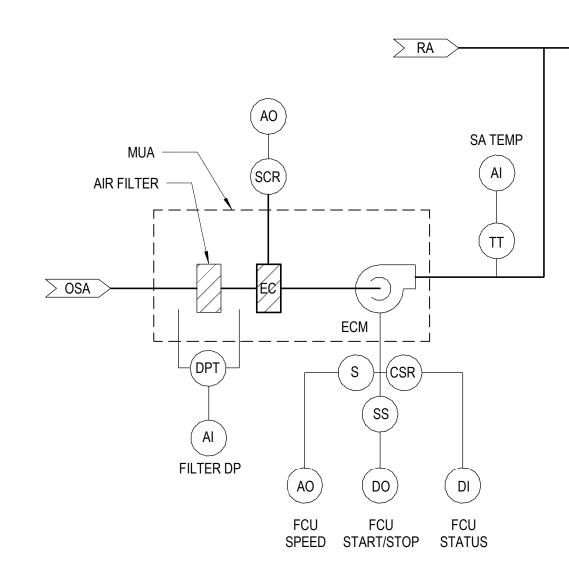
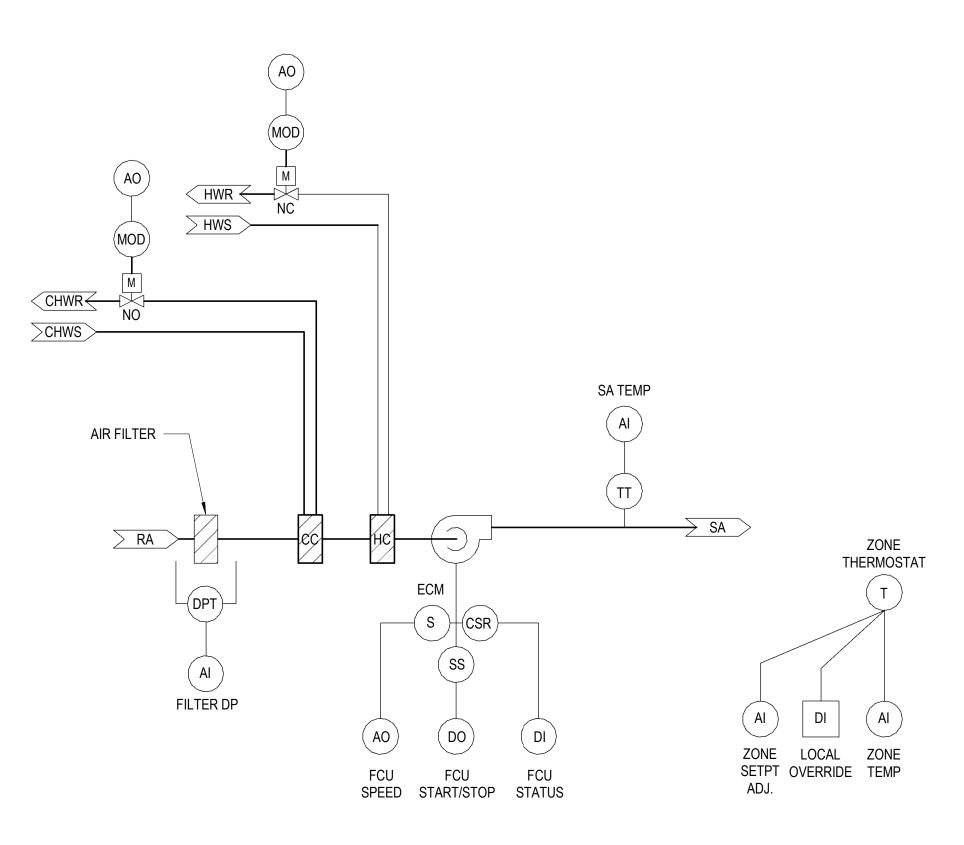
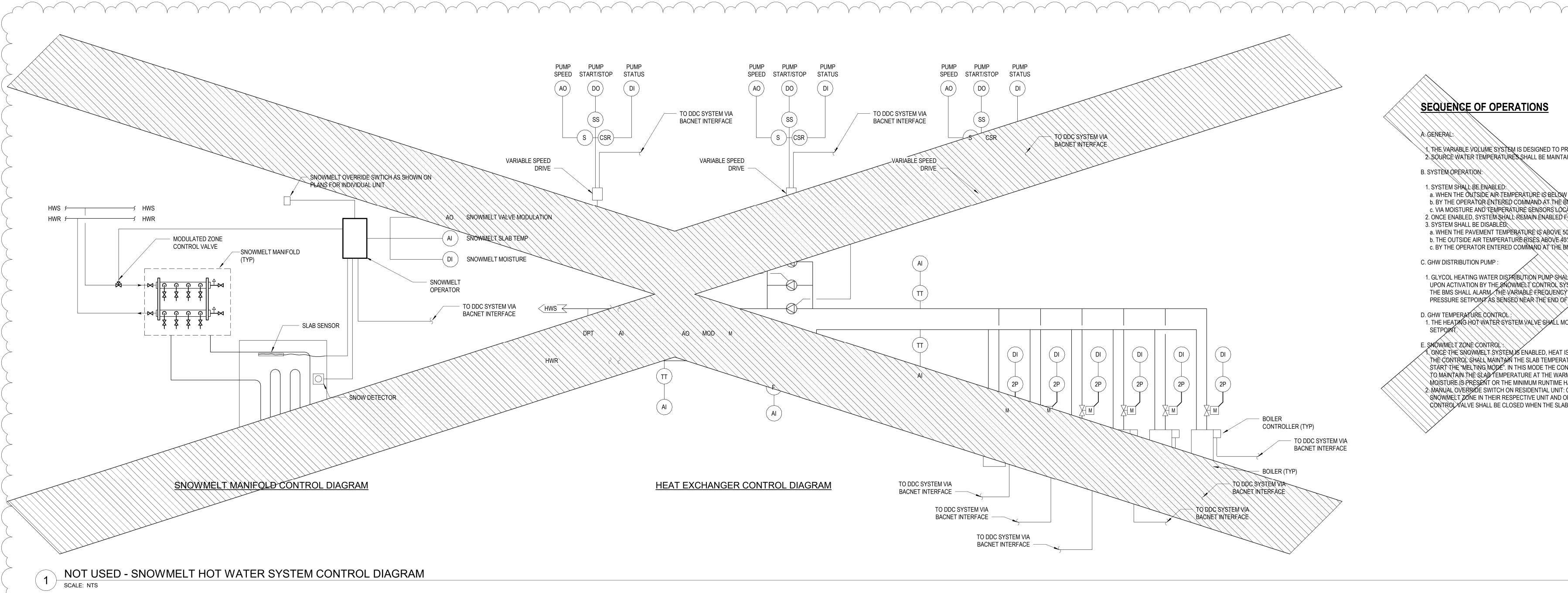
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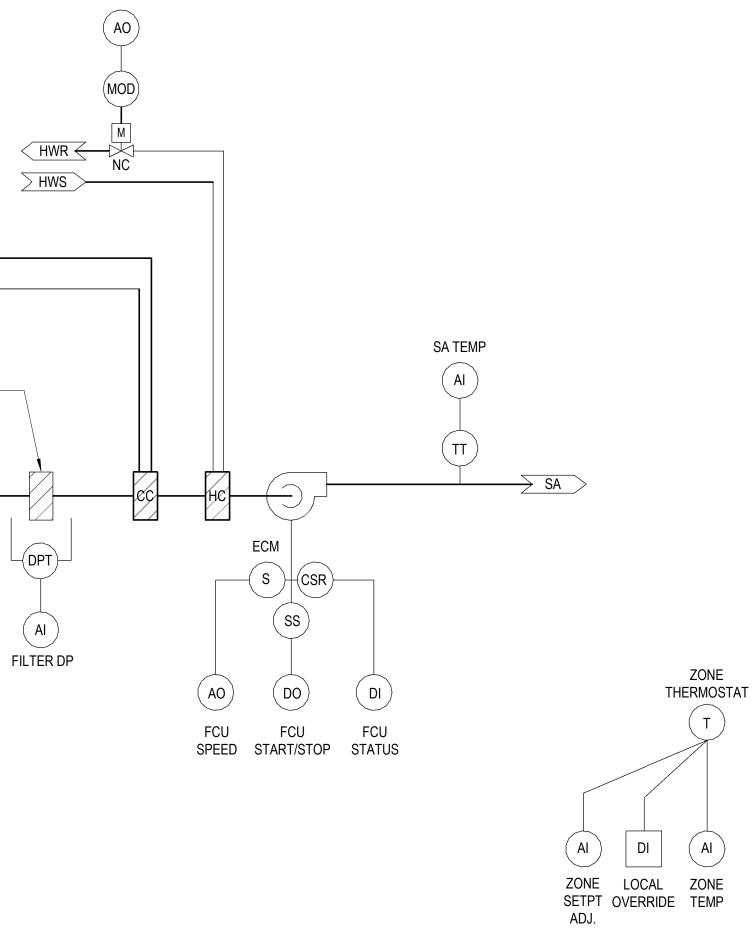


3 FAN COIL UNIT DIAGRAM - COOLING AND HEATING WITH MUA SCALE: NTS









SEQUENCE OF OPERATIONS

A. SYSTEM OFF:

B. SYSTEM START:

- FCU SUPPLY FAN OFF. MUA SUPPLY FAN OFF.
- CHILLED WATER CONTROL VALVE CLOSED. HEATING WATER CONTROL VALVE CLOSED.
- ELECTRIC HEATING COIL DE-ENERGIZED.
- CONTROL LOOPS INACTIVE.
- AUTOMATICALLY BY THE BMS BASED ON PREPROGRAMMED SCHEDULE.
- OPERATOR ENTERED COMMAND AT THE BMS. LOCAL SWITCH. LOCAL TEMPERATURE SENSOR. 4
- SYSTEM OPERATION: C.
- THE FCU SUPPLY FAN SHALL RUN.
- THE MUA SUPPLY FAN SHALL BE INTERLOCKED RUN WITH FCU SUPPLY FAN AT MINIMUM AIRFLOW. COOLING:
- ON A CALL FOR COOLING, THE COOLING COIL VALVE WILL BEGIN TO MODULATE OPEN. AS THE COOLING DEMAND INCREASES, THE VALVE WILL CONTINUE TO OPEN UNTIL THE DISCHARGE AIR TEMPERATURE REACHES 52°F (ADJ). ON CONTINUED CALL FOR COOLING, THE FAN WILL BEGIN TO MODULATE TOWARD THE MAXIMUM COOLING FAN AIRFLOW AS THE CHILLED WATER VALVE CONTINUES TO MODULATE OPEN MAINTAINING A 52°F (ADJ) DISCHARGE AIR TEMPERATURE. THIS PROCESS WILL CONTINUE UNTIL THE FAN REACHES THE COOLING MAXIMUM AIRFLOW AND THE CHILLED WATER VALVE REACHES MAXIMUM FLOW. UPON A DECREASE IN COOLING DEMAND, THE SEQUENCE WILL REVERSE.
- DEAD BAND: 4. WITH NO DEMAND IN THE SPACE, THERE WILL BE NO CALL FOR COOLING OR HEATING. THE FAN WILL BE AT MINIMUM AIRFLOW. THE HEATING COIL VALVE AND COOLING COIL VALVE WILL BE OFF.
- HEATING: 5. ON A CALL FOR HEATING, THE HEATING COIL VALVE WILL BEGIN TO MODULATE OPEN. AS THE HEATING DEMAND INCREASES, THE VALVE WILL CONTINUE TO MODULATE OPEN UNTIL THE DISCHARGE AIR TEMPERATURE REACHES 90°F (ADJ). ON CONTINUED CALL FOR HEATING, THE FAN BEGINS TO MODULATE FROM DEAD BAND TOWARDS THE MAXIMUM HEATING FAN AIRFLOW. THIS PROCESS WILL CONTINUE UNTIL THE FAN REACHES THE HEATING MAXIMUM AIRFLOW AND THE HOT WATER VALVE REACHES MAXIMUM FLOW. UPON A DECREASE IN
- HEATING DEMAND, THE SEQUENCE WILL REVERSE. THE MUA ELECTRIC COIL SHALL MODULATE TO MAINTAIN MUA DISCHARGE AIR TEMPERATURE. MUA UNIT NORMALLY OPERATE AT 200 CFM. INTERLOCK WITH RANGE HOOD AND INCREASE TO 750 CFM WHEN RANGE HOOD TURNED ON.
- D. SYSTEM STOP:
 - OPERATOR COMMAND AT THE BMS OR AUTOMATICALLY BY THE BMS BASED ON A PREPROGRAMMED SCHEDULE MANUAL OFF AT LOCAL SWITCH. WHEN THE SYSTEM IS CALLED TO STOP, THE SYSTEM SHALL REVERT TO THAT "OFF" STATE AS DESCRIBED ABOVE.
- E. SETPOINTS:
- 1. SPACE TEMPERATURE 70°F HEATING AND 75°F COOLING. ALARM AT BMS AT +/- 2°F FROM SETPOINT.

SEQUENCE OF OPERATIONS

A. SYSTEM OFF:

- SUPPLY FAN OFF. CHILLED WATER CONTROL VALVE CLOSED.
- HEATING WATER CONTROL VALVE CLOSED. CONTROL LOOPS INACTIVE.
- B. SYSTEM START:
 - AUTOMATICALLY BY THE BMS BASED ON PREPROGRAMMED SCHEDULE.
- OPERATOR ENTERED COMMAND AT THE BMS. LOCAL SWITCH. LOCAL TEMPERATURE SENSOR.
- C. SYSTEM OPERATION:
- THE SUPPLY FAN SHALL RUN.
- COOLING: 2. ON A CALL FOR COOLING, THE COOLING COIL VALVE WILL BEGIN TO MODULATE OPEN. AS THE COOLING DEMAND INCREASES, THE VALVE WILL CONTINUE TO OPEN UNTIL THE DISCHARGE AIR TEMPERATURE REACHES 52°F (ADJ). ON CONTINUED CALL FOR COOLING, THE FAN WILL BEGIN TO MODULATE TOWARD THE MAXIMUM COOLING FAN AIRFLOW AS THE CHILLED WATER VALVE CONTINUES TO MODULATE OPEN MAINTAINING A 52°F (ADJ) DISCHARGE AIR TEMPERATURE. THIS PROCESS WILL CONTINUE UNTIL THE FAN REACHES THE COOLING MAXIMUM AIRFLOW AND THE CHILLED WATER VALVE REACHES MAXIMUM FLOW. UPON A DECREASE IN COOLING DEMAND, THE SEQUENCE WILL REVERSE. DEAD BAND:
- WITH NO DEMAND IN THE SPACE, THERE WILL BE NO CALL FOR COOLING OR HEATING. THE FAN WILL BE AT MINIMUM AIRFLOW. The heating coil valve and cooling coil valve WILL BE OFF. HEATING: 4 ON A CALL FOR HEATING, THE HEATING COIL VALVE WILL BEGIN TO MODULATE OPEN. AS THE HEATING DEMAND INCREASES, THE VALVE WILL CONTINUE TO MODULATE OPEN UNTIL THE DISCHARGE AIR TEMPERATURE REACHES 90°F (ADJ). ON CONTINUED CALL FOR HEATING, THE FAN BEGINS TO MODULATE FROM DEAD BAND TOWARDS THE MAXIMUM HEATING FAN AIRFLOW. THIS PROCESS WILL CONTINUE UNTIL THE FAN REACHES THE HEATING MAXIMUM AIRFLOW AND THE HOT WATER VALVE REACHES MAXIMUM FLOW. UPON A DECREASE IN HEATING DEMAND, THE SEQUENCE WILL REVERSE.
- SYSTEM STOP: D.
 - OPERATOR COMMAND AT THE BMS OR AUTOMATICALLY BY THE BMS BASED ON A PREPROGRAMMED SCHEDULE
- MANUAL OFF AT LOCAL SWITCH. WHEN THE SYSTEM IS CALLED TO STOP, THE SYSTEM SHALL REVERT TO THAT "OFF" STATE AS DESCRIBED ABOVE.
- E. SETPOINTS:
- 1. SPACE TEMPERATURE 70°F HEATING AND 75°F COOLING. ALARM AT BMS AT +/- 2°F FROM SETPOINT.

	PUMP PUMP PUMP PUMP	PUMP PUMP O START/STOP STATUS	PUMP PUMP PUMP				
	SPEED START/STOP STATUS SPEED AO DO DI AO	\frown \frown	SPEED START/STOP STATUS AO DO DI				
	(SS) TO DDC SYSTEM VIA BACNET INTERFACE	(SS) TO DDC SYSTEM BACNET INTERF	VIA CE SS			SEQUENCE OF OPERATIONS	
	S CSR	- S - CSR - BACINET INTERP	S CSR TO DDC SY BACNET IN	'STEM VIA		A. GENERAL:	
	VARIABLE SPEED DRIVE VARIABLE SPEED DRIVE	VARIABLE	SPEED			1. THE VARIABLE VOLUME SYSTEM IS DESIGNED TO PROVIDE GL 2. SOURCE WATER TEMPERATURES SHALL BE MAINTAINED BY TH	YCOL HOT WATER TO SNOWMELT MANIFOLDS. HE HEATING WATER SYSTEM CONTROLS.
SNOWMELT OVERRIDE SWTICH AS SHOWN ON PLANS FOR INDIVIDUAL UNIT						B. SYSTEM ORERATION: 1. SYSTEM SHALL BE ENABLED:	
	WELT VALVE MODULATION					1. SYSTEM SHALL BE ENABLED: a. WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 35°F (ADJ. b. BY THE OPERATOR ENTERED COMMAND AT THE BMS, OR c. VIA MOISTURE AND TEMPERATURE SENSORS LOCATED FOR 2. ONCE ENABLED, SYSTEM SHALL REMAIN ENABLED FOR AT LEA	LOCAL SNOWMELT ZONE CONTROL.
	VIELT, SLAB TEMP					3. SYSTEM SHALL BE DISABLED a. WHEN THE PAVEMENT TEMPERATURE IS ABOVE 50°F, AND AM	ND HUMIDTY DROPS BELOW 50%, OR
CONTROL VALVE	MELT MOISTURE		Â			b. THE OUTSIDE AIR TEMPERATURE RISES ABOVE 40°F (ADJ.), C c. BY THE OPERATOR ENTERED COMMAND AT THE BMS C. GHW DISTRIBUTION PUMP :	
						1. GLYCOL HEATING WATER DISTRIBUTION PUMP SHALL BE STAF UPON ACTIVATION BY THE SNOWMELT CONTROL SYSTEM. BM THE BMS SHALL ALARM, THE VARIABLE FREQUENCY DRIVE MO	RTED TO SURPLY HEATING HOT WATER THROUGH THE AS SHALL RROVE OPERATION OF THE PUMP. UPON PU
	SYSTEM VIA					PRESSURE SETPOINT AS SENSED NEAR THE END OF THE MAIN	N PIPING RUN.
	INTERFACE					D. GHW TEMPERATURE CONTROL : 1. THE HEATING HOT WATER SYSTEM VALVE SHALL MODULATE T SETPOINT.	TO MATHIN THE GHW SURPLY TEMPERATURE OF 11
)	E. SMOWMELT ZONE CONTROL: 1. ONCE THE SNOWMELT SYSTEM IS ENABLED, HEAT IS APPLIED) TO THE SNOWMELT SYSTEM THROUGH OPENING THI
	HWR (Π)					THE CONTROL SHALL MAINTAIN THE SLAB TEMPERATUER ABOY START THE "MELTING MODE". IN THIS MODE THE CONTROL SHA TO MAINTAIN THE SLAB TEMPERATURE AT THE WARM-WEATHE	IER CUTOFF SET POINT. IT SHALL REMAIN IN THIS MOD
SNOW DETECTOR				$ \begin{array}{c c} (2P)\\ \end{array} \\ \end{array} $)	MOISTURE IS PRESENT OR THE MINIMUM RUNTIME HAS ELAPSI 2. MANUAL OVERBIDE SWITCH ON RESIDENTIAL UNIT: OVERRIDE SNOWMELT ZONE IN THEIR RESPECTIVE UNIT AND OPEN THE Z	E SWITCH INSTALLED INSIDE THE UNIT WILL ACTIVATE. ZONE CONTROL VALVE FOR A MINIMUM OF ONE (1) HC
	(AI)	(AI)			BOILER CONTROLLER (TYP)	CONTROL VALVE SHALL BE CLOSED WHEN THE SLAB TEMPERA	ATURE IS MAINTAINED AND NO MOISTURE IS PRESENT
					TO DDC SYSTEM VIA BACNET INTERFACE		
					BOILER (TYP)		
SNOWMELT MANIFOLD CONTROL DIAGRAM	HEAT EXCHANGER CON	TROL DIAGRAM TO DD BACNE	C SYSTEM VIA T INTERFACE		TO DDC SYSTEM VIA BACNET INTERFACE		
			TO DDC SYSTEM VIA	TO DDC SYS BACNET INT			
			BACNET INTERFACE	BACINET IN			
			TO DDC SYSTEM VIA BACNET INTERFACE				

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