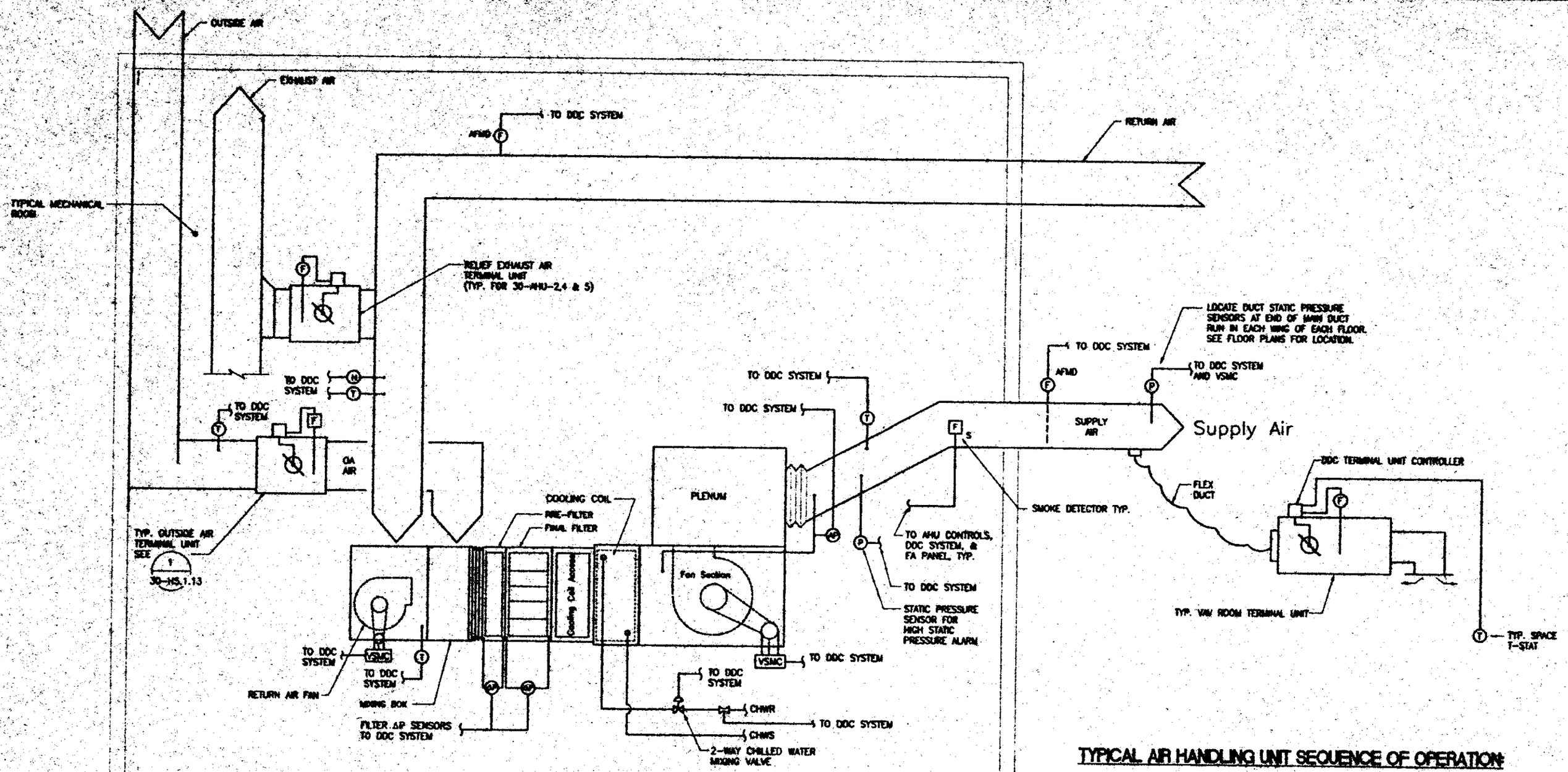
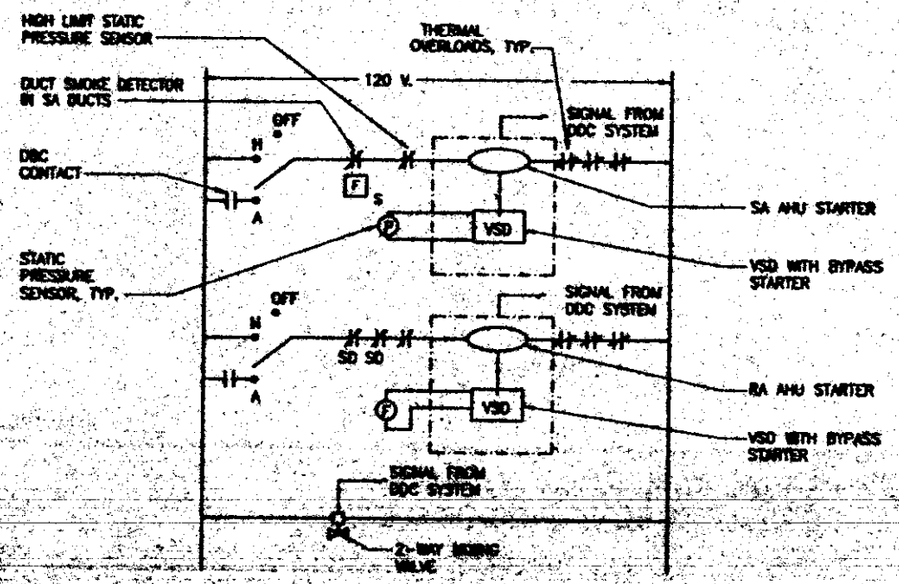



## 1 H9.4 TYPICAL VAV AIR HANDLING UNIT WITH RETURN FAN SCHEMATIC DIAGRAM

NOT TO SCALE

(TYPICAL FOR 30-AHU-2, 3, 4 & 5)




## 2 H9.4 TYPICAL AIR HANDLING UNIT CONTROL DIAGRAM

NOT TO SCALE

## TYPICAL AIR HANDLING UNIT SEQUENCE OF OPERATION

1. EACH AHU SUPPLY AND RETURN FAN SHALL BE TURNED ON AND OFF VIA THE DDC SYSTEM WHEN THE H-O-A SWITCH IS PLACED IN THE "AUTO" MODE. THE UNIT SHALL ALSO BE OPERATED MANUALLY WHEN THE H-O-A SWITCH IS PLACED IN THE "HAND" MODE. ALL AIR HANDLERS AND THEIR CORRESPONDING TERMINAL UNITS SHALL OPERATE ON THE TIME SCHEDULE PROGRAMMED INTO THE DDC SYSTEM.
2. THE AIR HANDLERS SHALL OPERATE CONTINUALLY 18 HOURS/DAY FROM 6:00 AM TO 10:00 PM.
3. AT START-UP FOR EACH AHU, THE DDC SYSTEM SHALL OPEN THE CHILLED WATER FLOW CONTROL VALVE TO ALLOW FLOW THROUGH THE AHU COOLING COIL. THE VSMC SHALL BE PROGRAMMED TO SOFT START THE AHU MOTOR AT START-UP TO PREVENT OVER-PRESSURIZATION OF THE DUCTWORK.
4. THE CHILLED WATER CONTROL VALVE SHALL MODULATE TO MAINTAIN THE ROOM SUPPLY AIR TEMPERATURE AT 55°F.
5. THE AIR DAMPER IN EACH ZONE TERMINAL UNIT SHALL MODULATE TO MAINTAIN THE ZONE SPACE TEMPERATURE AT SETPOINT. THE PRESSURE IN THE SUPPLY DUCT SHALL BE MEASURED BY THE STATIC PRESSURE SENSOR (SEE FLOOR PLANS FOR LOCATION) AND THE SIGNAL RELAYED TO THE VARIABLE FREQUENCY DRIVE PANEL. THE PANEL SHALL ADJUST THE FREQUENCY OF THE POWER SUPPLIED TO THE AHU SUPPLY FAN MOTOR TO INCREASE OR DECREASE ITS SPEED TO MAINTAIN THE DUCT STATIC PRESSURE AT 0.75" SP. THE REQUIRED SETPOINT SHALL BE ADJUSTED AFTER RECEIVING INPUT FROM THE BALANCING CONTRACTOR. THE DDC SYSTEM SHALL MODULATE THE RETURN AIR FAN TO MATCH THE AIR FLOW SUPPLIED BY THE SUPPLY FAN LESS THE OUTSIDE AIR.
6. THE SUPPLY AIR SETPOINT SIGNAL FROM THE DDC SYSTEM TO EACH AIR HANDLER SHALL BE RESET BASED ON EVALUATION OF THE FOLLOWING PARAMETERS: 1) THE DAMPER POSITION IN THE MOST OPEN DDC TERMINAL UNIT, 2) THE RETURN AIR HUMIDITY, AND 3) THE REHEAT STATUS OF EACH DDC VAV TERMINAL UNIT WITH REHEAT. IF ANY BOX IS IN ITS MAXIMUM OPEN POSITION, THE ROOM SUPPLY AIR SETPOINT SHALL BE 55°F. IF NONE OF THE BOXES ARE IN THEIR MAXIMUM OPEN POSITION, AND THERE IS A CALL FOR REHEAT AT ANY OF THE DDC VAV TERMINAL UNITS, THE DDC SYSTEM SHALL INCREASE THE SUPPLY AIR TEMPERATURE 1°F EVERY 30 MINUTES UP TO A MAXIMUM OF 60°F, AS LONG AS THE RETURN AIR HUMIDITY IS BELOW 55% UNTIL THE MOST OPEN BOX IS AT 95% FULL OPEN POSITION, AND THE ROOM SPACE TEMPERATURE IS STILL MAINTAINED AT SETPOINT. IF THE RETURN AIR HUMIDITY RISES ABOVE 55%, THE SUPPLY AIR SETPOINT SHALL BE RESET BACK DOWN 1°F EVERY 30 MINUTES UNTIL THE HUMIDITY IS KEPT UNDER CONTROL. THE SUPPLY AIR TEMPERATURE SHALL ALSO BE RESET DOWNWARDS 1°F EVERY 30 MINUTES IF THE TERMINAL UNITS ARE NOT ABLE TO MAINTAIN THE SPACE TEMPERATURE IN EACH ZONE AT SETPOINT WITH THE DAMPERS IN THEIR FULL OPEN POSITION.
7. A HIGH LIMIT STATIC PRESSURE SENSOR SHALL BE INSTALLED ON THE DISCHARGE DUCTWORK. THE HIGH LIMIT STATIC PRESSURE SENSOR SHALL SHUT DOWN THE UNIT & SOUND AN ALARM IF THE SENSOR MEASURES A STATIC PRESSURE OF 3" OR MORE.
8. THE DDC SYSTEM SHALL ALSO MONITOR AND ALARM THE FOLLOWING POINTS FOR EACH AIR HANDLING UNIT:
   - A. DUCT SMOKE DETECTOR ALARM
   - B. AIR HANDLER FAILURE ALARM
   - C. PRE FILTER HIGH DIFFERENTIAL PRESSURE ALARM
   - D. AFTER FILTER HIGH DIFFERENTIAL PRESSURE ALARM
   - E. SUPPLY AIR TEMPERATURE AND FLOW
   - F. RETURN AIR TEMPERATURE, HUMIDITY, AND FLOW, (RA FLOW SHALL BE BASED ON SA-OA=RA)
   - G. OUTSIDE AIR TEMPERATURE & FLOW, (OA FLOW SHALL BE ASSUMED TO BE THE DEFAULT VALUE)
   - H. MIXED AIR TEMPERATURE
   - I. CHILLED WATER SUPPLY AND RETURN TEMPERATURES
   - J. AIR HANDLER ON/OFF STATUS
   - K. HIGH STATIC PRESSURE
   - L. OPERATIONAL STATIC PRESSURE
   - M. SMOKE/FIRE DAMPERS
9. THE OUTSIDE AIR TERMINAL UNIT FOR EACH AIR HANDLER SHALL MODULATE ITS DAMPER POSITION TO MAINTAIN THE DESIGN OUTSIDE AIR FLOW TO THE AIR HANDLER INDEPENDENT OF THE PRESSURE CHANGES IN THE SYSTEM.
10. THE EXHAUST AIR TERMINAL UNIT FOR EACH AIR HANDLER SHALL MODULATE ITS DAMPER POSITION TO MAINTAIN THE DESIGN RELIEF EXHAUST AIR FLOW FROM THE RETURN AIR DUCT INDEPENDENT OF THE PRESSURE CHANGES IN THE SYSTEM.
11. UPON ACTIVATION OF THE DUCT SMOKE DETECTOR, THE AHU SHALL SHUT DOWN, THE SMOKE DAMPERS SHALL CLOSE, WHERE APPLICABLE AND A SIGNAL SHALL BE RELAYED TO THE FIRE ALARM SYSTEM.

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Drawing Title: TYPICAL AHU CONTROL DIAGRAM AND SEQUENCE OF OPERATION

Project No.: AMBULATORY CARE AND SURGERY BUILDING
Project: AMBULATORY CARE CLINIC

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