

ENERGY RECOVERY VENTILATOR (ERV-2-1)

RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN IN THE FOLLOWING MODES:

- OCCUPIED MODE: UPON STARTUP, THE UNIT SHALL RUN CONSTANTLY IN OCCUPIED MODE. THE UNIT SHALL PROVIDE MINIMUM REQUIRED OUTDOOR AIR TO AIR HANDLING UNITS AND SHALL CONTINUOUSLY EXHAUST REQUIRED AIRFLOWS FROM THE BUILDING AS INDICATED IN THE SCHEDULES.
- UNOCCUPIED MODE: THE UNIT MAY BE SHUT DOWN DURING NIGHT SET-BACK AND ANYTIME THE BUILDING WILL BE UNOCCUPIED FOR LONG PERIODS OF TIME.

EMERGENCY SHUTDOWN:

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

FREEZE PROTECTION:

THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A FREEZESTAT STATUS.

SUPPLY FAN:

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

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 (ADJ.).

EXHAUST FAN:

THE EXHAUST FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS OR WHENEVER THE BUILDING IS OCCUPIED.

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 (ADJ.).

ENTHALPY WHEEL - MODULATING:

THE CONTROLLER SHALL RUN THE ENTHALPY WHEEL FOR ENERGY RECOVERY AS FOLLOWS:

COOLING MODE:

WHEEL SHALL MODULATE TO OBTAIN THE LOWEST LEAVING AIR TEMPERATURE POSSIBLE. THE ENTHALPY WHEEL SHALL RUN FOR FULL COOL RECOVERY (HOT HUMID DAYS) WHENEVER:

- THE OUTSIDE AIR ENTHALPY IS GREATER THAN THE RETURN AIR ENTHALPY.
- AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT.
- AND THE SUPPLY FAN IS ON.

THE ENTHALPY WHEEL SHALL RUN FOR PARTIAL COOL RECOVERY (HOT DRY DAYS) WHENEVER:

- THE OUTSIDE AIR HUMIDITY RATIO IS LESS THAN THE RETURN AIR HUMIDITY RATIO
- AND THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE RETURN AIR TEMPERATURE
- AND THE UNIT DISCHARGE AIR DRY BULB DOES NOT DROP BELOW THE ENTHALPY WHEEL SUPPLY AIR DEWPOINT
- AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT
- AND THE SUPPLY FAN IS ON.

HEATING MODE:

THE WHEEL SHALL MODULATE TO MAINTAIN THE HIGHEST LEAVING AIR TEMP POSSIBLE. THE ENTHALPY WHEEL SHALL RUN FOR FULL HEAT RECOVERY WHENEVER:

- OUTSIDE AIR ENTHALPY IS LESS THAN RETURN AIR ENTHALPY
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE
- AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.
- AND THE SUPPLY FAN IS ON.

PERIODIC SELF-CLEANING:

THE ENTHALPY WHEEL SHALL RUN FOR 10SEC (ADJ.) EVERY 4HR (ADJ.) THE UNIT RUNS.

FROST PROTECTION:

THE ENTHALPY WHEEL SHALL RUN FOR 10SEC (ADJ.) EVERY 600SEC (ADJ.) WHENEVER:

- OUTSIDE AIR TEMPERATURE DROPS TO WITHIN 2°F (ADJ.) OF THE ENTHALPY WHEEL SUPPLY AIR DEWPOINT WHEN OUTSIDE AIR TEMPERATURE IS BELOW 35°F (ADJ.).
- OR THE EXHAUST AIR TEMPERATURE DROPS BELOW 25°F (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- ENTHALPY WHEEL ROTATION FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- ENTHALPY WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- ENTHALPY WHEEL RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

ELECTRIC HEATING WITH SCR:

THE CONTROLLER SHALL MEASURE THE ENTHALPY WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE HEATING TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 70°F (ADJ.). ELECTRIC HEATING SHALL RUN WHENEVER:

- ENERGY RECOVERY IS IN HEATING MODE.
- AND ENTHALPY WHEEL DISCHARGE AIR TEMP IS LESS THAN 65°F (ADJ.).
- AND BOTH SUPPLY AND EXHAUST FANS ARE ON.

OUTSIDE AIR AND RETURN AIR DAMPERS:

THE OUTSIDE AIR DAMPER SHALL OPEN TO PROVIDE MINIMUM OUTSIDE AIR VENTILATION ANYTIME THE FANS ARE RUNNING. THE RETURN AIR DAMPER SHALL OPEN TO EXHAUST REQUIRED AIRFLOW FROM THE BUILDING. BOTH DAMPERS SHALL CLOSE ANYTIME THE FANS STOP.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- OUTSIDE AIR DAMPER FAILURE: COMMANDED OPEN, BUT THE STATUS IS CLOSED.
- OUTSIDE AIR DAMPER IN HAND: COMMANDED CLOSED, BUT THE STATUS IS OPEN.
- RETURN AIR DAMPER FAILURE: COMMANDED OPEN, BUT THE STATUS IS CLOSED.
- RETURN AIR DAMPER IN HAND: COMMANDED CLOSED, BUT THE STATUS IS OPEN

RETURN AIR PREFILTER DIFFERENTIAL PRESSURE MONITOR:

THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE RETURN AIR PREFILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- RETURN AIR PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

OUTSIDE AIR (OA) PREFILTER DIFFERENTIAL PRESSURE MONITOR:

THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE OUTSIDE AIR PREFILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- OA PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

RETURN AIR TEMPERATURE:

THE CONTROLLER SHALL MONITOR THE RETURN AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

SUPPLY AIR TEMPERATURE:

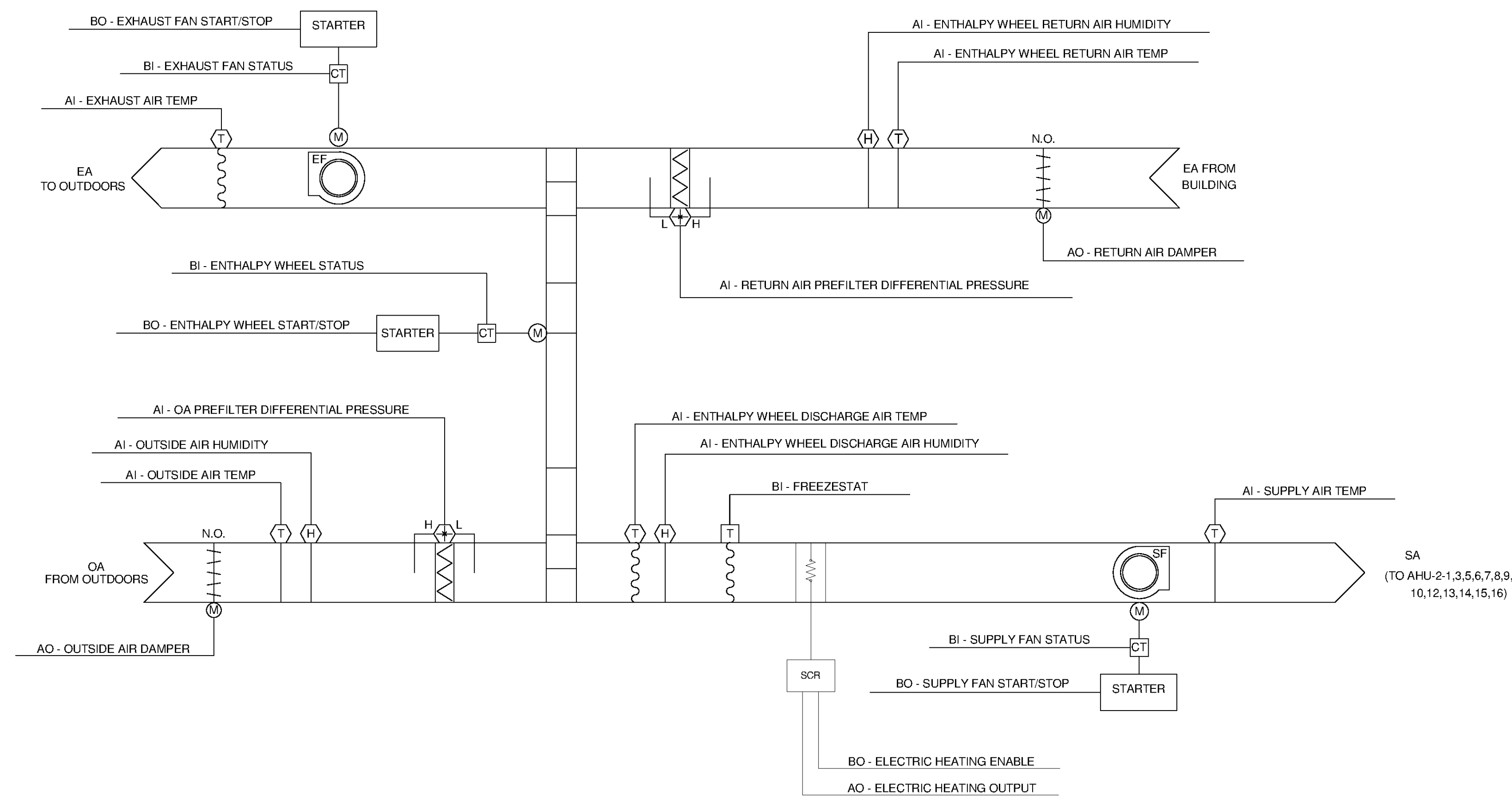
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

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POINT NAME	HARDWARE POINTS						SOFTWARE POINTS				SHOW ON GRAPHIC
	AI	AO	BI	BO	AV	BV	SCHED	TREND	ALARM		
OUTSIDE AIR TEMP	X							X		X	
OUTSIDE AIR HUMIDITY	X							X		X	
ENTHALPY WHEEL RETURN AIR TEMP	X							X		X	
ENTHALPY WHEEL RETURN AIR HUMIDITY	X							X		X	
ENTHALPY WHEEL DISCHARGE AIR TEMP	X							X		X	
ENTHALPY WHEEL DISCHARGE AIR HUMIDITY	X							X		X	
EXHAUST AIR TEMP	X							X		X	
RETURN AIR PREFILTER DIFFERENTIAL PRESSURE	X							X			
OA PREFILTER DIFFERENTIAL PRESSURE	X							X			
SUPPLY AIR TEMP	X							X		X	
ELECTRIC HEATING OUTPUT		X						X		X	
OUTSIDE AIR DAMPER		X								X	
RETURN AIR DAMPER		X								X	
FREEZESTAT			X					X	X	X	
SUPPLY FAN STATUS			X					X		X	
EXHAUST FAN STATUS			X					X		X	
ENTHALPY WHEEL STATUS				X				X		X	
SUPPLY FAN START/STOP					X			X		X	
EXHAUST FAN START/STOP					X			X		X	
ENTHALPY WHEEL START/STOP					X			X		X	
ELECTRIC HEATING ENABLE					X			X		X	
OUTSIDE AIR ENTHALPY					X			X		X	
OUTSIDE AIR DEWPOINT					X			X		X	
ENTHALPY WHEEL RETURN AIR ENTHALPY					X			X		X	
ENTHALPY WHEEL RETURN AIR DEWPOINT					X			X		X	
ENTHALPY WHEEL DISCHARGE AIR ENTHALPY					X			X		X	
ENTHALPY WHEEL DISCHARGE AIR DEWPOINT					X			X		X	
EMERGENCY SHUTDOWN							X		X	X	
SCHEDULE							X				
SUPPLY FAN FAILURE									X		
SUPPLY FAN IN HAND									X		
SUPPLY FAN RUNTIME EXCEEDED									X		
EXHAUST FAN FAILURE									X		
EXHAUST FAN IN HAND									X		
EXHAUST FAN RUNTIME EXCEEDED									X		
ENTHALPY WHEEL ROTATION FAILURE									X		
ENTHALPY WHEEL IN HAND									X		
ENTHALPY WHEEL RUNTIME EXCEEDED									X		
OUTSIDE AIR DAMPER FAILURE									X		
OUTSIDE AIR DAMPER IN HAND									X		
RETURN AIR DAMPER FAILURE									X		
RETURN AIR DAMPER IN HAND									X		
RETURN AIR PREFILTER CHANGE REQUIRED									X	X	
OA PREFILTER CHANGE REQUIRED									X	X	
HIGH RETURN AIR TEMP									X		
LOW RETURN AIR TEMP									X		
HIGH SUPPLY AIR TEMP									X		
LOW SUPPLY AIR TEMP									X		
TOTALS	10	3	4	4	6	1	1	25	21	28	
TOTAL HARDWARE (21)							TOTAL SOFTWARE (54)				



1 ENERGY RECOVERY VENTILATOR (ERV-2-1)
M-9903 N.T.S.

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BID SET

ALABAMA PROFESSIONAL ENGINEER
No. 6553
DONALD S. BOKER
12/24/2014

BY	
DESCRIPTION	
DATE	
MARK	

HUNTSVILLE UTILITIES
SOUTHEAST WATER TREATMENT PLANT
MECHANICAL HVAC CONTROLS

Project No.: 200-11740-10003
Designed By: SBR
Drawn By: SBR
Checked By: DSB

M-9903
Bar Measures 1 Inch

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