			1/\/	rui	1/0	JUI	701	1 30	JMI	MAK	1 + (<i>IK .</i>	414	HA	IVUL	1140	G UN	11/	AH.	-01					CIVI.)/ 		<u>, </u>					
	· INPUTS												OUTPUTS				\perp			SYSTEM FEATURES					_	1							
SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	ANALOG MEASURED CALCULATED						- BINARY				DIGITAL			ANALOG			ALARMS			PROGRAMS					GENERAL								
	TEMPERATURE		KW AIR FLOW		VIBRATIONS			di	STATUS	SMOKE FREEZE	AIR FLOW METER	710	OFF-AUTO-ON	OPEN-CLOSE	DAMPER POSITION	VALVE POSITION	SET FOURT ABOUSTIMENT VANE POSITION SCR CONTROL	HI ANALOG	LOW ANALOG HI BINARY	LOW BINARY PROOF		TIME SCHEDULING DEMAND LIMITING	DUTY CYCLE START/STOP OPTION	ENTHALPY OPTION	TREND	MAINT WK ORD		COLOR GRAPHIC	COLOR GRAPHIC		SUPPLEMENTARY NOTES		
OUTSIDE TEMERATURE	•				П	TT				П									·								Ш		Ш				
OUTSIDE RELATIVE HUMIDITY		•			П					П		П	\prod													$\perp \perp$	Ш						
PREHEAT COIL, HC-14	•				\prod				•			\prod		•		•		•					•			•		Ш					
PREHEAT COIL, HC-15	•				П				•					•		•		•					•			•	Ш		Ш				
AIR FILTER AF-OI (TYP 2)																		•								0		Ш				2 SENSORS	
AIR FILTER AF-02 (TYP 2)					П					П		\prod						•								0						2 SENSORS	
MIXING AIR DAMPER OI										П		П			•											0		Ш					
MIXING AIR DAMPER 02					П	П						\prod			•											0	•	Ш					
COOLING COIL CC-01	•				П											•		•								•		\coprod	$\perp \downarrow$				
COOLING COIL CC-02	•				П											•		•							•	•	Ш	Ш					
HUMIDIFIER HU-01		•			П				•			П		0		•		•	•				•			•							
HUMIDIFIER HU-02		•			П				•			\prod				•		•	•				•		•	•							
SUPPLY FAN SF-01			•		•		•		•		•	•					•	•		•		•		<u>ill</u>		6		Ш			\perp		
SUPPLY FAN SF-02		П	•		•		•		•		•						•	•		•		•	•		1	•	Ш				\perp		
SUPPLY AIR TEMP (TYP 2)	•																	•	•				Ш				Ш	\coprod	$\perp \perp$				
SUPPLY AIR RELATIVE HUMIDITY		•										Ш						•									\coprod				\perp		
ROOM TEMPERATURE (TYPICAL 5 ZONES)	•																	•	•		\coprod	Ш		Ш	•		$\bot \bot$	$\perp \! \! \perp$	$\perp \perp$	$\perp \! \! \perp$	\perp		
SPACE AVERAGE RELATIVE HUMIDITY		•																•	•		Ш	ot	Ш				Ш.	\coprod					
ZONE DUCT HEATER (VEA)	•								•			\coprod		\prod			•						•			0							-A
ZONE DUCT HEATERS (TYPICAL 5 ZONES)	•				\prod				•					9				•				Ш	•	1		•		$\bot \bot$	$\perp \perp$	-	\perp		Managharaka Managha (Managha)
SMOKE DETECTOR (SD-01)					\prod					•											\coprod	Ш		•				$\perp \perp$	$\perp \perp$		\perp		
MIXING AIR TEMP	•				\prod							Ш													$\perp \perp$				11		\perp		
MIXING AIR RELATIVE HUMIDITY		•			\prod	\prod																\coprod						Ц.	$\perp \perp$	$\perp \perp$	\perp		
AIR COMPRESSORS (TYP 2)	•								•						Ш			•	•										11	المعدد أحرب		aga glaga sagi na anamanan ani da da ana	
TOILET EXHAUST FAN, EF-01							•		•			•					$\bot \bot \bot$	\perp		0	$\downarrow \downarrow$	•	•	4	$\downarrow \downarrow$	•		11		22 1.00	1		
AIR FLOW DIAGRAM									\perp			$\perp \! \! \perp$	$\perp \perp$								11	ot	_	11		$\bot \downarrow$	44	•	1	4	4		
HEPA FILTERS					\prod													•						Ш	\coprod	•	\coprod	\coprod	$\perp \perp$		\perp		
FLOOR PLANS		T			IT	IT							+															•					

	INPUT/OU	TPUT SUMMARY FOR W	VATER CHILLERS CH-C	01 & CH-02 (TYP 4 SYSTEMS)		
		INPUTS	оитритѕ	SYSTEM FEATURES	_	
SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	ANALO	OG BINARY	DIGITAL ANALOG	ALARMS PROGRAMS	GENERAL	
	MEASURED	CALCULATED		ALAMA		SUPPLEMENTARY NOTES
	TEMPERATURE PRESSURE RH KW AIR FLOW LEVEL LEVEL CPA	UNIN WHI ENTIALPY RUN TIME EFFICIENCY WET BULB TEMP STATUS FILTER SMOKE FREZE ARREZE ARREZE ARREZE	OFF-ON OFF-AUTO-ON OFF-HI-LO OFF-HI-LO OFF-HI-LO OFF-HI-STAGE MULTI-STAGE MULTI-STAGE WALTI-STAGE STAGE WALTI-STAGE WALTI-STAG	HI ANALOG LOW ANALOG LOW ANALOG HI BINARY LOW BINARY PROOF TIME SCHEDULING DENANO LIMITING DUTY CYCLE START/STOP OPTION SWARE CNT REND ALARM INSTRUCT ALARM INSTRUCT ALARM INSTRUCT	COLOR GRAPHIC	
ATER CHILLER, CH-01	•					
ATER CHILLER, CH-02	• •	• • .	•			
HILLED WATER PUMP, WP-01	0 0					·
HILLED WATER PUMP, WP-02			•			
HILLED WATER RETURN TEMP	•			• , .		
HILLED WATER SUPPLY TEMP						
HILLED WATER BOOSTER PUMP	•			• • • • • • • • • • • • • • • • • • •		PUMP BY VE CONTRACTOR
HILLED WATER FLOW DIAGRAM					•	
LOOR PLANS					•	

NOTES:

- 1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES SEE SHEETS WA-H-001 AND WA-H-002.
- SMOKE DETECTORS WILL BE HARD WIRED TO THE SUPPLY FANS SF-01 & SF-02
 MOTOR STARTER TO STOP FANS WHEN SMOKE DETECTED IN THE RETURN AIR
 STREAM. ALSO SMOKE DETECTORS WILL BE SOFTWARE CONNECTED TO DDC
 CONTROL PANEL AND THE FACILITY CONTROL ROOM.
- 3. CONTROL SYSTEM SHALL BE STAND ALONE TYPE AND CONNECTED TO THE MAIN CONTROL AND MONITORING SYSTEM AT THE FACILITY CONTROL ROOM IN THE CORNER STATION BUILDING.
- 4. VACUUM EOUIPMENT ROOM WILL BE PROVIDED WITH FOUR TEMPERATURE SENSORS TO CONTROL THE RESPECTIVE DUCT HEATER. SYSTEM MAY AVERAGE THE READING OF THE FOUR ROOM TEMPERATURE SENSORS OR SELECT ANY SENSOR TO CONTROL THE DUCT HEATER.

SEQUENCE OF OPERATION:

- I. CHILLED WATER PLANT:
- UPON A SIGNAL FROM THE CENTRAL CONTROL SYSTEM THE PACKAGED CONTROLS PROVIDED WITH THE WATER CHILLER WILL PERFORM THE FOLLOWING:
- A. THE LEAD CHILLED WATER PUMP (WP-01) WILL START TO ESTABLISH STEADY WATER FLOW THROUGH THE SYSTEM.
- B. UPON PROOF OF ESTABLISHED WATER FLOW THE LEAD CHILLER (CH-01) WILL START TO MAINTAIN THE LEAVING CHILLED WATER TEMPERATURE SETPOINT (42°F).
- C. THE PACKAGED DDC CONTROLS ON THE WATER CHILLER WILL CYCLE THE REFRIGERATION COMPRESSORS IN SECUENCE TO MATCH THE SYSTEM THERMAL LOAD.
- D. WHEN THE THERMAL LOAD DROPS BELOW THE MINIMUM OPERATING CAPACITY OF THE WATER CHILLER, THE PACKAGED CONTROL WILL ACTIVATE THE HOT GAS BYPASS CYCLE.
- E. PACKAGED CONTROLS WILL RUN SELF DIAGNOSTICS TEST BEFORE STARTING THE REFRIGERATION COMPRESSORS TO PROVE THAT ALL OPERATING CONDITIONS ARE WITHIN THE NORMAL LIMITS.
- F. PACKAGED CONTROLS WILL CONTINUOUSLY MONITOR THE CHILLER OPERATION AND REPORT ANY OPERATIONAL OR SAFETY ALARMS TO THE OPERATOR COMPUTER IN THE FACILITY CONTROL ROOM. PACKAGED CONTROLS WILL AUTOMATICALLY STOP THE MALFUNCTIONING WATER CHILLER AND START THE STANDBY CHILLER.
- G. CENTRAL CONTROL SYSTEM WILL ALTERNATE THE LEAD AND STANDBY WATER CHILLERS TO MAINTAIN EOUAL OPERATING PERIODS ON BOTH WATER CHILLERS CHILLERS.
- II. AIR HANDLING SYSTEM:
- UPON A SIGNAL FROM THE CENTRAL CONTROL SYSTEM THE LEAD SUPPLY AIR FAN (SF-01) WILL START TO ESTABLISH A STEADY AIR FLOW THROUGH THE SYSTEM. THE DDC CONTROLS WILL PERFORM THE FOLLWING:
- A. MODULATE THE CONTROLLABLE PITCH VANES ON THE SUPPLY AIR FANS TO MAINTAIN THE DESIRED CONSTANT AIR VOLUME FLOW RATE REGARDLESS OF THE SYSTEM STATIC PRESSURE.
- B. THE TEMPERATURE SENSORS LOCATED DOWN STREAM OF THE OUTSIDE AIR PREHEAT COILS WILL BE USED TO CONTROL THE CAPACITY OF THE DUCT ELECTRIC HEATERS TO MAINTAIN THE OUTSIDE AIR DRY BULB TEMPERATURE AT 50°F.
- C. THE TEMPERATURE SENSOR LOCATED DOWN STREAM OF THE COOLING COIL WILL BE USED TO MODULATE THE 3-WAY CONTROL VALVE ON THE CHILLED WATER LOOP TO MAINTAIN THE LEAVING AIR DRY BULB TEMPERATURE AT THE SET POINT (50°F).
- D. THE DDC CONTROLS WILL COMPARE THE SPACE ROOM TEMPERATURE SENSORS AND MODULATE THE FACE AND BYPASS DAMPER BASED ON THE
- E. THE ROOM TEMPERATURE SENSORS (TOTAL 4) OF VACUUM EQUIPMENT AREA SHALL BE USED TO MODULATE THE SCR CONTROLS ON THE RESPECTIVE ELECTRIC DUCT HEATER TO MAINTAIN THE ROOM TEMPERATURE SETPOINT (72°F)
- F. THE ROOM TEMPERATURE SENSORS FOR OTHER ROOMS SHALL BE USED TO SEQUENCE THE CAPACITY CONTROL STAGES OF THEIR RESPECTIVE DUCT HEATERS TO MAINTAIN THE ROOM TEMPERATURE SET POINT.
- G. WHEN THE ROOM TEMPERATURE RISES 5 DEGREES F ABOVE THE SETPOINT, THE CONTROL SYSTEM SHALL REPORT AN ALARM SIGNAL TO THE FACILITY CONTROL ROOM.
- H. THE RELATIVE HUMIDITY SENSOR LOCATED IN VACUUM EQUIPMENT ROOM SHALL
 BE USED TO SEQUENCE THE CAPACITY CONTROL STAGES OF THE ELECTRIC HUMIDIFIER
 TO MAINTAIN THE SPACE MINIMUM RELATIVE HUMIDITY SETPOINT (30 % RH).
- I. THE SMOKE DUCT DETECTOR IN THE RETURN AIR DUCTS SHALL STOP THE SUPPLY AIR FANS WHEN SMOKE IS DETECTED IN THE RETURN AIR THE SHALL STOP THE SUPPLY AIR FANS WHEN SMOKE IS DETECTED IN THE RETURN AIR STREAM AND REPORT AN ALARM SIGNAL (AUDIO AND VISIUAL) AT THE FACILITY CONTROL ROOM AND LOCAL CONTROL PANEL.

 THE SPACE DIFFERENTIAL PRESSURE SENSORS SHALL BE USED TO MODULATE THE MOTORIZED CONTROL DAMPERS ON THE RETURN AIR DUCTS AND THE OUTSIDE AIR DUCTS TO MAINTAIN THE SPACE PRESSURIZATION AT THE SETPOINT.
- III. EQUIPMENT START UP:
- A. ALL WATER CHILLER SHALL BE SOFT START
- B. THE SUPPLY AIR FANS SF-01 & SF-02 SHALL START AT THE MINIMUM STATIC PRESSURE AND GRADUALLY INCREASE THE SYSTEM STATIC PRESSURE TO MAINTAIN THE DESIRED AIR FLOW RATE.
- C. THE BUILDING PRESSURIZATION SENSORS FOR LVEA AND OSB (LAB AREA) SHALL MODULATE THE MOTORIZED DAMPERS LOCATED ON THE RETURN AIR & OUTSIDE AIR DAMPERS TO START AT 100% RETURN AIR AND GRADUALLY MODULATE THE DAMPERS TO MAINTAIN THE BUILDING PRESSURIZATION SETPOINT.
- IV. TOILET EXHAUST FAN:
- A. THE TOILET EXHAUST FAN WILL RUN CONTINUOUSLY.

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