

MEA No.: 181001

## SECTION 15500 - HVAC - AUTOMATIC TEMPERATURE CONTROLS

## 1.1 GENERAL

- A. All applicable requirements of Section 15000 - HEATING, VENTILATING AND AIR CONDITIONING, GENERAL shall apply to this entire section and shall have the same force and effect as if fully included herein.
- B. Furnish and install an electronic/solid state system of Automatic Temperature Controls. The system shall be complete in all respects including labor, materials, equipment and services necessary and shall be installed by personnel employed by the Control Manufacturer.
- C. Performance of this work shall be accomplished by firms specializing in Automatic Temperature Control Systems for heating, ventilating and air conditioning systems. The firm shall provide proof of having successfully completed a minimum of five projects of similar size and scope. The Automatic Temperature Control System shall be as manufactured by Honeywell or approved equal. The control system manufacturer shall have an office staffed with factory trained engineers, technicians and mechanics who are fully capable of providing maintenance and service on all system components. The manufacturer shall have a service organization to provide 24 hour/day, 365 day/year emergency service.
- D. All wiring for controls shall be furnished and installed by the Control Manufacturer. Unless noted otherwise, this Contractor shall furnish and install all control devices together with control wiring, conduit and all appurtenances and accessories necessary to perform the sequence of operation specified. Wiring materials and installation shall conform to the National Electric Code.
  - 1. All input and output low voltage control wiring to the control units shall be #20 twisted cable. All trunk communication wiring shall be #24 AWG twisted shielded cable (low capacitance).
  - 2. All cable splices shall have joints soldered and taped including the shield. No mechanical connections will be acceptable.
  - 3. No digital input or output points shall be more than 250 feet from its respective panel.
  - 4. All connections within the panels must be made with connectors of appropriate size and design for the terminals being applied.
  - 5. All low voltage (30V and below) wiring above accessible, concealed and dry locations may be run in plenum-rated cable without conduit. All other wiring (low or high voltage) must be run in electric metallic tubing (EMT), 3/4-inch or greater. All AI and DI point wiring must be run in EMT separate from DO point wiring when EMT is required.
  - 6. All wiring associated with the installation will be the responsibility of this Contractor, unless otherwise directed herein. The term "wiring" is construed to include furnishing of wire, conduit, miscellaneous material and labor as required to install a total working system.
- E. The Contractor shall be responsible for coordinating the interface of controls to electrical contactors, motor starters and equipment. A 120 VAC control power transformer, a hand-off-auto (HOA) switch and a 120 VAC starter coil are provided with all electrical equipment unless noted otherwise. The Contractor shall provide either a "dry" contact in the auto position of the

HOA switch or an interposing relay if 120 VAC is an unacceptable voltage. The interposing relay with coil voltage acceptable to the ATC system shall be field mounted in the starter enclosure by the Contractor with an adequately rated contact in the auto position of the HOA switch. Where monitoring of a starter or relay by the ATC system is required, the Contractor shall provide and install either a field installed auxiliary contact to the starter or one 120 VAC interposing relay with "dry" contacts which the ATC system can monitor. The Contractor shall be responsible to ensure adequate voltage and power capacities are available for operation of all controls. The Contractor shall provide additional control power transformers for control equipment operating at other than 120 VAC or line voltage.

## 1.2 SCOPE

- A. This section of the Specifications covers the furnishing of all labor, materials, equipment and services necessary for and incidental to the installation of all automatic temperature controls.
- B. The Contractor shall be required to enlist the services of a qualified HVAC controls sub-contractor to provide a new control system capable of controlling the HVAC system as indicated in this specification and as required to provide a complete and fully functional system.

## 1.3 EQUIPMENT

- A. Transformers shall be provided for electric or electronic controls. Each transformer shall be connected to an electric circuit, which serves no other equipment. Spare circuits in electric panels may be used for controls. Control wiring shall not be connected to lighting circuits. When controls serve an individual air handling unit, transformers may be connected to fan motor leads of the unit controlled.
- B. Controllers
  - 1. Temperature controller shall be accomplished using programmable thermostats, Honeywell Vision Pro series or equal
- C. Automatic Dampers
  - 1. Automatic dampers shall be factory fabricated and shall be provided by the temperature control manufacturer. The control damper shall be installed by the Contractor under the supervision of the automatic temperature control manufacturer or his authorized agent. All dampers shall be full duct size or louver size unless indicated otherwise. All damper frames shall be constructed of 12 gauge galvanized sheet metal or extruded aluminum of 12 gauge, 0.081-inch minimal thickness and shall have flanges for duct mounting. The blades shall be parallel or opposed, as required and suitable for the air velocities to be encountered in the system. Replaceable edge and end seals shall be provided with damper, installed along the top, bottom and sides of the frame and each blade. Provide insulated blades for the mechanical room louver. Seals and bearings shall be able to withstand temperatures ranging from minus 40 degrees F to plus 200 degrees F. Dampers shall be rated for leakage in the full closed position, at 50-pounds per square inch torque applied by the control operator. Dampers shall not leak air at more than 20 CFM per square foot at four-inch static pressure water gauge.
- D. Damper Actuators
  - 1. Actuators shall be of the push-pull type for either modulating or two-position control. Actuators shall stroke by a rotating motion of an overload-proof synchronous motor. Control voltage shall be either 24 VAC or zero to 20 VDC as required by the application. Actuators shall be available with spring return to the fully extended position upon power

failure. Three point, floating actuator shall be available with adjustable end switches. Minimum/maximum manual positioners shall be available for proportional motors.

E. Indicators - Digital

1. A plug-in base-mounted digital indicator shall be capable of providing digital readout of the temperature sensor and set point of six different controllers.
2. The indicator shall have LED display channel selection buttons and LED display of type of sensor being read. The indicator shall also have a plug connector for connection of a portable printer.

1.4 SEQUENCE OF OPERATION

A. Air Handling Units AH-1 thru AH-8 and CU-1

1. Occupied mode: when any of the systems are in a scheduled occupied mode the outside air damper shall open and the supply fans shall run continuously and the heating and cooling portions of the system shall function as required to maintain space temperature.
2. Unoccupied mode: when the systems are in a scheduled unoccupied mode the outside air damper shall close and the supply fans shall cycle with the heating and cooling portions of the system to maintain space temperature.
3. The air handling unit supply fan(s) shall run whenever there is a call for heat.

B. Exhaust fans EF-1 and EF-2

1. EF-1 and EF-2 shall run continuously when the air conditioning/heating system is in a scheduled occupied mode and shall be off when the system(s) are in a scheduled unoccupied mode.

1.5 DRAWING AND LAYOUTS

- A. The Contractor shall provide diagrammatic layouts of the Control System specified herein. Layouts shall show all control equipment and the function of each item shall be indicated. The Contractor shall submit six (6) copies of Drawings of the entire control system to the Owner's Representative for approval before starting work.
- B. Bill of material shall include a schedule of all units, accessories and nameplates, which includes a complete description, rating and location of equipment being furnished.

1.6 INSTRUCTION AND ADJUSTMENT

- A. On completion of the installation, the ATC Contractor shall have completely adjusted the entire control system. Instruction on system operation shall be provided to the Owner's Representative.

END OF SECTION 15500