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HVAC CONTROL SEQUENCES OF OPERATION

GENERAL CONTROL NOTES:

1. THE NEW WAREHOUSE DIRECT DIGITAL CONTROLS (DDC) SHALL BE A COMPLETE SYSTEM SUITABLE FOR THE HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) SYSTEM. THE SYSTEM PROVIDED AND INSTALLED SHALL BE A JOHNSON METASYS SYSTEM SEAMLESSLY COMPATIBLE WITH THE EXISTING BUILDING CONTROLS AT THE VETERANS ADMINISTRATION MONTGOMERY, ALABAMA CAMPUS CURRENTLY MONITORED FROM THE REGIONAL OFFICE, BUILDING 42.

2. THE CONTRACTOR SHALL PROVIDE ALL POWER, CONTROL WIRING, CABLES, CONDUITS, CONTROL DEVICES, TRANSFORMERS AND ASSOCIATED APPURTENANCES FOR A COMPLETE AND FUNCTIONAL DDC CONTROL SYSTEM. ALL CONTROL, POWER WIRING AND CONDUIT NOT INDICATED ON THE ELECTRICAL DRAWINGS AND REQUIRED FOR THE CONTROL AND OPERATING SEQUENCES INDICATED HERE SHALL BE FURNISHED AND INSTALLED UNDER THIS SECTION, IN COMPLIANCE WITH ALL DIVISION 16000 SPECIFICATIONS AND GENERAL NOTE 6 ON SHEET M0-1. ALL LINE VOLTAGE AND ALTERNATING CURRENT CONTROL WIRING SHALL BE INSTALLED IN CONDUITS.

3. WHEN A POWER FAILURE OCCURS, ALL MECHANICAL HVAC MOTORS SHALL BE RESTARTED AT STAGGERED TIME INTERVALS TO PREVENT SUDDEN INRUSH CURRENT. SEE ELECTRICAL DRAWINGS FOR STARTING REQUIREMENTS.

4. ALL HAND OFF-AUTO SWITCHES SHALL BE MOUNTED ON OR NEAR THE MOTOR STARTERS.

5. ALL CONTROL VALVES SHALL BE THREE (3) WAY UNLESS INDICATED OTHERWISE.

6. DIFFERENTIAL PRESSURE SWITCHES SHALL ALARM THE DDC SYSTEM WHENEVER THE STATIC PRESSURE RISES ABOVE 0.35" FOR FILTERS.

HVAC SYSTEM SUMMARY:
THE HVAC AIR SIDE SYSTEM IS COMPRISED OF FOUR (4) SPLIT SYSTEM A/C UNITS (A/C-1, 2, 3 & 4) WITH CORRESPONDING OUTDOOR AIR-COOLED CONDENSING UNITS (ACCU-1, 2, 3 & 4) AND ALL ASSOCIATED APPURTENANCES. THE INDOOR UNITS WILL HAVE A PLENUM WITH RETURN AND OUTSIDE AIR CONNECTIONS, A BLOWER, A FILTER UPSTREAM OF A D/X COOLING COIL, AND A HOT WATER RE-HEAT COIL. AN OUTDOOR GAS-FIRED BOILER WILL FEED THE HOT WATER COILS THROUGH A SIMPLE SUPPLY AND RETURN HOT WATER LOOP.

BUILDING SCHEDULE:
THE BUILDING DDC SYSTEM SHALL OPERATE THE HVAC SYSTEM DURING A 10-HOUR PER DAY, 5-DAY A WEEK OCCUPIED SCHEDULE. THE OCCUPIED SCHEDULED SHALL INCLUDE DESIGN VENTILATION AS INDICATED ON SCHEDULES AND SPACE CONDITIONS OF 75 DEG F (ADJUSTABLE) AND 50% HUMIDITY (ADJUSTABLE). SPACE-MOUNTED TEMPERATURE SENSORS SHALL BE PROVIDED. THE DDC SYSTEM SHALL INCLUDE UNOCCUPIED PERIODS TO INCLUDE NIGHTS, WEEKENDS, AND HOLIDAY PERIODS (ADJUSTABLE). UNOCCUPIED SCHEDULE SHALL INCLUDE NO VENTILATION AND MAXIMUM SPACE CONDITIONS OF 85 DEG F, 60% RH (ADJUSTABLE) AND A MINIMUM SPACE TEMPERATURE OF 55 DEG F (ADJUSTABLE). DURING THE UNOCCUPIED SCHEDULE, THE A/C UNITS SHALL STOP OPERATION AND WILL ONLY START IF THE INTERIOR SPACE SENSORS INDICATE TEMPERATURES IN EXCESS OF 85 DEG F OR BELOW 55 DEG F.

A/C-1,2,3 & 4 AND ACCU-1,2,3 & 4
THIS SYSTEM SHALL OPERATE SUBJECT TO THE DDC SYSTEM SCHEDULE. THE DDC SYSTEM WILL CYCLE THE D/X COOLING COIL AND THE FAN IN THE INDOOR UNITS (e.g. A/C-1) AND MATCHING OUTDOOR CONDENSING UNITS (e.g. ACCU-1) TO MAINTAIN SETPOINT CONDITIONS. IN THE HEATING MODE, THE DDC SHALL MODULATE THE HOT WATER HEATING VALVE (V-1) FOR THE HEATING COIL TO MAINTAIN SETPOINT SPACE CONDITIONS. WHEN THE SPACE TEMPERATURE IS SATISFIED, THE HOT WATER VALVE WILL MODULATE TO THE CLOSED POSITION. THE DDC SYSTEM WILL MONITOR FAN ON-OFF STATUS AND HOT WATER CONTROL VALVE POSITION. A CONDENSATE DRAIN OVERFLOW SENSOR WILL PROVIDE INPUT TO THE DDC SYSTEM, WHICH WILL SIGNAL AN ALARM UPON OVERFLOW. A DUCT-MOUNTED HUMIDISTAT WILL MONITOR THE HUMIDITY IN THE RETURN AIR STREAM AND WILL CYCLE THE D/X COOLING COIL TO MAINTAIN HUMIDITY LEVELS BETWEEN 35% AND 60% (ADJUSTABLE).

SEQUENCE OF OPERATIONS

HEATING WATER SYSTEM CONTROLS:
THE HEATING WATER CONTROL SYSTEM SHALL BE ENERGIZED FOR OPERATION BY THE BUILDING DDC SYSTEM. WHEN THE CONTROL SYSTEM IS ENERGIZED, THE HOT WATER PUMP (HWP-1) SHALL START. ONCE THE HOT WATER PUMP IS STARTED, THE DDC WILL LOOK FOR A RUN STATUS INPUT FROM A DIFFERENTIAL PRESSURE SWITCH LOCATED ACROSS THE SUCTION AND DISCHARGE OF THE PUMP. SHOULD THE DDC NOT RECEIVE INPUT FROM THE HOT WATER PUMP IN 10 SECONDS, AN ALARM WILL BE GENERATED AT THE DDC MONITORING STATION. WHEN FLOW IS PROVEN AT A FLOW SWITCH ON THE HOT WATER SUPPLY AT THE BOILER PIPING DISCHARGE, THE BOILER (B-1) CONTROLS SHALL BE ENERGIZED. THE BOILER SHALL OPERATE THROUGH ITS OWN SAFETY AND OPERATING CONTROLS TO MAINTAIN DISCHARGE WATER SET POINT TEMPERATURE. THE BOILER (B-1) SHALL BE CAPABLE OF HEATING WATER TEMPERATURE RESET. THE WATER RESET MAY BE ACCOMPLISHED EITHER THROUGH FUEL GAS MODULATION OR FUEL PROPORTIONAL FIRING. AN AMBIENT AIR TEMPERATURE SENSOR SHALL BE USED TO MAINTAIN HOT WATER SUPPLY DISCHARGE TEMPERATURE IN ACCORDANCE WITH THE SCHEDULE SHOWN ON THE CONTROL DRAWINGS. TEMPERATURE SENSORS LOCATED ON THE HOT WATER SUPPLY AND RETURN PIPING SHALL PROVIDE INPUT TO THE DDC SYSTEM.

ALABAMA REGISTERED NO. 16179 PROFESSIONAL ENGINEER ROBERT L. YOUNG 1/23/03

Revisions	Date

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