

MAKEUP AIR UNIT AND CANOPY HOOD EXHAUST

**RUN CONDITIONS - INTERLOCKED:**

THE CANOPY HOOD EXHAUST (EF-2-11 AND EF-2-12) SHALL EACH RUN WHEN ACTIVATED BY THEIR ASSOCIATED MANUAL SWITCH.

THE MAKE UP AIR UNITS (MAU-2-1 AND MAU-2-2) SHALL BE INTERLOCKED AS FOLLOWS TO RUN WHENEVER THE CANOPY HOOD EXHAUST FANS RUN UNLESS SHUTDOWN ON SAFETIES. MAU-2-1 SHALL BE INTERLOCKED WITH EF-2-11. MAU-2-2 SHALL BE INTERLOCKED WITH EF-2-12.

**FREEZE PROTECTION:**

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

**SMOKE DETECTION:**

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

**OUTSIDE AIR DAMPER:**

THE OUTSIDE AIR DAMPER SHALL OPEN ANYTIME THE MAKE UP AIR UNIT RUNS AND SHALL CLOSE ANYTIME THE UNIT STOPS. THE SUPPLY FAN SHALL START ONLY AFTER THE DAMPER STATUS HAS PROVEN THE DAMPER IS OPEN. THE OUTSIDE AIR DAMPER SHALL CLOSE 4SEC (ADJ.) AFTER THE SUPPLY FAN STOPS.

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.

**SUPPLY FAN:**

THE SUPPLY FAN SHALL RUN ANYTIME THE EXHAUST FAN RUNS, 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 (ADJ.).

**EXHAUST FAN:**

THE EXHAUST FAN SHALL RUN WHENEVER THE FAN IS COMMANDED TO RUN BY THE MANUAL SWITCH.

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.).

**COIL LEAVING AIR TEMPERATURE SETPOINT - FIXED:**

THE CONTROLLER SHALL MONITOR THE COIL LEAVING AIR TEMPERATURE FROM THE MAKE UP AIR UNIT HEAT PUMP COIL AND SHALL MAINTAIN A FIXED COIL LEAVING AIR TEMPERATURE SETPOINT OF 56°F (ADJ.) IN COOLING MODE AND 70°F IN HEATING MODE.

**SUPPLY AIR TEMPERATURE SETPOINT - FIXED:**

THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE FROM THE MAKE UP AIR UNIT AND SHALL MAINTAIN A FIXED SUPPLY AIR TEMPERATURE SETPOINT OF 75°F (ADJ.) IN COOLING MODE AND 70°F IN HEATING MODE.

**HEATING AND COOLING - 2 COMPRESSOR STAGES:**

THE CONTROLLER SHALL MONITOR THE OUTDOOR AIR TEMPERATURE AND STAGE THE COMPRESSORS TO MAINTAIN ITS COIL LEAVING AIR TEMPERATURE 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 55°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 55°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.).

NOTE THAT MAU-2-2 WILL OPERATE ON A SINGLE COMPRESSOR CIRCUIT.

**ELECTRIC HEATING WITH SCR:**

THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING TO MAINTAIN ITS HEATING SETPOINT WHEN THE HEAT PUMP IS UNABLE TO MAINTAIN THE HEATING SETPOINT ALONE.

THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 70°F (ADJ.).
- AND THE SUPPLY AIR TEMPERATURE IS BELOW HEATING SETPOINT.
- AND THE FAN STATUS IS ON.

**HOT GAS REHEAT COIL:**

THE CONTROLLER SHALL MONITOR THE COIL LEAVING AIR TEMPERATURE DURING COOLING MODE AND PROVIDE HOT GAS REHEAT TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT DURING COOLING MODE.

**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 (ADJ.).

**COIL LEAVING AIR TEMPERATURE:**

THE CONTROLLER SHALL MONITOR THE COIL LEAVING AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH COIL LEAVING AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 75°F (ADJ.).
- LOW COIL LEAVING AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 48°F (ADJ.).

**SUPPLY AIR TEMPERATURE:**

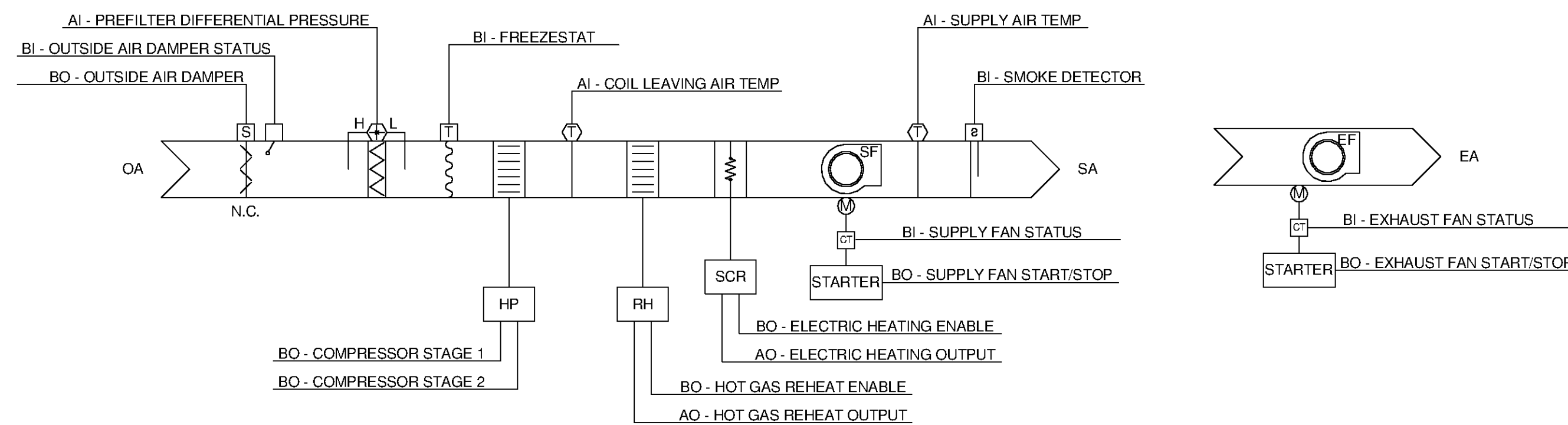
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 80°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).

**MAKE UP AIR UNIT AND CANOPY HOOD EXHAUST**

POINT NAME	HARDWARE POINTS				SOFTWARE POINTS					SHOW ON GRAPHIC
	AI	AO	BI	BO	AV	BV	SCHED	TREND	ALARM	
PREFILTER DIFFERENTIAL PRESSURE	X							X		
COIL LEAVING AIR TEMP	X							X		X
SUPPLY AIR TEMP	X							X		X
HOT GAS REHEAT OUTPUT		X						X		X
ELECTRIC HEATING OUTPUT		X						X		X
FREEZESTAT								X	X	X
SMOKE DETECTOR				X				X	X	X
OUTSIDE AIR DAMPER STATUS				X				X		X
SUPPLY FAN STATUS				X				X		X
EXHAUST FAN STATUS				X				X		X
OUTSIDE AIR DAMPER					X			X		X
SUPPLY FAN START/STOP					X			X		X
EXHAUST FAN START/STOP					X			X		X
COMPRESSOR STAGE 1					X			X		X
COMPRESSOR STAGE 2					X			X		X
HOT GAS REHEAT ENABLE					X			X		X
ELECTRIC HEATING ENABLE				X				X		X
COIL LEAVING AIR TEMP SETPOINT					X			X		X
SUPPLY AIR TEMP SETPOINT					X			X		X
OUTSIDE AIR DAMPER FAILURE									X	
OUTSIDE AIR DAMPER IN HAND									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	
COMPRESSOR RUNTIME EXCEEDED									X	
PREFILTER CHANGE REQUIRED									X	X
HIGH COIL LEAVING AIR TEMP									X	
LOW COIL LEAVING AIR TEMP									X	
HIGH SUPPLY AIR TEMP									X	
LOW SUPPLY AIR TEMP									X	
<b>TOTALS</b>	<b>3</b>	<b>2</b>	<b>5</b>	<b>7</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>19</b>	<b>16</b>	<b>19</b>
	<b>TOTAL HARDWARE (17)</b>				<b>TOTAL SOFTWARE (37)</b>					



**1 MAKE UP AIR UNIT AND CANOPY HOOD EXHAUST**  
M-9911 N.T.S.

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BID SET



BY	DATE	MARK	DESCRIPTION

HUNTSVILLE UTILITIES  
SOUTHEAST WATER TREATMENT PLANT  
**MECHANICAL HVAC  
CONTROLS**

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

**M-9911**

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Bar Measures 1 Inch