

SEQUENCE OF OPERATION:

FAN COIL UNIT TEMPERATURE CONTROL:
 PROVIDE SINGLE LOOP CONTROL TO MAINTAIN SPACE TEMPERATURE SET POINT. THE SINGLE LOOP SHALL BE REFERRED TO AS THE "SPACE TEMPERATURE CONTROL LOOP." IT SHALL GENERATE A 0 TO 100 OUTPUT THAT IS USED TO CONTROL THE FOLLOWING STAGES FROM A MAXIMUM HEATING CONDITION TO A MAXIMUM COOLING CONDITION. THE LOOP SHALL START IN A NEUTRAL POSITION WHEN ENABLED.

STAGE 1: HEATING WATER VALVE IS FULLY OPEN, THE FAN SPEED IS STEPPED DOWN FROM MAXIMUM SPEED TO MINIMUM SPEED, AND THE CHILLED WATER VALVE IS CLOSED.
 STAGE 2: HEATING WATER VALVE IS MODULATED FROM FULLY OPEN TO CLOSED, THE FAN IS AT MINIMUM SPEED, AND THE CHILLED WATER VALVE IS CLOSED.
 STAGE 3: THE HEATING WATER VALVE IS CLOSED, THE FAN IS OFF, AND THE CHILLED WATER VALVE IS CLOSED. THE FAN SHALL HAVE AN OVERRIDE AT THE THERMOSTAT TO ALLOW THE FAN TO RUN CONTINUOUSLY AT MINIMUM SPEED INSTEAD OF SHUTTING OFF AT STAGE 3.
 STAGE 4: THE HEATING WATER VALVE IS CLOSED, THE FAN IS ON AT MINIMUM SPEED, AND THE CHILLED WATER VALVE IS ENABLED TO MAINTAIN A UNIT DISCHARGE TEMPERATURE SET POINT (56F, ADJ).
 STAGE 5: THE HEATING WATER VALVE IS CLOSED, THE FAN IS STEPPED FROM MINIMUM SPEED UP TO MAXIMUM SPEED, AND THE CHILLED WATER VALVE IS ENABLED TO MAINTAIN A UNIT DISCHARGE TEMPERATURE SET POINT (56F, ADJ).
 STAGE 6: THE FAN IS AT MAXIMUM SPEED, THE CHILLED WATER VALVE IS ENABLED TO MAINTAIN A UNIT DISCHARGE TEMPERATURE SET POINT (56F, ADJ), AND THE HW VALVE POSITION IS, FROM HUMIDITY CONTROL, MODULATED BACK DOWN TO 0 IN AN OVERRIDE MANNER.

HUMIDITY CONTROL:
 THE HEATING VALVE SHALL BE MODULATED FROM CLOSED TO A MAXIMUM HUMIDITY CONTROL POSITION SET POINT (30% ADJ), VIA A HUMIDITY OVERRIDE CONTROL LOOP AS REQUIRED TO MAINTAIN THE SPACE HUMIDITY SET POINT (55% ADJ). HUMIDITY CONTROL SEQUENCE SHALL BE DISABLED IF THE HEATING WATER SYSTEM IS NOT OPERATIONAL FOR ANY REASON.

HIGH SAT OVERRIDE:
 THE HEATING VALVE POSITION SHALL BE LIMITED SO THAT THE DISCHARGE TEMPERATURE DOES NOT EXCEED 20 DEG. F ABOVE THE SPACE TEMPERATURE.

SET POINT:
 THE SPACE TEMPERATURE SET POINT SHALL BE SET AT THE THERMOSTAT, OR BY THE BAS, BETWEEN SPACE SET POINT MAXIMUM (74F) AND SPACE SET POINT MINIMUM (68F) VALUES, WITH A DEAD BAND OF 1 DEG. F (ADJ) DURING OCCUPIED PERIODS AND 5 DEG. F DURING UNOCCUPIED PERIODS. THE RANGE SHALL BE LIMITED DURING THE HEATING RANGE TO PREVENT THE SPACE TEMPERATURE SET POINT FROM EXCEEDING A HEATING HIGH LIMIT SET POINT (72F), AND SHALL BE LIMITED DURING THE COOLING RANGE TO PREVENT THE SPACE TEMPERATURE SET POINT FROM EXCEEDING THE COOLING LOW LIMIT SET POINT (70F).

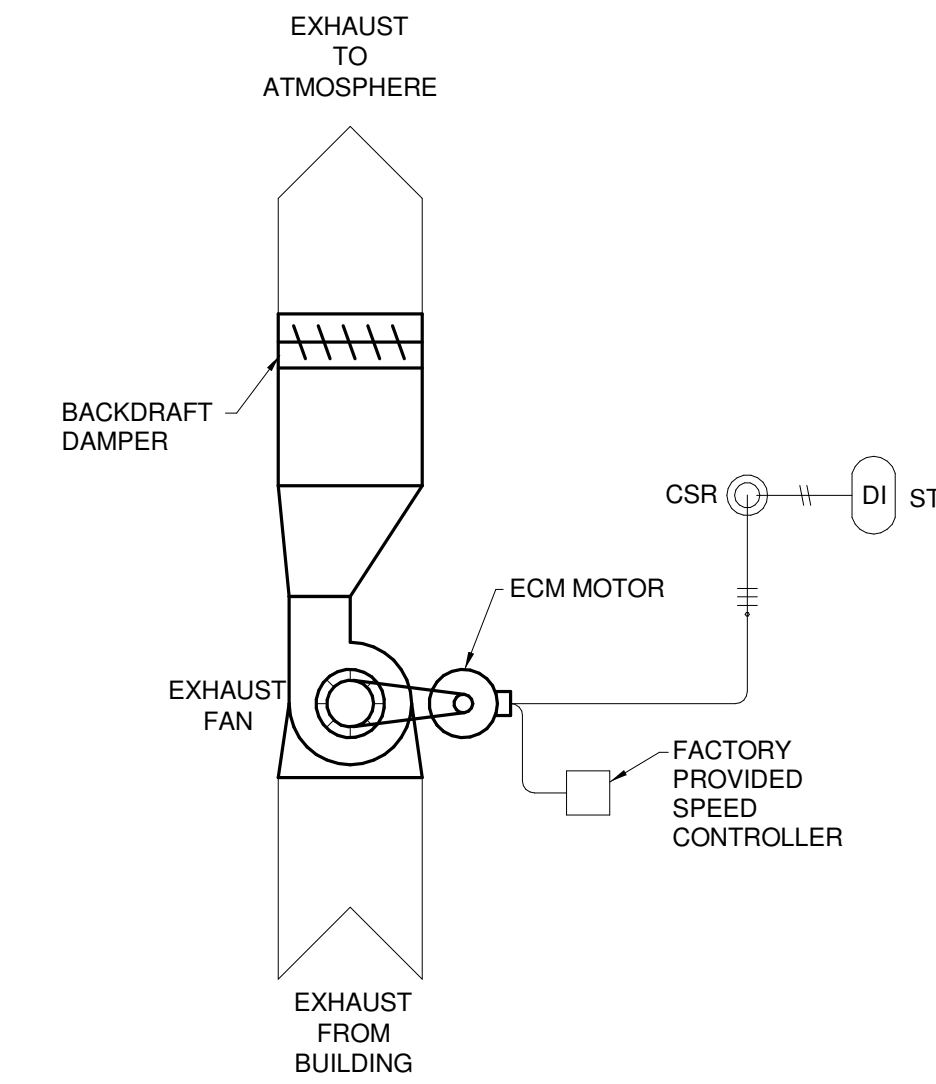
DORM ROOM OCCUPANCY SHALL BE DETERMINED BY SCHEDULE (SET UP FOR IN SESSION AND OUT OF SESSION SCHEDULES), AND SHALL BE SCHEDULED FOR FULL TIME OCCUPANCY DURING IN-SESSION TIMES OF THE YEAR.

UNITS SHALL BE REDILY CAPABLE OF BEING EXCLUDED FROM ANY RESET CALCULATIONS.
 PUBLIC AREA SCHEDULES SHALL BE COORDINATED WITH THE FACILITY.

MODES OF OPERATION:
 A. NORMAL: THE UNIT OPERATES TO THE PROVIDED SEQUENCE OF OPERATION.
 B. OCCUPANT DISABLED: THE FAN COIL VALVES SHALL CLOSE AND THE FAN SHALL BE DISABLED FROM THE THERMOSTAT.
 C. MAINTENANCE DISABLED: THE FAN COIL VALVES SHALL CLOSE AND THE FAN SHALL BE DISABLED.
 D. ALARM MODE: IF FAN STATUS DOESN'T PROVE, MOISTURE SWITCH FAILS, ETC. THEN THE FAN COIL VALVES SHALL CLOSE AND THE FAN SHALL BE DISABLED.

ALARMS:
 A. SUPPLY FAN: CT TRIPPED, FAN OFF WHEN COMMANDED ON.
 B. HIGH SPACE TEMP: SPACE TEMP > ACTIVE SET POINT + 5F OFFSET (ADJ).
 C. LOW SPACE TEMP: SPACE TEMP < ACTIVE SET POINT - 5F OFFSET (ADJ).
 D. HIGH HUMIDITY: SPACE HUMIDITY > MAX SPACE HUMIDITY SET POINT + 2% (ADJ).
 E. VALVE FAILED: VALVE FEEDBACK DOESN'T MATCH VALVE COMMAND WITHIN 3%.
 F. FILTER RUN TIME EXCEEDS ALARM LIMIT.
 G. HIGH UNIT MOISTURE.

TRENDING GROUPS:
 PROVIDE THE FOLLOWING TREND GROUPS FOR THE IDENTIFIED TRENDS.
 A. TEMPERATURE CONTROL: ACTIVE SPACE TEMP SET POINT, SPACE TEMP, SPACE TEMP CONTROL LOOP OUTPUT, HW VALVE, CHW VALVE, FAN SPEED, DAT.
 B. OVERRIDE CONTROL: ACTIVE SPACE TEMP SET POINT, SPACE TEMP, SPACE TEMP CONTROL LOOP OUTPUT, HW VALVE, CHW VALVE, DAT, HUMIDITY OVERRIDE, HI SAT OVERRIDE.
 C. HUMIDITY CONTROL: ACTIVE SPACE TEMP SET POINT, SPACE TEMP, SPACE HUMIDITY, SPACE TEMP CONTROL LOOP OUTPUT, HW VALVE, CHW VALVE, DAT, HUMIDITY OVERRIDE, HI SAT OVERRIDE.



SEQUENCE OF OPERATION:

MODES OF OPERATION

EXHAUST FAN SHALL BE ENABLED AND DISABLED BY DISCONNECT.

EXHAUST FAN ALARMS			
#	DESCRIPTION	ON GRAPHIC	IN TABLE
N/A	FAILED CURRENT SWITCH	N/A	YES

DIAGRAM GENERAL NOTES:

1. POWER WIRING TO TOGGLE DISCONNECT BY DIVISION 26.
2. CONTROL WIRING FROM MOTOR STARTER TO DAMPER ACTUATOR SHALL BE FURNISHED AND INSTALLED BY DIVISION 23.
3. CONTROL DAMPER FURNISHED AND FACTORY MOUNTED WITH EXHAUST FAN. DAMPER ACTUATOR FURNISHED DIVISION 23.

2 GENERAL EXHAUST CONTROL DIAGRAM
 NOT TO SCALE

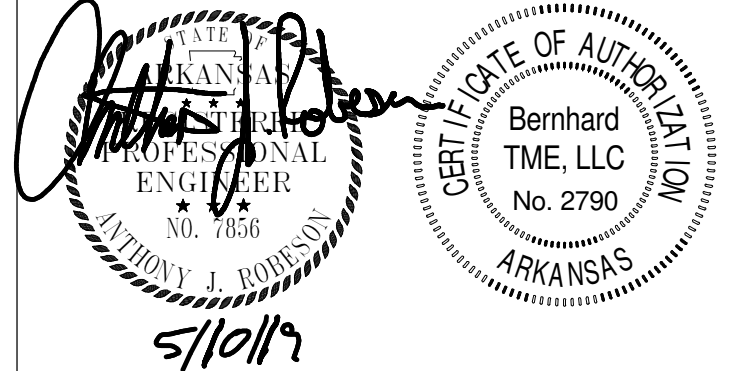
GENERAL NOTES:

1. IF A COMPONENT IS DISABLED DUE TO MAINTENANCE SHUTDOWN OR A FAULT CONDITION, THE COMPONENT SHALL BE HIGHLIGHTED, OUTLINED, FLASH OR CHANGE COLORS.
2. THIS GRAPHIC SHALL BE REPRESENTED ON THE BAS, INCLUDING THE RESULTS OF AS-BUILT CONDITIONS. THE GRAPHIC IS TO BE POPULATED WITH LIVE VALUES. SETPOINTS SHALL BE ADJUSTABLE FROM THIS GRAPHIC AND LINKS SHALL BE PROVIDED TO TRENDING GROUPS.
3. IF MULTIPLE UNITS SERVE THE SAME AREA, ONE OF THE CONTROLLERS WILL BE DESIGNATED AS THE MASTER CONTROLLER AND ALL OTHER CONTROLLERS WILL BE DESIGNATED AS SLAVE CONTROLLERS. VALVE ACTUATORS OF THE SLAVE CONTROLLERS WILL TRACK THOSE OF THE MASTER CONTROLLER.
4. ALL CONTROLLERS, ACTUATORS, SENSORS SWITCHES, TUBING AND POINTS INDICATED ON THE PLANS ARE PROVIDED AND INSTALLED BY DIVISION 23, UNLESS INDICATED OTHERWISE.
5. ALL POINTS AND COMPONENTS INDICATED ON THE CONTROL DRAWINGS ARE NEW AND PROVIDED BY DIVISION 23 UNLESS INDICATED OTHERWISE.
6. CONTROL VALVES SHALL BE SELECTED WITH PROPER AUTHORITY FOR THEIR GIVEN APPLICATION, PROVIDED BY DIVISION 23 AND INSTALLED BY DIVISION 23.
7. A SINGLE TRANSFORMER MAY BE PROVIDED FOR UP TO 10 CONTROLLERS PROVIDED THE LENGTH OF RUNS AND ZONING IS TAKEN INTO CONSIDERATION.
8. CONTROL WIRING IS BY DIVISION 23.
9. REFER TO MECHANICAL SHEETS FOR PIPE AND DUCT SIZES.
10. POWER WIRING IS BY DIVISION 26.
11. ATC CONTRACTOR SHALL TUNE ALL LOOPS AND TABLES FOR SMOOTH, STABLE OPERATION. NUMBERS INDICATED IN THESE DIAGRAMS ARE FOR A STARTING POINT ONLY. THESE DIAGRAMS REPRESENT THE BASIC FUNCTION OF THE CONTROLS SEQUENCE AND ARE NOT ALL INCLUSIVE. THE ATC CONTRACTOR IS STILL REQUIRED TO PROVIDE, DEFINE AND INDICATE ALL ALARMS, SETPOINTS AND FUNCTIONS REQUIRED TO ACHIEVE THE INTENT OF THE SEQUENCE AND TO MAINTAIN ALL EQUIPMENT MANUFACTURER'S REQUIREMENTS.
12. REFER TO MECHANICAL SHEETS AND SCHEDULES FOR FINAL COUNTS AND LOCATIONS. CONTRACTOR TO VERIFY FINAL QUANTITIES WITH MECHANICAL SCHEDULES AND PLANS.

1 TYPICAL HEATING AND COOLING FAN COIL UNIT CONTROL DIAGRAM
 NOT TO SCALE

FAN COIL UNIT ALARMS			
#	DESCRIPTION	ON GRAPHIC	IN TABLE
A	SUPPLY FAN FAIL	YES	YES
B	HIGH SPACE TEMP	YES	YES
C	LOW SPACE TEMP	YES	YES
D	HIGH HUMIDITY	YES	YES
E	VALVE FAILED	NO	YES
F	FILTER RUN TIME	NO	YES
G	UNIT MOISTURE ALARM	YES	YES

seal/signature



No.	Description	Date

UCA Housing Renovations - Phase 2 State Hall

University of Central Arkansas
 Conway, Arkansas

SMA Project Number 1807

Date 05-10-2019

Phase Construction Drawings

UCA Project Number UCA-19-021

Contents

CONTROLS - HVAC

Sheet Number

M6.6