

ENERGY RECOVERY UNIT SEQUENCE OF CONTROLS

UNIT SHALL PROVIDE CONSTANT DISCHARGE AIR CONDITIONS OF 72°F DB/50%RH (A.U.). UNIT SHALL MODULATE COOLING, HEATING, REHEAT AND ENERGY RECOVERY WHEEL TO MAINTAIN DISCHARGE AIR CONDITIONS.

RUN CONDITIONS – CONTINUOUS;
THE UNIT SHALL RUN CONTINUOUSLY.

EMERGENCY SHUTDOWN:

THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING AN EMERGENCY SHUTDOWN SIGNAL.

HEAT RECOVERY WHEEL – CONSTANT SPEED;
THE CONTROLLER SHALL RUN THE HEAT WHEEL FOR ENERGY RECOVERY AS FOLLOWS.

THE CONTROLLER SHALL MEASURE THE HEAT WHEEL DISCHARGE AIR TEMPERATURE AND RUN THE HEAT WHEEL TO MAINTAIN A SETPOINT 2°F (A.U.) LESS THAN THE UNIT SUPPLY AIR TEMPERATURE SETPOINT. THE HEAT WHEEL SHALL RUN FOR COOL RECOVERY WHENEVER:

- THE UNIT RETURN AIR TEMPERATURE IS 5°F (A.U.) OR MORE BELOW THE OUTSIDE AIR TEMPERATURE.
- AND THE UNIT IS IN A COOLING MODE.
- AND THE SUPPLY FAN IS ON.

HEATING RECOVERY MODE:

THE CONTROLLER SHALL MEASURE THE HEAT WHEEL DISCHARGE AIR TEMPERATURE AND RUN THE WHEEL TO MAINTAIN A SETPOINT 2°F (A.U.) GREATER THAN THE UNIT SUPPLY AIR TEMPERATURE SETPOINT. THE HEAT WHEEL SHALL RUN FOR HEAT RECOVERY WHENEVER:

UNIT RETURN AIR TEMPERATURE IS 5°F (A.U.) OR MORE ABOVE THE OUTSIDE AIR TEMPERATURE.

AND THE UNIT IS IN A HEATING MODE.

PERIODIC SELF-CLEANING:

THE HEAT WHEEL SHALL RUN FOR 10SEC (A.U.) EVERY 4HRS (A.U.) THE UNIT RUNS.

THE BYPASS DAMPERS WILL OPEN WHENEVER THE HEAT WHEEL IS DISABLED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HEAT WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS OFF.
- HEAT WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- HEAT WHEEL RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (A.U.).

SUPPLY FAN:

THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (A.U.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (A.U.).

EXHAUST FAN:

THE EXHAUST FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- EXHAUST FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (A.U.).

COOLING COIL:

THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE CONDENSING UNIT FAN AND COMPRESSOR TO MAINTAIN ITS COOLING SETPOINT.

- THE COOLING COIL AND HEATING COIL SHALL BE ENABLED AND THE STAGES MODULATED FOR DEHUMIDIFICATION AND TO MAINTAIN DISCHARGE AIR SET POINT.
- AND THE FAN STATUS IS ON.

HEATING COIL:

THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE SCR ELECTRIC HEATING COIL TO MAINTAIN ITS HEATING SETPOINT.

- THE HEATING COIL SHALL BE ENABLED WHENEVER:
- THE SUPPLY AIR TEMPERATURE IS BELOW HEATING SETPOINT.
- AND THE FAN STATUS IS ON.

RETURN AIR HUMIDITY:

THE CONTROLLER SHALL MONITOR THE SPACE RETURN AIR HUMIDITY. WHEN THE RETURN AIR HUMIDITY EXCEEDS 55% THE COOLING COIL AND HEATING COIL SHALL BE ENABLED AND THE STAGES MODULATED FOR DEHUMIDIFICATION AND TO MAINTAIN DISCHARGE AIR SET POINT.

PREFILTER DIFFERENTIAL PRESSURE MONITOR:

THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE PREFILTER.

- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (A.U.).

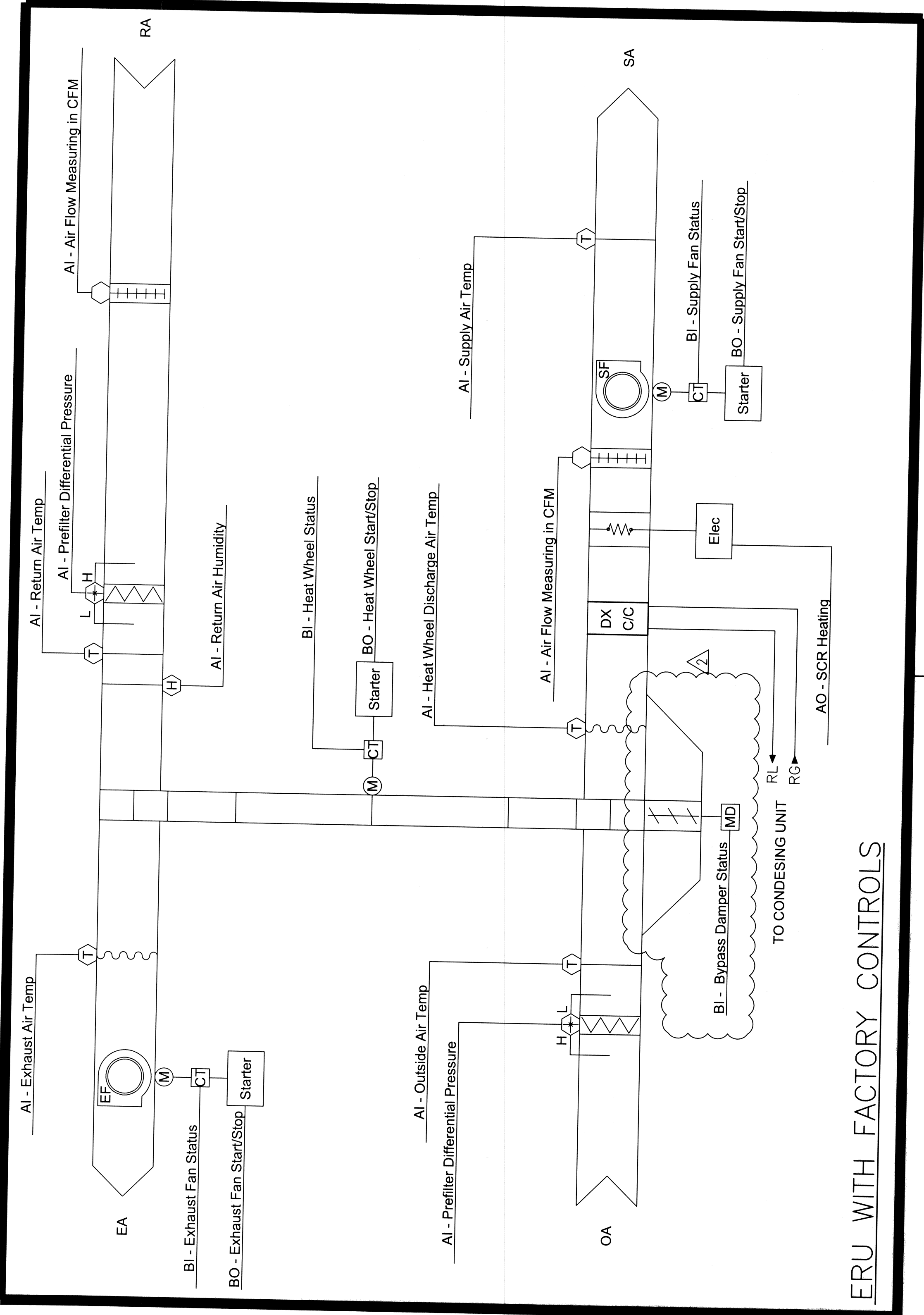
SUPPLY AIR TEMPERATURE:

THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (A.U.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (A.U.).

ENERGY RECOVERY UNIT CONTROL POINTS LIST

Point Name	Hardware Points					Software Points			
	AI	AO	BI	BO	AV	BV	Sched	Trend	Alarm
Outside Air Temp	X							X	
Outside Air Humidity	X							X	
Exhaust Air Temp	X							X	X
Heat Wheel Discharge Air Temp	X							X	X
Return Air Temp	X							X	X
Prefilter Differential Pressure	X							X	
Supply Air Temp	X							X	
Exhaust air Filter Pressure	X							X	
Return Air duct mounted Humidistat	X							X	
Heat Wheel Status			X					X	X
Supply Fan Status			X					X	X
Exhaust Fan Status			X					X	X
Heat Wheel Start/Stop			X					X	X
Supply Fan Start/Stop			X					X	X
Exhaust Fan Start/Stop			X					X	X
Supply Air Temp Setpoint				X				X	X
Emergency Shutdown					X			X	X
Prefilter Change Required						X		X	X
OA FLOW (CFM)		X						X	X
EA EXHAUST AIR FLOW (CFM)		X						X	X
Bypass Damper Status			X					X	X

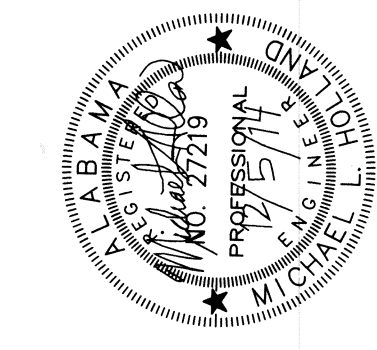


ERU WITH FACTORY CONTROLS

ENERGY RECOVERY UNIT CONTROL SCHEMATIC DIAGRAM

NO SCALE

PROVIDE INTERFACE MODULE FROM ERU TO BAS. ERU MANUFACTURER SHALL PROVIDE ALL THE MINIMUM POINTS AS INDICATED ON THE ERU CONTROL POINTS LIST. WHERE ERU MANUFACTURER DOES NOT PROVIDE THE MINIMUM POINTS FROM THE LIST, THE CONTROLS MANUFACTURER SHALL PROVIDE THE REMAINING POINTS. THE CONTROLS POINTS SHALL HAVE A MINIMUM NUMBER OF EXPECTED POINTS TO BE READABLE AND CONTROLLABLE FROM THE BAS.



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Drawing Title HVAC CONTROLS	Project Title 20 BED COTTAGE	Date 12 28 2014	Veterans Administration	
		Project No. 679-311		
Approved: Chief, Engineer <i>William H. Smith</i>	Building Number 149	Checked FLY	Drawn MLH	DRAWING NO. 149-M-901
	Location VAMC - TUSCALOOSA, ALABAMA	FILE NAME 2014-029-MECHANICAL		