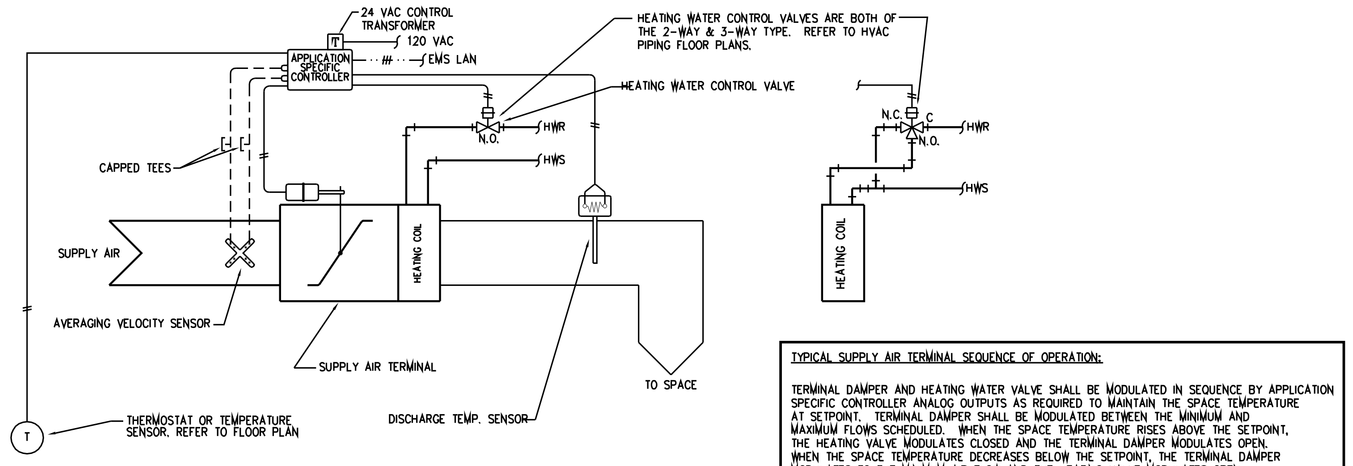
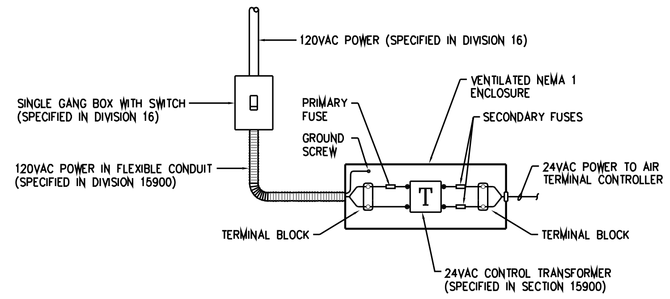


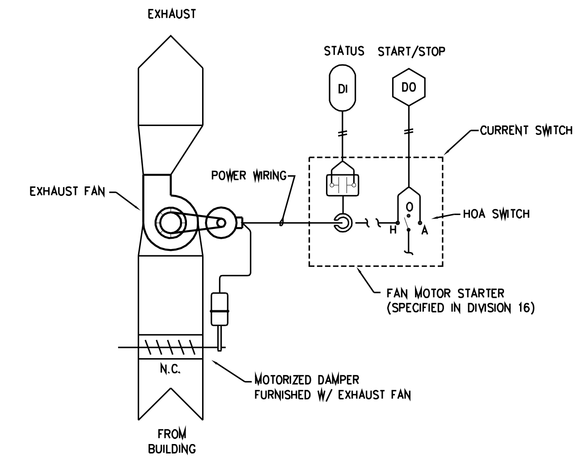
TYPICAL SUPPLY AIR TERMINAL SEQUENCE OF OPERATION:

TERMINAL DAMPER AND HEATING WATER VALVE SHALL BE MODULATED IN SEQUENCE BY APPLICATION SPECIFIC CONTROLLER ANALOG OUTPUTS AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE AT SETPOINT. TERMINAL DAMPER SHALL BE MODULATED BETWEEN THE MINIMUM AND MAXIMUM FLOWS SCHEDULED. WHEN THE SPACE TEMPERATURE RISES ABOVE THE SETPOINT, THE HEATING VALVE MODULATES CLOSED AND THE TERMINAL DAMPER MODULATES OPEN. WHEN THE SPACE TEMPERATURE DECREASES BELOW THE SETPOINT, THE TERMINAL DAMPER MODULATES TO THE MINIMUM AIR FLOW AND THE HEATING VALVE MODULATES OPEN.

1 TYPICAL SUPPLY AIR TERMINAL CONTROL DIAGRAM
N.T.S.



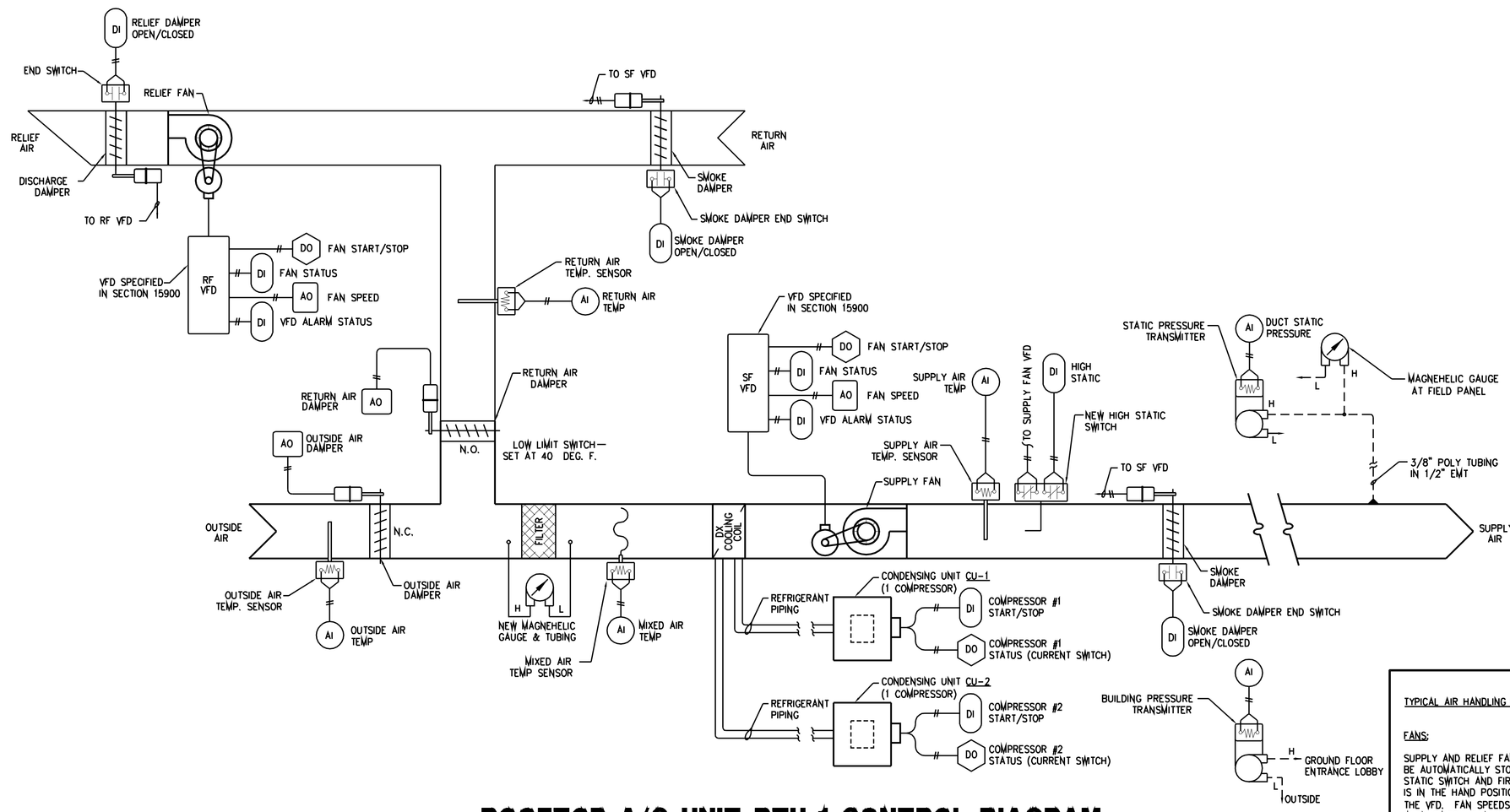
2 CONTROL TRANSFORMER DETAIL
N.T.S.



3 TYPICAL EXHAUST CONTROL DIAGRAM
N.T.S.

TYPICAL GENERAL EXHAUST FAN SEQUENCE OF OPERATION:

GENERAL EXHAUST FANS SHALL BE STARTED AND STOPPED BY SEPARATE DDC PANEL DIGITAL OUTPUTS. STATUS OF EXHAUST FANS SHALL BE MONITORED BY DDC PANEL.



4 ROOFTOP A/C UNIT RTU-1 CONTROL DIAGRAM
N.T.S.

TYPICAL AIR HANDLING UNIT SEQUENCE OF OPERATION.

FANS:

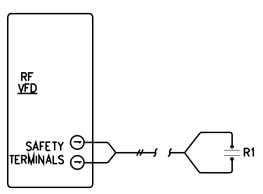
SUPPLY AND RELIEF FANS SHALL BE STARTED AND STOPPED BY VFD HOA SWITCH. FANS SHALL BE AUTOMATICALLY STOPPED THROUGH THE VFD SAFETY INTERLOCK CONTACTS BY THE HIGH STATIC SWITCH AND FIRE ALARM PANEL IN THE EVENT OF AN UNSAFE CONDITION. WHEN SWITCH IS IN THE HAND POSITION, FANS SHALL BE STARTED AND STOPPED BY PUSHBUTTONS LOCATED AT THE VFD. FAN SPEEDS SHALL BE CONTROLLED BY A MANUAL POTENTIOMETER AT THE VFD'S. WHEN SWITCH IS IN THE AUTOMATIC POSITION, FANS SHALL BE STARTED AND STOPPED BY DDC PANEL DIGITAL OUTPUT BASED UPON AIR TERMINAL WEEKLY SCHEDULES (FANS SHALL BE OPERATED IN THE EVENT THAT ANY AIR TERMINAL SERVED IS IN THE OCCUPIED MODE) OR OPERATOR COMMAND. IN THE EVENT THAT THE SPACE TEMPERATURE IN ANY AREA SERVED FALLS BELOW 50 DEG. F, THE FANS SHALL BE STARTED AND OPERATED UNTIL ALL SPACE TEMPERATURES EXCEED 55 DEG. F. SUPPLY FAN SPEED SHALL BE CONTROLLED BY ANALOG OUTPUT AS REQUIRED TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE AT ITS SETPOINT OF 1" W.G. THE SPEED OF THE SUPPLY FAN SHALL BE LIMITED TO 10% OF ITS CAPACITY UNTIL THE SMOKE DAMPER END SWITCHES HAVE PROVEN THAT THE SMOKE DAMPERS ARE OPEN.

RETURN AND OUTSIDE AIR DAMPER SHALL BE OPENED BY DDC PANEL ANALOG OUTPUTS TO A MINIMUM POSITION (ADJUSTABLE) ON FAN START-UP. RETURN AIR DAMPER SHALL NORMALLY BE FULLY OPEN. IN THE EVENT THAT THE OUTSIDE AIR TEMPERATURE FALLS BELOW 55 DEG. F (ADJUSTABLE), THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL BE MODULATED BY DDC PANEL ANALOG OUTPUTS AS REQUIRED TO MAINTAIN THE MIXED AIR TEMPERATURE AT ITS SETPOINT OF 55 DEG F (ADJUSTABLE). OUTSIDE AIR DAMPER SHALL BE FULLY OPENED PRIOR TO THE CLOSING OF THE RETURN AIR DAMPER. OUTSIDE AIR DAMPER AND RELIEF AIR DAMPER SHALL BE FULLY CLOSED ON FAN SHUTDOWN. WHEN THE OUTSIDE AIR TEMPERATURE FALLS BELOW 60 DEG F (ADJUSTABLE), THE RELIEF FAN SHALL BE STARTED. THE RELIEF FAN SPEED SHALL BE CONTROLLED BY DDC PANEL ANALOG OUTPUT AS REQUIRED TO MAINTAIN THE BUILDING PRESSURE SETPOINT OF 0.05" STATIC PRESSURE. THE RELIEF FAN DISCHARGE DAMPER SHALL BE OPENED THROUGH THE VFD INTERLOCKS. RELIEF AIR DISCHARGE DAMPER SHALL BE FULLY OPEN BEFORE RELIEF FAN STARTS. THE SPEED OF THE RELIEF FAN SHALL BE LIMITED TO 10% UNTIL THE RELIEF AIR DISCHARGE DAMPER END SWITCH HAS PROVEN THAT THE DAMPER IS OPEN.

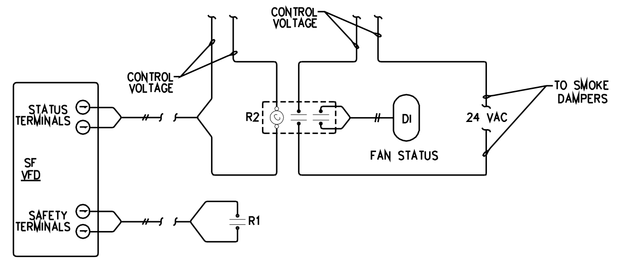
CU-1 - (COMPRESSOR #1), AND CU-2 (COMPRESSOR #2):

COMPRESSORS #1 AND #2 SHALL BE STARTED AND STOPPED AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT OF 55 DEG. F (ADJUSTABLE). COMPRESSORS SHALL BE SEQUENCED IN A LEAD-LAG ARRANGEMENT. ON A DEMAND FOR COOLING, ONE COMPRESSOR SHALL BE STARTED AND SHALL OPERATE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. IN THE EVENT THAT THE LEAD COMPRESSOR CANNOT MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT, THE SECOND COMPRESSOR SHALL BE STARTED AND SHALL OPERATE ALONG WITH THE LEAD COMPRESSOR TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. WHEN THE DEMAND FOR INCREASED COOLING CAPACITY HAS DIMINISHED, THE LAG (SECOND COMPRESSOR) SHALL BE SHUT DOWN AND THE LEAD COMPRESSOR SHALL CONTINUE TO OPERATE IN ORDER TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT SETPOINT. THE LEAD AND LAG ARRANGEMENT OF THE COMPRESSORS SHALL BE ALTERNATED MONTHLY TO INSURE EQUAL WEAR ON THE EQUIPMENT. COMPRESSORS SHALL NOT BE STARTED MORE THAN ONCE IN A 60 MINUTE PERIOD. COMPRESSORS SHALL BE STOPPED ON FAN SHUTDOWN.

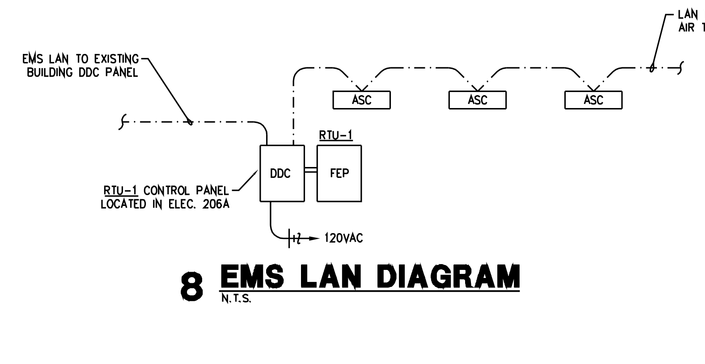
5 RTU-1 SAFETY INTERLOCK WIRING DIAGRAM
N.T.S.



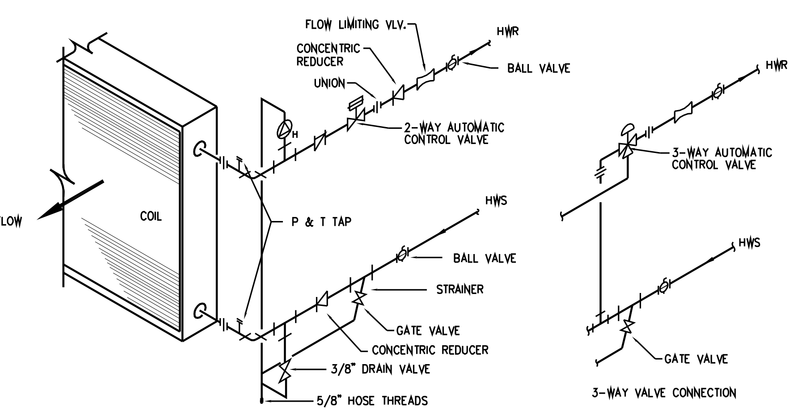
6 RTU-1 RETURN FAN VFD WIRING DIAGRAM
N.T.S.



7 RTU-1 SUPPLY FAN VFD WIRING DIAGRAM
N.T.S.



8 EMS LAN DIAGRAM
N.T.S.



NOTE:
USE 2-WAY CONTROL VALVES UNLESS SPECIFICALLY INDICATED TO USE A 3-WAY CONTROL AT CERTAIN VAV TERMINALS, AS INDICATED ON THE PLANS.

9 HEATING WATER COIL CONNECTION DETAIL
N.T.S.

CONTROLS LEGEND

AI	ANALOG INPUT TO DDC PANEL
DI	DIGITAL INPUT TO DDC PANEL
DO	DIGITAL OUTPUT FROM DDC PANEL
AO	ANALOG OUTPUT FROM DDC PANEL
-------	24VAC
-·-·-	EMS TRUNK CABLING
—·—·—	EMS LAN CABLING
	ELECTRONIC ACTUATOR

REVISIONS	DATE

DEPARTMENT OF VETERANS AFFAIRS — UNITED STATES OF AMERICA

TAGGART FOSTER·CURRENCE·GRAY ARCHITECTS

APPROVED: MEDICAL CENTER DIRECTOR	APPROVED: FACILITY PLANNER	APPROVED: SERVICE CHIEF
APPROVED: ASSOCIATE DIRECTOR	APPROVED: CHIEF ENGINEER	APPROVED: SERVICE CHIEF
APPROVED: ASSISTANT DIRECTOR	APPROVED: SERVICE CHIEF	APPROVED: SERVICE CHIEF

DRAWING TITLE: HVAC CONTROLS AND DETAILS

PROJECT TITLE: VETERAN'S ADMINISTRATION OUTPATIENT CARE FACILITY SECOND FLOOR ADDITION

BUILDING NUMBER: 1 | CHECKED: ERA | DRAWN: JPD

LOCATION: FAYETTEVILLE, AR

DATE: 30 JUNE 1999

PROJECT NUMBER: 82998

DRAWING NO.: H1.4

Dwg 35 of 43

Office of Facilities

DEPARTMENT OF VETERANS AFFAIRS