

AIR SOURCE HEAT PUMP - SPECIFIC SYSTEMS

APPLICABLE UNITS:

- AHU-4-1
- AHU-4-2
- AHU-4-3 (FUTURE)
- AHU-4-4 (FUTURE)

RUN CONDITIONS:

THE UNIT SHALL RUN CONTINUOUSLY DURING OCCUPIED MODE AND SHALL MAINTAIN:

- A 74°F (ADJ.) COOLING SETPOINT
- A 70°F (ADJ.) HEATING SETPOINT.
- UNIT SHALL RUN ONLY TO MAINTAIN SETPOINTS DURING UNOCCUPIED HOURS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).
- LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

SMOKE DETECTION:

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

FAN:

THE FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.

HEATING AND COOLING - 2 COMPRESSOR STAGES:

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE COMPRESSORS TO MAINTAIN ITS SETPOINT. TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME. THE COMPRESSOR SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.

THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 60°F (ADJ.).
- AND ZONE TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE FAN STATUS IS ON.
- AND THE REVERSING VALVE IS IN HEAT MODE.

THE COOLING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS GREATER THAN 45°F (ADJ.).
- AND ZONE TEMPERATURE IS GREATER THAN 76°F (ADJ.).
- AND THE FAN STATUS IS ON.
- AND THE REVERSING VALVE IS IN COOL MODE.

ON MODE CHANGE, THE COMPRESSOR SHALL BE DISABLED AND REMAIN OFF UNTIL AFTER THE REVERSING VALVE HAS CHANGED POSITION.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- COMPRESSOR 1 RUNTIME EXCEEDED: COMPRESSOR 1 RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).
- COMPRESSOR 2 RUNTIME EXCEEDED: COMPRESSOR 2 RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE MIXED AIR DAMPERS IN SEQUENCE TO MAINTAIN THE ZONE COOLING SETPOINT. THE OUTSIDE AIR DAMPER SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION TO OBTAIN MINIMUM OUTDOOR AIR FLOWS AS INDICATED IN THE EQUIPMENT SCHEDULES.

ECONOMIZER:

THE ECONOMIZER SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS AT LEAST 3°F (ADJ.) LESS THAN THE ZONE TEMPERATURE.
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN 60°F (ADJ.)

THE OUTSIDE AIR DAMPER SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF.

MINIMUM OUTSIDE AIR VENTILATION - FIXED PERCENTAGE:

THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM POSITION (ADJ.) DURING BUILDING OCCUPIED HOURS AND BE CLOSED DURING UNOCCUPIED HOURS.

SUPPLEMENTAL ELECTRIC HEATING STAGES:

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE HEATING TO MAINTAIN ITS HEATING SETPOINT SHOULD THE COMPRESSORS NOT MEET THE HEATING DEMAND. TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE HEATING SHALL BE ENABLED WHENEVER:

- THE HEAT PUMP IS IN HEATING MODE.
- AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.
- AND THE FAN IS ON.

FILTER DIFFERENTIAL PRESSURE MONITOR:

THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

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

DISCHARGE AIR TEMPERATURE:

THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS LESS THAN 40°F (ADJ.).

FAN STATUS:

THE CONTROLLER SHALL MONITOR THE FAN STATUS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

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

ZONE HUMIDITY:

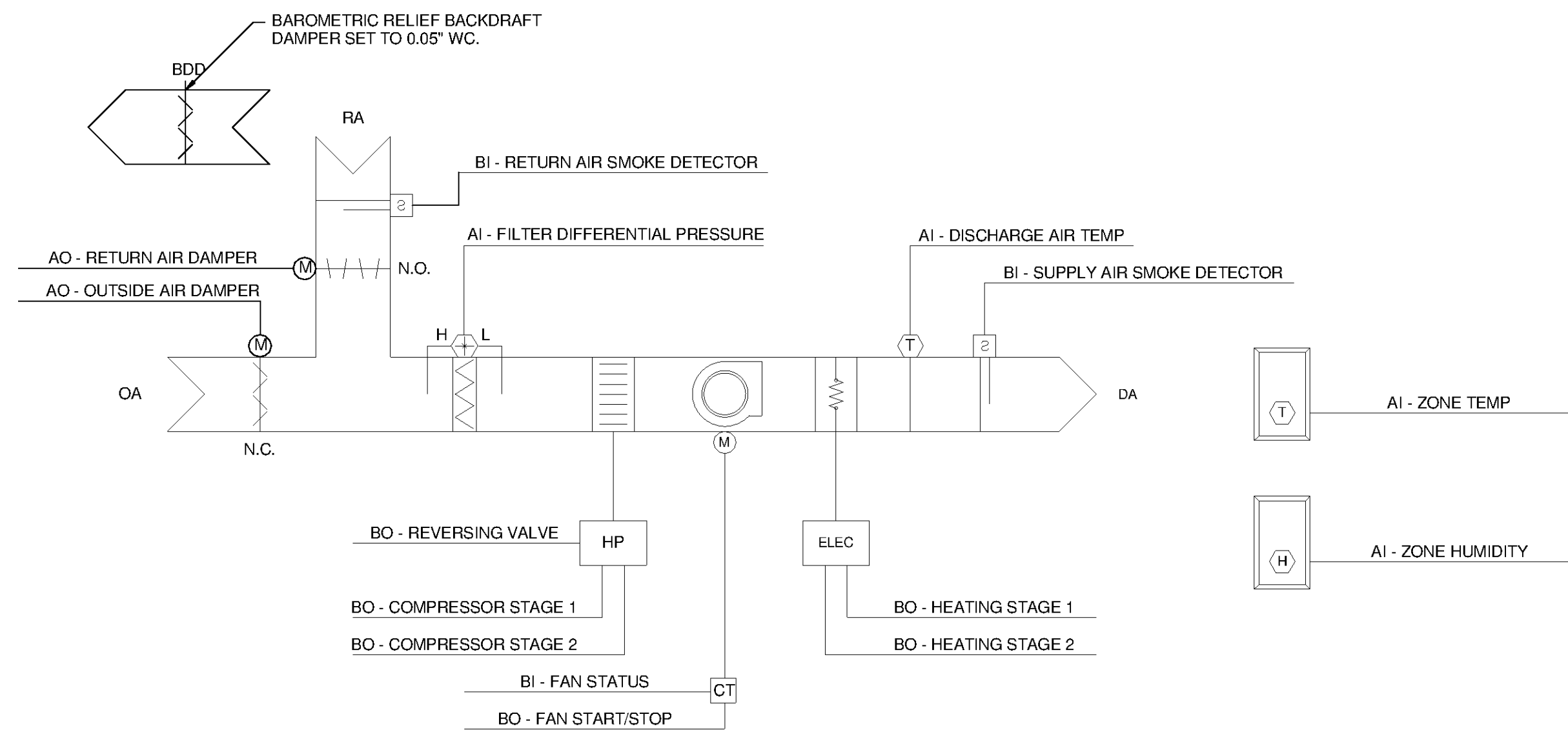
THE CONTROLLER SHALL MONITOR THE ZONE HUMIDITY.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH ZONE HUMIDITY: IF THE ZONE HUMIDITY IS GREATER THAN 70% (ADJ.).
- LOW ZONE HUMIDITY: IF THE ZONE HUMIDITY IS LESS THAN 35% (ADJ.).

AIR SOURCE HEAT PUMP - SPECIFIC SYSTEMS

POINT NAME	HARDWARE POINTS				SOFTWARE POINTS				SHOW ON GRAPHIC	
	AI	AO	BI	BO	AV	BV	SCHED	TREND		ALARM
ZONE TEMP	X							X		X
FILTER DIFFERENTIAL PRESSURE	X							X		X
DISCHARGE TEMP	X							X		X
ZONE HUMIDITY	X							X		X
RETURN AIR DAMPERS		X						X		X
OUTSIDE AIR DAMPERS		X						X		X
SUPPLY AIR SMOKE DETECTOR			X					X	X	X
RETURN AIR SMOKE DETECTOR			X					X	X	X
FAN STATUS			X					X		X
FAN START/STOP				X				X		X
REVERSING VALVE				X				X		X
COMPRESSOR STAGE 1				X				X		X
COMPRESSOR STAGE 2				X				X		X
HEATING STAGE 1				X				X		X
HEATING STAGE 2				X				X		X
SCHEDULE							X			
HEATING SETPOINT								X		X
COOLING SETPOINT								X		X
HIGH ZONE TEMP									X	
LOW ZONE TEMP									X	
COMPRESSOR 1 RUNTIME EXCEEDED									X	
COMPRESSOR 2 RUNTIME EXCEEDED									X	
FILTER CHANGE REQUIRED									X	
HIGH DISCHARGE AIR TEMP									X	
LOW DISCHARGE AIR TEMP									X	
FAN FAILURE									X	
FAN IN HAND									X	
FAN RUNTIME EXCEEDED									X	
HIGH ZONE HUMIDITY									X	
LOW ZONE HUMIDITY									X	
TOTALS	4	2	3	6	0	0	1	17	14	17
TOTAL HARDWARE (15)					TOTAL SOFTWARE (32)					

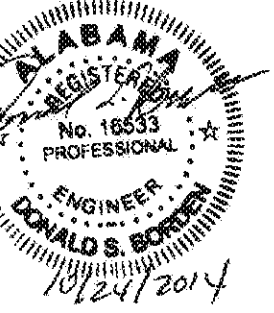


1 AIR SOURCE HEAT PUMP - SPECIFIC SYSTEMS
M-9904 N.T.S.

TETRA TECH



BID SET



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-9904

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Bar Measures 1 Inch