

The following changes to the Drawings and Project Specifications shall become a part of the Drawings and Project Specifications; superseding previously issued Drawings and Project Specifications to the extent modified by Addendum No. 4.

**Changes to the Addenda:**

- ADDENDUM #1, Changes to the Drawings, DRAWING A230, FLOOR PATTERN & FINISH PLAN, FINISH SCHEDULE, Keyed Finish Notes, Note 2, delete in its entirety.
- ADDENDUM #3, New Specifications, SECTION 084313:
  - Page 3:
    - Article 2.1.A.1., revise “Trifab 400 Framing Systems” to read “EnCORE Framing System”.
    - Article 2.1.B.5., revise [012500 “Substitution Procedures”] to read [016310 “Equals and Substitutions”].
  - Page 4:
    - Article 2.3.A.1., delete in its entirety.
    - Article 2.3.A.2., revise “Nonthermal” to read “Thermally broken”.

**New Specifications:**

- SECTION 230923, AUTOMATIC TEMPERATURE CONTROLS has been added and is attached as part of this addendum. (6)

**Changes to the Specifications:**

- TECHNICAL SPECIFICATIONS TABLE OF CONTENTS, Page 3, Division 23 – Heating, Ventilating, and Air-Conditioning, add the following:

“Section 230923 Automatic Temperature Controls 6”

**Changes to the Drawings:**

- DRAWING A100, DEMOLITION & FLOOR PLAN, Construction Notes, Note 3, add to the end the following:

“Coordinate phasing of fence modifications to allow access of equipment needed to pour concrete pad and place the generator.”

End of Addendum ‘4’

SECTION 230923 - AUTOMATIC TEMPERATURE CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. HVAC system remote controllers.
2. Programming.
3. Field devices.
4. ERV remote controller.

B. Related Requirements:

1. Section 230000 "Basic Mechanical Requirements".
2. Section 230593 "Testing, Adjusting and Balancing for HVAC".
3. Section 237200 "Air-to-Air Energy Recovery Equipment".

1.3 SCOPE OF WORK

- A. A complete system of Automatic Temperature Controls (ATC) shall be provided for all HVAC equipment.
- B. Scope of work shall include all devices, low and line voltage wiring, transformers, conduit, relays, and devices required for installation of a complete system to perform the Sequence of Operation.
- C. All new temperature controls installed as part of the scope of work of this project shall be compatible with the equipment furnished.

1.4 ACTION SUBMITTALS

- A. Product Data: Provide data for each system component.
- B. Shop Drawings:
  1. Trunk cable schematic showing programmable control unit locations and trunk data conductors.
  2. List of connected data points, including connected control unit and input device.
  3. System configuration with peripheral devices, batteries, power supplies, diagrams, and interconnections.
  4. Descriptive data and sequence of operation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Manufacturer and Installer.
- B. Manufacturer's Installation Instructions: Include for all manufactured components.

1.6 CLOSEOUT SUBMITTALS

- A. Accurately record actual location of control components, including panels, thermostats, and sensors.
- B. Revise Shop Drawings to reflect actual installation and operating sequences.
- C. Include data specified in "Submittals" in final "Record Documents" form.
- D. Provide test report indicating that all system setpoints and schedules have been adjusted and that all systems are working properly.
- E. Include instructions to operate all devices specified herein.
- F. Include inspection period, cleaning methods, cleaning materials recommended and calibration tolerances.

1.7 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five (5) years documented experience.
- B. Installer: Company specializing in applying the work of this Section with minimum five (5) years documented experience.
- C. Materials and equipment shall be the catalogued products of manufacturers regularly engaged in production and installation of Automatic Temperature Control systems and shall be manufacturer's standard design that complies with the specification requirements.
- D. Install system using competent workmen who are directly employed by the controls manufacturer and are fully trained in the installation of the temperature control equipment.
- E. Supplier shall have an in-place support facility within twenty (20) miles of the site with technical staff, spare parts inventory and all necessary test and diagnostic equipment.
- F. Conform to requirements of NFPA 70 (National Electrical Code).

1.8 WARRANTY AND MAINTENANCE

- A. Provide one (1) year warranty which shall include coverage for field-programmable micro-processor-based units and all related devices and components installed as work of this section.
- B. Provide one (1) year maintenance contract which includes complete performance check with report at 6 months and 12 months.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Carrier
  2. Honeywell
  3. Trane

**2.2 GENERAL SYSTEM DESCRIPTION**

- A. Provide stand-alone system of Automatic Temperature Controls system.
1. Programmable microcomputer based General Purpose Controllers interfacing directly with sensors, actuators, and environmental delivery systems (i.e., HVAC units); electric controls and mechanical devices for all items indicated on Drawings described herein including dampers, valves, panels, etc.
- B. Provide additional components, cabling and interface devices required for complete operational system, capable of the Sequence of Operation system.
- C. Contractor shall provide all necessary points and sensors for monitoring and controlling the sequence of operations as well as all points shown on the schematics in the contract documents.

**2.3 FIELD DEVICES**

- A. Actuators.
1. All automatically controlled devices, unless specified otherwise, shall in all cases be provided with actuators sized to operate their appropriate loads with sufficient reserve power to provide smooth modulating action or two-position action and tight close-off.
  2. Actuators shall be provided with suitable corrosion resistant linkages for valves or dampers. Except as specified herein, all actuators shall be sized for the load/close off encountered in strict accordance with manufacturer's recommendations. All actuators on outside air dampers shall be spring return heavy duty type actuators with proper linkage as required. All actuators shall drive to their "normal" position anytime their associated UV (etc.) is shut down. Actuators for valves above 2 inches shall be heavy duty type direct coupled actuators.
- B. Temperature Sensors.
1. Space Temperature Wall Modules shall be provided where shown on plans and shall be mounted 60 inches above finished floor with blank commercial type locking covers with the following features:
    - a. External adjustment knob calibrated in degrees F.
    - b. Push button/LED as noted in sequence of operation. Push button/LEDs shall allow for selection and display of four (4) operational modes: no override active, timed

- override occupied command active, continuous unoccupied command active, and continuous occupied command active.
- c. One (1) sensor per area shall be provided with plug-in port to respective UC network for software maintenance and/or reconfiguration.
  - d. Plastic used on subbase or housing shall be UL94-5V rated.
  - e. Provide thermostat guards for all thermostats with setpoint adjust capability.
- C. Fan proof-of-flow switches shall be adjustable set point and differential pressure type. Switches shall be piped to fan discharge except where fans operate at less than 1-inch WC, they shall be piped across the fan. For fractional horsepower and non-ducted fans, relays or auxiliary contacts may be used. Maximum pressure rating shall be at least 10 inches WC.
- D. Dampers.
1. AMCA-rated, parallel-blade design; 0.1084-inch minimum, galvanized-steel frames with holes for duct mounting; damper blades shall not be less than 0.0635-inch galvanized steel with maximum blade width of 8 inches.
  2. Blades shall be secured to ½-inch-diameter, zinc-plated axles using zinc-plated hardware, with nylon blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.
  3. Operating Temperature Range: From minus 40 to plus 200 deg F.
  4. For standard applications, include optional closed-cell neoprene edging
- E. Equipment operation sensors as follows:
1. Status Inputs for Fans: Differential-pressure switch with adjustable range of 0 to 5 inches wg.
  2. Status Inputs for Electric Motors: Current-sensing relay with current transformers, adjustable and set to one hundred seventy-five percent (175%) of rated motor current.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Install in accordance with manufacturer's instructions.
- B. Install electrical work in accordance with appropriate requirements of Division 26. Run all wiring (low and line voltage) in conduit.
- C. Furnish and install control transformers.
- D. Furnish and install all equipment, components, devices, transformers, low and line voltage wiring and conduit required for complete operational system of automatic temperature controls capable of the Sequence of Operation.
- E. Provide current sensing relays for each fan. Alarm condition shall be indicated at operators workstation when current is other than normal.

- F. Test each system for proper operation and instruct Owner's personnel on operation of system.
- G. Verification of existing conditions before starting work.
- H. At contract award, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

### 3.2 INSTALLATION

- A. Provide new control wiring as required for proper operation. All control wires installed under this contract shall be color coded, numbered or otherwise labeled for easy identification. All control wiring exposed to damage in workrooms shall be installed in conduit painted to match the mounting surface. All control wiring exposed in offices or other public spaces shall be installed in wire mold painted to match the mounting surface. All concealed control wiring shall be plenum rated. Provide and install batteries as required for proper operation. New installation shall be in accordance with manufacturer's recommendations.
- B. Provide all necessary transformers, relays, contactors, and other options as required for proper operation.
- C. Mount new thermostats at 78 inches above the floor in workroom spaces subject to damage from operations. Mount new thermostats at 54 inches above the floor in office and public areas.

### 3.3 TEMPERATURE CONTROL SYSTEM OPERATION

- A. Operation Instructions:
  - 1. Thermostats for controlled HVAC equipment shall be low voltage digital electronic type. See Drawings for HVAC equipment type and number of stages.
- B. Performance Requirements:
  - 1. LCD touch-screen display.
  - 2. Energy Star approved 3.5.
  - 3. Seven-Day Programmable Schedule: Minimum of four (4) separate scheduling periods per day (with separate heating and cooling setpoints for each period). Each time period and temperature setpoint shall be individually programmable.
  - 4. Automatic changeover between heating and cooling modes.
  - 5. Built in time delay between compressor starts.
  - 6. Fan Operation: Fan operation shall be programmable by time period to either operate continuously or automatically on a call for heating or cooling.
  - 7. Adaptive Recovery Control: Thermostat shall have an adaptive recovery feature that adjusts the start time, based on learned system performance, to reach setpoint at the desired occupancy time.
  - 8. Battery back-up to retain program and time through minimum 24-hour power outage.
  - 9. Keypad Lock: Keypad shall be partially lockable (via programming) to allow only temporary adjustment of temperature setpoints. Keypad shall also be fully lockable (via programming).

3.4      **STARTUP**

- A.    In addition to manufacturer's written installation and startup checks, perform the following:
  - 1.    Check for clear drain piping.
  - 2.    Adjust operating controls.

END OF SECTION 230923