

## 23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

### 23 09 00 Instrumentation and Control for HVAC

#### 23 09 13 Instrumentation and Control Devices for HVAC

##### 23 09 13.33 Control Valves

###### Cartridge Cage Valves and Dedicated Actuators

###### Mounting and Wiring

1. Valves shall be cast bronze with sweat or female national pipe thread pipe fittings in sizes from ½ up to 1 ¼ inches (DN15 to DN32). Flare or inverted flare pipe fittings shall be available for ½ inch (DN15) sizes, with inverted flare-to-sweat adapters for larger pipe sizes.
2. Valves shall be compact size capable of fitting inside terminal equipment such as fan coil units or unit ventilators.
3. Valves shall provide quick open, linear, or modified equal percentage flow control characteristics. Valve plug and seat construction shall be cage style using resilient seat materials for high differential pressure close-off. Two-way valves shall be capable of being used with flow in either direction.
4. Three-way valves shall have A-AB-B porting and may be used for mixing or diverting control with tight close-off in coil-bypass applications.
5. Valves bodies shall have static pressure ratings of 300 psig (2000 kPa) at 200°F (93 C) minimum.
6. Actuators shall be direct coupled type requiring neither crank-arm nor linkage and direct mount to the associated Honeywell valve family using a snap-on, twist-lock collar, and be removable without the use of tools.
7. Actuators shall provide plenum-rated, lead wire connections with adapter for ½ inch nominal flexible conduit where mechanical protection is required by local codes.
8. Valve actuator shall be capable of operating on 24 Vac Class II power (Safety Extra-Low Voltage), or be UL Recognized or CSA Certified to U.S. and Canadian Standards for use with line voltage.

###### Control

1. The actuator shall provide two-position, floating, or modulating control. Modulating control refers to direct acceptance of 2-10 Vdc or, with addition of a 500 ohm resistor, a 4-20 mA input signal. Floating control refers to direct acceptance of 24 Vac pulse-width modulated open and close commands from a tri-state (SP3T) controller. Two-position control shall be in the form of 24 Vac power controlled by SPST switch.
2. Two-position and floating control models shall be available with optional SPDT pilot-duty auxiliary switch for position verification feedback.
3. Actuators will be available with electronic fail-safe operation as optional, and shall also accept SPST pulse width modulated control signals.

###### Other

1. All valves must be field serviceable without the need to remove the valve from the piping, in order to minimize future service costs.

2. Valves may 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. 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. The presence of excess rust in the system will void the manufacturer's warranty. A side stream mechanical filtration system, 50 micron or smaller, filtering no more than 10% of system flow, shall be required for the entire building.
4. Actuated valves shall be capable of closing off against a maximum operating differential pressure of 60 psid (400 kPa), without cavitation or water hammer. The valve seat shall be a bubble-tight design.
5. All actuators must be able to operate from 32 to 150°F (0 to 65 C) ambient temperature, as measured at the actuator.
6. Actuators shall be constructed of materials resistant to condensation when used to control chilled water. Actuator damage due to condensation or falling water shall not be cause for warranty replacement.
7. Proportional actuators shall be designed for a minimum of 50,000 full-stroke cycles, and 1,000,000 repositions at rated load and temperature.
8. Two-position actuators shall be designed for a minimum of 100,000 full-stroke cycles at rated load and temperature.
9. All valves and actuators shall be manufactured under ISO 9001 International Quality Control Standards.
10. Valves and actuators shall be as manufactured by Honeywell.