

SECTION 23 09 00 – BUILDING AUTOMATION SYSTEM

This is supplemental language for a spec. This is not an all inclusive spec. This is language that is meant to be copied and pasted into an existing spec.

PART 1 - GENERAL

PART 2 - PRODUCTS

2.1 AUTOMATIC CONTROL VALVES

A. General:

1. All control valves shall be sized by the control vendor. All control valve bodies shall be suitable for the static and dynamic pressures of the system. Control valve operators shall be sized to close against a differential pressure equal to the design pump head plus 10 percent.
2. Body pressure rating and connection type construction shall conform to fitting and valve schedules. The valve seat differential pressure rating shall exceed the design pump head pressure.
3. Valves serving heat exchange coils and heat exchangers shall have equal percentage flow characteristics.
4. Closed system temperature or pressure bypass valves shall have equal percentage or linear control characteristics.
5. Open system temperature bypass valves (cooling towers) shall have linear control characteristics.
6. Steam valves shall have linear flow control characteristics.
7. Unless otherwise specified, control valves 2 inches and smaller shall have cast iron or bronze bodies with screwed NPT connections.
8. Valves between 2-1/2 inch and 6 inch shall have cast iron or bronze bodies with flanged connections.
9. Do not use pneumatic actuation where valves are exposed to outdoor elements or condensing atmospheres. All automatic control valves exposed to below freezing or condensing ambient shall be provided with electric actuators.
10. All automatic control valves controlled by the BAS shall be furnished by the controls contractor unless otherwise noted in these documents.
11. All automatic control valves shall be installed by the mechanical trade.
12. The controls contractor shall provide wiring as follows:
 - a. All line voltage power for electric valve actuators shall be wired by the controls contractor from the nearest available power panel. Coordinate with electrical trade.
 - b. All low voltage wiring between the controller and the valve actuator shall be wired by the controls contractor.
 - c. All wiring between safeties and the valve actuator shall be wired by the controls contractor.

- d. All wiring shall comply with code requirements. Segregate high and low voltage wiring and circuits and segregate the Fire Alarm (FACS) and BAS controls wiring.

B. Globe Valves for Hot Water and Chilled Water Coils

1. Single-seated.
2. Fully proportioning with modulating cage trim or V-port inner valves.
3. Flow characteristics shall be modified equal percentage at approximately 30% change per increment.
4. Rangeability shall be 100:1 or greater.
5. Body pressure rating and connection type construction shall conform to fitting and valve schedules. The ANSI rating of the valve shall match or exceed the ANSI rating of the piping in which the valve is installed.
6. 2" and under valves shall have a body pressure rating of ANSI class 250 or better. Provide Female NPT connections unless other fittings are called for in the piping drawings.
7. Valves 2-1/2" and larger valves shall have a body pressure rating of ANSI class 125 or 250 or better and connection type construction shall conform to pipe, fitting and valve schedules for valves 2-1/2 inches or larger.
8. Minimum ANSI rating shall be ANSI 125.
9. Stainless steel stems and trim.
10. Spring loaded Teflon packing
11. Quiet in operation.
12. Fail-safe in either normally open or normally closed position in the event of power failure.
13. Capable of operating in sequence with other valves and/or dampers when required by the sequence of operation.
14. Capable of operating at varying rates of speed to correspond to the exact dictates of the controller and variable load requirements.
15. Provide direct mount actuators specifically made for this valve. External valve linkages and damper actuators are more susceptible to binding and breaking and shall not be allowed.
16. Sizing (non Pressure Independent):
 - a. The valve shall be sized to have control authority over the coil branch circuit. Valve authority shall be between 0.25 and 0.5 as defined by pressure drop at valve full open divided by pressure drop of full circuit at design flow with valve full open.
 - b. Select the control valve using the Cv of the control valve to be as close to or one size higher than the Cv of the rest of the circuit. The Cv of the rest of the circuit defined by the design flow of the coil (gpm) divided by the square root of the cumulative pressure drops in the circuit, such as coil, piping, fittings, isolation valves, balancing valves, triple duty valves, strainers, etc.
17. Water valves shall fail normally open or closed, as scheduled on plans, or as required by sequences of operation.

C. ELECTRONIC VALVE ACTUATORS

1. Actuator shall be electric motor driving, microprocessor signal controlled.
2. Modulating valves shall be positive positioning, responding to a 0-10VDC, 2-10VDC or 4-20mA signal. Floating modulating signals are acceptable for modulation on terminal units and radiation units. There shall be a visual valve position indicator.

3. Power: All actuators shall be 24VAC power and less than 100VA draw. Power shall be via Class 2 wiring. Actuators requiring more than 100VA shall have a dedicated conduit for power wiring, not mixed with the signal wiring.
4. Fail Safe: Valves actuators shall position the valve in a fail-safe position when the power supply is disrupted or the signal goes to 0. Fail-safe according to the following guidelines unless otherwise stated in the sequence of operations
 - a. Power fail safe shall be via spring loaded mechanical means
 - b. Any AHU hot water exposed to ventilation air shall fail open
 - c. AHU Chilled water coils exposed to ventilation air in possible freezing conditions shall be fail open
 - d. AHU Chilled water coils that are drained in winter months or are in climate zones without freezing conditions shall be fail-in-place
 - e. Terminal unit valves shall fail-in-place
 - f. Chiller isolation valves shall fail-in-place
 - g. Boiler isolation valves shall fail-in-place
 - h. Any steam supply serving a water heat exchanger shall fail closed
 - i. Any steam supply to a terminal unit coil or a coil without ventilation air shall fail closed.
 - j. Any steam coil exposed to ventilation air shall fail open
5. Fail in Safe valves on primary equipment such as chilled water systems, hot water systems and condenser water systems shall have a means to manually open the valve when power is not available, such as a hand wheel or a geared crank with a clutch.
6. The actuator shall be designed with a current limiting motor protection. A release button (clutch) or handle on the actuator shall be provided to allow for manual override (except when actuator is spring return type).
7. Actuator shall provide minimum torque required for proper valve close-off. The close-off differential pressure rating of the valve shall exceed the highest possible head pressure available at the pump plus 10%, and still be rated for a Class IV leakage.
8. The actuator shall have the capability of adding auxiliary switches or feedback potentiometer if specified.
9. All automatic control valves installed in locations exposed to the elements shall be provided with weather resistant housings and heaters for climates that reach below freezing.
10. Actuators shall be UL and CSA listed.