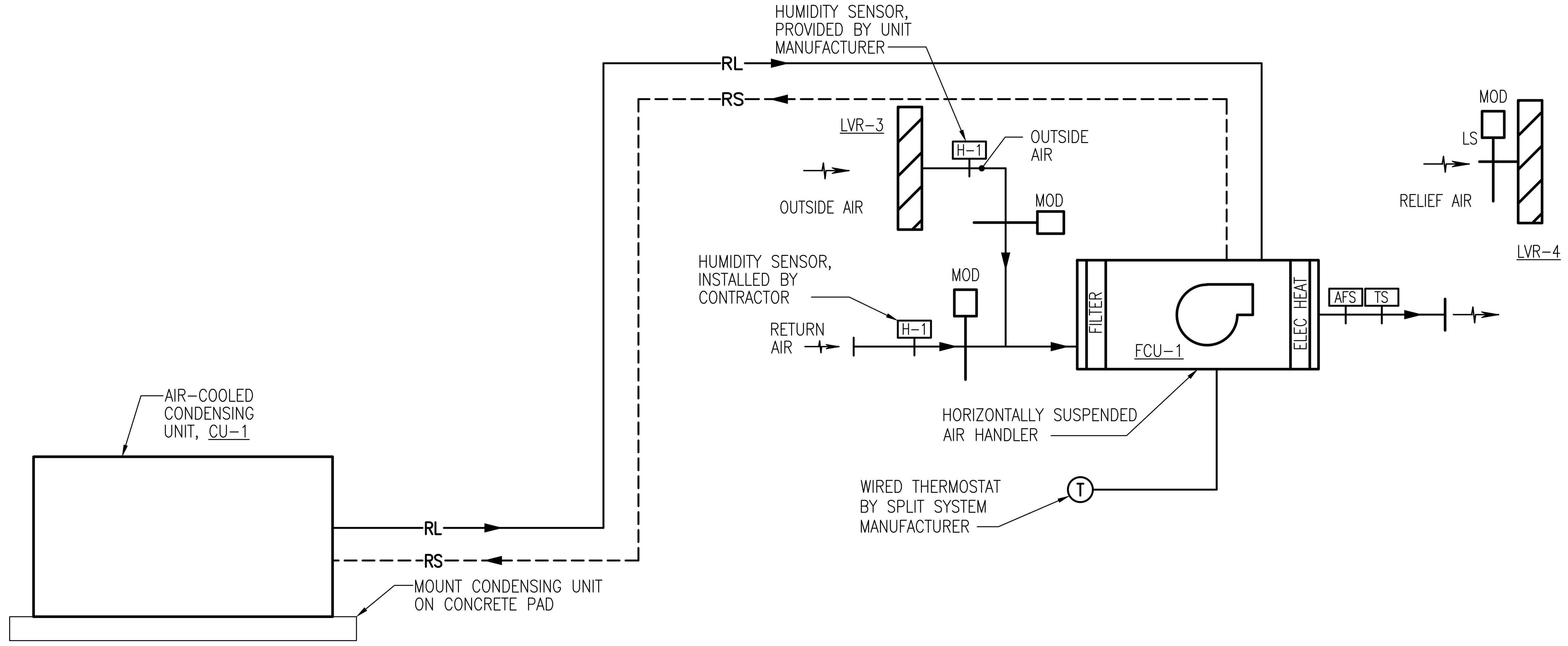


1 HV5.01 EQUIPMENT ROOM SPLIT SYSTEM CONTROLS SCHEMATIC

NOT TO SCALE

CONTROL SEQUENCE – SPLIT SYSTEM (FCU-1/CU-1)

GENERAL:

1. SPLIT SYSTEM SHALL OPERATE CONTINUOUSLY UNDER PACKAGED CONTROLS TO MAINTAIN SPACE TEMPERATURE. THE UNIT SHALL OPERATE 24/7.
2. INITIAL SPACE TEMPERATURE SETPOINTS:

   COOLING: 75°F (ADJUSTABLE).
   HEATING: 55°F (ADJUSTABLE).

3. STAGE COMPRESSORS AND CONDENSER FANS UNDER PACKAGED UNIT CONTROLS AS REQUIRED TO MAINTAIN SPACE TEMPERATURE SETPOINT FOR REGULAR OPERATION.

ECONOMIZER OPERATION

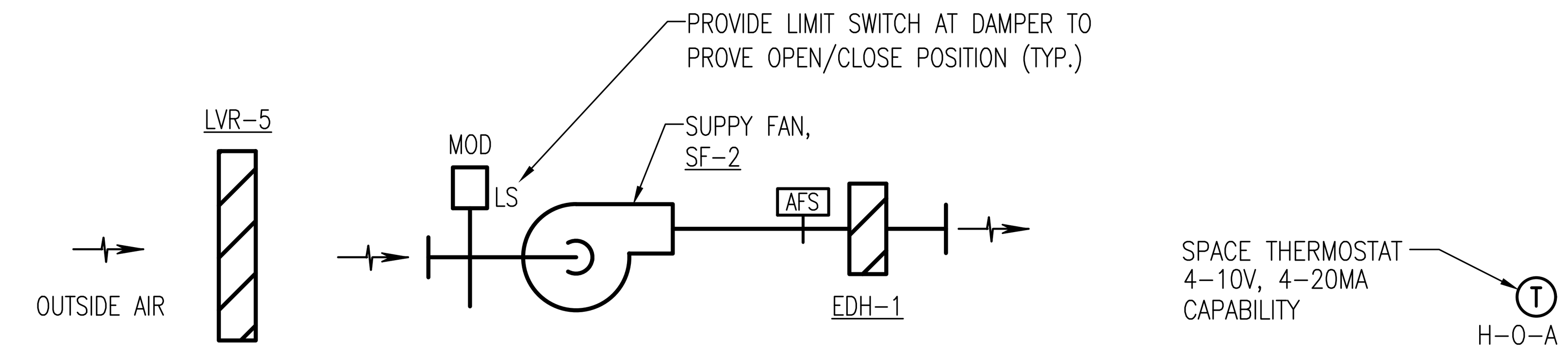
1. WHEN THE RA ENTHALPY (CALCULATED FROM THE RA HUMIDITY AND TEMPERATURE SENSORS) IS GREATER THAN THE OA ENTHALPY (CALCULATED FROM THE OA HUMIDITY AND TEMPERATURE SENSORS) FOR 15 MINUTES AS MEASURED BY THEIR RESPECTIVE ENTHALPY SENSORS, THE UNIT MUST UTILIZE ENTHALPY ECONOMIZER LOGIC TO MODULATE OUTSIDE AIR MOTORIZED DAMPER OPEN AND RETURN AIR MOTORIZED DAMPER CLOSED TO MAINTAIN SPACE TEMPERATURE. ECONOMIZER LAT SHALL BE LIMITED TO 55 DEG F.
2. ECONOMIZER CONTROLS MUST OVERRIDE OUTSIDE AIR DAMPER CONTROLS.
3. RELIEF AIR MOTORIZED DAMPER MUST MODULATE OPEN WHEN UNIT IS IN ECONOMIZER OPERATION.
4. WHEN OUTSIDE AIR MOTORIZED DAMPER IS FULLY OPEN AND SPACE AIR TEMPERATURE INCREASES ABOVE SUPPLY AIR SETPOINT BY 2 DEG F, MECHANICAL COOLING MUST BE ENERGIZED TO MODULATE COMPRESSORS TO MAINTAIN SUPPLY AIR SETPOINT.

WHEN OUTSIDE AIR ENTHALPY IS GREATER THAN THE RETURN AIR ENTHALPY, OUTSIDE AIR MOTORIZED DAMPER MUST MODULATE TO ITS MINIMUM POSITION AS RETURN AIR DAMPER MODULATE OPEN, AND STAGE COMPRESSORS TO MAINTAIN SETPOINT.

WHEN OUTSIDE AIR MOTORIZED DAMPER IS AT MINIMUM POSITION AND SPACE AIR TEMPERATURE FALLS BELOW SETPOINT BY 2 DEG F, ENERGIZE HEATING CYCLE.

FETY:

SYSTEM SHALL BE SHUT DOWN THROUGH HARD-WIRED CONNECTION TO EMERGENCY HVAC SHUTOFF SWITCH. ON SHUTDOWN, SYSTEM MUST BE MANUALLY RESET.



2 HV5.01 MINIMUM VENTILATION SUPPLY FAN (SF-2) CONTROLS SCHEMATIC

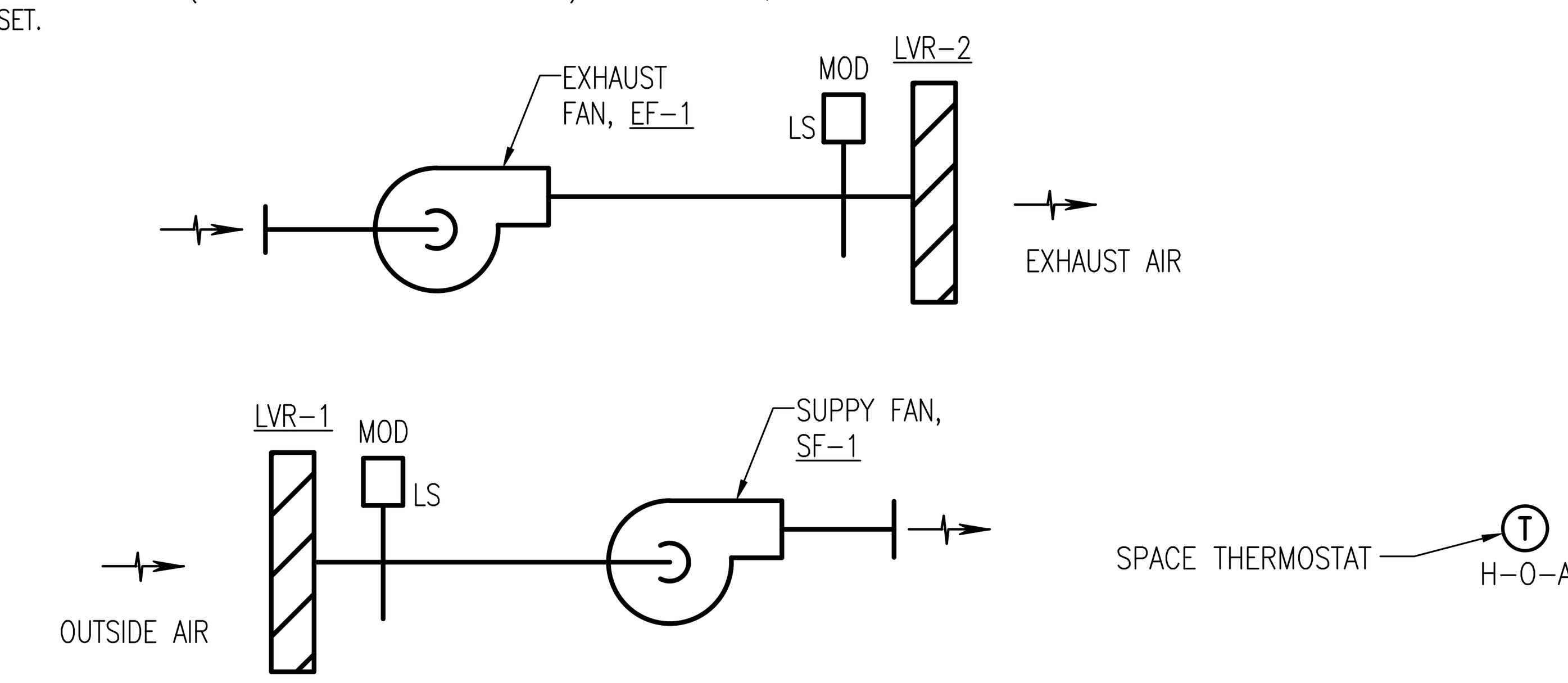
NOT TO SCALE

SUPPLY FAN (SF-2) SEQUENCE OF OPERATIONS

1. WHEN SF-1 AND EF-1 ARE NOT IN OPERATION, MOTORIZED DAMPER WILL OPEN AND SF-2 WILL RUN CONTINUOUSLY. SF-2 WILL OPERATE 24/7.
2. WHEN SPACE TEMPERATURE FALLS BELOW 50 F AND SF-2 IS IN OPERATION, ELECTRIC DUCT HEATER (EDH-1) SHALL ENERGIZE AFTER AFS PROVES AIRFLOW.
3. WHEN SPACE TEMPERATURE EXCEEDS 83 F, MOTORIZED DAMPER SHALL CLOSE AND SF-2 SHALL DE-ENERGIZE.

SAFETY:

1. SYSTEM SHALL BE SHUT DOWN BY EMERGENCY HVAC SHUTOFF SWITCH THROUGH CONNECTION AT VENTILATION CONTROL PANEL (SEE INSTRUMENTATION DRAWINGS). ON SHUTDOWN, SYSTEM MUST BE MANUALLY RESET.



3 HV5.01 EXHAUST FAN (EF-1) AND SUPPLY FAN (SF-1) CONTROLS SCHEMATIC

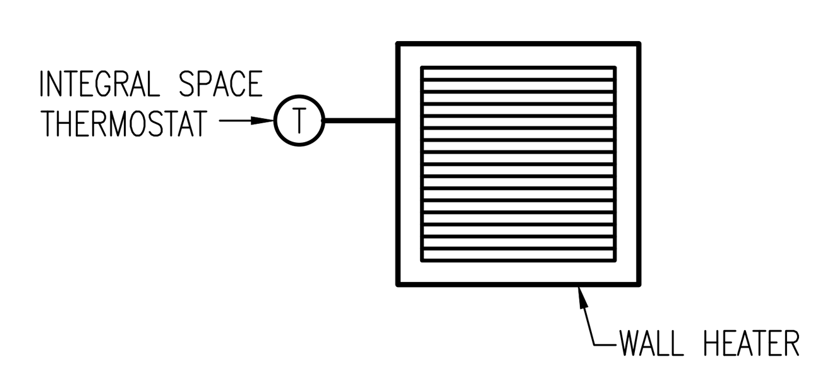
NOT TO SCALE

EXHAUST FAN (EF-1) AND SUPPLY FAN (SF-1) SEQUENCE OF OPERATIONS
(SEE INSTRUMENTATION DRAWINGS FOR ADDITIONAL INFORMATION)

1. EXHAUST FAN SHALL BE INTERLOCKED WITH SUPPLY FAN.
2. WHEN SPACE TEMPERATURE EXCEEDS 83 F (ADJ) OPEN OUTSIDE AIR DAMPER AND EXHAUST AIR DAMPER. ENERGIZE SUPPLY FAN (SF-1) AND EXHAUST FAN (EF-1) AND RUN CONTINUOUSLY AT LOW SPEED.
3. WHEN SPACE TEMPERATURE CONTINUES TO RISE TO ABOVE 87 F (ADJ), EF-1 AND SF-1 WILL INDEX TO HIGH SPEED.
4. DE-ENERGIZE SF-1 AND EF-1 AND CLOSE OUTSIDE AIR AND EXHAUST DAMPERS WHEN SPACE TEMPERATURE FALLS BELOW 80 F (ADJ)

SAFETY:

1. SYSTEM SHALL BE SHUT DOWN BY EMERGENCY HVAC SHUTOFF SWITCH THROUGH CONNECTION AT VENTILATION CONTROL PANEL (SEE INSTRUMENTATION DRAWINGS). ON SHUTDOWN, SYSTEM MUST BE MANUALLY RESET.



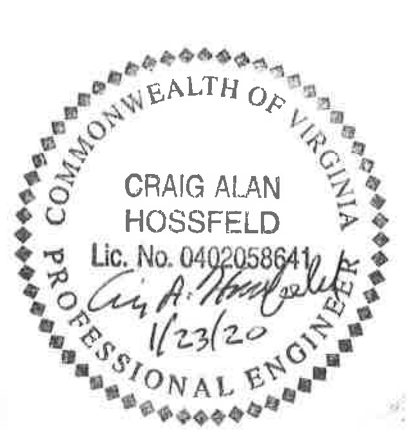
4 HV5.01 ELECTRIC UNIT HEATER CONTROLS SCHEMATIC

NOT TO SCALE

ELECTRIC UNIT HEATER – SEQUENCE OF OPERATION

GENERAL:

1. WHEN INTEGRAL SPACE THERMOSTAT SENSES A TEMPERATURE BELOW THE HEATING SETPOINT (50°F, ADJUSTABLE), THE UNIT HEATER SHALL ENERGIZE TO MAINTAIN SETPOINT. WHEN THE SPACE THERMOSTAT IS SATISFIED THE HEATER SHALL CYCLE OFF.



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WESTERN VIRGINIA WATER AUTHORITY 601 South Jefferson Street, Suite 300 Roanoke, Virginia 24011	DES: NAE DRAWN: NAE CHECK: CAH DATE: 1/24/20	SCALE: NOT TO SCALE HORIZ: N/A VERT: N/A	CRYSTAL SPRING PUMP STATION RELOCATION	HVAC CONTROL DIAGRAMS	DRAWING HV5.01	SHEET 48

REV	DATE	DESCRIPTION