Division 15 Mechanical

Section 15970 - Control Systems

Introduction

Equipment associated with:

THE MANAGEMENT OF HEATING, VENTILATION, AND AIR CONDITIONING RELATED UTILITIES.

Part 1 - General

- The Energy Management Control System shall be Direct Digital Control, fully automatic, with electric and pneumatic components as required. All actuation within mechanical rooms and major air handling units shall be pneumatic. Electric actuation can be used if better performance will result. Discuss with U of A, Facilities.
- All terminal boxes, sensors and actuators shall be electronic / electric.
- System design shall be stand alone and of modular fashion to insure future expansion capabilities, whether it be additional control / monitoring points or supervisory functions.
- System shall have a minimum of 10% capacity expansion within the current equipment.
- Monitor all central utilities and emergency systems from a local and remote location.
- Metering devices to be installed per design guidelines Section 15980.
- Provide industrial linear-type chilled water pressure control valve as required by U of A, at tunnel entrance to maintain system pressures within the building.
- Provide electronic speed control for variable volume systems.

Part 2 - Products

- Controls must completely interface with the *Campus* existing Barber Colman*/Siebe* or Johnson Controls systems without added expense.
- *The direct digital control system shall be directly connected to the Owner's campus-wide EMCS via the EtherNet.*
- *Controls shall be microprocessor based interoperable LONMARK controllers bearing the applicable LONMARK interoperability logo on each product provided.*
- *LonTalk communications protocol will be utilized on the dedicated building communication network between EMCS controllers and other LonWorks devices to assure interoperability between all devices within the building network.*
- *The EMCS shall provide the direct integration of standard BACnet.*
- *The EMCS shall provide Ethernet communication in compliance with the ASHRAE standard 135-P for BACnet.*
- Noise, surge and spike protection: Kele model # HSP-121-B
- Shall be capable of withstanding power outages and surges for extended periods of time.
- Memories shall be non-volatile , or unit shall hold memory up to 30 days minimum on backup batteries.

- All CV and VAV terminal units controls shall be DDC "smart type" for new building construction.
- Use Fisher 92B steam pressure reducing valve with the appropriate pilot.
- Use manual reset freeze stats.
- Humidity sensors: OMEGA-HX-93C.

Part 3 - Execution

- Supply the following monitoring and control features where applicable:
  - Building Systems

    Complete utility usage (water, steam condensate, chilled water, electric)
  - Utility Usage

    Chilled water flow in GPM, totalized energy in BTU's
    Hot water flow in GPM, totalized energy in BTU's
    Steam condensate flow in lbs./hr., totalized energy in lbs.
    Domestic water totalized in gallons
    Electric use totalized in kW hrs., real time demand in kW

    Individual equipment power and energy use where required by U of A
    Chilled water supply and return pressure and temperatures
    Steam pressures
    Domestic water pressures
    Hot water supply and return pressure and temperatures
    Status of equipment pumps and drives
    Change of set point capability for all variable frequency drives
    Provide HVAC equipment greater than 1 hp with time scheduling capability, i.e., time clocks
    Reset of hot water supply temperatures
    Chiller operational status, run times, pressures and temperatures
    Cooling tower operational status and temperatures
    Report of any EMCS component failures on critical equipment as required by U of A
    Emergency generator-run time, load, kW, kVA
    Alarms as specified in other sections
    Outside air temperature
  - Individual Unit Characteristics

    Air Handler status, start / stop
    Supply, Return and Mixed air temperatures
    Reset of hot and cold decks
    Economizer control
    Chilled water return temperature control
    Lighting controls where specified
    Filter differential pressure indication
    Air humidity status and reset when specified, high limit control.
    Status of Hot and Cold duct static pressure
    Active control strategy for maintaining outdoor air requirements, e.g, CO_2 sensing.
- Provide airflow measuring stations as required.
- All control valves and isolation valves are to be located outside the Air Handler enclosure.

- Chilled water control valves to fail to “open” position. Hot water control valves to fail to “closed” position.
- Provide adequate space to install all control valves with stems in the vertical position without exception.
- Provide adjustable static pressure safety switch to shut down VFD controlled fans.
- Identify all controls and wiring within pertinent control panel and provide control system drawing framed under plexiglass on inside of panel door.

End of Section 15970