

# Honeywell Control Ball Valve

## **2-Way and 3-Way VBN Control Ball valves ½ to 3 inches:**

Valve housing shall consist of forged brass rated at no less than 360 psi at 250°F. Standard valve ball shall consist of chemically nickel-plated brass. Manufacturer shall be able to provide optional 316 stainless steel ball and stem for 2-way valves. Valve shall have a blow-out proof stem with two EPDM O-rings with minimum 600 psi rating. Manufacturer shall be able to provide glass-filled polymer ball insert to make flow control equal percentage. Valves shall be Honeywell. The 2-way valves shall have EPDM O-rings behind ball seals to allow for a minimum close-off pressure of 100 psi with actuator which provides at least 27 lb-in. torque for ½ to 1 ¼ in. sizes and at least 44 lb-in. torque for 1 ½ to 3 in. sizes. Valve shall be available with a minimum of 32 unique CV values. Valve shall be available with threaded (fNPT) end connections. The 3-way valves shall be installed in a "T" configuration with actuator perpendicular to shaft. Valve shall not require elbows of any kind. The 3-way valves shall have EPDM O-rings behind ball seals to allow for a minimum close off pressure of 40 psi with an actuator that provides 27 lb-in. torque for ½ to 1 ¼ in. sizes and at least 44 lb-in. torque for 1 ½ to 2 ½ in. sizes. The 3-way valves must be available in both mixing and diverting configurations and shall be available with a minimum of 26 unique CV values. Valve shall be available with threaded (fNPT) end connections.

## **2-Way and 3-Way VBF Control Ball Valves 4 to 6 inches:**

Valve housing shall consist of cast iron, rated at no less than 240 psi at 250° F (121° C). Valve housing shall have ANSI Class 125 flanges. Valve ball shall consist of stainless steel with parabolic ports to make flow control equal percentage. Valve shall have a blow-out proof stem with two EPDM O-Rings. Valve shall have EPDM O-Rings behind ball seals to allow for a minimum close-off pressure of 70 psi with 88 in.-lbs of torque for 4- and 5-inch valves. 6-inch valves shall require actuators with 140 in.-lbs of torque for flow rates under 700 GPM. Valve shall be available with a minimum of 5 unique CV values for each size. 3-Way Valve: Bypass CV shall be 80% of Through CV.

## **6-Way VB6 Control Ball valves ½ to ¾ inches:**

Valve housing shall consist of nickel-plated forged brass rated at no less than 600 psi. Standard valve shall consist of dual stainless-steel ball and blow-out proof stems with EPDM O-ring packing design. Valve must include a precision machined brass disc to make flow control equal percentage. Valves shall be Honeywell. The valves shall have Teflon PTFE seats to provide minimum close-off pressure of 200 psi with actuator which provides 88 lb-in. torque. The 6-way valve shall be controlled by a single rotary actuator for managing two media in a switching application. The valve shall be closed to flow at mid-rotation. Valve shall be available with a wide range of CV values from 0.3 to 14 providing 80 unique combinations. Valve shall be available with threaded (fNPT) end connections in ½ inch and ¾ inch sizes.

# Honeywell Control Ball Valve

## SECTION 23 09 00 INSTRUMENTATION and CONTROL for HVAC

### PART 1 GENERAL

#### 1.1 SUMMARY

### PART 2 MATERIALS

#### 2.1 CONTROL BALL VALVES

- A. The valve and actuator combination product family shall be a factory assembled and tested unit. All valves and actuators shall be manufactured under ISO 9001 International Quality Control Standards.
- B. The actuator shall provide two-position, floating or proportional control. Proportional control refers to direct acceptance of 2-10 Vdc or a 4-20 mA input signal. Floating control refers to direct acceptance of 24Vac pulse-width modulated open and close commands from a tri-state (SP3T) controller. Two-position control of non-fail-safe actuators shall be in the form of 24Vac power controlled by SPDT switch. Two-position control of fail-safe actuators shall be in the form of 24Vac power controlled by SPST switch.
- C. Basis-of-Design: Honeywell VBN / VBF / VB6. Products of other manufacturers will be considered for acceptance provided they equal or exceed the minimum requirements and functional qualities of the specified product. Requests for Architect/Engineer's approval must be accompanied by the "Substitution Request Form", all valves and actuators shall be from the same manufacture, with complete technical data, and the valve manufacture's flow testing documentation from an independently owned third-party testing agency for each valve size and model for evaluation. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2-Way and 3-Way VBN Control Ball valves ½ to 3 inches (2 ½ inches for 3-way):  
Valves shall be available with female national pipe thread pipe (fNPT) fittings

1. Minimum Requirements:
  - a. The control ball shall have an equal percentage flow characteristic provided by a laser-milled, glass-filled polymer ball insert.
  - b. Valve ball and stem construction shall be nickel-plated brass or stainless steel.
  - c. Differential close-off pressure shall be at least 40 psid for 3-way valves and 100 psid for 2-way valves with ANSI Class IV seat leakage.

- d. Threaded valves bodies shall have static pressure rating of 360 psig (2500 kPa) at 250°F (121 C).
- e. Valve stem assembly shall be of a pack-less design and be field-replaceable without removing the valve body from the piping. Teflon® seals shall hold the stem in alignment and protect the O-ring from system temperature fluctuations. Stem O-ring shall be made of peroxide-cured EPDM and be isolated from system treatment chemicals by a reservoir of silicon grease. Valve shall have a blow-out proof stem with minimum 600 psi rating.
- f. Multiple Cv ratings shall be available in each valve size, ranging from 0.38 Cv to 266 Cv and contain a minimum of 32 unique Cv options in 2-way and ranging from 0.33 to 109 Cv and contain a minimum of 26 unique Cv options in 3-way.
- g. Actuated valves shall be capable of closing off against their maximum operating differential pressure. Seat leakage when closed shall be ANSI/ASME Class IV, minimum.
- h. Actuators shall be direct coupled rotary type requiring neither crank-arm nor linkage and direct mount to the valve actuator bracket. The bracket shall provide for up to 2 inches (50mm) of pipe insulation and provide a torque of a least 27 lb-in for valves up to 1 ¼ inches and a torque of at least 44 lb-in for valves up to 3 inches.
- i. Actuators shall be capable of operating on 24Vac Class II power, or be UL Recognized or CSA Certified to U.S. and Canadian Standards where used with line voltage.
- j. Actuators shall provide screw terminal wiring connections with adapters for flexible conduit where mechanical protection is required by local codes.
- k. Proportional actuators shall have a rotation direction control switch accessible on the cover to change between proportional or floating control. Actuators that require to be electronically programmed by use of a handheld programming device or external computer software are NOT acceptable.
- l. All actuators shall be designed for a minimum of 60,000 full-stroke cycles at actuator rated torque and temperature, and 1,500,000 repositions.
- m. Two-position actuators shall be designed for a minimum of 100,000 full-stroke cycles at rated load and temperature.
- n. Actuation shall be available with fail-safe operation capable of returning the valve to a normally open or normally closed position following loss of power.
- o. All fail-safe actuators must be designed for either normally open or normally closed fail-safe operation with a continuously engaged mechanical return spring. This spring must return the actuator to a fail-safe position within 20-25 seconds of power loss.

2-Way and 3-Way VBF Control Ball Valves 4 to 6 inches: Valves shall be available with wafer flanges for use with either ANSI/ASME 125/150 pipe flanges in sizes from 4 up to 6 inches.

1. Minimum Requirements:
  - a. The control ball shall have an equal percentage flow characteristic provided by a laser-milled, glass-filled polymer ball insert.
  - b. Valve trim shall be stainless steel.
  - c. Close-off pressure shall be 70 psid minimum, with ANSI Class IV seat leakage.
  - d. Valve bodies shall have static pressure rating of 240 psi (1655kPa) at 250°F (121 C).
  - e. Valve stem seals shall be EPDM O-rings and be replaceable.
  - f. Multiple Cv ratings shall be available in each valve size, with at least 5 discrete Cv values for each size ranging from 91 Cv to 650 Cv.
  - g. Actuated valves shall be capable of closing off against their maximum operating differential pressure. Seat leakage when closed shall be ANSI/ASME Class IV, minimum.
  - h. Actuators shall have a minimum of 88 in.-lbs of torque for 4- and 5-inch valves. 6-inch valves shall require actuators with 140 in.-lbs of torque for flow rates under 700 GPM.
  - i. Actuators shall be direct coupled rotary type requiring neither crank-arm nor linkage and direct mount to the valve actuator bracket.
  - j. Actuators shall be capable of operating on 24Vac Class II power, in both electronic fail-safe and stay-in-place configurations. Actuator fail-safe action in the event of power failure shall be field-selectable normally open or normally closed.
  - k. Actuators shall provide screw terminal wiring connections with adapters for flexible conduit where mechanical protection is required by local codes.
  - l. Actuation shall be available with electronic fail-safe operation capable of returning the valve to a normally open or normally closed position following loss of power.
  - m. Proportional actuators shall have a rotation direction control switch accessible on the cover to change between proportional or floating control. Actuators that require to be electronically programmed by use of a handheld programming device or external computer software are NOT acceptable.
  - n. All actuators shall be designed for a minimum of 60,000 full-stroke cycles at actuator rated torque and temperature, and 1,500,000 repositions.

- o. Two-position actuators shall be designed for a minimum of 100,000 full-stroke cycles at rated load and temperature.
- p. Actuation shall be available with fail-safe operation capable of returning the valve to a normally open or normally closed position following loss of power.
- q. All fail-safe actuators must be designed for either normally open or normally closed fail-safe operation with a continuously engaged mechanical return spring. This spring must return the actuator to a fail-safe position within 20-25 seconds of power loss.

6-Way VB6 Control Ball valves  $\frac{1}{2}$  to  $\frac{3}{4}$  inches: Valves shall be available with female national pipe thread pipe (fNPT) fittings

2. Minimum Requirements:

- a. The control ball shall have an equal percentage flow characteristic provided by a precision machined brass characterizing disc.
- b. Valve ball and stem construction shall be stainless steel.
- c. Close-off pressure shall be at least 200 psi.
- d. Threaded valves bodies shall have static pressure rating of 600 psi.
- e. Valve shall have a blow-out proof stem with minimum 600 psi rating.
- f. Valve shall provide a minimum rangeability of 100:1.
- g. Multiple Cv ratings shall be available from 0.3 to 14 providing 80 unique combinations.
- h. Actuated valves shall be capable of closing off against their maximum operating differential pressure. Seat leakage when closed shall with 0% leakage according to EN 12266-1:2003.
- i. Actuators shall be direct coupled rotary type requiring no crank-arm and direct mount to the valve actuator bracket. The bracket shall provide room for pipe insulation and provide a torque of 88 lb-in.
- j. Valve shall be controlled by a single rotary actuator for managing two media in a switching application. The valve shall be closed to flow at mid-rotation.
- k. Actuators shall be capable of operating on 24Vac Class II power.
- l. Actuators shall provide screw terminal wiring connections with adapters for flexible conduit where mechanical protection is required by local codes.
- m. Proportional actuators shall have a rotation direction control switch accessible on the cover to change between proportional or floating control. Actuators that require to be electronically programmed by use of a handheld programming device or external computer software are NOT acceptable.

- n. All actuators shall be designed for a minimum of 60,000 full-stroke cycles at actuator rated torque and temperature, and 1,500,000 repositions.

D. General Requirements:

1. Valve Schedule shall include a separate line for each valve and a column for each of the valve attributes: Valve Identification Tag, Location, Valve Type, Valve Size, Pipe Size, Configuration, Flow Capacity, Minimum Design Pressure Drop, Maximum Pressure Drop, Fail Position, Close-off Pressure, Actuator Identification Tag, and Actuator Type.
2. Valves shall not be installed with stems below the horizontal plane to prevent actuator damage due to stem seal leakage, or accumulation of particulate in the stem packing.
3. Valves shall be capable for use only in cold, warm and hot water system applications with diethylene glycol, ethylene glycol, or propylene glycol solutions up to 50% concentration.
4. A water filtration and treatment system shall be installed and operated according to the requirements of Division 23 25 13, Water Treatment for Closed-Loop Hydronic Systems. These requirements shall meet or exceed European Norm VDI 2035. The presence of excess rust in the system will void the manufacturer's warranty.
5. Run time shall be constant and independent of load, temperature, and supply voltage (within specifications).
6. Accessories Identification tags shall be available for all valves; tags shall be indelibly marked with size, Cv, model number, date code and tag location.

**Note to specifiers: Depending on the project configuration, the following should be included to provide detail for the deletion of balancing valves and associated balancing where pressure independent control valves are installed.**

**23 00 00 HEATING, VENTILATION, AND AIR-CONDITIONING (HVAC)**

**23 05 00 COMMON WORK RESULTS FOR HVAC**

**23 05 19 METERS AND GAGES FOR HVAC PIPING**

**“Balancing valves shall not be required where pressure independent modulating control valves are installed”.**

**23 05 23 GENERAL-DUTY VALVES FOR HVAC PIPING**

**“Balancing valves shall not be required where pressure independent modulating control valves are installed”.**

**23 05 93 TESTING, ADJUSTING, AND BALANCEING FOR HVAC**

**“Associated balancing shall not be required where pressure independent modulating control valves are installed”.**

**23 25 00 HVAC WATER TREATMENT**

**23 25 13 WATER TREATMENT FOR CLOSE-LOOP HYDRONIC SYSTEMS**

**“System side stream filter shall be provided with 50-micron filter (or finer)”.**