

**SECTION 23 09 13
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC**

PART 1 GENERAL

THE CONTRACTOR IS REFERRED TO THE “SPECIAL NOTICE TO CONTRACTORS SUMMARY FORM “THE “FORM OF PROPOSAL”; THE “FORM OF BID BOND”; “DIVISION 01 – GENERAL REQUIREMENTS” OF THE “CONTRACT SPECIFICATIONS”; THE “CONTRACT DRAWINGS” AND ALL AMENDMENTS AND ADDENDA THERETO; ALL OF WHICH GOVERN THE WORK OF THIS SECTION.

1.01 SECTION INCLUDES

- A. Air supply system.
- B. Thermostats.
- C. Automatic dampers.
- D. Damper operators.
- E. Miscellaneous accessories.

1.02 RELATED REQUIREMENTS

- A. Section 23 09 93 - Sequence of Operations for HVAC Controls.
- B. Section 23 33 00 - Air Duct Accessories: Installation of automatic dampers.
- C. Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.
- D. Section 26 27 26 - Wiring Devices: Elevation of exposed components.

1.03 REFERENCE STANDARDS

- A. [AMCA 500-D](#) - Laboratory Methods of Testing Dampers for Rating; 2012.
- B. [NEMA EN 10250](#) - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- C. [NFPA 90A](#) - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.
- B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

- A. See Section 01 30 00 - 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.
- D. Manufacturer's Instructions: Provide for all manufactured components.
- E. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

- F. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.
 - 1. Revise shop drawings to reflect actual installation and operating sequences.
- G. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner s name and registered with manufacturer.

1.06 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.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years experience approved by manufacturer.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.07 WARRANTY

- A. Correct defective Work within a five year period after Substantial Completion.

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 PANELS

- A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gauges, pilot lights, push buttons and switches flush on cabinet panel face.
- B. [NEMA EN 10250](#), general purpose utility enclosures with enamelled finished face panel.

2.03 DAMPERS

- A. Manufacturers:
 - 1. Greenheck.
- B. Performance: Test in accordance with [AMCA 500-D](#).
- C. Frames: Galvanized steel, welded or riveted with corner reinforcement, minimum 12 gage, 0.1046 inch.
- D. Blades: Galvanized steel, maximum blade size 8 inches wide, 48 inches long, minimum 22 gage, 0.0299 inch, attached to minimum 1/2 inch shafts with set screws.
- E. Blade Seals: Synthetic elastomeric inflatable mechanically attached, field replaceable.
- F. Jamb Seals: Spring stainless steel.
- G. Shaft Bearings: Oil impregnated sintered bronze.
- H. Linkage Bearings: Oil impregnated sintered bronze.
- I. Leakage: Less than one percent based on approach velocity of 2000 ft/min and 4 inches wg.

- J. Maximum Pressure Differential: 6 inches wg.
- K. Temperature Limits: -40 to 200 degrees Fahrenheit.

2.04 DAMPER OPERATORS

- A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
 - 1. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
 - 2. Provide one operator for maximum 36 sq ft damper section.
- B. Electric Operators:
 - 1. Manufacturers:
 - a. Belimo.
 - b. Honeywell_____.
 - 2. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.

2.05 INPUT/OUTPUT SENSORS

- A. Temperature Sensors:
 - 1. Manufacturers:
 - a. Veris Industries: www.veris.com.
 - b. Honeywell.
 - 2. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.
 - 3. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees Fahrenheit.
 - 4. Performance Characteristics:
 - a. RTD:
 - 1) Room Sensor Accuracy: Plus/minus 0.5 degrees Fahrenheit minimum.
 - 2) Duct Averaging Accuracy: Plus/minus 0.5 degrees Fahrenheit minimum.

2.06 THERMOSTATS

- A. Line Voltage Thermostats:
 - 1. Integral manual On/Off/Auto selector switch, single or two pole as required.
 - 2. Dead band: Maximum 2 degrees Fahrenheit.
 - 3. Cover: Locking with set point adjustment, with thermometer.
- B. Room Thermostat Accessories:
 - 1. Thermostat Covers: Brushed aluminum.
 - 2. Thermostat Guards: Metal mounted on separate base.
 - 3. Adjusting Key: As required for device.

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.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches above floor. Align with lighting switches and humidistats. Refer to Section 26 2726.
- C. Provide conduit and electrical wiring in accordance with Section 26 2717. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION 23 09 13 23 09 13