SECTION 15928

INSTRUMENTS AND CONTROL ELEMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Control valves.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.

C. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.

1.04 QUALITY ASSURANCE

A. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this work and licensed at the State in which the Project is located.

1.05 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

1.06 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a one year period after Substantial Completion.

1.07 MAINTENANCE SERVICE

A. Provide service and maintenance of control system for one year from Date of Substantial Completion.

B. Provide complete service of controls systems, including call backs. Make minimum of 2 complete normal inspections of approximately 3 hours duration in addition to normal service calls to inspect, calibrate, and adjust controls, and submit written reports.

PART 2 PRODUCTS

2.01 EQUIPMENT - GENERAL

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.02 CONTROL VALVES

A. Characterized Control Valves.
   1. Control valves shall be of the Characterized Control Valve type provided by Belimo.
   2. Characterized Control Valvesshall be used for all water applications requiring equal percentage characteristics.
   3. A TEFZEL, flow-characterizing disc shall be installed in the inlet of Two-way characterized control valves and in the control port of Three-way valves. The valve trim shall utilize a stainless steel ball and stem for all water or glycol solutions up to 60%. For water

applications, an optional chrome plated brass ball and brass stem may be used for sizes 3/4" and smaller.

4. Valve bodies shall be nickel-plated, forged brass with female NPT threads. Bodies to 1-1/4" shall be rated at 600 psi and sizes 1-1/2" to 3" at 400 psi.
5. Characterized Control Valves™ shall have a self-aligning, blowout proof, brass stem with a dual EPDM O-ring packing design. Fiberglass reinforced Teflon seats shall be used.
6. The valves shall have a four bolt mounting flange to provide a 4 position, field changeable, electronic actuator mounting arrangement.
7. A non-metallic coupling, constructed of high temperature, continual use material shall provide a direct, mechanical connection between the valve body and actuator. The coupling shall be designed to provide thermal isolation and eliminate lateral and rotational stem forces. Vent hole shall be provided to reduce condensation build-up.

B.

C. C. Electronic Valve Actuators

1. Electronic actuators, less than 600 in-lb. of rated torque, shall have ISO 9001 quality certification and be cULus listed under standard 60730-1 or UL listed under standard 873, CSA C22.2 No. 24 and have CE certification.
2. Electronic actuators used on valves shall be designed to directly couple and mount to a stem, shaft or ISO style-mounting pad.
3. Actuators shall be fully modulating/proportional, floating/tri-state, or two position as required and be factory or field selectable.
4. Optional auxiliary switches shall be available.
5. Actuators shall have an operating range of -22° to 122°F.
6. Proportional actuators shall accept a 0-10 VDC or 0-20 mA input signal and provide a 2-10 VDC or 4-20 mA (with a load resistor) operating range.
7. Actuators shall be capable of operating on 24VAC, 120VAC or 230VAC, or 24VDC and Class 2 wiring as dictated by the application. Power consumption shall not exceed 10 VA for AC, including 120VAC actuators, and 8 watts per actuator for DC applications. Field verify with Owner the actuator requirements prior to odering actuator.
8. NEMA 2 rated actuators shall be provided with either a covered terminal strip, or a three, six, or ten foot pre-wired, electrical cable.
9. Actuators using "on-board" chemical storage systems, capacitors, or other "on-board" non-mechanical forms of fail-safe operation are unacceptable.
10. Upon loss of control signal, a proportional actuator shall fail open or closed based on the minimum control signal. Upon loss of power, a non-spring return actuator shall maintain the last position.
11. Actuators utilizing brushless DC technology shall be capable of being mechanically and electrically paralleled to increase torque if required. Valves requiring greater torque or higher close off may be assembled with two low torque actuators.
12. Dual mounted actuators using additional anti-rotation strap mechanical linkages, or special factory wiring to function are not acceptable. Actuators in a tandem pair must be "off the shelf," standard actuators ready for field wiring.
13. Valve actuators will not produce more than 62 dB (A) when furnished with a mechanical fail-safe spring. Non-spring return actuators shall conform to a maximum noise rating of 45 dB(A) with power on or in the running or driving mode.
14. Proportional actuators shall be fully programmable. Control input, position feedback and running time shall be factory or field programmable. Diagnostic feedback shall provide indications of hunting or oscillation, mechanical overload, mechanical travel and mechanical load limit. The actuators shall also provide actuator service data, at minimum, number of hours powered and number of hours in motion.
15. Proportional actuators shall be capable of digital communication, as built.

D.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that systems are ready to receive work.

C. Beginning of installation means installer accepts existing conditions.

D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.

E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

F. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide valves with position indicators and with pilot positioners where sequenced with other controls.

C. Provide multiple valves where indicated or as required by flow of equipment served. At contractors option more control valves can be provided in a parallel arrangement.

D. Provide conduit and electrical wiring in accordance with Section 16155. Electrical material and installation shall be in accordance with appropriate requirements of Division 16.

END OF SECTION