

SECTION 15950 – INSTRUMENTATION AND CONTROL FOR HVAC

PART I - GENERAL

1.01 DESCRIPTION

- A. Section 15050, Basic Mechanical Materials and Methods, shall be considered a part of these specifications.
- B. The contractor under this heading shall be the heating and air conditioning contractor who shall furnish all control equipment, engineering services, job drawings, and field supervision for temperature control.
- C. This specification is intended to cover equipment for the automatic temperature control of the:

Heating,
Ventilation, and
Air Conditioning Systems.

1.02 GUARANTEE

- A. The control system shall be free from defects in workmanship and material under normal use and service. If within 12 months from date of acceptance by the engineer, any of the equipment herein described has proved to be defective in workmanship or material, it shall be replaced or repaired free of charge.
- B. This contractor shall, after completion of the original test of the installation and acceptance by the engineer, provide any service incidental to the proper performance of the temperature control system under guarantees outlined above for the period of one year. After completion of the installation, this contractor shall regulate and adjust all equipment provided under this contract. He shall place them in complete operating condition subject to the approval of Walgreen Co.

PART II - PRODUCTS

2.01 THERMOSTATS

- A. Programmable temperature control and remote sensor for packaged rooftop units.
- B. Temperature sensor and thermostats for Entrance heater (EH-1) roof-top unit.
- C. The respective RTU shall be controlled initially from a temperature sensor located in the Manager's office or later from a remote sensor in the Sales area.

2.02 FIRE PROTECTION

- A. When required by code, firestats and/or smoke detectors shall be as described in other sections of the specifications.

2.03 INDOOR RELATIVE HUMIDITY SENSOR

- A. This sensor located in the Sales area shall control the Humidimizer by Carrier, the Humiditrol by Lennox, or the Dehumidification by Trane.

PART III - EXECUTION

3.01 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. All control valves and damper motors, where required, shall be furnished and installed by the heating and air conditioning contractor.
- C. All dampers shall be positioned by the ventilation contractor. Ventilation contractor shall also mark positions of dampers on "as built" layouts.
- D. All control motors must be spring return and must have oil immersed gear train.
- E. All electrical wiring and mounting of temperature control devices shall be in accordance with all existing codes
- F. All temperature control devices and sensors shall be labeled with the associated RTU or exhaust fan number. (ie:RTU-1, EH-1, EF-1, etc.)

3.02 PERFORMANCE

- A. Sequence of Operations: The heating and cooling set points shall be individually adjustable for both occupied and unoccupied periods. The thermostats shall have a minimum dead band of 2 degrees F and a maximum dead band of 5 degrees F (no mechanical heating or cooling shall operate within this dead band). Space temperature deviation above cooling set point or below the heating set point shall generate a demand signal to control the system as follows:
 - 1. Heating: The ~~EMS~~ system (temperature control device) shall control the heating outputs based on the demand signal communicated from the temperature control program, taking into account both space temperature deviation (proportional error) and the duration of that temperature deviation (integral error). The outdoor air damper shall be at a minimum position during the occupied period, and shall be closed during the unoccupied period of the heating mode. Auxiliary heat shall be controlled at 2 degrees F below heating set point on heat pump systems.
 - 2. Cooling: The system shall control the cooling outputs taking into account both space temperature deviation (proportional error) and the duration of that temperature deviation (integral error).

- B. Heating Setback and Cooling Setup: Initiation of heating setback or cooling setup for each of 7 days shall be provided by a programmed time schedule manually entered into the thermostat. When all or a portion of a manually programmed schedule is unavailable, the thermostat shall control the unavailable program functions to occupied mode and default set point ranges as follows:

TABLE OF DEFAULT SETPOINT RANGES		
	Occupied	Unoccupied
	°F	°F
Heating	70	60
Cooling	74	80

- C. Set point Recovery from Unoccupied to Occupied: The thermostat shall select the optimum time to begin building warm up or cool down based on set points and occupied program.
1. The temperature shall ramp 5 degrees per hour for both heating and cooling on a conventional system.
 2. The temperature shall ramp 3 degrees per hour for heating and 5 degrees for cooling on a heat pump system.
- D. An enthalpy based changeover control shall determine the capability of the outdoor air to provide free cooling. A differential enthalpy, comparative enthalpy or dry bulb control shall not be used.
1. Free Cooling Available from Outdoor Air: On a call for cooling, the system shall enable the economizer to provide free cooling. If this does not meet the space demand, the system shall call for mechanical cooling to satisfy the programmed set point.
 2. Cooling Not Available from Outdoor Air: On a call for cooling, the system shall hold the economizer to minimum position and mechanical cooling shall be energized to satisfy the programmed set point.
- E. Fan Operation:
1. HVAC unit fan operation shall be constant during the occupied period.
 2. Fan operation shall be intermittent during the unoccupied period.
- F. Heating and Cooling Operation Minimum On/Off Times: The temperature control system shall incorporate a program to maintain minimum-stage operation times of 2 minutes "on" and 4 minutes "off" for compressor stages, and 2 minutes "on" and 2 minutes "off" for heat (gas or electric resistive).

END OF SECTION

