



AHU REPORT GENERATION:
 DDC BAS SHALL MONITOR THE FOLLOWING POINTS ON 10 MINUTE (ADJ.) INTERVALS WITHIN A SINGLE TREND. THE TREND SHALL RUN FOR A 100-DAY (ADJ.) DURATION AT WHICH POINT THE NEWEST VALUES SHALL AUTOMATICALLY OVERWRITE THE OLDEST VALUES.

- DATE
- TIME
- GLOBAL OUTSIDE AIR TEMP [°F]
- GLOBAL OUTSIDE AIR DEWPOINT [°F]
- GLOBAL OUTSIDE AIR HUMIDITY [%RH]
- SUPPLY AIRFLOW [CFM]
- SUPPLY AIR TEMP (SAT) [°F]
- SUPPLY AIR TEMP SETPOINT [°F]
- SUPPLY AIR RELATIVE HUMIDITY [%]
- RETURN AIR TEMP (RAT) [°F]
- RETURN AIR RELATIVE HUMIDITY [%]
- OUTSIDE AIRFLOW [CFM]
- MIXED AIR TEMP [°F]
- FILTER ALARM PRE-FILTER LOADING
- HEATING WATER VALVE POSITION [% OPEN]
- CHILLED WATER VALVE POSITION [% OPEN]
- SUPPLY FAN VFD OUTPUT [% FULL SPEED]
- OUTSIDE AIR DAMPER POSITION [% OPEN]
- RETURN AIR DAMPER POSITION [% OPEN]

THIS INFORMATION SHALL BE ACCESSIBLE TO VIEW IN GRAPHICAL FORM ON THE FMCS OPERATOR WORKSTATION.

ONCE PER MONTH, THE DDC FMCS SHALL RECORD THE LARGEST AHU AIRFLOW WHICH OCCURRED DURING THAT MONTH. THE DATE, TIME, OUTSIDE AIR TEMP (AND ALL OTHER VALUES LISTED ABOVE) THAT COINCIDED WITH THAT EVENT SHALL ALSO BE RECORDED. THIS INFORMATION SHALL BE STORED TO A MEMORY LOCATION ON THE FMCS OPERATOR WORKSTATION THAT IS MAINTAINED (NOT AUTOMATICALLY OVERWRITTEN).

AHU OUTSIDE AIR FLOW RATE SCHEDULE		
SYSTEM	HIGH MINIMUM OUTSIDE AIR FLOW RATE (CFM)	LOW MINIMUM OUTSIDE AIR FLOW RATE (CFM)
AHU-3M	600	300

SEQUENCE OF OPERATION:

WHEN AHU IS INDEXED TO RUN, THE FOLLOWING SHALL OCCUR:

- SUPPLY FANS SHALL BE ENABLED TO RUN.
- WHEN THE SUPPLY FANS HAVE STARTED THE RELIEF FAN SHALL BE ENABLED TO RUN.

SUPPLY FAN OPERATION:
 BAS SHALL MODULATE SIGNAL TO SUPPLY FAN VFD'S TO MAINTAIN DUCT STATIC PRESSURE AS MEASURED BY STATIC PRESSURE TRANSMITTER NEAR THE END OF THE CRITICAL DUCT BRANCH.

RELIEF FAN OPERATION:
 RELIEF FAN SHALL BE ENABLED TO RUN WHENEVER THE SUPPLY FAN IS INDEXED TO RUN. BAS SHALL MODULATE SIGNAL TO RELIEF FAN VFD AS REQUIRED TO MAINTAIN THE BUILDING STATIC PRESSURE AT +0.02" WC (ADJ.). WHEN THE RELIEF FAN IS INDEXED TO RUN THE FAN SHALL NOT START UNTIL THE DAMPER END SWITCH IS PROVEN. WHEN FAN IS INDEXED OFF, THE RELIEF DAMPER SHALL CLOSE AND THERE SHALL BE A 30 SECOND DELAY BEFORE THE FAN IS SHUT DOWN.

SUPPLY FAN AND CONTROL VALVE OPERATION:
 THE BAS WILL MODULATE THE SUPPLY FAN, COOLING CONTROL VALVE, AND HEATING CONTROL VALVE TO ACHIEVE THE ROOM TEMPERATURE OF 72°F (ADJ.) WITH 5°F (ADJ.) DEAD BAND BASED ON A SIGNAL FROM A WALL MOUNTED TEMPERATURE SENSOR. SEE DRAWINGS FOR TEMPERATURE SENSOR REQUIREMENTS. SPACES WITH ADJUSTABLE THERMOSTATS WILL ALLOW A +/- 3°F (ADJ.) OFFSET FROM THE SETPOINT.

- AT A FULL COOLING, THE SUPPLY FAN IS AT MAXIMUM COOLING CFM SPEED AND THE COOLING CONTROL VALVE SHALL BE OPEN TO MAINTAIN 55°F (ADJ.) DISCHARGE AIR TEMPERATURE.
- AS THE ROOM AIR TEMPERATURE FALLS, THE SUPPLY FAN SHALL RAMP DOWN TO MAINTAIN ROOM TEMPERATURE SET POINT WHILE MAINTAINING A 55°F (ADJ.) DISCHARGE AIR TEMPERATURE SET POINT.
- ON A FURTHER FALL IN ROOM TEMPERATURE, THE SUPPLY FAN WILL REMAIN AT MINIMUM SPEED AND THE COOLING CONTROL VALVE SHALL MODULATE TO MAINTAIN ROOM AIR TEMPERATURE SET POINT. WHEN THE SUPPLY FAN IS AT MINIMUM SPEED THE AHU DISCHARGE AIR TEMPERATURE SHALL NOT CONTROL THE COOLING CONTROL VALVE.
- UPON A FURTHER FALL IN SPACE TEMPERATURE, THE BAS WILL MODULATE THE PERIMETER RADIATION CONTROL VALVES OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE.
- ON A FURTHER REDUCTION IN ROOM TEMPERATURE, THE HEATING CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN ROOM AIR TEMPERATURE SET POINT. THE DISCHARGE AIR TEMPERATURE SHALL NOT RISE ABOVE 95°F AS THE HEATING CONTROL VALVE OPENS. THE SUPPLY FAN SHALL REMAIN AT MINIMUM HEATING CFM.
- ONCE THE HEATING CONTROL VALVE IS MAINTAINING 95°F DISCHARGE AIR, THE SUPPLY FAN SPEED SHALL RAMP UP TO MAXIMUM HEATING SPEED TO MAINTAIN ROOM AIR TEMPERATURE SET POINT.

STATIC PRESSURE AND DISCHARGE AIR TEMPERATURE RESET PRIORITY:
 RESET THE DISCHARGE AIR TEMPERATURE PRIOR TO RESETTING THE DUCTWORK STATIC PRESSURE SETPOINT. ONCE THE MAXIMUM SUPPLY TEMPERATURE IS REACHED THEN THE SYSTEM SHALL ENABLE THE STATIC PRESSURE RESET

DEMAND CONTROL VENTILATION:
 WHENEVER THE AIR HANDLING UNIT IS IN OCCUPIED MODE, THE OUTSIDE AIR DAMPER SHALL MODULATE OPEN. THE RETURN AIR AND OUTSIDE AIR DAMPER SHALL MODULATE IN OPPOSITION TO MAINTAIN THE MINIMUM OUTSIDE AIR FLOW RATE AS MEASURED AT THE OUTSIDE AIRFLOW MEASURING STATION. THE MINIMUM OUTSIDE AIR FLOW RATE SHALL BE RESET AS FOLLOWS:

- DURING OCCUPIED MODE, THE MINIMUM OA FLOW RATE SHALL NOT FALL BELOW THE AMOUNT LISTED IN THE AHU SCHEDULE.
- IF THE CO2 CONCENTRATION IS ABOVE ITS SCHEDULED SETPOINT, THE MINIMUM OA SETPOINT SHALL INCREASE UNTIL THE CO2 SETPOINT IS SATISFIED OR UNTIL THE DESIGN OCCUPIED HIGH MINIMUM OUTSIDE AIR FLOW ON THE AHU SCHEDULE IS REACHED.
- IF THE CO2 CONCENTRATION DROPS BELOW THE SCHEDULED CO2 SETPOINT, THE MINIMUM OUTSIDE AIR RATE SHALL BE RESET LOWER UNTIL THE CO2 CONCENTRATION REACHES ITS SETPOINT OR UNTIL THE AHU OUTSIDE AIR FLOW RATE REACHES THE MINIMUM OA RATE IN AHU SCHEDULE.

DEHUMIDIFICATION:
 THE BAS SHALL MEASURE THE RETURN AIR HUMIDITY AND OVERRIDE THE COOLING SYSTEM TO MAINTAIN RETURN AIR HUMIDITY AT OR BELOW 55%. DEHUMIDIFICATION SHALL BE ENABLED WHENEVER THE SUPPLY FAN STATUS IS ON. DURING THE DEHUMIDIFICATION CYCLE THE COOLING COIL VALVE SHALL MODULATE TO MAINTAIN 50°F (ADJ.) SETPOINT AS SENSED BY THE COOLING COIL DISCHARGE AIR TEMP SENSOR. THE CHILLED WATER VALVE SHALL RETURN TO NORMAL OPERATION WHEN THE RA % RH IS BELOW 55% RH (ADJ.).

ULTRAVIOLET LIGHT MONITOR:
 THE BAS WILL MONITOR THE OUTPUT POWER OF THE UV LIGHTS, THROUGH A RADIOMETER, AND WILL ALARM THE SYSTEM OPERATOR WHEN THE LEVEL DROPS BELOW ITS REPLACEMENT SETPOINT. UV LIGHTS WILL BE INTERLOCKED WITH DOOR SWITCHES IN ADJACENT ACCESS DOORS TO SHUT OFF LIGHTS WHENEVER THOSE DOORS ARE OPENED.

ALARMS, INTERLOCKS, AND SAFETIES:
 WHEN FIRE ALARM CONTROL PANEL INDICATES AN ALARM CONDITION, AHU SHALL BE SHUTDOWN.

THE FOLLOWING CONDITIONS SHALL SHUTDOWN THE AHU AND SHALL INDICATE AN ALARM CONDITION AT THE BAS WORKSTATION:

- SHOULD ANY ONE FOOT SECTION OF THE MANUAL RESET LOW LIMIT TEMPERATURE SWITCH SENSE AIR TEMP <34°F (ADJ.). IF MULTIPLE FREEZE STATS ARE REQUIRED, WIRE ALL TO A COMMON RESET SWITCH.
- A FLOAT SWITCH MOUNTED IN THE COOLING COIL DRAIN PAN SHALL CLOSE THE CHILLED WATER VALVE AND PREVENT SUPPLY FAN OPERATION UPON DETECTION OF WATER AND SHALL INDICATE AN ALARM TO THE OPERATOR WORKSTATION.

THE FOLLOWING CONDITIONS SHALL INDICATE AN ALARM AT THE FMCS, HOWEVER AHU SHALL CONTINUE TO OPERATE:

- AN ALARM IS INDICATED THE SUPPLY FAN VFD.
- DIFFERENTIAL PRESSURE TRANSDUCER ACROSS FILTER BANK EXCEEDS 1.5 INCHES W.G. (ADJ.)
- SEND AN ALARM TO THE BAS OPERATOR INTERFACE IF THE DISCHARGE AIR TEMPERATURE IS MORE THAN 5°F (ADJ.) ABOVE OR BELOW SETPOINT.

WHENEVER AHU IS SHUTDOWN THE FOLLOWING SHALL OCCUR:

- THE OUTSIDE AIR DAMPER SHALL FULLY CLOSE.
- RETURN AIR DAMPER SHALL FULLY OPEN.
- HEATING WATER CONTROL VALVE SHALL REMAIN UNDER CONTROL OF ITS INPUT SENSOR.
- CHILLED WATER CONTROL VALVE SHALL FULLY CLOSE.
- SUPPLY FAN VFD SHALL BE DE-ENERGIZED.

UNOCCUPIED MODE:
 PROVIDE TIME OF DAY SCHEDULE TO ALLOW AHU TO ENTER UNOCCUPIED MODE PER SCHEDULE. COORDINATE SCHEDULE WITH OWNER.

- THE SUPPLY FANS SHALL CONTINUE RUNNING.
- THE OUTSIDE AIR DAMPER SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN.
- THE SPACE TEMPERATURE SHALL BE ALLOWED TO VARY +/- 10°F (ADJ.) FROM OCCUPIED SETPOINT.

HEATING OPTIMUM START-UP:
 THIS CYCLE SHALL OVERRIDE THE UNOCCUPIED CYCLE. IF THE SYSTEM WAS OPERATING AS A RESULT OF THE UNOCCUPIED CYCLE, THE SYSTEM SHALL CONTINUE TO OPERATE. THE DDC SYSTEM SHALL DETERMINE THE MINIMUM RUNTIME TO WARM THE SPACE TO ITS SETPOINT WHEN THE COMPUTED START TIME IS REACHED. THE AIR HANDLING UNIT DISCHARGE AIR TEMPERATURE SHALL BE MAINTAINED AT A SETPOINT OF 75°F (ADJ.). THE SYSTEM SHALL CONTINUE TO OPERATE IN THIS MODE UNTIL THE TEMPERATURE EXCEEDS A SETPOINT OF 68°F (ADJ.). AT THAT TIME, THE DDC SYSTEM SHALL SWITCH TO OCCUPIED CONTROL.

COOLING OPTIMUM START-UP:
 THIS CYCLE SHALL OVERRIDE THE UNOCCUPIED CYCLE. IF THE SYSTEM WAS OPERATING AS A RESULT OF THE UNOCCUPIED CYCLE, THE SYSTEM SHALL CONTINUE TO OPERATE. THE DDC SYSTEM SHALL DETERMINE THE MINIMUM RUNTIME TO COOL THE SPACE TO ITS SETPOINT. WHEN THE COMPUTED START TIME IS REACHED, THE AIR HANDLING UNIT DISCHARGE AIR TEMPERATURE SHALL BE MAINTAINED AT A SETPOINT OF 55°F (ADJ.). THE SYSTEM SHALL CONTINUE TO OPERATE IN THIS MODE UNTIL THE TEMPERATURE IS LESS THAN A SETPOINT OF 75°F (ADJ.). AT THAT TIME, THE DDC SYSTEM SHALL SWITCH TO OCCUPIED CONTROL.

GRAPHICAL DISPLAY:
 DISPLAY THE GLOBAL OUTSIDE AIR TEMPERATURE AND HUMIDITY ON AHU GRAPHIC PAGE.

AIR HANDLING UNIT - SINGLE ZONE VAV CHILLED AND HEATING WATER WITH DEMAND CONTROL VENTILATION AND AIRFLOW MEASURING

1 NO SCALE

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