

SEQUENCE OF OPERATION

CONSTANT VOLUME SUPPLY AIR HANDLING UNITS (AHU-1, AHU-2, AHU-3, AHU-4):

GENERAL:

THE SUPPLY AIR HANDLING (AHU) SYSTEM IS BASED UPON AN 100% OUTSIDE AIR SUPPLY AHU, WITH SUPPLY FAN(S), PRE- AND FINAL-FILTERS, HEAT RECOVERY COIL, HEATING AND COOLING COILS, SOUND ATTENUATOR AND VARIABLE FREQUENCY DRIVE.

THE SYSTEM IS DESIGNED TO PROVIDE A CONSTANT SUPPLY OF COOL AIR TO THE SPACES USING TERMINAL UNITS TO MAINTAIN SPACE TEMPERATURE.

ASSOCIATED EXHAUST AHU FANS (AHU-6 AND AHU-7) SHALL BE INTERLOCKED TO OPERATE WITH SUPPLY FAN RUNNING.

NORMAL MODE:

SUPPLY AIR TEMPERATURE SENSOR THROUGH DDC CONTROLLER SHALL MODULATE THE HEAT RECOVERY SYSTEM, HEATING COIL CONTROL VALVE, AND COOLING COIL CONTROL VALVE IN SEQUENCE TO MAINTAIN SUPPLY AIR TEMPERATURE (SAT) SET POINT.

HEATING MODE: THE HEAT RECOVERY VALVE SHALL BE MODULATED TO MAINTAIN THE SAT SET POINT. IF THE HEAT RECOVERY SYSTEM CANNOT MAINTAIN SET POINT, OR IN THE EVENT OF A FAILURE OF THE HEAT RECOVERY SYSTEM, THE HEATING COIL CONTROL VALVE SHALL BE MODULATED TO MAINTAIN THE SAT SET POINT.

COOLING MODE: THE COOLING COIL CONTROL VALVE SHALL BE MODULATED OPEN TO MAINTAIN THE SAT SET POINT.

DDC SYSTEM SHALL MONITOR ZONE TEMPERATURES AND RESET SUPPLY AIR TEMPERATURE SET POINT IN ACCORDANCE WITH WARMEST ZONE TEMPERATURE CONDITIONS AS FOLLOWS:
WARMEST ZONE SUPPLY AIR TEMPERATURE
75 DEG F 55 DEG F
70 DEG F 60 DEG F
SUPPLY AIR TEMPERATURE SET POINT SHALL BE LINEAR BETWEEN AND LIMITED TO SPECIFIED PARAMETERS.

SUPPLY FAN CONTROL: VARIABLE FREQUENCY DRIVE SHALL BE TIMED RAMPED TO OPERATING SET POINT ON START-UP. STATIC PRESSURE SENSOR (LOCATED IN THE DUCT AT THE AHU DISCHARGE) THROUGH DDC CONTROLLER SHALL MODULATE THE SUPPLY FAN VARIABLE FREQUENCY DRIVE TO MAINTAIN SUPPLY AIR STATIC PRESSURE SET POINT. INITIAL SET POINT SHALL BE 4.0 IN WC.

AHU-4: EACH OR AND PROCEDURE ROOM SHALL HAVE INDIVIDUAL ROOM PRESSURE SENSORS TO MONITOR THE PRESSURE RELATIONSHIP OF THE O.R. OR PROCEDURE ROOM, WITH THE ADJACENT CORRIDOR. MONITORING SHALL BE LOCAL AND THROUGH THE DDC SYSTEM.

AHU-4 UNOCCUPIED:

DURING UNOCCUPIED MODE SCHEDULED THROUGH THE DDC SYSTEM, SUPPLY AND EXHAUST TERMINAL UNITS SERVING O.R.S AND PROCEDURE ROOMS SHALL MODULATE TO MINIMUM POSITION. ROOMS SHALL CONTINUE TO HAVE POSITIVE PRESSURE RELATIONSHIP RELATIVE TO ADJACENT CORRIDORS. UNOCCUPIED OVER-RIDE BUTTON SHALL BE LOCATED AT THE SURGERY CONTROL/NURSE STATION. WHEN BUTTON IS ACTIVATED ALL O.R.S AND PROCEDURE ROOM TERMINAL UNITS SHALL RESET TO OCCUPIED MODE (MAXIMUM SET POINT ON SUPPLY AND EXHAUST TERMINALS).

SAFETIES:

SAFETY INTERLOCKS SHALL BE INDEPENDENT OF DDC SYSTEM EXCEPT FOR MONITORING:

FREEZE PROTECTION THERMOSTAT SHUTS DOWN AHU IF DISCHARGE AIR TEMPERATURE DROPS BELOW 35 DEG F.

SUPPLY AIR DIFFERENTIAL PRESSURE SWITCH SHUTS DOWN AIR HANDLING UNIT IF DISCHARGE AIR DIFFERENTIAL STATIC PRESSURE EXCEEDS 5 IN WC.

DUCT SMOKE DETECTORS THROUGH FIRE ALARM SYSTEM SHUTS DOWN AHU'S UPON FIRE ALARM CONDITIONS (BY DIVISION 16 CONTRACTOR).

EACH O.R. ROOM SERVED BY AHU-4 SHALL HAVE A SMOKE DETECTOR. DURING OCCUPIED MODE, UPON DETECTION OF SMOKE IN AN O.R., THE SUPPLY AIR TERMINAL UNIT SERVING THE O.R. SHALL MODULATE TO MINIMUM SET POINT AND THE EXHAUST TERMINAL UNIT WILL CONTINUE TO OPERATE AT MAXIMUM SET POINT, CAUSING THE O.R. TO HAVE NEGATIVE PRESSURE RELATIVE TO THE ADJACENT CORRIDOR AND OTHER SPACES.

CONSTANT VOLUME EXHAUST AIR HANDLING UNITS (AHU-6, AND AHU-7):

GENERAL:

EXHAUST AHU INCLUDE EXHAUST FAN(S), PRE-FILTER, HEAT RECOVERY COIL, AND VARIABLE FREQUENCY DRIVE. EXHAUST FAN STATIC PRESSURE CONTROL:

NORMAL MODE:

VARIABLE FREQUENCY DRIVE SHALL BE TIMED RAMPED TO OPERATING SET POINT ON START-UP. STATIC PRESSURE SENSOR (LOCATED IN THE DUCT AT THE EXHAUST FAN INTAKE) THROUGH DDC CONTROLLER SHALL MODULATE THE EXHAUST FAN VARIABLE FREQUENCY DRIVE TO MAINTAIN SPACE STATIC PRESSURE SET POINT. INITIAL SET POINT SHALL BE -2.0 IN WC.

HEATING MODE: THE HEAT RECOVERY PUMP SHALL BE STARTED.

SAFETIES:

SAFETY INTERLOCKS SHALL BE INDEPENDENT OF DDC SYSTEM EXCEPT FOR MONITORING:

EXHAUST AIR DIFFERENTIAL PRESSURE SWITCH SHUTS DOWN AIR HANDLING UNIT IF EXHAUST AIR DIFFERENTIAL STATIC PRESSURE DROPS BELOW -3 IN WC.

DUCT SMOKE DETECTORS THROUGH FIRE ALARM SYSTEM SHUTS DOWN UPON FIRE ALARM CONDITIONS (BY DIVISION 16 CONTRACTOR).

CONSTANT VOLUME TERMINAL UNITS (TU):

DDC CONTROLS SHALL MODULATE PRIMARY AIR CONTROL DAMPER TO MAINTAIN CONSTANT VOLUME AIR SUPPLY.

ON CALL FOR HEATING, THE HOT WATER HEATING CONTROL VALVE SHALL BE MODULATED OPEN TO MAINTAIN 72 DEG F (ADJUSTABLE) SPACE TEMPERATURE.

EXHAUST FANS:

EF-6, EF-9, EF-10, EF-11: FANS SHALL RUN CONTINUOUSLY. DDC SYSTEM SHALL BE ABLE TO START/STOP FANS.

EF-3, EF-4, EF-5: FANS SHALL BE STARTED MANUALLY THROUGH ASSOCIATED HOOD FAN SWITCH. ASSOCIATED TERMINAL UNITS SHALL BE POSITIONED TO HIGH CFM SET POINT WITH EXHAUST FAN RUNNING.

EF-7 AND EF-8: FOR CHILLER PLANT NORMAL OPERATION, EF-7 SHALL RUN CONTINUOUSLY. IF REFRIGERATION MONITORING SYSTEM DETECTS REFRIGERANT IN ROOM OR IF THE EMERGENCY PUSH BUTTONS ARE ACTIVATED, EF-8 SHALL BE STARTED.

DDC SYSTEM SHALL BE ABLE TO START/STOP FANS.

FAN COIL FCU-4:

SUPPLY FAN CONTROL: STATIC PRESSURE SENSOR (LOCATED IN THE DUCT AT THE FCU DISCHARGE AND DHC DISCHARGES) THROUGH DDC CONTROLLER SHALL MODULATE THE SUPPLY FAN VARIABLE FREQUENCY DRIVE TO MAINTAIN SUPPLY AIR STATIC PRESSURE SET POINT. INITIAL SET POINT SHALL BE 2.0 IN WC. SUPPLY AIR VOLUME TO PHARMACY ANTE, HAZARD MATL WORK, AND IV ADMIXTURE WORK SHALL BE CONSTANT VOLUME. SUPPLY FAN VARIABLE FREQUENCY DRIVE INTENDED TO MODULATE TO COMPENSATE FOR PRE-FILTER LOADING, AND ROOM DIFFUSER HEPA FILTER LOADING.

TERMINAL UNIT PROVIDING VENTILATION AIR TO FCU-4 SHALL BE CONSTANT VOLUME.

COOLING MODE: THE COOLING COIL CONTROL VALVE SHALL BE MODULATED OPEN TO MAINTAIN THE SAT SET POINT, INITIAL SET POINT SHALL BE 65 DEG F. ROOM TEMPERATURE SENSORS IN HAZARD MATL WORK, AND IV ADMIXTURE WORK SHALL CONTROL DISCHARGE SAT BASED ON THE SENSOR CALLING FOR THE GREATEST AMOUNT OF COOLING.

PROVIDE DDC ALARM SIGNAL UPON DETECTION OF MOISTURE IN SECONDARY DRAIN PAN.

DUCT HEATING COILS, DHC-1 AND DHC-2:

ON CALL FOR HEATING, THE HOT WATER HEATING CONTROL VALVE SHALL BE MODULATED OPEN TO MAINTAIN 72 DEG F (ADJUSTABLE) SPACE TEMPERATURE.

PHARMACY ANTE, HAZARD MATL WORK, AND IV ADMIXTURE WORK:

ROOM PRESSURE MONITORING: PROVIDE ROOM PRESSURE TRANSMITTERS AND MONITORS AS INDICATED. MONITOR ROOM PRESSURE RELATIONS THROUGH DDC SYSTEM. ALARMS SHALL BE CAPABLE OF BEING SILENCED THROUGH THE DDC SYSTEM AND LOCALLY.

HAZARD MATL WORK, AND IV ADMIXTURE WORK:

DDC SYSTEM SHALL MONITOR ROOM TEMPERATURE AND HUMIDITY FOR EACH ROOM. PROVIDE IN EACH ROOM, TEMPERATURE AND HUMIDITY READOUT PANEL FOR LOCAL USE.