	**VFC-080LB-042C**	**VFC-080LB-042B**
10	5,430	1,710	50	**VFC-100LB-042C**	**VFC-100LB-042B**
12	8,077	2,563	50	**VFC-120LB-042C**	**VFC-120LB-042B**
14	10,538	3,384	50	**VFC-140LC-060C**	**VFC-140LC-060B**
16	13,966	4,483	50	**VFC-160LC-060C**	**VFC-160LC-060B**
18	17,214	5,736	50	**VFC-180LC-070C**	**VFC-180LC-080B**
20	22,339	7,144	50	**VFC-200LC-070C**	**VFC-200LC-070B**

1. On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the “C” at the end of the code number to an “E”.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series Two-Way, Industrial-Grade, Non-Spring Return, High Pressure Pneumatic Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies (Continued)

Technical Specifications

VF Series Two-Way, Industrial Grade, Non-Spring Return, High pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and 50/50 Glycol Solutions
Fluid Temperature Limits	**Water**	-40 to 250°F (-40 to 121°C)
	Steam	Not Rated for Steam Service
Maximum Closeoff	**2 through 12 in. Type "H"**	175 psig (1,206 kPa) Bidirectional 75 psig (517 kPa) Dead-End Service
	14 through 20 in. Type "H"	150 psig (1,034 kPa) Bidirectional 75 psig (517 kPa) Dead-End Service
	4 through 12 in. Type "L"	50 psig (345 kPa) Bidirectional Not Rated for Dead-End Service
Flow Characteristics		Equal Percentage
Maximum Fluid Velocity		30 ft/second (9 m/second)
End Connection		Fully Lugged, designed to be installed between ANSI 125/150 lb flanges
Actuator Ambient Operating Temperature Limits		-40 to 200°F (-40 to 93°C)
Air Supply Pressure		70 to 90 psig, 80 psig (551 kPa) nominal), 140 psig (965 kPa) maximum
Materials	**Body**	Cast Iron, Red Epoxy finish
	Disc	Ductile Iron Coated with Nylon 11
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel (2 through 12 in.) 304 Stainless Steel (14 through 20 in.)

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900145

Three-Way, Industrial-Grade, Spring Return, High Pressure Pneumatic Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Description

VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are designed for control of hot water, chilled water, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- spring return
- ANSI Class 125/150 flanges
- valve body: cast iron
- disc: ductile iron coated with Nylon 11
- valve stem: 416 stainless steel
- seat: EPDM
- fluid temperature rating: -40 to 250°F
- actuator ambient temperature rating: -13 to 200°F
- air supply pressure: 70 to 90 psig (80 psig nominal; 140 psig maximum)
- actuator body material: anodized extruded aluminum
- actuator end caps: polyester coated cast aluminum
- valve assemblies for On/Off applications come standard with a 24 or 120 VAC solenoid valve with speed controls
- valve assemblies for proportional applications come standard with a valve actuator positioner



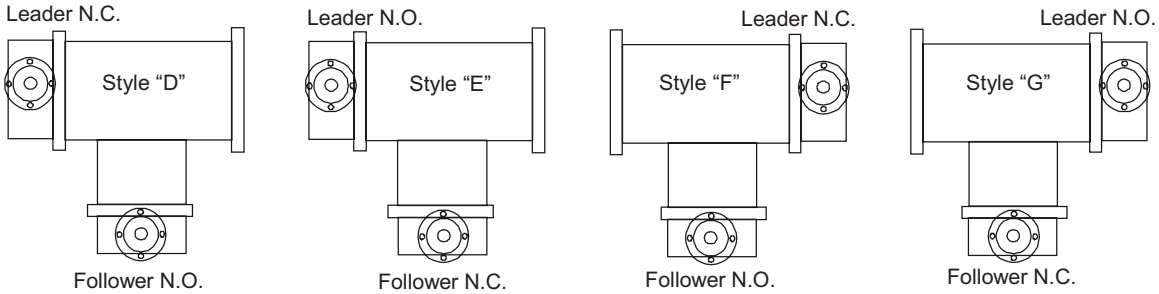
Three-Way Valve with Industrial Grade, Spring Return, V-919x Series High Pressure Pneumatic Actuator

Selection Chart

VF Series Two-Way, Industrial Grade, Sping Return, Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Actuator				On/Off [1]	Proportional (With Positioner)
Size, in.	Cv at 90°	Cv at 60°	Closeoff		
Three-Way Butterfly Valve Assemblies [2] – 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	**VFD-020HB-330C**	**VFD-020HB-330B**
2-1/2	282	107	175	**VFD-025HB-340C**	**VFD-025HB-340B**
3	461	154	175	**VFD-030HB-340C**	**VFD-030HB-340B**
4	841	274	175	**VFD-040HB-432C**	**VFD-040HB-432B**
5	1,376	428	175	**VFD-050HB-442C**	**VFD-050HB-442B**
6	1,850	567	175	**VFD-060HB-530C**	**VFD-060HB-530B**
8	3,316	1,081	175	**VFD-080HB-640C**	**VFD-080HB-640B**
10	5,430	1,710	175	**VFD-100HB-740C**	**VFD-100HB-740B**
12	8,077	2,563	175	**VFD-120HB-830C**	**VFD-120HB-830B**
Three-Way Butterfly Valve Assemblies [2] – 50 psig Closeoff Pressure; Not Rated for Dead-End Service					
4	841	274	50	**VFD-040LB-340C**	**VFD-040LB-340B**
5	1,376	428	50	**VFD-050LB-432C**	**VFD-050LB-432B**
6	1,850	567	50	**VFD-060LB-442C**	**VFD-060LB-442B**
8	3,316	1,081	50	**VFD-080LB-530C**	**VFD-080LB-530B**
10	5,430	1,710	50	**VFD-100LB-640C**	**VFD-100LB-640B**
12	8,077	2,563	50	**VFD-120LB-740C**	**VFD-120LB-740B**

1. On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the “C” at the end of the code number to an “E”.
2. Code numbers listed above are three-way valves, style “D”. For styles “E”, “F”, or “G” change the “D” in the third digit of the code number to the desired style. Example: VFE-xxxxx-xxxx, VFF-xxxxx-xxxx, VFG-xxxxx-xxxx.



Three-Way Valve Body Styles

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series Three-Way, Industrial-Grade, Spring Return, High Pressure Pneumatic Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies (Continued)

Repair Information

If the VF Series Two-Way, Industrial Grade, Sping Return, Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Technical Specifications

VF Series Three-Way, Industrial Grade, Spring Return, High Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and 50/50 Glycol Solutions
Fluid Temperature Limits	**Water**	-40 to 250°F (-40 to 121°C)
	Steam	Not Rated for Steam Service
Maximum Closeoff	**2 through 12 in. Type "H"**	175 psig (1,206 kPa) Bidirectional 75 psig (517 kPa) Dead-End Service
	4 through 12 in. Type "L"	50 psig (345 kPa) Bidirectional Not Rated for Dead-End Service
Flow Characteristics		Equal Percentage
Maximum Fluid Velocity		30 ft/second (9 m/second)
End Connection		Fully Lugged, designed to be installed between ANSI 125/150 lb flanges
Actuator Ambient Operating Temperature Limits		-40 to 200°F (-40 to 93°C)
Air Supply Pressure		70 to 90 psig, 80 psig (551 kPa) nominal), 140 psig (965 kPa) maximum
Materials	**Body**	Cast Iron, Red Epoxy finish
	Disc	Ductile Iron Coated with Nylon 11
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel (2 through 12 in.) 304 Stainless Steel (14 through 20 in.)
	Tee	Cast Iron

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900146

Three-Way, Industrial-Grade, Non-Spring Return, High Pressure Pneumatic Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Description

VF Series Standard-Pressure, Standard-Temperature Butterfly Valves are designed for control of hot water, chilled water, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- non-spring return (drive open, drive closed)
- ANSI Class 125/150 flanges
- valve body: cast iron
- disc: ductile iron coated with Nylon 11
- valve stem: 416 stainless steel
- seat: EPDM
- fluid temperature rating: -40 to 250°F
- actuator ambient temperature rating: -13 to 200°F
- air supply pressure: 70 to 90 psig (80 psig nominal; 140 psig maximum)
- actuator body material: anodized extruded aluminum
- actuator end caps: polyester coated cast aluminum
- valve assemblies for On/Off applications come standard with a 24 or 120 VAC solenoid valve with speed controls
- valve assemblies for proportional applications come standard with a valve actuator positioner



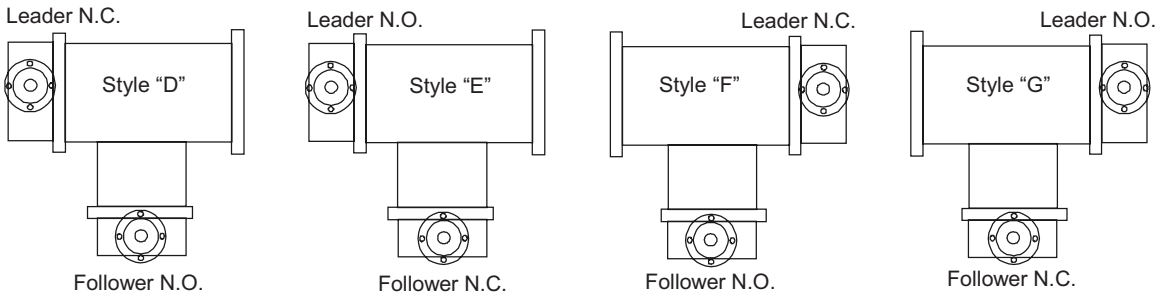
Three-Way Valve with Industrial-Grade, Non-Spring Return, V-909x Series High Pressure Pneumatic Actuator

Selection Chart

VF Series Three-Way, Industrial Grade, Non-Spring Return, High Pressure Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Actuator				On/Off[1]	Proportional (With Positioner)
Size, in.	Cv at 90°	Cv at 60°	Closeoff		
Three-Way Butterfly Valve Assemblies[2] – 175 psig Closeoff Pressure; 75 psig Dead-End Service					
2	144	61	175	**VFD-020HB-020C**	**VFD-020HB-020B**
2-1/2	282	107	175	**VFD-025HB-020C**	**VFD-025HB-020B**
3	461	154	175	**VFD-030HB-020C**	**VFD-030HB-020B**
4	841	274	175	**VFD-040HB-030C**	**VFD-040HB-030B**
5	1,376	428	175	**VFD-050HB-030C**	**VFD-050HB-030B**
6	1,850	567	175	**VFD-060HB-040C**	**VFD-060HB-040B**
8	3,316	1,081	175	**VFD-080HB-042C**	**VFD-080HB-042B**
10	5,430	1,710	175	**VFD-100HB-060C**	**VFD-100HB-060B**
12	8,077	2,563	175	**VFD-120HB-060C**	**VFD-120HB-060B**
Three-Way Butterfly Valve Assemblies[2] – 50 psig Closeoff Pressure; Not Rated for Dead-End Service					
4	841	274	50	**VFD-040LB-030C**	**VFD-040LB-030B**
5	1,376	428	50	**VFD-050LB-030C**	**VFD-050LB-030B**
6	1,850	567	50	**VFD-060LB-030C**	**VFD-060LB-030B**
8	3,316	1,081	50	**VFD-080LB-042C**	**VFD-080LB-042B**
10	5,430	1,710	50	**VFD-100LB-042C**	**VFD-100LB-042B**
12	8,077	2,563	50	**VFD-120LB-060C**	**VFD-120LB-060B**

1. On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the “C” at the end of the code number to an “E”.
2. Code numbers listed above are three-way valves, style “D”. For styles “E”, “F”, or “G” change the “D” in the third digit of the code number to the desired style. Example: VFE-xxxxx-xxxx, VFF-xxxxx-xxxx, VFG-xxxxx-xxxx.



Three-Way Valve Body Styles

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series Three-Way, Industrial-Grade, Non-Spring Return, High Pressure Pneumatic Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies (Continued)

Repair Information

If the VF Series Three-Way, Industrial Grade, Non-Spring Return, High Pressure Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Technical Specifications

VF Series Three-Way, Industrial Grade, Non-Spring Return, High Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and 50/50 Glycol Solutions
Fluid Temperature Limits	**Water**	-40 to 250°F (-40 to 121°C)
	Steam	Not Rated for Steam Service
Maximum Closeoff	**2 through 12 in. Type "H"**	175 psig (1,206 kPa) Bidirectional 75 psig (517 kPa) Dead-End Service
	4 through 12 in. Type "L"	50 psig (345 kPa) Bidirectional Not Rated for Dead-End Service
Flow Characteristics		Equal Percentage
Maximum Fluid Velocity		30 ft/second (9 m/second)
End Connection		Fully Lugged, designed to be installed between ANSI 125/150 lb flanges
Actuator Ambient Operating Temperature Limits		-40 to 200°F (-40 to 93°C)
Air Supply Pressure		70 to 90 psig, 80 psig (551 kPa) nominal), 140 psig (965 kPa) maximum
Materials	**Body**	Cast Iron, Red Epoxy finish
	Disc	Ductile Iron Coated with Nylon 11
	Seat	Ethylene Propylene Diene Monomer (EPDM)
	Stem	416 Stainless Steel (2 through 12 in.) 304 Stainless Steel (14 through 20 in.)
	Tee	Cast Iron

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900149

Two-Way, Non-Spring Return, High Pressure Pneumatic Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Description

VF Series High-Pressure, High-Temperature Butterfly Valves are designed for control of hot water, chilled water, steam, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- non-spring return (drive open, drive closed)
- ANSI Class 150 and 300 flanges
- valve body: carbon steel
- disc: stainless steel
- valve stem: stainless steel
- seat: RPTFE
- fluid temperature rating: -20 to 450°F
- actuator ambient temperature rating: -13 to 200°F
- air supply pressure: 70 to 90 psig (80 psig nominal; 140 psig maximum)
- actuator body material: anodized extruded aluminum
- actuator end caps: polyester coated cast aluminum
- valve assemblies for On/Off applications come standard with a 120 VAC solenoid valve or opional 24 VAC solenoid valve with speed controls
- valve assemblies for proportional applications come standard with a valve actuator positioner

Repair Information

If the VF Series Two-Way, Industrial Grade, Non-Spring Return, High Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



Two-Way High performance Valve with Industrial-Grade, Non-Spring Return, V-909x Series High Pressure Pneumatic Actuator

Selection Chart

VF Series Two-Way, Industrial Grade, Non-Spring Return, High Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Actuator				On/Off [1]	Proportional (With Positioner)
Size, in.	Cv at 90°	Cv at 60°	Closeoff		
Two-Way Butterfly Valve Assemblies – ANSI Class 300 Flanges [2]					
2-1/2	160	78	550 psig	**VFC-025ZE-030C**	**VFC-025ZE-030B**
3	185	123		**VFC-030ZE-030C**	**VFC-030ZE-030B**
4	375	250		**VFC-040ZE-040C**	**VFC-040ZE-040B**
5	790	360		**VFC-050ZE-042C**	**VFC-050ZE-042B**
6	1,000	530		**VFC-060ZE-050C**	**VFC-060ZE-050B**
8	2,000	950		**VFC-080ZE-060C**	**VFC-080ZE-060B**
10	2,650	1,200		**VFC-100ZE-070C**	**VFC-100ZE-070B**
12	4,000	1,690		**VFC-120ZE-070C**	**VFC-120ZE-070B**
14	3,900	1,570		**VFC-140ZE-080C**	**VFC-140ZE-080B**
Two-Way Butterfly Valve Assemblies – ANSI Class 150 Flanges [3]					
2-1/2	160	78	240 psig	**VFC-025VE-030C**	**VFC-025VE-030B**
3	185	123		**VFC-030VE-030C**	**VFC-030VE-030B**
4	375	250		**VFC-040VE-030C**	**VFC-040VE-030B**
5	790	360		**VFC-050VE-042C**	**VFC-050VE-042B**
6	1,350	510		**VFC-060VE-042C**	**VFC-060VE-042B**
8	2,800	1,060		**VFC-080VE-050C**	**VFC-080VE-050B**
10	4,300	1,630		**VFC-100VE-060C**	**VFC-100VE-060B**
12	6,650	2,530		**VFC-120VE-070C**	**VFC-120VE-070B**
14	7,650	2,900		**VFC-140VE-070C**	**VFC-140VE-070B**
16	9,800	3,700		**VFC-160VE-080C**	**VFC-160VE-080B**

1. On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the “C” at the end of the code number to an “E”.
2. Maximum closeoff pressure for ANSI Class 300 valves is 740 psig for fluid temperatures below 100°F, and 550 psig for fluid temperatures at 250°F. Maximum steam pressure is 150 psig for On/Off service and 50 psig for modulating service.
3. Maximum closeoff pressure for ANSI Class 150 valves is 280 psig for fluid temperatures below 100°F, and 240 psig for fluid temperatures at 250°F. Maximum steam pressure is 150 psig for On/Off service and 50 psig for modulating service.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series Two-Way, Non-Spring Return, High Pressure Pneumatic Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies (Continued)

Technical Specifications

VF Series Two-Way, Industrial Grade, Non-Spring Return, High Pressure Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and Steam
Fluid Temperature Limits	**Water**	-20 to 500°F (-29 to 260°C)
	Steam	On/Off Applications: 150 psig (1,034 kPa) saturated steam at 366°F (185°C)
		Modulating Applications: 50 psig saturated steam at 298°F (148°C)
Maximum Closeoff	**ANSI Class 150**	280 psig at 100°F 240 psig at 250°F 100 psig at 500°F
	ANSI Class 300	720 psig at 100°F 550 psig at 250°F 100 psig at 500°F
End Connection		Fully Lugged
Actuator Ambient Operating Temperature Limits		-13 to 200°F (-40 to 93°C)
Air Supply Pressure		70 to 90 psig, 80 psig (551 kPa) nominal), 140 psig (965 kPa) maximum
Materials	**Body**	Carbon Steel, ASTM A216 GR WCB/A516 GR 70
	Disc	Stainless Steel, ASTM A 351 GR CF8M
	Stem	17-4 PH Stainless Steel, ASTM A564-Type 630
	Taper Pin (Two Locations)	17-4 PH Stainless Steel, ASTM A564-Type 630 316 Stainless Steel, ASTM 276 Type 316
	Disc Spacer (Two Locations)	316 Stainless Steel, ASTM 276 Type 316
	Gland Ring	216 Stainless Steel, ASTM 276 Type 316
	Stem Seal	One Carbon Fiber Ring and Three TFE Rings
	Thrust Washer	316 Stainless Steel, ASTM 276 Type 316
	Gland Retainer	Carbon Steel, ASTM A216 GR WCB/A516 GR 70
	Stud (Two Locations)	316 Stainless Steel, ASTM A193-B8M
	Lock Washer (Two Locations)	18-8 Stainless Steel
	Hex Nut (Two Locations)	18-8 Stainless Steel
	Seat Assembly	RTFE with Silicone Rubber O-Ring
	Seat Retainer	Carbon Steel, ASTM A516 GR 70
	Cap Screw (Eight Locations)	Alloy Steel
	O-Ring Gasket	PTFE
	Locating Plug®	Carbon Steel, Phosphate Coated
	Bellville Washer and Grounding Washer	18-8 Stainless Steel (For 14 and 16 in. ANSI Class 150 Valves and 14 in. ANSI Class 300 Valves)

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VF Series

LIT-1900150

Two-Way, Spring Return, High Pressure Pneumatic Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies

Description

VF Series High-Pressure, High-Temperature Butterfly Valves are designed for control of hot water, chilled water, steam, 50% glycol solutions and condenser water in a wide range of HVAC applications.

Features

- spring return open or closed
- ANSI Class 150 and 300 flanges
- valve body: carbon steel
- disc: stainless steel
- valve stem: stainless steel
- seat: RPTFE
- fluid temperature rating: -20 to 450°F
- actuator ambient temperature rating: -13 to 200°F
- air supply pressure: 70 to 90 psig (80 psig nominal; 140 psig maximum)
- actuator body material: anodized extruded aluminum
- actuator end caps: polyester coated cast aluminum
- valve assemblies for On/Off applications come standard with a 120 VAC solenoid valve or optional 24 VAC solenoid valve with speed controls
- valve assemblies for proportional applications come standard with a valve actuator positioner

Repair Information

If the VF Series Two-Way, Industrial Grade, Spring Return, High Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assembly fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



Two-Way High Performance Valve with Industrial-Grade, Spring Return, V-919x Series High Pressure Pneumatic Actuator

Selection Chart

VF Series Two-Way, Industrial Grade, Spring Return, High Pressure Pneumatically Actuated, Standard-Pressure, Standard-Temperature Butterfly Valve Assemblies

Actuator				On/Off [1]		Proportional (With Positioner)	
Size, in.	Cv at 90°	Cv at 60°	Closeoff	Spring Closed	Spring Open	Spring Closed	Spring Open
Two-Way Butterfly Valve Assemblies – ANSI Class 300 Flanges [2]							
2-1/2	160	78	550 psig	VFC-025ZE-432C	VFN-025ZE-422C	VFC-025ZE-432B	VFN-025ZE-422B
3	185	123		VFC-030ZE-442C	VFN-030ZE-422C	VFC-030ZE-442B	VFN-030ZE-422B
4	375	250		VFC-040ZE-452C	VFN-040ZE-432C	VFC-040ZE-452B	VFN-040ZE-432B
5	790	360		VFC-050ZE-650C	VFN-050ZE-630C	VFC-050ZE-650B	VFN-050ZE-630B
6	1,000	530		VFC-060ZE-660C	VFN-060ZE-630C	VFC-060ZE-660B	VFN-060ZE-630B
8	2,000	950		VFC-080ZE-750C	VFN-080ZE-730C	VFC-080ZE-750B	VFN-080ZE-730B
10	2,650	1,200		VFC-100ZE-840C	VFN-100ZE-830C	VFC-100ZE-840B	VFN-100ZE-830B
12	4,000	1,690		VFC-120ZE-850C	VFN-120ZE-840C	VFC-120ZE-850B	VFN-120ZE-840B
Two-Way Butterfly Valve Assemblies – ANSI Class 150 Flanges [3]							
2-1/2	160	78	240 psig	VFC-025VE-360C	VFN-025VE-340C	VFC-025VE-360B	VFN-025VE-340B
3	185	123		VFC-030VE-360C	VFN-030VE-340C	VFC-030VE-360B	VFN-030VE-340B
4	375	250		VFC-040VE-430C	VFN-040VE-440C	VFC-040VE-430B	VFN-040VE-440B
5	790	360		VFC-050VE-462C	VFN-050VE-530C	VFC-050VE-462B	VFN-050VE-530B
6	1,350	510		VFC-060VE-550C	VFN-060VE-530C	VFC-060VE-550B	VFN-060VE-530B
8	2,800	1,060		VFC-080VE-650C	VFN-080VE-630C	VFC-080VE-650B	VFN-080VE-630B
10	4,300	1,630		VFC-100VE-750C	VFN-100VE-730C	VFC-100VE-750B	VFN-100VE-730B
12	6,650	2,530		VFC-120VE-830C	VFN-120VE-820C	VFC-120VE-830B	VFN-120VE-820B
14	7,650	2,900		VFC-140VE-850C	VFN-140VE-830C	VFC-140VE-850B	VFN-140VE-830B

1. On/Off assemblies come with a 120 VAC solenoid valve and speed controls. If a 24 VAC solenoid valve is desired, change the "C" at the end of the code number to an "E".
2. Maximum closeoff pressure for ANSI Class 300 valves is 740 psig for fluid temperatures below 100°F, and 550 psig for fluid temperatures at 250°F. Maximum steam pressure is 150 psig for On/Off service and 50 psig for modulating service.
3. Maximum closeoff pressure for ANSI Class 150 valves is 280 psig for fluid temperatures below 100°F, and 240 psig for fluid temperatures at 250°F. Maximum steam pressure is 150 psig for On/Off service and 50 psig for modulating service.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 10/07 Johnson Controls, Inc.

VF Series Two-Way, Spring Return, High Pressure Pneumatic Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies (Continued)

Technical Specifications

VF Series Two-Way, Industrial Grade, Spring Return, High Pressure Pneumatically Actuated, High-Pressure, High-Temperature Butterfly Valve Assemblies		
Service[1]		Hot Water, Chill Water, Condenser Water, and Steam
Fluid Temperature Limits	**Water**	-20 to 500°F (-29 to 260°C)
	Steam	On/Off Applications: 150 psig (1,034 kPa) saturated steam at 366°F (185°C)
		Modulating Applications: 50 psig saturated steam at 298°F (148°C)
Maximum Closeoff	**ANSI Class 150**	280 psig at 100°F 240 psig at 250°F 100 psig at 500°F
	ANSI Class 300	720 psig at 100°F 550 psig at 250°F 100 psig at 500°F
End Connection		Fully Lugged
Actuator Ambient Operating Temperature Limits		-13 to 200°F (-40 to 93°C)
Air Supply Pressure		70 to 90 psig, 80 psig (551 kPa) nominal), 140 psig (965 kPa) maximum
Materials	**Body**	Carbon Steel, ASTM A216 GR WCB/A516 GR 70
	Disc	Stainless Steel, ASTM A 351 GR CF8M
	Stem	17-4 PH Stainless Steel, ASTM A564-Type 630
	Taper Pin (Two Locations)	17-4 PH Stainless Steel, ASTM A564-Type 630 316 Stainless Steel, ASTM 276 Type 316
	Disc Spacer (Two Locations)	316 Stainless Steel, ASTM 276 Type 316
	Gland Ring	216 Stainless Steel, ASTM 276 Type 316
	Stem Seal	One Carbon Fiber Ring and Three TFE Rings
	Thrust Washer	316 Stainless Steel, ASTM 276 Type 316
	Gland Retainer	Carbon Steel, ASTM A216 GR WCB/A516 GR 70
	Stud (Two Locations)	316 Stainless Steel, ASTM A193-B8M
	Lock Washer (Two Locations)	18-8 Stainless Steel
	Hex Nut (Two Locations)	18-8 Stainless Steel
	Seat Assembly	RTFE with Silicone Rubber O-Ring
	Seat Retainer	Carbon Steel, ASTM A516 GR 70
	Cap Screw (Eight Locations)	Alloy Steel
	O-Ring Gasket	PTFE
	Locating Plug®	Carbon Steel, Phosphate Coated
	Bellville Washer and Grounding Washer	18-8 Stainless Steel (For 14 and 16 in. ANSI Class 150 Valves and 14 in. ANSI Class 300 Valves)

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

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VG7000 Series

LIT-1900123

Brass Trim Globe Valves with VA-4233 Series Electric Actuators

Description

VG7000 Series Brass Trim Globe Valves with VA-4233 Series Electric Actuator control hot or chilled water, or steam.

Feaatures

- spring return – stem up
- 61 lb force – provides tight shutoff
- manual opener
- fits VG7000 valves 1/2 through 1-1/4 in.
- valve body static pressure rating: ANSI Class 250
- optional auxiliary switches available
- factory or field assembly
- voltage: 20 to 30 VAC, 50/60 Hz, 12 VA

Repair Information

If the VG7000 Series Brass Trim Globe Valve Assembly with VA4233 Series Spring Return Electric Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



VA-4233 Electric Actuator mounted on VG7441 Brass Globe Valve

Selection Charts

VG7000 Series Brass Trim Globe Valve Assemblies with VA-4233 Series Electric Actuators, Less Auxiliary Switches (Part 1 of 2)

Actuator Code				VA-4233-AGA-2	VA-4233-BGA-2	VA-4233-GGA-2
Actuator Input				Floating	On/Off	0 to 10 VDC Proportional
Temperature Range				35 to 250°F (2 to 121°C), 15 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		
Two-Way Push-Down-to-Close – NPT End Connections						
VG7241CT	1/2”	0.73	345	VG7241CT+423AGA	VG7241CT+423BGA	VG7241CT+423GGA
VG7241ET	1/2”	1.8	345	VG7241ET+423AGA	VG7241ET+423BGA	VG7241ET+423GGA
VG7241GT	1/2”	4.6	208	VG7241GT+423AGA	VG7241GT+423BGA	VG7241GT+423GGA
VG7241LT	3/4”	7.3	132	VG7241LT+423AGA	VG7241LT+423BGA	VG7241LT+423GGA
VG7241NT	1”	11.6	63	VG7241NT+423AGA	VG7241NT+423BGA	VG7241NT+423GGA
VG7241PT	1-1/4”	18.5	38	VG7241PT+423AGA	VG7241PT+423BGA	VG7241PT+423GGA
Two-Way Push-Down-to-Open – NPT End Connections						
VG7441CT	1/2”	0.73	345	VG7441CT+423AGA	VG7441CT+423BGA	VG7441CT+423GGA
VG7441ET	1/2”	1.8	345	VG7441ET+423AGA	VG7441ET+423BGA	VG7441ET+423GGA
VG7441GT	1/2”	4.6	173	VG7441GT+423AGA	VG7441GT+423BGA	VG7441GT+423GGA
VG7441LT	3/4”	7.3	103	VG7441LT+423AGA	VG7441LT+423BGA	VG7441LT+423GGA
VG7441NT	1”	11.6	66	VG7441NT+423AGA	VG7441NT+423BGA	VG7441NT+423GGA
VG7441PT	1-1/4”	18.5	38	VG7441PT+423AGA	VG7441PT+423BGA	VG7441PT+423GGA
Three-Way Mixing – NPT End Connections						
VG7842CT	1/2”	0.73	345 / 345	VG7842CT+423AGA	VG7842CT+423BGA	VG7842CT+423GGA
VG7842ET	1/2”	1.8	345 / 345	VG7842ET+423AGA	VG7842ET+423BGA	VG7842ET+423GGA
VG7842GT	1/2”	4.6	208 / 173	VG7842GT+423AGA	VG7842GT+423BGA	VG7842GT+423GGA
VG7842LT	3/4”	7.3	132 / 103	VG7842LT+423AGA	VG7842LT+423BGA	VG7842LT+423GGA
VG7842NT	1”	11.6	63 / 66	VG7842NT+423AGA	VG7842NT+423BGA	VG7842NT+423GGA
VG7842PT	1-1/4”	18.5	38 / 38	VG7842PT+423AGA	VG7842PT+423BGA	VG7842PT+423GGA
Two-Way Push-Down-to-Close – Union Sweat End Connections						
VG7281CT	1/2”	0.73	345	VG7281CT+423AGA	VG7281CT+423BGA	VG7281CT+423GGA
VG7281ET	1/2”	1.8	345	VG7281ET+423AGA	VG7281ET+423BGA	VG7281ET+423GGA
VG7281GT	1/2”	4.6	208	VG7281GT+423AGA	VG7281GT+423BGA	VG7281GT+423GGA
VG7281LT	3/4”	7.3	132	VG7281LT+423AGA	VG7281LT+423BGA	VG7281LT+423GGA
VG7281NT	1”	11.6	63	VG7281NT+423AGA	VG7281NT+423BGA	VG7281NT+423GGA
VG7281PT	1-1/4”	18.5	38	VG7281PT+423AGA	VG7281PT+423BGA	VG7281PT+423GGA

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Brass Trim Globe Valves with VA-4233 Series Electric Actuators (Continued)

VG7000 Series Brass Trim Globe Valve Assemblies with VA-4233 Series Electric Actuators, Less Auxiliary Switches (Part 2 of 2)

Actuator Code				VA-4233-AGA-2	VA-4233-BGA-2	VA-4233-GGA-2
Actuator Input				Floating	On/Off	0 to 10 VDC Proportional
Temperature Range				35 to 250°F (2 to 121°C), 15 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		
Two-Way Push-Down-to-Open – Union Sweat End Connections						
VG7481CT	1/2”	0.73	345	VG7481CT+423AGA	VG7481CT+423BGA	VG7481CT+423GGA
VG7481ET	1/2”	1.8	345	VG7481ET+423AGA	VG7481ET+423BGA	VG7481ET+423GGA
VG7481GT	1/2”	4.6	173	VG7481GT+423AGA	VG7481GT+423BGA	VG7481GT+423GGA
VG7481LT	3/4”	7.3	103	VG7481LT+423AGA	VG7481LT+423BGA	VG7481LT+423GGA
VG7481NT	1”	11.6	66	VG7481NT+423AGA	VG7481NT+423BGA	VG7481NT+423GGA
VG7481PT	1-1/4”	18.5	38	VG7481PT+423AGA	VG7481PT+423BGA	VG7481PT+423GGA
Three-Way Mixing – Union Sweat End Connections						
VG7882CT	1/2”	0.73	345 / 345	VG7882CT+423AGA	VG7882CT+423BGA	VG7882CT+423GGA
VG7882ET	1/2”	1.8	345 / 345	VG7882ET+423AGA	VG7882ET+423BGA	VG7882ET+423GGA
VG7882GT	1/2”	4.6	208 / 173	VG7882GT+423AGA	VG7882GT+423BGA	VG7882GT+423GGA
VG7882LT	3/4”	7.3	132 / 103	VG7882LT+423AGA	VG7882LT+423BGA	VG7882LT+423GGA
VG7882NT	1”	11.6	63 / 66	VG7882NT+423AGA	VG7882NT+423BGA	VG7882NT+423GGA
VG7882PT	1-1/4”	18.5	38 / 38	VG7882PT+423AGA	VG7882PT+423BGA	VG7882PT+423GGA
Two-Way Push-Down-to-Close – 3/8 in. Union Sweat End Connections						
VG7271CT	1/2”	0.73	345	VG7271CT+423AGA	VG7271CT+423BGA	VG7271CT+423GGA
VG7271ET	1/2”	1.8	345	VG7271ET+423AGA	VG7271ET+423BGA	VG7271ET+423GGA
VG7271GT	1/2”	4.6	208	VG7271GT+423AGA	VG7271GT+423BGA	VG7271GT+423GGA
Two-Way Push-Down-to-Open – 3/8 in. Union Sweat End Connections						
VG7471CT	1/2”	0.73	345	VG7471CT+423AGA	VG7471CT+423BGA	VG7471CT+423GGA
VG7471ET	1/2”	1.8	345	VG7471ET+423AGA	VG7471ET+423BGA	VG7471ET+423GGA
VG7471GT	1/2”	4.6	173	VG7471GT+423AGA	VG7471GT+423BGA	VG7471GT+423GGA
Three-Way Mixing – 3/8 in. Union Sweat End Connections						
VG7872CT	1/2”	0.73	345 / 345	VG7872CT+423AGA	VG7872CT+423BGA	VG7872CT+423GGA
VG7872ET	1/2”	1.8	345 / 345	VG7872ET+423AGA	VG7872ET+423BGA	VG7872ET+423GGA
VG7872GT	1/2”	4.6	208 / 173	VG7872GT+423AGA	VG7872GT+423BGA	VG7872GT+423GGA
Two-Way Push-Down-to-Close – 3/4 in. Union Sweat End Connections						
VG7291CT	1/2”	0.73	345	VG7291CT+423AGA	VG7291CT+423BGA	VG7291CT+423GGA
VG7291ET	1/2”	1.8	345	VG7291ET+423AGA	VG7291ET+423BGA	VG7291ET+423GGA
VG7291GT	1/2”	4.6	208	VG7291GT+423AGA	VG7291GT+423BGA	VG7291GT+423GGA
Two-Way Push-Down-to-Open – 3/4 in. Union Sweat End Connections						
VG7491CT	1/2”	0.73	345	VG7491CT+423AGA	VG7491CT+423BGA	VG7491CT+423GGA
VG7491ET	1/2”	1.8	345	VG7491ET+423AGA	VG7491ET+423BGA	VG7491ET+423GGA
VG7491GT	1/2”	4.6	173	VG7491GT+423AGA	VG7491GT+423BGA	VG7491GT+423GGA
Three-Way Mixing – 3/4 in. Union Sweat End Connections						
VG7892CT	1/2”	0.73	345 / 345	VG7892CT+423AGA	VG7892CT+423BGA	VG7892CT+423GGA
VG7892ET	1/2”	1.8	345 / 345	VG7892ET+423AGA	VG7892ET+423BGA	VG7892ET+423GGA
VG7892GT	1/2”	4.6	208 / 173	VG7892GT+423AGA	VG7892GT+423BGA	VG7892GT+423GGA

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Brass Trim Globe Valves with VA-4233 Series Electric Actuators (Continued)

VG7000 Series Brass Trim Valve Assemblies with VA-4233 Series Electric Actuators and Two Auxiliary Switches (Part 1 of 2)

Actuator Code				VA-4233-AGC-2	VA-4233-BGC-2	VA-4233-GGC-2
Actuator Input				Floating	On/Off	0 to 10 VDC Proportional
Temperature Range				35 to 250°F (2 to 121°C), 15 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		
Two-Way Push-Down-to-Close – NPT End Connections						
VG7241CT	1/2”	0.73	345	VG7241CT+423AGC	VG7241CT+423BGC	VG7241CT+423GGC
VG7241ET	1/2”	1.8	345	VG7241ET+423AGC	VG7241ET+423BGC	VG7241ET+423GGC
VG7241GT	1/2”	4.6	208	VG7241GT+423AGC	VG7241GT+423BGC	VG7241GT+423GGC
VG7241LT	3/4”	7.3	132	VG7241LT+423AGC	VG7241LT+423BGC	VG7241LT+423GGC
VG7241NT	1”	11.6	63	VG7241NT+423AGC	VG7241NT+423BGC	VG7241NT+423GGC
VG7241PT	1-1/4”	18.5	38	VG7241PT+423AGC	VG7241PT+423BGC	VG7241PT+423GGC
Two-Way Push-Down-to-Open – NPT End Connections						
VG7441CT	1/2”	0.73	345	VG7441CT+423AGC	VG7441CT+423BGC	VG7441CT+423GGC
VG7441ET	1/2”	1.8	345	VG7441ET+423AGC	VG7441ET+423BGC	VG7441ET+423GGC
VG7441GT	1/2”	4.6	173	VG7441GT+423AGC	VG7441GT+423BGC	VG7441GT+423GGC
VG7441LT	3/4”	7.3	103	VG7441LT+423AGC	VG7441LT+423BGC	VG7441LT+423GGC
VG7441NT	1”	11.6	66	VG7441NT+423AGC	VG7441NT+423BGC	VG7441NT+423GGC
VG7441PT	1-1/4”	18.5	38	VG7441PT+423AGC	VG7441PT+423BGC	VG7441PT+423GGC
Three-Way Mixing – NPT End Connections						
VG7842CT	1/2”	0.73	345 / 345	VG7842CT+423AGC	VG7842CT+423BGC	VG7842CT+423GGC
VG7842ET	1/2”	1.8	345 / 345	VG7842ET+423AGC	VG7842ET+423BGC	VG7842ET+423GGC
VG7842GT	1/2”	4.6	208 / 173	VG7842GT+423AGC	VG7842GT+423BGC	VG7842GT+423GGC
VG7842LT	3/4”	7.3	132 / 103	VG7842LT+423AGC	VG7842LT+423BGC	VG7842LT+423GGC
VG7842NT	1”	11.6	63 / 66	VG7842NT+423AGC	VG7842NT+423BGC	VG7842NT+423GGC
VG7842PT	1-1/4”	18.5	38 / 38	VG7842PT+423AGC	VG7842PT+423BGC	VG7842PT+423GGC
Two-Way Push-Down-to-Close – Union Sweat End Connections						
VG7281CT	1/2”	0.73	345	VG7281CT+423AGC	VG7281CT+423BGC	VG7281CT+423GGC
VG7281ET	1/2”	1.8	345	VG7281ET+423AGC	VG7281ET+423BGC	VG7281ET+423GGC
VG7281GT	1/2”	4.6	208	VG7281GT+423AGC	VG7281GT+423BGC	VG7281GT+423GGC
VG7281LT	3/4”	7.3	132	VG7281LT+423AGC	VG7281LT+423BGC	VG7281LT+423GGC
VG7281NT	1”	11.6	63	VG7281NT+423AGC	VG7281NT+423BGC	VG7281NT+423GGC
VG7281PT	1-1/4”	18.5	38	VG7281PT+423AGC	VG7281PT+423BGC	VG7281PT+423GGC
Two-Way Push-Down-to-Open – Union Sweat End Connections						
VG7481CT	1/2”	0.73	345	VG7481CT+423AGC	VG7481CT+423BGC	VG7481CT+423GGC
VG7481ET	1/2”	1.8	345	VG7481ET+423AGC	VG7481ET+423BGC	VG7481ET+423GGC
VG7481GT	1/2”	4.6	173	VG7481GT+423AGC	VG7481GT+423BGC	VG7481GT+423GGC
VG7481LT	3/4”	7.3	103	VG7481LT+423AGC	VG7481LT+423BGC	VG7481LT+423GGC
VG7481NT	1”	11.6	66	VG7481NT+423AGC	VG7481NT+423BGC	VG7481NT+423GGC
VG7481PT	1-1/4”	18.5	38	VG7481PT+423AGC	VG7481PT+423BGC	VG7481PT+423GGC
Three-Way Mixing – Union Sweat End Connections						
VG7882CT	1/2”	0.73	345 / 345	VG7882CT+423AGC	VG7882CT+423BGC	VG7882CT+423GGC
VG7882ET	1/2”	1.8	345 / 345	VG7882ET+423AGC	VG7882ET+423BGC	VG7882ET+423GGC
VG7882GT	1/2”	4.6	208 / 173	VG7882GT+423AGC	VG7882GT+423BGC	VG7882GT+423GGC
VG7882LT	3/4”	7.3	132 / 103	VG7882LT+423AGC	VG7882LT+423BGC	VG7882LT+423GGC
VG7882NT	1”	11.6	63 / 66	VG7882NT+423AGC	VG7882NT+423BGC	VG7882NT+423GGC
VG7882PT	1-1/4”	18.5	38 / 38	VG7882PT+423AGC	VG7882PT+423BGC	VG7882PT+423GGC
Two-Way Push-Down-to-Close – 3/8 in. Union Sweat End Connections						
VG7271CT	1/2”	0.73	345	VG7271CT+423AGC	VG7271CT+423BGC	VG7271CT+423GGC
VG7271ET	1/2”	1.8	345	VG7271ET+423AGC	VG7271ET+423BGC	VG7271ET+423GGC
VG7271GT	1/2”	4.6	208	VG7271GT+423AGC	VG7271GT+423BGC	VG7271GT+423GGC
Two-Way Push-Down-to-Open – 3/8 in. Union Sweat End Connections						
VG7471CT	1/2”	0.73	345	VG7471CT+423AGC	VG7471CT+423BGC	VG7471CT+423GGC
VG7471ET	1/2”	1.8	345	VG7471ET+423AGC	VG7471ET+423BGC	VG7471ET+423GGC
VG7471GT	1/2”	4.6	173	VG7471GT+423AGC	VG7471GT+423BGC	VG7471GT+423GGC

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VG7000 Series Brass Trim Globe Valves with VA-4233 Series Electric Actuators (Continued)

VG7000 Series Brass Trim Valve Assemblies with VA-4233 Series Electric Actuators and Two Auxiliary Switches (Part 2 of 2)

Actuator Code				VA-4233-AGC-2	VA-4233-BGC-2	VA-4233-GGC-2
Actuator Input				Floating	On/Off	0 to 10 VDC Proportional
Temperature Range				35 to 250°F (2 to 121°C), 15 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		
Three-Way Mixing – 3/8 in. Union Sweat End Connections						
VG7872CT	1/2”	0.73	345 / 345	VG7872CT+423AGC	VG7872CT+423BGC	VG7872CT+423GGC
VG7872ET	1/2”	1.8	345 / 345	VG7872ET+423AGC	VG7872ET+423BGC	VG7872ET+423GGC
VG7872GT	1/2”	4.6	208 / 173	VG7872GT+423AGC	VG7872GT+423BGC	VG7872GT+423GGC
Two-Way Push-Down-to-Close – 3/4 in. Union Sweat End Connections						
VG7291CT	1/2”	0.73	345	VG7291CT+423AGC	VG7291CT+423BGC	VG7291CT+423GGC
VG7291ET	1/2”	1.8	345	VG7291ET+423AGC	VG7291ET+423BGC	VG7291ET+423GGC
VG7291GT	1/2”	4.6	208	VG7291GT+423AGC	VG7291GT+423BGC	VG7291GT+423GGC
Two-Way Push-Down-to-Open – 3/4 in. Union Sweat End Connections						
VG7491CT	1/2”	0.73	345	VG7491CT+423AGC	VG7491CT+423BGC	VG7491CT+423GGC
VG7491ET	1/2”	1.8	345	VG7491ET+423AGC	VG7491ET+423BGC	VG7491ET+423GGC
VG7491GT	1/2”	4.6	173	VG7491GT+423AGC	VG7491GT+423BGC	VG7491GT+423GGC
Three-Way Mixing – 3/4 in. Union Sweat End Connections						
VG7892CT	1/2”	0.73	345 / 345	VG7892CT+423AGC	VG7892CT+423BGC	VG7892CT+423GGC
VG7892ET	1/2”	1.8	345 / 345	VG7892ET+423AGC	VG7892ET+423BGC	VG7892ET+423GGC
VG7892GT	1/2”	4.6	208 / 173	VG7892GT+423AGC	VG7892GT+423BGC	VG7892GT+423GGC

Technical Specifications

VG7000 Brass Trim Globe Valves with VA4233 Series Spring Return Electric Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 250°F (2 to 121°C)
	Steam	15 psig (103 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
	Steam	15 psig (103 kPa) Saturated Steam at 250°F (121°C)
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves
	Steam	15 psig (103 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		-4 to 122°F (-20 to 50°C)
Actuator Input Signal	**VA-4233-AGx-2**	24 VAC or 24 VDC Three-Wire Floating Control
	VA-4233-BGx-2	24 VAC or 24 VDC Two-Wire On/Off Control
	VA-4233-GGx-2	0(2) to 10 VDC Proportional Control, 0 to 10 VDC Feedback
Actuator Power Requirements		24 VAC (20 to 30 VAC), 50/60 Hz, 12 VA Nominal
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Brass
	Seat	Brass Against Molded Elastomeric Disk
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

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VG7000 Series

LIT-1900084

Brass Trim Globe Valves with VA-715x Series Electric Actuators

Description

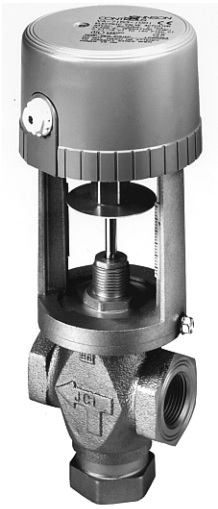
VG7000 Brass Trim Globe Valves with VA-715x Series Non-Spring Return Electric Actuator conrtrol hot or chilled water, or steam.

Features

- 90 lb force – provides tight closeoff
- direct coupled – no linkage required
- magnetic clutch – protects gearing, ensures tight closeoff
- controls – hot water, chilled water, or steam
- fits VG7000 valves 1/2 through 2 in.
- valve body static pressure rating: ANSI Class 250
- factory or field assembly
- voltage: 24 VAC, 50/60 Hz, 4.7 VA

Repair Information

If the VG7000 Brass Trim Globe Valve with VA-715x Series Non-Spring Return Electric Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



VA-715x Series Electric Actuator mounted on VG7842 Brass Globe Valve

Selection Chart

VG7000 Brass Trim Globe Valve with VA-715x Series Non-Spring Return Electric Actuator (Part 1 of 2)

Actuator Code				VA-7150-1001	VA-7153-1001	VA-7152-1001
Actuator Input				On/Off (Floating)	On/Off (Floating) with Feedback	0 to 10 VDC Proportional
Temperature Range				35 to 284°F Fluid Temperature, 38 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Non-Spring Return		
Two-Way Push-Down-to-Close – NPT End Connections						
VG7241CT	1/2”	0.73	345	VG7241CT+7150G	VG7241CT+7153G	VG7241CT+7152G
VG7241ET	1/2”	1.8	345	VG7241ET+7150G	VG7241ET+7153G	VG7241ET+7152G
VG7241GT	1/2”	4.6	216	VG7241GT+7150G	VG7241GT+7153G	VG7241GT+7152G
VG7241LT	3/4”	7.3	138	VG7241LT+7150G	VG7241LT+7153G	VG7241LT+7152G
VG7241NT	1”	11.6	86	VG7241NT+7150G	VG7241NT+7153G	VG7241NT+7152G
VG7241PT	1-1/4”	18.5	52	VG7241PT+7150G	VG7241PT+7153G	VG7241PT+7152G
VG7241RT	1-1/2”	28.9	34	VG7241RT+7150G	VG7241RT+7153G	VG7241RT+7152G
VG7241ST	2”	46.2	21	VG7241ST+7150G	VG7241ST+7153G	VG7241ST+7152G
Three-Way Mixing – NPT End Connections						
VG7842CT	1/2”	0.73	345 / 345	VG7842CT+7150G	VG7842CT+7153G	VG7842CT+7152G
VG7842ET	1/2”	1.8	345 / 345	VG7842ET+7150G	VG7842ET+7153G	VG7842ET+7152G
VG7842GT	1/2”	4.6	216 / 257	VG7842GT+7150G	VG7842GT+7153G	VG7842GT+7152G
VG7842LT	3/4”	7.3	138 / 153	VG7842LT+7150G	VG7842LT+7153G	VG7842LT+7152G
VG7842NT	1”	11.6	86 / 100	VG7842NT+7150G	VG7842NT+7153G	VG7842NT+7152G
VG7842PT	1-1/4”	18.5	52 / 57	VG7842PT+7150G	VG7842PT+7153G	VG7842PT+7152G
VG7842RT	1-1/2”	28.9	34 / 36	VG7842RT+7150G	VG7842RT+7153G	VG7842RT+7152G
VG7842ST	2”	46.2	21 / 22	VG7842ST+7150G	VG7842ST+7153G	VG7842ST+7152G
Two-Way Push-Down-to-Close – Union Sweat End Connections						
VG7281CT	1/2”	0.73	345	VG7281CT+7150G	VG7281CT+7153G	VG7281CT+7152G
VG7281ET	1/2”	1.8	345	VG7281ET+7150G	VG7281ET+7153G	VG7281ET+7152G
VG7281GT	1/2”	4.6	216	VG7281GT+7150G	VG7281GT+7153G	VG7281GT+7152G
VG7281LT	3/4”	7.3	138	VG7281LT+7150G	VG7281LT+7153G	VG7281LT+7152G
VG7281NT	1”	11.6	86	VG7281NT+7150G	VG7281NT+7153G	VG7281NT+7152G
VG7281PT	1-1/4”	18.5	52	VG7281PT+7150G	VG7281PT+7153G	VG7281PT+7152G
VG7281RT	1-1/2”	28.9	34	VG7281RT+7150G	VG7281RT+7153G	VG7281RT+7152G
VG7281ST	2”	46.2	21	VG7281ST+7150G	VG7281ST+7153G	VG7281ST+7152G

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VG7000 Series Brass Trim Globe Valves with VA-715x Series Electric Actuators (Continued)

VG7000 Brass Trim Globe Valve with VA-715x Series Non-Spring Return Electric Actuator (Part 2 of 2)

Actuator Code				VA-7150-1001	VA-7153-1001	VA-7152-1001
Actuator Input				On/Off (Floating)	On/Off (Floating) with Feedback	0 to 10 VDC Proportional
Temperature Range				35 to 284°F Fluid Temperature, 38 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Non-Spring Return		
Three-Way Mixing – Union Sweat End Connections						
VG7882CT	1/2”	0.73	345 / 345	VG7882CT+7150G	VG7882CT+7153G	VG7882CT+7152G
VG7882ET	1/2”	1.8	345 / 345	VG7882ET+7150G	VG7882ET+7153G	VG7882ET+7152G
VG7882GT	1/2”	4.6	216 / 257	VG7882GT+7150G	VG7882GT+7153G	VG7882GT+7152G
VG7882LT	3/4”	7.3	138 / 153	VG7882LT+7150G	VG7882LT+7153G	VG7882LT+7152G
VG7882NT	1”	11.6	86 / 100	VG7882NT+7150G	VG7882NT+7153G	VG7882NT+7152G
VG7882PT	1-1/4”	18.5	52 / 57	VG7882PT+7150G	VG7882PT+7153G	VG7882PT+7152G
VG7882RT	1-1/2”	28.9	34 / 36	VG7882RT+7150G	VG7882RT+7153G	VG7882RT+7152G
VG7882ST	2”	46.2	21 / 22	VG7882ST+7150G	VG7882ST+7153G	VG7882ST+7152G
Two-Way Push-Down-to-Close – 3/8 in. Union Sweat End Connections						
VG7271CT	1/2”	0.73	345	VG7271CT+7150G	VG7271CT+7153G	VG7271CT+7152G
VG7271ET	1/2”	1.8	345	VG7271ET+7150G	VG7271ET+7153G	VG7271ET+7152G
VG7271GT	1/2”	4.6	216	VG7271GT+7150G	VG7271GT+7153G	VG7271GT+7152G
Three-Way Mixing – 3/8 in. Union Sweat End Connections						
VG7872CT	1/2”	0.73	345 / 345	VG7872CT+7150G	VG7872CT+7153G	VG7872CT+7152G
VG7872ET	1/2”	1.8	345 / 345	VG7872ET+7150G	VG7872ET+7153G	VG7872ET+7152G
VG7872GT	1/2”	4.6	216 / 257	VG7872GT+7150G	VG7872GT+7153G	VG7872GT+7152G
Two-Way Push-Down-to-Close – 3/4 in. Union Sweat End Connections						
VG7291CT	1/2”	0.73	345	VG7291CT+7150G	VG7291CT+7153G	VG7291CT+7152G
VG7291ET	1/2”	1.8	345	VG7291ET+7150G	VG7291ET+7153G	VG7291ET+7152G
VG7291GT	1/2”	4.6	216	VG7291GT+7150G	VG7291GT+7153G	VG7291GT+7152G
Three-Way Mixing – 3/4 in. Union Sweat End Connections						
VG7892CT	1/2”	0.73	345 / 345	VG7892CT+7150G	VG7892CT+7153G	VG7892CT+7152G
VG7892ET	1/2”	1.8	345 / 345	VG7892ET+7150G	VG7892ET+7153G	VG7892ET+7152G
VG7892GT	1/2”	4.6	216 / 257	VG7892GT+7150G	VG7892GT+7153G	VG7892GT+7152G
Two-Way Push-Down-to-Close – Union Globe End Connections						
VG7251CT	1/2”	0.73	345	VG7251CT+7150G	VG7251CT+7153G	VG7251CT+7152G
VG7251ET	1/2”	1.8	345	VG7251ET+7150G	VG7251ET+7153G	VG7251ET+7152G
VG7251GT	1/2”	4.6	216	VG7251GT+7150G	VG7251GT+7153G	VG7251GT+7152G
VG7251LT	3/4”	7.3	138	VG7251LT+7150G	VG7251LT+7153G	VG7251LT+7152G
VG7251NT	1”	11.6	86	VG7251NT+7150G	VG7251NT+7153G	VG7251NT+7152G
VG7251PT	1-1/4”	18.5	52	VG7251PT+7150G	VG7251PT+7153G	VG7251PT+7152G
VG7251RT	1-1/2”	28.9	34	VG7251RT+7150G	VG7251RT+7153G	VG7251RT+7152G
Two-Way Push-Down-to-Close – Union Angle End Connections						
VG7551CT	1/2”	0.73	345	VG7551CT+7150G	VG7551CT+7153G	VG7551CT+7152G
VG7551ET	1/2”	1.8	345	VG7551ET+7150G	VG7551ET+7153G	VG7551ET+7152G
VG7551GT	1/2”	4.6	216	VG7551GT+7150G	VG7551GT+7153G	VG7551GT+7152G
VG7551LT	3/4”	7.3	138	VG7551LT+7150G	VG7551LT+7153G	VG7551LT+7152G
VG7551NT	1”	11.6	86	VG7551NT+7150G	VG7551NT+7153G	VG7551NT+7152G
VG7551PT	1-1/4”	18.5	52	VG7551PT+7150G	VG7551PT+7153G	VG7551PT+7152G
VG7551RT	1-1/2”	28.9	34	VG7551RT+7150G	VG7551RT+7153G	VG7551RT+7152G

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Brass Trim Globe Valves with VA-715x Series Electric Actuators (Continued)

Technical Specifications

VG7000 Brass Trim Globe Valves with VA-715x Series Non-Spring Return Electric Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 284°F (2 to 140°C)
	Steam	38 psig (262 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
	Steam	38 psig (262 kPa) Saturated Steam at 284°F (140°C)
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	15 psig (103 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		0 to 140°F (-18 to 60°C)
Actuator Input Signal	**VA-7150-1001**	24 VAC Three-Wire Floating Control
	VA-7152-1001	0 to 10 VDC Proportional Control
	VA-7153-1001	24 VAC Three-Wire Floating Control with 0 to 2000 ohm feedback potentiometer for 25/32 in. valve stroke
Actuator Power Requirements	**VA-7150-1001**	24 VAC (20 to 30 VAC), 50/60 Hz, 2.7 VA Nominal
	VA-7152-1001	24 VAC (20 to 30 VAC), 50/60 Hz, 4.7 VA Nominal
	VA-7153-1001	24 VAC (20 to 30 VAC), 50/60 Hz, 2.7 VA Nominal
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Brass
	Seat	Brass Against Molded Elastomeric Disk
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900085

Brass Trim Globe Valves with VA-720x Series Electric Actuators

Description

VG7000 Brass Trim Globe Valves with VA-720x Series Electric Actuator conrtrol hot or chilled water, or steam.

Features

- 180 lb force – provides tight closeoff
- direct coupled – no linkage required
- magnetic clutch – protects gearing, ensures tight closeoff
- controls – hot water, chilled water, or steam
- fits VG7000 valves 1/2 through 2 in.
- valve body static pressure rating: ANSI Class 250
- factory or field assembly
- voltage: 24 VAC, 50/60 Hz, 8.7 VA

Repair Information

If the VG7000 Brass Trim Globe Valve with VA-720x Series Non-Spring Return Electric Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



VA-720x Series Electric Actuator mounted on VG7842 Brass Globe Valve

Selection ChartT

VG7000 Brass Trim Globe Valve with VA-720x Series Non-Spring Return Electric Actuator

Actuator Code				VA-7200-1001	VA-7203-1001	VA-7202-1001
Actuator Input				On/Off (Floating)	On/Off (Floating) with Feedback	0 to 10 VDC Proportional
Temperature Range				35 to 284°F Fluid Temperature, 38 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Non-Spring Return		
Two-Way Push-Down-to-Close – NPT End Connections						
VG7241NT	1”	11.6	179	VG7241NT+7200G	VG7241NT+7203G	VG7241NT+7202G
VG7241PT	1-1/4”	18.5	109	VG7241PT+7200G	VG7241PT+7203G	VG7241PT+7202G
VG7241RT	1-1/2”	28.9	70	VG7241RT+7200G	VG7241RT+7203G	VG7241RT+7202G
VG7241ST	2”	46.2	45	VG7241ST+7200G	VG7241ST+7203G	VG7241ST+7202G
Three-Way Mixing – NPT End Connections						
VG7842NT	1”	11.6	179 / 209	VG7842NT+7200G	VG7842NT+7203G	VG7842NT+7202G
VG7842PT	1-1/4”	18.5	109 / 120	VG7842PT+7200G	VG7842PT+7203G	VG7842PT+7202G
VG7842RT	1-1/2”	28.9	70 / 74	VG7842RT+7200G	VG7842RT+7203G	VG7842RT+7202G
VG7842ST	2”	46.2	45 / 46	VG7842ST+7200G	VG7842ST+7203G	VG7842ST+7202G
Two-Way Push-Down-to-Close – Union Sweat End Connections						
VG7281NT	1”	11.6	179	VG7281NT+7200G	VG7281NT+7203G	VG7281NT+7202G
VG7281PT	1-1/4”	18.5	109	VG7281PT+7200G	VG7281PT+7203G	VG7281PT+7202G
VG7281RT	1-1/2”	28.9	70	VG7281RT+7200G	VG7281RT+7203G	VG7281RT+7202G
VG7281ST	2”	46.2	45	VG7281ST+7200G	VG7281ST+7203G	VG7281ST+7202G
Three-Way Mixing – Union Sweat End Connections						
VG7882NT	1”	11.6	179 / 209	VG7882NT+7200G	VG7882NT+7203G	VG7882NT+7202G
VG7882PT	1-1/4”	18.5	109 / 120	VG7882PT+7200G	VG7882PT+7203G	VG7882PT+7202G
VG7882RT	1-1/2”	28.9	70 / 74	VG7882RT+7200G	VG7882RT+7203G	VG7882RT+7202G
VG7882ST	2”	46.2	45 / 46	VG7882ST+7200G	VG7882ST+7203G	VG7882ST+7202G
Two-Way Push-Down-to-Close – Union Globe End Connections						
VG7251NT	1”	11.6	179	VG7251NT+7200G	VG7251NT+7203G	VG7251NT+7202G
VG7251PT	1-1/4”	18.5	109	VG7251PT+7200G	VG7251PT+7203G	VG7251PT+7202G
VG7251RT	1-1/2”	28.9	70	VG7251RT+7200G	VG7251RT+7203G	VG7251RT+7202G
Two-Way Push-Down-to-Close – Union Angle End Connections						
VG7551NT	1”	11.6	179	VG7551NT+7200G	VG7551NT+7203G	VG7551NT+7202G
VG7551PT	1-1/4”	18.5	109	VG7551PT+7200G	VG7551PT+7203G	VG7551PT+7202G
VG7551RT	1-1/2”	28.9	70	VG7551RT+7200G	VG7551RT+7203G	VG7551RT+7202G

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VG7000 Series Brass Trim Globe Valves with VA-720x Series Electric Actuators (Continued)

Technical Specifications

VG7000 Brass Trim Globe Valves with VA-720x Series Non-Spring Return Electric Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 284°F (2 to 140°C)
	Steam	38 psig (262 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
	Steam	38 psig (262 kPa) Saturated Steam at 284°F (140°C)
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	15 psig (103 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		23 to 131°F (-5 to 55°C)
Actuator Input Signal	**VA-7200-1001**	24 VAC Three-Wire Floating Control
	VA-7202-1001	0 to 10 VDC Proportional Control
	VA-703-1001	24 VAC Three-Wire Floating Control with 0 to 2000 ohm feedback potentiometer for 25/32 in. valve stroke
Actuator Power Requirements	**VA-7200-1001**	24 VAC (20 to 30 VAC), 50/60 Hz, 6.7 VA Nominal
	VA-7202-1001	24 VAC (20 to 30 VAC), 50/60 Hz, 8.7 VA Nominal
	VA-703-1001	24 VAC (20 to 30 VAC), 50/60 Hz, 6.7 VA Nominal
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Brass
	Seat	Brass Against Molded Elastomeric Disk
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900086

Brass Trim Globe Valves with M9216 Series Electric Actuators

Description

VG7000 Brass Trim Globe Valves with M9216 Series Electric Actuator conrtrol hot or chilled water, or steam.

Features

- spring return – stem up or stem down
- 180 lb force – provides tight closeoff
- manual opener
- fits VG7000 valves 1/2 through 2 in.
- valve body static pressure rating: ANSI Class 250
- optional auxiliary switches available
- factory or field assembly
- voltage : 20 to 30 VAC, 50/60 Hz, 12 VA

Repair Information

If the VG7000 Brass Trim Globe Valve with M9216 Series Spring Return Electric Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



M9216 Electric Actuator with M9000-500 linkage mounted on VG7842 Brass Globe Valve

Selection Charts

VG7000 Brass Trim Globe Valve with M9216 Series Spring Return Electric Actuator, Less Auxiliary Switches (Part 1 of 2)

Actuator Code				M9216-AGA-2	M9216-HGA-2	M9216-AGA-2	M9216-HGA-2
Actuator Input				On/Off (Floating)	0 to 10 VDC Proportional	On/Off (Floating)	0 to 10 VDC Proportional
Temperature Range				35 to 284°F Fluid Temperature, 38 psig Saturated Steam			
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		Spring Return – Stem Down	
Two-Way Push-Down-to-Close – NPT End Connections							
VG7241CT	1/2”	0.73	345	VG7241CT+926AGA	VG7241CT+926HGA	VG7241CT+946AGA	VG7241CT+946HGA
VG7241ET	1/2”	1.8	345	VG7241ET+926AGA	VG7241ET+926HGA	VG7241ET+946AGA	VG7241ET+946HGA
VG7241GT	1/2”	4.6	345	VG7241GT+926AGA	VG7241GT+926HGA	VG7241GT+946AGA	VG7241GT+946HGA
VG7241LT	3/4”	7.3	289	VG7241LT+926AGA	VG7241LT+926HGA	VG7241LT+946AGA	VG7241LT+946HGA
VG7241NT	1”	11.6	182	VG7241NT+926AGA	VG7241NT+926HGA	VG7241NT+946AGA	VG7241NT+946HGA
VG7241PT	1-1/4”	18.5	111	VG7241PT+926AGA	VG7241PT+926HGA	VG7241PT+946AGA	VG7241PT+946HGA
VG7241RT	1-1/2”	28.9	71	VG7241RT+926AGA	VG7241RT+926HGA	VG7241RT+946AGA	VG7241RT+946HGA
VG7241ST	2”	46.2	46	VG7241ST+926AGA	VG7241ST+926HGA	VG7241ST+946AGA	VG7241ST+946HGA
Three-Way Mixing – NPT End Connections							
VG7842CT	1/2”	0.73	345 / 345	VG7842CT+926AGA	VG7842CT+926HGA	VG7842CT+946AGA	VG7842CT+946HGA
VG7842ET	1/2”	1.8	345 / 345	VG7842ET+926AGA	VG7842ET+926HGA	VG7842ET+946AGA	VG7842ET+946HGA
VG7842GT	1/2”	4.6	345 / 345	VG7842GT+926AGA	VG7842GT+926HGA	VG7842GT+946AGA	VG7842GT+946HGA
VG7842LT	3/4”	7.3	289 / 321	VG7842LT+926AGA	VG7842LT+926HGA	VG7842LT+946AGA	VG7842LT+946HGA
VG7842NT	1”	11.6	182 / 213	VG7842NT+926AGA	VG7842NT+926HGA	VG7842NT+946AGA	VG7842NT+946HGA
VG7842PT	1-1/4”	18.5	111 / 122	VG7842PT+926AGA	VG7842PT+926HGA	VG7842PT+946AGA	VG7842PT+946HGA
VG7842RT	1-1/2”	28.9	71 / 76	VG7842RT+926AGA	VG7842RT+926HGA	VG7842RT+946AGA	VG7842RT+946HGA
VG7842ST	2”	46.2	46 / 47	VG7842ST+926AGA	VG7842ST+926HGA	VG7842ST+946AGA	VG7842ST+946HGA
Two-Way Push-Down-to-Close – Union Sweat End Connections							
VG7281CT	1/2”	0.73	345	VG7281CT+926AGA	VG7281CT+926HGA	VG7281CT+946AGA	VG7281CT+946HGA
VG7281ET	1/2”	1.8	345	VG7281ET+926AGA	VG7281ET+926HGA	VG7281ET+946AGA	VG7281ET+946HGA
VG7281GT	1/2”	4.6	345	VG7281GT+926AGA	VG7281GT+926HGA	VG7281GT+946AGA	VG7281GT+946HGA
VG7281LT	3/4”	7.3	289	VG7281LT+926AGA	VG7281LT+926HGA	VG7281LT+946AGA	VG7281LT+946HGA
VG7281NT	1”	11.6	182	VG7281NT+926AGA	VG7281NT+926HGA	VG7281NT+946AGA	VG7281NT+946HGA
VG7281PT	1-1/4”	18.5	111	VG7281PT+926AGA	VG7281PT+926HGA	VG7281PT+946AGA	VG7281PT+946HGA
VG7281RT	1-1/2”	28.9	71	VG7281RT+926AGA	VG7281RT+926HGA	VG7281RT+946AGA	VG7281RT+946HGA
VG7281ST	2”	46.2	46	VG7281ST+926AGA	VG7281ST+926HGA	VG7281ST+946AGA	VG7281ST+946HGA

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VG7000 Series Brass Trim Globe Valves with M9216 Series Electric Actuators (Continued)

VG7000 Brass Trim Globe Valve with M9216 Series Spring Return Electric Actuator, Less Auxiliary Switches (Part 2 of 2)

Actuator Code				M9216-AGA-2	M9216-HGA-2	M9216-AGA-2	M9216-HGA-2
Actuator Input				On/Off (Floating)	0 to 10 VDC Proportional	On/Off (Floating)	0 to 10 VDC Proportional
Temperature Range				35 to 284°F Fluid Temperature, 38 psig Saturated Steam			
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		Spring Return – Stem Down	
Three-Way Mixing – Union Sweat End Connections							
VG7882CT	1/2”	0.73	345 / 345	VG7882CT+926AGA	VG7882CT+926HGA	VG7882CT+946AGA	VG7882CT+946HGA
VG7882ET	1/2”	1.8	345 / 345	VG7882ET+926AGA	VG7882ET+926HGA	VG7882ET+946AGA	VG7882ET+946HGA
VG7882GT	1/2”	4.6	345 / 345	VG7882GT+926AGA	VG7882GT+926HGA	VG7882GT+946AGA	VG7882GT+946HGA
VG7882LT	3/4”	7.3	289 / 321	VG7882LT+926AGA	VG7882LT+926HGA	VG7882LT+946AGA	VG7882LT+946HGA
VG7882NT	1”	11.6	182 / 213	VG7882NT+926AGA	VG7882NT+926HGA	VG7882NT+946AGA	VG7882NT+946HGA
VG7882PT	1-1/4”	18.5	111 / 122	VG7882PT+926AGA	VG7882PT+926HGA	VG7882PT+946AGA	VG7882PT+946HGA
VG7882RT	1-1/2”	28.9	71 / 76	VG7882RT+926AGA	VG7882RT+926HGA	VG7882RT+946AGA	VG7882RT+946HGA
VG7882ST	2”	46.2	46 / 47	VG7882ST+926AGA	VG7882ST+926HGA	VG7882ST+946AGA	VG7882ST+946HGA
Two-Way Push-Down-to-Close – 3/8 in. Union Sweat End Connections							
VG7271CT	1/2”	0.73	345	VG7271CT+926AGA	VG7271CT+926HGA	VG7271CT+946AGA	VG7271CT+946HGA
VG7271ET	1/2”	1.8	345	VG7271ET+926AGA	VG7271ET+926HGA	VG7271ET+946AGA	VG7271ET+946HGA
VG7271GT	1/2”	4.6	345	VG7271GT+926AGA	VG7271GT+926HGA	VG7271GT+946AGA	VG7271GT+946HGA
Three-Way Mixing – 3/8 in. Union Sweat End Connections							
VG7872CT	1/2”	0.73	345 / 345	VG7872CT+926AGA	VG7872CT+926HGA	VG7872CT+946AGA	VG7872CT+946HGA
VG7872ET	1/2”	1.8	345 / 345	VG7872ET+926AGA	VG7872ET+926HGA	VG7872ET+946AGA	VG7872ET+946HGA
VG7872GT	1/2”	4.6	345 / 345	VG7872GT+926AGA	VG7872GT+926HGA	VG7872GT+946AGA	VG7872GT+946HGA
Two-Way Push-Down-to-Close – 3/4 in. Union Sweat End Connections							
VG7291CT	1/2”	0.73	345	VG7291CT+926AGA	VG7291CT+926HGA	VG7291CT+946AGA	VG7291CT+946HGA
VG7291ET	1/2”	1.8	345	VG7291ET+926AGA	VG7291ET+926HGA	VG7291ET+946AGA	VG7291ET+946HGA
VG7291GT	1/2”	4.6	345	VG7291GT+926AGA	VG7291GT+926HGA	VG7291GT+946AGA	VG7291GT+946HGA
Three-Way Mixing – 3/4 in. Union Sweat End Connections							
VG7892CT	1/2”	0.73	345 / 345	VG7892CT+926AGA	VG7892CT+926HGA	VG7892CT+946AGA	VG7892CT+946HGA
VG7892ET	1/2”	1.8	345 / 345	VG7892ET+926AGA	VG7892ET+926HGA	VG7892ET+946AGA	VG7892ET+946HGA
VG7892GT	1/2”	4.6	345 / 345	VG7892GT+926AGA	VG7892GT+926HGA	VG7892GT+946AGA	VG7892GT+946HGA

VG7000 Brass Trim Globe Valve with M9216 Series Spring Return Electric Actuator, and Two Auxiliary Switches (Part 1 of 2)

Actuator Code				M9216-AGC-2	M9216-HGC-2	M9216-AGC-2	M9216-HGC-2
Actuator Input				On/Off (Floating)	0 to 10 VDC Proportional	On/Off (Floating)	0 to 10 VDC Proportional
Temperature Range				35 to 284°F Fluid Temperature, 38 psig Saturated Steam			
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		Spring Return – Stem Down	
Two-Way Push-Down-to-Close – NPT End Connections							
VG7241CT	1/2”	0.73	345	VG7241CT+926AGC	VG7241CT+926HGC	VG7241CT+946AGC	VG7241CT+946HGC
VG7241ET	1/2”	1.8	345	VG7241ET+926AGC	VG7241ET+926HGC	VG7241ET+946AGC	VG7241ET+946HGC
VG7241GT	1/2”	4.6	345	VG7241GT+926AGC	VG7241GT+926HGC	VG7241GT+946AGC	VG7241GT+946HGC
VG7241LT	3/4”	7.3	289	VG7241LT+926AGC	VG7241LT+926HGC	VG7241LT+946AGC	VG7241LT+946HGC
VG7241NT	1”	11.6	182	VG7241NT+926AGC	VG7241NT+926HGC	VG7241NT+946AGC	VG7241NT+946HGC
VG7241PT	1-1/4”	18.5	111	VG7241PT+926AGC	VG7241PT+926HGC	VG7241PT+946AGC	VG7241PT+946HGC
VG7241RT	1-1/2”	28.9	71	VG7241RT+926AGC	VG7241RT+926HGC	VG7241RT+946AGC	VG7241RT+946HGC
VG7241ST	2”	46.2	46	VG7241ST+926AGC	VG7241ST+926HGC	VG7241ST+946AGC	VG7241ST+946HGC
Three-Way Mixing – NPT End Connections							
VG7842CT	1/2”	0.73	345 / 345	VG7842CT+926AGC	VG7842CT+926HGC	VG7842CT+946AGC	VG7842CT+946HGC
VG7842ET	1/2”	1.8	345 / 345	VG7842ET+926AGC	VG7842ET+926HGC	VG7842ET+946AGC	VG7842ET+946HGC
VG7842GT	1/2”	4.6	345 / 345	VG7842GT+926AGC	VG7842GT+926HGC	VG7842GT+946AGC	VG7842GT+946HGC
VG7842LT	3/4”	7.3	289 / 321	VG7842LT+926AGC	VG7842LT+926HGC	VG7842LT+946AGC	VG7842LT+946HGC
VG7842NT	1”	11.6	182 / 213	VG7842NT+926AGC	VG7842NT+926HGC	VG7842NT+946AGC	VG7842NT+946HGC
VG7842PT	1-1/4”	18.5	111 / 122	VG7842PT+926AGC	VG7842PT+926HGC	VG7842PT+946AGC	VG7842PT+946HGC
VG7842RT	1-1/2”	28.9	71 / 76	VG7842RT+926AGC	VG7842RT+926HGC	VG7842RT+946AGC	VG7842RT+946HGC
VG7842ST	2”	46.2	46 / 47	VG7842ST+926AGC	VG7842ST+926HGC	VG7842ST+946AGC	VG7842ST+946HGC

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Brass Trim Globe Valves with M9216 Series Electric Actuators (Continued)

VG7000 Brass Trim Globe Valve with M9216 Series Spring Return Electric Actuator, and Two Auxiliary Switches (Part 2 of 2)

Actuator Code				M9216-AGC-2	M9216-HGC-2	M9216-AGC-2	M9216-HGC-2
Actuator Input				On/Off (Floating)	0 to 10 VDC Proportional	On/Off (Floating)	0 to 10 VDC Proportional
Temperature Range				35 to 284°F Fluid Temperature, 38 psig Saturated Steam			
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		Spring Return – Stem Down	
Two-Way Push-Down-to-Close – Union Sweat End Connections							
VG7281CT	1/2”	0.73	345	VG7281CT+926AGC	VG7281CT+926HGC	VG7281CT+946AGC	VG7281CT+946HGC
VG7281ET	1/2”	1.8	345	VG7281ET+926AGC	VG7281ET+926HGC	VG7281ET+946AGC	VG7281ET+946HGC
VG7281GT	1/2”	4.6	345	VG7281GT+926AGC	VG7281GT+926HGC	VG7281GT+946AGC	VG7281GT+946HGC
VG7281LT	3/4”	7.3	289	VG7281LT+926AGC	VG7281LT+926HGC	VG7281LT+946AGC	VG7281LT+946HGC
VG7281NT	1”	11.6	182	VG7281NT+926AGC	VG7281NT+926HGC	VG7281NT+946AGC	VG7281NT+946HGC
VG7281PT	1-1/4”	18.5	111	VG7281PT+926AGC	VG7281PT+926HGC	VG7281PT+946AGC	VG7281PT+946HGC
VG7281RT	1-1/2”	28.9	71	VG7281RT+926AGC	VG7281RT+926HGC	VG7281RT+946AGC	VG7281RT+946HGC
VG7281ST	2”	46.2	46	VG7281ST+926AGC	VG7281ST+926HGC	VG7281ST+946AGC	VG7281ST+946HGC
Three-Way Mixing – Union Sweat End Connections							
VG7882CT	1/2”	0.73	345 / 345	VG7882CT+926AGC	VG7882CT+926HGC	VG7882CT+946AGC	VG7882CT+946HGC
VG7882ET	1/2”	1.8	345 / 345	VG7882ET+926AGC	VG7882ET+926HGC	VG7882ET+946AGC	VG7882ET+946HGC
VG7882GT	1/2”	4.6	345 / 345	VG7882GT+926AGC	VG7882GT+926HGC	VG7882GT+946AGC	VG7882GT+946HGC
VG7882LT	3/4”	7.3	289 / 321	VG7882LT+926AGC	VG7882LT+926HGC	VG7882LT+946AGC	VG7882LT+946HGC
VG7882NT	1”	11.6	182 / 213	VG7882NT+926AGC	VG7882NT+926HGC	VG7882NT+946AGC	VG7882NT+946HGC
VG7882PT	1-1/4”	18.5	111 / 122	VG7882PT+926AGC	VG7882PT+926HGC	VG7882PT+946AGC	VG7882PT+946HGC
VG7882RT	1-1/2”	28.9	71 / 76	VG7882RT+926AGC	VG7882RT+926HGC	VG7882RT+946AGC	VG7882RT+946HGC
VG7882ST	2”	46.2	46 / 47	VG7882ST+926AGC	VG7882ST+926HGC	VG7882ST+946AGC	VG7882ST+946HGC
Two-Way Push-Down-to-Close – 3/8 in. Union Sweat End Connections							
VG7271CT	1/2”	0.73	345	VG7271CT+926AGC	VG7271CT+926HGC	VG7271CT+946AGC	VG7271CT+946HGC
VG7271ET	1/2”	1.8	345	VG7271ET+926AGC	VG7271ET+926HGC	VG7271ET+946AGC	VG7271ET+946HGC
VG7271GT	1/2”	4.6	345	VG7271GT+926AGC	VG7271GT+926HGC	VG7271GT+946AGC	VG7271GT+946HGC
Three-Way Mixing – 3/8 in. Union Sweat End Connections							
VG7872CT	1/2”	0.73	345 / 345	VG7872CT+926AGC	VG7872CT+926HGC	VG7872CT+946AGC	VG7872CT+946HGC
VG7872ET	1/2”	1.8	345 / 345	VG7872ET+926AGC	VG7872ET+926HGC	VG7872ET+946AGC	VG7872ET+946HGC
VG7872GT	1/2”	4.6	345 / 345	VG7872GT+926AGC	VG7872GT+926HGC	VG7872GT+946AGC	VG7872GT+946HGC
Two-Way Push-Down-to-Close – 3/4 in. Union Sweat End Connections							
VG7291CT	1/2”	0.73	345	VG7291CT+926AGC	VG7291CT+926HGC	VG7291CT+946AGC	VG7291CT+946HGC
VG7291ET	1/2”	1.8	345	VG7291ET+926AGC	VG7291ET+926HGC	VG7291ET+946AGC	VG7291ET+946HGC
VG7291GT	1/2”	4.6	345	VG7291GT+926AGC	VG7291GT+926HGC	VG7291GT+946AGC	VG7291GT+946HGC
Three-Way Mixing – 3/4 in. Union Sweat End Connections							
VG7892CT	1/2”	0.73	345 / 345	VG7892CT+926AGC	VG7892CT+926HGC	VG7892CT+946AGC	VG7892CT+946HGC
VG7892ET	1/2”	1.8	345 / 345	VG7892ET+926AGC	VG7892ET+926HGC	VG7892ET+946AGC	VG7892ET+946HGC
VG7892GT	1/2”	4.6	345 / 345	VG7892GT+926AGC	VG7892GT+926HGC	VG7892GT+946AGC	VG7892GT+946HGC

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Brass Trim Globe Valves with M9216 Series Electric Actuators (Continued)

Technical Specifications

VG7000 Brass Trim Globe Valves with M9216 Series Spring Return Electric Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 284°F (2 to 140°C)
	Steam	38 psig (262 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
	Steam	38 psig (262 kPa) Saturated Steam at 284°F (140°C)
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	15 psig (103 kPa)r
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		-4 to 122°F (-20 to 50°C)
Actuator Input Signal	**M9216-AGx-2**	24 VAC Three-Wire Floating Control
	M9216HGx-2	0 to 10 VDC Proportional Control, 0 to 10 VDC Feedback
Actuator Power Requirements		24 VAC (20 to 30 VAC), 50/60 Hz, 12 VA Nominal
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Brass
	Seat	Brass Against Molded Elastomeric Disk
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900124

Stainless Steel Trim Globe Valves with VA-4233 Series Electric Actuators

Description

VG7000 Series Stainless Steel Trim Globe Valves with VA-4233 Series Electric Actuator control hot or chilled water, or steam.

Features

- spring return – stem up
- 61 lb force – provides tight shutoff
- packing – spring-loaded PTFE and elastomer V-rings
- manual opener
- fits VG7000 valves 1/2 through 1-1/4 in.
- valve body static pressure rating: ANSI Class 250
- optional auxiliary switches available
- factory or field assembly
- voltage: 20 to 30 VAC, 50/60 Hz, 12 VA

Repair Information

If the VG7000 Series Stainless Steel Trim Globe Valve with VA-4233 Series Electric Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



VA-4233 Electric Actuator mounted on VG7441 Brass Globe Valve

Selection Charts

VG7000 Series Valve Assemblies with VA-4233 Series Electric Actuators, Less Auxiliary Switches

Actuator Code				VA-4233-AGA-2	VA-4233-BGA-2	VA-4233-GGA-2
Actuator Input				Floating	On/Off	0 to 10 VDC - Proportional
Temperature Range				35 to 250°F (2 to 121°C), 15 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		
Two-Way Push-Down-to-Close – NPT End Connections						
VG7243CT	1/2”	0.73	230	VG7243CT+423AGA	VG7243CT+423BGA	VG7243CT+423GGA
VG7243ET	1/2”	1.8	230	VG7243ET+423AGA	VG7243ET+423BGA	VG7243ET+423GGA
VG7243GT	1/2”	4.6	130	VG7243GT+423AGA	VG7243GT+423BGA	VG7243GT+423GGA
VG7243LT	3/4”	7.3	82	VG7243LT+423AGA	VG7243LT+423BGA	VG7243LT+423GGA
VG7243NT	1”	11.6	39	VG7243NT+423AGA	VG7243NT+423BGA	VG7243NT+423GGA
VG7243PT	1-1/4”	18.5	24	VG7243PT+423AGA	VG7243PT+423BGA	VG7243PT+423GGA
Two-Way Push-Down-to-Open – NPT End Connections						
VG7443CT	1/2”	0.73	224	VG7443CT+423AGA	VG7443CT+423BGA	VG7443CT+423GGA
VG7443ET	1/2”	1.8	224	VG7443ET+423AGA	VG7443ET+423BGA	VG7443ET+423GGA
VG7443GT	1/2”	4.6	108	VG7443GT+423AGA	VG7443GT+423BGA	VG7443GT+423GGA
VG7443LT	3/4”	7.3	64	VG7443LT+423AGA	VG7443LT+423BGA	VG7443LT+423GGA
VG7443NT	1”	11.6	41	VG7443NT+423AGA	VG7443NT+423BGA	VG7443NT+423GGA
VG7443PT	1-1/4”	18.5	24	VG7443PT+423AGA	VG7443PT+423BGA	VG7443PT+423GGA
Three-Way Mixing – NPT End Connections						
VG7844CT	1/2”	0.73	230 / 224	VG7844CT+423AGA	VG7844CT+423BGA	VG7844CT+423GGA
VG7844ET	1/2”	1.8	230 / 224	VG7844ET+423AGA	VG7844ET+423BGA	VG7844ET+423GGA
VG7844GT	1/2”	4.6	130 / 108	VG7844GT+423AGA	VG7844GT+423BGA	VG7844GT+423GGA
VG7844LT	3/4”	7.3	82 / 64	VG7844LT+423AGA	VG7844LT+423BGA	VG7844LT+423GGA
VG7844NT	1”	11.6	39 / 41	VG7844NT+423AGA	VG7844NT+423BGA	VG7844NT+423GGA
VG7844PT	1-1/4”	18.5	24 / 24	VG7844PT+423AGA	VG7844PT+423BGA	VG7844PT+423GGA

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Stainless Steel Trim Globe Valves with VA-4233 Series Electric Actuators (Continued)

VG7000 Series Valve Assemblies with VA-4233 Series Electric Actuators and Two Auxiliary Switches

Actuator Code				VA-4233-AGC-2	VA-4233-BGC-2	VA-4233-GGC-2
Actuator Input				Floating	On/Off	0 to 10 VDC - Proportional
Temperature Range				35 to 250°F (2 to 121°C), 15 psig Saturated Steam		
Actuator Code				VA-4233-AGC-2	VA-4233-BGC-2	VA-4233-GGC-2
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		
Two-Way Push-Down-to-Close – NPT End Connections						
VG7243CT	1/2”	0.73	230	VG7243CT+423AGC	VG7243CT+423BGC	VG7243CT+423GGC
VG7243ET	1/2”	1.8	230	VG7243ET+423AGC	VG7243ET+423BGC	VG7243ET+423GGC
VG7243GT	1/2”	4.6	130	VG7243GT+423AGC	VG7243GT+423BGC	VG7243GT+423GGC
VG7243LT	3/4”	7.3	82	VG7243LT+423AGC	VG7243LT+423BGC	VG7243LT+423GGC
VG7243NT	1”	11.6	39	VG7243NT+423AGC	VG7243NT+423BGC	VG7243NT+423GGC
VG7243PT	1-1/4”	18.5	24	VG7243PT+423AGC	VG7243PT+423BGC	VG7243PT+423GGC
Two-Way Push-Down-to-Open – NPT End Connections						
VG7443CT	1/2”	0.73	224	VG7443CT+423AGC	VG7443CT+423BGC	VG7443CT+423GGC
VG7443ET	1/2”	1.8	224	VG7443ET+423AGC	VG7443ET+423BGC	VG7443ET+423GGC
VG7443GT	1/2”	4.6	108	VG7443GT+423AGC	VG7443GT+423BGC	VG7443GT+423GGC
VG7443LT	3/4”	7.3	64	VG7443LT+423AGC	VG7443LT+423BGC	VG7443LT+423GGC
VG7443NT	1”	11.6	41	VG7443NT+423AGC	VG7443NT+423BGC	VG7443NT+423GGC
VG7443PT	1-1/4”	18.5	24	VG7443PT+423AGC	VG7443PT+423BGC	VG7443PT+423GGC
Three-Way Mixing – NPT End Connections						
VG7844CT	1/2”	0.73	230 / 224	VG7844CT+423AGC	VG7844CT+423BGC	VG7844CT+423GGC
VG7844ET	1/2”	1.8	230 / 224	VG7844ET+423AGC	VG7844ET+423BGC	VG7844ET+423GGC
VG7844GT	1/2”	4.6	130 / 108	VG7844GT+423AGC	VG7844GT+423BGC	VG7844GT+423GGC
VG7844LT	3/4”	7.3	82 / 64	VG7844LT+423AGC	VG7844LT+423BGC	VG7844LT+423GGC
VG7844NT	1”	11.6	39 / 41	VG7844NT+423AGC	VG7844NT+423BGC	VG7844NT+423GGC
VG7844PT	1-1/4”	18.5	24 / 24	VG7844PT+423AGC	VG7844PT+423BGC	VG7844PT+423GGC

Technical Specifications

VG7000 Stainless Steel Trim Globe Valves with VA4233 Series Spring Return Electric Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 250°F (2 to 121°C)
	Steam	15 psig (103 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
	Steam	15 psig (103 kPa) Saturated Steam at 250°F (121°C)
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves
	Steam	15 psig (103 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		-4 to 122°F (-20 to 50°C)
Actuator Input Signal	**VA-4233-AGx-2**	24 VAC or 24 VDC Three-Wire Floating Control
	VA-4233-BGx-2	24 VAC or 24 VDC Two-Wire On/Off Control
	VA-4233-GGx-2	0(2) to 10 VDC Proportional Control, 0 to 10 VDC Feedback
Actuator Power Requirements		24 VAC (20 to 30 VAC), 50/60 Hz, 12 VA Nominal
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Brass
	Seat	Brass Against Molded Elastomeric Disk
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900090

Stainless Steel Trim Globe Valves with VA-715x Series Electric Actuators

Description

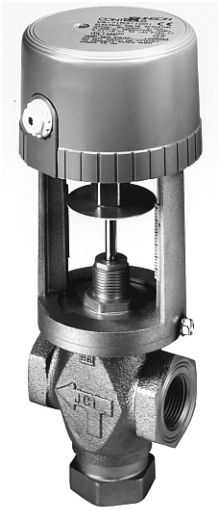
VG7000 Series Stainless Steel Trim Globe Valves with VA-715x Series Pneumatic Actuator control hot or chilled water, or steam.

Features

- 90 lb force provides tight closeoff
- direct coupled – no linkage required
- packing: spring-loaded PTFE and elastomer V-rings
- magnetic clutch protects gearing, ensures tight closeoff
- controls hot water, chilled water, or steam
- fits VG7000 valves 1/2 through 2 in.
- valve body static pressure rating: ANSI Class 250
- factory or field assembly
- voltage: 24 VAC, 50/60 Hz, 4.7 VA

Repair Information

If the VG7000 Stainless Steel Trim Globe Valve with VA-715x Series Non-Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



VA-715x Series Electric Actuator mounted on VG7844 Brass Globe Valve

Selection Chart

VG7000 Stainless Steel Trim Globe Valve with VA-715x Series Non-Spring Return Actuator

Actuator Code				VA-7150-1001	VA-7153-1001	VA-7152-1001
Actuator Input				On/Off (Floating)	On/Off (Floating) with Feedback	0 to 10 VDC Proportional
Temperature Range				35 to 338°F Fluid Temperature, 100 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Non-Spring Return		
Two-Way Push-Down-to-Close – NPT End Connections						
VG7243CT	1/2”	0.73	239	VG7243CT+7150G	VG7243CT+7153G	VG7243CT+7152G
VG7243ET	1/2”	1.8	239	VG7243ET+7150G	VG7243ET+7153G	VG7243ET+7152G
VG7243GT	1/2”	4.6	135	VG7243GT+7150G	VG7243GT+7153G	VG7243GT+7152G
VG7243LT	3/4”	7.3	86	VG7243LT+7150G	VG7243LT+7153G	VG7243LT+7152G
VG7243NT	1”	11.6	54	VG7243NT+7150G	VG7243NT+7153G	VG7243NT+7152G
VG7243PT	1-1/4”	18.5	33	VG7243PT+7150G	VG7243PT+7153G	VG7243PT+7152G
VG7243RT	1-1/2”	28.9	21	VG7243RT+7150G	VG7243RT+7153G	VG7243RT+7152G
VG7243ST	2”	46.2	13	VG7243ST+7150G	VG7243ST+7153G	VG7243ST+7152G
Three-Way Mixing – NPT End Connections						
VG7844CT	1/2”	0.73	239 / 308	VG7844CT+7150G	VG7844CT+7153G	VG7844CT+7152G
VG7844ET	1/2”	1.8	239 / 308	VG7844ET+7150G	VG7844ET+7153G	VG7844ET+7152G
VG7844GT	1/2”	4.6	135 / 161	VG7844GT+7150G	VG7844GT+7153G	VG7844GT+7152G
VG7844LT	3/4”	7.3	86 / 96	VG7844LT+7150G	VG7844LT+7153G	VG7844LT+7152G
VG7844NT	1”	11.6	54 / 63	VG7844NT+7150G	VG7844NT+7153G	VG7844NT+7152G
VG7844PT	1-1/4”	18.5	33 / 36	VG7844PT+7150G	VG7844PT+7153G	VG7844PT+7152G
VG7844RT	1-1/2”	28.9	21 / 22	VG7844RT+7150G	VG7844RT+7153G	VG7844RT+7152G
VG7844ST	2”	46.2	13 / 14	VG7844ST+7150G	VG7844ST+7153G	VG7844ST+7152G

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Stainless Steel Trim Globe Valves with VA-715x Series Electric Actuators (Continued)

Technical Specifications

VG7000 Stainless Steel Trim Globe Valves with VA-715x Series Non-Spring Return Electric Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 338°F (2 to 170°C)
	Steam	100 psig (690 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 308 psig (2,122 kPa) at 338°F (170°C)
	Steam	100 psig (690 kPa) Saturated Steam
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	100 psig (690 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.05% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		0 to 140°F (-18 to 60°C)
Actuator Input Signal	**VA-7150-1001**	24 VAC Three-Wire Floating Control
	VA-7152-1001	0 to 10 VDC Proportional Control
	VA-7153-1001	24 VAC Three-Wire Floating Control with 0 to 2000 ohm feedback potentiometer for 25/32 in. valve stroke
Actuator Power Requirements	**VA-7150-1001**	24 VAC (20 to 30 VAC), 50/60 Hz, 2.7 VA Nominal
	VA-7152-1001	24 VAC (20 to 30 VAC), 50/60 Hz, 4.7 VA Nominal
	VA-7153-1001	24 VAC (20 to 30 VAC), 50/60 Hz, 2.7 VA Nominal
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Stainless Steel
	Seat	Stainless Steel
	Packing	Spring-Loaded PTFE and Elastomer V-Rings

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900091

Stainless Steel Trim Globe Valves with VA-720x Series Electric Actuators

Description

VG7000 Series Stainless Steel Trim Globe Valves with VA-720x Series Pneumatic Actuator control hot or chilled water, or steam.

Features

- 180 lb force provides tight closeoff
- direct coupled – no linkage required
- packing: spring-loaded PTFE and elastomer V-rings
- magnetic clutch protects gearing, ensures tight closeoff
- controls hot water, chilled water, or steam
- fits VG7000 valves 1/2 through 2 in.
- valve body static pressure rating: ANSI Class 250
- factory or field assembly
- voltage: 24 VAC, 50/60 Hz, 8.7 VA

Repair Information

If the VG7000 Stainless Steel Trim Globe Valve with VA-720x Series Non-Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



VA-720x Series Electric Actuator mounted on VG7844 Brass Globe Valve

Selection Chart

VG7000 Stainless Steel Trim Globe Valve with VA-720x Series Non-Spring Return Actuator

Actuator Code				VA-7200-1001	VA-7203-1001	VA-7202-1001
Actuator Input				On/Off (Floating)	On/Off (Floating) with Feedback	0 to 10 VDC Proportional
Temperature Range				35 to 338°F Fluid Temperature, 100 psig Saturated Steam		
Valve	Size	Cv	Closeoff	Non-Spring Return		
Two-Way Push-Down-to-Close – NPT End Connections						
VG7243CT	1/2”	0.73	308	VG7241CT+7200G	VG7241CT+7203G	VG7241CT+7202G
VG7243ET	1/2”	1.8	308	VG7241ET+7200G	VG7241ET+7203G	VG7241ET+7202G
VG7243GT	1/2”	4.6	278	VG7241GT+7200G	VG7241GT+7203G	VG7241GT+7202G
VG7243LT	3/4”	7.3	177	VG7241LT+7200G	VG7241LT+7203G	VG7241LT+7202G
VG7241NT	1”	11.6	112	VG7241NT+7200G	VG7241NT+7203G	VG7241NT+7202G
VG7241PT	1-1/4”	18.5	68	VG7241PT+7200G	VG7241PT+7203G	VG7241PT+7202G
VG7241RT	1-1/2”	28.9	44	VG7241RT+7200G	VG7241RT+7203G	VG7241RT+7202G
VG7241ST	2”	46.2	28	VG7241ST+7200G	VG7241ST+7203G	VG7241ST+7202G
Three-Way Mixing – NPT End Connections						
VG7844CT	1/2”	0.73	308 / 308	VG7842CT+7200G	VG7842CT+7203G	VG7842CT+7202G
VG7844ET	1/2”	1.8	308 / 308	VG7842ET+7200G	VG7842ET+7203G	VG7842ET+7202G
VG7844GT	1/2”	4.6	278 / 308	VG7842GT+7200G	VG7842GT+7203G	VG7842GT+7202G
VG7844LT	3/4”	7.3	177 / 197	VG7842LT+7200G	VG7842LT+7203G	VG7842LT+7202G
VG7842NT	1”	11.6	112 / 131	VG7842NT+7200G	VG7842NT+7203G	VG7842NT+7202G
VG7842PT	1-1/4”	18.5	68 / 75	VG7842PT+7200G	VG7842PT+7203G	VG7842PT+7202G
VG7842RT	1-1/2”	28.9	44 / 46	VG7842RT+7200G	VG7842RT+7203G	VG7842RT+7202G
VG7842ST	2”	46.2	28 / 29	VG7842ST+7200G	VG7842ST+7203G	VG7842ST+7202G

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Stainless Steel Trim Globe Valves with VA-720x Series Electric Actuators (Continued)

Technical Specifications

VG7000 Stainless Steel Trim Globe Valves with VA-720x Series Non-Spring Return Electric Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 338°F (2 to 170°C)
	Steam	100 psig (690 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 308 psig (2,122 kPa) at 248°F (120°C)
	Steam	100 psig (690 kPa) Saturated Steam
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	100 psig (690 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.05% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		23 to 131°F (-5 to 55°C)
Actuator Input Signal	**VA-7200-1001**	24 VAC Three-Wire Floating Control
	VA-7202-1001	0 to 10 VDC Proportional Control
	VA-7203-1001	24 VAC Three-Wire Floating Control with 0 to 2000 ohm feedback potentiometer for 25/32 in. valve stroke
Actuator Power Requirements	**VA-7200-1001**	24 VAC (20 to 30 VAC), 50/60 Hz, 6.7 VA Nominal
	VA-7202-1001	24 VAC (20 to 30 VAC), 50/60 Hz, 8.7 VA Nominal
	VA-7203-1001	24 VAC (20 to 30 VAC), 50/60 Hz, 6.7 VA Nominal
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Stainless Steel
	Seat	Stainless Steel
	Packing	Spring-Loaded PTFE and Elastomer V-Rings

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900092

Stainless Steel Trim Globe Valves with M9216 Series Electric Actuators

Description

VG7000 Series Stainless Steel Trim Globe Valves with M9216 Series Electric Actuator control hot or chilled water, or steam.

Features

- spring return – stem up or stem down
- 180 lb force provides tight closeoff
- packing: spring-loaded PTFE and elastomer V-rings
- manual opener
- fits VG7000 valves 1/2 through 2 in.
- valve body static pressure rating: ANSI Class 250
- optional auxiliary switches available
- factory or field assembly
- voltage: 20 to 30 VAC, 50/60 Hz, 12 VA

Repair Information

If the VG7000 Stainless Steel Trim Globe Valve with M9216 Series Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



M9216 Series Electric Actuator with M9000-500 linkage mounted on VG7844 Brass Globe Valve

Selection Charts

VG7000 Stainless Steel Trim Globe Valve with M9216 Series Electric Actuators, Less Auxiliary Switches

Actuator Code				M9216-AGA-2	M9216-HGA-2	M9216-AGA-2	M9216-HGA-2
Actuator Input				On/Off (Floating)	0 to 10 VDC Proportional	On/Off (Floating)	0 to 10 VDC Proportional
Temperature Range				35 to 338°F Fluid Temperature, 100 psig Saturated Steam			
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		Spring Return – Stem Down	
Two-Way Push-Down-to-Close – NPT End Connections							
VG7243CT	1/2”	0.73	308	VG7243CT+926AGA	VG7243CT+926HGA	VG7243CT+946AGA	VG7243CT+946HGA
VG7243ET	1/2”	1.8	308	VG7243ET+926AGA	VG7243ET+926HGA	VG7243ET+946AGA	VG7243ET+946HGA
VG7243GT	1/2”	4.6	278	VG7243GT+926AGA	VG7243GT+926HGA	VG7243GT+946AGA	VG7243GT+946HGA
VG7243LT	3/4”	7.3	177	VG7243LT+926AGA	VG7243LT+926HGA	VG7243LT+946AGA	VG7243LT+946HGA
VG7243NT	1”	11.6	112	VG7243NT+926AGA	VG7243NT+926HGA	VG7243NT+946AGA	VG7243NT+946HGA
VG7243PT	1-1/4”	18.5	68	VG7243PT+926AGA	VG7243PT+926HGA	VG7243PT+946AGA	VG7243PT+946HGA
VG7243RT	1-1/2”	28.9	44	VG7243RT+926AGA	VG7243RT+926HGA	VG7243RT+946AGA	VG7243RT+946HGA
VG7243ST	2”	46.2	28	VG7243ST+926AGA	VG7243ST+926HGA	VG7243ST+946AGA	VG7243ST+946HGA
Three-Way Mixing – NPT End Connections							
VG7844CT	1/2”	0.73	308 / 308	VG7844CT+926AGA	VG7844CT+926HGA	VG7844CT+946AGA	VG7844CT+946HGA
VG7844ET	1/2”	1.8	308 / 308	VG7844ET+926AGA	VG7844ET+926HGA	VG7844ET+946AGA	VG7844ET+946HGA
VG7844GT	1/2”	4.6	278 / 308	VG7844GT+926AGA	VG7844GT+926HGA	VG7844GT+946AGA	VG7844GT+946HGA
VG7844LT	3/4”	7.3	177 / 197	VG7844LT+926AGA	VG7844LT+926HGA	VG7844LT+946AGA	VG7844LT+946HGA
VG7844NT	1”	11.6	112 / 131	VG7844NT+926AGA	VG7844NT+926HGA	VG7844NT+946AGA	VG7844NT+946HGA
VG7844PT	1-1/4”	18.5	68 / 75	VG7844PT+926AGA	VG7844PT+926HGA	VG7844PT+946AGA	VG7844PT+946HGA
VG7844RT	1-1/2”	28.9	44 / 46	VG7844RT+926AGA	VG7844RT+926HGA	VG7844RT+946AGA	VG7844RT+946HGA
VG7844ST	2”	46.2	28 / 29	VG7844ST+926AGA	VG7844ST+926HGA	VG7844ST+946AGA	VG7844ST+946HGA

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VG7000 Series Stainless Steel Trim Globe Valves with M9216 Series Electric Actuators (Continued)

VG7000 Stainless Steel Trim Globe Valve with M9216 Series Electric Actuators and Two Auxiliary Switches

Actuator Code				M9216-AGC-2	M9216-HGC-2	M9216-AGC-2	M9216-HGC-2
Actuator Input				On/Off (Floating)	0 to 10 VDC Proportional	On/Off (Floating)	0 to 10 VDC Proportional
Temperature Range				35 to 284°F Fluid Temperature, 38 psig Saturated Steam			
Valve	Size	Cv	Closeoff	Spring Return – Stem Up		Spring Return – Stem Down	
Two-Way Push-Down-to-Close – NPT End Connections							
VG7243CT	1/2”	0.73	308	VG7243CT+926AGC	VG7243CT+926HGC	VG7243CT+946AGC	VG7243CT+946HGC
VG7243ET	1/2”	1.8	308	VG7243ET+926AGC	VG7243ET+926HGC	VG7243ET+946AGC	VG7243ET+946HGC
VG7243GT	1/2”	4.6	278	VG7243GT+926AGC	VG7243GT+926HGC	VG7243GT+946AGC	VG7243GT+946HGC
VG7243LT	3/4”	7.3	177	VG7243LT+926AGC	VG7243LT+926HGC	VG7243LT+946AGC	VG7243LT+946HGC
VG7243NT	1”	11.6	112	VG7243NT+926AGC	VG7243NT+926HGC	VG7243NT+946AGC	VG7243NT+946HGC
VG7243PT	1-1/4”	18.5	68	VG7243PT+926AGC	VG7243PT+926HGC	VG7243PT+946AGC	VG7243PT+946HGC
VG7243RT	1-1/2”	28.9	44	VG7243RT+926AGC	VG7243RT+926HGC	VG7243RT+946AGC	VG7243RT+946HGC
VG7243ST	2”	46.2	28	VG7243ST+926AGC	VG7243ST+926HGC	VG7243ST+946AGC	VG7243ST+946HGC
Three-Way Mixing – NPT End Connections							
VG7844CT	1/2”	0.73	308 / 308	VG7844CT+926AGC	VG7844CT+926HGC	VG7844CT+946AGC	VG7844CT+946HGC
VG7844ET	1/2”	1.8	308 / 308	VG7844ET+926AGC	VG7844ET+926HGC	VG7844ET+946AGC	VG7844ET+946HGC
VG7844GT	1/2”	4.6	278 / 308	VG7844GT+926AGC	VG7844GT+926HGC	VG7844GT+946AGC	VG7844GT+946HGC
VG7844LT	3/4”	7.3	177 / 197	VG7844LT+926AGC	VG7844LT+926HGC	VG7844LT+946AGC	VG7844LT+946HGC
VG7844NT	1”	11.6	112 / 131	VG7844NT+926AGC	VG7844NT+926HGC	VG7844NT+946AGC	VG7844NT+946HGC
VG7844PT	1-1/4”	18.5	68 / 75	VG7844PT+926AGC	VG7844PT+926HGC	VG7844PT+946AGC	VG7844PT+946HGC
VG7844RT	1-1/2”	28.9	44 / 46	VG7844RT+926AGC	VG7844RT+926HGC	VG7844RT+946AGC	VG7844RT+946HGC
VG7844ST	2”	46.2	28 / 29	VG7844ST+926AGC	VG7844ST+926HGC	VG7844ST+946AGC	VG7844ST+946HGC

Technical Specifications

VG7000 Stainless Steel Trim Globe Valves with M9216 Series Spring Return Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 338°F (2 to 170°C)
	Steam	100 psig (690 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 308 psig (2,122 kPa) at 248°F (120°C)
	Steam	100 psig (690 kPa) Saturated Steam
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	100 psig (690 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.05% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		23 to 131°F (-5 to 55°C)
Actuator Input Signal	**M9216-AGx-2**	24 VAC Three-Wire Floating Control
	M9216-HGx-2	0 to 10 VDC Proportional Control, 0 to 10 VDC Feedback
Actuator Power Requirements		24 VAC (20 to 30 VAC), 50/60 Hz, 12 VA Nominal
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Stainless Steel
	Seat	Stainless Steel
	Packing	Spring-Loaded PTFE and Elastomer V-Rings

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900081

Brass Trim Globe Valves with V-3800 Compact Pneumatic Actuators

Description

VG7000 Series brass trimmed globe valves with V-3800 compact pneumatic actuators control hot or chilled water or 15 psig saturated steam.

Features

- compact – fits in tight spaces such as baseboard radiators and convectors
- rugged actuator die-cast enclosure, enclosed spring
- effective diaphragm area: 4 sq in.
- controls: hot or chilled water, 15 psig saturated steam
- valve trim: brass
- valve stem: stainless steel
- maximum supply air pressure: 25 psig (172 kPa)
- fluid temperature: 35 to 248°F (2 to 120°C)
- valve body static pressure rating: ANSI Class 250
- factory or field assembly

Repair Information

If the VG7000 Brass Trim Globe Valve with V-3800 Compact Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



V-3801-8001 Pneumatic Actuator mounted on VG7842 Brass Globe Valve

Selection Chart

VG7000 Series Brass Trim Globe Valves with V-3800 Compact Pneumatic Actuators (Part 1 of 2)

Actuator Code			V-3801-8001					
Mounting Kit			VG7000-1010		VG7000-1011		VG7000-1012	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – NPT End Connections								
VG7241CS	1/2”	0.73	186	**VG7241CS+3801B**	157	**VG7241CS+3801D**	84	**VG7241CS+3801E**
VG7241ES	1/2”	1.8	186	**VG7241ES+3801B**	157	**VG7241ES+3801D**	84	**VG7241ES+3801E**
VG7241GS	1/2”	4.6	105	**VG7241GS+3801B**	89	**VG7241GS+3801D**	48	**VG7241GS+3801E**
VG7241LS	3/4”	7.3	67	**VG7241LS+3801B**	56	**VG7241LS+3801D**	30	**VG7241LS+3801E**
Two-Way Normally Closed – NPT End Connections								
VG7441CS	1/2”	0.73	37	**VG7441CS+3801B**	57	**VG7441CS+3801D**	158	**VG7441CS+3801E**
VG7441ES	1/2”	1.8	37	**VG7441ES+3801B**	57	**VG7441ES+3801D**	158	**VG7441ES+3801E**
VG7441GS	1/2”	4.6	18	**VG7441GS+3801B**	28	**VG7441GS+3801D**	76	**VG7441GS+3801E**
VG7441LS	3/4”	7.3	11	**VG7441LS+3801B**	16	**VG7441LS+3801D**	45	**VG7441LS+3801E**
Three-Way Mixing – NPT End Connections								
VG7842CS	1/2”	0.73	186 / 37	**VG7842CS+3801B**	157 / 57	**VG7842CS+3801D**	84 / 158	**VG7842CS+3801E**
VG7842ES	1/2”	1.8	186 / 37	**VG7842ES+3801B**	157 / 57	**VG7842ES+3801D**	84 / 158	**VG7842ES+3801E**
VG7842GS	1/2”	4.6	105 / 18	**VG7842GS+3801B**	89 / 28	**VG7842GS+3801D**	48 / 76	**VG7842GS+3801E**
VG7842LS	3/4”	7.3	67 / 11	**VG7842LS+3801B**	56 / 16	**VG7842LS+3801D**	30 / 45	**VG7842LS+3801E**
Two-Way Normally Open – Union Sweat End Connections								
VG7281CS	1/2”	0.73	186	**VG7281CS+3801B**	157	**VG7281CS+3801D**	84	**VG7281CS+3801E**
VG7281ES	1/2”	1.8	186	**VG7281ES+3801B**	157	**VG7281ES+3801D**	84	**VG7281ES+3801E**
VG7281GS	1/2”	4.6	105	**VG7281GS+3801B**	89	**VG7281GS+3801D**	48	**VG7281GS+3801E**
VG7281LS	3/4”	7.3	67	**VG7281LS+3801B**	56	**VG7281LS+3801D**	30	**VG7281LS+3801E**
Two-Way Normally Closed – Union Sweat End Connections								
VG7481CS	1/2”	0.73	37	**VG7481CS+3801B**	57	**VG7481CS+3801D**	158	**VG7481CS+3801E**
VG7481ES	1/2”	1.8	37	**VG7481ES+3801B**	57	**VG7481ES+3801D**	158	**VG7481ES+3801E**
VG7481GS	1/2”	4.6	18	**VG7481GS+3801B**	28	**VG7481GS+3801D**	76	**VG7481GS+3801E**
VG7481LS	3/4”	7.3	11	**VG7481LS+3801B**	16	**VG7481LS+3801D**	45	**VG7481LS+3801E**
Three-Way Mixing – Union Sweat End Connections								
VG7882CS	1/2”	0.73	186 / 37	**VG7882CS+3801B**	157 / 57	**VG7882CS+3801D**	84 / 158	**VG7882CS+3801E**
VG7882ES	1/2”	1.8	186 / 37	**VG7882ES+3801B**	157 / 57	**VG7882ES+3801D**	84 / 158	**VG7882ES+3801E**
VG7882GS	1/2”	4.6	105 / 18	**VG7882GS+3801B**	89 / 28	**VG7882GS+3801D**	48 / 76	**VG7882GS+3801E**
VG7882LS	3/4”	7.3	67 / 11	**VG7882LS+3801B**	56 / 16	**VG7882LS+3801D**	30 / 45	**VG7882LS+3801E**

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VG7000 Series Brass Trim Globe Valves with V-3800 Compact Pneumatic Actuators (Continued)

VG7000 Series Brass Trim Globe Valves with V-3800 Compact Pneumatic Actuators (Part 2 of 2)

Actuator Code			V-3801-8001					
Mounting Kit			VG7000-1010		VG7000-1011		VG7000-1012	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – 3/8 in. Union Sweat End Connections								
VG7271CS	1/2”	0.73	186	**VG7271CS+3801B**	157	**VG7271CS+3801D**	84	**VG7271CS+3801E**
VG7271ES	1/2”	1.8	186	**VG7271ES+3801B**	157	**VG7271ES+3801D**	84	**VG7271ES+3801E**
VG7271GS	1/2”	4.6	105	**VG7271GS+3801B**	89	**VG7271GS+3801D**	48	**VG7271GS+3801E**
Two-Way Normally Closed – 3/8 in. Union Sweat End Connections								
VG7471CS	1/2”	0.73	37	**VG7471CS+3801B**	57	**VG7471CS+3801D**	158	**VG7471CS+3801E**
VG7471ES	1/2”	1.8	37	**VG7471ES+3801B**	57	**VG7471ES+3801D**	158	**VG7471ES+3801E**
VG7471GS	1/2”	4.6	18	**VG7471GS+3801B**	28	**VG7471GS+3801D**	76	**VG7471GS+3801E**
Three-Way Mixing – 3/8 in. Union Sweat End Connections								
VG7872CS	1/2”	0.73	186 / 37	**VG7872CS+3801B**	157 / 57	**VG7872CS+3801D**	84 / 158	**VG7872CS+3801E**
VG7872ES	1/2”	1.8	186 / 37	**VG7872ES+3801B**	157 / 57	**VG7872ES+3801D**	84 / 158	**VG7872ES+3801E**
VG7872GS	1/2”	4.6	105 / 18	**VG7872GS+3801B**	89 / 28	**VG7872GS+3801D**	48 / 76	**VG7872GS+3801E**
Two-Way Normally Open – 3/4 in. Union Sweat End Connections								
VG7291CS	1/2”	0.73	186	**VG7291CS+3801B**	157	**VG7291CS+3801D**	84	**VG7291CS+3801E**
VG7291ES	1/2”	1.8	186	**VG7291ES+3801B**	157	**VG7291ES+3801D**	84	**VG7291ES+3801E**
VG7291GS	1/2”	4.6	105	**VG7291GS+3801B**	89	**VG7291GS+3801D**	48	**VG7291GS+3801E**
Two-Way Normally Closed – 3/4 in. Union Sweat End Connections								
VG7491CS	1/2”	0.73	37	**VG7491CS+3801B**	57	**VG7491CS+3801D**	158	**VG7491CS+3801E**
VG7491ES	1/2”	1.8	37	**VG7491ES+3801B**	57	**VG7491ES+3801D**	158	**VG7491ES+3801E**
VG7491GS	1/2”	4.6	18	**VG7491GS+3801B**	28	**VG7491GS+3801D**	76	**VG7491GS+3801E**
Three-Way Mixing – 3/4 in. Union Sweat End Connections								
VG7892CS	1/2”	0.73	186 / 37	**VG7892CS+3801B**	157 / 57	**VG7892CS+3801D**	84 / 158	**VG7892CS+3801E**
VG7892ES	1/2”	1.8	186 / 37	**VG7892ES+3801B**	157 / 57	**VG7892ES+3801D**	84 / 158	**VG7892ES+3801E**
VG7892GS	1/2”	4.6	105 / 18	**VG7892GS+3801B**	89 / 28	**VG7892GS+3801D**	48 / 76	**VG7892GS+3801E**
Two-Way Normally Open – Union Globe End Connections								
VG7251CS	1/2”	0.73	186	**VG7251CS+3801B**	157	**VG7251CS+3801D**	84	**VG7251CS+3801E**
VG7251ES	1/2”	1.8	186	**VG7251ES+3801B**	157	**VG7251ES+3801D**	84	**VG7251ES+3801E**
VG7251GS	1/2”	4.6	105	**VG7251GS+3801B**	89	**VG7251GS+3801D**	48	**VG7251GS+3801E**
VG7251LS	3/4”	7.3	67	**VG7251LS+3801B**	56	**VG7251LS+3801D**	30	**VG7251LS+3801E**
Two-Way Normally Closed – Union Globe End Connections								
VG7451CS	1/2”	0.73	37	**VG7451CS+3801B**	57	**VG7451CS+3801D**	158	**VG7451CS+3801E**
VG7451ES	1/2”	1.8	37	**VG7451ES+3801B**	57	**VG7451ES+3801D**	158	**VG7451ES+3801E**
VG7451GS	1/2”	4.6	18	**VG7451GS+3801B**	28	**VG7451GS+3801D**	76	**VG7451GS+3801E**
Two-Way Normally Open – Union Angle End Connections								
VG7551CS	1/2”	0.73	186	**VG7551CS+3801B**	157	**VG7551CS+3801D**	84	**VG7551CS+3801E**
VG7551ES	1/2”	1.8	186	**VG7551ES+3801B**	157	**VG7551ES+3801D**	84	**VG7551ES+3801E**
VG7551GS	1/2”	4.6	105	**VG7551GS+3801B**	89	**VG7551GS+3801D**	48	**VG7551GS+3801E**
VG7551LS	3/4”	7.3	67	**VG7551LS+3801B**	56	**VG7551LS+3801D**	30	**VG7551LS+3801E**

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VG7000 Series Brass Trim Globe Valves with V-3800 Compact Pneumatic Actuators (Continued)

Technical Specifications

VG7000 Brass Trim Globe Valves with V-3800 Compact Pneumatic Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 248°F (2 to 120°C)
	Steam	15 psig (103 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
	Steam	15 psig (103 kPa) Saturated Steam at 248°F (120°C)
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa)
	Steam	15 psig (103 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Maximum Actuator Supply Pressure		25 psig (172 kPa) Maximum
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Brass
	Seat	Brass Against Molded Elastomeric Disk
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

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VG7000 Series

LIT-1900082

Brass Trim Globe Valves with V-3000 Pneumatic Actuators

Description

VG7000 Series brass trimmed globe valves with V-3800 pneumatic actuators control hot or chilled water or 38 psig saturated steam.

Features

- rugged actuator die-cast enclosure, fits VG7000 valves 1/2 through 2 in.
- effective diaphragm area: 8 sq in.
- controls: hot or chilled water, 38 psig saturated steam
- valve trim: brass
- maximum supply air pressure: 25 psig (172 kPa)
- fluid temperature: 35 to 284°F (2 to 140°C), 38 psig saturated steam
- valve body static pressure rating: ANSI Class 250
- factory or field assembly
- for optional V-9502-90 Positioner, add a "P" to the end of the code number (not available with enclosed spring actuator)

Repair Information

If theVG7000 Brass Trim Globe Valve with V-3000 Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



V-3000-8011 Pneumatic Actuator mounted on VG7441 Brass Globe Valve

Selection Charts

VG7000 Series Valve Assemblies with V-3000-8011 Exposed Pneumatic Actuators (Part 1 of 3)

Actuator Code			V-3000-8011					
Mounting Kit	1/2 and 3/4 in.		VG7000-1001		VG7000-1002		VG7000-1003	
	1 and 1-1/4 in.		VG7000-1004		VG7000-1005		VG7000-1006	
	1-1/2 and 2 in.		VG7000-1007		VG7000-1008		VG7000-1009	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – NPT End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7241CT	1/2"	0.73	365	VG7241CT+3008B	339	VG7241CT+3008D	191	VG7241CT+3008E
VG7241ET	1/2"	1.8	365	VG7241ET+3008B	339	VG7241ET+3008D	191	VG7241ET+3008E
VG7241GT	1/2"	4.6	225	VG7241GT+3008B	192	VG7241GT+3008D	108	VG7241GT+3008E
VG7241LT	3/4"	7.3	144	VG7241LT+3008B	122	VG7241LT+3008D	69	VG7241LT+3008E
VG7241NT	1"	11.6	90	VG7241NT+3008B	76	VG7241NT+3008D	42	VG7241NT+3008E
VG7241PT	1-1/4"	18.5	55	VG7241PT+3008B	47	VG7241PT+3008D	26	VG7241PT+3008E
VG7241RT	1-1/2"	28.9	35	VG7241RT+3008B	30	VG7241RT+3008D	16	VG7241RT+3008E
VG7241ST	2"	46.2	22	VG7241ST+3008B	19	VG7241ST+3008D	11	VG7241ST+3008E
Two-Way Normally Closed – NPT End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7441CT	1/2"	0.73	100	VG7441CT+3008B	142	VG7441CT+3008D	348	VG7441CT+3008E
VG7441ET	1/2"	1.8	100	VG7441ET+3008B	142	VG7441ET+3008D	348	VG7441ET+3008E
VG7441GT	1/2"	4.6	49	VG7441GT+3008B	68	VG7441GT+3008D	168	VG7441GT+3008E
VG7441LT	3/4"	7.3	29	VG7441LT+3008B	41	VG7441LT+3008D	100	VG7441LT+3008E
VG7441NT	1"	11.6	17	VG7441NT+3008B	25	VG7441NT+3008D	65	VG7441NT+3008E
VG7441PT	1-1/4"	18.5	10	VG7441PT+3008B	14	VG7441PT+3008D	37	VG7441PT+3008E
VG7441RT	1-1/2"	28.9	6	VG7441RT+3008B	9	VG7441RT+3008D	23	VG7441RT+3008E
VG7441ST	2"	46.2	4	VG7441ST+3008B	6	VG7441ST+3008D	14	VG7441ST+3008E
Three-Way Mixing – NPT End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7842CT	1/2"	0.73	365 / 100	VG7842CT+3008B	339 / 142	VG7842CT+3008D	191 / 348	VG7842CT+3008E
VG7842ET	1/2"	1.8	365 / 100	VG7842ET+3008B	339 / 142	VG7842ET+3008D	191 / 348	VG7842ET+3008E
VG7842GT	1/2"	4.6	225 / 49	VG7842GT+3008B	192 / 68	VG7842GT+3008D	108 / 168	VG7842GT+3008E
VG7842LT	3/4"	7.3	144 / 29	VG7842LT+3008B	122 / 41	VG7842LT+3008D	69 / 100	VG7842LT+3008E
VG7842NT	1"	11.6	90 / 17	VG7842NT+3008B	76 / 25	VG7842NT+3008D	42 / 65	VG7842NT+3008E
VG7842PT	1-1/4"	18.5	55 / 10	VG7842PT+3008B	47 / 14	VG7842PT+3008D	26 / 37	VG7842PT+3008E
VG7842RT	1-1/2"	28.9	35 / 6	VG7842RT+3008B	30 / 9	VG7842RT+3008D	16 / 23	VG7842RT+3008E
VG7842ST	2"	46.2	22 / 4	VG7842ST+3008B	19 / 6	VG7842ST+3008D	11 / 14	VG7842ST+3008E

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VG7000 Series Brass Trim Globe Valves with V-3000 Pneumatic Actuators (Continued)

VG7000 Series Valve Assemblies with V-3000-8011 Exposed Pneumatic Actuators (Part 2 of 3)

Actuator Code			V-3000-8011					
Mounting Kit	1/2 and 3/4 in.		VG7000-1001		VG7000-1002		VG7000-1003	
	1 and 1-1/4 in.		VG7000-1004		VG7000-1005		VG7000-1006	
	1-1/2 and 2 in.		VG7000-1007		VG7000-1008		VG7000-1009	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – Union Sweat End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7281CT	1/2"	0.73	365	**VG7281CT+3008B**	339	**VG7281CT+3008D**	191	**VG7281CT+3008E**
VG7281ET	1/2"	1.8	365	**VG7281ET+3008B**	339	**VG7281ET+3008D**	191	**VG7281ET+3008E**
VG7281GT	1/2"	4.6	225	**VG7281GT+3008B**	192	**VG7281GT+3008D**	108	**VG7281GT+3008E**
VG7281LT	3/4"	7.3	144	**VG7281LT+3008B**	122	**VG7281LT+3008D**	69	**VG7281LT+3008E**
VG7281NT	1"	11.6	90	**VG7281NT+3008B**	76	**VG7281NT+3008D**	42	**VG7281NT+3008E**
VG7281PT	1-1/4"	18.5	55	**VG7281PT+3008B**	47	**VG7281PT+3008D**	26	**VG7281PT+3008E**
VG7281RT	1-1/2"	28.9	35	**VG7281RT+3008B**	30	**VG7281RT+3008D**	16	**VG7281RT+3008E**
VG7281ST	2"	46.2	22	**VG7281ST+3008B**	19	**VG7281ST+3008D**	11	**VG7281ST+3008E**
Two-Way Normally Closed – Union Sweat End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7481CT	1/2"	0.73	100	**VG7481CT+3008B**	142	**VG7481CT+3008D**	348	**VG7481CT+3008E**
VG7481ET	1/2"	1.8	100	**VG7481ET+3008B**	142	**VG7481ET+3008D**	348	**VG7481ET+3008E**
VG7481GT	1/2"	4.6	49	**VG7481GT+3008B**	68	**VG7481GT+3008D**	168	**VG7481GT+3008E**
VG7481LT	3/4"	7.3	29	**VG7481LT+3008B**	41	**VG7481LT+3008D**	100	**VG7481LT+3008E**
VG7481NT	1"	11.6	17	**VG7481NT+3008B**	25	**VG7481NT+3008D**	65	**VG7481NT+3008E**
VG7481PT	1-1/4"	18.5	10	**VG7481PT+3008B**	14	**VG7481PT+3008D**	37	**VG7481PT+3008E**
VG7481RT	1-1/2"	28.9	6	**VG7481RT+3008B**	9	**VG7481RT+3008D**	23	**VG7481RT+3008E**
VG7481ST	2"	46.2	4	**VG7481ST+3008B**	6	**VG7481ST+3008D**	14	**VG7481ST+3008E**
Three-Way Mixing – Union Sweat End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7882CT	1/2"	0.73	365 / 100	**VG7882CT+3008B**	339 / 142	**VG7882CT+3008D**	191 / 348	**VG7882CT+3008E**
VG7882ET	1/2"	1.8	365 / 100	**VG7882ET+3008B**	339 / 142	**VG7882ET+3008D**	191 / 348	**VG7882ET+3008E**
VG7882GT	1/2"	4.6	225 / 49	**VG7882GT+3008B**	192 / 68	**VG7882GT+3008D**	108 / 168	**VG7882GT+3008E**
VG7882LT	3/4"	7.3	144 / 29	**VG7882LT+3008B**	122 / 41	**VG7882LT+3008D**	69 / 100	**VG7882LT+3008E**
VG7882NT	1"	11.6	90 / 17	**VG7882NT+3008B**	76 / 25	**VG7882NT+3008D**	42 / 65	**VG7882NT+3008E**
VG7882PT	1-1/4"	18.5	55 / 10	**VG7882PT+3008B**	47 / 14	**VG7882PT+3008D**	26 / 37	**VG7882PT+3008E**
VG7882RT	1-1/2"	28.9	35 / 6	**VG7882RT+3008B**	30 / 9	**VG7882RT+3008D**	16 / 23	**VG7882RT+3008E**
VG7882ST	2"	46.2	22 / 4	**VG7882ST+3008B**	19 / 6	**VG7882ST+3008D**	11 / 14	**VG7882ST+3008E**
Two-Way Normally Open – 3/8 in. Union Sweat End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7271CT	1/2"	0.73	365	**VG7271CT+3008B**	339	**VG7271CT+3008D**	191	**VG7271CT+3008E**
VG7271ET	1/2"	1.8	365	**VG7271ET+3008B**	339	**VG7271ET+3008D**	191	**VG7271ET+3008E**
VG7271GT	1/2"	4.6	225	**VG7271GT+3008B**	192	**VG7271GT+3008D**	108	**VG7271GT+3008E**
Two-Way Normally Closed – 3/8 in. Union Sweat End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7471CT	1/2"	0.73	100	**VG7471CT+3008B**	142	**VG7471CT+3008D**	348	**VG7471CT+3008E**
VG7471ET	1/2"	1.8	100	**VG7471ET+3008B**	142	**VG7471ET+3008D**	348	**VG7471ET+3008E**
VG7471GT	1/2"	4.6	49	**VG7471GT+3008B**	68	**VG7471GT+3008D**	168	**VG7471GT+3008E**
Three-Way Mixing – 3/8 in. Union Sweat End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7872CT	1/2"	0.73	365 / 100	**VG7872CT+3008B**	339 / 142	**VG7872CT+3008D**	191 / 348	**VG7872CT+3008E**
VG7872ET	1/2"	1.8	365 / 100	**VG7872ET+3008B**	339 / 142	**VG7872ET+3008D**	191 / 348	**VG7872ET+3008E**
VG7872GT	1/2"	4.6	225 / 49	**VG7872GT+3008B**	192 / 68	**VG7872GT+3008D**	108 / 168	**VG7872GT+3008E**

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VG7000 Series Brass Trim Globe Valves with V-3000 Pneumatic Actuators (Continued)

VG7000 Series Valve Assemblies with V-3000-8011 Exposed Pneumatic Actuators (Part 3 of 3)

Actuator Code			V-3000-8011					
Mounting Kit	1/2 and 3/4 in.		VG7000-1001		VG7000-1002		VG7000-1003	
	1 and 1-1/4 in.		VG7000-1004		VG7000-1005		VG7000-1006	
	1-1/2 and 2 in.		VG7000-1007		VG7000-1008		VG7000-1009	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – 3/4 in. Union Sweat End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7291CT	1/2"	0.73	365	**VG7291CT+3008B**	339	**VG7291CT+3008D**	191	**VG7291CT+3008E**
VG7291ET	1/2"	1.8	365	**VG7291ET+3008B**	339	**VG7291ET+3008D**	191	**VG7291ET+3008E**
VG7291GT	1/2"	4.6	225	**VG7291GT+3008B**	192	**VG7291GT+3008D**	108	**VG7291GT+3008E**
Two-Way Normally Closed – 3/4 in. Union Sweat End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7491CT	1/2"	0.73	100	**VG7491CT+3008B**	142	**VG7491CT+3008D**	348	**VG7491CT+3008E**
VG7491ET	1/2"	1.8	100	**VG7491ET+3008B**	142	**VG7491ET+3008D**	348	**VG7491ET+3008E**
VG7491GT	1/2"	4.6	49	**VG7491GT+3008B**	68	**VG7491GT+3008D**	168	**VG7491GT+3008E**
Three-Way Mixing – 3/4 in. Union Sweat End Connections (To specify a factory-mounted pneumatic postioner, add a "P" to the end of the code number.)								
VG7892CT	1/2"	0.73	365 / 100	**VG7892CT+3008B**	339 / 142	**VG7892CT+3008D**	191 / 348	**VG7892CT+3008E**
VG7892ET	1/2"	1.8	365 / 100	**VG7892ET+3008B**	339 / 142	**VG7892ET+3008D**	191 / 348	**VG7892ET+3008E**
VG7892GT	1/2"	4.6	225 / 49	**VG7892GT+3008B**	192 / 68	**VG7892GT+3008D**	108 / 168	**VG7892GT+3008E**
Two-Way Normally Open – Union Globe End Connections (No Positioner Option Available)								
VG7251CT	1/2"	0.73	365	**VG7251CT+3008B**	339	**VG7251CT+3008D**	191	**VG7251CT+3008E**
VG7251ET	1/2"	1.8	365	**VG7251ET+3008B**	339	**VG7251ET+3008D**	191	**VG7251ET+3008E**
VG7251GT	1/2"	4.6	225	**VG7251GT+3008B**	192	**VG7251GT+3008D**	108	**VG7251GT+3008E**
VG7251LT	3/4"	7.3	144	**VG7251LT+3008B**	122	**VG7251LT+3008D**	69	**VG7251LT+3008E**
VG7251NT	1"	11.6	90	**VG7251NT+3008B**	76	**VG7251NT+3008D**	42	**VG7251NT+3008E**
VG7251PT	1-1/4"	18.5	55	**VG7251PT+3008B**	47	**VG7251PT+3008D**	26	**VG7251PT+3008E**
VG7251RT	1-1/2"	28.9	35	**VG7251RT+3008B**	30	**VG7251RT+3008D**	16	**VG7251RT+3008E**
Two-Way Normally Closed – Union Globe End Connections (No Positioner Option Available)								
VG7451CT	1/2"	0.73	100	**VG7451CT+3008B**	142	**VG7451CT+3008D**	348	**VG7451CT+3008E**
VG7451ET	1/2"	1.8	100	**VG7451ET+3008B**	142	**VG7451ET+3008D**	348	**VG7451ET+3008E**
VG7451GT	1/2"	4.6	49	**VG7451GT+3008B**	68	**VG7451GT+3008D**	168	**VG7451GT+3008E**
Two-Way Normally Open – Union Angle End Connections (No Positioner Option Available)								
VG7551CT	1/2"	0.73	365	**VG7551CT+3008B**	339	**VG7551CT+3008D**	191	**VG7551CT+3008E**
VG7551ET	1/2"	1.8	365	**VG7551ET+3008B**	339	**VG7551ET+3008D**	191	**VG7551ET+3008E**
VG7551GT	1/2"	4.6	225	**VG7551GT+3008B**	192	**VG7551GT+3008D**	108	**VG7551GT+3008E**
VG7551LT	3/4"	7.3	144	**VG7551LT+3008B**	122	**VG7551LT+3008D**	69	**VG7551LT+3008E**
VG7551NT	1"	11.6	90	**VG7551NT+3008B**	76	**VG7551NT+3008D**	42	**VG7551NT+3008E**
VG7551PT	1-1/4"	18.5	55	**VG7551PT+3008B**	47	**VG7551PT+3008D**	26	**VG7551PT+3008E**
VG7551RT	1-1/2"	28.9	35	**VG7551RT+3008B**	30	**VG7551RT+3008D**	16	**VG7551RT+3008E**

VG7000 Series Valve Assemblies with V-3000-8003 Enclosed Pneumatic Actuators (Part 1 of 3)

Actuator Code			V-3000-8003					
Mounting Kit	1/2 and 3/4 in.		VG7000-1001		VG7000-1002		VG7000-1003	
	1 and 1-1/4 in.		VG7000-1004		VG7000-1005		VG7000-1006	
	1-1/2 and 2 in.		VG7000-1007		VG7000-1008		VG7000-1009	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – NPT End Connections								
VG7241CT	1/2"	0.73	365	**VG7241CT+3003B**	339	**VG7241CT+3003D**	191	**VG7241CT+3003E**
VG7241ET	1/2"	1.8	365	**VG7241ET+3003B**	339	**VG7241ET+3003D**	191	**VG7241ET+3003E**
VG7241GT	1/2"	4.6	225	**VG7241GT+3003B**	192	**VG7241GT+3003D**	108	**VG7241GT+3003E**
VG7241LT	3/4"	7.3	144	**VG7241LT+3003B**	122	**VG7241LT+3003D**	69	**VG7241LT+3003E**
VG7241NT	1"	11.6	90	**VG7241NT+3003B**	76	**VG7241NT+3003D**	42	**VG7241NT+3003E**
VG7241PT	1-1/4"	18.5	55	**VG7241PT+3003B**	47	**VG7241PT+3003D**	26	**VG7241PT+3003E**
VG7241RT	1-1/2"	28.9	35	**VG7241RT+3003B**	30	**VG7241RT+3003D**	16	**VG7241RT+3003E**
VG7241ST	2"	46.2	22	**VG7241ST+3003B**	19	**VG7241ST+3003D**	11	**VG7241ST+3003E**

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VG7000 Series Brass Trim Globe Valves with V-3000 Pneumatic Actuators (Continued)

VG7000 Series Valve Assemblies with V-3000-8003 Enclosed Pneumatic Actuators (Part 2 of 3)

Actuator Code			V-3000-8003					
Mounting Kit	1/2 and 3/4 in.		VG7000-1001		VG7000-1002		VG7000-1003	
	1 and 1-1/4 in.		VG7000-1004		VG7000-1005		VG7000-1006	
	1-1/2 and 2 in.		VG7000-1007		VG7000-1008		VG7000-1009	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Closed – NPT End Connections								
VG7441CT	1/2”	0.73	100	**VG7441CT+3003B**	142	**VG7441CT+3003D**	348	**VG7441CT+3003E**
VG7441ET	1/2”	1.8	100	**VG7441ET+3003B**	142	**VG7441ET+3003D**	348	**VG7441ET+3003E**
VG7441GT	1/2”	4.6	49	**VG7441GT+3003B**	68	**VG7441GT+3003D**	168	**VG7441GT+3003E**
VG7441LT	3/4”	7.3	29	**VG7441LT+3003B**	41	**VG7441LT+3003D**	100	**VG7441LT+3003E**
VG7441NT	1”	11.6	17	**VG7441NT+3003B**	25	**VG7441NT+3003D**	65	**VG7441NT+3003E**
VG7441PT	1-1/4”	18.5	10	**VG7441PT+3003B**	14	**VG7441PT+3003D**	37	**VG7441PT+3003E**
VG7441RT	1-1/2”	28.9	6	**VG7441RT+3003B**	9	**VG7441RT+3003D**	23	**VG7441RT+3003E**
VG7441ST	2”	46.2	4	**VG7441ST+3003B**	6	**VG7441ST+3003D**	14	**VG7441ST+3003E**
Three-Way Mixing – NPT End Connections								
VG7842CT	1/2”	0.73	365 / 100	**VG7842CT+3003B**	339 / 142	**VG7842CT+3003D**	191 / 348	**VG7842CT+3003E**
VG7842ET	1/2”	1.8	365 / 100	**VG7842ET+3003B**	339 / 142	**VG7842ET+3003D**	191 / 348	**VG7842ET+3003E**
VG7842GT	1/2”	4.6	225 / 49	**VG7842GT+3003B**	192 / 68	**VG7842GT+3003D**	108 / 168	**VG7842GT+3003E**
VG7842LT	3/4”	7.3	144 / 29	**VG7842LT+3003B**	122 / 41	**VG7842LT+3003D**	69 / 100	**VG7842LT+3003E**
VG7842NT	1”	11.6	90 / 17	**VG7842NT+3003B**	76 / 25	**VG7842NT+3003D**	42 / 65	**VG7842NT+3003E**
VG7842PT	1-1/4”	18.5	55 / 10	**VG7842PT+3003B**	47 / 14	**VG7842PT+3003D**	26 / 37	**VG7842PT+3003E**
VG7842RT	1-1/2”	28.9	35 / 6	**VG7842RT+3003B**	30 / 9	**VG7842RT+3003D**	16 / 23	**VG7842RT+3003E**
VG7842ST	2”	46.2	22 / 4	**VG7842ST+3003B**	19 / 6	**VG7842ST+3003D**	11 / 14	**VG7842ST+3003E**
Two-Way Normally Open – Union Sweat End Connections								
VG7281CT	1/2”	0.73	365	**VG7281CT+3003B**	339	**VG7281CT+3003D**	191	**VG7281CT+3003E**
VG7281ET	1/2”	1.8	365	**VG7281ET+3003B**	339	**VG7281ET+3003D**	191	**VG7281ET+3003E**
VG7281GT	1/2”	4.6	225	**VG7281GT+3003B**	192	**VG7281GT+3003D**	108	**VG7281GT+3003E**
VG7281LT	3/4”	7.3	144	**VG7281LT+3003B**	122	**VG7281LT+3003D**	69	**VG7281LT+3003E**
VG7281NT	1”	11.6	90	**VG7281NT+3003B**	76	**VG7281NT+3003D**	42	**VG7281NT+3003E**
VG7281PT	1-1/4”	18.5	55	**VG7281PT+3003B**	47	**VG7281PT+3003D**	26	**VG7281PT+3003E**
VG7281RT	1-1/2”	28.9	35	**VG7281RT+3003B**	30	**VG7281RT+3003D**	16	**VG7281RT+3003E**
VG7281ST	2”	46.2	22	**VG7281ST+3003B**	19	**VG7281ST+3003D**	11	**VG7281ST+3003E**
Two-Way Normally Closed – Union Sweat End Connections								
VG7481CT	1/2”	0.73	100	**VG7481CT+3003B**	142	**VG7481CT+3003D**	348	**VG7481CT+3003E**
VG7481ET	1/2”	1.8	100	**VG7481ET+3003B**	142	**VG7481ET+3003D**	348	**VG7481ET+3003E**
VG7481GT	1/2”	4.6	49	**VG7481GT+3003B**	68	**VG7481GT+3003D**	168	**VG7481GT+3003E**
VG7481LT	3/4”	7.3	29	**VG7481LT+3003B**	41	**VG7481LT+3003D**	100	**VG7481LT+3003E**
VG7481NT	1”	11.6	17	**VG7481NT+3003B**	25	**VG7481NT+3003D**	65	**VG7481NT+3003E**
VG7481PT	1-1/4”	18.5	10	**VG7481PT+3003B**	14	**VG7481PT+3003D**	37	**VG7481PT+3003E**
VG7481RT	1-1/2”	28.9	6	**VG7481RT+3003B**	9	**VG7481RT+3003D**	23	**VG7481RT+3003E**
VG7481ST	2”	46.2	4	**VG7481ST+3003B**	6	**VG7481ST+3003D**	14	**VG7481ST+3003E**
Three-Way Mixing – Union Sweat End Connections								
VG7882CT	1/2”	0.73	365 / 100	**VG7882CT+3003B**	339 / 142	**VG7882CT+3003D**	191 / 348	**VG7882CT+3003E**
VG7882ET	1/2”	1.8	365 / 100	**VG7882ET+3003B**	339 / 142	**VG7882ET+3003D**	191 / 348	**VG7882ET+3003E**
VG7882GT	1/2”	4.6	225 / 49	**VG7882GT+3003B**	192 / 68	**VG7882GT+3003D**	108 / 168	**VG7882GT+3003E**
VG7882LT	3/4”	7.3	144 / 29	**VG7882LT+3003B**	122 / 41	**VG7882LT+3003D**	69 / 100	**VG7882LT+3003E**
VG7882NT	1”	11.6	90 / 17	**VG7882NT+3003B**	76 / 25	**VG7882NT+3003D**	42 / 65	**VG7882NT+3003E**
VG7882PT	1-1/4”	18.5	55 / 10	**VG7882PT+3003B**	47 / 14	**VG7882PT+3003D**	26 / 37	**VG7882PT+3003E**
VG7882RT	1-1/2”	28.9	35 / 6	**VG7882RT+3003B**	30 / 9	**VG7882RT+3003D**	16 / 23	**VG7882RT+3003E**
VG7882ST	2”	46.2	22 / 4	**VG7882ST+3003B**	19 / 6	**VG7882ST+3003D**	11 / 14	**VG7882ST+3003E**

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VG7000 Series Brass Trim Globe Valves with V-3000 Pneumatic Actuators (Continued)

VG7000 Series Valve Assemblies with V-3000-8003 Enclosed Pneumatic Actuators (Part 3 of 3)

Actuator Code			V-3000-8003					
Mounting Kit	1/2 and 3/4 in.		VG7000-1001		VG7000-1002		VG7000-1003	
	1 and 1-1/4 in.		VG7000-1004		VG7000-1005		VG7000-1006	
	1-1/2 and 2 in.		VG7000-1007		VG7000-1008		VG7000-1009	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – 3/8 in. Union Sweat End Connections								
VG7271CT	1/2”	0.73	365	**VG7271CT+3003B**	339	**VG7271CT+3003D**	191	**VG7271CT+3003E**
VG7271ET	1/2”	1.8	365	**VG7271ET+3003B**	339	**VG7271ET+3003D**	191	**VG7271ET+3003E**
VG7271GT	1/2”	4.6	225	**VG7271GT+3003B**	192	**VG7271GT+3003D**	108	**VG7271GT+3003E**
Two-Way Normally Closed – 3/8 in. Union Sweat End Connections								
VG7471CT	1/2”	0.73	100	**VG7471CT+3003B**	142	**VG7471CT+3003D**	348	**VG7471CT+3003E**
VG7471ET	1/2”	1.8	100	**VG7471ET+3003B**	142	**VG7471ET+3003D**	348	**VG7471ET+3003E**
VG7471GT	1/2”	4.6	49	**VG7471GT+3003B**	68	**VG7471GT+3003D**	168	**VG7471GT+3003E**
Three-Way Mixing – 3/8 in. Union Sweat End Connections								
VG7872CT	1/2”	0.73	365 / 100	**VG7872CT+3003B**	339 / 142	**VG7872CT+3003D**	191 / 348	**VG7872CT+3003E**
VG7872ET	1/2”	1.8	365 / 100	**VG7872ET+3003B**	339 / 142	**VG7872ET+3003D**	191 / 348	**VG7872ET+3003E**
VG7872GT	1/2”	4.6	225 / 49	**VG7872GT+3003B**	192 / 68	**VG7872GT+3003D**	108 / 168	**VG7872GT+3003E**
Two-Way Normally Open – 3/4 in. Union Sweat End Connections								
VG7291CT	1/2”	0.73	365	**VG7291CT+3003B**	339	**VG7291CT+3003D**	191	**VG7291CT+3003E**
VG7291ET	1/2”	1.8	365	**VG7291ET+3003B**	339	**VG7291ET+3003D**	191	**VG7291ET+3003E**
VG7291GT	1/2”	4.6	225	**VG7291GT+3003B**	192	**VG7291GT+3003D**	108	**VG7291GT+3003E**
Two-Way Normally Closed – 3/4 in. Union Sweat End Connections								
VG7491CT	1/2”	0.73	100	**VG7491CT+3003B**	142	**VG7491CT+3003D**	348	**VG7491CT+3003E**
VG7491ET	1/2”	1.8	100	**VG7491ET+3003B**	142	**VG7491ET+3003D**	348	**VG7491ET+3003E**
VG7491GT	1/2”	4.6	49	**VG7491GT+3003B**	68	**VG7491GT+3003D**	168	**VG7491GT+3003E**
Three-Way Mixing – 3/4 in. Union Sweat End Connections								
VG7892CT	1/2”	0.73	365 / 100	**VG7892CT+3003B**	339 / 142	**VG7892CT+3003D**	191 / 348	**VG7892CT+3003E**
VG7892ET	1/2”	1.8	365 / 100	**VG7892ET+3003B**	339 / 142	**VG7892ET+3003D**	191 / 348	**VG7892ET+3003E**
VG7892GT	1/2”	4.6	225 / 49	**VG7892GT+3003B**	192 / 68	**VG7892GT+3003D**	108 / 168	**VG7892GT+3003E**
Two-Way Normally Open – Union Globe End Connections								
VG7251CT	1/2”	0.73	365	**VG7251CT+3003B**	339	**VG7251CT+3003D**	191	**VG7251CT+3003E**
VG7251ET	1/2”	1.8	365	**VG7251ET+3003B**	339	**VG7251ET+3003D**	191	**VG7251ET+3003E**
VG7251GT	1/2”	4.6	225	**VG7251GT+3003B**	192	**VG7251GT+3003D**	108	**VG7251GT+3003E**
VG7251LT	3/4”	7.3	144	**VG7251LT+3003B**	122	**VG7251LT+3003D**	69	**VG7251LT+3003E**
VG7251NT	1”	11.6	90	**VG7251NT+3003B**	76	**VG7251NT+3003D**	42	**VG7251NT+3003E**
VG7251PT	1-1/4”	18.5	55	**VG7251PT+3003B**	47	**VG7251PT+3003D**	26	**VG7251PT+3003E**
VG7251RT	1-1/2”	28.9	35	**VG7251RT+3003B**	30	**VG7251RT+3003D**	16	**VG7251RT+3003E**
Two-Way Normally Closed – Union Globe End Connections								
VG7451CT	1/2”	0.73	100	**VG7451CT+3003B**	142	**VG7451CT+3003D**	348	**VG7451CT+3003E**
VG7451ET	1/2”	1.8	100	**VG7451ET+3003B**	142	**VG7451ET+3003D**	348	**VG7451ET+3003E**
VG7451GT	1/2”	4.6	49	**VG7451GT+3003B**	68	**VG7451GT+3003D**	168	**VG7451GT+3003E**
Two-Way Normally Open – Union Angle End Connections								
VG7551CT	1/2”	0.73	365	**VG7551CT+3003B**	339	**VG7551CT+3003D**	191	**VG7551CT+3003E**
VG7551ET	1/2”	1.8	365	**VG7551ET+3003B**	339	**VG7551ET+3003D**	191	**VG7551ET+3003E**
VG7551GT	1/2”	4.6	225	**VG7551GT+3003B**	192	**VG7551GT+3003D**	108	**VG7551GT+3003E**
VG7551LT	3/4”	7.3	144	**VG7551LT+3003B**	122	**VG7551LT+3003D**	69	**VG7551LT+3003E**
VG7551NT	1”	11.6	90	**VG7551NT+3003B**	76	**VG7551NT+3003D**	42	**VG7551NT+3003E**
VG7551PT	1-1/4”	18.5	55	**VG7551PT+3003B**	47	**VG7551PT+3003D**	26	**VG7551PT+3003E**
VG7551RT	1-1/2”	28.9	35	**VG7551RT+3003B**	30	**VG7551RT+3003D**	16	**VG7551RT+3003E**

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VG7000 Series Brass Trim Globe Valves with V-3000 Pneumatic Actuators (Continued)

Technical Specifications

VG7000 Brass Trim Globe Valves with V-3000 Pneumatic Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 248°F (2 to 120°C) for V-3000-8003 35 to 284°F (2 to 140°C) for V-3000-8011
	Steam	38 psig (262 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
	Steam	38 psig (262 kPa) Saturated Steam at 284°F (140°C)
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	15 psig (103 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Maximum Actuator Supply Pressure		25 psig (172 kPa) Maximum
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Brass
	Seat	Brass Against Molded Elastomeric Disk
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

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VG7000 Series

LIT-1900083

Brass Trim Globe Valves with MP82 Series Pneumatic Actuators

Description

VG7000 Series brass trimmed globe valves with MP22 Series pneumatic actuators control hot or chilled water or 38 psig saturated steam.

Features

- industrial-grade, drawn-steel actuator fits VG7000 valves 1 through 2 in.
- corrosion-resistant, electro-painted finish
- effective diaphragm area: 25 sq in.
- controls: hot or chilled water, 38 psig saturated steam
- valve trim: brass
- maximum supply air pressure: 25 psig (172 kPa)
- fluid temperature: 35 to 284°F (2 to 140°C), 38 psig saturated steam
- valve body static pressure rating: ANSI Class 250
- factory or field assembly
- for optional V-9502-95 Positioner, change “00” at the end of the code number to “01”

Repair Information

If theVG7000 Brass Trim Globe Valve with MP82 Series Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



MP82 Series Pneumatic Actuator mounted on VG7441 Brass Globe Valve

Selection Chart

VG7000 Series Brass Trim Globe Valves with MP82 Series Pneumatic Actuators

Actuator Code	1 and 1-1/4 in.		MP822C001A		MP822D001A		MP822E001A	
	1-1/2 and 2 in.		MP823C001A		MP823D001A		MP823E001A	
Spring Range			3 to 7 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – NPT End Connections (To specify a factory-mounted pneumatic postioner, change “00” to the end of the code number to “01”.)								
VG7241NT	1”	11.6	279	**VG7241NT+822C00**	257	**VG7241NT+822D00**	148	**VG7241NT+822E00**
VG7241PT	1-1/4”	18.5	170	**VG7241PT+822C00**	157	**VG7241PT+822D00**	90	**VG7241PT+822E00**
VG7241RT	1-1/2”	28.9	109	**VG7241RT+823C00**	100	**VG7241RT+823D00**	58	**VG7241RT+823E00**
VG7241ST	2”	46.2	70	**VG7241ST+823C00**	64	**VG7241ST+823D00**	37	**VG7241ST+823E00**
Two-Way Normally Closed – NPT End Connections (To specify a factory-mounted pneumatic postioner, change “00” to the end of the code number to “01”.)								
VG7441NT	1”	11.6	70	**VG7441NT+822C00**	96	**VG7441NT+822D00**	223	**VG7441NT+822E00**
VG7441PT	1-1/4”	18.5	40	**VG7441PT+822C00**	55	**VG7441PT+822D00**	128	**VG7441PT+822E00**
VG7441RT	1-1/2”	28.9	25	**VG7441RT+823C00**	34	**VG7441RT+823D00**	79	**VG7441RT+823E00**
VG7441ST	2”	46.2	16	**VG7441ST+823C00**	21	**VG7441ST+823D00**	50	**VG7441ST+823E00**
Three-Way Mixing – NPT End Connections (To specify a factory-mounted pneumatic postioner, change “00” to the end of the code number to “01”.)								
VG7842NT	1”	11.6	279 / 70	**VG7842NT+822C00**	257 / 96	**VG7842NT+822D00**	148 / 223	**VG7842NT+822E00**
VG7842PT	1-1/4”	18.5	170 / 40	**VG7842PT+822C00**	157 / 55	**VG7842PT+822D00**	90 / 128	**VG7842PT+822E00**
VG7842RT	1-1/2”	28.9	109 / 25	**VG7842RT+823C00**	100 / 34	**VG7842RT+823D00**	58 / 79	**VG7842RT+823E00**
VG7842ST	2”	46.2	70 / 16	**VG7842ST+823C00**	64 / 21	**VG7842ST+823D00**	37 / 50	**VG7842ST+823E00**

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Brass Trim Globe Valves with MP82 Series Pneumatic Actuators (Continued)

Technical Specifications

VG7000 Brass Trim Globe Valves with MP82 Series Pneumatic Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 284°F (2 to 140°C)
	Steam	38 psig (262 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 365 psig (2,515 kPa) at 248°F (120°C)
	Steam	38 psig (262 kPa) Saturated Steam at 284°F (140°C)
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	15 psig (103 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Maximum Actuator Supply Pressure		25 psig (172 kPa) Maximum
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Brass
	Seat	Brass Against Molded Elastomeric Disk
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900087

Stainless Steel Trim Globe Valves with V-3000 Pneumatic Actuators

Description

VG7000 Series Stainless Steel Trim Globe Valves with V-3000 Pneumatic Actuator control hot or chilled water, or 100 psig saturated steam.

Features

- rugged actuator die-cast enclosure fits VG7000 valves 1/2 through 1-1/4 in.
- effective diaphragm area: 8 sq in.
- controls: hot or chilled water, 100 psig saturated steam
- valve trim: stainless steel
- packing: spring-loaded PTFE and elastomer V-rings
- maximum supply air pressure: 25 psig (172 kPa)
- fluid temperature: 35 to 338°F (2 to 170°C)
- valve body static pressure rating: ANSI Class 250
- factory or field assembly
- for optional V-9502-90 Positioner, add a "P" to the end of the code number (not available with enclosed spring actuator)

Repair Information

If the VG7000 Stainless Steel Trim Globe Valve with V-3000 Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement valveor actuator, contact the nearest Johnson Controls® representative.



V-3000-8011 Pneumatic Actuator mounted on VG7443 Brass Globe Valve

Selection Charts

VG7000 Stainless Steel Trim Globe Valve with V-3000-8011 Exposed Pneumatic Actuator

Actuator Code			V-3000-8011					
Mounting Kit	1/2 and 3/4 in.		VG7000-1001		VG7000-1002		VG7000-1003	
	1 and 1-1/4 in.		VG7000-1004		VG7000-1005		VG7000-1006	
	1-1/2 and 2 in.		VG7000-1007		VG7000-1008		VG7000-1009	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – NPT End Connections (To specify a factory-mounted pneumatic positioner, add "P" to the end of the code number.)								
VG7243CT	1/2"	0.73	299	**VG7243CT+3008B**	255	**VG7243CT+3008D**	143	**VG7243CT+3008E**
VG7243ET	1/2"	1.8	299	**VG7243ET+3008B**	255	**VG7243ET+3008D**	143	**VG7243ET+3008E**
VG7243GT	1/2"	4.6	169	**VG7243GT+3008B**	144	**VG7243GT+3008D**	81	**VG7243GT+3008E**
VG7243LT	3/4"	7.3	108	**VG7243LT+3008B**	92	**VG7243LT+3008D**	52	**VG7243LT+3008E**
VG7243NT	1"	11.6	67	**VG7243NT+3008B**	57	**VG7243NT+3008D**	32	**VG7243NT+3008E**
VG7243PT	1-1/4"	18.5	41	**VG7243PT+3008B**	35	**VG7243PT+3008D**	19	**VG7243PT+3008E**
Two-Way Normally Closed – NPT End Connections (To specify a factory-mounted pneumatic positioner, add "P" to the end of the code number.)								
VG7443CT	1/2"	0.73	75	**VG7443CT+3008B**	106	**VG7443CT+3008D**	261	**VG7443CT+3008E**
VG7443ET	1/2"	1.8	75	**VG7443ET+3008B**	106	**VG7443ET+3008D**	261	**VG7443ET+3008E**
VG7443GT	1/2"	4.6	36	**VG7443GT+3008B**	51	**VG7443GT+3008D**	126	**VG7443GT+3008E**
VG7443LT	3/4"	7.3	22	**VG7443LT+3008B**	31	**VG7443LT+3008D**	75	**VG7443LT+3008E**
VG7443NT	1"	11.6	13	**VG7443NT+3008B**	19	**VG7443NT+3008D**	49	**VG7443NT+3008E**
VG7443PT	1-1/4"	18.5	7	**VG7443PT+3008B**	11	**VG7443PT+3008D**	28	**VG7443PT+3008E**
Three-Way Mixing – NPT End Connections (To specify a factory-mounted pneumatic positioner, add "P" to the end of the code number.)								
VG7844CT	1/2"	0.73	299 / 75	**VG7844CT+3008B**	255 / 106	**VG7844CT+3008D**	143 / 261	**VG7844CT+3008E**
VG7844ET	1/2"	1.8	299 / 75	**VG7844ET+3008B**	255 / 106	**VG7844ET+3008D**	143 / 261	**VG7844ET+3008E**
VG7844GT	1/2"	4.6	169 / 36	**VG7844GT+3008B**	144 / 51	**VG7844GT+3008D**	81 / 126	**VG7844GT+3008E**
VG7844LT	3/4"	7.3	108 / 22	**VG7844LT+3008B**	92 / 31	**VG7844LT+3008D**	52 / 75	**VG7844LT+3008E**
VG7844NT	1"	11.6	67 / 13	**VG7844NT+3008B**	57 / 19	**VG7844NT+3008D**	32 / 49	**VG7844NT+3008E**
VG7844PT	1-1/4"	18.5	41 / 7	**VG7844PT+3008B**	35 / 11	**VG7844PT+3008D**	19 / 28	**VG7844PT+3008E**

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Stainless Steel Trim Globe Valves with V-3000 Pneumatic Actuators (Continued)

VG7000 Stainless Steel Trim Globe Valve with V-3000-8003 Enclosed Pneumatic Actuators

Actuator Code			V-3000-8003					
Mounting Kit	1/2 and 3/4 in.		VG7000-1001		VG7000-1002		VG7000-1003	
	1 and 1-1/4 in.		VG7000-1004		VG7000-1005		VG7000-1006	
	1-1/2 and 2 in.		VG7000-1007		VG7000-1008		VG7000-1009	
Spring Range			3 to 6 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open – NPT End Connections								
VG7243CT	1/2”	0.73	299	**VG7243CT+3003B**	255	**VG7243CT+3003D**	143	**VG7243CT+3003E**
VG7243ET	1/2”	1.8	299	**VG7243ET+3003B**	255	**VG7243ET+3003D**	143	**VG7243ET+3003E**
VG7243GT	1/2”	4.6	169	**VG7243GT+3003B**	144	**VG7243GT+3003D**	81	**VG7243GT+3003E**
VG7243LT	3/4”	7.3	108	**VG7243LT+3003B**	92	**VG7243LT+3003D**	52	**VG7243LT+3003E**
VG7243NT	1”	11.6	67	**VG7243NT+3003B**	57	**VG7243NT+3003D**	32	**VG7243NT+3003E**
VG7243PT	1-1/4”	18.5	41	**VG7243PT+3003B**	35	**VG7243PT+3003D**	19	**VG7243PT+3003E**
Two-Way Normally Closed – NPT End Connections								
VG7443CT	1/2”	0.73	75	**VG7443CT+3003B**	106	**VG7443CT+3003D**	261	**VG7443CT+3003E**
VG7443ET	1/2”	1.8	75	**VG7443ET+3003B**	106	**VG7443ET+3003D**	261	**VG7443ET+3003E**
VG7443GT	1/2”	4.6	36	**VG7443GT+3003B**	51	**VG7443GT+3003D**	126	**VG7443GT+3003E**
VG7443LT	3/4”	7.3	22	**VG7443LT+3003B**	31	**VG7443LT+3003D**	75	**VG7443LT+3003E**
VG7443NT	1”	11.6	13	**VG7443NT+3003B**	19	**VG7443NT+3003D**	49	**VG7443NT+3003E**
VG7443PT	1-1/4”	18.5	7	**VG7443PT+3003B**	11	**VG7443PT+3003D**	28	**VG7443PT+3003E**
Three-Way Mixing – NPT End Connections								
VG7844CT	1/2”	0.73	299 / 75	**VG7844CT+3003B**	255 / 106	**VG7844CT+3003D**	143 / 261	**VG7844CT+3003E**
VG7844ET	1/2”	1.8	299 / 75	**VG7844ET+3003B**	255 / 106	**VG7844ET+3003D**	143 / 261	**VG7844ET+3003E**
VG7844GT	1/2”	4.6	169 / 36	**VG7844GT+3003B**	144 / 51	**VG7844GT+3003D**	81 / 126	**VG7844GT+3003E**
VG7844LT	3/4”	7.3	108 / 22	**VG7844LT+3003B**	92 / 31	**VG7844LT+3003D**	52 / 75	**VG7844LT+3003E**
VG7844NT	1”	11.6	67 / 13	**VG7844NT+3003B**	57 / 19	**VG7844NT+3003D**	32 / 49	**VG7844NT+3003E**
VG7844PT	1-1/4”	18.5	41 / 7	**VG7844PT+3003B**	35 / 11	**VG7844PT+3003D**	19 / 28	**VG7844PT+3003E**

Technical Specifications

VG7000 Stainless Steel Trim Globe Valves with V-3000 Pneumatic Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 338°F (2 to 170°C) for V-3000-8011
	Steam	100 psig (690 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 308 psig (2,122 kPa) at 338°F (170°C)
	Steam	100 psig (690 kPa) Saturated Steam
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves; 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	100 psig (690 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.05% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Maximum Actuator Supply Pressure		25 psig (172 kPa) Maximum
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Stainless Steel
	Seat	Stainless Steel
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900088

Stainless Steel Trim Globe Valves with MP82 Series Pneumatic Actuators

Description

VG7000 Series Stainless Steel Trim Globe Valves with MP82 Series Pneumatic Actuator control hot or chilled water, or 100 psig saturated steam.

Features

- industrial-grade, drawn-steel actuator
- corrosion-resistant, electro-painted finish
- effective diaphragm area: 25 sq in.
- controls: hot or chilled water, 100 psig saturated steam
- valve trim: stainless steel
- packing: spring-loaded PTFE and elastomer V-rings
- maximum supply air pressure: 25 psig (172 kPa)
- fluid temperature: 35 to 338°F (2 to 170°C), 100 psig saturated steam
- valve body static pressure rating: ANSI Class 250
- factory or field assembly
- For optional V-9502-95 Positioner, change “00” at the end of the code number to “01”

Repair Information

If the VG7000 Stainless Steel Trim Globe Valve with MP82 Series Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



MP82 Series Pneumatic Actuator mounted on VG7443 Brass Globe Valve

Selection Chart

VG7000 Stainless Steel Trim Globe Valve with MP82 Series Pneumatic Actuator

Actuator			MP821C001B (1/2 and 3/4 in.) MP822C001A (1 and 1-1/4 in.) MP823C001A (1-1/2 and 2 in.)		MP821D001B (1/2 and 3/4 in.) MP822D001A (1 and 1-1/4 in.) MP823D001A (1-1/2 and 2 in.)		MP821E001B (1/2 and 3/4 in.) MP822E001A (1 and 1-1/4 in.) MP823E001A (1-1/2 and 2 in.)	
Spring Range			3 to 7 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open — NPT End Connections (To specify a factory-mounted positioner, change “00” at the end of the code number to “01”.)								
VG7243CT	1/2”	0.73	308	VG7243CT+821C00	308	VG7243CT+821D00	308	VG7243CT+821E00
VG7243ET	1/2”	1.8	308	VG7243ET+821C00	308	VG7243ET+821D00	308	VG7243ET+821E00
VG7243GT	1/2”	4.6	308	VG7243GT+821C00	308	VG7243GT+821D00	275	VG7243GT+821E00
VG7243LT	3/4”	7.3	308	VG7243LT+821C00	304	VG7243LT+821D00	175	VG7243LT+821E00
VG7243NT	1”	11.6	209	VG7243NT+822C00	193	VG7243NT+822D00	111	VG7243NT+822E00
VG7243PT	1-1/4”	18.5	128	VG7243PT+822C00	118	VG7243PT+822D00	68	VG7243PT+822E00
VG7243RT	1-1/2”	28.9	82	VG7243RT+823C00	75	VG7243RT+823D00	43	VG7243RT+823E00
VG7243ST	2”	46.2	52	VG7243ST+823C00	48	VG7243ST+823D00	28	VG7243ST+823E00
Two-Way Normally Closed — NPT End Connections (To specify a factory-mounted positioner, change “00” at the end of the code number to “01”.)								
VG7443CT	1/2”	0.73	280	VG7443CT+821C00	308	VG7443CT+821D00	308	VG7443CT+821E00
VG7443ET	1/2”	1.8	280	VG7443ET+821C00	308	VG7443ET+821D00	308	VG7443ET+821E00
VG7443GT	1/2”	4.6	135	VG7443GT+821C00	183	VG7443GT+821D00	308	VG7443GT+821E00
VG7443LT	3/4”	7.3	81	VG7443LT+821C00	109	VG7443LT+821D00	252	VG7443LT+821E00
VG7443NT	1”	11.6	53	VG7443NT+822C00	72	VG7443NT+822D00	168	VG7443NT+822E00
VG7443PT	1-1/4”	18.5	30	VG7443PT+822C00	41	VG7443PT+822D00	96	VG7443PT+822E00
VG7443RT	1-1/2”	28.9	19	VG7443RT+823C00	25	VG7443RT+823D00	59	VG7443RT+823E00
VG7443ST	2”	46.2	12	VG7443ST+823C00	16	VG7443ST+823D00	37	VG7443ST+823E00
Three-Way Mixing — NPT End Connections (To specify a factory-mounted positioner, change “00” at the end of the code number to “01”.)								
VG7844CT	1/2”	0.73	308 / 280	VG7844CT+821C00	308 / 308	VG7844CT+821D00	308 / 308	VG7844CT+821E00
VG7844ET	1/2”	1.8	308 / 280	VG7844ET+821C00	308 / 308	VG7844ET+821D00	308 / 308	VG7844ET+821E00
VG7844GT	1/2”	4.6	308 / 135	VG7844GT+821C00	308 / 183	VG7844GT+821D00	275 / 308	VG7844GT+821E00
VG7844LT	3/4”	7.3	308 / 81	VG7844LT+821C00	304 / 109	VG7844LT+821D00	175 / 252	VG7844LT+821E00
VG7844NT	1”	11.6	209 / 53	VG7844NT+822C00	193 / 72	VG7844NT+822D00	111 / 168	VG7844NT+822E00
VG7844PT	1-1/4”	18.5	128 / 30	VG7844PT+822C00	118 / 41	VG7844PT+822D00	68 / 96	VG7844PT+822E00
VG7844RT	1-1/2”	28.9	82 / 19	VG7844RT+823C00	75 / 25	VG7844RT+823D00	43 / 59	VG7844RT+823E00
VG7844ST	2”	46.2	52 / 12	VG7844ST+823C00	48 / 16	VG7844ST+823D00	28 / 37	VG7844ST+823E00

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series Stainless Steel Trim Globe Valves with MP82 Series Pneumatic Actuators (Continued)

Technical Specifications

VG7000 Stainless Steel Trim Globe Valves with MP82 Series Pneumatic Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 338°F (2 to 170°C)
	Steam	100 psig (690 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 308 psig (2.122 kPa) at 338°F (170°C)
	Steam	100 psig (690 kPa) Saturated Steam
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	35 psig (241 kPa) for ½ through 1-1/4 in. valves 30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	100 psig (690 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.05% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Maximum Actuator Supply Pressure		25 psig (172 kPa) Maximum
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Stainless Steel
	Seat	Stainless Steel
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG7000 Series

LIT-1900089

Stainless Steel Trim Globe Valves with MP84 Series Pneumatic Actuators

Description

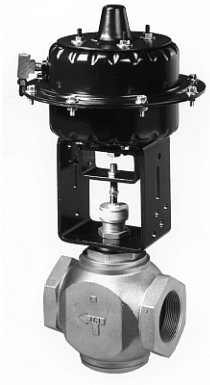
VG7000 Series Stainless Steel Trim Globe Valves with MP84 Series Pneumatic Actuator control hot or chilled water, or 100 psig saturated steam.

Features

- industrial-grade, drawn-steel actuator fits VG7000 valves 1-1/2 and 2 in. with 3/8 in. stem
- corrosion-resistant, electro-painted finish
- effective diaphragm area: 50 sq in.
- controls: hot or chilled water, 100 psig saturated steam
- valve trim: stainless steel
- packing: spring-loaded PTFE and elastomer V-rings
- maximum supply air pressure: 25 psig (172 kPa)
- fluid temperature: 35 to 338°F (2 to 170°C), 100 psig saturated steam
- valve body static pressure rating: ANSI Class 250
- factory or field assembly
- for optional V-9502-95 Positioner, change “00” at the end of the code number to “01”

Repair Information

If the VG7000 Stainless Steel Trim Globe Valve with MP84 Series Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative.



MP8000 Series Pneumatic Actuator mounted on VG7443 Brass Globe Valve

Selection Chart

VG7000 Stainless Steel Trim Globe Valve with MP84 Series Pneumatic Actuator

Actuator			MP843C001C (1-1/2 and 2 in.)		MP843D001C (1-1/2 and 2 in.)		MP843E001C (1-1/2 and 2 in.)	
Spring Range			3 to 7 psig		4 to 8 psig		9 to 13 psig	
Valve	Size	Cv	Closeoff	Code Number	Closeoff	Code Number	Closeoff	Code Number
Two-Way Normally Open — NPT End Connections (To specify a factory-mounted positioner, change “00” at the end of the code number to “01”.)								
VG7243RM	1-1/2”	28.9	165	**VG7243RM+843C00**	152	**VG7243RM+843D00**	88	**VG7243RM+843E00**
VG7243SM	2”	46.2	106	**VG7243SM+843C00**	97	**VG7243SM+843D00**	56	**VG7243SM+843E00**
Two-Way Normally Closed — NPT End Connections (To specify a factory-mounted positioner, change “00” at the end of the code number to “01”.)								
VG7443RM	1-1/2”	28.9	39	**VG7443RM+843C00**	53	**VG7443RM+843D00**	121	**VG7443RM+843E00**
VG7443SM	2”	46.2	24	**VG7443SM+843C00**	33	**VG7443SM+843D00**	76	**VG7443SM+843E00**
Three-Way Mixing — NPT End Connections (To specify a factory-mounted positioner, change “00” at the end of the code number to “01”.)								
VG7844RM	1-1/2”	28.9	165 / 39	**VG7844RM+843C00**	152 / 53	**VG7844RM+843D00**	88 / 121	**VG7844RM+843E00**
VG7844SM	2”	46.2	106 / 24	**VG7844SM+843C00**	97 / 33	**VG7844SM+843D00**	56 / 76	**VG7844SM+843E00**

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VG7000 Series Stainless Steel Trim Globe Valves with MP84 Series Pneumatic Actuators (Continued)

Technical Specifications

VG7000 Stainless Steel Trim Globe Valves with MP84 Series Pneumatic Actuators		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 338°F (2 to 170°C)
	Steam	100 psig (690 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	400 psig (2,756 kPa) Up to 150°F (66°C) decreasing to 308 psig (2.122 kPa) at 338°F (170°C)
	Steam	100 psig (690 kPa) Saturated Steam
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 250
Maximum Recommended Operating Pressure Drop	**Water**	30 psig (207 kPa) for 1-1/2 and 2 in. valves
	Steam	100 psig (690 kPa)
Flow Characteristics	**Two-Way Valves**	Equal Percentage
	Three-Way Valves	Linear Flow Characteristics
Rangeability[2]		25:1
Leakage		0.05% of Maximum Flow per ANSI/FCI 70-2, Class 4
Actuator Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Maximum Actuator Supply Pressure		25 psig (172 kPa) Maximum
Materials	**Body**	Cast Bronze
	Bonnet	Brass
	Stem	Stainless Steel
	Plug	Stainless Steel
	Seat	Stainless Steel
	Packing	Self Adjusting Ethylene Propylene Rubber (EPR) Ring Pack U-Cups

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.

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VG2000 Series

LIT-1900097

Cast Iron Flanged Globe Valves

Description

VG2000 Series Cast Iron Flanged Globe Valves are designed primarily to regulate the flow of water and steam in response to the demand of a controller in Heating, Ventilating, and Air Conditioning (HVAC) systems. Available in sizes 2-1/2 through 6 in., these ANSI Class 125 valves are available in Normally Open (N.O.), Normally Closed (N.C.), and three-way mixing configurations. Both electric and pneumatic actuators are available for factory or field mounting.

Refer to the *VG2000 Series Cast Iron Flanged Globe Valves Product Bulletin (LIT-977133)* for important product application information.

Features

- complete family of 2-1/2 through 6 in. cast iron flanged globe valves, brass trim, with several styles of electric and pneumatic actuators offers a broad selection from which to choose
- flexible features and options ordering matrix allow engineering to suit your specific application from thousands of easy-to-select, factory-assembled combinations
- standard Johnson Controls® Ring Pack Packings provide industry-leading reliability and operating life
- every valve tested for leakage — provides energy conservation and ensures occupant comfort



VG2000 Series
Cast Iron Flanged Globe Valves

Selection Chart

VG2x31 Valves with M91xx-xGx-2 Actuators – Non-Spring Return

			On/Off Floating without switches	Proportional without switches	On/Off Floating with two switches	Proportional with two switches
Size	Cv	Closeoff psig	M9116-AGA-2 M9124-AGA-2	M9116-GGA-2 M9124-GGA-2	M9116-AGC-2 M9124-AGC-2	M9116-GGC-2 M9124-GGC-2
			Two-Way, Push-Down-to-Close			
2-1/2	51	62	VG2231TM+916AGA	VG2231TM+916GGA	VG2231TM+916AGC	VG2231TM+916GGC
2-1/2	51	101	VG2231TM+924AGA	VG2231TM+924GGA	VG2231TM+924AGC	VG2231TM+924GGC
3	83	27	VG2231UM+916AGA	VG2231UM+916GGA	VG2231UM+916AGC	VG2231UM+916GGC
3	83	43	VG2231UM+924AGA	VG2231UM+924GGA	VG2231UM+924AGC	VG2231UM+924GGC
3	83	88	VG2231UM2924AGA[1]	VG2231UM2924GGA[1]	VG2231UM2924AGC[1]	VG2231UM2924GGC[1]
4	150	24	VG2231VM+924AGA	VG2231VM+924GGA	VG2231VM+924AGC	VG2231VM+924GGC
4	150	49	VG2231VM2924AGA[1]	VG2231VM2924GGA[1]	VG2231VM2924AGC[1]	VG2231VM2924GGC[1]
5	240	26	VG2231WN2924AGA[1]	VG2231WN2924GGA[1]	VG2231WN2924AGC[1]	VG2231WN2924GGC[1]
6	350	16	VG2231YN2924AGA[1]	VG2231YN2924GGA[1]	VG2231YN2924AGC[1]	VG2231YN2924GGC[1]
			Three-Way, Mixing			
2-1/2	54	37	VG2831TM+916AGA	VG2831TM+916GGA	VG2831TM+916AGC	VG2831TM+916GGC
2-1/2	54	60	VG2831TM+924AGA	VG2831TM+924GGA	VG2831TM+924AGC	VG2831TM+924GGC
3	80	16	VG2831UM+916AGA	VG2831UM+916GGA	VG2831UM+916AGC	VG2831UM+916GGC
3	80	26	VG2831UM+924AGA	VG2831UM+924GGA	VG2831UM+924AGC	VG2831UM+924GGC
3	80	53	VG2831UM2924AGA[1]	VG2831UM2924GGA[1]	VG2831UM2924AGC[1]	VG2831UM2924GGC[1]
4	157	9	VG2831VM+916AGA	VG2831VM+916GGA	VG2831VM+916AGC	VG2831VM+916GGC
4	157	14	VG2831VM+924AGA	VG2831VM+924GGA	VG2831VM+924AGC	VG2831VM+924GGC
4	157	30	VG2831VM2924AGA[1]	VG2831VM2924GGA[1]	VG2831VM2924AGC[1]	VG2831VM2924GGC[1]
5	238	7	VG2831WN+924AGA	VG2831WN+924GGA	VG2831WN+924AGC	VG2831WN+924GGC
5	238	15	VG2831WN2924AGA[1]	VG2831WN2924GGA[1]	VG2831WN2924AGC[1]	VG2831WN2924GGC[1]
6	347	4	VG2831YN+924AGA	VG2831YN+924GGA	VG2831YN+924AGC	VG2831YN+924GGC
6	347	9	VG2831YN2924AGA[1]	VG2831YN2924GGA[1]	VG2831YN2924AGC[1]	VG2831YN2924GGC[1]

1. Valve assemblies have two actuators mounted in tandem. On tandem actuator assemblies with switches, only one actuator is provided with auxiliary switches. M9116-AGx-2 actuators are not designed for tandem operation.

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VG2000 Series Cast Iron Flanged Globe Valves (Continued)



VG2x31 Valves with M9220 Series Non-Spring Return Electric Valve Actuators

Selection Chart

VG2x31 Valves with M9220-xGx-3 Actuators – Spring Return – Floating and On/Off						
			Floating		On/Off	
Size in.	Cv	Closeoff psig	Without Switches	With Two Switches	Without Switches	With Two Switches
			M9220-AGA-3	M9220-AGC-3	M9220-BGA-3	M9220-BGC-3
			Two-Way – Spring Return Normally Open – Valve Stem Up			
2-1/2	51	76	VG2231TM+92NAGA	VG2231TM+92NAGC	VG2231TM+92NBGA	VG2231TM+92NBGC
3	83	33	VG2231UM+92NAGA	VG2231UM+92NAGC	VG2231UM+92NBGA	VG2231UM+92NBGC
3	83	66	VG2231UM292NAGA[1]	VG2231UM292NAGC[1]	VG2231UM292NBGA[1]	VG2231UM292NBGC[1]
4	150	37	VG2231VM292NAGA[1]	VG2231VM292NAGC[1]	VG2231VM292NBGA[1]	VG2231VM292NBGC[1]
5	240	20	VG2231WM292NAGA[1]	VG2231WM292NAGC[1]	VG2231WM292NBGA[1]	VG2231WM292NBGC[1]
			Two-Way – Spring Return Normally Closed – Valve Stem Down			
2-1/2	51	76	VG2231TM+94NAGA	VG2231TM+94NAGC	VG2231TM+94NBGA	VG2231TM+94NBGC
3	83	33	VG2231UM+94NAGA	VG2231UM+94NAGC	VG2231UM+94NBGA	VG2231UM+94NBGC
3	83	66	VG2231UM294NAGA[1]	VG2231UM294NAGC[1]	VG2231UM294NBGA[1]	VG2231UM294NBGC[1]
4	150	37	VG2231VM294NAGA[1]	VG2231VM294NAGC[1]	VG2231VM294NBGA[1]	VG2231VM294NBGC[1]
5	240	20	VG2231WM294NAGA[1]	VG2231WM294NAGC[1]	VG2231WM294NBGA[1]	VG2231WM294NBGC[1]
			Three-Way Mixing – Spring Return – Valve Stem Up – Side Inlet Port Closed			
2-1/2	54	45	VG2831TM+92NAGA	VG2831TM+92NAGC	VG2831TM+92NBGA	VG2831TM+92NBGC
3	80	20	VG2831UM+92NAGA	VG2831UM+92NAGC	VG2831UM+92NBGA	VG2831UM+92NBGC
3	80	40	VG2831UM292NAGA[1]	VG2831UM292NAGC[1]	VG2831UM292NBGA[1]	VG2831UM292NBGC[1]
4	157	11	VG2831VM+92NAGA	VG2831VM+92NAGC	VG2831VM+92NBGA	VG2831VM+92NBGC
4	157	22	VG2831VM292NAGA[1]	VG2831VM292NAGC[1]	VG2831VM292NBGA[1]	VG2831VM292NBGC[1]
5	238	12	VG2831WN292NAGA[1]	VG2831WN292NAGC[1]	VG2831WN292NBGA[1]	VG2831WN292NBGC[1]
6	347	7	VG2831YN292NAGA[1]	VG2831YN292NAGC[1]	VG2831YN292NBGA[1]	VG2831YN292NBGC[1]
			Three-Way Mixing – Spring Return – Valve Stem Down – Side Inlet Port Open			
2-1/2	54	45	VG2831TM+94NAGA	VG2831TM+94NAGC	VG2831TM+94NBGA	VG2831TM+94NBGC
3	80	20	VG2831UM+94NAGA	VG2831UM+94NAGC	VG2831UM+94NBGA	VG2831UM+94NBGC
3	80	40	VG2831UM294NAGA[1]	VG2831UM294NAGC[1]	VG2831UM294NBGA[1]	VG2831UM294NBGC[1]
4	157	11	VG2831VM+94NAGA	VG2831VM+94NAGC	VG2831VM+94NBGA	VG2831VM+94NBGC
4	157	22	VG2831VM294NAGA[1]	VG2831VM294NAGC[1]	VG2831VM294NBGA[1]	VG2831VM294NBGC[1]
5	238	12	VG2831WN294NAGA[1]	VG2831WN294NAGC[1]	VG2831WN294NBGA[1]	VG2831WN294NBGC[1]
6	347	7	VG2831YN294NAGA[1]	VG2831YN294NAGC[1]	VG2831YN294NBGA[1]	VG2831YN294NBGC[1]

1. Valve assemblies have two actuators mounted in tandem. On tandem actuator assemblies with switches, only one actuator is provided with auxiliary switches.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG2000 Series Cast Iron Flanged Globe Valves (Continued)

Selection Chart

VG2x31 Valves with M9220-xGx-3 Actuators – Proportional				
			Proportional	
Size in.	Cv	Closeoff psig	Without Switches	With Two Switches
			M9220-GGA-3	M9220-GGC-3
			Two-Way – Spring Return Normally Open – Valve Stem Up	
2-1/2	51	76	VG2231TM+92NGGA	VG2231TM+92NGGC
3	83	33	VG2231UM+92NGGA	VG2231UM+92NGGC
3	83	66	VG2231UM292NGGA[1]	VG2231UM292NGGC[1]
4	150	37	VG2231VM292NGGA[1]	VG2231VM292NGGC[1]
5	240	20	VG2231WM292NGGA[1]	VG2231WM292NGGC[1]
			Two-Way – Spring Return Normally Closed – Valve Stem Down	
2-1/2	51	76	VG2231TM+94NGGA	VG2231TM+94NGGC
3	83	33	VG2231UM+94NGGA	VG2231UM+94NGGC
3	83	66	VG2231UM294NGGA[1]	VG2231UM294NGGC[1]
4	150	37	VG2231VM294NGGA[1]	VG2231VM294NGGC[1]
5	240	20	VG2231WM294NGGA[1]	VG2231WM294NGGC[1]
			Three-Way Mixing – Spring Return – Valve Stem Up – Side Inlet Port Closed	
2-1/2	54	45	VG2831TM+92NGGA	VG2831TM+92NGGC
3	80	20	VG2831UM+92NGGA	VG2831UM+92NGGC
3	80	40	VG2831UM292NGGA[1]	VG2831UM292NGGC[1]
4	157	11	VG2831VM+92NGGA	VG2831VM+92NGGC
4	157	22	VG2831VM292NGGA[1]	VG2831VM292NGGC[1]
5	238	12	VG2831WN292NGGA[1]	VG2831WN292NGGC[1]
6	347	7	VG2831YN292NGGA[1]	VG2831YN292NGGC[1]
			Three-Way Mixing – Spring Return – Valve Stem Down – Side Inlet Port Open	
2-1/2	54	45	VG2831TM+94NGGA	VG2831TM+94NGGC
3	80	20	VG2831UM+94NGGA	VG2831UM+94NGGC
3	80	40	VG2831UM294NGGA[1]	VG2831UM294NGGC[1]
4	157	11	VG2831VM+94NGGA	VG2831VM+94NGGC
4	157	22	VG2831VM294NGGA[1]	VG2831VM294NGGC[1]
5	238	12	VG2831WN294NGGA[1]	VG2831WN294NGGC[1]
6	347	7	VG2831YN294NGGA[1]	VG2831YN294NGGC[1]

1. Valve assemblies have two actuators mounted in tandem. On tandem actuator assemblies with switches, only one actuator is provided with auxiliary switches.

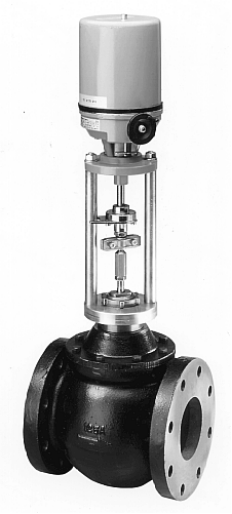
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VG2000 Series Cast Iron Flanged Globe Valves (Continued)





VG2x31 Valves with VA-3100 Series Non-Spring Return Electric Valve Actuators





VG2x31 Valves with VA-6100 Series Non-Spring Return Electric Valve Actuators

Selection Chart

VG2x31 Valves with VA-3100-xGx Series Non-Spring Return Actuators					
			Floating without Switches	Floating with Feedback and Two Switches	0 to 10 VDC Proportional with Two Switches
Size	Cv	Closeoff psig	VA-3100-AGA	VA-3100-AGC	VA-3100-HGC
			Two-Way Push-Down-to-Close		
2-1/2	51	115	VG2231TM+300AGA	VG2231TM+300AGC	VG2231TM+300HGC
3	83	79	VG2231UM+301AGA	VG2231UM+301AGC	VG2231UM+301HGC
4	150	45	VG2231VM+301AGA	VG2231VM+301AGC	VG2231VM+301HGC
5	240	29	VG2231WN+302AGA	VG2231WN+302AGC	VG2231WN+302HGC
6	350	20	VG2231YN+302AGA	VG2231YN+302AGC	VG2231YN+302HGC
			Three-Way Mixing		
2-1/2	54	69	VG2831TM+300AGA	VG2831TM+300AGC	VG2831TM+300HGC
3	80	48	VG2831UM+301AGA	VG2831UM+301AGC	VG2831UM+301HGC
4	157	27	VG2831VM+301AGA	VG2831VM+301AGC	VG2831VM+301HGC
5	238	17	VG2831WN+302AGA	VG2831WN+302AGC	VG2831WN+302HGC
6	347	12	VG2831YN+302AGA	VG2831YN+302AGC	VG2831YN+302HGC

Selection Chart

VG2x31 Valves with VA-6100-xGx Series Non-Spring Return Actuators				
			Floating with Two Switches	0 to 10 VDC Proportional with Two Switches
Size	Cv	Closeoff psig	VA-6100-AGC	VA-6100-HGC
			Two-Way Push-Down-to-Close	
4	150	89	VG2231VN+602AGC	VG2231VN+602HGC
5	240	57	VG2231WN+602AGC	VG2231WN+602HGC
6	350	40	VG2231YN+602AGC	VG2231YN+602HGC
			Three-Way Mixing	
4	157	54	VG2831VN+602AGC	VG2831VN+602HGC
5	238	34	VG2831WN+602AGC	VG2831WN+602HGC
6	347	24	VG2831YN+602AGC	VG2831YN+602HGC

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VG2000 Series Cast Iron Flanged Globe Valves (Continued)

Technical Specifications

VG2000 Series Cast Iron Flanged Globe Valves		
Service[1]		Hot Water, Chilled Water, 50% Glycol Solutions or Steam for HVAC Systems
Valve Stroke	2-1/2 and 3 in. Valves	3/4 in. (19 mm)
	3 and 4 in. Valves	1-1/8 in. (29 mm)
	5 in. Valves	1-3/8 in. (35 mm)
	6 in. Valves	1-1/2 in. (38 mm)
Valve Body Rating		Meets Requirements of ASME B16.1, Class 125
Valve Assembly Maximum Allowable Pressure/Temperature	Steam	35 psig (241 kPa) at 281°F (138°C)
	Water	175 psig (1,206 kPa) up to 150°F (66°C), Decreasing to 125 psig (861 kPa) at 281°F (138°C)
Leakage		0.1% of Maximum Flow
Inherent Flow Characteristics		Modified Linear
Rangeability[2]	2-1/2 in. Valves	6.5:1
	3 in. Valves	7.7:1
	4 in. Valves	9.3:1
	5 in. Valves	10.7:1
	6 in. Valves	10.4:1
Spring Ranges (MP8000 Series Actuators)		3 to 7, 4 to 8, and 9 to 13 psig (21 to 48, 28 to 55, and 62 to 90 kPa)
Maximum Recommended Operating Pressure Drop		35 psig (241 kPa) for All Valve Sizes
Maximum Actuator Supply Pressure (Pneumatically Actuated Valves Only)		25 psig (172 kPa) Maximum
Materials	Body	Cast Iron with Black Lacquer Finish
	Stem	316 Stainless Steel
	Plug	Brass
	Packing	Ethylene Propylene Terpolymer (EPT) Ring Packs
Valve Fluid Operating Temperature Limits		35 to 281°F (2 to 138°C), 35 psig (241 kPa) Saturated Steam
Actuator Ambient Operating Temperature Limits		Refer to the appropriate actuator product bulletin.

1. Proper water treatment is recommended; refer to VDI 2035 Standard.
2. Rangeability is defined as the ratio of maximum flow to minimum controllable flow.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG2x31 Series

LIT-1900096

Pneumatic Cast Iron Flanged Globe Valves



MP8000 Series Actuators
Mounted to VG2231 Two-Way Normally Open Valves



MP8000 Series Actuators
Mounted to VG2431 Two-Way Normally Closed Valves

Description

VG2x31 Series Valve

VG2000 Series cast Iron Flanged Globe Valves are designed primarily to regulate the flow of water and steam to the demand of a controller. For complete details refer to *VG2000 Series Cast Iron Flanged Globe Valve Product Bulletin LIT-977133*.

MP8000 Series Actuators

MP8000 Series Pneumatic Actuators are designed to accurately position chilled water, hot water, and steam control valves in response to a pneumatic signal from a controller. For complete details refer to *MP8000 Series Pneumatic Valve Actuators Product Bulletin, LIT-977257*.



MP8000 Series Actuators
Mounted to VG2831 Three-Way Mixing Valves

Features

VG2x31 Series Valve

- controls hot or chilled water, 35 psig saturated steam
- ANSI cast iron 125 flange meets ANSI B16.1
- ANSI III closeoff, leakage: 0.1% of maximum flow
- 175 psig static pressure rating at water temperatures 35 to 150°F; decreasing to 125 psig at 281°F
- maximum recommended operating pressure drop: 35 psig
- maximum actuator supply pressure: 25 psig

MP8000 Series Actuators

- two sizes – 25, 50, and 100 sq in. effective diaphragm area
- spring action field reversible
- optional pneumatic or electro-pneumatic positioner

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG2x31 Series Pneumatic Cast Iron Flanged Globe Valves (Continued)

Selection Charts

VG2231 Series Two-Way Normally Open Pneumatic Cast Iron Flanged Globe Valves

Spring Range			3 to 7 psig		4 to 8 psig		9 to 13 psig	
Valve	**Size**	**Cv**	**Closeoff**	**Code Number**	**Closeoff**	**Code Number**	**Closeoff**	**Code Number**
with MP82 Series Actuators – 25 sq in. Effective Diaphragm Area								
VG2231TL	2-1/2”	51	53	**VG2231TL+823C00**	49	**VG2231TL+823D00**	28	**VG2231TL+823E00**
VG2231UL	3”	83	37	**VG2231UL+823C00**	34	**VG2231UL+823D00**	19	**VG2231UL+823E00**
with MP84 Series Actuators – 50 sq in. Effective Diaphragm Area								
VG2231TM	2-1/2”	51	109	**VG2231TM+843C00**	100	**VG2231TM+843D00**	58	**VG2231TM+843E00**
VG2231UM	3”	83	75	**VG2231UM+845C00**	70	**VG2231UM+845D00**	40	**VG2231UM+845E00**
VG2231VM	4”	150	42	**VG2231VM+845C00**	39	**VG2231VM+845D00**	23	**VG2231VM+845E00**
with MP86 Series Actuators – 100 sq in. Effective Diaphragm Area								
VG2231UN	3”	83	152	**VG2231UN+865C00**	140	**VG2231UN+865D00**	81	**VG2231UN+865E00**
VG2231VN	4”	150	86	**VG2231VN+865C00**	79	**VG2231VN+865D00**	46	**VG2231VN+865E00**
VG2231WN	5”	240	55	**VG2231WN+867C00**	51	**VG2231WN+867D00**	29	**VG2231WN+867E00**
VG2231YN	6”	350	38	**VG2231YN+867C00**	35	**VG2231YN+867D00**	20	**VG2231YN+867E00**

VG2431 Series Two-Way Normally Closed Pneumatic Cast Iron Flanged Globe Valves

Spring Range			3 to 7 psig		4 to 8 psig		9 to 13 psig	
Valve	**Size**	**Cv**	**Closeoff**	**Code Number**	**Closeoff**	**Code Number**	**Closeoff**	**Code Number**
with MP84 Series Actuators – 50 sq in. Effective Diaphragm Area								
VG2431TM	2-1/2”	54	24	**VG2431TM+843C00**	32	**VG2431TM+843D00**	75	**VG2431TM+843E00**
VG2431UM	3”	83	17	**VG2431UM+845C00**	22	**VG2431UM+845D00**	52	**VG2431UM+845E00**
VG2431VM	4”	150	9	**VG2431VM+845C00**	13	**VG2431VM+845D00**	29	**VG2431VM+845E00**
with MP86 Series Actuators – 100 sq in. Effective Diaphragm Area								
VG2431UN	3”	83	34	**VG2431UN+865C00**	46	**VG2431UN+865D00**	105	**VG2431UN+865E00**
VG2431VN	4”	150	19	**VG2431VN+865C00**	26	**VG2431VN+865D00**	59	**VG2431VN+865E00**
VG2431WN	5”	237	12	**VG2431WN+867C00**	17	**VG2431WN+867D00**	38	**VG2431WN+867E00**
VG2431YN	6”	344	9	**VG2431YN+867C00**	11	**VG2431YN+867D00**	26	**VG2431YN+867E00**

VG2831 Series Three-Way Mixing Pneumatic Cast Iron Flanged Globe Valves

Spring Range			3 to 7 psig		4 to 8 psig		9 to 13 psig	
Valve	**Size**	**Cv**	**Closeoff**	**Code Number**	**Closeoff**	**Code Number**	**Closeoff**	**Code Number**
with MP84 Series Actuators – 50 sq in. Effective Diaphragm Area								
VG2831TM	2-1/2”	54	65 / 14	**VG2831TM+843C00**	60 / 19	**VG2831TM+843D00**	35 / 45	**VG2831TM+843E00**
VG2831UM	3”	80	45 / 10	**VG2831UM+845C00**	42 / 13	**VG2831UM+845D00**	24 / 31	**VG2831UM+845E00**
VG2831VM	4”	157	25 / 6	**VG2831VM+845C00**	23 / 8	**VG2831VM+845D00**	14 / 18	**VG2831VM+845E00**
with MP86 Series Actuators – 100 sq in. Effective Diaphragm Area								
VG2831UN	3”	80	91 / 21	**VG2831UN+865C00**	84 / 28	**VG2831UN+865D00**	49 / 63	**VG2831UN+865E00**
VG2831VN	4”	157	51 / 12	**VG2831VN+865C00**	47 / 16	**VG2831VN+865D00**	27 / 35	**VG2831VN+865E00**
VG2831WN	5”	238	33 / 7	**VG2831WN+867C00**	30 / 10	**VG2831WN+867D00**	18 / 23	**VG2831WN+867E00**
VG2831YN	6”	347	23 / 5	**VG2831YN+867C00**	21 / 7	**VG2831YN+867D00**	12 / 16	**VG2831YN+867E00**

Optional Positioner – Change the “00” at the end of the code number to either “01” or “02”

Optional Positioner	Mounting Bracket	Type	Control Input	Output Capacity	Ordering Code
V-9502-95	MP8000-6002	Pneumatic	2 to 12 psig Start 3 to 13 psig Span	1,000 scim – Dual Barbed Fitting 1,600 scim – 1/4” Barbed Fitting	“01”
EPP-1000-8	MP8000-6003	Electro-Pneumatic	0 to 10 VDC 4 to 20 mA 135 ohm Slidewire	476 scim	“02”

Repair Information

If the VG2x31 Series Pneumtic Cast Iron Flanged Globe Valve fails to operate within its specifications, replace the unit. For a replacement valve or actuator, contact the nearest Johnson Controls® representative. For complete details about VG2000 Series Cast Iron Flanged Valve repair parts refer to *VG2000 Series Cast Iron Flanged Valve Product Bulletin, LIT-977133.* For complete details about MP8000 Series Pneumatic Actuator repair parts refer to *MP8000 Series Pneumatic Actuator Product Bulletin, LIT-977257*.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

VG2x31 Series Pneumatic Cast Iron Flanged Globe Valves (Continued)

Technical Specifications

VG2x31 Series Pneumatic Cast Iron Flanged Globe Valves		
Service[1]		Hot Water, Chill Water, 50/50 Glycol Solutions and Steam for HVAC Systems
Fluid Temperature Limits	**Water**	35 to 281°F (2 to 138°C)
	Steam	35 psig (241 kPa) Saturated Steam
Maximum Allowable Pressure Temperature	**Water**	175 psig (1,206 kPa) Up to 150°F (66°C) decreasing to 125 psig (861 kPa) at 281°F (138°C)
	Steam	35 psig (241 kPa) Saturated Steam at 281°F (138°C)
Valve Body Pressure/ Temperature Rating		Meets Requirements of ANSI B16.15, Class 125
Maximum Recommended Operating Pressure Drop		35 psig (241 kPa)
Flow Characteristics		Modified Linear
Rangeability[2]	**2-1/2 in. Valves**	6.5:1
	3 in. Valves	7.7:1
	4 in. Valves	9.3:1
	5 in. Valves	10.7:1
	6 in. Valves	10.4:1
Leakage		0.1% of Maximum Flow per ANSI/FCI 70-2, Class 3
Actuator Ambient Operating Temperature Limits		-20 to 150°F (-29 to 66°C)
Maximum Actuator Supply Pressure		25 psig (172 kPa) Maximum
Materials	**Body**	Cast Iron with Black Lacquer Finish
	Stem	Stainless Steel
	Plug	Brass
	Packing	Ethylene Propylene Terpolymer (EPT) Rink Packs

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.

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VG7000 Series

LIT-1924005

Bronze Globe Valves for Assembly in the Field

Description

The VG7000 Series Bronze Valves accurately regulate the flow of water or steam in response to the demand of a controller in heating, ventilating, and air conditioning systems. These valves are available in normally open, normally closed, and three-way mixing configurations. Both electric and pneumatic actuators are available.

Features

- valves available in 1/2 through 2 in. sizes with several styles of electric and pneumatic actuators offers a broad selection to choose from
- complies with ANSI Class 250 (pressure/temperature) standard
- every valve tested for tight shutoff, ensuring occupant comfort and energy conservation
- uses standard Johnson Controls ring pack packing, providing industry-leading reliability and operating life
- complete actuator interchangeability, allowing easy field retrofit or mounting using standardized mounting kits
- all valve sizes available with brass trim or stainless steel trim for use in saturated steam applications up to 100 psig



VG7000 Series Bronze Control Valve

Selection Charts

VG7000 Series Valve Bodies

Valve Size	Cv	End Connections						
		Brass Trim						Stainless Steel Trim
		NPT	Union Sweat	Union Sweat (3/8 in. Copper Tubing)	Union Sweat (3/4 in. Copper Tubing)	Union Globe	Union Angle	NPT
Two-Way Push-Down-to-Close								
1/2”	0.73	VG7241CT	VG7281CT	VG7271CT	VG7291CT	VG7251CT	VG7551CT	VG7243CT
1/2”	1.8	VG7241ET	VG7281ET	VG7271ET	VG7291ET	VG7251ET	VG7551ET	VG7243ET
1/2”	4.6	VG7241GT	VG7281GT	VG7271GT	VG7291GT	VG7251GT	VG7551GT	VG7243GT
3/4”	7.3	VG7241LT	VG7281LT	---	---	VG7251LT	VG7551LT	VG7243LT
1”	11.6	VG7241NT	VG7281NT	---	---	VG7251NT	VG7551NT	VG7243NT
1-1/4”	18.5	VG7241PT	VG7281PT	---	---	VG7251PT	VG7551PT	VG7243PT
1-1/2”	28.9	VG7241RT	VG7281RT	---	---	VG7251RT	VG7551RT	VG7243RT
2”	46.2	VG7241ST	VG7281ST	---	---	---	---	VG7243ST
1-1/2”	28.9	3/8 in. “M” Stem Only Available in 1-1/2 and 2 in. NPT Stainless Steel Trim						VG7243RM
2”	46.2							VG7243SM
Two-Way Push-Down-to-Open								
1/2”	0.73	VG7441CT	VG7481CT	VG7471CT	VG7491CT	VG7451CT	---	VG7443CT
1/2”	1.8	VG7441ET	VG7481ET	VG7471ET	VG7491ET	VG7451ET	---	VG7443ET
1/2”	4.6	VG7441GT	VG7481GT	VG7471GT	VG7491GT	VG7451GT	---	VG7443GT
3/4”	7.3	VG7441LT	VG7481LT	---	---	---	---	VG7443LT
1”	11.6	VG7441NT	VG7481NT	---	---	---	---	VG7443NT
1-1/4”	18.5	VG7441PT	VG7481PT	---	---	---	---	VG7443PT
1-1/2”	28.9	VG7441RT	VG7481RT	---	---	---	---	VG7443RT
2”	46.2	VG7441ST	VG7481ST	---	---	---	---	VG7443ST
1-1/2”	28.9	3/8 in. “M” Stem Only Available in 1-1/2 and 2 in. NPT Stainless Steel Trim						VG7443RM
2”	46.2							VG7443SM
Three-Way Mixing								
1/2”	0.73	VG7842CT	VG7882CT	VG7872CT	VG7892CT	---	---	VG7844CT
1/2”	1.8	VG7842ET	VG7882ET	VG7872ET	VG7892ET	---	---	VG7844ET
1/2”	4.6	VG7842GT	VG7882GT	VG7872GT	VG7892GT	---	---	VG7844GT
3/4”	7.3	VG7842LT	VG7882LT	---	---	---	---	VG7844LT
1”	11.6	VG7842NT	VG7882NT	---	---	---	---	VG7844NT
1-1/4”	18.5	VG7842PT	VG7882PT	---	---	---	---	VG7844PT
1-1/2”	28.9	VG7842RT	VG7882RT	---	---	---	---	VG7844RT
2”	46.2	VG7842ST	VG7882ST	---	---	---	---	VG7844ST
1-1/2”	28.9	3/8 in. “M” Stem Only Available in 1-1/2 and 2 in. NPT Stainless Steel Trim						VG7844RM
2”	46.2							VG7844SM

Note: All actuators except MP84 Series use the 1/4 in. “T” stem. The MP84 Series pneumatic actuators require the 3/8 in. “M” stem.

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VG7000 Series Bronze Globe Valves for Assembly in the Field (Continued)

Pneumatic Actuators for VG7000 Series Brass Trim Valve Bodies

Actuator Code Number		V-3801-8001			V-3000-8011 Exposed Spring V-3000-8003 Enclosed Spring			MP822C00 (3 to 7) MP822D00 (4 to 8) MP822E00 (9 to 13)		1 and 1-1/4 in.
								MP823C00 (3 to 7) MP823D00 (4 to 8) MP823E00 (9 to 13)		1-1/2 and 2 in.
Temperature Range		35 to 248°F (2 to 120°C), 15 psig Saturated Steam			35 to 284°F (2 to 140°C), 38 psig Saturated Steam			35 to 284°F (2 to 140°C), 38 psig Saturated Steam		
Spring Range		3 to 6	4 to 8	9 to 13	3 to 6	4 to 8	9 to 13	3 to 7	4 to 8	9 to 13
Valve Size		Mounting Kit								
1/2 and 3/4 in.		VG7000-1010	VG7000-1011	VG7000-1012	VG7000-1001	VG7000-1002	VG7000-1003	---	---	---
1 and 1-1/4 in.		---	---	---	VG7000-1004	VG7000-1005	VG7000-1006	MP8000-6702		
1-1/2 and 2 in.		---	---	---	VG7000-1007	VG7000-1008	VG7000-1009			
Positioner		Not Available			V-9502-90 (V-3000-8011 Only)			V-9502-95		
Size	Cv	Closeoff Pressure								
Two-Way Normally Open										
1/2”	0.73	186	157	84	365	339	191	---	---	---
1/2”	1.8	186	157	84	365	339	191	---	---	---
1/2”	4.6	105	89	48	225	192	108	---	---	---
3/4”	7.3	67	56	30	144	122	69	---	---	---
1”	11.6	---	---	---	90	76	42	279	257	148
1-1/4”	18.5	---	---	---	55	47	26	170	157	90
1-1/2”	28.9	---	---	---	35	30	16	109	100	58
2”	46.2	---	---	---	22	19	11	70	64	37
Two-Way Normally Closed										
1/2”	0.73	37	57	158	100	142	348	---	---	---
1/2”	1.8	37	57	158	100	142	348	---	---	---
1/2”	4.6	18	28	76	49	68	168	---	---	---
3/4”	7.3	11	16	45	29	41	100	---	---	---
1”	11.6	---	---	---	17	25	65	70	96	223
1-1/4”	18.5	---	---	---	10	14	37	40	55	128
1-1/2”	28.9	---	---	---	6	9	23	25	34	79
2”	46.2	---	---	---	4	6	14	16	21	50
Three-Way Mixing										
1/2”	0.73	186 / 37	157 / 57	84 / 158	365 / 100	339 / 142	191 / 348	---	---	---
1/2”	1.8	186 / 37	157 / 57	84 / 158	365 / 100	339 / 142	191 / 348	---	---	---
1/2”	4.6	105 / 18	89 / 28	48 / 76	225 / 49	192 / 68	108 / 168	---	---	---
3/4”	7.3	67 / 11	56 / 16	30 / 45	144 / 29	122 / 41	69 / 100	---	---	---
1”	11.6	---	---	---	90 / 17	76 / 25	42 / 65	279 / 70	257 / 96	148 / 223
1-1/4”	18.5	---	---	---	55 / 10	47 / 14	26 / 37	170 / 40	157 / 55	90 / 128
1-1/2”	28.9	---	---	---	35 / 6	30 / 9	16 / 23	109 / 25	100 / 34	58 / 79
2”	46.2	---	---	---	22 / 4	19 / 6	11 / 14	70 / 16	64 / 21	37 / 50

Note: V-3000-8003 Actuators with enclosed springs are used in applications where the valve is exposed to the public, to prevent pinched fingers. Typical applications include control of hot water or steam radiators.

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VG7000 Series Bronze Globe Valves for Assembly in the Field (Continued)

Pneumatic Actuators for VG7000 Series Stainless Steel Trim Valve Bodies

Actuator Code Number		V-3000-8011 Exposed Spring V-3000-8003 Enclosed Spring			MP821C00 (3 to 7) MP821D00 (4 to 8) MP821E00 (9 to 13)		1/2 and 3/4 in.	MP843C00 (3 to 7) MP843D00 (4 to 8) MP843E00 (9 to 13)		1-1/2 and 2 in.
					MP822C00 (3 to 7) MP822D00 (4 to 8) MP822E00 (9 to 13)		1 and 1-1/4 in.			
					MP823C00 (3 to 7) MP823D00 (4 to 8) MP823E00 (9 to 13)		1-1/2 and 2 in.			
Temperature Range		35 to 338°F (2 to 170°C), 100 psig Saturated Steam			35 to 338°F (2 to 170°C), 100 psig Saturated Steam			35 to 338°F (2 to 140°C), 100 psig Saturated Steam		
Spring Range		3 to 6	4 to 8	9 to 13	3 to 6	4 to 8	9 to 13	3 to 7	4 to 8	9 to 13
Valve Size		Mounting Kit								
1/2 and 3/4 in.		VG7000-1001	VG7000-1002	VG7000-1003	MP8000-6701			Not Recommended		
1 and 1-1/4 in.		VG7000-1004	VG7000-1005	VG7000-1006	MP8000-6702					
1-1/2 and 2 in.		VG7000-1007	VG7000-1008	VG7000-1009				MP8000-6703		
Positioner		V-9502-90 (V-3000-8011 Only)			V-9502-95			V-9502-95		
Size	Cv	Closeoff Pressure								
Two-Way Normally Open										
1/2”	0.73	299	255	143	308	308	308	---	---	---
1/2”	1.8	299	255	143	308	308	308	---	---	---
1/2”	4.6	169	144	81	308	308	275	---	---	---
3/4”	7.3	108	92	52	304	304	175	---	---	---
1”	11.6	67	57	32	209	193	111	---	---	---
1-1/4”	18.5	41	35	19	128	118	68	---	---	---
1-1/2”	28.9	---	---	---	82	75	43	165	152	88
2”	46.2	---	---	---	52	48	28	106	97	56
Two-Way Normally Closed										
1/2”	0.73	75	106	261	280	308	308	---	---	---
1/2”	1.8	75	106	261	280	308	308	---	---	---
1/2”	4.6	36	51	126	135	183	308	---	---	---
3/4”	7.3	22	31	75	81	109	252	---	---	---
1”	11.6	13	19	49	53	72	168	---	---	---
1-1/4”	18.5	7	11	28	30	41	96	---	---	---
1-1/2”	28.9	---	---	---	19	25	59	39	53	121
2”	46.2	---	---	---	12	16	37	24	33	76
Three-Way Mixing										
1/2”	0.73	299 / 75	255 / 106	143 / 261	308 / 280	308 / 308	308 / 308	---	---	---
1/2”	1.8	299 / 75	255 / 106	143 / 261	308 / 280	308 / 308	308 / 308	---	---	---
1/2”	4.6	169 / 36	144 / 51	81 / 126	308 / 135	308 / 183	275 / 308	---	---	---
3/4”	7.3	108 / 22	92 / 31	52 / 75	304 / 81	304 / 109	175 / 252	---	---	---
1”	11.6	67 / 13	57 / 19	32 / 49	209 / 53	193 / 72	111 / 168	---	---	---
1-1/4”	18.5	41 / 7	35 / 11	19 / 28	128 / 30	118 / 41	68 / 96	---	---	---
1-1/2”	28.9	---	---	---	82 / 19	75 / 25	43 / 59	165 / 39	152 / 53	88 / 121
2”	46.2	---	---	---	52 / 12	48 / 16	28 / 37	106 / 24	97 / 33	56 / 76

Note: V-3000-8003 Actuators with enclosed springs are used in applications where the valve is exposed to the public, to prevent pinched fingers. Typical applications include control of hot water or steam radiators.

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VG7000 Series Bronze Globe Valves for Assembly in the Field (Continued)

Electric Actuators for VG7000 Series Brass Trim and Stainless Steel Trim Valve Bodies

Actuator Code Number		VA-7150-1001 On/Off (Floating) VA-7152-1001 0 to 10 VDC Proportional VA-7153-1001 On/Off (Floating) w/Feedback		VA-7200-1001 On/Off (Floating) VA-7202-1001 0 to 10 VDC Proportional VA-7203-1001 On/Off (Floating) w/Feedback		M9216-AGA-2 On/Off (Floating) M9216-HGA-2 0 to 10 VDC Proportional		VA-4233-AGA-2 Floating VA-4233-BGA-2 On/Off VA-4233-GGA-2 Proportional	
Style		Non-Spring Return				Spring Return			
Temperature Range		Brass Trim: 35 to 284°F (2 to 140°C), 38 psig Saturated Steam Stainless Steel Trim: 35 to 338°F (2 to 170°C), 100 psig Saturated Steam						Brass or Stainless Steel Trim: 35 to 250°F (2 to 121°C) 15 psig Saturated Steam	
Linkage		None		None		M9000-500		None	
Stem Type		Requires "T" Stem							
Size	Cv	Closeoff Pressure							
		Brass Trim	Stainless Steel Trim	Brass Trim	Stainless Steel Trim	Brass Trim	Stainless Steel Trim	Brass Trim	Stainless Steel Trim
Two-Way Push-Down-to-Close									
1/2"	0.73	345	239	---	308	345	308	345	230
1/2"	1.8	345	239	---	308	345	308	345	230
1/2"	4.6	216	135	---	278	345	283	208	130
3/4"	7.3	138	86	---	177	289	180	132	82
1"	11.6	86	54	179	112	182	114	63	39
1-1/4"	18.5	52	33	109	68	111	70	38	24
1-1/2"	28.9	34	21	70	44	71	45	—	—
2"	46.2	21	13	45	28	46	28	—	—
Two-Way Push-Down-to-Open									
1/2"	0.73	345	308	---	308	345	308	345	224
1/2"	1.8	345	308	---	308	345	308	345	224
1/2"	4.6	257	161	---	308	345	308	173	108
3/4"	7.3	153	96	---	197	321	194	103	64
1"	11.6	100	63	209	131	213	131	66	41
1-1/4"	18.5	57	36	120	75	122	75	38	24
1-1/2"	28.9	36	22	74	46	76	46	—	—
2"	46.2	22	14	46	29	47	29	—	—
Three-Way Mixing									
1/2"	0.73	345 / 345	239 / 308	---	308 / 308	345 / 345	308 / 308	345 / 345	230 / 224
1/2"	1.8	345 / 345	239 / 308	---	308 / 308	345 / 345	308 / 308	345 / 345	230 / 224
1/2"	4.6	216 / 257	135 / 161	---	278 / 308	345 / 345	283 / 308	208 / 173	130 / 108
3/4"	7.3	138 / 153	86 / 96	---	177 / 197	289 / 321	180 / 194	132 / 103	82 / 64
1"	11.6	86 / 100	54 / 63	179 / 209	112 / 131	182 / 213	114 / 131	63 / 66	39 / 41
1-1/4"	18.5	52 / 57	33 / 36	109 / 120	68 / 75	111 / 122	70 / 75	38 / 38	24 / 24
1-1/2"	28.9	34 / 36	21 / 22	70 / 74	44 / 46	71 / 76	45 / 46	—	—
2"	46.2	21 / 22	13 / 14	45 / 46	28 / 29	46 / 47	28 / 29	—	—

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VG7000 Series Bronze Globe Valves for Assembly in the Field (Continued)

Technical Specifications

VG7000 Series Valve Bodies, Two-Way and Three-Way				
Service		Steam, Hot Water, and Chilled Water with up to 50% Glycol Solution (Proper water treatment is recommended for long service life; refer to standard VDI 2035.)		
Valve Body Sizes Available		**Cv**		**Kv**
	1/2 in. (DN15)	0.73, 1.8, 4.6		0.63, 1.6, 4
	3/4 in. (DN20)	7.3		6.3
	1 in. (DN25)	11.6		10
	1-1/4 in. (DN32)	18.5		16
	1-1/2 in. (DN40)	28.9		25
	2 in. (DN50)	46.2		40
Stem Travel		**1/2 and 3/4 in.**	**1 and 1-1/4 in.**	**1-1/2 and 2 in.**
Two-Way and Three-Way		5/16 in.	1/2 in.	3/4 in.
End Connections		**Brass Trim**		**Stainless Steel Trim**
		NPT, Union Sweat, Globe & Angle		NPT
Materials	**Body**	Cast Bronze – C84400		Cast Bronze – C83600
	Stem	Stainless Steel		Stainless Steel
	Plug	Brass		Stainless Steel
	Seat	3/4 through 2 in.: Machined from Body 1/2 in.: Brass Seat		Stainless Steel Replaceable Seat
	Disk	EPDM		Stainless Steel
	Packing	Self-Adjusting EPT U-Cups		Spring-Loaded PTFE
Flow Characteristic	**Two-Way**	Equal Percentage		Equal Percentage
	Three-Way	Linear		Linear
Ratings	**Body**	ANSI Class 250[1]		ANSI Class 250[2]
	Leakage (Percent of Maximum Flow)	0.01%		0.05%
	Fluid Temperature, Body Only [3]	35 to 284°F (2 to 140°C)		35 to 338°F (2 to 170°C)
	Maximum Steam Pressure, Saturated Steam	38 psig (262 kPa)		100 psig (690 kPa)
	Maximum Pressure Drop, Valve Open	35 psig		35 psig

1. 400 psig (2,756 kPa) for fluid temperatures between 35 and 150°F (2 and 66°C); decreasing to 365 psig (2,515 kPa) at 248°F (120°C).
2. 400 psig (2,756 kPa) for fluid temperatures between 35 and 150°F (2 and 66°C); decreasing to 308 psig (2,122 kPa) at 338°F (170°C).
3. See recommended actuator tables for ambient limitations due to the actuator.

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VG2000 Series

LIT-1900064

Cast Iron Flanged Globe Valves for Assembly in the Field

Description

VG2000 Series Cast Iron Flanged Globe Valves are designed primarily to regulate the flow of water and steam in response to the demand of a controller in Heating, Ventilating, and Air Conditioning (HVAC) systems. Available in sizes 2-1/2 through 6 in., these ANSI Class 125 valves are available in Normally Open (N.O.), Normally Closed (N.C.), and three-way mixing configurations. Both electric and pneumatic actuators are available for factory or field mounting.

Refer to the *VG2000 Series Cast Iron Flanged Globe Valves Product Bulletin (LIT-977133)* for important product application information.

Features

- complete family of 2-1/2 through 6 in. cast iron flanged globe valves, brass trim, with several styles of electric and pneumatic actuators offers a broad selection from which to choose
- flexible features and options ordering matrix allow engineering to suit your specific application from thousands of easy-to-select, factory-assembled combinations
- standard Johnson Controls® Ring Pack Packings provide industry-leading reliability and operating life
- every valve tested for leakage — provides energy conservation and ensures occupant comfort



MP84 Actuated VG2000 Valve

Selection Chart

VG2000 Flanged Globe Valve Bodies/MP8000 Series Pneumatic Spring Return Actuators								
Spring Range			3 to 7 psig		4 to 8 psig		9 to 13 psig	
Valve Body Code Number	Valve Size in.	Cv	Closeoff psig	Actuator Code Number	Closeoff psig	Actuator Code Number	Closeoff psig	Actuator Code Number
Two-Way Normally Open with MP82 Series								
VG2231TL	2-1/2	51	53	**MP823C001E**	49	**MP823D001E**	28	**MP823E001E**
VG2231UL	3	83	37	**MP823C001E**	34	**MP823D001E**	19	**MP823E001E**
Two-Way Normally Open with MP84 Series								
VG2231TM	2/1/2	51	109	**MP843C001F**	100	**MP843D001F**	58	**MP843E001F**
VG2231UM	3	83	75	**MP845C001F**	70	**MP845D001F**	40	**MP845E001F**
VG2231VM	4	150	42	**MP845C001F**	39	**MP845D001F**	23	**MP845E001F**
Two-Way Normally Open with MP86 Series								
VG2231UN	3	83	152	**MP865C001G**	140	**MP865D001G**	81	**MP865E001G**
VG2231VN	4	150	86	**MP865C001G**	79	**MP865D001G**	46	**MP865E001G**
VG2231WN	5	240	55	**MP867C001G**	51	**MP867D001G**	29	**MP867E001G**
VG2231YN	6	350	38	**MP867C001G**	35	**MP867D001G**	20	**MP867E001G**
Two-Way Normally Closed with MP84 Series								
VG2431TM	2-1/2	54	24	**MP843C001F**	32	**MP843D001F**	75	**MP843E001F**
VG2431UM	3	83	17	**MP845C001F**	22	**MP845D001F**	52	**MP845E001F**
VG2431VM	4	150	9	**MP845C001F**	13	**MP845D001F**	29	**MP845E001F**
Two-Way Normally Closed with MP86 Series								
VG2431UN	3	83	34	**MP865C001G**	46	**MP865D001G**	105	**MP865E001G**
VG2431VN	4	150	19	**MP865C001G**	26	**MP865D001G**	59	**MP865E001G**
VG2431WN	5	237	12	**MP867C001G**	17	**MP867D001G**	38	**MP867E001G**
VG2431YN	6	344	9	**MP867C001G**	11	**MP867D001G**	26	**MP867E001G**
Three-Way Mixing with MP84 Series								
VG2831TM	2-1/2	54	65/14	**MP843C001F**	60/19	**MP843D001F**	35/45	**MP843E001F**
VG2831UM	3	80	45/10	**MP845C001F**	42/13	**MP845D001F**	24/31	**MP845E001F**
VG2831VM	4	157	25/6	**MP845C001F**	23/8	**MP845D001F**	14/18	**MP845E001F**
Three-Way Mixing with MP86 Series								
VG2831UN	3	80	91/21	**MP865C001G**	84/28	**MP865D001G**	49/63	**MP865E001G**
VG2831VN	4	157	51/12	**MP865C001G**	47/16	**MP865D001G**	27/35	**MP865E001G**
VG2831WN	5	238	33/7	**MP867C001G**	23/8	**MP867D001G**	18/23	**MP867E001G**
VG2831YN	6	347	23/5	**MP867C001G**	21/7	**MP867D001G**	12/16	**MP867E001G**

Mounting Kits for Field Mounting MP8000 Series Pneumatic Actuators

Mounting Kit Code Number	Actuator Style	Valve Size	Stem Type (Diameter)
MP8000-6201	MP82/MP83/MP84/MP85	2-1/2 through 4 in.	"L" Stem (3/8 in.) or "M" Stem (3/8 in.)
MP8000-6203	MP86/MP87	3 through 6 in.	"N" Stem (1/2 in.)

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VG2000 Series Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)

Postioners and Positioner Mounting Kits for MP8000 Series Pneumatic Valve Actuators

Code Number	Description	Shipping Weight lb (kg)
V-9502-95	Pneumatic Valve Actuator Positioner (Less Spring and Mounting Hardware)	0.9 (0.41)
MP8000-6002	Mounting Kit for V-9502-95 Pneumatic Valve Actuator Positioner (Kit includes All Necessary Mounting hardware and Six Springs)	1.3 (0.59)
EPP-1000-8	Electro-Pneumatic Valve Actuator Positioner (Less Mounting Hardware)	1.6 (0.73)
MP8000-6003	Mounting Kit for EPP-1000-8 Electro-Pneumatic Valve Actuator Positioner (Kit includes All Necessary Mounting Hardware)	1.5 (0.68)



M9100 Non-Spring Return Actuated VG2000 Valves



M9220 Spring Return Actuated VG2000 Valves

Selection Chart

VG2000 Flanged Globe Valve Bodies/M9100 Series Electric Non-Spring Return Actuators								
Valve Body Code Number	Valve Size in.	Cv	Closeoff psig	Mounting Kit Code Number	Non-Spring Return Actuator Code Numbers			
					Floating Control		0 to 10 VDC Proportional	
					Without Switches	With Two Switches	Without Switches	With Two Switches
Two-Way Push-Down-to-Close								
VG2231TM	2-1/2	51	62	M9000-530	**M9116-AGA-2**	**M9116-AGC-2**	**M9116-GGA-2**	**M9116-GGC-2**
VG2231TM	2/1/2	51	101		**M9124-AGA-2**	**M9124-AGC-2**	**M9124-GGA-2**	**M9124-GGC-2**
VG2231UM	3	83	27	M9000-531	**M9116-AGA-2**	**M9116-AGC-2**	**M9116-GGA-2**	**M9116-GGC-2**
VG2231UM	3	83	43		**M9124-AGA-2**	**M9124-AGC-2**	**M9124-GGA-2**	**M9124-GGC-2**
VG2231UM	3	83	88	M9000-532	**M9124-AGA-2**[1]	**M9124-AGC-2**[1]	**M9124-GGA-2**[1]	**M9124-GGC-2**[1]
VG2231VM	4	150	24	M9000-531	**M9124-AGA-2**	**M9124-AGC-2**	**M9124-GGA-2**	**M9124-GGC-2**
VG2231VM	4	150	49	M9000-532	**M9124-AGA-2**[1]	**M9124-AGC-2**[1]	**M9124-GGA-2**[1]	**M9124-GGC-2**[1]
VG2231WN	5	240	26	M9000-534	**M9124-AGA-2**[1]	**M9124-AGC-2**[1]	**M9124-GGA-2**[1]	**M9124-GGC-2**[1]
VG2231YN	6	350	16	M9000-536	**M9124-AGA-2**[1]	**M9124-AGC-2**[1]	**M9124-GGA-2**[1]	**M9124-GGC-2**[1]
Three-Way Mixing								
VG2831TM	2-1/2	54	37	M9000-530	**M9116-AGA-2**	**M9116-AGC-2**	**M9116-GGA-2**	**M9116-GGC-2**
VG2831TM	2-1/2	54	60		**M9124-AGA-2**	**M9124-AGC-2**	**M9124-GGA-2**	**M9124-GGC-2**
VG2831UM	3	80	16	M9000-531	**M9116-AGA-2**	**M9116-AGC-2**	**M9116-GGA-2**	**M9116-GGC-2**
VG2831UM	3	80	26		**M9124-AGA-2**	**M9124-AGC-2**	**M9124-GGA-2**	**M9124-GGC-2**
VG2831UM	3	80	53	M9000-532	**M9124-AGA-2**[1]	**M9124-AGC-2**[1]	**M9124-GGA-2**[1]	**M9124-GGC-2**[1]
VG2831VM	4	157	9	M9000-531	**M9116-AGA-2**	**M9116-AGC-2**	**M9116-GGA-2**	**M9116-GGC-2**
VG2831VM	4	157	14		**M9124-AGA-2**	**M9124-AGC-2**	**M9124-GGA-2**	**M9124-GGC-2**
VG2831VM	4	157	30	M9000-532	**M9124-AGA-2**[1]	**M9124-AGC-2**[1]	**M9124-GGA-2**[1]	**M9124-GGC-2**[1]
VG2831WN	5	238	7	M9000-533	**M9124-AGA-2**	**M9124-AGC-2**	**M9124-GGA-2**	**M9124-GGC-2**
VG2831WN	5	238	15	M9000-534	**M9124-AGA-2**[1]	**M9124-AGC-2**[1]	**M9124-GGA-2**[1]	**M9124-GGC-2**[1]
VG2831YN	6	347	4	M9000-535	**M9124-AGA-2**	**M9124-AGC-2**	**M9124-GGA-2**	**M9124-GGC-2**
VG2831YN	6	347	9	M9000-536	**M9124-AGA-2**[1]	**M9124-AGC-2**[1]	**M9124-GGA-2**[1]	**M9124-GGC-2**[1]

1. Valve assemblies require two actuators mounted in tandem. On tandem assemblies with switches, only one actuator is required to have switches.

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VG2000 Series Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)

Selection Chart

Flanged Globe Valve Bodies/M9220 Series Electric Spring Return Actuators										
Valve Body Code Number	Valve Size in.	Cv	Closeoff psig	Mounting Kit Code Number	Spring Return Actuator Code Numbers					
					Floating Control		On/Off Control		0 to 10 VDC Proportional	
					Without Switches	With Two Switches	Without Switches	With Two Switches	Without Switches	With Two Switches
Two-Way Push-Down-to-Close[1]										
VG2231TM	2-1/2	51	76	M9000-530	**M9220-AGA-3**	**M9220-AGC-3**	**M9220-BGA-3**	**M9220-BGC-3**	**M9220-GGA-3**	**M9220-GGC-3**
VG2231UM	3	83	33	M9000-531						
VG2231UM	3	83	66	M9000-532	**M9220-AGA-3[2]**	**M9220-AGC-3[2]**	**M9220-BGA-3[2]**	**M9220-BGC-3[2]**	**M9220-GGA-3[2]**	**M9220-GGC-3[2]**
VG2231VM	4	150	37							
VG2231WN	5	240	20	M9000-534						
Three-Way Mixing										
VG2831TM	2-1/2	54	45	M9000-530	**M9220-AGA-3**	**M9220-AGC-3**	**M9220-BGA-3**	**M9220-BGC-3**	**M9220-GGA-3**	**M9220-GGC-3**
VG2831UM	3	80	20	M9000-531						
VG2831UM	3	80	40	M9000-532	**M9220-AGA-3[2]**	**M9220-AGC-3[2]**	**M9220-BGA-3[2]**	**M9220-BGC-3[2]**	**M9220-GGA-3[2]**	**M9220-GGC-3[2]**
VG2831VM	4	157	11	M9000-531	**M9220-AGA-3**	**M9220-AGC-3**	**M9220-BGA-3**	**M9220-BGC-3**	**M9220-GGA-3**	
VG2831VN	4	157	22	M9000-532	**M9220-AGA-3[2]**	**M9220-AGC-3[2]**	**M9220-BGA-3[2]**	**M9220-BGC-3[2]**	**M9220-GGA-3[2]**	**M9220-GGC-3[2]**
VG2831WN	5	238	12	M9000-534						
VG2831YN	6	347	7	M9000-536						

1. Actuator can be configured to spring return the valve either open or closed.
2. Valve assemblies require two actuators mounted in tandem. On tandem assemblies with switches, only one actuator is required to have switches.

Mounting Kits for Field Mounting M9100 and M9220 Series Electric Actuators

Mounting Kit Code Number	Number of Actuator(s)	Valve	Valve Size	Valve Stroke	Stem Type (Diameter)
M9000-530	Single	VG2x31TM	2-1/2 in.	3/4 in.	"M" Stem (3/8 in.)
M9000-531		VG2x31UM and VG2x31VM	3 and 4 in.	1-1/8 in.	
M9000-532	Dual				
M9000-533	Single	VG2x31WN	5 in.	1-3/8 in.	"N" Stem (1/2 in.)
M9000-534	Dual				
M9000-535	Single	VG2x31YN	6 in.	1-1/2 in.	
M9000-536	Dual				
M9000-537		VG2x31UN and VG2x31VN	3 and 4 in.	1-1/8 in.	

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VG2000 Series Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)



VA-3100 Actuated Two-Way VG2000 Series Valves



VA-6100 Actuated Three-Way VG200 Series Valves

Selection Chart

Flanged Globe Valve Bodies/VA-3100 Series Electric Non-Spring Return Actuators							
Valve Body Code Number	Valve Size (in.)	Cv	Closeoff psig	Mounting Kit Code Number	Non-Spring Return Actuator Code Numbers		
					Floating without Switches	Floating with Two Switches	0 to 10 VDC Proportional with Two Switches
Two-Way Push-Down-to-Close							
VG2231TM	2-1/2	51	115	VA-3100-500	**VA-3100-AGA**	**VA-3100-AGC**	**VA-3100-HGC**
VG2231UM	3	83	79				
VG2231VM	4	150	45				
VG2231WN	5	240	29	VA-3100-501			
VG2231YN	6	350	20				
Three-Way Mixing							
VG2831TM	2-1/2	54	69	VA-3100-500	**VA-3100-AGA**	**VA-3100-AGC**	**VA-3100-HGC**
VG2831UM	3	80	48				
VG2831VM	4	157	27				
VG2831WN	5	238	17	VA-3100-501			
VG2831YN	6	347	12				

Selection Chart

Flanged Globe Valve Bodies/VA-6100 Series Electric Non-Spring Return Actuators						
Valve Body Code Number	Valve Size (in.)	Cv	Closeoff psig	Mounting Kit Code Number	Non-Spring Return Actuator Code Numbers	
					Floating without Switches	0 to 10 VDC Proportional with Two Switches
Two-Way Push-Down-to-Close						
VG2231VN	4	150	89	VA-3100-501	**VA-6100-AGC**	**VA-6100-HGC**
VG2231WN	5	240	57			
VG2231YN	6	350	40			
Three-Way Mixing						
VG2831VN	4	157	54	VA-3100-501	**VA-6100-AGC**	**VA-6100-HGC**
VG2831WN	5	238	34			
VG2831YN	6	347	24			

Mounting Kits for Field Mounting VA-3100 and VA-6100 Series Electric Actuators

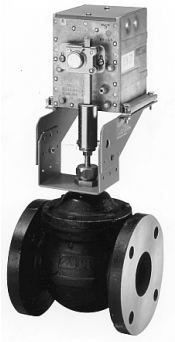
Mounting Kit Code Number	Actuator Series	Valve Size	Stem Type (Diameter)
VA-3100-500	VA-3100	2-1/2 through 4 in.	"M" Stem (3/8 in.)
		5 and 6 in.	"N" Stem (1/2 in.)
VA-3100-501	VA-6100	4 through 6 in.	

Tool Kit for VA-3100 Series Electric Actuators

Code Number	Description
VA-3100-101	Auxiliary Switch Cam Adjusting Wrench (Used on VA-3100 Series Electric Actuators – One Wrench is Supplied with Each Actuator)

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VG2000 Series Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)



M100 Actuated Two-Way VG2000 Series Valve



M100 Actuated Three-Way VG2000 Series Valve

Selection Chart

VG2000 Flanged Globe Valve Bodies/M100 Series Electric Actuators							
Valve Body Code Number	Valve Size (in.)	Cv	Closeoff Pressure (psig)				
			M120 or M130 with Y20EBD-1 Linkage Kit	M120 or M130 with Y20EBD-1 Linkage Kit	M140 with Y20EBD-2 Linkage Kit	M150 with Y20EBD-3 Linkage Kit	M140 with Y20EBD-4 Linkage Kit[1]
Two-Way Push-Down-to-Close							
VG2231TM	2-1/2	51	7 (48)	12 (83)	22 (152)	46 (317)	28 (193)
VG2231UM	3	83	—	7 (48)	14 (96)	31 (214)	18 (124)
VG2231VM	4	150	—	—	6 (41)	16 (110)	9 (62)
Three-Way Mixing							
VG2831TM	2-1/2	54	7 (48)	12 (83)	22 (152)	28 (193)	26 (179)
VG2831UM	3	80	—	7 (48)	14 (96)	19 (131)	18 (124)
VG2831VM	4	157	—	—	6 (41)	11 (76)	9 (62)

1. The special Y20EBD-4 Linkage Kit is available to enable an M150 Series Electric Actuator to operate S91 Series Auxiliary Switches for automatic heating/cooling changeover applications. The Y20EBD-4 Linkage Kit allows additional over travel after valve closeoff for switch operation.

Selection Chart

Available M100 Series Electric Actuators				
Description	Actuator Code Numbers			
	Torque			
	35 lb-in	75 lb-in	150 lb-in	50 lb-in
	Non-Spring Return			Spring Return
On/Off (Floating) Control, 120 VAC, Adjustable Travel	**M120AAA-1**	**M140AAA-1**	—	—
On/Off (Floating) Control, 120 VAC, Adjustable Travel, One Auxiliary Switch	—	—	—	**M130AAB-1**
On/Off (Floating) Control, 120 VAC, Adjustable Travel, Two Auxiliary Switches	**M120AAC-1**	—	—	—
On/Off (Floating) Control, 24 VAC, Adjustable Travel	**M120AGA-1**	**M140AGA-1**	**M150AGA-1**	**M130AGA-1**
On/Off (Floating) Control, 24 VAC, Adjustable Travel, One Auxiliary Switch	—	—	**M150AGB-1**	**M130AGB-1**
Proportional Control, Digital Input (R81CCA-2), 24 VAC, Adjustable Travel	**M120CGA-2**	**M140CGA-2**	**M150CGA-2**	**M130CGA-2**
DA/RA Analog DC Input (R81GAA-2), 24 VAC, Adjustable Travel	**M120GGA-3**	**M140GGA-3**	**M150GGA-3**	**M130GGA-3**
Proportional, Potentiometer Input (R81JAA-1), 120 VAC, Adjustable Travel	**M120JAA-1**	**M140JAA-1**	—	—
Proportional, Potentiometer Input (R81JAA-1), 120 VAC, Adjustable Travel, Two Auxiliary Switches	**M120JAC-1**	—	—	—
Proportional, Potentiometer Input (R81JAA-1), 24 VAC, Adjustable Travel	**M120JGA-1**	**M140JGA-1**	**M150JGA-1**	**M130JGA-1**
Proportional, Potentiometer Input (R81JAA-1), 120 VAC, Adjustable Travel, One Auxiliary Switch	—	—	**M150JGB-1**	**M130JGB-1**
Proportional, Potentiometer Input (R81JAA-1), 120 VAC, Adjustable Travel, Two Auxiliary Switches	—	—	**M150JGC-1**	**M130JGC-1**
Thermistor Input (R81QAA-1), 40 to 90° Set Point Range, 24 VAC, Adjustable Travel	—	—	**M150QGA-1**	**M130QGA-1**
Thermistor Input (R81QAA-1), 40 to 90° Set Point Range, 24 VAC, Adjustable Travel, One Auxiliary Switch	—	—	**M150QGB-1**	—

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VG2000 Series Cast Iron Flanged Globe Valves for Assembly in the Field (Continued)

Accessories for M100 Series Electric Actuators

Code Number	Description	Ship Weight lb (kg)
S91DJ-1	Auxiliary Switch Kit with One Single-Pole, Double-Throw Switch	1.8 (0.82)
S91EJ-1	Auxiliary Switch Kit with Two Single-Pole, Double-Throw Switches	1.9 (0.87)
S91PT-1	Auxiliary Potentiometer Switch Kit (1,000 ohms, 1/3 watt)	1.8 (0.82)
CVR83A-600R	Weather Resistant Cover	0.4 (0.18)
Y68AA-1	Cover Mounted Transformer (120 VAC Primary Power Supply, 40 VA Transformer Capacity)	1.9 (0.87)
Y68DA-1	Cover Mounted Transformer (240 VAC Primary Power Supply, 40 VA Transformer Capacity)	1.9 (0.87)
Y68HA-1	Cover Mounted Transformer (24 VAC Primary Power Supply, 40 VA Transformer Capacity - used when an Isolation Transformer is needed))	1.9 (0.87)

Technical Specifications

VG2000 Series Cast Iron Flanged Globe Valves		
Service[1]		Hot Water, Chilled Water, 50% Glycol Solutions or Steam for HVAC Systems
Valve Stroke	2-1/2 and 3 in. Valves	3/4 in. (19 mm)
	3 and 4 in. Valves	1-1/8 in. (29 mm)
	5 in. Valves	1-3/8 in. (35 mm)
	6 in. Valves	1-1/2 in. (38 mm)
Valve Body Rating		Meets Requirements of ASME B16.1, Class 125
Valve Assembly Maximum Allowable Pressure/Temperature	Steam	35 psig (241 kPa) at 281°F (138°C)
	Water	175 psig (1,206 kPa) up to 150°F (66°C), Decreasing to 125 psig (861 kPa) at 281°F (138°C)
Leakage		0.1% of Maximum Flow
Inherent Flow Characteristics		Modified Linear
Rangeability[2]	2-1/2 in. Valves	6.5:1
	3 in. Valves	7.7:1
	4 in. Valves	9.3:1
	5 in. Valves	10.7:1
	6 in. Valves	10.4:1
Spring Ranges (MP8000 Series Actuators)		3 to 7, 4 to 8, and 9 to 13 psig (21 to 48, 28 to 55, and 62 to 90 kPa)
Maximum Recommended Operating Pressure Drop		35 psig (241 kPa) for All Valve Sizes
Maximum Actuator Supply Pressure (Pneumatically Actuated Valves Only)		25 psig (172 kPa) Maximum
Materials	Body	Cast Iron with Black Lacquer Finish
	Stem	316 Stainless Steel
	Plug	Brass
	Packing	Ethylene Propylene Terpolymer (EPT) Ring Packs
Valve Fluid Operating Temperature Limits		35 to 281°F (2 to 138°C), 35 psig (241 kPa) Saturated Steam
Actuator Ambient Operating Temperature Limits	M91xx Series	-4 to 122°F (-20 to 50°C)
	M9220 Series	-40 to 131°F (-40 to 55°C)
	VA-3100 Series	14 to 140°F (-10 to 60°C) Floating Control 14 to 122°F (-10 to 50°C) Proportional Control
	VA-6100 Series	-4 to 140°F (-20 to 60°C)
	MP8000 Series	-20 to 150°F (-29 to 66°C)

1. Proper water treatment is recommended; refer to VDI 2035 Standard.
2. Rangeability is defined as the ratio of maximum flow to minimum controllable flow.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M9000-53x Series

LIT-1900196

Cast Iron Flanged Valves Linkage Kits

Description

The M9000-53x Series Cast Iron Flanged Valve Linkage Kits are designed specifically for field mounting Johnson Controls® M9116 and M9124 Series Non-Spring Return (NSR) and M9220 Series Spring Return (SR) Electric Actuators to Johnson Controls VG2000 Series Cast Iron Flanged Valves in sizes 2-1/2 through 6 in. Kits are available to fit older Johnson Controls valves for easy conversion from pneumatic or older electric actuator installations.

Refer to the *M9000-53x Series Cast Iron Flanged Valve Linkage Kit for M9000 Series Electric Actuators Product Bulletin (LIT-1201538)* for important product application information.

Features

- dedicated models facilitate quick and easy installation regardless of the valve stroke and electric actuator chosen
- single anti-rotation bracket allows one linkage to accommodate spring return and non-spring return electric actuators
- two-bolt coupler clamp provides quick and easy coupling of the linkage to the valve stem
- easy to convert from single to tandem actuators accommodates changing shutoff requirements

Repair Information

If the M9000-53x Series Cast Iron Flanged Valve Linkage Kit fails to operate within its specifications, replace the unit. For a replacement kit, contact the nearest Johnson Controls representative.



VG2x31 Valves with M9000 Series Electric Valve Actuators

Selection Chart

Valve Size, in.	Active Valve Code Number	Discontinued Valve Code Numbers That Are Compatible with Linkage Kit	Nominal Valve Stroke, in.	Valve Stem Diameter, in.	Actuator Series[1]	Number of Actuators Required	Linkage Kit Code Number
2-1/2	VG2231TM VG2431TM VG2831TM	V-5252-4, -5, -6, -7, -8, -32, -33 V-5462-6, -7, -34 V-5842-7, -8, -31 VB-3752-19 VB-3970-11 VB-4322-9	3/4	3/8	M9116 M9124 M9220	One	**M9000-530[2]**
3	VG2231UM VG2431UM VG2831UM	V-5252-9, -10, -11, -12, -13, -34, -35 V-5462-8, -9, -35 V-5842-9, -10, -32 VB-3752-22 VB-3970-14 VB-4322-11	1-1/8				**M9000-531[3]**
					M9124 M9220	Two	**M9000-532**
	VG2231UN VG2431UN VG2831UN	V-5462-10, -36 V-5842-17, -18, -33		1/2			**M9000-537**
4	VG2231VM VG2431VM VG2831VM	V-5252-14, -36 V-5462-11, -12, -37 V-5842-9, -10, -32 VB-3752-22 VB-3970-17 VB-4322-13		3/8		One	**M9000-531[3]**
						Two	**M9000-532**
	VG2231VN VG2431VN VG2831VN	V-5252-15, -16, -37 V-5462-13, -14, -38 V-5842-11, -12, -34		1/2			**M9000-537**
5	VG2231WN VG2431WN VG2831WN	V-5252-17, -18, -38 V-5462-15, -16, -39 V-5842-13, -14,-35 VB-3752-28 VB-3970-20 VB-4322-19	1-3/8			One	**M9000-533[3]**
						Two	**M9000-534**
6	VG2231YN VG2431YN VG2831YN	V-5252-19, -39 V-5462-17, -18, -40 V-5842-15, -16, -36 VB-3752-31 VB-3970-23 VB-4322-18	1-1/2			One	**M9000-535[3]**
						Two	**M9000-536**

1. M9116 and M9124 Series Electric Actuators are non-spring return. M9220 Series Electric Actuators are spring return.
2. The M9000-530 cannot be retrofitted with the M9000-610 Tandem Adapter Kit.
3. Linkages can be retrofitted with a tandem actuator using an M9100-610 Tandem Adapter Kit.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

M9000-53x Series Cast Iron Flanged Valves Linkage Kits (Continued)

Technical Specifications

M9000-53x Series Cast Iron Flanged Valve Linkage Kits		
Service[1]		Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for Heating, Ventilating, and Air Conditioning (HVAC) Systems
Force Output	**M9000-530**	378 lb (1684 N) minimum with M9116 Series Actuator 605 lb (2691 N) minimum with M9124 Series Actuator 457 lb (2035 N) minimum with M9220 Series Actuator
	M9000-531	238 lb (1060 N) minimum with M9116 Series Actuator 380 lb (1694 N) minimum with M9124 Series Actuator 288 lb (1281 N) minimum with M9220 Series Actuator
	M9000-532	761 lb (3385 N) minimum with Tandem M9124 Series Actuators 576 lb (2562 N) minimum with Tandem M9220 Series Actuators
	M9000-533	315 lb (1405 N) minimum with M9124 Series Actuator
	M9000-534	631 lb (2806 N) minimum with Tandem M9124 Series Actuators 477 lb (2121 N) minimum with Tandem M9220 Series Actuators
	M9000-535	280 lb (1248 N) minimum with M9124 Series Actuator
	M9000-536	561 lb (2495 N) minimum with Tandem M9124 Series Actuators 424 lb (1887 N) minimum with Tandem M9220 Series Actuators
	M9000-537	761 lb (3385 N) minimum with Tandem M9124 Series Actuators 576 lb (2562 N) minimum with Tandem M9220 Series Actuators
Valve Stroke	**M9000-530**	3/4 in. (19 mm) Nominal
	M9000-531	1-1/8 in. (29 mm) Nominal
	M9000-532	1-1/8 in. (29 mm) Nominal
	M9000-533	1-3/8 in. (35 mm) Nominal
	M9000-534	1-3/8 in. (35 mm) Nominal
	M9000-535	1-1/2 in. (38 mm) Nominal
	M9000-536	1-1/2 in. (38 mm) Nominal
	M9000-537	1-1/8 in. (29 mm) Nominal
Minimum Ambient Operating Temperaure (Limited by the Valve)		35°F (2°C) in Water and Steam Applications
Maximum Ambient Operating Temperature[2] **(Limited by the Actuator)**		122°F (50°C) M91xx Series Actuators 131°F (55°C) M9220 Series Actuators
Shipping Weight		7-1/2 lb (3.4 kg)

1. Proper water treatment is recommended; refer to VDI 2035 Standard.
2. In steam applications, install the valve with the stem horizontal to the piping, and wrap the valve with insulation.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

P1000 Series

LIT-1900445

Pressure Independent Valves

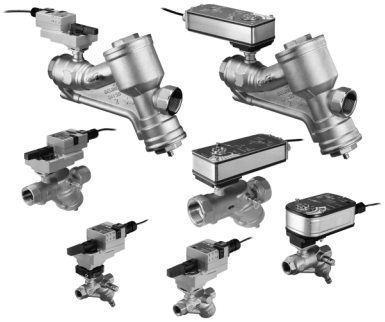
Description

P1000 Series Pressure Independent Valves are designed to regulate the flow of hot or chilled water and 60% glycol solutions in response to the demand of a controller in Heating, Ventilating, and Air Conditioning (HVAC) systems. The pressure independent valves eliminate the need for separate balancing valves. These valves are available in sizes 1/2 through 2 in. (DN15 through DN50) with factory-mounted Johnson Controls® VA2104 and VA2120 Non-Spring Return and M2204 and M2215 Series Spring Return Electric Actuators for floating or proportional control.

Refer to the *P1000 Series Pressure Independent Valves Product Bulletin (LIT-12011272)* for important product application information.

Features

- no Cv calculation — simplifies valve selection
- automatic system balancing prevents overflow or underflow to maximize system performance
- combined control and balancing valve reduces installation time and cost
- 600 psi static pressure rating for 1/2 through 1 in. valves and 400 psi static pressure rating for 1-1/4 through 2 in. valves allows use of valve in a wide range of systems
- 200 psi closeoff pressure rating provides tight shutoff in high pressure systems
- 5 to 50 psi operating differential pressure rating allows use of valve in a wide range of systems
- available with factory-mounted VA2104, VA2120, M2204, or M2215 Series Electric Actuators reduces installation time to reduce overall installation cost
- maintenance-free design eliminates need for periodic rebuilding and rebalancing of the system, with no packings to adjust
- ANSI Class IV leakage and ±5% flow accuracy reduces energy costs and provides superior room comfort



P1000 Series
Pressure Independent Valve Assembly

Repair Information

If the P1000 Pressure Independent Valve fails to operate within its specifications, refer to the *P1000 Pressure Independent Valves Product Bulletin (LIT-12011272)* for a list of replacement parts available.

Selection Charts

Two-Way Non-Spring Return (Part 1 of 2)

Size, in.	Flow Rate (GPM)	Closeoff psig	24 VAC			
			No Pressure Taps		With Two Pressure Taps	
			Floating	DC 0 to 10 V Proportional	Floating	DC 0 to 10 V Proportional
			VA2104-AGA-2	VA2104-HGA-2	VA2104-AGA-2	VA2104-HGA-2; VA2120-HGA-2
1/2	0.5	200	P1241A00+21LAGA	P1241A00+21LHGA	P1242A00+21LAGA	P1242A00+21LHGA
	1		P1241A01+21LAGA	P1241A01+21LHGA	P1242A01+21LAGA	P1242A01+21LHGA
	1.5		P1241A01521LAGA	P1241A01521LHGA	P1242A01521LAGA	P1242A01521LHGA
	2		P1241A02+21LAGA	P1241A02+21LHGA	P1242A02+21LAGA	P1242A02+21LHGA
	3		P1241A03+21LAGA	P1241A03+21LHGA	P1242A03+21LAGA	P1242A03+21LHGA
	4		P1241A04+21LAGA	P1241A04+21LHGA	P1242A04+21LAGA	P1242A04+21LHGA
	5		P1241A05+21LAGA	P1241A05+21LHGA	P1242A05+21LAGA	P1242A05+21LHGA
3/4	6	200	P1241B06+21LAGA	P1241B06+21LHGA	P1242B06+21LAGA	P1242B06+21LHGA
	7		P1241B07+21LAGA	P1241B07+21LHGA	P1242B07+21LAGA	P1242B07+21LHGA
	8		P1241B08+21LAGA	P1241B08+21LHGA	P1242B08+21LAGA	P1242B08+21LHGA
	9		P1241B09+21LAGA	P1241B09+21LHGA	P1242B09+21LAGA	P1242B09+21LHGA
	10		P1241B10+21LAGA	P1241B10+21LHGA	P1242B10+21LAGA	P1242B10+21LHGA
1	12	200	P1241C12+21LAGA	P1241C12+21LHGA	P1242C12+21LAGA	P1242C12+21LHGA
	14		P1241C14+21LAGA	P1241C14+21LHGA	P1242C14+21LAGA	P1242C14+21LHGA
	16		P1241C16+21LAGA	P1241C16+21LHGA	P1242C16+21LAGA	P1242C16+21LHGA
	18		P1241C18+21LAGA	P1241C18+21LHGA	P1242C18+21LAGA	P1242C18+21LHGA
1-1/4	18	200	—	—	—	P1242D18+21AHGA
	20		—	—	—	P1242D20+21AHGA
	22		—	—	—	P1242D22+21AHGA
	24		—	—	—	P1242D24+21AHGA
	26		—	—	—	P1242D26+21AHGA
1-1/2	26	200	—	—	—	P1242E26+21AHGA
	28		—	—	—	P1242E28+21AHGA
	30		—	—	—	P1242E30+21AHGA
	33		—	—	—	P1242E33+21AHGA

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P1000 Series Pressure Independent Valves (Continued)

Two-Way Non-Spring Return (Part 2 of 2)

Size, in.	Flow Rate (GPM)	Closeoff psig	24 VAC			
			No Pressure Taps		With Two Pressure Taps	
			Floating	DC 0 to 10 V Proportional	Floating	DC 0 to 10 V Proportional
			VA2104-AGA-2	VA2104-HGA-2	VA2104-AGA-2	VA2104-HGA-2; VA2120-HGA-2
2	33	200	—	—	—	P1242F33+21AHGA
	36		—	—	—	P1242F36+21AHGA
	40		—	—	—	P1242F40+21AHGA
	44		—	—	—	P1242F44+21AHGA
	48		—	—	—	P1242F48+21AHGA
	52		—	—	—	P1242F52+21AHGA
	56		—	—	—	P1242F56+21AHGA
	60		—	—	—	P1242F60+21AHGA
	65		—	—	—	P1242F65+21AHGA
	70		—	—	—	P1242F70+21AHGA
	75		—	—	—	P1242F75+21AHGA
	80		—	—	—	P1242F80+21AHGA

Two-Way Spring Return

Size, in.	Flow Rate (GPM)	Closeoff psig	DC 0 to 10 V Proportional Control, 24 VAC Supply			
			Spring Return Open		Spring Return Closed	
			Without Pressure Taps	With Pressure Taps	Without Pressure Taps	With Pressure Taps
			M2204-AGA-2	M2204-HGA-2	M2204-AGA-2	M2204-HGA-2; M2215-HGA-2
1/2	0.5	200	P1241A00+22LHGA	P1242A00+22LHGA	P1241A00+24LHGA	P1242A00+24LHGA
	1		P1241A01+22LHGA	P1242A01+22LHGA	P1241A01+24LHGA	P1242A01+24LHGA
	1.5		P1241A01522LHGA	P1242A01522LHGA	P1241A01524LHGA	P1242A01524LHGA
	2		P1241A02+22LHGA	P1242A02+22LHGA	P1241A02+24LHGA	P1242A02+24LHGA
	3		P1241A03+22LHGA	P1242A03+22LHGA	P1241A03+24LHGA	P1242A03+24LHGA
	4		P1241A04+22LHGA	P1242A04+22LHGA	P1241A04+24LHGA	P1242A04+24LHGA
	5		P1241A05+22LHGA	P1242A05+22LHGA	P1241A05+24LHGA	P1242A05+24LHGA
3/4	6	200	P1241B06+22LHGA	P1242B06+22LHGA	P1241B06+24LHGA	P1242B06+24LHGA
	7		P1241B07+22LHGA	P1242B07+22LHGA	P1241B07+24LHGA	P1242B07+24LHGA
	8		P1241B08+22LHGA	P1242B08+22LHGA	P1241B08+24LHGA	P1242B08+24LHGA
	9		P1241B09+22LHGA	P1242B09+22LHGA	P1241B09+24LHGA	P1242B09+24LHGA
	10		P1241B10+22LHGA	P1242B10+22LHGA	P1241B10+24LHGA	P1242B10+24LHGA
1	12	200	P1241C12+22LHGA	P1242C12+22LHGA	P1241C12+24LHGA	P1242C12+24LHGA
	14		P1241C14+22LHGA	P1242C14+22LHGA	P1241C14+24LHGA	P1242C14+24LHGA
	16		P1241C16+22LHGA	P1242C16+22LHGA	P1241C16+24LHGA	P1242C16+24LHGA
	18		P1241C18+22LHGA	P1242C18+22LHGA	P1241C18+24LHGA	P1242C18+24LHGA
1-1/4	18	200	—	P1242D18+22AHGA	—	P1242D18+24AHGA
	20		—	P1242D20+22AHGA	—	P1242D20+24AHGA
	22		—	P1242D22+22AHGA	—	P1242D22+24AHGA
	24		—	P1242D24+22AHGA	—	P1242D24+24AHGA
	26		—	P1242D26+22AHGA	—	P1242D26+24AHGA
1-1/2	26	200	—	P1242E26+22AHGA	—	P1242E26+24AHGA
	28		—	P1242E28+22AHGA	—	P1242E28+24AHGA
	30		—	P1242E30+22AHGA	—	P1242E30+24AHGA
	33		—	P1242E33+22AHGA	—	P1242E33+24AHGA
2	33	200	—	P1242F33+22AHGA	—	P1242F33+24AHGA
	36		—	P1242F36+22AHGA	—	P1242F36+24AHGA
	40		—	P1242F40+22AHGA	—	P1242F40+24AHGA
	44		—	P1242F44+22AHGA	—	P1242F44+24AHGA
	48		—	P1242F48+22AHGA	—	P1242F48+24AHGA
	52		—	P1242F52+22AHGA	—	P1242F52+24AHGA
	56		—	P1242F56+22AHGA	—	P1242F56+24AHGA
	60		—	P1242F60+22AHGA	—	P1242F60+24AHGA
	65		—	P1242F65+22AHGA	—	P1242F65+24AHGA
	70		—	P1242F70+22AHGA	—	P1242F70+22AHGA
	75		—	P1242F75+22AHGA	—	P1242F75+24AHGA
	80		—	P1242F80+22AHGA	—	P1242F80+24AHGA

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P1000 Series Pressure Independent Valves (Continued)

Technical Specifications

P1000 Series Pressure Independent Valves		
Service[1]		Hot Water, Chilled Water, and 60% Glycol Solutions for HVAC Systems
Valve Fluid Temperature Limits		0 to 212°F (-18 to 100°C)
Valve Body Pressure/Temperature Rating		600 psig (4,134 kPa) - sizes 1/2, 3/4, and 1 in. 400 psig (2,756 kPa) - sizes 1-1/4, 1-1/2, and 2 in.
Maximum Closeoff Pressure		200 psi (1,378 kPa)
Recommended Minimum Differential Operating Pressure		5 psi (34 kPa)
Maximum Recommended Operating Pressure Drop		50 psi Maximum Differential Pressure
Flow Characteristics		Equal Percentage
Flow Accuracy		Less than or Equal to 5% from 5 to 50 psi Differential Pressure
Valve Body Size/Flow Rate		See the following Field Adjustable Flow Ranges, Pressure Tap Flow Data, and Run Time Data Table.
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
End Connections		National Pipe Thread (NPT)
Material	**Body**	Forged Brass, Nickel Plated
	Ball	Chrome-Plated Brass
	Stem	Chrome-Plated Brass
	Seats	Fiberglass Reinforced Teflon® Polytetrafluoroethylene (PTFE)
	Characterizing Disk	Tefzel®
	Packing	Two Ethylene Propylene Diene Monomer (EPDM) O-rings
	Diaphragm	Polyester Reinforced Silicone
	Regulator	Stainless Steel/Brass/Delrin
	Spring	Stainless Steel
Power Requirements	**VA2104-AGA-2**	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 3 VA Supply Class 2
	VA2104-HGA-2	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 4 VA Supply Class 2
	VA2120-HGA-2	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 5 VA Supply Class 2
	M2204-HGA-2	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 5 VA Supply Class 2
	M2215-HGA-2	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%, 10 VA Supply Class 2
Input Signal	**Floating**	AC 24 V ±20%, 50/60 Hz, DC 24 V ±10%
	Proportional	DC 0 to 10 V, 4 to 20 mA with Field Furnished 500 ohm Resistor
Input Impedance	**Floating**	600 ohms
	Proportional	100,000 ohms for DC 0 to 10 V
Feedback	**Proportional Only**	DC 0 to 10 V, 0.5 mA Maximum
Electric Connection	**VA2104, VA2120**	36 in. (.91 m) 18 AWG Plenum Rated Cable, 1/2 in. Conduit
	M2204	36 in. (.91 m) 18 AWG Plenum Rated Cable, 1/2 in. Conduit
	M2215	36 in. (.91 m) 18 AWG Appliance Cable, 1/2 in. Conduit
Runtime		See the following Field Adjustable Flow Ranges, Pressure Tap Flow Data, and Run Time Data Table.
Audible Noise Rating	**VA2104**	<35 dB (A)
	M2204	<30 dB (A) Operating, <62 dB (A) Spring Return
	VA2120, M2215	<45 dB (A)
Manual Override	**Non-Spring Return**	External Push Button and Handle
	Spring Return	Hex Crank (M2215 only - No Manual Override for M2204)
Actuator Ambient Conditions	**Operating**	-22 to 122°F (-30 to 50°C), 5 to 95% RH Noncondensing (EN 60730-1)
	Storage	-40 to 176°F (-40 to 80°C), 5 to 95% RH Noncondensing (EN 60730-1)
Housing		NEMA 2 (IP54)
Housing Material	**VA2104, VA2120**	Thermoplastic Material, UL 94-5V
	M2204, M2215	Zinc-Coated Metal
Compliance	**North America**	UL Listed, File E22734, CCN XAPX (United States) and XAPX7 (Canada)

1. Proper water treatment is recommended; refer to VDI 2035 Standard.

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P1000 Series Pressure Independent Valves (Continued)

Field Adjustable Flow Ranges, Pressure Tap Flow Data, and Runtime Data

Size, in.	Valve Code Number		Factory Flow Rate (GPM)	Field Adjustable Flow Range Using FlowSetR Base (GPM)	Different Pressure Drop across Pressure Taps at Factory Flow Rate	Running Time (Seconds)	
	Without Pressure Taps	With Pressure Taps				VA2104-AGA-2	VA2104-HGA-2 VA2120-HGA-2 M2204-HGA-2 M2215-HGA-2
1/2	P1241A00	P1242A00	0.5	0.5 to 1.3	2.8	36	100
	P1241A01	P1242A01	1	0.5 to 1.3	2.5	60	
	P1241A015	P1242A015	1.5	0.5 to 5.5	2.5	47	
	P1241A02	P1242A02	2	0.5 to 5.5	2.5	51	
	P1241A03	P1242A03	3	0.5 to 5.5	2.5	56	
	P1241A04	P1242A04	4	0.5 to 5.5	2.3	63	
	P1241A05	P1242A05	5	0.5 to 5.5	2.0	68	
3/4	P1241B06	P1242B06	6	2 to 10	2.75	61	100
	P1241B07	P1242B07	7	2 to 10	2.75	64	
	P1241B08	P1242B08	8	2 to 10	2.0	67	
	P1241B09	P1242B09	9	2 to 10	2.0	69	
	P1241B10	P1242B10	10	2 to 10	2.5	76	
1	P1241C12	P1242C12	12	2 to 16	2.9	62	100
	P1241C14	P1242C14	14	2 to 16	2.6	67	
	P1241C16	P1242C16	16	2 to 16	1.6	86	
	P1241C18	P1242C18	18	6 to 19	1.4	67	
1-1/4		P1242D18	18		3.5		100
		P1242D20	20		3.2		
		P1242D22	22		3.0		
		P1242D24	24		3.0		
		P1242D26	26		3.4		
1-1/2		P1242E26	26		3.5		100
		P1242E28	28		3.4		
		P1242E30	30		3.2		
		P1242E33	33		3.3		
2		P1242F33	33		2.5		100
		P1242F36	36		2.4		
		P1242F40	40		2.4		
		P1242F44	44		3.8		
		P1242F48	48		3.0		
		P1242F52	52		2.7		
		P1242F56	56		2.1		
		P1242F60	60		1.9		
		P1242F65	65		2.0		
		P1242F70	70		2.0		
		P1242F75	75		1.8		
		P1242F80	80		2.0		

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

J Series

LIT-1900093

Electric Zone Valves – Two-Way Spring Closed (Normally Closed), On/Off Control

Description

This electric zone valve with forged brass body offers two-way spring closed (normally closed), on/off control for hot or chilled water applications. For complete details, refer to *J Series Electric Zone Valves Product Bulletin (LIT-977282).*

Features

- forged brass body and hard chrome-plated brass stem
- On/Off control from a two-wire thermostat
- provides economical control of hot or chilled water for fan coil, baseboard radiator, and VAV reheat applications
- 300 psig system operating pressure
- 400 psig static pressure rating
- buna-N (standard temperature) or nitrile disk (high temperature) provides tight closeoff



Standard Closeoff

- 1/2, 3/4, and 1” line sizes
- sweat, NPT, or inverted flare end connections



High Closeoff

- actuator can be factory or field installed
- actuator snaps in place for easy removal and assembly during installation

Selection Charts

J Series Electric Zone Valve – Two-Way Spring Closed (Normally Closed), On/Off Control (Part 1 of 2)

Valve Model Number					Actuator Model Number “G” Style Actuators have Standard Pressure Closeoff “H” Style Actuators have High Pressure Closeoff			
					Standard Temperature Rating: 200°F (93°C) Fluid, 104°F (40°C) Ambient		High Temperature Rating: 250°F (121°C) Fluid, 15 psig Steam, 169°F (76°C) Ambient	
Std. Temp	High Temp	Size	Cv	Close-off	24 VAC, 60 Hz	120 VAC, 60 Hz	24 VAC, 60 Hz	120 VAC, 60 Hz
					JG13A020 JH13A020	JG13B020 JH13B020	JG14A020 JH14A020	JG14B020 JH14B020
Sweat Connections – Standard Pressure Closeoff								
JT2211	JS2211	1/2”	1.0	60	**JT2211G13A020**	**JT2211G13B020**	**JS2211G14A020**	**JS2211G14B020**
JT2212	JS2212	1/2”	2.5	40	**JT2212G13A020**	**JT2212G13B020**	**JS2212G14A020**	**JS2212G14B020**
JT2213	JS2213	1/2”	3.5	25	**JT2213G13A020**	**JT2213G13B020**	**JS2213G14A020**	**JS2213G14B020**
JT2312	JS2312	3/4”	2.5	40	**JT2312G13A020**	**JT2312G13B020**	**JS2312G14A020**	**JS2312G14B020**
JT2313	JS2313	3/4”	3.5	25	**JT2313G13A020**	**JT2313G13B020**	**JS2313G14A020**	**JS2313G14B020**
JT2417	JS2417	1”	8.0	17	**JT2417G13A020**	**JT2417G13B020**	**JS2417G14A020**	**JS2417G14B020**
JT2517	JS2517	1-1/4”	8.0	17	**JT2517G13A020**	**JT2517G13B020**	**JS2517G14A020**	**JS2517G14B020**
NPT Connections – Standard Pressure Closeoff								
JT2221	JS2221	1/2”	1.0	60	**JT2221G13A020**	**JT2221G13B020**	**JS2221G14A020**	**JS2221G14B020**
JT2222	JS2222	1/2”	2.5	40	**JT2222G13A020**	**JT2222G13B020**	**JS2222G14A020**	**JS2222G14B020**
JT2223	JS2223	1/2”	3.5	25	**JT2223G13A020**	**JT2223G13B020**	**JS2223G14A020**	**JS2223G14B020**
JT2322	JS2322	3/4”	2.5	40	**JT2322G13A020**	**JT2322G13B020**	**JS2322G14A020**	**JS2322G14B020**
JT2323	JS2323	3/4”	3.5	25	**JT2323G13A020**	**JT2323G13B020**	**JS2323G14A020**	**JS2323G14B020**
JT2427	JS2427	1”	8.0	17	**JT2427G13A020**	**JT2427G13B020**	**JS2427G14A020**	**JS2427G14B020**
Inverted Flare Connections – Standard Pressure Closeoff								
JT2343	JS2343	3/4”	3.5	25	**JT2343G13A020**	**JT2343G13B020**	**JS2343G14A020**	**JS2343G14B020**
Sweat Connections – High Pressure Closeoff								
JT2211	JS2211	1/2”	1.0	75	**JT2211H13A020**	**JT2211H13B020**	**JS2211H14A020**	**JS2211H14B020**
JT2212	JS2212	1/2”	2.5	50	**JT2212H13A020**	**JT2212H13B020**	**JS2212H14A020**	**JS2212H14B020**
JT2213	JS2213	1/2”	3.5	30	**JT2213H13A020**	**JT2213H13B020**	**JS2213H14A020**	**JS2213H14B020**
JT2312	JS2312	3/4”	2.5	50	**JT2312H13A020**	**JT2312H13B020**	**JS2312H14A020**	**JS2312H14B020**
JT2313	JS2313	3/4”	3.5	30	**JT2313H13A020**	**JT2313H13B020**	**JS2313H14A020**	**JS2313H14B020**
JT2417	JS2417	1”	8.0	20	**JT2417H13A020**	**JT2417H13B020**	**JS2417H14A020**	**JS2417H14B020**
JT2517	JS2517	1-1/4”	8.0	20	**JT2517H13A020**	**JT2517H13B020**	**JS2517H14A020**	**JS2517H14B020**

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

J Series Electric Zone Valves – Two-Way Spring Closed (Normally Closed), On/Off Control (Continued)

J Series Electric Zone Valve – Two-Way Spring Closed (Normally Closed), On/Off Control (Part 2 of 2)

Valve Model Number					Actuator Model Number "G" Style Actuators have Standard Pressure Closeoff "H" Style Actuators have High Pressure Closeoff			
					Standard Temperature Rating: 200°F (93°C) Fluid, 104°F (40°C) Ambient		High Temperature Rating: 250°F (121°C) Fluid, 15 psig Steam, 169°F (76°C) Ambient	
Std. Temp	High Temp	Size	Cv	Close-off	24 VAC, 60 Hz	120 VAC, 60 Hz	24 VAC, 60 Hz	120 VAC, 60 Hz
					JG13A020 JH13A020	JG13B020 JH13B020	JG14A020 JH14A020	JG14B020 JH14B020
NPT Connections – High Pressure Closeoff								
JT2221	JS2221	1/2"	1.0	75	**JT2221H13A020**	**JT2221H13B020**	**JS2221H14A020**	**JS2221H14B020**
JT2222	JS2222	1/2"	2.5	50	**JT2222H13A020**	**JT2222H13B020**	**JS2222H14A020**	**JS2222H14B020**
JT2223	JS2223	1/2"	3.5	30	**JT2223H13A020**	**JT2223H13B020**	**JS2223H14A020**	**JS2223H14B020**
JT2322	JS2322	3/4"	2.5	50	**JT2322H13A020**	**JT2322H13B020**	**JS2322H14A020**	**JS2322H14B020**
JT2323	JS2323	3/4"	3.5	30	**JT2323H13A020**	**JT2323H13B020**	**JS2323H14A020**	**JS2323H14B020**
JT2427	JS2427	1"	8.0	20	**JT2427H13A020**	**JT2427H13B020**	**JS2427H14A020**	**JS2427H14B020**
Inverted Flare Connections – High Pressure Closeoff								
JT2343	JS2343	3/4"	3.5	30	**JT2343H13A020**	**JT2343H13B020**	**JS2343H14A020**	**JS2343H14B020**

Inverted Flare Fittings (Order Separately)

Code Number	Description	Length, in. (mm)
J647-601	For 1/2 in. (5/8 in. O.D.) Copper Tubing	15/16 (24)
J647-602	For 1/2 in. (5/8 in. O.D.) Copper Tubing	1-11/16 (43)
J647-603	For 1/2 in. (5/8 in. O.D.) Copper Tubing	3 (76)
J647-604	For 3/4 in. (7/8 in. O.D.) Copper Tubing	1-27/32 (47)
J647-605	For 1/2 in. (5/8 in. O.D.) Copper Tubing	1-15/16 (49)
J647-606	For 1 in. (1-1/8 in. O.D.) Copper Tubing	2-3/8 (60)
J647-607	Inverted Flare Nut	-----



J647-601 J647-602 J647-603 J647-604 J647-605 J647-606 J647-607
Inverted Flare Fittings

Repair Information

If the J Series Electric Zone Valve – Two-Way Spring Closed (Normally Closed), On/Off Control fails to operate within its specifications, refer to the *J Series Electric Zone Valves Product Bulletin (LIT-977282)* for a list of repair parts available. Available repair parts for J Series Electric Zone Valves include replacement valve bodies, replacement actuators, and the end connections listed in the Inverted Flare Fittings chart. No other field repairs should be attempted.

Technical Specifications

J Series Electric Zone Valves – Two-Way Spring Closed (Normally Closed), On/Off Control			
Service[1]			Hot Water Chill Water, and 50/50 Glycol Solutions for HVAC Systems
Fluid Temperature Limits	**Water**	**JT Series**	32 to 200°F (0 to 93°C)
		JS Series	32 to 250°F (0 to 121°C)
	Steam	**JT Series**	Not rated for steam service
		JS Series	15 psig (103 kPa) Saturated Steam
Valve Body Pressure Rating			300 psig (2,067 kPa)
Leakage			Bubble tight shut off
Ambient Operating Temperature Limits		**JT Series**	32 to 104°F (0 to 40°C)
		JS Series	32 to 169°F (0 to 76°C)
Cycle Time			Power stroke 9 to 11 seconds, spring return 4 to 5 seconds
Control Signal			24 VAC or 120 VAC, 60 Hz, Two-wire On/Off
Power Requirements			7 VA
Electrical Connection			18 in. (457 mm) wire leads
Materials	**Body**		Brass
	Stem		Brass (Hard Chrome Plated)
	Base Plate and Bearing Plate		Stainless Steel
	Actuator Housing		Stainless Steel
	Actuator Cover		Aluminum
	Valve Paddle	**JT Series**	Buna-N Rubber
		JS Series	Saturated Nitrile
	Stem Seals		Viton™ O-rings

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

J Series

LIT-1900094

Electric Zone Valves – Two-Way Spring Open (Normally Open), On/Off Control

Description

This electric zone valve witn forged brass body offers two-way spring open (normally open), on/off control for hot or chilled water applications. For complete details, refer to *J Series Electric Zone Valves Product Bulletin (LIT-977282)*.

Features

- forged brass body and hard chrome-plated brass stem
- provides economical control of hot or chilled water for fan coil, baseboard radiator, and VAV reheat applications
- On/Off control from a two-wire thermostat
- 300 psig system operating pressure
- 400 psig static pressure rating
- buna-N (standard temperature) or nitrile disk (high temperature) provides tight closeoff
- 1/2, 3/4, and 1” line sizes
- sweat, NPT, or inverted flare end connections
- actuator can be factory or field installed
- actuator snaps in place for easy removal and assembly during installation



Standard Closeoff

Selection Charts

J Series Electric Zone Valve – Two-Way Spring Open (Normally Open), On/Off Control (Part 1 of 2)

Valve Model Number					Actuator Model Number “G” Style Actuators have Standard Pressure Closeoff “H” Style Actuators have High Pressure Closeoff			
					Standard Temperature Rating: 200°F (93°C) Fluid, 104°F (40°C) Ambient		High Temperature Rating: 250°F (121°C) Fluid, 15 psig Steam, 169°F (76°C) Ambient	
Std. Temp	High Temp	Size	Cv	Close-off	24 VAC, 60 Hz	120 VAC, 60 Hz	24 VAC, 60 Hz	120 VAC, 60 Hz
					JG23A020 JH23A020	JG23B020 JH23B020	JG24A020 JH24A020	JG24B020 JH24B020
Sweat Connections – Standard Pressure Closeoff								
JT2211	JS2211	1/2”	1.0	60	JT2211G23A020	JT2211G23B020	JS2211G24A020	JS2211G24B020
JT2212	JS2212	1/2”	2.5	40	JT2212G23A020	JT2212G23B020	JS2212G24A020	JS2212G24B020
JT2213	JS2213	1/2”	3.5	25	JT2213G23A020	JT2213G23B020	JS2213G24A020	JS2213G24B020
JT2312	JS2312	3/4”	2.5	40	JT2312G23A020	JT2312G23B020	JS2312G24A020	JS2312G24B020
JT2313	JS2313	3/4”	3.5	25	JT2313G23A020	JT2313G23B020	JS2313G24A020	JS2313G24B020
JT2417	JS2417	1”	8.0	17	JT2417G23A020	JT2417G23B020	JS2417G24A020	JS2417G24B020
JT2517	JS2517	1-1/4”	8.0	17	JT2517G23A020	JT2517G23B020	JS2517G24A020	JS2517G24B020
NPT Connections – Standard Pressure Closeoff								
JT2221	JS2221	1/2”	1.0	60	JT2221G23A020	JT2221G23B020	JS2221G24A020	JS2221G24B020
JT2222	JS2222	1/2”	2.5	40	JT2222G23A020	JT2222G23B020	JS2222G24A020	JS2222G24B020
JT2223	JS2223	1/2”	3.5	25	JT2223G23A020	JT2223G23B020	JS2223G24A020	JS2223G24B020
JT2322	JS2322	3/4”	2.5	40	JT2322G23A020	JT2322G23B020	JS2322G24A020	JS2322G24B020
JT2323	JS2323	3/4”	3.5	25	JT2323G23A020	JT2323G23B020	JS2323G24A020	JS2323G24B020
JT2427	JS2427	1”	8.0	17	JT2427G23A020	JT2427G23B020	JS2427G24A020	JS2427G24B020
Inverted Flare Connections – Standard Pressure Closeoff								
JT2343	JS2343	3/4”	3.5	25	JT2343G23A020	JT2343G23B020	JS2343G24A020	JS2343G24B020
Sweat Connections – High Pressure Closeoff								
JT2211	JS2211	1/2”	1.0	75	JT2211H23A020	JT2211H23B020	JS2211H24A020	JS2211H24B020
JT2212	JS2212	1/2”	2.5	50	JT2212H23A020	JT2212H23B020	JS2212H24A020	JS2212H24B020
JT2213	JS2213	1/2”	3.5	30	JT2213H23A020	JT2213H23B020	JS2213H24A020	JS2213H24B020
JT2312	JS2312	3/4”	2.5	50	JT2312H23A020	JT2312H23B020	JS2312H24A020	JS2312H24B020
JT2313	JS2313	3/4”	3.5	30	JT2313H23A020	JT2313H23B020	JS2313H24A020	JS2313H24B020
JT2417	JS2417	1”	8.0	20	JT2417H23A020	JT2417H23B020	JS2417H24A020	JS2417H24B020
JT2517	JS2517	1-1/4”	8.0	20	JT2517H23A020	JT2517H23B020	JS2517H24A020	JS2517H24B020

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J Series Electric Zone Valves – Two-Way Spring Open (Normally Open), On/Off Control (Continued)

J Series Electric Zone Valve – Two-Way Spring Open (Normally Open), On/Off Control (Part 2 of 2)

Valve Model Number					Actuator Model Number "G" Style Actuators have Standard Pressure Closeoff "H" Style Actuators have High Pressure Closeoff			
					Standard Temperature Rating: 200°F (93°C) Fluid, 104°F (40°C) Ambient		High Temperature Rating: 250°F (121°C) Fluid, 15 psig Steam, 169°F (76°C) Ambient	
Std. Temp	High Temp	Size	Cv	Close-off	24 VAC, 60 Hz	120 VAC, 60 Hz	24 VAC, 60 Hz	120 VAC, 60 Hz
					JG23A020 JH23A020	JG23B020 JH23B020	JG24A020 JH24A020	JG24B020 JH24B020
NPT Connections – High Pressure Closeoff								
JT2221	JT2221	1/2"	1.0	75	**JT2221H23A020**	**JT2221H23B020**	**JS2221H24A020**	**JS2221H24B020**
JT2222	JT2222	1/2"	2.5	50	**JT2222H23A020**	**JT2222H23B020**	**JS2222H24A020**	**JS2222H24B020**
JT2223	JT2223	1/2"	3.5	30	**JT2223H23A020**	**JT2223H23B020**	**JS2223H24A020**	**JS2223H24B020**
JT2322	JT2322	3/4"	2.5	50	**JT2322H23A020**	**JT2322H23B020**	**JS2322H24A020**	**JS2322H24B020**
JT2323	JT2323	3/4"	3.5	30	**JT2323H23A020**	**JT2323H23B020**	**JS2323H24A020**	**JS2323H24B020**
JT2427	JT2427	1"	8.0	20	**JT2427H23A020**	**JT2427H23B020**	**JS2427H24A020**	**JS2427H24B020**
Inverted Flare Connections – High Pressure Closeoff								
JT2343	JS2343	3/4"	3.5	30	**JT2343H23A020**	**JT2343H23B020**	**JS2343H24A020**	**JS2343H24B020**

Inverted Flare Fittings (Order Separately)

Code Number	Description	Length, in. (mm)
J647-601	For 1/2 in. (5/8 in. O.D.) Copper Tubing	15/16 (24)
J647-602	For 1/2 in. (5/8 in. O.D.) Copper Tubing	1-11/16 (43)
J647-603	For 1/2 in. (5/8 in. O.D.) Copper Tubing	3 (76)
J647-604	For 3/4 in. (7/8 in. O.D.) Copper Tubing	1-27/32 (47)
J647-605	For 1/2 in. (5/8 in. O.D.) Copper Tubing	1-15/16 (49)
J647-606	For 1 in. (1-1/8 in. O.D.) Copper Tubing	2-3/8 (60)
J647-607	Inverted Flare Nut	-----



J647-601 J647-602 J647-603 J647-604 J647-605 J647-606 J647-607
Inverted Flare Fittings

Repair Information

If the J Series Electric Zone Valve – Two-Way Spring Closed (Normally Closed), On/Off Control fails to operate within its specifications, refer to the *J Series Electric Zone Valves Product Bulletin (LIT-977282)* for a list of repair parts available. Available repair parts for J Series Electric Zone Valves include replacement valve bodies, replacement actuators, and the end connections listed in the Inverted Flare Fittings chart. No other field repairs should be attempted.

Technical Specifications

J Series Electric Zone Valves – Two-Way Spring Closed (Normally Closed), On/Off Controls			
Service[1]			Hot Water Chill Water, and 50/50 Glycol Solutions for HVAC Systems
Fluid Temperature Limits	**Water**	**JT Series**	32 to 200°F (0 to 93°C)
		JS Series	32 to 250°F (0 to 121°C)
	Steam	**JT Series**	Not rated for steam service
		JS Series	15 psig (103 kPa) Saturated Steam
Valve Body Pressure Rating			300 psig (2,067 kPa)
Leakage			Bubble tight shut off
Ambient Operating Temperature Limits		**JT Series**	32 to 104°F (0 to 40°C)
		JS Series	32 to 169°F (0 to 76°C)
Cycle Time			Power stroke 9 to 11 seconds, spring return 4 to 5 seconds
Control Signal			24 VAC or 120 VAC, 60 Hz, Two-wire On/Off
Power Requirements			7 VA
Electrical Connection			18 in. (457 mm) wire leads
Materials	**Body**		Brass
	Stem		Brass (Hard Chrome Plated)
	Base Plate and Bearing Plate		Stainless Steel
	Actuator Housing		Stainless Steel
	Actuator Cover		Aluminum
	Valve Paddle	**JT Series**	Buna-N Rubber
		JS Series	Saturated Nitrile
	Stem Seals		Viton™ O-rings

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

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J Series

LIT-1900095

Electric Zone Valves – Three-Way Spring Return, On/Off Control

Description

J Series Electric Zone Valves accurately control the flow of saturated steam, hot water, and chilled water through coils and heat exchanges of all types. For complete details, refer to *J Series Electric Zone Valves Product Bulletin (LIT-977282)*.

Features

- forged brass body and hard chrome-plated brass stem
- provides economical control of hot or chilled water for fan coil, baseboard radiator, and VAV reheat applications
- On/Off control from a two-wire thermostat
- 300 psig system operating pressure
- 400 psig static pressure rating
- can be piped for mixing or diverting configuration
- buna-N (standard temperature) or nitrile disk (high temperature) provides tight closeoff



Standard Closeoff

- 1/2, 3/4, and 1” line sizes
- sweat, NPT, or inverted flare end connections



High Closeoff

- actuator can be factory or field installed
- actuator snaps in place for easy removal and assembly during installation

Selection Charts

Note: Three-way valves are shipped from the factory in the normally closed configuration (Port B closed); for normally open configuration, simply turn the valve around during installation.

J Series Electric Zone Valve – Three-Way Spring Return, On/Off Control

Valve Model Number					Actuator Model Number “G” Style Actuators have Standard Pressure Closeoff “H” Style Actuators have High Pressure Closeoff			
					Standard Temperature Rating: 200°F (93°C) Fluid, 104°F (40°C) Ambient		High Temperature Rating: 250°F (121°C) Fluid, 15 psig Steam, 169°F (76°C) Ambient	
Std. Temp	High Temp	Size	Cv	Close-off	24 VAC, 60 Hz	120 VAC, 60 Hz	24 VAC, 60 Hz	120 VAC, 60 Hz
					JG13A020 JH13A020	JG13B020 JH13B020	JG14A020 JH14A020	JG14B020 JH14B020
Sweat Connections – Standard Pressure Closeoff								
JT3213	JS3213	1/2”	4.0	25	JT3213G13A020	JT3213G13B020	JS3213G14A020	JS3213G14B020
JT3315	JS3315	3/4”	5.0	20	JT3315G13A020	JT3315G13B020	JS3315G14A020	JS3315G14B020
JT3417	JS3417	1”	8.0	17	JT3417G13A020	JT3417G13B020	JS3417G14A020	JS3417G14B020
JT3517	JS3517	1-1/4”	8.0	17	JT3517G13A020	JT3517G13B020	JS3517G14A020	JS3517G14B020
NPT Connections – Standard Pressure Closeoff								
JT3223	JS3223	1/2”	4.0	25	JT3223G13A020	JT3223G13B020	JS3223G14A020	JS3223G14B020
JT3325	JS3325	3/4”	5.0	20	JT3325G13A020	JT3325G13B020	JS3325G14A020	JS3325G14B020
JT3427	JS3427	1”	8.0	17	JT3427G13A020	JT3427G13B020	JS3427G14A020	JS3427G14B020
Inverted Flare Connections – Standard Pressure Closeoff								
JT3343	JS3343	3/4”	4.0	25	JT3343G13A020	JT3343G13B020	JS3343G14A020	JS3343G14B020
Sweat Connections – High Pressure Closeoff								
JT3213	JS3213	1/2”	4.0	30	JT3213H13A020	JT3213H13B020	JS3213H14A020	JS3213H14B020
JT3315	JS3315	3/4”	5.0	25	JT3315H13A020	JT3315H13B020	JS3315H14A020	JS3315H14B020
JT3417	JS3417	1”	8.0	20	JT3417H13A020	JT3417H13B020	JS3417H14A020	JS3417H14B020
JT3517	JS3517	1-1/4”	8.0	20	JT3517H13A020	JT3517H13B020	JS3517H14A020	JS3517H14B020
NPT Connections – High Pressure Closeoff								
JT3223	JS3223	1/2”	4.0	30	JT3223H13A020	JT3223H13B020	JS3223H14A020	JS3223H14B020
JT3325	JS3325	3/4”	5.0	25	JT3325H13A020	JT3325H13B020	JS3325H14A020	JS3325H14B020
JT3427	JS3427	1”	8.0	20	JT3427H13A020	JT3427H13B020	JS3427H14A020	JS3427H14B020
Inverted Flare Connections – High Pressure Closeoff								
JT3343	JS3343	3/4”	4.0	30	JT3343H13A020	JT3343H13B020	JS3343H14A020	JS3343H14B020

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

J Series Electric Zone Valves – Three-Way Spring Return, On/Off Control (Continued)

Inverted Flare Fittings (Order Separately)

Code Number	Description	Length, in. (mm)
J647-601	For 1/2 in. (5/8 in. O.D.) Copper Tubing	15/16 (24)
J647-602	For 1/2 in. (5/8 in. O.D.) Copper Tubing	1-11/16 (43)
J647-603	For 1/2 in. (5/8 in. O.D.) Copper Tubing	3 (76)
J647-604	For 3/4 in. (7/8 in. O.D.) Copper Tubing	1-27/32 (47)
J647-605	For 1/2 in. (5/8 in. O.D.) Copper Tubing	1-15/16 (49)
J647-606	For 1 in. (1-1/8 in. O.D.) Copper Tubing	2-3/8 (60)
J647-607	Inverted Flare Nut	-----



J647-601 J647-602 J647-603 J647-604 J647-605 J647-606 J647-607
Inverted Flare Fittings

Repair Information

If the J Series Electric Zone Valve – Three-Way Spring Return, On/Off Control fails to operate within its specifications, refer to *J Series Electric Zone Valves Product Bulletin (LIT-977282)* for a list of repair parts available. Available repair parts for J Series Electric Zone Valves include replacement valve bodies, replacement actuators, and the end connections listed in the Inverted Flare Fittings chart. No other field repairs should be attempted.

Technical Specifications

J Series Electric Zone Valves – Three-Way Spring Return, On/Off Control			
Service[1]			Hot Water Chill Water, and 50/50 Glycol Solutions for HVAC Systems
Fluid Temperature Limits	**Water**	**JT Series**	32 to 200°F (0 to 93°C)
		JS Series	32 to 250°F (0 to 121°C)
	Steam	**JT Series**	Not rated for steam service
		JS Series	15 psig (103 kPa) Saturated Steam
Valve Body Pressure Rating			300 psig (2,067 kPa)
Leakage			Bubble tight shut off
Ambient Operating Temperature Limits		**JT Series**	32 to 104°F (0 to 40°C)
		JS Series	32 to 169°F (0 to 76°C)
Cycle Time			Power stroke 9 to 11 seconds, spring return 4 to 5 seconds
Control Signal			24 VAC or 120 VAC, 60 Hz, Two-wire On/Off
Power Requirements			7 VA
Electrical Connection			18 in. (457 mm) wire leads
Materials	**Body**		Brass
	Stem		Brass (Hard Chrome Plated)
	Base Plate and Bearing Plate		Stainless Steel
	Actuator Housing		Stainless Steel
	Actuator Cover		Aluminum
	Valve Paddle	**JT Series**	Buna-N Rubber
		JS Series	Saturated Nitrile
	Stem Seals		Viton™ O-rings

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

J Series

LIT-1900189

Electric Zone Valves – Two- and Three-Way Non-Spring Return, Modulating Control

Description

This electric zone valve with forged brass body offers two- and three-way non-spring return, modulating control for hot or chilled water applications. For complete details, refer to *J Series Electric Zone Valves Product Bulletin (LIT-977282)*.

Features

- economical control of hot or chilled water (up to 50% glycol) for fan coil, baseboard radiator and VAV reheat applications.
- 0 to 10 VDC proportional and three wire floating control.
- 32 to 200°F (0 to 93°C) fluid temperature rating
- 32 to 125°F (0 to 52°C) ambient temperature rating
- 300 psig Static Pressure Rating
- 20 to 30 VAC 50/60 Hz
- forged brass body



JM Series
Two-way Non-spring Return
Modulating Electric Zone Valve

Note: Actuators and valve bodies can be ordered separately using the actuator and valve code numbers shown. JM Series Modulating Three-Way Electric Zone Valves must be piped in a mixing configuration only.

Selection Chart

Valve	Size	Cv	Close-off	Actuator	
				Three Wire Floating	0 to 10 VDC Proportional
				JT33A00T	JP33A000
Two-Way – Sweat Connections					
JM2211	1/2”	1	50	**JM2211T33A00T**	**JM2211P33A000**
JM2212	1/2”	2	50	**JM2212T33A00T**	**JM2212P33A000**
JM2213	1/2”	4	35	**JM2213T33A00T**	**JM2213P33A000**
JM2312	3/4”	2	50	**JM2312T33A00T**	**JM2312P33A000**
JM2313	3/4”	4	35	**JM2313T33A00T**	**JM2313P33A000**
JM2317	3/4”	7.5	35	**JM2317T33A00T**	**JM2317P33A000**
JM2413	1”	4	35	**JM2413T33A00T**	**JM2413P33A000**
JM2417	1”	8	35	**JM2417T33A00T**	**JM2417P33A000**
JM2517	1-1/4”	8	35	**JM2517T33A00T**	**JM2517P33A000**
Two-Way – NPT Connections					
JM2221	1/2”	1	50	**JM2221T33A00T**	**JM2221P33A000**
JM2222	1/2”	2	50	**JM2222T33A00T**	**JM2222P33A000**
JM2223	1/2”	4	35	**JM2223T33A00T**	**JM2223P33A000**
JM2322	3/4”	2	50	**JM2322T33A00T**	**JM2322P33A000**
JM2323	3/4”	4	35	**JM2323T33A00T**	**JM2323P33A000**
JM2327	3/4”	7.5	35	**JM2327T33A00T**	**JM2327P33A000**
JM2427	1”	8	35	**JM2427T33A00T**	**JM2427P33A000**
Three-Way – Sweat Connections					
JM3211	1/2”	1	50	**JM3211T33A00T**	**JM3211P33A000**
JM3212	1/2”	2	50	**JM3212T33A00T**	**JM3212P33A000**
JM3213	1/2”	4	35	**JM3213T33A00T**	**JM3213P33A000**
JM3312	3/4”	2	50	**JM3312T33A00T**	**JM3312P33A000**
JM3313	3/4”	4	35	**JM3313T33A00T**	**JM3313P33A000**
JM3317	3/4”	7.5	35	**JM3317T33A00T**	**JM3317P33A000**
JM3413	1”	4	35	**JM3413T33A00T**	**JM3413P33A000**
JM3417	1”	8	35	**JM3417T33A00T**	**JM3417P33A000**
JM3517	1-1/4”	8	35	**JM3517T33A00T**	**JM3517P33A000**
Three-Way – NPT Connections, mixing configuration only					
JM3221	1/2”	1	50	**JM3221T33A00T**	**JM3221P33A000**
JM3222	1/2”	2	50	**JM3222T33A00T**	**JM3222P33A000**
JM3223	1/2”	4	35	**JM3223T33A00T**	**JM3223P33A000**
JM3322	3/4”	2	50	**JM3322T33A00T**	**JM3322P33A000**
JM3323	3/4”	4	35	**JM3323T33A00T**	**JM3323P33A000**
JM3327	3/4”	7.5	35	**JM3327T33A00T**	**JM3327P33A000**
JM3427	1”	8	35	**JM3427T33A00T**	**JM3427P33A000**

Repair Information

If the J Series Electric Zone Valve – Two-Way and Three-Way Non-Spring Return, Modulating Control fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Technical Specifications

J Series Electric Zone Valves – Two-Way and Three-Way Non-Spring Return, Modulating Control		
Service[1]		Hot Water Chill Water, and 50/50 Glycol Solutions for HVAC Systems
Fluid Temperature Limits	**Water**	32 to 200°F (0 to 93°C)
	Steam	Not rated for steam service
Valve Body Pressure Rating		300 psig (2,067 kPa)
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2 Class IV
Ambient Operating Temperature Limits		32 to 125°F (0 to 52°C)
Cycle Time		Full Open to Full Close 150 seconds
Control Signal	**“T” Type Actuator**	24 VAC, 60 Hz, Three-Wire Floating Control
	“P” Type Actuator	0 to 10 VDC (1 to 9 VDC Actual) Factory Setting, 0 to 5 VDC, 5 to 10 VDC jumper selectable
Control Action	**“P” Type Actuator**	Factory Setting: Direct Acting Valve opens Port “B” as signal increases. Jumper selectable
Power Require-ments	**“T” Type Actuator**	1.2 VA
	“P” Type Actuator	1.6 VA
Electrical Connection		Terminal Block
Materials	**Body**	Brass
	Stem	Brass (Hard Chrome Plated)
	Base Plate and Bearing Plate	Stainless Steel
	Actuator Housing	High Temperature Plastic
	Valve Plug	High Temperature Thermoplastic Rubber
	Stem Seals	Viton™ O-rings

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

J Series

LIT-1900190

Electric Zone Valves – Two- and Three-Way Spring Closed (Normally Closed), Modulating Control

Description

This electric zone valve with forged brass body offers two- and three-way spring closed (normally closed), modulating control for hot or chilled water applications. For complete details, refer to *J Series Electric Zone Valves Product Bulletin (LIT-977282)*.

Features

- economical control of hot or chilled water (up to 50% glycol) for fan coil, baseboard radiator and VAV reheat applications.
- 0 to 10 VDC proportional and three wire floating control.
- 32 to 200°F (0 to 93°C) fluid temperature rating
- 32 to 125°F (0 to 52°C) ambient temperature rating
- 300 psig Static Pressure Rating
- 20 to 30 VAC 50/60 Hz
- forged brass body



JM Series Three-way Spring Return Modulating Zone Valve

Selection Chart

Valve	Size	Cv	Close-off[1]	Actuator	
				Three Wire Floating	0 to 10 VDC Proportional
				JT13A000	JP13A000
Two-Way – Sweat Connections					
JM2211	1/2"	1	50 / 50	**JM2211T13A000**	**JM2211P13A000**
JM2212	1/2"	2	50 / 20	**JM2212T13A000**	**JM2212P13A000**
JM2213	1/2"	4	35 / 20	**JM2213T13A000**	**JM2213P13A000**
JM2312	3/4"	2	50 / 20	**JM2312T13A000**	**JM2312P13A000**
JM2313	3/4"	4	35 / 20	**JM2313T13A000**	**JM2313P13A000**
JM2317	3/4"	7.5	35 / 15	**JM2317T13A000**	**JM2317P13A000**
JM2413	1"	4	35 / 20	**JM2413T13A000**	**JM2413P13A000**
JM2417	1"	8	35 / 15	**JM2417T13A000**	**JM2417P13A000**
JM2517	1-1/4"	8	35 / 15	**JM2517T13A000**	**JM2517P13A000**
Two-Way – NPT Connections					
JM2221	1/2"	1	50 / 50	**JM2221T13A000**	**JM2221P13A000**
JM2222	1/2"	2	50 / 20	**JM2222T13A000**	**JM2222P13A000**
JM2223	1/2"	4	35 / 20	**JM2223T13A000**	**JM2223P13A000**
JM2322	3/4"	2	50 / 20	**JM2322T13A000**	**JM2322P13A000**
JM2323	3/4"	4	35 / 20	**JM2323T13A000**	**JM2323P13A000**
JM2327	3/4"	7.5	35 / 15	**JM2327T13A000**	**JM2327P13A000**
JM2427	1"	8	35 / 15	**JM2427T13A000**	**JM2427P13A000**
Three-Way – Sweat Connections					
JM3211	1/2"	1	50 / 50	**JM3211T13A000**	**JM3211P13A000**
JM3212	1/2"	2	50 / 20	**JM3212T13A000**	**JM3212P13A000**
JM3213	1/2"	4	35 / 20	**JM3213T13A000**	**JM3213P13A000**
JM3312	3/4"	2	50 / 20	**JM3312T13A000**	**JM3312P13A000**
JM3313	3/4"	4	35 / 20	**JM3313T13A000**	**JM3313P13A000**
JM3317	3/4"	7.5	35 / 15	**JM3317T13A000**	**JM3317P13A000**
JM3413	1"	4	35 / 20	**JM3413T13A000**	**JM3413P13A000**
JM3417	1"	8	35 / 15	**JM3417T13A000**	**JM3417P13A000**
JM3517	1-1/4"	8	35 / 15	**JM3517T13A000**	**JM3517P13A000**
Three-Way – NPT Connections, mixing configuration only					
JM3221	1/2"	1	50 / 50	**JM3221T13A000**	**JM3221P13A000**
JM3222	1/2"	2	50 / 20	**JM3222T13A000**	**JM3222P13A000**
JM3223	1/2"	4	35 / 20	**JM3223T13A000**	**JM3223P13A000**
JM3322	3/4"	2	50 / 20	**JM3322T13A000**	**JM3322P13A000**
JM3323	3/4"	4	35 / 20	**JM3323T13A000**	**JM3323P13A000**
JM3327	3/4"	7.5	35 / 15	**JM3327T13A000**	**JM3327P13A000**
JM3427	1"	8	35 / 15	**JM3427T13A000**	**JM3427P13A000**

1. Operating/Power Failure

Note: Actuators and valve bodies can be ordered separately using the actuator and valve code numbers shown. JM Series Modulating Three-Way Electric Zone Valves must be piped in a mixing configuration only.

Repair Information

If the J Series Electric Zone Valve – Two-Way and Three-Way Spring Closed, Modulating Control fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Technical Specifications

J Series Electric Zone Valves – Two-Way and Three-Way Spring Closed, Modulating Control		
Service[1]		Hot Water Chill Water, and 50/50 Glycol Solutions for HVAC Systems
Fluid Temperature Limits	**Water**	32 to 200°F (0 to 93°C)
	Steam	Not rated for steam service
Valve Body Pressure Rating		300 psig (2,067 kPa)
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2 Class IV
Ambient Operating Temperature Limits		32 to 125°F (0 to 52°C)
Cycle Time		Full Close to Full Open 150 seconds
Control Signal	**"T" Type Actuator**	24 VAC, 60 Hz, Three-Wire Floating Control
	"P" Type Actuator	0 to 10 VDC (1 to 9 VDC Actual) Factory Setting, 0 to 5 VDC, 5 to 10 VDC jumper selectable
Control Action	**"P" Type Actuator**	Factory Setting: Direct Acting Valve opens Port "B" as signal increases. Jumper selectable
Power Requirements		1.6 VA
Electrical Connection		Terminal Block
Materials	**Body**	Brass
	Stem	Brass (Hard Chrome Plated)
	Base Plate and Bearing Plate	Stainless Steel
	Actuator Housing	High Temperature Plastic
	Valve Plug	High Temperature Thermoplastic Rubber
	Stem Seals	Viton™ O-rings

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

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

J Series

LIT-1900191

Electric Zone Valves – Two-Way Spring Open (Normally Open), Modulating Control

Description

This electric zone valve with forged brass body offers two--way spring open (normally open), modulating control for hot or chilled water applications. For complete details, refer to *J Series Electric Zone Valves Product Bulletin (LIT-977282)*.

Features

- economical control of hot or chilled water (up to 50% glycol) for fan coil, baseboard radiator and VAV reheat applications.
- 0 to 10 VDC proportional and three wire floating control.
- 32 to 200°F (0 to 93°C) fluid temperature rating
- 32 to 125°F (0 to 52°C) ambient temperature rating
- 300 psig Static Pressure Rating
- 20 to 30 VAC 50/60 Hz
- forged brass body



JM Series Two-Way Spring Return Modulating Zone Valve

Selection Chart

Valve	Size	Cv	Close-off	Actuator	
				Three Wire Floating	0 to 10 VDC Proportional
				JT13A000	JP13A000
Two-Way – Sweat Connections					
JM2211	1/2”	1	50	**JM2211T23A000**	**JM2211P23A000**
JM2212	1/2”	2	50	**JM2212T23A000**	**JM2212P23A000**
JM2213	1/2”	4	35	**JM2213T23A000**	**JM2213P23A000**
JM2312	3/4”	2	50	**JM2312T23A000**	**JM2312P23A000**
JM2313	3/4”	4	35	**JM2313T23A000**	**JM2313P23A000**
JM2317	3/4”	7.5	35	**JM2317T23A000**	**JM2317P23A000**
JM2413	1”	4	35	**JM2413T23A000**	**JM2413P23A000**
JM2417	1”	8	35	**JM2417T23A000**	**JM2417P23A000**
JM2517	1-1/4”	8	35	**JM2517T23A000**	**JM2517P23A000**
Two-Way – NPT Connections					
JM2221	1/2”	1	50	**JM2221T23A000**	**JM2221P23A000**
JM2222	1/2”	2	50	**JM2222T23A000**	**JM2222P23A000**
JM2223	1/2”	4	35	**JM2223T23A000**	**JM2223P23A000**
JM2322	3/4”	2	50	**JM2322T23A000**	**JM2322P23A000**
JM2323	3/4”	4	35	**JM2323T23A000**	**JM2323P23A000**
JM2327	3/4”	7.5	35	**JM2327T23A000**	**JM2327P23A000**
JM2427	1”	8	35	**JM2427T23A000**	**JM2427P23A000**

Repair Information

If the J Series Electric Zone Valve – Two-Way Spring Open, Modulating Control fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Note: Actuators and valve bodies can be ordered separately using the actuator and valve code numbers shown. JM Series Modulating Three-Way Electric Zone Valves must be piped in a mixing configuration only.

Technical Specifications

J Series Electric Zone Valves – Two-Way Spring Open, Modulating Control		
Service[1]		Hot Water Chill Water, and 50/50 Glycol Solutions for HVAC Systems
Fluid Temperature Limits	**Water**	32 to 200°F (0 to 93°C)
	Steam	Not rated for steam service
Valve Body Pressure Rating		300 psig (2,067 kPa)
Leakage		0.01% of Maximum Flow per ANSI/FCI 70-2 Class IV
Ambient Operating Temperature Limits		32 to 125°F (0 to 52°C)
Cycle Time		Full Close to Full Open 150 seconds
Control Signal	**“T” Type Actuator**	24 VAC, 60 Hz, Three-Wire Floating Control
	“P” Type Actuator	0 to 10 VDC (1 to 9 VDC Actual) Factory Setting, 0 to 5 VDC, 5 to 10 VDC jumper selectable
Control Action	**“P” Type Actuator**	Factory Setting: Direct Acting Valve opens Port “B” as signal increases. Jumper selectable
Power Requirements		1.6 VA
Electrical Connection		Terminal Block
Materials	**Body**	Brass
	Stem	Brass (Hard Chrome Plated)
	Base Plate and Bearing Plate	Stainless Steel
	Actuator Housing	High Temperature Plastic
	Valve Plug	High Temperature Thermoplastic Rubber
	Stem Seals	Viton™ O-rings

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

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J Series

LIT-1924210

Electric Zone Valves for Assembly in the Field

Description

J Series Electric Zone Valves accurately control the flow of saturated steam, hot water, and chilled water through coils and heat exchangers of all types, in a wide range of HVAC applications. The spring return, two-position design with synchronous motor has been proven reliable in millions of installations worldwide. The actuator can be removed from the valve quickly and easily, simplifying installation and servicing. No special linkage kit or commissioning is required.

Refer to the *J Series Zone Valves Product Bulletin (LIT-977282)* for important product application information.

Features

- quick and simply actuator removal eases installation and provides quick actuator replacement during service
- bubble-tight shutoff conserves energy and accurately controls zone temperature for increased comfort
- high closeoff pressure actuator option satisfies demanding requirements of high rise buildings and high pressure pumping systems
- interchangeable actuators allow field conversion from normally open to normally closed without re-piping
- choice of end connections provides increased versatility and replacement capability



J Series Electric Zone Valve

Selection Charts

J Series On/Off Valves – Standard Closeoff (Part 1 of 2)

Size In.	Cv	Closeoff psig	Valve – End Connections			Actuators			
			NPT	Sweat	Inverted Flare	AC 24 V	AC 120 V	AC 208 V	AC 230 V
Two-Way, Spring Closed, Standard Temperature (32 to 200°F, 32 to 104°F Ambient)									
1/2	1	60	**JT2221**	**JT2211**	—	**JG13A020**	**JG13B020**	**JG13D020**	**JG13U020**
	2.5	40	**JT2222**	**JT2212**	—				
	3.5	25	**JT2223**	**JT2213**	—				
3/4	2.5	40	**JT2322**	**JT2312**	—				
	3.5	25	**JT2323**	**JT2313**	**JT2343**				
1	8	17	**JT2427**	**JT2417**	—				
1-1/4	8	17	—	**JT2515**	—				
Two-Way, Spring Open, Standard Temperature (32 to 200°F, 32 to 104°F Ambient)									
1/2	1	60	**JT2221**	**JT2211**	—	**JG23A020**	**JG23B020**	**JG23D020**	**JG23U020**
	2.5	40	**JT2222**	**JT2212**	—				
	3.5	25	**JT2223**	**JT2213**	—				
3/4	2.5	40	**JT2322**	**JT2312**	—				
1	3.5	25	**JT2323**	**JT2313**	**JT2343**				
	8	17	**JT2427**	**JT2417**	—				
1-1/4	8	17	—	**JT2515**	—				
Three-Way, Spring Return Port B Closed, Standard Temperature (32 to 200°F, 32 to 104°F Ambient)									
1/2	4	30	**JT3223**	**JT3213**	—	**JG13A020**	**JG13B020**	**JG13D020**	**JG13U020**
3/4	5	25	**JT3325**	**JT3315**	**JT3343**				
1	8	20	**JT3427**	**JT3417**	—				
1-1/4	8	20	—	**JT3517**	—				
Two-Way, Spring Closed, High Temperature (32 to 250°F, 15 psig steam, 32 to 169°F Ambient)									
1/2	1	60	**JS2221**	**JS2211**	—	**JG14A020**	**JG14B020**	—	—
	2.5	40	**JS2222**	**JS2212**	—				
	3.5	25	**JS2223**	**JS2213**	—				
3/4	2.5	40	**JS2322**	**JS2312**	—				
	3.5	25	**JS2323**	**JS2313**	**JS2343**				
1	8	17	**JS2427**	**JS2417**	—				
1-1/4	8	17	—	**JS2515**	—				
Two-Way, Spring Open, High Temperature (32 to 250°F, 15 psig steam, 32 to 169°F Ambient)									
1/2	1	60	**JS2221**	**JS2211**	—	**JG24A020**	**JG24B020**	—	—
	2.5	40	**JS2222**	**JS2212**	—				
	3.5	25	**JS2223**	**JS2213**	—				
3/4	2.5	40	**JS2322**	**JS2312**	—				
	3.5	25	**JS2323**	**JS2313**	**JS2343**				
1	8	17	**JS2427**	**JS2417**	—				
1-1/4	8	17	—	**JS2515**	—				

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

J Series Electric Zone Valves for Assembly in the Field (Continued)

J Series On/Off Valves – Standard Closeoff (Part 2 of 2)

Size In.	Cv	Closeoff psig	Valve – End Connections			Actuators			
			NPT	Sweat	Inverted Flare	AC 24 V	AC 120 V	AC 208 V	AC 230 V
Three-Way, Spring Return Port B Closed, High Temperature (32 to 250°F, 15 psig steam, 32 to 169°F Ambient)									
1/2	4	30	JS3223	JS3213	—	JG14A020	JG14B020	—	—
3/4	5	25	JS3325	JS3315	JS3343				
1	8	20	JS3427	JS3417	—				
1-1/4	8	20	—	JS3517	—				

J Series On/Off Valves – High Closeoff

Size In.	Cv	Closeoff psig	Valve – End Connections			Actuators	
			NPT	Sweat	Inverted Flare	AC 24 V	AC 120 V
Two-Way, Spring Closed, Standard Temperature (32 to 200°F, 32 to 104°F Ambient)							
1/2	1	75	JT2221	JT2211	—	JH13A020	JH13B020
	2.5	50	JT2222	JT2212	—		
	3.5	30	JT2223	JT2213	—		
3/4	2.5	50	JT2322	JT2312	—		
	3.5	30	JT2323	JT2313	JT2343		
1	8	20	JT2427	JT2417	—		
1-1/4	8	20	—	JT2515	—		
Two-Way, Spring Open, Standard Temperature (32 to 200°F, 32 to 104°F Ambient)							
1/2	1	75	JT2221	JT2211	—	JH23A020	JH23B020
	2.5	50	JT2222	JT2212	—		
	3.5	30	JT2223	JT2213	—		
3/4	2.5	50	JT2322	JT2312	—		
	3.5	30	JT2323	JT2313	JT2343		
1	8	20	JT2427	JT2417	—		
1-1/4	8	20	—	JT2515	—		
Three-Way, Spring Return Port B Closed, Standard Temperature (32 to 200°F, 32 to 104°F Ambient							
1/2	4	30	JT3223	JT3213	—	JH13A020	JH13B020
3/4	5	25	JT3325	JT3315	JT3343		
1	8	20	JT3427	JT3417	—		
1-1/4	8	20	—	JT3517	—		
Two-Way, Spring Closed, High Temperature (32 to 250°F, 15 psig steam, 32 to 169°F Ambient)							
1/2	1	75	JS2221	JS2211	—	JH14A020	JH14B020
	2.5	50	JS2222	JS2212	—		
	3.5	30	JS2223	JS2213	—		
3/4	2.5	50	JS2322	JS2312	—		
	3.5	30	JS2323	JS2313	JS2343		
1	8	20	JS2427	JS2417	—		
1-1/4	8	20	—	JS2515	—		
Two-Way, Spring Open, High Temperature (32 to 250°F, 15 psig steam, 32 to 169°F Ambient)							
1/2	1	75	JS2221	JS2211	—	JH24A020	JH24B020
	2.5	50	JS2222	JS2212	—		
	3.5	30	JS2223	JS2213	—		
3/4	2.5	50	JS2322	JS2312	—		
	3.5	30	JS2323	JS2313	JS2343		
1	8	20	JS2427	JS2417	—		
1-1/4	8	20	—	JS2515	—		
Three-Way, Spring Return Port B Closed, High Temperature (32 to 250°F, 15 psig steam, 32 to 169°F Ambient)							
1/2	4	30	JS3223	JS3213	—	JH14A020	JH14B020
3/4	5	25	JS3325	JS3315	JS3343		
1	8	20	JS3427	JS3417	—		
1-1/4	8	20	—	JS3517	—		

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J Series Electric Zone Valves for Assembly in the Field (Continued)

J Series Modulating Control Valves - Spring Return

Size In.	Cv	Valve – End Connection		Actuator					
				Spring Return Open			Spring Return Closed		
		NPT	Sweat	Closeoff psig	AC 24 V Floating Control	DC 0 – 10 V Proportional	Closeoff psig [1]	AC 24 V Floating Control	DC 0 – 10 V Proportional
Two-Way – Spring Return									
1/2	1	**JM2221**	**JM2211**	50	**JT23A000**	**JP23A000**	50/50	**JT13A000**	**JP13A000**
	2	**JM2222**	**JM2212**	50			50/20		
	4	**JM2223**	**JM2213**	35			35/20		
3/4	2	**JM2322**	**JM2312**	50			50/20		
	4	**JM2323**	**JM2313**	35			35/20		
	7.5	**JM2327**	**JM2317**	35			35/15		
1	4	—	**JM2413**	35			35/20		
	8	**JM2427**	**JM2417**	35			35/15		
1-1/4	8	—	**JM2517**	35			35/15		
Three-Way – Spring Return									
1/2	1	**JM3221**	**JM3211**	50	**JT23A000**	**JP23A000**	50/50	**JT13A000**	**JP13A000**
	2	**JM3222**	**JM3212**	50			50/20		
	4	**JM3223**	**JM3213**	35			35/20		
3/4	2	**JM3322**	**JM3312**	50			50/20		
	4	**JM3323**	**JM3313**	35			35/20		
	7.5	**JM3327**	**JM3317**	35			35/15		
1	4	—	**JM3413**	35			35/20		
	8	**JM3427**	**JM3417**	35			35/15		
1-1/4	8	—	**JM3517**	35			35/15		

1. Operating/ power failure

J Series Modulating Control Valves - Non-Spring Return

Size In.	Cv	Valve – End Connection		Actuator (Non-Spring Return)		
		NPT	Sweat	Closeoff psig	AC 24 V Floating Control	DC 0 – 10 V Proportional
Two-Way – Non-Spring Return						
1/2	1	**JM2221**	**JM2211**	50	**JT33A00T**	**JP33A000**
	2	**JM2222**	**JM2212**	50		
	4	**JM2223**	**JM2213**	35		
3/4	2	**JM2322**	**JM2312**	50		
	4	**JM2323**	**JM2313**	35		
	7.5	**JM2327**	**JM2317**	35		
1	4	—	**JM2413**	35		
	8	**JM2427**	**JM2417**	35		
1-1/4	8	—	**JM2517**	35		
Three-Way – Non-Spring Return						
1/2	1	**JM3221**	**JM3211**	50	**JT33A00T**	**JP33A000**
	2	**JM3222**	**JM3212**	50		
	4	**JM3223**	**JM3213**	35		
3/4	2	**JM3322**	**JM3312**	50		
	4	**JM3323**	**JM3313**	35		
	7.5	**JM3327**	**JM3317**	35		
1	4	—	**JM3413**	35		
	8	**JM3427**	**JM3417**	35		
1-1/4	8	—	**JM3517**	35		

Repair Information

If the J Series Electric Zone Valve fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

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J Series Electric Zone Valves for Assembly in the Field (Continued)

Technical Specifications

J Series Electric Zone Valves		
Service[1]	Hot Water, Chilled Water, 50/50 Glycol Solutions and 15 psig steam for HVAC Systems	
End Connections		Threaded (NPT), Sweat (all models) Inverted Flare (JT and JS On/Off Series Only)
Fluid Temperature Limits	**JT Series**	32 to 200°F (0 to 93°C) Water in ambient temperature of 32 to 104°F (0 to 40°C)
	JS Series	32 to 250°F (0 to 121°C) Water in ambient temperature of 32 to 169°F (0 to 76°C)
	JM Series	32 to 200°F (0 to 93°C) Water in ambient temperature of 32 to 125°F (0 to 52°C)
Valve Body Pressure Rating		300 psig (2,067 kPa) System Operating Pressure
Cycle Times	**JT or JS Series**	Bubble-Tight Shutoff
	JM Series	0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
Materials	**Body**	Forged Brass
	Stem	Brass (Hard Chrome Plated)
	Base Plate and Bearing Plate	Stainless Steel
	Actuator Housing (JS/JT Series)	Stainless Steel
	Actuator Housing (JM Series)	High Temperature Plastic
	Cover (JS/JT Series)	Aluminum
	Valve Operating Paddle (JS/JT Series)	Standard Temperature Models: Buna-N Rubber High Temperature Models: Saturated Nitrile
	Valve Plug/Paddle (JM Series)	High Temperature Thermoplastic/Rubber
	Stem Assembly O-Ring Seals	Viton™ Stem Assembly O-Ring Seals
Control Signal	**JS and JT Series**	AC 24 V, 120 V, 208 V or 230 V, Two-wire On/Off
	JM Series	“T” Type, Three-Wire Floating, AC 24 V at 60 Hz “P” Type Proportional Control Factory Setting: 0 to 10 VDC (1 to 9 VDC Actual) 0 to 5 VDC, 5 to 10 VDC jumper selectable
Control Action	**JM Series**	“P” Type Proportional Control Factory Setting: Direct Acting valve opens port “B” as signal increases. Jumper selectable
Input Impedance	**JM Series**	“P” Type Proportional Control; Voltage Input: 200,000 ohms; Current Input: 300 ohms
Agency Approval		All actuators UL listed, File E6688 or E27734 CNN XAPX (U.S.) XAPX7 (Canada), CE Mark
Power Requirements	**JS/JT Series**	AC 24 V, 60 Hz (6.5 W), 7 VA AC 120 V, 60 Hz (6.5 W), 7 VA AC 208 V, 60 Hz (6.5 W), 7 VA AC 230 V, 60 Hz (6.5 W), 7 VA
	JM Series	AC 24 V, 60 Hz, 1.6 VA
Electrical Connections	**JS/JT Series**	18 in. (457 mm) Wire Leads
	JM Series	Terminal Block
Shipping Weight	**JS/JT Series**	1.0 lbs (454 g), maximum actuator and valve body
	JM Series	1.9 lbs (860 g), maximum actuator and valve body

1. Proper water treatment is recommended; refer to VDI 2035 Standard.

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V-3766, V-3966, and V-4332

LIT-1924115

Brass Pneumatic Flare Valves 1/2-Inch 2-Way and 3-Way

Description

The 1/2-inch flared valve line accurately regulates the flow of hot or cold water in small Heating, Ventilating, and Air Conditioning (HVAC) terminal units. These 1/2-inch valves are available with a factory-installed V-3000-1 exposed type pneumatic actuator; enclosed actuators (V-3000-2) are also available (order separately). This valve style is available for field mounting the VA-805x Series electric actuators or with a factory-coupled VA-805x Series electric actuator.

Features

- 1/2 in. OD SAE 45 flare donnections do not require solder installation with copper tubing; provide easy removal for maintenance
- standard Johnson Controls® non-adjustable ring pack packings provide proven reliability and long life
- body rated 400 psig static pressure does not restrict building location
- every valve tested for tight initial and long-term shutoff ensures occupant comfort and energy conservation
- factory-assembled valves available with pneumatic or electric actuators install quickly and easily, minimizing job site time



1/2-Inch Flare Valves

Selection Charts

Pneumatically Actuated V-3766, V-3966, and V-4332 Flare Valves

Valve Body	Style [1]	Max. Cv	Range-ability[2]	Valve Suffix with V-3000 Actuator (Maximum Closeoff Pressure, psi)[3]		
				Spring Ranges (psi)		
				3 to 6	4 to 8	9 to 13
V-3766	N.O.	1.0	7:1	-1001 (345)	–	–
	N.O.	1.7	12:1	-1002 (345)	–	–
	N.O.	3.2	23:1	-1003 (345)	–	–
V-3966	N.C.	1.7	12:1	–	–	-1001 (240)
	N.C.	3.2	23:1	–	–	-1002 (240)
V-4332	MIX	1.2	7:1	–	-1007 (240/240)	-1004 (240/240)
	MIX	2.0	12:1	–	-1009 (240/240)	-1006 (240/240)

1. **N.O.** = Normally Open **N.C.** = Normally Closed
   MIX = Mixing Valve, Maximum Closeoff Pressure (N.C. port/N.O. port)
2. Rangeability is defined as the ratio of maximum flow to minimum controllable flow.
3. Maximum closeoff pressures listed are for 20 psi supply pressure to diaphragm for normally open and 0 psi supply pressure to diaphragm for normally closed.

Valid Code Numbers of V-3766, V-3966, and V-4332 Flare Valve and Pneumatic Actuator Combinations

Valid Pneumatic Valve/Actuator Assembly Code Number	Spring Range (psi)	Max. Cv	Style
V-3766-1001	3-6	1.0	N.O.
V-3766-1002	3-6	1.7	
V-3766-1003	3-6	3.2	
V-3966-1001	9-13	1.7	N.C.
V-3966-1002	9-13	3.2	
V-4332-1004	9-13	1.2	MIX
V-4332-1006	9-13	2.0	
V-4332-1007	4-8	1.2	
V-4332-1009	4-8	2.0	
VB-3766-1	None	1.0	PDTC[1]
VB-3766-2	None	1.7	
VB-3766-3	None	3.2	
VB-3966-1	None	1.7	PDTO[1]
VB-3966-2	None	3.2	
VB-4332-4	None	1.2	MIX
VB-4332-5	None	2.0	

1. **PDTC** = Push Down to Close **PDTO** = Push Down to Open

Electrically Actuated V-3766, V-3966, and V-4332 Flare Valves

Valve Body	Style	Max. Cv	Range-ability	Assembly Order Code Number (Max. Shutoff Pressure, psi)	
				VA-8050	VA-8051
VB-3766-1	PDTC	1.0	7:1	AV-8050-1007(150)	AV-8051-1007 (150)
VB-3766-2	PDTC	1.7	12:1	AV-8050-1008 (150)	AV-8051-1008 (150)
VB-3766-3	PDTC	3.2	23:1	AV-8050-1009 (150)	AV-8051-1009 (150)
VB-4332-4	MIX	1.2	7:1	AV-8050-1016 (100)	AV-8051-1016 (100)
VB-4332-5	MIX	2.0	12:1	AV-8050-1017 (100)	AV-8051-1017 (100)

Valid Code Numbers of V-3766, V-3966, and V-4332 Flare Valve and Electric Actuator Combinations

Valid Actuator/Valve Factory-Assembly Code Number	Actuator	Valve Body	Max. Cv	Flared Valve Body Style
AV-8050-1007	VA-8050-1 Floating/ incremental	VB-3766-1	1.0	Two-Way (PDTC)
AV-8050-1008		VB-3766-2	1.7	
AV-8050-1009		VB-3766-3	3.2	
AV-8050-1016		VB-4332-4	1.2	Three-Way Mix
AV-8050-1017		VB-4332-5	2.0	
AV-8051-1007	VA-8051-1 Floating/ incremental feedback	VB-3766-1	1.0	Two-Way (PDTC)
AV-8051-1008		VB-3766-2	1.7	
AV-8051-1009		VB-3766-3	3.2	
AV-8051-1016		VB-4332-4	1.2	Three-Way Mix
AV-8051-1017	VA-8050-1	VB-4333-5	2.0	

Accessories for V-3766, V-3966, and V-4332 Flare Valves (Part 1 of 2)

Code Number	Description
V-3000-2	Enclosed V-3000 Actuator for Field Mounting
V-3000-10	Valve Position Indicator for V-3000-1 Exposed Style Pneumatically Actuated Valves
VA-8000-102	Valve Position Indicator for Electrically Actuated Valves with VA-805X Actuators only

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V-3766, V-3966, and V-4332 Brass Pneumatic Flare Valves 1/2-Inch 2-Way and 3-Way (Continued)

Accessories for V-3766, V-3966, and V-4332 Flare Valves (Part 2 of 2)

Code Number	Description
V-9502-15	Valve Positioner for Field Mounting to a V-3000-1 Exposed Style Pneumatically Actuated Valve
V-9502-20	Valve Positioner Spring for V-3000-1 Exposed Style Pneumatically Actuated Valves Using a V-9502-15 Positioner; 3.0 psi (21 kPa) Span
V-9502-101	Valve Positioner Spring for V-3000-1 Exposed Style Pneumatically Actuated Valves Using a V-9502-15 Positioner; 4.3 psi (30 kPa) Span
V-9502-19	Valve Positioner Spring for V-3000-1 Exposed Style Pneumatically Actuated Valves Using a V-9502-15 Positioner 8.0 psi (56 kPa) Span

Repair Information

Valve Code Number	Repair Kit Code Number	Description
V-3766 VB-3766	**V-3754-6010**[1]	Spring Kit, 3-6 psig, 1/2 in. stroke for V-3011, V-3020, V-3752, V-3755, V-4510, V-5250 (1-1/2 and 2), V-3754 (1/2 and 3/4), and V-3766 (1/2) Valve with V-3000-1 or V-3000-2 Actuator
V-3966 VB-3966	**V-3754-6009**[1]	Spring Kit, 9-13 psig, 1/2 in. stroke for V-3011, V-3020, V-3212, V-3752, V-3755, V-3970, V-4322 (1-1/2 and 2), V-3974, V-3966, V-6139 (1/2), V-3754, V-3974, V-4324 (1/2 and 3/4) Valve with V-3000-1 or V-3000-2 Actuator
V-4332 VB-4322	**V-4332-6001**[1]	Spring Kit, 4-8 psig, 5/16 in. stroke for V-3212, V-3970, V-4322 (1/2 and 3/4), V-4332, V-4333 (1/2), V-4334 (5/8), and VT Valve with V-3000-1 or V-3000-2 Actuator
	V-3752-6022[1]	Spring Kit, 9-13 psig, 5/16 in. stroke for V-3011, V-3020, V-3212, V-3752, V-3755, V-3970, V-4322 (1/2 and 3/4), V-4334 (5/8), V-4332, V-4333, V-5416, V-7416 (1/2), V-6143 (3/8 and 3/4) and VT Valve with V-3000-1 or V-3000-2 Actuator
All Assemblies	**V-9999-608**[2]	Ring Pack Packing Kits: Single Pack
	V-9999-610[2]	10-Pack (Contains enough materials to repack 10 valves)
	V-9999-630[3]	50-Pack (Contains U-cups and O-rings only to repack 50 valves)

1. Spring kit contains: spring, upper and lower spring plate, stem extension, lock screw, and instructions.
2. Packing kit contains: O-rings, crocus cloth, assembly tool, gland nut liner, guide, extractor/installer, ring pack assembly, follower, grease, and instructions.
3. Silicone grease is not included in this kit; order V-9999-606 separately.

Technical Specifications

V-3766, V-3966, and V-4332 Flare Valves		
Models	**Pneumatic**	V-3766 - PDTC (Normally Open), V-3966 - PDTO (Normally Closed), V-4332 - 3-Way Mixing
	Electric	VB-3766 - PDTC, VB-3996 - PDTO, VB-4332 - 3-Way Mixing
Service		Hot and Cold Water
Control Air Connection (Pneumatic Operation)		1/8 in. NPT Barbed Fitting for 5/32 or 1/4 in. OD Polytubing for pneumatic actuators
Flow Characteristics		Equal Percentage
Actuator Sizing/Maximum Closeoff Pressure		See Pneumatically Actuated and Electrically Actuated valve selection charts on the previous page.
Valve Stem Diameter		1/4 in.
Flow Coefficients (Cv)		Two Way: 1.0, 1.7, 3.2; Three Way (Mixing): 1.2, 2.0. See valve selection charts and Valid Code Numbers charts on the previous page.
Maximum Seat Leakage		PDTC (N.O.) and PDTO (N.C.): 0.05% of Maximum Rated Valve Capacity Three Way Mixing: 0.5% of Maximum Rated Valve Capacity
Maximum Recommended Differential Pressure for Valve Sizing		35 psi (245 kPa)
Rangeability		Refer to *Flare Valves 1/2-Inch 2-Way and 3-Way Product Bulletin, LIT-977175*.
Valve Stroke		5/16 in.
Maximum Allowable Pressure/Temperature		(2-Way) V-3766, VB-3766, V-3966, VB-3966 400 psi (2,800 kPa) up to 150°F (66°C) Decreasing to 345 psi (2,415 kPa) at 281°F (140°C) (3-Way Mixing) V-4332 and VB-4332 250 psi (1,750 kPa) Maximum at 281°F (140°C)
Ambient Temperature Limit		-10 to 150°F (-23 to 66°C) for pneumatic actuators; -10 to 140°F (-23 to 60°C) with VA-805x actuator
Fluid Operating Temperature Limits		281°F (140°C) Maximum for pneumatic actuators; 195°F (90°C) Maximum with VA-805x actuator
Materials	**Stem**	Stainless Steel
	Plug	PDTC (N.O.) and PDTO (N.C.): Brass with Molded and Bonded Composition Disc Three Way Mixing: Brass (metal-to-metal seating)
	Body	Cast Brass with Natural Finish
	Actuator	Die Cast Aluminum for pneumatic actuators. For electric actuators, see the relevant electric actuator product bulletin.
	Diaphragm	Molded Reinforced Synthetic Rubber for pneumatic actuators
Spring Ranges (Nominal)		3 to 6 psi (21 to 42 kPa) N.O. only; 4 to 8 psi (28 to 56 kPa) MX Only; 9 to 13 psi (63 to 91 kPa) N.C. and MX for pneumatic actuators
Body Style and Sizes		Offset Globe for 1/2 in. SAE Flared Connections
Maximum Control Pressure		30 psi (210 kPa) for pneumatic actuators

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V-4334

LIT-1924120

Flare Valve

Description

The V-4334 Three-Way Mixing Flare Valve accurately regulates the mixing of water at different temperatures in small room air conditioning units.

Features

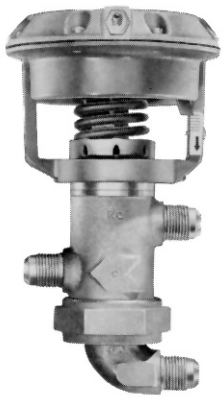
- supplied with a factory installed V-3000 exposed pneumatic actuator which has a synthetic rubber diaphragm in a die cast aluminum housing
- molded diaphragm provides a constant effective area throughout the valve stroke
- actuator assembly can be removed without disturbing the remainder of the valve assembly
- completely enclosed actuator can be ordered separately for field mounting (V-3000-8003)
- contains two modulating plugs which provide a characterized relationship between valve lift and flow at a constant pressure drop
- bottom service connection is furnished with a 90° elbow which can be rotated to any position

Applications

Typically used when hot water is circulated during the heating cycle and cold water is circulated during the cooling cycle.

Repair Information

If the V-4334 Flare Valve fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



V-4334 Flare Valve

Selection Charts

Code Number	Valve Size	Spring Range	Max Cv (kv)
V-4334-1001	5/8	4 to 8	4.7 (4.0)
V-4334-1002		9 to 13	

Accessories for V-4334 Flare Valves

Code Number	Description
V-3000-10	Valve Position Indicator
V-3000-8003	Enclosed V-3000 Actuator for Field Mounting
V-9502-15	Pneumatic Positioner

Technical Specifications

V-4334 Flare Valve	
Style	Cast Bronze for O.D. Tubing, S.A.E. 45° Flared Connections, 250 psig Body Rating
Valve Size	5/8 in.
Maximum Cv (kv)	4.7 (4.0)
Style	Three-Way Mixing Valve
Spring Range (Nominal)	4 to 8 psig and 9 to 13 psig
Service	Hot and Cold Water
Valve Stroke Length (Travel)	11/16 in.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

V-4440 Series

LIT-1924125

Water Valve 1/2 and 5/8 in. for Three and Four-Pipe Systems

Description

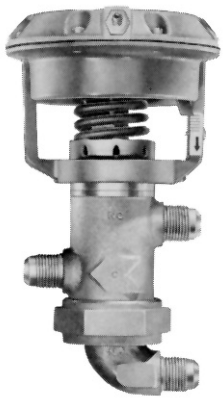
The V-4440 Water Valve 1/2 and 5/8 in. for three and four-pipe systems accurately regulates hot and cold water in small room air conditioning three or four-pipe systems. The two-pipe supply system provides heating and cooling water to the room units continuously.

Features

- supplied with a factory installed V-3000 exposed pneumatic actuator which has a synthetic rubber diaphragm in a die cast aluminum housing
- molded diaphragm provides a constant diaphragm effective area throughout the stroke
- complete actuator assembly can be removed without disturbing the remainder of the valve assembly
- completely enclosed actuator (V-3000-8003 can be ordered separately for field mounting)
- valve has two inlets (upper and lower) and one outlet (center)
- lower inlet port is normally open (N.O.) and the upper inlet port is normally closed (N.C.)
- V-4440 is both a switching valve and a control valve
- contains two modulating plugs with replaceable composition discs that are designed for both hot and cold water service
- bottom service connection is furnished with a 90° elbow which can be rotated to any position

Repair Information

If the V-4440 Water Valve fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.



V-4440 Water Valve

Selection Charts

Code Number[1]	Size (in.)	Max Cv (kv) N.C. Seat [2]	Body Style	Cv N.O. Seat [2]
Supply Valve for Three and Four-Pipe Systems (4 to 12 psig Spring)				
V-4440-1001	1/2	1.4 (1.2)	Three-Way 90° Elbow	1.4
V-4440-1002		2.4 (2.0)		2.4
V-4440-1003	5/8	4.1 (3.5)		4.7
V-4440-1004	1/2	1.4 (1.2)	Three-Way Straight	1.4
V-4440-1005		2.4 (2.0)		2.4
Return Valve for 4-Pipe System (6 to 9 psig Spring)				
V-4440-1008	1/2	2.4 (2.0)	Three-Way 90° Elbow	2.4
V-4440-1009	5/8	4.1 (3.5)		4.7
V-4440-1011	1/2	2.4 (2.0)	Three-Way Straight	2.4

1. With V-3000-1 Actuator Assembled and Seating Pressure 0 to 40 psig.
2. N.O. = Normally Open, N.C. = Normally Closed

Accessories for V-4440 Water Valve

Code Number	Description
V-3000-10	Valve Position Indicator
V-9502-15	Pneumatic Positioner
V-3000-8003	Enclosed V-3000 Actuator for Field Mounting

Technical Specifications

V-4440 Water Valve 1/2 and 5/8 in. for Three and Four-Pipe Systems	
Style	Cast Bronze for 1/2 and 5/8 in. O.D. Tubing, S.A.E. 45° Flared Connections, 250 psig Body Rating
Valve Size	1/2 and 5/8 in.
Maximum Cv	1.4, 2.4, 4.1 (Supply Valve) 2.4, 4.1 (Return Valve)
Spring Range (Nominal)	4 to 12 psig (Supply Valve) and 6 to 9 psig (Return Valve)
Service	Hot and Cold Water
Seating Pressure	0 to 40 psig
Valve Stroke Length (Travel)	11/16 in.

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VB-3766, VB-3966, VB-4332 Series

LIT-1924020

Brass Flare Valve Bodies, 1/2 in. Two-Way and Three-Way

Description

The 1/2 in. Two-Way and Three-Way Flare Valves accurately regulate the flow of hot or cold water in small HVAC terminal units, including fan coils, perimeter radiation, and reheat coils.

Features

- available with or without a factory coupled V-3000-1 pneumatic or VA-805x Series electric actuator. These actuators can also be field mounted.
- contains a modulating plug which provides an equal percentage relationship (two-way) and linear relationship (three-way) between valve travel and flow at a constant pressure drop
- uses standard Johnson Controls non-adjustable ring pack packing for proven reliability and long life
- a molded composition disk that ensures tight shutoff is bonded to the valve plug assembly and can be removed for servicing



VB-3766 Series Push-Down-To-Close



VB-3966 Series Push-Down-To-Open



VB-4332 Series Three-Way Mixing

Selection Chart

VB-3766, VB-3966, VB-4332 Series Brass Flare Valve Bodies, 1/2 in. Two-Way and Three-Way

Code Number	Size (in.)	Maximum Cv (Kv)	Stroke (in.)	Style	End Connection
VB-3766-1	1/2	1.0 (.85)	1/2	PDTC	Flare
VB-3766-2		1.7 (1.5)			
VB-3766-3		3.2 (2.7)			
VB-3966-1		1.7 (1.5)	1/2	PDTO	
VB-3966-2		3.2 (2.7)			
VB-4332-4		1.2 (1.0)	5/16	Mixing	
VB-4332-5		2.0 (1.7)			

Repair Information

If the VB-3766, V-3966, or VB-4332 Series Valve Body fails to operate within its specifications, replace the unit. For a replacement valve, contact the nearest Johnson Controls® representative.

Technical Specifications

VB-3766, VB-3966, VB-4332 Series Bronze Flare Valve Bodies, 1/2 in. Two-Way and Three-Way (Part 1 of 2)	
Service	Hot and Cold Water
Valve Stem Diameter	1/4 in.
Maximum Seat Leakage	PDTC and PDTO [1]: 0.01% of Maximum Rated Valve Capacity (Cv); Three-Way Mixing: 0.25% of Maximum Rated Valve Capacity (Cv)
Maximum Recommended Operating Differential Pressure for Valve Sizing	35 psi (245 kPa)
Valve Stroke Length (Travel)	Two-Way (VB-3766, VB-3966): 1/2 in. Three-Way (VB-4332): 5/16 in.
Max Allowable Pressure/ Temperature	(Two-Way) VB-3766, VB-3966: 400 psi (2,800 kPa) up to 150°F (66°C) Decreasing to 345 psi (2,415 kPa) at 281°F (140°C); (Three-Way Mixing) and VB-4332: 240 psi (1,750 kPa) Maximum to 281°F (140°C)

VB-3766, VB-3966, VB-4332 Series Bronze Flare Valve Bodies, 1/2 in. Two-Way and Three-Way (Part 2 of 2)		
Fluid Operating Temperature Limits		For VA-805x Electric Actuators: 35 to 195°F (2 to 90°C); For All Pneumatic Actuators: 35 to 281°F (2 to 38°C)
Maximum Closeoff Pressures		Refer to *V-3766, V-3966, and V-4332 Brass Pneumatic Flare Valves 1/2-Inch 2-Way and 3-Way Catalog Page (LIT-1924115)* on Page 245.
Flow Characteristics	**VB-3766**	PDTC: Equal Percentage
	VB-3966	PDTO: Cv 1.7: Equal Percentage; Cv 3.2: Modified Equal Percentage
	VB-4332	Both Ports: Cv 1.0 / 1.5 Linear; PDTC/PDTO: Cv 1.7 / 2.3 Quick Opening / Linear
Materials	**Stem**	Stainless Steel
	Plug	PDTC (N.O.)[1] and PDTO (N.C.)[1]: Brass with Molded and Bonded Composition Disk; Three-Way Mixing: Brass (Metal-to-Metal)
	Body	Cast Bronze with Natural Finish
	Packing	Non-Adjustable EPR (Ethylene Propylene Rubber) Ring Packs
Body Style and End Connection		Offset Globe for 1/2 in. S.A.E. Flared Connections
Rangeability and Flow Coefficient		**Max. Cv (Kv) — Rangeability**
	VB-3766 PDTC	1.0 (.85) — 7:1 1.7 (1.5) — 12:1 3.2 (2.7) — 23:1
	VB-3966 PDTO	1.8 (1.5) — 12:1 2.7 (2.3) — 23:1
	VB-4332 Mix	1.0 (.85) PDTC Port / 1.5 (1.28) PDTO Port — 10:1 for PDTC Port, 4:1 for PDTO Port 1.7 (1.5) PDTC Port / 2.3 (1.9) PDTO Port — 6:1 for both Ports
Dimensions (End-to-End)	**VB-3766, VB-4332**	3-3/8 in.
	VB-3966	3-3/4 in.
Recommended Actuators	**Pneumatic**	V-3000-1, V-3000-8003
	Electric	VA-805x, VA-715x (Field Mounting Only)

1. PDTC = Push-Down-to-Close PDTO = Push-Down-to-Open

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LIT-1900036

Sizing Water Valves

Two Position Applications: The valve is normally sized to the pipe size with the largest Cv.

Modulating Applications: The valve should be sized to produce the required GPM flow at a pressure drop of 1 to 2 times the pressure drop across the coil at design flow.

Example: To select a VG1000 Series Ball Valve for a coil that requires 14 gpm at 5 psi pressure drop. The valve should be selected to provide 14 gpm with a pressure drop across the valve between 5 and 10 psi (one to two times the pressure drop across the coil at the required flow).

Solution: From the VG1000 Series Ball Valve table below, a 1/2 in., 4.7 Cv valve will provide 14.1 gpm flow at a pressure drop across the valve of 9 psi. This is the valve to be selected, as the valve will provide the needed flow with a pressure drop between one and two times the pressure drop across the coil at the required flow.

Flow Rates in GPM (Gallons Per Minute)

VG1000 Series Ball Valve

Cv	1.2	1.9	2.9	4.7	7.4	11.7	18.7	29.2	46.8	73.7
Pressure Drop (psi)	Flow Rate in gpm (Gallons Per Minute)									
1	1.2	1.9	2.9	4.7	7.4	11.7	18.7	29.2	46.8	73.7
2	1.7	2.7	4.1	6.6	10.5	16.5	26.4	41.3	66.2	104.2
3	2.1	3.3	5.0	8.1	12.8	20.3	32.4	50.6	81.1	127.7
4	2.4	3.8	5.8	9.4	14.8	23.4	37.4	58.4	93.6	147.4
5	2.7	4.2	6.5	10.5	16.5	26.2	41.8	65.3	104.6	164.8
6	2.9	4.7	7.1	11.5	18.1	28.7	45.8	71.5	114.6	180.5
7	3.2	5.0	7.7	12.4	19.6	31.0	49.5	77.3	123.8	195.0
8	3.4	5.4	8.2	13.3	20.9	33.1	52.9	82.6	132.4	208.5
9	3.6	5.7	8.7	14.1	22.2	35.1	56.1	87.6	140.4	221.1
10	3.8	6.0	9.2	14.9	23.4	37.0	59.1	92.3	148.0	233.1
11	4.0	6.3	9.6	15.6	24.5	38.8	62.0	96.8	155.2	244.4
12	4.2	6.6	10.0	16.3	25.6	40.5	64.8	101.2	162.1	255.3
13	4.3	6.9	10.5	16.9	26.7	42.2	67.4	105.3	168.7	265.7
14	4.5	7.1	10.9	17.6	27.7	43.8	70.0	109.3	175.1	275.8
15	4.6	7.4	11.2	18.2	28.7	45.3	72.4	113.1	181.3	285.4
16	4.8	7.6	11.6	18.8	29.6	46.8	74.8	116.8	187.2	294.8
17	4.9	7.8	12.0	19.4	30.5	48.2	77.1	120.4	193.0	303.9
18	5.1	8.1	12.3	19.9	31.4	49.6	79.3	123.9	198.6	312.7
19	5.2	8.3	12.6	20.5	32.3	51.0	81.5	127.3	204.0	321.3
20	5.4	8.5	13.0	21.0	33.1	52.3	83.6	130.6	209.3	329.6
21	5.5	8.7	13.3	21.5	33.9	53.6	85.7	133.8	214.5	337.7
22	5.6	8.9	13.6	22.0	34.7	54.9	87.7	137.0	219.5	345.7
23	5.8	9.1	13.9	22.5	35.5	56.1	89.7	140.0	224.4	353.5
24	5.9	9.3	14.2	23.0	36.3	57.3	91.6	143.1	229.3	361.1
25	6.0	9.5	14.5	23.5	37.0	58.5	93.5	146.0	234.0	368.5
26	6.1	9.7	14.8	24.0	37.7	59.7	95.4	148.9	238.6	375.8
27	6.2	9.9	15.1	24.4	38.5	60.8	97.2	151.7	243.2	383.0
28	6.3	10.1	15.3	24.9	39.2	61.9	99.0	154.5	247.6	390.0
29	6.5	10.2	15.6	25.3	39.9	63.0	100.7	157.2	252.0	396.9
30	6.6	10.4	15.9	25.7	40.5	64.1	102.4	159.9	256.3	403.7

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VG1000 Series Flanged Ball Valve

Cv	47	74	117	176	211
Pressure Drop (psi)	Flow Rate in gpm (Gallons Per Minute)				
1	47.0	74.0	117	176	211
2	66.5	105	165	249	298
3	81.4	128	203	305	365
4	94	148	234	352	422
5	105	165	262	394	472
6	115	181	287	431	517
7	124	196	310	466	558
8	133	209	331	498	597
9	141	222	351	528	633
10	149	234	370	557	667
11	156	245	388	584	700
12	163	256	405	610	731
13	169	267	422	635	761
14	176	277	438	659	789
15	182	287	453	682	817
16	188	296	468	704	844
17	194	305	482	726	870
18	199	314	496	747	895
19	205	323	510	767	920
20	210	331	523	787	944
21	215	339	536	807	967
22	220	347	549	826	990
23	225	355	561	844	1012
24	230	363	573	862	1034
25	235	370	585	880	1055
26	240	377	597	897	1076
27	244	385	608	915	1096
28	249	392	619	931	1117
29	253	399	630	948	1136
30	257	405	641	964	1156

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VG2000 Series Flanged Cast Iron Globe Valve

	Two-Way					Three-Way				
Pipe Size	**2-1/2”**	**3”**	**4”**	**5”**	**6”**	**2-1/2”**	**3”**	**4”**	**5”**	**6”**
Cv	**51**	**83**	**150**	**240**	**350**	**54**	**80**	**157**	**238**	**347**
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**									
1	51.0	83.0	150.0	240.0	350.0	54.0	80.0	157.0	238.0	347.0
2	72.1	117.4	212.1	339.4	495.0	76.4	113.1	222.0	336.6	490.7
3	88.3	143.8	259.8	415.7	606.2	93.5	138.6	271.9	412.2	601.0
4	102.0	166.0	300.0	480.0	700.0	108.0	160.0	314.0	476.0	694.0
5	114.0	185.6	335.4	536.7	782.6	120.7	178.9	351.1	532.2	775.9
6	124.9	203.3	367.4	587.9	857.3	132.3	196.0	384.6	583.0	850.0
7	134.9	219.6	396.9	635.0	926.0	142.9	211.7	415.4	629.7	918.1
8	144.2	234.8	424.3	678.8	989.9	152.7	226.3	444.1	673.2	981.5
9	153.0	249.0	450.0	720.0	1050.0	162.0	240.0	471.0	714.0	1041.0
10	161.3	262.5	474.3	758.9	1106.8	170.8	253.0	496.5	752.6	1097.3
11	169.1	275.3	497.5	796.0	1160.8	179.1	265.3	520.7	789.4	1150.9
12	176.7	287.5	519.6	831.4	1212.4	187.1	277.1	543.9	824.5	1202.0
13	183.9	299.3	540.8	865.3	1261.9	194.7	288.4	566.1	858.1	1251.1
14	190.8	310.6	561.2	898.0	1309.6	202.0	299.3	587.4	890.5	1298.4
15	197.5	321.5	580.9	929.5	1355.5	209.1	309.8	608.1	921.8	1343.9
16	204.0	332.0	600.0	960.0	1400.0	216.0	320.0	628.0	952.0	1388.0
17	210.3	342.2	618.5	989.5	1443.1	222.6	329.8	647.3	981.3	1430.7
18	216.4	352.1	636.4	1018.2	1484.9	229.1	339.4	666.1	1009.7	1472.2
19	222.3	361.8	653.8	1046.1	1525.6	235.4	348.7	684.3	1037.4	1512.5
20	228.1	371.2	670.8	1073.3	1565.2	241.5	357.8	702.1	1064.4	1551.8
21	233.7	380.4	687.4	1099.8	1603.9	247.5	366.6	719.5	1090.7	1590.2
22	239.2	389.3	703.6	1125.7	1641.6	253.3	375.2	736.4	1116.3	1627.6
23	244.6	398.1	719.4	1151.0	1678.5	259.0	383.7	752.9	1141.4	1664.2
24	249.8	406.6	734.8	1175.8	1714.6	264.5	391.9	769.1	1166.0	1699.9
25	255.0	415.0	750.0	1200.0	1750.0	270.0	400.0	785.0	1190.0	1735.0
26	260.0	423.2	764.9	1223.8	1784.7	275.3	407.9	800.5	1213.6	1769.4
27	265.0	431.3	779.4	1247.1	1818.7	280.6	415.7	815.8	1236.7	1803.1
28	269.9	439.2	793.7	1270.0	1852.0	285.7	423.3	830.8	1259.4	1836.2
29	274.6	447.0	807.8	1292.4	1884.8	290.8	430.8	845.5	1281.7	1868.7
30	279.3	454.6	821.6	1314.5	1917.0	295.8	438.2	859.9	1303.6	1900.6

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VG7000 Series Bronze Globe Valve

Pipe Size	1/2"			3/4"	1”	1-1/4”	1-1/2”	2”
Cv	0.73	1.8	4.6	7.3	11.6	18.5	28.9	46.2
Pressure Drop (psi)	Flow Rate in gpm (Gallons Per Minute)							
1	0.7	1.8	4.6	7.3	11.6	18.5	28.9	46.2
2	1.0	2.5	6.5	10.3	16.4	26.2	40.9	65.3
3	1.3	3.1	8.0	12.6	20.1	32.0	50.1	80.0
4	1.5	3.6	9.2	14.6	23.2	37.0	57.8	92.4
5	1.6	4.0	10.3	16.3	25.9	41.4	64.6	103.3
6	1.8	4.4	11.3	17.9	28.4	45.3	70.8	113.2
7	1.9	4.8	12.2	19.3	30.7	48.9	76.5	122.2
8	2.1	5.1	13.0	20.6	32.8	52.3	81.7	130.7
9	2.2	5.4	13.8	21.9	34.8	55.5	86.7	138.6
10	2.3	5.7	14.5	23.1	36.7	58.5	91.4	146.1
11	2.4	6.0	15.3	24.2	38.5	61.4	95.9	153.2
12	2.5	6.2	15.9	25.3	40.2	64.1	100.1	160.0
13	2.6	6.5	16.6	26.3	41.8	66.7	104.2	166.6
14	2.7	6.7	17.2	27.3	43.4	69.2	108.1	172.9
15	2.8	7.0	17.8	28.3	44.9	71.7	111.9	178.9
16	2.9	7.2	18.4	29.2	46.4	74.0	115.6	184.8
17	3.0	7.4	19.0	30.1	47.8	76.3	119.2	190.5
18	3.1	7.6	19.5	31.0	49.2	78.5	122.6	196.0
19	3.2	7.8	20.1	31.8	50.6	80.6	126.0	201.4
20	3.3	8.0	20.6	32.6	51.9	82.7	129.2	206.6
21	3.3	8.2	21.1	33.5	53.2	84.8	132.4	211.7
22	3.4	8.4	21.6	34.2	54.4	86.8	135.6	216.7
23	3.5	8.6	22.1	35.0	55.6	88.7	138.6	221.6
24	3.6	8.8	22.5	35.8	56.8	90.6	141.6	226.3
25	3.7	9.0	23.0	36.5	58.0	92.5	144.5	231.0
26	3.7	9.2	23.5	37.2	59.1	94.3	147.4	235.6
27	3.8	9.4	23.9	37.9	60.3	96.1	150.2	240.1
28	3.9	9.5	24.3	38.6	61.4	97.9	152.9	244.5
29	3.9	9.7	24.8	39.3	62.5	99.6	155.6	248.8
30	4.0	9.9	25.2	40.0	63.5	101.3	158.3	253.0

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

J Series Electric Zone Valve

	JM Series Modulating					JS/JT Series On/Off					
Cv	**1**	**2**	**4**	**7.5**	**8**	**1**	**2.5**	**3.5**	**4**	**5**	**8**
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**										
1	1.0	2.0	4.0	7.5	8.0	1.0	2.5	3.5	4.0	5.0	8.0
2	1.4	2.8	5.7	10.6	11.3	1.4	3.5	4.9	5.7	7.1	11.3
3	1.7	3.5	6.9	13.0	13.9	1.7	4.3	6.1	6.9	8.7	13.9
4	2.0	4.0	8.0	15.0	16.0	2.0	5.0	7.0	8.0	10.0	16.0
5	2.2	4.5	8.9	16.8	17.9	2.2	5.6	7.8	8.9	11.2	17.9
6	2.4	4.9	9.8	18.4	19.6	2.4	6.1	8.6	9.8	12.2	19.6
7	2.6	5.3	10.6	19.8	21.2	2.6	6.6	9.3	10.6	13.2	21.2
8	2.8	5.7	11.3	21.2	22.6	2.8	7.1	9.9	11.3	14.1	22.6
9	3.0	6.0	12.0	22.5	24.0	3.0	7.5	10.5	12.0	15.0	24.0
10	3.2	6.3	12.6	23.7	25.3	3.2	7.9	11.1	12.6	15.8	25.3
11	3.3	6.6	13.3	24.9	26.5	3.3	8.3	11.6	13.3	16.6	26.5
12	3.5	6.9	13.9	26.0	27.7	3.5	8.7	12.1	13.9	17.3	27.7
13	3.6	7.2	14.4	27.0	28.8	3.6	9.0	12.6	14.4	18.0	28.8
14	3.7	7.5	15.0	28.1	29.9	3.7	9.4	13.1	15.0	18.7	29.9
15	3.9	7.7	15.5	29.0	31.0	3.9	9.7	13.6	15.5	19.4	31.0
16	4.0	8.0	16.0	30.0	32.0	4.0	10.0	14.0	16.0	20.0	32.0
17	4.1	8.2	16.5	30.9	33.0	4.1	10.3	14.4	16.5	20.6	33.0
18	4.2	8.5	17.0	31.8	33.9	4.2	10.6	14.8	17.0	21.2	33.9
19	4.4	8.7	17.4	32.7	34.9	4.4	10.9	15.3	17.4	21.8	34.9
20	4.5	8.9	17.9	33.5	35.8	4.5	11.2	15.7	17.9	22.4	35.8
21	4.6	9.2	18.3	34.4	36.7	4.6	11.5	16.0	18.3	22.9	36.7
22	4.7	9.4	18.8	35.2	37.5	4.7	11.7	16.4	18.8	23.5	37.5
23	4.8	9.6	19.2	36.0	38.4	4.8	12.0	16.8	19.2	24.0	38.4
24	4.9	9.8	19.6	36.7	39.2	4.9	12.2	17.1	19.6	24.5	39.2
25	5.0	10.0	20.0	37.5	40.0	5.0	12.5	17.5	20.0	25.0	40.0
26	5.1	10.2	20.4	38.2	40.8	5.1	12.7	17.8	20.4	25.5	40.8
27	5.2	10.4	20.8	39.0	41.6	5.2	13.0	18.2	20.8	26.0	41.6
28	5.3	10.6	21.2	39.7	42.3	5.3	13.2	18.5	21.2	26.5	42.3
29	5.4	10.8	21.5	40.4	43.1	5.4	13.5	18.8	21.5	26.9	43.1
30	5.5	11.0	21.9	41.1	43.8	5.5	13.7	19.2	21.9	27.4	43.8

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VF4, VF5 and VF6 Series M9000 and D-3000 Actuated Butterfly Valves

	Cv at 70° Open for Modulating Service							
Pipe Size	**2”**	**2-1/2”**	**3”**	**4”**	**5”**	**6”**	**8”**	**10”**
Cv	**105**	**156**	**240**	**423**	**656**	**941**	**1660**	**2560**
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**							
1	105	156	240	423	656	941	1,660	2,560
2	149	221	339	598	928	1,331	2,348	3,620
3	182	270	416	733	1,136	1,630	2,875	4,434
4	210	312	480	846	1,312	1,882	3,320	5,120
5	235	349	537	946	1,467	2,104	3,712	5,724
6	257	382	588	1,036	1,607	2,305	4,066	6,271
7	278	413	635	1,119	1,736	2,490	4,392	6,773
8	297	441	679	1,196	1,855	2,662	4,695	7,241
9	315	468	720	1,269	1,968	2,823	4,980	7,680
10	332	493	759	1,338	2,075	2,976	5,249	8,095
11	348	517	796	1,403	2,176	3,121	5,506	8,491
12	364	540	831	1,465	2,273	3,260	5,750	8,868
13	379	563	865	1,525	2,365	3,393	5,985	9,230
14	393	584	898	1,583	2,455	3,521	6,211	9,579
15	407	604	930	1,638	2,541	3,645	6,429	9,915
16	420	624	960	1,692	2,624	3,764	6,640	10,240
17	433	643	990	1,744	2,705	3,880	6,844	10,555
18	446	662	1,018	1,795	2,783	3,992	7,043	10,861
19	458	680	1,046	1,844	2,859	4,102	7,236	11,159
20	470	698	1,073	1,892	2,934	4,208	7,424	11,449
21	481	715	1,100	1,938	3,006	4,312	7,607	11,731
22	493	732	1,126	1,984	3,077	4,414	7,786	12,008
23	504	748	1,151	2,029	3,146	4,513	7,961	12,277
24	514	764	1,176	2,072	3,214	4,610	8,132	12,541
25	525	780	1,200	2,115	3,280	4,705	8,300	12,800
26	535	795	1,224	2,157	3,345	4,798	8,464	13,054
27	546	811	1,247	2,198	3,409	4,890	8,626	13,302
28	556	826	1,270	2,238	3,471	4,979	8,784	13,546
29	565	840	1,292	2,278	3,533	5,067	8,939	13,786
30	575	854	1,315	2,317	3,593	5,154	9,092	14,022

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VF4 and VF5 Series M9000 Actuated Butterfly Valves

	Cv at 90° Open for On/Off Service					
Pipe Size	**2”**	**2-1/2”**	**3”**	**4”**	**5”**	**6”**
Cv	**159**	**266**	**457**	**860**	**1320**	**2020**
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**					
1	159	266	457	860	1,320	2,020
2	225	376	646	1,216	1,867	2,857
3	275	461	792	1,490	2,286	3,499
4	318	532	914	1,720	2,640	4,040
5	356	595	1,022	1,923	2,952	4,517
6	390	652	1,119	2,107	3,233	4,948
7	421	704	1,209	2,275	3,492	5,344
8	450	752	1,293	2,432	3,734	5,713
9	477	798	1,371	2,580	3,960	6,060
10	503	841	1,445	2,720	4,174	6,388
11	527	882	1,516	2,852	4,378	6,700
12	551	922	1,583	2,979	4,573	6,998
13	573	959	1,648	3,101	4,759	7,283
14	595	995	1,710	3,218	4,939	7,558
15	616	1,030	1,770	3,331	5,112	7,823
16	636	1,064	1,828	3,440	5,280	8,080
17	656	1,097	1,884	3,546	5,443	8,329
18	675	1,129	1,939	3,649	5,600	8,570
19	693	1,160	1,992	3,749	5,754	8,805
20	711	1,190	2,044	3,846	5,903	9,034
21	729	1,219	2,094	3,941	6,049	9,257
22	746	1,248	2,144	4,034	6,191	9,475
23	763	1,276	2,192	4,124	6,331	9,688
24	779	1,303	2,239	4,213	6,467	9,896
25	795	1,330	2,285	4,300	6,600	10,100
26	811	1,356	2,330	4,385	6,731	10,300
27	826	1,382	2,375	4,469	6,859	10,496
28	841	1,408	2,418	4,551	6,985	10,689
29	856	1,433	2,461	4,631	7,108	10,878
30	871	1,457	2,503	4,710	7,230	11,064

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VFx- Series Standard Performance Butterfly Valves

	Cv at 70° Open for Modulating Service												
Pipe Size	**2”**	**2-1/2”**	**3”**	**4”**	**5”**	**6”**	**8”**	**10”**	**12”**	**14”**	**16”**	**18”**	**20”**
Cv	**84**	**163**	**267**	**496**	**775**	**1,025**	**1,862**	**2,948**	**4,393**	**5,939**	**7,867**	**10,065**	**12,535**
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**												
1	84	163	267	496	775	1,025	1,862	2,948	4,393	5,939	7,867	10,065	12,535
2	119	231	378	701	1,096	1,450	2,633	4,169	6,213	8,399	11,126	14,234	17,727
3	146	282	463	859	1,342	1,775	3,225	5,106	7,609	10,287	13,626	17,433	21,711
4	168	326	534	992	1,550	2,050	3,724	5,896	8,786	11,878	15,734	20,130	25,070
5	188	365	597	1,109	1,733	2,292	4,164	6,592	9,823	13,280	17,591	22,506	28,029
6	206	399	654	1,215	1,898	2,511	4,561	7,221	10,761	14,548	19,270	24,654	30,704
7	222	431	706	1,312	2,051	2,712	4,926	7,800	11,623	15,713	20,814	26,630	33,165
8	238	461	755	1,403	2,192	2,899	5,267	8,338	12,425	16,798	22,251	28,468	35,454
9	252	489	801	1,488	2,325	3,075	5,586	8,844	13,179	17,817	23,601	30,195	37,605
10	266	516	844	1,569	2,451	3,241	5,888	9,322	13,892	18,781	24,878	31,828	39,639
11	279	541	886	1,645	2,570	3,400	6,176	9,777	14,570	19,697	26,092	33,382	41,574
12	291	565	925	1,718	2,685	3,551	6,450	10,212	15,218	20,573	27,252	34,866	43,423
13	303	588	963	1,788	2,794	3,696	6,714	10,629	15,839	21,413	28,365	36,290	45,196
14	314	610	999	1,856	2,900	3,835	6,967	11,030	16,437	22,222	29,436	37,660	46,902
15	325	631	1,034	1,921	3,002	3,970	7,212	11,418	17,014	23,002	30,469	38,982	48,548
16	336	652	1,068	1,984	3,100	4,100	7,448	11,792	17,572	23,756	31,468	40,260	50,140
17	346	672	1,101	2,045	3,195	4,226	7,677	12,155	18,113	24,487	32,437	41,499	51,683
18	356	692	1,133	2,104	3,288	4,349	7,900	12,507	18,638	25,197	33,377	42,702	53,182
19	366	711	1,164	2,162	3,378	4,468	8,116	12,850	19,149	25,888	34,292	43,872	54,639
20	376	729	1,194	2,218	3,466	4,584	8,327	13,184	19,646	26,560	35,182	45,012	56,058
21	385	747	1,224	2,273	3,552	4,697	8,533	13,509	20,131	27,216	36,051	46,124	57,443
22	394	765	1,252	2,326	3,635	4,808	8,734	13,827	20,605	27,856	36,900	47,209	58,794
23	403	782	1,281	2,379	3,717	4,916	8,930	14,138	21,068	28,482	37,729	48,270	60,116
24	412	799	1,308	2,430	3,797	5,022	9,122	14,442	21,521	29,095	38,540	49,308	61,409
25	420	815	1,335	2,480	3,875	5,125	9,310	14,740	21,965	29,695	39,335	50,325	62,675
26	428	831	1,361	2,529	3,952	5,227	9,494	15,032	22,400	30,283	40,114	51,322	63,916
27	437	847	1,387	2,577	4,027	5,326	9,675	15,318	22,827	30,860	40,878	52,299	65,134
28	445	863	1,413	2,625	4,101	5,424	9,853	15,599	23,246	31,426	41,628	53,259	66,329
29	452	878	1,438	2,671	4,174	5,520	10,027	15,876	23,657	31,983	42,365	54,202	67,503
30	460	893	1,462	2,717	4,245	5,614	10,199	16,147	24,062	32,529	43,089	55,128	68,657

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VFx- Series Standard Performance Butterfly Valves

	Cv at 90° Open for On/Off Service												
Pipe Size	**2”**	**2-1/2”**	**3”**	**4”**	**5”**	**6”**	**8”**	**10”**	**12”**	**14”**	**16”**	**18”**	**20”**
Cv	**144**	**282**	**461**	**841**	**1,376**	**1,850**	**3,316**	**5,430**	**8,077**	**10,538**	**13,966**	**17,214**	**22,339**
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**												
1	144	282	461	841	1,376	1,850	3,316	5,430	8,077	10,538	13,966	17,214	22,339
2	204	399	652	1,189	1,946	2,616	4,690	7,679	11,423	14,903	19,751	24,344	31,592
3	249	488	799	1,457	2,383	3,204	5,744	9,405	13,990	18,252	24,190	29,816	38,692
4	288	564	922	1,682	2,752	3,700	6,632	10,860	16,154	21,076	27,932	34,428	44,678
5	322	631	1,031	1,881	3,077	4,137	7,415	12,142	18,061	23,564	31,229	38,492	49,952
6	353	691	1,129	2,060	3,371	4,532	8,123	13,301	19,785	25,813	34,210	42,166	54,719
7	381	746	1,220	2,225	3,641	4,895	8,773	14,366	21,370	27,881	36,951	45,544	59,103
8	407	798	1,304	2,379	3,892	5,233	9,379	15,358	22,845	29,806	39,502	48,689	63,184
9	432	846	1,383	2,523	4,128	5,550	9,948	16,290	24,231	31,614	41,898	51,642	67,017
10	455	892	1,458	2,660	4,351	5,850	10,486	17,171	25,542	33,324	44,164	54,435	70,642
11	478	935	1,529	2,789	4,564	6,136	10,998	18,009	26,788	34,951	46,320	57,092	74,090
12	499	977	1,597	2,913	4,767	6,409	11,487	18,810	27,980	36,505	48,380	59,631	77,385
13	519	1,017	1,662	3,032	4,961	6,670	11,956	19,578	29,122	37,995	50,355	62,066	80,544
14	539	1,055	1,725	3,147	5,149	6,922	12,407	20,317	30,221	39,430	52,256	64,409	83,585
15	558	1,092	1,785	3,257	5,329	7,165	12,843	21,030	31,282	40,814	54,090	66,670	86,519
16	576	1,128	1,844	3,364	5,504	7,400	13,264	21,720	32,308	42,152	55,864	68,856	89,356
17	594	1,163	1,901	3,468	5,673	7,628	13,672	22,389	33,302	43,449	57,583	70,975	92,106
18	611	1,196	1,956	3,568	5,838	7,849	14,069	23,038	34,268	44,709	59,253	73,033	94,776
19	628	1,229	2,010	3,666	5,998	8,064	14,454	23,669	35,207	45,934	60,876	75,034	97,373
20	644	1,261	2,062	3,761	6,154	8,274	14,830	24,284	36,121	47,127	62,458	76,983	99,903
21	660	1,292	2,113	3,854	6,306	8,478	15,196	24,883	37,014	48,291	64,000	78,885	102,370
22	675	1,323	2,162	3,945	6,454	8,677	15,553	25,469	37,885	49,428	65,506	80,741	104,779
23	691	1,352	2,211	4,033	6,599	8,872	15,903	26,041	38,736	50,539	66,979	82,555	107,134
24	706	1,382	2,258	4,120	6,741	9,063	16,245	26,602	39,569	51,625	68,419	84,331	109,438
25	720	1,410	2,305	4,205	6,880	9,250	16,580	27,150	40,385	52,690	69,830	86,070	111,695
26	734	1,438	2,351	4,288	7,016	9,433	16,908	27,688	41,185	53,734	71,213	87,775	113,907
27	748	1,465	2,395	4,370	7,150	9,613	17,230	28,215	41,969	54,757	72,570	89,447	116,077
28	762	1,492	2,439	4,450	7,281	9,789	17,547	28,733	42,740	55,762	73,901	91,088	118,207
29	776	1,519	2,483	4,529	7,410	9,963	17,857	29,241	43,496	56,749	75,209	92,700	120,299
30	789	1,545	2,525	4,606	7,537	10,133	18,163	29,741	44,240	57,719	76,495	94,285	122,356

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VFx- Series High Performance Class 150 Butterfly Valves

	Cv at 70° Open for Modulating Service									
Pipe Size	**2-1/2”**	**3”**	**4”**	**5”**	**6”**	**8”**	**10”**	**12”**	**14”**	**16”**
Cv	**100**	**155**	**315**	**500**	**750**	**1,590**	**2,430**	**3,750**	**3,400**	**5,510**
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**									
1	100	155	315	500	750	1,590	2,430	3,750	3,400	5,510
2	141	219	446	707	1,061	2,249	3,437	5,303	4,808	7,792
3	173	269	546	866	1,299	2,754	4,209	6,495	5,889	9,544
4	200	310	630	1,000	1,500	3,180	4,860	7,500	6,800	11,020
5	224	347	704	1,118	1,677	3,555	5,434	8,385	7,603	12,321
6	245	380	772	1,225	1,837	3,895	5,952	9,186	8,328	13,497
7	265	410	833	1,323	1,984	4,207	6,429	9,922	8,996	14,578
8	283	438	891	1,414	2,121	4,497	6,873	10,607	9,617	15,585
9	300	465	945	1,500	2,250	4,770	7,290	11,250	10,200	16,530
10	316	490	996	1,581	2,372	5,028	7,684	11,859	10,752	17,424
11	332	514	1,045	1,658	2,488	5,273	8,059	12,437	11,277	18,275
12	346	537	1,091	1,732	2,598	5,508	8,418	12,990	11,778	19,087
13	361	559	1,136	1,803	2,704	5,733	8,762	13,521	12,259	19,867
14	374	580	1,179	1,871	2,806	5,949	9,092	14,031	12,722	20,617
15	387	600	1,220	1,937	2,905	6,158	9,411	14,524	13,168	21,340
16	400	620	1,260	2,000	3,000	6,360	9,720	15,000	13,600	22,040
17	412	639	1,299	2,062	3,092	6,556	10,019	15,462	14,019	22,718
18	424	658	1,336	2,121	3,182	6,746	10,310	15,910	14,425	23,377
19	436	676	1,373	2,179	3,269	6,931	10,592	16,346	14,820	24,018
20	447	693	1,409	2,236	3,354	7,111	10,867	16,771	15,205	24,642
21	458	710	1,444	2,291	3,437	7,286	11,136	17,185	15,581	25,250
22	469	727	1,478	2,345	3,518	7,458	11,398	17,589	15,947	25,844
23	480	743	1,511	2,398	3,597	7,625	11,654	17,984	16,306	26,425
24	490	759	1,543	2,450	3,674	7,789	11,905	18,371	16,657	26,993
25	500	775	1,575	2,500	3,750	7,950	12,150	18,750	17,000	27,550
26	510	790	1,606	2,550	3,824	8,107	12,391	19,121	17,337	28,096
27	520	805	1,637	2,598	3,897	8,262	12,627	19,486	17,667	28,631
28	529	820	1,667	2,646	3,969	8,414	12,858	19,843	17,991	29,156
29	539	835	1,696	2,693	4,039	8,562	13,086	20,194	18,310	29,672
30	548	849	1,725	2,739	4,108	8,709	13,310	20,540	18,623	30,180

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VFx- Series High Performance Class 150 Butterfly Valves

	Cv at 90° Open for On/Off Service									
Pipe Size	**2-1/2”**	**3”**	**4”**	**5”**	**6”**	**8”**	**10”**	**12”**	**14”**	**16”**
Cv	**160**	**185**	**375**	**790**	**1,350**	**2,800**	**4,300**	**6,650**	**7,650**	**9,800**
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**									
1	160	185	375	790	1,350	2,800	4,300	6,650	7,650	9,800
2	226	262	530	1,117	1,909	3,960	6,081	9,405	10,819	13,859
3	277	320	650	1,368	2,338	4,850	7,448	11,518	13,250	16,974
4	320	370	750	1,580	2,700	5,600	8,600	13,300	15,300	19,600
5	358	414	839	1,767	3,019	6,261	9,615	14,870	17,106	21,914
6	392	453	919	1,935	3,307	6,859	10,533	16,289	18,739	24,005
7	423	490	992	2,090	3,572	7,408	11,377	17,594	20,240	25,928
8	453	523	1,061	2,235	3,818	7,920	12,162	18,809	21,638	27,719
9	480	555	1,125	2,370	4,050	8,400	12,900	19,950	22,950	29,400
10	506	585	1,186	2,498	4,269	8,854	13,598	21,029	24,191	30,990
11	531	614	1,244	2,620	4,477	9,287	14,262	22,056	25,372	32,503
12	554	641	1,299	2,737	4,677	9,700	14,896	23,036	26,500	33,948
13	577	667	1,352	2,848	4,868	10,096	15,504	23,977	27,583	35,334
14	599	692	1,403	2,956	5,051	10,477	16,089	24,882	28,624	36,668
15	620	717	1,452	3,060	5,229	10,844	16,654	25,755	29,628	37,955
16	640	740	1,500	3,160	5,400	11,200	17,200	26,600	30,600	39,200
17	660	763	1,546	3,257	5,566	11,545	17,729	27,419	31,542	40,406
18	679	785	1,591	3,352	5,728	11,879	18,243	28,214	32,456	41,578
19	697	806	1,635	3,444	5,885	12,205	18,743	28,987	33,346	42,717
20	716	827	1,677	3,533	6,037	12,522	19,230	29,740	34,212	43,827
21	733	848	1,719	3,620	6,187	12,831	19,705	30,474	35,057	44,909
22	751	868	1,759	3,705	6,332	13,133	20,169	31,191	35,882	45,966
23	767	887	1,798	3,789	6,474	13,428	20,622	31,892	36,688	46,999
24	784	906	1,837	3,870	6,614	13,717	21,066	32,578	37,477	48,010
25	800	925	1,875	3,950	6,750	14,000	21,500	33,250	38,250	49,000
26	816	943	1,912	4,028	6,884	14,277	21,926	33,909	39,008	49,970
27	831	961	1,949	4,105	7,015	14,549	22,344	34,554	39,751	50,922
28	847	979	1,984	4,180	7,144	14,816	22,754	35,189	40,480	51,857
29	862	996	2,019	4,254	7,270	15,079	23,156	35,811	41,197	52,775
30	876	1,013	2,054	4,327	7,394	15,336	23,552	36,424	41,901	53,677

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VFx- Series High Performance Class 300 Butterfly Valves

	Cv at 70° Open for Modulating Service								
Pipe Size	**2-1/2”**	**3”**	**4”**	**5”**	**6”**	**8”**	**10”**	**12”**	**14”**
Cv	**100**	**155**	**315**	**500**	**710**	**1,360**	**1,740**	**2,500**	**2,400**
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**								
1	100	155	315	500	710	1,360	1,740	2,500	2,400
2	141	219	446	707	1,004	1,923	2,461	3,536	3,394
3	173	269	546	866	1,230	2,356	3,014	4,330	4,157
4	200	310	630	1,000	1,420	2,720	3,480	5,000	4,800
5	224	347	704	1,118	1,588	3,041	3,891	5,590	5,367
6	245	380	772	1,225	1,739	3,331	4,262	6,124	5,879
7	265	410	833	1,323	1,879	3,598	4,604	6,614	6,350
8	283	438	891	1,414	2,008	3,847	4,922	7,071	6,788
9	300	465	945	1,500	2,130	4,080	5,220	7,500	7,200
10	316	490	996	1,581	2,245	4,301	5,502	7,906	7,590
11	332	514	1,045	1,658	2,355	4,511	5,771	8,292	7,960
12	346	537	1,091	1,732	2,460	4,711	6,028	8,660	8,314
13	361	559	1,136	1,803	2,560	4,904	6,274	9,014	8,653
14	374	580	1,179	1,871	2,657	5,089	6,511	9,354	8,980
15	387	600	1,220	1,937	2,750	5,267	6,739	9,683	9,295
16	400	620	1,260	2,000	2,840	5,440	6,960	10,000	9,600
17	412	639	1,299	2,062	2,927	5,607	7,174	10,308	9,896
18	424	658	1,336	2,121	3,012	5,770	7,382	10,607	10,182
19	436	676	1,373	2,179	3,095	5,928	7,585	10,897	10,461
20	447	693	1,409	2,236	3,175	6,082	7,782	11,180	10,733
21	458	710	1,444	2,291	3,254	6,232	7,974	11,456	10,998
22	469	727	1,478	2,345	3,330	6,379	8,161	11,726	11,257
23	480	743	1,511	2,398	3,405	6,522	8,345	11,990	11,510
24	490	759	1,543	2,450	3,478	6,663	8,524	12,247	11,758
25	500	775	1,575	2,500	3,550	6,800	8,700	12,500	12,000
26	510	790	1,606	2,550	3,620	6,935	8,872	12,748	12,238
27	520	805	1,637	2,598	3,689	7,067	9,041	12,990	12,471
28	529	820	1,667	2,646	3,757	7,196	9,207	13,229	12,700
29	539	835	1,696	2,693	3,824	7,324	9,370	13,463	12,924
30	548	849	1,725	2,739	3,889	7,449	9,530	13,693	13,145

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Sizing Water Valves (Continued)

Flow Rates in GPM (Gallons Per Minute)

VFx- Series High Performance Class 300 Butterfly Valves

	Cv at 90° Open for On/Off Service								
Pipe Size	**2-1/2”**	**3”**	**4”**	**5”**	**6”**	**8”**	**10”**	**12”**	**14”**
Cv									
Pressure Drop (psi)	**Flow Rate in gpm (Gallons Per Minute)**								
1	160	185	375	790	1,000	2,000	2,650	4,000	3,900
2	226	262	530	1,117	1,414	2,828	3,748	5,657	5,515
3	277	320	650	1,368	1,732	3,464	4,590	6,928	6,755
4	320	370	750	1,580	2,000	4,000	5,300	8,000	7,800
5	358	414	839	1,767	2,236	4,472	5,926	8,944	8,721
6	392	453	919	1,935	2,450	4,899	6,491	9,798	9,553
7	423	490	992	2,090	2,646	5,292	7,011	10,583	10,318
8	453	523	1,061	2,235	2,828	5,657	7,495	11,314	11,031
9	480	555	1,125	2,370	3,000	6,000	7,950	12,000	11,700
10	506	585	1,186	2,498	3,162	6,325	8,380	12,649	12,333
11	531	614	1,244	2,620	3,317	6,633	8,789	13,267	12,935
12	554	641	1,299	2,737	3,464	6,928	9,180	13,856	13,510
13	577	667	1,352	2,848	3,606	7,211	9,555	14,422	14,062
14	599	692	1,403	2,956	3,742	7,483	9,915	14,967	14,593
15	620	717	1,452	3,060	3,873	7,746	10,263	15,492	15,105
16	640	740	1,500	3,160	4,000	8,000	10,600	16,000	15,600
17	660	763	1,546	3,257	4,123	8,246	10,926	16,492	16,080
18	679	785	1,591	3,352	4,243	8,485	11,243	16,971	16,546
19	697	806	1,635	3,444	4,359	8,718	11,551	17,436	17,000
20	716	827	1,677	3,533	4,472	8,944	11,851	17,889	17,441
21	733	848	1,719	3,620	4,583	9,165	12,144	18,330	17,872
22	751	868	1,759	3,705	4,690	9,381	12,430	18,762	18,293
23	767	887	1,798	3,789	4,796	9,592	12,709	19,183	18,704
24	784	906	1,837	3,870	4,899	9,798	12,982	19,596	19,106
25	800	925	1,875	3,950	5,000	10,000	13,250	20,000	19,500
26	816	943	1,912	4,028	5,099	10,198	13,512	20,396	19,886
27	831	961	1,949	4,105	5,196	10,392	13,770	20,785	20,265
28	847	979	1,984	4,180	5,292	10,583	14,023	21,166	20,637
29	862	996	2,019	4,254	5,385	10,770	14,271	21,541	21,002
30	876	1,013	2,054	4,327	5,477	10,955	14,515	21,909	21,361

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LIT-1900037

Valve Sizing Steam Applications

Two Position Applications: The valve is normally sized to be the same as the pipe, using the largest Cv available for a given pipe size.

Modulating Applications: Select the valve to meet the BtuH requirements of the coil. The table assumes an atmospheric return.

Assumptions:

1.) The table assumes an atmospheric return.
2.) Minimum coil BtuH calculated assuming a pressure drop across the valve of 50% of supply pressure.
3.) Maximum coil BtuH calculated assuming a pressure drop across the valve of 80% of supply pressure.

Steam Sizing

VG1000 Series Ball Valve, Cv 1.2 to 7.4

Available Pipe Size NPT	1/2"		1/2"		1/2"		1/2" 3/4"		1/2" 3/4" 1"	
Cv	1.2		1.9		2.9		4.7		7.4	
Steam Supply	Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH	
Pressure Drop psi	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1	10,700	13,600	17,000	21,500	25,900	32,800	42,000	53,200	66,200	83,700
2	15,600	19,800	24,700	31,300	37,800	47,800	61,200	77,400	96,400	121,900
3	19,600	24,800	31,100	39,300	47,500	60,000	76,900	97,300	121,100	153,200
4	23,300	29,500	36,900	46,700	56,300	71,200	91,200	115,400	143,700	181,700
5	26,700	33,700	42,200	53,400	64,400	81,500	104,400	132,100	164,400	208,000
6	29,900	37,900	47,400	59,900	72,300	91,500	117,200	148,300	184,600	233,400
7	33,000	41,800	52,300	66,100	79,800	100,900	129,300	163,600	203,600	257,600
8	36,100	45,600	57,100	72,200	87,200	110,300	141,300	178,700	222,400	281,400
9	39,000	49,400	61,800	78,200	94,300	119,300	152,900	193,300	240,700	304,400
10	42,000	53,100	66,400	84,000	101,400	128,300	164,300	207,900	258,700	327,300
11	44,800	56,700	71,000	89,800	108,300	137,000	175,600	222,100	276,400	349,600
12	47,600	60,300	75,400	95,400	115,100	145,600	186,600	236,000	293,800	371,600
15	56,000	70,900	88,700	112,200	135,400	171,300	219,500	277,600	345,600	437,100

VG1000 Series Ball Valve, Cv 11.7 to 73.7

Available Pipe Size NPT	1/2" 3/4" 1"		1" 1-1/4" 1-1/2"		1-1/4" 1-1/2" 2"		1-1/2" 2"		2"	
Cv	11.7		18.7		29.2		46.8		73.7	
Steam Supply	Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH	
Pressure Drop psi	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1	104,700	132,400	167,300	211,600	261,200	330,400	416,800	527,200	659,200	833,800
2	152,400	192,700	243,500	308,000	380,300	481,000	606,900	767,600	959,800	1,214,100
3	191,500	242,300	306,100	387,200	478,000	604,600	762,800	964,900	1,206,400	1,526,000
4	227,100	287,300	363,000	459,200	566,800	717,000	904,600	1,144,300	1,430,700	1,809,700
5	260,000	328,900	415,600	525,700	648,900	820,800	1,035,600	1,309,900	1,637,800	2,071,700
6	291,800	369,100	466,400	589,900	728,200	921,200	1,162,200	1,470,100	1,838,100	2,325,000
7	322,000	407,300	514,600	650,900	803,500	1,016,400	1,282,400	1,622,100	2,028,100	2,565,400
8	351,700	444,900	562,100	711,000	877,700	1,110,200	1,400,800	1,771,800	2,215,400	2,802,200
9	380,500	481,300	608,200	769,300	949,600	1,201,200	1,515,500	1,917,000	2,396,800	3,031,800
10	409,100	517,500	653,800	827,000	1,021,000	1,291,400	1,629,300	2,061,000	2,576,900	3,259,500
11	437,000	552,800	698,500	883,500	1,090,700	1,379,600	1,740,600	2,201,700	2,752,800	3,482,100
12	464,500	587,500	742,400	939,000	1,159,200	1,466,300	1,850,000	2,340,100	2,925,900	3,700,900
15	546,400	691,100	873,200	1,104,600	1,363,600	1,724,800	2,176,100	2,752,600	3,441,600	4,353,300

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Valve Sizing Steam Applications (Continued)

Steam Sizing

VG1000 Series Flanged Ball Valve

Available Pipe Size NPT	2-1/2”		3”		4”		5”		6”	
Cv	47		74		117		176		211	
Steam Supply	Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Pressure Drop psi										
1	420,400	531,800	661,900	837,200	1,046,500	1,323,700	1,574,200	1,991,300	1,887,300	2,387,200
2	612,100	774,200	963,700	1,219,000	1,523,700	1,927,300	2,292,000	2,899,200	2,747,800	3,475,800
3	769,400	973,200	1,211,300	1,532,200	1,915,200	2,422,600	2,881,000	3,644,200	3,454,000	4,368,900
4	912,400	1,154,100	1,436,500	1,817,100	2,271,300	2,873,000	3,416,600	4,321,700	4,096,100	5,181,100
5	1,044,500	1,321,200	1,644,500	2,080,100	2,600,100	3,288,800	3,911,200	4,947,300	4,689,000	5,931,200
6	1,172,200	1,482,700	1,845,600	2,334,500	2,918,000	3,691,000	4,389,400	5,552,200	5,262,300	6,656,400
7	1,293,400	1,636,000	2,036,400	2,575,800	3,219,700	4,072,600	4,843,300	6,126,300	5,806,400	7,344,600
8	1,412,800	1,787,000	2,224,400	2,813,600	3,516,900	4,448,600	5,290,400	6,691,900	6,342,500	8,022,700
9	1,528,500	1,933,400	2,406,600	3,044,100	3,805,000	4,813,000	5,723,800	7,240,100	6,862,000	8,679,900
10	1,643,300	2,078,700	2,587,400	3,272,800	4,090,800	5,174,500	6,153,700	7,783,900	7,377,500	9,331,900
11	1,755,500	2,220,600	2,764,000	3,496,200	4,370,100	5,527,800	6,573,900	8,315,400	7,881,200	9,969,000
12	1,865,900	2,360,200	2,937,800	3,716,000	4,644,800	5,875,300	6,987,100	8,838,100	8,376,600	10,595,600
15	2,194,800	2,776,200	3,455,600	4,371,100	5,463,600	6,911,000	8,218,800	10,396,000	9,853,200	12,463,400
20	2,724,500	3,446,300	4,289,700	5,426,100	6,782,400	8,579,100	10,202,500	12,905,300	12,231,500	15,471,700
25	3,245,700	4,105,500	5,110,300	6,464,000	8,079,700	10,220,200	12,154,100	15,373,900	14,571,200	18,431,200

VG2000 Series Cast Iron Flanged Globe Valve

Available Pipe Size NPT	2-1/2”		3”		4”		5”		6”	
Cv	51		83		150		240		350	
Steam Supply	Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Pressure Drop psi										
	456,200	577,000	742,400	939,100	1,341,700	1,697,100	2,146,700	2,715,400	3,130,600	3,959,900
2	664,200	840,100	1,080,900	1,367,300	1,953,400	2,470,900	3,125,500	3,953,500	4,558,000	5,765,500
3	834,800	1,056,000	1,358,700	1,718,600	2,455,400	3,105,900	3,928,700	4,969,400	5,729,300	7,247,100
4	990,000	1,252,300	1,611,200	2,038,100	2,911,900	3,683,300	4,659,000	5,893,200	6,794,400	8,594,300
5	1,133,400	1,433,600	1,844,500	2,333,100	3,333,400	4,216,500	5,333,500	6,746,300	7,778,000	9,838,400
6	1,271,900	1,608,900	2,070,000	2,618,400	3,741,000	4,732,000	5,985,600	7,571,200	8,729,000	11,041,400
7	1,403,400	1,775,200	2,284,000	2,889,100	4,127,800	5,221,300	6,604,500	8,354,000	9,631,500	12,183,000
8	1,533,000	1,939,100	2,494,900	3,155,800	4,508,900	5,703,300	7,214,200	9,125,300	10,520,700	13,307,800
9	1,658,600	2,098,000	2,699,300	3,414,300	4,878,200	6,170,500	7,805,100	9,872,800	11,382,500	14,397,900
10	1,783,200	2,255,600	2,902,000	3,670,800	5,244,700	6,634,000	8,391,400	10,614,400	12,237,500	15,479,400
11	1,904,900	2,409,600	3,100,200	3,921,500	5,602,700	7,087,000	8,964,400	11,339,100	13,073,000	16,536,200
12	2,024,700	2,561,000	3,295,100	4,168,000	5,954,900	7,532,400	9,527,900	12,051,900	13,894,800	17,575,700
15	2,381,600	3,012,500	3,875,900	4,902,700	7,004,600	8,860,200	11,207,400	14,176,400	16,344,200	20,673,900
20	2,956,400	3,739,600	4,811,400	6,086,000	8,695,400	10,998,800	13,912,600	17,598,200	20,289,200	25,664,000
25	3,521,900	4,454,900	5,731,800	7,250,200	10,358,600	13,102,800	16,573,800	20,964,400	24,170,200	30,573,100
30	4,077,600	5,157,800	6,636,100	8,394,000	11,992,900	15,170,000	19,188,600	24,271,900	27,983,400	35,396,600
35	4,623,800	5,848,600	7,524,900	9,518,400	13,599,300	17,201,900	21,758,900	27,523,000	31,731,700	40,137,800

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

Valve Sizing Steam Applications (Continued)

Steam Sizing

VG7000 Series Bronze Globe Valve, Cv 0.73 to 7.3

Available Pipe Size NPT	1/2"		1/2"		1/2"		3/4"	
Cv	0.73		1.8		4.6		7.3	
Steam Supply[1]	Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH	
Pressure Drop psi	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1	6,500	8,300	16,100	20,400	41,100	52,000	65,300	82,600
2	9,500	12,000	23,400	29,700	59,900	75,800	95,100	120,300
3	11,900	15,100	29,500	37,300	75,300	95,200	119,500	151,200
4	14,200	17,900	34,900	44,200	89,300	113,000	141,700	179,300
5	16,200	20,500	40,000	50,600	102,200	129,300	162,200	205,200
6	18,200	23,000	44,900	56,800	114,700	145,100	182,100	230,300
7	20,100	25,400	49,500	62,700	126,600	160,100	200,900	254,100
8	21,900	27,800	54,100	68,400	138,300	174,900	219,400	277,600
9	23,700	30,000	58,500	74,000	149,600	189,200	237,400	300,300
10	25,500	32,300	62,900	79,600	160,800	203,400	255,200	322,900
11	27,300	34,500	67,200	85,000	171,800	217,300	272,700	344,900
12	29,000	36,700	71,500	90,400	182,600	231,000	289,800	366,600
15	34,100	43,100	84,100	106,300	214,800	271,700	340,900	431,200
20	42,400	53,000	104,600	130,800	267,400	334,200	424,400	530,300
25	50,400	60,300	124,300	148,600	317,700	379,800	504,100	602,700
30	58,400	67,600	143,900	166,700	367,800	425,900	583,700	675,900
35	66,200	74,800	163,200	184,500	417,000	471,500	661,800	748,200
40	69,800	77,400	172,100	190,900	439,800	487,900	698,000	774,400
45	81,900	89,500	201,900	220,600	516,000	563,900	818,900	894,800
50	89,700	96,800	221,100	238,600	565,000	609,700	896,600	967,600
55	97,400	104,000	240,100	256,500	613,700	655,400	973,900	1,040,100
60	105,100	111,200	259,100	274,300	662,200	701,000	1,050,900	1,112,400
65	112,800	118,500	278,100	292,200	710,700	746,600	1,127,900	1,184,800
70	120,500	125,700	297,100	310,000	759,300	792,300	1,204,900	1,257,400
75	128,100	132,900	315,900	327,700	807,200	837,500	1,281,000	1,329,000
80	135,800	140,200	334,800	345,600	855,700	883,200	1,357,900	1,401,600
85	143,400	147,300	353,500	363,200	903,300	928,100	1,433,600	1,472,900
90	151,000	154,500	372,400	381,000	951,700	973,800	1,510,200	1,545,300
95	158,600	161,600	390,900	398,500	999,100	1,018,500	1,585,500	1,616,300
100	166,200	168,900	409,800	416,400	1,047,400	1,064,200	1,662,200	1,688,800

1. For steam pressures greater than 38 PSIG, VG 7243 or VG 7443 (stainless steel trim valves) are required. See Lit. 977140 for ordering information.

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Valve Sizing Steam Applications (Continued)

Steam Sizing

VG7000 Series Bronze Globe Valve, Cv 11.6 to 46.2

Available Pipe Size NPT	1"		1 1/4"		1 1/2"		2"	
Cv	11.6		18.5		29.9		46.2	
Steam Supply[1]	Coil BtuH		Coil BtuH		Coil BtuH		Coil BtuH	
Pressure Drop psi	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1	103,800	131,200	165,500	209,300	267,400	338,300	413,200	522,700
2	151,100	191,100	240,900	304,700	389,400	492,500	601,700	761,000
3	189,900	240,200	302,800	383,100	489,400	619,100	756,300	956,600
4	225,200	284,800	359,100	454,300	580,400	734,200	896,900	1,134,400
5	257,800	326,100	411,100	520,000	664,500	840,500	1,026,700	1,298,700
6	289,300	365,900	461,400	583,600	745,700	943,300	1,152,200	1,457,500
7	319,200	403,800	509,100	644,000	822,800	1,040,800	1,271,400	1,608,200
8	348,700	441,100	556,100	703,400	898,800	1,136,900	1,388,700	1,756,600
9	377,200	477,200	601,600	761,000	972,400	1,230,000	1,502,500	1,900,500
10	405,600	513,000	646,800	818,200	1,045,400	1,322,400	1,615,400	2,043,300
11	433,300	548,100	691,000	874,100	1,116,800	1,412,700	1,725,600	2,182,800
12	460,500	582,500	734,400	929,000	1,187,000	1,501,500	1,834,100	2,320,000
15	541,700	685,200	863,900	1,092,800	1,396,300	1,766,100	2,157,400	2,729,000
20	674,400	842,700	1,075,500	1,344,000	1,738,300	2,172,200	2,685,900	3,356,300
25	801,100	957,700	1,277,600	1,527,300	2,064,800	2,468,500	3,190,500	3,814,200
30	927,500	1,074,000	1,479,100	1,712,800	2,390,600	2,768,300	3,693,800	4,277,500
35	1,051,700	1,188,900	1,677,200	1,896,100	2,710,800	3,064,500	4,188,600	4,735,100
40	1,109,100	1,230,500	1,768,900	1,962,400	2,858,900	3,171,700	4,417,500	4,900,700
45	1,301,300	1,421,900	2,075,400	2,267,700	3,354,200	3,665,200	5,182,800	5,663,200
50	1,424,800	1,537,600	2,272,200	2,452,100	3,672,400	3,963,200	5,674,500	6,123,700
55	1,547,600	1,652,800	2,468,100	2,635,900	3,989,000	4,260,100	6,163,600	6,582,500
60	1,669,900	1,767,700	2,663,200	2,819,100	4,304,400	4,556,300	6,650,900	7,040,200
65	1,792,300	1,882,800	2,858,300	3,002,700	4,619,700	4,853,000	7,138,100	7,498,600
70	1,914,700	1,998,100	3,053,600	3,186,600	4,935,200	5,150,200	7,625,700	7,957,800
75	2,035,500	2,111,900	3,246,300	3,368,000	5,246,800	5,443,500	8,107,000	8,411,000
80	2,157,800	2,227,200	3,441,300	3,552,000	5,561,900	5,740,800	8,594,000	8,870,400
85	2,278,000	2,340,500	3,633,000	3,732,700	5,871,800	6,032,900	9,072,800	9,321,800
90	2,399,800	2,455,600	3,827,300	3,916,200	6,185,800	6,329,500	9,558,000	9,780,000
95	2,519,400	2,568,400	4,018,100	4,096,200	6,494,100	6,620,300	10,034,300	10,229,400
100	2,641,300	2,683,600	4,212,300	4,279,800	6,808,100	6,917,100	10,519,500	10,688,000

1. For steam pressures greater than 38 PSIG, VG 7243 or VG 7443 (stainless steel trim valves) are required. See Lit. 977140 for ordering information.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

Valve Sizing Steam Applications (Continued)

Steam Sizing

JS Series Two Position On/Off Electric Zone Valve

Available Pipe Size NPT	1/2	1/2 3/4	1/2 3/4	1 1-1/4
Cv	1.0	2.5	3.5	8.0
Steam Supply Pressure Drop psi	Maximum Coil BtuH	Maximum Coil BtuH	Maximum Coil BtuH	Maximum Coil BtuH
1	11,310	28,280	39,600	90,510
2	16,470	41,180	57,660	131,780
3	20,710	51,760	72,470	165,650
4	24,560	61,390	85,940	196,440
5	28,110	70,270	98,380	224,880
6	31,550	78,870	110,410	252,370
7	34,810	87,020	121,830	278,470
8	38,020	95,060	133,080	304,180
9	41,140	102,840	143,980	329,090
10	44,230	110,570	154,790	353,810
11	47,250	118,120	165,360	377,970
12	50,220	125,540	175,760	401,730
15	59,070	147,670	206,740	472,550

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VG2000 Series

LIT-1900098

Cast Iron Flanged Globe Valves, Maintenance and Repair

Maintenance and Repair Parts

Code Number	Description	Ship Weight (lb)[1]
	Packing Kits	
V-9999-613	For 2-1/2 through 4 in. Valves with 3/8 in. Stem. Kit Includes: Two Ring Packs (U-Cup with O-Ring Installed), One Follower, One Spacer, Insertion/Removal Tool, One Grease Tube, and One 3 in. (76 mm) Strip of Crocus Cloth.	0.1
V-5252-668	For 3 through 6 in. Valves with 1/2 in. Stem. Kit Includes: Two Ring Packs (U-Cup with O-Ring Installed), One Follower, One Spacer Insertion/Removal Tool, One Grease Tube, and One 3 in. (76 mm) Strip of Crocus Cloth.	0.2
	Packing Nut Kits (Pneumatically Actuated Assembles Only)	
V-4510-6019	For 2-1/2 through 4 in Valves with 3/8 in. Stem	V-4510-6019
V-5252-609	For 3 through 6 in. Valves with 1/2 in. Stem	V-5252-609

1. lb x 0.454 = kg.

Valve Reconditioning Kits

Code Number	Description	Ship Weight (lb)[1]
V-5252-6001	Reconditioning Kit, 2-1/2 in. N.O. Flanged Valve, “M” Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 51.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	7.0
V-5252-6002	Reconditioning Kit, 2-1/2 in. N.O. Flanged Valve, “L” Stem (3/8 in.), for use with MP82 Pneumatic Actuator, Cv = 51.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	6.9
V-5252-6003	Reconditioning Kit, 3 in. N.O. Flanged Valve, “M” Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 83.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	9.5
V-5252-6004	Reconditioning Kit, 3 in. N.O. Flanged Valve, “L” Stem (3/8 in.), for use with MP82 Pneumatic Actuator; Cv = 83.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	9.5
V-5252-6005	Reconditioning Kit, 4 in. N.O. Flanged Valve, “M” Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 150.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, Grease Packet.	15.0
V-5252-6006	Reconditioning Kit, 4 in. N.O. Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 150.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	16.5
V-5252-6007	Reconditioning Kit, 5 in. N.O. Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 240.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	22.0
V-5252-6008	Reconditioning Kit, 6 in. N.O. Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 350.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	30.6
V-5462-6001	Reconditioning Kit, 2-1/2 in. N.C. Flanged Valve, “M” Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, CV = 54.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	7.4
V-5462-6002	Reconditioning Kit, 3 in. N.C. Flanged Valve, “M” Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 83.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	9.9
V-5462-6003	Reconditioning Kit, 3 in. N.C. Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 83.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	12.7
V-5462-6004	Reconditioning Kit, 4 in. N.C. Flanged Valve, “M” Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 150.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, Grease Packet.	16.3
V-5462-6005	Reconditioning Kit, 4 in. N.C. Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 150.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	17.4
V-5462-6006	Reconditioning Kit, 5 in. N.C. Flanged Valve, “N” Stem, (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 237.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	23.7
V-5462-6007	Reconditioning Kit, 6 in. N.C. Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 344.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	31.1
V-5842-6001	Reconditioning Kit, 2-1/2 in. Three-Way Mixing Flanged Valve, “M” Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 54.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	8.1
V-5842-6002	Reconditioning Kit, 3 in. Three-Way Mixing Flanged Valve, “M” Stem (3/8 in.), for use with MP84 Pneumatic Actuator or Electric Actuator, Cv = 80.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	10.8
V-5842-6003	Reconditioning Kit, 3 in. Three-Way Mixing Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 80.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	12.3
V-5842-6004	Reconditioning Kit, 4 in. Three-Way Mixing Flanged Valve, for use with Electric Actuator, Cv = 157.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	16.6
V-5842-6005	Reconditioning Kit, 4 in. Three-Way Mixing Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 157.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	17.8
V-5842-6006	Reconditioning Kit, 5 in. Three-Way Mixing Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 238.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	22.0
V-5842-6007	Reconditioning Kit, 6 in. Three-Way Mixing Flanged Valve, “N” Stem (1/2 in.), for use with MP86 Pneumatic Actuator, Cv = 347.0; Includes: Bonnet and Packing Items, Stem and Disk Assembly, Packing Tools, Gasket and Screw Set, and Grease Packet.	31.9

1. lb x 0.454 = kg.

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VG7000 Series

LIT-1924275

Bronze Globe Valves, Maintenance and Repair

Description

The packing and reconditioning kits in the selection chart include all components necessary to return a VG7000 series brass globe valve to "near new" condition.

Selection Chart

Maintenance and Repair Parts for VG7000 Series Bronze Globe Valves

Code Number	Description
Packing Kits	
VG7000-6001	Ring Pack, Single Pack, for Brass Trim Valves with 1/4 in. Stem (1/2 or 3/4 in. Valves). Kit Includes: Two Ring Packs (U-Cup with Installed O-Ring), One Stem Guide, One Insertion/Removal Tool, One Bullet, One Grease Tube, and One 3 in. Strip of Crocus Cloth.
VG7000-6002	Ring Pack, Single Pack, for Brass Trim Valves with 3/8 in. Stem (1 through 2 in. Valves). Kit Includes: Two Ring Packs (U-Cup with Installed O-Ring), One Stem Wiper, One Stem Guide, One Insertion/Removal Tool, One Sleeve Packing Installer, One Grease Tube, and One 3 in. Strip of Crocus Cloth.
VG7000-6003	Ring Pack, Ten Pack, for Brass Trim Valves with 1/4 in. Stem (1/2 or 3/4 in. Valves). Kit Includes: Twenty Ring Packs (U-Cup with Installed O-Ring), Ten Stem Guides, One Insertion/Removal Tool, One Bullet, Two Grease Tubes, and One 24 in. Strip of Crocus Cloth.
VG7000-6004	Ring Pack, Ten Pack, for Brass Trim Valves with 3/8 in. Stem (1 through 2 in. Valves). Kit Includes: Twenty Ring Packs (U-Cup with Installed O-Ring), Ten Stem Wipers, Ten Stem Guides, One Insertion/Removal Tool, One Sleeve Packing Installer, Two Grease Tubes, and One 24 in. Strip of Crocus Cloth.
VG7000-6011	PTFE V-Ring Pack for Stainless Steel Trim Valves with 1/4 in. Stem (1/2 or 3/4 in. Valves). Kit Includes: Two Teflon® V-Rings, One Rubber V-Ring, Two Teflon Stem Wipers, One Teflon Stem Guide, One Teflon Bushing, One Steel Washer, One Spring, One Insertion/Removal Tool, One Bullet, One Grease Tube, and One 3 in. Strip of Crocus Cloth.
VG7000-6012	PTFE V-Ring Pack for Stainless Steel Trim Valves with 3/8 in. Stem (1 through 2 in. Valves). Kit Includes: Two Teflon® V-Rings, One Rubber V-Ring, Two Teflon Stem Wipers, One Teflon Stem Guide, One Teflon Bushing, One Steel Washer, One Spring, One Insertion/Removal Tool, One Sleeve Packing Installer, One Grease Tube, and One 3 in. Strip of Crocus Cloth.
Valve Reconditioning Kits[1]	
VG72K1CS	Reconditioning Kit for 1/2 in., 0.73 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG72K1CT	Reconditioning Kit for 1/2 in., 0.73 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K1ES	Reconditioning Kit for 1/2 in., 1.8 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG72K1ET	Reconditioning Kit for 1/2 in., 1.8 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K1GS	Reconditioning Kit for 1/2 in., 4.6 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG72K1GT	Reconditioning Kit for 1/2 in., 4.6 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K1LS	Reconditioning Kit for 3/4 in., 7.3 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG72K1LT	Reconditioning Kit for 3/4 in., 7.3 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K1NT	Reconditioning Kit for 1 in., 11.6 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K1PT	Reconditioning Kit for 1-1/4 in., 18.5 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K1RT	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K1ST	Reconditioning Kit for 2 in., 46.2 Cv, Two-Way N.O./Push-Down-to-Close Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K3CT	Reconditioning Kit for 1/2 in., 0.73 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K3ET	Reconditioning Kit for 1/2 in., 1.8 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K3GT	Reconditioning Kit for 1/2 in., 4.6 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K3LT	Reconditioning Kit for 3/4 in., 7.3 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K3NT	Reconditioning Kit for 1 in., 11.6 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K3PT	Reconditioning Kit for 1-1/4 in., 18.5 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG72K3RL	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Large Threaded Stem for Use with V-500 Actuator Only.
VG72K3RT	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.

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VG7000 Series Bronze Globe Valves, Maintenance and Repair (Continued)

Maintenance and Repair Parts for VG7000 Series Bronze Globe Valves (Continued)

Code Number	Description
VG72K3SL	Reconditioning Kit for 2 in., 46.2 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Large Threaded Stem for Use with V-500 Actuator Only.
VG72K3ST	Reconditioning Kit for 2 in., 46.2 Cv, Two-Way N.O./Push-Down-to-Close Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K1CS	Reconditioning Kit for 1/2 in., 0.73 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG74K1CT	Reconditioning Kit for 1/2 in., 0.73 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K1ES	Reconditioning Kit for 1/2 in., 1.8 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG74K1ET	Reconditioning Kit for 1/2 in., 1.8 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K1GS	Reconditioning Kit for 1/2 in., 4.6 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG74K1GT	Reconditioning Kit for 1/2 in., 4.6 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K1LS	Reconditioning Kit for 3/4 in., 7.3 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG74K1LT	Reconditioning Kit for 3/4 in., 7.3 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K1NT	Reconditioning Kit for 1 in., 11.6 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K1PT	Reconditioning Kit for 1-1/4 in., 18.5 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K1RT	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K1RT+W	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84. Includes VG74K1RT Reconditioning Kit Plus Bottom Cap with Stem Guide.
VG74K1ST	Reconditioning Kit for 2 in., 46.2 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K1ST+W	Reconditioning Kit for 2 in., 46.2 Cv, Two-Way N.C./Push-Down-to-Open Valves, Brass Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84. Includes VG74K1ST Reconditioning Kit Plus Bottom Cap with Stem Guide.
VG74K3CT	Reconditioning Kit for 1/2 in., 0.73 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K3ET	Reconditioning Kit for 1/2 in., 1.8 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K3GT	Reconditioning Kit for 1/2 in., 4.6 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K3LT	Reconditioning Kit for 3/4 in., 7.3 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K3NT	Reconditioning Kit for 1 in., 11.6 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K3PT	Reconditioning Kit for 1-1/4 in., 18.5 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K3RL	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with V-500 Actuator Only.
VG74K3RL+W	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with V-500 Actuator Only. Includes VG74K3RL Reconditioning Kit Plus Bottom Cap with Stem Guide.
VG74K3RT	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K3RT+W	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84. Includes VG74K3RT Reconditioning Kit Plus Bottom Cap with Stem Guide.
VG74K3SL	Reconditioning Kit for 2 in., 46.2 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with V-500 Actuator Only.
VG74K3SL+W	Reconditioning Kit for 2 in., 46.2 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with V-500 Actuator Only. Includes VG74K3SL Reconditioning Kit Plus Bottom Cap with Stem Guide.
VG74K3ST	Reconditioning Kit for 2 in., 46.2 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG74K3ST+W	Reconditioning Kit for 2 in., 46.2 Cv, Two-Way N.C./Push-Down-to-Open Valves, Stainless Steel Trim, Equal Percentage Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84. Includes VG74K3ST Reconditioning Kit Plus Bottom Cap with Stem Guide.

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VG7000 Series Bronze Globe Valves, Maintenance and Repair (Continued)

Maintenance and Repair Parts for VG7000 Series Bronze Globe Valves (Continued)

Code Number	Description
VG78K2CS	Reconditioning Kit for 1/2 in., 0.73 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG78K2CT	Reconditioning Kit for 1/2 in., 0.73 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K2ES	Reconditioning Kit for 1/2 in., 1.8 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG78K2ET	Reconditioning Kit for 1/2 in., 1.8 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K2GS	Reconditioning Kit for 1/2 in., 4.6 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG78K2GT	Reconditioning Kit for 1/2 in., 4.6 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K2LS	Reconditioning Kit for 3/4 in., 7.3 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Slotted Stem for Use with V-3801 or VA-8x2x Series Actuators.
VG78K2LT	Reconditioning Kit for 3/4 in., 7.3 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K2NT	Reconditioning Kit for 1 in., 11.6 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K2PT	Reconditioning Kit for 1-1/4 in., 18.5 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K2RT	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K2RT+4	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84. Includes VG78K2RT Reconditioning Kit Plus Lower Valve Body with Stem Guide.
VG78K2ST	Reconditioning Kit for 2 in., 46.2 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K2ST+4	Reconditioning Kit for 2 in., 46.2 Cv, Three-Way Mixing Valves, Brass Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84. Includes VG78K2ST Reconditioning Kit Plus Lower Valve Body with Stem Guide.
VG78K4CT	Reconditioning Kit for 1/2 in., 0.73 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K4ET	Reconditioning Kit for 1/2 in., 1.8 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K4GT	Reconditioning Kit for 1/2 in., 4.6 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K4LT	Reconditioning Kit for 3/4 in., 7.3 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K4LT	Reconditioning Kit for 3/4 in., 7.3 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K4NT	Reconditioning Kit for 1 in., 11.6 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K4PT	Reconditioning Kit for 1-1/4 in., 18.5 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K4RL	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with V-500 Actuator Only.
VG78K4RL+4	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with V-500 Actuator Only. Includes VG78K4RL Reconditioning Kit Plus Lower Valve Body with Stem Guide.
VG78K4RT	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K4RT+4	Reconditioning Kit for 1-1/2 in., 28.9 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84. Includes VG78K4RT Reconditioning Kit Plus Lower Valve Body with Stem Guide.
VG78K4SL	Reconditioning Kit for 2 in., 46.2 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with V-500 Actuator Only.
VG78K4SL+4	Reconditioning Kit for 2 in., 46.2 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with V-500 Actuator Only. Includes VG78K4SL Reconditioning Kit Plus Lower Valve Body with Stem Guide.
VG78K4ST	Reconditioning Kit for 2 in., 46.2 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84.
VG78K4ST+4	Reconditioning Kit for 2 in., 46.2 Cv, Three-Way Mixing Valves, Stainless Steel Trim, Linear Flow Characteristics with Threaded Stem for Use with All Actuators Except V-3801, VA-8x2x, V-500, or MP84. Includes VG78K4ST Reconditioning Kit Plus Lower Valve Body with Stem Guide.

1. For brass trim kits, the reconditioning kits include a bonnet, packing, and a stem and plug assembly.
   For stainless steel kits, the reconditioning kits include a bonnet, packing, and a stem and plug assembly.

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LIT-1924280

Repair Parts for Use with Electric or Pneumatic VT Series Terminal Unit Valves 1/2 in., Two-Way and Three-Way

Description

The available packing kits and spring kits can extend the service life of the VT Series Valves. No inner valve kits are available for this series of valves.

Selection Charts

Ring Pack Packing Kits for VT Series Valves

Code Number	Callout	Description
V-9999-608	A	Single-pack
V-9999-610		Ten pack (Contains enough material to repack 10 valves)
V-9999-630		Fifty pack (Contains U-Cups and O-Rings only to repack 50 valves)
V-9999-649	B	Packing nut for all VT Styles

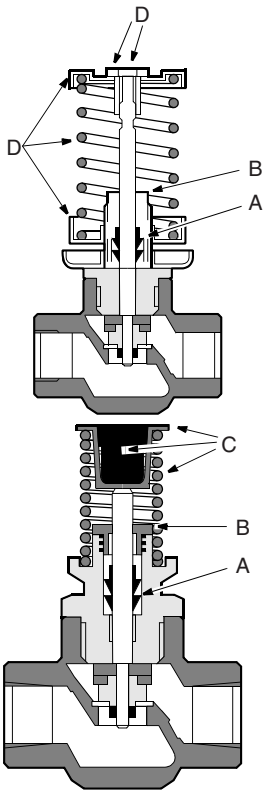
Spring Kits for VT Series Valves

Spring Kit	Callout	Spring Range	Actuator	Valve Size	Valve Body
V-9999-6001[1]	C	3-6 psig	V-3802 or V-4000	1/2 in.	VT Series
V-9999-6002[1]		4-8 psig			
V-9999-6003[1]		9-13 psig			
V-3752-6023[2]	D	3-6 psig	V-3000		
V-4332-6001[2]		4-8 psig			
V-3752-6022[2]		9-13 psig			

1. Kit Includes: spring, upper spring seat, upper spring seat retainer, and instructions
2. Kit Includes: spring, upper and lower spring seat, stem extension, stem lock screw, and instructions

Tailpiece and Nut for VT Series Valves

Code Number	Description	Size	Valve Size	Valve Body
V-9999-663	Tailpiece	3/8 inch tube	1/2 inch	VT Series
V-9999-664	Tailpiece	1/2 inch tube	1/2 inch	
V-9999-665	Tailpiece	3/4 inch tube	1/2 inch	
V-9999-666	Nut	3/8 and 1/2 inch tube	1/2 inch	
V-9999-667	Nut	3/4 inch tube	1/2 inch	

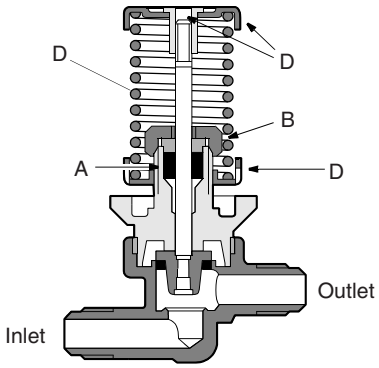


Repair Parts, VT Series Valves

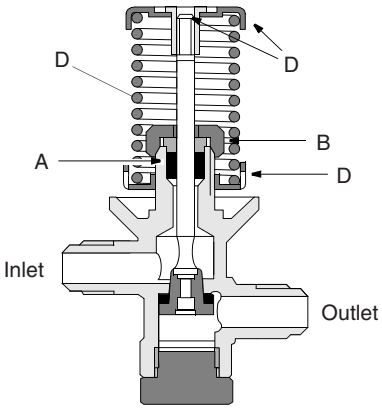
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LIT-1924285

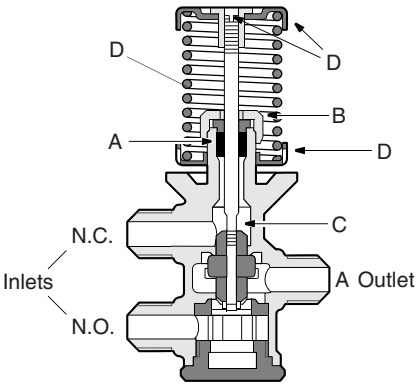
Repair Parts for 1/2 in. Flare Valves for Use with V-3766, V-3966, V-4332, VB-3766, VB-3966, VB-4332, AV-8050, AV-8051, and AV-8052 (Flare Valve Assemblies)



Repair Parts, V-3766, Normally Open Push-down-to-close



V-3966, Normally Closed Push-down-to-open



V-4332, 3-Way Mixing

Description

The available service parts listed in the table can extend the service life of the V-3766, V-3966, V-4332, VB-3766, VB-3966, VB-4332, AV-8050, AV-8051 and AV-8052 flare valve assemblies and in many cases return the valve to near original operating performance.

Selection Chart

Code Number	Callout	Description		
	A	**Ring Pack Packing Kits**:		
V-9999-608			Single pack	
V-9999-610			10 pack (contains enough material to repack 10 valves)	
V-9999-630			50 pack (contains U-Cups and O-Rings only to repack 50 valves)	
V-3752-646	B	**Gland Nut**		
	C	**Stem and Disc Assembly**: includes valve stem, upper and lower modulating plug, lock pins, disc and swivel, packings, and lower O-ring		
			Valve Size (in.)	**Max Cv**
V-4332-615			1/2 (V-4332, VB-4332)	1.2
V-4332-616			1/2 (V-4332, VB-4332)	2.0
	D	**Spring Kit**: Spring, Upper and Lower Spring Seat, Stem Extension and Lock Screw, Instructions		
			Valve Size (in.)	**Range (PSIG)**
V-3754-6009			1/2	9 to 13 (V-3966 only)
V-4332-6001			1/2	4 to 8 (V-4332 only)
V-3752-6022			1/2	9 to 13 (V-4332 only)
V-3754-6010			1/2	3 to 6 (V-3766 only)

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LIT-1924290

Repair Parts For Use With V-4334 5/8 in. Flare Valve

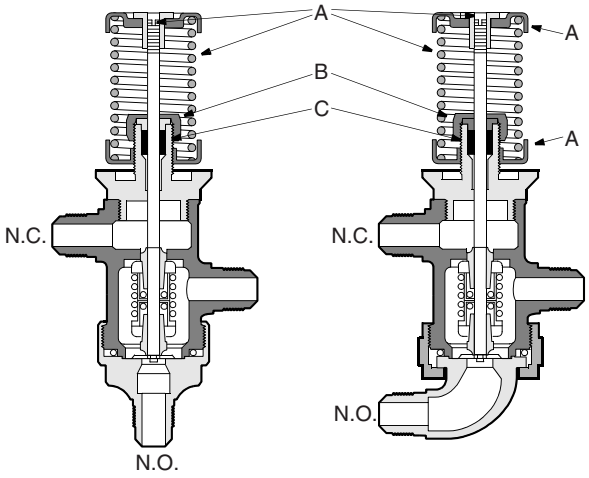
Description

The available service parts listed in the tables can extend the service life of the V-4334 flare valve assemblies and in many cases return the valve to near original operating performance.

Selection Chart

Code Number	Call-out	Description			
	A	Springs:	Range (psig)	Valve Size (in.)	Stroke (in.)
V-4332-6001			4 to 8	5/8	0.313
V-3752-6022			9 to 13	5/8	0.313
V-3752-646	B	Gland Nut			
V-9999-608	C	Ring Pack Packing Kits:	Single-Pack		
V-9999-610			10-Pack (Contains Enough Material to Repack 10 Valves)		
V-9999-630			50-Pack (Contains U-Cups and O-Rings only to Repack 50 Valves)		
	(---)	Recondition Kit:[1]	Valve Size (in.)		Cv
V-4334-6001			5/8 in.		4.7

1. Recondition Kit Includes: Cage, O-ring, Plug, Stem, Bonnet, Packing, Packing Nut, Instructions



Repair Parts, V-4334

LIT-1924295

Repair Parts For Use With V-4440 Water Valve 1/2 and 5/8 in. For Three- and Four-Pipe Systems

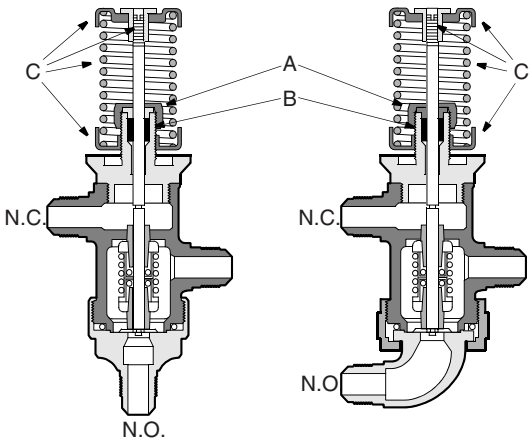
Description

The available service parts listed in the tables can extend the service life of the V-4440 flare valve assemblies and in many cases return the valve to near original operating performance.

Selection Chart

Code Number	Call out	Description			
V-3752-646	A	Gland Nut			
V-9999-608	B	Ring Pack Packing Kits	Single-Pack		
V-9999-610			10-Pack (Contains Enough Materials to Repack 10 Valves)		
V-9999-630			50-Pack (Contains U-Cups and O-Rings Only to Repack 50 Valves)		
	C	Main Springs	Valve Size (in.)	Spring Range (psig)	
V-4440-6001			1/2	6 to 9	
V-4440-6002			1/2	4 to 12	
V-4440-6001			5/8	6 to 9	
V-4440-6002			5/8	4 to 12	
	(---)	Recon-dition Kits[1]	Valve Size (in.)	Spring Range (psig)	Cv
V-4440-6003			1/2	4 to 12	1.4
V-4440-6004					2.4
V-4440-6005				6 to 9	2.4

1. Recondition kit includes: cage, O-ring, plug, stem, bonnet, packing, packing nut, and instructions.



Repair Parts, V-4440
N.O. = Normally Open N.C. = Normally Closed

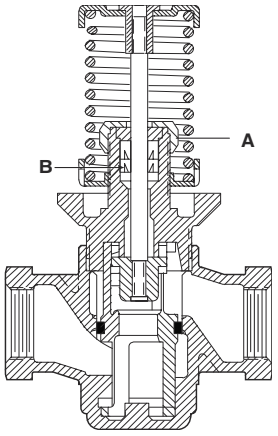
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LIT-1924300

Repair Parts for Cage Trim Valve for Use with V-3754 with Actuator and VB-3754 without Actuator (Including 1/2 in.)

Description

The available service parts listed in the tables can extend the service life of the V-3754 and VB-3754 cage trim valve assemblies and in many cases return the valve to near original operating performance.



Repair Parts, V-3754 and VB-3754

Selection Charts

Note: 1/2 inch valve assemblies discontinued in 1991.
VB valves used with AV-8050, AV-8051, AV-8052, AV-8090, AV-8091, and AV-8092 assemblies.
Springs are under compression.
Removal of springs requires use of spring compression tool JC 5389.

Code Number	Callout	Description		V-3754	VB-3754
V-3752-646	A	Gland Nut (Packing Nut)		X	X
V-9999-608	B	Ring Pack Packing Kits	Single pack	X	X
V-9999-610			10 pack (contains enough materials to repack 10 valves)	X	X
V-9999-630			50 pack (contains U-cups and O-rings only to repack 50 valves)	X	X

Spring Kits and Recondition Kits for use with V-3754 and VB-3754

Valve	Valve Size	Actuator Size	Spring Range	Spring Kit [1] Code Number	Recondition Kits [2] Code Number
V-3754	1/2 in.	V-3000	3-6 psig	**V-3754-6010**	**V-3754-6003 (C_V= 0.20), or V-3754-6004 (C_V= 0.40) or V-3754-6005 (C_V= 1.20), or V-3754-6006 (C_V= 2.20) or V-3754-6007 (C_V= 4.40)**
			9-13 psig	**V-3754-6009**	
	3/4 in.		3-6 psig	**V-3754-6010**	**V-3754-6001 (C_V= 8.6)**
			9-13 psig	**V-3754-6009**	
	1 in.		3-6 psig	**V-3754-6011**	**V-3754-6002 (C_V= 13.9)**
			9-13 psig	**V-3754-6008**	
	1-1/2 in.		3-6 psig	**V-3754-6011**	**V-5254-6001 (C_V= 27.5)**
			9-13 psig	**V-3754-6008**	

1. Spring Kit includes: upper and lower spring plate, spring, stem connector, stem lock screw, and instructions
2. Recondition Kit includes: cage, O-ring, plug, stem, bonnet, packing, packing nut, and instructions

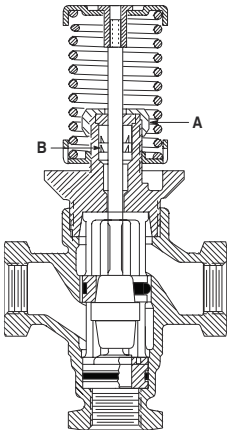
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LIT-1924305

Repair Parts For Use With V-4324 with Actuator and VB-4324 without Actuator (Including 1/2 in.)

Description

The available service parts listed in the tables can extend the service life of the V-4324 and VB-4324 cage trim valve assemblies and in many cases return the valve to near original operating performance.



Repair Parts, V-4324 and VB-4324

Selection Charts

Note: 1/2 inch valve assemblies discontinued in 1991.
VB valves used with AV-8050, AV-8051, AV-8052, AV-8090, AV-8091, and AV-8092 assemblies.
Springs are under compression.
Removal of springs requires use of spring compression tool JC 5389.

Code Number	Callout	Description		V-3754	VB-3754
V-3752-646	A	Gland Nut (Packing Nut)		X	X
V-9999-608	B	Ring Pack Packing Kits	Single Pack	X	X
V-9999-610			10-Pack (Contains Enough Material to Repack 10 Valves)	X	X
V-9999-630			50-Pack (Contains U-Cups and O-Rings only to Repack 50 Valves)	X	X

Spring Kits and Recondition Kits for V-4324 and VB-4324

Valve	Valve Size	Actuator Size	Spring Range	Spring Kit [1] Code Number	Recondition Kit [2] Code Number
V-4324	1/2 in.	V-3000	4-8#	V-3974-6008	V-4324-6003 (C_V= 1.20), or V-4324-6004 (C_V= 2.20), or V-4324-6005 (C_V= 4.40)
			9-13#	V-3754-6009	
	3/4 in.		4-8#	V-3974-6008	V-4324-6001 (C_V= 8.6)
			9-13#	V-3754-6009	
	1 in.		4-8#	V-3974-6009	V-4324-6002 (C_V= 13.9)
			9-13#	V-3754-6008	
	1-1/2 in.		4-8#	V-3974-6009	V-5844-6001 (C_V= 27.5)
			9-13#	V-3754-6008	

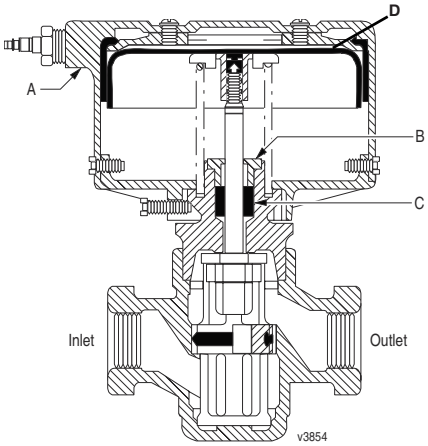
1. Spring Kit Includes: Upper & Lower Spring Plate, Spring, Stem Connector, Stem Lock Screw, Instructions
2. Recondition Kit Includes: Cage, O-ring, Plug, Stem, Bonnet, Packing, Packing Nut, Instructions

LIT-1924310

Repair Parts For Use With V-3854 with Oval Top Actuator

Description

The available packing kits and spring kits can extend the service life of the V-3854 Series Valves. No inner valve kits are available for this series of valves.



Repair Parts, V-3854 with Oval Top Actuator

Selection Charts

Code Number	Callout	Description	
V-3802-1	A	Oval Actuator	
V-3800-660	B	Packing Nut	
V-9999-608	C	Ring Pack Packing Kits	Single Pack
V-9999-610			10-Pack (Contains Enough Material to Repack 10 Valves)
V-9999-630			50-Pack (Contains U-Cups and O-Rings Only to Repack 50 Valves)
V-3100-611	D	Diaphragm	

Spring Kits[1] for use with V-3854 with Oval Top Actuator

Valve	Valve Size	Actuator Size	Spring Range	Spring Kit Code Number
V-3854	1/2 in.	V-3802	3-6	V-3754-6012
			9-13	V-3754-6013

1. Spring Kits include: upper spring seat, spring, stem extension, lock screw, and installation instruction.

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LIT-1924315

Repair Parts For Use With V-5254, V-5464, and V-5844 with V-5252 Size 4R Actuators

Description

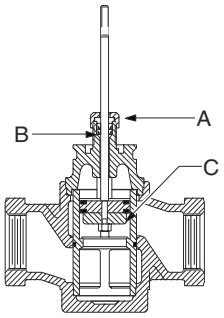
The available service parts listed in the tables can extend the service life of the V-5224, V-5464 and V-5844 Series cage trim valve assemblies and in some cases return the valve to near original operating performance.

Selection Charts

Repair Parts for V-5254 with V-5252 Size 4R Actuators

Code Number	Callout	Description
V-3752-646	**A**	**Packing Nut**
		Ring Pack Packing Kits
V-9999-608	**B**	Single Pack
V-9999-610		10-Pack (Contains Enough Material to Repack 10 Valves)
V-9999-630		50-Pack (Contains U-Cups and O-Rings only to Repack 50 Valves)
V-5254-6001	**C**	**Recondition Kit**[1] 1-1/2 inch Valve, 4R Actuator

1. Kit Includes: Cage, Nut, Plug, Disc, O-Ring, Stem, Bonnet, Packing, Packing Nut, Instruction

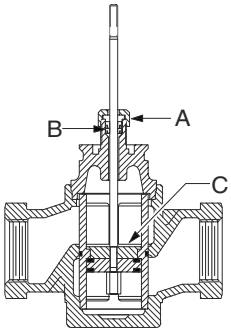


Repair Parts, V-5254

Repair Parts for V-5464 with V-5252 Size 4R Actuators

Code Number	Callout	Description
V-3752-646	**A**	**Packing Nut**
	B	**Ring Pack Packing Kits**
V-9999-608		Single Pack
V-9999-610		10-Pack (Contains Enough Material to Repack 10 Valves)
V-9999-630		50-Pack (Contains U-Cups and O-Rings only to Repack 50 Valves)
V-5464-6001	**C**	**Recondition Kit**[1] 1-1/2 inch Valve, 4R Actuator

1. Kit Includes: Cage, Nut, Plug, Disc, O-Ring, Stem, Bonnet, Packing, Packing Nut, Instruction

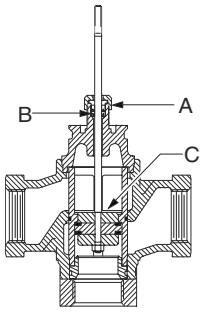


Repair Parts, V-5464

Repair Parts for V-5844 with V-5252 Size 4R Actuators

Code Number	Callout	Description
V-3752-646	**A**	Packing Nut
		Ring Pack Packing Kits
V-9999-608	**B**	Single Pack
V-9999-610		10-Pack (Contains Enough Material to Repack 10 Valves)
V-9999-630		50-Pack (Contains U-Cups and O-Rings only to Repack 50 Valves)
V-5844-6001	**C**	**Recondition Kit**[1] 1-1/2 inch Valve, 4R Actuator

1. Kit Includes: Cage, Nut, Plug, Disc, O-ring, Stem, Bonnet, Packing, Packing Nut, Instruction



Repair Parts, V-5844

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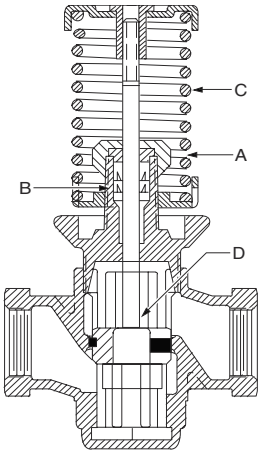
LIT-1924320

Repair Parts For Use With V-3974 with Actuator and VB-3974 without Actuator (Including 1/2 in.)

Description

The available service parts listed in the tables can extend the service life of the V-3974 and VB-3974 cage trim valve assemblies and in many cases return the valve to near original operating performance.

Note: 1/2 in. valve assemblies discontinued in 1991.
VB valves used with AV-8050, AV-8051, AV-8052, AV-8090, AV-8091, and AV-8092 assemblies.
Springs are under compression.
Removal of springs requires use of spring compression tool JC 5389.



Repair Parts, V-3974 and VB-3974

Selection Charts

Code Number	Callout	Description	V-3754	VB-3754
V-3752-646	**A**	**Gland Nut (Packing Nut)**	X	X
V-9999-608	**B**	**Ring Pack Packing Kits:** Single Pack	X	X
V-9999-610		10-Pack (Contains Enough Material to Repack 10 Valves)	X	X
V-9999-630		50-Pack (Contains U-Cups and O-Rings Only to Repack 50 Valves)	X	X

Spring Kits and Recondition Kits for V-3974 and VB-3974

Valve	Valve Size	Actuator	Spring Range	Spring Kit [1] (Callout C)	Recondition Kit [2] (Callout D)
V-3974	1/2 & 3/4	V-3000	4-8	**V-3974-6008**	**1/2 in: V-3974-6003 (Cv = 0.2) or -6004 (Cv = 0.4) or -6005 (Cv = 1.2) or -6006 (Cv = 2.2) or -6007 (Cv = 4.4)**
			9-13	**V-3754-6009**	**3/4 in: V-3974-6001 (Cv = 8.6)**
	1 & 1-1/2	V-3000	4-8	**V-3974-6009**	**1 in: V-3974-6002 (Cv = 13.9)**
			9-13	**V-3754-6008**	**1-1/2 in: V-5464-6001 (Cv = 27.5)**

1. Spring kit includes: spring, upper and lower spring seat, stem extension, stem lock screw, instructions.
2. Recondition kit includes: cage, O-ring, plug, stem, bonnet, packing, packing nut, instructions.

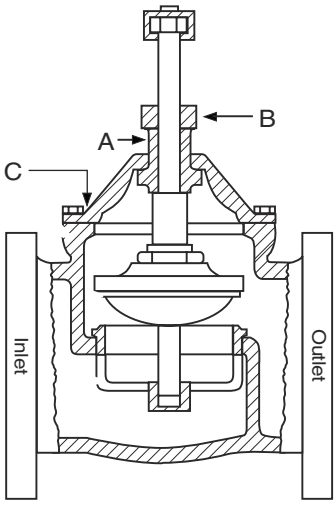
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LIT-1924325

Repairs Parts For Iron Flanged Globe Valves (2-1/2 Through 6 in.) For Use With V-5252 and VB-3752

Description

The available repair parts listed in the selection chart can extend the service life of the V-5252 and VB-3752 Series cast iron Globe Valves and return the valves to near original operating performance.



Repair Parts for Use with V-5252 and VB-3752

Selection Charts

Repair Parts for use with V-5252 and VB-3752

Code Number	Callout	Description		
	A	**Packing Kit:**		
		Valve Size (in.)	**Actuator Size**	**Type of Packing**
V-9999-613		2-1/2 Through 4	(VB-3752)	EPDM Ring Pack
V-9999-613		2-1/2 Through 4	4R and 5R	EPDM Ring Pack
V-5252-668		4 Through 6	8R	EPDM Ring Pack
	B	**Packing Nuts for:**		
		Actuator Size	**Valve Size**	**Stem Diameters**
V-4510-6019		4R	2-1/2 Through 3	3/8 in.
V-4510-6019		5R	2-1/2 Through 4	3/8 in.
V-5252-609		8R	4 Through 6	1/2 in.
	C	**Disc Only:**		
		Valve Size (in.)	**Seat Size (in.)**	
V-3020-6007		2	1-1/2	
V-4710-6010		2-1/2	2-1/2	
V-4710-6011		3	3	
V-4710-6013		4	4	
V-4710-6014		5	5	
V-4710-6015		6	6	

Recondition Kits for V-5252 and VB-3752[1]

Code Number	Valve Size (in.)	Actuator	Recondition Kits
V-5252	2-1/2	4R or 5R	**V-5252-6001 5R or V-5252-6002 4R**
	3	4R or 5R	**V-5252-6003 5R or V-5252-6004 4R**
	4	5R or 8R	**V-5252-6005 5R or V-5252-6006 8R**
	5	8R	**V-5252-6007**
	6	8R	**V-5252-6008**

1. Kit Includes: Stem, Packing Nut, Follower, Packing Box, Packing, Bonnet, Gasket, Swivel, Pins, Disc Holder, Screws, Disc Retainer, Disc, Spacer, Guide Rod, Swivel Nut, Packing Spacer, Packing Tools, and Instructions.

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LIT-1924330

Repairs Parts For Iron Flanged Globe Valves (2-1/2 Through 6 in.) For Use With V-5462 and VB-3970

Description

The available parts listed in the selection charts can extend the service life of the V-5462 and VB-3970 Series Cast Iron Globe Valves and return the valves to near original operating performance.

Selection Charts

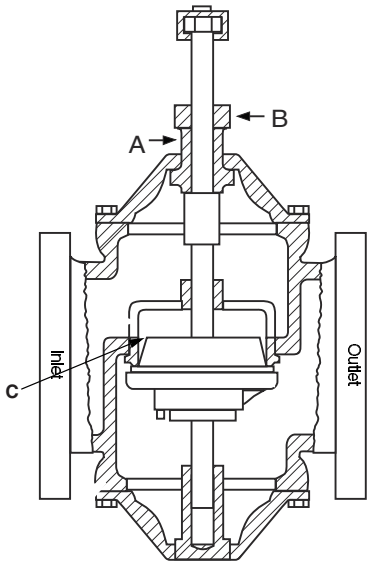
Repair Parts for use with V-5462 and VB-3970

Code Number	Callout	Description		
	A	**Packing Kit:**		
		Valve Size (in.)	**Actuator Size**	**Type of Packing**
V-9999-613		2-1/2 through 4	(VB-3790)	EPDM Ring Pack
V-9999-613		2-1/2 through 4	5R	EPDM Ring Pack
V-5252-668		3 through 6	8R	EPDM Ring Pack
	B	**Packing Nuts for:**		
		Actuator Size	**Valve Size**	**Stem Diameter**
V-4510-6019		5R	2-1/2 through 4	3/8 in.
V-5252-609		8R	4 through 6	1/2 in.
	C	**Disc Only:**		
		Valve Size (in.)		
V-3011-6002		1-1/4		
V-3020-6006		1-1/2		
V-3020-6007		2		
V-4710-6010		2-1/2		
V-4710-6011		3		
V-4710-6013		4		
V-4710-6014		5		
V-4710-6015		6		

Recondition Kits for V-5462 and VB-3970[1]

Code Number	Valve Size	Actuator	Recondition Kits
V-5462	2-1/2	5R	**V-5462-6001**
	3	5R or 8R	**V-5462-6002 5R or V-5462-6003 8R**
	4	5R or 8R	**V-5462-6004 5R or V-5462-6005 8R**
	5	8R	**V-5462-6006**
	6	8R	**V-5462-6007**

1. Kit includes: stem, packing nut, follower, packing box, packing, bonnet, gasket, swivel, pins, disc holder, screws, disc retainer, disc, spacer, packing spacer, swivel nut, spacer, packing tools, and instructions



Repair Parts for Use with V-5462 nd VB-3970

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LIT-1924335

Repairs Parts For Iron Flanged Globe Valves (2-1/2 Through 6 in.) For Use With V-5842 and VB-4322

Description

The available parts listed in the selection chaarts can extend the service life of the V-5842 and VB-4322 Series of Cast Iron Flanged Valves and return the valves to near original operating performance.

Selection Charts

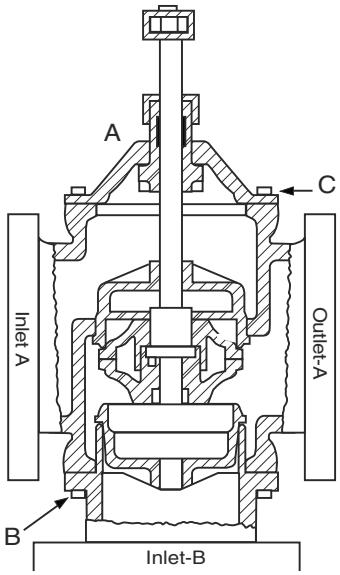
Repair Parts or use with V-5842 and VB-4322

Code Number	Callout	Description		
	A	**Packing Kit:**		
		Valve Size (in.)	**Actuator Size**	**Type of Packing**
V-9999-613		2-1/2 through 4	(VB-4322)	EPDM Ring Pack
V-9999-613		2-1/2 and 3	5R	EPDM Ring Pack
V-5252-668		3 through 6	8R	EPDM Ring Pack
Purchase Locally Qty. Req'd Per Valve	B	**Lower Cap Screws**		
		Valve Size (in.)	**Screw Size (in.)**	
6		2-1/2	1 x 5/16 - 18	
6		3	1 x 3/8 - 16	
8		4	1-1/4 x 3/8 - 16	
8		5	1-1/4 x 1/2 - 13	
10		6	1-1/2 x 1/2 - 13	
Purchase Locally Qty. Req'd Per Valve	C	**Upper Cap Screws**		
		Valve Size (in.)	**Screw Size (in.)**	
6		2-1/2	3/4 x 5/16 - 18	
6 and 8		3 and 4	7/8 x 3/8 - 16	
8 and 10		5 and 6	1 x 1/2 - 13	

Recondition Kits for V-5842 and VB-4322[1]

Code Number	Valve Size	Actuator	Recondition Kits
V-5842	2-1/2	5R	**V-5842-6001**
	3	5R or 8R	**V-5842-6002 5R or V-5842-6003 8R**
	4	5R or 8R	**V-5842-6004 (Elect) or V-5842-6005 8R**
	5	8R	**V-5842-6006**
	6	8R	**V-5842-6007**

1. Kit includes: stem, packing nut, follower, packing box, packing, bonnet, gasket, swivel, pins, disc holder, screws, lower plug, upper plug, guide rod, packing spacer, packing tools, and instructions



Repair Parts for Use with V-5842 and VB-4322

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924345

Repair Parts For Use With V-7216 Two-Way Normally Open Steam or Water Valve

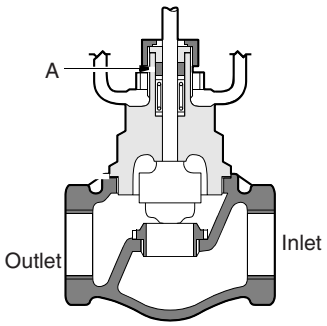
Description

The available packing kits can extend the service life of the V-7216 Series Valves. No inner valve kits are available for this series of valves.

Selection Chart

Code Number	Callout	Description		
	A	Packing Kits		
			Valve Size (in.)	Stem Size
V-9999-608 [1]			1/2 and 3/4	1/4
V-5290-6840 [2]			1/2 through 1	1/4
V-9999-613 [1]			1-1/4 through 2	3/8
V-5290-6841 [2]				

1. Low temperature use, less than or equal to 281° F (138° C)
2. High temperature use, greater than 281° F (138° C)



Repair Parts, V-7216

LIT-1924350

Repair Parts For Use With V-7416 Two-Way Normally Closed Steam or Water Valve

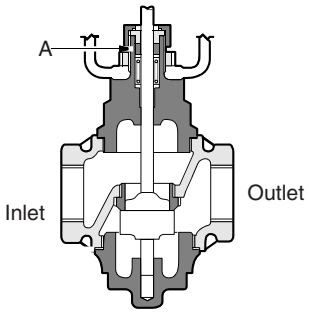
Description

The available packing kits can extend the service life of the V-7416 Series Valves. No inner valve kits are available for this series of valves.

Selection Chart

Code Number	Callout	Description		
	A	Packing Kits		
			Valve Size (in.)	Stem Size
V-9999-608 [1]			1/2 and 3/4	1/4
V-5290-6840 [2]			1/2 through 1	1/4
V-9999-613 [1]			1-1/4 through 2	3/8
V-5290-6841 [2]				

1. Low temperature use, less than or equal to 281° F (138° C)
2. High temperature use, greater than 281° F (138° C)



Repair Parts, V-7416

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924365

Repair Parts For Use With V-3752 Normally Open Valves 1/2 Through 2 in.

Description

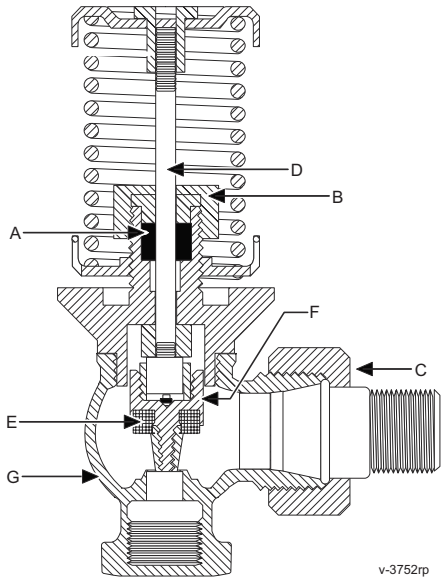
The available parts in the Selection Chart can extend the service life of the V-3752 Series of valves and return the valves to near original operating performance.

Selection Charts

Repair Parts for use with V-3752[1]

Code Number	Call-out	Description
V-9999-608	**A**	**Packing Kit**
V-3752-646	**B**	**Packing Nut**
	C	**Union Nut and Male Tailpiece Assembly for Valves with Union Connections**
		Valve Size (in.)
V-3752-636		1/2
V-3752-637		3/4
V-3752-638		1
V-3752-639		1-1/4
	D	**Stem and Swivel Assembly Includes Stem, Swivel, and Swivel Nut Lock Pin for Globe Valves:**
		Valve Size (in.)
V-3752-6064		1/2
	E	**Disc Assembly Includes: Disc, Disc Holder, Modulating Plug, and Three Pins for:**
		Globe Valves
		Valve Size (in.) / Seat Size (in.)Cv
V-3020-6045		1/2 / 3/80.9
V-3020-6047		1/2 / 3/81.8
		Union Angle Valves
		Valve Size (in.) / Seat Size (in.)Cv
V-3020-6045		1/2 / 3/81.1
V-3020-6047		1/2 / 3/82.5
	F	**Disc Only:**
		Valve Size (in.)
V-3020-6021		1/2
V-3752-6047		3/4
V-3011-6001		1
V-3011-6002		1-1/4
	G	**Union Globe Body Only:**
V-3752-6004		3/4
V-3752-6005		1
	æ	**Inner Valve and Spring Assembly for:**
		Globe Valves
		3 to 6 psig Spring
		Valve Size (in.) / Cv
V-3752-6050		1/2 / 0.9
V-3752-6051		1/2 / 1.8
		Union Angle Valves
		3 to 6 psig Spring
		Valve Size (in.) / Cv
V-3752-6052		1/2 / 2.5

1. The 1/2 through 2 in. size valves of this model were discontinued in 1979.



Repair Parts, V-3752

Spring Kits and Recondition Kits for V-3752 [1]

Code Number	Valve Size (in.)	Actuator Size	Spring Range (psig)	Spring Kit [2]	Recondition Kits [3]
V-3752	1/2	V-3000	3-6	**V-3752-6023**	---
			9-13	**V-3752-6022**	
	3/4		3-6	**V-3752-6023**	**V-3752-6016 (C_v = 3.7) or**
			9-13	**V-3752-6022**	**V-3752-6027 (C_v = 3.8)**
	1.		3-6	**V-3752-6024**	**V-3752-6017 (C_v = 7) or**
			9-13	**V-3752-6021**	**V-3752-6028 (C_v = 7)**
	1-1/4		3-6	**V-3752-6024**	**V-3752-6018 (C_v = 12) or**
			9-13	**V-3752-6021**	**V-3752-6019 (C_v = 12)**
	1-1/2		3-6	**V-3754-6010**	**V-3752-6020 (C_v = 20) or**
			9-13	**V-3754-6009**	**V-3752-6030 (C_v = 20)**
	2		3-6	**V-3754-6010**	**V-3752-6034 (C_v = 35) or**
			9-13	**V-3754-6009**	**V-3752-6031 (C_v = 26)**

1. The 1/2 through 2 in. size valves of this model were discontinued in 1979.
2. Spring Kit Includes: Spring, Upper & Lower Spring Seat, Stem Extension, Stem Lock Screw, and Instructions.
3. Recondition Kit Includes: O-ring, Swivel Nut, Washer, Disc, Disc holder, Contoured Disc Retainer, Pins, Swivel, Spacer, Stem, Bonnet, Packing, Packing Nut, and Instructions unless otherwise noted.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924370

Repair Parts For Use With V-3755 Normally Open Valves 1/2 Through 2 in.

Description

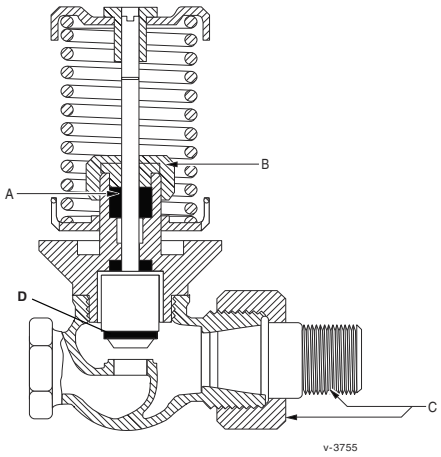
The available parts listed in the Selection Chart can extend the service life of the V-3755 Series Valves and return the valves to near original operating performance.

Selection Charts

Repair Parts for use with V-3755[1]

Code Number	Callout	Description	
V-9999-608	**A**	Packing Kit	
V-3752-646	**B**	Packing Nut	
	C	Union Nut and Male Tailpiece Assembly for Valves with Union Connections	
		Valve Size (in.)	
V-3752-636		1/2	
V-3752-637		3/4	
V-3752-638		1	
V-3752-639		1-1/4	
	D	Disc Only	
		Valve Size (in.)	Seat Size (in.)
V-3011-6002		1	1
V-3020-6006		1-1/4	1-1/4
V-3020-6007		1-1/2	1-1/2
V-3011-6003		2	2

1. This model discontinued in 1974.



Repair Parts, V-3755

Spring Kits and Recondition Kits for V-3755

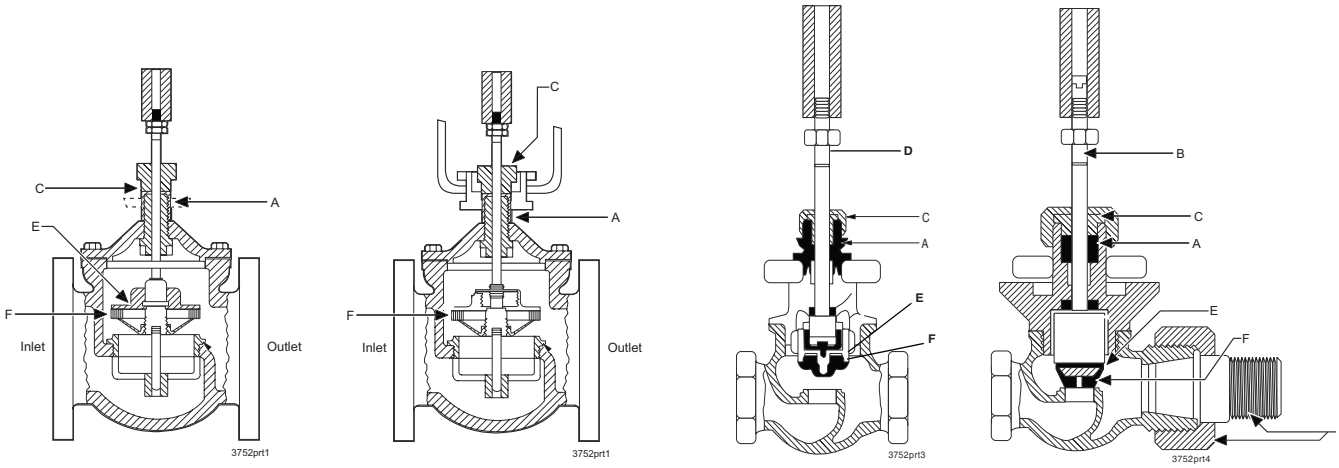
Code Number	Valve Size (in.)	Actuator Size	Spring Range (psig)	Spring Kit	Recondition Kits[1]
V-3755	1/2	V-3000	3-6	**V-3752-6023**	**V-3755-6050 (C_v = 3)**
			9-13	**V-3752-6022**	**No kit available, replace valve.**
	3/4		3-6	**V-3752-6023**	**V-3755-6002 (C_v = 5.2) or V-3755-6007 (C_v = 9) or V-3755-6011 (C_v = 6) or V-3755-6017 (C_v = 9)**
			9-13	**V-3752-6022**	
	1		3-6	**V-3752-6024**	**V-3755-6003 (C_v = 8.2) or V-3755-6008 (C_v = 17) or V-3755-6012 (C_v = 10) or V-3755-6018 (C_v = 17)**
			9-13	**V-3752-6021**	
	1-1/4		3-6	**V-3752-6024**	**V-3755-6004 (C_v = 13) or V-3755-6009 (C_v = 24)**
			9-13	**V-3752-6021**	
	1-1/2		3-6	**V-3754-6010**	**V-3755-6005 (C_v = 21) or V-3755-6014 (C_v = 23) or V-3755-6020 (C_v = 41)**
			9-13	**V-3754-6009**	
	2		3-6	**V-3754-6010**	**V-3755-6015 (C_v = 35) or V-3755-6021 (C_v = 60)**
			9-13	**V-3754-6009**	

1. Recondition Kit includes: O-ring, Swivel Nut, Washer, Disc Retainer, Disc, Disc Holder, Pins, Swivel, Stem, Bonnet, Packing Follower, Packing, Packing Nut, and Packing Spacer.

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LIT-1924375

Repair Parts for Use With VB-3752 Normally Open Steam and Water Valves



Repair Parts, VB-3752

Description

The available service parts listed in the tables can extend the service life of the VB-3752 Series valves and in many cases return the valve to near original operating performance.

Selection Chart

Repair Parts for use with VB-3752 (Part 1 of 2)

Code Number	Call out	Description			
	A	**Packing** for Use with both Water and Steam			
		Valve Size (in.)	Valve Shipping Date	Stem Diameter	
V-9999-608		1/2 to 1-1/4	All	1/4 in.	
V-9999-608		1-1/2 and 2	After 1-1-68	1/4 in.	
V-5460-602		1-1/2 and 2	Before 1-1-68	5/16 in.	
V-5460-602		2-1/2 to 4 (VA-3200)	All	5/16 in.	
V-5280-602		2-1/2 to 8 (VA-3400)	All	1/2 in.	
	B	**Union Nut and Male Tailpiece Assembly** for Valves with Union Connections:			
		Valve Size (in.)			
V-3752-636		1/2			
V-3752-637		3/4			
V-3752-638		1			
V-3752-639		1-1/4			
	C	**Gland Nut**			
		Valve Size (in.)	Valve Shipping Date	Actuator	
V-3752-646		1/2 to 1-1/4	All	VA-3200 VA-5000	
V-3752-646		1-1/2 & 2	After 1-1-68	VA-3200 VA-5000	
V-4510-6019		1-1/2 & 2	Before 1-1-68	VA-3200 VA-5000	
V-4510-6019		2-1/2 to 4	All	VA-3200	
V-4510-6020		2-1/2 to 8	All	VA-3400	

Repair Parts for use with VB-3752 (Part 2 of 2)

Code Number	Call out	Description		
	D	**Stem and Swivel Assembly** Includes: Stem, Swivel, and Pins for:		
		Valves Shipped after 3/1/69		
		Globe Valves		
		Valve Size (in.)		
V-3752-6064		1/2		
	E	**Disc Assembly** Includes: Disc, Disc Holder, Modulating Plug, and Pin		
		Globe Valves		
		Valve Size (in.)	Cv	
V-3020-6045		1/2	0.9	
V-3020-6047		1/2	1.8	
		Union Angle Valves		
V-3020-6045		1/2	0.9	
V-3020-6047		1/2	2.5	
	F	**Disc Only**		
		Valve Size (in.)	Seat Size (in.)	
V-3020-6021		1/2	3/8	
V-3752-6047		3/4	1/2	
V-3011-6001		1	3/4	
V-3011-6002		1-1/4	1	
V-3020-6006		1-1/2	1-1/4	
V-3020-6007		2	1-1/2	
V-4710-6010		2-1/2	—	
V-4710-6011		3	—	
V-4710-6013		4	—	
V-4710-6014		5	—	
V-4710-6015		6	—	

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924380

Repair Parts For Use With V-3800 Normally Open Valves 1/2 and 3/4 in.

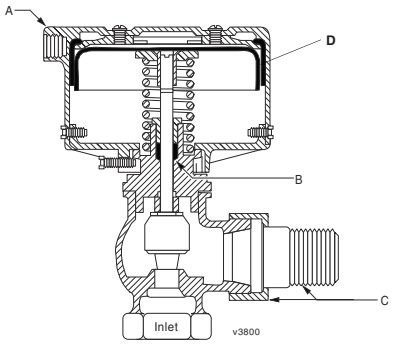
Description

The available packing kit and diaphragm kit can extend the service life of the V-3800 Series Valves. No inner valve kits are available for this series of valves.

Selection Chart

Code Number	Callout	Description
V-3802-1	A	**Oval Actuator Complete**
V-9999-608	B	**Packing Ring Pack**
	C	**Union Nut and Tailpiece Assembly** for Valves with Union Connections
		Valve Size (in.)
V-3752-636		1/2
V-3752-637		3/4
V-3100-611	D	**Diaphragm** for Oval Top Actuators

Note: This model discontinued in 1978.



Repair Parts, V-3800

LIT-1924385

Repair Parts For Use With V-5210 High Pressure Normally Open Valve 2-1/2 Through 4 in. Cast Iron 250 lb ANSI Raised Flanges

Description

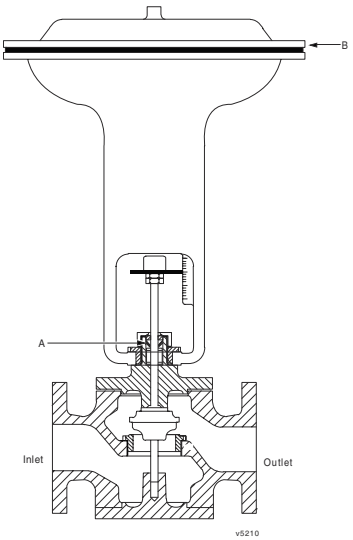
The repair parts available for the V-5210 Series of valves are limited to the parts in the selection chart.

Selection Chart

Repair Parts for use with V-5210

Code Number	Callout	Description	
	A	Packing Kits: Include	
V-5290-6842[1]		PTFE V-Rings for 2-1/2 through 4 in. Valves	
		Packing Kit	Steam Valves
V-4530-650[2]		V-3000 & 4R	
V-4530-626<superscript>2.		5R & 8R	
		Packing Kit	Water Valves
V-9999-608 <superscript>2.		V-3000 & 4R	
	B	Diaphragms	
V-4710-602		4R	
V-4710-603		5R	
V-4710-604		8R	

1. For valves shipped after June 1982.
2. For valves shipped before June 1982.



Repair Parts, V-5210

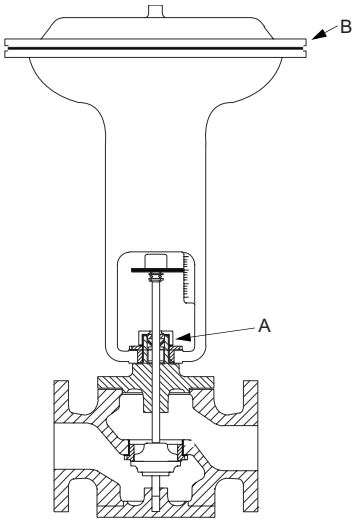
The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924390

Repair Parts For Use With V-5410 High Pressure Normally Closed Valves 2-1/2 Through 4 in. Cast Iron 250 lb ANSI Raised Flanges

Description

The repair parts listed in the selection chart are the only available parts for the V-5410 series of valves.



Repair Parts, V-5410

Selection Chart

Repair Parts for use with V-5410[1]

Code Number	Callout	Description	
	A	Packing Kits: Include	
V-5290-6842 [2]		PTFE V-Rings for 2-1/2 through 4 in. Valves	
		Packing Kit:	Steam Valves
V-4530-650 [3]		V-3000, 4R	
V-4530-626 <superscript>3.		5R, 8R	
		Packing Kit	Water Valves
V-9999-608 <superscript>3.		V-3000, 4R	
	B	Diaphragms	
V-4710-602		4R	
V-4710-603		5R	
V-4710-604		8R	

1. This model discontinued in 1993.
2. For valves shipped after June 1982.
3. For valves shipped before June 1982.

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924395

Valve Spring Kits Sorted by Valve Code Number

Description

Available replacement actuators and spring kits can extend the service life of many Johnson Controls valves.

Selection Chart

Valve Spring Kits (Part 1 of 4)

Valve Body	Valve Size (in.)	Spring Range (psig)	Actuator	Spring Kit Code Number
V-3011	1 and 1-1/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6024**
V-3011	1 and 1-1/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6021**
V-3011	1-1/2 - 2	3 - 6	V-3000-1 or V-3000-2	**V-3754-6010**
V-3011	1-1/2 - 2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-3011	1/2 and 3/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6023**
V-3011	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-3020	1 and 1-1/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6024**
V-3020	1 and 1-1/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6021**
V-3020	1-1/2 - 2	3 - 6	V-3000-1 or V-3000-2	**V-3754-6010**
V-3020	1-1/2 - 2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-3020	1/2 and 3/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6023**
V-3020	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-3100	1/2 and 3/4	3 - 6	V-3802 or V-4000	**V-3800-6002**
V-3100	1/2 and 3/4	9 - 13	V-3802 or V-4000	**V-3800-6003**
V-3212	1 and 1-1/4	4 - 8	V-3000-1 or V-3000-2	**V-4322-6001**
V-3212	1 and 1-1/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6021**
V-3212	1-1/2 - 2	4 - 8	V-3000-1 or V-3000-2	**V-3974-6008**
V-3212	1-1/2 - 2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-3212	1/2 and 3/4	4 - 8	V-3000-1 or V-3000-2	**V-4332-6001**
V-3212	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-3752	1 and 1-1/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6024**
V-3752	1 and 1-1/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6021**
V-3752	1-1/2 - 2	3 - 6	V-3000-1 or V-3000-2	**V-3754-6010**
V-3752	1-1/2 - 2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-3752	1/2 and 3/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6023**
V-3752	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-3754	1 and 1-1/2	3 - 6	V-3000-1 or V-3000-2	**V-3754-6011**
V-3754	1 and 1-1/2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6008**
V-3754	1/2 and 3/4	3 - 6	V-3000-1 or V-3000-2	**V-3754-6010**
V-3754	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-3755	1 and 1-1/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6024**
V-3755	1 and 1-1/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6021**
V-3755	1-1/2 - 2	3 - 6	V-3000-1 or V-3000-2	**V-3754-6010**
V-3755	1-1/2 - 2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-3755	1/2 and 3/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6023**
V-3755	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-3766	1/2	3 - 6	V-3000-1 or V-3000-2	**V-3754-6010**
V-3800	1/2 and 3/4	3 - 6	V-3802 or V-4000	**V-3800-6002**
V-3800	1/2 and 3/4	9 - 13	V-3802 or V-4000	**V-3800-6003**
V-3854	1/2	3 - 6	V-3802 or V-4000	**V-3754-6012**
V-3854	1/2	9 - 13	V-3802 or V-4000	**V-3754-6013**
V-3964	1/2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-3966	1/2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-3970	1 and 1-1/4	4 - 8	V-3000-1 or V-3000-2	**V-4322-6001**
V-3970	1 and 1-1/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6021**
V-3970	1-1/2 - 2	4 - 8	V-3000-1 or V-3000-2	**V-3974-6008**
V-3970	1-1/2 - 2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**

Valve Spring Kits (Part 2 of 4)

Valve Body	Valve Size (in.)	Spring Range (psig)	Actuator	Spring Kit Code Number
V-3970	1/2 and 3/4	4 - 8	V-3000-1 or V-3000-2	**V-4332-6001**
V-3970	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-3974	1 and 1-1/2	4 - 8	V-3000-1 or V-3000-2	**V-3974-6009**
V-3974	1 and 1-1/2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6008**
V-3974	1/2 and 3/4	4 - 8	V-3000-1 or V-3000-2	**V-3974-6008**
V-3974	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-4322	1 and 1-1/4	4 - 8	V-300-1 or V-3000-2	**V-4322-6001**
V-4322	1 and 1-1/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6021**
V-4322	1-1/2 - 2	4 - 8	V-3000-1 or V-3000-2	**V-3974-6008**
V-4322	1-1/2 - 2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-4322	1/2 and 3/4	4 - 8	V-3000-1 or V-3000-2	**V-4332-6001**
V-4322	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-4324	1 and 1-1/2	4 - 8	V-3000-1 or V-3000-2	**V-3974-6009**
V-4324	1 and 1-1/2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6008**
V-4324	1/2 and 3/4	4 - 8	V-3000-1 or V-3000-2	**V-3974-6008**
V-4324	1/2 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-4332	1/2	4 - 8	V-3000-1 or V-3000-2	**V-4332-6001**
V-4332	1/2	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-4333	1/2	4 - 8	V-3000-1 or V-3000-2	**V-4332-6001**
V-4333	1/2	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-4334	1/2	4 - 8	V-3000-1 or V-3000-2	**V-4332-6001**
V-4334	1/2	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-4440	1/2	4 - 12	V-3000-1 or V-3000-2	**V-4440-6002**
V-4440	5/8	4 - 12	V-3000-1 or V-3000-2	**V-4440-6002**
V-4440	1/2 and 5/8	6 - 9	V-3000-1 or V-3000-2	**V-4440-6001**
V-4510	1 and 1-1/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6024**
V-4510	1-1/2 - 2	3 - 6	V-3000-1 or V-3000-2	**V-3754-6010**
V-4510	1/2 and 3/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6023**
V-5216	1/2	3 - 6	V-3000-1 or V-3000-2	**V-3752-6023**
V-5216	3/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6024**
V-5230	1	3 - 7	V-3000-1 or V-3000-2	**V-5230-6002**
V-5230	1/2 and 3/4	3 - 7	V-3000-1 or V-3000-2	**V-5230-6001**
V-5250	1 and 1-1/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6024**
V-5250	1-1/2 - 2	3 - 6	V-3000-1 or V-3000-2	**V-3754-6010**
V-5250	1/2 and 3/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6023**
V-5416	1/2	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-5416	3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6021**
V-5430	1/2 and 3/4	9 - 14	V-3000-1 or V-3000-2	**V-5430-6001**
V-6139	1/2	9 - 13	V-3000-1 or V-3000-2	**V-3754-6009**
V-6143	3/8 and 3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-7216	1/2	3 - 6	V-3000-1 or V-3000-2	**V-3752-6023**
V-7216	3/4	3 - 6	V-3000-1 or V-3000-2	**V-3752-6024**
V-7416	1/2	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**
V-7416	3/4	9 - 13	V-3000-1 or V-3000-2	**V-3752-6021**

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

Valve Spring Kits Sorted by Valve Code Number (Continued)

Valve Spring Kits (Part 3 of 4)

Valve Body	Valve Size (in.)	Spring Range (psig)	Actuator	Spring Kit Code Number
VG7000	1/2 or 3/4	3 - 6	V-3000-8001, V-3000-8003, or V-3000-8011	**VG7000-1001**
VG7000	1/2 or 3/4	3 - 6	V-3801-8001	**VG7000-1010**
VG7000	1/2 or 3/4	4 - 8	V-3000-8001, V-3000-8003, or V-3000-8011	**VG7000-1002**
VG7000	1/2 or 3/4	4 - 8	V-3801-8001	**VG7000-1011**
VG7000	1/2 or 3/4	9 - 13	V-3000-8001, V-3000-8003, or V-3000-8011	**VG7000-1003**
VG7000	1/2 or 3/4	9 - 13	V-3801-8001	**VG7000-1012**
VG7000	1/2 or 3/4	Spring Kit with Three Springs[1]	V-3801-8001	**VG7000-1015**
VG7000	1/2 or 3/4	Not Applicable	V-400	**VG7000-1013**
VG7000	1 or 1-1/4	3 - 6	V-3000-8001, V-3000-8003, or V-3000-8011	**VG7000-1004**
VG7000	1 or 1-1/4	4 - 8	V-3000-8001, V-3000-8003, or V-3000-8011	**VG7000-1005**

Valve Spring Kits (Part 4 of 4)

Valve Body	Valve Size (in.)	Spring Range (psig)	Actuator	Spring Kit Code Number
VG7000	1 or 1-1/4	9 - 13	V-3000-8001, V-3000-8003, or V-3000-8011	**VG7000-1006**
VG7000	1-1/2 or 2	3 - 6	V-3000-8001, V-3000-8003, or V-3000-8011	**VG7000-1007**
VG7000	1-1/2 or 2	4 - 8	V-3000-8001, V-3000-8003, or V-3000-8011	**VG7000-1008**
VG7000	1-1/2 or 2	9 - 13	V-3000-8001, V-3000-8003, or V-3000-8011	**VG7000-1009**
VG7000	1, 1-1/4, 1-1/2 or 2	Not Applicable	V-400	**VG7000-1014**
VT Series	1/2	3 - 6	V-3802 or V-4000	**V-9999-6001**
	1/2	4 - 8	V-3802 or V-4000	**V-9999-6002**
	1/2	9 - 13	V-3802 or V-4000	**V-9999-6003**
VT Series (All)	1/2	3 - 6	V-3000-1 or V-3000-2	**V-3752-6023**
	1/2	4 - 8	V-3000-1 or V-3000-2	**V-4332-6001**
	1/2	9 - 13	V-3000-1 or V-3000-2	**V-3752-6022**

1. Spring Kit with Three Springs: 3 - 6, 4 - 8, 9 - 13 (Includes hardware to adapt one valve only)

LIT-1924400

Inner Valve Reconditioning Kits: 1/2 to 5/8 in.

Description

The selection chart below gives repair recommendation for older series of Johnson Controls 1/2 through 5/8 in size valves. Available inner valve kits can extend the service life of many series of Johnson Control valves, while others will require valve replacement to maintain system performance.

Note: For VG7000 Reconditioning Kits, refer to *VG7000 Series Bronze Globe Valves, Maintenance and Repair Catalog Page (LIT-1924275)* on Page 269.

Selection Chart

Inner Valve Reconditioning Kits: 1/2 to 5/8 in. (Part 1 of 2)

Valve Body	Valve Size (in.)	Spring Range	Inner Valve Kit Code Number
V-3011	1/2	3 - 6 or 9 - 13	No kits available, replace valve
V-3020	1/2	3 - 6 or 9 - 13	No kits available, replace valve
V-3100	1/2	3 - 6 or 9 - 13	No kits available, replace valve
V-3212	1/2	4 - 8 or 9 - 13	**V-3970-6003** or **V-3970-6004**
V-3752	1/2	3 - 6 or 9 - 13	**V-3752-6050**, **V-3752-6051** or **V-3752-6052**
V-3755	1/2	3 - 6 or 9 - 13	No kits available, replace valve
V-3766	1/2	3 - 6	No kits available, replace valve
V-3800	1/2	3 - 6 or 9 - 13	**V-3800-6050** or **V-3800-6051**
V-3854	1/2	3 - 6 or 9 - 13	**V-3854-6051** or **V-3854-6052**
V-3964	1/2	9 - 13	No kits available, replace valve
V-3966	1/2	9 - 13	No kits available, replace valve
V-3970	1/2	4 - 8	**V-3970-6003** or **V-3970-6004**
V-3974	1/2	4 - 8 or 9 - 13	**V-3974-6003, V-3974-6004**, **V-3974-6005**, **V-3974-6006** or **V-3974-6007**
V-4322	1/2	4 - 8 or 9 - 13	**V-4322-6004**

Inner Valve Reconditioning Kits: 1/2 to 5/8 in. (Part 2 of 2)

Valve Body	Valve Size (in.)	Spring Range	Inner Valve Kit Code Number
V-4332	1/2	4 - 8 or 9 - 13	No kits available, replace valve
V-4333	1/2	4 - 8 or 9 - 13	No kits available, replace valve
V-4334	5/8	4 - 8 or 9 - 13	No kits available, replace valve
V-4440	1/2	4 - 12	**V-4440-6003** or **V-4440-6004**
V-4440	1/2	6 - 9	**V-4440-6005**
V-4440	5/8	4 - 12 or 6 - 9	No kits available, replace valve
V-4510	1/2	3 - 6	No kits available, replace valve
V-5216	1/2	3 - 6	No kits available, replace valve
V-5230	1/2	3 - 7	No kits available, replace valve
V-5416	1/2	9 - 13	No kits available, replace valve
V-5430	1/2	9 - 14	No kits available, replace valve
V-6139	1/2	9 - 13	No kits available, replace valve
V-7216	1/2	3 - 6	No kits available, replace valve
V-7416	1/2	9 - 13	No kits available, replace valve
VT Series	1/2	3 - 6, 4 - 8 or 9 - 13	No kits available, replace valve

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924405

Inner Valve Reconditioning Kits: 3/4 to 2 in.

Description

The available parts listed in the selection chart can extend the service life of the valve series listed and return the valves to near original operating performance.

Note: For VG7000 Reconditioning Kits, refer to *VG7000 Series Bronze Globe Valves, Maintenance and Repair Catalog Page (LIT-1924275)* on Page 269.

Selection Chart

Inner Valve Reconditioning Kits, 3/4 to 2 in. (Part 1 of 2)

Valve Body	Valve Size (in.)	Spring Range	Inner Valve Kit
V-3752	3/4 UA	3 - 6 or 9-13	**V-3752-6016 or V-3752-6027**
V-3752	1 UA	3 - 6 or 9-13	**V-3752-6017 or V-3752-6028**
V-3752	1-1/4 UA	3 - 6 or 9-1	**V-3752-6018**
V-3752	1- 1/4 UG	3 - 6 or 9-13	**V-3752-6019**
V-3752	1-1/2 UA	3 - 6 or 9-13	**V-3752-6020 or V-3752-6030**
V-3752	2	3 - 6 or 9-13	**V-3752-6034 or V-3752-6031**
V-3800	3/4 UA	3 - 6	**V-3800-6001**
V-3754-1008	3/4	9 - 13	**V-3754-6001**
V-3754-1022	3/4	3 - 6	**V-3754-6001**
V-3754-1026	3/4	3 - 6	**V-3754-6001**
V-3754-4001	3/4	3 - 6	**V-3754-6001**
VB-3754-4	3/4		**V-3754-6001**
VB-3754-4014	3/4		**V-3754-6001**
V-3754-1010	1	9 - 13	**V-3754-6002**
V-3754-1023	1	3 - 6	**V-3754-6002**
V-3754-1027	1	3 - 6	**V-3754-6002**
V-3754-4002	1	3 - 6	**V-3754-6002**
VB-3754-5	1		**V-3754-6002**
VB-3754-8	1-1/4		**V-3754-6002**
V-3974-1004	3/4	9 - 13	**V-3974-6001**
V-3974-1010	3/4	9 - 13	**V-3974-6001**
V-3974-2004	3/4	9 - 13	**V-3974-6001**
V-3974-4001	3/4	9 - 13	**V-3974-6001**
VB-3974-4	3/4		**V-3974-6001**
VB-3974-1005	1		**V-3974-6002**
V-3974-1011	1	9 - 13	**V-3974-6002**
V-3974-2005	1	9 - 13	**V-3974-6002**
V-3974-4002	1	9 - 13	**V-3974-6002**
V-4324-1005	3/4	4 - 8	**V-4324-6001**
V-4324-1006	3/4	9 - 13	**V-4324-6001**
V-4324-1013	3/4	9 - 13	**V-4324-6001**
V-4324-4001	3/4	4 - 8	**V-4324-6001**
V-4324-4003	3/4	9 - 13	**V-4324-6001**
V-4324-4014	3/4		**V-4324-6001**
VB-4324-4	3/4		**V-4324-6001**
V-4324-1007	1	4 - 8	**V-4324-6002**
V-4324-1008	1	9 - 13	**V-4324-6002**
V-4324-1014	1	9 - 13	**V-4324-6002**
V-4324-4002	1	4 - 8	**V-4324-6002**
V-4324-4004	1	9 - 13	**V-4324-6002**
VB-4324-5	1		**V-4324-6002**
VB-4324-8	1-1/4		**V-4324-6002**

Inner Valve Reconditioning Kits, 3/4 to 2 in. (Part 2 of 2)

Valve Body	Valve Size (in.)	Spring Range	Inner Valve Kit
V-3754-1028	1-1/2	3 - 6	**V-5254-6001**
V-3754-1029	1-1/2	9 - 13	**V-5254-6001**
V-3754-1030	1-1/2	3 - 6	**V-5254-6001**
VB-3754-6	1-1/2		**V-5254-6001**
V-5254-1	1-1/2	2 - 5	**V-5254-6001**
V-5254-11	1-1/2	2 - 5	**V-5254-6001**
V-5254-2	1-1/2	2 - 5	**V-5254-6001**
V-5254-3	1-1/2	9 - 13	**V-5254-6001**
VB-3754-7	2		No kits available, replace valve.
V-5254-4	2	9 - 13	
V-5254-5	2	2 - 5	
V-5254-6	2	9 - 13	
V-5254-12	2	2 - 5	
V-3974-1012	1-1/2	9 - 13	**V-5464-6001**
V-3974-1013	1-1/2	9 - 13	**V-5464-6001**
VB-3974-6	1-1/2		**V-5464-6001**
V-5464-1	1-1/2	9 - 13	**V-5464-6001**
V-5464-11	1-1/2	9 - 13	**V-5464-6001**
V-5464-2	1-1/2	9 - 13	**V-5464-6001**
VB-3974-7	2		No kits available, replace valve.
V-5464-3	2	9 - 13	
V-5464-4	2	9 - 13	
V-5464-12	2	9 - 13	
V-4324-1015	1-1/2	4 - 8	**V-5844-6001**
V-4324-1016	1-1/2	9 - 13	**V-5844-6001**
V-4324-1017	1-1/2	9 - 13	**V-5844-6001**
VB-4324-6	1-1/2		**V-5844-6001**
V-5844-1	1-1/2	4 - 8	**V-5844-6001**
V-5844-2	1-1/2	9 - 13	**V-5844-6001**
V-5844-2	1-1/2	9 - 13	**V-5844-6001**
V-5844-11	1-1/2	9 - 13	**V-5844-6001**
VB-4324-7	2		No kits available, replace valve.
V-5844-4	2	4 - 8	
V-5844-5	2	9 - 13	
V-5844-6	2	9 - 13	
V-5844-12	2	9 - 13	

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924410

Inner Valve Reconditioning Kits: 2-1/2 to 6 in.

Description

The selection chart below gives repair recommendation for older series of Johnson Controls 2-1/2 through 6 in size valves. Available inner valve kits can extend the service life of many series of Johnson Control valves.

Note: For VG2000 Reconditioning Kits, refer to *VG2000 Series Cast Iron Flanged Globe Valves, Maintenance and Repair Catalog Page (LIT-1900098)* on Page 268.

Selection Chart

Inner Valve Reconditioning KIts: 2-1/2 to 6 in. (Part 1 of 2)

Valve Body	Valve Size (in.)	Spring Range	Inner Valve Kit Code Number
VB-3752-19	2-1/2		**V-5252-6001**
V-5252-7	2-1/2	2 - 5	**V-5252-6001**
V-5252-8	2-1/2	2 - 5	**V-5252-6001**
V-5252-33	2-1/2	2 - 5	**V-5252-6001**
V-5252-32	2-1/2	2 - 5	**V-5252-6002**
V-5252-4	2-1/2	2 - 5	**V-5252-6002**
V-5252-5	2-1/2	2 - 5	**V-5252-6002**
V-5252-6	2-1/2	9 - 13	**V-5252-6002**
VB-3752-22	3		**V-5252-6003**
V-5252-12	3	2 - 5	**V-5252-6003**
V-5252-13	3	2 - 5	**V-5252-6003**
V-5252-35	3	2 - 5	**V-5252-6003**
V-5252-10	3	2 - 5	**V-5252-6004**
V-5252-11	3	9 - 13	**V-5252-6004**
V-5252-34	3	2 - 5	**V-5252-6004**
V-5252-9	3	2 - 5	**V-5252-6004**
VB-3752-25	4		**V-5252-6005**
V-5252-14	4	2 - 5	**V-5252-6005**
V-5252-36	4	2 - 5	**V-5252-6005**
V-5252-15	4	2 - 5	**V-5252-6006**
V-5252-16	4	2 - 5	**V-5252-6006**
V-5252-37	4	2 - 5	**V-5252-6006**
VB-3752-28	5		**V-5252-6007**
V-5252-17	5	2 - 5	**V-5252-6007**
V-5252-18	5	2 - 5	**V-5252-6007**
V-5252-38	5	2 - 5	**V-5252-6007**
VB-3752-31	6		**V-5252-6008**
V-5252-19	6	2 - 5	**V-5252-6008**
V-5252-39	6	2 - 5	**V-5252-6008**
VB-3970-11	2-1/2		**V-5462-6001**
V-5462-6	2-1/2	9 - 13	**V-5462-6001**
V-5462-7	2-1/2	9 - 13	**V-5462-6001**
V-5462-34	2-1/2	9 - 13	**V-5462-6001**
VB-3970-14	3		**V-5462-6002**
V-5462-8	3	9 - 13	**V-5462-6002**
V-5462-9	3	9 - 13	**V-5462-6002**
V-5462-35	3	9 - 13	**V-5462-6002**

Inner Valve Reconditioning KIts: 2-1/2 to 6 in. (Part 2 of 2)

Valve Body	Valve Size (in.)	Spring Range	Inner Valve Kit Code Number
V-5462-10	3	9 - 13	**V-5462-6003**
V-5462-36	3	9 - 13	**V-5462-6003**
VB-3970-17	4		**V-5462-6004**
V-5462-11	4	9 - 13	**V-5462-6004**
V-5462 -12	4	9 - 13	**V-5462-6004**
V-5462-37	4	9 - 13	**V-5462-6004**
V-5462-13	4	9 - 13	**V-5462-6005**
V-5462-14	4	9 - 13	**V-5462-6005**
V-5462-38	4	9 - 13	**V-5462-6005**
VB-3970-20	5		**V-5462-6006**
V-5462-15	5	9 - 13	**V-5462-6006**
V-5462-39	5	9 - 13	**V-5462-6006**
VB-3970-23	6		**V-5462-6007**
V-5462-17	6	9 - 13	**V-5462-6007**
V-5462-18	6	9 - 13	**V-5462-6007**
V-5462-40	6	9 - 13	**V-5462-6007**
VB-4322-9	2-1/2		**V-5842-6001**
V-5842-31	2-1/2	9 - 13	**V-5842-6001**
V-5842-8	2-1/2	9 - 13	**V-5842-6001**
VB-4322-11	3		**V-5842-6002**
V-5842-10	3	9 - 13	**V-5842-6002**
V-5842-32	3	9 - 13	**V-5842-6002**
V-5842-17	3	9 - 13	**V-5842-6003**
V-5842-18	3	9 - 13	**V-5842-6003**
V-5842-33	3	9 - 13	**V-5842-6003**
VB-4322-13	4		**V-5842-6004**
V-5842-11	4	9 - 13	**V-5842-6005**
V-5842-12	4	9 - 13	**V-5842-6005**
V-5842-34	4	9 - 13	**V-5842-6005**
VB-4322-19	5	9 - 13	**V-5842-6006**
V-5842-13	5	9 - 13	**V-5842-6006**
V-5442-14	5	9 - 13	**V-5842-6006**
V-5842-35	5	9 - 13	**V-5842-6006**
V-5842-16	6	9 - 13	**V-5842-6007**
VB-4322-18	6	9 - 13	**V-5842-6007**
V-5842-15	6	9 - 13	**V-5842-6007**
V-5842-36	6	9 - 13	**V-5842-6007**

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

LIT-1924520

Cross-Reference of VT Series Threaded (NPT) Valves to VG7000 Series Valves

VT Series Threaded (NPT) Valve	VG7000 Series Equivalent
VTM-TC007 (Slotted Stem)	VG7441CT (Threaded Stem)
VTM-TC007-012	VG7441CT Plus VG7000-1001
VTM-TC007-013	VG7441CT Plus VG7000-1002
VTM-TC007-014	VG7441CT Plus VG7000-1003
VTM-TC007-020	VG7441CT
VTM-TC007-094	VG7441CT Plus VG7000-1012
VTM-TC007-312	VG7441CT+3008B
VTM-TC007-313	VG7441CT+3008D
VTM-TC007-314	VG7441CT+3008E
VTM-TC007-322	VG7441CT+3003B
VTM-TC007-323	VG7441CT+3003D
VTM-TC007-324	VG7441CT+3003E
VTM-TC007-394	VG7441CS+3801E
VTM-TC007-3P4	VG7441CT+3008EP
VTM-TC007-413	VG7441CS+3801D
VTM-TC007-414	VG7441CS+3801E
VTM-TC007-520	VG7241CT+7152G
VTM-TC019 (Slotted Stem)	VG7441ET (Threaded Stem)
VTM-TC019-012	VG7441ET Plus VG7000-1001
VTM-TC019-013	VG7441ET Plus VG7000-1002
VTM-TC019-014	VG7441ET Plus VG7000-1003
VTM-TC019-020	VG7441ET
VTM-TC019-094	VG7441ET Plus VG7000-1012
VTM-TC019-312	VG7441ET+3008B
VTM-TC019-313	VG7441ET+3008D
VTM-TC019-314	VG7441ET+3008E
VTM-TC019-322	VG7441ET+3003B
VTM-TC019-323	VG7441ET+3003D
VTM-TC019-324	VG7441ET+3003E
VTM-TC019-394	VG7441ES+3801E
VTM-TC019-3P4	VG7441ET+3008EP
VTM-TC019-413	VG7441ES+3801D
VTM-TC019-414	VG7441ES+3801E
VTM-TC019-520	VG7241ET+7152G
VTM-TC047 (Slotted Stem)	VG7441GT (Threaded Stem)
VTM-TC047-012	VG7441GT Plus VG7000-1001
VTM-TC047-013	VG7441GT Plus VG7000-1002
VTM-TC047-014	VG7441GT Plus VG7000-1003
VTM-TC047-020	VG7441GT
VTM-TC047-094	VG7441GT Plus VG7000-1012
VTM-TC047-312	VG7441GT+3008B
VTM-TC047-313	VG7441GT+3008D
VTM-TC047-314	VG7441GT+3008E
VTM-TC047-322	VG7441GT+3003B
VTM-TC047-323	VG7441GT+3003D
VTM-TC047-324	VG7441GT+3003E
VTM-TC047-394	VG7441GS+3801E
VTM-TC047-3P4	VG7441GT+3008EP
VTM-TC047-413	VG7441GS+3801D
VTM-TC047-414	VG7441GS+3801E
VTM-TC047-520	VG7241GT+7152G
VTM-TM007 (Slotted Stem)	VG7842CT (Threaded Stem)
VTM-TM007-012	VG7842CT Plus VG7000-1001
VTM-TM007-013	VG7842CT Plus VG7000-1002
VTM-TM007-014	VG7842CT Plus VG7000-1003
VTM-TM007-020	VG7842CT
VTM-TM007-094	VG7842CT Plus VG7000-1012
VTM-TM007-200	VG7842CS+8020G
VTM-TM007-220	VG7842CS+8122G
VTM-TM007-312	VG7842CT+3008B
VTM-TM007-313	VG7842CT+3008D
VTM-TM007-314	VG7842CT+3008E
VTM-TM007-322	VG7842CT+3003B
VTM-TM007-323	VG7842CT+3003D
VTM-TM007-324	VG7842CT+3003E
VTM-TM007-394	VG7842CS+3801E
VTM-TM007-3P3	VG7842CT+3008DP
VTM-TM007-413	VG7842CS+3801D
VTM-TM007-414	VG7842CS+3801E
VTM-TM007-500	VG7842CT+8050G
VTM-TM007-510	VG7842CT+8051G
VTM-TM007-520	VG7842CT+7152G
VTM-TM007-700	VG7842CT+7150G
VTM-TM007-720	VG7842CT+7152G
VTM-TM007-730	VG7842CT+7153G
VTM-TM019 (Slotted Stem)	VG7842ET (Threaded Stem)
VTM-TM019-012	VG7842ET Plus VG7000-1001
VTM-TM019-013	VG7842ET Plus VG7000-1002
VTM-TM019-014	VG7842ET Plus VG7000-1003
VTM-TM019-020	VG7842ET
VTM-TM019-094	VG7842ET Plus VG7000-1012
VTM-TM019-200	VG7842ES+8020G
VTM-TM019-220	VG7842ES+8122G
VTM-TM019-312	VG7842ET+3008B
VTM-TM019-313	VG7842ET+3008D
VTM-TM019-314	VG7842ET+3008E
VTM-TM019-322	VG7842ET+3003B
VTM-TM019-323	VG7842ET+3003D
VTM-TM019-324	VG7842ET+3003E
VTM-TM019-394	VG7842ES+3801E
VTM-TM019-3P3	VG7842ET+3008DP
VTM-TM019-413	VG7842ES+3801D
VTM-TM019-414	VG7842ES+3801E
VTM-TM019-500	VG7842ET+8050G
VTM-TM019-510	VG7842ET+8051G
VTM-TM019-520	VG7842ET+7152G
VTM-TM019-700	VG7842ET+7150G
VTM-TM019-720	VG7842ET+7152G
VTM-TM019-730	VG7842ET+7153G
VTM-TM047 (Slotted Stem)	VG7842GT (Threaded Stem)
VTM-TM047-012	VG7842GT Plus VG7000-1001
VTM-TM047-013	VG7842GT Plus VG7000-1002
VTM-TM047-014	VG7842GT Plus VG7000-1003
VTM-TM047-020	VG7842GT
VTM-TM047-094	VG7842GT Plus VG7000-1012
VTM-TM047-200	VG7842GS+8020G
VTM-TM047-220	VG7842GS+8122G
VTM-TM047-312	VG7842GT+3008B
VTM-TM047-313	VG7842GT+3008D
VTM-TM047-314	VG7842GT+3008E
VTM-TM047-322	VG7842GT+3003B
VTM-TM047-323	VG7842GT+3003D
VTM-TM047-324	VG7842GT+3003E
VTM-TM047-394	VG7842GS+3801E
VTM-TM047-3P3	VG7842GT+3008DP
VTM-TM047-413	VG7842GS+3801D
VTM-TM047-414	VG7842GS+3801E
VTM-TM047-500	VG7842GT+8050G
VTM-TM047-510	VG7842GT+8051G
VTM-TM047-520	VG7842GT+7152G
VTM-TM047-700	VG7842GT+7150G
VTM-TM047-720	VG7842GT+7152G
VTM-TM047-730	VG7842GT+7153G
VTM-TN007 (Slotted Stem)	VG7241CT (Threaded Stem)
VTM-TN007-012	VG7241CT Plus VG7000-1001

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

Cross-Reference of VT Series Threaded (NPT) Valves to VG7000 Series Valves (Continued)

VT Series Threaded (NPT) Valve	VG7000 Series Equivalent
VTM-TN007-013	VG7241CT Plus VG7000-1002
VTM-TN007-014	VG7241CT Plus VG7000-1003
VTM-TN007-020	VG7241CT
VTM-TN007-092	VG7241CT Plus VG7000-1010
VTM-TN007-093	VG7241CT Plus VG7000-1011
VTM-TN007-094	VG7241CT Plus VG7000-1012
VTM-TN007-200	VG7241CS+8020G
VTM-TN007-220	VG7241CS+8122G
VTM-TN007-312	VG7241CT+3008B
VTM-TN007-313	VG7241CT+3008D
VTM-TN007-314	VG7241CT+3008E
VTM-TN007-322	VG7241CT+3003B
VTM-TN007-323	VG7241CT+3003D
VTM-TN007-324	VG7241CT+3003E
VTM-TN007-392	VG7241CS+3801B
VTM-TN007-393	VG7241CS+3801D
VTM-TN007-394	VG7241CS+3801E
VTM-TN007-3P2	VG7241CT+3008BP
VTM-TN007-412	VG7241CS+3801B
VTM-TN007-413	VG7241CS+3801D
VTM-TN007-414	VG7241CS+3801E
VTM-TN007-500	VG7241CT+8050G
VTM-TN007-510	VG7241CT+8051G
VTM-TN007-520	VG7241CT+7152G
VTM-TN007-700	VG7241CT+7150G
VTM-TN007-720	VG7241CT+7152G
VTM-TN007-730	VG7241CT+7153G
VTM-TN019 (Slotted Stem)	VG7241ET (Threaded Stem)
VTM-TN019-012	VG7241ET Plus VG7000-1001

VT Series Threaded (NPT) Valve	VG7000 Series Equivalent
VTM-TN019-013	VG7241ET Plus VG7000-1002
VTM-TN019-014	VG7241ET Plus VG7000-1003
VTM-TN019-020	VG7241ET
VTM-TN019-092	VG7241ET Plus VG7000-1010
VTM-TN019-093	VG7241ET Plus VG7000-1011
VTM-TN019-094	VG7241ET Plus VG7000-1012
VTM-TN019-200	VG7241ET+7150G
VTM-TN019-220	VG7241ET+7152G
VTM-TN019-312	VG7241ET+3008B
VTM-TN019-313	VG7241ET+3008D
VTM-TN019-314	VG7241ET+3008E
VTM-TN019-322	VG7241ET+3003B
VTM-TN019-323	VG7241ET+3003D
VTM-TN019-324	VG7241ET+3003E
VTM-TN019-392	VG7241ES+3801B
VTM-TN019-393	VG7241ES+3801D
VTM-TN019-394	VG7241ES+3801E
VTM-TN019-3P2	VG7241ET+3008BP
VTM-TN019-412	VG7241ES+3801B
VTM-TN019-413	VG7241ES+3801D
VTM-TN019-414	VG7241ES+3801E
VTM-TN019-500	VG7241ET+8050G
VTM-TN019-510	VG7241ET+8051G
VTM-TN019-520	VG7241ET+7152G
VTM-TN019-700	VG7241ET+7150G
VTM-TN019-720	VG7241ET+7152G
VTM-TN019-730	VG7241ET+7153G
VTM-TN047 (Slotted Stem)	VG7241GT (Threaded Stem)
VTM-TN047-012	VG7241GT Plus VG7000-1001

VT Series Threaded (NPT) Valve	VG7000 Series Equivalent
VTM-TN047-013	VG7241GT Plus VG7000-1002
VTM-TN047-014	VG7241GT Plus VG7000-1003
VTM-TN047-020	VG7241GT
VTM-TN047-092	VG7241GT Plus VG7000-1010
VTM-TN047-093	VG7241GT Plus VG7000-1011
VTM-TN047-094	VG7241GT Plus VG7000-1012
VTM-TN047-200	VG7241GS+8020G
VTM-TN047-220	VG7241GS+8122G
VTM-TN047-312	VG7241GT+3008B
VTM-TN047-313	VG7241GT+3008D
VTM-TN047-314	VG7241GT+3008E
VTM-TN047-322	VG7241GT+3003B
VTM-TN047-323	VG7241GT+3003D
VTM-TN047-324	VG7241GT+3003E
VTM-TN047-392	VG7241GS+3801B
VTM-TN047-393	VG7241GS+3801D
VTM-TN047-394	VG7241GS+3801E
VTM-TN047-3P2	VG7241GT+3008BP
VTM-TN047-412	VG7241GS+3801B
VTM-TN047-413	VG7241GS+3801D
VTM-TN047-414	VG7241GS+3801E
VTM-TN047-500	VG7241GT+8050G
VTM-TN047-510	VG7241GT+8051G
VTM-TN047-520	VG7241GT+7152G
VTM-TN047-700	VG7241GT+7150G
VTM-TN047-720	VG7241GT+7152G
VTM-TN047-730	VG7241GT+7153G

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LIT-1924525

Cross-Reference of VT Series Union End Valves to VG7000 Series Valves

VT Series Union End Valve	VG7000 Series Equivalent
VTM-AN007 (Slotted Stem)	VG7551CT (Threaded Stem)
VTM-AN007-012	VG7551CT Plus VG7000-1001
VTM-AN007-013	VG7551CT Plus VG7000-1002
VTM-AN007-014	VG7551CT Plus VG7000-1003
VTM-AN007-020	VG7551CT
VTM-AN007-092	VG7551CT Plus VG7000-1010
VTM-AN007-093	VG7551CT Plus VG7000-1011
VTM-AN007-094	VG7551CT Plus VG7000-1012
VTM-AN007-200	VG7551CS+8020G
VTM-AN007-220	VG7551CS+8122G
VTM-AN007-312	VG7551CT+3008B
VTM-AN007-313	VG7551CT+3008D
VTM-AN007-314	VG7551CT+3008E
VTM-AN007-322	VG7551CT+3003B
VTM-AN007-323	VG7551CT+3003D
VTM-AN007-324	VG7551CT+3003E
VTM-AN007-392	VG7551CS+3801B
VTM-AN007-393	VG7551CS+3801D
VTM-AN007-394	VG7551CS+3801E
VTM-AN007-3P2	VG7551CT+3008BP
VTM-AN007-412	VG7551CS+3801B
VTM-AN007-413	VG7551CS+3801D
VTM-AN007-414	VG7551CS+3801E
VTM-AN007-500	VG7551CT+8050G
VTM-AN007-510	VG7551CT+8051G
VTM-AN007-520	VG7551CT+7152G
VTM-AN007-700	VG7551CT+7150G
VTM-AN007-720	VG7551CT+7152G
VTM-AN007-730	VG7551CT+7153G
VTM-AN019 (Slotted Stem)	VG7551ET (Threaded Stem)
VTM-AN019-012	VG7551ET Plus VG7000-1001
VTM-AN019-013	VG7551ET Plus VG7000-1002
VTM-AN019-014	VG7551ET Plus VG7000-1003
VTM-AN019-020	VG7551ET
VTM-AN019-092	VG7551ET Plus VG7000-1010
VTM-AN019-093	VG7551ET Plus VG7000-1011
VTM-AN019-094	VG7551ET Plus VG7000-1012
VTM-AN019-200	VG7551ES+8020G
VTM-AN019-220	VG7551ES+8122G
VTM-AN019-312	VG7551ET+3008B
VTM-AN019-313	VG7551ET+3008D
VTM-AN019-314	VG7551ET+3008E
VTM-AN019-322	VG7551ET+3003B
VTM-AN019-323	VG7551ET+3003D
VTM-AN019-324	VG7551ET+3003E
VTM-AN019-392	VG7551ES+3801B
VTM-AN019-393	VG7551ES+3801D
VTM-AN019-394	VG7551ES+3801E
VTM-AN019-3P2	VG7551ET+3008BP
VTM-AN019-412	VG7551ES+3801B
VTM-AN019-413	VG7551ES+3801D
VTM-AN019-414	VG7551ES+3801E
VTM-AN019-500	VG7551ET+8050G
VTM-AN019-510	VG7551ET+8051G
VTM-AN019-520	VG7551ET+7152G
VTM-AN019-700	VG7551ET+7150G
VTM-AN019-720	VG7551ET+7152G
VTM-AN019-730	VG7551ET+7153G
VTM-AN047 (Slotted Stem)	VG7551GT (Threaded Stem)
VTM-AN047-012	VG7551GT Plus VG7000-1001
VTM-AN047-013	VG7551GT Plus VG7000-1002
VTM-AN047-014	VG7551GT Plus VG7000-1003
VTM-AN047-020	VG7551GT
VTM-AN047-092	VG7551GT Plus VG7000-1010
VTM-AN047-093	VG7551GT Plus VG7000-1011
VTM-AN047-094	VG7551GT Plus VG7000-1012
VTM-AN047-200	VG7551GS+8020G
VTM-AN047-220	VG7551GS+8122G
VTM-AN047-312	VG7551GT+3008B
VTM-AN047-313	VG7551GT+3008D
VTM-AN047-314	VG7551GT+3008E
VTM-AN047-322	VG7551GT+3003B
VTM-AN047-323	VG7551GT+3003D
VTM-AN047-324	VG7551GT+3003E
VTM-AN047-392	VG7551GS+3801B
VTM-AN047-393	VG7551GS+3801D
VTM-AN047-394	VG7551GS+3801E
VTM-AN047-3P2	VG7551GT+3008BP
VTM-AN047-412	VG7551GS+3801B
VTM-AN047-413	VG7551GS+3801D
VTM-AN047-414	VG7551GS+3801E
VTM-AN047-500	VG7551GT+8050G
VTM-AN047-510	VG7551GT+8051G
VTM-AN047-520	VG7551GT+7152G
VTM-AN047-700	VG7551GT+7150G
VTM-AN047-720	VG7551GT+7152G
VTM-AN047-730	VG7551GT+7153G
VTM-GC007 (Slotted Stem)	VG7451CT (Threaded Stem)
VTM-GC007-012	VG7451CT Plus VG7000-1001
VTM-GC007-013	VG7451CT Plus VG7000-1002
VTM-GC007-014	VG7451CT Plus VG7000-1003
VTM-GC007-020	VG7451CT
VTM-GC007-094	VG7451CT Plus VG7000-1012
VTM-GC007-312	VG7451CT+3008B
VTM-GC007-313	VG7451CT+3008D
VTM-GC007-314	VG7451CT+3008E
VTM-GC007-322	VG7451CT+3003B
VTM-GC007-323	VG7451CT+3003D
VTM-GC007-324	VG7451CT+3003E
VTM-GC007-394	VG7451CS+3801E
VTM-GC007-3P4	VG7451CT+3008EP
VTM-GC007-413	VG7451CS+3801D
VTM-GC007-414	VG7451CS+3801E
VTM-GC007-520	VG7451CT+7152G
VTM-GC019 (Slotted Stem)	VG7451ET (Threaded Stem)
VTM-GC019-012	VG7451ET Plus VG7000-1001
VTM-GC019-013	VG7451ET Plus VG7000-1002
VTM-GC019-014	VG7451ET Plus VG7000-1003
VTM-GC019-020	VG7451ET
VTM-GC019-094	VG7451ET Plus VG7000-1012
VTM-GC019-312	VG7451ET+3008B
VTM-GC019-313	VG7451ET+3008D
VTM-GC019-314	VG7451ET+3008E
VTM-GC019-322	VG7451ET+3003B
VTM-GC019-323	VG7451ET+3003D
VTM-GC019-324	VG7451ET+3003E
VTM-GC019-394	VG7451ES+3801E
VTM-GC019-3P4	VG7451ET+3008EP
VTM-GC019-413	VG7451ES+3801D
VTM-GC019-414	VG7451ES+3801E
VTM-GC019-520	VG7451ET+7152G
VTM-GC047 (Slotted Stem)	VG7451GT (Threaded Stem)
VTM-GC047-012	VG7451GT Plus VG7000-1001
VTM-GC047-013	VG7451GT Plus VG7000-1002
VTM-GC047-014	VG7451GT Plus VG7000-1003
VTM-GC047-020	VG7451GT

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 9/07 Johnson Controls, Inc.

Cross-Reference of VT Series Union End Valves to VG7000 Series Valves (Continued)

VT Series Union End Valve	VG7000 Series Equivalent
VTM-GC047-094	VG7451GT Plus VG7000-1012
VTM-GC047-312	VG7451GT+3008B
VTM-GC047-313	VG7451GT+3008D
VTM-GC047-314	VG7451GT+3008E
VTM-GC047-322	VG7451GT+3003B
VTM-GC047-323	VG7451GT+3003D
VTM-GC047-324	VG7451GT+3003E
VTM-GC047-394	VG7451GS+3801E
VTM-GC047-3P4	VG7451GT+3008EP
VTM-GC047-413	VG7451GS+3801D
VTM-GC047-414	VG7451GS+3801E
VTM-GC047-520	VG7451GT+7152G
VTM-GN007 (Slotted Stem)	VG7251CT (Threaded Stem)
VTM-GN007-012	VG7251CT Plus VG7000-1001
VTM-GN007-013	VG7251CT Plus VG7000-1002
VTM-GN007-014	VG7251CT Plus VG7000-1003
VTM-GN007-020	VG7251CT
VTM-GN007-092	VG7251CT Plus VG7000-1010
VTM-GN007-093	VG7251CT Plus VG7000-1011
VTM-GN007-094	VG7251CT Plus VG7000-1012
VTM-GN007-200	VG7251CS+8020G
VTM-GN007-220	VG7251CS+8122G
VTM-GN007-312	VG7251CT+3008B
VTM-GN007-313	VG7251CT+3008D
VTM-GN007-314	VG7251CT+3008E
VTM-GN007-322	VG7251CT+3003B
VTM-GN007-323	VG7251CT+3003D
VTM-GN007-324	VG7251CT+3003E
VTM-GN007-392	VG7251CS+3801B
VTM-GN007-393	VG7251CS+3801D
VTM-GN007-394	VG7251CS+3801E
VTM-GN007-3P2	VG7251CT+3008BP
VTM-GN007-412	VG7251CS+3801B
VTM-GN007-413	VG7251CS+3801D
VTM-GN007-414	VG7251CS+3801E
VTM-GN007-500	VG7251CT+8050G
VTM-GN007-510	VG7251CT+8051G
VTM-GN007-520	VG7251CT+7152G
VTM-GN007-700	VG7251CT+7150G
VTM-GN007-720	VG7251CT+7152G
VTM-GN007-730	VG7251CT+7153G
VTM-GN019 (Slotted Stem)	VG7251ET (Threaded Stem)
VTM-GN019-012	VG7251ET Plus VG7000-1001
VTM-GN019-013	VG7251ET Plus VG7000-1002
VTM-GN019-014	VG7251ET Plus VG7000-1003

VT Series Union End Valve	VG7000 Series Equivalent
VTM-GN019-020	VG7251ET
VTM-GN019-092	VG7251ET Plus VG7000-1010
VTM-GN019-093	VG7251ET Plus VG7000-1011
VTM-GN019-094	VG7251ET Plus VG7000-1012
VTM-GN019-200	VG7251ES+8020G
VTM-GN019-220	VG7251ES+8122G
VTM-GN019-312	VG7251ET+3008B
VTM-GN019-313	VG7251ET+3008D
VTM-GN019-314	VG7251ET+3008E
VTM-GN019-322	VG7251ET+3003B
VTM-GN019-323	VG7251ET+3003D
VTM-GN019-324	VG7251ET+3003E
VTM-GN019-392	VG7251ES+3801B
VTM-GN019-393	VG7251ES+3801D
VTM-GN019-394	VG7251ES+3801E
VTM-GN019-3P2	VG7251ET+3008BP
VTM-GN019-412	VG7251ES+3801B
VTM-GN019-413	VG7251ES+3801D
VTM-GN019-414	VG7251ES+3801E
VTM-GN019-500	VG7251ET+8050G
VTM-GN019-510	VG7251ET+8051G
VTM-GN019-520	VG7251ET+7152G
VTM-GN019-700	VG7251ET+7150G
VTM-GN019-720	VG7251ET+7152G
VTM-GN019-730	VG7251ET+7153G
VTM-GN047 (Slotted Stem)	VG7251GT (Threaded Stem)
VTM-GN047-012	VG7251GT Plus VG7000-1001
VTM-GN047-013	VG7251GT Plus VG7000-1002
VTM-GN047-014	VG7251GT Plus VG7000-1003
VTM-GN047-020	VG7251GT
VTM-GN047-092	VG7251GT Plus VG7000-1010
VTM-GN047-093	VG7251GT Plus VG7000-1011
VTM-GN047-094	VG7251GT Plus VG7000-1012
VTM-GN047-200	VG7251GS+8020G
VTM-GN047-220	VG7251GS+8122G
VTM-GN047-312	VG7251GT+3008B
VTM-GN047-313	VG7251GT+3008D
VTM-GN047-314	VG7251GT+3008E
VTM-GN047-322	VG7251GT+3003B
VTM-GN047-323	VG7251GT+3003D
VTM-GN047-324	VG7251GT+3003E
VTM-GN047-392	VG7251GS+3801B
VTM-GN047-393	VG7251GS+3801D
VTM-GN047-394	VG7251GS+3801E
VTM-GN047-3P2	VG7251GT+3008BP
VTM-GN047-412	VG7251GS+3801B
VTM-GN047-413	VG7251GS+3801D

VT Series Union End Valve	VG7000 Series Equivalent
VTM-GN047-414	VG7251GS+3801E
VTM-GN047-500	VG7251GT+8050G
VTM-GN047-510	VG7251GT+8051G
VTM-GN047-520	VG7251GT+7152G
VTM-GN047-700	VG7251GT+7150G
VTM-GN047-720	VG7251GT+7152G
VTM-GN047-730	VG7251GT+7153G
VTM-UC007 (Slotted Stem)	VG7481CT (Threaded Stem)
VTM-UC007-012	VG7481CT Plus VG7000-1001
VTM-UC007-013	VG7481CT Plus VG7000-1002
VTM-UC007-014	VG7481CT Plus VG7000-1003
VTM-UC007-020	VG7481CT
VTM-UC007-094	VG7481CT Plus VG7000-1012
VTM-UC007-312	VG7481CT+3008B
VTM-UC007-313	VG7481CT+3008D
VTM-UC007-314	VG7481CT+3008E
VTM-UC007-322	VG7481CT+3003B
VTM-UC007-323	VG7481CT+3003D
VTM-UC007-324	VG7481CT+3003E
VTM-UC007-394	VG7481CS+3801E
VTM-UC007-3P4	VG7481CT+3008EP
VTM-UC007-413	VG7481CS+3801D
VTM-UC007-414	VG7481CS+3801E
VTM-UC007-520	VG7481CT+7152G
VTM-UC019 (Slotted Stem)	VG7481ET (Threaded Stem)
VTM-UC019-012	VG7481ET Plus VG7000-1001
VTM-UC019-013	VG7481ET Plus VG7000-1002
VTM-UC019-014	VG7481ET Plus VG7000-1003
VTM-UC019-020	VG7481ET
VTM-UC019-094	VG7481ET Plus VG7000-1012
VTM-UC019-312	VG7481ET+3008B
VTM-UC019-313	VG7481ET+3008D
VTM-UC019-314	VG7481ET+3008E
VTM-UC019-322	VG7481ET+3003B
VTM-UC019-323	VG7481ET+3003D
VTM-UC019-324	VG7481ET+3003E
VTM-UC019-394	VG7481ES+3801E
VTM-UC019-3P4	VG7481ET+3008EP
VTM-UC019-413	VG7481ES+3801D
VTM-UC019-414	VG7481ES+3801E
VTM-UC019-520	VG7481ET Plus VA-7152-1001
VTM-UC047 (Slotted Stem)	VG7481GT (Threaded Stem)
VTM-UC047-012	VG7481GT Plus VG7000-1001

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Cross-Reference of VT Series Union End Valves to VG7000 Series Valves (Continued)

VT Series Union End Valve	VG7000 Series Equivalent
VTM-UC047-013	VG7481GT Plus VG7000-1002
VTM-UC047-014	VG7481GT Plus VG7000-1003
VTM-UC047-020	VG7481GT
VTM-UC047-094	VG7481GT Plus VG7000-1012
VTM-UC047-312	VG7481GT+3008B
VTM-UC047-313	VG7481GT+3008D
VTM-UC047-314	VG7481GT+3008E
VTM-UC047-322	VG7481GT+3003B
VTM-UC047-323	VG7481GT+3003D
VTM-UC047-324	VG7481GT+3003E
VTM-UC047-394	VG7481GS+3801E
VTM-UC047-3P4	VG7481GT+3008EP
VTM-UC047-413	VG7481GS+3801D
VTM-UC047-414	VG7481GS+3801E
VTM-UC047-520	VG7481GT+7152G
VTM-UM007 (Slotted Stem)	VG7882CT (Threaded Stem)
VTM-UM007-012	VG7882CT Plus VG7000-1001
VTM-UM007-013	VG7882CT Plus VG7000-1002
VTM-UM007-014	VG7882CT Plus VG7000-1003
VTM-UM007-020	VG7882CT
VTM-UM007-094	VG7882CT Plus VG7000-1012
VTM-UM007-200	VG7882CS+8020G
VTM-UM007-220	VG7882CS+8122G
VTM-UM007-312	VG7882CT+3008B
VTM-UM007-313	VG7882CT+3008D
VTM-UM007-314	VG7882CT+3008E
VTM-UM007-322	VG7882CT+3003B
VTM-UM007-323	VG7882CT+3003D
VTM-UM007-324	VG7882CT+3003E
VTM-UM007-394	VG7882CS+3801E
VTM-UM007-3P3	VG7882CT+3008DP
VTM-UM007-413	VG7882CS+3801D
VTM-UM007-414	VG7882CS+3801E
VTM-UM007-500	VG7882CT+8050G
VTM-UM007-510	VG7882CT+8051G
VTM-UM007-520	VG7882CT+7152G
VTM-UM007-700	VG7882CT+7150G
VTM-UM007-720	VG7882CT+7152G
VTM-UM007-730	VG7882CT+7153G
VTM-UM019 (Slotted Stem)	VG7882ET (Threaded Stem)
VTM-UM019-012	VG7882ET Plus VG7000-1001
VTM-UM019-013	VG7882ET Plus VG7000-1002
VTM-UM019-014	VG7882ET Plus VG7000-1003
VTM-UM019-020	VG7882ET
VTM-UM019-094	VG7882ET Plus VG7000-1012
VTM-UM019-200	VG7882ES+8020G
VTM-UM019-220	VG7882ES+8122G
VTM-UM019-312	VG7882ET+3008B
VTM-UM019-313	VG7882ET+3008D
VTM-UM019-314	VG7882ET+3008E
VTM-UM019-322	VG7882ET+3003B
VTM-UM019-323	VG7882ET+3003D
VTM-UM019-324	VG7882ET+3003E
VTM-UM019-394	VG7882ES+3801E
VTM-UM019-3P3	VG7882ET+3008DP
VTM-UM019-413	VG7882ES+3801D
VTM-UM019-414	VG7882ES+3801E
VTM-UM019-500	VG7882ET+8050G
VTM-UM019-510	VG7882ET+8051G
VTM-UM019-520	VG7882ET+7152G
VTM-UM019-700	VG7882ET+7150G
VTM-UM019-720	VG7882ET+7152G
VTM-UM019-730	VG7882ET+7153G
VTM-UM047 (Slotted Stem)	VG7882GT (Threaded Stem)
VTM-UM047-012	VG7882GT Plus VG7000-1001
VTM-UM047-013	VG7882GT Plus VG7000-1002
VTM-UM047-014	VG7882GT Plus VG7000-1003
VTM-UM047-020	VG7882GT
VTM-UM047-094	VG7882GT Plus VG7000-1012
VTM-UM047-200	VG7882GS+8120G
VTM-UM047-220	VG7882GS+8122G
VTM-UM047-312	VG7882GT+3008B
VTM-UM047-313	VG7882GT+3008D
VTM-UM047-314	VG7882GT+3008E
VTM-UM047-322	VG7882GT+3003B
VTM-UM047-323	VG7882GT+3003D
VTM-UM047-324	VG7882GT+3003E
VTM-UM047-394	VG7882GS+3801E
VTM-UM047-3P3	VG7882GT+3008DP
VTM-UM047-413	VG7882GS+3801D
VTM-UM047-414	VG7882GS+3801E
VTM-UM047-500	VG7882GT+8050G
VTM-UM047-510	VG7882GT+8051G
VTM-UM047-520	VG7882GT+7152G
VTM-UM047-700	VG7882GT+7150G
VTM-UM047-720	VG7882GT+7152G
VTM-UM047-730	VG7882GT+7153G
VTM-UN007 (Slotted Stem)	VG7281CT (Threaded Stem)
VTM-UN007-012	VG7281CT Plus VG7000-1001
VTM-UN007-013	VG7281CT Plus VG7000-1002
VTM-UN007-014	VG7281CT Plus VG7000-1003
VTM-UN007-020	VG7281CT
VTM-UN007-092	VG7281CT Plus VG7000-1010
VTM-UN007-093	VG7281CT Plus VG7000-1011
VTM-UN007-094	VG7281CT Plus VG7000-1012
VTM-UN007-200	VG7281CS+8020G
VTM-UN007-220	VG7281CS+8122G
VTM-UN007-312	VG7281CT+3008B
VTM-UN007-313	VG7281CT+3008D
VTM-UN007-314	VG7281CT+3008E
VTM-UN007-322	VG7281CT+3003B
VTM-UN007-323	VG7281CT+3003D
VTM-UN007-324	VG7281CT+3003E
VTM-UN007-392	VG7281CS+3801B
VTM-UN007-393	VG7281CS+3801D
VTM-UN007-394	VG7281CS+3801E
VTM-UN007-3P2	VG7281CT+3008BP
VTM-UN007-412	VG7281CS+3801B
VTM-UN007-413	VG7281CS+3801D
VTM-UN007-414	VG7281CS+3801E
VTM-UN007-500	VG7281CT+8050G
VTM-UN007-510	VG7281CT+8051G
VTM-UN007-520	VG7281CT+7152G
VTM-UN007-700	VG7281CT+7150G
VTM-UN007-720	VG7281CT+7152G
VTM-UN007-730	VG7281CT+7153G
VTM-UN019 (Slotted Stem)	VG7281ET (Threaded Stem)
VTM-UN019-012	VG7281ET Plus VG7000-1001
VTM-UN019-013	VG7281ET Plus VG7000-1002
VTM-UN019-014	VG7281ET Plus VG7000-1003
VTM-UN019-020	VG7281ET
VTM-UN019-092	VG7281ET Plus VG7000-1010
VTM-UN019-093	VG7281ET Plus VG7000-1011
VTM-UN019-094	VG7281ET Plus VG7000-1012
VTM-UN019-200	VG7281ES+8020G
VTM-UN019-220	VG7281ES+8122G
VTM-UN019-312	VG7281ET+3008B
VTM-UN019-313	VG7281ET+3008D
VTM-UN019-314	VG7281ET+3008E
VTM-UN019-322	VG7281ET+3003B
VTM-UN019-323	VG7281ET+3003D
VTM-UN019-324	VG7281ET+3003E
VTM-UN019-392	VG7281ES+3801B
VTM-UN019-393	VG7281ES+3801D
VTM-UN019-394	VG7281ES+3801E
VTM-UN019-3P2	VG7281ET+3008BP
VTM-UN019-412	VG7281ES+3801B

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Cross-Reference of VT Series Union End Valves to VG7000 Series Valves (Continued)

VT Series Union End Valve	VG7000 Series Equivalent
VTM-UN019-413	VG7281ES+3801D
VTM-UN019-414	VG7281ES+3801E
VTM-UN019-500	VG7281ET+8050G
VTM-UN019-510	VG7281ET+8051G
VTM-UN019-520	VG7281ET+7152G
VTM-UN019-700	VG7281ET+7150G
VTM-UN019-720	VG7281ET+7152G
VTM-UN019-730	VG7281ET+7153G
VTM-UN047 (Slotted Stem)	VG7281GT (Threaded Stem)
VTM-UN047-012	VG7281GT Plus VG7000-1001
VTM-UN047-013	VG7281GT Plus VG7000-1002
VTM-UN047-014	VG7281GT Plus VG7000-1003
VTM-UN047-020	VG7281GT
VTM-UN047-092	VG7281GT Plus VG7000-1010
VTM-UN047-093	VG7281GT Plus VG7000-1011
VTM-UN047-094	VG7281GT Plus VG7000-1012
VTM-UN047-200	VG7281GS+8020G
VTM-UN047-220	VG7281GS+8122G
VTM-UN047-312	VG7281GT+3008B
VTM-UN047-313	VG7281GT+3008D
VTM-UN047-314	VG7281GT+3008E
VTM-UN047-322	VG7281GT+3003B
VTM-UN047-323	VG7281GT+3003D
VTM-UN047-324	VG7281GT+3003E
VTM-UN047-392	VG7281GS+3801B
VTM-UN047-393	VG7281GS+3801D
VTM-UN047-394	VG7281GS+3801E
VTM-UN047-3P2	VG7281GT+3008BP
VTM-UN047-412	VG7281GS+3801B
VTM-UN047-413	VG7281GS+3801D
VTM-UN047-414	VG7281GS+3801E
VTM-UN047-500	VG7281GT+8050G
VTM-UN047-510	VG7281GT+8051G
VTM-UN047-520	VG7281GT+7152G
VTM-UN047-700	VG7281GT+7150G
VTM-UN047-720	VG7281GT+7152G
VTM-UN047-730	VG7281GT+7153G
VTM-XC007 (Slotted Stem)	VG7491CT (Threaded Stem)
VTM-XC007-012	VG7491CT Plus VG7000-1001
VTM-XC007-013	VG7491CT Plus VG7000-1002
VTM-XC007-014	VG7491CT Plus VG7000-1003
VTM-XC007-020	VG7491CT
VTM-XC007-094	VG7491CT Plus VG7000-1012
VTM-XC007-312	VG7491CT+3008B
VTM-XC007-313	VG7491CT+3008D
VTM-XC007-314	VG7491CT+3008E
VTM-XC007-322	VG7491CT+3003B
VTM-XC007-323	VG7491CT+3003D
VTM-XC007-324	VG7491CT+3003E
VTM-XC007-394	VG7491CS+3801E
VTM-XC007-3P4	VG7491CT+3008EP
VTM-XC007-413	VG7491CS+3801D
VTM-XC007-414	VG7491CS+3801E
VTM-XC007-520	VG7491CT Plus VA-7152-1001
VTM-XC019 (Slotted Stem)	VG7491ET (Threaded Stem)
VTM-XC019-012	VG7491ET Plus VG7000-1001
VTM-XC019-013	VG7491ET Plus VG7000-1002
VTM-XC019-014	VG7491ET Plus VG7000-1003
VTM-XC019-020	VG7491ET
VTM-XC019-094	VG7491ET Plus VG7000-1012
VTM-XC019-312	VG7491ET+3008B
VTM-XC019-313	VG7491ET+3008D
VTM-XC019-314	VG7491ET+3008E
VTM-XC019-322	VG7491ET+3003B
VTM-XC019-323	VG7491ET+3003D
VTM-XC019-324	VG7491ET+3003E
VTM-XC019-394	VG7491ES+3801E
VTM-XC019-3P4	VG7491ET+3008EP
VTM-XC019-413	VG7491ES+3801D
VTM-XC019-414	VG7491ES+3801E
VTM-XC019-520	VG7491ET Plus VA-7152-1001
VTM-XC047 (Slotted Stem)	VG7491GT (Threaded Stem)
VTM-XC047-012	VG7491GT Plus VG7000-1001
VTM-XC047-013	VG7491GT Plus VG7000-1002
VTM-XC047-014	VG7491GT Plus VG7000-1003
VTM-XC047-020	VG7491GT
VTM-XC047-094	VG7491GT Plus VG7000-1012
VTM-XC047-312	VG7491GT+3008B
VTM-XC047-313	VG7491GT+3008D
VTM-XC047-314	VG7491GT+3008E
VTM-XC047-322	VG7491GT+3003B
VTM-XC047-323	VG7491GT+3003D
VTM-XC047-324	VG7491GT+3003E
VTM-XC047-394	VG7491GS+3801E
VTM-XC047-3P4	VG7491GT+3008EP
VTM-XC047-413	VG7491GS+3801D
VTM-XC047-414	VG7491GS+3801E
VTM-XC047-520	VG7491GT Plus VA-7152-1001
VTM-XM007 (Slotted Stem)	VG7892CT (Threaded Stem)
VTM-XM007-012	VG7892CT Plus VG7000-1001
VTM-XM007-013	VG7892CT Plus VG7000-1002
VTM-XM007-014	VG7892CT Plus VG7000-1003
VTM-XM007-020	VG7892CT
VTM-XM007-094	VG7892CT Plus VG7000-1012
VTM-XM007-200	VG7892CS+8020G
VTM-XM007-220	VG7892CS+8122G
VTM-XM007-312	VG7892CT+3008B
VTM-XM007-313	VG7892CT+3008D
VTM-XM007-314	VG7892CT+3008E
VTM-XM007-322	VG7892CT+3003B
VTM-XM007-323	VG7892CT+3003D
VTM-XM007-324	VG7892CT+3003E
VTM-XM007-394	VG7892CS+3801E
VTM-XM007-3P3	VG7892CT+3008DP
VTM-XM007-413	VG7892CS+3801D
VTM-XM007-414	VG7892CS+3801E
VTM-XM007-500	VG7892CT+8050G
VTM-XM007-510	VG7892CT+8051G
VTM-XM007-520	VG7892CT+7152G
VTM-XM007-700	VG7892CT+7150G
VTM-XM007-720	VG7892CT+7152G
VTM-XM007-730	VG7892CT+7153G
VTM-XM019 (Slotted Stem)	VG7892ET (Threaded Stem)
VTM-XM019-012	VG7892ET Plus VG7000-1001
VTM-XM019-013	VG7892ET Plus VG7000-1002
VTM-XM019-014	VG7892ET Plus VG7000-1003
VTM-XM019-020	VG7892ET
VTM-XM019-094	VG7892ET Plus VG7000-1012
VTM-XM019-200	VG7892ES+8020G
VTM-XM019-220	VG7892ES+8122G
VTM-XM019-312	VG7892ET+3008B
VTM-XM019-313	VG7892ET+3008D
VTM-XM019-314	VG7892ET+3008E
VTM-XM019-322	VG7892ET+3003B
VTM-XM019-323	VG7892ET+3003D
VTM-XM019-324	VG7892ET+3003E
VTM-XM019-394	VG7892ES+3801E
VTM-XM019-3P3	VG7892ET+3008DP
VTM-XM019-413	VG7892ES+3801D
VTM-XM019-414	VG7892ES+3801E
VTM-XM019-500	VG7892ET+8050G
VTM-XM019-510	VG7892ET+8051G
VTM-XM019-520	VG7892ET+7152G
VTM-XM019-700	VG7892ET+7150G
VTM-XM019-720	VG7892ET+7152G

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Cross-Reference of VT Series Union End Valves to VG7000 Series Valves (Continued)

VT Series Union End Valve	VG7000 Series Equivalent
VTM-XM019-730	VG7892ET+7153G
VTM-XM047 (Slotted Stem)	VG7892GT (Threaded Stem)
VTM-XM047-012	VG7892GT Plus VG7000-1001
VTM-XM047-013	VG7892GT Plus VG7000-1002
VTM-XM047-014	VG7892GT Plus VG7000-1003
VTM-XM047-020	VG7892GT
VTM-XM047-094	VG7892GT Plus VG7000-1012
VTM-XM047-200	VG7892GS+8020G
VTM-XM047-220	VG7892GS+8122G
VTM-XM047-312	VG7892GT+3008B
VTM-XM047-313	VG7892GT+3008D
VTM-XM047-314	VG7892GT+3008E
VTM-XM047-322	VG7892GT+3003B
VTM-XM047-323	VG7892GT+3003D
VTM-XM047-324	VG7892GT+3003E
VTM-XM047-394	VG7892GS+3801E
VTM-XM047-3P3	VG7892GT+3008DP
VTM-XM047-413	VG7892GS+3801D
VTM-XM047-414	VG7892GS+3801E
VTM-XM047-500	VG7892GT+8050G
VTM-XM047-510	VG7892GT+8051G
VTM-XM047-520	VG7892GT+7152G
VTM-XM047-700	VG7892GT+7150G
VTM-XM047-720	VG7892GT+7152G
VTM-XM047-730	VG7892GT+7153G
VTM-XN007 (Slotted Stem)	VG7291CT (Threaded Stem)
VTM-XN007-012	VG7291CT Plus VG7000-1001
VTM-XN007-013	VG7291CT Plus VG7000-1002
VTM-XN007-014	VG7291CT Plus VG7000-1003
VTM-XN007-020	VG7291CT
VTM-XN007-092	VG7291CT Plus VG7000-1010
VTM-XN007-093	VG7291CT Plus VG7000-1011
VTM-XN007-094	VG7291CT Plus VG7000-1012
VTM-XN007-200	VG7291CS+8020G
VTM-XN007-220	VG7291CS+8122G

VT Series Union End Valve	VG7000 Series Equivalent
VTM-XN007-312	VG7291CT+3008B
VTM-XN007-313	VG7291CT+3008D
VTM-XN007-314	VG7291CT+3008E
VTM-XN007-322	VG7291CT+3003B
VTM-XN007-323	VG7291CT+3003D
VTM-XN007-324	VG7291CT+3003E
VTM-XN007-392	VG7291CS+3801B
VTM-XN007-393	VG7291CS+3801D
VTM-XN007-394	VG7291CS+3801E
VTM-XN007-3P2	VG7291CT+3008BP
VTM-XN007-412	VG7291CS+3801B
VTM-XN007-413	VG7291CS+3801D
VTM-XN007-414	VG7291CS+3801E
VTM-XN007-500	VG7291CT+8050G
VTM-XN007-510	VG7291CT+8051G
VTM-XN007-520	VG7291CT+7152G
VTM-XN007-700	VG7291CT+7150G
VTM-XN007-720	VG7291CT+7152G
VTM-XN007-730	VG7291CT+7153G
VTM-XN019 (Slotted Stem)	VG7291ET (Threaded Stem)
VTM-XN019-012	VG7291ET Plus VG7000-1001
VTM-XN019-013	VG7291ET Plus VG7000-1002
VTM-XN019-014	VG7291ET Plus VG7000-1003
VTM-XN019-020	VG7291ET
VTM-XN019-092	VG7291ET Plus VG7000-1010
VTM-XN019-093	VG7291ET Plus VG7000-1011
VTM-XN019-094	VG7291ET Plus VG7000-1012
VTM-XN019-200	VG7291ES+8020G
VTM-XN019-220	VG7291ES+8122G
VTM-XN019-312	VG7291ET+3008B
VTM-XN019-313	VG7291ET+3008D
VTM-XN019-314	VG7291ET+3008E
VTM-XN019-322	VG7291ET+3003B
VTM-XN019-323	VG7291ET+3003D
VTM-XN019-324	VG7291ET+3003E
VTM-XN019-392	VG7291ES+3801B
VTM-XN019-393	VG7291ES+3801D
VTM-XN019-394	VG7291ES+3801E
VTM-XN019-3P2	VG7291ET+3008BP

VT Series Union End Valve	VG7000 Series Equivalent
VTM-XN019-412	VG7291ES+3801B
VTM-XN019-413	VG7291ES+3801D
VTM-XN019-414	VG7291ES+3801E
VTM-XN019-500	VG7291ET+8050G
VTM-XN019-510	VG7291ET+8051G
VTM-XN019-520	VG7291ET+7152G
VTM-XN019-700	VG7291ET+7150G
VTM-XN019-720	VG7291ET+7152G
VTM-XN019-730	VG7291ET+7153G
VTM-XN047 (Slotted Stem)	VG7291GT (Threaded Stem)
VTM-XN047-012	VG7291GT Plus VG7000-1001
VTM-XN047-013	VG7291GT Plus VG7000-1002
VTM-XN047-014	VG7291GT Plus VG7000-1003
VTM-XN047-020	VG7291GT
VTM-XN047-092	VG7291GT Plus VG7000-1010
VTM-XN047-093	VG7291GT Plus VG7000-1011
VTM-XN047-094	VG7291GT Plus VG7000-1012
VTM-XN047-200	VG7291GS+8020G
VTM-XN047-220	VG7291GS+8122G
VTM-XN047-312	VG7291GT+3008B
VTM-XN047-313	VG7291GT+3008D
VTM-XN047-314	VG7291GT+3008E
VTM-XN047-322	VG7291GT+3003B
VTM-XN047-323	VG7291GT+3003D
VTM-XN047-324	VG7291GT+3003E
VTM-XN047-392	VG7291GS+3801B
VTM-XN047-393	VG7291GS+3801D
VTM-XN047-394	VG7291GS+3801E
VTM-XN047-3P2	VG7291GT+3008BP
VTM-XN047-412	VG7291GS+3801B
VTM-XN047-413	VG7291GS+3801D
VTM-XN047-414	VG7291GS+3801E
VTM-XN047-500	VG7291GT+8050G
VTM-XN047-510	VG7291GT+8051G
VTM-XN047-520	VG7291GT+7152G
VTM-XN047-700	VG7291GT+7150G
VTM-XN047-720	VG7291GT+7152G
VTM-XN047-730	VG7291GT+7153G

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Cross-Reference of Cage Trim Valves to VG7000 Series Valves

Cage Trim Valve	VG7000 Series Equivalent
AV-8050-1004	VG7241LT+8050G
AV-8050-1005	VG7241NT+7150G
AV-8050-1006	VG7241RT+7150G
AV-8050-1013	VG7842LT+8050G
AV-8050-1014	VG7842NT+7150G
AV-8050-1015	VG7842RT+7150G
AV-8051-1004	VG7241LT+8051G
AV-8051-1005	VG7241NT+7153G
AV-8051-1006	VG7241RT+7153G
AV-8051-1013	VG7842LT+8051G
AV-8051-1014	VG7842NT+7153G
AV-8051-1015	VG7842RT+7153G
AV-8052-1013	VG7842LT+7152G
AV-8052-1014	VG7842NT+7152G
AV-8052-1015	VG7842RT+7152G
AV-8052-1021	VG7241LT+7152G
AV-8052-1022	VG7241NT+7152G
AV-8052-1023	VG7241RT+7152G
V-3754-1008	VG7241LT+3008E
V-3754-1010	VG7241NT+3008E
V-3754-1022	VG7241LT+3008B
V-3754-1023	VG7241NT+3008B
V-3754-1026	VG7241LT+3008BP
V-3754-1027	VG7241NT+3008BP
V-3754-1028	VG7241RT+3008B
V-3754-1029	VG7241RT+3008E
V-3754-1030	VG7241RT+3008BP
VB-3754-4	VG7241LT
VB-3754-5	VG7241NT
VB-3754-6	VG7241RT
VB-3754-7	VG7241ST
VB-3754-8	VG7241PT
V-3974-1004	VG7441LT+3008E
V-3974-1005	VG7441NT+3008E
V-3974-1010	VG7441LT+3008EP
V-3974-1011	VG7441NT+3008EP
V-3974-1012	VG7441RT+3008E
V-3974-1013	VG7441RT+3008EP
VB-3974-4	VG7441LT
VB-3974-5	VG7441NT
VB-3974-6	VG7441RT
VB-3974-7	VG7441ST
V-4324-1005	VG7842LT+3008D

Cage Trim Valve	VG7000 Series Equivalent
V-4324-1006	VG7842LT+3008E
V-4324-1007	VG7842NT+3008D
V-4324-1008	VG7842NT+3008E
V-4324-1013	VG7842LT+3008EP
V-4324-1014	VG7842NT+3008EP
V-4324-1015	VG7842RT+3008D
V-4324-1016	VG7842RT+3008E
V-4324-1017	VG7842RT+3008EP
VB-4324-4	VG7842LT
VB-4324-5	VG7842NT
VB-4324-6	VG7842RT
VB-4324-7	VG7842ST
VB-4324-8	VG7842PT
V-5254-1	VG7241RT+823C00
V-5254-11	VG7241RT+823C00 Plus EP-1000-8 Plus MP8000-6003
V-5254-12	VG7241ST+823C00 Plus EP-1000-8 Plus MP8000-6003
V-5254-2	VG7241RT+823C01
V-5254-3	VG7241RT+823E00
V-5254-4	VG7241ST+823C00
V-5254-5	VG7241ST+823C01
V-5254-6	VG7241ST+823E00
V-5464-1	VG7441RT+823E00
V-5464-11	VG7441RT+823E00 Plus EP-1000-8 Plus MP8000-6003
V-5464-12	VG7441ST+823E00 Plus EP-1000-8 Plus MP8000-6003
V-5464-2	VG7441RT+823E01
V-5464-3	VG7441ST+823E00
V-5464-4	VG7441ST+823E01
V-5844-1	VG7842RT+823D00
V-5844-11	VG7842RT+823E00 Plus EP-1000-8 Plus MP8000-6003
V-5844-12	VG7842ST+823E00 Plus EP-1000-8 Plus MP8000-6003
V-5844-2	VG7842RT+823E00
V-5844-3	VG7842RT+823E01
V-5844-4	VG7842ST+823D00
V-5844-5	VG7842ST+823E00
V-5844-6	VG7842ST+823E01
VBC-TCS15-820	VG7241RT+7202G
VBC-TCS20-820	VG7241ST+7202G
VBC-TMC86-700	VG7842LT+7150G

Cage Trim Valve	VG7000 Series Equivalent
VBC-TMC86-720	VG7842LT+7152G
VBC-TMC86-730	VG7842LT+7153G
VBC-TMS10-700	VG7842NT+7150G
VBC-TMS10-720	VG7842NT+7152G
VBC-TMS10-730	VG7842NT+7153G
VBC-TMS12-700	VG7842PT+7150G
VBC-TMS12-720	VG7842PT+7152G
VBC-TMS12-730	VG7842PT+7153G
VBC-TMS15-700	VG7842RT+7150G
VBC-TMS15-720	VG7842RT+7152G
VBC-TMS15-730	VG7842RT+7153G
VBC-TMS15-800	VG7842RT+7200G
VBC-TMS15-820	VG7842RT+7202G
VBC-TMS15-830	VG7842RT+7203G
VBC-TMS20-700	VG7842ST+7150G
VBC-TMS20-720	VG7842ST+7152G
VBC-TMS20-730	VG7842ST+7153G
VBC-TMS20-800	VG7842ST+7200G
VBC-TMS20-820	VG7842ST+7202G
VBC-TMS20-830	VG7842ST+7203G
VBC-TNC86-700	VG7241LT+7150G
VBC-TNC86-720	VG7241LT+7152G
VBC-TNC86-730	VG7241LT+7153G
VBC-TNS10-700	VG7241NT+7150G
VBC-TNS10-720	VG7241NT+7152G
VBC-TNS10-730	VG7241NT+7153G
VBC-TNS12-700	VG7241PT+7150G
VBC-TNS12-720	VG7241PT+7152G
VBC-TNS12-730	VG7241PT+7153G
VBC-TNS15-700	VG7241RT+7150G
VBC-TNS15-720	VG7241RT+7152G
VBC-TNS15-730	VG7241RT+7153G
VBC-TNS15-800	VG7241RT+7200G
VBC-TNS15-820	VG7241RT+7202G
VBC-TNS15-830	VG7241RT+7203G
VBC-TNS20-700	VG7241ST+7150G
VBC-TNS20-720	VG7241ST+7152G
VBC-TNS20-730	VG7241ST+7153G
VBC-TNS20-800	VG7241ST+7200G
VBC-TNS20-820	VG7241ST+7202G
VBC-TNS20-830	VG7241ST+7203G

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Cross-Reference of V-7x16 Series Valves to VG7000 Series Valves

V-7x16 Series Valve	VG7000 Series Equivalent
V-7216-4502	VG7243CT+3008B
V-7216-4503	VG7243ET+3008B
V-7216-4505	VG7243GT+3008B
V-7216-4506	VG7243GT+3008B
V-7216-4507	VG7243LT+3008B
V-7216-4515	VG7243GT+821C00
V-7216-4516	VG7243LT+821C00
V-7216-4517	VG7243NT+822C00
V-7216-4518	VG7243PT+822C00
V-7216-4519	VG7243RT+823C00
V-7216-4521	VG7243PT+822C00
V-7216-4522	VG7243RM+843C00
V-7216-4523	VG7243SM+843C00
V-7216-4552	VG7243CT+3008BP
V-7216-4553	VG7243ET+3008BP
V-7216-4555	VG7243GT+3008BP

V-7x16 Series Valve	VG7000 Series Equivalent
V-7216-4557	VG7243LT+3008BP
V-7216-4564	VG7243GT+821C01
V-7216-4565	VG7243GT+823C01
V-7216-4566	VG7243LT+821C01
V-7216-4567	VG7243NT+822C01
V-7216-4571	VG7243PT+822C01
V-7216-4572	VG7243RM+843C01
V-7216-4573	VG7243SM+843C01
V-7416-4502	VG7443CT+3008E
V-7416-4503	VG7443ET+3008E
V-7416-4505	VG7443GT+3008E
V-7416-4506	VG7443GT+3008E
V-7416-4507	VG7443LT+3008E
V-7416-4515	VG7443GT+821E00
V-7416-4516	VG7443LT+821E00
V-7416-4517	VG7443NT+822E00

V-7x16 Series Valve	VG7000 Series Equivalent
V-7416-4518	VG7443PT+822E00
V-7416-4519	VG7443RT+823E00
V-7416-4521	VG7443PT+822E00
V-7416-4522	VG7443RM+843E00
V-7416-4523	VG7443SM+843E00
V-7416-4552	VG7443CT+3008EP
V-7416-4555	VG7443GT+3008EP
V-7416-4557	VG7443LT+3008EP
V-7416-4563	VG7443GT+821E01
V-7416-4565	VG7443GT+821E01
V-7416-4566	VG7443LT+821E01
V-7416-4567	VG7443NT+822E01
V-7416-4571	VG7443PT+822E01
V-7416-4572	VG7443RM+843E01
V-7416-4573	VG7443SM+843E01

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