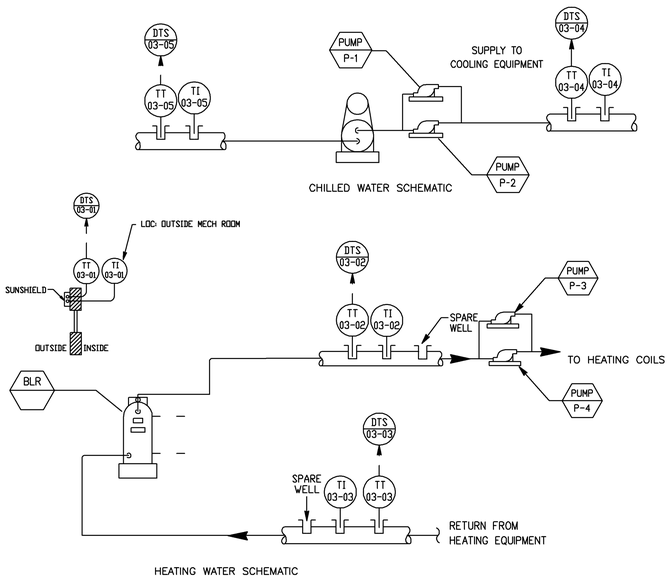
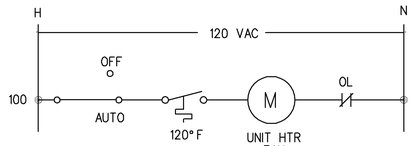




UNIT HEATER SEQUENCE OF OPERATION (TYPICAL)

A WALL-MOUNTED THERMOSTAT WITH AN "AUTO-OFF" SWITCH, LOCATED AS SHOWN, SHALL CYCLE THE FAN TO MAINTAIN THE SETPOINT AS SHOWN WHEN THE SWITCH IS IN THE "AUTO" POSITION. WHEN THE SWITCH IS IN THE "OFF" POSITION, THE FAN SHALL BE STOPPED.

DATA TERMINAL STRIP LAYOUT

	DEVICE NO.	DESCRIPTION	TYPE
1	TT-03-01	OUTSIDE AIR TEMPERATURE	AI
2	TT-03-02	HEATING WATER SUPPLY TEMP.	AI
3	TT-03-03	HEATING WATER RETURN TEMP.	AI
4	TT-03-04	CHILLED WATER SUPPLY TEMP.	AI
5	TT-03-05	CHILLED WATER RETURN TEMP.	AI
6			
7			
8			
9	BLR	BOILER STATUS	DI
10	CH	CHILLER STATUS	DI
11	CSR-03-01	P-3 PUMP STATUS	DI
12	CSR-03-02	P-1 PUMP STATUS	DI
13	CSR-03-03	P-4 PUMP STATUS	DI
14	CSR-03-04	P-2 PUMP STATUS	DI
15	C-03-01	P-3 PUMP START/STOP	DO
16	C-03-02	P-1 PUMP START/STOP	DO
17	C-03-03	P-4 PUMP START/STOP	DO
18	C-03-04	P-2 PUMP START/STOP	DO
19	CH	CHILLER START/STOP	DO
20			
21			
22			

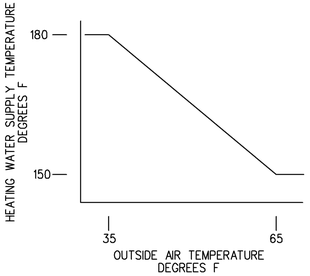
SENSOR SCHEDULE

IDENTIFIER	FUNCTION	RANGE
TT-03-01	OUTSIDE AIR TEMPERATURE TRANSMITTER	-30 TO +130 DEG F
TT-03-02	HEATING WATER SUPPLY TEMPERATURE TRANSMITTER	100 TO 250 DEG F
TT-03-03	HEATING WATER RETURN TEMPERATURE TRANSMITTER	100 TO 250 DEG F

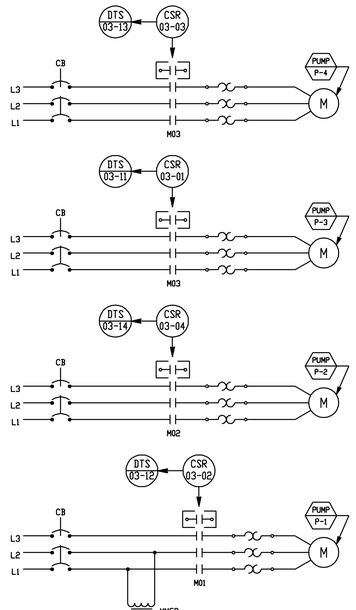
	HARDWARE																		SOFTWARE																	
	OUTPUT											INPUT								ALARMS					APPLICATION PROGRAMS											
	DIGITAL							ANALOG				DIGITAL						ANALOG			DIGITAL			ANALOG													
	CONTROL RELAY							POSITION ADJUSTMENT				AUXILIARY CONTACT	CURRENT SENSING RELAY					TEMPERATURE	% RELATIVE HUMIDITY	PSIG, PSIA, PSID	FLOW			CONTACT CLOSURE					HIGH LIMIT	LOW LIMIT	RUN TIME	SCHEDULED START/STOP	OPTIMUM START/STOP	DUTY CYCLING	DEMAND LIMITING	OUTSIDE AIR RESET		VENTILATION/RECIRCULATION	FAILURE MODE **
OUTSIDE AIR																		1										X	X					X				
HW SUPPLY																		1										X	X					X				
HW RETURN																		1										X	X									
BOILER	1											1						2						X						X								F
CHILLER	1											1						2						X						X	X		X	X				F
HW PUMP	2												2											X						X	X		X	X				F
CHW PUMP	2												2											X						X	X		X	X				F

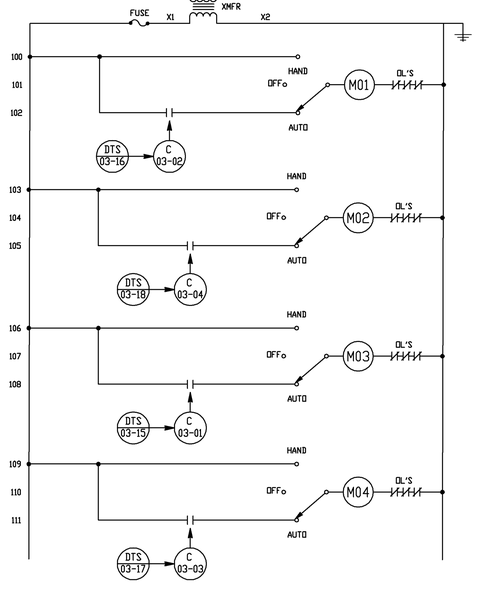
* PULSE INPUTS

** C - LAST COMMAND
H - HIGH VALUE
L - LOW VALUE
O - ON (OPEN)
F - OFF (CLOSED)



HEATING WATER RESET SCHEDULE





PUMP STARTERS

SEQUENCE OF OPERATION

HEATING WATER CONTROL

THE DDC SYSTEM SHALL ACCEPT A SIGNAL FROM A SUNSHIELDED OUTSIDE AIR TEMPERATURE SENSING ELEMENT AND TRANSMITTER LOCATED AS SHOWN. THE DDC SYSTEM SHALL RESET THE HYDRONIC HEATING SUPPLY TEMPERATURE SETPOINT IN A LINEAR SCHEDULE BASED ON THE OUTSIDE AIR TEMPERATURE AS SHOWN. THE DDC SYSTEM SHALL ACCEPT A SIGNAL FROM A TEMPERATURE SENSING ELEMENT AND TRANSMITTER LOCATED IN THE HYDRONIC HEATING SUPPLY LINE AND THE DDC SYSTEM OUTPUT SHALL START/STOP THE BOILERS TO MAINTAIN SETPOINT IN THE HYDRONIC HEATING SUPPLY LINE.

HW PUMP AND BOILER CONTROL

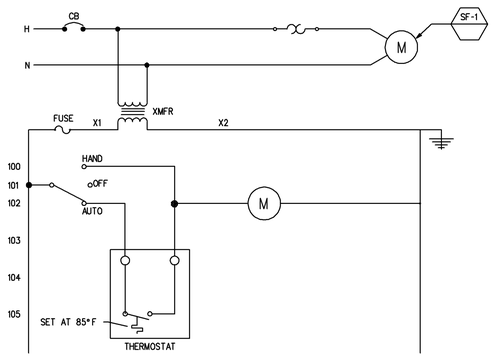
THE HOT WATER SYSTEM WILL BE DIRECTLY CONTROLLED BY THE CONTROL SYSTEM. IN THE OCCUPIED MODE AND UNOCCUPIED MODE, THE PRIMARY HOT WATER DISTRIBUTION PUMP WILL BE STARTED UPON A CALL FOR HEAT FROM ANY CONTROL MODULE. IF THE PRIMARY PUMP FAILS TO PROVIDE FLOW, THE STANDBY DISTRIBUTION PUMP WILL BE STARTED, AND A PRIMARY PUMP ALARM WILL BE GENERATED. IF THE STANDBY PUMP ALSO FAILS TO PROVIDE FLOW, A STANDBY ALARM WILL BE GENERATED, AND THE HOT WATER PRODUCTION PUMPS AND BOILERS WILL BE SHUT DOWN.

EVERY SEVEN DAYS, THE PRIMARY AND SECONDARY DISTRIBUTION PUMPS SHALL AUTOMATICALLY EXCHANGE POSITIONS. ONCE FLOW IS ESTABLISHED IN THE HOT WATER DISTRIBUTION LOOP, THE HOT WATER PRODUCTION PUMPS AND BOILERS WILL BE STAGED ON AND OFF AS NECESSARY TO MAINTAIN THE INDICATED HOT WATER SUPPLY TEMPERATURE. INTERNAL BOILER CONTROLS WILL OPERATE THE GAS BURNERS AS NEEDED. THE BOILER WILL NOT BE ALLOWED TO FIRE UNLESS FLOW IS PROVEN IN ITS PRODUCTION LOOP. PUMP FAILURE SHALL GENERATE AN ALARM.

CHW PUMP AND CHILLER CONTROL

THE CHILLED WATER SYSTEM WILL BE DIRECTLY CONTROLLED BY THE CONTROL SYSTEM. IN THE OCCUPIED MODE AND UNOCCUPIED MODE, THE PRIMARY CHILLED WATER DISTRIBUTION PUMP WILL BE STARTED UPON A CALL FOR COOLING FROM ANY CONTROL MODULE. IF THE PRIMARY PUMP FAILS TO PROVIDE FLOW, THE STANDBY DISTRIBUTION PUMP WILL BE STARTED, AND A PRIMARY PUMP ALARM WILL BE GENERATED. IF THE STANDBY PUMP ALSO FAILS TO PROVIDE FLOW, A STANDBY ALARM WILL BE GENERATED.

EVERY SEVEN DAYS, THE PRIMARY AND SECONDARY DISTRIBUTION PUMPS SHALL AUTOMATICALLY EXCHANGE POSITIONS. ONCE FLOW IS ESTABLISHED IN THE CHILLED WATER DISTRIBUTION LOOP AND FLOW IS PROVEN THROUGH THE EVAPORATOR, THE CHILLER SHALL START. INTERNAL CHILLER CONTROLS WILL STAGE THE COOLING AS NEEDED TO MAINTAIN LOOP SUPPLY TEMPERATURE.



NOTES:

1. SUPPLY FAN SHALL BE CONTROLLED BY A SPACE MOUNTED THERMOSTAT LOCATED IN THE MECH. ROOM.

MECHANICAL ROOM SUPPLY FAN CONTROLS

US ARMY CORPS OF ENGINEERS SAVANNAH

SYMBOL	DESCRIPTION	DATE	BY

DATE: 25 JAN 2010
SOLICITATION NO.: W912HN-09-R-0018
CONTRACT NO.:
CATEGORY CODE: 730-46-01
PLOT DATE:
PLOT SCALE: 1:1
DESIGNED BY: REL
DWN BY: REL
CKD BY: TAM
SUBMITTED BY:
FILE NAME: BRHM-604
SIZE: 34x22

U. S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS SAVANNAH DISTRICT

LS3P ASSOCIATES LTD. 205 ½ KING STREET CHARLESTON, SC. 29401

ALBRITTON JUNIOR HIGH SCHOOL ADDITION
FT BRAGG NORTH CAROLINA

HVAC CONTROLS
HYDRONICS & MISC.

PLATE REFERENCE NUMBER MI604
SHEET 83