

SECTION 238123 - COMPUTER ROOM AIR CONDITIONING UNIT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

1.2 SCOPE

- A. Provide complete factory packaged computer room air conditioning units with chilled water coil and direct expansion coil with air cooled condenser. Size, capacity and performance shall be as indicated in the schedule on the drawing.

1.3 RELATION TO OTHER WORK

- A. Coordinate equipment ordering, delivery and placement; utility connections; and the work of all related trades.

1.4 SHOP DRAWINGS

- A. Refer to section entitled "General Mechanical Provisions". Include complete information on: operating and safety controls, including microprocessor control system; operating sequence, power requirements; and power, control and interlock wiring diagrams and capacities when operating with chilled water or with direct expansion equipment.

1.5 BASIS OF DESIGN

- A. Basis of design is similar to Liebert self-contained factory assembled unit with upflow air delivery.

1.6 CERTIFIED PERFORMANCE

- A. Thermal and acoustical insulation shall meet the requirements of NFPA 90A. Compressor motors, starters and control wiring shall conform to NEMA, UL, NEC and Local Utility requirements. Performance shall be in accordance with ARI Standard 550.
- B. Fan ratings shall comply with the latest Air Movement and Control Association (AMCA) Standards.

1.7 MANUFACTURER'S CHECKOUT

- A. Start-up Service: Manufacturer shall furnish a factory-trained representative without charge for three working days. Representative shall supervise leak testing, start-up and instruction of Owner's personnel on operation and maintenance.

1.8 ACCEPTABLE MANUFACTURERS

- A. Airflow Company, Climateworx or equivalent.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Cabinet: Factory assembled; frame constructed of heliarc welded tubular steel; exterior panels insulated with a minimum 1 inch thickness, 1-1/2 lbs. density fiberglass; panels removable for service access with concealed fasteners; panels arranged to provide access to the electrical control panel and compressor section without interrupting the air flow; paint color selected by Architect.
- B. Fan Section: Centrifugal type; double width; double inlet; statically and dynamically balanced as completed assembly; maximum vibration level of two mils in any plane; steel shaft with self-aligning ball bearings; motor mounted on adjustable slide base; v-belt drive; draw through cooling coil. Refer to paragraph entitled "V-BELT DRIVE" in Section 230500.
- C. Filter: Filter holding frame located within cabinet; serviceable from either end of unit; high efficiency throwaway type; rated not less than 35% efficiency. For filter type refer to Section 234100, AIR FILTER ASSEMBLIES.

2.2 REFRIGERATION SYSTEM

- A. Dual Circuiting: Each refrigeration circuit shall include hot gas mufflers, liquid line filter driers, refrigerant sight glass with moisture indicator; adjustable, externally equalized expansion valves, and liquid line solenoid valves.
- B. Semi-Hermetic Compressors: The compressors shall be located in a separate compartment so they may be serviced during operation of the equipment. The compressor shall be semi-hermetic with a suction gas cooled motor, vibration isolators, thermal overloads, oil sight glass, manual reset high pressure switch, pump down low pressure switch, suction line strainer, reversible oil pumps for forced feed lubrication and a maximum operating speed of 1750 rpm.

2.3 AIR-COOLED CONDENSER

- A. General: Air cooled condenser shall be the horizontal discharge, slow speed, multiple v-belt drive centrifugal fan type. The condenser shall have two separate refrigeration circuits to balance the heat rejection of each compressor at 100 degree F. ambient. The condenser shall be constructed of reinforced steel and contain a copper tube, aluminum fin coil.
- B. Winter Control System: The winter control system for the air cooled condenser shall allow start-up and positive head pressure control with ambient temperatures as low as -30 degree F. The package shall include the insulated and heated receivers, pressure relief valves for each circuit, head pressure three-way control valves, and valves for isolating the refrigerant charge. The winter control system shall be factory prepiped, insulated, and mounted ready for the field connection to the unit.

- C. Fan Section: Fan shall be centrifugal type, double width, double inlet and shall be statically and dynamically balanced at the factory. The fan shall be driven by a 1750 rpm motor mounted on an adjustable slide base.
- D. Head Pressure Control: The control system shall be complete with transducers, thermostats and electrical control circuit, factory pre-packaged in the integral condenser control box. The transducer shall automatically sense the highest head pressure of either operating compressor and control the fan on the air cooled condenser to properly maintain the head pressure.

2.4 COOLING COIL

- A. Chilled Water Coil: Chilled water cooling coil 2-way modulating valve. Microprocessor shall position the valve in response to room conditions. Cooling capacity will be controlled by modulating the chilled water. The modulating valve's travel for dehumidification shall be proportional. The cooling coil shall be constructed of copper tubes and aluminum fins. The entire coil assembly shall be mounted in a stainless steel condensate drain pan.
- B. Direct Expansion Coil: The A-frame evaporator coil shall be constructed of copper tubes and aluminum fins and have a maximum face velocity of 350 ft. per minute and be not less than 4 rows deep. Refrigerant of each system shall be distributed throughout the entire coil face area. A stainless steel condensate drain pan shall be provided.

2.5 CONTROL PANEL

- A. Electronic control system shall be totally solid state. The system shall be provided with Start button, Stop button, Silencer button, Temporary Loss of Power indicator, manual reset circuit breakers, plug-in solid state temperature control with sensitivity adjustment, plug-in solid state humidity control, and backlighted monitor panel.
- B. Backlighted monitor panel shall have the following visual indicators:
 - 1. Cooling on Dehumidification
 - 2. Heating Stage 1, 2 & 3
 - 3. Change Filters
 - 4. Humidification
- C. Solid state temperature and humidity control each shall have one adjusting sensing point for the room conditions. The temperature and humidity controls shall have a "push-to-test" calibration check button and built in visual indicators to indicate the mode of operation of the control. All controls and control sensors shall be easily accessible.
- D. Each high voltage circuit in the system shall be individually protected by a dual element fuse. All starters, contactors and relays shall be controlled by a 24 volt control circuit. All high voltage components shall be protected by a safety lock dead front panel.
- E. Provide panel to include a solid state plug-in module, silencer switch, individual red indicators for each function to be monitored, and an audible alarm. The following alarm conditions shall be provided: high and low temperature and humidity, loss of air flow, change filter, high and low humidifier water level, manual override, water under floor, loss of water flow, loss of power and main fan overload. Provide a set of dry contacts for connection to the Control System as required by Division 17.

F. Microprocessor Control System:

1. The control system shall be microprocessor based. The system shall be provided with LED numerical display to allow observation of room temperature and humidity and each function (temperature setpoint, temperature sensitivity, humidity setpoint, humidity sensitivity). Normal operating modes (heating, cooling, humidification, dehumidification) shall be indicated by colored LEDs on the unit-mounted display panel.
2. The control system shall monitor unit operation and activate an audible and visual alarm in the event the following factory preset alarm conditions:
 - a. High temperature
 - b. Low temperature
 - c. High humidity
 - d. Low humidity
 - e. High head pressure
 - f. Change filters
 - g. Loss of air
 - h. Humidifier problem
 - i. Field accessible local alarm
 - j. Manual override activated
3. A compressor sequence switch shall be provided to change the lead/lag sequence of the compressors.

G. Accessories to be Included:

1. Firestat: The firestat shall immediately shut down the environmental control system when activated. The firestat shall be mounted in the electrical panel with the sensing element in the return air.
2. Disconnect Switch (Locking Type): The non-automatic molded case circuit breaker shall be mounted in the high voltage section of the electrical panel. The switch shall be accessible from the outside of the unit with the access panel closed, and prevent access to the high voltage electrical components until switched to the "OFF" position.

2.6 REHEAT COIL

- A. Electric: Heavy duty; low watt density; fin tubular construction; sufficient capacity to maintain room dry bulb conditions when the system is calling for dehumidification; multiple stage control; installation UL approved with all safety and operating controls; disconnect switch. Coil capacity and the number of stages are specified in schedule on drawing.

2.7 HUMIDIFIER

- A. General: Located in bypass air to prevent over-humidification; field adjustable flush control system to change the cycle time in accordance with local water conditions; humidifier capacity specified in the schedule on drawing.
- B. Infra-red: Infra-red type consisting of high intensity quartz lamps mounted above and out of the water supply; stainless steel evaporator pan; serviceable for cleaning without disconnecting water supply lines, drain lines or electrical connections; liquid level control; emergency overflow; prepiped ready for final connection with primary water supply from cooling coil condensate.

PART 3 - EXECUTION

3.1 PLACEMENT AND MOUNTING

- A. Installed units shall be free of vibration and shall not produce excessive noise within the occupancy area of the building.
- B. Layout and carefully install units with sufficient clearances to permit proper maintenance.
- C. Coordinate with piping, ductwork, starters, electrical connections and controls for a neat workmanlike installation.
- D. The computer room air conditioning unit shall be furnished for the electrical voltage and phase indicated in the schedule on the drawings. Verify the circuit voltage and phase indicated on the electrical drawings prior to submitting shop drawings.

3.2 INSTALLATION

- A. Layout exact location for air cooled condensers structural bases, and furnish to Contractor a dimensional drawing showing base sizes and locations including sleeve location for the refrigerant piping.
- B. Install computer room air conditioning units and air cooled condensers and make refrigerant piping connections and electrical connections in accordance with the manufacturer's recommendations.

3.3 LUBRICATION

- A. Provide initial charge of lubricating oil for all equipment furnished. Before system is finally accepted by Owner, drain oil from equipment and replace with new charge. Furnish Owner chart stating type oil and schedule of maintenance to be used for various equipment.

3.4 REFRIGERANT

- A. Provide all refrigerant required to develop system to full rating. Guarantee that loss of refrigerant for first twelve month period not to exceed ten percent (10%) of full charge of system, and provide refrigerant required if this amount is exceed in addition to correcting cause of refrigerant loss.
- B. Refrigerant piping shall be installed with the air cooled condensers above the location of the compressors.

3.5 DUCT CONNECTIONS

- A. Supply and Return: Ducts shall be connected to their respective units with flexible connectors. Refer to paragraph entitled "FLEXIBLE DUCT CONNECTIONS" in Section 233300.

END OF SECTION 238123