

“ I recommend Kele to plant engineers frequently because of the wide selection of automation and control products on your website. ”



CONTROL VALVES



Products manufactured in the United States



Products that are new to the catalog



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■ Indicates New Products



TWO-POSITION ZONE VALVES KZ SERIES

DESCRIPTION

The Kele **KZ Series** Zone Valves are high-quality, cost-competitive, two-position, spring return zone valves made for chilled water, hot water, and 15 psig (103 kPa) steam applications. The **KZ Series** zone valves feature, as standard, high temperature ratings and high close-off ratings. They are available in a full range of common sizes, connection types, and operating voltages.

FEATURES

- **High-quality, long-life design**
- **High close-off pressures standard**
- **Drop-in replacement for existing zone valves**
- **Manual override lever for N.C. actuators**
- **Actuators available with end switch**
- **Front-mount, push-button actuator release**
- **Anti-water hammer gear motion**
- **Knockout for 1/2" conduit**
- **Available assembled or separate valve/actuator**



KZ2-411-KZ1-21



KZ3-411



SPECIFICATIONS

| | | | |
|----------------------------------|--|-------------------------------|--|
| Size | 1/2", 3/4", 1", 1-1/4" (sweat connections only) | Conduit Connection | 7/8" (2.2 cm) knockout for 1/2" conduit |
| Cv Range | 1.0, 2.5, 3.5, 5.0, 7.5, 8.0 | Wiring | 24 VAC actuators: 18" (45.7 cm) leads; 120 VAC actuators: 6" (15.2 cm) leads |
| Connections | FNPT, Sweat (BSP, inverted flare and SAE flare available special order) | Auxiliary Switch | Model dependant; switch closes when actuator opens, operates with manual override |
| Body Pattern | 2-way and 3-way (mixing/diverting) | Contact Rating | 24 VAC actuators: 0.4A @ 24 VAC 120 VAC actuators: 5.0A @ 120-277 VAC |
| Flow Characteristic | Quick Opening | Actuator Compatibility | 2-way valves: N.O. or N.C. actuator 3-way valves: N.C. actuator only |
| Leakage Class | ANSI Class III (0.1%) | Drive Time | 10 to 60 seconds |
| Maximum Closeoff Pressure | Cv = 1.0: 75 psid (517 kPa) Cv = 2.5: 50 psid (345 kPa) Cv = 3.5: 30 psid (207 kPa) Cv = 5.0: 25 psid (172 kPa) Cv = 7.5: 20 psid (137 kPa) Cv = 8.0: 20 psid (137 kPa) | Spring Return Time | 6 seconds |
| Maximum Pressure | 300 psig (2067 kPa) | Manual Override | Included on N.C. actuators only |
| Materials Of Construction | Forged brass body, stainless steel stem, brass seat, EPDM paddle, aluminum actuator base, polycarbonate actuator housing | Operating Temperature | Maximum ambient 104°F (40°C) for models with auxiliary switches; maximum 169°F (77°C) for models without auxiliary switches |
| Media Compatibility | Hot and chilled water, up to 50% glycol; 15 psig (103 kPa) maximum steam (2-way valves only) | Weight | 1/2" valves: .70 lb (.32 kg) 3/4" valves: .80 lb (.36 kg) 1" valves: .90 lb (.41 kg) 1-1/4" valves: .90 lb (.41 kg) Actuators: .92 lb (.42 kg) |
| Media Temperature Range | 32° to 250°F (0° to 121°C) | Approvals | UL, ULC, CE, plenum rating |
| Supply Voltage | 24 VAC models, 120 VAC models (208, 240, 277 VAC models available special order) | Warranty | 2 years |
| Supply VA | 7 VA | | |



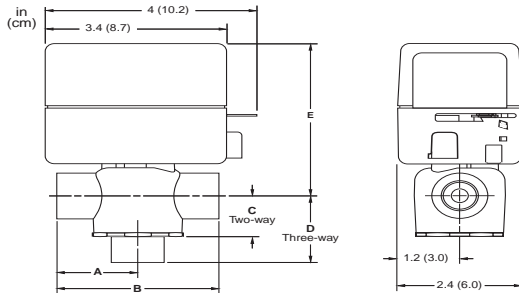
CONTROL VALVES

TWO-POSITION ZONE VALVES KZ SERIES

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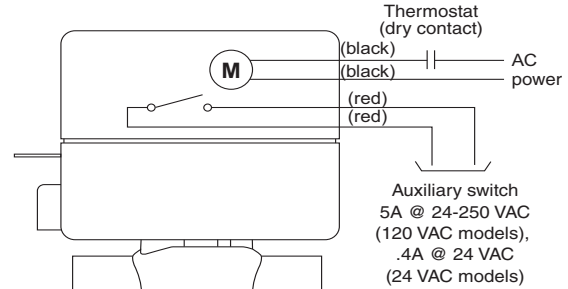
CONTROL VALVES

DIMENSIONS

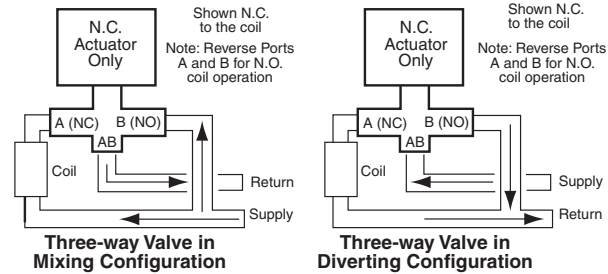
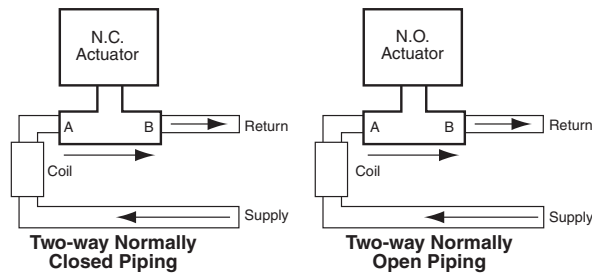


| CONNECTION SIZE/TYPE | A | B | C | D | E |
|----------------------|-----------|------------|-----------|------------|-----------|
| 1/2" Sweat | 1.3 (3.4) | 2.6 (6.8) | 0.9 (2.4) | 1.3 (3.4) | 3.5 (8.9) |
| 3/4" Sweat | 1.4 (3.5) | 2.75 (7.0) | 0.9 (2.4) | 1.5 (3.8) | 3.5 (8.9) |
| 1" Sweat | 1.7 (4.3) | 3.4 (8.6) | 0.9 (2.4) | 1.6 (3.9) | 3.7 (9.3) |
| 1 1/4" Sweat | 1.8 (4.6) | 3.6 (9.2) | 0.9 (2.4) | 1.7 (4.3) | 3.7 (9.3) |
| 1/2" NPT | 1.4 (3.6) | 2.9 (7.2) | 0.9 (2.4) | 1.25 (3.2) | 3.5 (8.9) |
| 3/4" NPT | 1.6 (3.9) | 3.7 (7.8) | 0.9 (2.4) | 1.25 (3.2) | 3.7 (9.3) |
| 1" NPT | 1.8 (4.6) | 3.6 (9.2) | 0.9 (2.4) | 1.7 (4.3) | 3.7 (9.3) |

WIRING



PIPING



ORDERING INFORMATION

| VALVE | |
|-----------------|------------------------------------|
| MODEL | DESCRIPTION |
| KZ2 | Two-way |
| KZ3 | Three-way (requires N.C. actuator) |
| CONNECTION SIZE | |
| 4 | 1/2" |
| 5 | 3/4" |
| 6 | 1" |
| 7 | 1-1/4" (sweat connection only) |
| CONNECTION TYPE | |
| 1 | NPT |
| 3 | Sweat |
| CV RATING | |
| 1 | 1.0 (1/2" only) |
| 2 | 2.5 (1/2", 3/4") |
| 3 | 3.5 (1/2", 3/4") |
| 5 | 5.0 (3/4") |
| 7 | 7.5-8.0 (3/4", 1", 1-1/4")* |

Example: KZ2-512 Two-way, 3/4" NPT, Cv = 2.5

Note: Above combinations are regularly stocked at Kele. Valves are also available with BSP, inverted flare, and SAE flare connections; consult Kele for pricing and availability.

* 1-1/4" size only available with sweat connections.

| ACTUATOR | |
|----------|--|
| MODEL | DESCRIPTION |
| KZ1 | Two-position spring return |
| FUNCTION | |
| 1 | N.C. with end switch, two- or three-way |
| 2 | N.C. without end switch, two- or three-way |
| 3 | N.O. with end switch, two-way only |
| 4 | N.O. without end switch, two-way only |
| VOLTAGE | |
| 1 | 24 VAC |
| 2 | 120 VAC |

Example: KZ1-22 Normally closed, two-position, spring return, 120 VAC

Notes: Above combinations are regularly stocked at Kele. Actuators are also available in 208, 230, and 277 VAC, and in 24 VAC with terminals; consult Kele for pricing and availability.

To order a valve/actuator assembly, append the valve number with the actuator number, separated by a dash. Example: KZ2-512-KZ1-22 is a two-way, 3/4" NPT, Cv = 2.5 valve with a normally closed, two-position, spring return, 120 VAC actuator pre-assembled by Kele.



DESCRIPTION

The Spartan **V200** two-way and **V300** three-way zone valve product line is a complete offering in zone valves with a wide variety of connection sizes and types, and a wide selection of actuators, including electric, thermostatic, thermo-electric, and pneumatic. All the valve bodies are interchangeable with all the actuators for complete flexibility and easy selection.

FEATURES

- Valves are fully interchangeable with all actuators
- Complete selection of NPT/Sweat/Union fittings
- Electric, thermostatic, thermo-electric and pneumatic actuators
- Interchangeable cartridges for multiple Cvs
- Full service from the top of the valve body



| SPECIFICATIONS | |
|----------------------------------|--|
| Size | 1/2", 3/4", 1" |
| Cv Range | 0.15 to 9.0 |
| Connections | NPT, solder, union |
| Stroke | 2-way valves: 0.16" (4.0 mm) 3-way valves: 0.11" (2.8 mm) |
| Life Expectancy | 1.5 million cycles, 3 million full strokes |
| Body Pattern | 2-way, 3-way diverting (mixing OK if pressure drop <5 psid) |
| Leakage Class | ANSI Class III (0.1%) |
| Body Rating | ANSI 250 (400 psi @ 150°F, 250 psi @ 250°F), PN16 |
| Maximum Closeoff Pressure | OT-11, -21, -51: 30 psid (207 kPa); all others 45 psid (311 kPa) |
| Materials Of Construction | Low zinc bronze valve body alloy C84400, stainless steel stem and spring, integral bronze seat, EPDM/brass disc/plunger, double EPDM o-rings |
| Media Compatibility | Hot and chilled water, up to 50% glycol; 15 psig (103 kPa) steam (1" valve not rated for steam) |
| Media Temperature Range | 250°F (120°C) maximum media temperature |
| Supply Voltage | ME-16, -17: 24 VAC, 50/60 Hz ME-4430, -4530: 24 VAC, 50/60 Hz ME-4431, -4531: 110 VAC, 50/60 Hz ME-46, -47, -48, -49: 24 VAC, 50/60 Hz ME-41, -42, -43: 24 VAC, 50/60 Hz ME-44, -45, -46, -47, -48, -49: 8 VA |
| Supply VA | ME-16, -17: 2W holding, 5W running |
| Supply Watts | ME-41, -42, -43: 1W |
| Control Signal | OT-11, -21, -51: thermostatic, modulating, temperature up = stem down MP-5100: pneumatic, SR, 3-6 psi |
| Input Impedance | modulating or 2-position MP-5300: pneumatic, SR, 7-11 psi modulating or 2-position ME-16, -17: 2-position, SR, two-wire, wax technology, can be pulsed ME-44, -45: 2-position, SR two-wire ME-4640: floating, SR ME-4740: PWM, SR, 0.2 to 5 second pulse, 5 seconds full stroke ME-48, -49: proportional, SR, 2-10/10-2 VDC or 4-20 mA ME-4140: floating, NSR, triac or low energy gold contacts ME-4240: PWM, NSR ME-4340: proportional, NSR, 2-10 VDC ME-46, -47: 2 kΩ ME-48, -49: 200 kΩ ME-41, -42: 2 kΩ ME-4340: 200 kΩ |
| Wiring | ME-16, -17: 40" (100 cm) leads ME-44, -45: 4" (10 cm) leads ME-46, -47, -48, -49: 32" plenum-rated cable ME-41, -42, -43: 32" plenum-rated cable |
| Action | Cartridges spring return valve stem up; valve body designs are either stem-up-to-open (SUTO) or stem-up-to-close (SUTC); spring return actuators available in fail-stem-up or fail-stem-down |
| (Continued on next page) | |



CONTROL VALVES

ZONE VALVES

V200, V300 SERIES

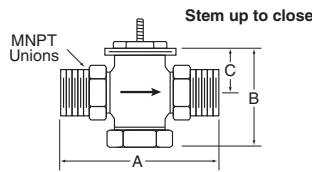
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CONTROL VALVES

SPECIFICATIONS (continued)

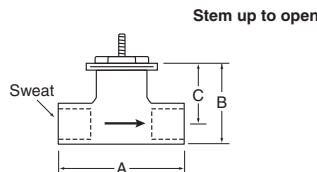
| | | | |
|-------------------------------|---|-----------------------|---|
| Actuator Compatibility | All actuators: compatible with all valve bodies (exception: V222 valves use MP actuators only) | | |
| Actuator Mounting | Knurled mounting ring, hand tighten | | |
| Air Connections | Brass barbs for 5/32" or 1/4" OD flexible tubing (MP actuators, maximum 60 psig) | | |
| Dimensions | OT-11, -21, -51: 3.4"H x 2.4" Dia. (8.6 x 6.0 cm) MP-51, -53: 2.5"H x 3.1" Dia. (6.4 x 7.8 cm) ME-16, -17: 3.1"H x 1.8"W x 1.8"D (7.9 x 4.6 x 4.6 cm) ME-44, -45: 3.5"H x 2.8"W x 2.5"D (8.9 x 7.1 x 6.3 cm) ME-46, -47, -48, -49: 3.5"H x 3.0"W x 3.5"D (8.9 x 7.6 x 8.9 cm) ME-41, -42, -43: 3.1"H x 2.5"W x 3.3"D (7.9 x 6.4 x 8.5 cm) | Setpoint Range | MP-51, -53: 41° to 122°F (5° to 50°C) ME-16, -17: 46° to 122°F (8° to 50°C) ME-44, -45: 41° to 122°F (5° to 50°C) ME-46, -47, -48, -49: 32° to 122°F (0° to 50°C) ME-41, -42, -43: 40° to 122°F (5° to 50°C) |
| Drive Time | OT-11, -21, -51: variable MP-51, -53: variable ME-16, -17: <5 minutes ME-44, -45: 10 seconds; ME-46, -47, -48, -49: 60 seconds drive, 25 seconds spring ME-41, -42: 90 seconds ME-4340: 60 seconds | Weight | OT-11, -21, -51: 40° to 85°F (4° to 29°C) V222-12, -34: 1.5 lb (.68 kg) V241-12: .60 lb (.27 kg) V241-34: 1.0 lb (.45 kg) V243-12: .55 lb (.25 kg) V243-34: .75 lb (.34 kg) V245-12: .50 lb (.23 kg) V245-34: .70 lb (.32 kg) V320-12: .95 lb (.43 kg) V320-34: 1.0 lb (.45 kg) V345-10: 2.1 lb (.95 kg) V325-12: .60 lb (.27 kg) V325-34: .80 lb (.35 kg) OT-1100: .30 lb (.14 kg) MP-51, -53: .40 lb (.18 kg) ME-16, -17: .30 lb (.14 kg) ME-44, -45: .75 lb (.34 kg) ME-46, -47, -48, -49: .95 lb (.43 kg) ME-41, -42: .55 lb (.25 kg) |
| Enclosure Rating | NEMA 1 (IP20) | Approvals | CE |
| Feedback | ME-46, -47, -48, -49: 1-5 VDC, 100 kΩ impedance ME-41, -42, -43: 1-5 VDC, 33 kΩ impedance | Warranty | Valves: 5 years; Actuators: 2 years |
| Manual Override | ME-16, -17 actuators only | | |
| Operating Temperature | OT-11, -21, -51: 40° to 85°F (4° to 29°C) | | |

DIMENSIONS - in (cm)



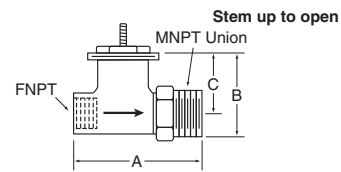
| | A | B | C |
|---------|------------|-----------|-----------|
| V222-12 | 4.3 (10.9) | 2.4 (6.2) | 1.1 (2.8) |
| V222-34 | 5.2 (13.2) | 2.4 (6.2) | 1.1 (2.8) |

MP actuator only



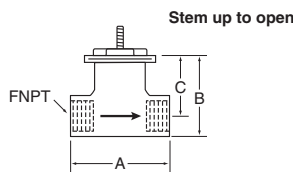
| | A | B | C |
|---------|-----------|-----------|-----------|
| V245-12 | 2.2 (5.9) | 1.6 (4.1) | 1.1 (2.8) |
| V245-34 | 2.3 (5.8) | 1.6 (4.1) | 1.1 (2.8) |

Mounts to any Spartan actuator



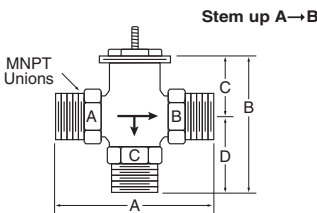
| | A | B | C |
|---------|-----------|-----------|-----------|
| V241-12 | 3.3 (8.4) | 1.6 (4.1) | 1.1 (2.8) |
| V241-34 | 3.8 (9.6) | 2.2 (5.6) | 1.1 (2.8) |

Mounts to any Spartan actuator



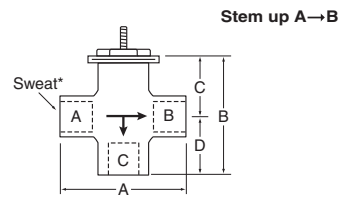
| | A | B | C |
|---------|-----------|-----------|-----------|
| V243-12 | 2.3 (5.8) | 1.6 (4.1) | 1.1 (2.8) |
| V243-34 | 2.7 (6.9) | 2.2 (5.6) | 1.1 (2.8) |
| V243-10 | 3.9 (9.9) | 2.8 (7.1) | 1.8 (4.6) |

Mounts to any Spartan actuator



| | A | B | C | D |
|---------|------------|------------|-----------|-----------|
| V320-12 | 4.3 (10.8) | 3.2 (8.1) | 1.1 (2.8) | 2.1 (5.3) |
| V320-34 | 5.2 (13.2) | 3.7 (9.4) | 1.1 (2.8) | 2.6 (6.6) |
| V345-10 | 6.2 (15.8) | 4.6 (11.7) | 1.5 (4.0) | 3.1 (7.9) |

Mounts to any Spartan actuator



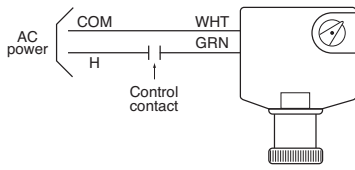
| | A | B | C | D |
|---------|-----------|-----------|-----------|-----------|
| V325-12 | 3.0 (7.7) | 2.6 (6.7) | 1.1 (2.8) | 1.5 (3.8) |
| V325-34 | 2.2 (5.7) | 2.2 (5.7) | 1.1 (2.8) | 1.1 (2.8) |

*V325-12 is the same valve body as V325-34 (3/4"); it has inserts for 1/2" sweat.

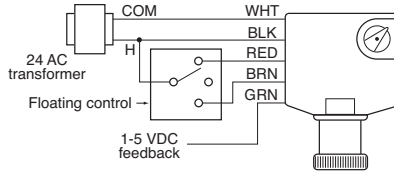
Mounts to any Spartan actuator



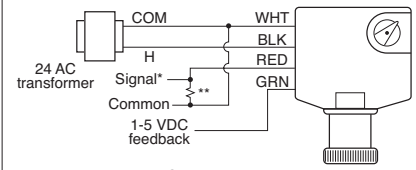
ELECTRICAL ACTUATOR WIRING



Two-position Spring Return Actuators
(ME-4430, -4431, -4530, -4531)

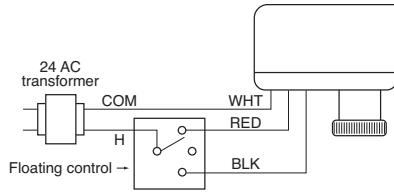


Floating Spring Return Actuator
(ME-4640)

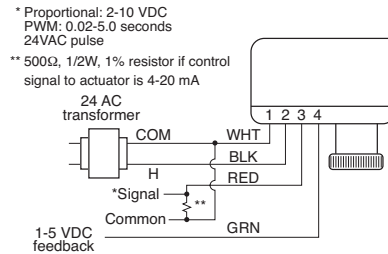


PWM and Proportional Spring Return Actuators
(ME-4740, -4840, -4940)

* Proportional: 2-10 VDC
PWM: 0.02-5.0 seconds 24 AC pulse
** 500Ω, 1/2W, 1% resistor if control signal to actuator is 4-20 mA

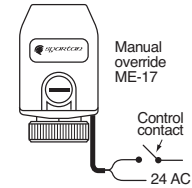


Floating Non-Spring Return Actuators
(ME-4140, -4142)



Proportional and PWM Non-Spring Return Actuator
(ME-4240, -4340)

* Proportional: 2-10 VDC
PWM: 0.02-5.0 seconds
24VAC pulse
** 500Ω, 1/2W, 1% resistor if control signal to actuator is 4-20 mA



Two-position Wax Actuators
(ME1605, ME1705)

ORDERING INFORMATION

| Valve Model No. | Cv | Description |
|-----------------|------|--|
| V222-12-ER1.0 | 1.0 | 1/2", 2W, SUTC, MNPT unions (MP actuators only)* |
| V222-12-ER2.0 | 2.0 | |
| V222-12-ER3.0 | 3.0 | |
| V222-34-ER1.0 | 1.0 | 3/4", 2W, SUTC, MNPT unions (MP actuators only)* |
| V222-34-ER2.0 | 2.0 | |
| V222-34-ER3.0 | 3.0 | |
| V241-12-BC0.15 | 0.15 | 1/2", 2W, SUTO, FNPT X MNPT union (Change "-EPxxx" to "-EVxxx" for steam applications) |
| V241-12-BC0.25 | 0.25 | |
| V241-12-EP0.5 | 0.5 | |
| V241-12-EP1.0 | 1 | |
| V241-12-EP1.5 | 1.5 | |
| V241-12-EP2.0 | 2 | |
| V241-12-EP2.5 | 2.5 | |
| V241-12-EP3.0 | 3 | |
| V241-12-EP3.5 | 3.5 | |
| V241-34-EP1.0 | 1 | |
| V241-34-EP1.5 | 1.5 | |
| V241-34-EP2.0 | 2 | |
| V241-34-EP2.5 | 2.5 | |
| V241-34-EP4.5 | 4.5 | |
| V243-12-BC0.15 | 0.15 | 1/2", 2W, SUTO, FNPT (Change "-EPxxx" to "-EVxxx" for steam applications) |
| V243-12-BC0.25 | 0.25 | |
| V243-12-EP0.5 | 0.5 | |
| V243-12-EP1.0 | 1 | |
| V243-12-EP1.5 | 1.5 | |
| V243-12-EP2.0 | 2 | |
| V243-12-EP2.5 | 2.5 | |
| V243-12-EP3.0 | 3 | |
| V243-12-EP3.5 | 3.5 | |
| V243-34-EP1.0 | 1 | |
| V243-34-EP1.5 | 1.5 | |
| V243-34-EP2.0 | 2 | |
| V243-34-EP2.5 | 2.5 | |
| V243-34-EP4.5 | 4.5 | |
| V243-10-EB6.0 | 6 | 1", 2W, SUTO, FNPT (Use EV6.4 or EV9.0 for steam) |
| V243-10-EB6.4 | 6.4 | |
| V243-10-EB8.0 | 8 | |
| V243-10-EB9.0 | 9 | |
| V245-12-BC0.15 | 0.15 | 1/2", 2W, SUTO, sweat (Change "-EPxxx" to "-EVxxx" for steam applications) |
| V245-12-BC0.25 | 0.25 | |
| V245-12-EP0.5 | 0.5 | |
| V245-12-EP1.0 | 1 | 1/2", 2W, SUTO, sweat (Change "-EPxxx" to "-EVxxx" for steam applications) |
| V245-12-EP1.5 | 1.5 | |
| V245-12-EP2.0 | 2 | |
| V245-12-EP2.5 | 2.5 | |
| V245-12-EP3.0 | 3 | |
| V245-12-EP3.5 | 3.5 | |

*Change "ER..." to "EVR..." for steam applications

| Valve Model No. | Cv | Description |
|-----------------|-----|--|
| V245-34-EP1.0 | 1 | 3/4", 2W, SUTO, sweat (Change "-EPxxx" to "-EVxxx" for steam applications) |
| V245-34-EP1.5 | 1.5 | |
| V245-34-EP2.0 | 2 | |
| V245-34-EP2.5 | 2.5 | |
| V245-34-EP3.0 | 3 | |
| V245-34-EP3.5 | 3.5 | |
| V320-12-ED1.0 | 1.0 | 1/2", 3W, diverting valve, MNPT unions |
| V320-12-ED2.0 | 2.0 | |
| V320-12-ED3.0 | 3.0 | |
| V320-12-ED3.5 | 3.5 | |
| V320-34-ED1.0 | 1.0 | 3/4", 3W, diverting valve, MNPT unions |
| V320-34-ED2.0 | 2.0 | |
| V320-34-ED3.0 | 3.0 | |
| V320-34-ED3.5 | 3.5 | |
| V345-10-ED5.5 | 5.5 | 1", 3W, diverting valve, MNPT unions |
| V325-12-ED1.0 | 1.0 | 1/2", 3W, diverting valve, sweat (uses 3/4" → 1/2" bushing) |
| V325-12-ED2.0 | 2.0 | |
| V325-12-ED3.0 | 3.0 | |
| V325-12-ED3.5 | 3.5 | |
| V325-34-ED1.0 | 1.0 | 3/4", 3W, diverting valve, sweat |
| V325-34-ED2.0 | 2.0 | |
| V325-34-ED3.0 | 3.0 | |
| V325-34-ED3.5 | 3.5 | |

| Actuator Model No. | Description |
|------------------------------------|---|
| THERMO-ELECTRIC | |
| ME-1605 | Two-position SR, two-wire, 24 VAC, wax, fail stem up |
| ME-1705 | Two-position SR, two-wire, 24 VAC, wax, fail stem down |
| ELECTRIC | |
| ME-4140 | Floating, NSR, 24 VAC with timeout |
| ME-4240 | PWM 0.25-5 sec, NSR, 24 VAC |
| ME-4340 | Proportional 2-10 VDC, NSR, 24 VAC |
| ME-4430 | Two-position SR, two-wire, 24 VAC, fail stem up |
| ME-4431 | Two-position SR, two-wire, 110 VAC, fail stem up |
| ME-4530 | Two-position SR, two-wire, 24 VAC, fail stem down |
| ME-4531 | Two-position SR, two-wire, 110 VAC, fail stem down |
| ME-4640 | Floating, SR, 24 VAC, fail stem up |
| ME-4840 | Proportional 2-10 VDC, SR, 24 VAC, fail stem up |
| ME-4940 | Proportional 2-10 VDC, SR, 24 VAC, fail stem down |
| ME-4740 | PWM 0.25-5 sec, SR, 24 VAC, fail stem up |
| SELF-CONTAINED THERMOSTATIC | |
| OT-1100 | Valve mount thermostatic top 40° to 85°F (5° to 30°C) |
| OT-2100 | 6 -1/2" capillary, remote bulb 40° to 85°F (5° to 30°C) |
| OT-5100 | 6 -1/2" capillary, remote wall mount 40° to 85°F (5° to 30°C) |
| OM-1200 | Locking cover for OT-1100 |
| PNEUMATIC | |
| MP-5100 | 4 sq in actuator, modulating 3-6 psi spring, fail stem up |
| MP-5300 | 4 sq in actuator, modulating 7-11 psi spring, fail stem up |



CONTROL VALVES

ZONE VALVES

V200, V300 SERIES

4

CONTROL VALVES

VALVE SELECTION CHART

| Size/Connections | Flow Pattern (SUTO/C = stem up to open/close) | |
|------------------------|---|-----------|
| | Two-way | Three-way |
| 1/2" FNPT | V243 (SUTO) | — |
| 3/4" FNPT | | |
| 1" FNPT | | |
| 1/2" sweat | V245 (SUTO) | V325 |
| 3/4" sweat | | |
| 1/2" unions/MNPT | V222 (SUTC) V240 (SUTO) | V320 |
| 3/4" unions/MNPT | | |
| 1" unions/MNPT | | |
| 1/2" FNPT x union/MNPT | V241 (SUTO) | — |
| 3/4" FNPT x union/MNPT | | |

ACTUATOR SELECTION CHART

| Control | Fail Mode | |
|------------------------------|--|--|
| | Fail-in-Place | Spring Return |
| Two-position electric | — | ME-4430 (24V, fail up) ME-4431 (115V, fail up) ME-4530 (24V, fail down) ME-4531 (115V, fail down) |
| Floating electric | ME-4140 (with timeout) ME-4142 (with timeout) | ME-4640 (fail up) |
| PWM electric | ME-4240 | ME-4740 (fail up) |
| Proportional electric | ME-4340 | ME-4840 (fail up) ME-4940 (fail down) |
| Pneumatic | — | MP-5100 (3-6 psi, fail up) MP-5300 (7-11 psi, fail up) |
| Two-position thermo-electric | — | ME-1605 (fail up) ME-1705 (fail down) |
| Thermostatic | OT-1100 (valve mount) OT-2100 (remote bulb) OT-5100 (wall mount) | — |

Note: Match valve stem action to the action of the actuator to achieve desired assembly action.

For example: a V243 (stem up to open) with an ME-4430 actuator (fail up) will be a normally open assembly. That valve with an ME-4530 would be normally closed.

ACCESSORIES

| MODEL | DESCRIPTION |
|----------------|---|
| BC0.15 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 0.15 |
| BC0.25 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 0.25 |
| EB6.0 | Cartridge for two-way 1" SUTO; Cv = 6.0 |
| EB6.4 | Cartridge for two-way 1" SUTO; Cv = 6.4 |
| EB8.0 | Cartridge for two-way 1" SUTO; Cv = 8.0 |
| EB9.0 | Cartridge for two-way 1" SUTO; Cv = 9.0 |
| ED1.0 | Cartridge for three-way; Cv = 1.0 |
| ED2.0 | Cartridge for three-way; Cv = 2.0 |
| ED3.0 | Cartridge for three-way; Cv = 3.0 |
| ED3.5 | Cartridge for three-way; Cv = 3.5 |
| EP0.5 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 0.5 |
| EP1.0 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 1.0 |
| EP1.5 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 1.5 |
| EP2.0 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 2.0 |
| EP2.5 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 2.5 |
| EP3.0 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 3.0 |
| EP3.5 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 3.5 |
| EP4.5 | Cartridge for two-way 1/2" or 3/4" SUTO; Cv = 4.5 |
| EV1.5 | Cartridge for steam Cv=1.5, for 2W 1/2" or 3/4" valve |
| EV2.0 | Cartridge for steam Cv=2.0, for 2W 1/2" or 3/4" valve |
| EV0.5 | Cartridge for steam Cv=0.5, for 2W 1/2" valve |
| EV2.5 | Cartridge for steam Cv=2.5, for 2W 1/2" or 3/4" valve |
| EV3.5 | Cartridge for steam Cv=3.5, for 2W 1/2" or 3/4" valve |
| EV4.5 | Cartridge for steam Cv=4.5, for 2W 3/4" valve |
| EV1.0 | Cartridge for steam Cv=1.0, for 2W 1/2" or 3/4" valve |
| EV6.4 | Cartridge for steam Cv=6.4, for 2W 1" valve |
| EV9.0 | Cartridge for steam Cv=9.0, for 2W 1" valve |
| EV3.0 | Cartridge for steam Cv=3.0, for 2W 1/2" or 3/4" valve |
| AV-6112 | 1/2" union MNPT, for V320, 222 |
| AV-6134 | 3/4" union MNPT, for V320, 222 |
| AV-6312 | 1/2" union sweat, for V320, 222 |
| AV-6334 | 3/4" union sweat, for V320, 222 |
| AV07 | Cartridge tool, 3/4" and 1/2" hex |



DESCRIPTION

The **599 Series** zone valves work with any SFA/P Series or SSA/P Series electric actuator. The actuators provide two-position, three-position or 0-10 VDC control. Typical applications include hot or chilled water for zones with radiators, floor heating via manifolds, fan coil units, cooling ceilings, wall-mounted boilers, and VAV applications.

FEATURES

- **Direct-coupled universal bonnet**
- **Direct-coupled installation without tools**
- **Manual override with hex wrench**
- **Visual position indication**

SIEMENS



Two-way

Three-way



4

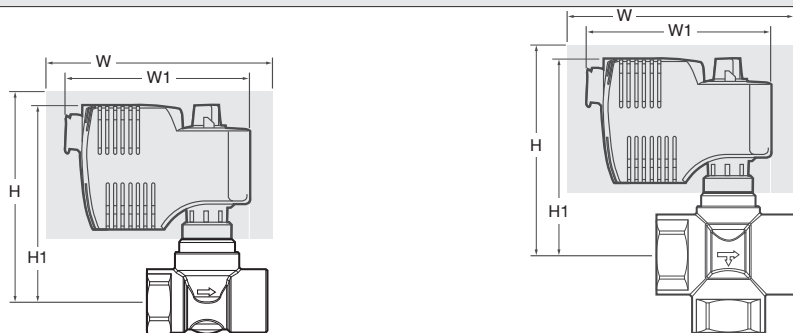
CONTROL VALVES

SPECIFICATIONS

| | | | |
|--------------------------------|---|------------------------------|--|
| Size | 1/2", 3/4", 1" | Stroke Time | Two-position actuators: 35 seconds; three-position (floating) actuators: 150 seconds; proportional (0-10 VDC) actuators: 34 seconds |
| Cv Range | 1, 2.5, 4, 4.1, 7 | Operating Temperature | 41° to 122°F (5° to 50°C) |
| Stroke | 0.1" (2.5 mm) | Operating Humidity | 0 to 90% RH non-condensing |
| Body Pattern | 2-way, 3-way diverting | Weight | Two-position actuators: 1.2 lb (0.54 kg); three-position (floating) actuators: 0.5 lb (0.25 kg); proportional (0-10 VDC) actuators: 0.5 lb (0.25 kg) |
| Flow Characteristic | Linear | Enclosure Rating | NEMA 1 (indoor only) |
| Leakage Rating | ANSI Class III (0.1% of rated capacity) | Approvals | CE, EMC directive 89/336/EEC, 73/23/EEC low voltage; UL873, cUL Certified to Canadian Standard C22.2 No. 24-93 |
| Body Rating | ANSI Class 125 | Warranty | 2 years |
| Media Temperature Range | 34° to 230°F (1° to 110°C) | | |
| Supply Voltage | 24 VAC ±20%, 120 VAC ±20%, 50/60 Hz | | |
| Supply VA | Two-position actuators: 9.8 VA; three-position (floating) actuators: 0.8 VA; proportional (0-10 VDC) actuators: 2.5 VA | | |
| Control Signal | Two-position, three-position (floating), and 0-10 VDC proportional | | |
| Action | Two-way valves are stem-up-to-open; three-way valves are diverting; normal position is determined by choice of actuator | | |

DIMENSIONS

in (cm)



| | Valve Line Size | H1 | | H | | W1 | | W | |
|-----|-----------------|-------------|-------------|--------------|--------------|-------------|-------------|--------------|--------------|
| | | 2-way | 3-way | 2-way | 3-way | 2-way | 3-way | 2-way | 3-way |
| SR | 0.5 (1.5) | 4.38 (11.2) | 4.38 (11.2) | 12.38 (31.5) | 12.38 (31.5) | 4.38 (11.2) | 4.38 (11.2) | 12.38 (31.5) | 12.38 (31.5) |
| | 0.75 (2) | 4.38 (11.2) | 4.38 (11.2) | 12.38 (31.5) | 12.38 (31.5) | 4.38 (11.2) | 4.38 (11.2) | 12.38 (31.5) | 12.38 (31.5) |
| | 1 (2.5) | 4.38 (11.2) | 4.38 (11.2) | 12.38 (31.5) | 12.38 (31.5) | 4.38 (11.2) | 4.38 (11.2) | 12.38 (31.5) | 12.38 (31.5) |
| NSR | 0.5 (1.5) | 4.26 (10.8) | 4.26 (10.8) | 12.26 (31.1) | 12.26 (31.1) | 3.26 (8.3) | 3.26 (8.3) | 11.26 (28.6) | 11.26 (28.6) |
| | 0.75 (2) | 4.26 (10.8) | 4.26 (10.8) | 12.26 (31.1) | 12.26 (31.1) | 3.26 (8.3) | 3.26 (8.3) | 11.26 (28.6) | 11.26 (28.6) |
| | 1 (2.5) | 4.26 (10.8) | 4.26 (10.8) | 12.26 (31.1) | 12.26 (31.1) | 3.26 (8.3) | 3.26 (8.3) | 11.26 (28.6) | 11.26 (28.6) |



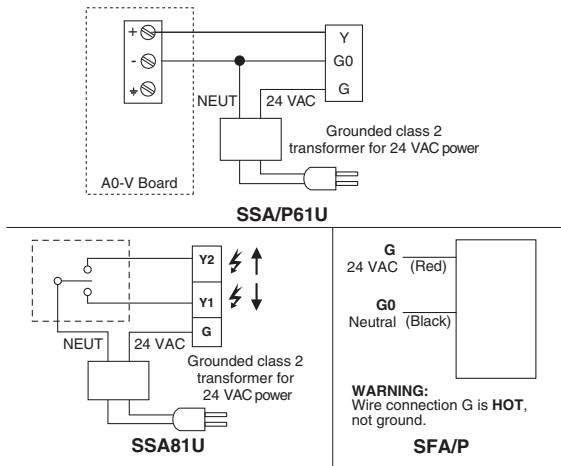
CONTROL VALVES

ZONE VALVES 599 SERIES

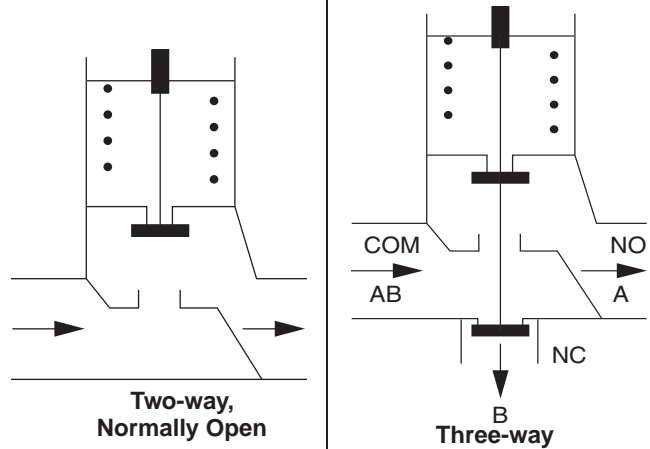
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CONTROL VALVES

WIRING



FLOW



ORDERING INFORMATION

| 2-Way | Line Size | | Close Off | | Flow Rate | | Valve Body Only | 120 VAC | | | | 24 VAC | | |
|-------|-----------|-----|-----------|-----|-----------|------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------------|-------------------|
| | | | | | | | | Spring Return | | Spring Return | | Non-Spring Return | | |
| | | | | | | | | 2 position | | 2-Position | | 3-position | 0 to 10 VDC Modulating | |
| | | | | | | | | Normally Closed | Normally Open | Normally Closed | Normally Open | Normally Closed | Normally Closed | Normally Open |
| | | | | | | | | SFA11U* | SFP11U* | SFA71U* | SFP71U* | SSA81U* | SSA61U* | SSP61U* |
| | | | | | | | | Actuator Code 240 | Actuator Code 241 | Actuator Code 242 | Actuator Code 243 | Actuator Code 244 | Actuator Code 245 | Actuator Code 248 |
| NPT | 0.5 | 1.5 | 44 | 303 | 1 | 0.85 | 599-00210 | 240-00210 | 241-00210 | 242-00210 | 243-00210 | 244-00210 | 245-00210 | 248-00210 |
| | 0.5 | 1.5 | 44 | 303 | 2.5 | 2 | 599-00211 | 240-00211 | 241-00211 | 242-00211 | 243-00211 | 244-00211 | 245-00211 | 248-00211 |
| | 0.5 | 1.5 | 44 | 303 | 4 | 3.4 | 599-00214 | 240-00214 | 241-00214 | 242-00214 | 243-00214 | 244-00214 | 245-00214 | 248-00214 |
| | 0.75 | 2 | 44 | 303 | 4.1 | 3.5 | 599-00212 | 240-00212 | 241-00212 | 242-00212 | 243-00212 | 244-00212 | 245-00212 | 248-00212 |
| Sweat | 1 | 2.5 | 22 | 152 | 7 | 6 | 599-00213 | 240-00213 | 241-00213 | 242-00213 | 243-00213 | 244-00213 | 245-00213 | 248-00213 |
| | 0.5 | 1.5 | 44 | 303 | 1 | 0.85 | 599-00510 | 240-00510 | 241-00510 | 242-00510 | 243-00510 | 244-00510 | 245-00510 | 248-00510 |
| | 0.5 | 1.5 | 44 | 303 | 2.5 | 2 | 599-00511 | 240-00511 | 241-00511 | 242-00511 | 243-00511 | 244-00511 | 245-00511 | 248-00511 |
| | 0.5 | 1.5 | 44 | 303 | 4 | 3.4 | 599-00514 | 240-00514 | 241-00514 | 242-00514 | 243-00514 | 244-00514 | 245-00514 | 248-00514 |
| | 0.75 | 2 | 44 | 303 | 4.1 | 3.5 | 599-00512 | 240-00512 | 241-00512 | 242-00512 | 243-00512 | 244-00512 | 245-00512 | 248-00512 |
| | 1 | 2.5 | 22 | 152 | 7 | 6 | 599-00513 | 240-00513 | 241-00513 | 242-00513 | 243-00513 | 244-00513 | 245-00513 | 248-00513 |

| 3-Way | Line Size | | Close Off | | Flow Rate | | Valve Body Only | 120 VAC | | | | 24 VAC | | |
|-------|-----------|-----|-----------|-----|-----------|------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------------|-------------------|
| | | | | | | | | 2 position | | 2-Position | | 3-position | 0 to 10 VDC Modulating | |
| | | | | | | | | SR AB → B | SR AB → A | SR AB → B | SR AB → A | Non-Spring Return | Non-Spring Return | |
| | | | | | | | | SFA11U* | SFP11U* | SFA71U* | SFP71U* | SSA81U* | SSA61U* | SSP61U* |
| | | | | | | | | Actuator Code 240 | Actuator Code 241 | Actuator Code 242 | Actuator Code 243 | Actuator Code 244 | Actuator Code 245 | Actuator Code 246 |
| NPT | 0.5 | 1.5 | 44 | 303 | 1 | 0.85 | 599-00230 | 240-00230 | 241-00230 | 242-00230 | 243-00230 | 244-00230 | 245-00230 | 248-00230 |
| | 0.5 | 1.5 | 44 | 303 | 2.5 | 2 | 599-00231 | 240-00231 | 241-00231 | 242-00231 | 243-00231 | 244-00231 | 245-00231 | 248-00231 |
| | 0.5 | 1.5 | 44 | 303 | 4 | 3.4 | 599-00234 | 240-00234 | 241-00234 | 242-00234 | 243-00234 | 244-00234 | 245-00234 | 248-00234 |
| | 0.75 | 2 | 44 | 303 | 4.1 | 3.5 | 599-00232 | 240-00232 | 241-00232 | 242-00232 | 243-00232 | 244-00232 | 245-00232 | 248-00232 |
| Sweat | 1 | 2.5 | 22 | 152 | 7 | 6 | 599-00233 | 240-00233 | 241-00233 | 242-00233 | 243-00233 | 244-00233 | 245-00233 | 248-00233 |
| | 0.5 | 1.5 | 44 | 303 | 1 | 0.85 | 599-00530 | 240-00530 | 241-00530 | 242-00530 | 243-00530 | 244-00530 | 245-00530 | 248-00530 |
| | 0.5 | 1.5 | 44 | 303 | 2.5 | 2 | 599-00531 | 240-00531 | 241-00531 | 242-00531 | 243-00531 | 244-00531 | 245-00531 | 248-00531 |
| | 0.5 | 1.5 | 44 | 303 | 4 | 3.4 | 599-00534 | 240-00534 | 241-00534 | 242-00534 | 243-00534 | 244-00534 | 245-00534 | 248-00534 |
| | 0.75 | 2 | 44 | 303 | 4.1 | 3.5 | 599-00532 | 240-00532 | 241-00532 | 242-00532 | 243-00532 | 244-00532 | 245-00532 | 248-00532 |
| | 1 | 2.5 | 22 | 303 | 7 | 6 | 599-00533 | 240-00533 | 241-00533 | 242-00533 | 243-00533 | 244-00533 | 245-00533 | 248-00533 |

*Actuator only

Example: A 240-00210 is a 599-00210 valve body and SFA11U actuator assembly. The valve and actuator can also be ordered separately.

SSTAG

RELATED PRODUCTS

Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order



KVC 2100N66 valve with
KVC 6936 actuator

DESCRIPTION

The Kele **KVC Series** includes two- and three-way, hot and chilled water control valves and fail-in-place or power-fail return electric actuators. The unique cartridge design enables the valve to be piped mixing or diverting for the three-way valve, and either flow direction for the two-way valve. The actuator uses a unique twist-off mount for easy installation or servicing and is available with two-position, floating, or proportional control signals.

FEATURES

- *Three-way mixing and diverting in one body*
- *Two-way bi-directional flow for simple installation*
- *Linear flow characteristics*
- *Easily replaceable seat cartridge*
- *Twist-on low power/long life actuator*
- *Manual override*
- *Fail-in-place or power-fail return actuator models*
- *Selectable power fail return direction models*

SPECIFICATIONS

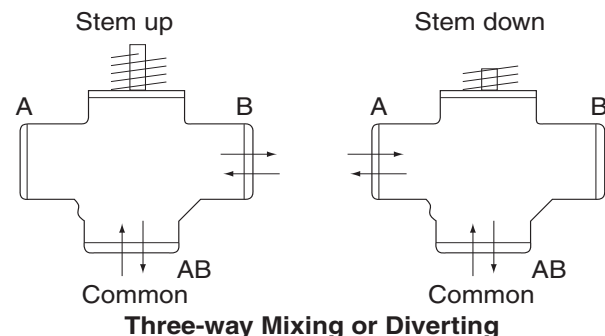
| | | | |
|----------------------------------|---|------------------------|--|
| Size | 1/2", 3/4", 1-1/4", 1" | wAction | |
| Cv | 0.7, 4.7, 0.7, 2.9, 4.7, 8.7 | 2-way | Stem spring up on actuator removal, stem up to close (bi-directional flow) |
| Connections | FNPT | 3-way | Stem spring up on actuator removal, stem up closes port A, stem down closes port B |
| Body Pattern | 2-Way, 3-Way | Connector | Twist-lock mount with latch |
| Flow Characteristic | Linear | Manual Override | Combination override lever and position indicator |
| Maximum Closeoff Pressure | 60 psid (414 kPa) | Stroke Time | |
| Pressure Rating | 300 psig (2069 kPa) | KVCx114 | 6 seconds |
| Materials Of Construction | Bronze valve body, stainless steel stem, Ryton® and Noryl® trim, Noryl® and Ryton® plastic actuator housing | KVCx93x | 120 seconds |
| Media Compatibility | Hot water, chilled water | Weight | |
| Media Temperature Range | 34° to 203°F (1° to 95°C) | KVC2050 | 1.2 lb (.54 kg) |
| Supply Voltage | 24 VAC, 50/60 Hz | KVC2075 | 1.8 lb (.80 kg) |
| Supply VA | 6 VA | KVC2100 | 2.1 lb (.95 kg) |
| Control Signal | Two-position, floating, or proportional | KVC2125 | 2.2 lb (1.0 kg) |
| Wiring | 39" (99 cm) cable, 20 AWG conductors | KVC3050 | 1.4 lb (.61 kg) |
| | | KVC3075 | 1.5 lb (.68 kg) |
| | | KVC3100 | 1.6 lb (.70 kg) |
| | | KVCxxx4 | 0.9 lb (.39 kg) |
| | | KVCxxx6 | 1.1 lb (.50 kg) |
| | | Approvals | UL, CSA Listed, CE Certified |
| | | Warranty | 1 year |

TABLE 1. KVC REPLACEMENT CARTRIDGES

| CARTRIDGE MODEL NO. | BODY PATTERN | VALVE SIZE AND CV | | | |
|---------------------|--------------|-------------------|------|-----|--------|
| | | 1/2" | 3/4" | 1" | 1-1/4" |
| VCZZ1100 | Two-way | 3.2 | 4.7 | 6.6 | 7.1 |
| VCZZ1400 | | 2.9 | 3.9 | 4.2 | 4.3 |
| VCZZ1500 | | 0.7 | 0.8 | 0.8 | 0.8 |
| VCZZ1600 | | 1.3 | 1.5 | 1.5 | 1.5 |
| VCZZ6100 | Three-way | 3.8 | 6.6 | 8.7 | 8.7 |

Note: **1000 Series** cartridges fit all two-way bodies.
6000 Series cartridges fit all three-way bodies.
Cartridge tool included with each cartridge.

THREE-WAY VALVE FLOW CHARACTERISTICS





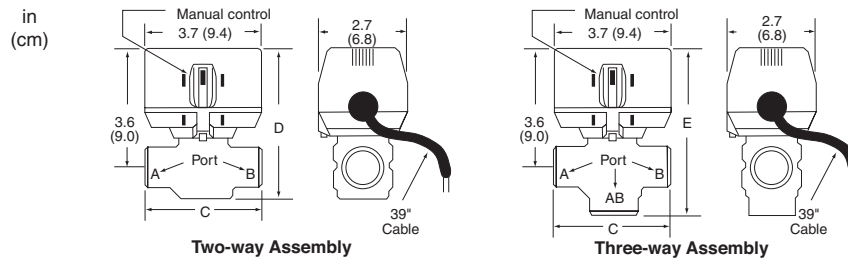
CONTROL VALVES

ZONE VALVES KVC SERIES

4

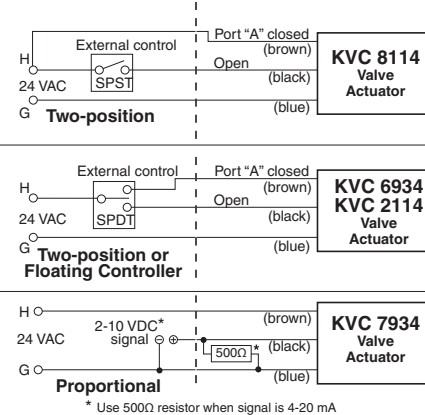
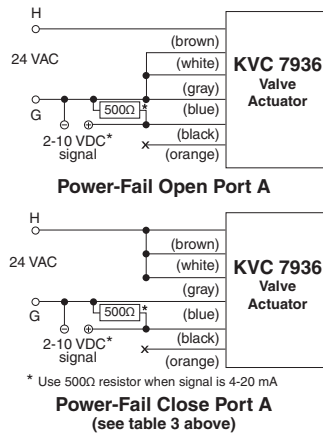
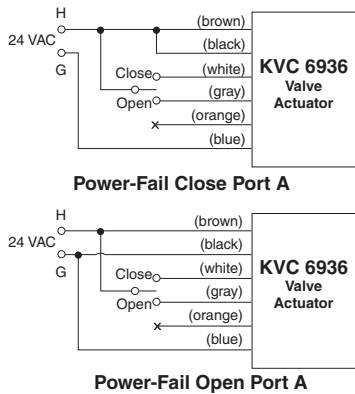
CONTROL VALVES

DIMENSIONS



| TABLE 2. SPECIFICATIONS AND DIMENSIONS | | | | | | | |
|--|--------|-----------|------|-----|------------|-------------|-------------|
| VALVE NUMBER | SIZE | PORT | BODY | Cv | C in (cm) | D in (cm) | E in (cm) |
| KVC2050N07 | 1/2" | two-way | FNPT | 0.7 | 3.87 (9.8) | 4.37 (11.1) | — |
| KVC2050N13 | 1/2" | two-way | FNPT | 1.3 | 3.87 (9.8) | 4.37 (11.1) | — |
| KVC2050N29 | 1/2" | two-way | FNPT | 2.9 | 3.87 (9.8) | 4.37 (11.1) | — |
| KVC2050N32 | 1/2" | two-way | FNPT | 3.2 | 3.87 (9.8) | 4.37 (11.1) | — |
| KVC2075N47 | 3/4" | two-way | FNPT | 4.7 | 3.7 (9.4) | 4.45 (11.3) | — |
| KVC2100N66 | 1" | two-way | FNPT | 6.6 | 3.7 (9.4) | 4.45 (11.3) | — |
| KVC2125N71 | 1-1/4" | two-way | FNPT | 7.1 | 4.3 (11.0) | 4.6 (11.8) | — |
| KVC3050N37 | 1/2" | three-way | FNPT | 3.7 | 3.7 (9.4) | — | 5.34 (13.6) |
| KVC3075N66 | 3/4" | three-way | FNPT | 6.6 | 3.7 (9.4) | — | 5.12 (13.0) |
| KVC3100N87 | 1" | three-way | FNPT | 8.7 | 3.7 (9.4) | — | 5.35 (13.6) |
| KVC3125N92 | 1-1/4" | three-way | FNPT | 9.2 | 4.3 (11.0) | — | 5.6 (14.2) |

WIRING



ORDERING INFORMATION

| MODEL | DESCRIPTION |
|---------|---|
| KVC8114 | Two-position, three-wire SPST control, six-second timing actuator |
| KVC2114 | Two-position, three-wire SPDT control, six-second timing actuator |
| KVC6934 | Three-wire floating control, 120-second timing actuator |
| KVC6936 | Three-wire floating control, 120-second timing power-fail return actuator |
| KVC7934 | Proportional 2-10 VDC control, 120-second timing actuator |
| KVC7936 | Proportional 2-10 VDC control, 120-second timing power-fail return actuator |

| SSTAG | RELATED PRODUCTS |
|-------|--|
| | Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order |



DESCRIPTION

The **V5860 Series** valve is designed specifically for use in small hot water or chilled water applications. The **V5860** comes in two-way and three-way configurations in 1/2" and 3/4" FNPT. The wide selection of Cv's offer precise equal percentage control, which is ideal for fan coils, baseboards, and small AHUs. The field-mounted, non-spring return screw-on actuators offer easy installation and modulating control using floating or proportional signals.

FEATURES

- **Very small Cv's from 0.19 up to 4.9**
- **High quality plug-seat design for precise control**
- **Very quiet operation**
- **Floating or proportional control**
- **Non-spring return actuators**



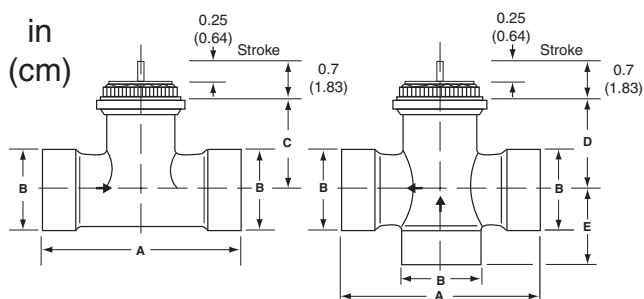
Honeywell



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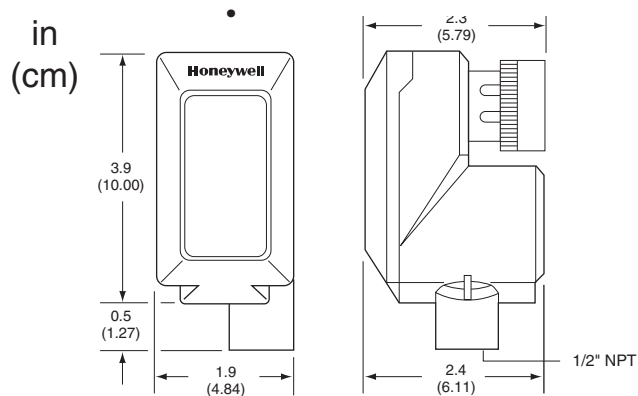
CONTROL VALVES

DIMENSIONS



| PIPE SIZE | DIMENSION | | | | |
|-----------|-----------|-----|--------|--------|--------|
| | A | B | C | D | E |
| 1/2 | 3 | 3/4 | 1-5/16 | 1-5/16 | 1-5/16 |
| 3/4 | 3-1/2 | 1 | 1-1/4 | 1-1/4 | 1-1/2 |

Valve



Actuator

INDIVIDUAL SPECIFICATIONS

| Model | Size | Cv | Maximum Closeoff Pressure | Action | Weight |
|------------|------|------|---------------------------|--|-----------------|
| V5862A2005 | 1/2" | 0.19 | 65 psid | Stem up on actuator removal, valve open | 0.6 lb (.27 kg) |
| V5862A2013 | 1/2" | 0.29 | 65 psid | Stem up on actuator removal, valve open | 0.6 lb (.27 kg) |
| V5862A2021 | 1/2" | 0.47 | 65 psid | Stem up on actuator removal, valve open | 0.6 lb (.27 kg) |
| V5862A2039 | 1/2" | 0.74 | 65 psid | Stem up on actuator removal, valve open | 0.6 lb (.27 kg) |
| V5862A2047 | 1/2" | 1.2 | 65 psid | Stem up on actuator removal, valve open | 0.6 lb (.27 kg) |
| V5862A2054 | 1/2" | 1.9 | 65 psid | Stem up on actuator removal, valve open | 0.6 lb (.27 kg) |
| V5862A2062 | 3/4" | 2.9 | 45 psid | Stem up on actuator removal, valve open | 0.9 lb (.41 kg) |
| V5862A2070 | 3/4" | 4.9 | 45 psid | Stem up on actuator removal, valve open | 0.9 lb (.41 kg) |
| V5863A2004 | 1/2" | 0.29 | 55 psid | Stem up on actuator removal, ports B-AB open | 0.7 lb (.32 kg) |
| V5863A2012 | 1/2" | 0.47 | 55 psid | Stem up on actuator removal, ports B-AB open | 0.7 lb (.32 kg) |
| V5863A2020 | 1/2" | 0.74 | 55 psid | Stem up on actuator removal, ports B-AB open | 0.7 lb (.32 kg) |
| V5863A2038 | 1/2" | 1.2 | 22 psid | Stem up on actuator removal, ports B-AB open | 0.7 lb (.32 kg) |
| V5863A2046 | 1/2" | 1.9 | 22 psid | Stem up on actuator removal, ports B-AB open | 0.7 lb (.32 kg) |
| V5863A1006 | 3/4" | 2.9 | 26 psid | Stem up on actuator removal, ports B-AB open | 1.0 lb (.45 kg) |
| V5863A1014 | 3/4" | 4.9 | 26 psid | Stem up on actuator removal, ports B-AB open | 1.0 lb (.45 kg) |
| M6410A1029 | | | | Drive open, drive closed, fail-in-place | 1.0 lb (.45 kg) |
| M7410F1000 | | | | Direct or reverse acting, switch selectable, fail-in-place | .55 lb (.25 kg) |



CONTROL VALVES

MODULATING ZONE VALVES V5860 SERIES

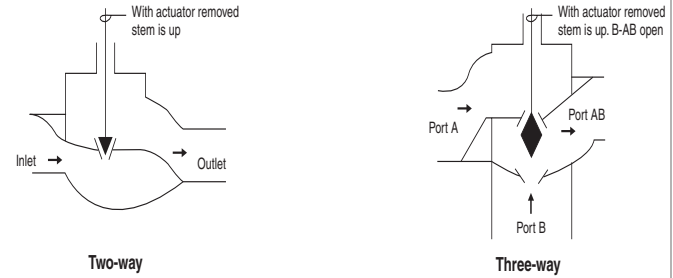
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CONTROL VALVES

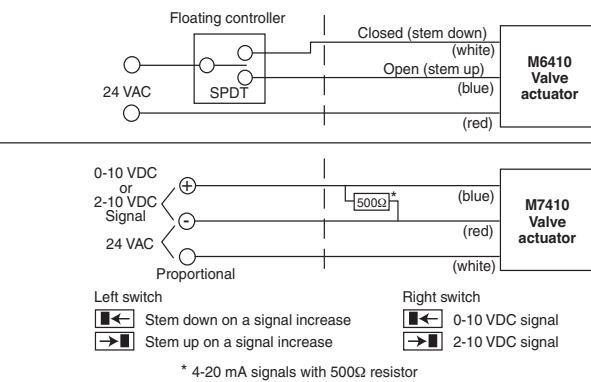
COMMON SPECIFICATIONS

| | |
|----------------------------------|---|
| Connections | FNPT |
| Stroke | 1/4" |
| Body Pattern | 2-Way, 3-Way mixing |
| Flow Characteristic | Equal Percentage (two-way), Linear (three-way) |
| Pressure Rating | 230 psig (1586 kPa) |
| Materials Of Construction | Brass valve body and trim, stainless steel stem |
| Media Compatibility | Hot or chilled water, 50% maximum glycol |
| Media Temperature Range | 36° to 230°F (2° to 110°C) |
| Supply Voltage | 24 VAC, 50/60 Hz |
| Supply VA | 0.7 VA (M6410), 1.4 VA (M7410) |
| Control Signal | Tri-state (floating) (M6410), 0/2-10 VDC or 4-20 mA (M7410) |
| Conduit Connection | 1/2" FNPT hub |
| Wiring | 4.9' (1.5 m) cable |
| Action | Stem up on actuator removal, valve open (B-AB open for 3-way) |
| Stroke Time | 125 seconds @ 60 Hz, 150 seconds @ 50 Hz |
| Operating Temperature | 32° to 140°F (0° to 60°C) |
| Enclosure Rating | UL Listed for plenum use, UL94-5V |
| Warranty | 1 year |

VALVE FLOW CHARACTERISTICS



WIRING



ORDERING INFORMATION

| Model | Description | Maximum Closeoff Pressure | Weight |
|------------|---|---------------------------|-----------------|
| V5862A2005 | 1/2", 2W, NPT, Cv=0.19 | 65 psid | 0.6 lb (.27 kg) |
| V5862A2013 | 1/2", 2W, NPT, Cv=0.29 | 65 psid | 0.6 lb (.27 kg) |
| V5862A2021 | 1/2", 2W, NPT, Cv=0.47 | 65 psid | 0.6 lb (.27 kg) |
| V5862A2039 | 1/2", 2W, NPT, Cv=0.74 | 65 psid | 0.6 lb (.27 kg) |
| V5862A2047 | 1/2", 2W, NPT, Cv=1.2 | 65 psid | 0.6 lb (.27 kg) |
| V5862A2054 | 1/2", 2W, NPT, Cv=1.9 | 65 psid | 0.6 lb (.27 kg) |
| V5862A2062 | 3/4", 2W, NPT, Cv=2.9 | 45 psid | 0.9 lb (.41 kg) |
| V5862A2070 | 3/4", 2W, NPT, Cv=4.9 | 45 psid | 0.9 lb (.41 kg) |
| V5863A2004 | 1/2", 3W, NPT, Cv=0.29 | 55 psid | 0.7 lb (.32 kg) |
| V5863A2012 | 1/2", 3W, NPT, Cv=0.47 | 55 psid | 0.7 lb (.32 kg) |
| V5863A2020 | 1/2", 3W, NPT, Cv=0.74 | 55 psid | 0.7 lb (.32 kg) |
| V5863A2038 | 1/2", 3W, NPT, Cv=1.2 | 22 psid | 0.7 lb (.32 kg) |
| V5863A2046 | 1/2", 3W, NPT, Cv=1.9 | 22 psid | 0.7 lb (.32 kg) |
| V5863A1006 | 3/4", 3W, NPT, Cv=2.9 | 26 psid | 1.0 lb (.45 kg) |
| V5863A1014 | 3/4", 3W, NPT, Cv=4.9 | 26 psid | 1.0 lb (.45 kg) |
| M6410A1029 | Two-position or tri-state (floating), 24 VAC, fail-in-place | | 1.0 lb (.45 kg) |
| M7410F1000 | Proportional (0/2-10 VDC, 4-20 mA), 24 VAC, fail-in-place | | .55 lb (.25 kg) |

SSTAG

RELATED PRODUCTS

Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order

CONTROL VALVES

TWO-POSITION POPTOP™ ZONE VALVES VT SERIES



DESCRIPTION

The VT Series Two-Position PopTop™ zone valves offer a wide range of models to handle chilled water, hot water, and 15 psig (103 kPa) steam applications. PopTop™ valves feature removable actuators to aid in both installation and service. They are available in 2-way and 3-way body patterns and with normally open or normally closed actuators.

FEATURES

- Two- or three-way mixing/diverting body patterns
- Removable and replaceable actuator
- NPT, sweat, or inverted flare connections
- 2-position spring return control

Schneider
Electric

AG13A02A



AH23B020



VT2221



4

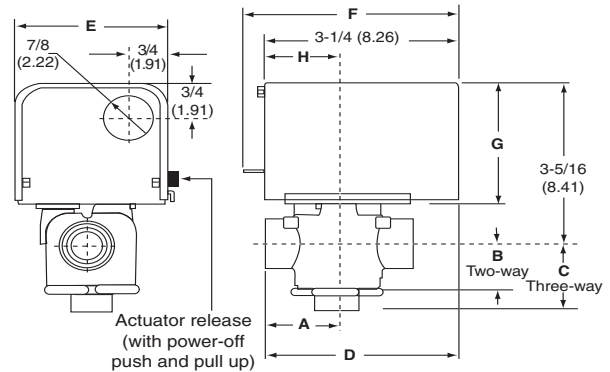
CONTROL VALVES

DIMENSIONS

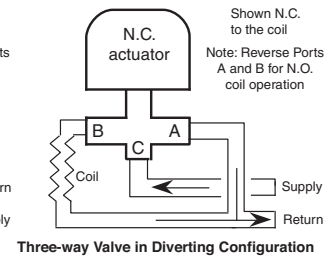
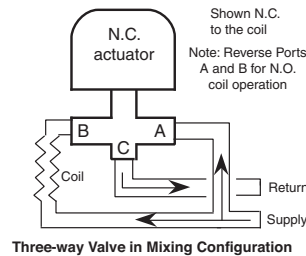
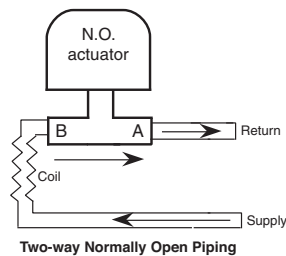
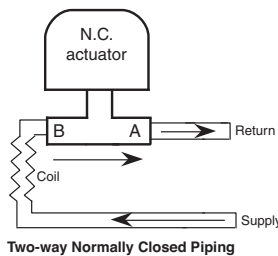
in
(cm)

| VALVE BODY SIZE | DIMENSIONS | | | |
|----------------------|----------------|------------|----------------|---------------|
| | A | B | C | D |
| 1/2" Sweat | 1-5/16 (3.33) | 7/8 (2.22) | 1-5/16 (3.33) | 3-5/16 (8.41) |
| 3/4" Sweat | 1-3/8 (3.49) | 7/8 (2.22) | 1-11/16 (4.29) | 3-3/8 (8.57) |
| 1" Sweat | 1-11/16 (4.29) | 7/8 (2.22) | 1-11/16 (4.29) | 3-5/8 (9.21) |
| 1/2" NPT | 1-3/8 (3.49) | 7/8 (2.22) | 1-5/16 (3.33) | 3-3/8 (8.57) |
| 3/4" NPT | 1-11/16 (4.29) | 7/8 (2.22) | 1-7/16 (3.65) | 3-5/8 (9.21) |
| 1" NPT | 1-7/8 (4.76) | 1 (2.54) | 1-3/4 (4.45) | 3-7/8 (9.84) |
| Inverted flare union | 1-3/8 (3.49) | 7/8 (2.22) | 1-5/16 (3.33) | 4-1/8 (10.48) |

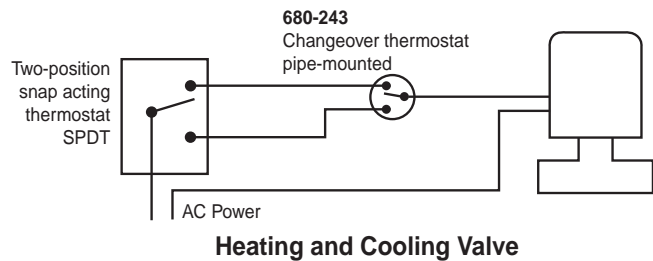
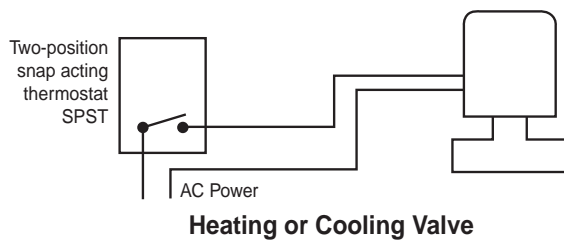
| ACTUATOR | E | F | G | H |
|----------|--------------|----------------|--------------|--------------|
| AG | 2-3/8 (6.03) | 3-11/16 (9.36) | 2-3/8 (6.03) | 1-1/4 (3.18) |
| AH | 2-5/8 (6.67) | 3-7/8 (9.84) | 2-3/8 (6.03) | 1-1/4 (3.18) |



PIPING



WIRING





CONTROL VALVES

TWO-POSITION POPTOP™ ZONE VALVES VT SERIES

4

CONTROL VALVES

SPECIFICATIONS

| | |
|----------------------------------|--|
| Size | 1/2", 3/4", 1" |
| Cv Range | 1.0 to 8.0 |
| Connections | FNPT, Sweat, or inverted flare (3/4" only) |
| Flow Characteristic | Quick Opening |
| Leakage Rating | ANSI Class IV (0.01% of rated capacity) |
| Maximum Closeoff Pressure | Cv 1.0-1.5: 60 psid (414 kPa) AG actuator, 75 psid (517 kPa) AH actuator Cv 2.5-3.0: 40 psid (276 kPa) AG actuator, 50 psid (345 kPa) AH actuator Cv 3.5-4.0: 25 psid (172 kPa) AG actuator, 30 psid (207 kPa) AH actuator Cv 5.0: 20 psid (137 kPa) AG actuator, 25 psid (172 kPa) AH actuator Cv 7.5-8.0: 17 psid (117 kPa) AG actuator, 20 psid (137 kPa) AH actuator |
| Maximum Pressure Rating | 300 psig (2067 kPa) |
| Materials Of Construction | Brass valve body and seat, nickel-plated stem, BUNA N paddle; stainless steel base plate and aluminum cover on actuator |
| Media Compatibility | Hot or chilled water; 50% or less ethylene glycol; 15 psig steam |
| Media Temperature Range | 32° to 200°F (0° to 93°C) with AG actuator; up to 250°F (121°C) with AH actuator |

| | |
|-------------------------------|--|
| Supply Voltage | 24 VAC ±10%; 120 VAC ±10%, 50/60 Hz; 208-277V models also available |
| Supply VA | 7 VA |
| Supply Watts | 6.5 W |
| Control Signal | Two-position, two-wire |
| Wiring | 18" (45.2 cm) leads |
| Action | Two-way valves: N.O./N.C. determined by choice of actuator; three-way valves: N.C. actuator only |
| Actuator Compatibility | AG (general purpose) or AH (high performance) type actuators only Poptop® |
| Actuator Mounting | N.O. contacts, 24-240 VAC, 5A |
| Auxiliary Contacts | Models with auxiliary switch available |
| Auxiliary Switch | 25 seconds maximum @ 60 Hz |
| Drive Time | N.C. actuators only |
| Manual Override | AG actuator: maximum ambient 104°F (40°C); AH actuator: maximum ambient 169°F (77°C) |
| Operating Temperature | 9 seconds maximum |
| Spring Return Time | Valve bodies: <1.4 lb (.64 kg) |
| Weight | Actuators: 1.0 lb (.45 kg) |
| Approvals | UL and ULc Listed; CE |
| Warranty | 2 years |

ORDERING INFORMATION

| MODEL | DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--|-------|------------|------|---|-----|-----|------|---|-----|-----|------------|---|-----|-----|------------|---|-----|-----|----------|---|-----|-----|------|---|-----|-----|----|
| V | Two-position PopTop electric valve | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TEMPERATURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T | Water | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S | Steam (must use high temperature actuator) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONFIGURATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Two-way | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Three-way | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CV SIZE | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 1/2" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 3/4" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 1" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONNECTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Sweat - 1/2", 3/4", 1" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | NPT - 1/2", 3/4", 1" | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Inverted flare - 3/4" only | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CV CAPACITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>2-way</th> <th>3-way</th> <th>Size</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1.0</td> <td>1.5</td> <td>1/2"</td> </tr> <tr> <td>2</td> <td>2.5</td> <td>3.0</td> <td>1/2", 3/4"</td> </tr> <tr> <td>3</td> <td>3.5</td> <td>4.0</td> <td>1/2", 3/4"</td> </tr> <tr> <td>5</td> <td>5.0</td> <td>5.0</td> <td>3/4", 1"</td> </tr> <tr> <td>7</td> <td>7.5</td> <td>7.5</td> <td>3/4"</td> </tr> <tr> <td>7</td> <td>8.0</td> <td>8.0</td> <td>1"</td> </tr> </tbody> </table> | 2-way | 3-way | Size | 1 | 1.0 | 1.5 | 1/2" | 2 | 2.5 | 3.0 | 1/2", 3/4" | 3 | 3.5 | 4.0 | 1/2", 3/4" | 5 | 5.0 | 5.0 | 3/4", 1" | 7 | 7.5 | 7.5 | 3/4" | 7 | 8.0 | 8.0 | 1" |
| 2-way | 3-way | Size | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1.0 | 1.5 | 1/2" | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 2.5 | 3.0 | 1/2", 3/4" | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 3.5 | 4.0 | 1/2", 3/4" | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 5.0 | 5.0 | 3/4", 1" | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 7.5 | 7.5 | 3/4" | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 8.0 | 8.0 | 1" | | | | | | | | | | | | | | | | | | | | | | | | | |

V - T - 2 - 2 - 1 - 1 Example: VT2211

Note: Valve and actuator shipped separately.

*Inverted flare fittings not included with valve. They are field-supplied.

| MODEL | DESCRIPTION |
|------------------------|--------------------|
| A | VT Series actuator |
| CLOSEOFF | |
| G | General operation |
| H | High performance |
| VALVE OPERATION | |
| 1 | Normally closed* |
| 2 | Normally open** |
| TEMPERATURE | |
| 3 | Normal |
| 4 | Steam |
| VOLTAGE | |
| A | 24 VAC, 50/60 Hz |
| B | 120 VAC, 50/60 Hz |
| D | 208 VAC, 60 Hz |
| T | 277 VAC, 60 Hz |
| U | 230/220 VAC, 50 Hz |
| LEADS | |
| 02 | 18" Leads |
| OPTIONS | |
| 0 | None |
| A | End switch |

A - G - 1 - 3 - A - 02 - 0 Example: AG13A020

* Three-way valves use N.C. actuator only; reverse ports for N.O.
** No manual override.

RELATED PRODUCTS

SSTAG
680-243-6

Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order
Changeover thermostat with conduit fitting

ACCESSORIES

| | |
|-----------------|--|
| 30-158-A | AG/AH Series actuator replacement motor, 24 VAC |
| 30-158-B | AG/AH Series actuator replacement motor, 110/120 VAC |
| 30-158-D | AG/AH Series actuator replacement motor, 208 VAC |
| 30-158-T | AG/AH Series actuator replacement motor, 277 VAC |
| 30-158-Y | AG/AH Series actuator replacement motor, 230/240 VAC |
| 436-252 | 3/4" flare-to-sweat fitting |



Schneider
Electric



AP23A000
with VM2313

VM2211

AT33A000



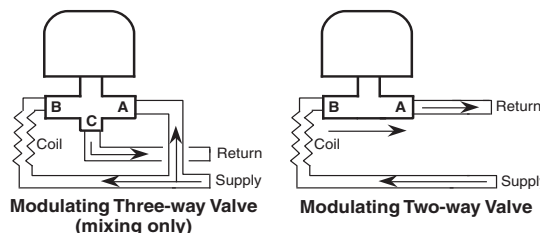
DESCRIPTION

The **VM Series** Modulating PopTop™ Zone Valves offer a wide variety of Cv ranges and control signal options for hot and chilled water. The PopTop™ valves are designed with removable actuators with tri-state or proportional control and either non-spring or spring return action. The valves are available in two- and three-way body patterns, 1/2" to 1-1/4" sizes, and in NPT or sweat pipe connections. An optional motor timeout actuator is available for controllers that do not automatically turn off their signals after the full stroke of the valve.

FEATURES

- Two- or three-way mixing body patterns
- Removable and replaceable actuator
- NPT or sweat connections
- Manual override
- Time-out option (tri-state actuator)
- Non-spring or spring return actuators

PIPING



Note: Piping is the same for N.O. or N.C. type valves.
Normal (Open, Closed) position refers to flow through the coil.

SPECIFICATIONS

| | | | |
|----------------------------------|--|-------------------------------|--|
| Size | 1/2", 3/4", 1", 1-1/4" | Control Signal | VA (AT/AP spring-return) AT actuators: tri-state (floating); AP actuators: proportional (0-5, 0-10, 5-10 VDC or 4-20 mA) jumper selectable |
| Cv Range | 1.0 to 8.0 | Input Impedance | 200 kΩ (0-10 VDC); 300Ω (4-20 mA) |
| Connections | FNPT, Sweat, 1/2" SAE flare, or BSP valve body connections | Wiring | Terminals |
| Flow Characteristic | Equal Percentage for Cv 1 to 4; linear for Cv 8.0 | Action | Two-way valves: N.O./N.C. determined by choice of actuator; three-way valves: use only N.C. actuator |
| Leakage Rating | ANSI Class IV (0.01% of rated capacity) | Actuator Compatibility | AT (tri-state) or AP (proportional 0-10 VDC, 4-20 mA) type actuators only |
| Maximum Closeoff Pressure | Cv 1.0: 50 psid (344 kPa) Cv 2.0: 50 psid (344 kPa), 20 psid (137 kPa) spring return Cv 4.0: 35 psid (241 kPa), 20 psid (137 kPa) spring return Cv 8.0: 35 psid (241 kPa), 15 psid (103 kPa) spring return | Actuator Mounting | Poptop® |
| Maximum Pressure Rating | 300 psig (2067 kPa) | Drive Time | 150 seconds @ 60 Hz |
| Materials Of Construction | Brass valve body and seat, chrome- plated stem, thermoplastic plug; high-temperature plastic actuator housing | Spring Return Time | 9 seconds maximum |
| Media Compatibility | Hot or chilled water; 50% or less ethylene glycol | Manual Override | Combination override lever and position indicator, all actuators |
| Media Temperature Range | 32° to 200°F (0° to 93°C) | Operating Temperature | Maximum ambient 125°F (52°C) |
| Supply Voltage | 24 VAC ±15%, 50/60 Hz | Operating Humidity | 5 to 95% RH non-condensing |
| Supply VA | 1 VA (AT non-spring); 1.2 VA (AT w/ timeout); 1.7 VA (AP non-spring); 10 | Weight | Valve plus actuator assembly, <1.9 lb (.86 kg) |
| | | Enclosure Rating | NEMA 1 |
| | | Approvals | UL873, File #E9429 Class 2; CUL Canadian Standards C22.2 No. 24; CE Approved; C-tick |
| | | Warranty | 2 years |



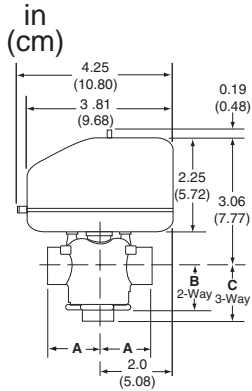
CONTROL VALVES

MODULATING POPTOP™ ZONE VALVES VM SERIES

4

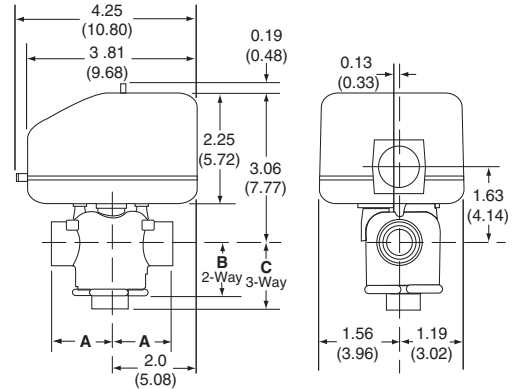
CONTROL VALVES

DIMENSIONS



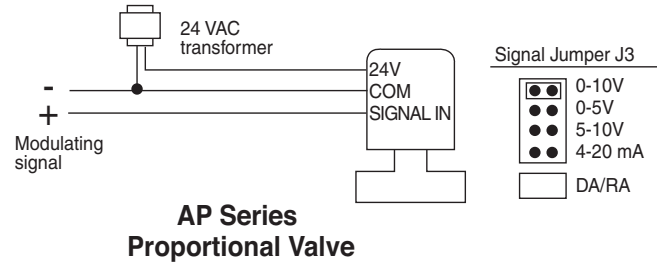
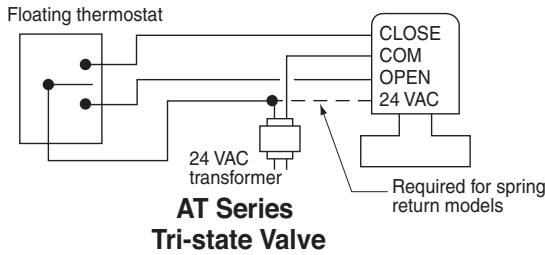
Spring Return

| VALVE BODY SIZE | DIMENSIONS | | |
|-----------------|----------------|--------------|----------------|
| | A | B | C |
| 1/2" sweat | 1-5/16 (3.33) | 15/16 (2.38) | 1-5/16 (3.33) |
| 3/4" NPT | 1-3/8 (3.49) | 15/16 (2.38) | 1-11/16 (3.33) |
| 1" sweat | 1-11/16 (4.29) | 15/16 (2.38) | 1-11/16 (3.33) |
| 1-1/4" sweat | 1-7/8 (4.76) | 1 (2.54) | 1-13/16 (4.76) |
| 1/2" NPT/BSP | 1-2/8 (3.49) | 15/16 (2.38) | 1-5/16 (3.33) |
| 3/4" NPT/BSP | 1-11/16 (4.29) | 15/16 (2.38) | 1-7/16 (3.65) |
| 1" NPT/BSP | 1-7/8 (4.76) | 1 (2.54) | 1-11/16 (4.29) |
| 1/2" SAE flare | 4-9/16 (11.59) | 5/16 (0.31) | 2-1/4 (5.72) |



Non-Spring Return

WIRING



ORDERING INFORMATION

VALVE

| MODEL | DESCRIPTION |
|----------------------|----------------------------------|
| VM | Modulating PopTop electric valve |
| CONFIGURATION | |
| 2 | Two-way |
| 3 | Three-way |
| VALVE SIZE | |
| 2 | 1/2" |
| 3 | 3/4" |
| 4 | 1" |
| 5 | 1-1/4" |
| CONNECTION | |
| 1 | Sweat - 1/2", 3/4", 1", 1-1/4" |
| 2 | Threaded NPT - 1/2", 3/4", 1" |
| 3 | Threaded BSP - 1/2", 3/4", 1" |
| 5 | 1/2" SAE flare |
| CV | |
| 1 | 1.0 |
| 2 | 2.0 |
| 3 | 4.0 |
| 7 | 8.0 |
| SIZE | |
| 1 | 1/2" |
| 2 | 3/4" |
| 3 | 1" |
| 4 | 1-1/4" |

VM - 2 - 2 - 2 - 1 **Example: VM2221**

ACTUATOR

| MODEL | DESCRIPTION |
|------------------------------|---|
| A | VM Series actuator |
| CONTROL | |
| T | Three-wire floating |
| P | Proportional, 0-10 VDC, 4-20 mA |
| ACTION | |
| 1 | Normally closed spring return* |
| 2 | Normally open spring return* |
| 3 | Non-spring return |
| TEMPERATURE RATINGS | |
| 3 | General temperature only |
| VOLTAGE | |
| A | 24 VAC only |
| LEADS | |
| 00 | No leads |
| TIMEOUT CONFIGURATION | |
| T | Time-out for AT models |
| 0 | No timeout for AT models All AP models |

A - T - 3 - 3 - A - 00 - 0 **Example: AT33A000**

* Three-way valves are compatible only with N.C. actuators.
For N.O. simply turn the valve around.

BODY AND ACTUATOR REQUIREMENTS

| Spring Return Action Configurations | |
|--|--|
| Body Configuration | Actuator Spring Return Mode |
| V X 3 X X X | A X 1 X X X X |
| 2 = Two-way 3 = Three-way If body configuration is 2, actuator action can be 1 or 2. If body configuration is 3, actuator action must be 1. | 1 = Normally Closed 2 = Normally Open If actuator action is 1, body configuration can be 2 or 3. If actuator action is 2, body configuration must be 2. |



DESCRIPTION

ASCO **8210 Series** solenoid valves are general service, pilot operated, two-way solenoid valves for liquid and air/inert gas applications. They are available in normally closed or normally open operation with coil voltages to meet any typical application. The **8210 Series** come completely assembled with conduit connection and wire leads.

FEATURES

- **Industry standard Red Hat II**
- **Wide range of sizes and options**
- **High flow rates, low pressure drop**
- **Long service life**
- **For hot or chilled water, air or inert gases**
- **1/2" NPT conduit connection standard**
- **Lead wires standard**
- **Not polarity sensitive**



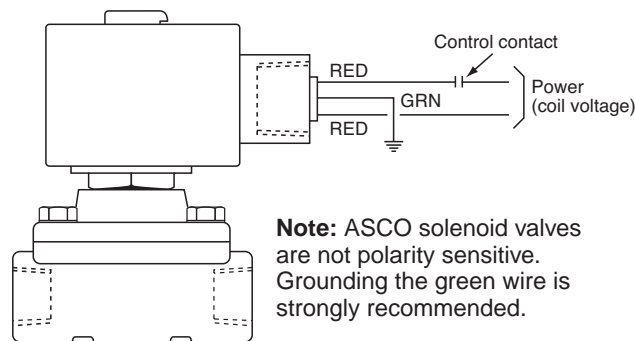
APPLICATION

The **8210 Series** valves are general purpose, and the standard models are suitable for most clean liquids (hot and chilled water, light oils), air and inert gas applications. They are ideal for boiler and cooling tower fill valves. There are also many options available for the **8210 Series**, such as explosionproof enclosures, manual operators, junction box/terminal block wiring connections, and different seal materials for more demanding media.

Many solenoid valves are pilot-operated and require a differential pressure to open/close. Applications such as gravity drain for tanks or vacuum applications may not generate enough differential pressure across the valve for the valve to operate. In these applications, choose a direct-acting valve which is indicated in the ASCO catalog with a minimum differential pressure of zero.

Other types of ASCO valves, also available through Kele, include valves for hot water/steam service, cryogenic service, fuel service, intrinsically safe applications, and pneumatic control systems.

WIRING



| SPECIFICATIONS | |
|----------------------------------|---|
| Size | 1/2" NPT to 2" NPT |
| Cv | 4.0, 5.0, 13, 15, 22, 43, 5.5 |
| Materials Of Construction | Brass body, NBR or PTFE seals and discs |
| Media Compatibility | Clean hot or chilled water, air or inert gas |
| Media Temperature Range | Maximum 180°F (82°C) water temperature |
| Supply Voltage | 120 VAC, 60 Hz, 24 VAC, 60 Hz |
| Action | N.C., N.O. (valve body determines action) |
| Operating Pressure | Minimum 5 psid (35 kPa), maximum 125 to 150 psid (862 to 1034 kPa), varies by model |
| Operating Temperature | 32° to 125°F (0° to 52°C) |
| Enclosure Rating | NEMA 4 (standard Red Hat II enclosure) |
| Approvals | CSA, UL Listed, CE |
| Warranty | 1 year |



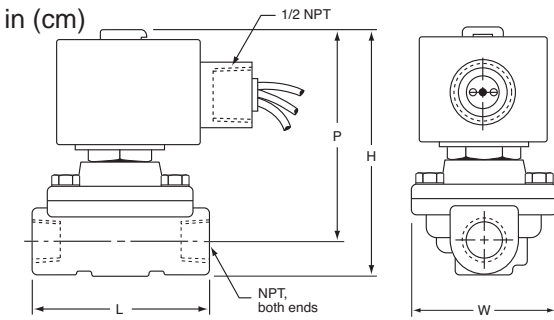
CONTROL VALVES

RED HAT SOLENOID VALVES 8210 SERIES

4

CONTROL VALVES

DIMENSIONS



| Model | Size | H | L | P | Width | Weight lb (kg) |
|----------|------------|------------|------------|------------|------------|-------------------|
| 8210G2 | 1/2" NPT | 3.1 (8.6) | 2.8 (7.0) | 2.8 (7.2) | 2.3 (5.9) | 1.9 (.86) |
| 8210G9 | 3/4" NPT | 3.6 (9.2) | 2.8 (7.1) | 3.0 (7.6) | 2.3 (5.9) | 2.7 (1.2) |
| 8210G4 | 1" NPT | 5.6 (14.3) | 3.8 (9.5) | 4.0 (10.2) | 2.9 (7.5) | 4.4 (2.0) |
| 8218G8 | 1-1/4" NPT | 5.6 (14.3) | 3.7 (9.3) | 4.0 (10.2) | 3.4 (8.6) | 5.6 (2.5) |
| 8210G22 | 1-1/2" NPT | 6.1 (15.6) | 4.4 (11.1) | 4.2 (10.6) | 3.4 (8.6) | 5.8 (2.6) |
| 8210G100 | 2" NPT | 7.3 (18.6) | 5.1 (12.9) | 4.7 (11.9) | 4.7 (11.9) | 7.2 (3.3) |
| 8210G34 | 1/2" NPT | 4.3 (11.0) | 2.8 (7.0) | 3.8 (9.6) | 2.3 (5.8) | 1.9 (.86) |
| 8210G35 | 3/4" NPT | 4.6 (11.6) | 2.8 (7.1) | 3.9 (10.0) | 2.3 (5.8) | 2.7 (1.2) |
| 8210G14 | 1" NPT | 6.5 (16.6) | 3.7 (9.3) | 4.9 (12.5) | 3.4 (8.6) | 4.4 (2.0) |
| 8210G18 | 1-1/4" NPT | 6.5 (16.6) | 3.7 (9.3) | 4.9 (12.5) | 3.4 (8.6) | 5.6 (2.5) |
| 8210G32 | 1-1/2" NPT | 7.0 (17.9) | 4.4 (11.1) | 5.1 (12.9) | 3.8 (9.5) | 5.8 (2.6) |
| 8210G103 | 2" NPT | 8.2 (20.9) | 5.1 (12.9) | 4.7 (11.9) | 4.7 (11.9) | 7.2 (3.3) |

ORDERING INFORMATION

| MODEL | DESCRIPTION |
|-----------------|---|
| 8210G2-120/60 | 1/2" NPT solenoid valve, N.C., 120 VAC coil |
| 8210G2-24/60 | 1/2" NPT solenoid valve, N.C., 24 VAC coil |
| 8210G9-120/60 | 3/4" NPT solenoid valve, N.C., 120 VAC coil |
| 8210G9-24/60 | 3/4" NPT solenoid valve, N.C., 24 VAC coil |
| 8210G4-120/60 | 1" NPT solenoid valve, N.C., 120 VAC coil |
| 8210G4-24/60 | 1" NPT solenoid valve, N.C., 24 VAC coil |
| 8210G8-120/60 | 1-1/4" NPT solenoid valve, N.C., 120 VAC coil |
| 8210G8-24/60 | 1-1/4" NPT solenoid valve, N.C., 24 VAC coil |
| 8210G22-120/60 | 1-1/2" NPT solenoid valve, N.C., 120 VAC coil |
| 8210G22-24/60 | 1-1/2" NPT solenoid valve, N.C., 24 VAC coil |
| 8210G100-120/60 | 2" NPT solenoid valve, N.C., 120 VAC coil |
| 8210G100-24/60 | 2" NPT solenoid valve, N.C., 24 VAC coil |
| 8210G34-120/60 | 1/2" NPT solenoid valve, N.O., 120 VAC coil |
| 8210G34-24/60 | 1/2" NPT solenoid valve, N.O., 24 VAC coil |
| 8210G35-120/60 | 3/4" NPT solenoid valve, N.O., 120 VAC coil |
| 8210G35-24/60 | 3/4" NPT solenoid valve, N.O., 24 VAC coil |
| 8210G14-120/60 | 1" NPT solenoid valve, N.O., 120 VAC coil |
| 8210G14-24/60 | 1" NPT solenoid valve, N.O., 24 VAC coil |
| 8210G18-120/60 | 1-1/4" NPT solenoid valve, N.O., 120 VAC coil |
| 8210G18-24/60 | 1-1/4" NPT solenoid valve, N.O., 24 VAC coil |
| 8210G32-120/60 | 1-1/2" NPT solenoid valve, N.O., 120 VAC coil |
| 8210G32-24/60 | 1-1/2" NPT solenoid valve, N.O., 24 VAC coil |
| 8210G103-120/60 | 2" NPT solenoid valve, N.O., 120 VAC coil |
| 8210G103-24/60 | 2" NPT solenoid valve, N.O., 24 VAC coil |

RELATED PRODUCTS

| | |
|--------------|--|
| SSTAG | Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order |
|--------------|--|

ACCESSORIES

| | |
|--------------|--------------------------------|
| 238210-005-D | 24 VAC coil N.C., (1/2"-2") |
| 238210-032-D | 120 VAC coil N.C., (1/2"-2") |
| 238610-005-D | 24 VAC coil N.O., (1/2"-3/4") |
| 238610-032-D | 120 VAC coil N.O., (1/2"-3/4") |
| 272610-005-D | 24 VAC coil N.O., (1"-2") |
| 272610-032-D | 120 VAC coil N.O., (1"-2") |



Danfoss



4

CONTROL VALVES

DESCRIPTION

The **EVSI Series** solenoid valves are two-way, two-position valves for clean water or low pressure steam applications and are available in normally closed or normally open operation. **EVSI Series** valves are pilot-operated and designed for non-water hammer operation. They come completely assembled with coil and are UL recognized and CSA listed. The coils also include a gasketed conduit connector for NEMA 4 (IP65) environmental rating.

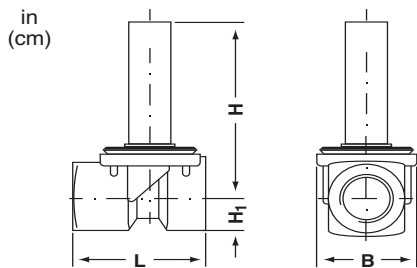
FEATURES

- **Anti-water hammer design**
- **For hot or chilled water and low pressure steam**
- **Fully encapsulated molded coils**
- **1/2" threaded conduit connection**
- **Enclosed screw terminals**
- **NEMA 4 (IP56) environmental rating**
- **Modular conduit connection for easy installation**
- **Unique snap-on coil, no tools required**



EVSI-20-NC-24

DIMENSIONS



| TYPE | NPT | L in (cm) | B in (cm) | H ₁ in (cm) | H* in (cm) | Weight w/o coil lbs (kg) |
|---------|-------|--------------|--------------|---------------------------|---------------|-----------------------------|
| EVSI 15 | 0.5" | 3.25 (8.3) | 2.1 (5.2) | 0.6 (1.5) | 3.7 (9.4) | 1.8 (0.80) |
| EVSI 20 | 0.75" | 3.7 (9.4) | 2.25 (5.8) | 0.7 (1.8) | 3.9 (9.8) | 2.2 (1.0) |
| EVSI 25 | 1" | 4.6 (11.6) | 2.75 (7.0) | 0.9 (2.2) | 4.25 (10.8) | 3.1 (1.4) |
| EVSI 32 | 1.25" | 4.8 (12.2) | 3.25 (8.2) | 0.7 (2.7) | 4.5 (11.5) | 4.4 (2.0) |
| EVSI 40 | 1.5" | 5.2 (13.2) | 3.75 (9.5) | 1.25 (3.2) | 4.9 (12.4) | 7.1 (3.2) |
| EVSI 50 | 2" | 6.4 (16.2) | 4.4 (11.3) | 1.4 (3.7) | 5.1 (13.0) | 9.6 (4.3) |

* For normally open valves + 3/16" (0.5 cm). 018F coil weight = 0.75 (0.34)

SPECIFICATIONS

| | | | |
|----------------------------------|--|------------------------------|--|
| Size | 1/2" FNPT to 2" FNPT | Supply Watts | 14 W |
| Cv | 4.6, 9.3, 12.3, 21, 28, 46.7 | Conduit Connection | 1/2" NPT |
| Life Expectancy | 800,000 cycles minimum | Wiring Terminations | Screw terminals inside DIN connector accept 16 to 18 AWG wire; DIN spades on encapsulated coil |
| Maximum System Pressure | 225 psig (1550 kPa) for 1/2" and 3/4" valves; 180 psig (1240 kPa) for 1" to 2" valves | Action | N.C., N.O. (valve body determines action) |
| Pressure Drop | Minimum differential pressure 4.3 psid (30 kPa) to operate the pilot; maximum differential pressure 142 psid (980 kPa) | Stroke Time | .04 seconds opening time, 0.35 seconds closing time for 1/2" valves; up to 5.0 seconds opening time, 10.0 seconds closing time for 2" valves |
| Materials Of Construction | Brass valve body, EPDM gasket | Manual Override | EVSI-MOM manual override magnet, order separately |
| Media Compatibility | Clean hot or chilled water or glycol, steam ≤15 psig | Operating Temperature | 32° to 120°F (0° to 50°C) |
| Media Temperature Range | -22° to 248°F (-30° to 120°C) | Dimensions | Coil, 2.5"H x 1.8"W x 2.4"D (5.7 x 4.6 x 6.1 cm) |
| Supply Voltage | 120 VAC, 50/60 Hz; 24 VAC, 50/60 Hz; 240 VAC, 50/60 Hz | Enclosure Rating | NEMA 4 (IP65) with waterproof conduit connection |
| | | Warranty | 1 year |

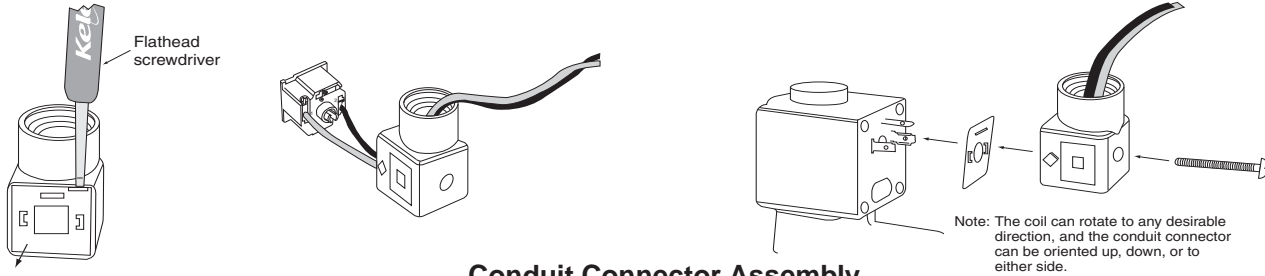
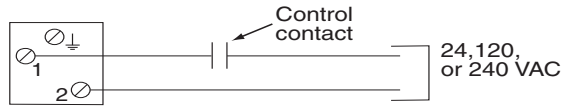


CONTROL VALVES

SOLENOID VALVES EVSI SERIES

4 CONTROL VALVES

WIRING



Conduit Connector Assembly

ORDERING INFORMATION

| MODEL | DESCRIPTION |
|-------|---|
| EVSI | Solenoid valve |
| | SIZE (NPT) |
| 15 | 1/2", Cv = 4.6, opening time 0.04 sec, closing time 0.35 sec |
| 20 | 3/4", Cv = 9.3, opening time 0.04 sec, closing time 1.0 sec |
| 25 | 1", Cv = 12.3, opening time 0.30 sec, closing time 1.0 sec |
| 32 | 1-1/4", Cv = 21.0, opening time 1.0 sec, closing time 2.5 sec |
| 40 | 1-1/2", Cv = 28.0, opening time 1.5 sec, closing time 4.0 sec |
| 50 | 2", Cv = 46.7, opening time 5.0 sec, closing time 10.0 sec |
| | NORMAL MODE |
| NC | Normally closed |
| NO | Normally open |
| | COIL VOLTAGE |
| 24 | 24 VAC, 50/60 Hz |
| 120 | 120 VAC, 50/60 Hz |
| 240 | 240 VAC, 50/60 Hz |

EVSI — 15 — NC — 24

Example: EVSI-15-NC-24 Solenoid valve with 1/2" NPT, normally closed, and 24 VAC coil

ACCESSORIES

| | |
|-----------------|--|
| 018F7655 | 24 VAC, 50/60 Hz replacement coil only |
| 018F7663 | 120 VAC, 50/60 Hz replacement coil only |
| 018F7658 | 208/240 VAC, 60 Hz replacement coil only |

RELATED PRODUCTS

| | |
|-----------------|--|
| EVSI-MOM | Solenoid valve manual override magnet |
| SSTAG | Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order |



DESCRIPTION

The **B2 Series** 2-way and **B3 Series** 3-way ball valves are used for two-position, floating or proportional control of HVAC hot or chilled water. The valves come assembled with direct coupled Belimo electric actuators with spring return or non-spring return operation.

FEATURES

- Equal percentage characteristic (2-way)
- Large Cv range from 0.8 to 57
- Assembled, ready for installation
- Spring return or non-spring return actuators
- Floating, two-position, or proportional control

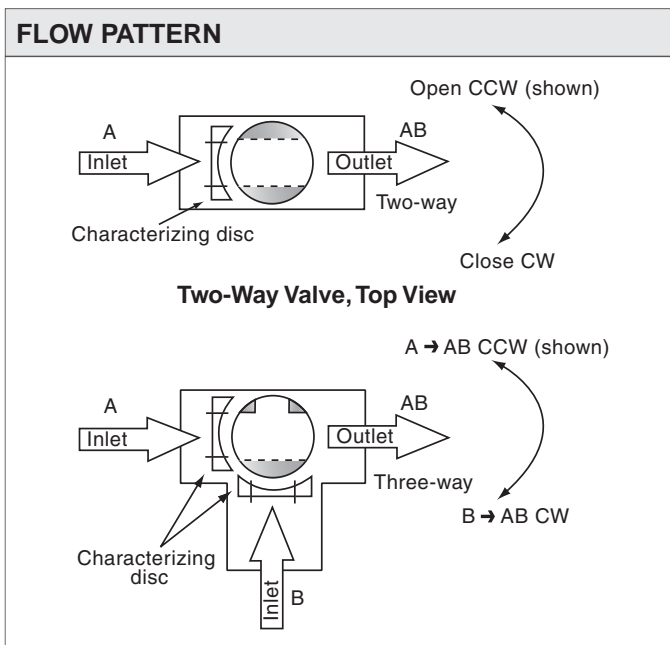


4

CONTROL VALVES

| SPECIFICATIONS | |
|----------------------------------|--|
| Size | 1/2" to 2" NPT standard, larger sizes also available |
| Cv Range | 0.8 to 57 |
| Body Pattern | Two-way, three-way mixing or diverting |
| Flow Characteristic | Two-way equal percentage, three-way linear |
| Leakage Rating | 0% for port A to AB; 2% maximum for port B to AB |
| Maximum Closeoff Pressure | 200 psid (1380 kPa), except B251 is 100 psid (690 kPa) |
| Materials Of Construction | Forged brass body with nickel plating, chrome plated (or stainless steel) ball, PTFE Teflon® seals, Tefzel® characterized disc, EPDM o-rings |
| Media Compatibility | Hot or chilled water, <60% glycol |
| Media Temperature Range | 0° to 212°F (-18° to 100°C) |
| Approvals | UL Listed, CSA, CE |
| Compatible Actuators | Non-spring return TR, LRB, NRB, ARB; spring return TF, LF, AF |
| Pressure Drop | Maximum differential pressure 30 psid (207 kPa), higher could cause noise and/or damage |
| Pressure Rating | Two-way 1/2" to 1-1/4": 600 psig (4135 kPa); Two-way 1-1/4" (B231) to 2": 400 psig (2758 kPa); Three-way 1/2" to 1": 600 psig (4135 kPa); Three-way 1-1/4" to 2": 400 psig (2758 kPa) |
| Warranty | 5 years |

| DIMENSIONS | | | | |
|-----------------|--------------------|-------------|-------------|-------------|
| VALVE SIZE (in) | DIMENSIONS in (cm) | | | |
| | A | B | C | D |
| 1/2 | 2.60 (6.60) | 1.78 (4.52) | 1.65 (4.19) | 1.34 (3.40) |
| 3/4 | 2.95 (7.49) | 1.87 (4.75) | 1.65 (4.19) | 1.52 (3.85) |
| 1 | 3.43 (8.71) | 1.87 (4.75) | 1.65 (4.19) | 1.71 (4.35) |
| 1-1/4 | 4.02 (10.21) | 2.05 (5.20) | 1.65 (4.19) | 2.00 (5.08) |
| 1-1/2 | 4.45 (11.30) | 2.05 (5.20) | 1.65 (4.19) | 2.22 (5.65) |
| 2 | 5.00 (12.70) | 2.27 (5.77) | 1.65 (4.19) | 2.50 (6.35) |



CAUTION: B port leakage rating on three-way valves is 0.5% to 2% of Cv. Do not pipe B port to the coil.



CONTROL VALVES

BALL VALVES B2, B3 SERIES

4

CONTROL VALVES

ORDERING INFORMATION

| VALVE SPECIFICATION | | | | NON-SPRING RETURN | | | | SPRING RETURN (N.O. / CCW) | | |
|---------------------|---------|------|--------|-------------------|--------------|--------------|---------------|----------------------------|-----------|--------------|
| Port | Valve # | Cv | Size | Two-pos/Tri-state | | Proportional | | Two-pos | Tri-state | Proportional |
| | | | | Standard | NEMA 4 | Standard | NEMA 4 | | | |
| Two-way | B209B | 0.8 | 1/2" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Two-way | B211B | 1.9 | 1/2" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Two-way | B212B | 3.0 | 1/2" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Two-way | B213B | 4.7 | 1/2" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Two-way | B214B | 7.4 | 1/2" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Two-way | B218B | 7.4 | 3/4" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Two-way | B219B | 10.0 | 3/4" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Two-way | B223 | 10.0 | 1" | LRB24-3 | NRB24-3-T-N4 | LRB24-SR | NRB24-SR-T-N4 | LF24 | LF24-3 | LF24-SR |
| Two-way | B224 | 19.0 | 1" | LRB24-3 | NRB24-3-T-N4 | LRB24-SR | NRB24-SR-T-N4 | LF24 | LF24-3 | LF24-SR |
| Two-way* | B225 | 30.0 | 1" | LRB24-3 | NRB24-3-T-N4 | LRB24-SR | NRB24-SR-T-N4 | LF24 | LF24-3 | LF24-SR |
| Two-way* | B230 | 19.0 | 1-1/4" | LRB24-3 | NRB24-3-T-N4 | LRB24-SR | NRB24-SR-T-N4 | LF24 | LF24-3 | LF24-SR |
| Two-way | B231 | 25.0 | 1-1/4" | ARB24-3 | NRB24-3-T-N4 | ARB24-SR | NRB24-SR-T-N4 | AFB24 | AFB24-MFT | AFB24-MFT |
| Two-way* | B240 | 37.0 | 1-1/2" | ARB24-3 | ARB24-3-T-N4 | ARB24-SR | ARB24-SR-T-N4 | AFB24 | AFB24-MFT | AFB24-MFT |
| Two-way | B249 | 46.0 | 2" | ARB24-3 | ARB24-3-T-N4 | ARB24-SR | ARB24-SR-T-N4 | AFB24 | AFB24-MFT | AFB24-MFT |
| Two-way* | B250 | 57.0 | 2" | ARB24-3 | ARB24-3-T-N4 | ARB24-SR | ARB24-SR-T-N4 | AFB24 | AFB24-MFT | AFB24-MFT |
| Three-way | B309B | 0.8 | 1/2" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Three-way | B311B | 1.9 | 1/2" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Three-way | B312B | 3.0 | 1/2" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Three-way | B313B | 4.7 | 1/2" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Three-way | B318B | 7.4 | 3/4" | TR24-3-T | NRB24-3-T-N4 | TR24-SR-T | NRB24-SR-T-N4 | TF24 | TF24-3 | TF24-SR |
| Three-way | B323 | 10.0 | 1" | LRB24-3 | NRB24-3-T-N4 | LRB24-SR | NRB24-SR-T-N4 | LF24 | LF24-3 | LF24-SR |
| Three-way* | B325 | 30.0 | 1" | LRB24-3 | NRB24-3-T-N4 | LRB24-SR | NRB24-SR-T-N4 | LF24 | LF24-3 | LF24-SR |
| Three-way | B330 | 19.0 | 1-1/4" | ARB24-3 | ARB24-3-T-N4 | ARB24-SR | ARB24-SR-T-N4 | AFB24 | AFB24-MFT | AFB24-MFT |
| Three-way | B331 | 25.0 | 1-1/4" | ARB24-3 | ARB24-3-T-N4 | ARB24-SR | ARB24-SR-T-N4 | AFB24 | AFB24-MFT | AFB24-MFT |
| Three-way | B340 | 37.0 | 1-1/2" | ARB24-3 | ARB24-3-T-N4 | ARB24-SR | ARB24-SR-T-N4 | AFB24 | AFB24-MFT | AFB24-MFT |
| Three-way | B349 | 46.0 | 2" | ARB24-3 | ARB24-3-T-N4 | ARB24-SR | ARB24-SR-T-N4 | AFB24 | AFB24-MFT | AFB24-MFT |
| Three-way | B350 | 57.0 | 2" | ARB24-3 | ARB24-3-T-N4 | ARB24-SR | ARB24-SR-T-N4 | AFB24 | AFB24-MFT | AFB24-MFT |

*No characterized disc; requires Cv adjustment for installation in pipe sizes larger than the valve.

| MODEL | DESCRIPTION |
|---------|---|
| B ___ / | Ball valve with brackets and mounting (select from above) |
| ---- | Compatible actuator (select from above) (other options for the actuator family are also available) |

All valves are factory assembled. No field assembly required.

Example: B209B / TR24-SR-T 1/2" ball valve, Cv=0.8, with proportional non-spring return actuator

Note: Standard ball valve construction is chrome-plated brass ball for 1/2" and 3/4" sizes (B suffix); stainless steel ball available as an option. On 1" sizes and larger, stainless ball is standard.

Note: Multi-function Technology® (MFT) model actuators are also available. Add -MFT to the base model number and specify the control signal configuration or the Belimo P-code for a pre-set MFT configuration (not required if to be field configured, or if the default configuration of 2-10 VDC is required).

Example: AF24-MFT-P30001 an AF24-MFT configured at Kele for a floating point input, standard 2-10 VDC feedback, and 150 second running time.}

RELATED PRODUCTS

SSTAG
ZS-CCV-90

Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order
NEMA 4 weather shield for LF/AF actuators



BELIMO



B215HT029/LRB24-SR



4

CONTROL VALVES

DESCRIPTION

The **HTCCV Series** 2-way high temperature ball valves are used for two-position, floating or proportional control of HVAC hot or chilled water, potable water or low pressure steam. The valves come assembled with direct coupled Belimo electric actuators with spring return or non-spring return operation. This valve displays a true equal percentage characteristic. They come in standard sizes from 1/2" to 1" and Cv's from (0.29 to 28).

FEATURES

- Equal percentage flow characteristic
- Extremely low lead content enabling valve to be used for potable water
- Assembled, ready for installation
- Spring return or non-spring return actuators
- Floating, two-position, or proportional control

SPECIFICATIONS

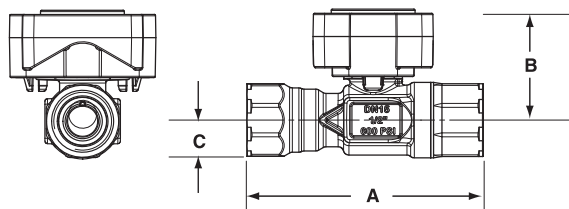
Size 1/2", 3/4" and 1" FNPT
Cv Range 0.29 to 28
Body Pattern 2-way only
Flow Characteristic Equal Percentage
Leakage Rating 0%, bubble tight
Maximum Closeoff Pressure 200 psid (1380 kPa)

Materials Of Construction Brass body (DZR) P-CuZn35Pb2, stainless steel ball and stem, Tefzel® characterized disc and seat, EPDM o-rings

Media Compatibility Hot water, <60% glycol, <15 psig (104 kPa) steam, potable water

Media Temperature Range 60° to 266°F (16° to 130°C) water, limited to 250°F (121°C) for steam
Approvals UL Listed, CSA, CE
Compatible Actuators Non-spring return: TR, LRB; Spring return: TF, LF
Pressure Drop Maximum differential pressure 60 psid (414 kPa) for water, 15 psid (104 kPa) for steam
Pressure Rating 600 psig (4135 kPa)
Warranty 5 years

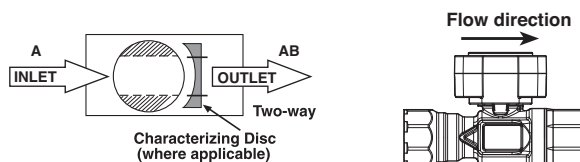
DIMENSIONS



| Valve Nominal Size | | | Dimensions - inches (cm) | | |
|--------------------|--------|---------|--------------------------|-------------|--------------|
| Valve Body | Inches | DN (mm) | A | B | C |
| B215HT | 1/2" | 15 | 3.33 (8.46) | 2.09 (5.32) | 0.53 (1.35) |
| B220HT | 3/4" | 20 | 3.96 (10.06) | 2.37 (6.01) | 0.67 (1.70) |
| B225HT | 1" | 25 | 5.14 (13.06) | 3.14 (7.98) | 0.92 (2.325) |

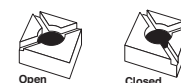
FLOW PATTERN

2-way High Temperature Characterized Control Valves



Upstream A
Downstream AB

Valve should be installed with the characterization disc downstream (unlike the CCV series valves).





CONTROL VALVES

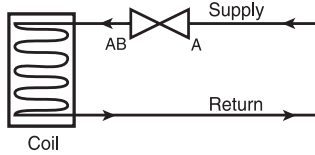
HIGH TEMPERATURE BALL VALVES HTCCV SERIES

4

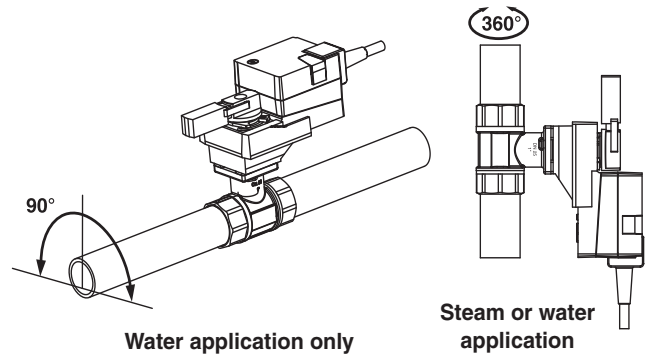
CONTROL VALVES

MOUNTING / PIPING DIAGRAMS

2-way Valve Piping Diagram
(1 Input, 1 Output)



Assembly can be mounted horizontally or vertically for water applications. For steam applications the valve can be mounted vertically but if mounted horizontally the valve must be 90° off center of the pipe. Do not install with actuator below pipe.



ORDERING INFORMATION

| VALVE SPECIFICATION | | | | NON-SPRING RETURN | | SPRING RETURN | | |
|---------------------|------------|-------|------|-------------------|--------------|---------------|-----------|--------------|
| Port | Valve# | Cv | Size | Two-Pos/Tri-state | Proportional | Two-Pos | Tri-state | Proportional |
| Two-way | B215HT029 | 0.29 | 1/2" | TR24-3-T | TR24-SR-T | TF24 | TF24-3 | TF24-SR |
| Two-way | B215HT046 | 0.46 | 1/2" | TR24-3-T | TR24-SR-T | TF24 | TF24-3 | TF24-SR |
| Two-way | B215HT073 | 0.73 | 1/2" | TR24-3-T | TR24-SR-T | TF24 | TF24-3 | TF24-SR |
| Two-way | B215HT116 | 1.16 | 1/2" | TR24-3-T | TR24-SR-T | TF24 | TF24-3 | TF24-SR |
| Two-way | B215HT186 | 1.86 | 1/2" | TR24-3-T | TR24-SR-T | TF24 | TF24-3 | TF24-SR |
| Two-way | B215HT290 | 2.9 | 1/2" | TR24-3-T | TR24-SR-T | TF24 | TF24-3 | TF24-SR |
| Two-way | B215HT455* | 4.55 | 1/2" | TR24-3-T | TR24-SR-T | TF24 | TF24-3 | TF24-SR |
| Two-way | B220HT186 | 1.86 | 3/4" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B220HT290 | 2.9 | 3/4" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B220HT464 | 4.64 | 3/4" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B220HT731 | 7.31 | 3/4" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B220HT928 | 9.28 | 3/4" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B220HT1320 | 13.2 | 3/4" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B225HT464 | 4.64 | 1" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B225HT731 | 7.31 | 1" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B225HT1160 | 11.6 | 1" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B225HT1856 | 18.56 | 1" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |
| Two-way | B225HT2800 | 28 | 1" | LRB24-3 | LRB24-SR | LF24 | LF24-3 | LF24-SR |

*Modified equal percentage characteristic

B_ _ _ / Select ball valve # from list above (brackets and mounting are included).

Select actuator # from list above (other options for the actuator family are also available)

Example: B215HT029 / TR24-SR 1/2" ball valve, Cv=0.29 with proportional non-spring return actuator

All valves are factory assembled. No field assembly required.

Note: Multi-Function Technology® (MFT) model actuators are available. Add -MFT to the base model number and specify the control signal configuration or the Belimo P-code for a pre-set MFT configuration (not required if to be field configured, or if the default configuration of 2-10 VDC is required).

RELATED PRODUCTS

SSTAG

Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order



Honeywell

DESCRIPTION

The **VBN2** and **VBN3 Series** are Honeywell's characterized flow, low torque, two- and three-way ball valves. They are designed to provide Cv ratings that closely match industry standard globe valves and they have equal percentage flow characteristics. A single-style bracket maximizes simplicity and flexibility in mounting spring or non-spring return actuators. The valve bodies are 1/2" to 2" NPT sizes and use low torque, low cost actuators.

FEATURES

- *Parabolic flow insert constructed into the ball*
- *Cv ratings similar to globe valves*
- *Three-way body pattern similar to globe valves*
- *Low torque means smaller, lower cost actuators*
- *Common mounting bracket*
- *Removable manual override handle*
- *Flexible bracket orientation*
- *Plenum rated*
- *Available with or without actuator*
- *Nema 3R option available*



VBN2AE3P0A



VBN2BL3SRA



VBN2AB3S0X

4

CONTROL VALVES

SPECIFICATIONS

| | | | |
|----------------------------------|--|----------------------------------|---|
| Size | 1/2" to 3" FNPT (three-way to 2-1/2") | Materials Of Construction | Forged brass body (ASTM B283), nickel-plated brass (or stainless steel) ball and stem, EPDM o-ring stem seals and EPDM with reinforced Teflon® ball seals |
| Cv Range | 0.38 to 162 | Media Compatibility | Hot or chilled water, <50% glycol |
| Body Pattern | Two-way and three-way (mixing or diverting) | Media Temperature Range | -22° to 250°F (-30° to 121°C) |
| Flow Characteristic | Two-way: equal percentage for models with parabolic insert, linear for full port models; Three-way: equal percentage ports A-to-AB and linear ports B-to-AB | Compatible Actuators | Any Honeywell or Kele 44 in-lb non-spring return or spring return actuator will operate all VBN2, VBN3 assemblies up to 3" |
| Leakage Rating | ANSI Class IV (0.01% of Cv) | Operating Temperature | See MN Series and MS Series in ACTUATORS & DAMPERS catalog section |
| Maximum Closeoff Pressure | Two-way 1/2" and 3/4": 130 psid (897 kPa); Two-way 1" to 3": 100 psid (690 kPa); Three-way 1/2" to 1": 50 psid (345 kPa); Three-way 1-1/4" to 2-1/2": 40 psid (276 kPa) | Pressure Rating | 360 psig (2482 kPa) @ 250°F (121°C) |
| | | Warranty | 1 year on valves, 5 years on actuators |



CONTROL VALVES

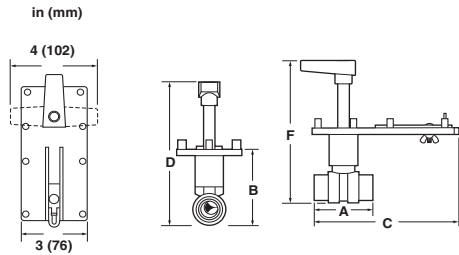
BALL VALVES

VBN2, VBN3 SERIES

4

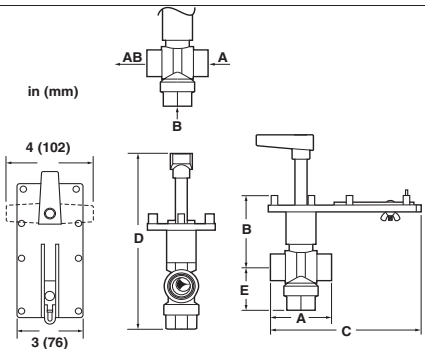
CONTROL VALVES

DIMENSIONS



| PIPE SIZE (in) | MODEL | APPROXIMATE DIMENSIONS inches (mm) | | | | APPROX. WEIGHT lb (kg) |
|----------------|----------|---------------------------------------|---------------|---------------|----------------|---------------------------|
| | | A | B | C | F | |
| 1/2, 3/4 | VBN2A, B | 2-5/8 (67) | 3-11/16 (94) | 6-1/2 (165) | 8-5/16 (211) | 1 (0.5) |
| 1 | VBN2C | 4-3/8 (111) | 3-15/16 (100) | 7-3/8 (187) | 8-7/8 (225) | 2.4 (1.1) |
| 1-1/4 | VBN2D | 3-5/8 (92) | 4-7/16 (113) | 7 (178) | 9-1/16 (231) | 2.4 (1.1) |
| 1-1/2 | VBN2E | 3-3/4 (95) | 5-3/16 (132) | 7-1/16 (179) | 9-1/16 (231) | 3.2 (1.5) |
| 2 | VBN2F | 4-3/8 (111) | 5-3/4 (146) | 7-7/16 (189) | 10-1/2 (267) | 5 (2.3) |
| 2-1/2 | VBN2G | 4-3/4 (121) | 5-3/4 (146) | 7-9/16 (192) | 10-1/2 (267) | 5.5 (2.5) |
| 3 | VBN2H | 5 (127) | 5-7/8 (149) | 7-11/16 (195) | 10-11/16 (271) | 5.9 (2.7) |

VBN2 – Two-way Valves



| PIPE SIZE (in) | MODEL | APPROXIMATE DIMENSIONS inches (mm) | | | | | APPROX. WEIGHT lb (kg) |
|----------------|-------|---------------------------------------|---------------|---------------|----------------|------------|---------------------------|
| | | A | B | C | D | E | |
| 1/2 | VBN3A | 3-1/2 (90) | 3-5/16 (84) | 7 (178) | 9-3/8 (238) | 2-3/8 (60) | 2.4 (1.1) |
| 3/4 | VBN3B | 2-13/16 (71) | 3-5/16 (84) | 6-1/2 (168) | 8-13/16 (224) | 2 (51) | 2 (0.9) |
| 1 | VBN3C | 4-1/2 (114) | 4 (102) | 7-13/16 (198) | 10-13/16 (275) | 3-1/4 (83) | 3.3 (1.5) |
| 1-1/4 | VBN3D | 3-5/8 (92) | 4 (102) | 7-5/16 (186) | 10-5/16 (262) | 2-3/4 (70) | 2.8 (1.3) |
| 1-1/2 | VBN3E | 4-1/2 (114) | 4-1/2 (114) | 7-13/16 (198) | 11 (279) | 3-1/4 (83) | 3.3 (1.5) |
| 2 | VBN3F | 4 (102) | 4-1/2 (114) | 7-5/16 (186) | 11 (279) | 3-1/4 (83) | 3.3 (1.5) |
| 2-1/2 | VBN3G | 5 (127) | 5-13/16 (132) | 7-13/16 (198) | 12-5/16 (313) | 3-3/4 (95) | 3.8 (1.7) |

VBN3 – Three-way Valves

ORDERING INFORMATION

| | |
|-----|---|
| VBN | Ball Valve |
| 2 | Valve Type |
| 2 | Two-way type |
| 3 | Three-way type |
| | Valve Size |
| A | 1/2" NPT (DN15) |
| B | 3/4" NPT (DN20) |
| C | 1" NPT (DN25) |
| D | 1-1/4" NPT (DN32) |
| E | 1-1/2" NPT (DN40) |
| F | 2" NPT (DN50) |
| G | 2-1/2" NPT (DN65) |
| H | 3" NPT (DN80), (two-way only) |
| | Cv Letter Code Designation |
| B | |
| D | See Table 1 for two-way valves |
| - | See Table 2 for three-way valves |
| U | |
| 3 | ANSI 300 Valve construction |
| P | Plated (chrome or nickel) |
| S | Stainless steel |
| 0 | No enclosure |
| R | NEMA 3R enclosure |
| | Actuator Selection |
| A | Non-spring return, floating actuator (MN6105A1011) |
| B | Non-spring return, modulating actuator (MN7505A2001) |
| C | Spring return, 24V, two-position actuator (MS8105A1030) |
| D | Spring return, modulating/floating actuator (MS7505A2030) |
| X | No actuator |

VBN 2 A B 3 P 0 C Example: VBN-2-B-A-3P0-C two-way ball valve, 1/2" NPT, 0.38 Cv, nickel-plated brass trim with MS8105A1008 actuator

TABLE 1. TWO-WAY Cv LETTER DESIGNATOR VALUES

| Pipe Size | Cv Letter Designator | | | | | | | | | | | | | |
|-----------|----------------------|------|-----|-----|-----|-----|-------|-------|-----|-----|----|------|------|-----|
| | B | D | E | G | H | J | K | L | M | N | R | S | U | |
| 1/2" | 0.38 | 0.68 | 1.3 | 2.6 | 4.7 | 8.0 | 11.7* | | | | | | | |
| 3/4" | 0.31 | 0.63 | 1.2 | 2.5 | 4.3 | 7.4 | 10.1 | 14.7* | 29* | | | | | |
| 1" | | | | | 4.4 | 9.0 | | 15.3 | 26 | 44* | | | | |
| 1-1/4" | | | | | 4.4 | 8.3 | 14.9 | 25 | 37 | 41* | | 102* | | |
| 1-1/2" | | | | | | | | 23 | 30 | 41 | 74 | | | |
| 2" | | | | | | | | | | | 42 | 71 | 100 | |
| 2-1/2" | | | | | | | | | | | 45 | 72 | 101 | 162 |
| 3" | | | | | | | | | | | 49 | 82 | 145* | |

TABLE 2. THREE-WAY Cv LETTER DESIGNATOR VALUES

| Pipe Size | Cv Letter Designator | | | | | | | | | | | |
|-----------|----------------------|-----|-----|-----|-----|-------|-----|-----|-----|----|------|-----|
| | E | F | G | H | J | K | L | M | N | P | R | T |
| 1/2" | 1.0 | 2.4 | | 4.3 | 8.0 | | | | | | | |
| 3/4" | 1.3 | 2.4 | 3.8 | | 7.0 | 11.0* | | | | | | |
| 1" | 1.3 | 2.3 | 3.5 | 4.5 | 8.6 | 14.9 | 22 | 31 | | | | |
| 1-1/4" | | | | 4.1 | 8.7 | 12.7 | 19* | 27 | 34* | | | |
| 1-1/2" | | | | 4.0 | 8.3 | 13.4 | 24 | 32* | | 61 | | |
| 2" | | | | | | | 24 | | 38 | 57 | 83 | 109 |
| 2-1/2" | | | | | | | | | 38 | 74 | 100* | |

*Denotes full port valve (with no insert). Provides linear flow control.

RELATED PRODUCTS

SSTAG

Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order



DESCRIPTION

The Johnson Controls **VG1000 Series** ball valves are available with two- and three-way body patterns with a characterized insert for equal percentage flow control and Cv ratings in the range of traditional globe valves. They are available in connection sizes from 1/2" to 2" (Cv's from 1.2 to 73.7). The **VG1000 Series** valves are used in combination with spring return and non-spring return direct-coupled actuators from Johnson Controls. The **VG1000 Series** are designed to control chilled water, hot water, 50% glycol, and 15 psig steam (stainless trim models only).

FEATURES

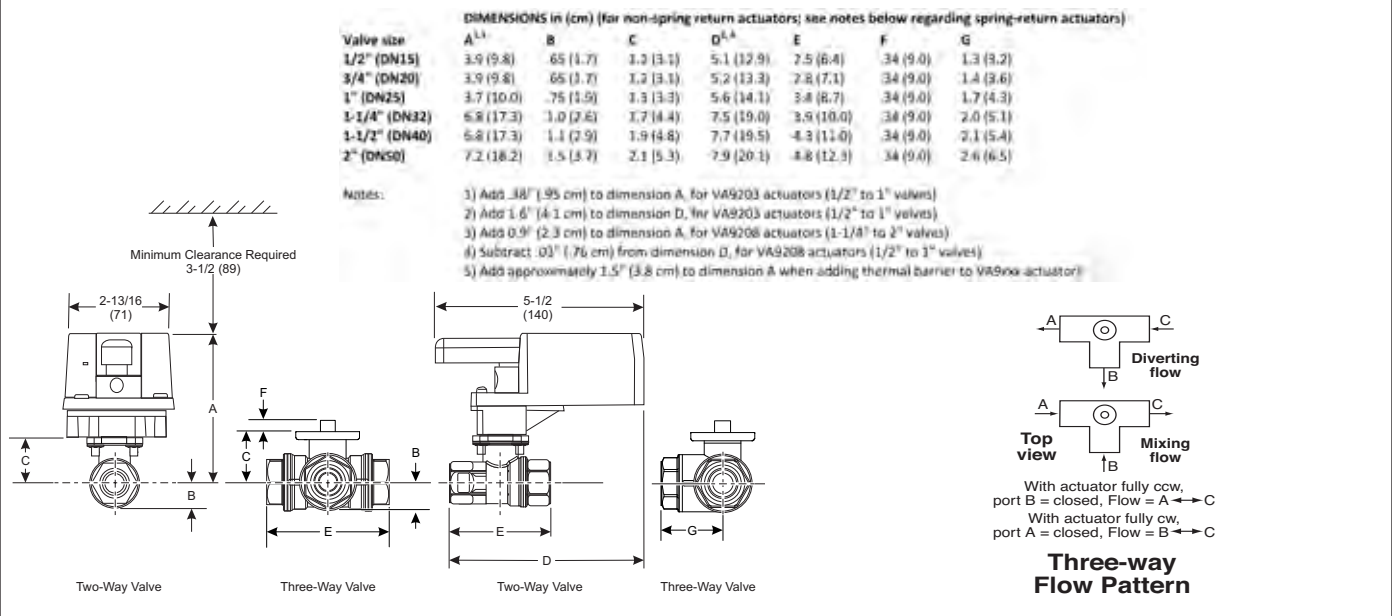
- **Minimum 200,000 full cycle life expectancy**
- **Compatible with water, glycol, and low-pressure steam**
- **Equal percentage flow characteristics**
- **Assembled or ordered separately**



VG1241AF/
M9106-AGA-2



DIMENSIONS



SPECIFICATIONS

| | | | |
|----------------------------------|--|--------------------------------|--|
| Size | 1/2" to 2" FNPT | Media Compatibility | Hot or chilled water, <50% glycol, <15 psi steam (stainless trim models only) |
| Cv Range | 1.2 to 73.7 | Media Temperature Range | Stainless trim: 23° to 250°F (-5° to 121°C); Brass trim: 23° to 203°F (-5° to 95°C) |
| Life Expectancy | 200,000 leak-free cycles | Compatible Actuators | Non-spring return: VA9104 (integral linkage) or M9109 w/M9000-520 linkage; Spring return: VA9203, VA9208 (integral linkage) |
| Body Pattern | Two-way and three-way mixing or diverting | Operating Temperature | See M9100 Series and M9200 Series in ACTUATORS & DAMPERS catalog section |
| Flow Characteristic | Equal percentage | Warranty | 1 year |
| Leakage Rating | ANSI Class IV (0.01% of Cv) | | |
| Maximum Closeoff Pressure | 200 psid (1378 kPa) | | |
| Pressure Drop | 50 psid (345 kPa) maximum; full port valves up to 150 psid (1034 kPa) | | |
| Pressure Rating | 580 psig (3996 kPa), PN40 | | |
| Materials Of Construction | Forged brass body, stainless steel (or chrome-plated brass) ball, stainless steel (or nickel-plated brass) stem, EPDM o-ring stem seals and graphite reinforced PTFE seats | | |



CONTROL VALVES

BALL VALVES VG1000 SERIES

4

CONTROL VALVES

ORDERING INFORMATION

2-way Stainless Steel Trim Ball Valve Assemblies, NPT Connections^{1,2,3,4,5}

| Valve | | | Non Spring Return Actuator | | | | Spring Return Actuator ⁶ | | |
|--------|----------|------|----------------------------|---------------|---------------|----------|-------------------------------------|---------------|---------------|
| Size | Model | Cv | Two-position | Floating | Proportional | Linkage | Two-position | Floating | Proportional |
| 1/2" | VG1245AD | 1.2 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1245AE | 1.9 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1245AF | 2.9 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1245AG | 4.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1245AL | 7.4 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1245AM | 11.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 3/4" | VG1245BG | 4.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 3/4" | VG1245BL | 7.4 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 3/4" | VG1245BN | 11.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1" | VG1245CL | 7.4 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1" | VG1245CN | 11.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1" | VG1245CP | 18.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1-1/4" | VG1245DN | 11.7 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/4" | VG1245DP | 18.7 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/4" | VG1245DR | 29.2 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/2" | VG1245EP | 18.7 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/2" | VG1245ER | 29.2 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/2" | VG1245ES | 46.8 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 2" | VG1245FR | 29.2 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 2" | VG1245FS | 46.8 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 2" | VG1245FT | 73.7 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |

3-way Stainless Steel Trim Ball Valve Assemblies, NPT Connections^{1,2}

| Valve | | | Non Spring Return Actuator | | | | Spring Return Actuator ⁶ | | |
|--------|----------|------|----------------------------|---------------|---------------|----------|-------------------------------------|---------------|---------------|
| Size | Model | Cv | Two-position | Floating | Proportional | Linkage | Two-position | Floating | Proportional |
| 1/2" | VG1845AD | 1.2 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1845AE | 1.9 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1845AF | 2.9 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1845AG | 4.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1845AL | 7.4 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1/2" | VG1845AM | 11.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 3/4" | VG1845BG | 4.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 3/4" | VG1845BL | 7.4 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 3/4" | VG1845BN | 11.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1" | VG1845CL | 7.4 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1" | VG1845CN | 11.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1" | VG1845CP | 18.7 | VA9104-IGA-3S | VA9104-AGA-3S | VA9104-GGA-3S | Included | VA9203-BGA-2 | VA9203-AGA-2Z | VA9203-GGA-2Z |
| 1-1/4" | VG1845DN | 11.7 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/4" | VG1845DP | 18.7 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/4" | VG1845DR | 29.2 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/2" | VG1845EP | 18.7 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/2" | VG1845ER | 29.2 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 1-1/2" | VG1845ES | 46.8 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 2" | VG1845FR | 29.2 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 2" | VG1845FS | 46.8 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |
| 2" | VG1845FT | 73.7 | M9109-AGA-2 ⁷ | M9109-GGA-2 | M9000-520 | | VA9208-BGA-2 | VA9208-AGA-2 | VA9208-GGA-2 |

Example: VG1845AD/VA9104-IGA-3S is an assembly of a 3-way 1/2", Cv=1.2 valve with non-spring return, 2-position actuator.

- Notes:
- 1) Order optional thermal barrier M9000-561 for steam applications when using VA actuators. Barrier is included with linkage M9000-520.
 - 2) Order optional weathershield M9000-341 for assemblies using VA actuators. Not available for assemblies using M actuators & linkage.
 - 3) Valves are also available with brass trim, for water applications only; models are VG1241 instead of VG1245, for example.
 - 4) Valves are also available with sweat connections; models are VG1275 instead of VG1245, for example.
 - 5) Valves are also available with press connections; models are VG1295 instead of VG1245, for example.
 - 6) Spring return assembly model numbers have either -NC (normally closed) or -NO (normally open) suffix and will be pre-assembled as such. For 3W valves, "normal" refers to flow to the coil, port A.
 - 7) Requires controller with timeout, or use M9106-IGA-2. No time out on M9109. The M9106-IGA valve size limit is 1.5" maximum.
 - 8) Valves, linkages, and actuators can be ordered separately or assembled (no extra charge).



DESCRIPTION

Honeywell **VRN, VRW Series** pressure-regulated control valves reduce overall installation labor by integrating flow control and temperature control functions into a single valve assembly and then automatically controlling the flow in each hydronic system circuit to maintain temperature when piping pressures fluctuate. The valves feature an integrated pressure control cartridge that delivers flow balancing and control functions in one package. Calculating Cv is not required, simply match the circuit flow rate with the valve capacity to determine the correct model number.

VRN valves are threaded, sizes 1/2" to 3" FNPT, and use standard Honeywell 44 in-lb fail-safe and non-fail safe direct-coupled actuators. **VRW** valves are flanged sizes 2-1/2" to 6".

FEATURES

- **Field serviceable valve stem and cartridge saves service labor and system downtime**
- **Controls flow exactly at all load conditions, not only design conditions, for consistent accuracy**
- **Accurate flow regulation allows for the optimum sizing of chillers, boilers and pumps**
- **Optional test ports allow system access for balancing reports**
- **Manual override for convenient system flushing, filling, service and manual control during power outage**

Honeywell



NEW!

VRN2AF3D2D

4

CONTROL VALVES

SPECIFICATIONS

| | | | |
|----------------------------------|---|--------------------------------|--|
| Size | 1/2" to 3" FNPT; 2-1/2" to 6" multi-size flanges | Media Compatibility | Hot or chilled water, <50% glycol |
| Body Pattern | 2-Way | Media Temperature Range | -22° to 250°F (-30° to 121°C) for NPT valves; -4° to 248°F (-20° to 120°C) for flanged valves |
| Flow Characteristic | Equal Percentage | Compatible Actuators | Honeywell 44 in-lb non-spring return or spring return actuators will operate all VRN assemblies up to 3" |
| Flow Range | 1.0 gpm (1/2" NPT valve) to 469 gpm (6" flanged valve) | Operating Temperature | See MN Series and MS Series in ACTUATORS & DAMPERS catalog section |
| Leakage Rating | 0.01% for NPT valves, 0.2% for flanged valves | Warranty | 1 year on valves, 5 years on actuators |
| Maximum Closeoff Pressure | 100 psid (690 kPa) | | |
| Pressure Rating | 360 psig (2482 kPa) @ 250°F (121°C) for NPT valves; 580 psig (4000 kPa) @ 248°F (120°C) for flanged valves | | |
| Materials Of Construction | Forged brass body (ASTM B283), nickel-plated brass (or stainless steel) ball and stem, EPDM o-ring stem seals and EPDM with reinforced Teflon® ball seals; flanged bodies are ductile iron (ASTM A536-65T, Class 60-45-18); regulator is hydrogenated acrylonitrile-butadiene rubber rolling diaphragm in stainless steel housing | | |



CONTROL VALVES

PRESSURE REGULATING BALL VALVES VRN, VRW SERIES

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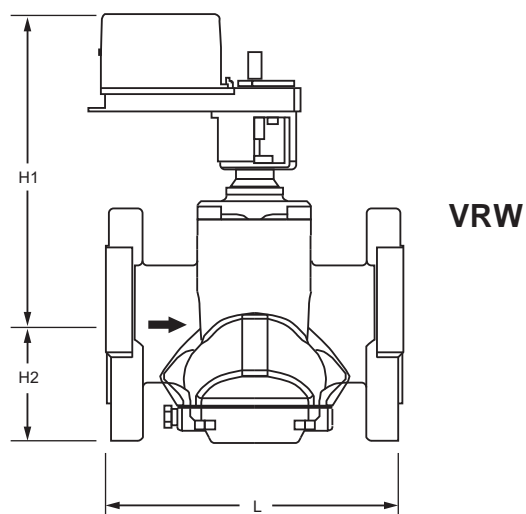
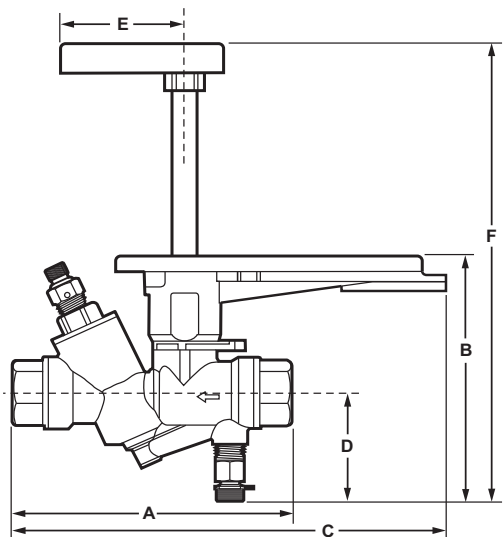
CONTROL VALVES

DIMENSIONS

| Model | Size | A | B | C | D | E | F | L | H1 | H2 | Weight |
|-------|------------------------------|---|--|--|--|------------------|---|--------------------|--------------------|-------------------|---|
| VRN2A | 1/2" (DN15) | 5.7" (14.5 cm) | 4.3" (10.9 cm) | 8.6" (21.8 cm) | 1.0" (2.6 cm) | 2.5" (6.4 cm) | 8.4" (21.3 cm) | -- | -- | -- | 0.9 lb (0.4 kg) |
| VRN2B | 3/4" (DN20) | 5.7" (14.5 cm) | 4.3" (10.9 cm) | 8.6" (21.8 cm) | 1.0" (2.6 cm) | 2.5" (6.4 cm) | 8.4" (21.3 cm) | -- | -- | -- | 0.9 lb (0.4 kg) |
| VRN2C | 1" (DN25) | 5.9" (15.0 cm) or 9" (22.9 cm) | 4.3" (10.9 cm) or 4.6" (11.7 cm) | 8.7" (22.1 cm) or 10.9" (27.7 cm) | 1.0" (2.6 cm) or 1.6" (4.1 cm) | 2.5" (6.4 cm) | 8.4" (21.3 cm) or 9.4" (23.9 cm) | -- | -- | -- | 0.9 lb (0.4 kg) or 1.5 lb (0.7 kg) |
| VRN2D | 1-1/4" (DN32) | 8.4" (21.3 cm) | 4.6" (11.7 cm) | 10.6" (26.9 cm) | 1.6" (4.1 cm) | 2.5" (6.4 cm) | 9.4" (23.9 cm) | -- | -- | -- | 1.5 lb (0.7 kg) |
| VRN2E | 1-1/2" (DN40) | 8.2" (20.8 cm) or 10.0" (25.4 cm) | 4.6" (11.7 cm) or 5.2" (13.2 cm) | 10.5" (26.7 cm) or 12.1" (30.7 cm) | 1.6" (4.1 cm) or 2.1" (5.3 cm) | 2.5" (6.4 cm) | 9.4" (23.9 cm) or 10.4" (26.4 cm) | -- | -- | -- | 1.5 lb (0.7 kg) or 3.6 lb (1.6 kg) |
| VRN2F | 2" (DN50) | 9.9" (25.1 cm) | 5.2" (13.2 cm) | 12.0" (30.5 cm) | 2.1" (5.3 cm) | 2.5" (6.4 cm) | 10.4" (26.4 cm) | -- | -- | -- | 3.6 lb (1.6 kg) |
| VRN2G | 2-1/2" (DN65) | 10.3" (26.3 cm) | 5.2" (13.2 cm) | 12.2" (31.0 cm) | 2.1" (5.3 cm) | 2.5" (6.4 cm) | 10.4" (26.4 cm) | -- | -- | -- | 3.6 lb (1.6 kg) |
| VRN2H | 3" (DN80) | 10.8" (27.4 cm) | 5.2" (13.2 cm) | 12.4" (31.4 cm) | 2.1" (5.3 cm) | 2.5" (6.4 cm) | 10.4" (26.4 cm) | -- | -- | -- | 3.6 lb (1.6 kg) |
| VRW2J | 2-1/2" and 3" (DN65/DN80) | -- | -- | -- | -- | -- | -- | 8.8" (22.4 cm) | 9.8" (24.6 cm) | 3.8" (9.5 cm) | 27.8 lb (10.0 kg) |
| VRW2K | 3" and 4" (DN80/DN100) | -- | -- | -- | -- | -- | -- | 12.6" (32.0 cm) | 11.4" (29.9 cm) | 5.3" (13.5 cm) | 75.0 lb (30.0 kg) |
| VRW2L | 5" and 6" (DN125/DN150) | -- | -- | -- | -- | -- | -- | 16.6" (42.2 cm) | 13.3" (33.8 cm) | 7.1" (18.0 cm) | 148 lb (70 kg) |

NOTE: 1" and 1-1/2" valve bodies are available in standard or "large body" for additional flow capacity

DIMENSION DIAGRAMS



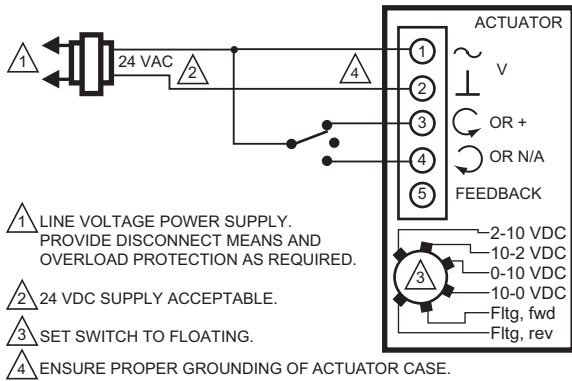
NEW!

CONTROL VALVES

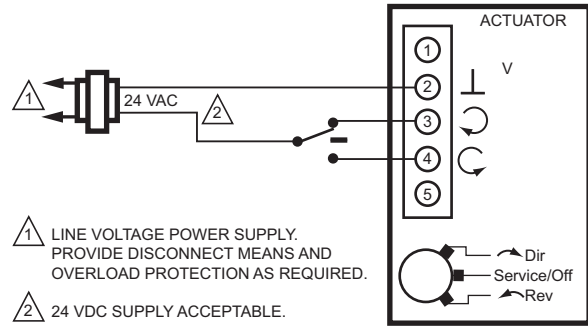
PRESSURE REGULATING BALL VALVES VRN, VRW SERIES



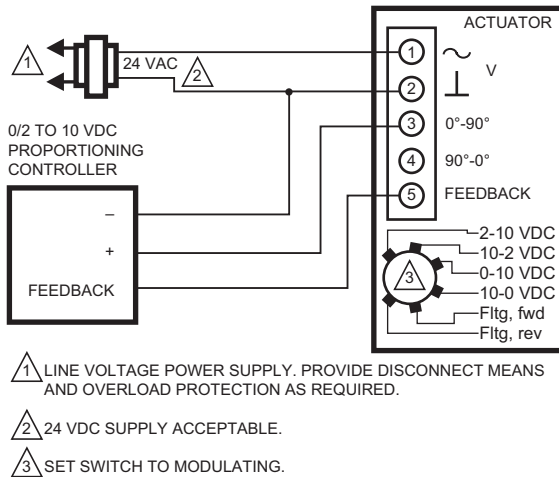
WIRING



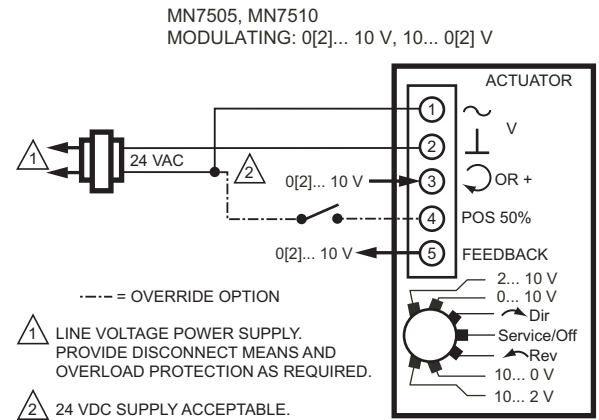
VRN/MS7505 for Floating Control (SR)



VRN/MN6105 for Floating Control (NSR)

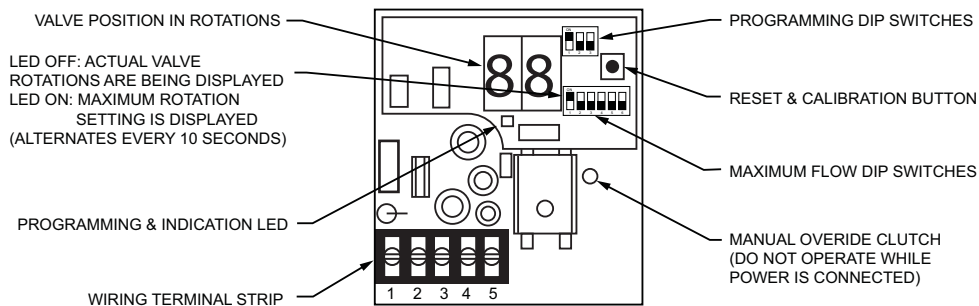


VRN/MS7505 for Proportional Control (SR)



VRN/MN7505 for Proportional Control (NSR)

ACTUATOR CIRCUIT BOARD LAYOUT



VRW Wiring

4

CONTROL VALVES



CONTROL VALVES

PRESSURE REGULATING BALL VALVES VRN, VRW SERIES

4

CONTROL VALVES

ORDERING INFORMATION

| MODEL | DESCRIPTION |
|-----------------------------------|---|
| VRN | FNPT valve body (1/2" to 3" only) |
| VRW | Multi-size flanged valve body (2-1/2" to 6" only) |
| SIZE | DESCRIPTION |
| 2A | 1/2" (DN15) FNPT |
| 2B | 3/4" (DN20) FNPT |
| 2C | 1" (DN25) FNPT |
| 2D | 1-1/4" (DN32) FNPT |
| 2E | 1-1/2" (DN40) FNPT |
| 2F | 2" (DN50) FNPT |
| 2G | 2-1/2" (DN65) FNPT |
| 2H | 3" (DN80) FNPT |
| 2J | 2-1/2" (DN65) and 3" (DN80) flanges |
| 2K | 3" (DN80) and 4" (DN100) flanges |
| 2L | 5" (DN125) and 6" (DN150) flanges |
| FLOW RATE (COMPATIBLE VALVE SIZE) | |
| B | 1 gpm (1/2", 3/4", 1" only) |
| D | 2 gpm (1/2", 3/4", 1" only) |
| E | 3 gpm (1/2", 3/4", 1" only) |
| F | 4 gpm (1/2", 3/4", 1" only) |
| G | 5 gpm (1/2", 3/4", 1" only) |
| H | 6 gpm (1/2", 3/4", 1" only) |
| J | 7 gpm (1/2", 3/4", 1" only) |
| K | 8 gpm (3/4", 1" only) |
| L | 9 gpm (3/4", 1" only) |
| M | 10 gpm (3/4", 1", 1-1/4", 1-1/2" only) |
| N | 15 gpm (1", 1-1/4", 1-1/2" only) |
| P | 20 gpm (1", 1-1/4", 1-1/2" only) |
| Q | 25 gpm (1-1/4", 1-1/2", 2", 2-1/2", 3" only) |
| R | 30 gpm (1-1/4", 1-1/2", 2", 2-1/2", 3" only) |
| S | 35 gpm (1-1/4", 1-1/2", 2", 2-1/2", 3" only) |
| T | 40 gpm (1-1/2", 2", 2-1/2", 3" only) |
| U | 45 gpm (1-1/2", 2", 2-1/2", 3" only) |
| 1 | 50 gpm (1-1/2", 2", 2-1/2", 3" only) |
| 2 | 55 gpm (2", 2-1/2", 3" only) |
| 3 | 60 gpm (2", 2-1/2", 3" only) |
| 4 | 65 gpm (2", 2-1/2", 3" only) |
| 5 | 70 gpm (2", 2-1/2", 3" only) |
| 6 | 75 gpm (2", 2-1/2", 3" only) |
| 7 | 80 gpm (2-1/2", 3" only) |
| 8 | 85 gpm (2-1/2", 3" only) |
| 9 | 95 gpm (2-1/2", 3" only) |
| v | Adjustable, low minimum DP |
| w | Adjustable, high minimum DP |
| PRESSURE RATING | |
| 3 | 360 psig body rating (NPT only) |
| 4 | ANSI/ASME 150/300 (flanged only) |
| VALVE TRIM | |
| D | Brass trim (NPT only) |
| S | Stainless trim |
| ACTUATOR SELECTION | |
| 2 | NEMA 2 actuator (NPT only) |
| F | No actuator (NPT only) |
| M | Multi-turn actuator (flanged only) |
| ACTUATOR CONTROL SIGNAL | |
| A | Floating control, non-spring return |
| B | Proportional control, non-spring return |
| D | Proportional control, spring return/failsafe |

Example: **VRN2AF3D2D** 1/2", 4 gpm, NPT, brass trim, NEMA 2 proportional SR actuator

NEW!



DESCRIPTION

The **V5011 Series** is a two-way threaded globe valve used for control of water or steam. The **V5013 Series** is a three-way threaded globe valve used for mixing control of water. The valves can be ordered assembled with actuators for spring return or non-spring return operation, or the valve, linkage, and actuator may be ordered separately for field assembly.

FEATURES

- Two- and three-way body patterns from 1/2" to 2"
- Two-way equal percentage characteristics
- Three-way linear characteristics
- Floating, two-position, or proportional control actuators
- ANSI 150 body class
- Compatible with MP953 pneumatic actuators



Kele

V5013N1097/
KA-175-P



| SPECIFICATIONS | |
|----------------------------------|---|
| Size | 1/2" to 2" FNPT |
| Cv Range | 0.73 to 46.8 |
| Stroke | 3/4" |
| Body Pattern | Two-way (stem up to open), three-way mixing (stem up to open B-AB) |
| Flow Characteristic | Two-way V5011N1xxx: equal percentage; Two-way V5011N2xxx: linear; Three-way: ports A-AB equal percentage, ports B-AB linear |
| Rangeability | 50:1 per VDI/VDE 2173 |
| Leakage Rating | ANSI Class III, 0.05% of Cv |
| Life Expectancy | 250,000 full cycles at maximum rated temperature |
| Maximum Closeoff Pressure | Actuator dependant, see Selection Chart; maximum differential pressure for quiet service 20 psid |
| Pressure Drop | Maximum water differential pressure for quiet service 20 psid (138 kPa). |
| Maximum Pressure Rating | Water: 217 psi (1497 kPa) from 36° to 248°F (2° to 120°C), 185 psi (1277 kPa) from 248° to 337°F (120° to 169°C); Steam: 100 psi (690 kPa) at 337°F (169°C), using stainless trim valve (V5011N2xxx) |
| Pressure Rating | ANSI 150 |
| Materials Of Construction | Red brass body, stainless steel stem, metal-to-metal brass/stainless plug and seat, spring-loaded carbon-fiber reinforced Teflon® V-ring packing |
| Media Compatibility | Hot or chilled water, <50% glycol, steam (use V5011N2xxx for steam above 15 psig (103 kPa) to 100 psig (690 kPa)) |
| Media Temperature Range | Brass trim: 36° to 248°F (2° to 120°C), 15 psig (103 kPa) steam; Stainless trim: 36° to 340°F (2° to 177°C), 100 psig (690 kPa) steam |
| Action | Stem up to open (2-way), stem up to open B-AB, close A-AB (3-way) |
| Compatible Actuators | Electric rotary Kele KA/KAS Series or Honeywell MN/MS Series with appropriate Q5020 Linkage, or direct-mount ML Series shown on following pages. For pneumatic actuation see MP953 Series in PNEUMATICS & FITTINGS catalog section. |
| Actuator Mounting | U-bolt or set screws to fit 1-3/8" valve yoke diameter, 3/4" stroke length |
| Operating Temperature | Actuator dependant, refer to appropriate ACTUATORS & DAMPERS section or ML Series (on following pages) for specifications |
| Approvals | Actuator dependant, refer to appropriate ACTUATORS & DAMPERS section or ML Series (on following pages) for specifications |
| Warranty | 1 year on valves, 5 years on rotary actuators, 1 year on direct-mount actuators |



CONTROL VALVES

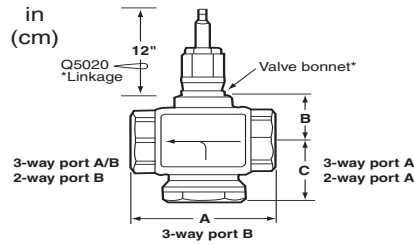
THREADED GLOBE VALVES

V5011, V5013 SERIES

4

CONTROL VALVES

DIMENSIONS



V501x Two-way and Three-way

| VALVE SIZE | ANSI CLASS 150 | | |
|------------|--------------------|------------|------------|
| | Dimensions in (cm) | | |
| | A | B | C |
| 1/2" | 3.3 (8.38) | 1.6 (3.95) | 2.6 (6.65) |
| 3/4" | 3.3 (8.38) | 1.6 (3.95) | 2.2 (6.50) |
| 1" | 4.1 (10.42) | 1.6 (3.95) | 2.6 (6.65) |
| 1-1/4" | 4.2 (10.67) | 1.6 (3.95) | 2.9 (7.25) |
| 1-1/2" | 4.7 (11.94) | 1.8 (4.65) | 3.0 (7.70) |
| 2" | 5.3 (13.46) | 1.8 (4.65) | 3.3 (8.35) |

* Allow approximately 12" (30.5 cm) clearance above the valve bonnet for installation and service of the actuator and linkage.

| Body Type | GLOBE VALVE | | | | NON-SPRING RETURN* | | | SPRING RETURN* | | |
|---------------|-------------|------------|---------------------------|---------------------------|-----------------------|--------------|------------------|----------------|--------------------------|------------------|
| | Size | Cv | Water and 15# Steam Model | High-Pressure Steam Model | Floating Two-position | Proportional | Close-off (psid) | Two-position | Proportional or Floating | Close-off (psid) |
| Two-way NPT | 1/2" | 0.73 | V5011N1008 | V5011N2006 | KA-44-2T | KA-44-M | 230 | KAS-44-2 | KAS-44-M | 207 |
| | 1/2" | 1.16 | V5011N1016 | V5011N2014 | KA-44-2T | KA-44-M | 230 | KAS-44-2 | KAS-44-M | 207 |
| | 1/2" | 1.85 | V5011N1024 | V5011N2022 | KA-44-2T | KA-44-M | 230 | KAS-44-2 | KAS-44-M | 207 |
| | 1/2" | 2.9 | V5011N1032 | V5011N2030 | KA-44-2T | KA-44-M | 230 | KAS-44-2 | KAS-44-M | 207 |
| | 1/2" | 4.7 | V5011N1040 | V5011N2048 | KA-44-2T | KA-44-M | 143 | KAS-44-2 | KAS-44-M | 184 |
| | 3/4" | 7.3 | V5011N1057 | V5011N2055 | KA-44-2T | KA-44-M | 69 | KAS-44-2 | KAS-44-M | 79 |
| | 1" | 11.7 | V5011N1065 | V5011N2063 | KA-44-2T | KA-44-M | 47 | KAS-44-2 | KAS-44-M | 66 |
| | 1-1/4" | 18.7 | V5011N1073 | V5011N2071 | KA-88-2T | KA-88-M | 69 | KAS-88-2 | KAS-88-M | 84 |
| Three-way NPT | 1-1/2" | 29.3 | V5011N1081 | V5011N2089 | KA-88-2T | KA-88-M | 44 | KAS-88-2 | KAS-88-M | 55 |
| | 2" | 46.8 | V5011N1099 | V5011N2097 | KA-175-2T | KA-175-P | 58 | KAS-175-2 | KAS-175-M | 63 |
| | 1/2" | 2.9 | V5013N1030 | | KA-44-2T | KA-44-M | 230 | KAS-44-2 | KAS-44-M | 207 |
| | 1/2" | 4.7 | V5013N1048 | | KA-44-2T | KA-44-M | 143 | KAS-44-2 | KAS-44-M | 184 |
| | 3/4" | 7.3 | V5013N1055 | | KA-44-2T | KA-44-M | 69 | KAS-44-2 | KAS-44-M | 79 |
| | 1" | 11.7 | V5013N1063 | | KA-44-2T | KA-44-M | 47 | KAS-44-2 | KAS-44-M | 66 |
| | 1-1/4" | 18.7 | V5013N1071 | | KA-88-2T | KA-88-M | 69 | KAS-88-2 | KAS-88-M | 84 |
| | 1-1/2" | 29.3 | V5013N1089 | | KA-88-2T | KA-88-M | 44 | KAS-88-2 | KAS-88-M | 55 |
| 2" | 46.8 | V5013N1097 | | KA-175-2T | KA-175-P | 58 | KAS-175-2 | KAS-175-M | 63 | |

* See KA and KAS Series direct-coupled actuator catalog pages for wiring and specs. Q5020A1003 linkage included with assembly.

| MODEL | DESCRIPTION |
|---|--|
| VALVE SELECTION (INCLUDES Q5020A1003 LINKAGE) | |
| Vxxxxxxx / | Select 1/2" to 2" valve model number (from list above) |
| ACTUATOR SELECTION* | |
| KA_ _ _ _ | KA actuator (from list above) |

Example: V5011N1008 / KA-44-2T 1/2" two-way globe valve, Cv=0.73, with floating non-spring return actuator, factory assembled.

* Specify normally open or normally closed when ordering an assembly with a KAS actuator.

For field assembly, order the Model Q5020A1003 linkage, the valve, and the actuator as separate line items.

RELATED PRODUCTS

Q5020A1003
SSTAG
SW2

Linkage for 1/2" to 2" valves
Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order
Auxiliary switch kit for KA-175/301 and KAS-88/175

ACCESSORIES

0901786A

Repack kit for V5011, V5013 valves with 1/4" diameter stem (1/2" to 1-1/4")



DESCRIPTION

The **VGF Series** is a family of two- and three-way flanged globe valves designed specifically for commercial HVAC systems. All models of the VGF Series have stainless steel trim suitable for chilled water/glycol, heating water, and steam up to 100 psig.

The valves are available with linear or equal percentage flow characteristics. They have ASME/ANSI standard dimensions and pressure/temperature ratings, and there are models with pressure balanced trim for high close-off applications. The **VGF Series** come assembled with Kele Revolution direct-coupled electric actuators or direct-mount Honeywell actuators, or the valves and actuators can be ordered separately.

FEATURES

- **Stainless steel trim - all models**
- **ANSI B16.3 pressure/temperature ratings**
- **ANSI 125 flanges standard, ANSI 250 special order**
- **Equal Percentage or linear flow characteristics**
- **Three-way mixing models or diverting models**
- **Pressure balanced models for high close off**
- **Available assembled with actuator or separate**
- **Spring or non-spring return assemblies**
- **Floating, two-position, or proportional control**



VGF31EM25/KAS-175-M



Q5022B1009/KAS-175-M

TABLE 1. MEDIA PRESSURE/TEMPERATURE RATING

| Temperature °F (°C) | System Pressure | |
|------------------------|----------------------------------|----------------------------------|
| | ANSI Class 125 (VGF21, VGF31) | ANSI Class 250 (VGF22, VGF32) |
| 35 to 130 (2-66) | 175 psig (1206 kPa) | 400 psig (2758 kPa) |
| Up to 200 (<93) | 165 psig (1138 kPa) | 370 psig (2251 kPa) |
| Up to 250 (<121) | 150 psig (1034 kPa) | 340 psig (2344 kPa) |
| Up to 300 (<149) | 140 psig (965 kPa) | 310 psig (2137 kPa) |
| Up to 356 (<180) | 125 psig (862 kPa) | 280 psig (1931 kPa) |

NOTE: ANSI Class 250 valves are special order.

SPECIFICATIONS

| | | | |
|----------------------------------|---|--------------------------------|--|
| Size | 2-1/2" to 6", ANSI Flanges | Media Compatibility | Hot or chilled water, <50% glycol, steam to 100 psig (690 kPa) |
| Cv Range | 72 to 370 | Media Temperature Range | See Table 1 |
| Connections | Flanges per ANSI/ISA 75.03; bolt holes conform to ANSI B16.1 | Actuator Mounting | U-bolt or set screws attach to valve yoke; 2-1/2" and 3" valves: 1-3/8" yoke diameter and 3/4" stroke length; 4", 5" and 6" valves: 1-7/8" yoke diameter with 1-1/2" stroke length |
| Stroke | 3/4" (2-1/2" and 3" valves); 1-1/2" (4", 5" and 6" valves) | Approvals | Actuator dependant, refer to appropriate ACTUATORS & DAMPERS section or ML Series (on following pages) for specifications |
| Body Pattern | Two-way: stem up to open Three-way mixing: stem up to open B-AB Three-way diverting: stem up to open AB-A | Compatible Actuators | Rotary Kele KA/KAS Series or Honeywell MN/MS Series with appropriate Q5020/Q5022 Linkage, or direct-mount ML Series |
| Flow Characteristic | Two-way: Equal percentage or linear Three-way: Linear | Operating Temperature | Actuator dependant, refer to appropriate ACTUATORS & DAMPERS section or ML Series (on following pages) for specifications |
| Rangeability | 50:1 | Warranty | 1 year on valves, 5 years on rotary actuators, 1 year on direct-mount actuators |
| Leakage Rating | Single seat: ANSI Class III, 0.05% Pressure balanced: ANSI Class IV, 0.01% | | |
| Maximum Closeoff Pressure | Actuator dependant, see Selection Chart | | |
| Maximum Pressure Rating | See Table 1 | | |
| Pressure Rating | ANSI Class 125 (Class 250 models available) | | |
| Materials Of Construction | Cast iron ASTM A126 Class B (GG25) body, stainless steel stem and trim, spring-loaded PTFE cone ring packing | | |



CONTROL VALVES

FLANGED GLOBE VALVES VGF SERIES

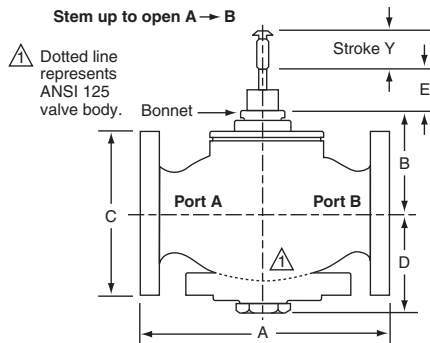
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CONTROL VALVES

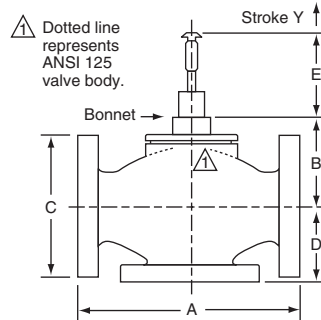
TABLE 2. VGF SERIES FLANGED GLOBE VALVE AND ACTUATOR COMBINATIONS AND CLOSE-OFF RATINGS

| Body Type | Size | Cv | Valve Model | NON-SPRING RETURN (NSR) ACTUATORS | | | | SPRING RETURN (SR) ACTUATORS | | | |
|--------------------------------------|------|-----|--------------------|-----------------------------------|------------------|-----------------|------------|------------------------------|-----------------------|------------------|------------|
| | | | | Floating | Proportional | Close Off (psd) | Linkage | Two-position | Proportional/Floating | Close off (psid) | Linkage |
| Two-way E = Equal % L = Linear | 2.5 | 72 | VGF21 (E OR L) S25 | KA-301-2T | KA-301-P | 95 | Q5020B1001 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 112 | Q5022A1001 |
| | 3 | 120 | VGF21 (E OR L) S30 | KA-301-2T | KA-301-P | 47 | Q5020B1001 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 55 | Q5022A1001 |
| | 4 | 150 | VGF21 (E OR L) S40 | (2 qty) KA-301-2T | (2 qty) KA-301-P | 47 | Q5022B1009 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 27 | Q5022B1009 |
| | 5 | 320 | VGF21 (E OR L) S50 | (2 qty) KA-301-2T | (2 qty) KA-301-P | 18 | Q5022B1009 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 11 | Q5022B1009 |
| | 6 | 370 | VGF21 (E OR L) S60 | (2 qty) KA-301-2T | (2 qty) KA-301-P | 18 | Q5022B1009 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 11 | Q5022B1009 |
| Three-way mixing | 2.5 | 70 | VGF31EM25 | KA-301-2T | KA-301-P | 120 | Q5020B1001 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 141 | Q5022A1001 |
| | 3 | 115 | VGF31EM30 | KA-301-2T | KA-301-P | 80 | Q5020B1001 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 94 | Q5022A1001 |
| | 4 | 150 | VGF31EM40 | (2 qty) KA-301-2T | (2 qty) KA-301-P | 47 | Q5022B1009 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 27 | Q5022B1009 |
| | 5 | 285 | VGF31EM50 | (2 qty) KA-301-2T | (2 qty) KA-301-P | 18 | Q5022B1009 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 11 | Q5022B1009 |
| | 6 | 365 | VGF31EM60 | (2 qty) KA-301-2T | (2 qty) KA-301-P | 18 | Q5022B1009 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 11 | Q5022B1009 |
| Three-way diverting | 2.5 | 72 | VGF31LD25 | KA-301-2T | KA-301-P | 95 | Q5020B1001 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 112 | Q5022A1001 |
| | 3 | 120 | VGF31LD30 | KA-301-2T | KA-301-P | 47 | Q5020B1001 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 55 | Q5022A1001 |
| | 4 | 150 | VGF31LD40 | (2 qty) KA-301-2T | (2 qty) KA-301-P | 47 | Q5022B1009 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 27 | Q5022B1009 |
| | 5 | 320 | VGF31LD50 | (2 qty) KA-301-2T | (2 qty) KA-301-P | 18 | Q5022B1009 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 11 | Q5022B1009 |
| | 6 | 370 | VGF31LD60 | (2 qty) KA-301-2T | (2 qty) KA-301-P | 18 | Q5022B1009 | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 11 | Q5022B1009 |
| Two-way pressure balanced | 2.5 | 70 | VGF21 (E OR L) P25 | ML6421A1017 | ML7421A1032 | 175 | N/A | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 175 | Q5022A1001 |
| | 3 | 115 | VGF21 (E OR L) P30 | ML6421A1017 | ML7421A1032 | 175 | N/A | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 175 | Q5022A1001 |
| | 4 | 150 | VGF21 (E OR L) P40 | ML6421B1040 | ML7421B1023 | 175 | N/A | (2 qty) KAS-175-2 | (2 qty) KAS-175-M | 175 | Q5022B1009 |

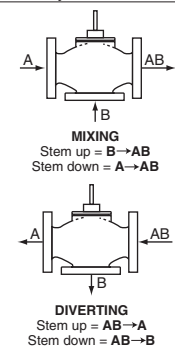
DIMENSIONS



| Actuator Clearances Above Bonnet | in (cm) |
|--|--------------|
| KA and KAS | 12 (30.5) |
| ML 6421 | 14.25 (36.0) |
| ML 7421 | 14.25 (36.0) |
| Q5020B1001 (Requires 12" for service) Weight 6 lb (2.7 kg) | 9.5 (24.1) |



Three-way Valve Flow Patterns



Two-way valves, Equal Percentage or Linear, Standard or Pressure Balanced

| VALVE SIZE (in) | ANSI CLASS 125 | | | | | | Weight lb (kg) |
|-----------------|-----------------------------------|--------------|-------------|---|-------------|------------|----------------|
| | Two-way Valve Dimensions, in (mm) | | | | | | |
| | A | B | C | D | E | Y | |
| 2-1/2 | 10-7/8 (276) | 10-7/8 (276) | 7 (178) | - | 3-1/2 (89) | 3/4 (20) | 42 (19.0) |
| 3 | 11-1/2 (298) | 11-1/2 (298) | 7-1/2 (191) | - | 3-1/2 (89) | 3/4 (20) | 53 (24.0) |
| 4 | 13-7/8 (352) | 13-7/8 (352) | 9 (229) | - | 5-1/2 (133) | 1-1/2 (38) | 73 (33.1) |
| 5 | 15-1/2 (400) | 15-1/2 (400) | 10 (254) | - | 5-1/2 (133) | 1-1/2 (38) | 120 (54.4) |
| 6 | 17-1/2 (451) | 17-1/2 (451) | 11 (279) | - | 5-1/2 (133) | 1-1/2 (38) | 166 (75.3) |

Three-way Valves, Mixing or Diverting

| VALVE SIZE (in) | ANSI CLASS 125 | | | | | | Weight lb (kg) |
|-----------------|-------------------------------------|---------------|-------------|-------------|---------------|------------|----------------|
| | Three-way Valve Dimensions, in (mm) | | | | | | |
| | A | B | C | D | E | Y | |
| 2-1/2 | 10-7/8 (276) | 3 (276) | 7 (178) | 3-1/2 (95) | 4-3/16 (107) | 3/4 (20) | 42 (19.0) |
| 3 | 11-3/4 (298) | 4-3/16 (107) | 7-1/2 (191) | 4-3/8 (111) | 4-3/16 (107) | 3/4 (20) | 53 (24.0) |
| 4 | 13-7/8 (352) | 5-1/2 (140) | 9 (229) | 5-1/8 (130) | 6-11/16 (170) | 1-1/2 (38) | 73 (33.1) |
| 5 | 15-1/2 (400) | 5-3/8 (137) | 10 (254) | 5-1/2 (146) | 6-11/16 (170) | 1-1/2 (38) | 120 (54.4) |
| 6 | 17-1/2 (451) | 5-11/16 (145) | 11 (279) | 6-5/8 (168) | 6-11/16 (170) | 1-1/2 (38) | 166 (75.3) |

ORDERING INFORMATION

| MODEL | DESCRIPTION |
|--------------------|---|
| VGF_____ / | Select valve model (from table above) |
| KA_____ or ML_____ | Select actuator model (from list above) |

Example: VGF21ES25 / KAS-175-M is a two-way, 2-1/2" ANSI 125 flanged, Cv=63, equal percentage valve assembled with a spring return, proportional/floating actuator.

Note: Valve assemblies with KA and KAS actuators use the Q5020B1001 linkage. If ordering valve and actuator separately for field assembly, order the Q5020B1001 also.

Note: Specify normally open or normally closed when ordering an assembly with KAS spring return actuator.

RELATED PRODUCTS

SSTAG
208638
R43176754-002
R43176755-005

Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order
Packing kit for all VGF Series flanged globe valves
Repair kit for 2-1/2" and 3" VGF Series ANSI 125 flanged valves
Repair kit for all 4" to 6" VGF Series flanged valves

CONTROL VALVES

DIRECT-MOUNT GLOBE VALVE ACTUATORS ML SERIES



DESCRIPTION

The **ML6420**, **ML6421**, **ML6984**, **ML7420**, **ML7421**, and **ML7984** are direct-mount, electric, non-spring return actuators designed for use on Honeywell V5011N/13N and VGF Series globe valves.

The **ML6425** and **ML7425** are direct-mount, electric spring return. The actuators can be ordered pre-assembled with a valve, or they may be easily installed in the field; separate linkages are not required.

Honeywell



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CONTROL VALVES

| DIRECT-MOUNT ACTUATOR SELECTION CHART / CLOSE-OFF RATINGS | | | | | | | | |
|---|--------------------|-------------------|----------------------------------|----------------|---------------|-----------------------------|--------------|---------------|
| | | | Non-spring return (NSR) actuator | | | Spring return (SR) actuator | | |
| Size | Two-way valve | Three-way valve | Floating | Proportional | Closeoff psid | Floating | Proportional | Closeoff psid |
| 1/2" | V5011N1008 - N1040 | V5013N1030, N1048 | ML6984, ML6420 | ML7984, ML7420 | 273, 230 | ML6425 | ML7425 | 230 |
| 3/4" | V5011N1057 | V5013N1055 | ML6984, ML6420 | ML7984, ML7420 | 273, 230 | ML6425 | ML7425 | 230 |
| 1" | V5011N1065 | V5013N1063 | ML6984, ML6420 | ML7984, ML7420 | 193, 163 | ML6425 | ML7425 | 163 |
| 1-1/4" | V5011N1073 | V5013N1071 | ML6984, ML6420 | ML7984, ML7420 | 123, 104 | ML6425 | ML7425 | 104 |
| 1-1/2" | V5011N1081 | V5013N1089 | ML6984, ML6420 | ML7984, ML7420 | 79, 67 | ML6425 | ML7425 | 67 |
| 2" | V5011N1099 | V5013N1097 | ML6984, ML6420 | ML7984, ML7420 | 44, 37 | ML6425 | ML7425 | 37 |
| 2-1/2" | | VGF31EM25 | ML6421A | ML7421A | 87 | ML6425 | ML7425 | 29 |
| 3" | | VGF31EM30 | ML6421A | ML7421A | 58 | ML6425 | ML7425 | 19 |
| 2-1/2" | VGF21ES25, LS25 | VGF31LD25 | ML6421A | ML7421A | 69 | ML6425 | ML7425 | 23 |
| 3" | VGF21ES30, LS30 | VGF31LD30 | ML6421A | ML7421A | 34 | ML6425 | ML7425 | 11 |
| 4" | VGF21ES40, LS40 | VGF31LD40, EM40 | ML6421B | ML7421B | 34 | N/A | N/A | N/A |
| 5" | VGF21ES50, LS50 | VGF31LD50, EM50 | ML6421B | ML7421B | 13 | N/A | N/A | N/A |
| 6" | VGF21ES60, LS60 | VGF31LD60, EM60 | ML6421B | ML7421B | 13 | N/A | N/A | N/A |
| 2-1/2" | VGF21EP25 | | ML6421A | ML7421A | 175 | N/A | N/A | N/A |
| 3" | VGF21EP30 | | ML6421A | ML7421A | 175 | N/A | N/A | N/A |
| 4" | VGF21EP40 | | ML6421B | ML7421B | 175 | N/A | N/A | N/A |
| 5" | VGF21EP50 | | ML6421B | ML7421B | 175 | N/A | N/A | N/A |
| 6" | VGF21EP60 | | ML6421B | ML7421B | 175 | N/A | N/A | N/A |

| COMMON SPECIFICATIONS | | |
|---------------------------|---|--|
| Life Expectancy | 50,000 full stroke cycles or 1,000,000 repositions (ML6984, ML7984) | Operating Temperature 14° to 122°F (-10° to 50°C) for ML64xx, ML74xx; 32° to 132°F (0° to 55°C) for ML6984, ML7984 |
| Input Impedance | 100 kΩ for 2-10 VDC input, 500Ω for 4-20 mA input (ML74xx); 20 kΩ for 2-10 VDC input, 237Ω for 4-20 mA input (ML7984) | |
| Noise | 55 dBA @ 3.3' (1m) for ML6984, ML7984 only, others not rated | Operating Humidity 5% to 95% RH non-condensing for ML64xx, ML74xx; 15% to 95% RH non-condensing for ML6984, ML7984 |
| Spring Return Time | 12 seconds, for ML6425, ML7425 only | |
| Manual Override | Yes, on ML6420, ML7420, ML6421, ML7421 only | Approvals UL Listed, CE Warranty 1 year |



CONTROL VALVES

DIRECT-MOUNT GLOBE VALVE ACTUATORS

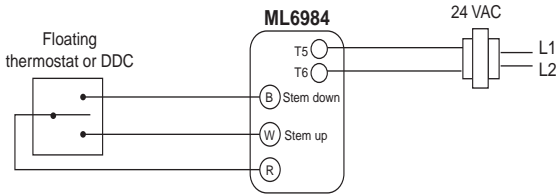
ML SERIES

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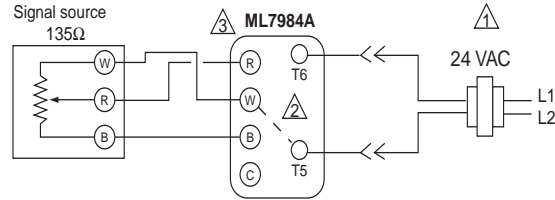
CONTROL VALVES

WIRING

CAUTION: Install actuator on valve before energizing.

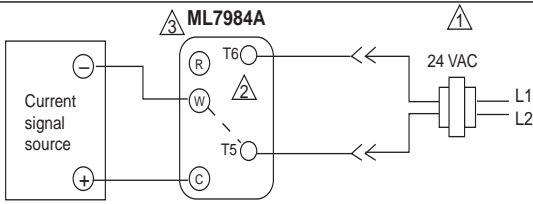


ML6984 Floating Control



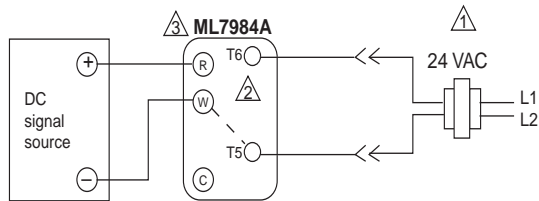
| FUNCTION | DIP SWITCH CONFIGURATION | | | | | | | | |
|-----------------------|--|-----|-----|---|---|----|-----|-----|-----|
| Mechanical 135Ω input | <table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>On</td> <td>Off</td> <td>Off</td> <td>Off</td> </tr> </table> | 1 | 2 | 3 | 4 | On | Off | Off | Off |
| 1 | 2 | 3 | 4 | | | | | | |
| On | Off | Off | Off | | | | | | |

ML7984A Resistance Control



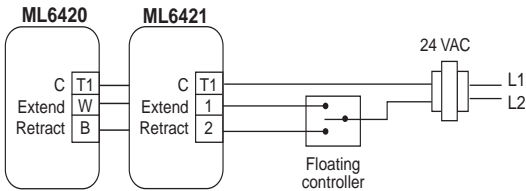
| FUNCTION | DIP SWITCH CONFIGURATION | | | | | | | | |
|------------------------|---|----|-----|---|---|-----------------|----------------|----|-----|
| 4-20 mA direct acting | <table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Master actuator</td> <td>Slave actuator</td> <td>On</td> <td>Off</td> </tr> </table> | 1 | 2 | 3 | 4 | Master actuator | Slave actuator | On | Off |
| 1 | 2 | 3 | 4 | | | | | | |
| Master actuator | Slave actuator | On | Off | | | | | | |
| 20-4 mA reverse acting | <table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Master actuator</td> <td>Slave actuator</td> <td>On</td> <td>Off</td> </tr> </table> | 1 | 2 | 3 | 4 | Master actuator | Slave actuator | On | Off |
| 1 | 2 | 3 | 4 | | | | | | |
| Master actuator | Slave actuator | On | Off | | | | | | |

ML7984A mA Proportional Control

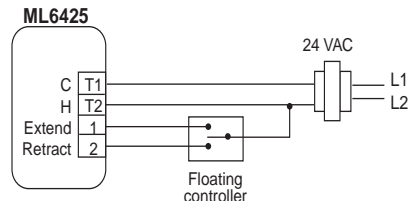


| FUNCTION | DIP SWITCH CONFIGURATION | | | | | | | | |
|-------------------------|--|-----|-----|---|---|----|-----|-----|-----|
| 2-10 VDC direct acting | <table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>On</td> <td>Off</td> <td>Off</td> <td>Off</td> </tr> </table> | 1 | 2 | 3 | 4 | On | Off | Off | Off |
| 1 | 2 | 3 | 4 | | | | | | |
| On | Off | Off | Off | | | | | | |
| 10-2 VDC reverse acting | <table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>On</td> <td>Off</td> <td>Off</td> <td>Off</td> </tr> </table> | 1 | 2 | 3 | 4 | On | Off | Off | Off |
| 1 | 2 | 3 | 4 | | | | | | |
| On | Off | Off | Off | | | | | | |

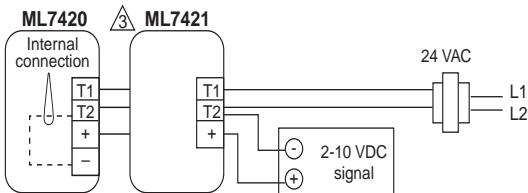
ML7984A VDC Proportional Control



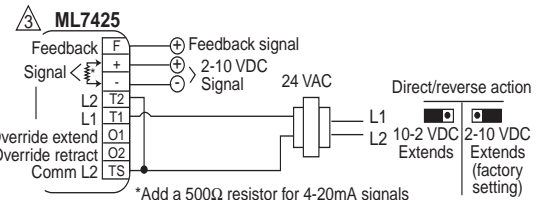
ML6420, ML6421 Floating Control



ML6425 Floating Control



ML7420, ML7421 mA Proportional Control



ML7425 VDC Proportional Control

- 1 Allow 0.5 amps maximum for each device. Actuators and controller can share the same transformer providing proper phasing is observed, except as noted.
- 2 "T5" and "W" terminal are connected internally. Device is compatible with the three-wire control system.
- 3 Use configuration DIP switches to select device functions. See installation instructions.

| FUNCTION | DIP SWITCH CONFIGURATION | | | | | | | | |
|----------------|---|-----|-----|---|---|-----|-----|-----|-----|
| Direct Acting | <table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>On</td> <td>Off</td> <td>Off</td> <td>Off</td> </tr> </table> | 1 | 2 | 3 | 4 | On | Off | Off | Off |
| 1 | 2 | 3 | 4 | | | | | | |
| On | Off | Off | Off | | | | | | |
| Reverse Acting | <table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Off</td> <td>Off</td> <td>Off</td> <td>Off</td> </tr> </table> | 1 | 2 | 3 | 4 | Off | Off | Off | Off |
| 1 | 2 | 3 | 4 | | | | | | |
| Off | Off | Off | Off | | | | | | |

CONTROL VALVES

DIRECT-MOUNT GLOBE VALVE ACTUATORS ML SERIES



4

CONTROL VALVES

| INDIVIDUAL SPECIFICATIONS | | | | | | | |
|---------------------------|------------------|-------------------------|-----------|---------------------------------|--------------------------------|-----------------|-------------|
| Model | Force | Supply Voltage | Supply VA | Control Signal | Action | Stroke | Stroke Time |
| ML6420A3049 | 135 lbf (600 N) | 24 VAC 50/60 Hz | 6 VA | Two-position/floating | NSR, DA/RA by wiring | 3/4" (1.9 cm) | 60 seconds |
| ML7420A3055 | 135 lbf (600 N) | 24 VAC 50/60 Hz | 7 VA | Prop. 2-10 VDC, 4-20 mA | NSR, DA/RA by jumpers | 3/4" (1.9 cm) | 60 seconds |
| ML6984A4000 | 160 lbf (710 N) | 24 VAC 50/60 Hz, 24 VDC | 12 VA | Two-position/floating | NSR, DA/RA by wiring | 3/4" (1.9 cm) | 63 seconds |
| ML7984A4009 | 160 lbf (710 N) | 24 VAC 50/60 Hz, 24 VDC | 12 VA | Prop. 2-10 VDC, 4-20 mA, 0-135Ω | NSR, DA/RA by DIP switches | 3/4" (1.9 cm) | 63 seconds |
| ML6421A1017 | 405 lbf (1800 N) | 24 VAC 60 Hz | 11 VA | Two-position/floating | NSR, DA/RA by wiring | 3/4" (1.9 cm) | 95 seconds |
| ML7421A1032 | 405 lbf (1800 N) | 24 VAC 60 Hz | 12 VA | Prop. 2-10 VDC, 4-20 mA | NSR, DA/RA by jumpers | 3/4" (1.9 cm) | 95 seconds |
| ML6421B1040 | 405 lbf (1800 N) | 24 VAC 60 Hz | 11 VA | Two-position/floating | NSR, DA/RA by wiring | 1-1/2" (3.8 cm) | 175 seconds |
| ML7421B1023 | 405 lbf (1800 N) | 24 VAC 60 Hz | 12 VA | Prop. 2-10 VDC, 4-20 mA | NSR, DA/RA by jumpers | 1-1/2" (3.8 cm) | 175 seconds |
| ML6425A3022 | 135 lbf (600 N) | 24 VAC 50/60 Hz | 11 VA | Two-position/floating | SR stem down, DA/RA by wiring | 3/4" (1.9 cm) | 90 seconds |
| ML6425B3013 | 135 lbf (600 N) | 24 VAC 50/60 Hz | 11 VA | Two-position/floating | SR stem up, DA/RA by wiring | 3/4" (1.9 cm) | 90 seconds |
| ML7425A3013 | 135 lbf (600 N) | 24 VAC 50/60 Hz | 12 VA | Prop. 2-10 VDC, 4-20 mA | SR stem down, DA/RA by jumpers | 3/4" (1.9 cm) | 90 seconds |
| ML7425B3012 | 135 lbf (600 N) | 24 VAC 50/60 Hz | 12 VA | Prop. 2-10 VDC, 4-20 mA | SR stem up, DA/RA by jumpers | 3/4" (1.9 cm) | 90 seconds |

ORDERING INFORMATION

| Model | Description |
|--------------------|---|
| ML6420A3049 | 135 lbf, non-spring return, floating control for 1/2" to 2" valves |
| ML7420A3055 | 135 lbf, non-spring return, proportional control (2-10V, 4-20 mA) for 1/2" to 2" valves |
| ML6984A4000 | 160 lbf, non-spring return, floating control for 1/2" to 2" valves |
| ML7984A4009 | 160 lbf, non-spring return, proportional input (2-10V, 4-20 mA, 135Ω) for 1/2" to 2" valves |
| ML6421A1017 | 405 lbf, non-spring return, floating control for 2-1/2" to 3" valves |
| ML6421B1040 | 405 lbf, non-spring return, floating control for 4" to 6" valves |
| ML7421A1032 | 405 lbf, non-spring return, proportional control (2-10V, 4-20 mA) for 2-1/2" to 3" valves |
| ML7421B1023 | 405 lbf, non-spring return, proportional control (2-10V, 4-20 mA) for 4" to 6" valves |
| ML6425A3022 | 135 lbf, spring return stem down, floating control for 1/2" to 3" valves |
| ML6425B3013 | 135 lbf, spring return stem up, floating control for 1/2" to 3" valves |
| ML7425A3013 | 135 lbf, spring return stem down, proportional (2-10 VDC, 4-20 mA) for 1/2" to 3" valves |
| ML7425B3012 | 135 lbf, spring return stem up, proportional (2-10V, 4-20 mA) for 1/2" to 3" valves |

| RELATED PRODUCTS | | PAGE |
|-------------------|--|------------|
| SSTAG | Stainless steel tag on bead chain, 1" x 2" dogtag, custom engraved per order | 163 |
| KOV Series | Fabric Weatherproof cover for globe actuators | |



CONTROL VALVES

GLOBE VALVES VG7000 SERIES

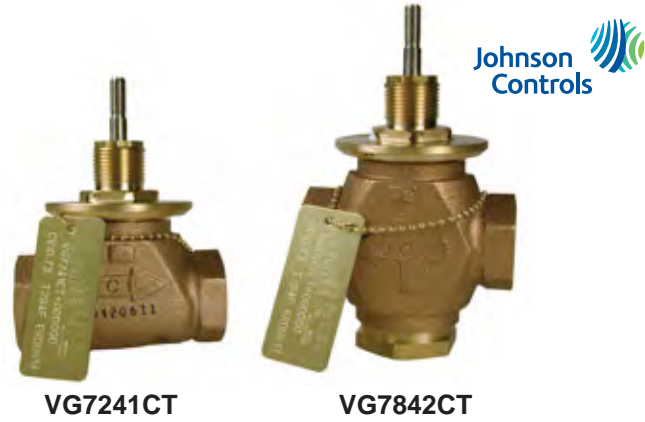
DESCRIPTION

The **VG7000 Series** Valves are designed for hot water, chilled water, or steam control in HVAC systems. The globe design exhibits excellent control with two-way equal percentage and three-way linear response. The valves come in two- or three-way NPT thread configurations. All the valves can be fitted with many different control actuators (both electric and pneumatic) and with a variety of control signals, spring ranges, and failsafe operation.

4

FEATURES

- *Wide actuator selection, electric and pneumatic*
- *Corrosion protection with brass and optional SS trim*
- *Equal percentage and linear characteristics*
- *Longevity with over one million cycles tested*
- *Serviceability with in-place valve repacking*



CONTROL VALVES

SPECIFICATIONS

| | | | |
|----------------------------------|--|----------------------------------|---|
| Size | 1/2" to 2" FNPT | Pressure Rating | ANSI B16.15, Class 250 (EN 12360) |
| Cv Range | 0.73 to 46.2 | Materials Of Construction | Cast bronze body, stainless steel stem, brass trim models have brass plug, elastomer disc seat and rubber (EPR packing), stainless trim models have stainless plug/seat and spring-loaded PTFE/elastomer V-ring packing |
| Stroke | 5/16" (8 mm): 1/2" and 3/4" valves; 1/2" (13 mm): 1" and 1-1/4" valves; 3/4" (19 mm): 1-1/2" and 2" valves | Media Compatibility | Hot or chilled water; <50% glycol; steam (Fluid Group 1 according to 67/548/EEC) |
| Flow Characteristic | Two-way equal percentage; three-way linear | Media Temperature Range | Water 35° to 248°F (2° to 120°C); Steam Maximum 338°F (170°C) (actuator dependent) |
| Rangeability | 25:1 per EN 60534-2-4 | Actuator Mounting | Threaded mounting collar |
| Leakage Rating | Brass trim: ANSI Class IV, 0.01% of maximum flow per ANSI/FCI 70-2; stainless trim: 0.05% of maximum flow | Approvals | Actuator dependent, refer to following pages for specifications |
| Maximum Closeoff Pressure | Actuator dependant, see Ordering Information | Compatible Actuators | Electric VA-7000 or VA-4233 Series shown on following pages; pneumatic see V-3000, MP800 Series in PNEUMATICS & FITTINGS catalog section. |
| Pressure Drop | Maximum recommended pressure drop for water is 35 psid (241 kPa) for 1/2" to 1-1/4" valves, 30 psid for 1-1/2" and 2" valves; for steam 15 psid (103 kPa) for brass trim valves and 100 psid (690 kPa) for stainless trim valves | Operating Temperature | Actuator dependent, refer to following pages for specifications |
| Maximum Pressure Rating | Brass trim with water: 400 psi (2756 kPa) up to 150°F (66°C), decreasing to 365 psi (2515 kPa) at 248°F (120°C); Brass trim with steam: 35 psi (241 kPa) at 284°F (138°C); Stainless trim with water: 400 psi (2756 kPa) up to 150°F (66°C), decreasing to 308 psi (2122 kPa) at 338°F (170°C); Stainless trim with steam: 100 psi (241 kPa) at 338°F (170°C) | Warranty | 1 year |

CONTROL VALVES

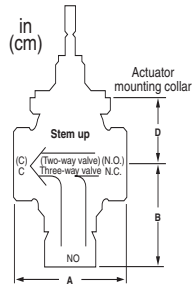
GLOBE VALVES
VG7000 SERIES



4

CONTROL VALVES

DIMENSIONS



| VALVE SIZE in (DN)* | WEIGHT lb (kg) | DIMENSIONS | | | |
|------------------------|-------------------|---------------------------------|------------------|---------------|------------------------------------|
| | | A FACE TO FACE ALL VALVES | B LOWER VALVE | | D ACTUATOR COLLAR ALL VALVES |
| | | | Two-way | Three-way | |
| 1/2 (DN15) | 2.2 (1.0) | 3 (7.6) | 13/16 (2.1) | 1-13/16(4.6) | 1-3/4 (4.4) |
| 3/4 (DN20) | 3.3 (1.5) | 3-7/32 (8.1) | 15/16 (2.4) | 2-1/8 (5.4) | 1-3/4 (4.4) |
| 1 (DN25) | 5.3 (2.4) | 4-1/8 (10.4) | 1-5/32 (2.9) | 2-9/19 (6.5) | 2-11/16 (6.8) |
| 1-1/4 (DN32) | 5.3 (2.4) | 4-23/32 (11.9) | 1-11/32 (3.4) | 2-25/32 (7.0) | 2-13/16 (7.1) |
| 1-1/2 (DN40) | 10.9 (5.0) | 5-1/8 (13.0) | 2-5/32 (5.5) | 3-3/8 (8.5) | 3-7/16 (8.7) |
| 2 (DN50) | 16.0 (7.3) | 5-29/32 (15.0) | 2-1/8 (5.3) | 3-3/4 (9.5) | 3-3/4 (9.5) |

* DN is the European designation for the body size in metric units "cm."

ORDERING INFORMATION

| MODEL | DESCRIPTION |
|-------|---|
| VG7 | Globe valve NPT thread |
| CODE | Configuration code for brass trim (Order codes 243, 443, 844 for stainless steel trim respectively) |
| 241 | Two-way N.O. (stem down = closed) |
| 441 | Two-way N.C. (stem down = open) |
| 842 | Three-way mixing |

| CODE | VALVE SIZE (FNPT) | FLOW Cv | CLOSEOFF FOR ELECTRIC ACTUATORS (psid) | | | |
|------|-------------------|---------|--|------|------|------|
| | | | 715x | 720x | 423x | 926x |
| CT | 1/2" | 0.73 | 345 | N/A | 345 | N/A |
| ET | 1/2" | 1.8 | 345 | N/A | 345 | N/A |
| GT | 1/2" | 4.6 | 216 | N/A | 208 | N/A |
| LT | 3/4" | 7.3 | 138 | N/A | 132 | N/A |
| NT | 1" | 11.6 | 86 | N/A | 63 | N/A |
| PT | 1-1/4" | 18.5 | 52 | N/A | 38 | 111 |
| RT | 1-1/2" | 28.9 | N/A | 70 | N/A | 71 |
| ST | 2" | 46.2 | N/A | 45 | N/A | 46 |

| ASSEMBLY CODE | VALVE SIZE AND PNEUMATIC ACTUATOR* |
|---------------|---|
| 3008B | 1/2" - 1", 3-6 psig, V-3000-8011 (with VG7000-100(1,4) spring kit) |
| 3008D | 1/2" - 1", 4-8 psig, V-3000-8011 (with VG7000-100(2,5) spring kit) |
| 3008E | 1/2" - 1", 9-13 psig, V-3000-8011 (with VG7000-100(3,6) spring kit) |
| 821C | 1/2" - 3/4", 3-7 psig, MP821C001 (SS trim only) |
| 821D | 1/2" - 3/4", 4-8 psig, MP821D001 (SS trim only) |
| 821E | 1/2" - 3/4", 9-13 psig, MP821E001 (SS trim only) |
| 822C | 1" - 1-1/4", 3-7 psig, MP822C001 |
| 822D | 1" - 1-1/4", 4-8 psig, MP822D001 |
| 822E | 1" - 1-1/4", 9-13 psig, MP822E001 |
| 823C | 1-1/2" - 2", 3-7 psig, MP823C001 |
| 823D | 1-1/2" - 2", 4-8 psig, MP823D001 |
| 823E | 1-1/2" - 2", 9-13 psig, MP823E001 |
| P | Pilot positioner installed for any of the above |

*See V-3000/MP8000 catalog page for specs and close off ratings

| ASSEMBLY CODE | VALVE SIZE AND ELECTRIC NON-SPRING RETURN ** |
|---------------|--|
| 7150G | 1/2" - 1 1/4" VA-7150-1001, floating |
| 7152G | 1/2" - 1 1/4" VA-7152-1001, 0-10 VDC control |
| 7200G | 1-1/2" - 2" VA-7200-1001, floating |
| 7202G | 1-1/2" - 2" VA-7202-1001, 0-10 VDC / 0-20 mA control |

**See VA-7000 catalog page for wiring and specs

| ASSEMBLY CODE | VALVE SIZE AND ELECTRIC SPRING RETURN *** |
|---------------|---|
| 423A | 1/2" - 1-1/4" VA-4233-AGA-2, floating |
| 423B | 1/2" - 1-1/4" VA-4233-BGA-2, two-position |
| 423G | 1/2" - 1-1/4" VA-4233-GGA-2, 0-10 VDC proportional |
| 72CHGA | 1-1/4" - 2" VA-7820HGA-2 Two-position or floating, 0-10 VDC proportional, spring up |
| 74CHGA | 1-1/4" - 2" VA-7830HGA-2 Two-position or floating, 0-10 VDC proportional, spring down |

***See VA-4233 catalog page for wiring and specs

VG7241 CT / 3008E P Example: VG7241CT/3008EP 1/2" two-way N.O. 9-13 psig pneumatic valve with positioner



CONTROL VALVES

DIRECT-MOUNT GLOBE VALVE ACTUATORS

VA-4233, VA-7000 SERIES

DESCRIPTION

The **VA-7000 Series** is a family of direct-mount non-spring return actuators for use with 1/2" to 2" JCI VG7000 valves in a wide range of HVAC applications. They are available for three-wire floating control or proportional control. The **VA-4233 Series** is a family of direct-mount spring return actuators, available for two-position, floating, or proportional control.



4

CONTROL VALVES

FEATURES

- **Compact size**
- **Simple installation and adjustment**
- **No separate linkages**
- **Economical, yet powerful**

COMMON SPECIFICATIONS

| | |
|------------------------------|---|
| Supply Voltage | 24 VAC 50/60 Hz |
| Noise | 35 dBa @ 3.3 ft (1m) |
| Feedback | 0/2-10 VDC (VA-78xx-HGA only) |
| Auxiliary Contacts | Two SPDT; 50 VA pilot duty @ 24 VAC; 5.8A resistive, 1/4 HP, 275 VA pilot duty @ 120 VAC (VA-4233-GGC only) |
| Valve Mounting | |
| VA-71xx, -72xx | Set screw to bonnet, 1/4-28 UNF-2B threads for valve stem; |
| VA-4233, -78xx | Set screw to bonnet, stem nut connector |
| Spring Return Time | 15 seconds (VA-4233 only) |
| Life Expectancy | 100,000 full stroke cycles |
| Operating Temperature | |
| VA-71xx | 0° to 140°F (-18° to 60°C); |
| VA-72xx, -78xx | 23° to 131°F (-5° to 55°C); |
| VA-4233 | 32° to 122°F (0° to 50°C) |
| Operating Humidity | 10% to 90% RH non-condensing |
| Approvals | |
| VA-71xx, -72xx, -4233 | UL 873 Listed, File E27734, Class 2, plenum rated; CSA C22.2 No. 139 Certified, File LR85083; CE Directive 89/336/EEC; |
| VA-78 | UL 60730 Listed, File E194024; ULc 60730-1 Listed; CE Directive 89/336/EEC |
| Warranty | 1 year |

CONTROL VALVES

DIRECT-MOUNT GLOBE VALVE ACTUATORS

VA-4233, VA-7000 SERIES



4

CONTROL VALVES

| INDIVIDUAL SPECIFICATIONS | | | | | | | |
|---------------------------|-----------------|-----------|--|--|--------------------------------------|--------------------------|----------------------|
| Model | Force | Supply VA | Control Signal | Input Impedance | Action | Stroke | Stroke Time |
| VA-7150-1001 | 90 lbf (400 N) | 2.7 VA | Floating | | NSR, DA/RA by wiring | .78" (2.0 cm) maximum | 165 seconds |
| VA-7152-1001 | | 4.7 VA | Prop. 0-5 VDC, 0-10 VDC | 100 k Ω | NSR, DA/RA by jumpers | | |
| VA-7200-1001 | 180 lbf (800 N) | 6.7 VA | Floating | | NSR, DA/RA by wiring | | 62 seconds |
| VA-7202-1001 | | 8.7 VA | Prop. 0-10 VDC, 0-20 mA | 100 k Ω (0-10 VDC); 500 Ω (0-20 mA) | NSR, DA/RA by jumpers | | |
| VA-4233-AGA-2 | 61 lbf (271 N) | 12 VA | Floating | | SR stem up, DA/RA by wiring | .91" (2.3 cm) maximum | 76 seconds |
| VA-4233-BGA-2 | | | Two-position | | SR stem up, power stem down | | |
| VA-4233-GGA-2 | | | Prop. 0/2-10 VDC, 6-9 VDC, 4-20 mA | 200 k Ω (2-10 VDC); 500 Ω (4-20 mA) | SR stem up, DA/RA by switch | | |
| VA-4233-GGC-2 | | | Prop. 0/2-10 VDC, 6-9 VDC, 4-20 mA | 200 k Ω (2-10 VDC); 500 Ω (4-20 mA) | SR stem up, DA/RA by switch | | |
| VA7820-HGA-2 | 180 lbf (800 N) | 11 VA | Prop. 0/2-10 VDC, 0/4-20 mA | 100 k Ω (0-10 VDC); 500 Ω (0-20 mA) | SR stem up, DA/RA by DIP switch | 1.0" (2.5 cm) maximum | 114 or 57 seconds |
| VA7830-HGA-2 | | | Prop. 0/2-10 VDC, 0/4-20 mA | 100 k Ω (0-10 VDC); 500 Ω (0-20 mA) | SR stem down, DA/RA by DIP switch | | |



CONTROL VALVES

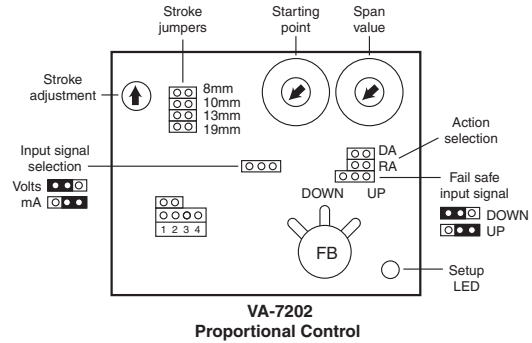
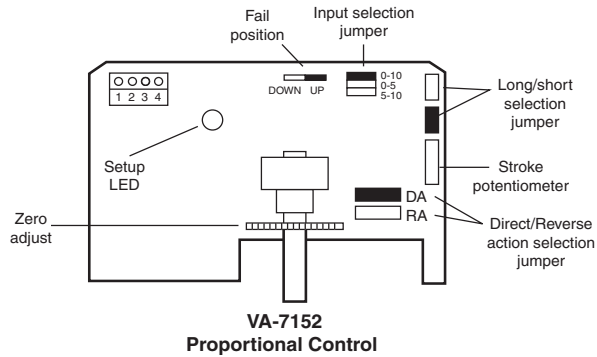
DIRECT-MOUNT GLOBE VALVE ACTUATORS

VA-4233, VA-7000 SERIES

4

CONTROL VALVES

PROPORTIONAL CONTROL SETUP COMPONENTS



DA (direct acting)
Signal increase extends stem downward

RA (reverse acting)
Signal increase retracts stem upward

DIMENSIONS

| Model | Dimensions | Enclosure Rating | Wiring | Conduit Connection | Weight |
|---------------|--|------------------|--|---|-----------------|
| VA-7150-1001 | 6.1"H x 3.8" Diameter (15.4 x 9.8 cm) | NEMA 1 (IP40) | Screw terminals, 24 to 14 AWG | Cable gland, 1/2" (6.4 mm) maximum diameter | 1.7 lb (0.8 kg) |
| VA-7152-1001 | 6.1"H x 3.8" Diameter (15.4 x 9.8 cm) | NEMA 1 (IP40) | Screw terminals, 24 to 14 AWG | Cable gland, 1/2" (6.4 mm) maximum diameter | 1.7 lb (0.8 kg) |
| VA-7200-1001 | 7.8"H x 4.2" Diameter (19.7 x 10.6 cm) | NEMA 2 (IP42) | Screw terminals, 24 to 14 AWG | Two 7/8" (2.2 cm) knockouts for 1/2" fittings | 2.2 lb (1.0 kg) |
| VA-7202-1001 | 7.8"H x 4.2" Diameter (19.7 x 10.6 cm) | NEMA 2 (IP42) | Screw terminals, 24 to 14 AWG | Two 7/8" (2.2 cm) knockouts for 1/2" fittings | 2.2 lb (1.0 kg) |
| VA-4233-AGA-2 | 6.8"H x 4.1"W x 3.3"D (17.3 x 10.4 x 9.1 cm) | NEMA 2 (IP42) | 48" (12.2 cm) cable with 20 AWG | Fitting for 1/2" conduit | 3.1 lb (1.4 kg) |
| VA-4233-BGA-2 | 6.8"H x 4.1"W x 3.3"D (17.3 x 10.4 x 9.1 cm) | NEMA 2 (IP42) | 48" (12.2 cm) cable with 20 AWG | Fitting for 1/2" conduit | 3.1 lb (1.4 kg) |
| VA-4233-GGA-2 | 6.8"H x 4.1"W x 3.3"D (17.3 x 10.4 x 9.1 cm) | NEMA 2 (IP42) | 48" (12.2 cm) cable with 20 AWG | Fitting for 1/2" conduit | 3.1 lb (1.4 kg) |
| VA-4233-GGC-2 | 6.8"H x 4.1"W x 3.3"D (17.3 x 10.4 x 9.1 cm) | NEMA 2 (IP42) | 48" (12.2 cm) cable with 18 AWG | Fitting for 1/2" conduit | 3.1 lb (1.4 kg) |
| VA7820-HGA-2 | 9.1"H x 4.5"W x 8.4"D (23.1 x 11.5 x 21.2 cm) | NEMA 2 (IP54) | 48" (12.2 cm) UL 758 AWM cable, 18 AWG | Integral connector for 3/8" (1.0 cm) flex conduit | 7.3 lb (3.3 kg) |
| VA7830-HGA-2 | 9.1"H x 4.5"W x 8.4"D (23.1 x 11.5 x 21.2 cm) | NEMA 2 (IP54) | 48" (12.2 cm) UL 758 AWM cable, 18 AWG | Integral connector for 3/8" (1.0 cm) flex conduit | 7.3 lb (3.3 kg) |



ORDERING INFORMATION

| Model | Description |
|----------------------|---|
| VA-7150-1001 | 90 lbf, non-spring return, floating control, for 1/2" to 1-1/4" valves |
| VA-7152-1001 | 90 lbf, non-spring return, proportional (0-5, 0-10 VDC) control, for 1/2" to 1-1/4" valves |
| VA-7200-1001 | 180 lbf, non-spring return, floating control, for 1-1/2" and 2" valves |
| VA-7202-1001 | 180 lbf, non-spring return, proportional (0-10 VDC, 0-20 mA) control, for 1-1/2" and 2" valves |
| VA-4233-AGA-2 | 61 lbf, spring return stem up, floating control, for 1/2" to 1-1/4" valves |
| VA-4233-BGA-2 | 61 lbf, spring return stem up, two-position control, for 1/2" to 1-1/4" valves |
| VA-4233-GGA-2 | 61 lbf, spring return stem up, proportional control, for 1/2" to 1-1/4" valves |
| VA-4233-GGC-2 | 61 lbf, spring return stem up, proportional control, with auxiliary switches, for 1/2" to 1-1/4" valves |
| VA7820-HGA-2 | 180 lbf, spring return stem up, proportional control, for 1/2" to 2" valves |
| VA7830-HGA-2 | 181 lbf, spring return stem down, proportional control, for 1/2" to 2" valves |

M9000-200

RELATED PRODUCTS

Commissioning tool

VG7000-1016

V-9999-BC1

ACCESSORIES

Bonnet adapter for replacing M100, V-400, V-500, MP8000 Series on VG7000 valves

Kit for 1/2" to 1-1/4" Invensys VB-7000, VB9000 Series valves



CONTROL VALVES

THREADED AND FLANGED GLOBE VALVES VB SERIES

4

CONTROL VALVES

DESCRIPTION

The **VB Series** Globe Valves are available in 1/2" to 2" threaded bronze body **VB-7XXX** models, or in 2 1/2" to 6" flanged cast iron body **VB-8XXX** models. The flanged valves have a patented balanced plug design. The balanced plug design allows water or steam to flow through the valve plug, equalizing the pressure on the top and bottom of the plug which greatly reduces the force required to operate and close these larger size valves. The **VB Series** Valves are designed for control of chilled water, hot water, or steam in the HVAC industry and have a long history of high quality and reliability. They are available pre-assembled with electric or pneumatic actuators, or available without actuator for field assembly.

FEATURES

- *Low-profile body*
- *High quality, proven history of performance*
- *Self-adjusting packing design*
- *Wide temperature range 20° to 281°F (-7° to 138°C)*
- *Pneumatic or electric actuation choices*



Schneider
Electric

VF-8213-596-5-12

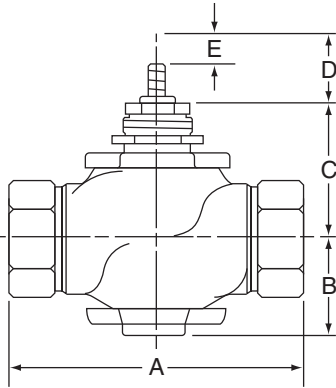
- *Available pre-assembled or separately*
- *Two- and three-way body patterns*
- *Mixing and diverting 3-way body patterns*
- *Balanced plug design on flanged models*

SPECIFICATIONS

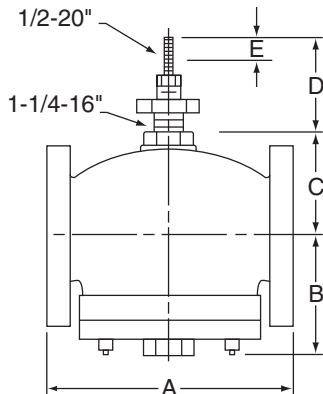
| | | | |
|----------------------------------|--|--------------------------------|---|
| Size | 1/2" to 2" FNPT, 2-1/2" to 6" flanged | | |
| Cv Range | 0.4 to 40 (NPT bodies); 56 to 500 (flanged bodies) | | |
| Body Pattern | Two-way, three-way mixing or diverting | | |
| Rangeability | 1/2" to 2": from 5:1 (Cv=0.4), up to 75:1 (Cv=40) 2-1/2" to 6": 100:1 | | |
| Leakage Rating | ANSI Class IV, 0.01% of Cv | | |
| Maximum Closeoff Pressure | Actuator dependant, see Ordering Information | | |
| Pressure Drop | 35 psid (241 kPa) for water; 20 psid (138 kPa) for steam | | |
| Pressure Rating | 1/2" to 2": ANSI B16.15-1985, Class 250 (400 psi (2756 kPa) @ 20° to 150°F (-7° to 66°C), decreasing to 321 psi (2215 kPa) at 281°F (138°C)); 2-1/2" to 6": ANSI B16.1-1993, Class 125 (200 psi (1380 kPa) @ 20° to 150°F (-7° to 66°C), decreasing to 169 psi (1166 kPa) at 281°F (138°C)) | | |
| Materials Of Construction | 1/2" to 2": Bronze body/plug/seat, stainless steel stem and spring- | | |
| | | | loaded TFE packing; |
| | | | 2-1/2" to 6": Cast iron body, bronze plug/seat, stainless steel stem and spring-loaded TFE/EPDM packing |
| | | Media Compatibility | Hot or chilled water, steam (up to 35 psig (241 kPa)) |
| | | Media Temperature Range | 20° to 281°F (-7° to 138°C) |
| | | Action | Two-way stem up to close and stem up to open models; three-way mixing or diverting |
| | | Actuator Mounting | Threaded mounting yoke |
| | | Compatible Actuators | Electric Forta Series or DuraDrive Series shown on following pages; pneumatic see MK Series in PNEUMATICS & FITTINGS catalog section. |
| | | Operating Temperature | Actuator dependant, refer to following pages for specifications |
| | | Approvals | Actuator dependant, refer to following pages for specifications |
| | | Warranty | 2 years |



MODEL NUMBERS AND DIMENSIONS FOR VB-7000 AND VB-8000 SERIES VALVES WITHOUT ACTUATORS



Typical VB-7000 Threaded Valve



Typical VB-8000 Flanged Valve

Note: Actuator dimensions are listed on the DuraDrive Series pages

| Part Number | Valve Size | Pattern | Stem Position | Dimensions in inches (mm) | | | | | Weight (lbs) |
|--|------------|---------|---------------|---------------------------|-------------|--------------|---------------|----------------------------|--------------|
| | | | | A | B | C | D (Stem Down) | E ^a (Stem Down) | |
| VB-7213-0-4-01 VB-7213-0-4-02 VB-7213-0-4-03 VB-7213-0-4-04 | 1-1/2" | 2-way | SUTO | 3-1/16 (78) | 1-1/16 (27) | 1-11/16 (43) | 3/4 (19) | 7/16 (11) | 2.0 |
| VB-7213-0-4-05 VB-7213-0-4-06 | 3/4" | 2-way | SUTO | 3-5/8 (92) | | | | | 5.5 |
| VB-7213-0-4-07 VB-7213-0-4-08 | 1" | 2-way | SUTO | 4-5/8 (118) | 1-1/8 (29) | 2-3/8 (60) | | | 6.0 |
| VB-7213-0-4-09 VB-7213-0-4-10 | 1-1/4" | 2-way | SUTO | 5-3/8 (137) | 1-3/8 (35) | 2-7/16 (57) | | | 13 |
| VB-7213-0-4-11 | 2" | 2-way | SUTO | 6-1/8 (156) | 1-9/16 (40) | 2-3/4 (70) | | | 13 |

| | | | | | | | | | |
|--|--------|-------|------|-------------|-------------|--------------|------------|-----------|-----|
| VB-7223-0-4-01 VB-7223-0-4-02 VB-7223-0-4-03 VB-7223-0-4-04 | 1/2" | 2-way | SUTC | 3-1/16 (78) | 1-1/4 (32) | 1-11/16 (43) | 1-1/8 (29) | 7/16 (11) | 2.0 |
| VB-7223-0-4-05 VB-7223-0-4-06 | 3/4" | 2-way | SUTC | 3-5/8 (92) | | | | | 3.0 |
| VB-7223-0-4-07 VB-7223-0-4-08 | 1" | 2-way | SUTC | 4-5/8 (118) | 1-3/4 (45) | 1-3/4 (45) | | | 5.5 |
| VB-7223-0-4-09 VB-7223-0-4-10 | 1-1/4" | 2-way | SUTC | 5-3/8 (137) | 2 (51) | 2-1/8 (54) | | | 6.0 |
| VB-7223-0-4-11 | 2" | 2-way | SUTC | 6-1/8 (156) | 2-1/16 (53) | 2-3/16 (56) | | | 13 |

| | | | | | | | | | |
|----------------------------------|--------|-------|---------|-------------|------------|--------------|----------|-----------|-------------|
| VB-7313-0-4-02 VB-7313-0-4-04 | 1/2" | 3-way | MIXING* | 3-1/16 (78) | 1-3/8 (35) | 1-11/16 (43) | 3/4 (19) | 7/16 (11) | 2.0 |
| VB-7313-0-4-06 VB-7313-0-4-08 | 3/4" | 3-way | MIXING* | 3-5/8 (92) | | | | | 1-9/16 (40) |
| VB-7313-0-4-09 VB-7313-0-4-10 | 1-1/4" | 3-way | MIXING* | 4-5/8 (118) | 1-5/8 (41) | 2 (51) | | | 5.0 |
| VB-7313-0-4-11 | 2" | 3-way | MIXING* | 6-1/8 (156) | 1-7/8 (53) | 1-3/16 (30) | | | 5.5 |

| | | | | | | | | | |
|--|--------|-------|------------|-------------|--------------|--------------|----------|-----------|-----|
| VB-7323-0-4-04 VB-7323-0-4-06 VB-7323-0-4-08 | 1/2" | 3-way | DIVERTING* | 3-1/16 (78) | 1-3/8 (53) | 1-11/16 (43) | 3/4 (19) | 7/16 (11) | 2.0 |
| VB-7323-0-4-09 VB-7323-0-4-10 VB-7323-0-4-11 | 3/4" | 3-way | DIVERTING* | 3-5/8 (92) | 1-11/16 (43) | | | | 2.5 |
| | 1" | 3-way | DIVERTING* | 4-5/8 (118) | 1-9/16 (40) | 1-3/4 (45) | | | 5.0 |
| | 1-1/4" | 3-way | DIVERTING* | 5-3/8 (137) | 1-5/8 (41) | 2 (51) | | | 5.5 |
| | 1-1/2" | 3-way | DIVERTING* | 6-1/8 (156) | 1-9/16 (40) | 1-1/8 (29) | | | 14 |
| | 2" | 3-way | DIVERTING* | | 1-7/8 (53) | 1-3/16 (30) | | | 14 |

| | | | | | | | | | |
|--|--------|-------|------|--------------|---------------|--------------|------------|--------|-----|
| VB-8213-0-5-12 VB-8213-0-5-13 VB-8213-0-5-14 | 2-1/2" | 2-way | SUTO | 8-9/16 (217) | 4 (102) | 4-1/8 (105) | 3-1/4 (83) | 1 (25) | 46 |
| VB-8213-0-5-15 VB-8213-0-5-16 | 3" | 2-way | SUTO | 9-1/2 (241) | 4-5/8 (117) | 4-3/8 (111) | | | 58 |
| | 4" | 2-way | SUTO | 11-1/2 (292) | 5-1/2 (140) | 5-1/16 (129) | | | 95 |
| | 5" | 2-way | SUTO | 13 (330) | 6-15/16 (176) | 5-9/16 (141) | | | 141 |
| | 6" | 2-way | SUTO | 14 (356) | 7-1/2 (190) | 6-3/8 (162) | 1-3/4 (45) | 146 | |

| | | | | | | | | | |
|--|--------|-------|------|--------------|---------------|-------------|------------|--------|-----|
| VB-8223-0-5-12 VB-8223-0-5-13 VB-8223-0-5-14 | 2-1/2" | 2-way | SUTC | 8-9/16 (217) | 4 (102) | 4-1/4 (108) | 3-1/4 (83) | 1 (25) | 46 |
| VB-8223-0-5-15 VB-8223-0-5-16 | 3" | 2-way | SUTC | 9-1/2 (241) | 4-1/4 (108) | 4-7/8 (124) | | | 58 |
| | 4" | 2-way | SUTC | 11-1/2 (292) | 4-15/16 (125) | 5-3/4 (146) | | | 95 |
| | 5" | 2-way | SUTC | 13 (330) | 5-7/16 (138) | 6-3/4 (172) | | | 141 |
| | 6" | 2-way | SUTC | 14 (356) | 6-1/4 (159) | 7-1/2 (191) | 1-3/4 (45) | 146 | |

| | | | | | | | | | |
|--|--------|-------|--------------|--------------|---------------|--------------|------------|--------|-----|
| VB-8303-0-5-12 VB-8303-0-5-13 VB-8303-0-5-14 | 2-1/2" | 3-way | MIX. & DIV.* | 8-9/16 (217) | 5-7/16 (138) | 4-3/16 (106) | 3-1/4 (83) | 1 (25) | 55 |
| VB-8303-0-5-15 VB-8303-0-5-16 | 3" | 3-way | MIX. & DIV.* | 9-1/2 (241) | 6-3/8 (162) | 4-3/8 (111) | | | 68 |
| | 4" | 3-way | MIX. & DIV.* | 11-1/2 (292) | 8-7/16 (214) | 5-1/16 (129) | | | 113 |
| | 5" | 3-way | MIX. & DIV.* | 13 (330) | 8-13/16 (224) | 5-5/8 (143) | | | 166 |
| | 6" | 3-way | MIX. & DIV.* | 14 (356) | 9-3/4 (248) | 6-3/4 (171) | 1-3/4 (45) | 212 | |

^a Stroke for rated flow. Add up to 1/16 inch (1.6mm) for disc seating and compression.
SUTO = Stem up to open, SUTC = Stem up to close
*See 3-way flow patterns on the next page



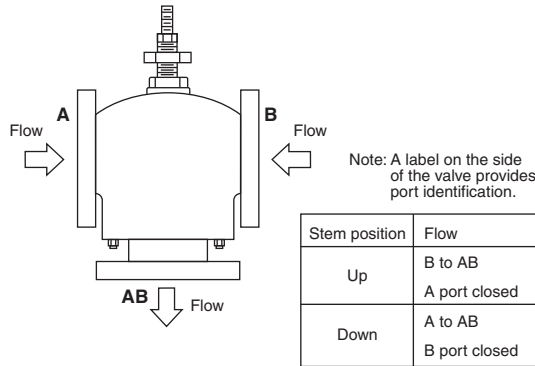
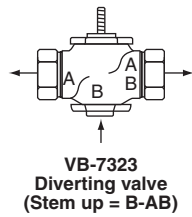
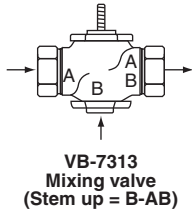
CONTROL VALVES

THREADED AND FLANGED GLOBE VALVES VB SERIES

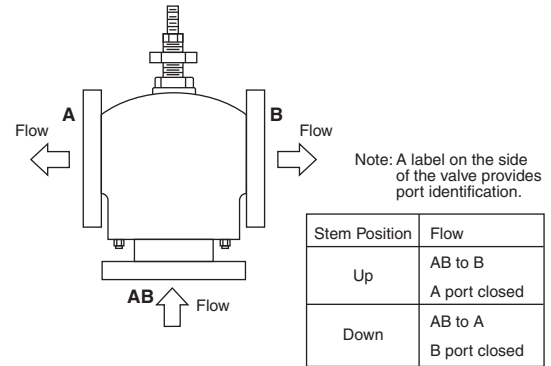
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CONTROL VALVES

VALVE FLOW PATTERNS



VB-8303 Piped as mixing valve

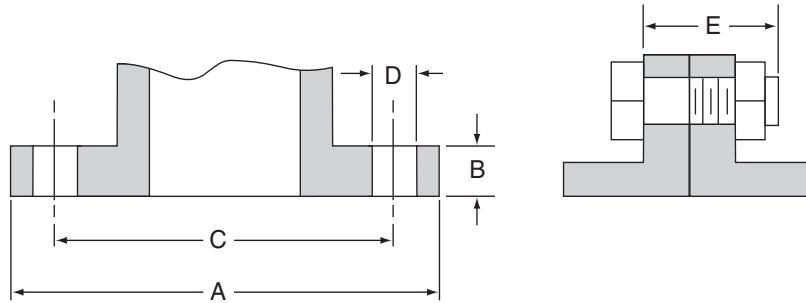


VB-8303 Piped as diverting valve

Three-way Flanged Valve Flow Patterns

Note: Two-way VB-7213 and VB-8213 valves are stem up to open (SUTO).
VB-7223 and VB-8223 are stem up to close (SUTC).

FLANGE DIMENSIONS



Flange Dimensions

Flange Detail for American Standard 125 psi Cast Iron Pipe Flanges

| Nominal Pipe Size | Flanges | | Drilling | | Bolting | | Length of Machine Bolts E |
|-------------------|-------------------|--------------------|---------------------------|--------------------------|-----------------|-------------------|---------------------------|
| | Flange Diameter A | Flange Thickness B | Diameter of Bolt Circle C | Diameter of Bolt Holes D | Number of Bolts | Diameter of Bolts | |
| 2-1/2" | 7" | 11/16" | 5-1/2" | 3/4" | 4 | 5/8" | 2-1/2" |
| 3" | 7-1/2" | 3/4" | 6" | | | | |
| 4" | 9" | 15/16" | 7-1/2" | 7/8" | 8 | 3/4" | 3" |
| 5" | 10" | | 8-1/2" | | | | |
| 6" | 11" | 1" | 9-1/2" | | | | |

CONTROL VALVES

THREADED AND FLANGED GLOBE VALVES VB SERIES



ORDERING INFORMATION

| TWO-WAY ELECTRIC VALVE ASSEMBLIES - ORDERING INFORMATION | | | | | | | | |
|--|----------------|-----|-----------------|-----------------------|---|-----------------|-----------------------|---------------------------------------|
| Model Number | Size | Cv | Pattern | Fail | Control | Actuator | Linkage | Closeoff |
| SUTO = Stem Up To Open, SUTC = Stem Up To Close | | | | | | | | |
| VF-7213-255-4-01 | 1/2" NPT | 0.4 | Two-way SUTO | Non-spring return | Floating (24 VAC) | MF-22303 | None | 130 |
| VF-7213-255-4-02 | 1/2" NPT | 1.3 | | | | | | 80 |
| VF-7213-255-4-03 | 1/2" NPT | 2.2 | | | | | | |
| VF-7213-255-4-04 | 1/2" NPT | 4.4 | | | | | | |
| VF-7213-255-4-05 | 3/4" NPT | 5.5 | | | | | | |
| VF-7213-255-4-06 | 3/4" NPT | 7.5 | | | | | | |
| VS-7213-256-4-01 | 1/2" NPT | 0.4 | Two-way SUTO | Non-spring return | Proportional (24 VAC, 4-20 mA) 2-10 VDC | MS-22353 | None | 130 |
| VS-7213-256-4-02 | 1/2" NPT | 1.3 | | | | | | |
| VS-7213-256-4-03 | 1/2" NPT | 2.2 | | | | | | |
| VS-7213-256-4-04 | 1/2" NPT | 4.4 | | | | | | |
| VS-7213-256-4-05 | 3/4" NPT | 5.5 | | | | | | |
| VS-7213-256-4-06 | 3/4" NPT | 7.5 | | | | | | |
| VA-7213-804-4-01 | 1/2" NPT | 0.4 | Two-way SUTO | Spring return N.O. | Two-position (24 VAC) | MA51-7103-100 | None | 250 |
| VA-7213-804-4-02 | 1/2" NPT | 1.3 | | | | | | 250 |
| VA-7213-804-4-03 | 1/2" NPT | 2.2 | | | | | | 250 |
| VA-7213-804-4-04 | 1/2" NPT | 4.4 | | | | | | 250 |
| VA-7213-804-4-05 | 3/4" NPT | 5.5 | | | | | | 200 |
| VA-7213-804-4-06 | 3/4" NPT | 7.5 | | | | | | 200 |
| VA-7213-804-4-07 | 1" NPT | 10 | | | | 150 | | |
| VA-7213-804-4-08 | 1" NPT | 14 | | | | 150 | | |
| VA-7213-593-4-09 | 1-1/4" NPT | 20 | | | | 150 | | |
| VA-7213-593-4-10 | 1-1/2" NPT | 28 | | | | 100 | | |
| VA-7213-593-4-11 | 2" NPT | 40 | | | | 65 | | |
| VA-8213-596-5-12 | 2-1/2" Flanged | 56 | | | | 125 | | |
| VA-8213-596-5-13 | 3" Flanged | 85 | | | | | | |
| VA-8213-596-5-14 | 4" Flanged | 145 | | | | | | |
| VA-8213-596-5-15 | 5" Flanged | 240 | | | | | | |
| VA-8213-596-5-16 | 6" Flanged | 370 | | | | | | |
| VA-41-7153 | | | | | | | AV-609 | |
| VA-7223-804-4-01 | 1/2" NPT | 0.4 | | | | Two-way SUTC | Spring return N.C. | Two-position (24 VAC) |
| VA-7223-804-4-02 | 1/2" NPT | 1.3 | 250 | | | | | |
| VA-7223-804-4-03 | 1/2" NPT | 2.2 | 250 | | | | | |
| VA-7223-804-4-04 | 1/2" NPT | 4.4 | 250 | | | | | |
| VA-7223-804-4-05 | 3/4" NPT | 5.5 | 200 | | | | | |
| VA-7223-804-4-06 | 3/4" NPT | 7.5 | 200 | | | | | |
| VA-7223-804-4-07 | 1" NPT | 10 | 90 | | | | | |
| VA-7223-804-4-08 | 1" NPT | 14 | 90 | | | | | |
| VA-7223-593-4-09 | 1-1/4" NPT | 20 | 150 | | | | | |
| VA-7223-593-4-10 | 1-1/2" NPT | 28 | 100 | | | | | |
| VA-7223-593-4-11 | 2" NPT | 40 | 65 | | | | | |
| VA-8223-596-5-12 | 2-1/2" Flanged | 56 | 125 | | | | | |
| VA-8223-596-5-13 | 3" Flanged | 85 | | | | | | |
| VA-8223-596-5-14 | 4" Flanged | 145 | | | | | | |
| VA-8223-596-5-15 | 5" Flanged | 240 | | | | | | |
| VA-8223-596-5-16 | 6" Flanged | 370 | | | | | | |
| VA-41-7153 | | | | AV-609 | | | | |
| VF-7213-804-4-01 | 1/2" NPT | 0.4 | Two-way SUTO | Spring return N.O. | Floating (24 VAC) | | | |
| VF-7213-804-4-02 | 1/2" NPT | 1.3 | | | | 250 | | |
| VF-7213-804-4-03 | 1/2" NPT | 2.2 | | | | 250 | | |
| VF-7213-804-4-04 | 1/2" NPT | 4.4 | | | | 250 | | |
| VF-7213-804-4-05 | 3/4" NPT | 5.5 | | | | 200 | | |
| VF-7213-804-4-06 | 3/4" NPT | 7.5 | | | | 200 | | |
| VF-7213-804-4-07 | 1" NPT | 10 | | | | 150 | | |
| VF-7213-804-4-08 | 1" NPT | 14 | | | | 150 | | |
| VF-7213-593-4-09 | 1-1/4" NPT | 20 | | | | 100 | | |
| VF-7213-593-4-10 | 1-1/2" NPT | 28 | | | | 65 | | |
| VF-7213-593-4-11 | 2" NPT | 40 | | | | | | |
| VF-8213-596-5-12 | 2-1/2" Flanged | 56 | | | | 125 | | |
| VF-8213-596-5-13 | 3" Flanged | 85 | | | | | | |
| VF-8213-596-5-14 | 4" Flanged | 145 | | | | | | |
| VF-8213-596-5-15 | 5" Flanged | 240 | | | | | | |
| VF-8213-596-5-16 | 6" Flanged | 370 | | | | | | |
| VF-41-7153 | | | | | | | AV-609 | |
| VU-7213-674-4-02 | 1/2" NPT | 2.2 | | | | Two-way SUTO | Non-Spring Return | Programmable Floating/Proportional |
| VU-7213-674-4-04 | 1/2" NPT | 4.4 | 250 | | | | | |
| VU-7213-674-4-06 | 3/4" NPT | 7.5 | 250 | | | | | |
| VU-7213-680-4-08 | 1" NPT | 14 | 207 | | | | | |
| VU-7213-680-4-09 | 1-1/4" NPT | 20 | 130 | | | | | |
| VU-7213-680-4-10 | 1-1/2" NPT | 28 | 88 | | | | | |
| VU-7213-680-4-11 | 2" NPT | 40 | 48 | | | | | |
| VU-8213-686-5-12 | 2-1/2" Flanged | 56 | Two-way SUTO | | | M1500A | AV-812 | 125 |
| VU-8213-686-5-13 | 3" Flanged | 85 | | | | | | |
| VU-8213-686-5-14 | 4" Flanged | 145 | | | | | | |
| VU-8213-686-5-15 | 5" Flanged | 240 | | | | | | |
| VU-8213-686-5-16 | 6" Flanged | 370 | | | | | | |

4

CONTROL VALVES



CONTROL VALVES

THREADED AND FLANGED GLOBE VALVES

VB SERIES

4

CONTROL VALVES

ORDERING INFORMATION

| TWO-WAY ELECTRIC VALVE ASSEMBLIES - ORDERING INFORMATION (continued) | | | SUTO = Stem Up To Open, SUTC = Stem Up To Close | | | | | |
|--|----------------|-----|---|-----------------------|-----------------------------------|---------------|---------|----------|
| Model Number | Size | Cv | Pattern | Fail | Control | Actuator | Linkage | Closeoff |
| VF-7223-804-4-01 | 1/2" NPT | 0.4 | Two-way SUTC | Spring return N.C. | Floating (24 VAC) | MF51-7103-100 | None | 250 |
| VF-7223-804-4-02 | 1/2" NPT | 1.3 | | | | | | 250 |
| VF-7223-804-4-03 | 1/2" NPT | 2.2 | | | | | | 250 |
| VF-7223-804-4-04 | 1/2" NPT | 4.4 | | | | | | 250 |
| VF-7223-804-4-05 | 3/4" NPT | 5.5 | | | | | | 200 |
| VF-7223-804-4-06 | 3/4" NPT | 7.5 | | | | | | 200 |
| VF-7223-804-4-07 | 1" NPT | 10 | | | | | | 90 |
| VF-7223-804-4-08 | 1" NPT | 14 | | | | | | 90 |
| VF-7223-593-4-09 | 1-1/4" NPT | 20 | | | | 150 | | |
| VF-7223-593-4-10 | 1-1/2" NPT | 28 | | | | 100 | | |
| VF-7223-593-4-11 | 2" NPT | 40 | | | | 65 | | |
| VF-8223-596-5-12 | 2-1/2" Flanged | 56 | | | | 125 | | |
| VF-8223-596-5-13 | 3" Flanged | 85 | | | | | | |
| VF-8223-596-5-14 | 4" Flanged | 145 | | | | | | |
| VF-8223-596-5-15 | 5" Flanged | 240 | | | | | | |
| VF-8223-556-5-16 | 6" Flanged | 370 | | | | | | |
| VF-8223-556-5-16 | 6" Flanged | 370 | MF41-7153 | AV-609 | | | | |
| VS-7213-814-4-01 | 1/2" NPT | 0.4 | Two-way SUTO | Spring return N.O. | Proportional (24 VAC, 4-20 mA) | MS51-7103-160 | None | 250 |
| VS-7213-814-4-02 | 1/2" NPT | 1.3 | | | | | | 250 |
| VS-7213-814-4-03 | 1/2" NPT | 2.2 | | | | | | 250 |
| VS-7213-814-4-04 | 1/2" NPT | 4.4 | | | | | | 250 |
| VS-7213-814-4-05 | 3/4" NPT | 5.5 | | | | | | 200 |
| VS-7213-814-4-06 | 3/4" NPT | 7.5 | | | | | | 200 |
| VS-7213-814-4-07 | 1" NPT | 10 | | | | | | 150 |
| VS-7213-814-4-08 | 1" NPT | 14 | | | | | | 150 |
| VS-7213-593-4-09 | 1-1/4" NPT | 20 | | | | 150 | | |
| VS-7213-593-4-10 | 1-1/2" NPT | 28 | | | | 100 | | |
| VS-7213-593-4-11 | 2" NPT | 40 | | | | 65 | | |
| VS-8213-596-5-12 | 2-1/2" Flanged | 56 | | | | 125 | | |
| VS-8213-596-5-13 | 3" Flanged | 85 | | | | | | |
| VS-8213-596-5-14 | 4" Flanged | 145 | | | | | | |
| VS-8213-596-5-15 | 5" Flanged | 240 | | | | | | |
| VS-8213-556-5-16 | 6" Flanged | 370 | | | | | | |
| VS-8213-556-5-16 | 6" Flanged | 370 | MS41-7153 | AV-609 | | | | |
| VS-7223-814-4-01 | 1/2" NPT | 0.4 | Two-way SUTC | Spring return N.C. | Proportional (24 VAC, 4-20 mA) | MS51-7103-160 | None | 250 |
| VS-7223-814-4-02 | 1/2" NPT | 1.3 | | | | | | 250 |
| VS-7223-814-4-03 | 1/2" NPT | 2.2 | | | | | | 250 |
| VS-7223-814-4-04 | 1/2" NPT | 4.4 | | | | | | 250 |
| VS-7223-814-4-05 | 3/4" NPT | 5.5 | | | | | | 200 |
| VS-7223-814-4-06 | 3/4" NPT | 7.5 | | | | | | 200 |
| VS-7223-814-4-07 | 1" NPT | 10 | | | | | | 90 |
| VS-7223-814-4-08 | 1" NPT | 14 | | | | | | 90 |
| VS-7223-593-4-09 | 1-1/4" NPT | 20 | | | | 150 | | |
| VS-7223-593-4-10 | 1-1/2" NPT | 28 | | | | 100 | | |
| VS-7223-593-4-11 | 2" NPT | 40 | | | | 65 | | |
| VS-8223-596-5-12 | 2-1/2" Flanged | 56 | | | | 125 | | |
| VS-8223-596-5-13 | 3" Flanged | 85 | | | | | | |
| VS-8223-596-5-14 | 4" Flanged | 145 | | | | | | |
| VS-8223-596-5-15 | 5" Flanged | 240 | | | | | | |
| VS-8223-556-5-16 | 6" Flanged | 370 | | | | | | |
| VS-8223-556-5-16 | 6" Flanged | 370 | MS41-7153 | AV-609 | | | | |

THREE-WAY ELECTRIC VALVE ASSEMBLIES - ORDERING INFORMATION

| Model Number | Size | Cv | Pattern | Fail | Control | Actuator | Linkage | Closeoff |
|------------------|----------------|-----|-------------------------------|-----------------------|---|--------------------------------|---------|----------|
| VF-7313-255-4-02 | 1/2" NPT | 1.3 | Three-way Mixing | Non-spring return | Floating (24 VAC) | MF-22303 Incl. two-position | None | 130 |
| VF-7313-255-4-04 | 1/2" NPT | 4.4 | | | | | | 80 |
| VF-7313-255-4-06 | 3/4" NPT | 7.5 | | | | | | |
| VS-7313-256-4-02 | 1/2" NPT | 1.3 | Three-way Mixing | Non-spring return | Proportional (24 VAC, 4-20 mA) 2-10 VDC | MS-22353 | None | 130 |
| VS-7313-256-4-04 | 1/2" NPT | 4.4 | | | | | | 80 |
| VS-7313-256-4-06 | 3/4" NPT | 7.5 | | | | | | 40 |
| VA-7313-804-4-02 | 1/2" NPT | 1.3 | Three-way Mixing | Spring return B-AB | Two-position (24 VAC) | MA51-7103-100 | None | 250 |
| VA-7313-804-4-04 | 1/2" NPT | 4.4 | | | | | | 250 |
| VA-7313-804-4-06 | 3/4" NPT | 7.5 | | | | | | 200 |
| VA-7313-804-4-08 | 1" NPT | 14 | | | | 90 | | |
| VA-7313-593-4-09 | 1-1/4" NPT | 20 | | | | 150 | | |
| VA-7313-593-4-10 | 1-1/2" NPT | 28 | | | | 100 | | |
| VA-7313-593-4-11 | 2" NPT | 40 | 65 | | | | | |
| VU-7313-674-4-02 | 1/2" NPT | 2.2 | Mixing | Non-Spring Return | Programmable Floating/Proportional | M400A | AV-811 | 250 |
| VU-7313-674-4-04 | 1/2" NPT | 4.4 | | | | | | 250 |
| VU-7313-674-4-06 | 3/4" NPT | 7.5 | | | | | | 198 |
| VU-7313-674-4-08 | 1" NPT | 14 | | | | 207 | | |
| VU-7313-680-4-09 | 1-1/4" NPT | 20 | | | | 130 | | |
| VU-7313-680-4-10 | 1-1/2" NPT | 28 | | | | 88 | | |
| VU-7313-680-4-11 | 2" NPT | 40 | 48 | | | | | |
| VU-8303-686-5-12 | 2-1/2" Flanged | 80 | Three-way Mixing/Diverting | | | M1500A | AV-812 | 125 |
| VU-8303-686-5-13 | 3" Flanged | 110 | | | | | | |
| VU-8303-686-5-14 | 4" Flanged | 190 | | | | | | |
| VU-8303-686-5-15 | 5" Flanged | 290 | | | | | | |
| VU-8303-686-5-16 | 6" Flanged | 500 | | | | | | |

CONTROL VALVES

THREADED AND FLANGED GLOBE VALVES

VB SERIES



ORDERING INFORMATION

| THREE-WAY ELECTRIC VALVE ASSEMBLIES - ORDERING INFORMATION (continued) | | | | | | | | | |
|--|----------------|-----|-------------------------------|-----------------------|---|---------------|---------|----------|-----|
| Model Number | Size | Cv | Pattern | Fail | Control | Actuator | Linkage | Closeoff | |
| VA-8303-596-5-12 | 2-1/2" Flanged | 80 | Three-way Mixing/Diverting | Spring return B-AB | Two-position (24 VAC) | MA61-7203 | None | 35 | |
| VA-8303-596-5-13 | 3" Flanged | 110 | | | | | | | |
| VA-8303-596-5-14 | 4" Flanged | 190 | | | | | | | |
| VA-8303-596-5-15 | 5" Flanged | 290 | | | | | | | |
| VA-8303-556-5-16 | 6" Flanged | 500 | | | | MA41-7153 | AV-609 | | |
| VF-7313-804-4-02 | 1/2" NPT | 1.3 | Three-way Mixing | Spring return B-AB | Floating (24 VAC) | MF51-7103-100 | None | 35 | 250 |
| VF-7313-804-4-04 | 1/2" NPT | 4.4 | | | | | | | |
| VF-7313-804-4-06 | 3/4" NPT | 7.5 | | | | | | | |
| VF-7313-804-4-08 | 1" NPT | 14 | | | | | | | |
| VF-7313-593-4-09 | 1-1/4" NPT | 20 | | | | MF51-7203 | None | 150 | |
| VF-7313-593-4-10 | 1-1/2" NPT | 28 | | | | | | | |
| VF-7313-593-4-11 | 2" NPT | 40 | | | | MF61-7203 | None | 100 | |
| VF-8303-596-5-12 | 2-1/2" Flanged | 80 | | | | | | | |
| VF-8303-596-5-13 | 3" Flanged | 110 | Three-way Mixing/Diverting | | | MF41-7153 | AV-609 | 35 | 65 |
| VF-8303-596-5-14 | 4" Flanged | 190 | | | | | | | |
| VF-8303-596-5-15 | 5" Flanged | 290 | | | | | | | |
| VF-8303-556-5-16 | 6" Flanged | 500 | | | | | | | |
| VS-7313-814-4-02 | 1/2" NPT | 1.3 | Three-way Mixing | Spring return B-AB | Proportional (24 VAC, 4-20 mA) 2-10 VDC | MS51-7103-160 | None | 35 | 250 |
| VS-7313-814-4-04 | 1/2" NPT | 4.4 | | | | | | | |
| VS-7313-814-4-06 | 3/4" NPT | 7.5 | | | | | | | |
| VS-7313-814-4-08 | 1" NPT | 14 | | | | | | | |
| VS-7313-593-4-09 | 1-1/4" NPT | 20 | | | | MS51-7203 | None | 150 | |
| VS-7313-593-4-10 | 1-1/2" NPT | 28 | | | | | | | |
| VS-7313-593-4-11 | 2" NPT | 40 | | | | MS61-7203 | None | 100 | |
| VS-8303-596-5-12 | 2-1/2" Flanged | 80 | | | | | | | |
| VS-8303-596-5-13 | 3" Flanged | 110 | Three-way Mixing/Diverting | | | MS41-7153 | AV-609 | 35 | 65 |
| VS-8303-596-5-14 | 4" Flanged | 190 | | | | | | | |
| VS-8303-596-5-15 | 5" Flanged | 290 | | | | | | | |
| VS-8303-556-5-16 | 6" Flanged | 500 | | | | | | | |

| TWO-WAY PNEUMATIC VALVE ASSEMBLIES - ORDERING INFORMATION | | | | | | | | | | | |
|---|----------------|-----|---------|-----------------------|------------------------------------|----------------------|---------|----------------------|-----|-----|-----|
| Model Number | Size | Cv | Pattern | Fail | Control | Actuator | Linkage | Closeoff | | | |
| VK4-7213-201-4-01 | 1/2" NPT | 0.4 | Two-way | Spring return N.O. | 3-7 psi spring with positioner | MK-2690+AK-42309-500 | AV-7400 | 220 | | | |
| VK4-7213-201-4-02 | 1/2" NPT | 1.3 | | | | | | | | | |
| VK4-7213-201-4-03 | 1/2" NPT | 2.2 | | | | | | | | | |
| VK4-7213-201-4-04 | 1/2" NPT | 4.4 | | | | | | | | | |
| VK4-7213-201-4-05 | 3/4" NPT | 5.5 | | | | | | AV-401 | 150 | 130 | |
| VK4-7213-201-4-06 | 3/4" NPT | 7.5 | | | | | | | | | |
| VK4-7213-301-4-07 | 1" NPT | 10 | | | | | | | | | |
| VK4-7213-301-4-08 | 1" NPT | 14 | | | | | | | | | |
| VK4-7213-301-4-09 | 1-1/4" NPT | 20 | | | | | | AV-430 | 125 | 90 | |
| VK4-7213-611-4-10 | 1-1/2" NPT | 28 | | | | | | | | | |
| VK4-7213-611-4-11 | 2" NPT | 40 | | | | | | | | | |
| VK4-8213-602-5-12 | 2-1/2" Flanged | 56 | | | | | | AV-497 | | 125 | 250 |
| VK4-8213-602-5-13 | 3" Flanged | 85 | | | | | | | | | |
| VK4-8213-602-5-14 | 4" Flanged | 145 | | | | | | | | | |
| VK4-8213-602-5-15 | 5" Flanged | 240 | | | | | | | | | |
| VK4-8213-652-5-16 | 6" Flanged | 370 | | | | MK-6911+AK-42309-500 | 125 | 160 | | | |
| VK4-7223-203-4-01 | 1/2" NPT | 0.4 | | | | | | | | | |
| VK4-7223-203-4-02 | 1/2" NPT | 1.3 | Two-way | Spring return N.C. | 8-13 psi spring with positioner | MK-2690+AK-42309-500 | | AV-7400 | 130 | | |
| VK4-7223-203-4-03 | 1/2" NPT | 2.2 | | | | | | | | | |
| VK4-7223-203-4-04 | 1/2" NPT | 4.4 | | | | | | | | | |
| VK4-7223-203-4-05 | 3/4" NPT | 5.5 | | | | | | | | | |
| VK4-7223-203-4-06 | 3/4" NPT | 7.5 | | | | | | AV-401 | 60 | 60 | |
| VK4-7223-203-4-07 | 1" NPT | 10 | | | | | | | | | |
| VK4-7223-303-4-08 | 1" NPT | 14 | | | | | | AV-430 | | 90 | 40 |
| VK4-7223-303-4-09 | 1-1/4" NPT | 20 | | | | | | | | | |
| VK4-7223-613-4-10 | 1-1/2" NPT | 28 | | | | | | AV-497 | 125 | | 170 |
| VK4-7223-613-4-11 | 2" NPT | 40 | | | | | | | | | |
| VK4-8223-602-5-12 | 2-1/2" Flanged | 56 | | | | | | MK-6911+AK-42309-500 | | 125 | 90 |
| VK4-8223-602-5-13 | 3" Flanged | 85 | | | | | | | | | |
| VK4-8223-602-5-14 | 4" Flanged | 145 | | | | | | | | | |
| VK4-8223-602-5-15 | 5" Flanged | 240 | | | | | | | | | |
| VK4-8223-652-5-16 | 6" Flanged | 370 | | | | | | | | | |

| THREE-WAY PNEUMATIC VALVE ASSEMBLIES - ORDERING INFORMATION | | | | | | | | | | |
|---|----------------|-----|-------------------------------|-----------------------|-------------------------------------|----------------------|---------|----------|----|----|
| Model Number | Size | Cv | Pattern | Fail | Control | Actuator | Linkage | Closeoff | | |
| VK4-7313-303-4-02 | 1/2" NPT | 1.3 | Three-way Mixing | Spring return B-AB | 10-13 psi spring with positioner | MK-4621+AK-42309-500 | AV-401 | 200 | | |
| VK4-7313-303-4-04 | 1/2" NPT | 4.4 | | | | | | | | |
| VK4-7313-303-4-06 | 3/4" NPT | 7.5 | | | | | | | | |
| VK4-7313-303-4-08 | 1" NPT | 14 | | | | | | | | |
| VK4-7313-303-4-09 | 1-1/4" NPT | 20 | | | | MK-6611+AK-42309-500 | AV-430 | 120 | | |
| VK4-7313-612-4-10 | 1-1/2" NPT | 28 | | | | | | | | |
| VK4-7313-612-4-11 | 2" NPT | 40 | | | | MK-6811+AK-42309-500 | | AV-497 | 60 | |
| VK4-8303-602-5-12 | 2-1/2" Flanged | 80 | | | | | | | | |
| VK4-8303-602-5-13 | 3" Flanged | 110 | Three-way Mixing/Diverting | | | MK-6911+AK-42309-500 | AV-497 | | 35 | 40 |
| VK4-8303-602-5-14 | 4" Flanged | 190 | | | | | | | | |
| VK4-8303-602-5-15 | 5" Flanged | 290 | | | | | | | | |
| VK4-8303-652-5-16 | 6" Flanged | 500 | | | | | | | | |

4

CONTROL VALVES



CONTROL VALVES

GLOBE VALVE ACTUATORS FORTA SERIES

DESCRIPTION

The **Forta Series** globe valve actuator is a programmable linear actuator family for use with VB7000, VB8000 and VB9000 series two- and three-way valves. The actuators are easily configured for floating or proportional control, direct or reverse action, stroke timing and flow characteristics. An automatic input control signal setup allows for easy field installation onto existing Schneider Electric globe valves. The Forta actuator can also be purchased as part of a complete valve assembly for new applications/installations (order the VU Series).

4

CONTROL VALVES

FEATURES

- *Floating or proportional control in the same actuator*
- *Proportional configuration 0-10, 2-10 VDC or 4-20 mA, 500Ω resistor included*
- *Direct/Reverse action (switch selectable)*
- *Configurable run time*
- *Manual override*
- *Electronic valve sequencing and flow characteristic (equal percentage or linear) selection*
- *Torque overload protection (full stroke)*
- *Easy auto zero and span*



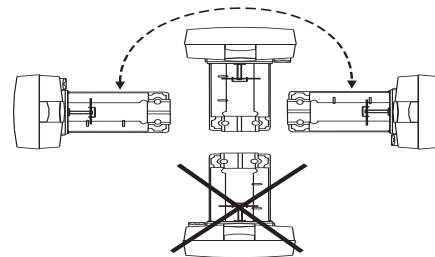
M800A-VB
(screw-mount, linkage not required)



M400A with AV-811
on a VB-7213-0-4-07



MOUNTING



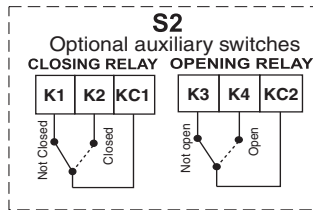
SPECIFICATIONS

| | |
|---------------------------|--|
| Supply Voltage | 24 VAC ±10%, 50/60 Hz |
| Supply VA | |
| M400 | 6 VA |
| M800 | 15 VA |
| M1500 | 24 VA |
| Control Signal | Floating or Proportional 0/2-10 VDC or 4-20 mA |
| Motor | Brushless DC |
| Noise | 32 dBA maximum |
| Conduit Connection | Two knockouts, 7/8" (2.2 cm) |
| Wiring | Screw terminals |
| Feedback | 2-10 VDC |
| Auxiliary Switch | Two SPDT, 4A resistive @ 24 VAC (model specific) |
| Action | Non-spring return, direct or reverse DIP switch selectable |
| Force | |
| M400 | 90 lbf (400 N) |
| M800 | 180 lbf (800 N) |
| M1500 | 337 lbf (1500 N) |
| Stroke | 3/8" to 2" (.9 to 5.2 cm) |
| Stroke Time | Floating, 60 or 300 seconds; Proportional, 15 seconds (for 1/2" stroke) |

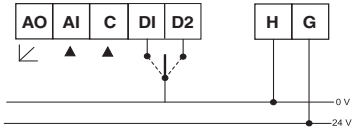
| | |
|------------------------------|--|
| Valve Mounting | |
| Non "...VB" | Requires AV-811 linkage for VB-7xxx, AV-812 for VB-8xxx, VB-9xxx valves |
| "-VB" models | Direct screw-mount to valve bonnet |
| Manual Override | Yes |
| Operating Temperature | 14° to 122°F (-10° to 50°C) for chilled water applications; maximum temperature reduces to 90°F (32°C) when media temperature is 366°F (186°C) |
| Operating Humidity | 15% to 95% RH non-condensing |
| Dimensions | |
| M400, M800 | 9.5"H x 6.3"W x 4.6"D (24.2 x 16.0 x 11.7 cm) |
| M1500 | 6.8"H x 6.3"W x 4.6"D (17.3 x 16.0 x 11.7 cm) |
| Weight | 3.9 lb (1.8 kg) |
| Enclosure Rating | NEMA 2 (IP54) if both conduit connectors used, otherwise NEMA 1 (IP40) |
| Approvals | UL 873, cULus, C-tick, CE |
| Warranty | 1 year |



WIRING



*add- S2 to model number for auxiliary switch



| Terminal | Function | Description |
|----------|----------|-----------------|
| G | 24 vac | power |
| H | 24 vac | power |
| AI | + | input signal |
| C | - | signal common |
| D1 | Floating | Extend/Retract* |
| D2 | Floating | Extend/Retract* |
| A0 | + | feedback signal |

*Exact operation will vary based on the settings of DIP switch #1 and #7

DIP SWITCH SETTINGS

| MOD | Function in the "OFF" position | Function in the "ON" position | Description |
|------------|--------------------------------|-------------------------------|-----------------------------------|
| --- | INC | Modulating | Control |
| 2-10 | SEQ | - | Control |
| 6-10, 5-10 | 0-10 | 2-10 V | Voltage range |
| 60 s | 2-6, 0-5 | 6-10 V, 5-10 V | Part of voltage range |
| NORM | 300 s | 60 s | Running time |
| NORM | INV | Normal | Inverted |
| OP | LIN/LG | Normal | Valve characteristic |
| | ADJ | Operation | Operation/End position adjustment |

COMPATIBILITY

VB-7000 Bronze Valve

(AV-811 linkage required for M400A, M800A, M1500A)

| Valve size | M400A/ M400A-VB (90 lbf) | M800A/ M800A-VB (180 lbf) | M1500A/ M1500A-VB (337 lbf) |
|------------|--------------------------------|---------------------------------|-----------------------------------|
| 1/2" | ✓ | | |
| 3/4" | ✓ | ✓ | |
| 1" | ✓ | ✓ | |
| 1-1/4" | ✓ | ✓ | |
| 1-1/2" | ✓ | ✓ | ✓ |
| 2" | ✓ | ✓ | ✓ |

VB-8000/9000 Flanged Iron Valve

(AV-812 linkage required)

| Valve size | M400A (90 lbf) | M800A (180 lbf) | M1500A (337 lbf) |
|------------|-------------------|--------------------|---------------------|
| 2-1/2" | | ✓* | ✓ |
| 3" | | ✓* | ✓ |
| 4" | | ✓* | ✓ |
| 5" | | | ✓ |
| 6" | | | ✓ |

* VB-9313 only

ORDERING INFORMATION

MODEL

M400A
M400A-S2
M400A-S2-VB
M400A-VB
M800A
M800A-S2
M800A-S2-VB
M800A-VB
M1500A
M1500A-S2
M1500A-S2-VB
M1500A-VB
AV-811
AV-812

DESCRIPTION

90 lbf, non-spring return, proportional/floating control, requires AV-81x linkage
 90 lbf, non-spring return, proportional/floating control, requires AV-81x linkage, auxiliary switch
 90 lbf, non-spring return, proportional/floating control, screw-mount, auxiliary switch
 90 lbf, non-spring return, proportional/floating control, screw-mount
 180 lbf, non-spring return, proportional/floating control, requires AV-81x linkage
 180 lbf, non-spring return, proportional/floating control, requires AV-81x linkage, auxiliary switch
 180 lbf, non-spring return, proportional/floating control, screw-mount, auxiliary switch
 180 lbf, non-spring return, proportional/floating control, screw-mount
 337 lbf, non-spring return, proportional/floating control, requires AV-81x linkage
 337 lbf, non-spring return, proportional/floating control, requires AV-81x linkage, auxiliary switch
 337 lbf, non-spring return, proportional/floating control, screw-mount, auxiliary switch
 337 lbf, non-spring return, proportional/floating control, screw-mount
 Linkage for VB-7xxx valves (required for M400A, M800A, M1500A)
 Linkage for VB-8xxx & VB-9xxx valves (required for M400A, M800A, M1500A)

ACCESSORIES

AV-811
AV-812

Linkage for VB-7xxx valves (required for M400A, M800A, M1500A)
 Linkage for VB-8xxx & VB-9xxx valves (required for M400A, M800A, M1500A)



CONTROL VALVES

GLOBE VALVE ACTUATORS DURADRIVE SERIES

DESCRIPTION

The Schneider Electric **DuraDrive Series** linear globe valve actuators are designed to mount directly onto two- and three-way VB-7000 and VB-8000 Series globe valves. They have integral linkage to provide linear travel and are available in a wide selection of spring and non-spring return models.



MA51-7103-000

4

FEATURES

- *Direct-mount, integral linkage (SR models)*
- *Wide selection of control signal inputs*
- *Rugged design, reliable performance*
- *Spring or non-spring return models*

CONTROL VALVES

COMMON SPECIFICATIONS

Input Impedance

| | |
|---------------------------|---|
| ML-22353 | 100 k Ω for 2-10 VDC input, 100 Ω for 4-20 mA input |
| MS41-7153/AV-609-1 | 80 k Ω @ 0/2-10 VDC; 500 Ω @ 4-20 mA |

Conduit Connection 1/2" FNPT

Wiring

| | |
|---------------------------|---|
| MF-22303, MS-22353 | 48" (122 cm) 18 AWG plenum cable rated for UL |
| Mx51-7103 | 36" (91 cm) plenum cable |
| Mxxx-7203 | 36" (91 cm) appliance cable |
| Mx41-7153 | 36" (91 cm) cable, 18 AWG |

Enclosure Rating

| | |
|---------------------------|---------------|
| MF-22303, MS-22353 | NEMA 1 (IP31) |
| All others | NEMA 2 (IP54) |

Feedback

| | |
|-------------------------|--------------|
| MS-22353 | 15k ohm pot. |
| MF51, MS51, MS41 | 2-10 VDC |

Manual Override

Crank

Operating Humidity

5% to 95% RH non-condensing

Operating Temperature

| | |
|-----------------------------|------------------------------|
| MF-22303, MS-22353 | 40° to 281°F (4° to 138°C) |
| Mx51-7103, Mx41 | -22° to 140°F (-30° to 60°C) |
| Mx51-7203, Mx61-7203 | 0° to 140°F (-18° to 60°C) |

Weight

| | |
|---------------------------|-----------------|
| MF-22303, MS-22353 | 1.5 lb (.68 kg) |
| Mxxx-7102, -7203 | 4.3 lb (1.9 kg) |
| Mx41-7153/AV-609 | 7.5 lb (3.4 kg) |

Approvals

| | |
|---------------------------|--|
| MF-22303, MS-22353 | UL 873, File E9429; cUL, C22.2 No. 24-93; CE EMC Directive 89/336/EEC; |
| Mx51, Mx61 | UL 873, File E9429; cUL, C22.2 No. 24-93; CE EMC Directive 89/336/EEC; C-tick; |
| Mx41-7153 | UL, CE, cUL, C-tick |

Warranty

| | |
|---------------------------|---------|
| MF-22303, MS-22353 | 2 years |
| All others | 5 years |

CONTROL VALVES

GLOBE VALVE ACTUATORS DURADRIVE SERIES



4

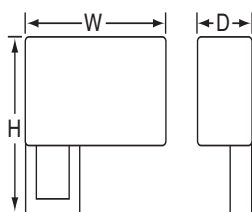
CONTROL VALVES

INDIVIDUAL SPECIFICATIONS

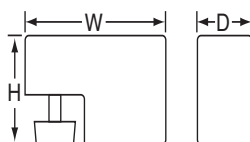
| Model | Supply Voltage | Supply VA | Force/Torque | Actuator Code | Action | Control Signal | Stroke | Drive Time | Spring Return Time |
|---------------------------|----------------|-----------|-------------------|---------------|-----------------------------------|------------------------------|---------------------|---------------------|--------------------|
| MF-22303 | 24 VAC | 1.5 VA | 45 lbf (200 N) | 255 | NSR, DA/RA by wiring terminations | Floating, contacts or Triacs | 9/16" (1.4 cm) | 126 seconds nominal | |
| MS-22353 | 24 VAC | 4.0 VA | 45 lbf (200 N) | 256 | NSR, stem up 2V, stem down 10V | Prop. 2-10 VDC or 4-20 mA | 9/16" (1.4 cm) | 126 seconds nominal | |
| MA51-7103-100 | 24 VAC/VDC | 5.3 VA | 105 lbf (467 N) | 804 | SR valve stem up | Two-position | 1/2" (1.3 cm) | 44 seconds | 19 seconds |
| MF51-7103-100 | 24 VAC/VDC | 6.9 VA | 105 lbf (467 N) | 804 | SR valve stem up, DA/RA by wiring | Floating | 1/2" (1.3 cm) | 60 seconds | 16 seconds |
| MS51-7103-100 | 24 VAC/VDC | 6.6 VA | 105 lbf (467 N) | 814 | SR, DA/RA by jumpers | Prop. 2-10 VDC | 1/2" (1.3 cm) | 60 seconds | 16 seconds |
| MS51-7103-160 | 24 VAC/VDC | 6.6 VA | 105 lbf (467 N) | 814 | SR, DA/RA by jumpers | Prop. 4-20 mA | 1/2" (1.3 cm) | 60 seconds | 16 seconds |
| MA51-7203 | 24 VAC/VDC | 9.7 VA | 220 lbf (979 N) | 593 | SR valve stem up | Two-position | 1/2" (1.3 cm) | 190 seconds maximum | 35 seconds |
| MA61-7203 | 24 VAC/VDC | 9.7 VA | 220 lbf (979 N) | 596 | SR valve stem up | Two-position | 1" (2.5 cm) | 190 seconds maximum | 40 seconds |
| MF51-7203 | 24 VAC/VDC | 9.7 VA | 220 lbf (979 N) | 593 | SR valve stem up, DA/RA by wiring | Floating | 1/2" (1.3 cm) | 190 seconds maximum | 35 seconds |
| MF61-7203 | 24 VAC/VDC | 9.7 VA | 220 lbf (979 N) | 596 | SR valve stem up, DA/RA by wiring | Floating | 1" (2.5 cm) | 190 seconds maximum | 40 seconds |
| MS51-7203 | 24 VAC/VDC | 9.7 VA | 220 lbf (979 N) | 593 | SR, DA/RA by jumpers | Prop. 2-10 VDC or 4-20 mA | 1/2" (1.3 cm) | 190 seconds maximum | 35 seconds |
| MS61-7203 | 24 VAC/VDC | 9.7 VA | 220 lbf (979 N) | 596 | SR, DA/RA by jumpers | Prop. 2-10 VDC or 4-20 mA | 1" (2.5 cm) | 190 seconds maximum | 40 seconds |
| MA41-7153/AV-609-1 | 24 VAC/VDC | 9.7 VA | 133 in-lb (15 Nm) | 556 | SR, Mounting orientation DA/RA | Two-position | 1" w/AV-609 linkage | 190 seconds | 30 seconds |
| MF41-7153/AV-609-1 | 24 VAC/VDC | 9.7 VA | 133 in-lb (15 Nm) | 556 | SR, Mounting orientation DA/RA | Floating | 1" w/AV-609 linkage | 190 seconds | 30 seconds |
| MS41-7153/AV-609-1 | 24 VAC/VDC | 9.7 VA | 133 in-lb (15 Nm) | 556 | SR, Mounting orientation DA/RA | Prop. 2-10 VDC or 4-20 mA | 1" w/AV-609 linkage | 190 seconds | 30 seconds |

ACTUATOR DIMENSIONS

in (cm)



*Mx41/Mx51/Mx61



Mx-223x3

| Model Number | H | W | D |
|-------------------------|---------------|---------------|--------------|
| Mx51-7103 | 6-5/16 (16.0) | 6-3/4 (17.2) | 3-1/2 (8.9) |
| Mx51-7203 | 7 (17.8) | 10-5/8 (27.0) | 2-9/16 (6.5) |
| Mx61-7203 | 9-9/16 (24.2) | 10-5/8 (27.0) | 2-9/16 (6.5) |
| Mx223x3 | 3-5/16 (8.4) | 5-9/16 (14.1) | 3 (7.6) |
| Mx41-7153/AV-609 | 11-5/8 (29.5) | 4 (10.2) | 6-1/8 (15.6) |

* Mx41 assemblies include separate AV-60x linkages. Dimension diagrams are generic and for illustration purposes only.



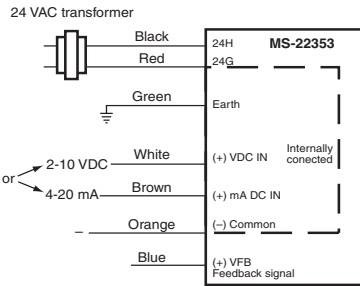
CONTROL VALVES

GLOBE VALVE ACTUATORS DURADRIVE SERIES

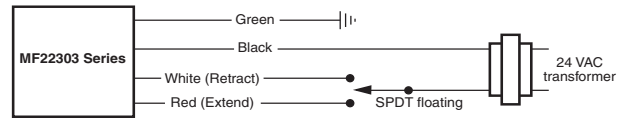
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CONTROL VALVES

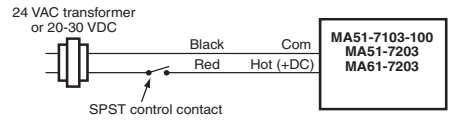
WIRING



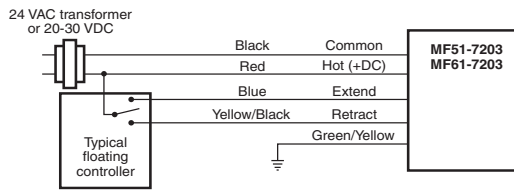
MS-22353 Wiring



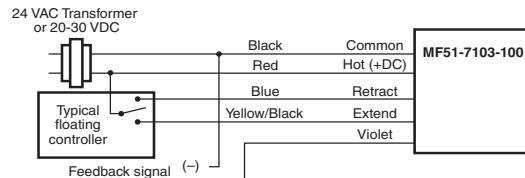
MF22303 Wiring



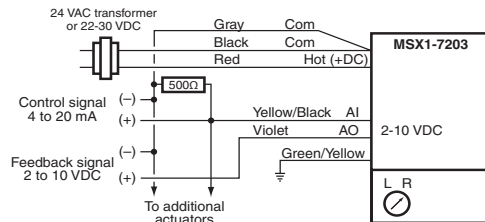
MA51-7203, MA51-7103-100, MA61-7203 Wiring



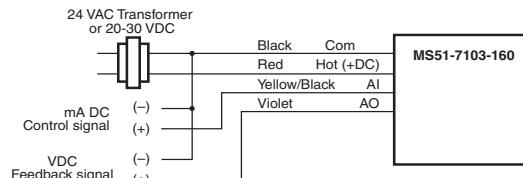
MF41-7153, MF51/MF61-7203 Wiring



MF51-7103-100 Wiring



MS51/MS61-7203 Wiring



MS51-7103-160 Wiring

ORDERING INFORMATION

| Model | Description |
|----------------------|---|
| MF-22303 | Non-spring return, 45 lbf, floating control, for 1/2" to 1-1/4" VB-7xxx valves |
| MS-22353 | Non-spring return, 45 lbf, proportional 2-10 VDC or 4-20 mA control, for 1/2" to 1-1/4" VB-7xxx |
| MA51-7103-100 | Spring return stem up, 105 lbf, two-position, plenum cable, for 1/2" to 2" VB-7xxx |
| MF51-7103-100 | Spring return stem up, 105 lbf, floating, plenum cable, for 1/2" to 2" VB-7xxx |
| MS51-7103-100 | Spring return stem up, 105 lbf, proportional 2-10 VDC, plenum cable, for 1/2" to 2" VB-7xxx |
| MS51-7103-160 | Spring return stem up, 105 lbf, proportional 4-20 mA, plenum cable, for 1/2" to 2" VB-7xxx |
| MA51-7203 | Spring return stem up, 220 lbf, two-position, plenum cable, for 1-1/4" to 2" VB-7xxx |
| MA61-7203 | Spring return stem up, 220 lbf, two-position, plenum cable, for 2-1/2" to 4" VB-7xxx |
| MF51-7203 | Spring return stem up, 220 lbf, floating, plenum cable, for 1-1/4" to 2" VB-7xxx |
| MF61-7203 | Spring return stem up, 220 lbf, floating, plenum cable, for 2-1/2" to 4" VB-7xxx |
| MS51-7203 | Spring return stem up, 220 lbf, proportional, plenum cable, for 1-1/4" to 2" VB-7xxx |
| MS61-7203 | Spring return stem up, 220 lbf, proportional, plenum cable, for 2-1/2" to 4" VB-7xxx |
| MA41-7153 | Spring return 133 in-lb (15 Nm), two-position, 24 VAC, two-wire control |
| MF41-7153 | Spring return 133 in-lb (15 Nm), tri-state control, 24 VAC |
| MS41-7153 | Spring return 133 in-lb (15 Nm), proportional control, 24 VAC |



DESCRIPTION

The Belimo **NVF** and **NV Series** Direct-mount Globe Valve Actuators offer spring return (NVF) and non-spring return (NV) control for many two- and three-way, 1/2" through 2" threaded globe valves. Both are available with Belimo MFT technology and on/off, floating, and proportional control signal types. They are powered with 24 VAC or 24 VDC.

Using the UNV-001 linkage, the **NVF** and **NV Series** actuators mount directly to Schneider Electric VB7000 Series threaded globe valves. Other UNV Series linkages allow the **NVF** and **NV Series** actuators to control valves from Siemens, Johnson Controls, Honeywell, and other manufacturers.

FEATURES

- **Self-adjusting stroke**
- **Automatic adjusting position indicators**
- **Self-locking valve coupling**
- **Manual override**
- **Fully-configurable MFT models**
- **Universal linkage kits**

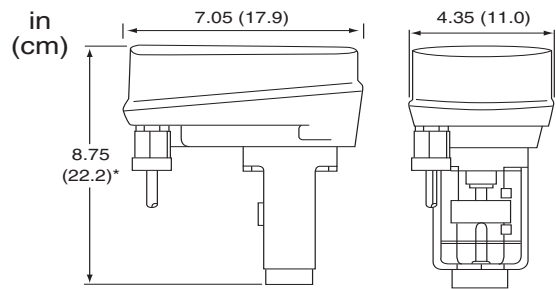
APPLICATION

The **NVF24 Series** spring return actuator has a force rating of 180 lbf and close off ratings for two- and three-way mixing valves are 250 psid for 1/2" and 3/4" valves, 207 psid for 1" valves, 130 psid for 1-1/4" valves, 88 psid for 1-1/2" valves, and 47 psid for 2". Closeoff is 250 psid for all sizes of three-way diverting valves. These ratings are for Belimo G2 and G3 Series and Schneider Electric VB7000 and VB9000 series valves.

The **NV24 Series** non-spring return actuator has a force rating of 225 lbf. and close off ratings for two- and three-way mixing valves are 250 psid for 1/2" through 1" valves, 162 psid for 1-1/4" valves, 110 psid for 1-1/2" valves, and 58 psid for 2". Closeoff is 250 psid for all sizes of three-way diverting valves. These ratings are for Belimo G2 and G3 Series and Schneider Electric VB7000 and VB9000 series valves.



DIMENSIONS



*UNV-001 dimension. Height of UNV-002 through UNV-035 is 10 (25.5).

UNV-001 Bracket shown

SPECIFICATIONS

| | | | |
|------------------------------|---|------------------------------|---|
| Supply Voltage | 24 VAC $\pm 20\%$, 50/60 Hz; 24 VDC $\pm 10\%$ | NVF24-MFT | Spring return stem up, switchable direct/reverse acting |
| Supply VA | 5 VA (NV24-3), 7 VA (NV24-MFT), 10 VA (NVF24-MFT) | NVF24-MFT-E | Spring return stem down, switchable direct/reverse acting |
| Control Signal | Two-position/floating, Proportional 2-10 VDC, 4-20 mA, PWM (MFT) | Force | 180 lbf (800 N) |
| Input Impedance | 100 k Ω for 2-10 VDC; 500 Ω for 4-20 mA, 750 Ω for PWM | Spring Return Time | 30 seconds |
| Noise | <35 dBA | Stroke Time | 150 seconds |
| Wiring | 36" (91 cm) 18 AWG Appliance cable | Manual Override | 3/16" (5 mm) hex crank |
| Conduit Connection | 1/2" NPT | Operating Temperature | -22° to 122°F (-30° to 50°C) |
| Feedback | 2-10 VDC (MFT models) | Operating Humidity | 5% to 95% RH non-condensing |
| Valve Mounting Action | UNV linkage required | Stroke | 3/4" (20 mm) maximum |
| NV24-3 | Non-spring return, direct/reverse acting wiring method | Weight | 3.3 lb (1.5 kg) (NV24-3); 4.0 lb (1.8 kg) (MFT models) |
| NV24-MFT | Non-spring return, switchable direct/reverse acting | Enclosure Rating | NEMA 2 (IP54) mounted vertical, UL 94-5V flammability |
| | | Approvals | UL 873 listed; CE; CSA 22.2 No. 24 certified |
| | | Warranty | 5 years |



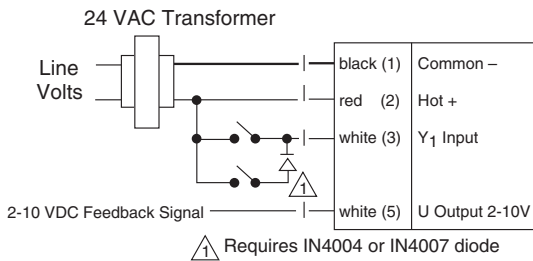
CONTROL VALVES

GLOBE VALVE ACTUATORS NV, NVF SERIES

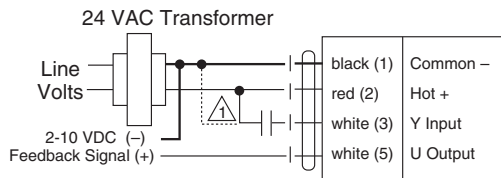
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CONTROL VALVES

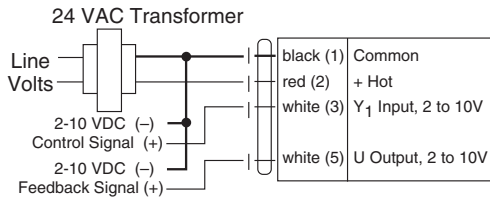
WIRING



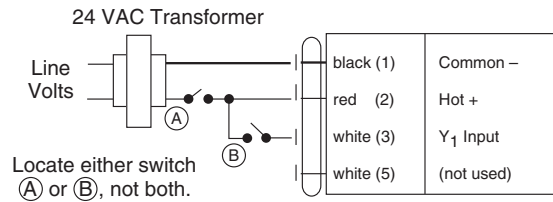
NVF24-MFT, NVF24-MFT-E, Floating Control



NVF24-MFT, NVF24-MFT-E, Pulse-width Modulation Control (Configurable)



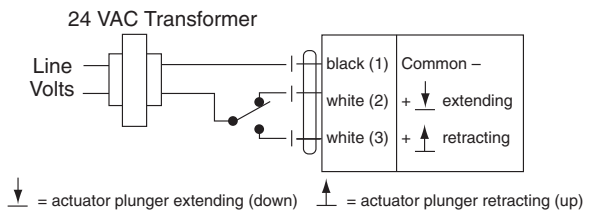
NVF24-MFT, NVF24-MFT-E, 2-10 VDC Control, 4-20mA w/500Ω Resistor



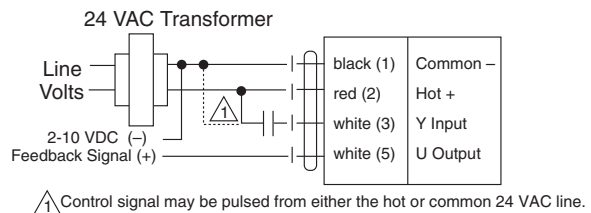
| | Actuator | | Control Switch Location | Correct LED Indication |
|-------------------------------------|--------------------------|----------------------------|-------------------------|------------------------|
| | Open (Switch Selectable) | Closed (Switch Selectable) | | |
| OFF/ON Drive "open" Spring "closed" | 150 sec (MFT selectable) | 30 sec Spring Return | (A) | Flashing Red |
| OFF/ON Drive "open" Drive "closed" | 150 sec (MFT selectable) | 150 sec (MFT selectable) | (B) | Steady Green |

* For on/off control of NVF...MFT actuators. The control function must be set for VDC.

NVF24-MFT, NVF24-MFT-E*, On/Off Control



NV24-3, On/Off/Floating Control



Range Available: 20 ms to 50 sec
Typical: 0.59 to 2.93, 0.02 to 5.00, 0.10 to 25.5; custom configurations available

NV24-MFT, Pulse-width Modulation Control

ORDERING INFORMATION

| ACTUATORS | |
|-----------|---|
| MODEL | DESCRIPTION |
| NV24-3 | 225 lbf, on/off/floating, non-spring return |
| NV24-MFT | 225 lbf, proportional, non-spring return |

| LINKAGES | |
|----------|---|
| MODEL | DESCRIPTION |
| UNV-001 | Linkage for Schneider VB-9000 (1/2" to 1-1/4"), VB-7000 (1/2" to 2") |
| UNV-003 | Linkage for Siemens VF-599 valves 1/2" to 2" |
| UNV-004 | Linkage for Siemens VP-658 valves 1/2" to 1-1/4" |
| UNV-005 | Linkage for Siemens VP-591 valves 1/2" to 1" (2-way), 1/2" to 2" (3-way) |
| UNV-006 | Linkage for Honeywell V5011/V5013 valves 1/2" to 2", V33/V34 2-1/2" to 3" |
| UNV-007 | Linkage for Robertshaw V6600/6700 valves 1/2" to 2" |
| UNV-008 | Linkage for JCI V-3754, 3974, 4324, 5844 valves 3/4" to 2" |
| UNV-009 | Linkage for JCI VG-7000 valves 1/2" to 3/4" |
| UNV-040 | Linkage for JCI VG-7000, 1" to 2" |
| UNV-035 | Hi-temp linkage for Schneider VB-7000/9000 (Belimo G2/G3) |

| ACTUATORS | |
|------------|---|
| MODEL | DESCRIPTION |
| NVF24-MFT | 180 lbf, on/off/floating/proportional, spring return up |
| NVF24-MFTE | 180 lbf, on/off/floating/proportional, spring return down |

TWO-WAY NORMAL POSITION

| | | |
|------------------------------|--------|------|
| MFT Spring Return Stem-Up | VB7213 | N.O. |
| | VB7223 | N.C. |
| | VG7241 | N.O. |
| | VG7441 | N.C. |
| | V5011 | N.O. |
| MFTE Spring Return Stem-Down | VB7213 | N.C. |
| | VB7223 | N.O. |
| | VG7241 | N.C. |
| | VG7441 | N.O. |
| | V5011 | N.C. |

Note: Actuators and linkages may be ordered separately or assembled with a valve.

Fully-assembled Schneider valves with NV actuators may be ordered using the following methodology:

Example: VB-7213-0-4-03/NVF24-MFT.

The UNV-001 linkage will be automatically used in the assembly.

Contact Kele to discuss your specific needs.

KOV-2

RELATED PRODUCTS

NEMA 3R fabric weather shield, 8" dia. x 10"H, fits Honeywell ML6420/7420/6425/7425 and Belimo NV/NVF



FABRIC WEATHERPROOF COVER FOR GLOBE VALVE ACTUATORS KOV SERIES



KOV-3 on
ML7421B actuator
and 5" globe valve



DESCRIPTION

The **KOV Series** fabric cover offers an innovative and effective weather protection solution for low-voltage direct-mount globe valve actuators. Made of heavy-duty, water repellent, acrylic woven fabric, the **KOV** provides a significant degree of protection against falling rain, sleet, snow and ice. The light color minimizes solar heat gain to keep the actuator cooler than traditional plastic or metal enclosures and the fabric breathes to prevent condensation. It can be installed and removed in seconds and it is available in four sizes to fit many popular globe valve direct-mount actuators.

FEATURES

- **Heavy-duty, water repellent fabric**
- **Keeps actuator cool in hot sun**
- **Breatheable design prevents condensation**
- **Cinch strap allows quick and easy installation**
- **Keeps actuator clean and protected**

APPLICATION

The **KOV Series** has been tested to the NEMA 3R standard and will effectively protect a NEMA 2 (IP42 or equivalent) actuator from the weather when mounted vertically. The cover fabric is guaranteed for a period of five years against loss of color or strength from normal exposure conditions including sunlight, mildew, rot and atmospheric chemicals. It is not rated for high-voltage equipment.

SPECIFICATIONS

Materials Of Construction

600D Oxford fabric, thickened and densified for heavy duty protection; nylon webbing and straps; nylon buckle

Dimensions

| | |
|--------------|---|
| KOV-1 | Approximately 6" diameter x 7"H (15 x 18 cm) |
| KOV-2 | Approximately 8" diameter x 10"H (20 x 25 cm) |
| KOV-3 | Approximately 10" diameter x 10"H (25 x 25 cm) |
| KOV-4 | Approximately 14" diameter x 12"H (36 x 30 cm) |

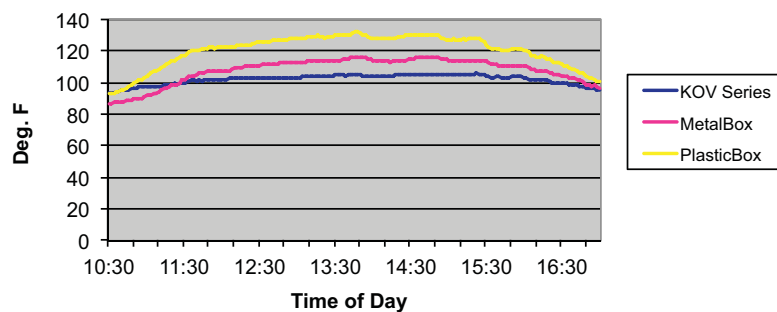
Color

Light tan to minimize solar gain

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CONTROL VALVES

Weather Shield Temperature Comparisons
Enclosure air temperature test data



ORDERING INFORMATION

| Model | Description |
|--------------|---|
| KOV-1 | NEMA 3R fabric weather shield, 6" dia. x 7"H, fits Honeywell ML6984/7984, JCI VA-4233 |
| KOV-2 | NEMA 3R fabric weather shield, 8" dia. x 10"H, fits Honeywell ML6420/7420/6425/7425 and Belimo NV/NVF |
| KOV-3 | NEMA 3R fabric weather shield, 10" dia. x 10"H, fits Honeywell ML6421/7421 |
| KOV-4 | NEMA 3R fabric weather shield, 14" dia. x 12"H, fits Honeywell Q5022 linkage with dual actuators |



CONTROL VALVES

BUTTERFLY VALVES 522 SERIES

DESCRIPTION

The **522 Series** resilient seated butterfly valves are available in 2"-20" sizes. Economical and designed to meet today's HVAC and industrial process requirements, they come standard with full lugged bodies, aluminum bronze discs, 416 stainless steel stems, and EPDM seats. The valves come assembled with electric, pneumatic, or manual operators and are ready to install.

4

FEATURES

- *High pressure pneumatic actuators are rack and pinion driven and available in both double acting and spring return designs*
- *High torque industrial grade electric actuators are available in modulating or on/off configurations; spring return fail-safe operation also available*
- *High torque non-spring return industrial grade electric actuators are waterproof (NEMA4, 4X, 6 and IP67) and come standard with heaters*
- *Valve discs are spherically machined and hand polished for bubble tight shut off, minimum torque, and long life*
- *Unique tongue and groove seat design is designed to seal with slip on or weld neck flanges*
- *The bonded in seat design totally encases the valve interior to isolate the body from line media*
- *Stem packing gland is a self-adjusting design and gives positive sealing in both directions, preventing external substances from entering the stem bore*

CONTROL VALVES



522-05-H2X-0



522-05-E2X-0



522-03-KMSC-0

ultraflo®

COMMON SPECIFICATIONS

| | |
|----------------------------------|--|
| Size | 2" to 20" full-lug bodies |
| Mounting Flange | ANSI 125/150 lug style flanges |
| Maximum Closeoff Pressure | 100 psid (689 kPa) |
| Maximum Pressure | 200 psig (1379 kPa) |
| Materials Of Construction | Valve body: polyester coated cast iron, A 126 Class B; seat: EPDM bonded in for dead end service; shaft and taper-pin: Type 416/17-4 pH; disc: aluminum bronze; weather seal: Buna-N; bearings: Acetol |
| Media Compatibility | Hot or chilled water, ethylene glycol |
| Media Temperature Range | -40° to 250°F (-40° to 120°C) |
| Supply Voltage | Electric KA/KAS actuators: 24 VAC/VDC; Electric 200/200S actuators: 120 VAC |
| Control Signal | Pneumatic modulating: 3-15 psi with positioner; Pneumatic 2-position low pressure (P): 0/25 psig; Pneumatic high pressure (HP): 24 VAC 3-way solenoid valve; Electric KA/KAS: 2-pos. 24 VAC, proportional 0-10 VDC, 4-20 mA; Electric 200/200S: 2-pos. 120 VAC, proportional 4-20 mA |

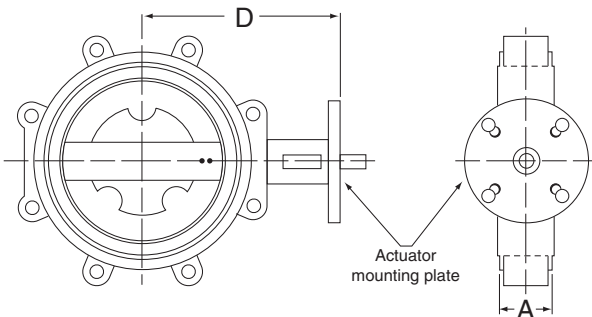
| | |
|------------------------------|--|
| Supply Air Pressure | Pneumatic high pressure (HP): 80-140 psi; Pneumatic low pressure (P): 20-25 psi |
| Air Connections | Pneumatic high pressure (HP): 1/4" FNPT; Pneumatic low pressure (P): barb fittings for 5/32" or 1/4" OD poly tubing |
| Manual Override | KA actuators: pushbutton; KAS actuators: hex wrench crank; 200/200S actuators on 6" to 10" valves: 10-position lever operator; 200/200S actuators on 8" to 20" valves: worm-gear operator |
| Operating Temperature | Pneumatic high pressure (HP): -40° to 200°F (-40° to 95°C); Pneumatic low pressure (P): -4° to 176°F (-20° to 80°C); Electric KA: -5° to 140°F (-20° to 60°C); Electric KAS: -40° to 140°F (-40° to 60°C); Electric 200/200S: -21° to 148°F (-29° to 64°C) |
| Enclosure Rating | Electric KA/KAS: NEMA 2; Electric 200/200: NEMA 4/4X |
| Warranty | 2 years |



VALVE DIMENSIONS in (cm)

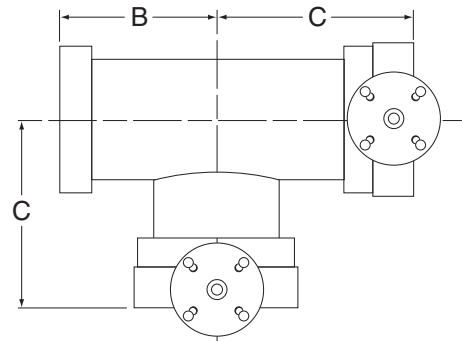
| PORT | DIM. | 2" | 2.5" | 3" | 4" | 5" | 6" | 8" | 10" | 12" | 14" | 16" | 18" | 20" | | | | |
|-------------------------|---------|----------------|----------------|----------------|---------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|--|----------------|--|
| 2-way | A | 1.62 (4.1) | 1.75 (4.5) | 1.75 (4.5) | 2 (5.1) | 2.12 (5.4) | 2.12 (5.4) | 2.5 (6.4) | 2.5 (6.4) | 3 (7.6) | 3 (7.6) | 4 (10.2) | 4.25 (10.8) | 5 (12.7) | | | | |
| | B | 4.5 (11.4) | 5 (12.7) | 5.5 (14) | 6.5 (16.5) | 7.5 (19.1) | 8 (20.3) | 9 (22.9) | 11 (28) | 12 (30.5) | 14 (35.6) | 15 (38.1) | 16.5 (41.9) | 18 (45.7) | | | | |
| 3-way | C | 6.12 (15.6) | 6.75 (17.2) | 7.25 (18.5) | 8.5 (21.6) | 9.62 (24.5) | 10.12 (25.7) | 11.5 (29.21) | 13.5 (34.3) | 15 (38.1) | 17 (43.2) | 19 (46.3) | 20.75 (52.7) | 23 (58.4) | | | | |
| | D | 5.5 (14) | 6 (15.3) | 6.3 (16) | 7 (17.8) | 7.5 (19.1) | 8 (20.3) | 9.5 (24.2) | 10.75 (27.4) | 12.25 (31.2) | 13.62 (34.6) | 14.75 (37.5) | 16 (40.7) | 17.25 (43.8) | | | | |
| Height without Actuator | | | | | | | | | | | | | | | | | | |
| Weight 2-way | lb (kg) | 7 (3.2) | 8 (3.7) | 9 (4.1) | 15 (6.8) | 20 (9.1) | 23 (10.5) | 42 (19.1) | 66 (30) | 88 (40) | 114 (51.8) | 166 (75.3) | 226 (102.6) | 305 (138.4) | | | | |
| Weight 3-way | lb (kg) | 46 (20.9) | 56 (25.4) | 71 (32.3) | 105 (47.7) | 133 (60.4) | 159 (72.2) | 256 (116.2) | 419 (190.1) | 573 (260) | 710 (322.1) | 928 (421.0) | 1163 (527.6) | 1511 (685.4) | | | | |
| Mounting | lugs | 4-.625-11UNC | | | 8-.625-11UNC | | 8-.750-10UNC | | 12-.875-09UNC | | 12-1.00-08UNC | | 16-1.00-08UNC | | 16-1.125-07UNC | | 20-1.125-07UNC | |

Two-way Valve Bodies

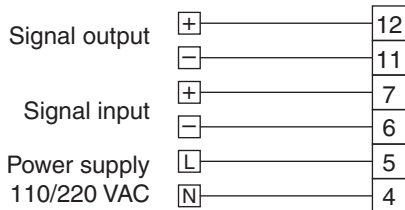


*For total valve height add dimension "D" to the actuator coupling height listed above.

Three-way Tee-mounted Valve Bodies



200/200S SERIES WIRING



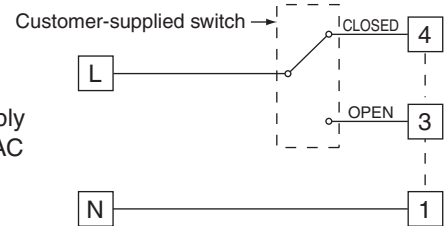
3-phase & 24 VDC powered models available

Modulating Service

Notes:

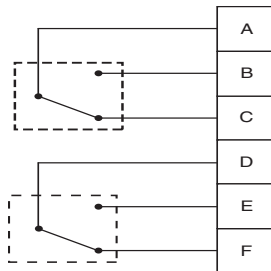
- Input signal:
4-20 mA
1-5V
2-10V
- Output signal:
4-20 mA
2-10V

Power supply
110/220 VAC



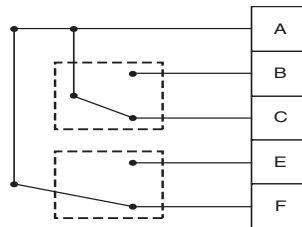
On/Off Service

AUXILIARY SWITCH WIRING



Series 202 - 226 auxiliary switch wiring

Shown at fully clockwise rotation



Series 201 auxiliary switch wiring

Shown at fully clockwise rotation



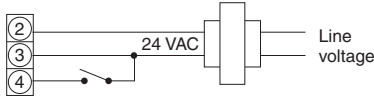
CONTROL VALVES

BUTTERFLY VALVES 522 SERIES

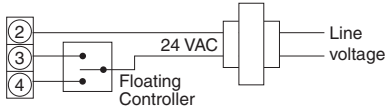
4

CONTROL VALVES

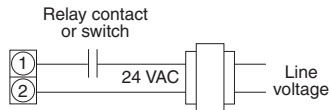
KA / KAS ACTUATOR WIRING



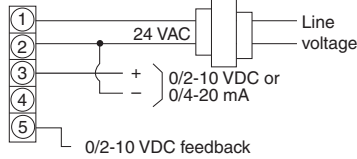
KA-175-2T - KA-301-2T
Two-position Control



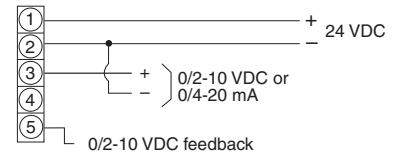
KA-175-2T - KA-301-2T
Floating Control



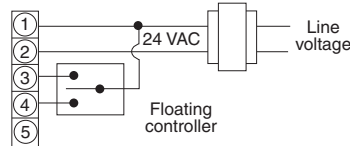
KAS-175-2
Two-position Control



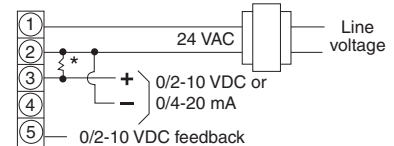
KA-301-P
Proportional Control
24 VAC Power
0/2-10 VDC or 0/4-20 mA Signal



KA-175-P - KA-301-P
Proportional Control
24 VDC Power
0/2-10 VDC or 0/4-20 mA Signal



KAS-175-M
Floating Control



* 500Ω, 1/2"W or greater resistor required when control signal is 4-20 mA

KAS-175-M
Proportional Control

ELECTRIC ACTUATOR SPECIFICATIONS (SIZED FOR 100 PSI LINE PRESSURE)

| 2-Way Valve Size | 3-Way Valve Size | ELECTRIC ACTUATOR SPECS | | | | | | | | |
|------------------|------------------|-------------------------|----------------|--------------------------------------|----------------|--------------------|----------------|---------------------------|-----------------------------------|----------------|
| | | Electric Actuator | Electric Power | Control Signal | Torque (in-lb) | Failsafe Operation | Timing seconds | Dimensions H x W x L (in) | Coupling ² Height (in) | Weight lb (kg) |
| 2" | 2" | KA-175 | 24 VAC, 6 VA | Two-pos/float or 2-10 VDC | 175 | No | 95 | 3.9x3.6x8.8 | 3.25 | 3.2 (1.4) |
| 2.5-5" | 2.5-4" | KA-301 | 24 VAC, 9 VA | Two-pos/float or 2-10 VDC | 301 | No | 95 | 3.9x3.6x8.8 | 3.25 | 3.2 (1.4) |
| 2-5" | 2"-4" | KAS-175 | 24 VAC, 16 VA | Two-pos/float or 0-10 VDC | 175 | Yes | 90 | 2.9x3.9x9.8 | 3.25 | 7 (3.2) |
| 2"-3" | 2"-3" | 201* | 120 VAC, 0.5A | Two Position or 4-20 mA ¹ | 450 | No | 20 | 7.4x4.0x5 | 1 | 5 (2.3) |
| 4"-6" | 4" | 202* | 120 VAC, 1.0A | Two Position or 4-20 mA ¹ | 800 | No | 15 | 7x7.8x12.8 | 1 | 25 (11.34) |
| - | 5"-6" | 203* | 120 VAC, 1.0A | Two Position or 4-20 mA ¹ | 1335 | No | 22 | 7x7.8x12.8 | 1 | 25 (11.34) |
| 8"-12" | 8"-10" | 204* | 120 VAC, 1.3A | Two Position or 4-20 mA ¹ | 3560 | No | 16 | 12.5x9.3x15.5 | 0.5 | 49 (22.2) |
| 12"-14" | 10"-12" | 206* | 120 VAC, 1.8A | Two Position or 4-20 mA ¹ | 5785 | No | 28 | 12.5x9.3x15.5 | 0.5 | 49 (22.2) |
| 16"-18" | 14" | 207* | 120 VAC, 3.2A | Two Position or 4-20 mA ¹ | 8850 | No | 46 | 16x9.1x17.1 | 4 | 80 (36.3) |
| 20" | 16"-18" | 208* | 120 VAC, 4.0A | Two Position or 4-20 mA ¹ | 13275 | No | 46 | 16x9.1x17.1 | 4 | 80 (36.3) |
| - | 20" | 210* | 120 VAC, 4.0A | Two Position or 4-20 mA ¹ | 22125 | No | 58 | 22.2x15.4x17.9 | 5 | 124 (56.2) |
| 2"-4" | 2"-3" | 205** | 120 VAC, 1A | Two Position or 4-20 mA ¹ | 442 | Yes | 7 (3 Spring) | 15.7x10.2x14.2 | 1 | 59.5 (27) |
| 5"-6" | 4"-5" | 213** | 120 VAC, 3.8A | Two Position or 4-20 mA ¹ | 1150 | Yes | 7 (8 Spring) | 18.8x14.4x18.2 | 1 | 125.7 (57) |
| 8" | 6" | 220** | 120 VAC, 3.8A | Two Position or 4-20 mA ¹ | 1770 | Yes | 11 (12 Spring) | 21.6x17.2x23.6 | 1 | 209.4 (95) |
| 10" | 8" | 226** | 120 VAC, 3.8A | Two Position or 4-20 mA ¹ | 2301 | Yes | 14 (12 Spring) | 21.6x17.2x23.6 | 1 | 209.4 (95) |

Notes:

- 201-212 and 205-226 electric actuators come standard with a control signal of 4-20 mA but are configurable to 1-5 VDC or 2-10 VDC.
- The KA and KAS Series actuators are Kele-brand direct-coupled actuators with NEMA 2 enclosures. They are used on smaller sized valves (5" and smaller on 2-way and 4" and smaller on 3-way).
- All 200 Series electric actuators come with integral heater.

* 201-212 series actuators are electric industrial grade actuators. Upon loss of power the valves fail in place. Upon loss of signal the valves fail in place but are configurable to drive open, closed or in place.

** 205-226 series actuators are fail closed industrial grade actuators. Upon loss of power they will fail closed CW. Upon loss of signal they will fail closed.



PNEUMATIC ACTUATOR SPECIFICATIONS (Actuators are sized for 100 psi line pressure and 80 psi air supply)

| | 2-Way Valve Size | 3-Way Valve Size | Pneumatic Actuator Specs | | | | | | | | | |
|--|------------------|------------------|--------------------------|-----------------|----------------|--------------------|------------------------------------|--------------------|----------------------|----------------------------|-----------------|------------------------------|
| | | | Pneumatic Actuator | Air Source psig | Control Signal | | Torque in-lb Nm = in-lb x 0.113 | Failsafe Operation | Timing seconds | Dimensions H x W x L in | Coupling Height | Actuator Weight** lb (kg) |
| | | | | | 2-Pos | Prop. | | | | | | |
| High Pressure Double-Acting (DA) | 2"-3" | 2" | 100-060 | 80-140 | 24 VAC* | 3-15 psig | 297 | N/A | 0.25 | 4.53 x 3.11 x 5.58 | Direct Mount | 3.4 (1.5) |
| | 4", 5" | 2.5"-4" | 100-080 | 80-140 | 24 VAC* | 3-15 psig | 721 | N/A | 0.25 | 5.43 x 3.83 x 7.4 | Direct Mount | 6.1 (2.8) |
| | 6" | 5" | 100-090 | 80-140 | 24 VAC* | 3-15 psig | 1013 | N/A | 0.25 | 5.78 x 4.17 x 8.59 | Direct Mount | 8.4 (3.8) |
| | 8" | 6" | 100-120 | 80-140 | 24 VAC* | 3-15 psig | 2171 | N/A | 0.5 | 7.28 x 4.91 x 11.9 | Direct Mount | 16.4 (7.4) |
| | 10" | 8" | 100-130 | 80-140 | 24 VAC* | 3-15 psig | 2894 | N/A | 0.5 | 8.09 x 5.44 x 12.31 | Direct Mount | 20.9 (9.5) |
| | 12" | 10"-12" | 100-160 | 80-140 | 24 VAC* | 3-15 psig | 5742 | N/A | 1 | 9.36 x 6.82 x 15.54 | Direct Mount | 38.1 (17.3) |
| | 14"-18" | 14"-16" | 100-210 | 80-140 | 24 VAC* | 3-15 psig | 11870 | N/A | 2 | 11.45 x 8.83 x 17.8 | 5" | 65.0 (29.5) |
| 20" | 18"-20" | 100-260 | 80-140 | 24 VAC* | 3-15 psig | 29171 | N/A | 2.75 | 13.35 x 10.75 x 26.7 | 1" | 144 (65.3) | |
| Spring return actuators may require different quantity of springs indicated by the last digit in part number. Corresponding torque outputs are stated. | | | | | | | | | | | | |
| High Pressure Fail Closed (FC) | 2" | | 100-065 | 80-140 | 24 VAC* | 3-15 psig | 135 | CW | 0.25 | 4.53 x 3.11 x 5.58 | Direct Mount | 4.1 (1.9) |
| | 2.5"/3" | 2" | 100-084(5) | 80-140 | 24 VAC* | 3-15 psig | 255(316) | CW | 0.25 | 5.43 x 3.83 x 7.4 | Direct Mount | 7.9 (3.6) |
| | 4" | 2.5" | 100-095(4) | 80-140 | 24 VAC* | 3-15 psig | 367(459) | CW | 0.25 | 5.78 x 4.17 x 8.59 | Direct Mount | 10.8 (4.9) |
| | 5", 6" | 3", 4" | 100-124(3) | 80-140 | 24 VAC* | 3-15 psig | 732(915) | CW | 0.5 | 7.28 x 4.91 x 11.90 | Direct Mount | 22.7 (10.3) |
| | | 5" | 100-134 | 80-140 | 24 VAC* | 3-15 psig | 1058 | CW | 0.5 | 8.09 x 5.44 x 12.31 | Direct Mount | 27.3 (12.4) |
| | 8" | 6" | 100-164(3) | 80-140 | 24 VAC* | 3-15 psig | 1818 | CW | 1 | 9.36 x 6.82 x 15.54 | Direct Mount | 52.6 (23.8) |
| | 10"/12"/14" | 8"/10" | 100-213(4) | 80-140 | 24 VAC* | 3-15 psig | 2924(3896) | CW | 2 | 11.45 x 8.83 x 17.8 | Direct Mount | 95.3 (43.2) |
| 16"/18"/20" | 12"-14" | 100-264(5)(6) | 80-140 | 24 VAC* | 3-15 psig | 9448(11811)(14173) | CW | 2.75 | 13.35 x 10.75 x 26.7 | 1" | 192.6 (87.1) | |
| High Pressure Fail Open (FO) | 2" | | 100-064 | 80-140 | 24 VAC* | 3-15 psig | 156 | CCW | 0.25 | 4.53 x 3.11 x 5.58 | Direct Mount | 4.1 (1.9) |
| | 2.5", 3" | | 100-084 | 80-140 | 24 VAC* | 3-15 psig | 360 | CCW | 0.25 | 5.43 x 3.83 x 7.4 | Direct Mount | 7.9 (3.6) |
| | 4" | | 100-094 | 80-140 | 24 VAC* | 3-15 psig | 522 | CCW | 0.25 | 5.78 x 4.17 x 8.59 | Direct Mount | 10.8 (4.9) |
| | 5", 6" | | 100-124 | 80-140 | 24 VAC* | 3-15 psig | 1178 | CCW | 0.5 | 7.28 x 4.91 x 11.9 | Direct Mount | 22.7 (10.3) |
| | | | 100-136 | 80-140 | 24 VAC* | 3-15 psig | 2837 | CCW | 0.5 | 8.09 x 5.44 x 12.31 | Direct Mount | 27.3 (12.4) |
| | 8", 10" | | 100-164 | 80-140 | 24 VAC* | 3-15 psig | 3147 | CCW | 1 | 9.36 x 6.82 x 15.54 | Direct Mount | 52.6 (23.8) |
| | 12" | | 100-214 | 80-140 | 24 VAC* | 3-15 psig | 6551 | CCW | 2 | 11.45 x 8.83 x 17.8 | 1" | 95.3 (43.2) |
| 14"-20" | | 100-264 | 80-140 | 24 VAC* | 3-15 psig | 14929 | CCW | 2.75 | 13.35 x 10.75 x 26.7 | 1" | 192.6 (87.1) | |
| Low-Pressure Pneumatic*** | | | | | | | | | | | | |
| | 2" | | D-3153-5130 | 20-25 | 0/20 psig | NA | 158 | Yes | 15 | 10.0 x 8.0 x 16.0 | 3" | 14.0 (6.4) |
| | 2.5"-3" | 2" | D-3244-5110 | 20-25 | 0/20 psig | NA | 328 | Yes | 15 | 12.0 x 10.0 x 20.0 | 4" | 24 (10.9) |
| | 4"-6" | 2.5"-4" | D-3246-5110 | 20-25 | 0/20 psig | NA | 491 | Yes | 15 | 14.0 x 12.0 x 24.0 | 5" | 35 (15.9) |
| | 2" | | D-3153-5120 | 20-25 | NA | 3-15 psig | 158 | Yes | 15 | 12.0 x 10.0 x 20.0 | 3" | 14.0 (6.4) |
| | 2.5"-3" | 2" | D-3244-5100 | 20-25 | NA | 3-15 psig | 328 | Yes | 15 | 14.0 x 12.0 x 24.0 | 4" | 24 (10.9) |
| | 4"-6" | 2.5"-4" | D-3246-5100 | 20-25 | NA | 3-15 psig | 491 | Yes | 15 | 16.0 x 14.0 x 24.0 | 5" | 35 (15.9) |

Notes:

* 24 VAC solenoids are standard. 12 VDC, 24 VDC, and 12 VAC solenoids are available as well as 3-15 psi or 4-20 mA positioners.

** Weights of fail-closed and fail-open actuators are maximum weight as the number of springs may vary by application.

*** Open 70° maximum.

DA = Double Acting, FC = Fail Closed, FO = Fail Open

The 4" 3-way and 5" and 6" 2-way valves use double D-3246-5110 actuators.

Spring return actuators may require different quantity of springs indicated by ().

Contact Kele for complete actuator specifications.



CONTROL VALVES

BUTTERFLY VALVES 522 SERIES

4

CONTROL VALVES

ELECTRIC ACTUATOR CODES

| ACTUATOR CODE VALVE TYPE/ SIZE | K2NX OR E2X (2-POSITION/FLOATING, NON-SPRING RETURN) | KMNX OR EMX (MODULATING, NON-SPRING RETURN) | K2SO, K2SC, OR E2C, E2O (2-POSITION/FLOATING, SPRING RETURN OPEN/CLOSED) | KMSO, KMSC, OR EMC, EMO (MODULATING, SPRING RE- TURN OPEN/CLOSED) |
|--------------------------------------|--|---|--|---|
| 2-WAY/2" | KA-175-2T OR 201E2A | KA-175-P OR 201EMA | KAS-175-M OR 205S2A | KAS-175-M OR 205SMA |
| 2-WAY/2.5" | KA-301-2T OR 201E2A | KA-301-P OR 201EMA | KAS-175-M OR 205S2A | KAS-175-M OR 205SMA |
| 2-WAY/3" | KA-301-2T OR 201E2A | KA-301-P OR 201EMA | KAS-175-M OR 205S2A | KAS-175-M OR 205SMA |
| 2-WAY/4" | DUAL KA-301-2T OR 201E2A | DUAL KA-301-P OR 201EMA | DUAL KAS-175-M OR 213S2A | DUAL KAS-175-M OR 213SMA |
| 2-WAY/5" | DUAL KA-301-2T OR 202E2A | DUAL KA-301-P OR 202EMA | DUAL KAS-175-M OR 213S2A | DUAL KAS-175-M OR 213SMA |
| 2-WAY/6" | 203E2A | 203EMA | 213S2A | 213SMA |
| 2-WAY/8" | 204E2A | 204EMA | 226S2A | 226SMA |
| 2-WAY/10" | 204E2A | 204EMA | -- | -- |
| 2-WAY/12" | 206E2A | 206EMA | -- | -- |
| 2-WAY/14" | 207E2A | 207EMA | -- | -- |
| 2-WAY/16" | 207E2A | 207EMA | -- | -- |
| 2-WAY/18" | 208E2A | 208EMA | -- | -- |
| 2-WAY/20" | 208E2A | 208EMA | -- | -- |
| 3-WAY/2" | KA-175-2T OR 201E2A | KA-175-P OR 201EMA | KAS-175-M OR 205S2A | KAS-175-M OR 205SMA |
| 3-WAY/2.5" | KA-301-2T OR 201E2A | KA-301-P OR 201EMA | KAS-175-M OR 205S2A | KAS-175-M OR 205SMA |
| 3-WAY/3" | DUAL KA-301-2T OR 202E2A | DUAL KA-301-P OR 202EMA | DUAL KAS-175-M OR 213S2A | DUAL KAS-175-M OR 213SMA |
| 3-WAY/4" | DUAL KA-301-2T OR 202E2A | DUAL KA-301-P OR 202EMA | DUAL KAS-175-M OR 213S2A | DUAL KAS-175-M OR 213SMA |
| 3-WAY/5" | 203E2A | 203EMA | 213S2A | 213SMA |
| 3-WAY/6" | 204E2A | 204EMA | 220S2A | 220SMA |
| 3-WAY/8" | 204E2A | 204EMA | -- | -- |
| 3-WAY/10" | 206E2A | 206EMA | -- | -- |
| 3-WAY/12" | 207E2A | 207EMA | -- | -- |
| 3-WAY/14" | 208E2A | 208EMA | -- | -- |
| 3-WAY/16" | 210E2A | 210EMA | -- | -- |
| 3-WAY/18" | 210E2A | 210EMA | -- | -- |
| 3-WAY/20" | 212E2A | 212EMA | -- | -- |

PNEUMATIC ACTUATOR CODES

*3-Way is in () when there is a difference in 2-way and 3-way sizes. 3-way assemblies always fail closed (no H2O, HMO, P2O, PMO)

| Actuator Code | H2X, HMX | H2C, HMC | H2O, HMO | P2C, PMC, P2O, PMO |
|---------------|-------------------------|----------------------------|---------------------------|--|
| Valve Size | Pneumatic double acting | Pneumatic fail closed (cw) | Pneumatic fail open (ccw) | Pneumatic fail open/ fail closed (cw) |
| 2" | 100-060 | 100-065 (100-084) | 100-064 | D-3153-5130 (D-3244-5110) |
| 2.5" | 100-060 (100-080) | 100-084 (100-094) | 100-084 | D-3244-5110 (D-3246-5110) |
| 3" | 100-060 (100-080) | 100-085 (100-123) | 100-084 | D-3244-5110 (D-3246-5110) |
| 4" | 100-080 (100-080) | 100-095 (100-124) | 100-094 | D-3246-5110 (X2 FOR 3W) |
| 5" | 100-080 (100-090) | 100-124 (100-134) | 100-124 | D-3246-5110 (X2) (NO 3W) |
| 6" | 100-090 (100-120) | 100-125 (100-163) | 100-124 | D-3246-5110 (X2) (NO 3W) |
| 8" | 100-120 (100-130) | 100-164 (100-213) | 100-164 | — |
| 10" | 100-130 (100-160) | 100-213 (100-214) | 100-164 | — |
| 12" | 100-160 (100-160) | 100-214 (100-263) | 100-214 | — |
| 14" | 100-210 | 100-216 (100-264) | 100-264 | — |
| 16" | 100-210 | 100-264 (NA) | 100-264 | — |
| 18" | 100-210 (100-260) | 100-265 (NA) | 100-264 | — |
| 20" | 100-260 (100-260) | 100-266 (NA) | 100-264 | — |

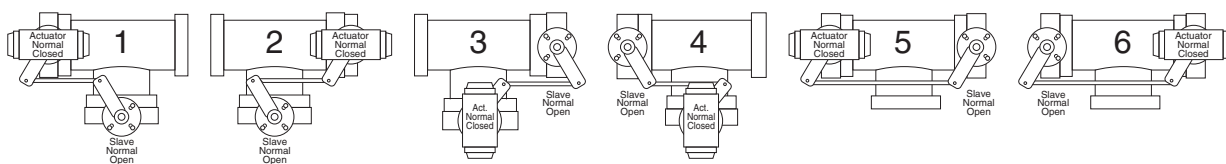


ORDERING INFORMATION

| MODEL CODE | | DESCRIPTION | | | | |
|--|--|--|------|---------------------------------------|--|-----------------------|
| 522 | | SIZE CODE | SIZE | Cv @ 90° (TWO-POSITION) | Cv @ 70° (LOW PRESSURE PNEUMATIC) ³ | Cv @ 60° (MODULATING) |
| 02 | 2" | | | 144 | 84 | 61 |
| 25 | 2.5" | | | 282 | 163 | 107 |
| 03 | 3" | | | 461 | 267 | 154 |
| 04 | 4" | | | 841 | 496 | 274 |
| 05 | 5" | | | 1,376 | 775 | 428 |
| 06 | 6" | | | 1,850 | 1,025 | 567 |
| 08 | 8" | | | 3,316 | 1,862 | 1,081 |
| 10 | 10" | | | 5,430 | 2,948 | 1,710 |
| 12 | 12" | | | 8,077 | 4,393 | 2,563 |
| 14 | 14" | | | 10,538 | 5,939 | 3,384 |
| 16 | 16" | | | 13,966 | 7,867 | 4,483 |
| 18 | 18" | | | 17,214 | 10,065 | 5,736 |
| 20 | 20" | | | 22,339 | 12,535 | 7,144 |
| ACTUATOR CODE | OPERATION | INPUT SIGNAL | | FAIL POSITION ON LOSS OF POWER SUPPLY | | |
| KELE KA SERIES² ELECTRIC ACTUATORS - NON SPRING RETURN | | | | | | |
| K2NX | Two-position, floating | 24 VAC | | N/A | | |
| KMNX | Proportional | 2-10 VDC, 4-20 mA (with 500 Ohm resistor) | | N/A | | |
| ULTRAFLO 200 SERIES ELECTRIC ACTUATORS - NON SPRING RETURN | | | | | | |
| E2X | Two-position | 120 VAC | | N/A | | |
| EMX | Proportional | 2-10 VDC, 4-20 mA (with 500 Ohm resistor) | | N/A | | |
| KELE KA SERIES² ELECTRIC ACTUATORS - SPRING RETURN | | | | | | |
| K2SO ¹ | Two-position | 24 VAC | | Open | | |
| K2SC | Two-position | 24 VAC | | Closed | | |
| KMSO ¹ | Proportional | 2-10 VDC, 4-20 mA (with 500 Ohm resistor), tri-state | | Open | | |
| KMSC | Proportional | 2-10 VDC, 4-20 mA (with 500 Ohm resistor), tri-state | | Closed | | |
| ULTRAFLO 200 SERIES ELECTRIC ACTUATORS - SPRING RETURN | | | | | | |
| E2O ¹ | Two-position | 120 VAC | | Open | | |
| E2C | | | | Closed | | |
| EMO ¹ | Proportional | 4-20 mA | | Open | | |
| EMC | | | | Closed | | |
| HIGH PRESSURE PNEUMATIC - NON SPRING RETURN | | | | | | |
| H2X | Two-position | 24 VAC | | N/A | | |
| HMX | Proportional | 3-15 psig or 4-20 mA | | N/A | | |
| HIGH PRESSURE PNEUMATIC - SPRING RETURN | | | | | | |
| H2O ¹ | Two-position | 24 VAC | | Open | | |
| H2C | | | | Closed | | |
| HMO ¹ | Proportional | 3-15 psig or 4-20 mA | | Open | | |
| HMC | | | | Closed | | |
| LOW-PRESSURE PNEUMATIC - SPRING RETURN | | | | | | |
| P2O ¹ | Two-position | 0/20 psig | | Open | | |
| P2C | | | | Closed | | |
| PMO ¹ | Proportional | 3-15 psig w/ Positioner | | Open | | |
| PMC | | | | Closed | | |
| MANUAL OPERATION | | | | | | |
| M2X | N/A | Manual operation (2-way valves only) 2"-6" lever; 8"-20" gear operator | | | | |
| BUTTERFLY VALVE ONLY | | | | | | |
| XXX | N/A | Butterfly valve only | | | | |
| CONFIGURATION CODE | | | | | | |
| 0 | 2-way | | | | | |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | 3-way (See below for illustration of 3-way configurations) | | | | | |

- Notes:**
- Do not use normally open actuators for 3 way valves.
 - Kele actuators available on 5" and smaller two way and 4" and smaller three way.
 - Low pressure assemblies have a maximum open rotation of 70°, for both 2-position and modulating control.

THREE-WAY CONFIGURATION





CONTROL VALVES

BUTTERFLY VALVES

F6, F7 SERIES

DESCRIPTION

The **F6, F7 Series** butterfly valves fulfill the requirements of commercial and industrial HVAC applications requiring positive shutoff for water. Applications include chiller isolation, cooling tower isolation, change-over systems, large air handler coil control and bypass, and various water distribution and storage systems. The F6 assemblies are two-way and the F7 are three-way flow patterns. Undercut disc assemblies, designated by "HDU" in the part number have a maximum close-off of 50 psid, and full-cut models, designated by "HD" part number, have full 200 psid close-off rating. Small size valves are available with economical Belimo rotary actuators and all sizes are available with industrial grade, NEMA 4 actuators, to meet most application requirements. Other sizes, assembly combinations, connection types, and materials of construction are available.

FEATURES

- **Advanced seat and disc design provide bubble-tight shutoff while maintaining a low seating torque**
- **Standard rotary actuators, or industrial grade NEMA 4 actuators for a variety of application requirements**
- **Internal valve body five bushing design isolates the valve body from the shaft resulting in better control**
- **Standard stainless steel disc and shaft for strength, durability and long-lasting operation**

APPLICATIONS

Butterfly valves allow high flows with relatively low pressure loss, compared to globe valves, and are typically used for isolation or flow control. Good modulation is achieved between 30 and 70 degrees of full open. At valve openings greater than 70 degrees, the pressure loss is too low to produce any significant effect on flow or the energy loss of a flow system. Butterfly valves can be controlled with a maintenance-free electronic actuator or manually, with an ergonomic, wear-free plastic handle or gear operator.



BELIMO®

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4

CONTROL VALVES

SPECIFICATIONS

| | | | |
|----------------------------------|---|--------------------------------|---|
| Mounting Flange | ANSI Class 125/150 lug style flanges | Media Compatibility | Hot or chilled water, up to 60% glycol |
| Maximum Closeoff Pressure | 50 psid (345 kPa) (undercut models); 200 psid (1380 kPa) (full rated models) | Media Temperature Range | -22° to 250°F (-30° to 120°C) |
| Pressure Rating | 200 psig (1379 kPa) @ -30°F to 275°F per ASME/ANSI Class 125/150 | Supply Voltage | 24 VAC/VDC (Belimo direct-coupled); 24 VAC or 120 VAC (SY Series) |
| Materials Of Construction | Ductile iron ASTM A536 (with epoxy powder finish) valve body; EPDM seat; 416 stainless steel shaft; 304 stainless steel disc; EPDM o-ring; RPTFE bushings | Control Signal | Two-position, floating, proportional 0-10 VDC, 4-20 mA |
| | | Manual Override | All models have manual override |
| | | Operating Temperature | -22° to 122°F (-30° to 50°C) |
| | | Enclosure Rating | NEMA 2 and NEMA 4 enclosed (Belimo direct-coupled actuators); NEMA 4/4X (SY Series industrial actuators) |
| | | Warranty | 2 years |

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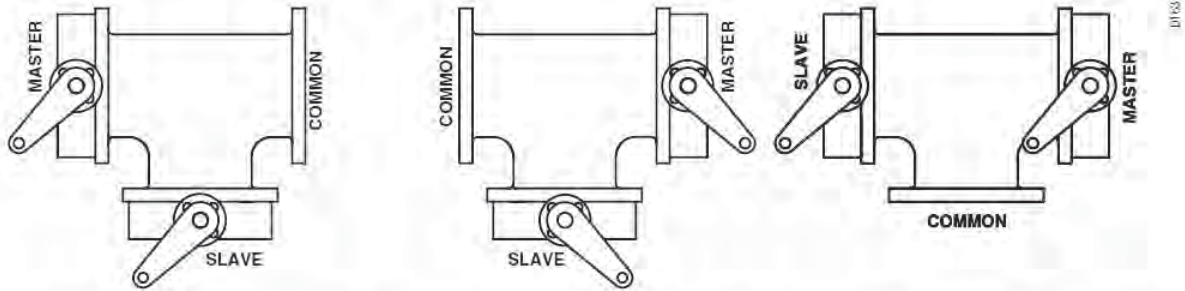
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January 2012



THREE-WAY CONFIGURATION CODES



| CONFIG CODE | ON/OFF OR MOD@2VDC MASTER VALVE IS | MASTER VALVE @ FAIL |
|-------------|------------------------------------|---------------------|
| X10 | OPEN | NON-FAIL |
| X11 | OPEN | OPEN |
| X12 | OPEN | CLOSED |
| X13 | CLOSED | NON-FAIL |
| X14 | CLOSED | OPEN |
| X15 | CLOSED | CLOSED |

| CONFIG CODE | ON/OFF OR MOD@2VDC MASTER VALVE IS | MASTER VALVE @ FAIL |
|-------------|------------------------------------|---------------------|
| X20 | OPEN | NON-FAIL |
| X21 | OPEN | OPEN |
| X22 | OPEN | CLOSED |
| X23 | CLOSED | NON-FAIL |
| X24 | CLOSED | OPEN |
| X25 | CLOSED | CLOSED |

| CONFIG CODE | ON/OFF OR MOD@2VDC MASTER VALVE IS | MASTER VALVE @ FAIL |
|-------------|------------------------------------|---------------------|
| X30 | OPEN | NON-FAIL |
| X31 | OPEN | OPEN |
| X32 | OPEN | CLOSED |
| X33 | CLOSED | NON-FAIL |
| X34 | CLOSED | OPEN |
| X35 | CLOSED | CLOSED |

X Specifies Bi-Directional Flow Capability

Notes:

1. Slave Valve operates inversely of the Master Valve.
2. The Master Valve is always located on the run.
3. The Slave Valve may also have an actuator if required (Direct Coupled).
4. On/Off actuator normal position is a function of field logic.
5. Proportional actuator normal position is a function of the CCW/CW
6. All 3-way assemblies are designed for 90 degree actuator rotation.

TWO-WAY CONFIGURATION CODES (ADD CODE SUFFIX TO PART NUMBER, AS NECESSARY)

| | Code | |
|------------------------------|-------|--|
| Non-spring return 2-position | -- | Set up required, Field logic determines normal position |
| Non-spring return Modulating | NC | Normally closed Low signal = closed |
| Non-spring return Modulating | NO | Normally open Low signal = open |
| Spring return 2-position | NO/FO | Normally open/fail open Field logic determines normal position Spring fails valve open |
| Spring return 2-position | NC/FC | Normally closed/fail closed Field logic determines normal position Spring fails valve closed |
| Spring return Modulating | NO/FO | Normally open/fail open Low signal = open Spring fails valve open |
| Spring return Modulating | NO/FC | Normally open/fail closed Low signal = open Spring fails valve closed |
| Spring return Modulating | NC/FO | Normally closed/fail open Low signal = closed Spring fails valve open |
| Spring return Modulating | NC/FC | Normally closed/fail closed Low signal = closed Spring fails valve closed |



CONTROL VALVES

BUTTERFLY VALVES F6, F7 SERIES

4

CONTROL VALVES

ASSEMBLY COMBINATIONS/ORDERING INFORMATION - INDOOR LOCATIONS

| Model | Size | Cv @ 90° | Close-off | NSR On/off/floating | NSR Proportional/MFT | SR or fail-safe On/off/floating | SR or fail-safe Proportional/MFT |
|-------------------------|---------------|----------|-----------|---------------------|----------------------|---------------------------------|----------------------------------|
| 2-way undercut | | | | | | | |
| F650HDU | 2" (DN50) | 115 | 50 | ARB24-3-5 | ARB24-MFT-5 | AF24 | AFX24-MFT-X1 |
| F665HDU | 2-1/2" (DN65) | 196 | | | | 2xAF24-MFT-X1 | 2xAFX24-MFT-X1 |
| F680HDU | 3" (DN80) | 302 | | GRB24-3-7 | GRX24-MFT-7 | GKRB24-3-7 | GKRX24-MFT-7 |
| F6100HDU | 4" (DN100) | 600 | | | | | |
| F6125HDU | 5" (DN125) | 1022 | | 2xGRB24-3-7 | 2xGRX24-MFT-7 | -- | -- |
| F6150HDU | 6" (DN150) | 1579 | | | | | |
| 3-way undercut | | | | | | | |
| F750HDU | 2" (DN50) | 115 | 50 | AMB24-3-X1 | AMX24-MFT-X1 | AF24 | AFX24-MFT-X1 |
| F765HDU | 2-1/2" (DN65) | 196 | | | | 2xAF24 | 2xAFX24-MFT-X1 |
| F780HDU | 3" (DN80) | 302 | | GMB24-3-X1 | GMX24-MFT-X1 | GKB24-3-X1 | GKX24-MFT-X1 |
| F7100HDU | 4" (DN100) | 600 | | | | | |
| F7125HDU | 5" (DN125) | 1022 | | 2xGMB24-3-X1 | 2xGMX24-MFT-X1 | -- | -- |
| F7150HDU | 6" (DN150) | 1579 | | | | -- | -- |
| 2-way full rated | | | | | | | |
| F650HD | 2" (DN50) | 115 | 200 | ARB24-3-5 | ARX24-MFT-5 | AF24 | AFX24-MFT-X1 |
| F665HD | 2-1/2" (DN65) | 196 | | | | 2xAF24 | 2xAFX24-MFT-X1 |
| F680HD | 3" (DN80) | 302 | | GRB24-3-5 | GRX24-MFT-5 | GKRB24-3-5 | GKRX24-MFT-5 |
| F6100HD | 4" (DN100) | 600 | | | | | |
| F6125HD | 5" (DN125) | 600 | | -- | -- | -- | -- |
| F6150HD | 6" (DN150) | 1579 | | -- | -- | -- | -- |
| F6200HD | 8" (DN200) | 3136 | | -- | -- | -- | -- |
| F6250HD | 10" (DN250) | 5340 | | -- | -- | -- | -- |
| F6300HD | 12" (DN300) | 8250 | | -- | -- | -- | -- |
| F6350HD | 14" (DN350) | 11917 | | -- | -- | -- | -- |
| F6400HD | 16" (DN400) | 16388 | | -- | -- | -- | -- |
| F6450HD | 18" (DN450) | 21705 | | -- | -- | -- | -- |
| F6500HD | 20" (DN500) | 27908 | | -- | -- | -- | -- |
| 3-way full rated | | | | | | | |
| F750HD | 2" (DN50) | 115 | 200 | AMB24-3-X1 | AMX24-MFT-X1 | AF24 | AFX24-MFT-X1 |
| F765HD | 2-1/2" (DN65) | 196 | | GMB24-3-X1 | GMX24-MFT-X1 | GKB24-3-X1 | GKX24-MFT-X1 |
| F780HD | 3" (DN80) | 302 | | 2xGMB24-3-X1 | 2xGMX24-MFT-X1 | -- | -- |
| F7100HD | 4" (DN100) | 600 | | | | | |
| F7125HD | 5" (DN125) | 600 | | -- | -- | -- | -- |
| F7150HD | 6" (DN150) | 1579 | | -- | -- | -- | -- |
| F7200HD | 8" (DN200) | 3136 | | -- | -- | -- | -- |
| F7250HD | 10" (DN250) | 5340 | | -- | -- | -- | -- |
| F7300HD | 12" (DN300) | 8250 | | -- | -- | -- | -- |
| F7350HD | 14" (DN350) | 11917 | | -- | -- | -- | -- |
| F7400HD | 16" (DN400) | 16388 | | -- | -- | -- | -- |
| F7450HD | 18" (DN450) | 21705 | | -- | -- | -- | -- |
| F7500HD | 20" (DN500) | 27908 | | -- | -- | -- | -- |

Ordering example: F6100HDU/GKRX24-MFT-7 two-way 4", undercut, 50 psid close-off, fail-safe, proportional/MFT control, 24V actuator

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CONTROL VALVES

BUTTERFLY VALVES F6, F7 SERIES



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CONTROL VALVES

| ASSEMBLY COMBINATIONS/ORDERING INFORMATION - NEMA 4 RATED | | | | | | | |
|---|---------------|----------|-----------|------------------------------------|-------------------------------------|-------------------------------|--------------------------------|
| Model | Size | Cv @ 90° | Close-off | NSR On/off/floating NEMA 4 housing | NSR Proportional/MFT NEMA 4 housing | NSR On/off/floating SY NEMA 4 | NSR Proportional/MFT SY NEMA 4 |
| 2-way undercut | | | | | | | |
| F650HDU | 2" (DN50) | 115 | 50 | GRCB24-3-T-N4 | GRX24-MFT-T-N4 | -- | -- |
| F665HDU | 2-1/2" (DN65) | 196 | | | | -- | -- |
| F680HDU | 3" (DN80) | 302 | | -- | -- | | |
| F6100HDU | 4" (DN100) | 600 | | 2xGRCB24-3-T-N4 | 2xGRX24-MFT-T-N4 | -- | -- |
| F6125HDU | 5" (DN125) | 1022 | | | | -- | -- |
| F6150HDU | 6" (DN150) | 1579 | | -- | -- | -- | -- |
| 3-way undercut | | | | | | | |
| F750HDU | 2" (DN50) | 115 | 50 | GMC24-3-T-X1-N4 | GMX24-MFT-T-X1-N4 | -- | -- |
| F765HDU | 2-1/2" (DN65) | 196 | | | | -- | -- |
| F780HDU | 3" (DN80) | 302 | | GMC24-3-T-X1-N4 | GMX24-MFT-T-X1-N4 | -- | -- |
| F7100HDU | 4" (DN100) | 600 | | 2xGMC24-3-T-X1-N4 | 2xGMX24-MFT-T-X1-N4 | -- | -- |
| F7125HDU | 5" (DN125) | 1022 | | | | -- | -- |
| F7150HDU | 6" (DN150) | 1579 | | -- | -- | -- | -- |
| 2-way full rated | | | | | | | |
| F650HD | 2" (DN50) | 115 | 200 | -- | -- | SY2-24 or SY2-110 | SY2-24MFT or SY2-120MFT |
| F665HD | 2-1/2" (DN65) | 196 | | -- | -- | | |
| F680HD | 3" (DN80) | 302 | | -- | -- | | |
| F6100HD | 4" (DN100) | 600 | | -- | -- | | |
| F6125HD | 5" (DN125) | 600 | | -- | -- | SY3-24 or SY3-110 | SY3-24MFT or SY3-120MFT |
| F6150HD | 6" (DN150) | 1579 | | -- | -- | | |
| F6200HD | 8" (DN200) | 3136 | | -- | -- | SY4-24 or SY4-110 | SY4-24MFT or SY4-120MFT |
| F6250HD | 10" (DN250) | 5340 | | -- | -- | | |
| F6300HD | 12" (DN300) | 8250 | | -- | -- | SY5-24 or SY5-110 | SY5-24MFT or SY5-120MFT |
| F6350HD | 14" (DN350) | 11917 | | -- | -- | | |
| F6400HD | 16" (DN400) | 16388 | | -- | -- | SY6-110 | SY6-120MFT |
| F6450HD | 18" (DN450) | 21705 | | -- | -- | SY8-110 | SY8-120MFT |
| F6500HD | 20" (DN500) | 27908 | | -- | -- | | |
| 3-way full rated | | | | | | | |
| F750HD | 2" (DN50) | 115 | 200 | -- | -- | SY2-24 or SY2-110 | SY2-24MFT or SY2-120MFT |
| F765HD | 2-1/2" (DN65) | 196 | | -- | -- | | |
| F780HD | 3" (DN80) | 302 | | -- | -- | | |
| F7100HD | 4" (DN100) | 600 | | -- | -- | | |
| F7125HD | 5" (DN125) | 600 | | -- | -- | | |
| F7150HD | 6" (DN150) | 1579 | | -- | -- | SY4-24 or SY4-110 | SY4-24MFT or SY4-120MFT |
| F7200HD | 8" (DN200) | 3136 | | -- | -- | | |
| F7250HD | 10" (DN250) | 5340 | | -- | -- | SY5-24 or SY5-110 | SY5-24MFT or SY5-120MFT |
| F7300HD | 12" (DN300) | 8250 | | -- | -- | | |
| F7350HD | 14" (DN350) | 11917 | | -- | -- | SY6-110 | SY6-120MFT |
| F7400HD | 16" (DN400) | 16388 | | -- | -- | SY7-110 | SY7-120MFT |
| F7450HD | 18" (DN450) | 21705 | | -- | -- | SY8-110 | SY8-120MFT |
| F7500HD | 20" (DN500) | 27908 | | -- | -- | | |

Ordering example: F6100HDU/2XGRX24-MFT-T-N4 two-way 4", undercut, 50 psid close-off, non-spring return, proportional control, 24V, NEMA4



CONTROL VALVES

STEAM VALVE SIZING INFORMATION

4

CONTROL VALVES

RECOMMENDED PRESSURE DROPS FOR STEAM

Refer to specific valve data for maximum allowable pressure drops and close-off ratings.

Two-position Zone Valves and Direct Radiator Valves

Use a minimum of 10% of inlet pressure (psig).

Proportional Control Valves

Low pressure (15 psig or less): ΔP of 80% of gauge inlet pressure.

When Cv required is between two valve sizes and closer to the smaller valve size, resize for Cv using 42% of the absolute inlet pressure as pressure drop. Use the valve that is larger than the calculated Cv.

For steam pressures greater than 15 psig: 42% of the absolute inlet pressure.

When Cv required is between two valve sizes, select the larger size.

Note: Do not size steam valves on higher system pressures using a pressure drop greater than 42% of the absolute inlet pressure.

Cv (FLOW COEFFICIENT) DETERMINATION

The Steam Valve Capacity Table on the following page is based on the following formula:

$$C_v = \frac{QK}{3\sqrt{\Delta P \times P_2}}$$

Where: Cv = Coefficient of flow

Q = lb per hour of steam

ΔP = Differential pressure in psig (pressure drop)

P_2 = Outlet pressure in psia (absolute)
psig + 14.7 = psia (absolute)

K = 1 + (0.0007 x °F super-heat)

Note: K normally is 1 (K = 1 for saturated steam).

Other forms of the formula are:

$$Q = \frac{3C_v\sqrt{\Delta P \times P_2}}{K}$$

Note: K normally is 1.

$$\Delta P = \left(\frac{QK}{3C_v}\right)^2 \times \frac{1}{P_2}$$

Note: K normally is 1.

$$P_2 = \left(\frac{QK}{3C_v}\right)^2 \times \frac{1}{\Delta P}$$

Note: K normally is 1 (K = 1 for saturated steam).

These formulas can be used to calculate one of the quantities if the others are known.

See next page for Steam Valve Capacity Table

USEFUL STEAM INFORMATION

1 Boiler hp = 34.5 lb/hr

EDR

(equivalent direct radiation) = 240 BTU/hr per FT²

1 Therm = 100,000 BTU

To convert BTU/hr to lb/hr of steam, divide BTU/hr by the latent heat of vaporization (h_{fg}) at the corresponding steam pressure.

Example:

100,000 BTU/hr = 105 lb/hr of 5 psig steam

$$\left(\frac{100,000 \text{ BTU/hr}}{954}\right) = 105 \text{ lb/hr}$$

STEAM DATA

| psig (kPa) | Temperature °F (°C) | Latent Heat (h_{fg}) |
|------------|---------------------|--------------------------|
| 0 (0) | 212 (100) | 970 |
| 5 (34) | 237 (114) | 954 |
| 15 (103) | 250 (121) | 945 |
| 50 (345) | 298 (148) | 912 |
| 100 (689) | 338 (170) | 880 |



STEAM CAPACITY IN POUNDS PER HOUR (based on saturated steam)

| Inlet Pressure psig | 2# | | 5# | | 10# | | 15# | | 20# | | 25# | | 40# | | 50# | | 100# | |
|------------------------|------|------|------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0.2* | 1.6 | 0.5* | 4 | 1* | 8 | 1.5* | 12 | 2* | 14 | 2.5* | 16 | 4* | 23 | 5* | 27 | 10* | 48 |
| 0.4 | 2.2 | 5.9 | 3.7 | 9.5 | 5.9 | 13.9 | 7.8 | 17.5 | 9.7 | 20.4 | 11.6 | 23.4 | 17.1 | 32.4 | 20.7 | 38.3 | 38.8 | 68 |
| 0.99 | 5.4 | 14.6 | 9.2 | 23.5 | 14.5 | 34.3 | 19.3 | 43.3 | 24 | 50.6 | 28.6 | 57.8 | 42.3 | 80.2 | 51.3 | 94.8 | 96.1 | 168 |
| 1.3 | 7.1 | 19.2 | 12.1 | 31 | 19 | 45.1 | 25.4 | 56.8 | 31.5 | 66.4 | 37.6 | 75.9 | 55.5 | 104.3 | 67.4 | 124.4 | 126.2 | 221 |
| 1.8 | 9.8 | 27 | 18.7 | 43 | 26.3 | 62.4 | 35.1 | 78.7 | 43.7 | 91.9 | 52.1 | 105.2 | 76.9 | 145.8 | 93.3 | 172.3 | 174.7 | 306 |
| 2.5 | 13.6 | 37 | 23 | 59 | 37 | 87 | 49 | 109 | 61 | 128 | 72 | 146 | 107 | 203 | 130 | 239 | 242 | 424 |
| 3.3 | 18 | 49 | 31 | 79 | 48 | 114 | 64 | 144 | 80 | 169 | 95 | 193 | 141 | 267 | 171 | 316 | 320 | 560 |
| 3.6 | 19.6 | 53 | 34 | 86 | 53 | 125 | 70 | 157 | 87 | 184 | 104 | 210 | 154 | 292 | 187 | 345 | 349 | 611 |
| 4.0 | 22 | 59 | 37 | 95 | 58 | 139 | 78 | 175 | 97 | 204 | 116 | 234 | 171 | 324 | 207 | 383 | 388 | 679 |
| 5 | 27 | 74 | 47 | 119 | 73 | 173 | 98 | 219 | 121 | 255 | 145 | 292 | 214 | 405 | 259 | 479 | 485 | 848 |
| 6 | 33 | 89 | 56 | 143 | 88 | 208 | 117 | 262 | 146 | 306 | 174 | 351 | 256 | 486 | 311 | 574 | 582 | 1018 |
| 7.5 | 41 | 111 | 70 | 178 | 110 | 260 | 146 | 328 | 182 | 383 | 217 | 438 | 320 | 608 | 389 | 718 | 728 | 1273 |
| 9.0 | 49 | 133 | 84 | 214 | 131 | 312 | 176 | 393 | 218 | 460 | 260 | 526 | 385 | 729 | 466 | 861 | 874 | 1528 |
| 10.5 | 57 | 155 | 98 | 250 | 153 | 364 | 205 | 459 | 255 | 536 | 304 | 613 | 449 | 851 | 544 | 1005 | 1019 | 1782 |
| 11 | 60 | 162 | 102 | 262 | 161 | 381 | 215 | 481 | 267 | 562 | 318 | 643 | 470 | 891 | 570 | 1053 | 1068 | 1867 |
| 15 | 82 | 221 | 139 | 357 | 219 | 520 | 293 | 656 | 304 | 766 | 434 | 876 | 641 | 1215 | 777 | 1436 | 1456 | 2546 |
| 17.4 | 95 | 257 | 162 | 414 | 254 | 603 | 340 | 761 | 422 | 889 | 503 | 1016 | 743 | 1409 | 902 | 1665 | 1689 | 2954 |
| 25 | 136 | 369 | 232 | 594 | 365 | 867 | 488 | 1093 | 607 | 1277 | 723 | 1460 | 1068 | 2025 | 1296 | 2393 | 2427 | 4244 |
| 35.8 | 195 | 528 | 333 | 851 | 523 | 1241 | 699 | 1565 | 867 | 1828 | 1036 | 2091 | 1529 | 2900 | 1856 | 3427 | 3475 | 6077 |
| 40 | 218 | 590 | 372 | 951 | 584 | 1387 | 780 | 1749 | 970 | 2043 | 1157 | 2337 | 1709 | 3240 | 2073 | 3829 | 3883 | 6790 |
| 45 | 245 | 664 | 418 | 1070 | 657 | 1560 | 878 | 1967 | 1092 | 2298 | 1302 | 2629 | 1923 | 3645 | 2332 | 4307 | 4368 | 7639 |
| 56 | 305 | 826 | 521 | 1331 | 818 | 1942 | 1093 | 2448 | 1359 | 2860 | 1620 | 3271 | 2392 | 4536 | 2903 | 5360 | 5436 | 9506 |
| 65 | 354 | 958 | 604 | 1545 | 949 | 2254 | 1268 | 2842 | 1577 | 3320 | 1881 | 3797 | 2777 | 5265 | 3369 | 6221 | 6310 | 11034 |
| 75 | 409 | 1106 | 697 | 1783 | 1095 | 2601 | 1463 | 3279 | 1820 | 3830 | 2170 | 4381 | 3204 | 6075 | 3887 | 7179 | 7280 | 12731 |
| 85 | 463 | 1253 | 790 | 2021 | 1241 | 2947 | 1658 | 3716 | 2062 | 4341 | 2459 | 4966 | 3631 | 6885 | 4406 | 8136 | 8251 | 14429 |
| 100 | 545 | 1475 | 930 | 2377 | 1460 | 3468 | 1951 | 4372 | 2426 | 5107 | 2893 | 5842 | 4272 | 8101 | 5183 | 9571 | 9707 | 16975 |
| 115 | 627 | 1696 | 1069 | 2734 | 1680 | 3988 | 2244 | 5028 | 2790 | 5873 | 3327 | 6718 | 4913 | 9316 | 5961 | 11007 | 11163 | 19521 |
| 145 | 790 | 2138 | 1348 | 3447 | 2118 | 5028 | 2829 | 6340 | 3518 | 7405 | 4195 | 8471 | 6195 | 11746 | 7516 | 13878 | 14075 | 24613 |
| 170 | 926 | 2507 | 1580 | 4042 | 2483 | 5895 | 3317 | 7433 | 4124 | 8682 | 4918 | 9931 | 7263 | 13771 | 8811 | 16271 | 16502 | 28857 |
| 200 | 1090 | 2949 | 1859 | 4755 | 2921 | 6935 | 3902 | 8744 | 4852 | 10214 | 5786 | 11684 | 8544 | 16201 | 10366 | 19143 | 19414 | 33950 |
| 235 | 1281 | 3465 | 2184 | 5587 | 3432 | 8149 | 4585 | 10275 | 5701 | 12002 | 6799 | 13729 | 10040 | 19036 | 12180 | 22493 | 22812 | 39891 |
| 275 | 1499 | 4055 | 2556 | 6538 | 4016 | 9536 | 5366 | 12024 | 6672 | 14044 | 7956 | 16065 | 11749 | 22277 | 14254 | 26321 | 26695 | 46681 |
| 350 | 1907 | 5161 | 3253 | 8321 | 5112 | 12136 | 6829 | 15303 | 8491 | 17875 | 10126 | 20447 | 14953 | 28352 | 18141 | 33500 | 33975 | 59412 |
| 425 | 2316 | 6267 | 3950 | 10104 | 6207 | 14737 | 8292 | 18582 | 10311 | 21705 | 12296 | 24828 | 18157 | 34427 | 22028 | 40678 | 41256 | 72143 |
| 440 | 2398 | 6488 | 4090 | 10461 | 6426 | 15257 | 8585 | 19238 | 10675 | 22471 | 12730 | 25704 | 18798 | 35642 | 22806 | 42114 | 42712 | 74689 |

1 MBH equals 1000 BTU/hr 1000 BTU/hr is approximately 1#/hr * For two-position control



CONTROL VALVES

CONTROL VALVE TERMINOLOGY

CONTROL SIGNAL TERMS

Modulating - A term used to describe a type of actuator or control action that can be positioned anywhere between two stroke limits.

Proportional - A type of modulation where the positioning of the controlled device is in response to a linear analog signal (example 4-20 mA, or 2-10 VDC).

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Floating - A type of modulation based on timing, stroke length, and stroke speed of an actuator. An electric motor is driven either clockwise or counterclockwise for a specific amount of time, to reach a given position within two stroke limits.

Two-Position - Either full open or full closed, no intermediate position. On/off is another term for two-position.

VALVE FLOW CHARACTERISTICS

Valve Flow Characteristic - The relationship between the stem travel, expressed in percent of travel, and the flow of the fluid through the valve, expressed in percent of full flow.

Quick-Opening Characteristic - Maximum possible flow as soon as the stem starts to move from a closed position. This characteristic is usually selected for two-position rather than modulating valves.

Linear Characteristic - This flow-lift relationship, if plotted on rectilinear coordinates, approximates a straight line, giving equal volume changes for equal lift changes, regardless of percent of valve opening.

Equal Percentage Characteristic - Like movements of the valve stem at any point of the flow range changes the existing flow an equal percentage regardless of the existing flow.

Example:

Suppose a valve stem has been lifted 30 percent of its total lift and the flow at this time is 3.9 GPM (gallons per minute). Now assume that the valve opens an additional 10 percent of its full travel and that the flow increases to 6.2 GPM or a 60 percent increase. Next, suppose that the valve stem moves an additional 10 percent so that it is now 50 percent open. The flow now will be 10 GPM or another 60 percent increase in flow.

Equal percentage is especially useful for control jobs where occasional wide variations in loads occur.

OTHER VALVE TERMS

Capacity Index (aka Flow Coefficient or Cv) - The quantity of water in GPM at 60 °F (16 °C) that flows through a given wide-open valve with a pressure drop of 1 PSID (pounds per square inch differential). Once the Cv of the valve has been determined, the flow through that valve can be calculated provided the characteristics of the fluid and the pressure drop through the valve are known.

Close-Off - The close-off rating of a valve is the maximum allowable pressure drop to which the valve may be subjected while fully closed, without leaking through. This rating is usually a function of the power available from the valve actuator for holding the valve closed against pressure drop, but structural parts such as the stem sometimes are the limiting factor. The close-off rating is independent of the actual valve body rating.

Rangeability - The ratio of the maximum controllable flow to the minimum controllable flow. For instance, a valve with a rangeability of 50:1 and having a total flow capacity of 100 GPM, fully open, will accurately control flow down to 2 GPM. Generally, a rangeability of 50:1 or 40:1 are considered acceptable for modulating control with globe valves. Some "high-performance" valves claim to have 300:1 rangeability.

Turndown - The ratio between maximum usable flow and the minimum controllable flow, usually less than the rangeability. For instance, as stated above, after the 100 GPM valve has been applied at a job, it might turn out that the most flow that valve will ever see is 68 GPM. Since the minimum controllable flow is 2 GPM, the turndown for this valve is 34 to 1. In comparing rangeability and turndown, we may say that rangeability is a measure of the predicted stability of the control valve, and turndown is a measure of the actual stability of the valve.

VALVE BODY PATTERNS

Two-Way Valve - A valve that has two ports, one inlet and one outlet. Most control valves are unidirectional (designated inlet and outlet ports) and must be installed as such.

Three-Way Mixing Valves - A valve that has three openings, two inlets and one outlet. Fluid entering the inlet ports is mixed in any proportion desired, by moving the valve stem, and exits the outlet port.

Three-Way Diverting Valves - A valve that has three openings (one inlet and two outlets). Fluid entering the inlet port can be diverted to either of the two outlet ports, in any proportion desired, by moving the valve stem.