

# JGHNSON CONTROLS Creating a better climate for business.



Environmental Control System Building Automation System Fire Management System Security System Lighting Services Telecommunication System Integrated Motor Control Center Air and Water Systems Balancing Instrumentation System Installation Building Operations Management Energy Conservation Control Custom Programmed Maintenance Automatic Temperature Controls Heating

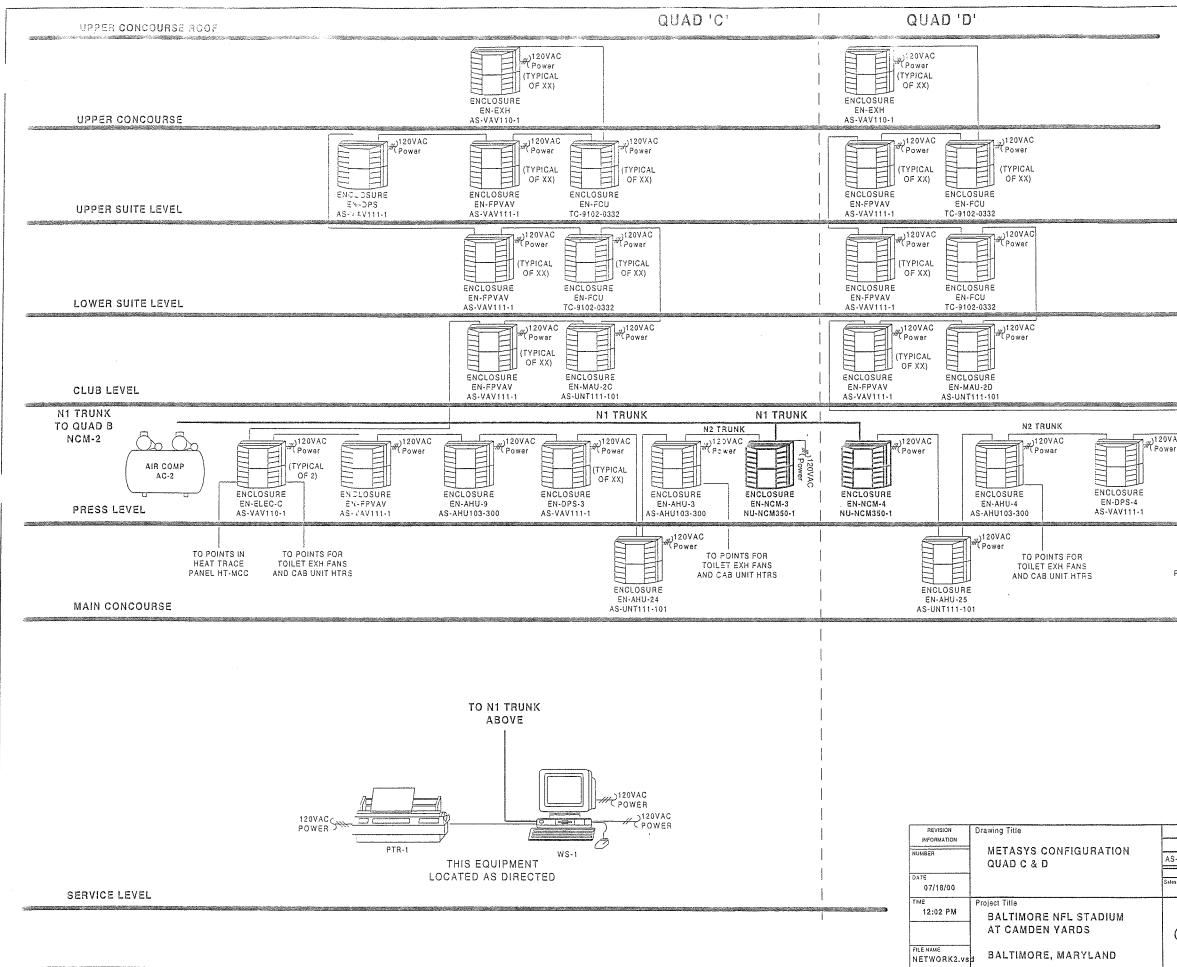
Heating Air Conditioning Air Filters Water Treatment Coil Cleaning Control Center Fire Management Sound and Communication Programmed Clocks Contract Operations Time-Shared Automated Building Service Refrigeration Electrical Equipment Emergency Generator / Lighting Equipment Industrial Controls / Recording / Indication Equipment

PROJECT

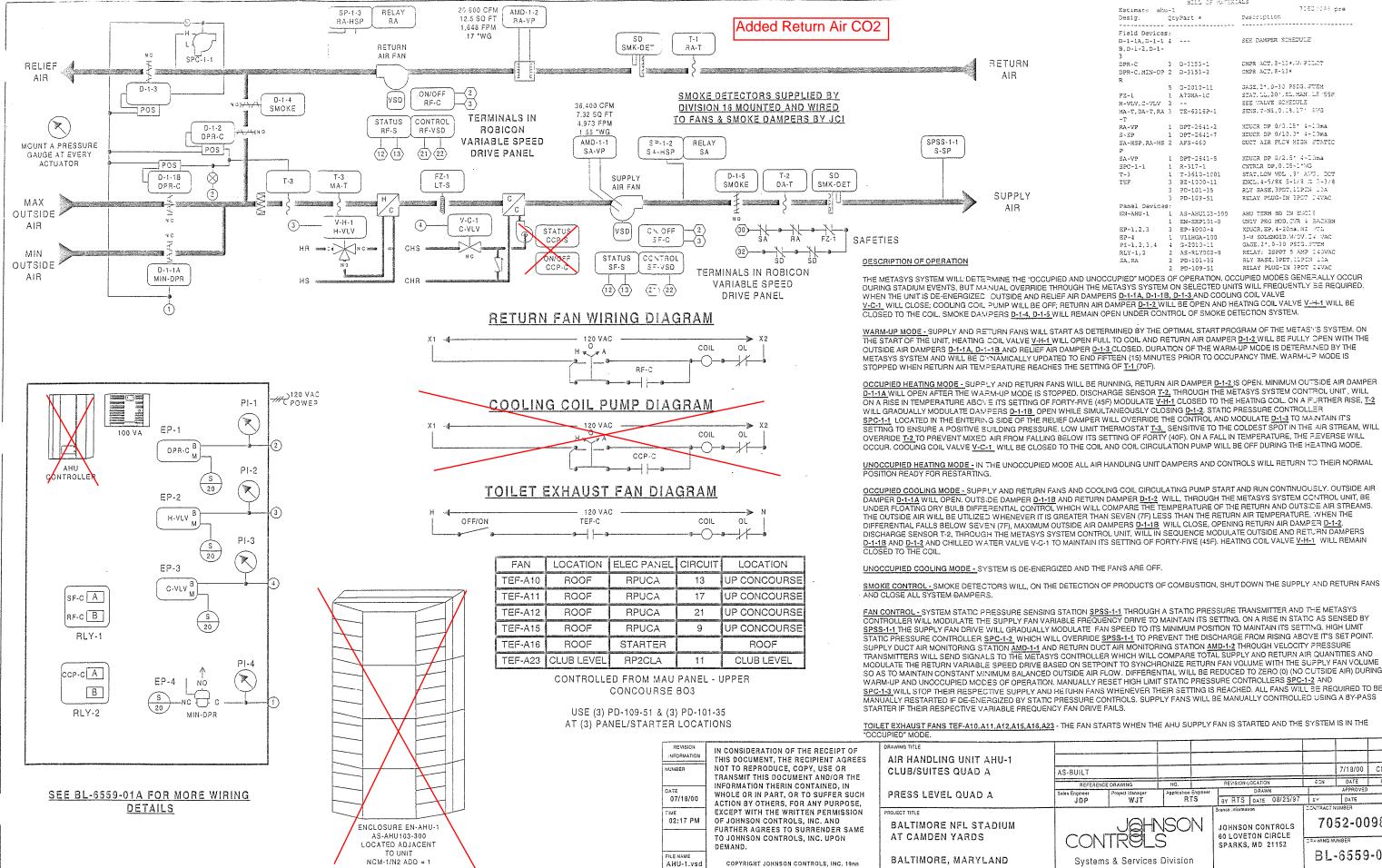
#### BALTIMORE NFL STADIUM AT CAMDEN YARDS HOME OF THE BALTIMORE RAVENS

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AS-BUILT								7/18/00	CME				
REFERENCE DRA	AWING	NO.	A	EVISION	OCATION	T	ECN	DATE	BY				
	DNTF Systems &	Servic	HNS LS ces Divisio	n n	V	J 6 5 T	60 Loveto Sparks, M TEL: 410 FAX: 410	Controls, I	1152				
ALES ENGINEER	PROJECT MANA WJ		APPLICATION END RTS		0915/9	7	CONTRACT	52-0	)98				

UPPER CONCOURSE ROOF	QUAD 'A'	QUAD'B'	BILL OF MATERIALS Estimate: networka/b 70520098.pre
UPPER CONCOURSE	U120VAC (Powar (TYPICAL OF 1) ENCLOSURE EN-EXH AS-VAV110-1	I 120VAC (Power (TYPICAL OF 1) ENCLOSURE EN-EXH AS-VAV110-1	Desig. QtyPart # Description Panel Devices: NCM-1,2,5 3 EN-EWC22-0 UNIV PKG MOD,F/NCM-30C 3 NU-NCL350-1 NETWORK CTRL, ETHERNET-
UPPER SUITE LEVEL	I20VAC     I20VAC       Power     Power       (TYPICAL     OF XX)       ENCLOSURE     ENCLOSURE       EN-FPVAV     EN-FCU       AS-VAV111-1     TC-3-D2-0332	Image: Power     Image: Power       Image: Power	
. LOWER SUITE LEVEL	ENCLOSURE EN-FPVAV AS-VAV111-1 ENCLOSURE EN-FPVAV EN-FPVA	I 20VAC Power (TYPICAL OF XX) ENCLOSURE EN-FPVAV AS-VAV111-1 TC-9102-0332	
CLUB LEVEL	(TYPICAL ENCLOSURE EN-FPVAV AS-VAV111-1 (TYPICAL ENCLOSURE EN-VAU-2A AS-UNT111-101	Image: Power     Image: Power       Image: Power	
PRESS LEVEL AS-VAV110-1	N1 TRUNK N2 TRUNK Power ENCLOSURE EN-AHU-1 AS-AHU103-300 NU-NC M350-1	N1 TRUNK N2 TRUNK N2 TRUNK N2 TRUNK Power Power (TYPICAL OF XX) ENCLOSURE EN-RHC-XX AS-VAV111-1 S-VAV110-1 N120VAC Power (TYPICAL OF 2) ENCLOSURE EN-RHC-XX AS-VAV110-1 ENCLOSURE EN-RHC-XX AS-VAV10-1 ENCLOSURE EN-RHC-XX AS-VAV10-1 ENCLOSURE EN-RHC-XX AS-VAV10-1 ENCLOSURE ENCLOSURE EN-RHC-XX AS-VAV10-1 ENCLOSURE EN-RHC-XX AS-VAV10-1 ENCLOSURE EN-RHC-XX AS-VAV10-1 ENCLOSURE ENCLOSURE EN-RHC-XX AS-VAV10-1 ENCLOSURE EN-RHC-XX AS-VAV10-1 ENCLOSURE EN-RHC-XX AS-VAV10-1 ENCLOSURE ENCLOSU	N1 TRUNK TO QUAD C NCM-3
TO POINTS IN TO POINTS FO HEAT TRACE TOILET EXH FA PANEL HT-MCA AND CAB UNIT H	NS TOILET EXH FANS	TO POINTS FOR TO POINTS IN TOILET EXH FANS HEAT TRACE AND CAB UNIT HTRS PANEL HT-MCB EN-LOSURE EN-AHU-26 AS-UNT111-101	
(TYPICAL OF 6) ENCLOSURE EN-ELEC-S S-VAV110-1 (120VAC OF 6) ENCLOSURE EN-ELEC-S CONTRE EN-HVU-7 AS-VAV110-1 (120VAC (Power) (120VAC EN-CLOSURE EN-HVU-7 (Power) (120VAC OF 6) (120VAC)	er ENCLOSURE ENCLOSURE EN-HVU-10 EN-HVU-5 AS-UNT111-101 AS-UNT111-101	ENCLOSURE ENCLOSURE ENCLOSURE ENCLOSURE ENCLOSURE ENCLOSURE EN-AHU-17 (TYPICAL OF 4) AS-UNT111-101 AS-UNT111-101	<u>N1 TRUNK CABLE = TO BE IN STRUCTURED</u> <u>WIRING SYSTEM SUPPLIED BY JOB ELECTRICIAN</u> <u>N2 TRUNK CABLE = 3 CONDUCTOR #18AWG</u>
ENCLOSURE ENCLOSURE EN-AHU-11 EN-AHU-12 AS-AHU103-300 AS-AHU103-300	ENCLOSURE EN-AHU-13 AS-AHU103-300 C EN-AHU-14 AS-UNT111-101 C EN-AHU-14 AS-UNT111-101 C EN-AHU-14 AS-UNT111-101 C EN-AHU-14 AS-UNT111-101 C	ENCLOSURE EN-RHC-XX EN-RHC	COMP C-1 SHIELDED TWISTED WIRE SOLID OR STRANDED BELDON OR EQUAL FIELD POINT WIRING TO BE 2 OR 3 CONDUCTOR #18AWG SHIELDED TWISTED WIRE SOLID OR STRANDED BELDON OR EQUAL
ENGLOSURE EN-AHU-19 AS-UNT111-101 SERVICE LEVEL	ENCLOSURE ENCLOSURE EN-COOLING EN-HVU-1 DX-9100-8454 AS-UNT111-101	ENCLOSURE EN-HVU-2 AS-UNT111-101 EN-HVU-3 AS-UNT111-101 EN-HVU-4 AS-UNT111-101 EN-HVU-4 AS-UNT111-101 EN-HVU-8 AS-UNT111-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-101 AS-UNT11-10 AS-UNT11-10 AS-UNT11-10 AS-UNT11-10 AS-UNT11-10 AS-UNT11-10	AS-BUILT 7/18/00 CM REFERENCE DRAWING NO. REVISION-LOCATION ECN OATE BY Sales Engineer Project Manager Application Engineer DRAWN APPROVED JDP WJT RTS BY RTS OATE 7/24/97 SY OATE Branch Information Controls, Inc. 70.000, 000
		FILE NAME FILE NAME FILE NAME NETWORK1 vsh BALTIMORE, MARYLAND	Systems & Services Division



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PI	R-1	evice:	1		11280		EPSCN FX-870				
WS	5-1			-	15315 PMI-0		Deskpro 2000 PMI, NEW	5/100M	MLC., 2.1G	B,/16MB	
			1		PMI-SCS		PMI, NEW, SUBS	CRIPTI	CM		
	nel D IM-3,4	evice		EN-EWC	22-0		UNIV PKG MOD,				
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Estimate: ab		BILL OF MATERIA	70500098 pre
		/Part *	
Field Devices	::		
D-1-1A, D-1-1	4		SEE DAMPER SCHEDULE
B, D-1-2, D-1-			
3			
DPR-C	3		DMPR ACT, 3-12*, W/ PILOT
DPR-C,MIN-DP	2	D-3153-2	DMPR ACT, 8-13*
R			
			GAGE, 2*, 0-30 PSIG. FTEM
			STAT, LL, 20', EL, MAN. LE (55P
H-VLV,C-VLV	2		SEE VALVE SCHEDULE
MA-T, DA-T, RA	3	TE-6316P-1	SENS.T-NI,0.1%,17° AVG
-T			
			XDUCR DP 0/0.25* 4-10ma
S-SP	1		XDUCR DP 0/10.3" 4-13ma
SA-HSP, RA-HS	2	AFS-460	BUCT AIR FLOW HIGH STATIC
P			
			XEUCR DP 0/2.5* 4-2.0ma
SPC-1-1			CNTRLE DP.0.05~1*WG
T-3		T-3610-1001	STAT, LOW VOL , 3' AVB, DOT
TEF			ENCL, 4-5/8X 5-1/8 12 3-3/8
			RLY BASE, 3PDT, 11PIN 10A
	3	PD-109-51	RELAY PLUG-IN BPDT IAVAC
Panel Device:			
		AS-AHU103-300	AHU TERM BD IN EWC15
		EN-EXP101-0	UNIV PKG MOD, CVR & BACKEN XDUCR, EP, 4-20ma, HI WOL
EP-1,2,3	3	EP-3000-4	XDUCR, EP, 4-20ma, HI WDL
E2-4	1		3-W SOLENOID.W/OV.I4 VAC
			GAGE, 2", 0-30 PSIG, STEM
			RELAY; 2SPDT 5 AMP 143VAC
SA, RA			RLY BASE, 3PDT, 11PIN 13A
	_	PD-109-51	
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THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED OUTSIDE AND RELIEF AIR DAMPERS D-1-1A, D-1-1B, D-1-3 AND COOLING COIL VALVE V-C-1 WILL CLOSE; COOLING COIL PUMP WILL BE OFF; RETURN AIR DAMPER D-1-2 WILL BE OPEN AND HEATING COIL VALVE V-+-1 WILL BE CLOSED TO THE COIL. SMOKE DAMPERS D-1-4, D-1-5 WILL REMAIN OPEN UNDER CONTROL OF SMOKE DETECTION SYSTEM.

WARM-UP MODE - SUPPLY AND RETURN FANS WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METAS''S SYSTEM. ON THE START OF THE UNIT, HEATING COIL VALVE V-H-1 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER <u>D-1-2</u> WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER <u>D-1-1</u> BAND RELIEF AIR DAMPER <u>D-1-1</u> BAND RELIEF AIR DAMPER <u>D-1-3</u> CLOSED. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS

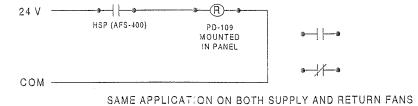
OCCUPIED HEATING MODE - SUPPLY AND RETURN FANS WILL BE RUNNING, RETURN AIR DAMPER D-1-2 IS OPEN. MINIMUM OUTSIDE AIR DAMPER ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF FORTY-FIVE (45F) MODULATE V-H-1 CLOSED TO THE HEATING COIL. ON A FURTHER RISE, 1-2 WILL GRADUALLY MODULATE DAMPERS <u>D-1-18</u> OPEN WHILE SIMULTANEOUSLY CLOSING <u>D-1-2</u>, STATIC PRESSURE CONTROLLER <u>SPC-1-1</u> LOCATED IN THE ENTERING SIDE OF THE RELIEF DAMPER WILL OVERRIDE THE CONTROL AND MODULATE <u>D-1-3</u> TO MAINTAIN ITS SECTING TO ENSURE A POSITIVE SUILDING PRESSURE. LOW LIMIT THERMOSTAT 13, SENSITIVE TO THE COLDEST SPOT IN THE AIR STREAM, WILL OVERRIDE 1-2 TO PREVENT MIXED AIR FROM FALLING BELOW ITS SETTING OF FORTY (40F). ON A FALL IN TEMPERATURE, THE PEVERSE WILL OCCUR. COOLING COIL VALVE V-C-1 WILL BE CLOSED TO THE COIL AND COIL CIRCULATION PUMP WILL BE OFF DURING THE HEATING MODE.

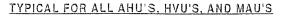
UNOCCUPIED HEATING MODE - IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL

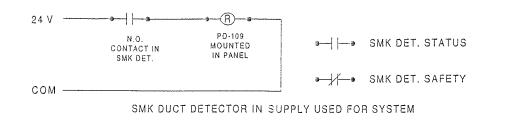
OCCUPIED COOLING MODE - SUPPLY AND RETURN FANS AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE AIR DAMPER <u>D-1-1A</u> WILL OPEN. OUTS DE DAMPER <u>D-1-18</u> AND RETURN DAMPER <u>D-1-2</u> WILL, THROUGH THE METASYS SYSTEM CCNTROL UNIT, BE UNDER FLOATING DRY BULB DIFFERENTIAL CONTROL WHICH WILL COMPARE THE TEMPERATURE OF THE RETURN AND OUTS DE AIR STREAMS. THE OUTSIDE AIR WILL BE UTILIZED WHENEVER IT IS GREATER THAN SEVEN (7F) LESS THAN THE RETURN AIR TEMPERATURE. WHEN THE DIFFERENTIAL FALLS BELOW SEVEN (7F), MAXIMUM OUTSIDE AIR DAMPERS D-1-18 WILL CLOSE, OPENING RETURN AIR DAMPER D-1-2. DISCHARGE SENSOR T-2, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL IN SEQUENCE MODULATE OUTSIDE AND RETURN DAMPERS D-1-1B AND D-1-2 AND CHILLED WATER VALVE V-0-1 TO MAINTAIN ITS SETTING OF FORTY-FIVE (45F). HEATING COIL VALVE V-H-1 WILL REMAIN

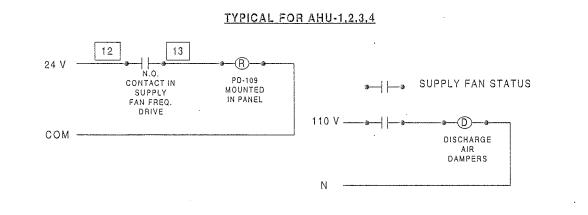
FAN CONTROL - SYSTEM STATIC PRESSURE SENSING STATION <u>SPSS-1-1</u> THROUGH A STATIC PRESSURE TRANSMITTER AND THE METASYS CONTROLLER WILL MODULATE THE SUPPLY FAN VARIABLE FREQUENCY DRIVE TO MAINTAIN ITS SETTING. ON A RISE IN STATIC AS SENSED BY SPSS-1-1 THE SUPPLY FAN DRIVE WILL GRADUALLY MODULATE FAN SPEED TO ITS MINIMUM POSITION TO MAINTAIN ITS SETTING. HIGH LIMIT STATIC PRESSURE CONTROLLER SPC-1-2 WHICH WILL OVERRIDE SPSS-1-1 TO PREVENT THE DISCHARGE FROM RISING ABOVE IT'S SET POINT. SUPPLY DUCT AIR MONITORING STATION AMD-1-1 AND RETURN DUCT AIR MONITORING STATION AMD-1-2 THROUGH VELOCITY PRESSURE TRANSMITTERS WILL SEND SIGNALS TO THE METASYS CONTROLLER WHICH WILL COMPARE TOTAL SUPPLY AND RETURN AIR QUANTITIES AND MODULATE THE RETURN VARIABLE SPEED DRIVE BASED ON SETPOINT TO SYNCHRONIZE RETURN FAN VOLUME WITH THE SUPPLY FAN VOLUME SO AS TO MAINTAIN CONSTANT MINIMUM BALANCED OUTSIDE AIR FLOW. DIFFERENTIAL WILL BE REDUCED TO ZERO (0) (NO CUTSIDE AIR) DURING WARM-UP AND UNOCCUPIED MODES OF OPERATION, MANUALLY RESET HIGH LIMIT STATIC PRESSURE CONTROLLERS SPC-1-2 AND SPC-1-3 WILL STOP THEIR RESPECTIVE SUPPLY AND HE IURN FANS WHENEVER THEIR SETTING IS REACHED. ALL FANS WILL BE REQUIRED TO BE MANUALLY RESTARTED IF DE-ENERGIZED BY STATIC PRESSURE CONTROLS. SUPPLY FANS WILL BE MANUALLY CONTROLLED USING A BY-PASS

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STATUS .

TYPICAL FOR AHU-1.2.3.4 SAFETY

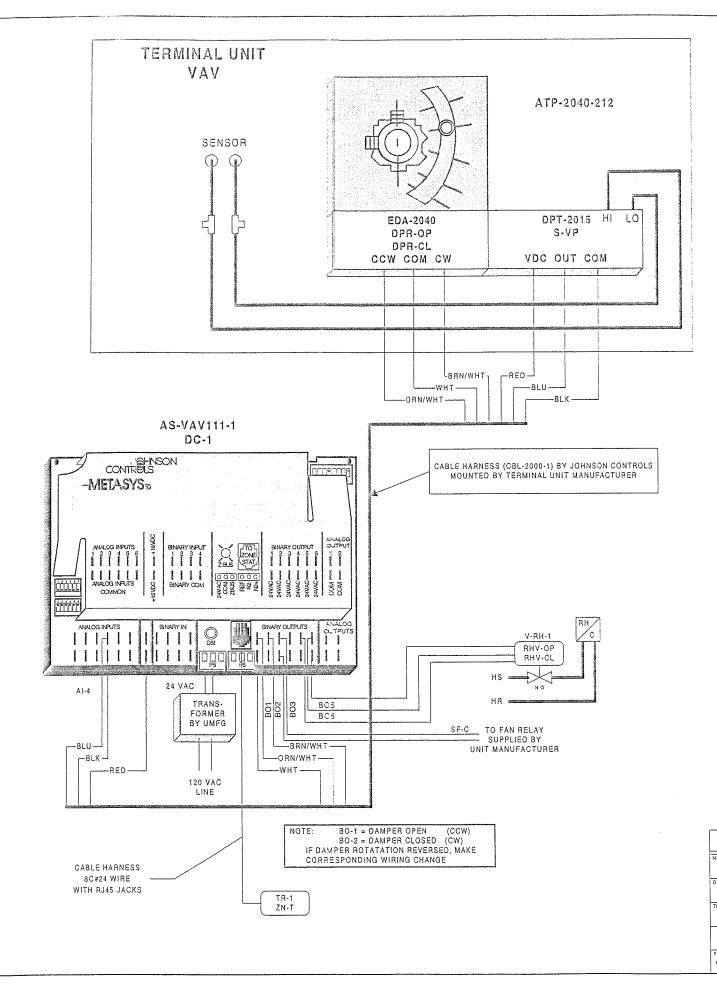
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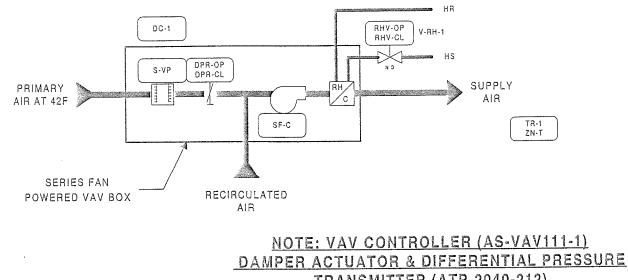
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Tog Point Ty	Syste		Object Name	Expanded ID	Display Units	DC 7vp	ə N2 Trunk M	12 Addr I	Cable Destination av/Terminal	Modulə Typə	Termination	Panel	Panel Location	Sicat Numiciar	Reference Drawing	Cable Number	Wiring/1 ubing	Termination In	Dəvicə	Termination Out	Location	াগাng/⊺ এ5ing	Terminalions	Device	Location	Rəf Dətail	Comment
	AHU-1					AHU			uy/renningi			EN-AHU-1	Press Lev MER A		M.3-09	1		1	1		1	<u> </u>		ļ			Power to Controller
	LAHU-1					AHU						EN-AHU-1	Press Lev MER A	0	M.3-09		1	1		1		1		<u> </u>			
BO-1	AHU-1		N-DPB	Min OA Damper Control	Cicsed: Open	-		1180-	-1		BO#.24V	EN-AHU-1	Press Lev MER A	0	M.3-09	AH-1-80-1	1		V11HGA-1C0	1		2-8	2-Wire	SAV-24VAC		-A50 -A53	
BO-2	AHU-1			Supply Fan Control	Off On		1	1180-		RLY	BO#.24V,BICCM	EN-AHU-1	Press Lev MER A	0	M.3-09	AH-1-BO-2	3/18	A,COILS,COM		COM,NO		2'-4	See starter detail				
80-3	AHU-1			Return Fan Control	Clf On		11	1180-		BLY	BO#,24V,BICOM	EN-AHU-1	Press Lev MER A	0	M.3-09	AH-1-BO-3		B,COILS,COM		COM,NO		2-4	See starter detail			A53 A53	
80-4	AHU-1			Clg Coil Pump 1 Control	Off On		1	1 80-		RLY	BO#,24V,BICCM	EN-AHU-1	Press Lev MER A	0	M.3-09	AH-1-80-4	3/18	A,COILS,COM		COM,NO		2:-4	See starter detail				I
80-4	AHU-1			Toilet Exh Fan Control	Off On			1 BO-					Press Lev MER A		M.3-09	AH-1-BO-5			PD-109-51			12:13	Device dependen	124VAC OUT	+	A50	<u> </u>
80-6	IAHU-1			1		AHU		1 BO-		<u> </u>			Press Lev MER A		M.3-09	AH-1-BO-6	1		<u> </u>		_					<u></u>	<u> </u>
80-7	AHU-1			······		AHU		1180-					Press Lev MER A		M.3-09	AH-1-BO-7	1		<u> </u>			<u> </u>				1	
80-8	AHU-1					AHU	1	1 BO-	-8	1		EN-AHU-1	Press Lev MER A	0	M.3-09	AH-1-80-8	1										
80-9	AHU-1					IAHU	1	1/BQ-				EN-AHU-1	Press Lev MER A	0	M.3-09	AH-1-80-9											
BO-10	AHU-1					TAHU	1	180-	-10				Press Lev MER A		M.3-09	AH-1-80-10									1	1	
IAO-1	AHU-1		B-C	Damper Control	% Open	AHU	1	1 AO-	-1		AC#,AOCOM	EN-AHU-1	Press Lev MER A		M.3-09	AH-1-AO-1			EP-8000-4	SUPPLY,O		11.4*	Barb Fitting	EP-PNEU.		A28	
1AO-2	AHU-1			Heating Coil Valve	% Open	AHU	1	1 AO-	-2		AO#,AOCOM	EN-AHU-1	Press Lev MER A		M.3-09	AH-1-AO-2			EP-8000-4	SUPPLY.O		11 4"	Barb Fitting	EP-PNEU.		1A28	
A0-3	AHU-1			Clg Coll Valve	% Open		1	1 AQ-	-3		AO#,AOCOM		Press Lev MER A		M.3-09	AH-1-AO-3	2/18	+,-	EP-8000-4	SUPPLY,O	1	11 - 2"	Barb Fitting	EP-PNEU.		A21	
AQ-4	AHU-1			Sup Fan Var Spd Drive	*	AHU	1	1 AO-	-4		AC#,AOCOM		Press Lev MER A		M.3-09	AH-1-AO-4						2.13	Device dependen			A21	
1AO-5	AHU-1			Bet Fan Var Spd Drive		AHU	1	1 AO-	-5		AO≇,AOCOM		Press Lev MER A		M.3-09	AH-1-AO-5			}			12-3	Device depender	10-20mA 001		- R21	
1AO-6	AHU-1					AHU	1	1 AO-	-6				Press Lev MER A		M.3-09	AH-1-AO-6	1					1		t Aux Contact (NO)		A40	
181-1	AHU-1	I SF	-S	Supply Fan Status	Off On	AHU	1	1 81-1			BI#,BICOM		Press Lev MER A		M.3-09	AH-1-BI-1	4					12.22		tiAux Contact (NO)		1A40	
B1-2	AHU-1	RF	-S	Return Fan Status	Off On	IAHU	1	1 81-2	2		BI#,BICOM		Press Lev MER A		M.3-09	AH-1-BI-2			ļ			12:22	Device depender			A40	
81-3	AHU-1	SN	K-DET	Smoke Detectors	Normal  Alarm	AHU	1	1 81-3	3		BI#,BICOM		Press Lev MER A		M.3-09	AH-1-BI-3	1					222	NO.M1	A70 (NC)		A41	
81-4	IAHU-1	LT	S	Low Temperature Stat	Normail Alarm	AHU	1	1 81-4	1		BI#,BICOM		Press Lev MER A		M.3-09	AH-1-8I-4			ļ		_	12 22		t Aux Contact (NO)		1A40	
81-5	AHU-1	00	P-S	Clg Coil Pump 1 Status	Off On	AHU	1	1 BI-5			BI#,BICOM		Press Lev MER A		M.3-09	AH-1-BI-5			<u> </u>					ntiAFS-460 & Relay		A40	[
81-6	AHU-1	SA	-HSP	Supply Air Static Press	Normal Alarm	AHU	1	1 BI-6			BI#,BICOM		Press Lev MER A		M.3-09	AH-1-BI-6						12:22		ti AFS-460 & Relay		A40	
81-7	AHU-1	RA	-HSP	Return Air Static Press	Normal Alarm	AHU	1	1 81-7			BI#,BICOM		Press Lev MER A		M.3-09	AH-1-BI-7					<u> </u>	14 44	Therice depender	ILIAFO 400 & Heldy		1	
BI-8	AHU-1	1				AHU	1	1 BI-8					Press Lev MER A		M.3-09	AH-1-BI-8			. <u> </u>			278		DPT-2641		A2	1
AI-1	IAHU-1	RA		Return Air Vel Pressure		AHU	1	1 Al-1		1	AI#,+VDC		Press Lev MER A		M.3-09	AH-1-Al-1	J						2-Wire	TE-6316P-1		IA4	
AI-2	AHU-1	RA	-T	Return Air Temperature	Deg F	AHU	1	1 Al-2			AI≇,AICM		Prass Lev MER A		M.3-09	AH-1-AI-2	1						2-wire	TE-6316P-1		A4	
AI-3	AHU-1			Disch Air Temperature	Deg F	AHU	1	1 AI-3			AI#,AICM		Press Lev MER A		M.3-09	AH-1-AI-3	- <u> </u>	_ <u>_</u>					2-Wire	ITE-6316P-1	+	IA4	
AI-4	AHU-1	MA	-T	Mixed Air Temperature		AHU	1	1 Al-4			Al≇,AICM		Press Lev MER A		M.3-09	AH-1-AI-4						<u>i 4 · 0</u>	2-114	10-00101-1		1	
AI-5	AHU-1					AHU	1	1 AI-5					Press Lev MER A		M.3-09	AH-1-AI-5			+			1					1
AI-6	AHU-1				i .	JAHU	1	1 Al-6		L			Press Lev MER A		M.3-09	AH-1-AI-6		_				12.78		DPT-2641		A2	
AI-7	AHU-1			Supply Static Pressure	i In. Wg	AHU	1	1 Al-7			AI#,+VDC		Press Lev MER A		M.3-09	AH-1-AI-7				1		12 13		DPT-2641		A2	
AI-8	AHU-1	S-1	/P	Supply Vel Pressure	in. Wg	AHU	1	1 AI-8	3	1	AI#,+VDC	IEN-AHU-1	Press Lev MER A		M.3-09	AH-1-AI-8	3	1	1	1	<u>, l</u>	i∠ -0	[7,†	101 1-20-11			1



## SERIES FAN POWERED VARIABLE AIR VOLUME (VAV) WITH REHEAT COIL



#### DESCRIPTION OF OPERATION

PRIMARY AIR VALVE WILL OPEN TO THEIR MINIMUM POSITION AND TERMINAL UNIT FAN WILL START AND RUN CONTINUOUSLY WHENEVER AIR HANDLING UNIT IS RUNNING. TERMINAL UNIT FANS WILL START THIRTY (30) SECONDS BEFORE OPENING OF AIR VALVES TO PREVENT BACK SPINNING OF FAN. FANS WILL ALSO BE OPERATED AS DEFINED IN THE UNOCCUPIED MODES. PRIMARY AIR VALVES WILL BE CLOSED DURING UNOCCUPIED HEATING MODE. ROOM SENSOR TR-1 WILL ON A RISE IN TEMPERATURE GRADUALLY MODULATE REHEAT COIL VALVE V-RH-1 CLOSED AND ON A CONTINUED RISE WILL GRADUALLY MODULATE PRIMARY AIR VALVE FROM IT'S MINIMUM TO MAXIMUM SETTING TO MAINTAIN IT'S SETTING OF SEVENTY-FIVE (75F). ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED. DURING OPERATION OF THE WARM-UP MODE ALL PRIMARY AIR VALVES OPEN TO THEIR MAXIMUM POSITION AND TERMINAL FANS START TO PERMIT FULL AIR FLOW TO THE SPACES. REHEAT COIL VALVE V-RH-1 IS MODULATED IN RESPONSE TO ROOM SENSOR TO MAINTAIN SPACE TEMPERATURE.

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TIME 02:18 PM FILE NAME VAVBOX-A.VS	EXCEPT WITH THE WRITTEN PERMISSION OF JOHNSON CONTROLS, INC. AND FURTHER AGREES TO SURRENDER SAME TO JOHNSON CONTROLS, INC. UPON DEMAND.	PROJECT TITLE BALTIMORE NFL STADIUM AT CAMDEN YARDS BALTIMORE, MARYLAND	

		BILL OF MATER	ALS	
Estimate:	-		7052009	8.pre
Desig.	Qty	Part #	Description	
Field Devi	.ces:			
DC-1	45	AS-VAV110-1	VAV 6AI,481,8BO,8K	
V-RH-1	46		SEE VALVE SCHEDULE	
VAV	46	ATP-2040-212	ACT, 2MIN+1.5"DP, 1/2"CPL	G
ZN-T	30	TE-6410W-1000	MSTAT, NI, BCIL, JACK	

# TRANSMITTER (ATP-2040-212) ARE FACTORY MOUNTED BY TITUS

AS-BUILT								7/18/00	CME
AEFERENCE	DRAWING	NO.		REVISION-L	OCATIO	v	ECN	DATE	ЗY
lalas Engineer	Project Manager	Application	Engineer	1	WARG	N		APPROVED	
JDP	WJT	R.	rs	BY RTS	DATE	08/26/97	BY	DATE	
	L			Branch Informati	on		CONTRACT	NUMBER	
001	JAHN	ĮSO	Ν	Johnson	Contr	ols, inc.	70	52-00	98
CON	IRO S	, ,		60 Lovet			DRAWING 1	NUMBER	
		-		Sparks, I	AD 21	152	l gi	-6559	-02
C	ontrols Grou	р						-0000	V 54

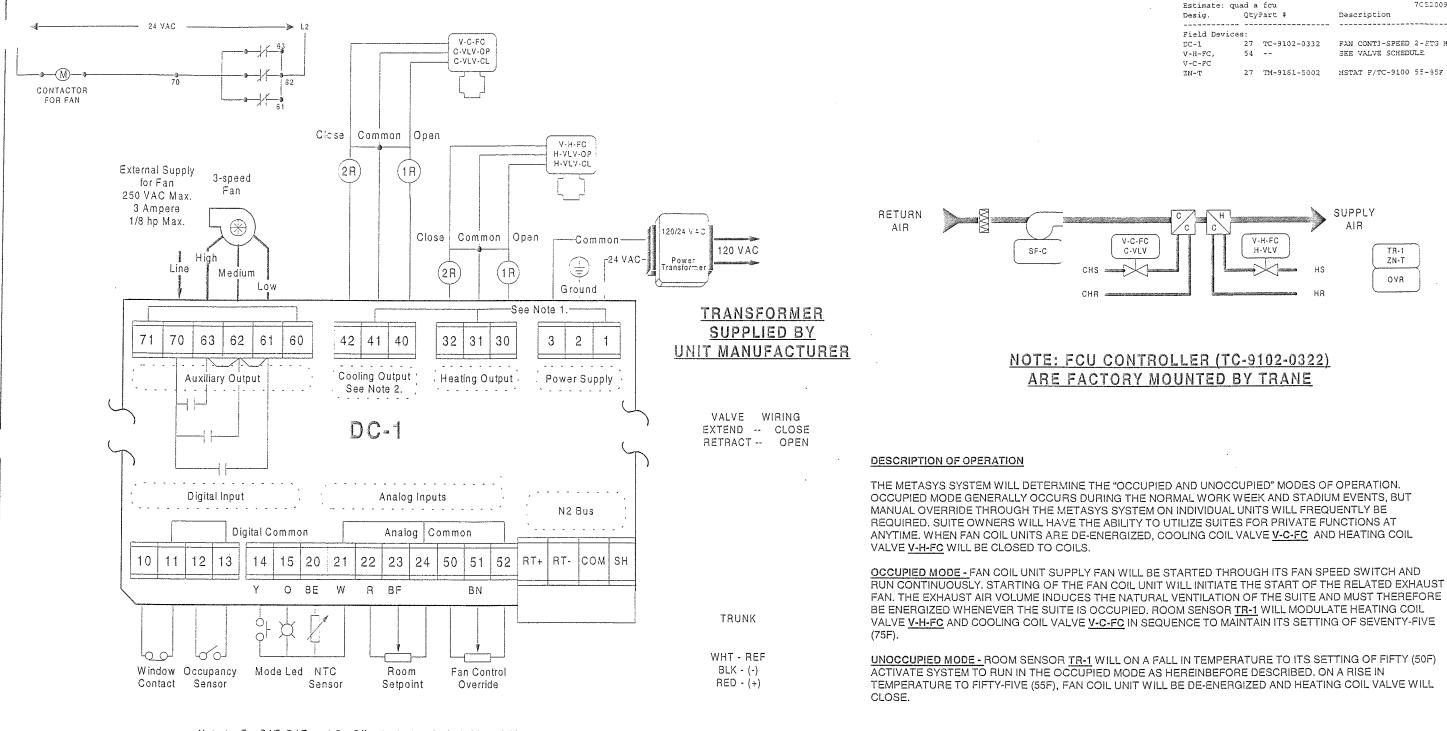
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Spreadsheet	1	Software	*************	1		Digit	tal Controller Information		1	Pa	nel Intormati	on			1	Intermediate De	evice			Fie	ld Device			
ig Point Type	System Object Name Name	Expended (0)	Display Units	s DC 7	ype N2 Trun	k N2 Addi	Cable Destination Module Ty Bay/Terminal	pe Termination	Panel	Panel Location	Number	Reference Drawing	Cable Number	Wiring/I ubing	Termination In	Device	Termination Out	Location	Wiring/T ⊔bing	Terminations	Device	Location		Comment
<u>}</u>	FP-VAV-A	i		IVAV	·····				EN-FPVA	V At VAVBOX			1	1	1			1	1	1				Power to Controller
	EP-VAV-A I			IVAV		1 ×	d		EN-FPVA	V At VAVBOX	0		1	1					1					N2 Trunk
	FP-VAV-A ZN-T	Zone Temperature	Deg F	VAV		1	CAL-1	PHONE JACK	EN-FPVA	VIAt VAVBOX	0		FP-x-Al-1	1		1			3/26	PHONE JACK	Metastat-Ph Jack		U2	
	FP-VAV-A			IVAY		1 2	CIAI-2		EN-FPVA	V At VAVBOX	0		FP-x-AI-2	1	1		1				]			
AI-3	FP-VAV-A			VAV		1 ×	KIAI-3	i	EN-FPVA	V At VAVBOX	0		FP-x-Al-3	1	1		1							
	FP-VAV-A S-VP	Supply Vel Pressure	lo, Wa	VAV		11 ×	CAI-4	AI# AICM +15VD	DEN-FPVA	V At VAVBOX	0		FP-x-Al-4	1			1		3.18	OUT,COM,+VDC	DPT-2000		<u>U9</u>	
	FP-VAV-A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		VAV		11 ×	KIAI-5		EN-FPVA	V At VAVBOX	0		FP-x-AI-5				i.							
	FP-VAV-A			VAV		1 ×	CAI-6		EN-FPVA	V At VAVBOX	0		FP-x-Al-6	1										
	FP-VAV-A			VAV		1 ×	K BI-1	i	EN-FPVA	V At VAVBOX	0	1	FP-x-BI-1	1									,	
	FP-VAV-A			VAV		11 X	(BI-2	i	EN-FPVA	V At VAVBOX	0		FP-x-BI-2	T			1							
	FP-VAV-A			IVAV		1 ×	KIBI-3	1	EN-FPVA	V At VAVBOX	0		FP-x-BI-3	1										
	IFP-VAV-A			VAV		11 X	KB1-4	í	EN-FPVA	V At VAVBOX	0		FP-x-BI-4				i							
80-1	FP-VAV-A DPR-OP	Damper Open	Off On	VAV		11 X	KBO-1	BO-a,BO-b.24VA	GEN-FPVA	V At VAVBOX	0		FP-x-80-1							CW,CCW,COM			U54	
	FP-VAV-A DPR-CL	Damper Close	Off On	VAV		1 X	(BO-2	BO-a,BO-b.24VA	<b>DEN-FPVA</b>	V At VAVBOX	0		FP-x-80-2				1			CW,CCW,COM			U54	
80-3	FP-VAV-A SF-C	Supply Fan Control	Off On	VAV		11 X	(BO-3	BO#,24VAC	EN FPVA	V At VAVBOX	0		FP-x-80-3	2/18	COIL	RELAY	NO.COM		2/14	See starter detail	Starter (NO)		U51	
80-4	FP-VAV-A			VAV		11 X	(BO-4	i		V At VAVBOX	0		FP-x-80-4	1									1150	
80-5	FP-VAV-A RHV-OP	Reheat Valve Open	Off On	VAV		1 X	(BO-5	BO-a,BO-b.24VA			0		FP-x-80-5	1		<u> </u>				BLK,RED,WHT			U58	
BQ-6	FP-VAV-A RHV-CL	Reheat Valve Close	Off On	VAV		1) X	K BO-6	BO-a,BO-b,24VA			j 0		FP-x-80-6						G/18	BLK,RED,WHT	VA-7150		U58	
	FP-VAV-A	1		VAV	1	1 X	(AO-1	1		V At VAVBOX	0		FP-x-AO-1	L		1								
AQ-2	FP-VAV-A			VAV		11 X	(AO-2		IEN-FPVA	V At VAVBOX	0		FP-x-AO-2	1		1	:		1		1			

7052-0098



Note 1: For PAT, DAT, and On-Off outputs, terminals 1, 31, and 41 are internally connected.

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DATE	WHOLE OR IN PART, OR TO SUFFER SUCH	QUAD A	Salas
07/18/00	ACTION BY OTHERS, FOR ANY PURPOSE,		
TIME	EXCEPT WITH THE WRITTEN PERMISSION	PROJECT TITLE	
02:34 PM	OF JOHNSON CONTROLS, INC. AND FURTHER AGREES TO SURRENDER SAME	BALTIMORE NFL STADIUM	
	TO JOHNSON CONTROLS, INC. UPON	AT CAMDEN YARDS	
	DEMAND.		
FILE NAME FANCOILA.VSC	COPYRIGHT JOHNSON CONTROLS, INC. 19nn	BALTIMORE, MARYLAND	

		BILL OF MATERI	ALS
Estimate:	quad a	fcu	7CE20093.pre
Desig.	Qty	Part #	Description
Field Devi	ces:		
DC-1	27	TC-9102-0332	FAN CONT3-SPEED 2-STG H/C
V-H-FC,	54		SEE VALVE SCHEDULE
V-C-FC			
ZN-T	27	TM-9151-5002	MSTAT F/TC-9100 55-85F FSC

							Γ			
S-BUILT									7/18/00	CME
REFEREN	CE DRAWING	NO.		REVISION-L	OCATIO	N	F	ECN	DATE	ΒΥ
las Engineer	Project Manager	Application Eng		1	DRAW	N			APPROVED	
JDP	WJT	RTS		BY RTS	DATE	08/28/97		BY	DATE	
			T	Branch informat.	on.		C	ONTRACT	NUMBER	
$\sim$	ITREL	1	Johnson	Contr	ols, Inc.	7052-0098				
CON	IIRUL		60 Loveto			DRAWING NUMBER				
		Sparks, M	AD 21	152	BL-6559-03					

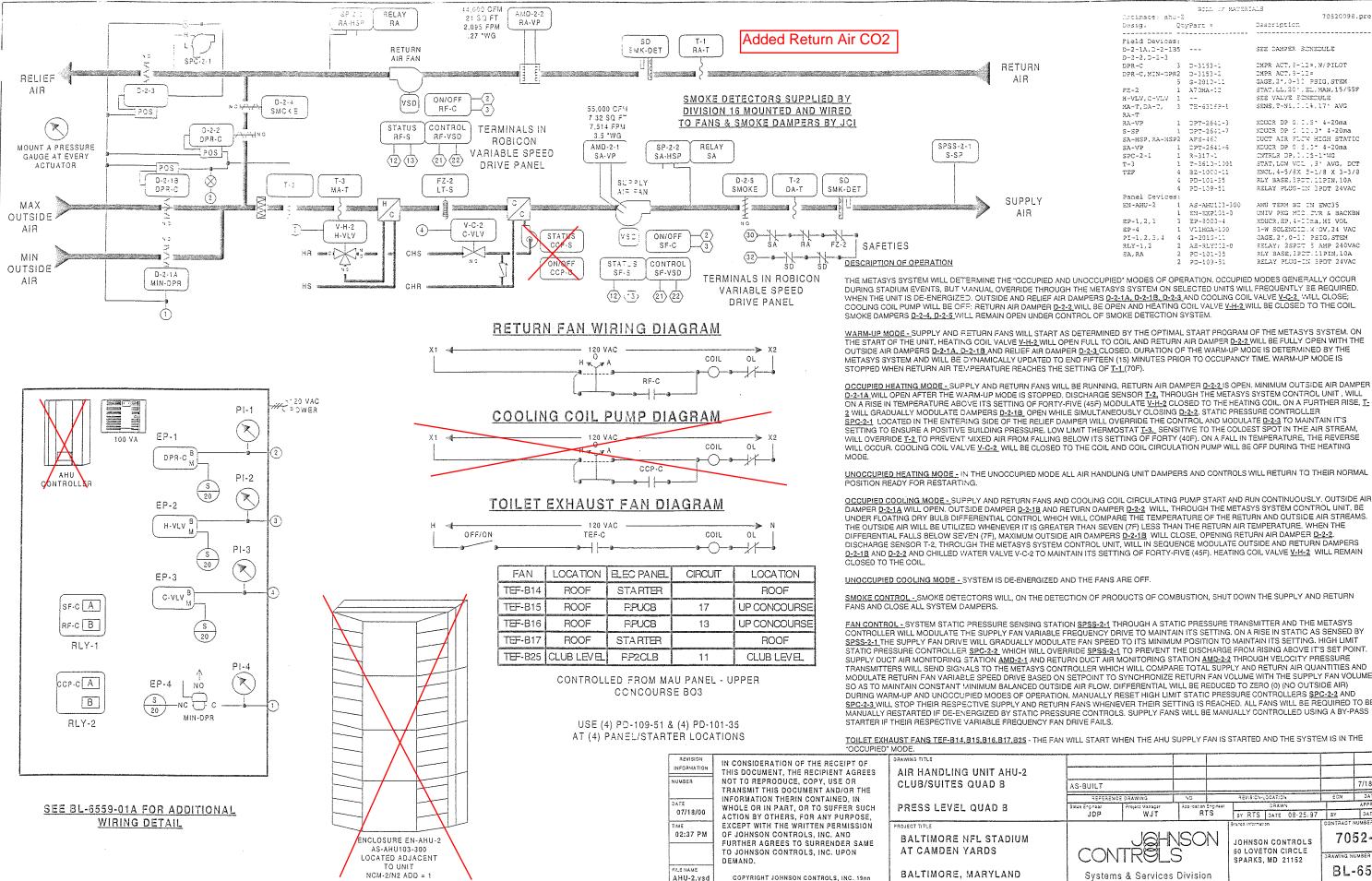
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								0:	gital Controller Inf	amation	and the second	T		Panet Informa	tion		1	l	intermediate Dev	vicə	100 TO		Fie	ld Device			والمتحدق والمعاملة والمتحرين والمعادين والمعاد المراجع
<u> </u>	eadsheet Point Type	System	Object	Software Exponded ID	Display	Units	DC Type N2 Tru	1	Cable		Termination	Panet	Panel Loca	l Slot	Reference	Cable Number	Wiring/T ubing	Termination In	Dəvicə	Terminatio Out	on Location	Wiring/I ubing	Terminations	Device	Location		
1		Name	Name						Bay/Terming	1	1	1		L					Lana and the second sec		<u></u>						Power to Controller
		IFCU-A	1			17	·>					EN-FCU			0							1	1				N2 Trunk
	·· ···•	FCU-A	•	i		T	"C	1	Y		1		At FCU		0	IFC-x-BO-1			<u> </u>			3/18	BLK,WHT,RED	VA-7150 (Heating)			
-	30-1	FCU-A	H-VLV-OP	Htg Valve Open	011	On 📅	2	1	Y 80-1		32,31/COM.30		At FCU	· · · · · · · · · · · · · · · · · · ·	0	FC-x-80-2						3/18	BLK,WHT,RED	VA-7150 (Heating)			
	30-2	FCU-A	H-VLV-CL	Htg Valve Close	Off	On iī	5	1	Y BO-2						<u>u</u>	FC-x-BO-3		·				13/18	BLK, WHT, RED	VA-7150 (Cooling)			
	30-3	FCU-A	C-VLV-OP	Clg Vaive Open	Off	On ~	10 I	1	Y 80-3						0	FC-x-BO-4								VA-7150 (Cooling)			
	30.4			Clg Vaive Close	Off	On T	3	1	Y BO-4		42,41/CCM.40				01	FC-x-BO-5	-+	1				4/14	HI,MED,LOW,NE	UStarter Coil (3 spd fan	)		
- 1	30-5	FCU-A	F-SPD-1	Fan (Speed 1)	Olf			1	Y BO-5		71.70 LINE 63,6					FC-x-BO-5		+				4/14	HI,MED,LOW,NE	UStarter Coil (3 spd fan	)		
	30-6	FCU-A	F-SPD-2	Fan (Sceed 2)	Off	On T	0	1	Y BO-6		71,70 LINE 63,6				0	FC-x-80-7						4/14	HI,MED,LOW,NE	UStarter Coil (3 spd fan	)	[	
-	30-7	FCU-A	F-SPD-3	Fan (Speed 3)	Off	On 😳	3	1	Y 80-7		71,70 LINE/63,6					FC-x-BI-1											
	31-1	FCU-A	1			17	"C	1	Y 81-1			EN-FCU			<u>v</u>	FC-x-BI-2						k					
	31-2	FCU-A	+	1		Ĩ		1	Y BI-2				At FCU		0	FC-x-BI-3											
	31-3	FCU-A	1	1		17		1	Y B1-3		L		At FCU		01	FC-x-Al-1		+				3/22	14 MODE, 15 LE	D.TM-9100 (Mode & LE	D)		
	Al-1	FCU-A	ZN-T	Zone Temperature	Deg	e 7	5	1	Y AI-1		14 MODE.15 LE					FC-x-AI-1	-1	- <u> </u>	<u> </u>			3/22	22,23,21/24	TM-9100 (Setpoint)			
	41-2	FCU-A	ZNISET	Zone Temp Set Point	Deg	F T	Э I	1	Y AI-2		22,23,21/24	EN-FCU			0	FC-x-AI-2		+				2/22	51,21/24	TM-9100 (Fan Overrig	de)		
_	AI-4	FCU-A	01/9	Fan Cverride	Lo-Md	Hi		1	YIAI-4		51,21/24	EN-FCU	ALFCU		0)	1-0-x-AI-4		1									

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		BILL OF MATERI	
Cacimace: ah			70520098.pre
Desig.	QC	yPart =	Description
Field Device			
		~~-	SEE DAMPER SCHEDULE
D-2-2, D-2-3			
		D-3153-1	CMPR ACT, 3-LE=, N/PILOT
DPR-C.MIN-DP	-		CMPR ACT, 3-12 #
bin office of			GAGE, 2*, 0-31 PSIG, STEM
FZ-2			STAT, LL, 20', EL, MAN, 15/55P
H-VLV.C-VLV			SEE VALVE SCHEDULE
		79-63169-1	SENS, T-N1, 1.1%, 17' AVG
RA-T			
	1	DPT-2641-3	XEUCR DP 0.1.5 4-20ma
			XDUCR DP 0.10.0* 4-20ma
SA-HSP, RA-HS	22	AFS-460	DUCT AIR FLUX HIGH STATIC
SA-VP	1	DPT-2641-6	XDUCR DP 0/3.3* 4+20ma
SPC-2~1	1	3-317-1	CNTRLR DP, 1.15-1*WG
T-3	1	r-3610-1001	STAT, LOW VCL , 3' AVG, DCT
TEF	4	BZ-1000-11	ENCL, 4-5/8X E-1/8 X 3-3/8
	4	2D-101-35	RLY BASE, BPDT, LIPIN, 10A
	4	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
Panel Cevice	s:		
EN-AHU-2	1	AS-AHU103-300	AHU TERM BC IN EWC35
			UNIV PKG MCC. IVR & BACKBN
EP-1,2,3	3	ZP-8000-4	XDUCR, EP, 4-11ma, HI VOL
			3-W SOLENCIE.W/OV,24 VAC
PI-1,2,3,4	4	3-2010-11	GAGE, 2*, 0-31 PSIG, STEM
RLY-1,2	2	AS-RLYCC2-0	RELAY; 2SPOT 5 AMP 240VAC
SA,RA	2	PD-101-35	RLY BASE, 1PDT. 11PIN, 10A
	2	PD-109-51	RELAY PLUG-IN 3PDT 24VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT VANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY SE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED. OUTSIDE AND RELIEF AIR DAMPERS <u>D-2-1A</u>, <u>D-2-1B</u>, <u>D-2-3</u> AND COOLING COIL VALVE <u>V-C-2</u>. WILL CLOSE; COOLING COIL PUMP WILL BE OFF: RETURN AIR DAMPER <u>D-2-2</u> WILL BE OPEN AND HEATING COIL VALVE <u>V-H-2</u>. WILL BE CLOSED TO THE COIL.

WARM-UP MODE \_ SUPPLY AND RETURN FANS WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COIL VALVE V-H-2 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-2-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPERS D-2-1A, D-2-1B AND RELIEF AIR DAMPER D-2-3 CLOSED, DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS

ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF FORTY-FIVE (45F) MODULATE V-H-2 CLOSED TO THE HEATING COIL. ON A FURTHER RISE, I-2 WILL GRADUALLY MODULATE DAMPERS <u>D-2-18</u> OPEN WHILE SIMULTANEOUSLY CLOSING <u>D-2-2</u>. STATIC PRESSURE CONTROLLER <u>SPC-2-1</u> LOCATED IN THE ENTERING SIDE OF THE RELIEF DAMPER WILL OVERRIDE THE CONTROL AND MODULATE <u>D-2-3</u> TO MAINTAIN IT'S SETTING TO ENSURE A POSITIVE BUILDING PRESSURE. LOW LIMIT THERMOSTAT T-3. SENSITIVE TO THE COLDEST SPOT IN THE AIR STREAM, WILL OVERRIDE <u>1-2</u> TO PREVENT VIXED AIR FROM FALLING BELOW ITS SETTING OF FORTY (40F). ON A FALL IN TEMPERATURE, THE REVERSE WILL OCCUR. COOLING COIL VALVE V-C-2 WILL BE CLOSED TO THE COIL AND COIL CIRCULATION PUMP WILL BE OFF DURING THE HEATING

UNOCCUPIED HEATING MODE - IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL

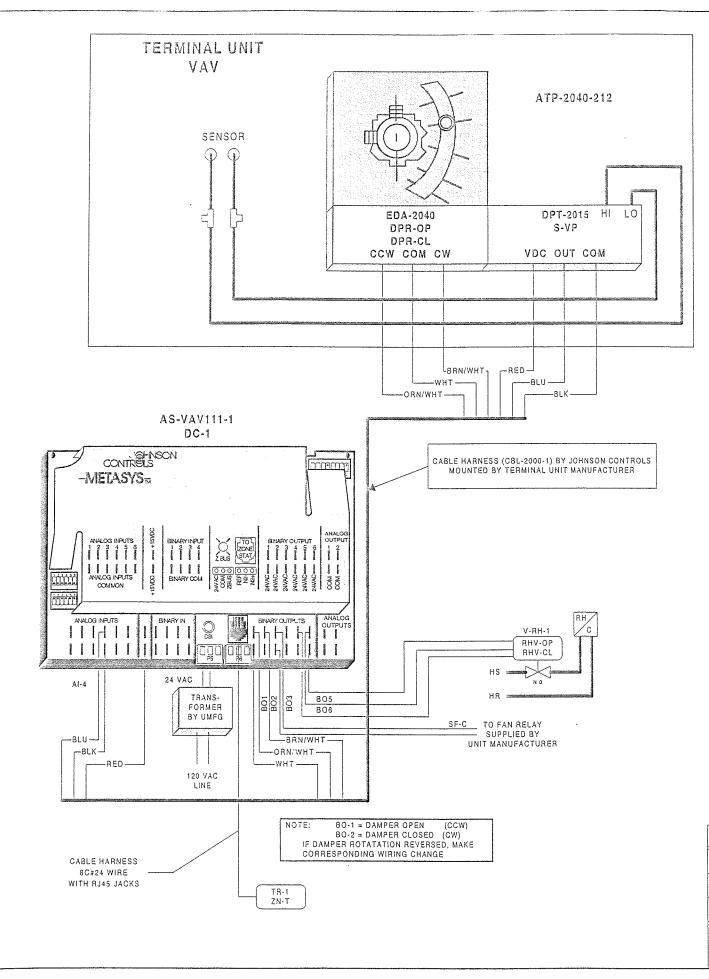
OCCUPIED COOLING MODE - SUPPLY AND RETURN FANS AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE AIR DAMPER <u>D-2-14</u> WILL OPEN. OUTSIDE DAMPER <u>D-2-18</u> AND RETURN DAMPER <u>D-2-2</u> WILL, THROUGH THE METASYS SYSTEM CONTROL UNIT, BE UNDER FLOATING DRY BULB DIFFERENTIAL CONTROL WHICH WILL COMPARE THE TEMPERATURE OF THE RETURN AND OUTSIDE AIR STREAMS. THE OUTSIDE AIR WILL BE UTILIZED WHENEVER IT IS GREATER THAN SEVEN (7F) LESS THAN THE RETURN AIR TEMPERATURE. WHEN THE DIFFERENTIAL FALLS BELOW SEVEN (7F), MAXIMUM OUTSIDE AIR DAMPERS <u>D-2-1B</u> WILL CLOSE, OPENING RETURN AIR DAMPER <u>D-2-2</u>. DISCHARGE SENSOR T-2, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL IN SEQUENCE MODULATE OUTSIDE AND RETURN DAMPERS D-2-1B AND D-2-2 AND CHILLED WATER VALVE V-C-2 TO MAINTAIN ITS SETTING OF FORTY-FIVE (45F). HEATING COIL VALVE V-H-2 WILL REMAIN

FAN CONTROL - SYSTEM STATIC PRESSURE SENSING STATION SPSS-2-1 THROUGH A STATIC PRESSURE TRANSMITTER AND THE METASYS CONTROLLER WILL MODULATE THE SUPPLY FAN VARIABLE FREQUENCY DRIVE TO MAINTAIN ITS SETTING. ON A RISE IN STATIC AS SENSED BY SPSS-2-1 THE SUPPLY FAN DRIVE WILL GRADUALLY MODULATE FAN SPEED TO ITS MINIMUM POSITION TO MAINTAIN ITS SETTING. HIGH LIMIT STATIC PRESSURE CONTROLLER SPC-2-2 WHICH WILL OVERRIDE SPSS-2-1 TO PREVENT THE DISCHARGE FROM RISING ABOVE IT'S SET POINT. SUPPLY DUCT AIR MONITORING STATION AMD-2-1 AND RETURN DUCT AIR MONITORING STATION AMD-2-2 THROUGH VELOCITY PRESSURE TRANSMITTERS WILL SEND SIGNALS TO THE METASYS CONTROLLER WHICH WILL COMPARE TOTAL SUPPLY AND RETURN AIR QUANTITIES AND MODULATE RETURN FAN VARIABLE SPEED DRIVE BASED ON SETPOINT TO SYNCHRONIZE RETURN FAN VOLUME WITH THE SUPPLY FAN VOLUME SO AS TO MAINTAIN CONSTANT MINIMUM BALANCED OUTSIDE AIR FLOW. DIFFERENTIAL WILL BE REDUCED TO ZERO (0) (NO OUTSIDE AIR) DURING WARM-UP AND UNOCCUPIED MODES OF OPERATION. MANUALLY RESET HIGH LIMIT STATIC PRESSURE CONTROLLERS SPC-2-2 AND SPC-2-3 WILL STOP THEIR RESPECTIVE SUPPLY AND RETURN FANS WHENEVER THEIR SETTING IS REACHED. ALL FANS WILL BE REQUIRED TO BE MANUALLY RESTARTED IF DE-ENERGIZED BY STATIC PRESSURE CONTROLS. SUPPLY FANS WILL BE MANUALLY CONTROLLED USING A BY-PASS

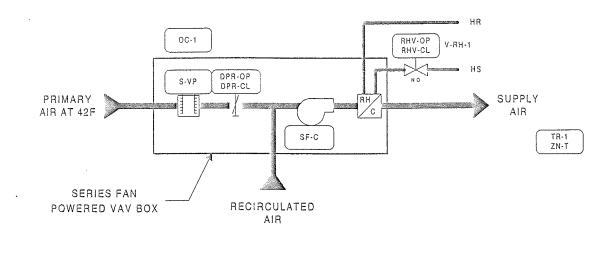
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											r	p	zmai Information			1	and the second	Intermediate De	evice			Fie	ld Device		1	
Spreadshe		System	Object	Software Expanded ID	Display Ur		ia N2 Trunk N	Digital Controller Info Cable 2 Addr Destination	Modulə Typə	Termination	Panel	Panel Location	Slot R	èlerence Drawina	Cable Number	Wiring/T ubing	Termination Ir	Device	Termination Out	Location	Wiring/T ubing	Terminations	Dəvicə	Location	Ref Detai	Comment
g rounce	100	Namə	Nome	Lipaneten				Bay/Terminal			<u> </u>				ļ					1						Power to Controller
	(A	AHU-2	. <u></u> i	1	1 1	14.HU						Press Lev MER a		3-10		+										N2 Trunk
		AHU-2				1×1+1U	1	1				Press Lev MER E	0 M.:		AH-1-80-1			V11HGA-100			2/18	2-Wire	SAV-24VAC		A50	
80-1	A	AHU-2	MIN-OPR	Min OA Damper Control	Closed Op	ben AHU	1	1 80-1				Press Lev MER E				3/18	A.COILS.COM		COM.NO		2/14	See starter detail	Starter (NO)		A53	<u> </u>
80-2	A	AHU-2	SF-C	Succiv Fan Control	011 0	กบ	1	1 80-2	1 144 1	BO#,24V,BICOM						3/13	B.COILS.COM		COMINO		2/14	See starter detail	Starter (NO)		A53	1
60-3	A	HU-2	BF-C	Return Fan Control	Off O	)n .4.40	1	1 90-3		BO#,24V,BICOM						13/18	A.COILS.COM		COM,NO		2/14	See starter detail	Starter (NO)		A53	
:80-4	1		CCP-C	Clg Coil Pump 2 Control	OITO	0n ,4,4U	1	1 80-4	RLY	BO#,24V,BICOM					IAH-1-80-5	3/10	14,00123,0014	PD-109-51			2/18	Device dependent	t 24VAC OUT		A50	<u> </u>
80-5				Todet Exh Fan Control	Olf C	n "i,-iU	1	1 80-5		BO#,24V		Press Lev MER E			AH-1-BO-5	1		1 0-108-01				1				1
80-6		AHU-2	1	1		ા	1	1 BO-6				Press Lev MER 8			AH-1-80-6	<u> </u>			<u>l</u>							
BO-7		AHU-2	+			1.40	1	1 BO-7				Press Lev MER E			AH-1-80-7	1					<u> </u>	1				<u> </u>
BO-8		AHU-2	+	1	1 1	1,1,40	1	1180-8		1		Press Lev MER a			AH-1-80-8											1
80-9		AHU-2	+	1		,x,HU	1	1 BO-9				Press Lev MER			AH-1-80-9 AH-1-80-10					_		1				
BO-10		AHU-2		1		LA.HU	1	1 80-10				Press Lev MER 8				10/10	+	EP-5000-4	SUPPLY.O		1/4*	Barb Fitting	EP-PNEU.		A28	<u> </u>
AQ-1			DPR-C	Damper Control	% Open	1.4,rHU	1	1 AO-1		AO#,AOCOM		Press Lev MER 8				2/18	+,-	EP-8000-4	SUPPLY,O		1/4	Barb Fitting	EP-PNEU.		A28	1
A0-2				Heating Coll Valve	% Open		1	1 AO-2		AO#,AOCOM		Press Lev MER E						EP-8000-4	SUPPLY.O		1/4*	Barb Fitting	EP-PNEU.		A28	
AO-2				Clo Col Valve	% Open		1	1 AO-3		AO#,AOCOM		Press Lev MER 8				12/18	+,-	61-0000-4			2/18	Device dependen	t 0-20mA OUT		A21	
AO-4				Sup Fan Var Spd Drive	0/	¥1U	1	11AO-4		AO#,AOCCM		Press Lev MER 8			AH-1-AO-4						12/18	Device dependen			A21	
AO-4				Ret Fan Var Spd Drive	%	A.HU	1	11AO-5	1	AO#,AOCOM		Press Lev MER a			AH-1-AO-5						10.0	Barrie				
AO-5		AHU-2	14-450	ineri an var opd bitte		1.4.40	1	1 AO-6				Press Lev MER 8			AH-1-AO-6						2/22	Device dependen	nt Aux Contact (NO)		A40	
BI-1			SF-S	Supply Fan Status	011 0		1	1 91-1		BI#,BICOM		Press Lev MER 8			AH-1-BI-1						2/22		nt Aux Contact (NO)		A40	
81-2				Return Fan Status			1	1 81-2		BI#,BICOM		2 Press Lev MER 3			AH-1-BI-2						12/22	Device dependen			A40	
81-3				Smoke Detectors	Normal Ala		1	1;BI-3		BI#,BICOM		Press Lev MER			AH-1-BI-3					-	2/22	NO.M1	A70 (NC)		A41	
81-4				Low Temperature Stat	Normali Ala	UH.4. mie	1	1;81-4	1	BI#,BICOM		Press Lev MER		.3-10	AH-1-BI-4						2/22		nt Aux Contact (NO)		A40	
181-5				Clg Coll Pump 2 Status	Off C		1	181-5	1	BI#,BICOM		2 Press Lev MER			AH-1-BI-5						2/22		nt AFS-460 & Relay		A40	
181-6				Supply Air Static Press	Normall Ala			1 BI-6	1	BI#,BICOM		2 Press Lev MER		.3-10	AH-1-8I-6	1					12/22		nt AFS-460 & Relay		A40	
81-6				Return Air Static Press	Normali Ala			1 81-7		BI#,BICOM		Press Lev MER		.3-10	AH-1-BI-7						1444	Device dependen	(in the local data in the second seco			
81-7		AHU-2	innenar"	There in a laber 1955	11011101 110	LL.HU	<u>i i </u>	1 81-8				2 Press Lev MER		.3-10	AH-1-BI-8						2/18		DPT-2641		A2	1
Al-1			BA-VP	Return Air Vel Pressure	In. Wa			1 Al-1	1	AI#,+VDC		2 Press Lev MER		.3-10	AH-1-Al-1						2/18	2-Wire	ITE-6316P-1		A4	1
AI-1				Return Air Temcerature	Deg F	Anu		1  AI-2	1	AI#,AICM		2 Press Lev MER		.3-10	AH-1-AI-2	_					2/18	2-Wire	TE-6316P-1		A4	i
-		AHU-2		Disch Air Temperature	Deg F	1.40		1 AI-3	1	AI#,AICM		2 Press Lev MER		.3-10	AH-1-AI-3						2/18	2-Wire	TE-6316P-1		A4	
AI-3		AHU-2 AHU-2		Mixed Air Temperature	Deg F	<u></u>		1 Al-4		AI#,AICM	EN-AHU-	2 Press Lev MER		.3-10	AH-1-Al-4	1					2/10	4-1110	16.00101-1			1
AI-4			pviA+1	WINGLAS TENDERAUIS		LLHU		1 AI-5		1	EN-AHU-	2 Press Lev MER		.3-10	AH-1-AI-5	1					4					1
AI-5		AHU-2 AHU-2	<u> </u>			1U		11AI-6	1		EN-AHU-	2 Press Lev MER		.3-10	AH-1-AI-6						10/12		DPT-2641		A2	
IAI-6			S-SP	Supply Static Pressure	In. Wa			1)AI-7		AI#,+VDC	EN-AHU-	2 Press Lev MER		.3-10	AH-1-AI-7						2/18	1-1+	DPT-2641		A2	
AI-7				Supply Static Pressure	In. Wg			1 Al-8		AI#.+VDC	EN-AHU-	2 Press Lev MER	5 0 M	.3-10	AH-1-AI-8	1		<u> </u>			12/18	<u></u>	101 1-20-11			

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### SERIES FAN POWERED VARIABLE AIR VOLUME (VAV) WITH REHEAT COIL



# NOTE: VAV CONTROLLER (AS-VAV111-1) **DAMPER ACTUATOR & DIFFERENTIAL PRESSURE** TRANSMITTER (ATP-2040-212) ARE FACTORY MOUNTED BY TITUS

#### **DESCRIPTION OF OPERATION**

PRIMARY AIR VALVE WILL OPEN TO THEIR MINIMUM POSITION AND TERMINAL UNIT FAN WILL START AND RUN CONTINUOUSLY WHENEVER AIR HANDLING UNIT IS RUNNING, TERMINAL UNIT FANS WILL START THIRTY (30) SECONDS BEFORE OPENING OF AIR VALVES TO PREVENT BACK SPINNING OF FAN. FANS WILL ALSO BE OPERATED AS DEFINED IN THE UNOCCUPIED MODES. PRIMARY AIR VALVES WILL BE CLOSED DURING UNOCCUPIED HEATING MODE. ROOM SENSOR TR-1 WILL ON A RISE IN TEMPERATURE GRADUALLY MODULATE REHEAT COIL VALVE <u>V-RH-1</u> CLOSED AND ON A CONTINUED RISE WILL GRADUALLY MODULATE PRIMARY AIR VALVE FROM IT'S MINIMUM TO MAXIMUM SETTING TO MAINTAIN IT'S SETTING OF SEVENTY-FIVE (75F). ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED. DURING OPERATION OF THE WARM-UP MODE ALL PRIMARY AIR VALVES OPEN TO THEIR MAXIMUM POSITION AND TERMINAL FANS START TO PERMIT FULL AIR FLOW TO THE SPACES. REHEAT COIL VALVE V-RH-1 IS MODULATED IN RESPONSE TO ROOM SENSOR TO MAINTAIN SPACE TEMPERATURE.

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Field Dev:	ices:			
DC-1	53	AS-VAV110-1	VAV 6%I,4BI,8BC	D, 8K
V-RH-1	53		SEE VALVE SCHED	DULE
VAV	53	ATP-2040-212	ACT, 2MIN+1.5*D	2,1/2*CPLG
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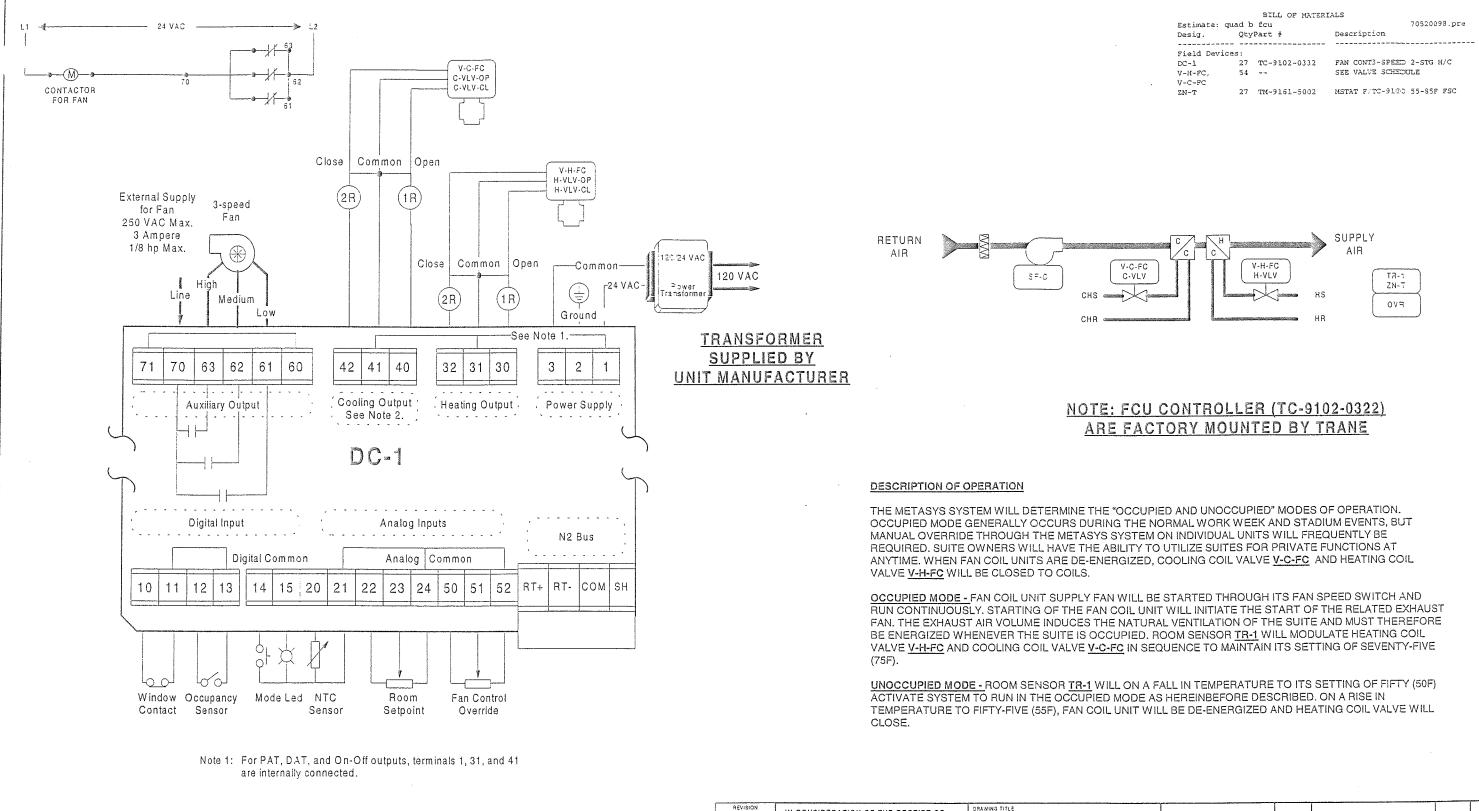
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ag Point Ty	System	n Cbject Name	in the second	Display Units	DCType	N2 Trunk N2 Addr	Cable	Module Type	Termination	Panel	Panel Location	Slot	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location		Comment
	I NGMA	Mana			]		Bay/Terminal	)	<u> </u>											1			1		Power to Controller
1	FP-VAV-	8,			VAV				<u></u>	EN-FPVAV		1								1					N2 Trunk
	FP-VAV-	8 i.			VAV	11 X	(			EN-FPVAV			<u></u>	FPVAV-x-Al-1				1		8/26	PHONE JACK	Metastat-Ph Jack		U2	
Al-1	FP-VAV-	8 ZN-T	Zone Temperature	Deg F	VAV		(Al-1		PHONE JACK				J	FPVAV-x-AI-2	· -							1			
AI-2	FP-VAV-	8			VAV		(AI-2				At VAVBOX			FPVAV-x-AI-3						1					
AI-3	FP-VAV-	8			VAV		(AI-3				At VAVBOX		J	FPVAV-x-AI-4						3/18	OUT,COM,+VDC	DPT-2000		U9	
AI-4	FP-VAV-	B S-VP	Supply Vel Pressure	in. Wg	VAV		(IAI-4		AI#,AICM,+15VD					FPVAV-x-AI-5	<u> </u>				1	1		1			
IAI-5	FP-VAV-	8			VAV		(AI-5			EN-FPVAV			0	FPVAV-X-AI-5					<u> </u>					T	
AI-6	FP-VAV-	8			VAV		(IAI-6		L		At VAVBOX		<u>vi</u>	FPVAV-x-BI-1							1		-	1	
81-1	FP-VAV-	8			VAV		(81-1				At VAVBOX		0	FPVAV-x-BI-2										1	
81-2	FP-VAV-	8			VAV		(81-2				At VAVBOX	_		FPVAV-x-BI-3					1		1			l.	
81-3	FP-VAV-	B			VAV		(81-3			EN-FPVAV			0	FPVAV-x-BI-4					1	- <u> </u>					
81-4	FP-VAV-	В			VAV	1! X	(181-4				At VAVBOX			IFPVAV-x-BO-1						3/18	CW.CCW.COM	EDA-2040		U54	
BO-1	FP-VAV-	B DPR-OP	Damper Open	Off Cn	VAV		80-1		BO-a,BO-b,24VA					FPVAV-x-BO-2						3/18	CW.CCW.COM	EDA-2040		U54	
BO-2			Damper Close	Off Cn			(BO-2		80-a,80-b,24VA					FPVAV-x-BO-3	2/18	COIL	RELAY	NO.COM	1	2/14	See starter detail	Starter (NO)	1	U51	
80-3	iFP-VAV-		Supply Fan Control		VAV		(BO-3			EN-FPVAV	At VAVBOX		<u>vi</u>	FPVAV-x-80-4	210	10010	24. They had 1. 1	1	1		1				
BO-4	FP-VAV-				VAV		(BO-4		BO-a.BO-b.24VA				0	FPVAV-x-80-5		+			1	3/18	BLK,RED,WHT	VA-7150	1	U58	
BO-5			Reneat Valve Open	Off On			(IBO-5		BO-a,BO-b,24VA				0	FPVAV-x-BO-6					1	3/18	BLK,RED,WHT	VA-7150		U58	
BO-6			Reheat Valve Close		VAV		(BO-6				At VAVBOX		<u></u>	FPVAV-x-AQ-1			<u>.</u>		1						1
AO-1	FP-VAV-	в					(AO-1 (AO-2							FPVAV-x-AO-2					1	1	1			1	1



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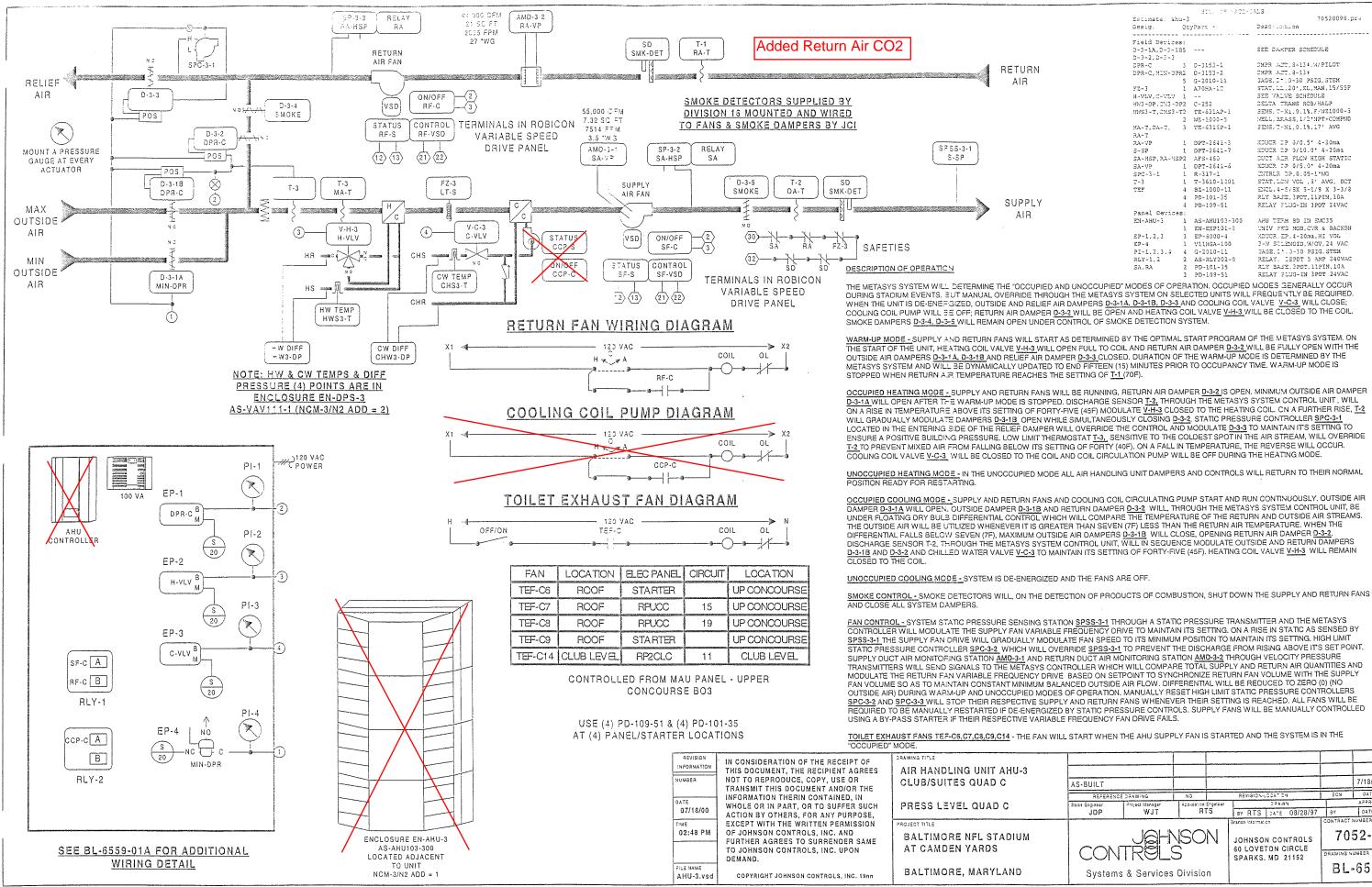
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II Spreadsheet	1		Soltware		Ĩ			Diç	ital Controller Info	mation		1		Panel Inform	nation		1	lı	ntermediate De	vicə			Fie	ld Device			
ag Point Typ	e Syster Name	m Object 1e Name	Exponded ID	Displ	ay Units	DC Туре	N2 Trunk	N2 Add	Cable Ir Destination Bay/Terminal	Module Type	Termination	Panel	Panel Locai	an Slot Numbe	Reference Drawing	Cablə Number	Wiring/T ubing	Termination in	Device	Termination Out	Lacation	Wiring/î ubing	Terminations	Dəvicə	Location		Comment
	FCU-B		****	م بر معالم معالم معالم معالم مع ا	i i	тс	1					IEN FOU	AL FOU		1		1	i			1			!	-		Power to Controller
	FCU-8					TC	1	1	<u>vi</u>	1		IEN-FCU	At FCU		0		1	1			4						N2 Trunk
80-1	FCU-B	H-VI V-OP	Htg Valve Ccen	Off	I Ch	TC	1	1	YIBO-1			EN-FCU			01	FCU-x-80-1	1				1			VA-7150 (Heating)	1		
80-2	FCU-B		Htg Valve Close		I On I		1 1	1	YIBO-2			EN-FOU			0	FCU-x-BO-2					1			IVA-7150 (Heating)	<u></u>		
80-3	FCU-B		Clg Valve Ccen		Cm		1 1	1	Y BO-3		42,41/COM,40	IEN-FOU	At FCU		0	FCU-x-BO-3				1				VA-7150 (Cooling)	<u> </u>		
80-4	FCU-8		Clo Valve Close		Cm		1	1	YIBO-4		42.41/COM.40	EN-FCU	At FCU		01	FCU-x-BO-4		1						VA-7150 (Cooling)			
80-5	FCU-8	F-SPD-1			1 Ch		1	1	YIBO-5		71.70 LINE/63.62	JEN-FCU	At FCU		0	FCU-x-BO-5	1	1			1			Starter Coil (3 spd fan)			
80-6	IFCU-8				2m		1	1	Y 80-6		71,70 LINE/63.62	.IEN-FCU	At FCU		0	FCU-x-BO-6	1				1			Starter Coil (3 spd fan)			
80-7	FCU-8				Cn		1	1	YIBO-7		71,70 LINE/63,62	JEN-FCU	At FCU		0	FCU-x-80-7	4				i .	4/14	HI,MED.LOW,NE	Starter Coil (3 spd fan)	<u> </u>		
81-1	FCU-B		un (opede d)	1	i ii	TC	1	1	Y BI-1			EN-FCU	At FCU		0	FCU-x-BI-1	1					]					
81-2	IFCU-B					TC	1 1	1	YIB1-2			EN-FCU	At FCU		0	FCU-x-BI-2	1				1						
81-3	FCU-B			1	1 1	TC	1	1	Y BI-3			EN-FCU	At FCU	·	0	FCU-x-BI-3	1				1				<u> </u>		
Al-1	FCU-B	ZN-T	Zone Temperature	0	ea F	TC	1	1	Y Al-1		14 MODE, 15 LEC	EN-FCU	At FCU		0	FCU-x-AI-1	1			Į		3/22		TM-9100 (Mode & LED)			
AI-2	FCU-8		Zone Temp Set Point	D D	eq F	TC	1	1	Y AI-2		22,23.21/24	EN-FCU	At FCU		0	FCU-x-AI-2	1				1	3/22		TM-9100 (Setpoint)			
Al-4	FCU-8		an Override		Md-i-t	TC	1	1	YAI-1		51,21/24	EN-FCU	At FCU		0	FCU-x-AI-4	1			1		2/22	151,21/24	iTM-9100 (Fan Override	)] [		



Escimate: ah			70520098.pr=
Desig.	Qt	yPart -	Desc: 10.110n
Field Device			SEE DAMPER SCHEDULE
D-3-1A, D-3-1 D-3-2, D-3-3			SEE DAMPER SCHEDOLG
		0 0150 1	CMPR ACT, 8-134, W/PILOT
DEATE DEATE	2	0-3103-1	CMPR AZT, 8-13:
D58-0'NTX-D5	*K4	0-3153-2	CICE 2* A 20 BOTO CEEM
	2	G-2010+11	SAGE, 3°, 0-30 PSIG, STEM STAT, 11, 20', EL, MAN, 15/55F SEE VALVE SCHEDULE
FZ-3	1	A/OHA-10	STAT, LL., 20°, EL, MAN, 15/33P
H-VLV,C-VLV	1		SEE /ALVE SCHEDULE
HW3~DP, CN3~D	092	C-252	DELTA TRANS ROB/HALP
			SENS, T-N1,0.1%,F/WZ1000-5
			WELL, BEASS, 1/2*NPT+COMPND
	3	TE-63152-1	SENS, T-Ni,0.1%,17' AVG
RA-T			
RA-VP	1	DPT-2641-3	XOUCR IP 0/0.5* 4-20ma
S-SP	1	DPT-2641-7	XDUCR DP 0/10.0* 4-20ma
SA-HSP, RA-HS	SP2	AFS-460	XDUCR IP 0/0.5* 4-20ma XDUCR IP 0/10.0* 4-20ma DUCT AIR FLCW HIGH STATIC
SA-VP	1	DPT-2641-6	XDUCR IP 0/5.0° 4~20ma
SPC-3-1	1	R-317-1	CHITRLE DP,0.05-1*WG
7-3	1	T-3610-1301	STAT, LON VOL , 3' AVG, DCT
TEF	4	BZ-1000-11	ENCL, 4-5/SX 5-1/8 X 3-3/3
			RLY BASE, 3PDT, 11PIN, 10A
	4	PD-109-51	RELAY FLUG-IN 3PDT 24VAC
Panel Device	es:		
EN-AHU-3	1	AS-AHU103-300	AHU TERM BD IN EWC35
			UNIV FRIS MOD, CVR & BACKBN
EP-1,2,3	3	EP-8000-4	KDUCR. EP, 4-20ma, HI VOL
EP-4	1	V11HGA-100	3-W SCLENGID, W/OV, 24 VAC
PI-1,2,3,4	4	G-2010-11	GAGE, 1 . )-30 PSIG, STEM
RLY-1,2	2	AS-RLY002-0	CAGE, 1*, 0-30 PSIG, STEM RELAY, ISPDT 5 AMP 240VAC
SA, RA	2	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
			RELAY PLUG-IN 3PDT 24VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR THE ME RASTADIUM EVENTS, BUT MANUAL OVERBIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AND RELIEF AIR DAMPERS D-3-1A. D-3-1B, D-3-3 AND COOLING COIL VALVE V-C-3. WILL CLOSE; COOLING COIL PUMP WILL SE OFF, RETURN AIR DAMPER D-3-2 WILL BE OPEN AND HEATING COIL VALVE V-H-3 WILL BE CLOSED TO THE COIL.

WARM-UP MODE \_\_SUPPLY AND RETURN FANS WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COIL VALVE V-H-3 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-3-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPERS D-3-1A, D-3-1B AND RELIEF AIR DAMPER D-3-3 CLOSED, DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN RETURN A R TEMPERATURE REACHES THE SETTING OF T-1 (70F).

OCCUPIED HEATING MODE - SUPPLY AND RETURN FANS WILL BE RUNNING, RETURN AIR DAMPER <u>D-3-2</u> IS OPEN. MINIMUM OUTSIDE AIR DAMPER <u>D-3-1A</u> WILL OPEN AFTER THE WARM-UP MODE IS STOPPED. DISCHARGE SENSOR <u>T-2</u>, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF FORTY-FIVE (45F) MODULATE <u>V-H-3</u> CLOSED TO THE HEATING COIL. ON A FURTHER RISE, <u>T-2</u> WILL GRADUALLY MODULATE DAMPERS D-3-1B. OPEN WHILE SIMULTANEOUSLY CLOSING D-3-2. STATIC PRESSURE CONTROLLER SPC-3-1 LOCATED IN THE ENTERING SIDE OF THE RELIEF DAMPER WILL OVERRIDE THE CONTROL AND MODULATE D-3-3 TO MAINTAIN IT'S SETTING TO ENSURE A POSITIVE BUILDING PRESSURE. LOW LIMIT THERMOSTAT T-3. SENSITIVE TO THE COLDEST SPOT IN THE AIR STREAM, WILL OVERRIDE T-2 TO PREVENT MIXED AIR FROM FALLING BELOW ITS SETTING OF FORTY (40F). ON A FALL IN TEMPERATURE, THE REVERSE WILL OCCUR.

UNOCCUPIED HEATING MODE - IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL

OCCUPIED COOLING MODE - SUPPLY AND RETURN FANS AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE AIR DAMPER <u>D-3-1A</u> WILL OPEN. OUTSIDE DAMPER <u>D-3-1B</u> AND RETURN DAMPER <u>D-3-2</u> WILL, THROUGH THE METASYS SYSTEM CONTROL UNIT, BE UNDER FLOATING DRY BULS DIFFERENTIAL CONTROL WHICH WILL COMPARE THE TEMPERATURE OF THE RETURN AND CUTSIDE AIR STREAMS. THE OUTSIDE AIR WILL BE UTILIZED WHENEVER IT IS GREATER THAN SEVEN (7F) LESS THAN THE RETURN AIR TEMPERATURE. WHEN THE DIFFERENTIAL FALLS BELOW SEVEN (7F), MAXIMUM OUTSIDE AIR DAMPERS <u>D-3-1B</u> WILL CLOSE, OPENING RETURN AIR DAMPER <u>D-3-2</u>. DISCHARGE SENSOR T-2, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL IN SEQUENCE MODULATE OUTSIDE AND RETURN DAMPERS <u>D-3-1B</u> AND <u>D-3-2</u> AND CHILLED WATER VALVE <u>V-C-3</u> TO MAINTAIN ITS SETTING OF FORTY-FIVE (45F). HEATING COIL VALVE <u>V-H-3</u> WILL REMAIN

FAN CONTROL - SYSTEM STATIC PRESSURE SENSING STATION <u>SPSS-3-1</u> THROUGH A STATIC PRESSURE TRANSMITTER AND THE METASYS CONTROLLER WILL MODULATE THE SUPPLY FAN VARIABLE FREQUENCY DRIVE TO MAINTAIN ITS SETTING. ON A RISE IN STATIC AS SENSED BY <u>SPSS-3-1</u> THE SUPPLY FAN DRIVE WILL GRADUALLY MODULATE FAN SPEED TO ITS MINIMUM POSITION TO MAINTAIN ITS SETTING. HIGH LIMIT STATIC PRESSURE CONTROLLER SPC-3-2, WHICH WILL OVERTIES SPS-3-1 TO PREVENT THE DISCHARGE FROM RISING ABOVE IT'S SET POINT. SUPPLY DUCT AIR MONITORING STATION AMD-3-1 AND RETURN DUCT AIR MONITORING STATION AMD-3-2 THROUGH VELOCITY PRESSURE TRANSMITTERS WILL SEND SIGNALS TO THE METASYS CONTROLLER WHICH WILL COMPARE TOTAL SUPPLY AND RETURN AIR QUANTITIES AND MODULATE THE RETURN FAN VARIABLE FREQUENCY DRIVE BASED ON SETPOINT TO SYNCHRONIZE RETURN FAN VOLUME WITH THE SUPPLY FAN VOLUME SO AS TO MAINTAIN CONSTANT MINIMUM BALANCED OUTSIDE AIR FLOW. DIFFERENTIAL WILL BE REDUCED TO ZERO (0) (NO OUTSIDE AIR) DURING WARM-UP AND UNOCCUPIED MODES OF OPERATION. MANUALLY RESET HIGH LIMIT STATIC PRESSURE CONTROLLERS SPC-3-2 AND SPC-3-3 WILL STOP THEIR RESPECTIVE SUPPLY AND RETURN FANS WHENEVER THEIR SETTING IS REACHED. ALL FANS WILL BE REQUIRED TO BE MANUALLY RESTARTED IF DE-ENERGIZED BY STATIC PRESSURE CONTROLS. SUPPLY FANS WILL BE MANUALLY CONTROLLED

TOILET EXHAUST FANS TEF-C6.07, C8, C9, C14 - THE FAN WILL START WHEN THE AHU SUPPLY FAN IS STARTED AND THE SYSTEM IS IN THE

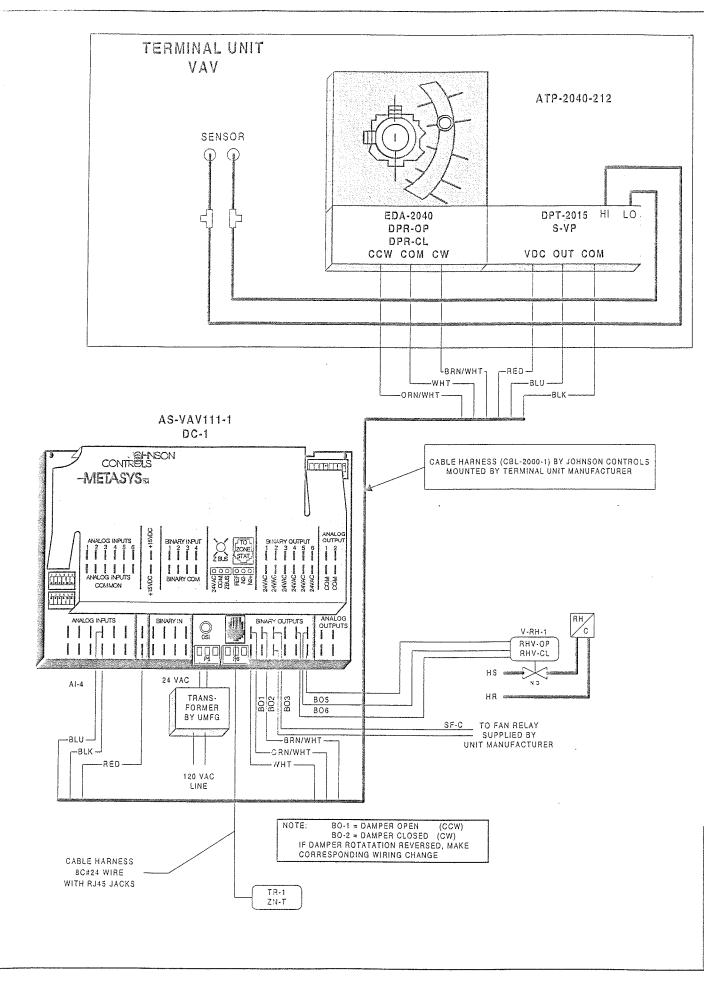
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ales Engineer	Project Manager	Application Engin	t i	CRAW	N		APPROVED	
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Systems	& Services	Division				BL	-6559	-07

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ag Point Typ	System	n Object Name	Exponded ID	Display Units	DC Тура	N2 Trunk		Module Type	Termination	Panəl	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Terminatian Out	Location	Wiring/T ubing	Terminations	Dəvicə	Location	Rəf Dəlcii	Comment Power to Controller
i i i i i i i i i i i i i i i i i i i	AHU-3				AHU		1 1	1		EN-AHU-3	Press Law MER C	1	M.3-11			1					<u> </u>				N2 Trunk
	AHU-3				AHU	1	1		1	(EN-AHU-3	Press Law MER C		M.3-11			1						0.11/0.0/10		A50	N2 HUNK
80-1	AHU-3	MIN-OPF	Min OA Damper Control	Closed Open I	AHU	1 1	1 80-1		80#.24V	EN-AHU-3	Press Law MER C		M.3-11	AH-1-BO-1			V11HGA-100					SAV-24VAC		A50 A53	
BO-2	AHU-3	ISF-C	Supply Fan Control	Off On I	AHU	1	1 1,BO-2	RLY	BO#.24V.BICCM	EN-AHU-3	Press Lew MER C		M.3-11	AH-1-80-2	3/18	A.COILS.COM		CCM,NO			See starter detail			A53	
80-3	AHU-3	RF-C	Return Fan Control	Off On	AHU	1	1 BO-3	RLY			Press Law MER C		M.3-11		3/18	B,COILS.COM		COM.NO			See starter detail			A53	
1BO-4	AHU-3	CCP-C	Clg Coil Pump 3 Control	i Olf On I	AHU	1	1 BO-4	RLY	-804,24V.8ICCM	EN-AHU-3	Press Law MER C		M.3-11	AH-1-80-4	3/18	A,COILS,COM		COM,NO			See starter detail			A50	
BO-5	AHU-3	TEF-C	Toilet Exh Fan Control	Off On	AHU	1	1 BO-5		-BO#.24V		Press Law MER C		M.3-11	AH-1-80-5	1		PD-109-51			2/18	Device dependent	24VAC OUT		A00	
80-6	AHU-3		1		AHU	1	1 BO-6		1		Press Law MER C		M.3-11	AH-1-BO-6			1					L			
80-7	AHU-3		1	1	AHU	1	1 BO-7		1		Press Law MER C	-	M.3-11	AH-1-BO-7	1		1								
80-8	AHU-3		2	1	AHU	1	1 80-8		1		Press Law MER C		M.3-11	AH-1-BO-8											
BO-9	AHU-3				AHU	1	1 BO-9		1		Press Law MER C		M.3-11	AH-1-BO-9	1									1	
BO-10	AHU-3		1		AHU	1	1 BO-10	1	1		Press Law MER C		M.3-11	AH-1-BO-10	1		1					EP-PNEU.	<u> </u>	A28	
AO-1	AHU-3	DPR-C	Damper Control	% Croen	AHU	1	1 AO-1		AO#,ACCOM		Press Law MER C		M.3-11	AH-1-AO-1	2/18	+	EP-8000-4	SUPPLY.O			a are i interig			A28	
AO-2	IAHU-3	H-VLV	Heating Coll Valve	1. % Cipen	AHU	1	1 AO-2		AC#,ACCOM	EN-AHU-3	Press Law MER C		M.3-11	AH-1-AO-2		+,-	EP-8000-4	SUPPLY,O				EP-PNEU.		A28	
AO-3	AHU-3	C-VLV	Clg Coil Valve	% Cipen	AHU	1	1 AO-3		AO#,ACCOM		Press Lev MER C		M.3-11	AH-1-AO-3	12/18	+,-	EP-8000-4	SUPPLY,0	i			EP-PNEU.		A28 A21	
AO-4	AHU-3	SF-VSD	Sup Fan Var Spd Drive	u ar	AHU	1	1 AO-4		.AO#.ACCOM	EN-AHU-3	Press Lev MER C		M.3-11	AH-1-AO-4	4						Device dependent			A21	
AU-5	AHU-3	RF-VSD	Ret Fan Var Spd Drive	<i>u</i> <sub>T</sub>	AHU	1	1 AO-5		AO#,ACCOM	EN-AHU-3	Press Law MER C		M.3-11	AH-1-AO-5						2/18	Device dependent	0-20mA 001		AZI	
AO-6	AHU-3		1	1	AHU	1	1 AO-6		ł		Press Law MER C		M.3-11	AH-1-AO-6										A40	
181-1	IAHU-3	ISF-S	Supply Fan Status	Off On	AHU	1	1 BI-1	1	BI#,BICOM		Press Law MER C		M.3-11	AH-1-BI-1								Aux Contact (NO)		A40	
81-2	AHU-3	AF-S	Return Fan Status	Off On	AHU	1	1 IBI-2		BI≢,SICOM	EN-AHU-3	Press Lev MER C		M.3-11	AH-1-BI-2	1							Aux Contact (NO)		A40	
BI-3	AHU-3	SMK-DET	Smoke Detectors	Normal: Alarm	AHU	1	1 81-3		B1#,BICCM		Press Lev MER C		M.3-11	AH-1-BI-3							Device dependent			1	
81-4	AHU-3	LT-S	Low Temperature Stat	Normal Alarm	AHU .	1 1	1 81-4		BI#,BICCM		Press Lev MER C		M.3-11	AH-1-8I-4		1						A70 (NC)		A41 A40	
81-5	AHU-3	CCP-S	Clg Coll Pump 3 Status	Olf On	AHU	1	1 BI-5		BI#.BICCM		Press Lav MER C		M.3-11	AH-1-BI-5	1	1						Aux Contact (NO)		A40 A40	
81-6	AHU-3	SA-HSP	Supply Air Static Press	Normai Alarm	AHU	1	1 81-6		BI#,BICOM		Press Law MER C	1	M.3-11	AH-1-81-6								AFS-460 & Relay		A40 A40	l <u> </u>
BI-7	AHU-3	RA-HSP	Return Air Static Press	Normali Alarm	AHU	1	1 81-7		BI#,BICOM		Press Lev MER C		M.3-11	AH-1-BI-7	1	1				2/22	Device dependent	AFS-460 & Relay		1A4U	1
BI-8	AHU-3		1	1	AHU	1	1 81-8				Press Lev MER C		M.3-11	AH-1-BI-8	1					0.110	ļ	DPT-2641		142	
AI-1	AHU-3	RA-VP	Return Air Vel Pressure		AHU	1	1 Al-1		AI#,+VDC		Press Lav MER C		M.3-11	AH-1-AI-1	1	<u> </u>				0.10	1.1.	DP1-2641 TE-6316P-1		A2 A4	
AI-2	AHU-3	RA-T	Return Air Temperature		AHU	1	1 Al-2		AI#,AICM		Press Lev MER C		M.3-11	AH-1-AI-2							2-Wire	TE-6316P-1		A4 A4	
AI-3	AHU-3	DA-T	Disch Air Temperature	Deig F	AHU	1 1	1 Al-3		AI#,AICM		Press Law MER C		(M.3-11	AH-1-Al-3							ie mao	TE-6316P-1		A4 A4	!
AI-4	AHU-3	MA-T	Mixed Air Temperature		AHU	1	1 Al-4		AI#,AICM		Press Lav MER C		M.3-11	AH-1-AI-4	1					2/18	2-Wire	110-03107-1		101	1
AI-5	AHU-3				AHU	1	1 AI-5				Press Lev MER C		M.3-11	AH-1-AI-5	1		4				ļ			+	<u></u>
AI-6	AHU-3			1	AHU	1	1 AI-6				Press Lav MER C		M.3-11	AH-1-Al-6					L	2/12		DPT-2641		140	·
AI-7	AHU-3	S-SP	Supply Static Pressure	In. Wg	AHU	1	1 Al-7		AI#,+VDC		Press Lev MER C		M.3-11	AH-1-AI-7	1					2/18	-,+ 	DP1-2641		A2 A2	
AI-8	AHU-3	S-VP	Supply Vel Pressure	In. Ng	AHU	1	1 AI-8		IAI#,+VDC	EN-AHU-3	Press Lav MER C		M.3-11	AH-1-Al-8	1	1		<u></u>	1	2/18	<u> -,+</u>	UP1-2041		ING	1

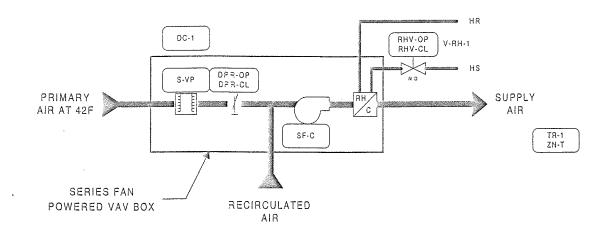
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ull Spreadshe	et 🗍			Software		1		Di	gital Controller In	formation		1	F	anel inform	ation				Intermediate Dev	ice		l	Field	Device			
Tag Point T	урә	System Name	Object Nome	Expanded ID	Discuby Unit	s DC Ty	pə N2 Tru	nk N2 Ad	Cable dr Destination Bay/Termina	1	a Tamination	Panəl	Parel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Terminoritan Out	Location	Wiring/f ubing	Terminations	Device	Location	Rəf Dətail	Comment
	<u></u> н	EATING		1		VAV			1 BOV/19mino	1		ENLOPS-2	Pressev MER (	<u></u>						i internationalistation in the second	- <del>Name and a second se</del>	1					Power to Controller
		EATING				VAV		1	2				Press Lev MER (		1				<u></u>		· i · · · · · · · · · · · · · · · · · ·						N2 Trunk
Al-1				HW Sup Temp At AHU-3	Deg F	VAV		1	2 Al-1		AI# AICM		Press _av MER (		<u> </u>	DPS-2-AI-1	<u> </u>				1	2/18	2-Wire	TE-631AP-1	1	U1	
AI-2				HW Diff Press At AHU-3	259	VAV		1	2 AI-2				Pressev MER (		2	DPS-2-AI-2			- <u> </u>		1	3/18	Device dependen	t Rob/Hai 252C	l	US	4-20ma with 500 OHM Resistor
AI-3				CW Sup Temp At AHU-3	Dag E	VAV		1	2 AI-3		Al# AICM		Pressev MER (		<u></u>	DPS2-AI-3					1	2/18	2-Wire	TE-631AP-1	il	U1	
AI-4				CW Diff Press At AHU-3		VAV		1	21AI-4				Press _ev MER (			DPS-2-AI-4	1	1				3/18	Device dependen	tIRob/Hal 252C		US	4-20ma with 500 OHM Resistor
AI-5		EATING				IVAV		1	2 AI-5				Pressev MER (		)	DPS-2-AI-5			1			6	1				
AI-6	H	EATING				VAV		1	2 AI-6		1		Press _ev MER (			DPS-2-AI-6	1				1	1	1				
81-1	н	EATING	1		·····	VAV		1	2iBI-1		1	EN-DPS-3	Press Lev MER (	2 0		IDPS-2-BI-1			1				1				
.81-2	H	EATING	#	1		VAV		1	2 BI-2		4	EN-DPS-3	Press _ev MER (	; (	)	DPS-2-81-2		1			i	1		1			
181-3	iH	EATING		1		VAV		1	2 81-3			EN-DPS-3	Press _ev MER (	: (	)	DPS-2-BI-3	1	1			1			1			
B1-4	H	EATING		1	1	VAV		1	2 81-4		i	EN-DPS-3	Press _ev MER (	; (	2	OPS2-BI-4								1	_		
80-1	H	EATING	!	i		VAV		1	2 BO-1		1	EN-DPS-3	Press _ev MER (		)	DPS-2-80-1			1	1	1						
-BO-2	Н	EATING	<u> </u>			VAV		1	2 80-2			EN-DPS-3	Press _ev MER (	; (	וכ	DPS2-80-2											
80-3 80-4		EATING	1		:	VAV	1	1	2 BO-3				Press _av MER (		2	DPS2-80-3					1						
80-4	H	EATING				VAV		1	2 80-4		:		Press Lev MER (		)	DPS2-BO-4	1										
80-5 80-6	H	EATING	1			IVAV	i i	1	2IBO-5				Press _ev MER (		0	OPS-2-80-5	1				-	1					
BO-6	н	EATING		1		VAV		1	2180-6				Press Lev MER (		0	DPS2-BO-6	1				1	201					
AO-1		EATING				VAV		1	2 AO-1		:		Press Lev MER (		0	DPS2-AO-1	<u> </u>				ľ	1					
AO-2	H	EATING	1			VAV	1	1	2!AO-2			EN-DPS-3	Press _ev MER (		Di	DPS2-AO-2	1							· ·			



#### SERIES FAN POWERED VARIABLE AIR VOLUME (VAV) WITH REHEAT COIL



## NOTE: VAV CONTROLLER (AS-VAV111-1) DAMPER ACTUATOR & DIFFERENTIAL PRESSURE TRANSMITTER (ATP-2040-212) ARE FACTORY MOUNTED BY TITUS

#### DESCRIPTION OF OPERATION

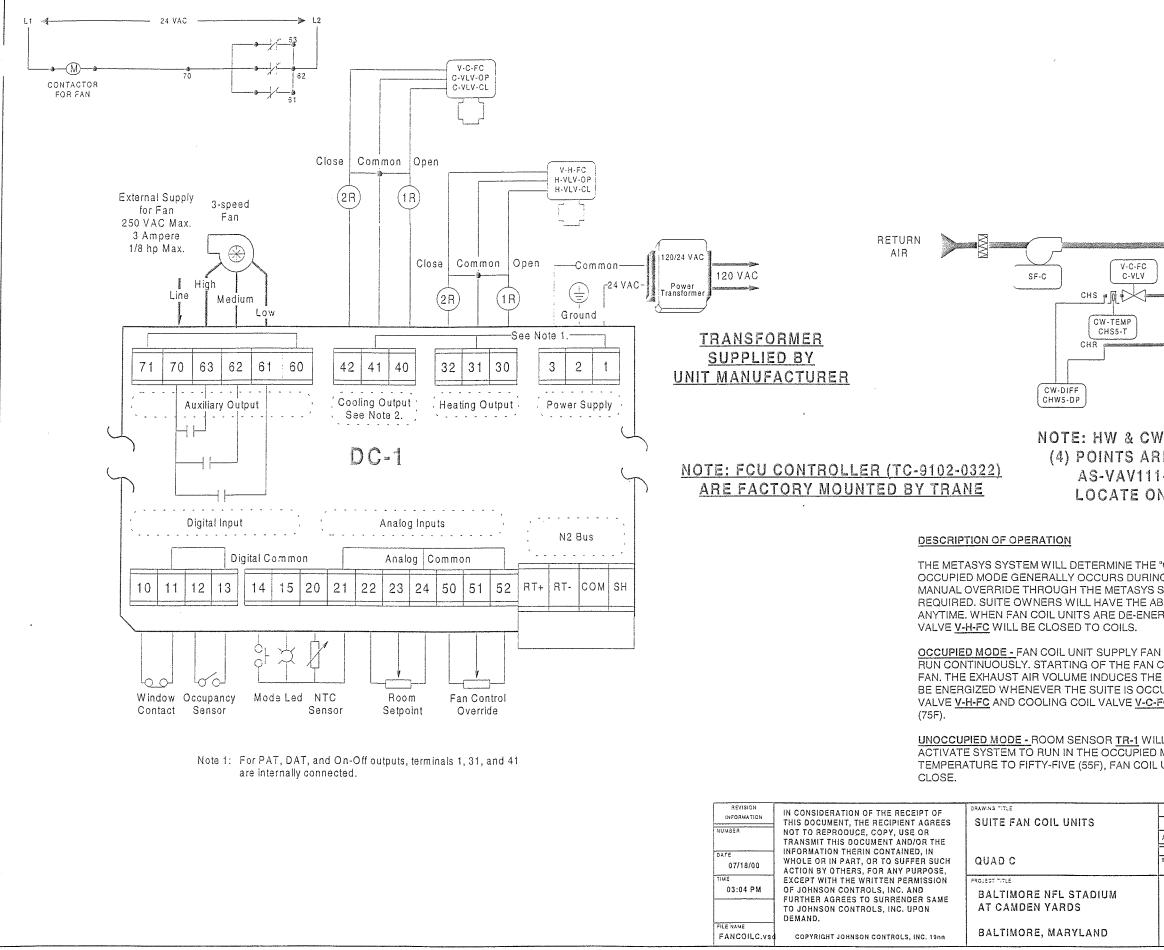
PRIMARY AIR VALVE WILL OPEN TO THEIR MINIMUM POSITION AND TERMINAL UNIT FAN WILL START AND RUN CONTINUOUSLY WHENEVER AIR HANDLING UNIT IS RUNNING. TERMINAL UNIT FANS WILL START THIRTY (30) SECONDS BEFORE OPENING OF AIR VALVES TO PREVENT BACK SPINNING OF FAN. FANS WILL ALSO BE OPERATED AS DEFINED IN THE UNOCCUPIED MODES. PRIMARY AIR VALVES WILL BE CLOSED DURING UNOCCUPIED HEATING MODE. ROOM SENSOR TR-1 WILL ON A RISE IN TEMPERATURE GRADUALLY MODULATE REHEAT COIL VALVE V-RH-1 CLOSED AND ON A CONTINUED RISE WILL GRADUALLY MODULATE PRIMARY AIR VALVE FROM IT'S MINIMUM TO MAXIMUM SETTING TO MAINTAIN IT'S SETTING OF SEVENTY-FIVE (75F). ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED. DURING OPERATION OF THE WARM-UP MODE ALL PRIMARY AIR VALVES OPEN TO THEIR MAXIMUM POSITION AND TERMINAL FANS START TO PERMIT FULL AIR FLOW TO THE SPACES. REHEAT COIL VALVE V-RH-1 IS MODULATED IN RESPONSE TO ROOM SENSOR TO MAINTAIN SPACE TEMPERATURE.

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07/18/00	WHOLE OR IN PART, OR TO SUFFER SUCH ACTION BY OTHERS, FOR ANY PURPOSE,	QUADC	Salas
TIME	EXCEPT WITH THE WRITTEN PERMISSION	PROJECT TITLE	
02:50 PM	OF JOHNSON CONTROLS, INC. AND FURTHER AGREES TO SURRENDER SAME	BALTIMORE NFL STADIUM	
	TO JOHNSON CONTROLS, INC. UPON DEMAND.	AT CAMDEN YARDS	
FILE NAME VAVBOX-C.VS	COPYRIGHT JOHNSON CONTROLS, INC. 19nn	BALTIMORE, MARYLAND	

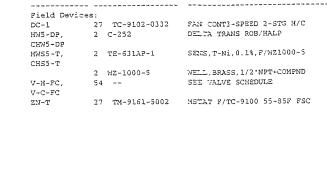
Estimate:	cruad c	BILL OF MATERI vavbox	ALS 70520098.pre
Desig.	-	Part ‡	Description
Field Devi	ces:		
DC-1	60	AS-VAV110-1	VAV 6AI,4BI,8BO,8K
V-RH-1	60		SEE VALVE SCHEDULE
VAV	60	ATP-2040-212	ACT _ IMIN+1.5*DP, 1/2*CPLG
ZN-T	38	TE-6410W-1000	MSTAT, NI, BOX, JACK

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lies Engineer	Project Manager	Application E	Enginaer	1	DRAW	N		APPROVED	
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Co	ontrols Group	c		Sparks, M	D 211	52	BL	-6559	-08

Il Spreadsheet	1		Software		1		Digital Controller Info	mation		1	P	anel Informa	ition			Intermediate De	/ìcə			Field	Device		<u> </u>	
ag Point Type	System Name	Object Name	Exponded ID	Display Units	DC Туре	N2 Truni	Cacle N2 Addr Destination	Modulə Type	Termination	Panel	Pamel Location	tol2 Number	Reference Drawing	Cable Number	Wiring/T ubing	Davica	Terminization Chat	Location	Wiring/I ubing	Terminations	Dəvicə	Location		Comment
	IFP-VAV-C				VAV		Bay/Terminal			IEN-EPVAV	TAt V.4VBOX		[						1				1	ower to Controller
		+			VAV						TAT V 4VBOX	0										1		12 Trunk
	FP-VAV-C					~			PHONE JACK		At Y.4VBOX			EPVAV-x-Al-1				1	8/26	PHONE JACK	Metastat-Ph Jack		U2	
	FP-VAV-C	ZN-T	Zone Temperature	Jeg F	VAV		X Al-1		FHOREJAON		At V =VBOX			FPVAV-x-Al-2							1			
AI-2	FP-VAV-C				VAV		XIAI-2				At Y 4VBOX			FPVAV-x-AI-3						1			T	
IAI-3	FP-VAV-C				VAV		X AI-3							FPVAV-x-AI-4					3/18	OUT,COM,+VDC	DPT-2000	1	109	
AI-4	FP-VAV-C	IS-VP	Supply Vel Pressure	in. Wg	VAV		X AI-4		AI#,AICM,+15VD					FPVAV-x-AI-5					-1					
AI-5	FP-VAV-C	1			VAV	1	X AI-5				At V AVBOX			FPVAV-x-AI-5										
Al-6	IFP-VAV-C		1	1 1	<b>VAV</b>		X Al-6				At V.4VBOX	<u>_</u>						+						
BI-1	FP-VAV-C				VAV		X 81-1				At V 4.VBOX		1	FPVAV-x-BI-1										
BI-2	FP-VAV-C	1		1 1	VAV		X BI-2	1			At Y AVBOX	0		FPVAV-x-BI-2								+		
BI-3	FP-VAV-C	1			VAV	1	X 81-3				At V AVBOX	C	l	FPVAV-x-BI-3		· · · · · · · · · · · · · · · · · · ·								
81-4	FP-VAV-C				VAV		X 81-4				At V≭VBOX	C		FPVAV-x-BI-4					3/18	CW.CCW.COM	EDA 2040		U54	
180-1	FP-VAV-C	IDPB-OP	Damper Open	Ciff On	VAV		XIBO-1		80-a.80-b.24VA			0		FPVAV-x-BO-1									U54	
80-2	FP-VAV-C		Damoer Close	Cift On	VAV	-	XIBO-2		BO-a, BO-b, 24VA	CIEN-FPVAV	At V.4VBOX	0	1	FPVAV-x-BO-2						CW,CCW,COM			US1	
BO-3	FP-VAV-C		Supply Fan Control	Cit# On			X BO-3	1	BO#,24VAC	EN-FPVAV	At V.4.VBOX	0	1	FPVAV-x-BO-3	2/18 COIL	RELAY	NO,CCM		2/14	See starter detail	Starter (NO)			
	FP-VAV-C	1	Coppert - In: Contract		VAV		X 80-4			EN-FPVAV	At V ≤ VBOX	0	)j	FPVAV-x-BO-4		1							1058	
		BHV-OP	Reheat Valve Open	Crt On	VAV	1	X BO-5		BO-a, SC-b, 24VA	C.EN-FPVAV	At V + VBOX	0	)	FPVAV-x-BO-5						BLK,RED,WHT				
			Reheat Valve Close	Ctff On			X BO-6		BO-a,BO-b,24VA	CIEN-FPVAV	At V + VBOX	0		FPVAV-x-BO-6					3/18	BLK,RED,WHT	VA-/150		U58	
AO-1	FP-VAV-C		i i i i i i i i i i i i i i i i i i i		VAV		XIAO-1			IEN FPVAV	At VAVBOX		)	FPVAV-x-AO-1				1	1					
AO-2	FP-VAV-C				VAV		X AO-2			EN-FPVAV	At Y &VBOX	(		FPVAV-x-AO-2			1							



				DIFF 5-DP				
/ TEMPS E IN EN -1 (NCM N UPPEI	CLOSU I-3/N2 A	RE E	N-C = 3)	)PS				
OCCUPIED G THE NOR SYSTEM ON BILITY TO U RGIZED, CO	MAL WORF INDIVIDUA FILIZE SUIT	(WEEK LUNIT ES FOI	CANE S WII R PRI	STADI LL FREC VATE F	UM EVENTS QUENTLY BI FUNCTIONS	S, BUT E AT		
WILL BE S COIL UNIT W NATURAL V UPIED. ROC C IN SEQUI	/ILL INITIAT	TE THE ON OF T R TR-1 V	STAF THE S WILL	RT OF T SUITE A MODUL	HE RELATE ND MUST T ATE HEATI	D EXHA HEREF( NG COIL	DRE -	
L ON A FAL MODE AS H UNIT WILL I	EREINBEF	ORE DE	ESCR	IBED. C	N A RISE IN	1		
AS-BUILT					<u></u>		7/18/00	СМЕ
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BILL OF MATERIALS

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QtyPart #

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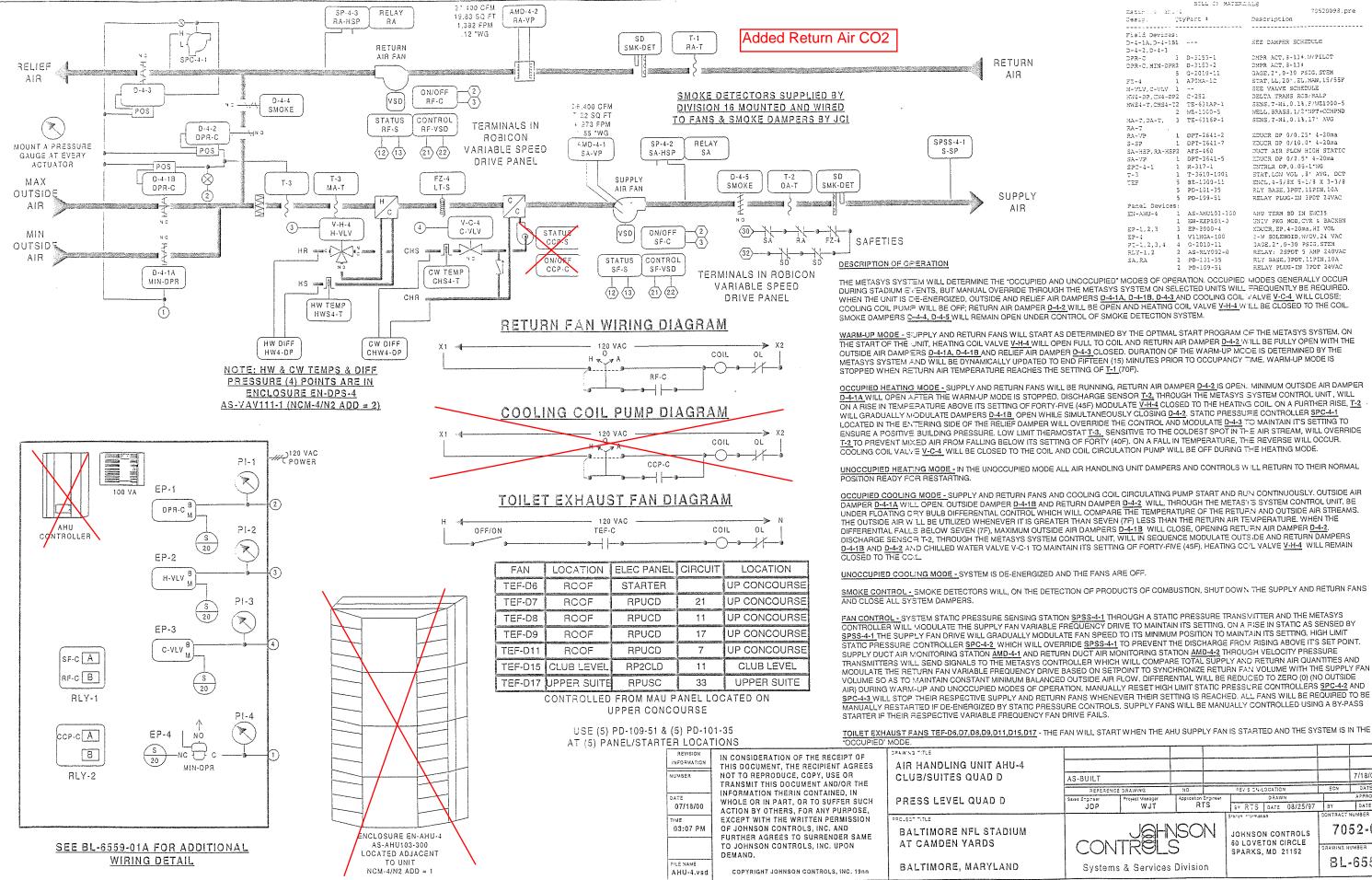
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ull Spreadshe	et			Soítware				Digit	al Controller Info	ormation		L		Panel Inform	ation			Į	Intermediate Dev	icə		)	Field	l Device				
Tag Point T	үрө	System Nome	Cbject Ncme	Expanded ID	Display Units	DC Туре	N2 Trunk	N2 Addr	Cable Destination Bay/Terminat	Module Type	Termination	Panel	Panel Loca	tion Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Dəvicə	Location	Rəf Dətail	Comment	ıt
1		CU-C	1			TC	1					EN-FCU	AC FOU		]		1	**************************************	in the second se			1				1	Power to Controller	
	iF(	CU-C	•	1		TC	1	Y				EN-FCU	At FOU		0					1	1	1					N2 Trunk	
80-1				Hig Valve Open	Cif On	TC	1	Y	BO-1	1	32,31/COM,30	EN-FCU	LAT FOU		0	FCU-x-BO-1		1		1		3/18	BLK,WHT,RED	VA-7150 (Heating)				
80-2 80-3				Htg Valve Close	- Off On	TC	1	Y	80-2	1	32.31/COM,30	EN-FCU	LAs ≈CU		0	FCU-x-BO-2		1	1			3/18	BLK,WHT,RED	VA-7160 (Heating)				
BO-3	F	CU-C	C-VLV-OP	Clg Valve Open	Off On	TC	1	Ý	BO-3		42,41/CCM.40	EN-FCU	At FOU		0	FCU-x-BO-3		1	1		1	3/18	BLK,WHT,RED	VA-7150 (Cooling)				
80-4				Clg Valve Close	Cđ On	TC	1	Y	80-4		42,41/COM,40	EN-FCU	'At FOU		0	FCU-x-BO-4	-	1				3/18	BLK,WHT,RED	VA-7150 (Cooling)				
BO-5				Fan (Speed 1)	Off On	TC	1		80-5		71,70 LINE/63.62,	SIEN-FCU	At FOU		0	FCU-x-80-5		1	1			4/14	HI,MED,LOW,NE	UStarter Coil (3 spd	fan)	1		
BO-6				Fan (Speed 2)	Dif On	TC	1	Y	BO-6	1	71,70 LINE/63,62,	EN-FCU	As FOU		0	FCU-x-BO-6			1		1	4/14	HI,MED,LOW,NE	UStarter Coil (3 spd	fan)			
BO-7			F-SPD-3	Fan (Speed 3)	· Off On	TC	1 1	Y	BO-7		71,70 LINE/63,62,	SEN-FCU	At FOU		0	FCU-x-BO-7		1				4/14	HI,MED,LOW,NE	UStarter Coil (3 spd	fan)			
81-1	FC	CU-C CU-C				TÇ	1 1	Y	BI-1			IEN-FCU	At FOU		0	FCU-x-BI-1			1			1						
BI-2 BI-3						TC	1	Y	BI-2	1		EN-FCU			0	FCU-x-BI-2	144	1										
BI-3	FC	CU-C	1			TC	1	Ŷ	B1-3	1		EN-FCU	At FOU	1	0	FCU-x-81-3	2	1	1	1	1	1				1		
AI-1			ZN-T	Zone Temperature	Deg F	TC	1	Y	AI-1		14 MODE,15 LED	2EN-FCU	At FOU		0	FCU-x-Al-1			1	1	1	3/22	14 MODE, 15 LED	D/TM-9100 (Mode &	LED)			
AI-2			ZN-SET	Zone Temp Set Point	Deg F	TC	1		AI-2	1	22,23,21/24	EN-FCU	At FOU		0	FCU-x-AI-2	1	1		1	1	3/22	22,23,21/24	TM-9100 (Setpoint	)	1		
AI-4	FC	cu-c	OVR	Fan Override	Lo-Ma-Hi	TC	1	Y	A1-4	1	51,21/24	EN-FCU	1At FOU	1	0	FCU-x-AI-4		1	1	1	1	2/22	51,21/24	TM-9100 (Fan Ove	rride)	1		

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Full Spreadshee	t		Soitware		1		Digi	al Controller Info	ormation	į		Pa	nel Informa	lion				ntermediate Dev	ica		1	Field	Device			
Tag Point Ty	pə Systen Name		Expanded ID	Display Units	DC Typə	N2 Trunk	k N2 Addr	Cable Destination 8ay/Terminal		Termination	Panel	Panel Location	Slot Numbər	Reference Drawing	Cable Number	Wining/I ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location		
	HEATING				IVAV		-	1 OGV/Terminar			EN-OPS	Upper Suite Level				1	1						1	1	1	Power to Controlliar
	HEATING				VAV	1	1 3					Upper Suite Level	0											1	1	N2 Trunk
Al-1 Al-2			HW Sup Temo At FCU	Deg F	IVAV		1 3	Al-1	Al#			Lipper Suite Level			DPS-3-Al-1	· · · · · · · · · · · · · · · · · · ·		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1		2/18	2-Wire	TE-631AP-1		U1	
AI-2			HW Diff Press At FCU		IVAV	1		Al-2		AICM,+15VDC		Upper Suite Level	0		DPS-3-AI-2				1	1	3/18	Device dependent	tiRob/Hal 252C		U5	4-20ma with SCC. OHM Resistor
AI-3	COOLING	CHS5-T	CW Sup Temp At FCU	Deg F	VAV			AI-3				Loger Suite Level	Ö		DPS-3-AI-3				1		12/18	2-Wire	TE-631AP-1		101	
AI-4	COOLING	CHW5-DF	CW Diff Press At FCU		VAV			Al-4				Lipper Suite Level	0		DPS-3-AI-4		1		1		3/18	Device dependent	Rob/Hal 252C	1	U5	4-20ma with 500 OHM Resistor
	HEATING		1		VAV	1		A1-5				Upper Suite Level	0		DPS-3-AI-5	i	1		1	1	1				1	
AI-5 AI-6	HEATING				VAV	1		AI-6				Coper Suite Level	0		DPS-3-AI-6				1							
181-1	HEATING				VAV	1		BI-1				Coper Suite Level	0		DPS-3-BI-1		1				1				1	
81-2	HEATING				VAV	1	1 3	81-2		1	EN-DPS	Coper Suite Level	0		DPS-3-8I-2		1			1	-				1	
BI-3	IHEATING				VAV	1	1 3	BI-3			EN-DPS	Under Suite Level	0		DPS-3-BI-3										1	
BLA	HEATING		1		VAV	1		BI-4			EN-DPS	Cipper Suite Level	0		DPS-3-81-4	]	1		1		1					
80-1	HEATING		1		VAV	1	1 3	80-1	1	1	EN-DPS	Upper Suite Level	0		DPS-3-80-1		1		1	1					1	
180-2	HEATING				VAV	1	1  3	80-2			EN-DPS	Upper Suite Level	0		DPS-3-80-2									1		
BO-3	HEATING		1		VAV	1	11 3	80-3			EN-DPS	Upper Suite Level	0		DPS-3-80-3		1								L	
BO-1 BO-2 BO-3 BO-4	HEATING				VAV	1	1 3	80-4			EN-DPS	Coper Suite Level	0		DPS-3-80-4				1							
80-5	HEATING			1	VAV	1	1 3	BO-5	1		EN-DPS	Lipper Suite Level	0		DPS-3-80-5		1				1				<u> </u>	
BO-6	HEATING		1		VAV	1	1 3	80-6	1		EN-DPS	upper Suite Level	Q		DPS-3-80-6										<u> </u>	
AO-1	HEATING		1		VAV	1		AO-1			EN-DPS	Coper Suite Level	0		DPS-3-AO-1		Í				1		1	1		
AO-2	HEATING			1	VAV	1	1 3	AO-2			EN-DPS	Upper Suite Level	0		DPS-3-AO-2				1							



	SILL CE MATERI.	
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Desig. Ot	yPart \$	Description
Field Devices:		
D-4-1A, D-4-1B1		SEE DAMPER SCHEDULE
D-4-2,D-4-3		
DPR-C 3		CMPR ACT, 3-13#.W/PILOT
DPR-C,MIN-DPR2		DMPR ACT, 8-13#
5		GAGE, 2°, 0-30 PSIG, STEM
2Z-4 1	A70HA~1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV,C-VLV 1		SEE VALVE SCHEDULE
HW4-DP,CW4-DP2		DELTA TRANS RCB/HALP
HWS4-T,CHS4-T2	TE-631AP-1	SENS,T-N1,0.1%,F/WZ1000-5
2	WZ-1000-5	WELL, BRASS, 1/2 NPT+COMPND
МА-Т, ЭА-Т, 3	TE-5316P-1	SENS, T-N1, 0.13, 17' AVG
RA-T		
PA-VP 1	DPT-2641-2	2DUCR DP 0/0.25* 4-20ma
S-SP 1	DPT-2641-7	XDUCR DP 0/10.0* 4-20ma
SA-HSP, RA-HSP2	AFS-460	DUCT AIR FLOW HIGH STATIC
SA-VP 1	DPT-2641-5	XDUCR DP 0/2.5* 4-20ma
SPC-4-1 1		CNTRLR DP.0.05-1*WG
	T-3610-1001	STAT, LOW VOL , S' AVG, DCT
TEF 5	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
5	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
5	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
Panel Devices:		
EN-AHU-4 1	AS-AHU103-300	AHU TERM BD IN EWC35
	EN-EXP101-0	UNIV PKG MOD, CVR & BACKEN
	EP-3000-4	XDUCR, EP, 4-20ma, HI VOL
	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
22-1.2.3.4 4	G-2010-11	GAGE, 2°, 0-30 PSIG, STEM
	AS-RLY002-0	RELAY; 25PDT 5 AMP 240VAC
	PD-131-35	RLY BASE, 3PDT, 11PIN, 10A
2		RELAY PLUG-IN 3PDT 24VAC

THE ME TASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNICOUPIED MODES OF OPERATION. OCCUPIED MODES GENERALLY OUCON DURING STADIUM E''ENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQURRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AND RELIEF AIR DAMPERS <u>D-4-14</u>, D-4-19, D-4-3 AND COOLING COLL "ALVE <u>V-C-4</u> WILL CLOSE; CCOLING COLL PUMP WILL BE OFF; RETURN AIR DAMPER <u>D-4-2</u> WILL BE OPEN AND HEATING COLL VALVE <u>V-H-4</u> WILL BE CLOSED TO THE COLL. SMOKE DAMPERS <u>D-4-4</u>, D-4-5 WILL REMAIN OPEN UNDER CONTROL OF SMOKE DETECTION SYSTEM.

WARM-UP MODE - SUPPLY AND RETURN FANS WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE JNIT, HEATING COIL VALVE V-H-4 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-4-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPERS D4-1A, D-4-1B AND RELIEF AIR DAMPER D-4-3 CLOSED. DURATION OF THE WARM-UP MCOE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS

OCCUPIED HEATING MODE - SUPPLY AND RETURN FANS WILL BE RUNNING, RETURN AIR DAMPER D-4-2 IS OPEN. MINIMUM OUTSIDE AIR DAMPER D-4-1A WILL OPEN AFTER THE WARM-UP MODE IS STOPPED. DISCHARGE SENSOR T-2, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF FORTY-FIVE (45F) MODULATE V-1-4 CLOSED TO THE HEATING COIL. ON A FURTHER RISE, T-2 WILL GRADUALLY MODULATE DAMPERS D-4-1B OPEN WHILE SIMULTANEOUSLY CLOSING D-4-2, STATIC PRESSURE CONTROLLER <u>SPC4-1</u> LOCATED IN THE ENTERING SIDE OF THE RELIEF DAMPER WILL OVERNIDE THE CONTROL AND MODULATE D-4-3 TO MAINTAIN ITS SETTING TO THROUGH A DOCTORY OF THE RELIEF DAMPER WILL OVERNIDE THE CONTROL AND MODULATE D-4-3 TO MAINTAIN ITS SETTING TO ENSURE A POSITIVE BUILDING PRESSURE. LOW LIMIT THERMOSTAT T-3, SENSITIVE TO THE COLDEST SPOT IN THE AIR STREAM, WILL OVERRIDE T-2 TO PREVENT MIXED AIR FROM FALLING BELOW ITS SETTING OF FORTY (40F). ON A FALL IN TEMPERATURE, THE REVERSE WILL OCCUR.

UNOCCUPIED HEATING MODE TIN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL

OCCUPIED COOLING MODE - SUPPLY AND RETURN FANS AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE AIR DAMPER D-4-1A WILL OPEN. OUTSIDE DAMPER D-4-1B AND RETURN DAMPER D-4-2 WILL, THROUGH THE METASY'S SYSTEM CONTROL UNIT, BE UNDER FLOATING CRY BULB DIFFERENTAL CONTROL WHICH WILL COMPARE THE TEMPERATURE OF THE RETURN AND OUTSIDE AIR STREAMS. THE OUTSIDE AIR WILL BE UTILIZED WHENEVER IT IS GREATER THAN SEVEN (7F) LESS THAN THE RETURN AIR TEMPERATURE. WHEN THE DIFFERENTIAL FALLS BELOW SEVEN (7F), MAXIMUM OUTSIDE AIR DAMPERS D-4-1B WILL CLOSE, OPENING RETURN AIR DAMPER D-4-2. DISCHARGE SENSCR T-2, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL IN SEQUENCE MODULATE OUTS DE AND RETURN DAMPERS D-4-1B AND D-4-2 AND CHILLED WATER VALVE V-C-1 TO MAINTAIN ITS SETTING OF FORTY-FIVE (45F). HEATING CC/L VALVE V-H-4 WILL REMAIN

FAN CONTROL - SYSTEM STATIC PRESSURE SENSING STATION <u>SPSS-4-1</u> THROUGH A STATIC PRESSURE TRANSWITTER AND THE METASYS CONTROLLER WILL WODULATE THE SUPPLY FAN VARIABLE FREQUENCY DRIVE TO MAINTAIN ITS SETTING. ON A FISE IN STATIC AS SENSED BY <u>SPSS-4-1</u> THE SUPPLY FAN DRIVE WILL GRADUALLY MODULATE FAN SPEED TO ITS MINIMUM POSITION TO MAINTAIN ITS SETTING. HIGH LIMIT SPSS-4-1 THE SUPPLY FAN DRIVE WILL GRADUALLY MODULATE FAN SPEED TO TIS MINIMUM POSITION TO MAINTAIN ITS SETTING. HIGH LIMIT STATIC PRESSURE CONTROLLER SPC-4-2 WHICH WILL OVERRIDE <u>SPSS-4-1</u> TO PREVENT THE DISCHARGE FROM RISING ABOVE ITS SET POINT. SUPPLY DUCT AIR MONITORING STATION <u>AMD-4-1</u> AND RETURN DUCT AIR MONITORING STATION <u>AMD-4-2</u> THROUGH VELOCITY PRESSURE TRANSMITTERS WILL SEND SIGNALS TO THE METASYS CONTROLLER WHICH WILL COMPARE TOTAL SUPPLY AND RETURN AIR QUANTITIES AND MODULATE THE RETURN FAN VARIABLE FREQUENCY DRIVE BASED ON SETPOINT TO SYNCHRONIZE RETURN FAN VOLUME WITH THE SUPPLY FAN VOLUME SO AS TO MAINTAIN CONSTANT MINIMUM BALANCED OUTSIDE AIR FLOW. DIFFERENTIAL WILL BE REDUCED TO ZERO (0) (NO OUTSIDE AIR) DURING WARM-UP AND UNOCCUPIED MODES OF OPERATION. MANUALLY RESET HIGH LIMIT STATIC PRESSURE CONTROLLERS SPC-4-2 AND SPC-4-3 WILL STOP THEIR RESPECTIVE SUPPLY AND RETURN FANS WHENEVER THEIR SETTING IS REACHED. ALL FANS WILL BE REQUIRED TO BE MANUALLY RESTARTED IF DE-ENERGIZED BY STATIC PRESSURE CONTROLS. SUPPLY FANS WILL BE MANUALLY CONTROLLED USING A BY-PASS

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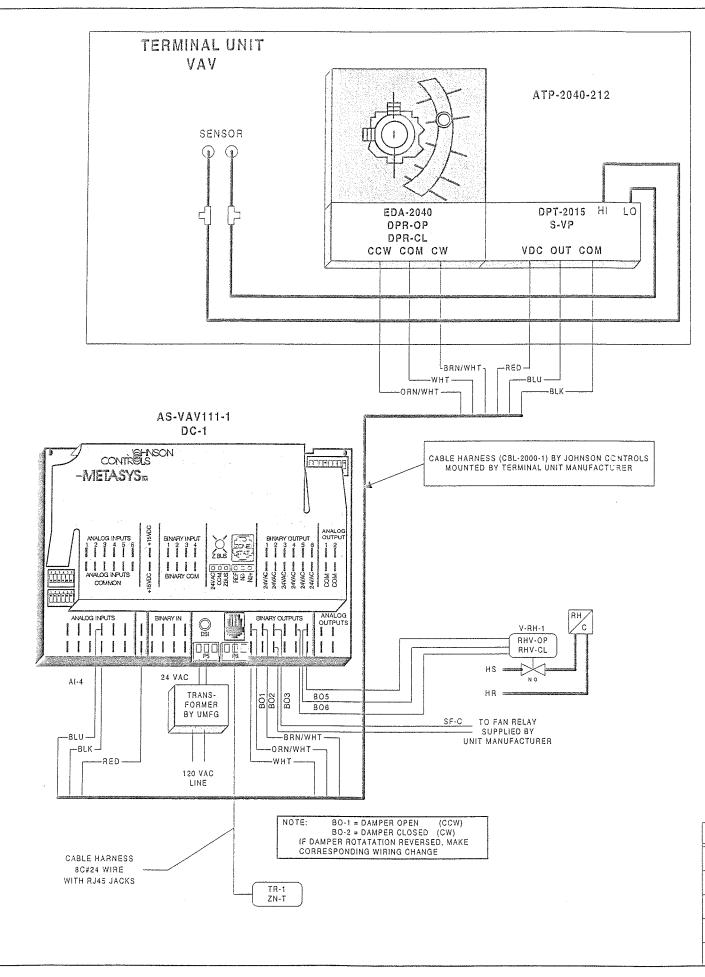
I Spreadshe	oot 1			Software		1			Digital Controller Info	mation	1	Pan	el Inforn	nation		Ì		Intermediate Dev	ricə			Fie	ld Device		 
ag Point T	Ivpa S		Object Name	Expanded ID	Display U	Jnits DC	Type N	V2 Trunk N2	Cablə	Modula Typa	Termination	Panel Panel Location	Slo Numt	1 1	Cable Number	Wiring/I ubing	Temination In	Dəvicə	Termination Dut	Location	Wirding/T ubing	Terminations	Device	Location Ref Detai	Comment
		U-4 1							1 bdy/reannaide		1	EN-AHU-4 Press Lev MER D	1	M.3-12	1	1					4	<u> </u>			N2 Trunk
		U-4 1*				AHU		1	1			EN-AHU-4 Press Lev MER D	1	0 M.3-12	1	1								A50	INZ HUNK
-BO-1			UN ODD	Min OA Damper Control	Closedi O			1	1/80-1		BO#24V	EN-AHU-4 Press Lev MER D	1		AH-1-BO-1	1		V11HGA-100		_	1.44	12-Wire	SAV-24VAC		
BO-2		-		Supply Fan Control		On AHU			180-2	BLY	BO#24V.BICCM	EN-AHU-4 :Press Lev MER D	1	0 M.3-12	AH-1-80-2	3/18	A,CCILS,COM		COM.MO			See starter detail		A53	
80-2				Return Fan Control	011 0	On AHU			1:80-3		BO# 24V.BICOM	EN-AHU-4 IPress Lev MER D	1	0 M.3-12	AH-1-BO-3	3/18	B,COILS,COM		COM.MO			See starter detail		A53	
80-3				Clg Coil Pump Control		On AHU			1.80-4	BLY		EN-AHU-4 Press Lev MER D			AH-1-BO-4	3/18	A,COILS,COM		COM.MO			See starter detail			
BO-4				Toilet Exh Fan Control		On IAHU			1180-5	p. (2.)	BO#.24V	EN-AHU-4 (Press Lev MER D		0 M.3-12	AH-1-BO-5	1		PD-109-51			2/18	Device depender	nt 24VAC OUT	A50	
80-6		U-4 1 U-4	127-0	Tollet Exil Part Control		AHU			1180-6			EN-AHU-4 Press Lev MER D		0 M.3-12	AH-1-BO-6						1				
80-6		U-4 U-4				AHU			180-7		1	EN-AHU-4 Press Lev MER D		0 M.3-12	AH-1-BO-7	1									
						AHU		1	1 80-8			EN-AHU-4 Press Lev MER D	1	0IM.3-12	AH-1-80-8	1		1							
80-8		<u>U-4 1</u>	i			AHU			1180-9			EN-AHU-4 Press Lev MER D	<u>†                                    </u>	0iM.3-12	AH-1-BO-9										
BO-9	AH					AHU			1180-10			EN-AHU-4 Press Lev MER D		0 M.3-12	AH-1-BO-10	1		1						i	
BO-10		U-4		0	% Oper				11AO-1		AO#.AOCOM	EN-AHU-4 Press Lev MER D			AH-1-AO-1	2/18	1+,-	EP-8000-4	SUPPLY.O		1/4*	Barb Fitting	EP-PNEU.	A28	
AO-1				Damper Control				<u> </u>	1 AO-2		AO#.AOCOM	EN-AHU-4 Press Lev MER D		0 M.3-12	AH-1-AO-2	2/18	+	EP-8000-4	SUPPLY,O		1/4"	Barb Fitting	EP-PNEU.	A28	
AO-2		U-4 H		Heating Coil Valve	% Oper				1 AO-3			EN-AHU-4 Press Lev MER D			AH-1-AO-3	12/18	+ -	EP-8000-4	SUPPLY,0		1/4"	Barb Fitting	EP-PNEU.	A28	
AO-3		U-4 [C		Clg Coil Valve	% Oper			1	1 AO-3			EN-AHU-4 Press Lev MER D			AH-1-AO-4					-	2/18	Device depender		1 A21	
AC-4				Sup Fan Var Spd Drive	%	AHU			11AO-4 11AO-5			EN-AHU-4 Press Lev MER D			AH-1-AO-5			+			2/18	Device depender	nt 0-20mA OUT	A21	
AO-5			RF-VSD	Ret Fan Var Spd Drive	%	AHU		1				IEN-AHU-4 Press Lev MER D			AH-1-AO-6										
AO-6	AHI	-	1			1410		1	1 AO-6		BI# BICOM	EN-AHU-4 Press Lev MER D			AH-1-BI-1						2/22	Device depender	nt Aux Contact (NO)	A40	
81-1		the second s		Supply Fan Status		On AHU		1	1 81-1		BI#BICOM	EN-AHU-4 Press Lev MER D			AH-1-BI-2			·		1	2/22	Device depender	nt Aux Contact (NO)	; A40	
81-2				Return Fan Status		On AHU		11	1 81-2		BI#BICOM	EN-AHU-4 Press Lev MER D			AH-1-8I-3						12/22	Device depender	nt/Contact (NO)	1 A40	
81-3	AH	U-4 IS		Smoke Detectors	Normal Al			1	1 BI-3		BI#,BICOM	EN-AHU-4 Press Lev MER D			AH-1-8I-4						2/22	NO.M1	A70 (NC)	1 A41	
B1-4	and the second se	U-4  L		Low Temperature Stat	Normal Al			1	1 BI-4		BI#BICOM	EN-AHU-4 Press Lev MER D			AH-1-BI-5					1	12/22	Device depender	nt Aux Contact (NO)	A40	
BI-5	AHI			Clg Coil Pump Status		On AHU		1	1 BI-5		BI#BICOM	IEN-AHU-4 Press Lev MER D			AH-1-BI-6								ntIAFS-460 & Relay	i A40	
BI-6	AHL			Supply Air Static Press	Normal Al			1	1 BI-6		BI#BICOM	EN-AHU-4 Press Lev MER D			AH-1-8I-7						2/22	Device depender	nt AFS-460 & Relay	A40	1
BI-7			RA-HSP	Return Air Static Press	Normal Al			1	1 BI-7		BI#,BICOM	EN-AHU-4 Press Lev MER D			AH-1-BI-8						1			1	
BI-8	AHI					AHU		1	1 81-8		Al#.+VDC	EN-AHU-4 Press Lev MER D			AH-1-61-6				-1	-	2/18	+	DPT-2641	A2	
Al-1		U-4  P		Return Air Vel Pressure	ln. Wg			1	1 Al-1						AH-1-AL-2			+				2-Wire	TE-6316P-1	A4	
AI-2				Return Air Temperature	Deg F			1	1 Al-2		AI#,AICM	EN-AHU-4 Press Lev MER D			AH-1-AI-2							2-Wire	TE-6316P-1	A4	
IAI-3		U-4 C		Disch Air Temperature	Deg F	AHU		1	1 AI-3		AI#,AICM	EN-AHU-4 Press Lev MER D			AH-1-AI-4							2-Wire	TE-6316P-1	A4	
AI-4		J-4 №	AA-T	Vixed Air Temperature	Deg F	AHU		1	1 Al-4		AI#,AICM	EN-AHU-4 Press Lev MER D			AH-1-AI-4						1010				1
AI-5	AHL	J-4				AHU		1	1 AI-5		ļ	EN-AHU-4 Press Lev MER D		o milo re											
Al-6	AHL	J-4				AHU		1	1 AI-6		L	EN-AHU-4 Press Lev MER D			AH-1-AI-6					+	2/18		DPT-2641	A2	
AI-7	AHU	J-4 S	S-SP	Supply Static Pressure	In. Wg	J AHU		1	1 Al-7		Al#,+VDC	EN-AHU-4 Press Lav MER D									2/18		DPT-2641		
A1-8	AHL	J-4 IS	-VP	Supply Vel Pressure	In. Wg	UHAI I		1	1 AI-8		Al#.+VDC	EN-AHU-4 Press Lev MER D		0 M.3-12	AH-1-AI-8	1	1				Jel 10	107	1011-2041		

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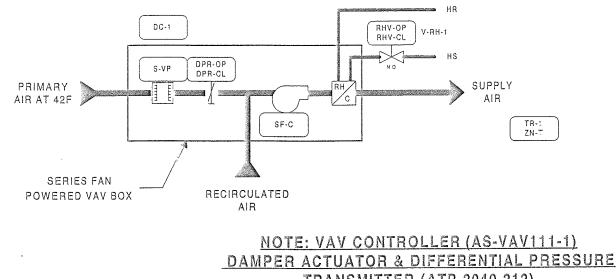
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Full Sp	preadsheet	1		Soitware		7		Digital Controller Infor	mation		Pan	al Informat	ion				Intermediate Dev	icə		)	Fiə	ld Device		1	
Tog	Point Type	System Name	1	Expanded ID	Display Uni	DC Type	N2 Trunk	N2 Addr Destination Bay/Terminal	Module Type	Fermination	Panel Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wining/T ubing	Terminations	Device	Location	Ref Detail	
	- <u>}</u>	IHEATING				VAV		1 Bdy/rennandr	1		IEN-DPS-4 Press Lav MER D				3	<u>)</u>				1		i	l		Power to Comtroller
		HEATING				IVAV			+		EN-DPS-4 Press Lav MER D				1	· · · · · · · · · · · · · · · · · · ·				1		1	1		N2 Trunk
	Al-1			HW Sup Temp At AHU-4	Deg F	VAV		11 21Al-1		AI#,AICM	EN-DPS-4 Press Lev MER D		<u></u>	DPS-2-AI-1	1					2/18	2-Wire	TE-631AP-1		U1	
	AI-2			HW Diff Press At AHU-4	PSI	IVAV	-	1 2 Al-2			C EN-DPS-4 Press Lev MER D			DPS-2-AI-2	<u>+</u>		+			3/18	Device dependen	t Rob/Hal 252C	Í	U5	4-20ma with 500 OHM Resistor
	IAI-3			CW Sup Temp At AHU-4	Deg F	VAV		1 2 AI-3		AI#,AICM	TEN-DPS-4 Press Lev MER D			DPS-2-AI-3	+			1		2/18	2-Wire	TE-631AP-1		U1	
	Al-4			CW Diff Press At AHU-4	PSI	VAV		2 Al-4			C EN-DPS-4 Press Lev MER D			DPS2-Al-4		1				3/18	Device dependen	t Rob/Hal 252C	1	US	4-20ma with 500 OHM Resistor
	AI-5	HEATING		GW DII FIESS ALANG-4	1.01	IVAV		2 Al-4		1.1.1.7.10141.7.1040	EN-DPS-4 Press Lev MER D			DPS-2-AI-5	1					1		1			
	IAI-6	HEATING				VAV		2 AI-5	+	1	EN-OPS-4 Press Lev MER D			DPS-2-AI-6											
	81-1	HEATING		·		VAV		2 8 -1			EN-DPS-4 Press Lev MER D		0	DPS2-81-1	-		+								
	BI-2	HEATING		÷		VAV		2 8 -2			EN-OPS-4 Press Lev MER D		ol	IDPS-2-81-2	<u> </u>							1			
	191-2	IHEATING				IVAV	1	2 81-3			EN-DPS-4 Press Lev MER D			DPS-2-8I-3	1										
	81-3 81-4	HEATING				VAV		2 81-4		<u></u>	EN-DPS-4 Press Lev MER D		0	DPS2-BI-4		1									
	BO-1	HEATING				IVAV		2 80-1			EN-DPS-4 Press Lev MER D		0	DPS-2-BO-1	†			1					i		l
	BO-2	HEATING				VAV		2180-2			EN-DPS-4 Press Lev MER D			DPS-2-80-2						1			1		
	BO-3	HEATING				VAV		280-2	+		EN-DPS-+ Press Lev MER D			DPS-2-BO-3	1			1		1					1
	BO-4	HEATING				VAV		2 80-5			IEN-DPS-4 Press Lev MER D			IOPS2-80-4		1		1							<u> </u>
	BC-5	INEATING				VAV		2180-5		1	EN-DPS-4 Press Lev MER D			DPS-2-80-5				1	1						<u> </u>
	180-6	HEATING	1			VAV	1	280-6		1	EN-DPS-4 Press Lev MER D		0	DPS2-BO-6	1	1	1	1	1						
	80-6 A0-1	HEATING				IVAV		2 AO-1	+	- <u>†</u>	IEN-DPS-4 Press Lev MER D		0	DPS-2-AO-1	1	1									<u> </u>
	A0-2	HEATING		-		IVAV		2 AO-2			EN-DPS-4 Press Lev MER D			DPS2-AO-2	1	1			[					]	

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#### SERIES FAN POWERED VARIABLE AIR VOLUME (VAV) WITH REHEAT COIL



# DESCRIPTION OF OPERATION

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PRIMARY AIR VALVE WILL OPEN TO THEIR MINIMUM POSITION AND TERMINAL UNIT FAN WILL START AND RUN CONTINUOUSLY WHENEVER AIR HANDLING UNIT IS RUNNING. TERMINAL UNIT FANS WILL START THIRTY (30) SECONDS BEFORE OPENING OF AIR VALVES TO PREVENT BACK SPINNING OF FAN. FANS WILL ALSO BE OPERATED AS DEFINED IN THE UNOCCUPIED MODES. PRIMARY AIR VALVES WILL BE CLOSED DURING UNOCCUPIED HEATING MODE. ROOM SENSOR TR-1 WILL ON A RISE IN TEMPERATURE GRADUALLY MODULATE REHEAT COIL VALVE V-RH-1 CLOSED AND ON A CONTINUED RISE WILL GRADUALLY MODULATE PRIMARY AIR VALVE FROM IT'S MINIMUM TO MAXIMUM SETTING TO MAINTAIN IT'S SETTING OF SEVENTY-FIVE (75F). ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED. DURING OPERATION OF THE WARM-UP MODE ALL PRIMARY AIR VALVES OPEN TO THEIR MAXIMUM POSITION AND TERMINAL FANS START TO PERMIT FULL AIR FLOW TO THE SPACES. REHEAT COIL VALVE V-RH-1 IS MODULATED IN RESPONSE TO ROOM SENSOR TO MAINTAIN SPACE TEMPERATURE.

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02:54 PM	EXCEPT WITH THE WRITTEN PERMISSION OF JOHNSON CONTROLS, INC. AND FURTHER AGREES TO SURRENDER SAME TO JOHNSON CONTROLS, INC. UPON DEMAND.	BALTIMORE NFL STADIUM AT CAMDEN YARDS	
FILE NAME VAVBOX-D.VS	COPYRIGHT JOHNSON CONTROLS, INC. 19nn	BALTIMORE, MARYLAND	

Estimate:	quad d	BILL OF MATTER	TALS 7052009	8.pre
Desig.	Qty	Part #	Description	
Field Dev:	ices:			
CC-1	46	AS-VAV110-1	VAV 6AI,4BI,8BO,8K	
V-RH-1	46		SEE VALVE SCHEDULE	
VAV	46	ATP-2040-21.2	ACT, 2MIN+1.5*DP, 1/2*CPL	G
ZN-T	28	TE-6410W-1000	MSTAT, NI, BOX, JACK	

# TRANSMITTER (ATP-2040-212) ARE FACTORY MOUNTED BY TITUS

	1								
S-BUILT								7/18/00	CME
REFERENCE	CRAWING	NO.		REVISION-L	OCATIO	N	ECN	DATE	3Y
senipn3 erk	Project Managar	Application	Engineer	T	DRAW	N		APPROVED	
JDP	WJT	R1	rs	BY RTS	DATE	08/28/97	BY	DATE	
	La		1	Eranch intermali:	5a		CONTRACT	NUMBER	
	JOHN	SO	N	Johnson	Contr	ols, inc.	70	52-00	98
CON	IKOLS	5		60 Loveto			DRAWING	UMBER	
Co	ontrols Group	C		Sparks, M	10 21	152	BL	-6559	-11

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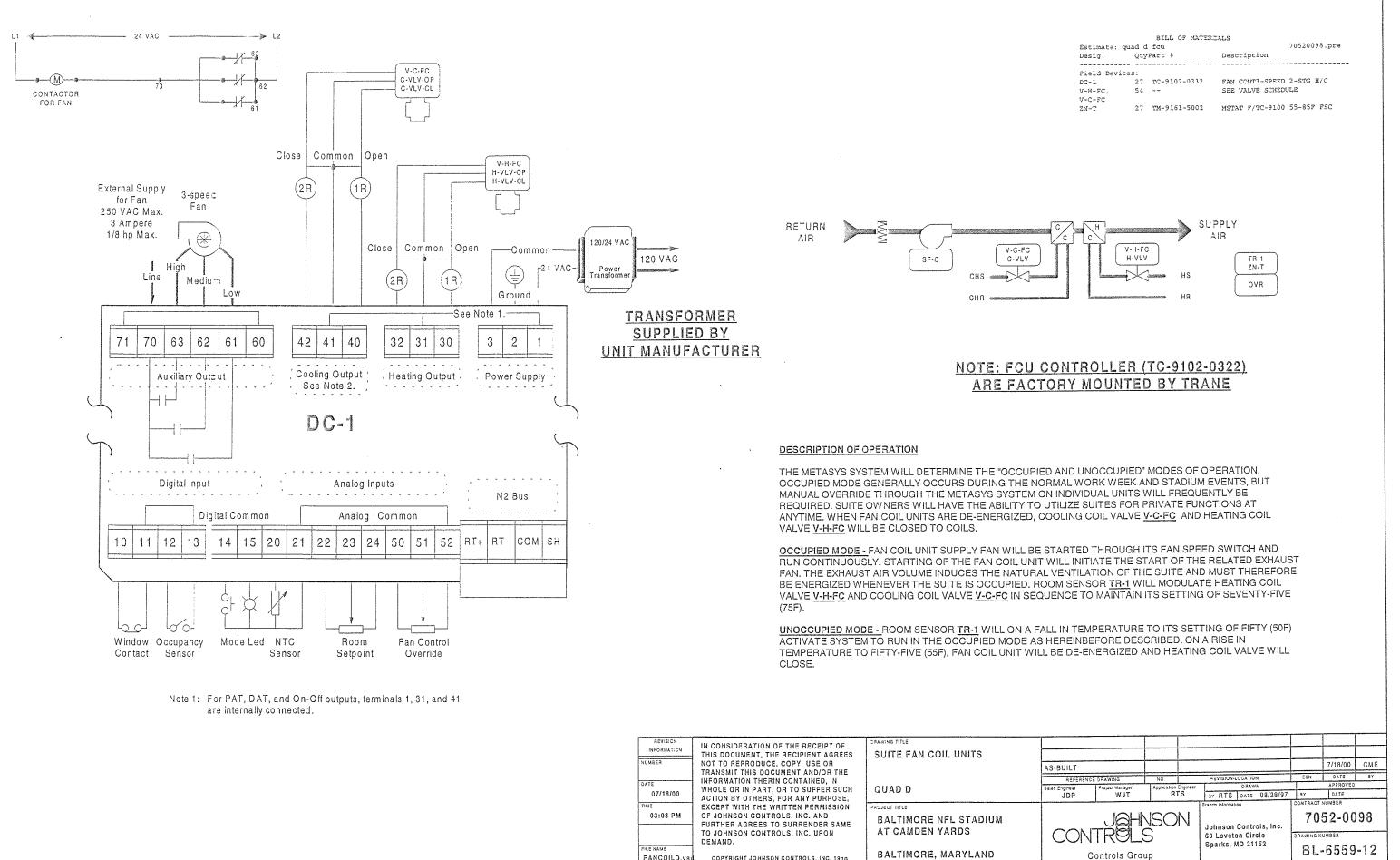
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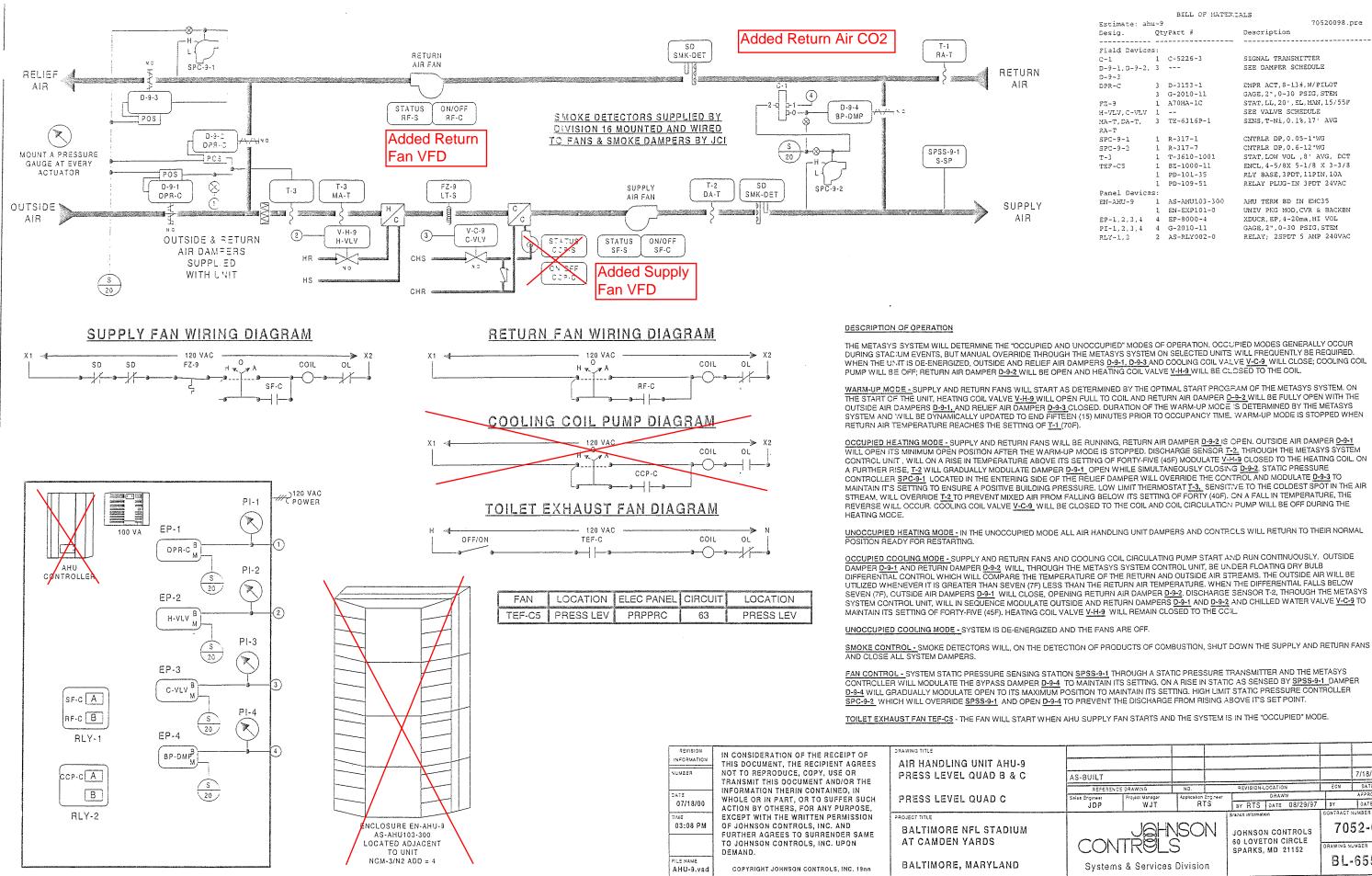
Il Spreadsheet	_		Software				Digita	l Controller Info	mation			Pan	I Informatio	on			1	Intermediate Devi	Ca			Fie	ld Device			
Tag Point Typ	Non	mə Nam	Expanded ID	Display Units	DCType	N2 Trunk	N2 Addr	Cable Destination Bay/Terminal	Modulə Typə	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Tarmination Out	Location	Wiring/T ubing	Terminations	Dəvicə	Location	Rəf Dətail	Comment
	FP-VA				VAV				İ	1	EN-FPY A	V At VAVBOX					**************************************		1					1		Power to Cantroller
	FP-VA				VAV	1	Xi					VIAt VAVBOX	0				ł		1		1			1	1	N2 Trunk
Al-1		AV-D ZN-T	Zone Temperature		VAV	1		Al-1		PHONE JACK			0		FPVAV-x-Al-1		1				8/26	PHONE JACK	Metastat-Ph Jack		U2	
Al-2	FP-VA				VAV	1		AI-2				V At VAVBOX	0		FPVAV-x-AI-2						1			1	1	
AI-3	FP-VA	V-D S-VP	1		VAV	1		AI-3				V At VAVBOX	0		FPVAV-x-AI-3						1				1	
AI-4	FP-VA		Supply Vel Pressure		VAV	1		AI-4		AI# AICM,+15VDC			0		FPVAV-x-AI-4		1				3/18	OUT,COM.+VDC	DPT-2000		U9	
AI-6	FP-VA				VAV	1		Al-5		L		V At VAVBOX	0		FPVAV-x-AI-5										L	
BI-1	FP-VA				VAV	1		Al-6 Bl-1				V At VAVBOX	0		FPVAV-x-AI-6				1						1	
81-2	IFP-VA				VAV VAV	1						V At VAVBOX	0		FPVAV-x-8I-1					1					<u> </u>	
81-3	EP-VA				VAV	<u>                                      </u>	X					V IAt VAVBOX	0		FPVAV-x-BI-2						1				1	
81-4	FP-VA				VAV	<u>                                      </u>	X					V At VAVBOX	0		FPVAV-x-BI-3		<u> </u>	<u> </u>	<u> </u>		1					
BO-1			Damper Open		VAV			BI-4 BO-1				V At VAVBOX	0		FPVAV-x-BI-4									_	L	
BO-2	EP-VAV	V-D IOPB-CL	Damper Close	Olf On		<u> </u>		BO-1 BO-2		BO-a,BO-b,24VAC			0		FPVAV-x-80-1				<u> </u>			CW,CCW,COM			U54	
BO-3	FP-VAV	V-DUSE-C	Supply Fan Control	Off On				BO-2 BO-3		BO-a,BO-b,24VAC			0		FPVAV-x-BO-2				<u> </u>			CW,CCW,COM			U54	
80-4	EP-VAV				VAV	1		BO-3 BO-4	+	BO#,24VAC		V At VAVBOX	0		FPVAV-x-BO-3		COIL	RELAY	NC.:DOM		2/14	See starter detail	Starter (NO)		U51	
80-5			Reheat Valve Open	Off On				BO-5		BO-a,BO-b,24VAC	CN CDV 6				FPVAV-x-80-4 FPVAV-x-80-5					L	10110	Children and Children				
BO-6			Reheat Valve Close	Off On		1		30-5		BO-a.BO-b.24VAC			0		FPVAV-x-80-5					<u>}</u>		BLK,RED,WHT			U58	
AO-1	FP-VAV				VAV			AO-1					0		FPVAV-x-60-6						3/18	BLK,RED,WHT	VA-/150		U58	
AO-2	FP-VAV	V-D			VAV			40-2				V At VAVBOX	0		FPVAV-x-AO-2			· [			<u> </u>					



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TIME	EXCEPT WITH THE WRITTEN PERMISSION	PROJECT TITLE	1
03:03 PM	OF JOHNSON CONTROLS, INC. AND FURTHER AGREES TO SURRENDER SAME TO JOHNSON CONTROLS, INC. UPON	BALTIMORE NFL STADIUM	
	DEMAND.		
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I Spreadshe	eet l	S	oftware				Digi	al Controiler Ir	normation		1		Panel Inform	tion				Intermediate Dev	ic:e			Fie	d Devica		<u> </u>	
og Point 1	Ivpa	System Object Name Name	Expanded ID	Display U	nits DC Ty	De N2 Trun	k N2 Add	Cable Destinatio Bay/Termin	5	pə Təminati	on Pomal	Panel Locat	ion Slot Numbe	Reference r Drawing	Cable Number	Wiring/T ubing	Termination Ir	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Lacation	Ref Delail	
		CU-0			ITC			1 DOWNSHITT		i i i i i i i i i i i i i i i i i i i	EN-FOU	IAI FOU		1		Ì			•	1	4			1		Power to Controller
		CU-D *		+	TC			/			EN-FOU			0		1			1					1		N2 Trunk
BO-1		CU-D H-VLV-OP Htg Valv	a Open	1 Off	Dn ITC			/BO-1		32,31/COM,3				0	FCU-x-BO-1								VA-7150 (Heating)			1
		CU-D H-VLV-CL Htg Valv		Off			<del>; </del> ,	(80-2		32,31/COM,3				0	FCU-x-BO-2	1							VA-7150 (Heating)			
80-2 80-3		CU-D C-VLV-OP Clg Valv		Off				(80-3			EN-800			0	FCU-x-BO-3				;	1			VA-7150 (Cooling)	<u> </u>		
80-3		CU-D C-VLV-CL Clg Valv		Off				(180-4			EN-FOU			0	FCU-x-BO-4				1				VA-7150 (Cooling)		1	
80-4		CU-D F-SPD-1 iFan (Sp		Off				(80-5			62,61EN-FCU			0	FCU-x-80-5			1	1				UStarter Coil (3 spd fan)			
80-5		CU-D F-SPD-2 Fan (Sp			On ITC			(BO-6			62,61EN-FOU			0	FCU-x-80-6				1				UStarter Coil (3 spd fan)			
BO-6		CU-D F-SPD-3 Fan (Sp		Off				71BO-7			62.6 EN-FOJ			0	FCU-x-BO-7				1		4/14	HI,MED,LOW,NE	UStarter Coil (3 spd fan)	-		
			380.31					/IBI-1		1,1,70 0110 0	EN-FOU			01	FCU-x-BI-1				1		1					
BI-1		CU-D			10	_		/181-2			EN-FOU			0	FCU-x-81-2		-i		5							
BI-2 BI-3		CU-D						(181-3			EN-FOU			0	FCU-x-BI-3	1			]	-	1					
		CU-D		- Door G	10			(Al-1		ULMODE 15	ED 2IEN-POU			ő	FCU-x-AI-1	1					3/22	14 MODE, 15 LED	TM-9100 (Mode & LEC	0}		
Al-1			mperature	Deg F				(AI-2		22.23.21/24	EN-FOU			ăl	FCU-x-AI-2						3/22	22,23,21/24	TM-9100 (Setpoint)			
AI-2		CU-D ZN-SET Zone Te CU-D OVB Fan Ove	mp Set Point	Deg F			-	(AI-2 (AI-4		151.21/24	EN-FOU			0	FCU-x-AI-4				1		2/22	51,21/24	TM-9100 (Fan Overrid	e)		1



		BILL OF MATERI	ALS	B0600000
Estimate: ah				70520098.pre
Desig.	Qt	yPart #	Description	
Field Device		C-5226-3	SIGNAL TRANSMIT	
			SEE DAMPER SCHE	
D-9-1,D-9-2, D-9-3	3		SEE DAMPER SCRE	DOLL
DPR-C	3	D-3153-1	DMPR ACT, 8-13#,	W/PILOT
	3	G-2010-11	GAGE,2*,0-30 PS	IG, STEM
FZ-9	1	A70HA-1C	STAT, LL, 20', EL,	MAN, 15/55F
H-VLV, C-VLV	1		SEE VALVE SCHED	ULE
MA-T, DA-T,	3	TE-6316P-1	SENS, T-Ni, 0.1%,	17' AVG
RA-T				
SPC-9-1	1	R-317-1	CNTRLE DP,0.05-	1*WG
SPC-9-2	1	R-317-7	CNTRLR DP,0.6-1	2 "WG
т-3	1	T-3610-1001	STAT, LOW VOL , 8	' AVG, DCT
TEF-C5	1	BZ-1000-11	ENCL, 4-5/8X 5-1	/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 1	1PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3	PDT 24VAC
Panel Device	s:			
EN-AHU-9	1	AS-AHU103-300	AHU TERM BD IN	EWC35
	1	EN-EXP101-0	UNIV PKG MOD, CV	R & BACKBN
EP-1,2,3,4	4	EP-8000-4	XDUCR, EP, 4-20ma	,HI VOL
		G-2010-11	GAGE,2",0-30 PS	IG, STEM
RLY-1,2	2	AS-RLY002-0	RELAY; 2SPDT 5	AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STAD: UM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AND RELIEF AIR DAMPERS <u>D-9-1</u>, <u>D-9-3</u> AND COOLING COIL VALVE <u>V-C-9</u> WILL CLOSE; COOLING COIL

WARM-UP MODE - SUPPLY AND RETURN FANS WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COLL VALVE <u>V-H-9</u> WILL OPEN FULL TO COLL AND RETURN AIR DAMPER <u>D-9-2</u> WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPERS <u>D-9-1</u>, AND RELIEF AIR DAMPER <u>D-9-3</u> CLOSED. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN PETURN AND TEMPERATIRE BEACHES AT SECTION OF THE VARIANCE OF THE COLD AND THE METASYS

OCCUPIED HEATING MODE - SUPPLY AND RETURN FANS WILL BE RUNNING, RETURN AIR DAMPER D-9-1 SOPEN. OUTSIDE AIR DAMPER D-9-1 WILL OPEN ITS MINIMUM OPEN POSITION AFTER THE WARM-UP MODE IS STOPPED. DISCHARGE SENSOR T-2. THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF FORTY-FIVE (45F) MODULATE <u>V-H-9</u> CLOSED TO THE HEATING COIL. ON A FURTHER RISE, <u>T-2</u> WILL GRADUALLY MODULATE DAMPER <u>D-9-1</u> OPEN WHILE SIMULTANEOUSLY CLOSING <u>D-9-2</u>. STATIC PRESSURE CONTROLLER SPC-9-1 LOCATED IN THE ENTERING SIDE OF THE RELIEF DAMPER WILL OVERRIDE THE CONTROL AND MODULATE <u>D-9-3</u> TO MAINTAIN IT'S SETTING TO ENSURE A POSITIVE BUILDING PRESSURE. LOW LIMIT THERMOSTAT T-3, SENSITIVE TO THE COLDEST SPOT IN THE AIR STREAM, WILL OVERRIDE T-2 TO PREVENT MIXED AIR FROM FALLING BELOW ITS SETTING OF FORTY (40F). ON A FALL IN TEMPERATURE, THE REVERSE WILL OCCUR. COOLING COIL VALVE V-C-9 WILL BE CLOSED TO THE COIL AND COIL CIRCULATION PUMP WILL BE OFF DURING THE

OCCUPIED COOLING MODE - SUPPLY AND RETURN FANS AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE DAMPER D-1 AND RETURN DAMPER D-2 WILL, THROUGH THE METASYS SYSTEM CONTROL UNIT, BE UNDER FLOATING DRY BULB DIFFERENTIAL CONTROL WHICH WILL COMPARE THE TEMPERATURE OF THE RETURN AND OUTSIDE AIR STREAMS. THE OUTSIDE AIR WILL BE UTILIZED WHENEVER IT IS GREATER THAN SEVEN (7F) LESS THAN THE RETURN AIR TEMPERATURE. WHEN THE DIFFERENTIAL FALLS BELOW SEVEN (7F), CUTSIDE AIR DAMPERS D-9-1 WILL CLOSE, OPENING RETURN AIR DAMPER D-9-2, DISCHARGE SENSOR T-2, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL IN SEQUENCE MODULATE OUTSIDE AND RETURN DAMPERS D-9-1 AND D-9-2 AND CHILLED WATER VALVE V-C-9 TO

FAN CONTROL - SYSTEM STATIC PRESSURE SENSING STATION <u>SP5S-9-1</u> THROUGH A STATIC PRESSURE TRANSMITTER AND THE METASYS CONTROLLER WILL MODULATE THE BYPASS DAMPER <u>D-9-4</u> TO MAINTAIN ITS SETTING. ON A RISE IN STATIC AS SENSED BY <u>SPSS-9-1</u> DAMPER <u>D-9-4</u> WILL GRADUALLY MODULATE OPEN TO ITS MAXIMUM POSITION TO MAINTAIN ITS SETTING. HIGH LIMIT STATIC PRESSURE CONTROLLER SPC-9-2 WHICH WILL OVERRIDE SPS-9-1 AND OPEN D-9-4 TO PREVENT THE DISCHARGE FROM RISING ABOVE IT'S SET POINT.

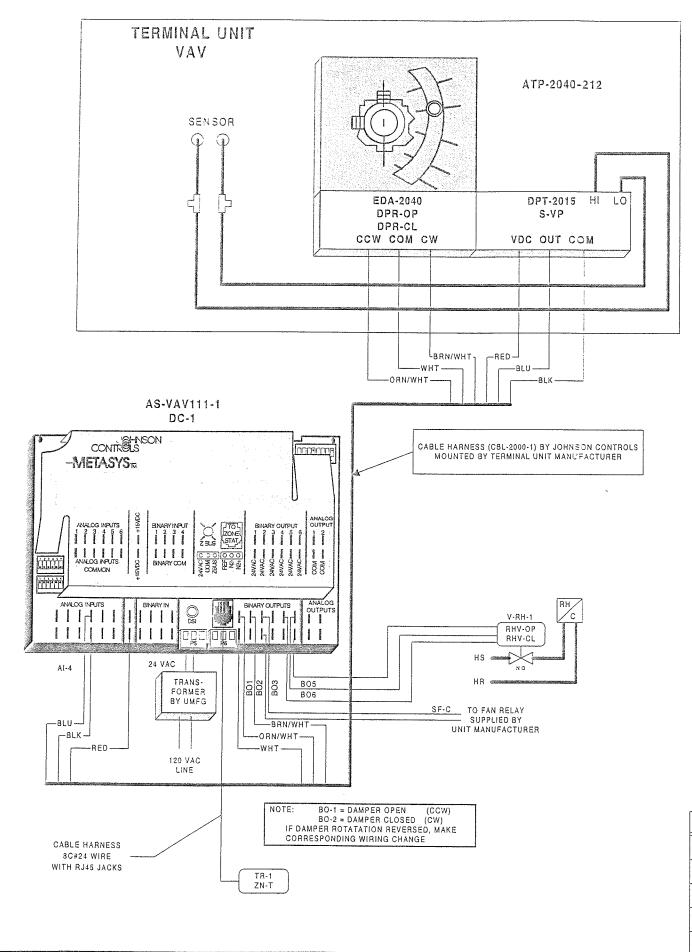
AS-BUILT								7/18/00	CME
REFERENCE	DRAWING	NO.		REVISION-L	OCATIO	4	ECN	DATE	ay
alas Enginear	Project Manager	Application	Engineer	T	DRAW	N		APPROVED	
JDP	TLW	ี กา		BY RTS	DATE	08/29/97	BY	DATE	
		4		Branch informati	on		CONTRACT	NUMBER	
	<u>J</u> AH	ĮSO	N	JOHNSO			70	52-00	98
CON	TRELS		SPARKS,			DRAWING		4.0	
Systems	& Services	Divisio	n				BL	-6559	-13

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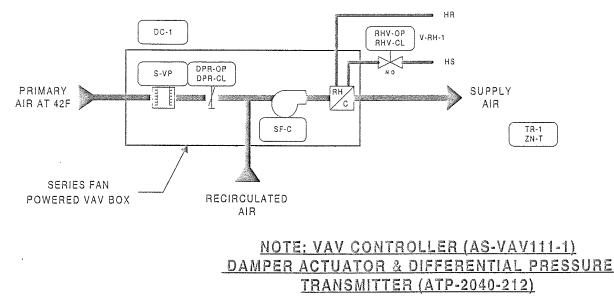
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ull Spread	sneet		alle practice and the second state	Soltware		1		Digital Controller Info	omation		1	Po	onel Informat	ion				Intermedicite Dev	/icə			Field (	Device			
'ag Poi		System Name	Object Name	Expanded 1D	Display Units	DC Турэ	N2 Trunk	Cable N2 Addr Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wining/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	<b>Terminations</b>	Device	Location R	ləf Dəlail	Comment
		AHU-9	1	1		AHU			1		EN-AHU-9	Press Level MER	i ii	vi.3-13		4	<u></u>						*******			ower to Controller
		AHU-9		1		AHU	1	4			EN-AHU-S	Press Level MER	0	W.3-13		1	1									2 Trunk
80-		AHU-9		Supply Fan Control	Off On		11	4 BO-1	RLY	BO#.24V,BICOM	E'HAHU-S	Press Level MER	01	vl.3-13	AHU-9-4-BO-1	3/18	A.COILS.COM	RELAY-A	COM.NO		2/14	See starter detail	Starter (NO)	A		
BO-			RF-C	Return Fan Control	Off On		1	4 BO-2	ALY	BO#,24V,BICOM	EN-AHU-S	Press Level MER	0	4.3-13	AHU-9-4-BO-2	3/18	B.COILS.COM	RELAY-B	COM.NO		2/14	See starter detail	Starter (NO)	A	53	
BO-	3	AHU-9	1			AHU	1	4 80-3				Press Lavel MER	0	4.3-13	AHU-9-4-BO-3	1	1									·
80-		AHU-9		Clg Coil Pump 9 Cemtral	Off On		1	480-4	RLY	BO#.24V,BICOM	EN-AHU-9	Press Level MER	01	4.3-13	AHU-9-4-80-4	3/18	A.COILS.COM	RELAY-A	COM.NO		2/14	See starter detail	Starter (NO)	А	53	·····
BO-		AHU-9	TEF5-C	Toilet Exh Fan C5 Control	Off On		1	4 BO-5		80#.24V	EN-AHU-S	Press Level MER	01	4.3-13	AHU-9-4-BO-5	1	1	1				Device dependent!		A	50	·····
BO-	0	AHU-9				AHU	1	4 80-6			EN-AHU-9	Press Level MER	01	4.3-13	AHU-9-4-BO-6	-	1	1		1						
		AHU-9		<u> </u>		AHU	1	480-7	1		EN-AHU-9	Press Level MER	0	M.3-13	AHU-9-4-BO-7	1		1		1				h <del></del>		
BO-		AHU-9				AHU	1	4 BO-8		1	EN-AHU-9	Press Level MER	01	4.3-13	AHU-9-4-BO-8		i	1	1							······
BO-		AHU-9		1		AHU	1	4 BO-9			EN-AHU-9	Press Level MER	0	vi.3-13	AHU-9-4-80-9		1	1	1	i						
80-		AHU-9	1			AHU	1	4 BO-10			EN-AHU-9	Press Level MER	0	4.3-13	AHU-9-4-BO-10		1						· · · · · ·			
AO-				Damper Control		AHU	1	4 AO-1		AO#,AOCOM	EN-AHU-9	Press Level MER	0	M.3-13	AHU-9-4-AO-1	2/18	1+	EP-8000-4	SUPPLY.O		1/4*	Barb Fitting	EP-PNEU.	4	28	
AO-2				Heating Coil Valve	10 apart	AHU	1	4 AO-2	1	AO#,AOCOM	EN-AHU-9	Press Level MER	01	4.3-13	AHU-9-4-AO-2			IEP-8000-4	SUPPLY,0				EP-PNEU.		28	
AO-3				Clg Coll Valve		AHU	1	4 AO-3		AO#,AOCOM	EN-AHU-9	Press Level MER	01		AHU-9-4-AO-3			EP-8000-4	SUPPLY.O				EP-PNEU.		28	
AO-4			BP-DMP	Bypass Damper		AHU	1	4 AO-4		AO#,AOCOM	EN-AHU-9	Press Level MER			AHU-9-4-AO-4			EP-8000-4	SUPPLY.O				EP-PNEU.		28	
AO-5		A4U-9				AHU	1	4 AO-5	i i		EN-4HU-9	Press Level MER	01		AHU-9-4-AO-5			1 0000 1	1001121,0			Daror ming	LI I NEO.		20	····
IAO-6		AHU-9	1			AHU	1	4 AO-6			EMAHU-9	Press Level MER	01	1.3-13	AHU-9-4-AO-6		·									
81-1				Supply Fan Status	Off On		1	4 BI-1		BI#,BICOM	EN-AHU-9	Press Level MER	01		AHU-9-4-BI-1		1				2/22	Device dependent	Aux Contact (NO)	Δ.	40	
IBI-2				Return Fan Status	Off On		1	4 BI-2		81#,BICOM	E:-AHU-9	Press Level MER	01	4.3-13	AHU-9-4-BI-2		1	1				Device dependent			40	
BI-3				Smoke Detectors	Normall Alarm		1	4 BI-3		81#,81COM		Press Level MER	01		AHU-9-4-BI-3	[	1					Device dependent		A		
BI-4					Normal Alarm		1	4 81-4	1	BI#,BICOM	E-4HU-9	Press Level MER			AHU-9-4-BI-4	;	+						A70 (NC)		41	
81-5				Clg Coil Pump 9 Staitus	Off On		1	4 BI-5	1	BI#,BICOM	EN-AHU-9	Press Level MER	0	1.3-13	AHU-9-4-81-5	i						Device dependent			40	
61-6			SA-HSP	Supply Air Static Press	Normal Alarm		1	4 BI-6	-  i	BI#,BICOM		Press Level MER			AHU-9-4-BI-6		1		<u> </u>			Device dependent			40	
BI-7		AHU-9				AHU	1	4 81-7	1			Press Level MER			AHU-9-4-8I-7		÷					a crice acpondent	contact (no)	^		
BI-8		AHU-9		i		AHU	1	4 BI-8			EN-AHU-9	Press Level MER			AHU-9-4-8I-8	i	<u>.</u>								·····	
Al-1		AHU-9	1			AHU	1	4 AI-1				Press Level MER			AHU-9-4-AI-1		<u></u>									
AI-2				Return Air Temperature		AHU	1	4 AI-2		AI#,AICM		Press Level MER			AHU-9-4-AI-2		1				2/18	2-Wire	TE-6315P-1	A	4	
AI-3				Disch Air Temperature		AHU	1	4 AI-3		AI#,AICM	E. AHU-9	Press Level MER			AHU-9-4-AI-3	<u> </u>		<u> </u>					TE-6315P-1	Â		
Al-4			MA-T	Mixed Air Temperature	Deg F	AHU	1	4 AI-4		AI#,AICM		Press Level MER			AHU-9-4-AI-4								TE-6315P-1	Â		
AI-5		AHU-9	<u> </u>			AHU	1	4 AI-5				Press Level MER			AHU-9-4-AI-5						510	2-1110	1001011	^		
AI-6		AHU-9		l		AHU	1	4 AI-6				Press Level MER			AHU-9-4-AI-6		1		·							
AI-7			S-SP	Supply Static Pressure	In, Wg	AHU	1	4 AI-7	1	AI#,+VDC		Press Level MER			AHU-9-4-AI-7				+	├	2/18	- 4	DPT-2641			
Al-8	A	NHU-9				AHU	1	4 AI-8				Press Level MER			AHU-9-4-AI-8		1				210	*,+	051*2041	A	<u> </u>	



## SERIES FAN POWERED VARIABLE AIR VOLUME (VAV) WITH REHEAT COIL



#### **DESCRIPTION OF OPERATION**

PRIMARY AIR VALVE WILL OPEN TO THEIR MINIMUM POSITION AND TERMINAL UNIT FAN WILL START AND RUN CONTINUOUSLY WHENEVER AIR HANDLING UNIT IS RUNNING. TERMINAL UNIT FANS WILL START THIRTY (30) SECONDS BEFORE OPENING OF AIR VALVES TO PREVENT BACK SPINNING OF FAN. FANS WILL ALSO BE OPERATED AS DEFINED IN THE UNOCCUPIED MODES. PRIMARY AIR VALVES WILL BE CLOSED DURING UNOCCUPIED HEATING MODE. ROOM SENSOR TR-1 WILL ON A RISE IN TEMPERATURE GRADUALLY MODULATE REHEAT COIL VALVE V-RH-1 CLOSED AND ON A CONTINUED RISE WILL GRADUALLY MODULATE PRIMARY AIR VALVE FROM IT'S MINIMUM TO MAXIMUM SETTING TO MAINTAIN IT'S SETTING OF SEVENTY-FIVE (75F). ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED. DURING OPERATION OF THE WARM-UP MODE ALL PRIMARY AIR VALVES OPEN TO THEIR MAXIMUM POSITION AND TERMINAL FANS START TO PERMIT FULL AIR FLOW TO THE SPACES. REHEAT COIL VALVE V-RH-1 IS MODULATED IN RESPONSE TO ROOM SENSOR TO MAINTAIN SPACE TEMPERATURE.

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BILL OF XEXTERIALS Estimate: ahu-9 vavbox 70520098.pre													
Desig.	Qty	Part 4	Description										
Field Device	s:												
DC-1	30	AS-VAV110-1	VAV 6AI,4BI,8BO,8K										
V-RH-1	30		SEE VALVE SCHEDULE										
VAV	30	ATP-2040-112	ACT, 2MIN+1.5*DP, 1/2*CPLG										
ZN-T	21	TE-6410W-1000	MSTAT, NI, BOX, JACK										

# ARE FACTORY MOUNTED BY TITUS

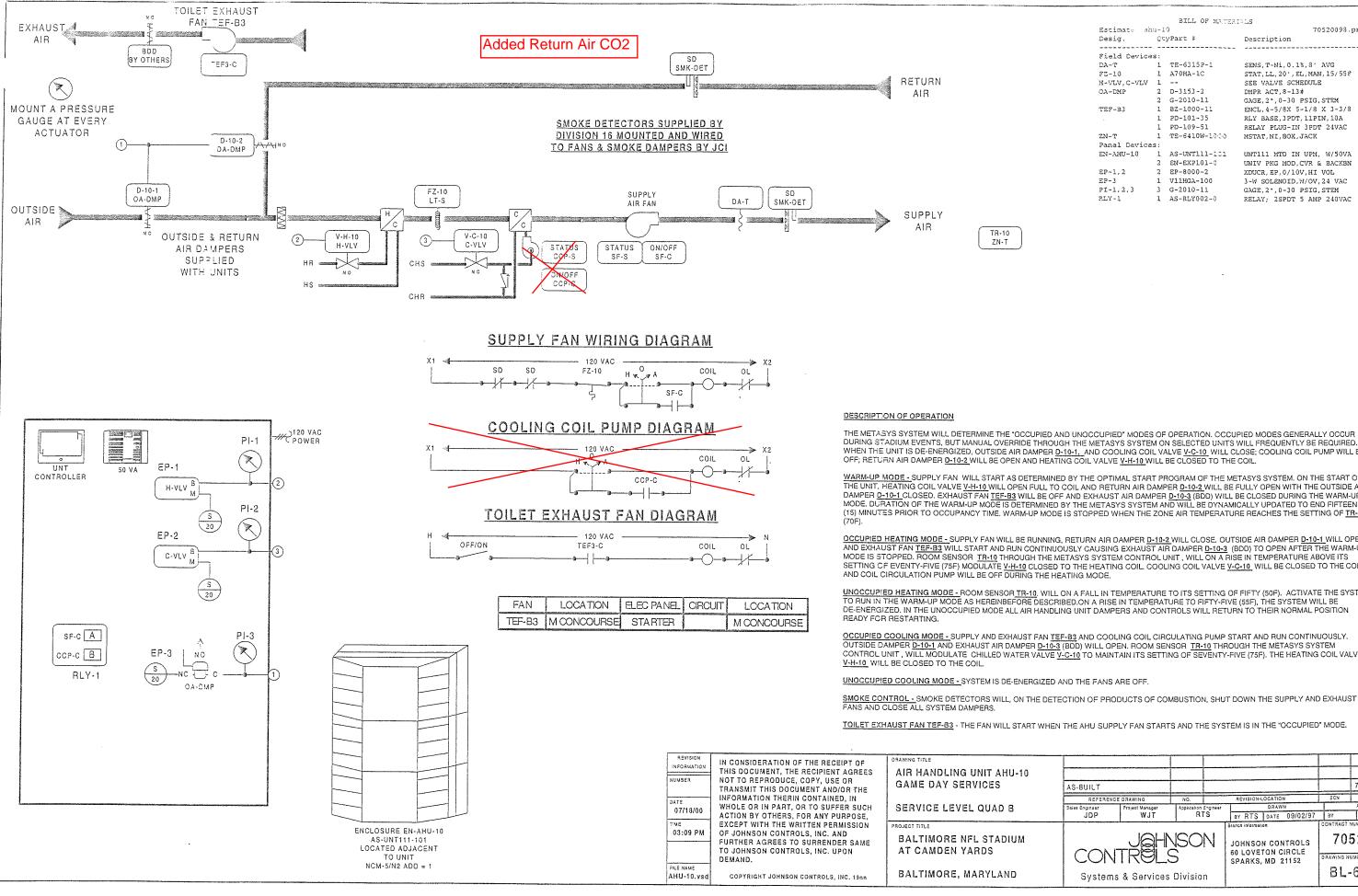
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S-BUILT								7/18/00	CME				
REFERENCE	DRAWING	NO.		REVISION-L	OCATIO	N	ECN	DATE	BY				
las Engineer	Project Vanager	Application	Engineer	1	DRAW	N	APPROVED						
JDP	WJT	RTS		BY RTS	DATE	08/28/97	BY	DATE					
			1	Branch Informate	on		CONTRACT NUMBER						
	J <u>a</u> hn	SO	N	Johnson			7052-0098						
CON	IRULE	)		60 Loveto			BL-6559-14						
Co	ontrols Group	)		Sparks, N	10 211	52							

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Full Spreadsheet		Software			1	Digital Controller Information				1	P	anel Informa	ion		*****		ntermedicne Dev	/icə		Field Device				1				
Tag	Point Type	Ncme	Object Name	Expandad ID	Display Units	DC Түр	ə N2 Trunk	N2 Addr	Cacia Destination Bay/Terminal	Module lype	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Rəf Dətail	Comment	
		FP-VAV-C9		1		IVAV		1		1	1	EN-FPVAV	At VAVBOX	1	2019 - 20	1		1			1	1	-	1		1F	ower to Controller	
L	1	FP-VAV-C9				VAV	1	Z					At VAVBOX	0		1		1				1		1		N	2. Trunk	
	AI-1	FP-VAV-C9		Zone Temperature	Deg F	VAV	1		Al-1		PHONE JACK	EN-FPVAV	At VAVBOX	0		FPVAV-x-Al-1					1	8/26	PHONE JACK	Metastat-Ph Jack		U2	*****	
	IAI-2	FP-VAV-C9				VAV	1		AI-2				At VAVBOX	0		FPVAV-x-Al-2						1	1					
	AI-3	FP-VAV-C9		1		VAV	1		NI-3		1		At VAVBOX	0		FPVAV-x-AI-3						-						
	A -4	FP-VAV-C9		Supply Vel Pressure	In. Wg	VAV	1		AI-4		AI#, AICM, +15VDC			0		FPVAV-x-AI-4		1				3/18	OUT,COM,+VDC	DPT-2000	1	U9		
	IAI-5	FP-VAV-C9				VAV	1		AI-5		1		At VAVBOX	0		FPVAV-x-AI-5					1			1	1			
	;AI-6	FP-VAV-C9				IVAV	1		AI-6				At VAVBOX	0		FPVAV-x-Al-6						1		1		1		
	81-1	FP-VAV-C9				VAV	1	Z:					At VAVBOX	0		FPVAV-x-8I-1						1		1				
	81-2	FP-VAV-C9				VAV	1	i Zil		1	1		At VAVBOX	0		FPVAV-x-BI-2		1			1	1						
	81-3 81-4	FP-VAV-C9				IVAV	1	Z					At VAVBOX	0		FPVAV-x-BI-3		ł				1		1	1			
		FP-VAV-C9				VAV	1		31-4				At VAVBOX	01		FPVAV-x-BI-4		1				1				-		
				Damper Open		VAV	1		30-1		BO-a,BO-b,24VAC			0		FPVAV-x-80-1					1	3/18	CW,CCW,COM	EDA-2040		U54		
				Damper Close	Off On		1		30-2		80-a.80-b.24VAC			0		FPVAV-x-BO-2				1		3/18	CW,CCW,COM	EDA-2040		U54 U51		
		FP-VAV-C9		Supply Fan Controls	Off On		1		30-3		BO#,24VAC		At VAVBOX	0		FPVAV-x-BO-3		COIL	RELAY	NO,COM		2/14	See starter detail	Starter (NO)		U51		
	80-4 80-5	FP-VAV-C9		<u></u>		VAV	1		30-4				At VAVBOX	0		FPVAV-x-BO-4		1			1	1						
				Rehnat Valve Colen	Off On		1		30-5		80-a.80-b.24VAC			0		FPVAV-x-BO-5						3/18	BLK,RED,WHT	IVA-7150		U58		
	80-6 A0-1		HHV-CL	Reheat Valve Closie	Off On		1		30-6		BO-a,BO-b,24VAC			01		FPVAV-x-BO-6					1	3/18	BLK, RED, WHT	VA-7150		U58		
		FP-VAV-C9			_	VAV	1		0-1				At VAVBOX	01		FPVAV-x-AO-1												
	AO-2	FP-VAV-C9				VAV	1	1 Z!/	0-2	1		EN-FPVAV	At VAVBOX	0		FPVAV-x-AO-2					1							

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Estimate ah		BILL OF MATERI	%LS 70520098.pre
			Description
Field Device	s:		
DA-T	1	TE-63152-1	SENS, T-Ni, 0.13, 3' AVG
FZ-10	1	TE-63152-1 A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV.C-VLV	1		SEE VALVE SCHEDULE
ON DKD	2	D-3153-2	DWDD 1CT 9.127
	2	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
TEF-B3	1	BZ-1000-11	ENCL. 4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	RLY BASE 3PDT. 11 PTN. 10A
	1	PD-109-51	PRINT DING-IN 3PDT 24VAC
7M - 10	1	mm=6410W=10m0	NEDRI 1800 IN SIDI 24410
Zanel Device	<u> </u>	12-04100-10-00	GAGE, 2*, 0-30 PSIG, STEM ENCL, 4-5/8X 5-1/8 X 3-3/8 RLY BASE, 3PDT, 11PIN, 10A RELAY PLUG-IN 3PDT 24VAC MSTAT, NI, BOX, JACK
EN-AHU-10	1	AS-UNITIT-101	UNTILL MID IN UPM, W/SUVA
	4	EN-EXPIDI-U	UNT111 MTD IN UPM, W/50VA UNIV PKG MOD,CVR & BACKBN
EP-1,2	2	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
EP-3	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2,3	3	G-2010-11	GAGE,2*,0~30 PSIG,STEM RELAY; 2SPDT 5 AMP 240VAC
RLY-1	1	AS-RLY002-0	XDUCR, EP, 0/10V, HI VOL 3-W SOLENOID, W/OV, 24 VAC GAGE, 2*, 0-30 PSIG, STEM RELAY; 2SPDT 5 AMP 240VAC
TASYS SYSTER	VI OI L V/	N SELECTED UNITS V	VIED MODES GENERALLY OCCUR VILL FREQUENTLY BE REQUIRED. OSE; COOLING COIL PUMP WILL BE COIL.
RETURN AIR D. AUST AIR DAMI ETASYS SYSTEI	AMF PER M AI	PER <u>D-10-2</u> WILL BE F D-10-3 (BDD) WILL B ND WILL BE DYNAMIC	TASYS SYSTEM. ON THE START OF ULLY OPEN WITH THE OUTSIDE AIR E CLOSED DURING THE WARM-UP CALLY UPDATED TO END FIFTEEN E REACHES THE SETTING OF <u>TR-10</u>
JSING EXHAUS	Γ All	R DAMPER <u>D-10-3</u> (BI	IDE AIR DAMPER <u>D-10-1 W</u> ILL OPEN DD) TO OPEN AFTER THE WARM-UP E IN TEMPERATURE ABOVE ITS

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-10, WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED COOLING MODE - SUPPLY AND EXHAUST FAN TEF-B3 AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE DAMPER D-10-1 AND EXHAUST AIR DAMPER D-10-3 (BDD) WILL OPEN. ROOM SENSOR TR-10 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL MODULATE CHILLED WATER VALVE V-C-10 TO MAINTAIN ITS SETTING OF SEVENTY-FIVE (75F). THE HEATING COIL VALVE

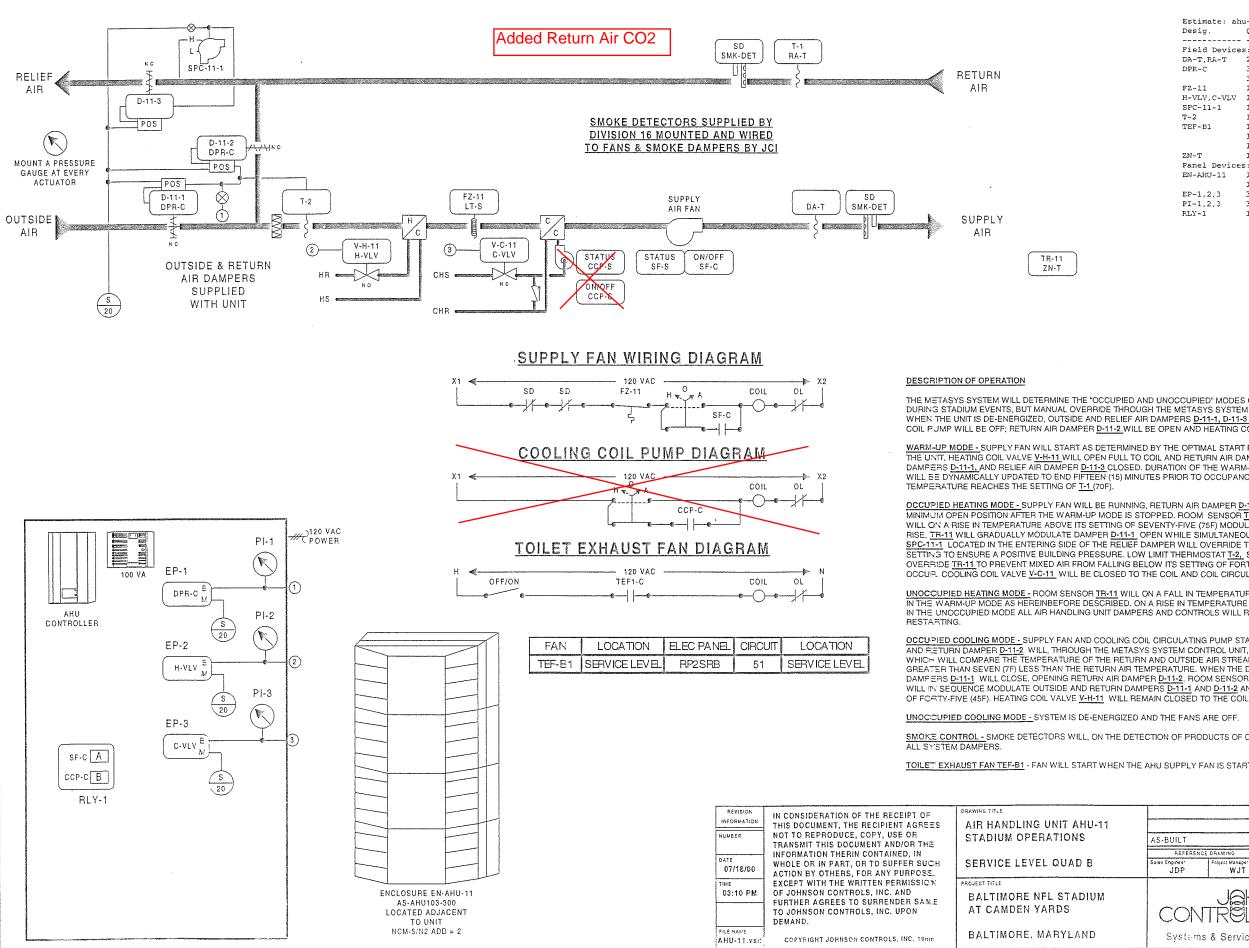
S-BUILT								7/18/00	CME				
REFERENCE	DRAWING	NO.		REVISION	OCATIO	4	ECN	DATE	ЗY				
lias Enginaar	Project Manager	Application :	Engineer		DRAW	N	APPROVED						
JDP	WJT	RTS		BY RTS	DATE	09/02/97	ЗY	DATE					
		1 <u>_</u>		Branch Informati	on		CONTRACT NUMBER						
		SO	N	JOHNSO 60 LOVE			7052-0098						
CON	IKULS	5		SPARKS,			DRAWING NUMBER						
Systems	& Services I	Divisio	n				BL	-6559	-15				

ull Spreadshee	t		Software			transfer and the state of the s	ntroller Information			Par	nel Informati	on			1	ntermediate Dev	ice			Field	Device	- (	]	
ag Point Ty	rpe Sys Na	stem Ot ame N	Expanded IV	Display Units	DC Type	N2 Trunk N2 Addr De	Cable estination Module Typ y/Terminal	be Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Witing/T ubing	Terminations	Device	Location	Ref Detail	Comment
	AHU-1	-10			UNT					Service Level B	1	M.2-01B	1			1	1	i			1	Î Î	1	Power to Controller
	AHU-	-10			JUNT	1 1			#EN-AHU10	) Service Level B		M.2-01B		1	1		1	1			1		1)	N2 Trunk
AI-1	AHU-	-10 DA-T	Disch Air Temperature	Deg F	UNT	1 1 Al-1		AI#,AICM	EN-AHU10	Service Level B	0	M.2-01B	AHU10-1-AI-1						2/18	2-Wire	TE-6315P-1		01	
AI-2	AHU-	-10			UNT	1 1 Al-2				Service Level B			AHU10-1-AI-2										-	
Al-3	AHU-	-10			UNT	1 1 Al-3				) Service Level B		M.2-01B	AHU10-1-AI-3											
AI-4	AHU-	-10 ZN-T	Zone Temperature	Deg F	UNT	1 1 1 AI-4		PHONE JACK		) Service Level B		M.2-01B	AHU10-1-Al-4					1	8/26	TE-6410W-1000	TE-6410-		U2	
Al-5	AHU-	-10			UNT	1 1 AI-5				Service Level B		M.2-01B	AHU10-1-AI-5	1									1	
AI-6	AHU-				UNT	1 1 Al-6				) Service Level B		M.2-01B	AHU10-1-AI-6										1	
BI-1	AHU-		Supply Fan Status	Off On		1 1 BI-1		BI#,24VAC		) Service Level B		M.2-01B	AHU10-1-BI-1	1.400							t Aux Contact (NO)		U70 I	
BI-2	AHU-	-10  SMK		Normal Alarm		1 1 81-2	······	BI#,24VAC		Service Level B		M.2-01B	AHU10-1-BI-2							Device dependent			U70	
BI-3	AHU-	-10  LT-S	Low Temperature Stat	Normal Alarm		1 1 BI-3		BI#,24VAC		Service Level B		M.2-01B	AHU10-1-BI-3	L							A70 (NC)	1	U71	
BI-4	AHU-		Clg Coil Pump 10 Status	Off On		1 1 BI-4		BI#,24VAC		Service Level B		M.2-01B	AHU10-1-BI-4	1					2/22		Aux Contact (NO)		U70	
80-1	AHU-		Supply Fan Control	Off On		1 1 BO-1				Service Level B		M.2-01B	AHU10-1-80-1		A,COILS,COM		NO,COM				Starter (NO)-(sw I	o)	U60	
BO-2	AHU-			Off On		1 1 BO-2		BO#,24VAC		Service Level B		M.2-01B	AHU10-1-BO-2			PD-109-51					t 24VAC OUT (sw I		U51	
BO-3	AHU-			Closed Open		1 1 BO-3				Service Level B		M.2-01B	AHU10-1-80-3	· · · · ·		V11HGA-100					SAV-24VAC (sw I		U51	
80-4	AHU-		Clg Coll Pump 10 Control	Off On	UNI	1 1 BO-4		180#,24V,COM		Service Level B		M.2-01B	AHU10-1-BO-4		B,COILS,COM	RELAY-B	NO,COM		2/14	See starter detail	Starter (NO)-(sw i	0)	U60	
BO-5	AHU-					1 1 BO-5				Service Level B		M.2-01B	AHU10-1-BO-5		l	ļ								
BO-6	AHU-				UNI	1 1 BO-6				Service Level B		M.2-01B	AHU10-1-BO-6								1		1	
AO-1	AHU-			% Open	UNT	1 1 AO-1				Service Level B		M.2-01B	AHU10-1-AO-1		+,-	EP-8000-2	SUPPLY, O			Device dependen			U23	
AO-2	iAHU-	I-10 C-VI	Cooling Coil Valve	% Open	JUNI	1  1 AO-2	2	[AU#,AOCM_24]	VAEN-AHU10	0 Service Level B	0	M.2-01B	AHU10-1-AO-2	2/18	l+,-	EP-8000-2	SUPPLY, O		3/18	Device dependen	t 0-10V OUT		U23	

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		BILL OF MATERS	
Estimate: ah		l yPart #	70520098.pre
			Description
Field Device			
DA-T, RA-T	2	TE-6315P-1	SENS, T-Ni, 0.1%, 8' AVG
DPR-C	З	D-3153-1	DMPR ACT, 8-13#, W/PILOT
	3	G-2010-11	GAGE,2*,0-30 PSIG,STEM
FZ-11	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV,C-VLV			SEE VALVE SCHEDULE
SPC-11-1	1	E-317-1	CNTRLR DP,0.05-1*WG
T-2	1	T-3610-1001	STAT, LOW VOL , 8' AVG, DCT
TEF-B1	1	EZ-1000-11	ENCL,4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-AHU-11	1	AS-AHU103-300	AHU TERM BD IN EWC35
	1	EN-EXP101-0	UNIV PKG MOD, CVR & EACKEN
EP-1,2,3	3	EP-8000-4	XDUCR, EP, 4-20ma, HI VOL
PI-1,2,3	3	G-2010-11	GAGE,2",0-30 PSIG,STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUP DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AND RELIEF AIR DAMPERS D-11-1, D-11-3 AND COOLING COIL VALVE V-C-11 WILL CLOSE; COOLING COIL PJMP WILL BE OFF; RETURN AIR DAMPER D-11-2 WILL BE OPEN AND HEATING COIL VALVE V-H-11 WILL BE CLOSED TO THE COIL.

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COIL VALVE V-H-11 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-11-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPERS D-11-1, AND RELIEF AIR DAMPER D-11-3 CLOSED. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL 5E DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN RETURN AIR

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER <u>D-11-2</u> IS OPEN. OUTSIDE AIR DAMPER <u>D-11-1</u> WILL OPEN ITS MINIMUM OPEN POSITION AFTER THE WARM-UP MODE IS STOPPED. ROOM SENSOR <u>TR-11</u>, THROUGH THE METASYS SYSTEM CONTROL UNIT , WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-11 CLOSED TO THE HEATING COIL. ON A FURTHER RISE, <u>TR-11</u> WILL GRADUALLY MODULATE DAMPER <u>D-11-1</u> OPEN WHILE SIMULTANEOUSLY CLOSING <u>D-11-2</u>, STATIC PRESSURE CONTROLLER <u>SPC-11-1</u> LOCATED IN THE ENTERING SIDE OF THE RELIEF DAMPER WILL OVERRIDE THE CONTROL AND MODULATE <u>D-11-3</u> TO MAINTAIN IT'S SETTING TO ENSURE A POSITIVE BUILDING PRESSURE. LOW LIMIT THERMOSTAT T-2, SENSITIVE TO THE COLDEST SPOT IN THE AIR STREAM, WILL OVERBIDE TR-11 TO PREVENT MIXED AIR FROM FALLING BELOW ITS SETTING OF FORTY (40F). ON A FALL IN TEMPERATURE, THE REVERSE WILL OCCUR. COOLING COIL VALVE V-C-11 WILL BE CLOSED TO THE COIL AND COIL CIRCULATION PUMP WILL BE OFF DURING THE HEATING MODE.

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-11 WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50) ACTIVATE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED. ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION READY FOR

OCCUPIED COOLING MODE - SUPPLY FAN AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY, OUTSIDE DAMPER D-11-1 AND FETURN DAMPER D-11-2 WILL, THROUGH THE METASYS SYSTEM CONTROL UNIT, BE UNDER FLOATING DRY BULB DIFFERENTIAL CONTROL WHIC-- WILL COMPARE THE TEMPERATURE OF THE RETURN AND OUTSIDE AIR STREAMS. THE OUTSIDE AIR WILL BE UTILIZED WHENEVER IT IS GREATER THAN SEVEN (7F) LESS THAN THE RETURN AIR TEMPERATURE. WHEN THE DIFFERENTIAL FALLS BELOW SEVEN (7F), OUTSIDE AIR DAMPERS <u>D-11-1</u> WILL CLOSE, OPENING RETURN AIR DAMPER <u>D-11-2</u>, ROOM SENSOR <u>TR-11</u>, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL IN SEQUENCE MODULATE OUTSIDE AND RETURN DAMPERS <u>D-11-1</u> AND <u>D-11-2</u> AND CHILLED VI ATER VALVE <u>V-C-11</u> TO MAINTAIN ITS SETTING

SMOKE CONTROL - SMOKE DETECTORS WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION. SHUT DOWN THE SUPPLY FAN AND CLOSE

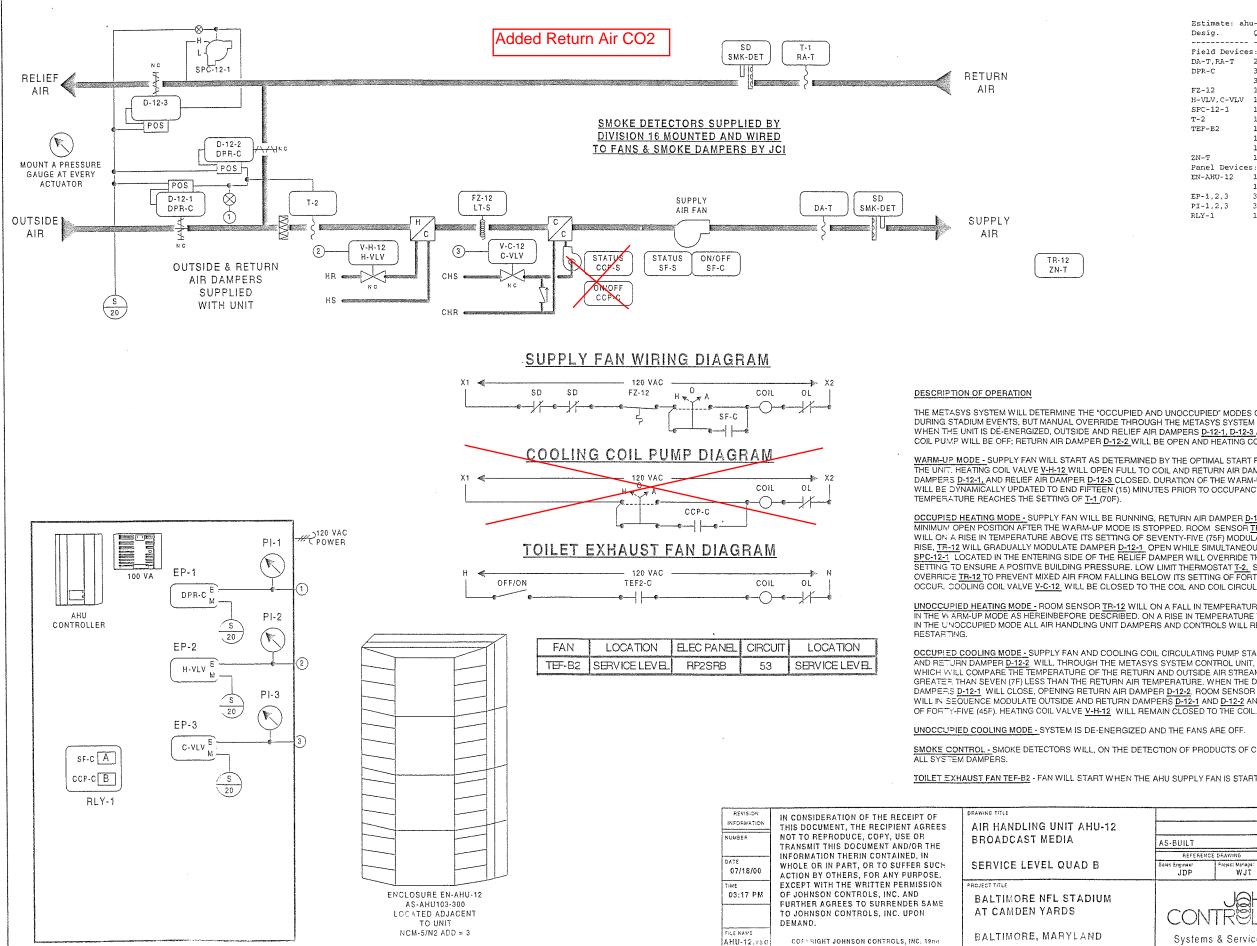
TOILET EXHAUST FAN TEF-B1 - FAN WILL START WHEN THE AHU SUPPLY FAN IS STARTED AND THE SYSTEM IS IN THE "OCCUPIED" MODE.

1		1		1	1	
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AS-BUILT					7/18/00	СМ
REFEREN	CE DRAWING	NC ,	REVISION-LOCATION	ECN	DATE .	BY
Sales Engineer	Projaci Manage!	Application Empiriser	DEAWA		CEVCRAPA	
JDP	WJT	RTS	E" RTS DATE 09/02/97	EY	DATE	
			Branch Information	CONTRACT	NUNBER	
	JaH	NOSN	JOHNSON CONTROLS	70	52-00	98
	JTREL	5	SPARKS, MD 21152	LPAWING N	IUNBER	
System	ns & Services	Division		BL	6559	-16

Spreads	neet			Software			Digital Controller Inf	ormation			Par	nel Informatio	n		[	1	Intermediate Dev	vice			Field	Device		1	
Point	Туре	System Name	Object Name	Expanded ID	Display Units	DC Type N2 Tr	unk N2 Addr Destination Bay/Termina		Termination	Panel	Panel Location		Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
	  :/	AHU-11				AHU				EN-AHU11	Service Level B	18	1.2-01B	1	1				1	}	1				Power to Controller
	1	AHU-11	•	1		AHU	1 2		1	EN-AHU11	Service Level B		1.2-01B		1	1	1			1					N2 Trunk
BO-1	17	AHU-11	SF-C	Supply Fan Control	Off On	AHU	1 2 BO-1	RLY	BO#,24V,BICOM	EN-AHU11	Service Level B			AHU11-2-BO-1	3/18	A,COILS,COM	RELAY-A	COM,NO		12/14	See starter detail	Starter (NO)		A53	
BO-2	1	AHU-11	TEF1-C	Toilet Exh Fan B1 Control	Otl On	AHU	1 2 BO-2				Service Level B		1.2-01B	AHU11-2-BO-2			PD-109-51			2/18	Device dependent	24VAC OUT		A50 :	
BO-3	1	AHU-11	CCP-C	Clg Coil Pump 11 Control	Off On	AHU	1 2 80-3	RLY	BO#,24V,BICOM	EN-AHU11	Service Level B	010	4.2-01B	AHU11-2-BO-3	3/18	B,COILS,COM	RELAY-S	COM,NO		2/14	See starter detail	Starter (NO)		A53	
BO-4	1/	AHU-11		1		AHU	1 2 80-4			EN-AHU11	I Service Level B	01	4.2-01B	AHU11-2-BO-4		1	1			1				,	
BO-5	17	AHU-11		1		AHU	1 2 80-5				I Service Level B	01	4.2-01B	AHU11-2-BO-5	1		1			}					
BO-6	1	AHU-11		1		AHU	1 2 BO-6	1		EN-AHU11	Service Level B		1.2-01B	AHU11-2-BO-6	1	1				1					
BO-7	1	AHU-11		1		AHU	1 2 BO-7				Service Level B	01	1.2-01B	AHU11-2-BO-7	1		1			1				;	
BO-8	1	AHU-11		1		AHU	1 2 BO-8				Service Level B		4.2-01B	AHU11-2-BO-8		1				1				ł	
80-9		AHU-11	1	1		AHU	1 2 80-9				I Service Level B		4.2-01B	AHU11-2-BO-9	1	1				1		1		:	
BO-1	0	AHU-11		1		AHU	1 2 BO-10			EN-AHU11	1 Service Level B	10	4.2-01B	AHU11-2-BO-10	5					1			1		
AO-1	1	AHU-11	DPR-C	Damper Control	% Open	AHU	1 2 AO-1		AO#,AOCOM	EN-AHU11	1 Service Level B	10	4.2-01B	AHU11-2-AO-1	2/18	+,-	EP-8000-4	SUPPLY,O		1/4*	Barb Fitting	EP-PNEU.		A28	
AO-2		AHU-11	H-VLV	Heating Coil Valve	% Open	AHU	1 2 AO-2		AO#,AOCOM	EN-AHU11	Service Level B	0	4.2-01B	AHU11-2-AO-2	2/18	+,-	EP-8000-4	SUPPLY,O			Barb Fitting	EP-PNEU.		A28	
AO-3	ļ.	AHU-11	C-VLV	Cooling Coll Valve	% Open	AHU	1 2 AO-3				Service Level B	01	A.2-01B	AHU11-2-AO-3	2/18	+,-	EP-8000~4	SUPPLY,O		1/4	Barb Fitting	EP-PNEU.		A28 :	
AQ-4		AHU-11	1			AHU	1 2 AO-4			EN-AHU11	1 Service Level B		4.2-01B	AHU11-2-AO-4											
AO-5		AHU-11	1	1		AHU	1 2 AO-5			EN-AHU11	1 Service Level B	01	A.2-01B	AHU11-2-AO-5	8			1						:	
AO-6		AHU-11	1	1		AHU	1 2 AO-6			EN-AHU11	1 Service Level B	01	4.2-01B	AHU11-2-AO-6	1					1	ļ			1	
BI-1			SF-S	Supply Fan Status	Off On	IAHU	1 2 BI-1		BI#,BICOM	EN-AHU11	1 Service Level B	01	A.2-01B	AHU11-2-BI-1						2/22	Device dependent	IAux Contact (NO)		A40	
BI-2		AHU-11	SMK-DET	Smoke Detectors	Normal Alarm	AHU	1 2 BI-2			EN-AHU11	1 Service Level B	0	A.2-01B	AHU11-2-BI-2			1				Device dependent			A40	
B1-3		AHU-11	LT-S	Low Temperature Stat	Normal Alarm	AHU	1 2 BI-3		BI#,BICOM	EN-AHU11	1 Service Level B	0	1.2-01B	AHU11-2-BI-3						2/22	Device dependent	(Contact (NO)		A40	
BI-4		AHU-11	ICCP-S	Clg Coil Pump 11 Status	Ofi On	AHU	1 2 81-4				1  Service Level B	01	1.2-01B	AHU11-2-BI-4	1					2/22	Device dependent	Aux Contact (NO)		A40	
BI-5		AHU-11	1			AHU	1 2 BI-5			EN-AHU1	1 Service Level B	01	A.2-01B	AHU11-2-BI-5	1					1					
BI-6	i.	AHU-11	1			AHU	1 2 BI-6		1	EN-AHU1	1 Service Level B	0	A.2-01B	AHU11-2-BI-6	1										
BI-7	1	AHU-11	1			AHU	1 2 BI-7		1	EN-AHU1	1 Service Level B		4.2-01B	AHU11-2-BI-7						1					
BI-8		AHU-11				AHU	1 2 BI-8			EN-AHU1	1  Service Level B	10	1.2-01B	AHU11-2-BI-8		1				1		1			
Al-1		AHU-11	DA-T	Disch Air Temperature	Deg F	AHU	1 2 Al-1		Al#,AICM	EN-AHU1	1 Service Level B	0	A.2-01B	AHU11-2-AI-1			1				2-Wire	TE-6315P-1		A4	
AI-2		AHU-11	RA-T	Return Air Temperature	Deg F	AHU	1 2 AI-2		AI#,AICM	EN-AHU1	1 Service Level B		A.2-01B	AHU11-2-AI-2	-	1	1			2/18	2-Wire	TE-6315P-1		A4	
AI-3	i.	AHU-11	1			AHU	1 2 AI-3				1 Service Level B		4.2-01B	AHU11-2-AI-3						1					
AI-4			ZN-T	Zone Temperature	Deg F	AHU	1 2 Al-4		PHONE JACK	EN-AHU1	1 Service Level B	01	A.2-01B	AHU11-2-AI-4	1	1				8/26	PHONE JACK	TE-6410W-1000	1	A5	
AI-5		AHU-11	1	1	1 1	AHU	1 2 AI-5			EN-AHU1	1 Service Level B	01	A.2-01B	AHU11-2-AI-5	1	1	1								
AI-6		AHU-11	1			AHU	1 2 AI-6			EN-AHU1	1 Service Level B	oi	4.2-018	AHU11-2-AI-6		1				1					
AI-7		AHU-11	1			AHU	1 2 AI-7	1		EN-AHU1	1 Service Level B	0	A.2-01B	AHU11-2-AI-7		1				T	1				
AL-9		AHU-11	1			AHU	1 2 AI-8		1	EN-AHU1	1 Service Level B	0	A.2-01B	AHU11-2-AI-8	1	1				1			1		

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		BILL OF MATERI	IALS
Estimate: ab	u-1	.2	70520098.pre
		yPart #	Description
Field Device			
DA-T, RA-T	2	TE-6315P-1	SENS,T-Ni,0.1%,8' AVG
DPR-C	3	D-3153-1	DMPR ACT, 8-13#, W/PILOT
	З	G-2010-11	GAGE,2°,0-30 PSIG,STEM
FZ-12	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV, C-VLV	1		SEE VALVE SCHEDULE
SPC-12-1	1	R-317-1	CNTELE DP,0.05-1*WG
т-2	1	T-3610-1001	STAT, LOW VOL , 8' AVG, DCT
TEF-B2	1	BZ-1000-11	ENCL,4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	PLY BASE, 3PDT, 11PIN, 10A
	l	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-AHU-12	1	AS-AHU103-300	AHU TERM BD IN EWC35
	1	EN-EXP101-C	UNIV PKG MOD, CVR & EACKEN
EP-1,2,3	3	EP-8000-4	XDUCR, EP, 4-20ma, HI VOL
PI-1,2,3	З	G-2010-11	GAGE,2*,0-30 PSIG,STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AND RELIEF AIR DAMPERS <u>D-12-1</u>, <u>D-12-3</u> AND COOLING COIL VALVE <u>V-C-12</u> WILL CLOSE; COOLING COIL PUMP WILL BE OFF; RETURN AIR DAMPER <u>D-12-2</u> WILL BE OPEN AND HEATING COIL VALVE <u>V-H-12</u> WILL BE CLOSED TO THE COIL.

WARM-UP\_MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT. HEATING COIL VALVE V-H-12 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-12-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPERS D-12-1, AND RELIEF AIR DAMPER D-12-3 CLOSED. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN RETURN AIR

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER D-12-2 IS OPEN. OUTSIDE AIR DAMPER D-12-1 WILL OPEN ITS MINIMUM OPEN POSITION AFTER THE WARM-UP MODE IS STOPPED. ROOM SENSOR TR-12, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-12 CLOSED TO THE HEATING COIL. ON A FURTHER RISE, <u>TF-12</u> WILL GRADUALLY MODULATE DAMPER <u>D-12-1</u> OPEN WHILE SIMULTANEOUSLY CLOSING <u>D-12-2</u> STATIC PRESSURE CONTROLLER <u>SPC-12-1</u> LOCATED IN THE ENTERING SIDE OF THE RELIEF DAMPER WILL OVERRIDE THE CONTROL AND MODULATE <u>D-12-3</u> TO MAINTAIN IT'S SETTING TO ENSURE A POSITIVE BUILDING PRESSURE. LOW LIMIT THERMOSTAT T-2, SENSITIVE TO THE COLDEST SPOT IN THE AIR STREAM, WILL OVERRIDE TR-12 TO PREVENT MIXED AIR FROM FALLING BELOW ITS SETTING OF FORTY (40F). ON A FALL IN TEMPERATURE, THE REVERSE WILL OCCUF. COOLING COIL VALVE V-C-12 WILL BE CLOSED TO THE COIL AND COIL CIRCULATION PUMP WILL BE OFF DURING THE HEATING MODE.

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-12 WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50) ACTIVATE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED. ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEE NORMAL POSITION READY FOR

OCCUPIED COOLING MODE - SUPPLY FAN AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY, OUTSIDE DAMPER D-12-1 AND RETURN DAMPER D-12-2 WILL, THROUGH THE METASYS SYSTEM CONTROL UNIT, BE UNDER FLCATING DRY BULB DIFFERENTIAL CONTROL WHICH WILL COMPARE THE TEMPERATURE OF THE RETURN AND OUTSIDE AIR STREAMS. THE OUTSIDE AIR WILL BE UTILIZED WHENEVER IT IS GREATE: THAN SEVEN (7F) LESS THAN THE RETURN AIR TEMPERATURE, WHEN THE DIFFERENTIAL FALLS BELOW SEVEN (7F), OUTSIDE AIR DAMPERS <u>D-12-1</u> WILL CLOSE, OPENING RETURN AIR DAMPER <u>D-12-2</u>, ROOM SENSOR <u>TR-12</u>, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL IN SEQUENCE MODULATE OUTSIDE AND RETURN DAMPERS <u>D-12-1</u> AND <u>D-12-2</u> AND CHILLED WATER VALVE <u>V-0-12</u> TO MAINTAIN ITS SETTING

SMOKE CONTROL \_ SMOKE DETECTORS WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION. SHUT DOWN THE SUPPLY FAN AND CLOSE

TOILET EXHAUST FAN TEF-B2 - FAN WILL START WHEN THE AHU SUPPLY FAN IS STARTED AND THE SYSTEM IS IN THE "OCCUPIED" MODE.

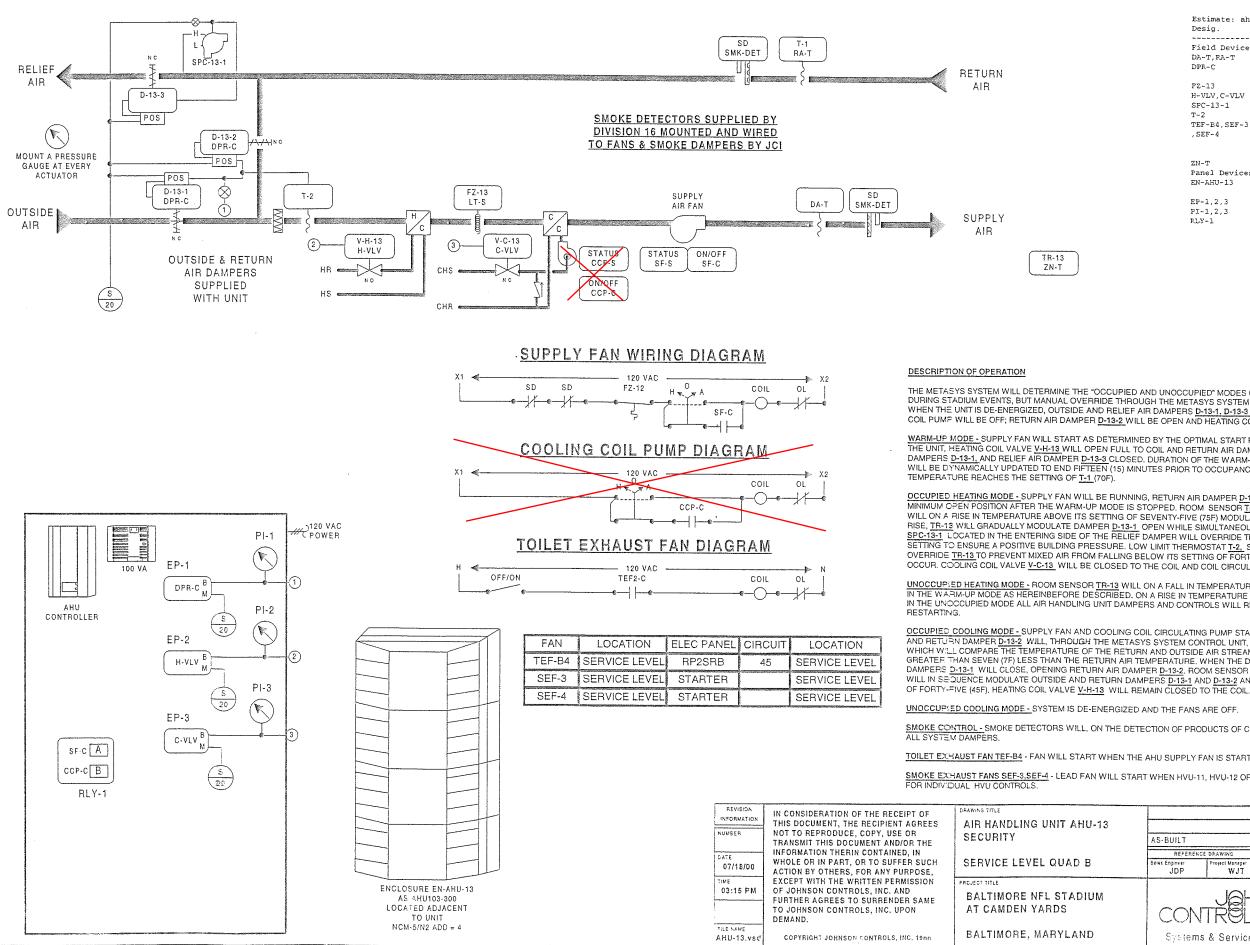
AS-BUILT								7/18/00	CME
REFERENCE	DRAWING	NC		REVISION-	DCATIO	N	ECN	CATE	EV
Sales Engineer	Project Manage:	Application 1		1	DRAW	ĸ		APPROVES	
 JDP	WJT	RT	5	er RTS	DATE	09/02/97	ŧ,	DATE	
CON Systems	JAH TREL & Services	NSO S Divisior	N	JOHNSO 60 LOVE SPARKS,	N CON TON C	IRCLE	2-24 NG N	52-00	

	preadsheet	1		Software				Dìgital	Controller Info	motion				Pane	Information		L		Intermediate Dev	vice			Field	Device			
og	Point Type	System Name	Object Name	Expanded ID	Display Units	DC Туре	N2 Trun	k N2 Addr	Cable Destination Bay/Termina		Termination	Panel	Panel Loce	ation	Slot Referenc Number Drawing	ICoble Numbe	Wiring/T ubing	Termination In	n Device	Termination Out	Location	Wiring/I ubing	Terminations	Device	Location	Ref Detail	Comment
	_	AHU-12		1		AHU	1				1	EN-AHU12	Service Leve	IB	M.2-01B		1				1	ŧ.					Power to Controller
		AHU-12				AHU		1 3			1	EN-AHU12	Service Leve	B	0 M.2-01B			1				<u>}</u>					N2 Trunk
	80-1	AHU-12	SF-C	Supply Fan Control	Off On	AHU		1 31	30-1	RLY	BO#,24V,BICOM	EN-AHU12	Service Leve	18	• 0 M.2-01B	AHU12-3-BO-1		A,COILS,COM		COM,NO		2/14	See starter detail			A53	
	BO-2	AHU-12	TEF2-C	Toilet Exh Fan B2 Control	Off On				30-2				Service Leve		0 M.2-01B	AHU12-3-BO-2			PD-109-51			2/18	Device dependen			A50	
	BO-2 BO-3	AHU-12	ICCP-C	Clg Coil Pump 12 Control	Off On	AHU			30-3	RLY	BO#,24V,BICOM				0IM.2-01B	AHU12-3-BO-3		B,COILS,COM	I RELAY-E	COM,NO		2/14	See starter detail	Starter (NO)		A53	
^	BO-4	AHU-12		10.9 00.000		AHU			30-4				Service Leve		0 M.2-01B	AHU12-3-BO-4						1	[			<u> </u>	
	BO-5	AHU-12	-			AHU			30-5				Service Leve		0 M.2-01B	AHU12-3-BO-5				-		1					
	BO-6	AHU-12				AHU			30-6				Service Leve		0 M.2-01B	AHU12-3-BO-6						<u> </u>	l				<u> </u>
	BO-7	AHU-12				AHU			30-7				Service Leve		0 M.2-01B	AHU12-3-BO-7						1					
	IBO-8	AHU-12				AHU			30-8				Service Leve		0 M.2-01B	AHU12-3-BO-8							<u> </u>			ļ	
	80-9	AHU-12				AHU		1 31	30-9				Service Leve		0 M.2-01B	AHU12-3-BO-9											
	BO-10	AHU-12		1		AHU			30-10				Service Leve		0 M.2-01B	AHU12-3-BO-1						1		EP-PNEU.		A28	
	IAO-1	AHU-12	DPR-C	Damper Control	% Open	AHU			40-1		AO#,AOCOM				0 M.2-01B	AHU12-3-AO-1		+,-	EP-8000-4	SUPPLY,O		1/4"		EP-PNEU.		A28	
	AO-2	AHU-12	H-VLV	Heating Coil Valve		AHU			40-2		AO#,AOCOM				0[M.2-01B	AHU12-3-AO-2		+,-	EP-8000-4	SUPPLY,O		1/4*		EP-PNEU.		A28	
	AO-3	AHU-12	C-VLV	Cooling Coil Valve	10 apan	AHU			40-3		AO#,AOCOM				0 M.2-01B	AHU12-3-AO-3		+,-	EP-8000-4	SUPPLY,O		1/4"	Barb Fitting	EP-PNEU.		A20	
	AO-4	AHU-12				AHU			40-4				Service Leve		0 M.2-01B	AHU12-3-AO-4						· · · · ·					
	1AO-5	AHU-12				AHU			40-5				Service Leve		0 M.2-01B	AHU12-3-AO-5									·····		
	AO-6	AHU-12				AHU			AO-6				Service Leve		0 M.2-01B	AHU12-3-AO-6	5 <u> </u>					2/22	Davies dependen	I Aux Contact (NO)		A40	
	BI-1	AHU-12	SF-S	Supply Fan Status	Off On				31-1				Service Leve		0 M.2-018	AHU12-3-BI-1							Device dependen			A40	
	BI-2	AHU-12	SMK-DET	Smoke Detectors	Normal Alarm				B1-2				Service Leve		0 M.2-01B	AHU12-3-BI-2						2/22		A70 (NC)		A41	
	BI-3	AHU-12	LT-S	Low Temperature Stat	Normal Alarm				BI-3				Service Leve		0 M.2-01B	AHU12-3-BI-3								Alux Contact (NO)		A40	
	BI-4	AHU-12	CCP-S	Clg Coil Pump 12 Status	Ott On				BI-4		BI#,BICOM		Service Leve		0 M.2-01B	AHU12-3-BI-4						2122	Device dependen	RIAUX CONIACI (NO)		A40	
	B1-5	AHU-12				AHU			BI-5				Service Leve		0 M.2-01B	AHU12-3-BI-5						-				·	
	BI-6	AHU-12				AHU			BI-6		. <u> </u>		Service Leve		0 M.2-01B	AHU12-3-BI-6						1					
	BI-7	AHU-12	1			AHU			B1-7				2 Service Leve		0 M.2-01B	AHU12-3-BI-7						-f					
	BI-8	AHU-12				AHU			BI-8				Service Leve		0 M.2-01B	AHU12-3-BI-8						2/18	2-Wire	TE-6315P-1		A4	
	AI-1	AHU-12	DA-T	Disch Air Temperature		AHU			Al-1		Al#,AICM		2 Service Leve		0 M.2-01B	AHU12-3-AI-1						2/18	2-Wire	TE-6315P-1		A4	
	AI-2	AHU-12	RA-T	Return Air Ternoerature	Deg F	AHU	1		AI-2		AI#,AICM		Service Leve		0 M.2-01B	AHU12-3-AI-2						1210	12-14HC	112-00105-1			
	AI-3	AHU-12				IAHU			AI-3		1		2 Service Leve		0 M.2-01B	AHU12-3-AI-3						8/26	PHONE JACK	TE-6410W-1000		A5	
	Al-4	AHU-12	ZN-T	Zone Temperature	Deg F	AHU			A1-4		PHONE JACK				0 M.2-01B	AHU12-3-AI-4						0/20	FROME JACK	1 2-041049-1000		h0	
	AI-5	AHU-12				AHU			A1-5				2 Service Leve		0 M.2-01B	AHU12-3-AI-5						+					1
	AI-6	AHU-12				AHU			Al-6		<u> </u>		2 Service Leve		0 M.2-01B	AHU12-3-AI-6										1	
	AI-7	AHU-12				AHU			AI-7				Service Leve		0 M.2-01B	AHU12-3-Al-7						+					
1	AI-8	AHU-12	1			AHU		1 3	AI-8		1	JEN-AHU12	2 Service Levi	ei B	0iM.2-018	AHU12-3-AI-8	<u> </u>	<u>l</u>					J			l	<u>.</u>

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		BILL OF MATER:	TALS
Estimate: ah	u~1	.3	70520098.pre
Desig.	Qt	yPart #	
Field Device	5:		
DA-T, RA-T	2	TE-6315P-1	SENS, T-Ni, 0.1%, 8' AVG
DPR-C	3	D-3153-1	DMPR ACT, 8-13#, W/PILOT
	3	G-2010-11	
FZ-13	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV, C-VLV	1		SEE VALVE SCHEDULE
SPC-13-1	1	E-317-1	CNTRLE DP,0.05-1*WG
T-2	1	T-3610-1001	STAT, LOW VOL , 8' AVG, DCT
TEF-B4, SEF-3	3	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
, SEF-4			
	3	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	3	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device:	s:		
EN-AHU-13	1	AS-AHU103-300	AHU TERM BD IN EWC35
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1,2,3	3	EP-8000-4	XDUCR, EP, 4-20ma, HI VOL
PI-1,2,3	3	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AND RELIEF AIR DAMPERS <u>D-13-1</u>, D-13-3 AND COOLING COL VALVE <u>V-C-13</u> WILL CLOSE; COOLING COIL PUMP WILL BE OFF; RETURN AIR DAMPER D-13-2 WILL BE OPEN AND HEATING COIL VALVE V-H-13 WILL BE CLOSED TO THE COIL.

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COIL VALVE V-H-13 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-13-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPERS D-13-1, AND RELIEF AIR DAMPER D-13-3 CLOSED. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTHERN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN RETURN AIR

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER D-13-2 IS OPEN. OUTSIDE AIR DAMPER D-13-1 WILL OPEN ITS MINIMUM OPEN POSITION AFTER THE WARM-UP MODE IS STOPPED. ROOM SENSOR TE-13, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-13 CLOSED TO THE HEATING COIL. ON A FURTHER RISE, TR-13 WILL GRADUALLY MODULATE DAMPER D-13-1 OPEN WHILE SIMULTANEOUSLY CLOSING D-13-2. STATIC PRESSURE CONTROLLER SIDE 13-1 CONTROL AND THE ENTERING SIDE OF THE DEFINED BY UNDER THE CONTROL AND MODULATE D-13-2 ON MAINTAIN ITS SPC-13-1 LOCATED IN THE ENTERING SIDE OF THE RELIEF DAMPER WILL OVERRIDE THE CONTROL AND MODULATE D-13-3 TO MAINTAIN IT'S SETTING TO ENSURE A POSITIVE BUILDING PRESSURE. LOW LIMIT THERMOSTAT T-2, SENSITIVE TO THE COLDEST SPOT IN THE AIR STREAM, WILL OVERBIDE TR-13 TO PREVENT MIXED AIR FROM FALLING BELOW ITS SETTING OF FORTY (40F). ON A FALL IN TEMPERATURE, THE REVERSE WILL OCCUR. COOLING COIL VALVE V-C-13 WILL BE CLOSED TO THE COIL AND COIL CIRCULATION PUMP WILL BE OFF DURING THE HEATING MODE.

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-13 WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50) ACTIVATE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED. ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION READY FOR

OCCUPIED COOLING MODE - SUPPLY FAN AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY, OUTSIDE DAMPER D-13-1 AND RETURN DAMPER <u>D-13-2</u> WILL, THROUGH THE METASYS SYSTEM CONTROL UNIT, BE UNDER FLOATING DRY BULB DIFFERENTIAL CONTROL WHICH WILL COMPARE THE TEMPERATURE OF THE RETURN AND OUTSIDE AIR STREAMS. THE OUTSIDE AIR WILL BE UTILIZED WHENEVER IT IS GREATER THAN SEVEN (7F) LESS THAN THE RETURN AIR TEMPERATURE. WHEN THE DIFFERENTIAL FALLS BELOW SEVEN (7F), OUTSIDE AIR DAMPERS D-13-1 WILL CLOSE, OPENING RETURN AIR DAMPER D-13-2, ROOM SENSOR TR-13, THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL IN SEQUENCE MODULATE OUTSIDE AND RETURN DAMPERS D-13-1 AND D-13-2 AND CHILLED WATER VALVE V-C-13 TO MAINTAIN ITS SETTING

SMOKE CONTROL - SMOKE DETECTORS WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE SUPPLY FAN AND CLOSE

TOILET EXHAUST FAN TEF-B4 - FAN WILL START WHEN THE AHU SUPPLY FAN IS STARTED AND THE SYSTEM IS IN THE "OCCUPIED" MODE.

SMOKE EXHAUST FANS SEF-3, SEF-4 - LEAD FAN WILL START WHEN HVU-11, HVU-12 OR HVU-13 SUPPLY FANS ARE STARTED, SEE DRAWINGS

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AS-BUILT					•			7/18/00	CME
REFERENCE	DRAWING	NO.		REVISION-	OCATION		ECA	37AQ	•
Seles Engineer	Froject Manager	Application (		1	DEAW	4		APPROVED	
JDP	WJT	i Ri	S	EY RTS	DATE	09/02/97	ē٢	0'ATE	
CON Systems	JOHN TROLS & Services [	SO S	V	JOHNSO 60 LOVE SPARKS,	N CON Ion Ci	SCLE	CREW NG N	52-00	

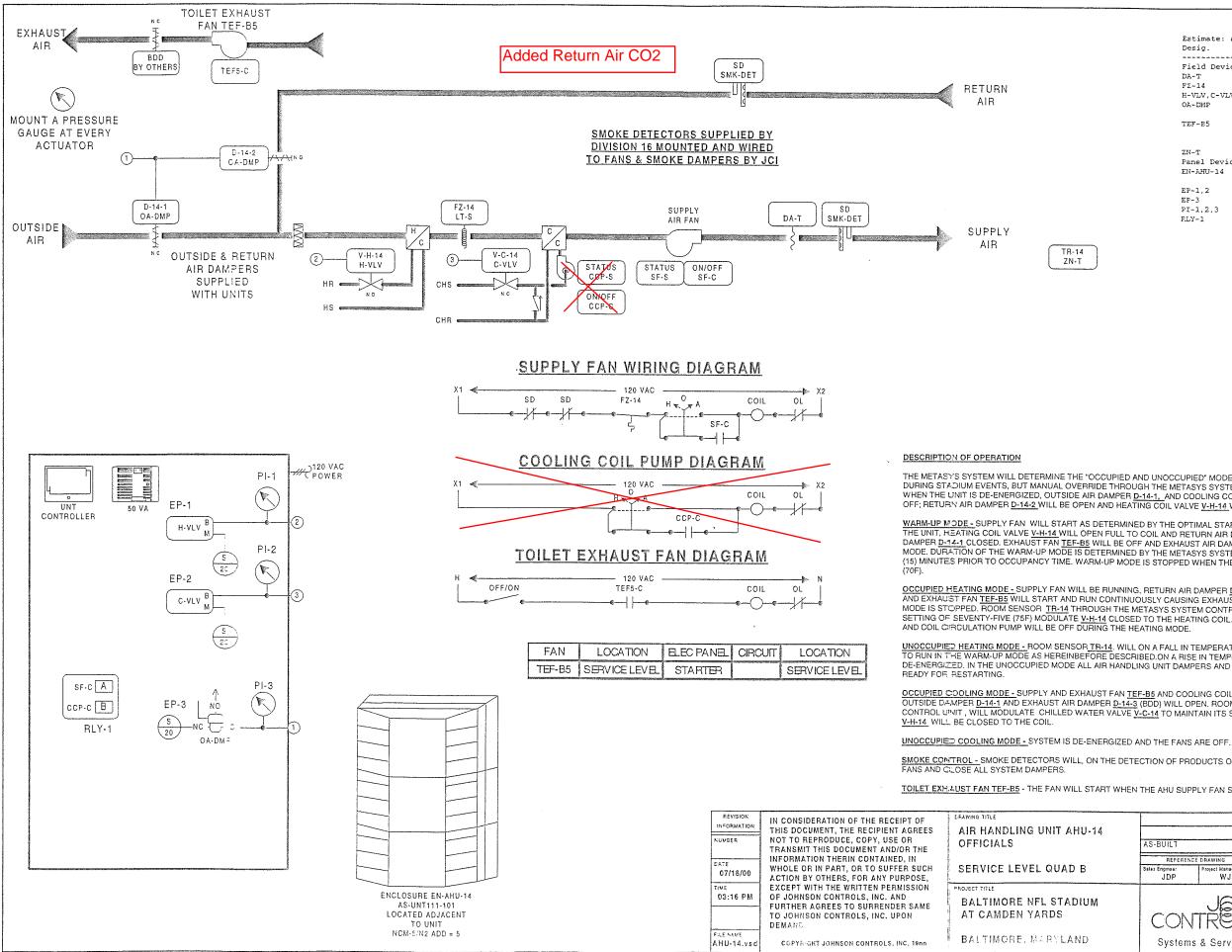
ull Sprea	adsheet			Software			Digital Controller In	formation			Pc	ne! Information					Intermediate De	vice		1	Field	Device	1		
>g P	Point Type	System Name	Object Name	Expanded ID	Display Units	DC Type N2 Truni	Cable N2 Addr Destinatio Bay/Termi	··· 1·································	Termination	Panel	Panel Location	1 1	elerence Drawing	Cable Number	Wiring/I ubing	Termination In	Device	Termination Out	Location	Wiring/I ubing	Terminations	Device	Location	Ref Detail	Commeni
1		AHU-13	1		1	AHU					3 Service Level B		2-018				1	1		1		1			Power to Controller
		AHU-13				AHU	1 4			EN-AHU13	3 Service Level B	0.M.2	2-01B												N2 Trunk
В	30-1	AHU-13	SF-C	Supply Fan Control	Off On		1 4 80-1	RLY	BO#,24V,BICON	EN-AHU13	3 Service Level B	0/M.2	2-01B	AHU13-4-80-1	3/18	A,COILS,COM	RELAY-A	COM,NO	1	2/14	See starter detail	Starter (NO)		A53	
6	30-2	AHU-13		Toilet Exh Fan B4 Control	Otí On		1 4 BO-2		BO#,24V		3 Service Level B	0iM.2	2-01B	AHU13-4-BO-2		1	PD-109-51		1		Device dependen		1	A50	
B	30-3	AHU-13		Clg Coil Pump 13 Control	Off On		1 4 80-3	RLY			3 Service Level B	0:M.2	2-01B	AHU13-4-BO-3	3/18	A,COILS,COM	RELAY-A	ICOM,NO			See starter detail		1	A53	
B	30-4	AHU-13		Smoke Exh Fan 3 Control	Off On		1 4 BO-4		BO#,24V	EN-AHU13	3 Service Level B	0 M.2	2-01B	AHU13-4-BO-4			PD-109-51	1	1		Device dependen			A50	
В			SEF4-C	Smoke Exh Fan 4 Control	Off On		1 4 80-5		BO#,24V		3 Service Level B	0 M.2	2-01B	AHU13-4-BO-5			PD-109-51				Device dependen		1	A50	
B		AHU-13				AHU -	1 4 BO-6				3 Service Level B	01M.2		AHU13-4-BO-6		1		1	1		1		1 1		· ·····
В		AHU-13				AHU	1 4 BO-7				3 Service Level B	0 M.2		AHU13-4-BO-7			······		1				1		
B		AHU-13				AHU	1 4 BO-8				3 Service Level B	0 M.2	2-018	AHU13-4-BO-8		1	1		1	1	· · · · ·	1	1		
		AHU-13				AHU	1 4 BO-9			EN-AHU13	3 Service Level B	0iM.2	2-01B	AHU13-4-BO-9		1	1		1			1			
B	30-10	AHU-13				AHU	1 4 BO-10		1	EN-AHU13	3 Service Level B	0 M.2	2-01B	AHU13-4-BO-10				1	1	1	<u> </u>	+			
A		AHU-13	DPR-C	Damper Control	10 0 0 0 0 1	AHU	1 4 AO-1				3 Service Level B	01M.2	2-01B	AHU13-4-AO-1	2/18	+	EP-8000-4	SUPPLY,O		1/4*	Barb Fitting	EP-PNEU.		A28	
A	40-2	AHU-13		Heating Coil Valve	% Open	AHU	11 4 AO-2		AO#,AOCOM	EN-AHU13	3 Service Level B	0:M.2	2-01B	AHU13-4-AO-2	2/18	+	EP-8000-4	SUPPLY,O			Barb Fitting	EP-PNEU.		A28	
A	40-3	AHU-13	C-VLV	Cooling Coil Valve		AHU	1 4 AO-3		AO#,AOCOM	EN-AHU13	3 Service Level B	0/M.2	2-01B	AHU13-4-AO-3	2/18	1+	EP-8000-4	SUPPLY.O			Barb Fitting	EP-PNEU.		A28	
Â	AO-4	AHU-13				AHU	1 4 AO-4		1	EN-AHU1	3 Service Level B	0 M.2	2-01B	AHU13-4-AO-4		1.,		1		1		2. 7.120			
A	AO-5	AHU-13	1	T		AHU	1 4 AO-5	1		IEN-AHU13	3 Service Level B	0 M.2	2-01B	AHU13-4-AO-5		1		1		1					
A	40-6	AHU-13	1			AHU	1 4 AO-6			EN-AHU13	3 Service Level B	0 M.2	2-01B	AHU13-4-AO-6						1		· · · ·			
B	31-1	AHU-13	SF-S	Supply Fan Status	Off On	AHU	1 4 BI-1		BI#,BICOM	IEN-AHU13	3 Service Level B	0 M.2		AHU13-4-BI-1						2/22	Device dependen	t Aux Contact (NO		A40	
B	31-2	AHU-13	SMK-DET	Smoke Detectors	Normal Alarm	AHU	1 4 BI-2		BI#,BICOM		3 Service Level B	0 M.2	2-01B	AHU13-4-BI-2							Device dependen			A40	
B	31-3	AHU-13	LT-S	Low Temperature Stat	Normal Alarm	AHU	1 4 BI-3		BI#,BICOM	EN-AHU13	3 Service Level B	0(M.2		AHU13-4-BI-3							NO.M1	A70 (NC)		A41	
В	31-4	AHU-13	CCP-S	Clg Coil Pump 13 Status	Off On	AHU	1 4 BI-4		BI#,BICOM	FEN-AHU13	3 Service Level B	0 M.2		AHU13-4-BI-4		-						t Aux Contact (NO		A40	
B	31-5	AHU-13				AHU	1 4 BI-5			EN-AHU13	3 Service Level B	01M.2		AHU13-4-BI-5							i contro oppendon		4		· · · · · ·
B	31-6	AHU-13				AHU	1 4 BI-6			EN-AHU13	3 Service Level B	0 M.2		AHU13-4-BI-6					<u> </u>	<u> </u>					
B	31-7	AHU-13	1	1		AHU	1 4 81-7		1	EN-AHU13	3 Service Level B	0 M.2		AHU13-4-BI-7					+						······
B	31-8	AHU-13	1	1		AHU	1 4 BI-8			EN-AHU13	3 Service Level B	01M.2		AHU13-4-BI-8	i					1		1			
A	Al-1	AHU-13	DA-T	Disch Air Temperature		AHU	1 4 Al-1		AI#,AICM	EN-AHU13	3 Service Level B	0IM.2		AHU13-4-AI-1				1	1	2/18	2-Wire	TE-6315P-1		A4	· · · · · · · · · · · · · · · · · · ·
A	41-2	AHU-13	RA-T	Return Air Temperature	Deg F	AHU	1 4 Al-2		AI#,AICM	EN-AHUIS	3 Service Level B	0/M.2		AHU13-4-AI-2		1	i				2-Wire	TE-6315P-1		A4	
A	AI-3	AHU-13				AHU	1 4 AI-3			EN-AHUIS	3 Service Level B	0 M.2		AHU13-4-AI-3		1				1		1			
A	41-4	AHU-13	ZN-T	Zone Temperature	Deg F	AHU	1 4 Al-4		PHONE JACK		3 Service Level B	0iM.2		AHU13-4-AI-4		1	1			8/26	PHONE JACK	TE-6410W-1000	1	A5	
Á	AI-5	AHU-13	1	1	1 1	AHU	1 4 AI-5				3 Service Level B	0iM.2		AHU13-4-AI-5				1		1	1	12 0 101 1000	-  ť		······
A	AI-6	AHU-13	1	1		AHU	1 4 AI-6		1	EN-AHU1	3 Service Level B	01M.2		AHU13-4-AI-6	( <u> </u>					1		+			
A	41-7	AHU-13		1		AHU	1 4 Al-7		1		3 Service Level B	01M.2		AHU13-4-AI-7						1	<u> </u>				
A	AI-8	IAHU-13		1		AHU	1 4 AI-8				3 Service Level B	0 M.2		AHU13-4-AI-8	t	1	+		+	1					

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		BILL OF MATER	LALS
Estimate: ab	iu-1	4	70520098.pre
Desig.	Qt	yPart #	Description
Field Device			**********************
DA-T			
		TE-6315P-1	SENS, T-Ni, 0.1%, 8' AVG
FZ-14			STAT, LL, 20', EL, MAN, 15/55F
H-VLV,C-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13*
	2	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
TEF-E5	1	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	FLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	FELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-AHU-14	1	AS-UNT111-101	UNT111 MTD IN UPM, W/50VA
	2	EN-EXP101-0	UNIV PKG MOD, CVR & BACKEN
EP-1,2	2	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
EP-3	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2,3	з	G-2010-11	GAGE,2*,0-30 PSIG,STEM
FLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASY'S SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUP DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AIR DAMPER <u>D-14-1</u>, AND COOLING COIL VALVE <u>V-C-14</u> WILL CLOSE; COOLING COIL PUMP WILL BE OFF; RETURN AIR DAMPER <u>D-14-2</u> WILL BE OPEN AND HEATING COIL VALVE <u>V-H-14</u> WILL BE CLOSED TO THE COIL.

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COIL VALVE V-H-14 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-14-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER D-14-1 CLOSED. EXHAUST FAN TEF-B5 WILL BE OFF AND EXHAUST AIR DAMPER D-14-3 (BDD) WILL BE CLOSED DURING THE WARM-UP MODE. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN THE ZONE AIR TEMPERATURE REACHES THE SETTING OF TR-14

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER D-14-2 WILL CLOSE, OUTSIDE AIR DAMPER D-14-1 WILL OPEN AND EXHAUST FAN TEF-B5 WILL START AND RUN CONTINUOUSLY CAUSING EXHAUST AIR DAMPER D-14-3 (BDD) TO OPEN AFTER THE WARM-UP MODE IS STOPPED. ROOM SENSOR TE-14 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-14 CLOSED TO THE HEATING COIL. COOLING COIL VALVE V-C-14 WILL BE CLOSED TO THE COIL

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-14. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F). THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED COOLING MODE - SUPPLY AND EXHAUST FAN TEF-B5 AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE DAMPER D-14-1 AND EXHAUST AIR DAMPER D-14-3 (BDD) WILL OPEN. ROOM SENSOR TR-14 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL MODULATE CHILLED WATER VALVE V-C-14 TO MAINTAIN ITS SETTING OF SEVENTY -FIVE (75F). THE HEATING COIL VALVE

SMOKE CONTROL - SMOKE DETECTORS WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE SUPPLY AND EXHAUST

TOILET EXHAUST FAN TEF-B5 - THE FAN WILL START WHEN THE AHU SUPPLY FAN STARTS AND THE SYSTEM IS IN THE "OCCUPIED" MODE.

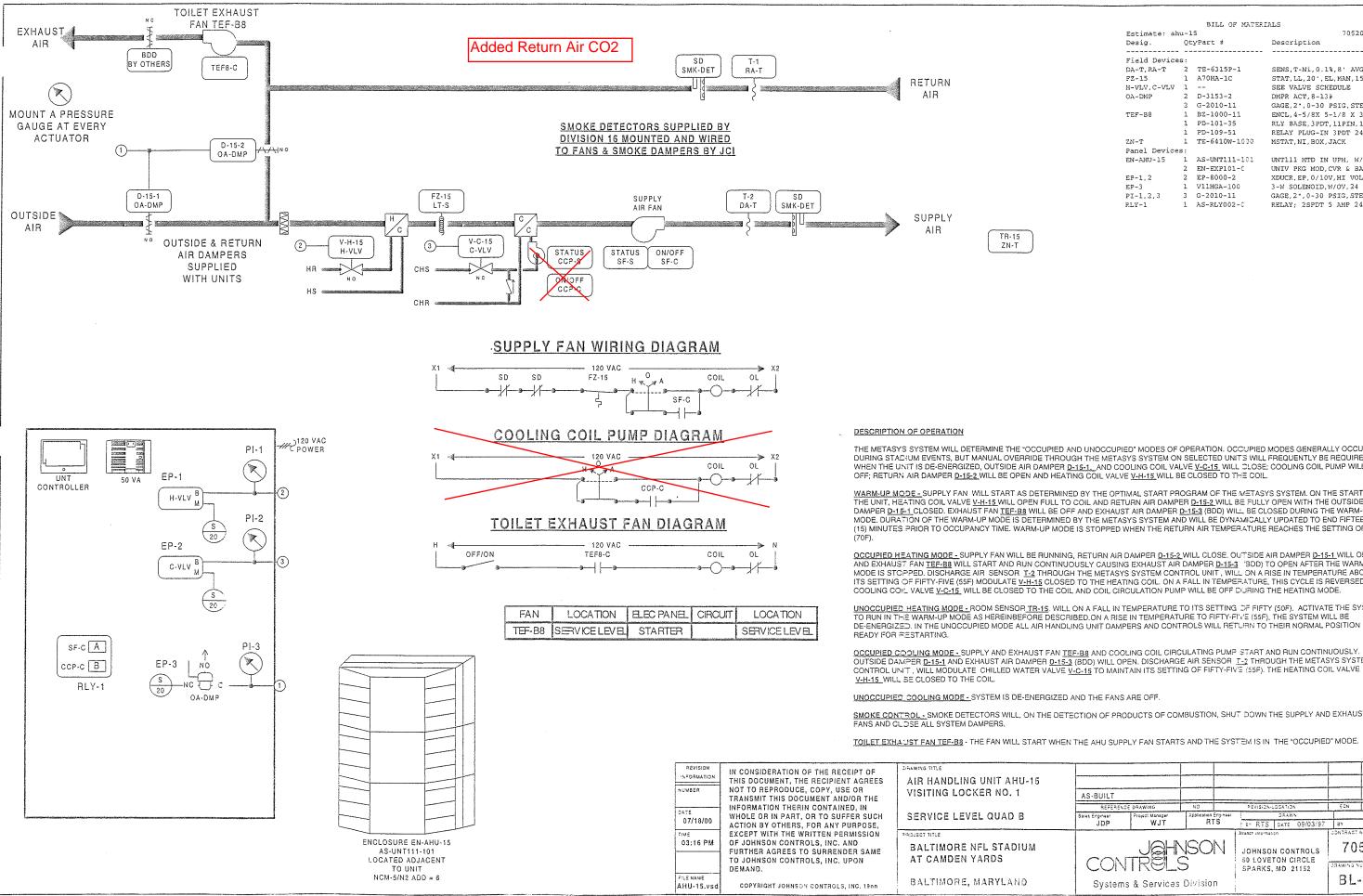
	AS-BUILT			 			7/18/00	CME
	REFEREN Sales Engineer JDP	CE DRAWING Project Manager WJT	NO. Application Er	REVISION	DRAWN	ECN 17 BY	DATE APPROVED	FY
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ull Spreadshee	t		Software			Digil	al Controller Info	mation		1	Par	nel Informat	ion		1		Intermediate Dev	ice	1	Field	Device	ĺ	1	
īog Point Ty	pe Syste Nam		Expanded ID	Display Units	DC Type N2	Trunk N2 Add	Cable T Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
	AHU-14				UNT						Service Level B		M.2-01B	1				:	1	1		1	/	ower to Controller
	AHU-14				JUNT	1	5				Service Level B		M.2-01B		1			:	1	1		T I	/i	V2 Trunk
Al-1	i AHU-14		Disch Air Temperature	Deg F	JUNT	1	5 AI-1				Service Level B			AHU14-5-Al-1	1	Τ		;	2/18	2-Wire	TE-6315P-1	1	U1 [	
AI-2	AHU-14				UNT	1	5 Ai-2				Service Level B	0	M.2-01B	AHU14-5-AI-2				1					1	
AI-3	AHU-14				UNT		5 AI-3				Service Level B			AHU14-5-AI-3					1			1	1	
AI-4	AHU-14		Zone Temperature	Deg F	UNT		5 AI-4				Service Level B			AHU14-5-AI-4					8/26	PHONE JACK	TE-6410W-1000	1	U2	
A1-5	AHU-14				UNT		5 AI-5				Service Level B			AHU14-5-AI-5	ł				l.					
A1-6	AHU-14				UNT	1	5 Al-6				Service Level B			AHU14-5-AI-6	ţ.	1					1			
BI-1	AHU-14		Supply Fan Status	Off On		1	5 BI-1				Service Level B	0	M.2-01B	AHU14-5-BI-1	1				2/22	Device dependen	(Aux Contact (NO)	1	U70	
B1-2	AHU-14		Smoke Detectors	Normal Alarm		1	5 BI-2				Service Level B		M.2-018	AHU14-5-BI-2	2				2/22	Device dependen	(Contact (NO)	1	U70	
B1-3	AHU-14	LT-S	Low Temperature Stat	Normal Alarm		1	5 BI-3		BI#,24VAC		Service Level B	0	M.2-01B	AHU14-5-BI-3	1			3	2/22	NO,M1	A70 (NC)		U71	
BI-4	AHU-14		Clg Coil Pump 14 Status	Off On		1	5 BI-4				Service Level B		M.2-01B	AHU14-5-BI-4	E.			1	2/22	Device dependen	(Aux Contact (NO)	1 1	U70	
BO-1	AHU-14		Supply Fan Control	Off On			5 BO-1	IRLY	BO#,24V,COM	EN-AHU14	Service Level B	0	M.2-01B	AHU14-5-BO-1	3/18	A,COILS,COM	RELAY-A	INO,COM	12/14	See starter detail	Starter (NO)-(sw lo	) (	U60	
BO-2	AHU-14	TEF5-C	Toilet Exh Fan B5 Control	Off On		1	5 BO-2				Service Level B	0	M.2-01B	AHU14-5-BO-2	-		PD-109-51	1	2/18	Device dependen	124VAC OUT (sw lo	)  l	U51	
BO-3	AHU-14		Outside Air Damper	Closed Open		1	5 BO-3				Service Level B	0	M.2-01B	AHU14-5-BO-3			V11HGA-100		2/18	Device dependen	124VAC OUT (sw lo	5) [1	U51	
BO-4	AHU-14		Cig Coil Pump 14 Control	Off On		1	5 BO-4	RLY			Service Level B		M.2-018	AHU14-5-BO-4		B,COILS,COM	RELAY-B	INO,COM	2/14	See starter detail	Starter (NO)-(sw lo	) (	U60	
80-5	AHU-14				UNT	1	5 BO-5				Service Level B		M.2-01B	AHU14-5-BO-5	1		1			1	1	1		
BO-6	AHU-14				UNT	1[	5 BO-6				Service Level B	0	M.2-01B	AHU14-5-BO-6	1			1	1	1	1			
AO-1	AHU-14	H-VLV	Heating Coil Valve		UNT	1	5 AO-1		AO#,AOCM,24V			0	M.2-01B	AHU14-5-AO-1	2/18	+,-	EP-8000-2	SUPPLY, O	3/18	Device dependen	10-10V OUT	1	U23	
AO-2	AHU-14	C-VLV	Cooling Coil Valve	% Open	IUNT I	1	5/AO-2		AO#,AOCM,24V	AEN-AHU14	Service Level B	0	M.2-01B	AHU14-5-AO-2	2/18	+,-	EP-8000-2	SUPPLY, O	3/18	Device dependen	tIO-10V OUT	1	U23	

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		BILL OF MATERI	ALS
Estimate: ah	u-1	.5	70520098.pre
Desig.	Q٣	yPart #	Description
Field Device	s:		
DA-T, RA-T	2	TE-6315P-1	SENS,T-Ni,0.1%,8' AVG
FZ-15	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV,C-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13#
	2	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
TEF~B8	1	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-AHU-15	1	AS-UNT111-101	UNT111 MTD IN UPM, W/50VA
	2	EN-EXP101-C	UNIV PKG MOD, CVR & BACKBN
EP-1,2	2	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
EP-3	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2,3	3	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
PLY-1	1	AS-RLY002-C	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STACHUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNIT'S WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AIR DAMPER <u>D-15-1.</u> AND COOLING COIL VALVE <u>V-C-15</u>. WILL CLOSE; COOLING COIL PUMP WILL BE

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COIL VALVE V-H-15 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-15-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER D-15-1 CLOSED. EXHAUST FAN TEF-B8 WILL BE OFF AND EXHAUST AIR DAMPER D-15-3 (BDD) WILL BE CLOSED DURING THE WARM-UP MODE, DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME, WARM-UP MODE IS STOPPED WHEN THE RETURN AIR TEMPERATURE REACHES THE SETTING OF T-1

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER D-15-2 WILL CLOSE. OUTSIDE AIR DAMPER D-15-1 WILL OPEN AND EXHAUST FAN TEF-B8 WILL START AND RUN CONTINUOUSLY CAUSING EXHAUST AIR DAMPER D-15-3 (3DD) TO OPEN AFTER THE WARM-UP MODE IS STCPPED. DISCHARGE AIR SENSOR <u>1-2</u> THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF FIFTY-FIVE (55F) MODULATE <u>V-H-15</u> CLOSED TO THE HEATING COIL. ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED. COOLING COIL VALVE V-C-15 WILL BE CLOSED TO THE COIL AND COIL CIRCULATION PUMP WILL BE OFF DURING THE HEATING MODE.

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-15. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED CODLING MODE - SUPPLY AND EXHAUST FAN TEF-B8 AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE DAMPER D-15-1 AND EXHAUST AIR DAMPER D-15-3 (BDD) WILL OPEN. DISCHARGE AIR SENSOR T-2 THROUGH THE METASYS SYSTEM

SMOKE CONTROL \_ SMOKE DETECTORS WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE SUPPLY AND EXHAUST

AS-BUILT								7/18/00	CME
REFERENCE	DRAWING	NO		PEVISION-L	OCATIO	8	ECN	DATE	ê Y
Sales Engineer	Project Manager	Application		1	98AV	(N		APPROVED	
JDP	WJT	R	rs -	Er RTS	DATE	09/03/97	BY	DATE	
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ull Sprea	adsheet			Software				Digite	I Controller Infor	mation			Pa	nəl Informatio	>n			I	ntermediate Dev	rica			Field	Device			
⊐g P	Point Type	System Name	Object Name	Expanded ID	Display	Units	DC Type N2 Ti	runk N2 Addr	Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Devicə	Yermination Out	Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
		AHU-15			1		JNT						Service Level B		4.2-01B					1		1	i i	1			Power to Controller
		AHU-15	•	1	-	jil.	UNT	1 6				EN-AHU15	Service Level B	0	1.2-01B					4							N2 Trunk
AI	1-1	AHU-15	RA-T	Return Air Temperature	Deg	· / /	JNT	1 6	Al-1		AI#,AICM	EN-AHU15	Service Level B	ON	A.2-01B	AHU15-6-AI-1		[	1	4		2/18	2-Wire	TE-6315P-1		U1	
	1-2	AHU-15					JNT		Al-2				Service Level B		A.2-01B	AHU15-6-AI-2											
Al		AHU-15	DA-T	Disch Air Temperature	Deg		JNT		A1-3		AI#,AICM		Service Level B		4.2-018	AHU15-6-AI-3				1		2/18	2-Wire	TE-6315P-1		U1	
Al			ZN-T	Zone Temperature	Deg		JNT		A1-4		PHONE JACK				1.2-018	AHU15-6-AI-4						8/26	PHONE JACK	TE-6410W-1000		U2	
AI		AHU-15					JNT		AI-5				Service Level B		1.2-018	AHU15-6-AI-5											
A		AHU-15					JNT		AI-6				Service Level B		1.2-018	AHU15-6-AI-6											
BI		AHU-15	SF-S	Supply Fan Status		On IL			81-1		B1#,24VAC		Service Level B		1.2-018	AHU15-6-BI-1				1		2/22	Device dependent	Aux Contact (NO)		U70	
BI		AHU-15	SMK-DET	Smoke Detectors	Normal A				81-2		BI#,24VAC		Service Level B		1.2-01B	AHU15-6-BI-2						2/22	Device dependent			U70	
BI		AHU-15	LT-S	Low Temperature Stat	Normal A				BI-3				Service Level B		1.2-018	AHU15-6-BI-3				i				A70 (NC)		U71	
BI		AHU-15	ICCP-S	Clg Coil Pump 15 Status		On IL			BI-4		BI#,24VAC		Service Level B		A.2-01B	AHU15-6-BI-4						2/22		Aux Contact (NO)		U70	
BC		AHU-15	SF-C	Supply Fan Control	alar and the second second	On IL			BO-1	ALY		to	iService Level B		A.2-01B	AHU15-6-BO-1	3/18	A,COILS,COM		NO,COM		· · · · · · · · · · · · · · · · · · ·		Starter (NO)-(sw lo		U60	
80	0-2	AHU-15	TEF8-C	Toilet Exh Fan B8 Control		On IL			80-2				Service Level B		1.2-018	AHU15-6-BO-2			PD-109-51	!		2/18		24VAC OUT (sw lo		U51	
	0-3	AHU-15	OA-DMP	Outside Air Damper	Closed				80-3		BO#,24VAC		Service Level B		1.2-018	AHU15-6-BO-3			V11HGA-100			2/18		24VAC OUT (sw id		U51	
	0-4	AHU-15	CCP-C	Clg Coil Pump 15 Control	Off	On IL			80-4	RLY	BO#,24V,COM				1.2-01B	AHU15-6-BO-4	3/18	B,COILS,COM	RELAY-B	NO,COM		2/14	See starter detail	Starter (NO)-(sw lo	)	U60	
	0-5	AHU-15		<u> </u>			JNT	<u>1  6</u>	BO-5				Service Level B		A.2-01B	AHU15-6-BO-5		ļ		1	L	L	·				
BC	0-6	AHU-15				14	TAL		BO-6				Service Level B		1.2-01B	AHU15-6-BO-6		L		1							
A	0-1		H-VLV	Heating Coil Valve	% Op		JNI		AO-1		AO#,AOCM,24V				1.2-018	AHU15-6-AO-1			EP-8000-2	SUPPLY, O			Device dependent			U23	
	0-2	IAHU-15	C-VLV	Cooling Coil Valve	% Op	en il	JNT	11 6	AO-2		AO#,AOCM,24V	4EN-AHU15	Service Level B	1 018	A.2-01B	AHU15-6-AO-2	2/18	+	EP-8000-2	SUPPLY, O		3/18	Device dependent	0-10V OUT		U23	

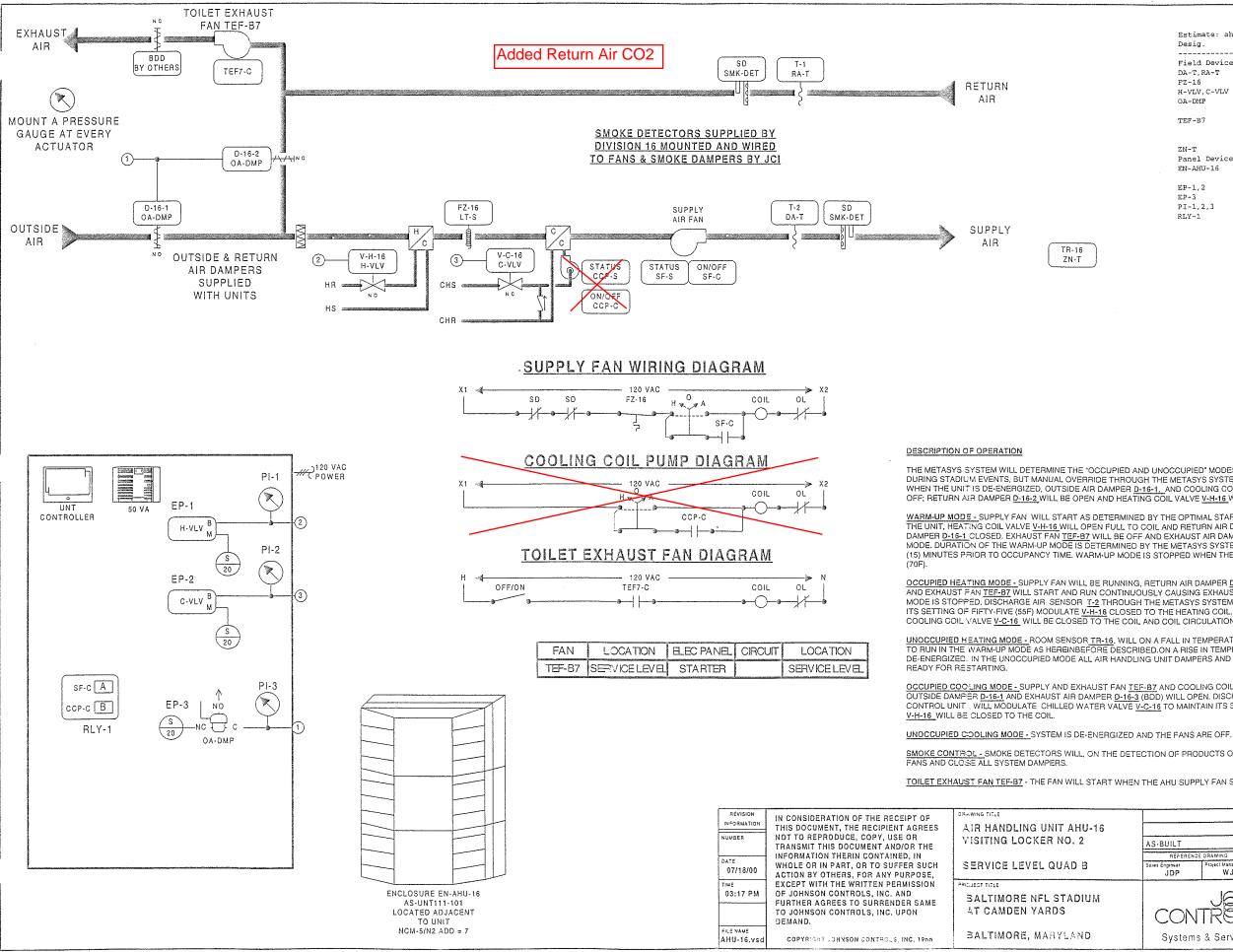
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		BILL OF MATERI	IALS
Estimate: ab	u-1	.6	70520098.pre
Desig.	Qt	yPart #	Description
Field Device	s:		
DA-T, RA-T	2	TE-6315P-1	SENS,T-Ni,0.1%,8' AVG
FZ-16	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV, C-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13#
	2	G-2010-11	GAGE,2*,0-30 PSIG,STEM
TEF-B7	1	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-AHU-16	1	AS-UNT111-101	UNT111 MTD IN UPM, W/SOVA
	2	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1,2	2	EP-8000-2	NDUCR, EP, 0/10V, HI VOL
EP-3	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2,3	3	G-2010-11	GAGE,2",0-30 PSIG,STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AIR DAMPER <u>D-16-1</u>, AND COOLING COIL VALVE <u>V-C-16</u> WILL CLOSE; COOLING COIL PUMP WILL BE OFF; RETURN AIR DAMPER <u>D-16-2</u> WILL BE OPEN AND HEATING COIL VALVE <u>V-H-16</u> WILL BE CLOSED TO THE COIL.

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COLVALVE V-H-16 WILL OPEN FULL TO COLVAND RETURN AIR DAMPER D-16-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER D-16-1 CLOSED. EXHAUST FAN TEF-87 WILL BE OFF AND EXHAUST AIR DAMPER D-16-3 (BDD) WILL BE CLOSED DURING THE WARM-UP MODE. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DEVIDENT OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DEVIDENT OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DEVIDENT OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DEVIDENT OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DEVIDENT OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DEVIDENT OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DEVIDENT OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DETERMINED BY THE METASYS BYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DETERMINED BY THE METASYS AND THE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DETERMINED BY THE METASYS BYSTEM AND THE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DETERMINED BY THE METASYS BYSTEM AND THE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DETERMINED BY THE METASYS BYSTEM AND THE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DETERMINED BY THE METASYS BYSTEM AND THE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DETERMINED BY THE DYNAMICALLY UPDATED TO END FIFTEEN (15) MULTICES DETERMINED BY THE DYNAMICALLY DYNAMICALLY UPDATED FIFTEEN (15 (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN THE RETURN AIR TEMPERATURE REACHES THE SETTING OF T-1

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER D-16-2, WILL CLOSE, OUTSIDE AIR DAMPER D-16-1 WILL OPEN AND EXHAUST FAN TEF-BT WILL START AND RUN CONTINUOUSLY CAUSING EXHAUST AIR DAMPER D-16-3 (EDD) TO OPEN AFTER THE WARM-UP MODE IS STOPPED, DISCHARGE AIR SENSOR T-2 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF FIFTY-FIVE (55F) MODULATE V-H-16 CLOSED TO THE HEATING COLL ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED. COOLING COLL VALVE V-C-16 WILL BE CLOSED TO THE COLL AND COLL CIRCULATION PUMP WILL BE OFF DURING THE HEATING MODE.

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-16. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE '55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED COOLING MODE - SUPPLY AND EXHAUST FAN TEF-B7 AND COOLING COLL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE DAMPER <u>D-16-1</u> AND EXHAUST AIR DAMPER <u>D-16-3</u> (BDD) WILL OPEN. DISCHARGE AIR SENSOR <u>T-2</u> THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL MODULATE CHILLED WATER VALVE <u>V-C-16</u> TO MAINTAIN ITS SETTING OF FIFTY-FIVE (35F). THE HEATING COIL VALVE

SMOKE CONTRIDL - SMOKE DETECTORS WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE SUPPLY AND EXHAUST

TOILET EXHAUST FAN TEF-B7 - THE FAN WILL START WHEN THE AHU SUPPLY FAN STARTS AND THE SYSTEM IS IN THE "OCCUPIED" MODE.

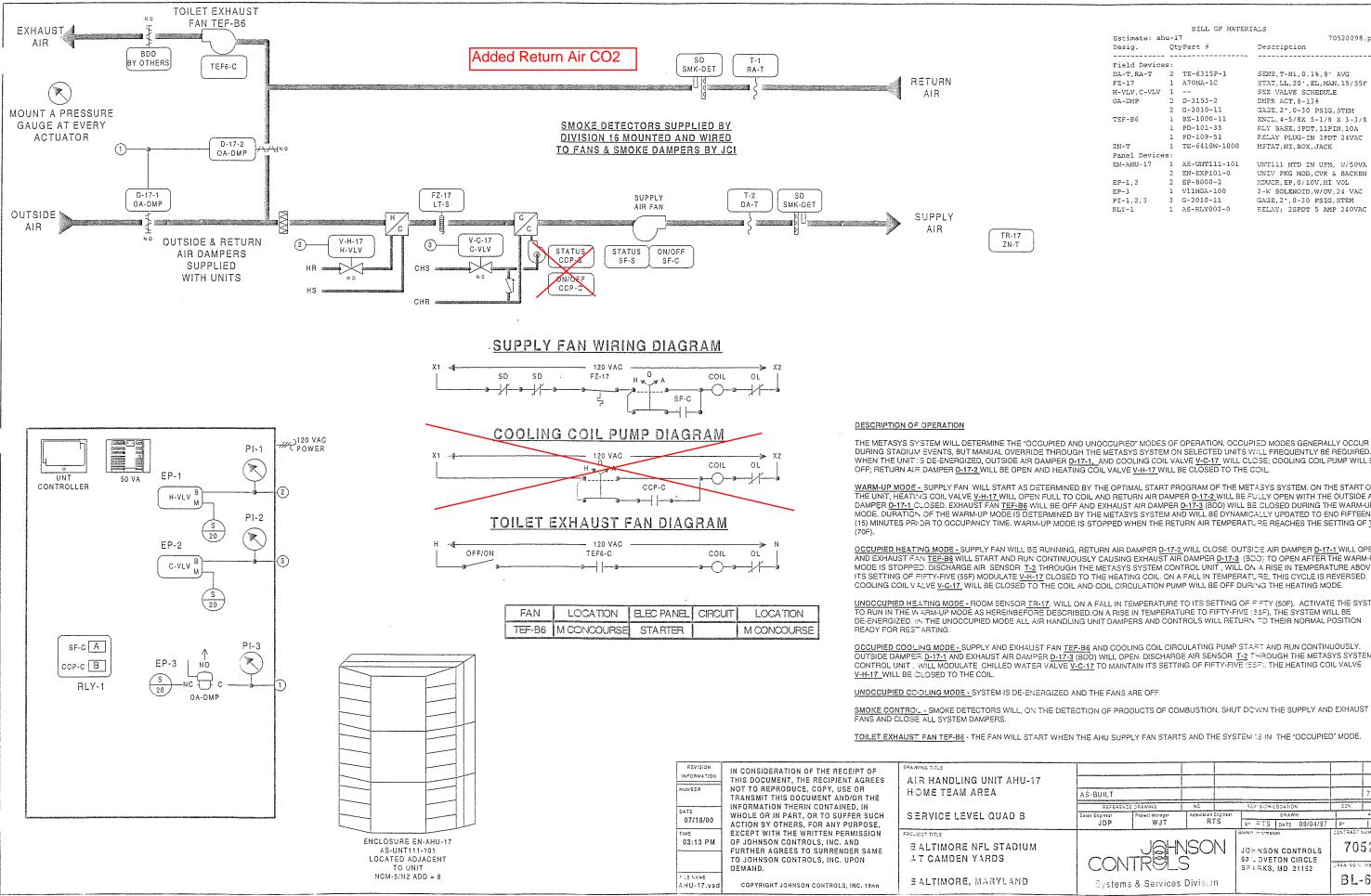
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ull Spreads	sheet			Software				Digital Contro	CONTRACTOR CONTRACTOR OF THE OWNER OF THE	ation		1	Par	el Informati	on			1	ntermediate Dev	icə			Field	Device			
'ag Poir	nt Type	System Name	Object Name	Expanded ID	Display Un	its DC	Type N2 Trunk	N2 Addr Desti	able nation I erminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/f ubing	Terminations	Device	Location	Rəf Detail	Comment
		AHU-16			1	UNT						EN-AHU16	Service Level B		M.2-01B	l i				1		1					ower to Controller
		AHU-16	*	<u> </u>		UNT	1	7				EN-AHU16	Service Level B	01	M.2-01B			1		1					1	1	12 Trunk
Al-1		AHU-16	RA-T	Return Air Temperature	Deg F	UNT	1	7 Al-1			AI#,AICM	EN-AHU16	Service Level B	0	vi.2-018	AHU16-7-Al-1				1		2/18	2-Wire	TE-6315P-1	1	J1	
AI-2		AHU-16			1	UNT	1	7 AI-2					Service Level B		vi.2-01B	AHU16-7-Al-2		1		1		[	1				
AI-3		AHU-16	DA-T	Disch Air Temperature	i Deg F	IUNT	1	7 Al-3			AI#,AICM		Service Level B		vi.2-01B	AHU16-7-AI-3				l		2/18	2-Wire	TE-6315P-1	1	J1	
A1-4			ZN-T	Zone Temperature	I Deg F	UNT	1	7 AI-4			PHONE JACK		Service Level B		VI.2-01B	AHU16-7-AI-4						8/26	PHONE JACK	TE-6410W-1000	1	J2	
A1-5		AHU-16				UNT	1	7 AI-5					Service Level B		vi.2-018	AHU16-7-AI-5				1			1	1			
AI-6		AHU-16				UNT	1	7 AI-6					Service Level B		vi.2-018	AHU16-7-AI-6							1				
B1-1			SF-S	Supply Fan Status		n IUNT	1	7 BI-1			BI#,24VAC		Service Level B		vi.2-01B	AHU16-7-BI-1				1		2/22	Device dependent	(Aux Contact (NO)	1 1	J70	
81-2		AHU-16	SMK-DET	Smoke Detectors	Normal Ala		1	7 BI-2			BI#,24VAC		Service Level B		vi.2-01B	AHU16-7-BI-2				1		2/22	Device dependent	(Contact (NO)	II. II	J70	
BI-3 BI-4		AHU-16	LI-S	Low Temperature Stat	Normal Ala		1	7 BI-3			BI#,24VAC		Service Level B		VI.2-01B	AHU16-7-BI-3				1		2/22	NO,M1	A70 (NC)		J71	
81-4			CCP-S	Clg Coil Pump 16 Status		n UNT	1	7 81-4			BI#,24VAC		Service Level B		M.2-01B	AHU16-7-BI-4				l		2/22	Device dependent	t Aux Contact (NO)	L. L	J70	
80-	1		SF-C	Supply Fan Control		n junt	1	7 BO-1	[F	ALY	BO#,24V.COM		Service Level 8		vi.2-01B	AHU16-7-BO-1		A,COILS,COM		INO,COM		2/14	See starter detail	Starter (NO)-(sw lo		J60	
BO-2 BO-2	2	AHU-16	TEF7-C	Toilet Exh Fan B7 Control		n UNT	1	7 BO-2			BO#,24VAC		Service Level 8		vi.2-01B	AHU16-7-BO-2			PD-109-51	1		2/18	Device dependent	t 24VAC OUT (sw lo		J51	
BO-	3		OA-DMP	Outside Air Damper	Closed Op		1	7 BO-3			BO#,24VAC		Service Level B		V.2-01B	AHU16-7-BO-3			V11HGA-100					t 24VAC OUT (sw lo		J51	
BO-			CCP-C	Clg Coil Pump 16 Control	Off O	n UNT		7 BO-4	[F	RLY	BO#,24V,COM				M.2-01B	AHU16-7-BO-4		B,COILS,COM	RELAY-B	NO,COM		2/14	See starter detail	Starter (NO)-(sw lo	) (t	J60	
BO-	5	AHU-16 AHU-16						7 BO-5					Service Level B		VI.2-01B	AHU16-7-BO-5	l			:		L					
				No alian Onit Malan	1 2			7 BO-6					Service Level B		VI.2-01B	AHU16-7-BO-6				1							
AO-		AHU-16	H-VLV	Heating Coil Valve	% Open		1	7 AO-1			AO#,AOCM,24V				M.2-01B	AHU16-7-AO-1			EP-8000-2	SUPPLY, O			Device dependent	tIO-10V OUT		J23	
AO-2	2	AHU-16	C-VLV	Cooling Coil Valve	% Open	UNT	1	7 AO-2			AO#,AOCM,24V	AEN-AHU16	Service Level B	0	M.2-01B	AHU16-7-AO-2	2/18	+	EP-8000-2	SUPPLY, O	1	3/18	Device dependent	tIO-10V OUT	1	J23	

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		BILL OF MATERI	TALS
Estimate: ah	u-1	.7	70520098.pre
Desig.	Qt	yPart #	Description
Field Device			
DA-T,RA-T	2	TE-6315P-1	SENS,T-N1,0.1%,8' AVG
FZ-17	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV,C-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13#
	2	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
TEF-B6	1	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
		PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-AHU-17	1	AS-UNT111-101	UNT111 MTD IN UPM, W/50VA
	2	EN-EXP101-0	UNIV PKG MOD, CVR & BACKEN
EP-1,2		EP-8000-2	NDUCR, EP, 0/10V, HI VOL
EP-3	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2,3	3	G-2010-11	GAGE,2*,0-30 PSIG,STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION, OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AIR DAMPER <u>D-17-1</u>, AND COOLING COIL VALVE <u>V-0-17</u> WILL CLOSE; COOLING COIL PUMP WILL BE OFF; RETURN AIR DAMPER <u>D-17-2</u> WILL BE OPEN AND HEATING COIL VALVE <u>V-0-17</u> WILL BE CLOSED TO THE COIL.

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COLLVALVE V-H-17 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-17-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER D-17-1 CLOSED. EXHAUST FAN TEF-B6 WILL BE OFF AND EXHAUST AIR DAMPER D-17-3 (BDD) WILL BE CLOSED DURING THE WARM-UP MODE. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PROOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN THE RETURN AIR TEMPERATURE REACHES THE SETTING OF T-1

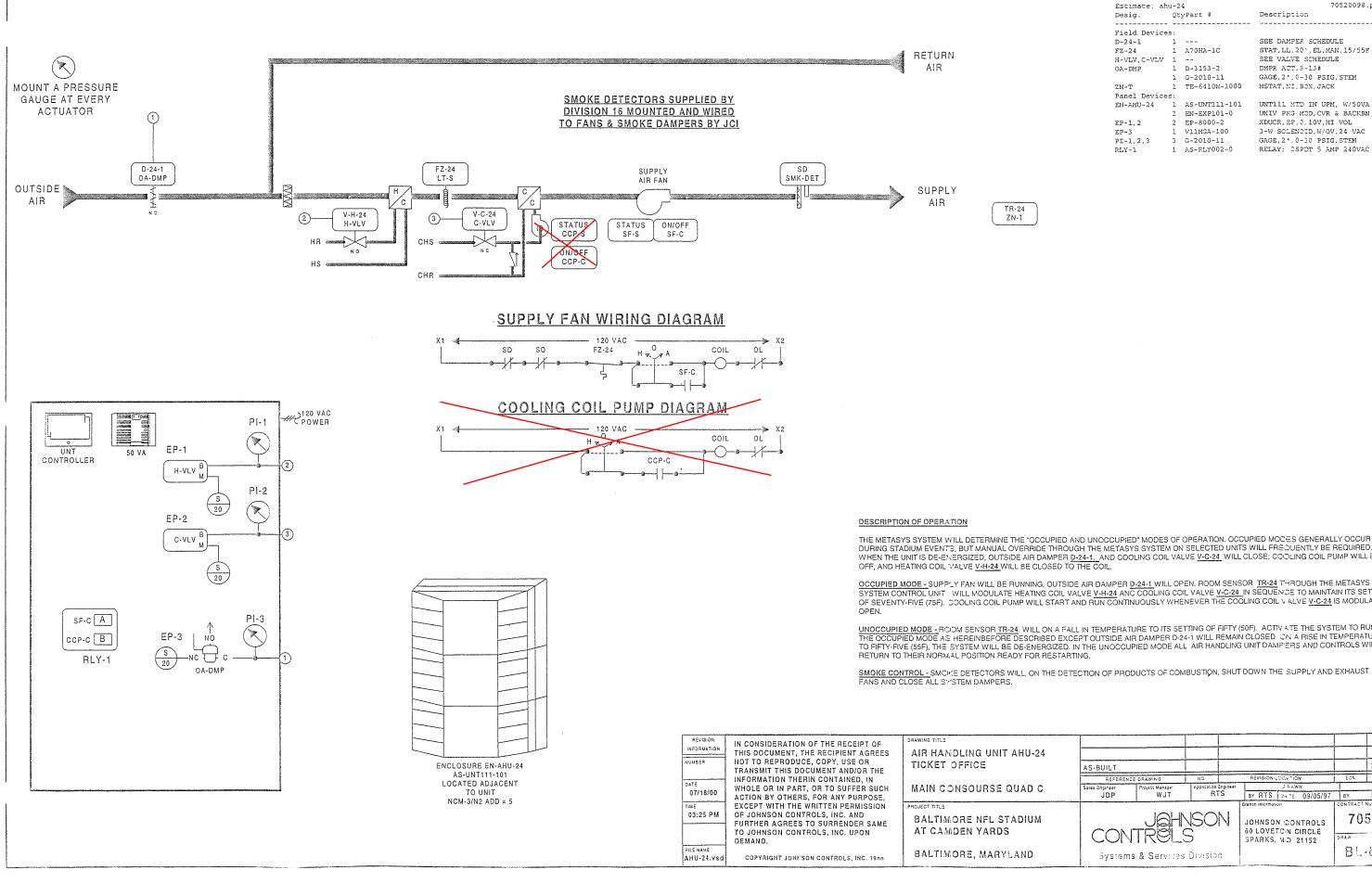
OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER D-17-2, WILL CLOSE, OUTSIDE AIR DAMPER D-17-1, WILL OPEN AND EXHAUST FAN TEF-B6 WILL START AND RUN CONTINUOUSLY CAUSING EXHAUST AIR DAMPER D-17-3 (BDD) TO OPEN AFTER THE WARM-UP MODE IS STOPPED. DISCHARGE AIR SENSOR 1-2 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF FIFTY-FIVE (55F) MODULATE V-H-17 CLOSED TO THE HEATING COIL. ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED. COOLING COIL V 4LVE V-C-17 WILL BE CLOSED TO THE COIL AND COIL CIRCULATION PUMP WILL BE OFF DURING THE HEATING MODE.

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-17, WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF PETTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED. ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED COOLING MODE - SUPPLY AND EXHAUST FAN TEF-B6 AND COOLING COIL CIRCULATING PUMP START AND RUN CONTINUOUSLY. OUTSIDE DAMPER D-17-1 AND EXHAUST AIR DAMPER D-17-3 (BDD) WILL OPEN. DISCHARGE AIR SENSOR T-2 THROUGH THE METASYS SYSTEM CONTROL UNIT. WILL MODULATE CHILLED WATER VALVE V-C-17 TO MAINTAIN ITS SETTING OF FIFTY-FIVE (55F). THE HEATING COIL VALVE

TOILET EXHAUST FAN TEF-B6 - THE FAN WILL START WHEN THE AHU SUPPLY FAN STARTS AND THE SYSTEM "S IN THE "OCCUPIED" MODE.

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		BILL OF MATERI	ALS
Estimate: ah	u-2	4	70520098.pre
Desig.	Qt	yPart #	Description
		····	
Field Device	s;		
D-24-1	1		SEE DAMPER SCHEDULE
FZ-24	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV,C-VLV	1	~~~~	SEE VALVE SCHEDULE
OA-DMP	1	D-3153-2	DMPR ACT, 8-13#
	1	G-2010-11	GAGE, 2 .0-30 PSIG, STEM
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-AHU-24	1	AS-UNT111-101	UNT111 MTD IN UPM, W/SOVA
	2	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1,2	2	EP-8000-2	XDUCR, EP, 0, 10V, HI VOL
EP-3	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2,3	3	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 25PDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AIR DAMPER D-24-1, AND COOLING COIL VALVE V-C-24 WILL CLOSE; COOLING COIL PUMP WILL BE

OCCUPIED MODE - SUPPLY FAN WILL BE RUNNING, OUTSIDE AIR DAMPER <u>D-24-1</u> WILL OPEN. ROOM SENSOR <u>TR-24</u> THROUGH THE METASYS SYSTEM CONTROL UNIT WILL MODULATE HEATING COIL VALVE <u>V-H-24</u> AND COOLING COIL VALVE <u>V-C-24</u> IN SEQUENCE TO MAINTAIN ITS SETTING OF SEVENTY-FIVE (75F). COOLING COIL PUMP WILL START AND RUN CONTINUOUSLY WHENEVER THE COOLING COIL VALVE <u>V-C-24</u> IS MODULATED

UNOCCUPIED MODE - ROOM SENSOR TR-24, WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE OCCUPIED MODE AS HEREINBEFORE DESCRIBED EXCEPT OUTSIDE AIR DAMPER D-24-1 WILL REMAIN CLOSED. ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED, IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL DEDITION TO THE DESCRIPTION OF THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL DEDITION TO THE DESCRIPTION OF THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL DEDITION OF THE DESCRIPTION OF THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL DEDITION OF THE DESCRIPTION OF THE DESCRIPTI

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## Baltimore NFL Stadium

II Spreadshee	t		Software		[		Digit	al Controller Info	ormation		l.	Po	anel Informa	rtion			······································	Intermediate Dev	ice		<u> </u>	Field	Device			
Tog Point Ty	oe Syste Narr	1	Expanded ID	Display Units	DC ĭуре	N2 Trunk	N2 Addr	Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Siot Number	Reference Drawing	Cable Number	Wiring/î ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
	AHU-24				UNT				1		EN-AHU24	AT UNIT	1		1	and the second second	1			- <del>hami</del>	e			1		Power to Controller
	AHU-24				UNT	1	5			1	EN-AHU24	AT UNIT	0	i	1		1	1		1						N2 Trunk
Al-1	AHU-24				UNT	1		Al-1		}	EN-AHU24	AT UNIT	0		AHU24-5-AI-1		······				1					
AI-2	AHU-24				UNT	1	5	Al-2 Al-3			EN-AHU24	AT UNIT	0		AHU24-5-AI-2			1			h					
AI-3	AHU-24				UNT	1					EN-AHU24	AT UNIT	0		AHU24-5-AI-3					1			}			
AI-4	AHU-24	and the second s	Zone Temperature	Deg F	JUNT	1		Al-4		PHONE JACK	EN-AHU24		0		AHU24-5-AI-4					1	8/26	PHONE JACK	TE-6410W-1000		U2	
AI-5	AHU-24				UNT	1		AI-5			EN-AHU24		0		AHU24-5-AI-5					1						
Al-6	AHU-24				UNT	1		Al-6			EN-AHU24		0	1	AHU24-5-AI-6				1	1	1					
BI-1	AHU-24		Supply Fan Status	Off On		1		81-1		BI#,24VAC	EN-AHU24	AT UNIT	0		AHU24-5-BI-1				1		.2/22	Device dependent	Aux Contact (NO)		U70	
BI-2	AHU-24			Normal Alarm		1		BI-2		Bi#,24VAC	EN-AHU24		0		AHU24-5-BI-2		1			1	2/22	Device dependent			U70	
BI-3	AHU-24		Low Temperature Stat	Normal Alarm		1		81-3		BI#,24VAC	EN-AHU24		0		AHU24-5-BI-3						2/22		A70 (NC)		U71	
IBI-4	AHU-24		Clg Coil Pump Status	Off On		1		81-4		BI#,24VAC	EN-AHU24		0		AHU24-5-BI-4						2/22		Aux Contact (NO)		U70 I	
BO-1	AHU-24		Supply Fan Control	Off On	JUNT	1		BO-1	RLY	BO#,24V,COM	EN-AHU24		0		AHU24-5-BO-1	3/18	A,COILS,COM	RELAY-A	NO,COM	;			Starter (NO)-(sw lo		U60	
BO-2	AHU-24				UNT	1		BO-2		l	EN-AHU24		0		AHU24-5-BO-2					1				·		
BO-3	AHU-24		Outside Air Damper	Closed Open		1		BO-3		BO#,24VAC	EN-AHU24		0		AHU24-5-BO-3			V11HGA-100	1		2/18	Device dependent	24VAC OUT (sw ld	)	U51	
BO-4	AHU-24		Clg Coil Pump Control	Off On		1	5	BO-4	RLY	BO#,24V,COM	EN-AHU24		0		AHU24-5-BO-4	3/18	B,COILS,COM	RELAY-B	NO,COM	1	2/14	See starter detail	Starter (NO)-(sw lo	)	U60	
BO-5	AHU-24				IUNT	1		BO-5	1		EN-AHU24		0		IAHU24-5-BO-5		1				·		<u> </u>			
80-6	AHU-24				IUNT	1	5	BO-6			EN-AHU24		0		AHU24-5-BO-6						, ,					
AO-1	AHU-24		Heating Coil Valve	% Open	UNT	1		AO-1		AO#,AOCM,24VA			0		AHU24-5-AO-1		+,-	EP-8000-2	SUPPLY, O	1	3/18	Device dependent	0-10V OUT		U23	
AO-2	AHU-24	C-VLV	Cooling Coil Valve	% Open	JUNT	1 1	5	AO-2		AO#,AOCM,24VA	GEN-AHU24	AT UNIT	0		AHU24-5-AO-2	2/18	+	EP-8000-2	SUPPLY. O		3/18	Device dependent	0-10V OUT		U23	

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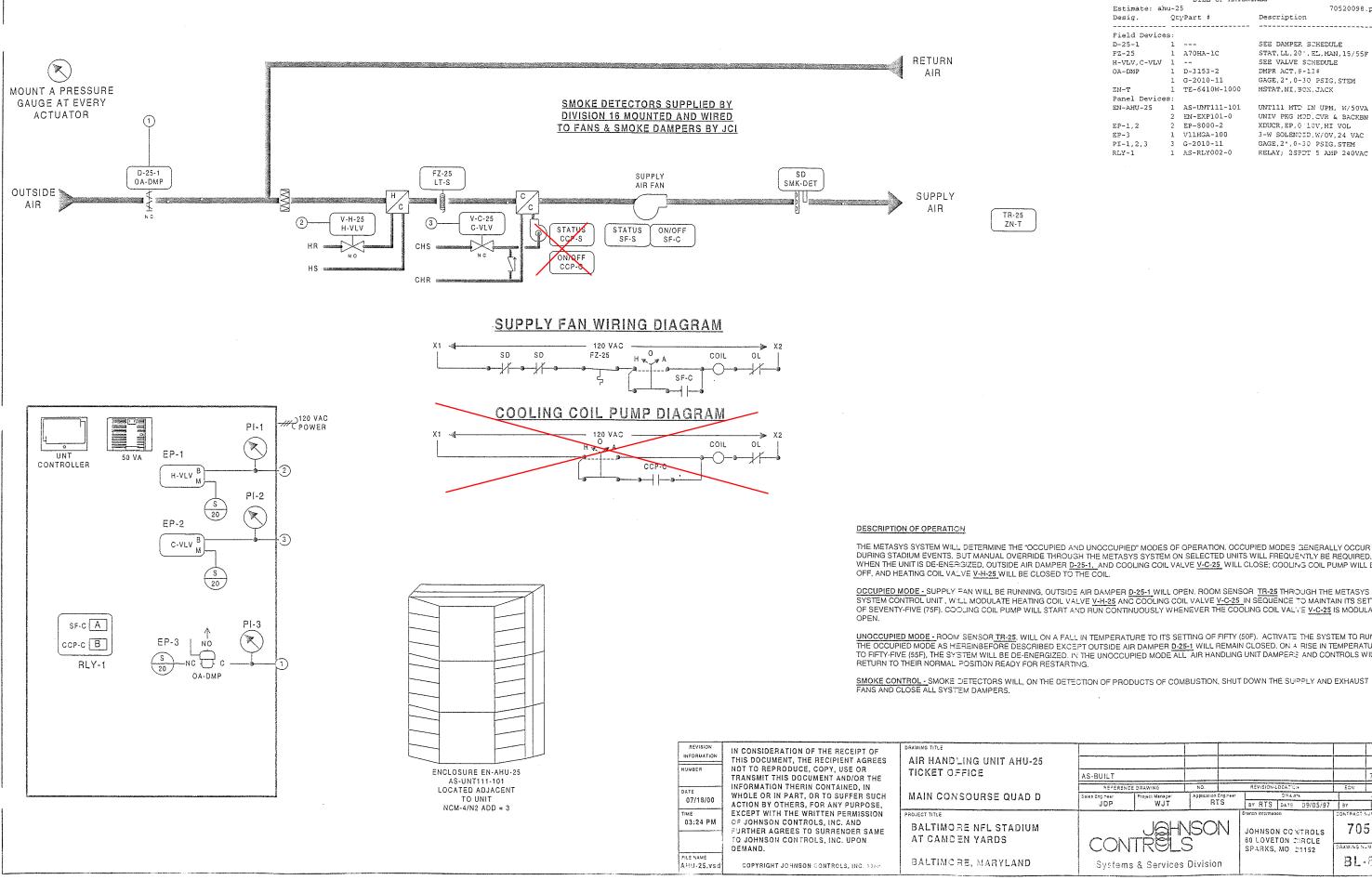
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		BILL OF MATERI	IALS
Estimate: ah	u-2	5	70520098.pre
Desig.	Qt	yPart #	Description
Field Device	s:		
D-25-1	1		SEE DAMPER SCHEDULE
FZ-25	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV,C-VLV	1		SEE VALVE SCHEDULE
OA-DMP	1	D-3153-2	DMPR ACT, 8-13≇
	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
ZN-T	1	TE-6410W-1000	MSTAT, NI, BON, JACK
Panel Device	s:		
EN-AHU-25	1	AS-UNT111-101	UNTILL MTD IN UPM, W/50VA
	2	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1,2	2	EP-8000-2	XDUCR, EP, 0 10V, HI VOL
EP-3	1	V11HGA-100	3-W SOLENCID, W/OV, 24 VAC
PI-1,2,3	3	G-2010-11	GAGE,2*,0~30 PSIG,STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS. BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AIR DAMPER <u>D-25-1</u>, AND COOLING COIL VALVE <u>V-C-25</u> WILL CLOSE; COOLING COIL PUMP WILL BE OFF, AND HEATING COIL VALVE <u>V-H-25</u> WILL BE CLOSED TO THE COIL.

OCCUPIED MODE - SUPPLY FAN WILL BE RUNNING, OUTSIDE AIR DAMPER D-25-1 WILL OPEN. ROOM SENSOR TR-25 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL MODULATE HEATING COIL VALVE V-H-25 ANC COOLING COIL VALVE V-C-25 IN SEQUENCE TO MAINTAIN ITS SETTING OF SEVENTY-FIVE (75F). CODUNG COIL PUMP WILL START AND RUN CONTINUOUSLY WHENEVER THE COOLING COIL VALVE V-C-25 IS MODULATED

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	AS-BUILT								7/18/00	CVE
	REFERENCE	DRAWING	NO.		REVISION-L	OCATIO	,	ECN	DATE	ş -
1	Sales Engineer	Project Manager	Application			DRAW	's.		APPROVED	
	JDP	WJT	R	rs	av RTS	DATE	09/05/97	BY	DATE	
A		-J <u>a</u> H	<u> </u>	Ν	JOHNSO 60 LOVE	N CO Y		CONTRACT	комвен 52-00	98
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preadsheet			Software					Digite	al Controller Info	mation		*********	Pan	el Informati	n			ł	ntermediate Dev	vice			Field	Device			
Point Type	System Name	Object Name	Expanded ID	Display	y Units	DC Type	N2 Trunk	N2 Addr	Cable Destination Bay/Terminat	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
	AHU-25					UNT						EN-AHU25													1	1	Power to Controller
1	AHU-25	•	1			UNT	1	1 3				EN-AHU25		0									1		1		N2 Trunk
AI-1	AHU-25					UNT	1		Al-1			EN-AHU25		0		AHU25-3-AI-1											
AI-2	AHU-25					UNT	1		AI-2			EN-AHU25		0		AHU25-3-Al-2											
AI-3	AHU-25				1	UNT	1		AI-3			EN-AHU25		0		AHU25-3-AI-3											
A -4	AHU-25	ZN-T	Zone Temperature	Deg	JF	UNT	1		AI-4					0		AHU25-3-AI-4						8/26	PHONE JACK	TE-6410W-1000		U2	
AI-5	AHU-25					UNT	1		IAI-5			EN-AHU25		0		AHU25-3-AI-5											
AI-6	AHU-25					UNT	1	1 3	Al-6			EN-AHU25		0		AHU25-3-AI-6							t				
BI-1	AHU-25	SF-S	Supply Fan Status	Off	On		ļ 1	1 3	81-1		BI#,24VAC	EN-AHU25		0		AHU25-3-BI-1							Device dependent			U70	
BI-2			Smoke Detectors	Normal			1		BI-2		BI#,24VAC	EN-AHU25		0		AHU25-3-BI-2						2/22	Device dependent			U70	
BI-3			Low Temperature Stat	Normal			1		BI-3		BI#,24VAC	EN-AHU25		0		AHU25-3-BI-3								A70 (NC)		U71	
BI-4			Clg Coil Pump Status		On		1		B1-4		B1#,24VAC	EN-AHU25		0		AHU25-3-BI-4					i		Device dependent			U70	
BO-1	AHU-25	ISF-C	Supply Fan Control	Off	On		1		BO-1	RLY	BO#,24V,COM	EN-AHU28		0		AHU25-3-BO-1		A,COILS,COM	RELAY-A	NO,COM	ļ	2/14	See starter detail	Starter (NO)-(sw lo)		U60	
BO-2	AHU-25					UNT			BO-2			EN-AHU25		0		AHU25-3-BO-2											
BO-3			Outside Air Damper	Closed				1 3	IBO-3 IBO-4		BO#,24VAC	EN-AHU25		0		AHU25-3-BO-3			V11HGA-100				Device dependent		-	U51	
BO-4		CCP-C	Clg Coil Pump Control	Off	On			1 3	BO-4 BO-5	HLY	BO#,24V,COM	EN-AHU25		0		AHU25-3-BO-4		B,COILS,COM	HELAY-B	NO,COM		2/14	See starter detail	Starter (NO)-(sw lo)		U60	
BO-5	AHU-25					UNT	ļ	1 3	80-5			EN-AHU25		0		AHU25-3-BO-5											
BO-6	AHU-25					UNT										AHU25-3-BO-6		1	50 0000 0		ļ	040					
AO-1 AO-2			Heating Coll Valve Cooling Coll Valve	% Or % Ot		UNT			AO-1 AO-2		AO#,AOCM,24VA					AHU25-3-AO-1 AHU25-3-AO-2			EP-8000-2 EP-8000-2	SUPPLY, O SUPPLY, O			Device dependent			U23 U23	

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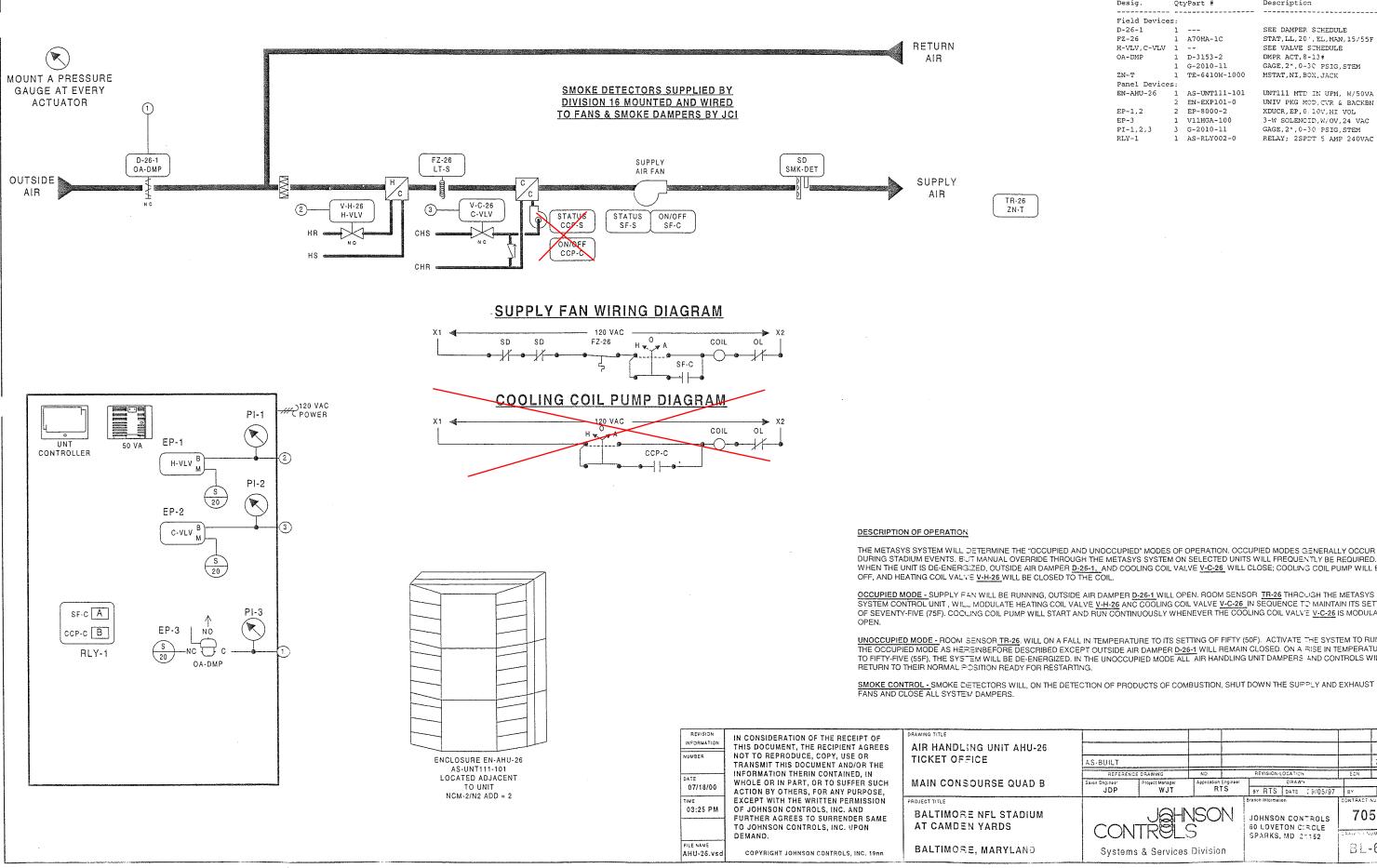
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		BILL OF MATERI	ALS
Estimate: ah	u-2	6	70520098.pre
Desig.	Qt	yPart #	Description
Field Device	s:		
D-26-1	1		SEE DAMPER SCHEDULE
FZ-26	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV,C-VLV	1	~	SEE VALVE SCHEDULE
OA-DMP	1	D-3153-2	DMPR ACT, 8-13#
	1	G-2010-11	GAGE,2*,0-30 PSIG,STEM
ZN-T	1	TE-6410W-1000	MSTAT, NI, BON, JACK
Panel Device	s:		
EN-AHU-26	1	AS-UNT111-101	UNTI11 MTD IN UPM, W/50VA
	2	EN~EXP101-0	UNIV PKG MOD, CVR & BACKEN
EP-1,2	2	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
EP-3	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2,3	3	G-2010-11	GAGE,2",0-30 PSIG,STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS. SUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT IS DE-ENERGIZED, OUTSIDE AIR DAMPER <u>D-25-1</u>, AND COOLING COIL VALVE <u>V-C-26</u> WILL CLOSE; COOLING COIL PUMP WILL BE OFF, AND HEATING COIL VALVE <u>V-H-26</u> WILL BE CLOSED TO THE COIL.

OCCUPIED MODE - SUPPLY F4N WILL BE RUNNING, OUTSIDE AIR DAMPER <u>D-26-1</u> WILL OPEN. ROOM SENSOR <u>TR-26</u> THROUGH THE METASYS SYSTEM CONTROL UNIT, WIL\_ MODULATE HEATING COIL VALVE <u>V-H-26</u> AND COOLING COIL VALVE <u>V-C-26</u> IN SEQUENCE TO MAINTAIN ITS SETTING OF SEVENTY-FIVE (75F). COOLING COIL PUMP WILL START AND RUN CONTINUOUSLY WHENEVER THE COOLING COIL VALVE <u>V-C-26</u> IS MODULATED

UNOCCUPIED MODE - ROOM SENSOR TR-26. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE OCCUPIED MODE AS HEREINBEFORE DESCRIBED EXCEPT OUTSIDE AIR DAMPER <u>D-26-1</u> WILL REMAIN CLOSED. ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F). THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL BE DE-ENERGIZED.

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Sales Enginee?	Project Manager	Application			DRAW	•		APPROVED	
JDP	WJT	RI	rs	BY RTS	DATE	: 9/05/97	BY	DATE	
				Branch Informati	on		CONTRACT	NUMBER	
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Fuli Spre	adsheet	[		Software		1		Digi	al Controller Infor	mation			Pc	inel Inform	ation				Intermediate De	vice			Fie	ld Device			
Tag	Point Type	System Name	Object Name	Expanded ID	Display Units	DC Type	N2 Trunk	k N2 Add	Cable Destination Bay/Terminal	Module Type	Termination	Panet	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/ ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
		AHU-26				UNT		1		1		EN-AHU26		1			1	1			1						Power to Controller
		AHU-26	*			UNT	1	1 2	2			EN-AHU26							1								N2 Trunk
A	41-1	AHU-26				JUNT	1		2 Al-1			EN-AHU26		(		AHU26-2-AI-1	1						1				
	AI-2	AHU-26				UNT	1		2 Al-2			EN-AHU26				AHU26-2-AI-2	1										
A	41-3	AHU-26				UNT	1		2 A1-3			EN-AHU26		(		AHU26-2-AI-3	1										
	41-4	AHU-26	ZN-T	Zone Temperature	Deg F	UNT	1 1		2 AI-4		PHONE JACK	EN-AHU26				AHU26-2-AI-4						8/26	PHONE JACK	TE-6410W-1000		U2	
	41-5	AHU-26				UNT			2 AI-5			EN-AHU26		1		AHU26-2-AI-5											
	11-6	AHU-26				UNT		1	2 AI-6			EN-AHU26				AHU26-2-AI-6	ļ					l					
	31-1	AHU-26	SF-S	Supply Fan Status	Off On			1	BI-1		BI#,24VAC	EN-AHU26		1		AHU26-2-BI-1	ļ					2/22		Aux Contact (NO)		U70	
	31-2	AHU-26	SMK-DET	Smoke Detectors	Normal Alarm			1	2 BI-2 2 BI-3		BI#,24VAC	EN-AHU26				AHU26-2-BI-2	ļ					2/22	Device dependent			U70	
	31-3	AHU-26	LT-S	Low Temperature Stat	Normal Alarm				2 BI-3 2 BI-4		BI#,24VAC	EN-AHU26				AHU26-2-BI-3	<u> </u>							A70 (NC)		U71	
	31-4			Clg Coil Pump Status	Off On				2 B0-1			EN-AHU26			1	AHU26-2-BI-4			-			2/22	Device dependent			U70	
IE	30-1		SF-C	Supply Fan Control	Off On				2 BO-1 2 BO-2	RLY	BO#,24V,COM	EN-AHU26				AHU26-2-BO-1		A,COILS,COM	RELAY-A	NO,COM		2/14	See starter detail	Starter (NO)-(sw lo)		U60	
	30-2	AHU-26				UNT			2180-2 2180-3		0010110	EN-AHU26				AHU26-2-BO-2											
	30-3			Outside Air Damper	Closed Open				2 BO-4		BO#,24VAC	EN-AHU26				AHU26-2-BO-3			V11HGA-100			2/18		24VAC OUT (sw lo)		U51	
	30-4		CCP-C	Clg Coil Pump Control	Off On	UNT			2 BO-5	HLY	BO#,24V,COM	EN-AHU26				AHU26-2-BO-4		B,COILS,COM	RELAY-B	NO,COM		2/14	See starter detail	Starter (NO)-(sw lo)		U60	
	30-5	AHU-26							2180-5 2180-6			EN-AHU26			1	AHU26-2-BO-5 AHU26-2-BO-6	· · · · ·										
1.7	30-6	AHU-26							2 AO-1		10	EN-AHU26			1												
	40-1 40-2			Heating Coil Valve	% Open				2 AO-1 2 AO-2		AO#,AOCM,24V				<u></u>	AHU26-2-AO-1		+,-	EP-8000-2	SUPPLY, O		3/18	Device dependent			U23	
1 <i>P</i>	40-2	AMU-26	10-12	Cooling Coil Valve	i % Open	UNT	1	4 4	CIAU-2	1	AO#,AOCM,24V/	AGEIN-AHU26		1 1	21	AHU26-2-AO-2	210	1+	EP-8000-2	ISUPPLY, O	1	3/18	Device dependent	10-10V OUT	1	U23	

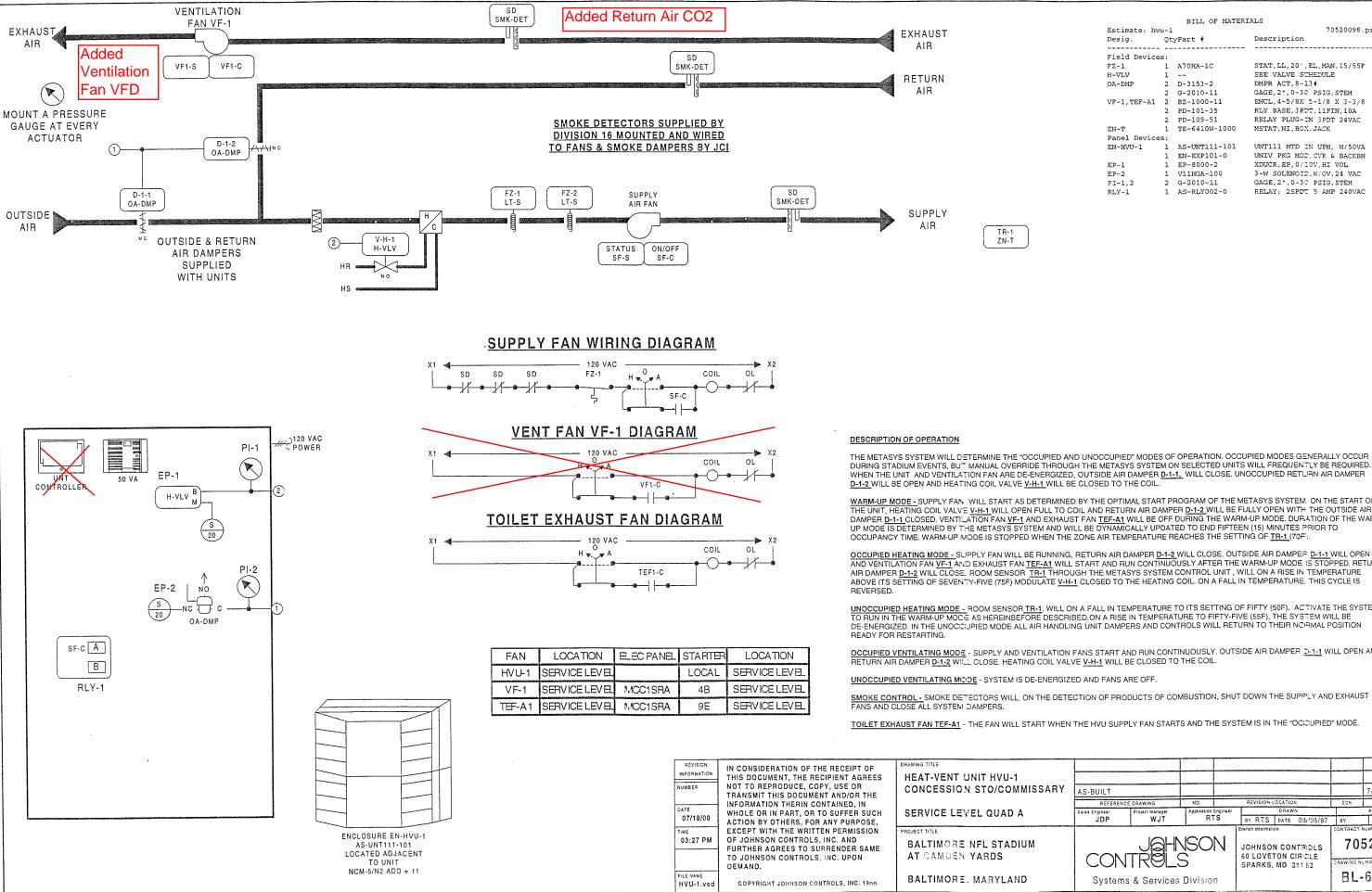
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		BILL OF MATERI	ALS
Estimate: hv	u-1		70520098.pre
Desig.	Qt	yPart #	Description
Field Device	s:		
FZ-1	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13#
	2	G-2010-11	GAGE,2*,0-30 PSIG,STEM
VF-1, TEF-A1	2	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	2	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	2	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-HVU-1	1	AS-UNT111-101	UNT111 MTD IN UPM, W/SOVA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
EP-2	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2	2	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND VENTILATION FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-1-1, WILL CLOSE. UNOCCUPIED RETURN AIR DAMPER

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COIL VALVE V-H-1 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-1-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER D-1-1 CLOSED. VENTILATION FAN VF-1 AND EXHAUST FAN TEF-A1 WILL BE OFF DURING THE WARM-UP MODE. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN THE ZONE AIR TEMPERATURE REACHES THE SETTING OF TR-1 (70F).

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER <u>D-1-2</u> WILL CLOSE, OUTSIDE AIR DAMPER <u>D-1-1</u> WILL OPEN AND VENTILATION FAN <u>VF-1</u> AND EXHAUST FAN <u>TEF-A1</u> WILL START AND RUN CONTINUOUSLY AFTER THE WARM-UP MODE IS STOPPED. RETURN AIR DAMPER <u>D-1-2</u> WILL CLOSE, ROOM SENSOR <u>TR-1</u> THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-1 CLOSED TO THE HEATING COIL. ON A FALL IN TEMPERATURE. THIS CYCLE IS

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-1. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED VENTILATING MODE - SUPPLY AND VENTILATION FANS START AND RUN CONTINUOUSLY. OUTSIDE AIR DAMPER 2-1-1 WILL OPEN AND

TOILET EXHAUST FAN TEF-A1 - THE FAN WILL START WHEN THE HVU SUPPLY FAN STARTS AND THE SYSTEM IS IN THE "OCCUPIED" MODE.

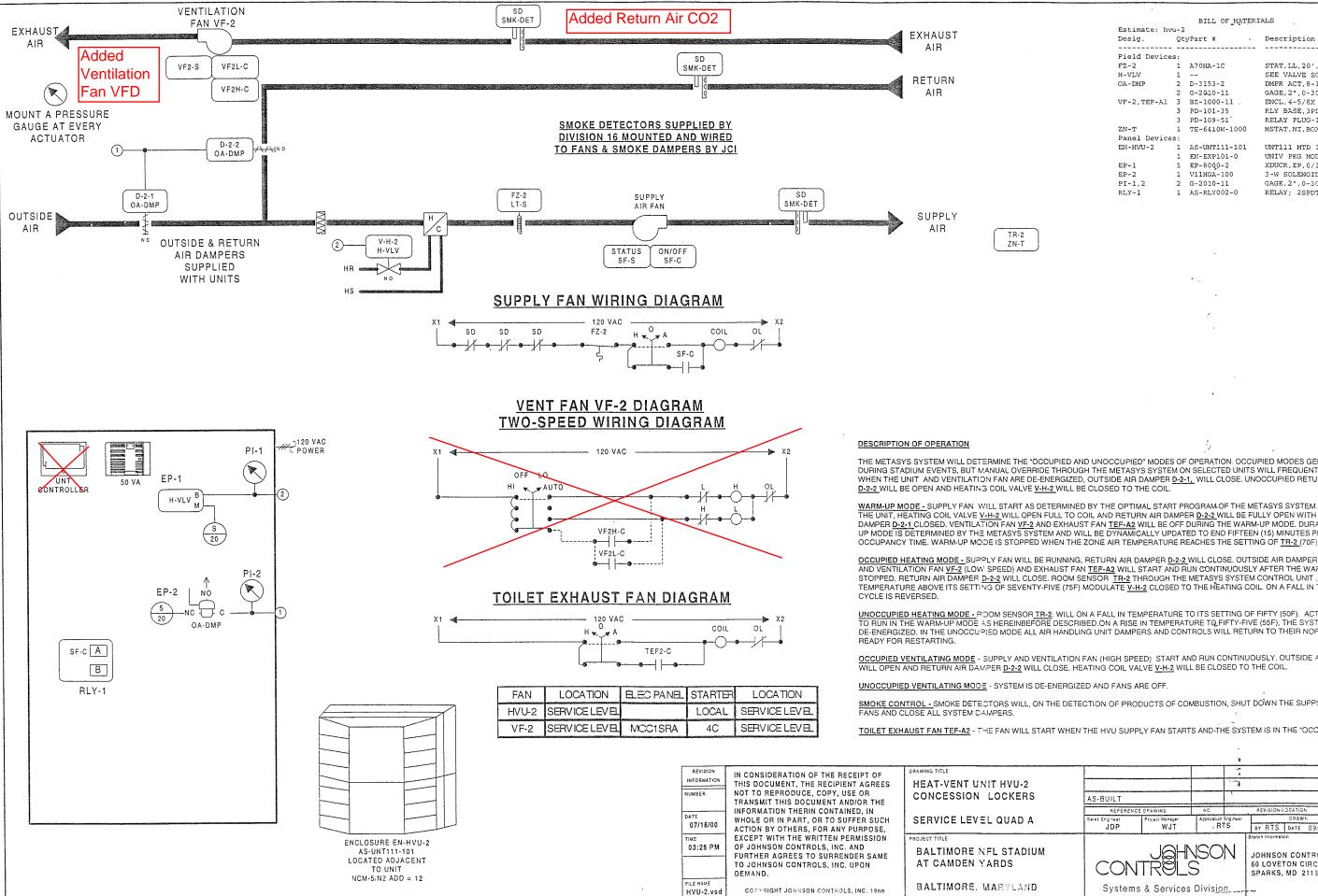
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	REFERENCE	DRAWING	NO.	1	REVISION	OCATIO		ECN	DATE	ĝγ
	Sales Engineer	Project Manager	Application			DRAW	N		APPROVED	
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ull Spr	eadsheet			Software				Digital C	ontroller Infor	nation		)	Par	nel Informati	on	1		[	Intermediate Dev	icə			Field	Device			
<u> </u>	Point Type	System Name	Object Name	Expanded ID	Display Units	DC Type	N2 Trunk N		Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/I ubing	Terminations	Device	Locafion	Ref Detail	Comment
		HVU-1				UNT						EN-HVU-1	Service Level A		M.2-01A							and the second se				16	ower to Controller
-+		HVU-1				UNT	1	11				EN-HVU-1	Service Level A	0	M.2-01A											1	12 Trunk
-+	Al-1	HVU-1				UNT	1	11 Al	-1			EN-HVU-1	Service Level A	0	M.2-01A	HVU-1-11-AI-1											
	Al-2	HVU-1				UNT	1	11 AI	-2			EN-HVU-1	Service Level A		M.2-01A	HVU-1-11-AI-2											
	Al-3	HVU-1	-			UNT	1	11 AI	-3				Service Level A		M.2-01A	HVU-1-11-AI-3											
	Al-4	HVU-1	ZN-T	Zone Temperature	Deg F	UNT	1	11 AI	-4		PHONE JACK		Service Level A		M.2-01A	HVU-1-11-AI-4						8/26	PHONE JACK	TE-6410W-1000		U2	
	AI-5	HVU-1	1			UNT	1	11 AI					Service Level A		M.2-01A	HVU-1-11-AI-5											
	AI-6	HVU-1				UNT	1	11 AI					Service Level A		M.2-01A	HVU-1-11-AI-6											
-1	B1-1	HVU-1	SF-S	Supply Fan Status	Off On	UNT	1	11 BI			BI#,24VAC		Service Level A		M.2-01A	HVU-1-11-BI-1					<u> </u>			Aux Contact (NO)		U70	
	B1-2	HVU-1	VF1-S	Vent Fan 1 Status	Off On	UNT	1	11 BI			BI#,24VAC		Service Level A		M.2-01A	HVU-1-11-BI-2						2/22		Aux Contact (NO)		U70	
	BI-3	HVU-1	SMK-DET	Smoke Detectors	Normal Alarm	n jUNT	1	11 BI			BI#,24VAC		Service Level A		M.2-01A	HVU-1-11-BI-3							Device dependent			U70	
- 1	BI-4	HVU-1	LT-S	Low Temperature Stat	Normal Alarm		1	11 BI			BI#,24VAC		Service Level A		M.2-01A	HVU-1-11-BI-4								A70 (NC)		U71	
_	BO-1	HVU-1	SF-C	Supply Fan Control	Off On		1	11 BC		1	BO#,24V,COM		Service Level A		M.2-01A	HVU-1-11-80-1		A,COILS,COM		NO,COM				Starter (NO)-(sw lo		U60	
_	BO-2	HVU-1	OA-DMP	Outside Air Damper	Closed Oper		1	11 BC			BO#,24VAC		Service Level A		M.2-01A	HVU-1-11-BO-2			V11HGA-100					24VAC OUT (sw lo		U51	
	BO-3	HVU-1	VF1-C	Vent Fan 1 Control	Off On		1	11 BC			BO#.24VAC		Service Level A		M.2-01A	HVU-1-11-BO-3			PD-109-51					24VAC OUT (sw lo		U51	
	BO-4	HVU-1	TEF1-C	Toilet Exh Fan A1 Control	Off On	UNT	1	11 B(			BO#,24VAC		Service Level A		M.2-01A	HVU-1-11-BO-4			PD-109-51			2/18	Device dependent	24VAC OUT (sw lo	)	U51	
	BO-5	HVU-1				UNT	1	11 B(		.l		1	Service Level A		M.2-01A	HVU-1-11-BO-5			<u> </u>								
	BO-6	HVU-1				UNT	1	11 B(					Service Level A		M.2-01A	HVU-1-11-BO-6					<u> </u>						
	AO-1	HVU-1	H-VLV	Heating Coil Valve	% Open	IUNT	1	11 A(			AO#,AOCM,24V		Service Level A		M.2-01A	HVU-1-11-AO-1		+,-	EP-8000-2	SUPPLY, O		3/18	Device dependent	10-10V OUT		U23	
	AO-2	HVU-1			1	UNT	1	11 A	D-2	1		EN-HVU-1	Service Level A	<u>i 0</u>	M.2-01A	HVU-1-11-AO-2			1		1			l			

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		BILL OF MATERI	ALS
Estimate: hv	u-2		70520098.pre
Desig.	Qt	yPart #	Description
Field Device			
FZ-2	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13*
	2	G-2010-11	GAGE,2°,0-30 FSIG,STEM
VF-2, TEF-Al	3	BZ-1000-11	ENCL, 4-5/8X 5-1 8 X 3-3/8
	3	PD-101-35	RLY BASE, 3PDT. LIPIN, 10A
	3	PD-109-51	RELAY PLUG-IN 3FDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOZ, JACK
Panel Device	s:		
EN-HVU-2	1	AS-UNT111-101	UNTIL1 MTD IN UPM, W/50VA
	1	EN-EXP101-0	UNIV PKG MOD, THE & BACKBN
EP-1	1.	EP-80Q0-2	XDUCR, EP, 0/107, HI VOL
EP-2	1	V11HGA-100	3-W SOLENOID, N OV, 24 VAC
PI-1,2	2	G-2010-11	GAGE, 2*, 0-30 FSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND VENTILATION FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-2-1, WILL CLOSE. UNOCCUPIED RETURN AIR DAMPER

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COLVALVE <u>V-H-2</u> WILL OPEN FULL TO COLL AND RETURN AIR DAMPER <u>D-2-2</u> WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER <u>D-2-1</u> CLOSED. VENTILATION FAN <u>VF-2</u> AND EXHAUST FAN <u>TEF-A2</u> WILL BE OFF DURING THE WARM-UP MODE. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER D-2-2 WILL CLOSE. OUTSIDE AIR DAMPER C-2-1 WILL OPEN AND VENTILATION FAN VF-2 (LOW' SPEED) AND EXHAUST FAN TEF-A2 WILL START AND RUN CONTINUOUSLY AFTER THE WARM-UP MODE IS STOPPED. RETURN AIR DAMPER D-2-2 WILL CLOSE. ROOM SENSOR TR-2 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-2 CLOSED TO THE HEATING COIL. ON A FALL IN TEMPERATURE, THIS

UNOCCUPIED HEATING MODE - POOM SENSOR TR-2, WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACT": ATE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED VENTILATING MODE - SUPPLY AND VENTILATION FAN (HIGH SPEED) START AND RUN CONTINUOUSLY. OUTSIDE AJF. DAMPER <u>D-2-1</u> WILL OPEN AND RETURN AIR DAMPER <u>D-2-2</u> WILL CLOSE. HEATING COIL VALVE <u>V-H-2</u> WILL BE CLOSED TO THE COIL.

SMOKE CONTROL - SMOKE DETECTORS WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE SUPPLY AND EXHAUST

TOILET EXHAUST FAN TEF-A2 - THE FAN WILL START WHEN THE HVU SUPPLY FAN STARTS AND THE SYSTEM IS IN THE "OCC. IPIED" MODE.

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AS-BUILT			ľ.					7/18/00	СМЕ
REPERENC	EDRAWING	NO.		REVISION	LOCATIO	ĸ	ECN	DATE	êr
Sales Engineer	Project Manager	Application			ORAW	th,		APPROVED	
JDP	WJT	. R	TS	BY RTS	DATE	09/04/97	BY	DATE	
 				Branch intermat	ion		CONTRACT	NUMBER	
CON	-JQH	λRC	N	JOHNSO 60 LOVE			70	52-00	98
	IROL	>		SPARKS			DRAWING		
1	s & Services	Divis <u>ic</u>	<u>n</u>				BL	-6559	-30
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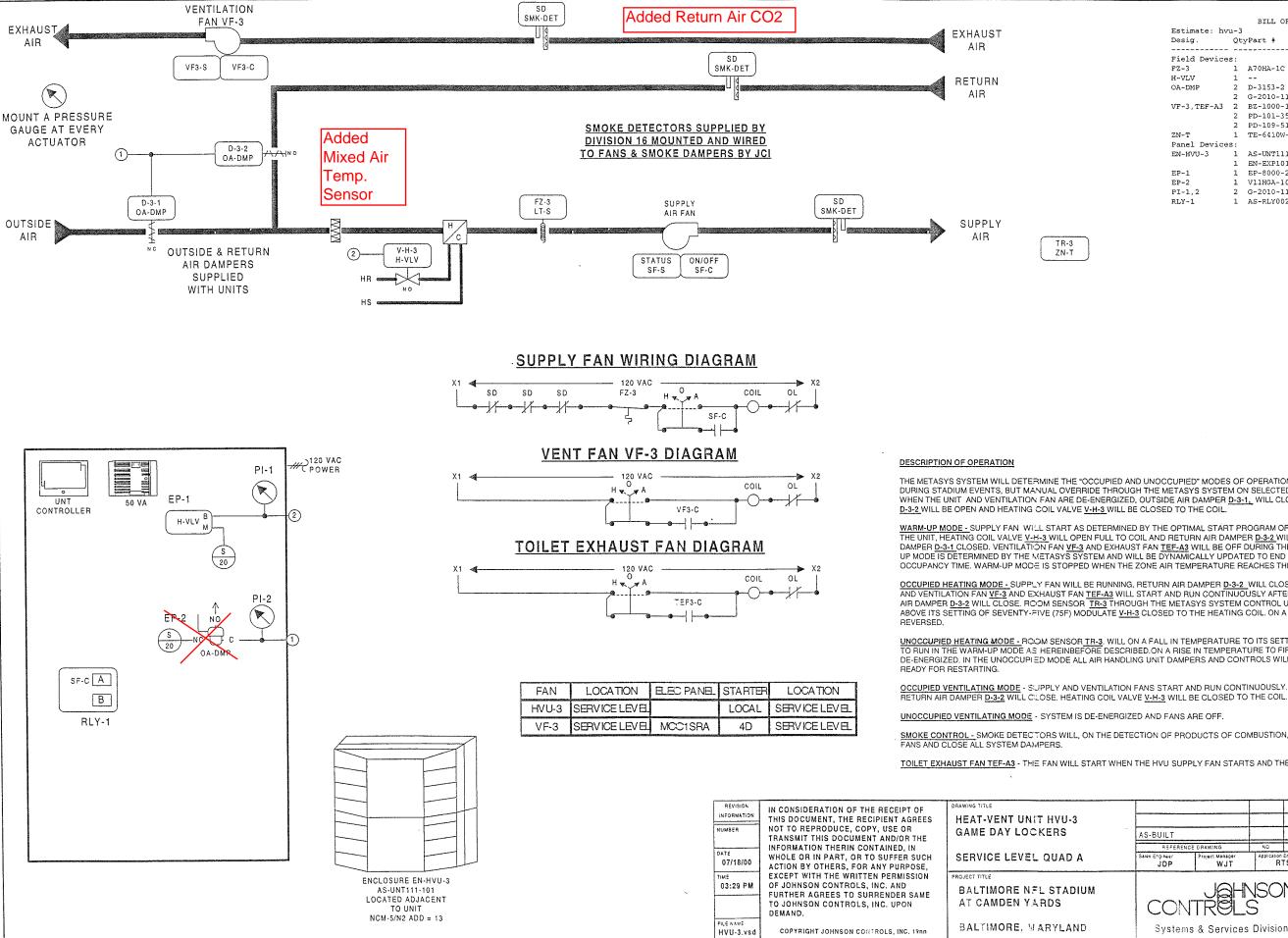
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# Baltimore NFL Stadium

I Spreadshee	et			Software		T			Digital	Controller Info	mation			Po	nel Informat	on				Intermediate Dev	сө			Field	Device			
Point Ty		System Name	Object Name	Expanded ID	Display	Units	DC Туре	N2 Trunk	N2 Addr	Cable Destination Bay/Terminal	1 ···	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location		
	: អ)	VU-2	1			ł	UNT		1			1	EN-HVU-2	Service Level A	1	M.2-01A				1	1		ĥ					Power to Controller
		VU-2			1 1	i	UNT	1	12				EN-HVU-2	Service Level A	1 0	M.2-01A						1						N2 Trunk
Al-1		VU-2			1		UNT	1	12	Al-1			EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-Al-1						l.					
Al-2		VU-2					UNT	1	12	A1-2			EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-AI-2				1		*		1			
AI-3		VU-2				1	UNT	1	12	Al-3			EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-AI-3											
AI-4		VU-2	ZN-T	Zone Temperature	Deg	FI	UNT	1	12	Al-4		PHONE JACK	EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-AI-4						8/26	PHONE JACK	TE-6410W-1000		U2	
AI-5		VU-2				2	UNT		121	AI-5		1	EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-AI-5											
AI-6		VU-2	<u> </u>			1	UNT		12	Al-6			EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-AI-6						P					
BI-1			SF-S	Supply Fan Status	Off	On i	UNT		12	BI-1		BI#,24VAC	EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-BI-1						2/22	Device dependent	Aux Contact (NO)		U70	
BI-2			VF2-S	Vent Fan 2 Status	Off	On I	UNT		12	BI-2		BI#,24VAC	EN-HVU-2	Service Level A	) 0	M.2-01A	HVU-2-12-BI-2			1	1		2/22	Device dependent	Aux Contact (NO)		U70	
B1-3			SMK-DET	Smoke Detectors	Normal				12	BI-3		BI#,24VAC	EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-BI-3				1		2/22	Device dependent			Ū70	
81-4		VU-2	IT-S	Low Temperature Stat	Normal	Alarm	UNT	-	12	BI-4		BI#,24VAC	EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-BI-4								A70 (NC)		U71	
80-1			SF-C	Supply Fan Control	Off	On	UNT		12	BO-1	RLY	BO#,24V,COM	EN-HVU-2	Service Level A	0	M.2-01A	HVU-2-12-BO-1		A,COILS,COM	RELAY-A	NO,COM				Starter (NO)-(sw I	<b>)</b>	U60	
BO-2	Гн	VU-2	OA-DMP	Outside Air Damper	Closed	Open	UNT		12	BO-2		BO#,24VAC	EN-HVU-2	Service Level A	1 0	M.2-01A	HVU-2-12-BO-2			V11HGA-100					24VAC OUT (sw )		U51	
BO-3		VU-2	VF2L-C	Vent Fan 2 Control Low	Off	On	UNT		12	BO-3		BO#,24VAC	EN-HVU-2	Service Level A		M.2-01A	HVU-2-12-BO-3			PD-109-51					24VAC OUT (sw I		U51	
BO-4		VU-2	VF2H-C	Vent Fan 2 Control High	Off	On	UNT			BO-4		BO#,24VAC		Service Level A		M.2-01A	HVU-2-12-BO-4			PD-109-51			2/18	Device dependent	24VAC OUT (sw I	o)	U51	
BO-5	ГH	VU-2					UNT		12	PO-5				Service Level A		M.2-01A	HVL1-2-12-BO-5											
BO-6		VU-2		1			UNT			BO-6				Service Level A			HVU-2-12-BO-6					· · ·	<u> </u>		1			l
AO-1			H-VLV	Heating Coil Valve	% Op	ben	UNT			AO-1		AO#,AOCM,24		Service Level A			HVU-2-12-AO-1		+,-	EP-8000-2	SUPPLY, O		3/18	Device dependent	0-10V OUT		U23	
AO-2		VU-2	1		1	1	UNT	1	1 12	AO-2			EN-HVU-2	Service Level A	1 0	M.2-01A	HVU-2-12-AO-2								1			

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		BILL OF MATERI	ALS
Estimate: hv	u-3		70520098.pre
Desig.	Qt	yPart #	Description
Field Device			
FZ-3	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13#
	2	G-2010-11	GAGE, 2", 0-30 PSIG, STEM
VF-3, TEF-A3	2	BZ-1000-11	ENCL, 4-5/8X 5-1 8 X 3-3/8
	2	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	2	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-HVU-3	1	AS-UNT111-101	UNT111 MTD IN UPM, W/50VA
	1	EN-EXP101-0	UNIV PKG MOD, CVP & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
EP-2	1	V11HGA-100	3-W SOLENOID, W. OV, 24 VAC
PI-1,2	2	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND VENTILATION FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-3-1, WILL CLOSE, UNOCCUPIED RETURN AIR DAMPER

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COLL VALVE <u>V-H-3</u> WILL OPEN FULL TO COLL AND RETURN AIR DAMPER <u>D-3-2</u> WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER <u>D-3-1</u> CLOSED. VENTILATION FAN <u>VF-3</u> AND EXHAUST FAN <u>TEF-A3</u> WILL BE OFF DURING THE WARM-UP MODE. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN THE ZONE AIR TEMPERATURE REACHES THE SETTING OF TR-3 (70F)

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER <u>D-3-2</u> WILL CLOSE. OUTSIDE AIR DAMPER <u>D-3-1</u> WILL OPEN AND VENTILATION FAN <u>VF-3</u> AND EXHAUST FAN <u>TEF-A3</u> WILL START AND RUN CONTINUOUSLY AFTER THE WARM-UP MODE IS STOPPED. RETURN AIR DAMPER <u>D-3-2</u> WILL CLOSE. ROOM SENSOR <u>TR-3</u> THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE <u>V-H-3</u> CLOSED TO THE HEATING COIL. ON A FALL IN TEMPERATURE, THIS CYCLE IS

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-3. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIV 4 TE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED VENTILATING MODE - SUPPLY AND VENTILATION FANS START AND RUN CONTINUOUSLY. OUTSIDE AIR DAMPER D-3-1 WILL OPEN AND

SMOKE CONTROL - SMOKE DETECTORS WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE SUPPLY AND EXHAUST

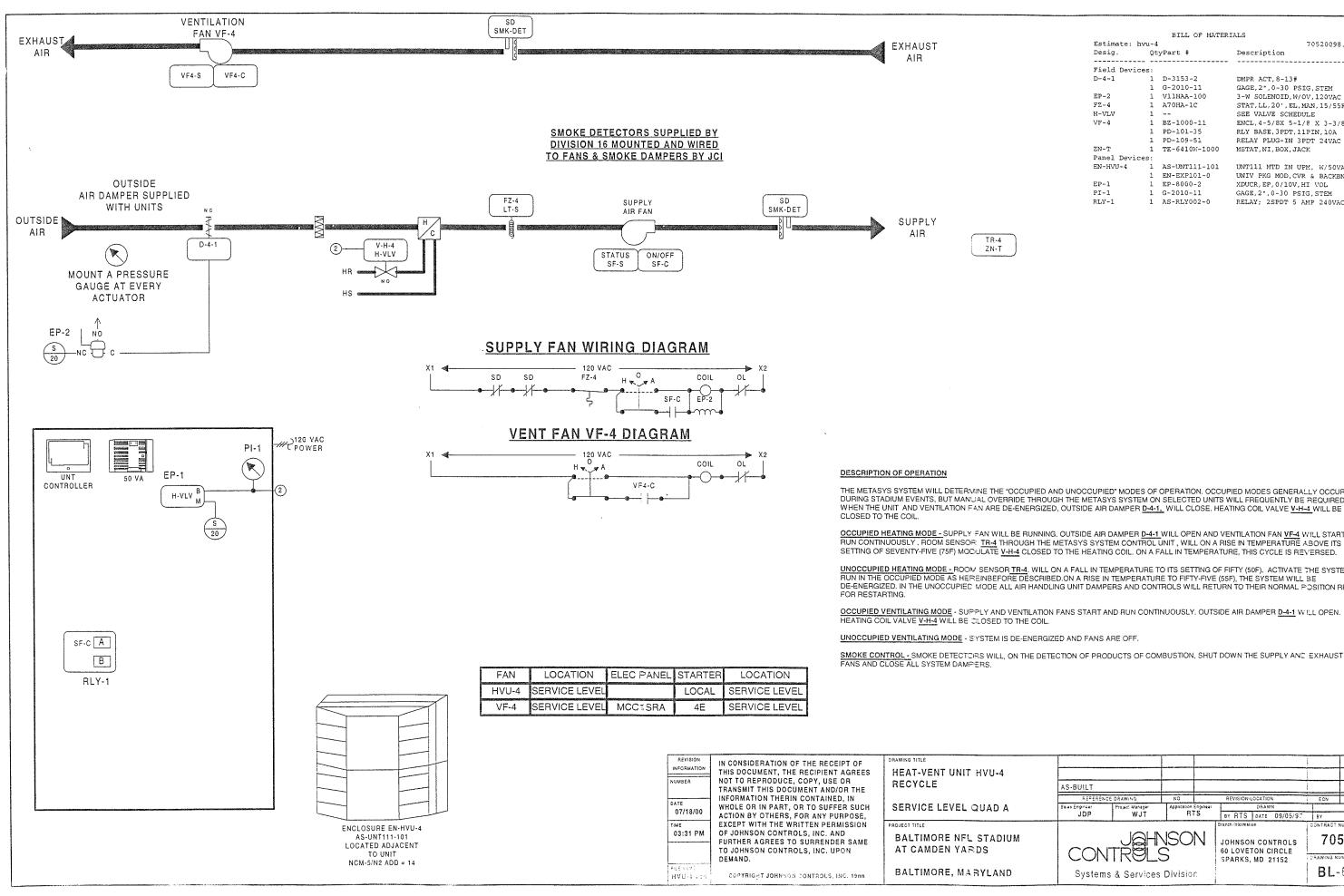
TOILET EXHAUST FAN TEF-A3 - THE FAN WILL START WHEN THE HVU SUPPLY FAN STARTS AND THE SYSTEM IS IN THE "OCCUP"IED" MODE.

 AS-BUILT						7/18/00	CME
REFERENCE	DRAWING	NO	REVISION	OCATION	ECN	DATE	Sv
Sales Engineer	Project Manager	Application Engineer		DRAWN		APPROVED	
JDP	WJT	RTS	BY RTS	DATE 09/05/127	BY	DATE	
			Branch Informati	on	CONTRACT	NUMBER	
	JAHV	ISON		N CONTROLS	70	52-00	98
CON	IROLE	)		MD 21152	CRAWING		
Systems	& Services (	Division			BL	-6559	-31

Full Sp	readsheet	<u> </u>		Software			Digital	Controller Infor	mation		l	Par	nel Informatio	n			1	ntermediate Devi	сө	Γ		Field	Device			
Tag	Point Type	System Name	Object Name	Expanded ID	Display Units	DC Type N	Trunk N2 Addr	Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	1 1	Reference Drawing	Cable Number	Wiring/T ubing	emination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Rəf Dətail	Comment
		HVU-3	1	1		UNT					EN-HVU-3	Service Level A		.2-01A						l.			1		1	Power to Controller
		HVU-3	*			UNT	1 13				EN-HVU-3	Service Level A		I.2-01A						I						N2 Trunk
	AI-1	HVU-3				UNT	1	41-1			EN-HVU-3	Service Level A			HVU-3-13-AI-1					-						
	AI-2	HVU-3				ÚNŤ	1 13					Service Level A			HVU-3-13-AI-2											
	AI-3	HVU-3	1			UNT	1 13					Service Level A			HVU-3-13-Al-3											
	Al-4	HVU-3	ZN-T	Zone Temperature	Deg F	UNT	1 13		[[	PHONE JACK		Service Level A			HVU-3-13-Al-4					e l	B/26	PHONE JACK	TE-6410W-1000		U2	
	AI-5	HVU-3				UNT	1 13					Service Level A			HVU-3-13-AI-5											
	AI-6	HVU-3				UNT	1 13					Service Level A		I.2-01A	HVU-3-13-AI-6											
	BI-1	HVU-3	SF-S	Supply Fan Status		UNT	1 13			BI#,24VAC		Service Level A		.2-01A	HVU-3-13-BI-1								Aux Contact (NO)		U70	
	BI-2	HVU-3	VF3-S	Vent Fan 3 Status		UNT	1 13	J 1 4		BI#,24VAC		Service Level A		I.2-01A	HVU-3-13-BI-2					1			tiAux Contact (NO)		U70	
	B1-3	HVU-3	SMK-DET	Smoke Detectors	Normal Alarm		1 13			BI#,24VAC		Service Level A			HVU-3-13-BI-3							Device dependent			U70	
	BI-4	HVU-3	LT-S	Low Temperature Stat	Normal Alarm		1 13			BI#,24VAC		Service Level A		1.2-01A	HVU-3-13-BI-4								A70 (NC)		U71	
	BO-1	HVU-3	SF-C	Supply Fan Control	Off On			30-1				Service Level A		1.2-01A	HVU-3-13-BO-1	3/18 A	,COILS,COM		NO,COM		2/14		Starter (NO)-(sw lo	)	U60	
	BO-2	HVU-3	OA-DMP	Outside Air Damper	Closed Open			30-2		BO#,24VAC		Service Level A		1.2-01A	HVU-3-13-BO-2			V11HGA-100					124VAC OUT (sw lo		U51	
	BO-3	HVU-3	VF3-C	Vent Fan 3 Control	Off On	UNT		30-3	1	BO#,24VAC		Service Level A		1.2-01A	HVU-3-13-BO-3			PD-109-51			2/18	Device dependent	124VAC OUT (sw lo	>	U51	
	BO-4	HVU-3	1	1		UNT		BO-4				Service Level A		1.2-01A	HVU-3-13-BO-4								1			
	BO-5	HVU-3				UNT		BO-5				Service Level A		.2-01A	HVU-3-13-BO-5				L			[	<u> </u>			
	BO-6	HVU-3		1		UNT		BO-6				Service Level A		.2-01A	HVU-3-13-BO-6											
	AO-1	HVU-3	H-VLV	Heating Coil Valve	% Open	UNT		AO-1		AO#,AOCM,24V		Service Level A		1.2-01A	HVU-3-13-AO-1	2/18 +		EP-8000-2	SUPPLY, O		3/18	Device dependent	10-10V OUT		U23	
	AO-2	HVU-3				UNT	1 13	AO-2			EN-HVU-3	Service Level A	1 0 M	1.2-01A	HVU-3-13-AO-2			1								

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		BILL OF MATERI	TALS
Estimate: hv	u-4		70520098.pre
Desig.	Qt	yPart #	Description
Field Device	s:		
D-4-1	1	D-3153-2	DMPR ACT, 8-13#
	1	G-2010-11	GAGE,2*,0-30 PSIG,STEM
EP-2	1	V11HAA-100	3-W SOLENOID, W/OV, 120VAC
FZ-4	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV	1		SEE VALVE SCHEDULE
VF-4	1	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-HVU-4	1	AS-UNT111-101	UNT111 MTD IN UPM, W/SOVA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
PI-1	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND VENTILATION FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-4-1, WILL CLOSE. HEATING COIL VALVE V-H-4 WILL BE

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING. OUTSIDE AIR DAMPER <u>D-4-1</u> WILL OPEN AND VENTILATION FAN <u>VF-4</u> WILL START AND RUN CONTINUOUSLY. ROOM SENSOF: <u>TR-4</u> THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MOCULATE V-H-4 CLOSED TO THE HEATING COIL. ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED.

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-4, WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE OCCUPIED MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION READY

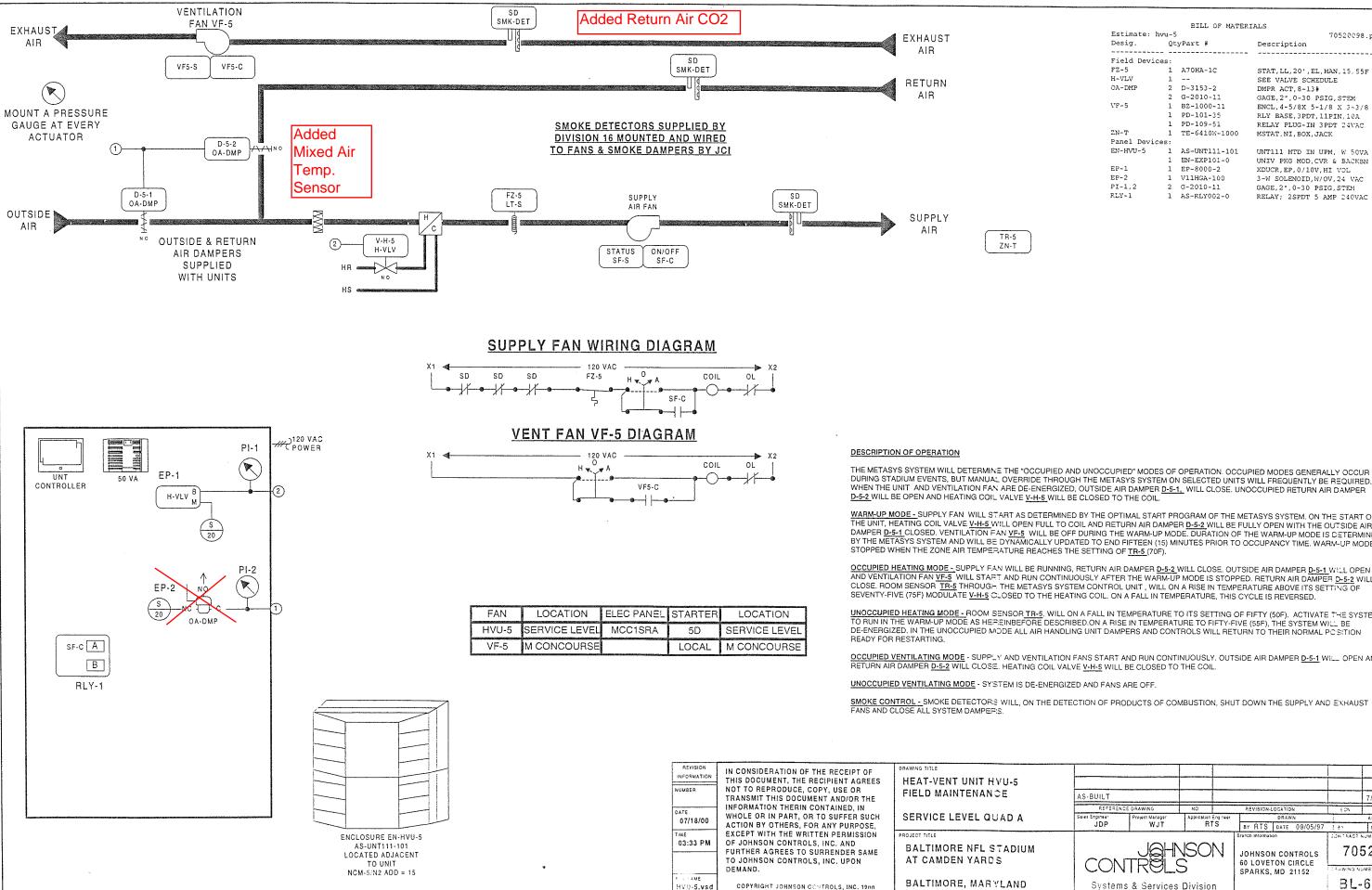
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AS-BUILT							)	7/18/00	CME
REFERENCE	DRAWING	NO		REVISION	OCATIO	N	ECN	DATE	βY
Sales Engineer	Project Manager	Application			DRAW	N		APPROVED	
JDP	WJT	R	rs	BY RTS	DATE	09/05/97	BY	DATE	
				\$ ranch informali	on		CONTRAC	T NUMBER	
CON		ĮSO	N	JOHNSOI 60 LOVET			70	52-00	98
	IROLE	>	1	SPARKS,			PRAWING	мимвея	
Systems	& Services [	Divisio	r.				BL	-6559	-32

ull Spread	dsheet			Software				Diç	ital Controller Info	mation		1	Pa	nel Informati	on	or a second s		1	ntermediate Dev	rice			Field (	Device			
og Po	oint Type	System Name	Object Name	Expanded ID	Display U	nits E	DC Type N2 Tr	unk N2 Ad	Cable dr Destination Bay/Terminal	Module Type	Termination	Panəł	Panel Location	Slat Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
	i	HVU-4				U							Service Level A		VI.2-01A					1	1	).	1		1		Power to Controller
		HVU-4	•				NT	1	14				Service Level A		M.2-01A						7						12 Trunk
AI-		HVU-4				1.7.	NT	1	14 Al-1				Service Level A		M.2-01A	HVU-4-14-Al-1					1	Ê.					
Al-	2	HVU-4				U		1	14 Al-2				Service Level A			HVU-4-14-Al-2						-					
Al-	3	HVU-4				UI	NT	1	14 Al-3				Service Level A		M.2-01A	HVU-4-14-AI-3						Ł					
Al-	4	HVU-4	ZN-T	Zone Temperature	Deg F	ប	NT	1	14 AI-4				Service Level A		M.2-01A	HVU-4-14-Al-4						8/26	PHONE JACK	TE-6410W-1000	1	U2	
Al-	5	HVU-4					NT	1	14 AI-5				Service Level A		M.2-01A	HVU-4-14-AI-5					1	l					
AI-	6	HVU-4					INT	1	14 AI-6				Service Level A		M.2-01A	HVU-4-14-AI-6						l.					
BI-		HVU-4	SF-S	Supply Fan Status	Off C			1	14 BI-1				Service Level A		M.2-01A	HVU-4-14-BI-1						2/22	Device dependent	Aux Contact (NO)		U70	
BI-		HVU-4	VF4-S	Vent Fan 4 Status		Dn Ul		1	14 BI-2		BI#.24VAC	EN-HVU-4	Service Level A		M.2-01A	HVU-4-14-BI-2		1				:2/22	Device dependent	Aux Contact (NO)		U70	
BI		HVU-4	SMK-DET	Smoke Detectors	Normal Al	arm  U	NT	1	14 81-3		BI#,24VAC	EN-HVU-4	Service Level A			HVU-4-14-8I-3						2/22	Device dependent	Contact (NO)		U70	
BI-	4	HVU-4	LT-S	Low Temperature Stat	Normal Al				14 BI-4		BI#,24VAC		Service Level A		M.2-01A	HVU-4-14-BI-4				1		2/22	NO,M1	A70 (NC)	1	U71	
BC		HVU-4	SF-C	Supply Fan Control		Dn U			14 80-1	RLY			Service Level A		M.2-01A	HVU-4-14-BO-1		A,COILS,COM	RELAY-A	NO,COM		2/14	See starter detail	Starter (NO)-(sw lo	b) (	U60	
BC	)-2	HVU-4	VF4-C	Vent Fan 4 Control	Off (	Dn U	INT		14 BO-2		BO#,24VAC		Service Level A		M.2-01A	HVU-4-14-80-2			PD-109-51			2/18	Device dependent	24VAC OUT (sw id	) (	U51	
BC	)-3	HVU-4				U			14 BO-3				Service Level A		M.2-01A	HVU-4-14-BO-3		1		1		1					
BC	)-4	HVU-4					INT		14 BO-4				Service Level A	0	M.2-01A	HVU-4-14-BO-4						ii					
BC	)-5	HVU-4					INT		14 BO-5				Service Level A		M.2-01A	HVU-4-14-BO-5						ļ					
BC	)-6	HVU-4		1		U	INT		14 BO-6				Service Level A		M.2-01A	HVU-4-14-BO-6						ł					
AC	)-1	HVU-4	H-VLV	Heating Coil Valve	% Oper	n  U	INT		14 AO-1		AO#,AOCM,24V	AEN-HVU-4	Service Level A	0:	M.2-01A	HVU-4-14-AO-1	2/18	+,-	EP-8000-2	SUPPLY, O		13/18	Device dependent	0-10V OUT	1	U23	
AC	)-2	HVU-4				U	INT	1	14 AO-2		1	EN-HVU-4	Service Level A	0	M.2-01A	HVU-4-14-AO-2						1					

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		BILL OF MATERI	ALS
Estimate: hv	u-5		70520098.pre
Desig.	Qt	yPart #	Description
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Field Device	s:		
FZ-5	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15, 55F
H-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13#
	2	G-2010-11	GAGE, 2", 0-30 PSIG, STEM
VF-5	1	B2-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-HVU-5	1	AS-UNT111-101	UNTIL1 MTD IN UPM, W.50VA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
EP-2	1	V11HGA~100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2	2	G-2010-11	GAGE, 2", 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND VENTILATION FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-5-1, WILL CLOSE, UNOCCUPIED RETURN AIR DAMPER

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COIL VALVE V-H-5 WILL OPEN FULL TO COIL AND RETURN AIR DAMPER D-5-2 WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER D-5-1 CLOSED. VENTILATION FAN VF-5 WILL BE OFF DURING THE WARM-UP MODE. DURATION OF THE WARM-UP MODE IS CETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN THE ZONE AIR TEMPERATURE REACHES THE SETTING OF <u>TR-5</u> (70F).

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER <u>D-5-2</u> WILL CLOSE. OUTSIDE AIR DAMPER <u>D-5-1</u> WILL OPEN AND VENTILATION FAN <u>VF-5</u> WILL STAFT AND RUN CONTINUOUSLY AFTER THE WARM-UP MODE IS STOPPED. RETURN AIR DAMPER <u>D-5-2</u> WILL CLOSE. ROOM SENSOR <u>TR-5</u> THROUGH: THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-5 CLOSED TO THE HEATING COIL. ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED.

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-5. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F). THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED VENTILATING MODE - SUPPLY AND VENTILATION FANS START AND RUN CONTINUOUSLY. OUTSIDE AIR DAMPER D-5-1 WILL OPEN AND

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	AS-BUILT								7/18/00	CME
	REFEREN	CE ORAWING	NO		REVISION	OCATIO	N	E DN	DATE	9 Y
	Seles Engineer	Project Manager	Application			DRAW	N	1	APPROVED	
_	JDP	WJT	RI	T S	BY RTS	DATE	09/05/97	<del>!</del> \	OATE	
					Branch Informati	<i>é</i> n		CONTRACT	NUMBER	
			λRO	Ν	JOHNSO			70	52-00	98
		IROLI	2		SPARKS,			DRAWING 1	NUMBER	
	System	s & Services	Divisio	n				BL	-6559	-33

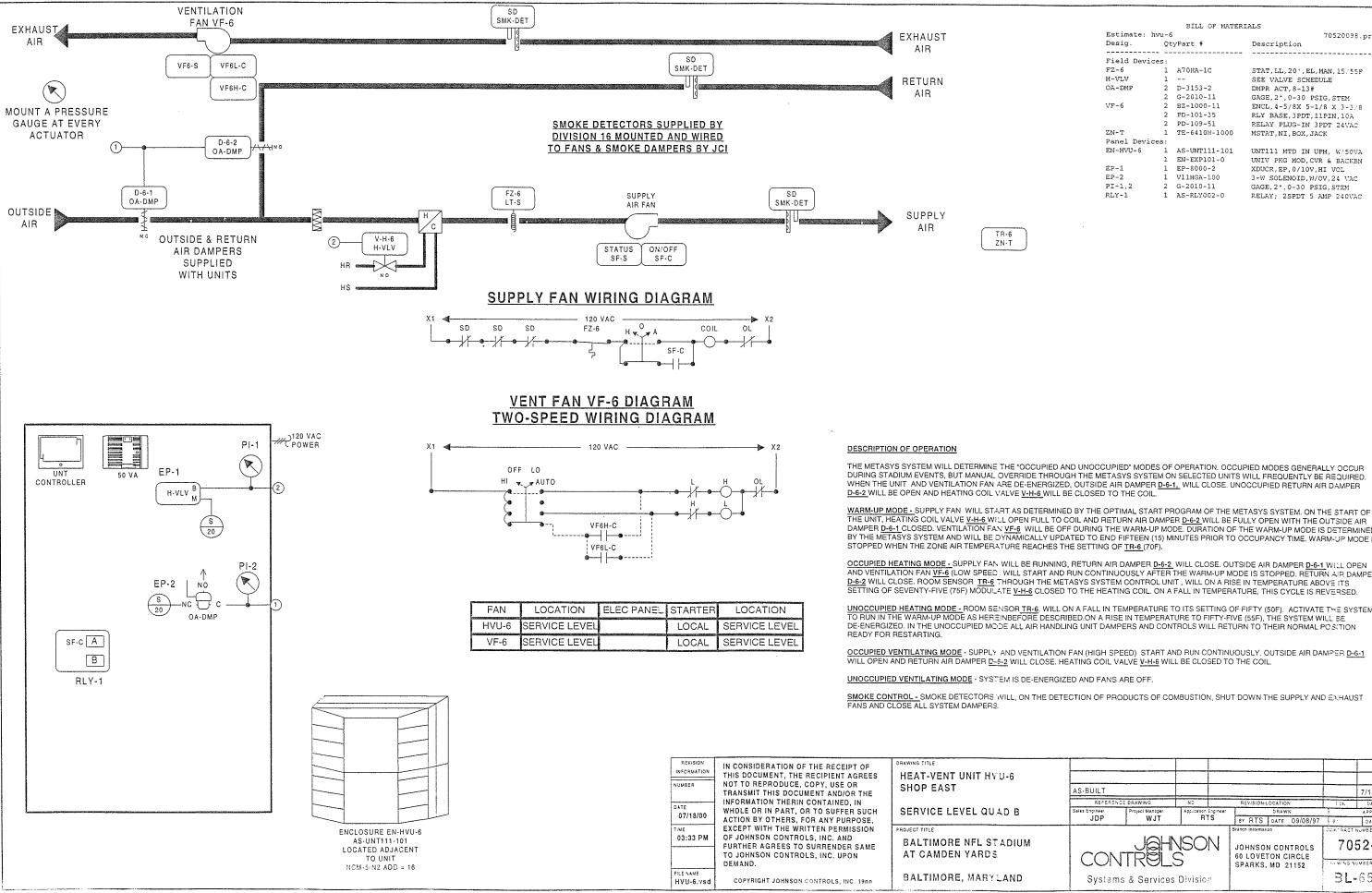
II Spreadsh	eet			Software				Digital (	Controller Infor	mation			Pc	onel Informatio	n				ntermediate Dev	ice			Field	Device		<u> </u>	
ig Point	Туре	System Name	Object Name	Expanded ID	Display Ur	nits D	OC Type N2 Trunk		Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
	UH I	IVU-5	1			UN						EN-HVU-5	Service Level A	M	1.2-01A	1			j – – – – – – – – – – – – – – – – – – –		1					1	Power to Controller
		170-5	•			UN	VT 1	15				EN-HVU-5	Service Level A	01M	1.2-01A							1				]	N2 Trunk
Al-1		IVU-5				UN	VT 1	15 A	-1			EN-HVU-5	Service Level A	0 M	1.2-01A	HVU-5-15-AI-1	~~~~~					Į.					
Al-2		10-5				UN	VT 1	15 A	-2			IEN-HVU-5	Service Level A	0 M	1.2-01A	HVU-5-15-Al-2						p					
AI-2		1VU-5				UN	VT 1	15 A	-3			EN-HVU-5	Service Level A	0 M	1.2-01A	HVU-5-15-AI-3						ž				1	
AI-4		1VU-5	7N.T	Zone Temperature	Deg F	ĬUN	IT i T	15 A	-4		PHONE JACK	EN-HVU-5	Service Level A	0 M	1.2-01A	HVU-5-15-AI-4						8/26	PHONE JACK	TE-6410W-1000	1	U2	
AI-5	11.	10-5	2.11	Zono romporante		UN	NT 1	15 A	1-5				Service Level A	0 M	1.2-01A	HVU-5-15-AI-5			· · · · · ·	1		1		1	1		
11.6		170-5				UN	VT 1	15 A	1-6			EN-HVU-5	Service Level A	0 M	1.2-01A	HVU-5-15-AI-6						1					
BI-1			SE-S	Supply Fan Status	Off C	n UN	VT 1	15 B	-1		BI#.24VAC		Service Level A		1.2-01A	HVU-5-15-BI-1		· · ·	·····			2/22	Device dependent	Aux Contact (NO)		U70	
81-2	1.		VE5-S	Vent Fan 5 Status		n Uh		15 B	1-2		BI#,24VAC	EN-HVU-5	Service Level A	01M	1.2-01A	HVU-5-15-BI-2		· · · · ·					Device dependent	Aux Contact (NO)		U70	
BI-3	11			Smoke Detectors	Normal Al			15 B	-3		BI#.24VAC		Service Level A	0 M	1.2-01A	HVU-5-15-BI-3							Device dependent	Contact (NO)		1070	
BI-4		IVU-5	UT-S	Low Temperature Stat	Normal Ala			15 8	-4		BI#.24VAC		Service Level A		1.2-01A	HVU-5-15-BI-4			h				NO.M1	A70 (NC)		U71	
BO-1			ISF-C	Supply Fan Control		n Ut		15 B	0-1	BLY	BO#,24V,COM	EN-HVU-5	Service Level A	OM	1.2-01A	HVU-5-15-BO-1	3/18	A,COILS,COM	BELAY-A	NO,COM		2/14	See starter detail	Starter (NO)-(sw lo	)	1060	
BO-2		10-5	OA-DMP	Outside Air Damper	Closed Or		VT 1	15 B	0-2	1.1=1		EN-HVU-5	Service Level A		1.2-01A	HVU-5-15-BO-2			V11HGA-100			2/18	Device dependent	24VAC OUT (sw lo	) )	U51	
80-2			VF5-C	Vent Fan 5 Control		Dn UN			0-3		BO#,24VAC		Service Level A		1.2-01A	HVU-5-15-BO-3			PD-109-51					24VAC OUT (sw lo		U51	
BO-4		1VU-5	VI 3-0	Vent I all o obliver		IUN		15 B					Service Level A		1.2-01A	HVU-5-15-BO-4		+				1		1			
BO-4		1VU-5				U			0-5	1			Service Level A		1.2-01A	HVU-5-15-BO-5		-				1	·····	1		1	
BO-6		HVU-5				U	NT 1		0-6				Service Level A		1.2-01A	HVU-5-15-BO-6						<del>     </del>					
AO-1			H-VLV	Heating Coil Valve	% Oper	<u>, iu</u>	NT 1	15 A					Service Level A		1.2-01A	HVU-5-15-AO-1		+	EP-8000-2	SUPPLY, O		3/18	Device dependent	0-10V OUT		U23	
A0-1		1VU-5	11-464	I lealing our valve	78 Oper			15 A		·			Service Level A		1.2-01A	HVU-5-15-AO-2						1	borres soportaon	+		1	

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		BILL OF MATERI	ALS
Estimate: hv	u-6		70520098.pre
Desig.	Qt	yPart #	Description
Field Device	s:		
FZ-6	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13#
	2	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
VF-6	2	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	2	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	2	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-HVU-6	1	AS-UNT111-101	UNT111 MTD IN UPM, W/SOVA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKEN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
EP-2	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2	2	G-2010-11	GAGE, 2", 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERSIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND VENTILATION FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-6-1, WILL CLOSE. UNOCCUPIED RETURN AIR DAMPER

THE UNIT, HEATING COLL VALVE <u>V-H-6</u> WILL OPEN FULL TO COLL AND RETURN AIR DAMPER <u>D-6-2</u> WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER <u>D-6-1</u> CLOSED. VENTILATION FAN <u>VF-6</u> WILL BE OFF DURING THE WARM-UP MODE. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME. WARM-UP MODE IS STOPPED WHEN THE ZONE AIR TEMPERATURE REACHES THE SETTING OF <u>TR-6</u> (70F).

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER D-6-2 WILL CLOSE. OUTSIDE AIR DAMPER D-6-1 WILL OPEN AND VENTILATION FAN <u>VF-6</u> (LOW SPEED, WILL START AND RUN CONTINUOUSLY AFTER THE WARM-UP MODE IS STOPPED. RETURN AIR DAMPER D-6-2 WILL CLOSE. ROOM SENSOR TR-6 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS TING OF SEVENTY-FIVE (75F) MODULATE V-H-6 CLOSED TO THE HEATING COLL ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED.

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-6, WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED, ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F). THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

OCCUPIED VENTILATING MODE - SUPPLY AND VENTILATION FAN (HIGH SPEED) START AND RUN CONTINUOUSLY. OUTSIDE AIR DAMPER D-6-1

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AS-BUILT			<u> </u>				7/18/00	СМЕ
REFERENCE	DRAWING	NO		REVISION-L	OCATION	E DK _	DATE	8 Y
Sales Engineer	Project Manager	Application			ORAWN	1	APPROVED	
 JDP	WJT	R	15	BY RTS	DATE 09/08/97	3.	DATE	
CON		SO	N		N CONTROLS	оситнаст 70	52-00	98
	& Services (	<b>)</b> Divisio	n	SPARKS,	MD 21152	BL	-655 <b>9</b>	-34

ull Spreadsheet	1		Software		I			Digito	at Controller Infor	nation			Pc	nel Informa	ion			1	Intermediate Dev	ce			Field	Device		ĺ	
og Point Typ	.e Name	Object Name	Expanded ID	Display	Units	DC Type	N2 Trunk	N2 Addr	Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wining/T ubing	Terminations	Device	Location	Ref Detail	Comment
	HVU-6	1		1	j.	JNT	1	<u> </u>				EN-HVU-6	Service Level B		M.2-01B							İ		1		1	ower to Controller
	HVU-6				il.	JNT	1	16					Service Level B		M.2-01B											į.	12 Trunk
Al-1	HVU-6				i.	JNT	1	16	Al-1				Service Level B		M.2-01B	HVU-6-16-Al-1											
Al-2	HVU-6					UNT	1		Al-2				Service Level B		M.2-01B	HVU-6-16-AI-2	·								l		
AI-3	HVU-6					UNT	1		AI-3				Service Level B		M.2-01B	HVU-6-16-AI-3											
AI-4	HVU-6	ZN-T	Zone Temperature	Deg		UNT	1		AI-4		PHONE JACK		Service Level B		M.2-01B	HVU-6-16-AI-4	i					8/26	PHONE JACK	TE-6410W-1000		U2	
AI-5	HVU-6					UNT	1	in the second se	AI-5				Service Level B		M.2-01B	HVU-6-16-AI-5						Į					
AI-6	HVU-6	1				UNT	1		Al-6		200		Service Level B		M.2-01B	HVU-6-16-AI-6										1/70	
BI-1	HVU-6	SF-S	Supply Fan Status		On I		1		BI-1		BI#,24VAC		Service Level B		M.2-01B	HVU-6-16-BI-1								t Aux Contact (NO)		U70	
81-2	HVU-6	VF6-S	Vent Fan 6 Status		On I		1 1		BI-2				Service Level B		M.2-018 M.2-01B	HVU-6-16-BI-2 HVU-6-16-BI-3				·				t Aux Contact (NO)		U70	
BI-3	HVU-6	SMK-DET	Smoke Detectors	Normal				16	BI-3		BI#,24VAC		Service Level B		M.2-01B	HVU-6-16-BI-4							Device dependen			U70 U71	
BI-4	HVU-6	LT-S	Low Temperature Stat	Normal				16	BO-1		BI#,24VAC		Service Level B Service Level B			HVU-6-16-BO-1		A,COILS,COM	DELAYA	NO.COM				A70 (NC) Starter (NO)-(sw lo			
BO-1	HVU-6	SF-C	Supply Fan Control		On I				BO-2				Service Level B		M.2-01B	HVU-6-16-BO-2		TA,COILS,COM	V11HGA-100	140,00M				t 24VAC OUT (sw k		1151	
BO-2	HVU-6	OA-DMP	Outside Air Damper	Closed Off	Open II				BO-3				Service Level B		M.2-01B	HVU-6-16-BO-3			PD-109-51					t 24VAC OUT (sw k		1151	
BO-3	HVU-6	VF6L-C	Vent Fan 6 Control High		On I		+		80-4				Service Level B		M.2-01B	HVU-6-16-BO-4			PD-109-51					t 24VAC OUT (sw k		1151	
BO-4 BO-5	HVU-6	VF6H-C	Vent Pan 6 Control High			UNT			BO-5				Service Level B		M.2-01B	HVU-6-16-BO-5			1 0-103-51			2/10	Device dependen	1244740 001 (34 1		001	
BO-6	HVU-6					UNT			BO-6		1		Service Level B		M.2-01B	HVU-6-16-BO-6				1		1			1		
AQ-1	HVU-6	H-VLV	Heating Coil Valve	% 00		UNT			SAO-1	1	AO# AOCM.24V		Service Level B		M.2-01B	HVU-6-16-AO-1		+.+	EP-8000-2	SUPPLY, O		3/18	Device dependen	t 0-10V OUT	1	U23	
AO-1 AO-2	HVU-6	I I V V	Interning con valve			UNT	+		AO-2				Service Level B			HVU-6-16-AQ-2				1		1		1			

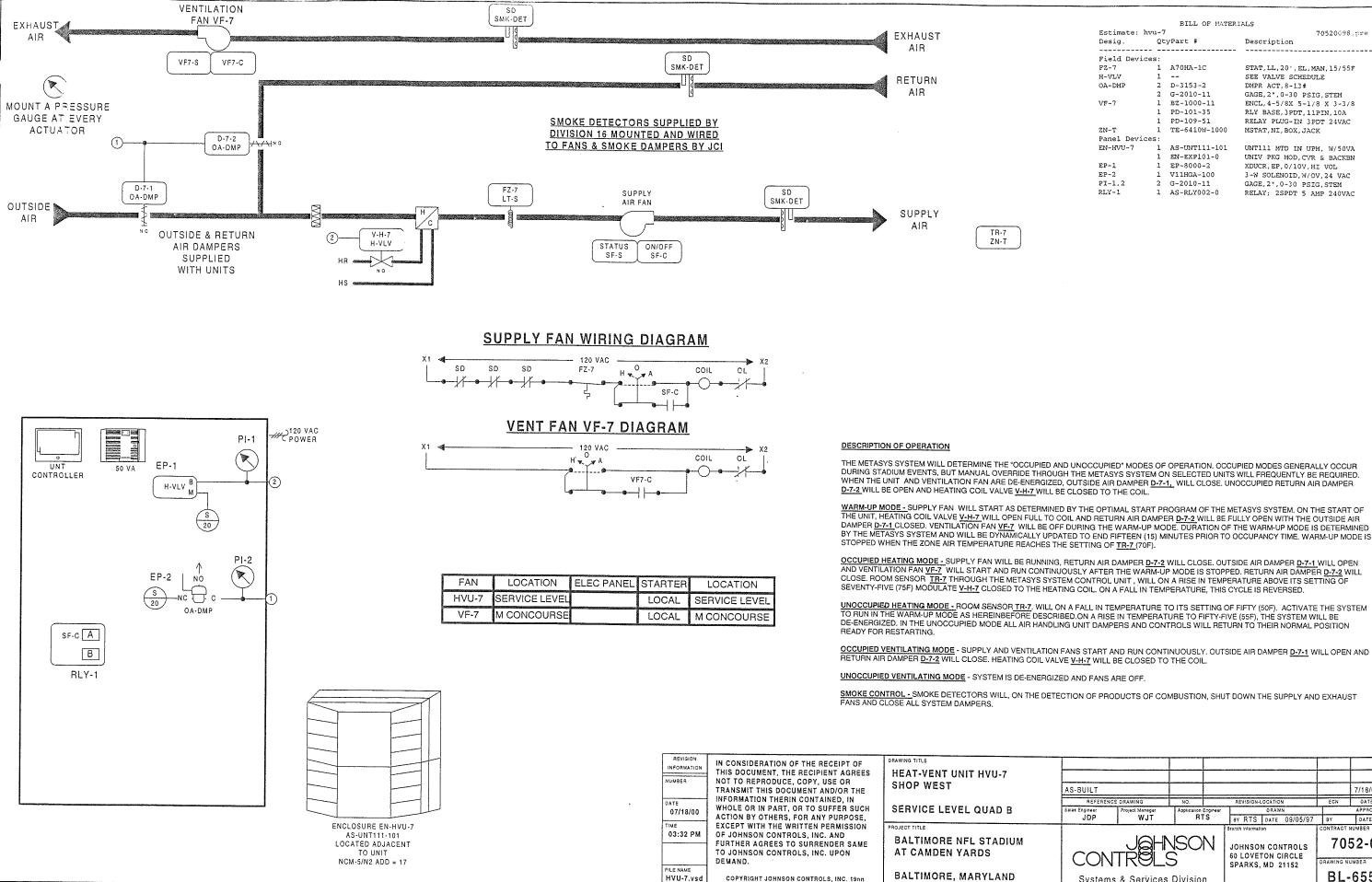
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		BILL OF MATERI	
Estimate: hv			70520098.pre
Desig.	Qt	yPart #	Description
Field Device	 		
		A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV	1		SEE VALVE SCHEDULE
OA-DMP	2	D-3153-2	DMPR ACT, 8-13#
	2	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
VF-7	1	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	1.	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-HVU-7	1	AS-UNT111-101	UNT111 MTD IN UPM, W/50VA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
EP-2	1	V11HGA-100	3-W SOLENOID, W/OV, 24 VAC
PI-1,2	2	G-2010-11	GAGE, 2", 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

WHEN THE UNIT AND VENTILATION FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-7-1, WILL CLOSE. UNOCCUPIED RETURN AIR DAMPER

WARM-UP MODE - SUPPLY FAN WILL START AS DETERMINED BY THE OPTIMAL START PROGRAM OF THE METASYS SYSTEM. ON THE START OF THE UNIT, HEATING COL VALVE <u>V-H-7</u> WILL OPEN FULL TO COLL AND RETURN AIR DAMPER <u>D-7-2</u> WILL BE FULLY OPEN WITH THE OUTSIDE AIR DAMPER <u>D-7-1</u> CLOSED. VENTILATION FAN <u>VF-7</u> WILL BE OFF DURING THE WARM-UP MODE. DURATION OF THE WARM-UP MODE IS DETERMINED BY THE METASYS SYSTEM AND WILL BE DYNAMICALLY UPDATED TO END FIFTEEN (15) MINUTES PRIOR TO OCCUPANCY TIME, WARM-UP MODE IS

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, RETURN AIR DAMPER D-7-2 WILL CLOSE. OUTSIDE AIR DAMPER D-7-1 WILL OPEN AND VENTILATION FAN VF-7 WILL START AND RUN CONTINUOUSLY AFTER THE WARM-UP MODE IS STOPPED. RETURN AIR DAMPER D-7-2 WILL CLOSE. ROOM SENSOR TR-7 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF

TO RUN IN THE WARM-UP MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION

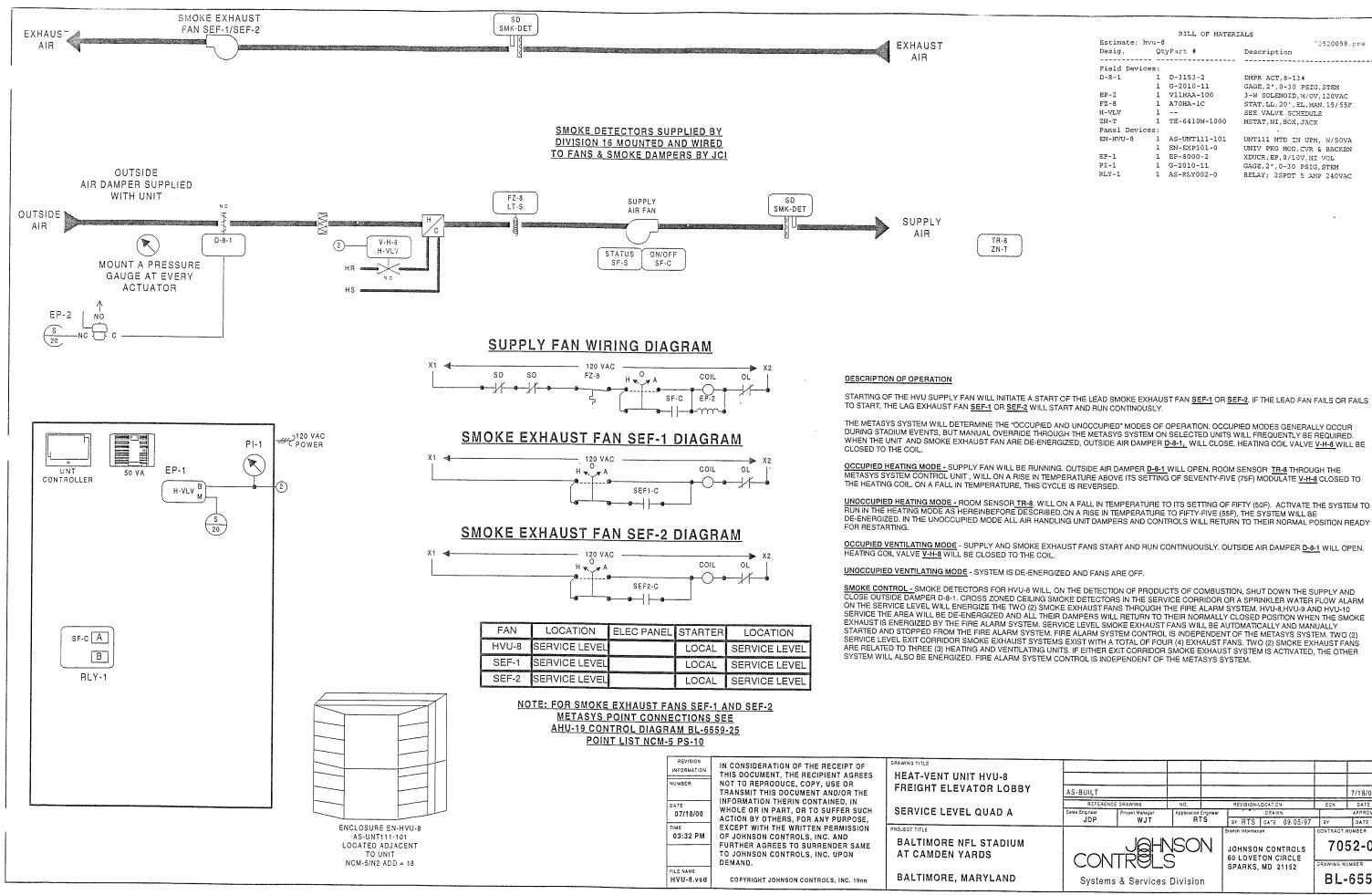
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S-BUILT										7/18/00	CME				
REFERENCE	DRAWING	NO.			REVISION-L	OCATIO	N	F	ECN	DATE	ач				
ales Engineer Project Manager		Application Engineer				ORAW	8	APPROVED							
JDP	WJT	RTS			ay RTS	DATE	09/05/97		8Y	DATE					
				Bra	anch informatio	'n		CONTRACT NUMBER							
		SO	N		JOHNSON 50 LOVET			7052-0098							
CON	IRELE	1	S	SPARKS,	MD 2	1152	DRAWING NUMBER								
Systems	& Services [					BL-6559-35									

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I Spreads	heet.	Software					Digital Controller Information				1	Pa	nel Information		1	Intermediate Device					Field		1		
Ронт	nt Type	System Name	Object Name	Expanded ID	Display Units	DC Type	N2 Trunk N2 Add	Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Refer Number Drav	ICCEUS Numb	er Wiring, ubing	Termination Ir	Device	Termination Out	Location	Wiring/T ubing		Device	Location R	əf Detail	Comment
	i }	170-7				UNT		· · · · ·			EN-HVU-7	Service Level B	M.2-01							<u>ļ                                    </u>			l		
		170-7	•			UNT	1 1	71				Service Level B	0:M.2-01							1					r to Controller
A1-*	ł	HVU-7		1		UNT	1 1	7.4-1				Service Level B	0.M.2-01		<del>, }</del>									N2 T	unk
AI-2	ji t	170-7				UNT	1 1	7.4-2				Service Level 8	01M.2-01							ļ	·				
AI-3	, H	HVU-7				UNT	1 1	7.4-3	1			Service Level 8	0 M.2-01												
A14	ł	IVU-7	ZN-T	Zone Temperature	Deg F	UNT	1 1	7 1 4				Service Level 8	0 M.2-01							1					
AI-5		HVU-7				UNT	1 1	7.4-5				Service Level B	0iM.2-011							8/26	PHONE JACK	TE-6410W-1000	U2	!	
Al-	ŀ	-IVU-7	[			UNT		7.41-6				Service Level B	0.M.2-011						<u> </u>	1					
B1-1	1 H	HVU-7	SF-S	Supply Fan Status	Off On	UNT	1 1 1	7 51-1		BI#,24VAC		Service Level B	0 M.2-01							1					
BI-2	41	170-7	VF7-S	Vent Fan 7 Status	Off On			7 5%-2		BI#,24VAC		Service Level B	0 M.2-011							2/22	Device depencian	tiAux Contact (NO)	07	0	
BI-3	IF.	170-7		Smoke Detectors	Normal Alarm			7 5%3		81#,24VAC		Service Level B					-			2/22	Device dependen	tiAux Contact (NO)	07	0	
81-4	i)-	170-7	LT-S	Low Temperature Stat	Normali Alarm			7 5:-4		BI#,24VAC		Service Level B	0 M.2-018						1		Device depencien	t Contact (NO)	U7		
BQ-1	F	IVU-7	SF-C	Supply Fan Control	Off On			7 50-1		B0#,24V,COM		Service Level B	0 M.2-018						1	2/22	NO,M1	A70 (NC)	7Ú	1	
BC-2	H	IVU-7		Outside Air Damper	Closed Open			7 90-2					0 M.2-018			A,COILS,COM		NO,COM		2/14	See starter decail	Starter (NO)-(sw lo	) Ue	0	
BC-3			VE7-C	Vent Fan 7 Control	Off On			7 50-3				Service Level B	0 M.2-018				V11HGA-100		1	2/18	Device dependien	t 24VAC OUT (sw lo	) US	1	······
BC4		1VU+7				UNT	1 1	7 5:0-4				Service Level B	0 M.2-018				PD-109-51		1	2/18	Device depencien	124VAC OUT (sw lo	) Us	1	
8C-5	L.	1VU-7				UNT		76.0-5				Service Level B	01M.2-018							1					
80-5		100-7				UNT		780-6	·			Service Level B	0 M.2-018							1		T			
AC-1			H-VI.V	Heating Coil Valve								Service Level 8	0 M.2-01					1	1	1					
AC-2		1VU-7	11-11.7	meaning Con Valve	% Open			40-1				Service Level B	0 M.2-018	HVU-7-17-AO-	-1 2/18	+,-	EP-8000-2	SUPPLY, O	1	3/18	Device dependen	tio-10V OUT	02	3	
	i:	100-7		L		UNT	1 1	1.0-2	1		EN-HVU-7	Service Level B	0/M.2-018	HVU-7-17-AO-	2				1	1				<u> </u>	



BILL OF MATERIALS Estimate: hvu-8 ~0520098.pre Desig. QtyPart # Description \_\_\_\_\_ -------Field Devices: D-8-1 D-3153-2 DMPR ACT, 8-13# G-2010-11 GAGE, 2", 0-30 PSIG, STEM EP-2 V11HAA-100 3-W SOLENOID, W/OV, 120VAC FZ-8 1 A70HA-1C STAT, LL, 20', EL, MAN, 15/55F H-VLV SEE VALVE SCHEDULE ZN-TTE-6410W-1000 MSTAT, NI, BOX, JACK Panel Devices: AS-UNT111-101 EN-HVU-8 UNTILL MTD IN HPM W/SOVA EN-EXP101-0 UNIV PKG MOD, CVR & BACKBN EP - 1EP-8000-2 XDUCR, EP, 0/10V, HI VOL PI-1 1 G-2010-11 GAGE, 2\*, 0-30 PSIG, STEM RLY-1 1 AS-RLY002-0 RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND SMOKE EXHAUST FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-8-1, WILL CLOSE. HEATING COIL VALVE V-H-8 WILL BE

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING. OUTSIDE AIR DAMPER D-8-1 WILL OPEN. ROOM SENSOR TR-8 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-8 CLOSED TO

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-8, WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE HEATING MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION READY

CLOSE OUTSIDE DAMPER D-8-1. CROSS ZONED CEILING SMOKE DETECTORS IN THE SERVICE CORRIDOR OR A SPRINKLER WATER FLOW ALARM ON THE SERVICE LEVEL WILL ENERGIZE THE TWO (2) SMOKE EXHAUST FANS THROUGH THE FIRE ALARM SYSTEM. HVU-8, HVU-9, AND HVU-10 SERVICE THE AREA WILL BE DE-ENERGIZE THE TWO (2) SWOKE EXAMPLES WILL RETURN TO THEIR NORMALLY CLOSED POSITION WHEN THE SMOKE EXHAUST IS ENERGIZED BY THE FIRE ALARM SYSTEM. SERVICE LEVEL SMOKE EXHAUST FANS WILL BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED FROM THE FIRE ALARM SYSTEM. FIRE ALARM SYSTEM CONTROL IS INDEPENDENT OF THE METASYS SYSTEM. TWO (2) SERVICE LEVEL EXIT CORRIDOR SMOKE EXHAUST SYSTEMS EXIST WITH A TOTAL OF FOUR (4) EXHAUST FANS. TWO (2) SMOKE EXHAUST FANS ARE RELATED TO THREE (3) HEATING AND VENTILATING UNITS. IF EITHER EXIT CORRIDOR SMOKE EXHAUST SYSTEM IS ACTIVATED, THE OTHER

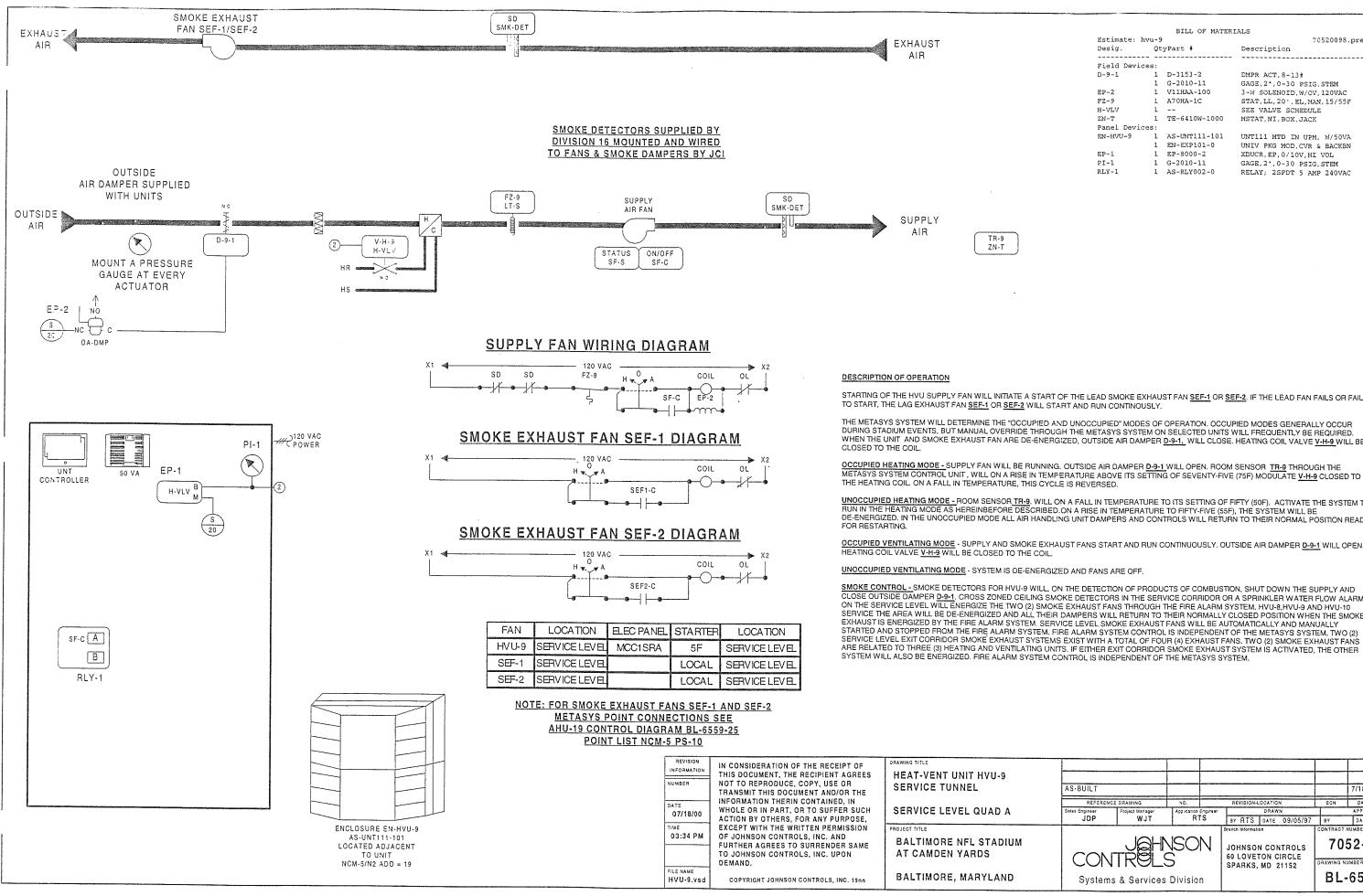
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DRAWING	NQ.		REVISION-L	OCATION	ECN	DATE	ay		
Project Manager				DRAWN	APPROVED				
WJT	I RT	S	BY RTS	DATE 09/05/97	BY DATE				
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	Project Manager WJT	Project Manager Appheation RT WJT Appheation RTRELS	Project Manager WJT Application Engineer RTS	Project Manager WJT Application Engineer WJT Application Engineer BY RTS BY RTS JOHNSON GO LOVET SPARKS,	Project Manager WJT Application Engineer WJT BY RTS DATE 09:05/97 BY RTS DATE 09:05/97 Branch Information JOHNSON CONTROLS 60 LOVETON CIRCLE SPARKS, MD 21152	Project Manager WJT Application Engineer WJT BY RTS DATE 09/05/97 BY Branch Information Project Manager Branch Information JORAWN JORAW	DRAWING NO. REVISION-LOCATION EON DATE Project Manager Application Engineer BY RTS DATE OB/05/97 BY DATE WJT RTS DATE O9/05/97 BY DATE Stanch Information CONTROLS 60 LOVETON CIRCLE SPARKS, MD 21152 DATE DATE		

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III Spreiz	risheet	Software Digita: Controller Information				Panel Information							t	ntermediate Dev	ce	1	Field	1										
, P.	cint Type	Name	Object Name	Expanded ID	Display Units	DC Type	N2 Trunk	N2 Addr Des	Cable Itination M Terminal	lodule Type	Termination	Panel	Panel I	Location	Slot Number	Reference Drawing	Cathle Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
		HVU-8	·			UNT	1					EN-HVU-8				A.2-01A					1	1	1	[				Power to Controller
		HVU-8				UNT	1	1 18		·····		EN-HVU-8			0 1	4.2-01A						1	1					N2 Trunk
A;-		HVU-8			·····	UNT	1	1 13.41-1				EN-HVU-8					HV/U-8-18-AI-1						1					
<u>, , , , , , , , , , , , , , , , , , , </u>		fining and the second second			i	UNT	1	1 18:,AI-2				EN-HVU-8					HV/U-8-18-AI-2					1						
.,د <u>:</u> .,د:		HVU-8 HVU-8	757 7			UNT	<u> </u> !	1 13.AI-3				EN-HVU-8					HV/U-8-18-AI-3					1	1	1				
,A,-		HVU-8	219-1	Zone Temperature	Deg F		<u>                                     </u>	1 13.Al-4			PHONE JACK						HV/U-8-18-AI-4					1	8/26	PHONE JACK	TE-6410W-1000		U2	
Air		HVU-8				UNT	1	1 18.AI-5				EN-HVU-8					HV/U-8-18-AI-5						1			1		
8		HVU-8	000	Current For Chatur		UNT	<u>                                     </u>	1 13.AI-6				EN-HVU-8					HV/J-8-18-Al-6											
		HVU-8	OF-O	Supply Fan Status	Off i On		1	1 13 SI-1				EN-HVU-8					HVU-8-18-BI-1					1	2/22	Device dependen	Aux Contact (NO)		U70	
		HVU-8	SMK-DET	Smoke Detectors	Normal: Alarm			1 13 BI-2				EN-HVU-8					HVIJ-8-18-8I-2					1	2/22	Device dependen	t Contact (NO)		U70	
-18		HVU-8	L1-3	Low Temperature Stat	Normal: Alarm			18 BI-3				EN-HVU-8					HVU-8-18-8I-3							NO,M1	A70 (NC)		U71	
-10-		HVU-8		10		UNT	1	1 15 BI-4				EN-HVU-8	Service L	evel A			HVU-8-18-8I-4					1				<u> </u>		
80		HVU-8	101-0	Supply Fan Control	Off On			13.30-1	HL	LY	BO#,24V,COM						HV/1-8-18-80-1		A,COILS,COM	RELAY-A	NO,COM		2/14	See starter cetail	Starter (NO)-(sw lo	0)	U60	
80		HVU-8			i	UNT		15 BO-2				EN-HVU-8					HV/U-8-18-80-2				1	1	8			1		
60	~ 3	HVU-8				UNT	1	1 15 BO-3 1 15 BO-4				EN-HVU-8					HV/U-8-18-BO-3					1	40					
-180	,4 	HVU-8				UNT						EN-HVU-8					HV:0-8-18-BO-4						1		·   ·····	1		
- 10 60		HVU-8	+				+	18 BO-5				EN-HVU-8					HVU-8-18-BO-5					1	1			1		
		HVU-8	H-VLV	Hopting Coll Value			+	13 30-6				EN-HVU-8					HV:J-8-18-BO-6					1				1		
A.C.		HVU-8	11-VLV	Heating Coil Valve		UNT	<u> </u>	13 40-1			AO#,AOCM,24V						HVIJ-8-18-AO-1		+,-	EP-8000-2	SUPPLY, O	1	3/18	Device dependen	tio-10V OUT	1	U23	
	.~~	0170-0				IUNT	1 1	1 1E AO-2			1	EN-HVU-8	Service L	evel A	010	1.2-01A	HVIJ-8-18-AO-2					1						



		BILL OF MATERI	IALS
Estimate: h	vu-9	) }	70520098.pre
Desig.	Qt	:yPart #	Description
Field Devic	 eg.		
D-9-1	1	D-3153-2	DMPR ACT, 8-13#
	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
EP-2	1	V11HAA-100	3-W SOLENOID, W/OV, 120VAC
FZ-9	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV	1		SEE VALVE SCHEDULE
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Devic	es:		
EN-HVU-9	1	AS-UNT111-101	UNTIL1 MTD IN UPM, W/SOVA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
PI-1	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

STARTING OF THE HVU SUPPLY FAN WILL INITIATE A START OF THE LEAD SMOKE EXHAUST FAN SEF-1 OR SEF-2. IF THE LEAD FAN FAILS OR FAILS

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND SMOKE EXHAUST FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER <u>D-9-1.</u> WILL CLOSE. HEATING COIL VALVE <u>V-H-9</u> WILL BE

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING. OUTSIDE AIR DAMPER <u>D-9-1</u> WILL OPEN. ROOM SENSOR <u>TR-9</u> THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE <u>V-H-9</u> CLOSED TO

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-9. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE HEATING MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION READY

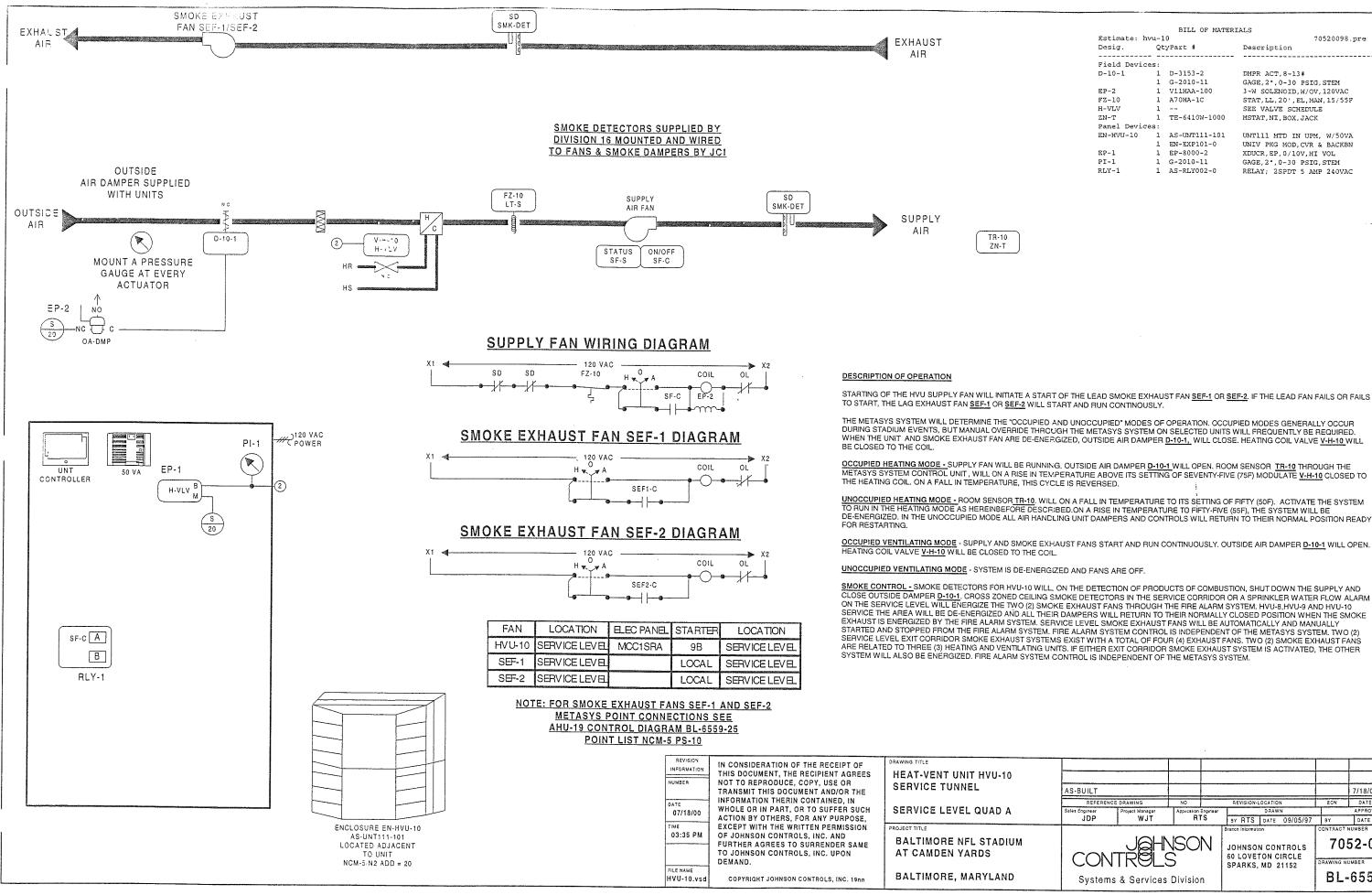
CLOSE OUTSIDE DAMPER <u>D-9-1</u>. CROSS ZONED CEILING SMOKE DETECTORION OF PRODOUTS OF CORRIDOR OF A SPRINKLER WATER FLOW ALARM ON THE SERVICE LEVEL WILL ENERGIZE THE TWO (2) SMOKE EXHAUST FANS THROUGH THE FIRE ALARM SYSTEM. HVU-8, HVU-9 AND HVU-10 SERVICE THE AREA WILL BE DE-ENERGIZED AND ALL THEIR DAMPERS WILL RETURN TO THEIR NORMALLY CLOSED POSITION WHEN THE SMOKE EXHAUST IS ENERGIZED BY THE FIRE ALARM SYSTEM. SERVICE LEVEL SMOKE EXHAUST FANS WILL BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED FROM THE FIRE ALARM SYSTEM. FIRE ALARM SYSTEM CONTROL IS INDEPENDENT OF THE METASYS SYSTEM. TWO (2) SERVICE LEVEL EXIT CORRIDOR SMOKE EXHAUST SYSTEMS EXIST WITH A TOTAL OF FOUR (4) EXHAUST FANS. TWO (2) SMOKE EXHAUST FANS ARE RELATED TO THREE (3) HEATING AND VENTILATING UNITS. IF EITHER EXIT CORRIDOR SMOKE EXHAUST SYSTEM IS ACTIVATED, THE OTHER

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ales Engineer	Project Manager	Application				DRAW	Ň		APPROVED	
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CON	IROLE	>				MD 2		DRAWING N	UMBER	
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ull Sornadsheet			Software		1		Dirgital	Controller Infor	mation			Po	nel Informa	tion				Intermediate Dev	rice		1	Field	Device			
ag Point Type	System Name	Object Name	Expanded ID	Display Units	DC Type	N2 Trunk	N2 Acter	Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminications	Device	Location	Ref Detail	Comment
	HVU-9		1	1	UNT		1				EN-HVU-9	Service Level A	- terrestanting	M.2-01A	· · · · · · · · · · · · · · · · · · ·			1	i	i	1					Power to Controller
	HVU-9				UNT	1	191				EN-HVU-9	Service Level A	0	M.2-01A	:					1	1					N2 Trunk
,Al-1	HVU-9				UNT	1	19iA	J-1			EN-HVU-9	Service Level A	0	M.2-01A	HVU-9-19-AI-1					· · · · ·						
.4i-2	HVU-9	_			IUNT	1	19 A	1-2			EN-HVU-9	Service Level A	0	M.2-01A	HVU-9-19-AI-2					1	1					
.41-3	HVU-9				UNT	1	19iA	1-3			EN-HVU-9	Service Level A	0	M.2-01A	HVU-9-19-AI-3					1	1					
.4.1-4	HVU-9	ZN-T	Zone Temperature	Deg F	UNT	1	191A	1-4		PHONE JACK	EN-HVU-9	Service Level A	0	M.2-01A	-VU-9-19-AI-4			1			8/26	PHONE ACK	TE-6410W-1000		U2	
.41-5	HVU-9	_			UNT	1	191A	I-5			EN-HVU-9	Service Level A	0	M.2-01A						1	1		1			
.41-6	HVU-9			1	UNT	1	191A	1-6			EN-HVU-9	Service Level A	0	M.2-01A	~VU-9-19-AI-6			1								
51-1	HVU-9	SF-S	Supply Fan Status	Off On	UNT	1	191B	1-1		BI#,24VAC	EN-HVU-9	Service Level A	0	M.2-01A	HVU-9-19-BI-1						2/22	Device cecenden	Aux Contact (NO)		U70	
·SI-2	HVU-9	SMK-DET	Smoke Detectors	Normal: Alarm	UNT	1	1918	1-2		BI#,24VAC	EN-HVU-9	Service Level A	0	M.2-01A	-VU-9-19-BI-2					1		Device cependent			U70	
31-3	HVU-9	LT-S	Low Temperature Stat	Normal Alarm	UNT	1	19 B					Service Level A	0	M.2-01A	HVU-9-19-BI-3		1			1			A70 (NC)		U71	
-BI-4	HVU-9	<u></u>			UNT	1	:9iB				EN-HVU-9	Service Level A	0	M.2-01A	WU-9-19-BI-4		1		1	1	1					
BO-1	HVU-9	SF-C	Supply Fan Control	Off On	UNT	1	1918	0-1	RLY	BO#,24V,COM	EN-HVU-9	Service Level A	0	M.2-01A	HVU-9-19-BO-1	3/18	A,COILS,COM	RELAY-A	NO,COM	1	2/14	See starter detail	Starter (NO)-(sw lo	)	U60	
30-2	HVU-9				UNT	1	19 <sup>1</sup> 8					Service Level A	0	M.2-01A	-VU-9-19-BO-2								1	, 		
30-3	HVU-9				UNT	1	1918	0-3				Service Level A	0	M.2-01A				1		î	1		1			
BO-4	HVU-9		-		UNT	1	~ 9 B					Service Level A	0	M.2-01A	-VU-9-19-BO-4			1		1			1			
30-5	HVU-9				UNT	1	~9 B					Service Level A	0	M.2-01A	HVU-9-19-BO-5					1			1			
BO-6	HVU-9				UNT	1	79:B					Service Level A	0	M.2-01A					1		1					
AO-1		H-VLV	Heating Coil Valve	% Open	UNT	1	"9:A					Service Level A	0	M.2-01A		2/18	+,-	EP-8000-2	SUPPLY, O	1	3/18	Device cependent	0-10V OUT		U23	
40-2	HVU-9				UNT	1 1	1 "ĐIA	0-2	1		IEN-HVU-9	Service Level A	0	M.2-01A	-'VU-9-19-AO-2			1			1		1		i	



Estimate: h	un_1	BILL OF MATER	IALS 70520098.pre
Desig.		-	Description
Field Devic	es:		
D-10-1	1	D-3153-2	DMPR ACT, 8-13#
	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
EP-2	1	VI1HAA-100	3-W SOLENOID, W/OV, 120VAC
FZ-10	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV	1		SEE VALVE SCHEDULE
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Devic	es:		
EN-HVU-10	1	AS-UNT111-101	UNTILL MTD IN UPM, W/SOVA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
PI-1	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

STARTING OF THE HVU SUPPLY FAN WILL INITIATE A START OF THE LEAD SMOKE EXHAUST FAN SEF-1 OR SEF-2. IF THE LEAD FAN FAILS OR FAILS

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION, OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THRCUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND SMOKE EXHAUST FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER <u>D-10-1</u>, WILL CLOSE. HEATING COIL VALVE <u>V-H-10</u> WILL DE CLOSED TO THE COIL

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING. OUTSIDE AIR DAMPER D-10-1 WILL OPEN. ROOM SENSOR TR-10 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-10 CLOSED TO

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-10. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE HEATING MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION READY

SMOKE CONTROL - SMOKE DETECTORS FOR HVU-10 WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE SUPPLY AND CLOSE OUTSIDE DAMPER D-10-1. CROSS ZONED CEILING SMOKE DETECTORS IN THE SERVICE CORRIDOR OR A SPRINKLER WATER FLOW ALARM ON THE SERVICE LEVEL WILL ENERGIZE THE TWO (2) SMCKE EXHAUST FANS THROUGH THE FIRE ALARM SYSTEM. HVU-8, HVU-9 AND HVU-10 SERVICE THE AREA WILL BE DE-ENERGIZED AND ALL THEIR DAMPERS WILL RETURN TO THEIR NORMALLY CLOSED POSITION WHEN THE SMOKE EXHAUST IS ENERGIZED BY THE FIRE ALARM SYSTEM. SERVICE LEVEL SMOKE EXHAUST FANS WILL BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED FROM THE FIRE ALARM SYSTEM. FIRE ALARM SYSTEM CONTROL IS INDEPENDENT OF THE METASYS SYSTEM. TWO (2) SERVICE LEVEL EXIT CORRIDOR SMOKE EXHAUST SYSTEMS EXIST WITH A TOTAL OF FOUR (4) EXHAUST FANS, TWO (2) SMOKE EXHAUST FANS ARE RELATED TO THREE (3) HEATING AND VENTILATING UNITS. IF EITHER EXIT CORRIDOR SMOKE EXHAUST SYSTEM IS ACTIVATED, THE OTHER

AS-BUILT									7/18/00	CME
REFERENCE	DRAWING	NO		P	EVISION-L	OCATIO	N	ECN	DATE	BY
Sales Engineer	Project Manager	Application				DRAW	N		APPROVED	
JDP	WJT	R1	rs	5	Y RITS	DATE	09/05/97	8Y	DATE	
			1	Bran	on informatio	n		CONTRACT	NUMBER	
	-JQHN	SO	N		HNSON		TROLS	70	52-00	98
CON	TRELS	>			ARKS.			DRAWING N	UMBER	
Systems	& Services (	Divisio	n					BL	-6559	-38

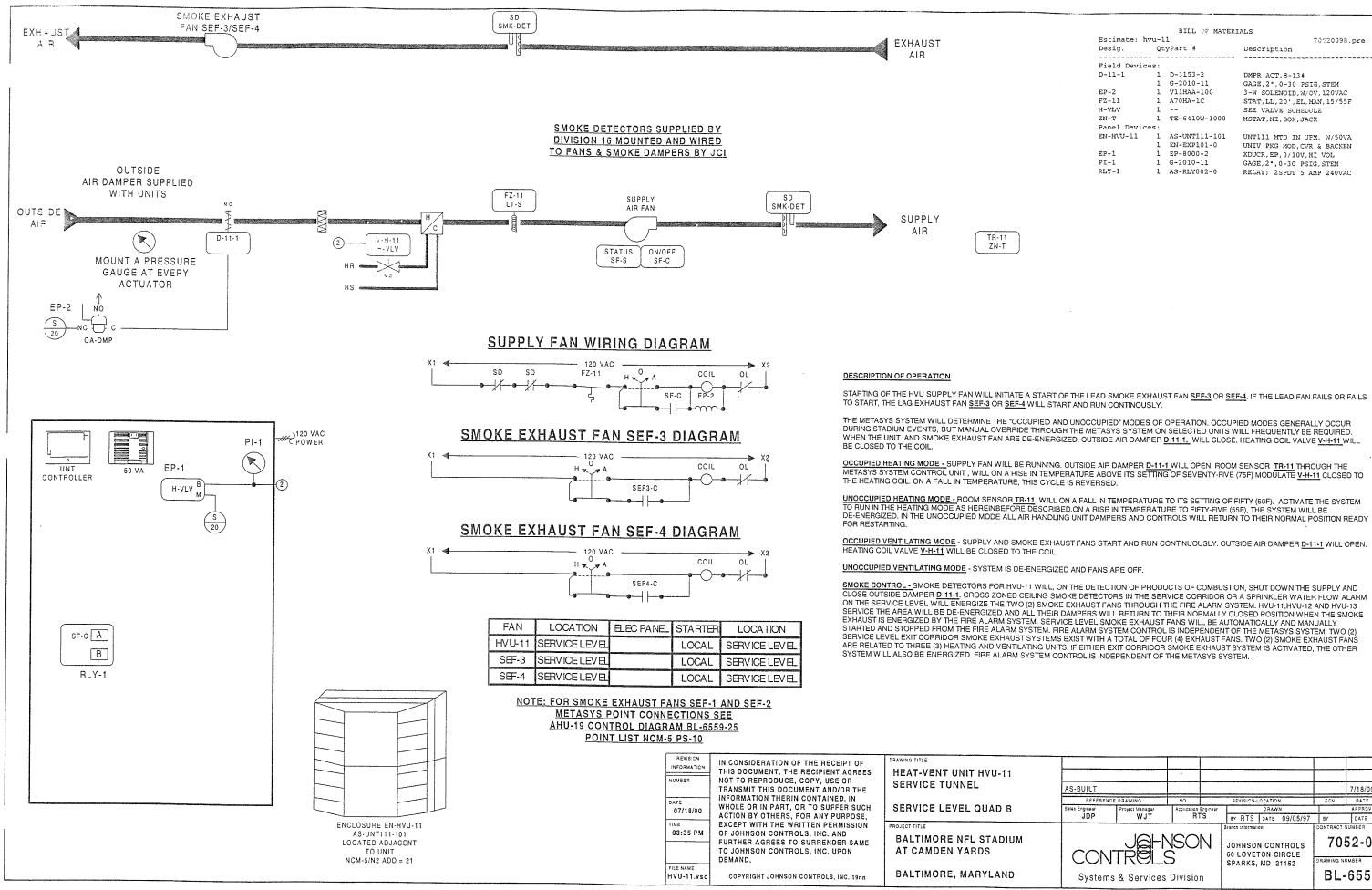
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Spreadsheet		-	Software		-	Digito	l Controller Info	malion		Pa	nel Information	m			łı	ntermediate Devi	CƏ		1	Field	Device	1		
Point Typ	System Name	Object Name	Expanded ID	Display Uni	ts DC1	ype N2 Trunk N2 4dr	Cable Destination Bay/Terminal	Module Type Termination	Panel	Panel Location	1 1	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Training and the second second second second second second second second second second second second second se	Location Re	f Dətail	Comment
	HVU-10			1	IUNT		- odyrenning		EN-HVLH	0  Service Level A		1.2-01A	<u></u>		ļ	******								
	HVU-10	•			TUNT	1 20		+		0 Service Level A		1.2-01A							1				Pow	ver to Controller
AI-1	HVU-10				UNT	1 20	Al-1			0 Service Level A									1				N2 -	Trunk
AI-2	HVU-10				UNT		Al-2					1.2-01A	HVU10-20-AI-1											
AI-3	HVU-10				UNT		Al-3			0 Service Level A		1.2-01A	HVU10-20-AI-2						1					
AI-4	HVU-10	ZN-T	Zone Temperature	Deg E	UNT		Al-4	PHONE MOR	EN-RVUI	0 Service Level A		1.2-01A	HVU10-20-AI-3						1					······
AI-5	HVU-10		zono remperatore	Degi	LINT		Al-5	PHONE JACK		0 Service Level A		1.2-01A	HVU10-20-AI-4						8/26	PHONE JACK	TE-6410W-1000	U2		······································
AI-6	HVU-10	<u> </u>			UNT		AI-5 AI-6			0 Service Level A		1.2-01A	HVU10-20-AI-5								[·····			
BI-1	HVU-10	SE-S	Supply Fan Status	Off Or	UNT		BI-1	BI#.24VAC		0 Service Level A		1.2-01A	HVU10-20-AI-6						1					
BI-2	HVU-10	SMK-DET	Smoke Detectors	Normall Alar			BI-2			0 Service Level A		1.2-01A	HVU10-20-BI-1						12/22	Device dependent	Aux Contact (NO)	U70		
BI-3	HVU-10	-	Low Temperature Stat	Normal Alar				BI#.24VAC		0 Service Level A			HVU10-20-BI-2					1		Device dependent		U70		
81-4	HVU-10		cow remperature stat	INOITIAL AIA	UNT		81-3	BI#,24VAC		0 Service Level A		1.2-01A	HVU10-20-BI-3					1			A70 (NC)	U7		
BQ-1		SF-C	Supply Fan Control		10.11		BI-4			0 Service Level A			HVU10-20-BI-4					1	1					
80-2	HVU-10	101-0	Supply Pan Control		UNT		80-1	HLY BO#,24V,COM		0 Service Level A		I.2-01A	HVU10-20-BO-1		A,COILS,COM	RELAY-A	NO,COM		2/14	See starter detail	Starter (NO)-(sw lo	UGO	2	
BO-3	HVU-10				UNT		BO-2			0 Service Level A		1.2-01A	HVU10-20-80-2					1					·	
BO-3 BO-4	HVU-10				UNT		BO-3			0 Service Level A		I.2-01A	HVU10-20-BO-3			~~~~	}		1					••
BO-4 BO-5							BO-4			0 Service Level A	0 M.	1.2-01A	HVU10-20-80-4						+					
BO-6	HVU-10	<u> </u>			UNT		80-5			0 Service Level A	0 M.	1.2-01A	HVU10-20-80-5				1	1						
AO-1		-			UNT		80-6		EN-HVU1	0 Service Level A	0 M.	I.2-01A	HVU10-20-80-6						1					
AO-1 AO-2		H-VLV	Heating Coil Valve	% Open	UNT		AO-1			0 Service Level A	0 M.	1.2-01A	HVU10-20-AO-11	2/18	+	EP-8000-2	SUPPLY, O	1	3/18	Device clebendent				
AU-2	HVU-10	1			UNT	1 20	AO-2		IEN-HVU1	0 Service Level A	0 M		HVU10-20-AO-2						1010	movine meneodent	0-100 001	U23	<u>,</u>	



		BILL OF MATERI	IALS
Estimate: hu	ru-1	.1	70520098.pre
Desig.	Qt	yPart #	Description
Field Device	s:		
D-11-1	1	D-3153-2	DMPR ACT, 8-13#
	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
EP-2	1	V11HAA-100	3-W SOLENOID, W/OV, 120VAC
FZ-11	l	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-ATA	1		SEE VALVE SCHEDULE
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Device	s:		
EN-HVU-11	1	AS-UNT111-101	UNT111 MTD IN UPM, W/50VA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
PI-1	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

WHEN THE UNIT AND SMOKE EXHAUST FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-11-1, WILL CLOSE. HEATING COIL VALVE V-H-11 WILL

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING. OUTSIDE AIR DAMPER D-11-1 WILL OPEN. ROOM SENSOR TR-11 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-11 CLOSED TO THE HEATING COLL ON A FALL IN TEMPERATURE, THIS CYCLE IS REVERSED.

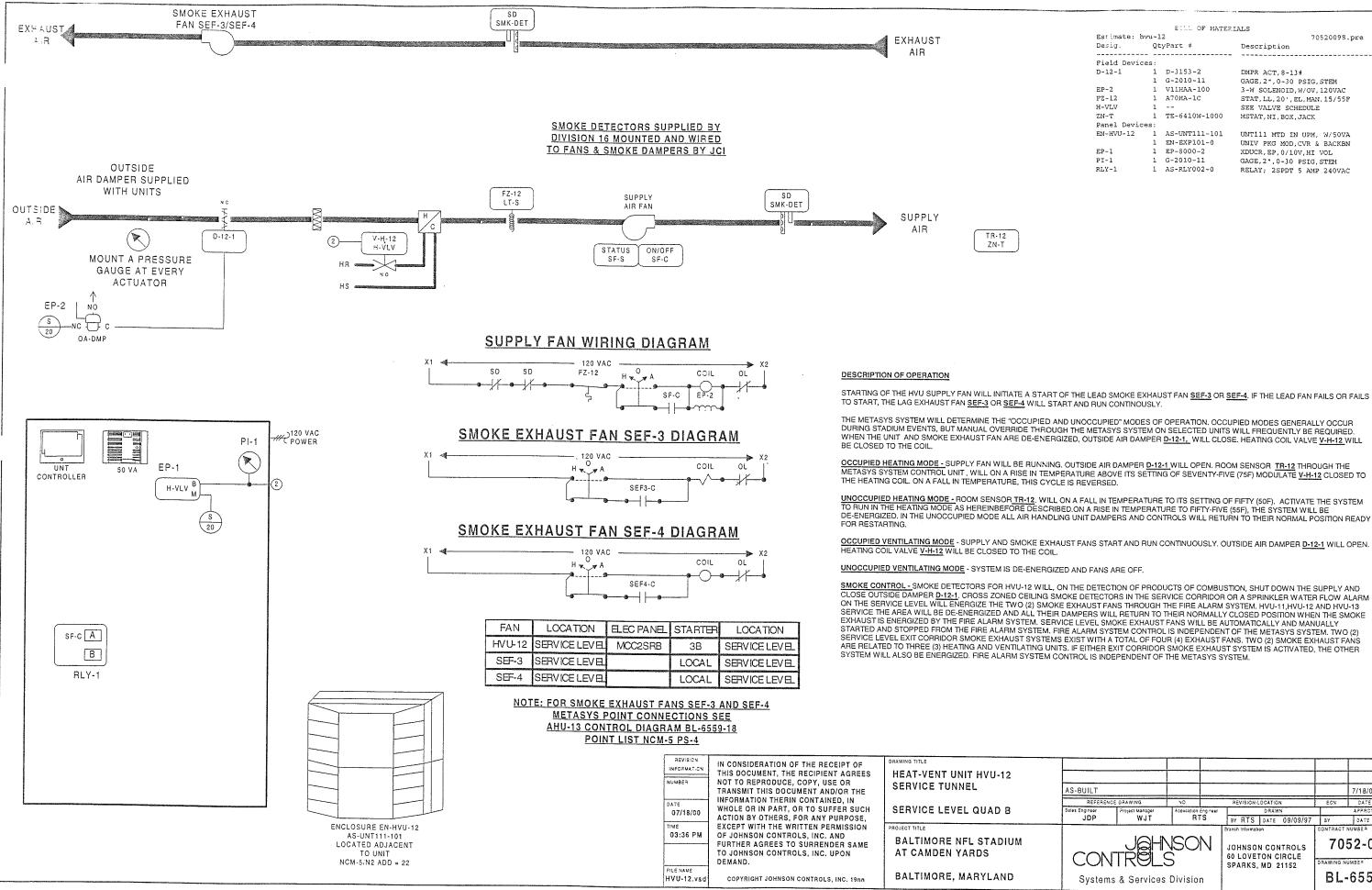
SMOKE CONTROL - SMOKE DETECTORS FOR HVU-11 WILL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE SUPPLY AND CLOSE OUTSIDE DAMPER <u>D-11-1</u>. CROSS ZONED CEILING SMOKE DETECTORS IN THE SERVICE CORRIDOR OR A SPRINKLER WATER FLOW ALARM ON THE SERVICE LEVEL WILL ENERGIZE THE TWO (2) SMOKE EXHAUST FANS THROUGH THE FIRE ALARM SYSTEM. HVU-11, HVU-12 AND HVU-13 SERVICE THE AREA WILL BE DE-ENERGIZED AND ALL THEIR DAMPERS WILL RETURN TO THEIR NORMALLY CLOSED POSITION WHEN THE SMOKE EXHAUST IS ENERGIZED BY THE FIRE ALARM SYSTEM. SERVICE LEVEL SMOKE EXHAUST FANS WILL BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED FROM THE FIRE ALARM SYSTEM. FIRE ALARM SYSTEM CONTROL IS INDEPENDENT OF THE METASYS SYSTEM. TWO (2) SERVICE LEVEL EXIT CORRIDOR SMOKE EXHAUST SYSTEM EXIST WITH A TOTAL OF FOUR (4) EXHAUST FANS. TWO (2) SMOKE EXHAUST FANS. ARE RELATED TO THREE (3) HEATING AND VENTILATING UNITS. IF EITHER EXIT CORRIDOR SMOKE EXHAUST SYSTEM IS ACTIVATED, THE OTHER SYSTEM WILL ALSO BE ENERGIZED. FIRE ALARM SYSTEM CONTROL IS INDEPENDENT OF THE METASYS SYSTEM.

AS-BUILT								7/18/00	CME
REFERENCE	DRAWING	NO.		REVISION-L	OCATION	4	ECN	DATE	BY
Sales Engineer	Project Manager	Application 4			DRAW	N		APPROVED	
JDP	WJT	RT	S	BY RTS	DATE	09/05/97	BY	DATE	
CON		SO	N	JOHNSON 60 LOVET				O52-00	98
	& Services [	<b>)</b> Division	n	SPARKS,	MD 2	1152		g NUMBER L-6559	-39

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Full Sp	readsheet			Software		Ι			Dig	ital Controller In	formation			Pa	nel Informa	ion				Intermediate Dev	icə		1	Field D	evice			
ĩag	Point Type	Name	Object Name	Expanded ID	Display	Units	DC Тура	N2 Trun	k N2 Ad	Cable dr Destination Bay/Termin		e Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing		Device	Location	Ref Detail	Comment
b		HVU-11					UNT							Service Level B	1	M.2-01B				1			i					Power to Controller
i		HVU-11	•				UNT		1	21			EN-HVU11	Service Level B	0	M.2-01B					1	1	1					N2 Trunk
	Al-1	HVU-11					UNT		1	21 Al-1			EN-HVU11	Service Level B	0	M.2-01B	HVU11-21-AI-1					1	<u> </u>					
	AI-2	HVU-11					UNT			21 Al-2				Service Level B	0	M.2-01B	HVU11-21-AI-2					1						
	AI-3	HVU-11					UNT			21 Al-3				Service Level B	0	M.2-01B	HVU11-21-AI-3									1		
	AI-4	HVU-11	ZN-T	Zone Temperature	Deg		UNT		1	21 Al-4		PHONE JACK		Service Level B	0	M.2-01B	HVU11-21-AI-4					1	8/26	PHCINE JACK	FE-6410W-1000		U2	
	AI-5	HVU-11					UNT			21 Al-5				Service Level B	0	M.2-018	HVU11-21-AI-5					1	1			1		
	Al-6	HVU-11					UNT			21 Al-6				Service Level B	0	M.2-01B	HVU11-21-AI-6											
	81-1	HVU-11	SF-S	Supply Fan Status		On				21 BI-1		BI#,24VAC		Service Level B	0	M.2-01B	HVU11-21-8I-1					1	2/22	Device dependent	Aux Contact (NO)		U70	
	81-2	HVU-11	SMK-DET	Smoke Detectors	Normal					21 BI-2		BI#,24VAC	EN-HVU11	Service Level B	0	M.2-01B	HVU11-21-BI-2					1		Device dependent			U70	
	BI-3	HVU-11	LT-S	Low Temperature Stat	Normal				1	21 BI-3		BI#,24VAC		Service Level B	0	M.2-01B	HVU11-21-BI-3		-						470 (NC)		U71	
	81-4	HVU-11					UNT			21 BI-4				Service Level B	0	M.2-01B	HVU11-21-BI-4											
		HVU-11	SF-C	Supply Fan Control	Off	On				21 80-1	RLY	BO#,24V,COM	EN-HVU11	Service Level B	0	M.2-01B	HVU11-21-80-1	3/18	A,COILS,COM	RELAY-A	NO,COM	1	2/14	See starter detail	Starter (NO)-(sw le	2)	U60	
	BO-2	HVU-11					UNT			21 80-2				Service Level B	0	M.2-01B	HVU11-21-BO-2									í		
		HVU-11					UNT			21 80-3				Service Level B	0	M.2-01B	HVU11-21-BO-3						1			· · · ·		
	BO-4	HVU-11					UNT			21 80-4		1		Service Level B	0	M.2-01B	HVU11-21-BO-4			1		1	1			1		
	BO-5	HVU-11					UNT			21 BO-5		1		Service Level B	0	M.2-01B	HVU11-21-BO-5		~			1						
	BO-6	HVU-11	-1				UNT			21 BO-6				Service Level B	0	M.2-01B	HVU11-21-BO-6					1						
	AO-1		H-VLV	Heating Coil Valve	% Op		UNT			21 AO-1		AO#,AOCM.24\		Service Level B	0	M.2-01B	HVU11-21-AO-1	2/18	+,-	EP-8000-2	SUPPLY, O	1	3/18	Device dependent	D-10V OUT	1	U23	
	AO-2	HVU-11					UNT		1	21!AO-2			EN-HVU11	Service Level B	0	M.2-01B	HVU11-21-AO-2									1		



Estimate: h	vu-1	EILL OF MATER	IALS 70520098.pre
Desig.	Qt	YPart #	Description
Field Devic	es:		
D-12-1	1	D-3153-2	DMPR ACT, 8-13#
	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
EP-2	1	V11HAA-100	3-W SOLENOID, W/OV, 120VAC
FZ-12	1	A70HA-1C	STAT, LL, 20', EL, MAN, 15/55F
H-VLV	1		SEE VALVE SCHEDULE
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Devic	es:		
EN-HVU~12	1	AS-UNT111-101	UNTII1 MTD IN UPM, W/50VA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
PI-1	1	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND SMOKE EXHAUST FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER <u>D-12-1</u>, WILL CLOSE. HEATING COIL VALVE <u>V-H-12</u> WILL

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING. OUTSIDE AIR DAMPER <u>D-12-1</u> WILL OPEN. ROOM SENSOR <u>TR-12</u> THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE <u>V-H-12</u> CLOSED TO

DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION READY

ON THE SERVICE LEVEL WILL ENERGIZE THE TWO (2) SMOKE EXHAUST FANS THROUGH THE FIRE ALARM SYSTEM. HVU-11, HVU-12 AND HVU-13 SERVICE THE AREA WILL BE DE-ENERGIZED AND ALL THEIR DAMPERS WILL RETURN TO THEIR NORMALLY CLOSED POSITION WHEN THE SMOKE EXHAUST IS ENERGIZED BY THE FIRE ALARM SYSTEM. SERVICE LEVEL SMOKE EXHAUST FANS WILL BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED FROM THE FIRE ALARM SYSTEM. FIRE ALARM SYSTEM CONTROL IS INDEPENDENT OF THE METASYS SYSTEM. TWO (2) SERVICE LEVEL EXIT CORRIDOR SMOKE EXHAUST SYSTEMS EXIST WITH A TOTAL OF FOUR (4) EXHAUST FANS. TWO (4) SMOKE EXHAUST FANS ARE RELATED TO THREE (3) HEATING AND VENTILATING UNITS. IF EITHER EXIT CORRIDOR SMOKE EXHAUST SYSTEM IS ACTIVATED, THE OTHER

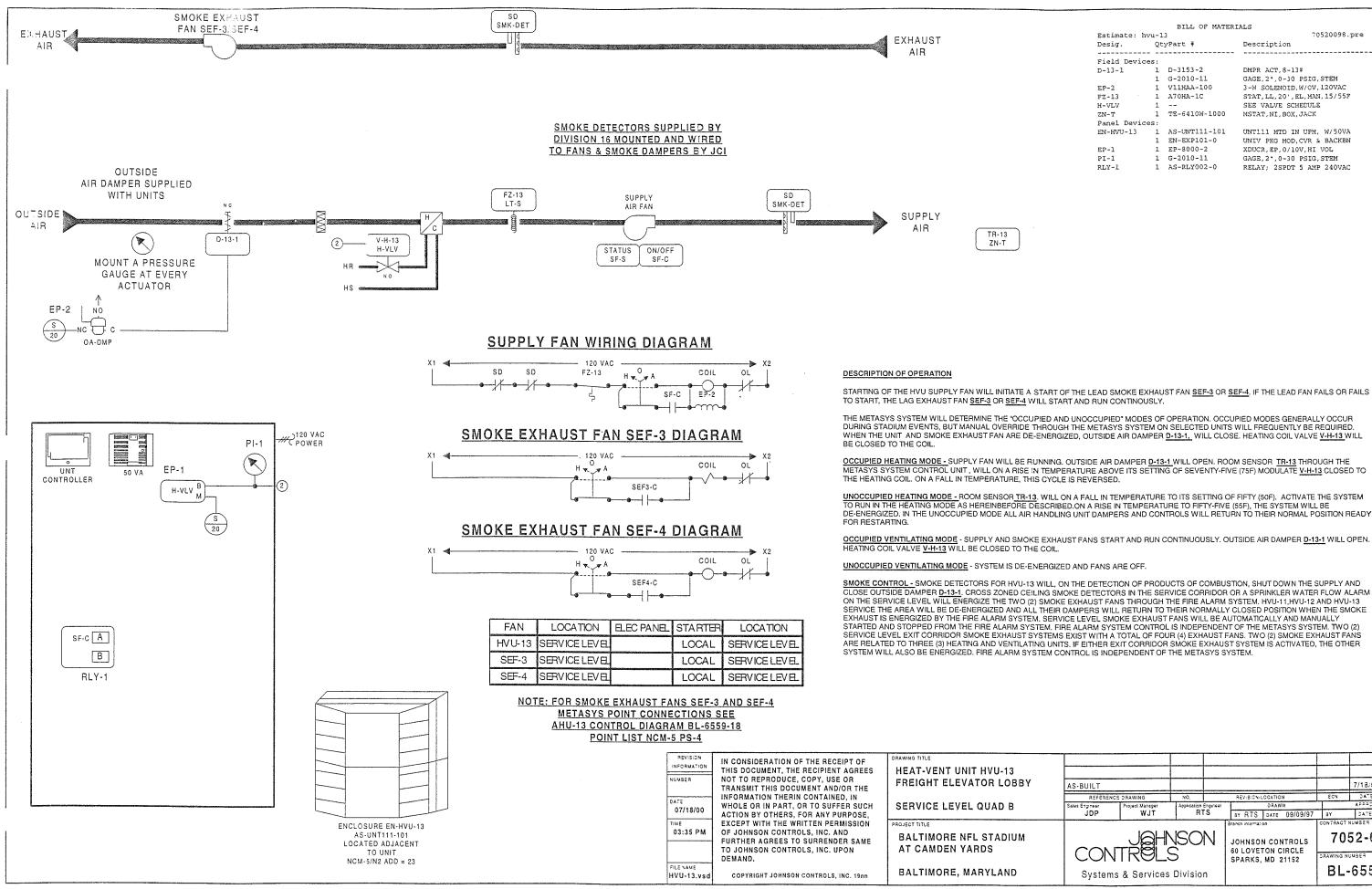
S-8UILT									7/18/00	CME
REFERENCE	ORAWING	ND.		AEV	ISION-L	OCATION	1	ECN	DATE	BY
ales Engineer	Project Manager	Accilication		Τ		DRAW	N	1	APPROVED	
JDP	WJT	RT	S	ЭҮ і	RTS	DATE	09/09/97	ЗY	OATE	
			1	Branch I	nformatio	n.		CONTRACT	NUMBER	
CON		SO					TROLS	70	52-00	98
CON	INGLE	)				MD 2		DRAWING N	IUMBER	
Systems	& Services [	Divisio	n					BL	-6559	-40

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nag (	Point Type	System Name	Object Name	Expanded ID	Dísplay Units	DC Гуре N	Trunk N2 Ad	Cable dr Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
		HVU-12				UNT					EN-HVU12	Service Level B		M.2-018	1											Power to Controller
		HVU-12	<u> </u>			UNT	1	22				Service Level B	1 0	M.2-01B						1	1			1		N2 Trunk
,		HVU-12						22 Al-1				Service Level B		M.2-01E	HVU12-22-AI-1								1	1		
		HVU-12 HVU-12	-			A. C. Strategie and Strategies and S		22 AI-2				Service Level B		M.2-018	HVU12-22-AI-2											
			ZN-T	Zone Temperature		UNT		22 AI-3		DUONE HOL		Service Level B		M.2-018	HVU12-22-AI-3					<u> </u>						
		HVU-12	1219-1	Zone remperature	Deg F			22 AI-4 22 AI-5		PHONE JACK		Service Level B		M.2-018	HVU12-22-AI-4					L	8/26	PHONE JACK	TE-6410W-1000		U2	
		HVU-12	· / ·			UNT		22 AI-5 22 AI-6				Service Level B		M.2-018	HVU12-22-AI-5						l			L		
			SE-S	Supply Fan Status	Off On			22 AI-0		BI#.24VAC		Service Level B Service Level B		M.2-01B	HVU12-22-AI-6						0/00					Mile 1
		HVU-12	SMK-DET	Smoke Detectors	Normal Alarm		1	22 BI-2		BI#.24VAC		Service Level B		M.2-01E	HVU12-22-BI-1 HVU12-22-BI-2								Aux Contact (NO)		U70	
		111/1/1		Low Temperature Stat	Normali Alarm			22 81.3				Service Level B		M.2-018	HVU12-22-8I-2				+			Device dependent			U70	
		HVU-12	1		- Honnar Filant	TUNT	1	22 BI-4				Service Level B		M.2-018	HVU12-22-BI-4						2122	NC.M1	A70 (NC)		U71	
	BO-1	HVU-12	SF-C	Supply Fan Control	Off On	UNT	1	22 80-1	RLY			Service Level B		M.2-018	HVU12-22-BO-1	3/18	A.COILS.COM	RELAY-A	NO.COM		2/14	Saa starter detail	Starter (NO)-(sw h		U60	
		HVU-12				UNT	1	22180-2				Service Level B		M.2-01E	HVU12-22-BO-2		1.000.000		110,001		<i></i>	ore statter uetall	Starter (IVO)-(SW II	<i>ŋ</i>	000	
		HVU-12				UNT		22 BO-3			EN-HVU12	Service Level 8		M.2-018	HVU12-22-80-3							·				
	BO-4 ·	HVU-12				UNT	1	22 BO-4		1	EN-HVU12	Service Level 8		M.2-01B	HVU12-22-BO-4		+									
	BO-5	HVU-12				UNT	1	22 BO-5				Service Level B		M.2-01B	HVU12-22-BO-5		1			1	1		t			
		HVU-12				UNT	•	22 BO-6				Service Level B	0	M.2-01B	HVU12-22-BO-6		1				1					
			H-VLV	Heating Coil Valve	% Open	UNT		22 AO-1				Service Level 8	0	M.2-01B	HVU12-22-AO-1	2/18	+,-	EP-8000-2	SUPPLY, O	1	3/18	Device dependent	0-10V OUT	1	U23	
	40-2	HVU-12				UNT	1	22 AO-2		1	EN-HVU12	Service Level B	) (	M.2-01B	HVU12-22-AO-2							·		1		



BILL OF MATERIALS 70520098.pre Estimate: hvu-13 OtyPart # Description Desig. Field Devices: D-3153-2 DMPR ACT, 8-13# D-13-1 G-2010-11 GAGE, 2\*, 0-30 PSIG, STEM EP-2 1 V11HAA-100 3-W SOLENOID, W/OV, 120VAC FZ-13 1 A70HA-1C STAT, LL, 20', EL, MAN, 15/55F SEE VALVE SCHEDULE H-VLV ~~ TE-6410W-1000 ZN-T MSTAT, NI, BOX, JACK Panel Devices: 1 AS-UNT111-101 UNTILL MTD IN UPM. W/SOVA EN-HV11-13 EN-EXP101-0 UNIV PKG MOD, CVR & BACKBN EP-8000-2 XDUCR, EP, 0/10V, HI VOL EP-1 PI-1 G-2010-11 GAGE, 2\*, 0-30 PSIG, STEM 1 AS-RLY002-0 RLY-1 RELAY: 2SPDT 5 AMP 240VAC

STARTING OF THE HVU SUPPLY FAN WILL INITIATE A START OF THE LEAD SMOKE EXHAUST FAN SEF-3 OR SEF-4. IF THE LEAD FAN FAILS OR FAILS

THE METASYS SYSTEM WILL DETERMINE THE "OCCUPIED AND UNOCCUPIED" MODES OF OPERATION. OCCUPIED MODES GENERALLY OCCUR DURING STADIUM EVENTS, BUT MANUAL OVERRIDE THROUGH THE METASYS SYSTEM ON SELECTED UNITS WILL FREQUENTLY BE REQUIRED. WHEN THE UNIT AND SMOKE EXHAUST FAN ARE DE-ENERGIZED, OUTSIDE AIR DAMPER D-13-1, WILL CLOSE. HEATING COIL VALVE V-H-13 WILL

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING, OUTSIDE AIR DAMPER D-13-1, WILL OPEN. ROOM SENSOR TR-13 THROUGH THE METASYS SYSTEM CONTROL UNIT, WILL ON A RISE IN TEMPERATURE ABOVE ITS SETTING OF SEVENTY-FIVE (75F) MODULATE V-H-13 CLOSED TO

UNOCCUPIED HEATING MODE - ROOM SENSOR TR-13. WILL ON A FALL IN TEMPERATURE TO ITS SETTING OF FIFTY (50F). ACTIVATE THE SYSTEM TO RUN IN THE HEATING MODE AS HEREINBEFORE DESCRIBED.ON A RISE IN TEMPERATURE TO FIFTY-FIVE (55F), THE SYSTEM WILL BE DE-ENERGIZED. IN THE UNOCCUPIED MODE ALL AIR HANDLING UNIT DAMPERS AND CONTROLS WILL RETURN TO THEIR NORMAL POSITION READY

CLOSE OUTSIDE DAMPER D-13-1. CROSS ZONED CEILING SMOKE DETECTORS IN THE SERVICE CORRIDOR OR A SPRINKLER WATER FLOW ALARM ON THE SERVICE LEVEL WILL ENERGIZE THE TWO (2) SMOKE EXHAUST FANS THROUGH THE FIRE ALARM SYSTEM. HVU-11, HVU-12 AND HVU-13 SERVICE THE AREA WILL BE DE-ENERGIZED AND ALL THEIR DAMPERS WILL RETURN TO THEIR NORMALLY CLOSED POSITION WHEN THE SMOKE EXHAUST IS ENERGIZED BY THE FIRE ALARM SYSTEM. SERVICE LEVEL SMOKE EXHAUST FANS WILL BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED FROM THE FIRE ALARM SYSTEM. FIRE ALARM SYSTEM CONTROL IS INDEPENDENT OF THE METASYS SYSTEM. TWO (2) SERVICE LEVEL EXIT CORRIDOR SMOKE EXHAUST SYSTEMS EXIST WITH A TOTAL OF FOUR (4) EXHAUST FANS. TWO (2) SMOKE EXHAUST FANS ARE RELATED TO THREE (3) HEATING AND VENTILATING UNITS. IF EITHER EXIT CORRIDOR SMOKE EXHAUST SYSTEM IS ACTIVATED, THE OTHER

				·					
AS-BUILT								7/18/00	CME
REFERENCE	DRAWING	NO.		REVISION-L	CCATION	4	ECN	DATE	ВY
Sales Engineer	Project Manager	Application			WARG	N		APPACVED	
JDP	WJT	RI	rs	ar RTS	DATE	09/09/97	BY	CATE	
				Branch informatio	5n		CONTRACT	NUMBER	
	JQH)	ĮSO	N	JOHNSON 60 LOVET			70	52-00	98
CON	TRØLS	5		SPARKS,			DRAWING P	IUNBER	
Systems	& Services	Divisio	n				BL	-6559	-41

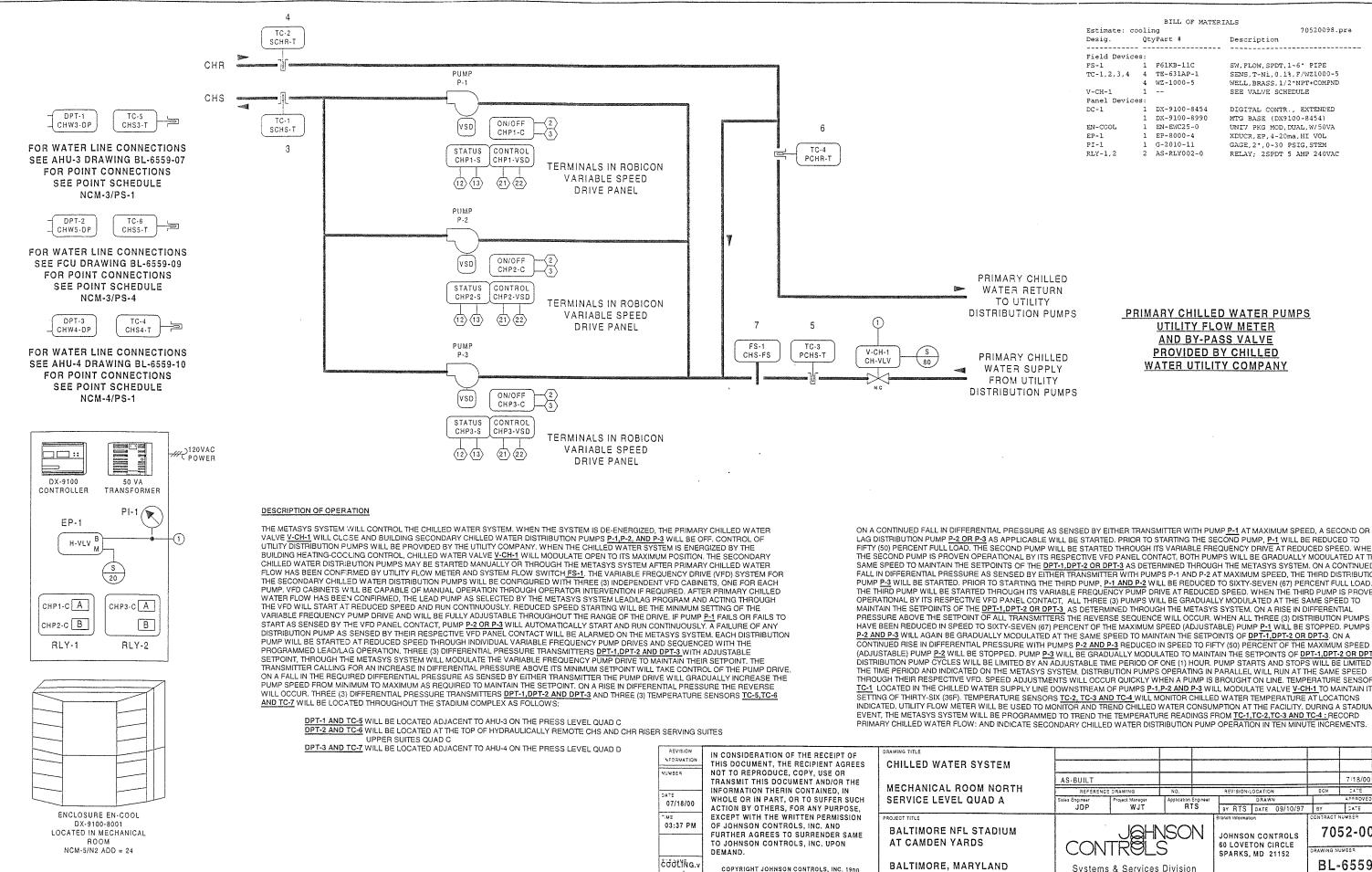
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Full Sprea	dsheet			Software					Digital Co	ontroller Inform	nation				Panel Infor	mation		1	Intermediate I	Device		1	Field	Device			
Tag Po	oínt Type	System Name	Object Name	Expanded ID	Display U	nits D	ОС Тура	N2 Trunik N2		Cable Destination ay/Terminal	Module Type	Termination	Panel	Panel Local	on Siot Numb	1	Cable Number	Wiring/T ubing	n In Device	Termination Out	<sup>1</sup> Location	Wiring/T ubing	Terminations	Device	Location	Ref Detail	Comment
	4	HVU-13	1		;	JUN	TV I	;			1		JEN-HVU13	Service Level	3	M.2-011B					1	1					Power to Controller
		HVU-13	·			UN		1	23					Service Level		01M.2-01/B											N2 Trunk
Al-		HVU-13				UN		1	23 AI-				EN-HVU13	Service Level	3	0 M.2-01B	HVU13-23-AI-1				1						
Al-		HVU-13				UN		11	23 AI-2	2		-	EN-HVU13	Service Level	3	0 M.2-011B	HVU13-23-AI-2							1			
Al-		HVU-13				UN	TV TV	41	23 AI-3					Service Level		0 M.2-01 B	HVU13-23-AI-3										
AI-			ZN-T	Zone Temperature	Deg F	UN	17	1	23 Al-			PHONE JACK				0 M.2-01 B	HVU13-23-AI-4				1	8/26	PHONE JACK	TE-6410W-1000	-	U2	
Al-	-5	HVU-13				UN	IT I	1	23 AI-		L			Service Level		0 M.2-01 B	HVU13-23-AI-5										
Al-		HVU-13			1	UN		1	23 Al-6	5		1		Service Level		0 M.2-01 B	HVU13-23-AI-6										
181-	-1	HVU-13	SF-S	Supply Fan Status	Off C			11	23 81-	1				Service Level		0 M.2-01 B	HVU13-23-BI-1				1	2/22	Device dependen	t Aux Contact (NO)		U70	
BI-	2	HVU-13	SMK-DET	Smoke Detectors	Normal Al			1	23 81-2	2		BI#,24VAC		Service Level		0 M.2-0+B	HVU13-23-BI-2					2/22	Device dependen	t Contact (NO)		U70	
BI-		HVU-13	LT-S	Low Temperature Stat	Normal Al			1	23 BI-3					Service Level		0 M.2-01 B	HVU13-23-BI-3					2/22	NO,M1	A70 (NC)		U71	
BI-		HVU-13				JUN		11	23 81-4					Service Level		0 M.2-07 B	HVU13-23-BI-4					-					
BC	)-1		SF-C	Supply Fan Control	011 0			11	23 80		ALY	BO#,24V,COM				0 M.2-01 B	HVU13-23-BO-	A,COILS,C	OM RELAY-A	NO,COM		2/14	See starter detail	Starter (NO)-(sw I	o)	U60	·····
BC	)-2	HVU-13				UN		1	23 80					Service Level		0 M.2-01 B	HVU13-23-BO-2										
80		HVU-13				UN		11	23 80	-3				Service Level		0 M.2-0†B	HVU13-23-BO-3										
8C	)-4	HVU-13	1	1		IUN		1	23 80					Service Level		0 M.2-01B	HVU13-23-BO-4					-					
8C		HVU-13				JUN	IT I	1	23 80	-5				Service Level		0 M.2-01 B	HVU13-23-BO-5					1		1			
80		HVU-13	l			JUN	NT I	1!	23 80	-				Service Level		0/M.2-01B	HVU13-23-80-6							1			
AC			H-VLV	Heating Coil Valve	% Oper				23 AO		ļ	AO#,AOCM.24V				0[M.2-01B	HVU13-23-AO-		EP-8000-2	SUPPLY, O		3/18	Device dependen	t 0-10V OUT		U23	
AC	)-2 [	HVU-13				UN	VT i	*1	23 AO	-2			EN-HVU13	Service Level	3	01M.2-013	HVU13-23-AO-2	2									



Estimate: co		BILL OF MATERI	IALS 70520098.pre
Desig.	Qt		Description
Field Device			
FS-1	1	F61KB-11C	SW.FLOW, SPDT, 1-6* PIPE
TC-1,2,3,4	4	TE-631AP-1	SENS, T-Ni, 0.1%, F/WZ1000-5
	4	WZ-1000-5	WELL, BRASS, 1/2*NPT+COMPND
V-CH-1	1		SEE VALVE SCHEDULE
Panel Device	es:		
DC-1	1	DX-9100-8454	DIGITAL CONTR., EXTENDED
	1	DX-9100-8990	MTG BASE (DX9100-8454)
EN-COOL	1	EN-EWC25-0	UNIV PKG MOD, DUAL, W/50VA
EP-1	1	EP-8000-4	XDUCR, EP, 4-20ma, HI VOL
PI-1	1	G-2010-11	GAGE,2*,0-30 PSIG,STEM
RLY-1,2	2	AS-RLY002-0	RELAY: 2SPDT 5 AMP 240VAC

PRIMARY CHILLED WATER PUMPS UTILITY FLOW METER AND BY-PASS VALVE PROVIDED BY CHILLED WATER UTILITY COMPANY

LAG DISTRIBUTION PUMP P-2 OR P-3 AS APPLICABLE WILL BE STARTED. PRIOR TO STARTING THE SECOND PUMP, P-1 WILL BE REDUCED TO FIGTY (50) PERCENT FULL LOAD. THE SECOND PUMP WILL BE STARTED THROUGH ITS VARIABLE FREQUENCY DRIVE AT REDUCED SPEED, WHEN THE SECOND PUMP IS PROVEN OPERATIONAL BY ITS RESPECTIVE VFD PANEL CONTACT, BOTH PUMPS WILL BE GRADUALLY MODULATED AT THE SAME SPEED TO MAINTAIN THE SETPOINTS OF THE <u>DPT-1,DPT-2</u> OR <u>DPT-3</u> AS DETERMINED THROUGH THE METASYS SYSTEM. ON A CONTINUED FALL IN DIFFERENTIAL PRESSURE AS SENSED BY EITHER TRANSMITTER WITH PUMPS P-1 AND P-2 AT MAXIMUM SPEED, THE THIRD DISTRIBUTION PUMP P-3 WILL BE STARTED. PRIOR TO STARTING THE THIRD PUMP, P-1 AND P-2 WILL BE REDUCED TO SIXTY-SEVEN (67) PERCENT FULL LOAD. THE THIRD PUMP WILL BE STARTED THROUGH ITS VARIABLE FREQUENCY PUMP DRIVE AT REDUCED SPEED. WHEN THE THIRD PUMP IS PROVEN OPERATIONAL BY ITS RESPECTIVE VFD PANEL CONTACT, ALL THREE (3) PUMPS WILL BE GRADUALLY MODULATED AT THE SAME SPEED TO MAINTAIN THE SETPOINTS OF THE DPT-1, DPT-2 OR DPT-3 AS DETERMINED THROUGH THE METASYS SYSTEM. ON A RISE IN DIFFERENTIAL PRESSURE ABOVE THE SETPOINT OF ALL TRANSMITTERS THE REVERSE SEQUENCE WILL OCCUR. WHEN ALL THREE (3) DISTRIBUTION PUMPS HAVE BEEN REDUCED IN SPEED TO SIXTY-SEVEN (67) PERCENT OF THE MAXIMUM SPEED (ADJUSTABLE) PUMP P-1 WILL BE STOPPED. PUMPS P-2 AND P-3 WILL AGAIN BE GRADUALLY MODULATED AT THE SAME SPEED TO MAINTAIN THE SETPOINTS OF DPT-1, DPT-2 OR DPT-3, ON A CONTINUED RISE IN DIFFERENTIAL PRESSURE WITH PUMPS P-2 AND P-3 REDUCED IN SPEED TO FIFTY (50) PERCENT OF THE MAXIMUM SPEED (ADJUSTABLE) PUMP P-2 WILL BE STOPPED. PUMP P-3 WILL BE GRADUALLY MODULATED TO MAINTAIN THE SETPOINTS OF DPT-1, DPT-2 OR DPT-3 DISTRIBUTION PUMP CYCLES WILL BE LIMITED BY AN ADJUSTABLE TIME PERIOD OF ONE (1) HOUR. PUMP STARTS AND STOPS WILL BE LIMITED BY THE TIME PERIOD AND INDICATED ON THE METASYS SYSTEM. DISTRIBUTION PUMPS OPERATING IN PARALLEL WILL RUN AT THE SAME SPEED THROUGH THEIR RESPECTIVE VFD. SPEED ADJUSTMENTS WILL OCCUR QUICKLY WHEN A PUMP IS BROUGHT ON LINE. TEMPERATURE SENSOR TC-1 LOCATED IN THE CHILLED WATER SUPPLY LINE DOWNSTREAM OF PUMPS P-1, P-2 AND P-3 WILL MODULATE VALVE V-CH-1 TO MAINTAIN ITS SETTING OF THIRTY-SIX (36F). TEMPERATURE SENSORS TC-2, TC-3 AND TC-4 WILL MONITOR CHILLED WATER TEMPERATURE AT LOCATIONS INDICATED. UTILITY FLOW METER WILL BE USED TO MONITOR AND TREND CHILLED WATER CONSUMPTION AT THE FACILITY. DURING A STADIUM EVENT, THE METASYS SYSTEM WILL BE PROGRAMMED TO TREND THE TEMPERATURE READINGS FROM TC-1, TC-2, TC-3 AND TC-4 : RECORD PRIMARY CHILLED WATER FLOW: AND INDICATE SECONDARY CHILLED WATER DISTRIBUTION PUMP OPERATION IN TEN MINUTE INCREMENTS.

AS-BUILT								7/18/00	СМЕ
REFERENCE	DRAWING	NO.		REVISION-L	OCATION	4	ECN	CATE	BY
Sales Engineer	Project Manager	Application		1	DRAW	N		APPROVED	
JDP	WJT	RT	S	BY RTS	DATE	09/10/97	8Y	DATE	
	·		1	Branch Informatio	n		CONTRACT	NUMBER	
CON	JAHN	SO	N	JOHNSON 60 LOVET			70	52-00	98
CON	IKOLS	)		SPARKS,			DRAWING N	UMBER	
	& Services [	Divisio	n				BL	-6559	-42

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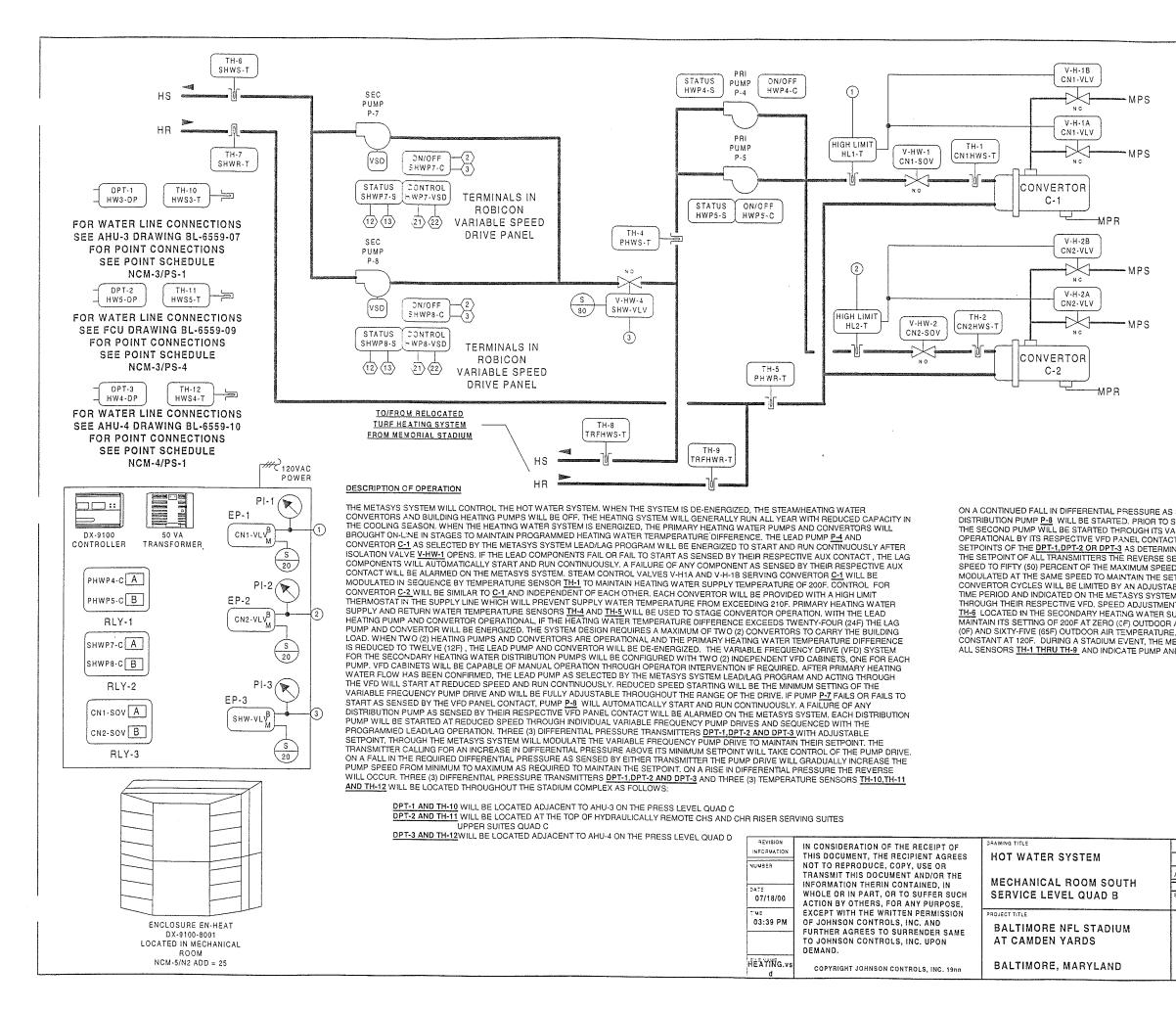
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ull Spreads	heet			Software					Digita	Controller Infe	ormation				anel Informa	tion			]	ntermediate Devi	ice		1	Field	Device			
ag Poin	it Type	System Name	Object Name	Expanded ID	Display U	nits D	С Туре	l2 ľπunk	N2 Addr	Cable Destination Bay/Termina		Termination	Panel	Panel Locatio	n Slof Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location Ref	Detail	Comment
		OOLING					9100 j		1				EN-COOL	Service Lev MEI	IAI	IM.S-14								1		<u> </u>		ower to Controller
		OOLING	•				9100	1	24					Service Lev MEI		M.3-14		1			1		- <u> </u>	+				2 Trunk
DI-1		OOLING		Chill Wtr Pump 1 Status	Off (			1	24			DI#,COM		Service Lev MEI		M.3-14	COOL-24-DI-1				1		2/22	Device dependent	Aux Contact (NO)	D70		
DI-2		OOLING		Chill Wtr Pump 2 Status	Off (			1	24			DI#,COM		Service Lev MEI		M.3-14	COOL-24-DI-2		1	· · · · · ·	1		2/22	Device dependent		D70		
DI-3		OOLING		Chill Wtr Pump 3 Status	Off (			1	24			DI#,COM	EN-COOL	Service Lev MER	IA (	M.3-14	COOL-24-DI-3	1			1		2/22	Device dependent		D70		
D1-4	IC IC	OOLING	CHS-FS	Chill Wtr Sup Flow Sw	Open Clo			1	24	DI-4		DI#,COM	EN-COCL	Service Lev MEI	IAI (	M.3-14	COOL-24-DI-4	1			1	1	2/22	Device dependent		D70		
01-5		OOLING					9100	1	24				EN-CCOL	Service Lev MEI	A (	M.3-14	COOL-24-DI-5	1				•		Device dependent	Contact (NO)		,	
OI-6		OOLING					9100	1	24				EN-COOL	Service Lev MEI	IAI (	M.3-14	COOL-24-DI-6	1				1						
D1-7		OOLING					9100	1	24	DI-7			EN-COOL	Service Lev MER	A I	M.3-14	COOL-24-DI-7						1			<u> </u> ]		
D1-8		OOLING				DX	9100	1	24	2I-8			EN-COCL	Service Lev MEI	A (	M.3-14	COOL-24-DI-8	1								+		1778 AL.
AQ-1		OOLING	CH-VLV	Main Chill Wtr Valve	%		9100	1	24			AO#,AOCOM	EN-COOL	Service Lev MEI	A C	M.3-14	COOL-24-AQ-1	2/18	+	EP-8000-2	SUPPLY.O		1/4*	Barb Fitting	EP-PNEU.	D22		
AO-2		OOLING	CHP1-VSD	Ch Wat Pmp 1 Var Spd Dr	%	DX	9100	1	24	40-2		AO#,AOCOM		Service Lev MER		M.3-14	COOL-24-AO-2			LI 0000 2	100111110		2/18	Device dependent		D22		
AO-9		OOLING	CHP2-VSD	Ch Wat Pmp 2 Var Spd Dr	**	DX	9100	1	24	40-9		AO#,AOCOM		Service Lev MEI		M.3-14	COOL-24-AO-9						2/18	Device dependent				
AO-1	0 C	OOLING	CHP3-VSD	Ch Wat Pmp 3 Var Spd Dr	°.	DX	9100	1	24	40-10		AO#,AOCOM		Service Lev ME		M.3-14	COOL-24-AO-1						2/18	Device dependent		D21		
AO-1		OOLING				DX	9100	1	24	40-11				Service Lev ME		M.3-14	COOL-24-AO-1						2/10	Device dependent	0-2000 001	D21		
AO-12		OOLING				DX	9100	1		40-12				Service Lev MEI		M.3-14	COOL-24-AO-12								l			
AO-1		OOLING				DX	9100	1		AC-13				Service Lev ME		IM.3-14	COOL-24-A0-1						1	<u> </u>				
AO-14		OOLING				DX	9100	1	24	40-14				Service Lev MER		0M.3-14	COOL-24-AO-1											
DO-3		OOLING		Chill Water Pump 1 Cotrt	Off	n iDX	9100	1	24	00-3	RLY	DO# 24V COM	EN-COOL	Service Lev MEI		IM.3-14	COOL-24-DO-3		A.COILS.COM		COMINO		2/14					
DO-4		OOLING	CHP2-C	Chill Water Pump 2 Cntrl	Off	n DX	9100	1		00-4	RLY	DO#24V.COM	EN-COOL	Service Lev MEI		M.3-14	COOL-24-DO-4		B.COILS.COM		COM,NO	-	2/14	See starter detail		D60		
DO-5		OOLING	CHP3-C	Chill Water Pump 3 Cntrl	011	n iDX	9100	1		00-5	BLY			Service Lev MEI		M.3-14	COOL-24-DO-5		A.COILS.COM		COM,NO			See starter detail		D60		
00-6		OOLING	·····		+		9100	1		00-6		a de la	Service Lev MEI		M.3-14	COOL-24-DO-6		A.COILS.COM	HELAT-A	LCOM,NO		2/14	See starter detail	Starter (NO)	D60	)		
DO-7		OOLING			·		9100	1	24			*		Service Lev MER		IM.3-14	COOL-24-DO-6							( 		I		
DO-8	C	OOLING			<u> </u>		9100	1	24			1		Service Lev MER		M.3-14	COOL-24-DO-8									L		
AI-1	C	OOLING	PCHS-T	Pri Chill Wtr Supply Temp	Deg F		9100	1	24			AI#.AICOM		Service Lev MER		M.3-14	COOL-24-DO-8				<u> </u>			1				
AI-2	C	OOLING	PCHR-T	Pri Chill Wtr Beturn Temp	Deg F		9100	1	24			Al#,AICOM		Service Lev MER		M.3-14	COOL-24-AI-1 COOL-24-AI-2	1					12/18	2-Wire	TE-631AP-1	D3		
AI-3		OOLING		Sec Chill Wtr Supply Temp	Deg F			1	24			AI#,AICOM		Service Lev MER		1M.3-14	COOL-24-AI-2	4						2-Wire	TE-631AP-1	D3		
AI-4		OOLING		Sec Chill Wtr Supply Temp	Deg F			1	24			AI#,AICOM		Service Lev MER		M.3-14	COOL-24-AI-3	1						2-Wire	TE-631AP-1	D3		
AI-5	C	OOLING		service and servic	1 1		9100		24			1 447 2 40 0141		Service Lev MER		M.3-14	COOL-24-AI-4	1					2/18	2-Wire	TE-631AP-1	D3		
A1-6	C	OOLING					9100	1	24			+		Service Lev MER		M-3-14				ļ				L				
AI-7		OOLING					9100		24/					Service Lev MER			COOL-24-AI-6					+		<u> </u>				
A1-8		OOLING		·			9100		24/							M.3-14	COOL-24-A1-7						1					
				L		107			24//	10			ILIN-COOL	Service Lev MER	(A) (	M.3-14	COOL-24-AI-8	4				1	1	1				

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Field Devices: HL1-T,HL2-T 2 T-8020-1 CONTRLR,IMMERSICN,PROP 2 T-8020-101 WELL,BRASS,F/T-8020 TH-1,2,4,5,6 8 TE-631AP-1 SENS,T-Ni,0.1%,F/WZ1000-5 ,7,8,9		
2 T-8020-101 WELL, BRASS, F/T-8020 TH-1,2,4,5,6 8 TE-631AP-1 SENS, T-Ni,0.1%, F/WZ1000-5 ,7,8,9		
TH-1,2,4,5,6 8 TE-631AP-1 SENS,T-Ni,0.1%,F/WZ1000-5 ,7,8,9		
,7,8,9		
TH-1,2,4,5,6 8 WZ-1000-5 WELL, BRASS, 1/2 "NPT+COMPND		
TH-1,2,4,5,6 8 WZ-1000-5 WELL,BRASS,1/2*NPT+COMPND ,7,8,9,		
V-H-1,V-H-2 4 SEE VALVE SCHEDULE		
V-HW-1,2,4 3 SEE VALVE SCHEDULE		
V-HW-1,2,4 5 SZE VALVE SCHEDULZ Panel Devices:		
DC-1 1 DX-9100-8454 DIGITAL CONTR., EXTENDED		
1 DX-9100-8454 DIGITAL CONTR., EXTEMDED		
EN-HEAT 1 EN-EWC25-0 UNTU PKG MOD DUAL W/50VA		
ER-123 3 ER-2000.4 VENCE RD 4 20- UT VOL		
EP-1,2,3         3         EP-8000-4         XDUCR, EP,4-20ma, HI VOL           PI-1,2,3         3         G-2010-11         GAGE,2*,0-30         PSIG,STEM           RLY-1,2,3         3         AS-RLY002-0         RELAY; 2SPDT 5         AMP 240VAC		
PI-1,2,5 3 G-2010-11 GAGE, 2, 0-30 PSIG, STEM		
REI-1,2,5 5 AS-REFOUZ-0 RELAY; 2SPDT 5 AMP 240VAC		
	ľ	
SENSED BY EITHER TRANSMITTER WITH PUMP P-7 AT MAXIMUM SPEED, THE LAG		
TARTING THE SECOND PUMP, P-7 WILL BE REDUCED TO FIFTY (50) PERCENT FULL LOA		
RIABLE FREQUENCY DRIVE AT REDUCED SPEED. WHEN THE SECOND PUMP IS PROVE	EN	
T, BOTH PUMPS WILL BE GRADUALLY MODULATED AT THE SAME SPEED TO MAINTAIN		
IED THROUGH THE METASYS SYSTEM. ON A RISE IN DIFFERENTIAL PRESSURE ABOVE		
QUENCE WILL OCCUR. WHEN BOTH DISTRIBUTION PUMPS HAVE BEEN REDUCED IN		
	1	
TPOINTS OF DPT-1, DPT-2 OR DPT-3. DISTRIBUTION PUMP, HEATING PUMP AND	E	
TPOINTS OF <u>DPT-1,DPT-2 OR DPT-3</u> . DISTRIBUTION PUMP, HEATING PUMP AND BLE TIME PERIOD OF ONE (1) HOUR. PUMP STARTS AND STOPS WILL BE LIMITED BY TH	E	
TPOINTS OF <u>DPT-1,DPT-2 OR DPT-3</u> . DISTRIBUTION PUMP, HEATING PUMP AND BLE TIME PERIOD OF ONE (1) HOUR. PUMP STARTS AND STOPS WILL BE LIMITED BY TH 1. DISTRIBUTION PUMPS OPERATING IN PARALLEL WILL RUN AT THE SAME SPEED		
TPOINTS OF <u>DPT-1,DPT-2 OR DPT-3</u> . DISTRIBUTION PUMP, HEATING PUMP AND SLE TIME PERIOD OF ONE (1) HOUR. PUMP STARTS AND STOPS WILL BE LIMITED BY TH 1. DISTRIBUTION PUMPS OPERATING IN PARALLEL WILL RUN AT THE SAME SPEED TS WILL OCCUR QUICKLY WHEN A PUMP IS BROUGHT ON LINE. TEMPERATURE SENSC		
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TPOINTS OF DPT-1, DPT-2 OR DPT-3. DISTRIBUTION PUMP, HEATING PUMP AND         SUBJECT 10 HOUR. PUMP STARTS AND STOPS WILL BE ALIMITED BY TH.         ADD PS OPERATING IN PARALLEL WILL RUN AT THE SAME SPEED         TS WILL OCCUR QUICKLY WHEN A PUMP IS BROUGHT ON LINE. TEMPERATURE SENSO         TS WILL OCCUR QUICKLY WHEN A PUMP IS BROUGHT ON LINE. TEMPERATURE SENSO         TEMPERATURE TEMPERATURE RESET WILL BE A LINEAR FUNCTION BETWEEN ZE         AS OUTDOOR AIR TEMPERATURE RESET WILL BE A LINEAR FUNCTION BETWEEN ZE         AS OUTDOOR AIR TEMPERATURE REPEATURE RESE ABOVE 65F SUPPLY WATER WILL REMAIN         TAND P-3         CONVERTOR OPERATION, INCLUDING TURF HEATING IN TEN (10) MINUTE INCREMENT         OCONVERTOR OPERATION, INCLUDING TURF HEATING IN TEN (10) MINUTE INCREMENT         AS-BUILT         AS-BUILT         AS-BUILT         AS-BUILT         AS-BUILT         AS-BUILT         AS-BUILT         ASE OF DAWING         ASE OF DAWING <td c<="" td=""><td>DR ERO OM IS. L CME BY D</td></td>	<td>DR ERO OM IS. L CME BY D</td>	DR ERO OM IS. L CME BY D
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TPOINTS OF <u>PPT-1, DPT-2 OR DPT-3</u> , DISTRIBUTION PUMP, HEATING PUMP AND         NUE THE PERIOD OF ONE (1) HOUR, PUMP STARTS AND STOPS WILL BE LIMITED BY TH         LIME PERIOD OF ONE (1) HOUR, PUMP STARTS AND STOPS WILL BE LIMITED BY TH         LIME PERIOD OF ONE (1) HOUR, PUMP STARTS AND STOPS WILL BE LIMITED BY TH         LIME PERIOD OF ONE (1) HOUR, PUMP STARTS AND STOPS WILL BE LIMITED BY TH         LINE DE VILL BE AND STOPS WILL BE LIMITED BY TH         LINE DE VILL BE AND STOPS WILL BE LIMITED BY TH         AND P-B WILL BE UNITED BY THE SAME SPEED         AS OUTDOOR AIR TEMPERATURE RESET WILL BE A LINEAR FUNCTION BETWEEN ZE         AS OUTDOOR AIR TEMPERATURE RISES ABOVE 65F SUPPLY WATER WILL REMAIN         TASYS SYSTEM WILL BE PROGRAMMED TO TREND THE TEMPERATURE READINGS FR         D CONVERTOR OPERATION, INCLUDING TURF HEATING IN TEN (10) MINUTE INCREMENT         ASSOUTED SAMING         ASSOUTED SAMING         ASSOUTED SAMING         ASSOUTED SAMING         ADD PARMING         ASSOUTED SAMING         ASSOUTED SAMING         ASSOUTED SAMING         ADD ASTOP SAMING         ASSOUTED SAMING         ASTE SAMING <td co<="" td=""><td>DR ERO OM rs. <u>CME</u> BY 098</td></td>	<td>DR ERO OM rs. <u>CME</u> BY 098</td>	DR ERO OM rs. <u>CME</u> BY 098
TPOINTS OF DPT-1, DPT-2 OR DPT-3. DISTRIBUTION PUMP, HEATING PUMP AND         SUBJECT OF ONE (1) HOUR. PUMP STARTS AND STOPS WILL BE LIMITED BY TH.         ILL DUMPS OPERATING IN PARALLEL WILL RUN AT THE SAME SPEED         TS WILL OCCUR QUICKLY WHEN A PUMP IS BROUGHT ON LINE. TEMPERATURE SENSO         TS WILL OCCUR QUICKLY WHEN A PUMP IS BROUGHT ON LINE. TEMPERATURE SENSO         TAND P-3         MILT MODULATE VALVE V-HW-4 TO         ANT POMPS         AND P-3         ANT POMPS         AND P-3         MILT MODULATE VALVE V-HW-4 TO         ANT P-3	DR ERO OM rs. <u>CME</u> BY 098	

BILL OF MATERIALS

Description

70520098.pre

Estimate: heating

QtyPart #

Desig.

4

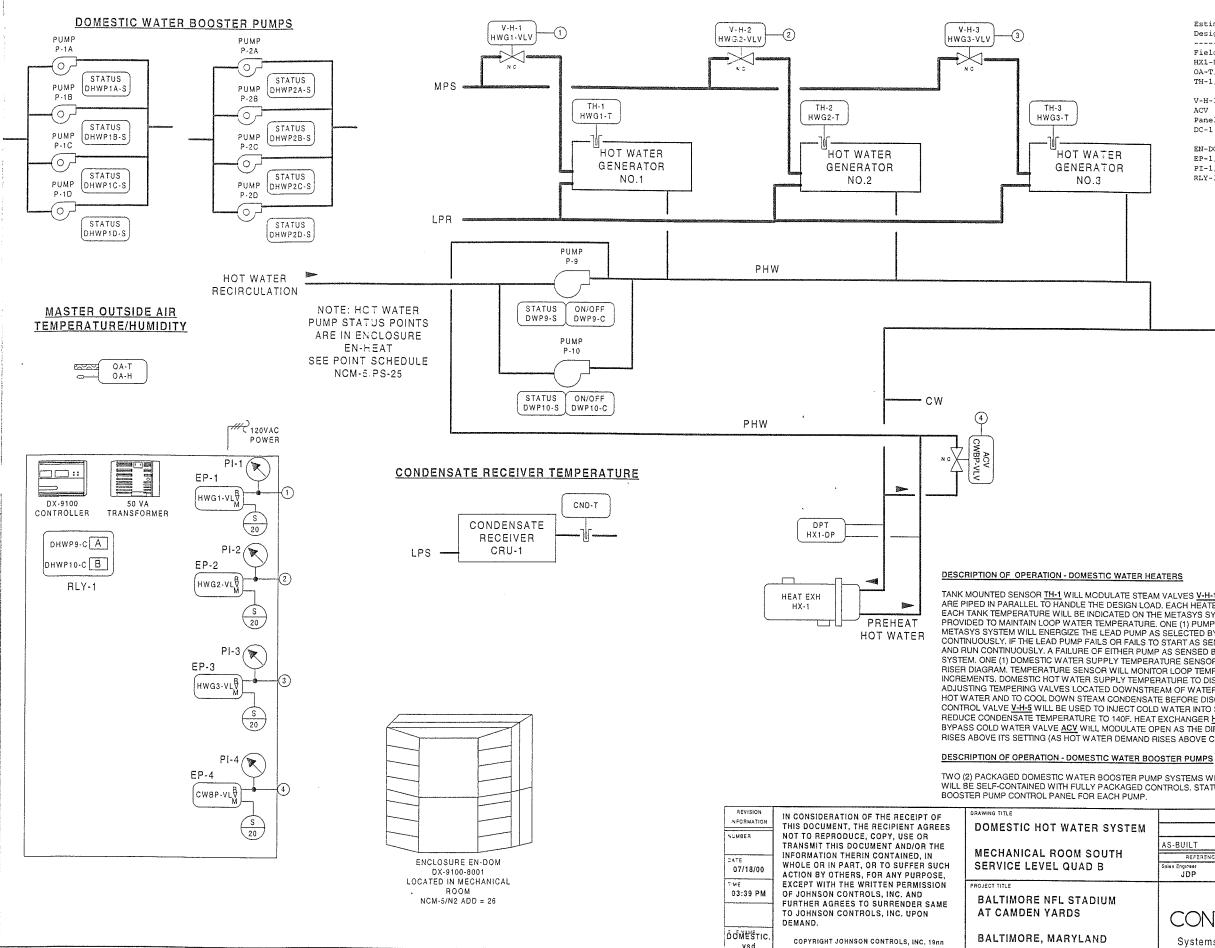
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Spreadsheet	fra		Software			and the second second second second second second second second second second second second second second secon	Digi	ital Controller Info	ormation		1	Pc	nel Informat	ion				ntermediate Dev	içe			Field	Device			
Point Type	Name	ə Namə	Evpanded ID	Display Unit	S DC Ty	pə N2 Tru	nk N2 Add	Cable dr Destination Bay/Termina		Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	r Wiring/1 ubing	Termination In	Device	Termination Out	Location	Winng/T ubing	Construction of the second second second second second second second second second second second second second	Device	Location	Ref Detail	Comment
	HEATING				DX910					1	EN-HEAT	Service Lev MER 8	3 i	M.3-16	1	1						4				Power to Controller
	HEATING				DX910			25			EN-HEAT	Service Lev MER 8	3 0	M.3-16		1					<u> </u>					N2 Trunk
DI-1	HEATING	G PHWP4-S	Pri HW Pump 4 Status		DX910			25 DI-1		DI#,COM		Service Lev MER 8		Mt.3-16	HEAT-25-DI-1	-					2/22	Device dependen	LAUX Contact (NO		D70	
IDI-2	HEATING	G PHWP5-8	Pri HW Pump 5 Status	Off On				25 DI-2		DI#,COM		Service Lev MER E		M.3-16	HEAT-25-DI-2	1					2/22		tIAux Contact (NO		D70	
	HEATING	a SHWP7-S	Sec HW Pump 7 Status	Off On	DX910	)		25 DI-3		DI#,COM		Service Lev MER 6		MA.3-16	HEAT-25-DI-3	1					2/22		tiAux Contact (NO		D70	
	REATING	G SHWP8-S	Sec HW Pump 8 Status	Olf On				25 DI-4		DI#,COM		Service Lev MER E		M.3-16	HEAT-25-DI-4						2/22		t Aux Contact (NO		D70	
DI-5 DI-6	HEATING	J DWP9-S	Dom HW Pump 9 Status	Off On				25 DI-5		DI#,COM		Service Lev MER E		M.3-16	HEAT-25-DI-5	1						Device dependen			D70	·
DI-6	HEATING	JUWP10-S	Dom HW Pump 10 Status	Off On				25 DI-6		DI#.COM		Service Lev MER 6		M.3-16	HEAT-25-DI-6	1						Device dependen			D70	······
DI-8	HEATING				DX910		1 2	25 DI-7				Service Lev MER E		M.3-16	HEAT-25-DI-7							Device dependen	Aux Contact (NO		010	
					DX910			25 DI-8				Service Lev MER E		ML.3-16	HEAT-25-DI-8	1								-		
AO-1 AO-2	HEATING	GN1-VLV	Conv 1 Steam Valves	%	DX910		1 2	25 AO-1		AO#,AOCOM		Service Lev MER E		M.3-16	HEAT-25-AO-1	2/18	+	EP-8000-2	SUPPLY.O	~~~~	1/4"	Barb Fitting	EP-PNEU.	-	D22	
			Conv 2 Steam Valves	%	DX910			25 AO-2		AO#,AOCOM	EN-HEAT	Service Lev MER E	3 0	ML3-16	HEAT-25-AO-2	2/18	+,-	EP-8000-2	SUPPLY,O		1/4"		EP-PNEU.		D22	
	HEATING	A HWP7-VS	D Sec HW Pump 1 Var Sod D	r %	DX910			25 AO-9		AO#,AOCOM		Service Lev MER 8		M.3-16	HEAT-25-AO-9	1	1					Device dependent		-[]	D21	
AO-10	HEATING	a HWP8-VS	D Sec HW Pump 2 Var Spd D	r %	DX910			25 AO-10		AO#,AOCOM		Service Lev MER E		M.3-16	HEAT-25-AO-10	2	1		<u> </u>			Device dependent			D21	
AO-11 AO-12			Sec HW Control Valve	%	DX910			25 AQ-11		AO#,AOCOM	EN-HEAT	Service Lev MER E	0	Mt.3-16	HEAT-25-AO-11	1 2/18	+	EP-8000-2	SUPPLY.O		1/4*		EP-PNEU.		D21	
AO-12 AO-13	HEATING				DX910			25 AO-12			EN-HEAT	Service Lev MER 8	0	M.3-16	HEAT-25-AO-12	2	1		Contrario		101	Darb Filling	EF-FNEU.		022	
AO-13	HEATING				DX910			25 AO-13				Service Lev MER B		ML3-16	HEAT-25-AO-13	3					<u> </u>					
					DX910			25 AO-14			EN-HEAT	Service Lev MER 8	0	ML3-16	HEAT-25-AO-14	4						+				
	MEATING	5 PHWP4-C	Pri HW Pump 4 Control	Off On				25 DO-3	RLY	DO#,24V,COM	EN-HEAT	Service Lev MER 8	0	M.3-16	HEAT-25-DO-3	3/18	A,COILS,COM	BELAY-A	COM.NO		2/14	See starter detail	Charter (NO)		D60	
DO-4	HEATING	PHWP5-C	Pri HW Pump 5 Control	Off On			1 2	25 DO-4	RLY	DO#24V.COM	EN-HEAT	Service Lev MER 8	0	Mf3-16	HEAT-25-DO-4	3/18	B.COILS.COM		COM.NO		2/14	See starter detail			D60	
			Sec HW Pump 7 Control	Off On				5 DO-5	RLY	DO#,24V,COM	EN-HEAT	Service Lev MER 8	0	M_3-16	HEAT-25-DO-5	3/18	A.COILS.COM		COM,NO		2/14	See starter detail			D60	
			Sec HW Pump 8 Control	Off On				15 DO-6	RLY	DO#,24V,COM	EN-HEAT	Service Lev MER 8	0	M.3-16	HEAT-25-DO-6	3/18	B,COILS,COM		COM.NO			See starter detail			D60	
	HEATING	- CN1-SOV	Conv 1 Shut Off Valve	Off On				5 DO-7	RLY	DO#,24V,COM	EN-HEAT	Service Lev MER B	0		HEAT-25-00-7		A.COILS.COM		COM.NO			See starter detail			D60	
	HEATING	CN2-SOV	Conv 2 Shut Off Valve	Off On				5 DO-8	RLY	DO#,24V,COM	EN-HEAT	Service Lev MER E	0		HEAT-25-DO-8		B,COILS.COM		COM.NO		2/14	See starter detail			D60	
Al-1	HEATING	CN1HWS-	T Conv 1 HW Supply Temp	Deg F				5 Al-1		AI#,AICOM	EN-HEAT	Service Lev MER E	0		HEAT-25-AI-1				0011110			2-Wire	TE-631AP-1		060	
AI-2	HEATING	CN2HWS	T Conv 2 HW Supply Temp	Deg F				5 Al-2		AI#,AICOM	EN-HEAT	Service Lev MER E	0		HEAT-25-AI-2	1	1					2-Wire	TE-631AP-1		03	
AI-3	HEATING	PHWS-T	Pri HW Supply Temp		DX910			5 AI-3		AI#,AICOM	EN-HEAT	Service Lav MER E	0		HEAT-25-AI-3	1		·				2-Wire	TE-631AP-1		D3	
Al-4	MEATING		Pri HW Return Temp		DX910			5 Al-4		AI#,AICOM	EN-HEAT	Service Lev MER E	0	ML3-16	HEAT-25-AI-4	1						2-Wire	TE-631AP-1		D3	
AI-5	INCATING	SHWS-T	Sec HW Supply Temp		DX9100			5 AI-5		AI# AICOM	EN-HEAT	Service Lev MER B	0		HEAT-25-AI-5	1			<u> </u>			2-Wire	TE-631AP-1		D3	
Al-6 Al-7	HEATING	SHWR-T	Sec HW Return Temp		DX9100			5 Al-6		AI# AICOM	EN-HEAT	Service Lev MER E	0		HEAT-25-AI-6	1							TE-631AP-1		D3 D3	*
	HEATING	I HFHWS-	T Turf HW Supply Temp		DX9100			5 AI-7		AI#,AICOM	EN-HEAT	Service Lev MER E	0	M.3-16	HEAT-25-AI-7	1						2-Wire	TE-631AP-1		D3 D3	
IAI-8	HEATING	THEHWR-	T Turf HW Return Temp	Deg F	DX9100		1 25	5 AI-8		AI#,AICOM	EN-HEAT	Service Lev MER E	0		HEAT-25-AI-8				t			2-wire 2-Wire	TE-631AP-1 TE-631AP-1		D3	· · · · · · · · · · · · · · · · · · ·

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Estimate: do	mes	BILL OF MATERI	ALS	70520098.cre
Desig.	Qt	yPart #	Description	
Field Device	s:			
HX1-DP	1	C-252	DELTA TRANS ROB	HALP
OA-T, OA-H	1	RHT-2-I-0/A	OUTSIDE AIR TEM	IP/HUMD
TH-1,2,3,5	4	TE-631AP-1	SENS, T-Ni, 0.1%,	F/WZ1000-5
	4	WZ-1000-5	WELL, BRASS, 1/2"	NPT+COMPND
V-H-1,2,3, ACV	4		SEE VALVE SCHED	ULE
Panel Device	s:			
DC-1	1	DX-9100-8454	DIGITAL CONTR	EXTENDED
	1	DX-9100-8990	MTG BASE (DX910	0-8454)
EN-DOM	1	EN-EWC25-0	UNIV PKG MOD. DU	AL,W/50VA
EP-1,2,3,4	4	EP-8000-4	XDUCR, EP, 4-20ma	HI VOL
PI-1,2,3,4	4	G-2010-11	GAGE, 2", 0-30 PS	IG, STEM
RLY-1	1	AS-RLY002-0	RELAY; 2SPDT 5	AMP 240VAC

TH-5 DWS-T

TO FOUR (4) HOLBY TEMPERING VALVE SYSTSEMS

TANK MOUNTED SENSOR TH-1 WILL MODULATE STEAM VALVES V-H-1 TO MAINTAIN ITS SETTING OF 140F. THREE (3) STORAGE WATER HEATERS ARE PIPED IN PARALLEL TO HANDLE THE DESIGN LOAD, EACH HEATER WILL HAVE SELF CONTAINED CONTROL OF ITS OWN TANK TEMPERATURE. EACH TANK TEMPERATURE WILL BE INDICATED ON THE METASYS SYSTEM. TWO (2) DOMESTIC HOT WATER RECIRCULATION PUMPS ARE PROVIDED TO MAINTAIN LOOP WATER TEMPERATURE. ONE (1) PUMP IS REQUIRED TO FOR DESIGN LOAD AND WILL RUN CONTINUOUSLY. THE METASYS SYSTEM WILL ENERGIZE THE LEAD PUMP AS SELECTED BY THE LEAD/LAG PROGRAM AND THE PUMP WILL START AND RUN CONTINUOUSLY. IF THE LEAD PUMP FAILS OR FAILS TO START AS SENSED BY ITS AUX CONTACT. THE LAG PUMP WILL AUTOMATICALLY START AND RUN CONTINUOUSLY. A BAULURE OF ENTITIED AND AS OCIDED BY THE DECRECIVE AUX CONTACT. THE LAG PUMP WILL AUTOMATICALLY START AND RUN CONTINUOUSLY. A FAILURE OF EITHER PUMP AS SENSED BY THEIR RESPECTIVE AUX CONTACT WILL BE ALARMED ON THE METASYS SYSTEM. ONE (1) DOMESTIC WATER SUPPLY TEMPERATURE SENSOR <u>TH-5</u> WILL BE PROVIDED WHERE INDICATED ON THE DOMESTIC WATER RISER DIAGRAM. TEMPERATURE SENSOR WILL MONITOR LOOP TEMPERATURE AND TREND DATA DURING STADIUM EVENTS IN TEN (10) MINUTE INCREMENTS. DOMESTIC HOT WATER SUPPLY TEMPERATURE TO DISTRIBUTION WILL BE MECHANICALLY REGULATED TO 120F USING MANUALLY ADJUSTING TEMPERING VALVES LOCATED DOWNSTREAM OF WATER HEATERS. HEAT EXCHANGER <u>HX-1</u> WILL BE USED TO PREHEAT DOMESTIC HOT WATER AND TO COOL DOWN STEAM CONDENSATE BEFORE DISCHARGING TO THE DRAINAGE SYSTEM. SELF-CONTAINED TEMPERATURE CONTROL VALVE <u>V-H-5</u> WILL BE USED TO INJECT COLD WATER INTO STEAM CONDENSATE DOWNSTREAM OF <u>HX-1</u> AS REQUIRED TO FURTHER REDUCE CONDENSATE TEMPERATURE TO 140F. HEAT EXCHANGER HX-1 IS A MECHANICAL DEVICE REQUIRING NO TEMPERATURE CONTROLS. BYPASS COLD WATER VALVE ACV WILL MODULATE OPEN AS THE DIFFERENTIAL PRESSURE AS SENSED BY HX1-DP INLET AND OUTLET PIPING RISES ABOVE ITS SETTING (AS HOT WATER DEMAND RISES ABOVE CAPACITY OF HX-1 AND PREHEATING IS MAXIMIZED).

TWO (2) PACKAGED DOMESTIC WATER BOOSTER PUMP SYSTEMS WITH FOUR (4) PUMPS EACH ARE PROVIDED FOR THE FACILITY. EACH SYSTEM WILL BE SELF-CONTAINED WITH FULLY PACKAGED CONTROLS. STATUS INDICATION WILL BE PROVIDED ON THE METASYS SYSTEM THROUGH THE

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AS-BUILT						Ι		7/18/00	СМЕ
REFERENCE	DRAWING	NO.		REVISION-LOCAT	ON	T	ECN	DATE	BY
Sales Engineer	Project Manager	Application Engine	ē(	DRA	WN			APPROVED	
JDP	WJT	RTS		BY RTS DAT	09/11/97		ЗY	DATE	
			1	Branch Information		Tc.	CONTRACT	NUMBER	
	JOHN TROLS	SON		JOHNSON CO			70	52-00	98
CON	IROLE	)		SPARKS, MD			RAWING N	UMBER	
Systems	& Services (	Division					BL	-6559	-44

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Full Spreadsheet			Software					Digital Co	ntroller Infor	mation		1		Panel Infom	acttion		T		Intermediate Dev	ricə		1	Field	Device			
Tag Point Typ	oo Syste Nar		i Expanded ID	Displ	ay Units	DC Тур	e N2 Trunk		Cable estination v/Terminal	Module Type	Termination	Panel	Ponel Locati	n Slot Numb	Reference Prawing	Cable Numbe	Wiring/ ubing	Termination In	Device	Termination Out	Location	Wining/T uiching	Terminations	Device	Location (	lef Detail	Comment
	DOME					DX9100			<u> Adama Canto a Anno</u>		1		Service Lev ME		M.3-16		- <b>1</b>			- <del>Ieman</del>		1		4	- <u> </u>		Power to Controller
	DOME					DX9100	1	26					Service Lev ME		0/M.3-16	1				1							N2 Trunk
DI-1			-S Dom HW Pump 1A Status		On		1	26 DI-1			DI#.COM	EN-COM	Service Lev ME	<b>1</b> B	0//M.3-16	DOM-26-DI-1					1	2/22	Device dependent	Contact (NO)		70	
DI-2	DOMES	STIC DHWP1B	-S Dom HW Pump 1B Status	Off	On	DX9100	1	26 DI-2			DI#.COM		Service Lev ME		0/M.3-16	DOM-26-DI-2	1						Device dependent			70	
DI-3	DOMES	STIC DHWP1C	-S Dom HW Pump 1C Status	Off	On	DX9100	1	26 DI-3			DI#,COM	EN-COM	Service Lev ME	18	OIM.3-16	DOM-26-DI-3						2/22	Device dependent	(NO)		070	
DI-4	DOMES	STIC DHWP1D	-S Dom HW Pump 10 Status	i Off	On	DX9100	1	26 DI-4			DI#,COM	EN-COM	Service Lev ME	18	0/iM.3-16	DOM-26-DI-4			1			2/22	Device dependent	(NO)		70	
DI-5	DOMES	STIC DHWP2A	-S Dom HW Pump 2A Status	Off			1	26iDI-5			DI#,COM		Service Lev ME		O.M.3-16	DOM-26-DI-5	1	1					Device dependent			70	
DI-6	DOMES	STIC DHWP28	-S Dom HW Pump 28 Status	Off	On		1	261DI-6			DI#,COM	EN-DOM	Service Lev ME	18	0/M.3-16	DOM-26-DI-6	1				1		Device dependent			70	
DI-7	DOMES	STIC DHWP2C	-S Dom HW Pump 2C Status	Off	On		1	26 01-7			DI#.COM		Service Lev ME		09M.3-16	DOM-26-DI-7	1	1					Device dependent			070	
DI-8	DOMES	STIC DHWP2D	-S Dom HW Pump 2D Status	Off	On		1	26 DI-8			DI#,COM		Service Lev ME		CIM.3-16	DOM-26-DI-8							Device dependent			070	
AO-1	DOMES	STIC HWG1-VL	V HW Gen 1 Steam Valve			DX9100	1	26 AO-			AO#,AOCOM	EN-DOM	Service Lev ME	R B	CoM.3-16	DOM-26-AO-1	2/18	+	EP-8000-2	SUPPLY.O				EP-PNEU.		22	
AO-2			V HW Gen 2 Steam Valve			DX9100	1	26IAO-2			AO#,AOCOM		Service Lav ME		CIM.3-16	DOM-26-AO-2	2/18	+,-	EP-8000-2	SUPPLY,O	1			EP-PNEU.		22	
AO-9	DOMES	STIC HWG3-VL	V HW Gen 3 Steam Valve			DX9100	1	26 AO-9			AO#,AOCOM	EN-COM	Service Lev ME	18	C.M.3-16	DOM-26-AO-9	2/18	+,-	EP-8000-2	SUPPLY.O				EP-PNEU.		22	
AO-10	DOMES	STIC CWBP-VL	V Cold Water Bypass Valve			DX9100	1	26 AO-			AO#,AOCOM		Service Lev ME		0+M.3-16	DOM-26-AO-10	2/18	+,-	EP-8000-2	SUPPLY.O				EP-PNEU.		22	
AO-11	DOMES					DX9100	1	26 AO-	11			EN-COM	Service Lev ME	18	C-M.3-16	DOM-26-AO-11		**									
AO-12	DOMES					DX9100	1	26!AO-				EN-COM	Service Lev ME	18	C M.3-16	DOM-26-AO-12	2				1	1					
AO-13	DOMES					DX9100	1	261AO-				EN-DOM	Service Lev ME	RB	0 M.3-16	DOM-26-AO-13	3				1	1					
AO-14	DOMES					DX9100	1	26 AO-				EN-COM	Service Lev ME	18	© M.3-16	DOM-26-AO-14	1		1								
DO-3	DOMES	STIC DHWP9-C	Dom HW Pump 9 Control	0//	On		1	26 00-3		RLY	IDO#,24V.COM	EN-COM	Service Lev ME	18	:-M.3-16	DOM-26-DO-3	3/18	A.COILS.COM	BELAY-A	COM.NO	+	2/14	See starter detail	Starter (NO)		60	
DO-4	DOMES	STIC DHWP10-	C Dom HW Pump 10 Control	Off		DX9100	1	26 DO-4		RLY	DO#,24V.COM	EN-COM	Service Lev ME	18	C M.3-16	DOM-26-DO-4	3/18	B.COILS.COM	RELAY-B	COM,NO			See starter detail			60	
DO-5	DOMES					DX9100	1	26IDO-				EN-COM	Service Lev ME	18	C M.3-16	DOM-26-DO-5	1		1			1	occoluncer actain				
DO-6	DOMES					DX9100	1	26 DO-0				EN-DOM	Service Lev ME	18	C M.3-16	DOM-26-DO-6		1	1								
00-7	DOMES					DX9100	1	26 DO-				EN-COM	Service Lev ME	18	C M.3-16	DOM-26-DO-7	1	1			1	·			+		
DO-8	DOMES					DX9100	1	26 DO-	8		1	EN-COM	Service Lev ME	18	C M.3-16	DOM-26-DO-8	1	·· · · · · · · · · · · · · · · · · · ·		1		1					
Al-1		STIC OA-T	Outdoor Air Temperature			DX9100	1	26 Al-1			Ai#,15V	EN-COM	Service Lev ME	18	C M.3-16	DOM-26-AI-1	1	1	1	1	1	2/18	•.+	BH-2-I-O/A	-	)1	
AI-2		STIC HWG1-T	HW Gen 1 HW Supply Ten			DX9100	1	26 AI-2			AI#,AICOM	EN-DOM	Service Lev ME	18	C M.3-16	DOM-26-AI-2	1		1	1			2-Wire	TE-631AP-1	-  r	)3	
AI-3		STIC HWG2-T	HW Gen 2 HW Supply Ten			DX9100	1	26 AI-3			AI#,AICOM	EN-DOM	Service Lav ME	38	C M.3-16	DOM-26-AI-3	1		1				2-Wire	TE-631AP-1	là	)3	
AI-4		STIC HWG3-T	HW Gen 3 HW Supply Ten	np De		DX9100	1	26 AI-4			AI#,AICOM		Service Lev ME		© M.3-16	DOM-26-AI-4	1						2-Wire	TE-631AP-1		03	
AI-5		STIC HX1-DP	Dom HW Diff Pressure			DX9100	1	26 AI-5			Al#,+15V	EN-DOM	Service Lev ME	18	0 M.3-16	DOM-26-AI-5	1		-	1			Device dependent			01	
AI-6		STIC CND-T	Condensate Water Temp	De		DX9100	1	26¦AI-6			AI#,AICOM	EN-DOM	Service Lev ME	18	O.M.3-16	DOM-26-AI-6	1				1		2-Wire	TE-631AP-1		)3	
AI-7		STIC OA-H	Outdoor Air Humidity			DX9100	1	26 Al-7			Al#.15V	EN-DOM	Service Lev ME	18	0 M.3-16	DOM-26-AI-7	1			1	<u> </u>		•.+	RH-2-1-0/A		01	
AI-8	DOMES	STIC DWS-T	Hot Water Supply Temp	De	eg F	DX9100	1	26 AI-8			AI#,AICOM	EN-DOM	Service Lev ME	18	D:M.3-16	DOM-26-AI-8	1	1	1		1	1	2-Wire	TE-631AP-1		03	

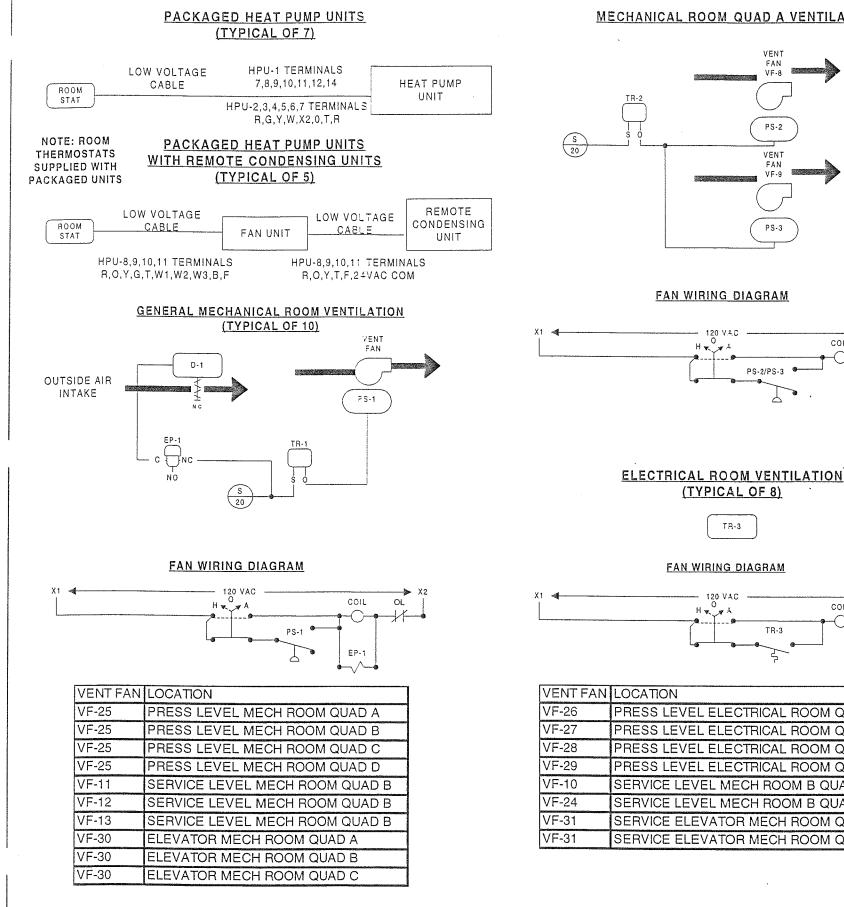
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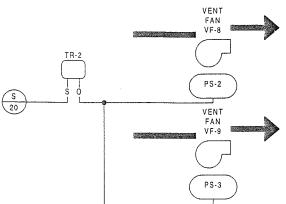
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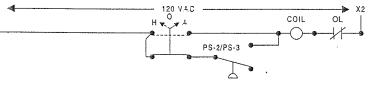
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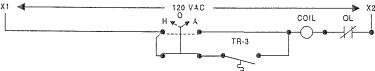
Spreadsheet			Software		l		Digital C	ontroller Informe	ation	-		Pa	nel Informa	ticm			1	ntermediate Dev	rice			Field	Device	I		
Point Type	Name	Object Name	Expanded ID	Display Units		N:2 Trun		Cable Destination lay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	MANUAL COORDINATION OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER	Termination Out	Location	Wiring,/T ubing:	1	Device	Location	Rəf Dətail	Comment
	ISEF-A	_			VAV						EN-EXH	AT FAN	1	***************************************		1			i			1		- <u>}</u>		ower to Controller
	SEF-A		·······		VAV		1 2				EN-EXH	AT FAN		2'												V2 Trunk
	SEF-A				VAV	:	1 2 Al-	1			EN-EXH			)	EXH-2-AI-1		1									NZ TILITA
	ISEF-A				VAV		1 2 AI-				EN-EXH			31	EXH-2-AI-2	1	1									
	SEF-A				VAV		1 2 Al-	3			EN-EXH	AT FAN		)i	EXH-2-AI-3	1										· · · · · · · · · · · · · · · · · · ·
			···		VAV		1 2 AI-	- management of the second sec			EN-EXH			)i	EXH-2-AI-4	1	1									
	SEF-A				VAV		1 2 Al-	5			EN-EXH		1	)(	EXH-2-AI-5		1									
	SEF-A				VAV		1 2 Al-	6			EN-EXH	AT FAN		3i	EXH-2-AI-6	1										
	SEF-A		Smoke Exh Fan 5 Status		VAV	!	1  2 Bl-	1			EN-EXH	AT FAN		);	EXH-2-81-1	1	1				2/22	Device dependent	Aux Contact		1170	
	SEF-A	SEF6-S	Smoke Exh Fan 6 Status	Off On	VAV		1 2 BI-	2		BI# 24VAC	EN-EXH	AT FAN	1	)i	EXH-2-BI-2							Device dependent			U70	
					VAV	;	1 2 BI-	3			EN-EXH	AT FAN	1	)(	EXH-2-BI-3							inevice dependent.	NUX CONIACI (NO)		0/0	
81-4	SEF-A				VAV	:	1 2 BI-	4			EN-EXH	AT FAN		)!	EXH-2-BI-4	1										
BO-1					VAV		2 BC	-1			EN-EXH	AT FAN		)i	EXH-2-BO-1											
BO-2 BO-3	SEF-A				VAV	,	1 2 BC	-2			EN-EXH	AT FAN		):	EXH-2-80-2											
BO-3	SEF-A				VAV		1 2 BC				EN-EXH	AT FAN		)i	EXH-2-80-3		+									
BO-4	SEF-A				VAV		1 2 BC				EN-EXH	AT FAN		):	EXH-2-BO-4		1									
BO-5 BO-6	SEF-A				VAV		2 BC	-5			EN-EXH			]:	EXH-2-80-5		†	L								
80-6	SEF-A SEF-A			1	VAV		2 80	-6			EN-EXH	AT FAN	-	):	EXH-2-80-6				+			1	·····			
					VAV		1 2 BC				EN-EXH	AT FAN		):	EXH-2-80-7							[				
BO-8	SEF-A		1		VAV		280	-8			EN-EXH	AT FAN	1	);	EXH-2-80-8	1										



## MECHANICAL ROOM QUAD A VENTILATION







VENT FAN	LOCATION
VF-26	PRESS LEVEL ELECTRICAL ROOM QUAD A
VF-27	PRESS LEVEL ELECTRICAL ROOM QUAD B
VF-28	PRESS LEVEL ELECTRICAL ROOM QUAD C
VF-29	PRESS LEVEL ELECTRICAL ROOM QUAD D
VF-10	SERVICE LEVEL MECH ROOM B QUAD B
VF-24	SERVICE LEVEL MECH ROOM B QUAD B
VF-31	SERVICE ELEVATOR MECH ROOM QUAD A
VF-31	SERVICE ELEVATOR MECH ROOM QUAD B

### PACKAGED AIR CONITIONING UNITS

THERMOSTAT

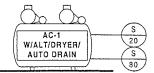
GENERAL MECHANICAL ROOM VENTILATION - ROOM THERMOSTAT TR-1 CONTROLS THE VENTILATION FAN. ON A RISE IN ROOM TEMPERATURE ABOVE THE SETTING OF TR-1 TO NINETY-FIVE (95F), FAN WILL START AND RUN CONTINUOUSLY AND OUTSIDE AIR INTAKE DAMPER WILL OPEN FULL. ON A FALL IN TEMPERATURE TO EIGHTY-FIVE (85F), FAN WILL BE DE-ENERGIZED AND THE OUTSIDE AIR INTAKE DAMPER WILL CLOSE.

DE-ENERGIZED

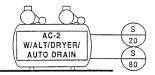
WILL BE DE-ENERGIZED.

REVISION INFORMATION	Drawing Title
NUMBER	MISCELLANEOUS SYSTEMS
DATE 07/18/00	
TIME 03:42 PM	Project Title BALTIMORE NFL STADIUM
	AT CAMDEN YARDS
FILE NAME MISC.vsd	BALTIMORE, MARYLAND

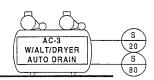
	BILL OF MATE	
Estimate: mi	scellaneous	70520098.pre
Desig.	QtyPart #	Description
Field Device	es:	
AC~1	1 AD-030-3C4	3 HP 460/3 80G DA DRY LD
AC-2,3	2 AD-007-1C4	3/4HP 460/3 30G DA DRY AD
D-1	10 D-4073-2	DMPR ACT, 8-13#
EP-1	10 V11HAA-100	3-W SOLENOID, W/OV, 120VAC
PS,1,2,3	12 P10BC-7C	SW, PE, SPDT, 2 #DIF
TR-1,2	11 T-4000-3139	CVR, WHT, JCI, HOR
	11 T-4002-124	STAT MOUNTING BRACKET
	11 T-4002-201	STAT, DIR, HORIZ, F
TR-3	8 T26S-18C	STAT, RM, H/C, ADJ, 40/90F



3 H.P. LOCATED IN SERVICE LEVEL MECHANICAL ROOM QUAD B



3/4 H.P. LOCATED IN PRESS LEVEL AHU-3 MECHANICAL ROOM QUAD C



3/4 H.P. LOCATED IN PRESS LEVEL AHU-4 MECHANICAL ROOM QUAD D

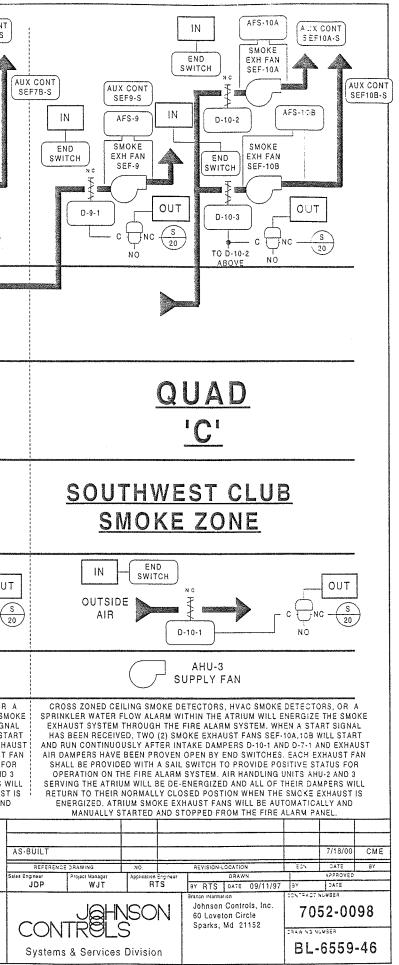
PACKAGED AIR CONDITIONING SYSTEMS INCLUDE ELECTRIC HEAT PUMP UNITS AND SPLIT SYSTEM DIRECT EXPANSION COOLING UNITS WITH ELECTRIC HEAT. THESE SYSTEMS WILL BE PROVIDED WITH PACKAGED ELECTRONIC CONTROLS AND REMOTE MOUNTED PROGRAMMABLE

 $\frac{\text{MECHANICAL ROOM QUAD A VENTILATION}{\text{MECHANICAL ROOM THERMOSTAT <u>TR-2</u> CONTROLS IN SEQUENCE TWO (2) VENTILATION FANS <u>VF-3</u> AND <u>VF-9</u>. ON A RISE IN ROOM TEMPERATURE ABOVE THE SETTING OF <u>TR-2</u>, TO NINETY-FIVE (95F), FAN <u>VF-8</u> WILL START AND RUN CONTINOUSLY. ON A$ CONTINUED RISE IN ROOM TEMPERATURE ABOVE THE SETTING OF TR-2, FAN VF-9 WILL START AND RUN CONTINUOUSLY. ON A FALL IN TEMPERATURE TO EIGHTY-FIVE (85F) THE REVERSE SEQUENCE WILL OCCUR. ON A CONTINUED FALL IN TEMPERATURE FAN VF-3 WILL BE

ELECTRIC ROOM VENTILATION - ROOM THERMOSTAT TR-3 WILL CONTROL THE VENTILATION FAN. ON A RISE IN ROOM TEMPERATURE ABOVE THE SETTING OF TR-3 TO NINETY-FIVE (95F), THE FAN WILL START AND RUN CONTINUOUSLY. ON A FALL IN TEMPERATURE TO EIGHTY-FIVE (85F), FAN

AS-BUILT								7/18/00	СМЕ
REFERENCE	DRAWING	NO.		REVISION-L	OCATIO	N	EDN	DATE	8Y
Sales Engineer	Project Manager	Application i		1	DRAW	N		APPROVED	
JDP	WJT	81	rs –	BY RTS	DATE	09/11/97	5*	DATE	
		ĮSO	N	Branch Informa Johnson 60 Lovel Sparks,	Contr ton Cir	cle	00NTRADT	оливен 52-00	98
CON	IROLE	>		op unit,			CPAWING 1		
Systems	& Services	Divisio	n				BL	-6559	-45

UPPER CONCOURSE ROOF	AUX CONT SEF6-S IN END SWITCH SWITCH NC D-6-1 U NO UT NO	AUX CONT SEF12-S IN END SWITCH N° END SWITCH N° END SWITCH N° EF-12 N° D-12-1 N° N° N° N° N° N° SEF-12 N° N° SEF-12 N° SWITCH N° SEF-12 N° SWITCH N° SEF-12 N° SWITCH N° SEF-12 N° SWITCH N° SEF-12 N° SWITCH N° SEF-12 N° SWITCH N° SEF-12 N° SWITCH N° SEF-12 N° SWITCH N° SEF-12 SWITCH N° SEF-12 N° SWITCH SEF-12 SWITCH N° SEF-12 SWITCH SUTCH SWITCH SUTCH S	IN AFS-7 4 AUX CONT SWITCH AUX CONT SWITCH AFS-8 IN D-7-2 AFS-78 AFS-78 AFS-78 IN D-7-2 AFS-78 SMOXE EXH F 4.N SEF-77 AFS-78 SMOXE EXH F 4.N SEF-77 AFS-78 SMOXE EXH F 4.N SEF-77 OUT D-7-2 NO C OUT D-7-2 NO C OUT D-7-2 NO C C NO C SMOXE EXH F 4.N SEF-73 C OUT D-7-2 NO C SMOXE EXH F 4.N SEF-73 C OUT D-7-2 NO C SMOXE EXH F 4.N SEF-75 C NO C SMOXE EXH F 4.N SEF-75 NO C SMOXE EXH F 4.N SEF-75 NO C SMOXE EXH F 4.N SEF-75 NO C SMOXE EXH F 4.N SEF-75 NO C SMOXE EXH F 4.N SEF-75 NO C SMOXE EXH F 4.N SEF-75 NO C SMOXE C SMOXE EXH F 4.N SEF-75 NO C SMOXE C SMOXE C SMOXE
	QUAD	QUAD	QUAD
	<u>'A'</u>		
UPPER SUITE LEVEL	<u> </u>	<u></u>	<u>B</u>
	NORTH ATRIUM	SMOKE ZONE	SOUTHEAST ATRIUM
LOWER SUITE LEVEL			SMOKE ZONE
LOWER SOITE LEVEL			
CLUB LEVEL			
PRESS LEVEL	AHU-1 SUPPLY FAN	AHU-4 SUPPLY FAN	AHU-2 SUPPLY FAN
MAIN CONCOURSE	WILL ENERGIZE THE SMOKE EXHAUST SYSTEM THROUGH T FOUR (4) SMOKE EXHAUST FANS SEF-5,6,11,12 WILL START / EXHAUST AIR DAMPERS HAVE BEEN PROVEN OPEN BY EI	DETECTORS, OR A SPRINKLER WATER FLOW ALARM WITHIN THE ATRIUM THE FIRE ALARM SYSTEM. WHEN A START SIGNAL HAS BEEN RECEIVED. AND RUN CONTINUOUSLY AFTER INTAKE DAMPERS D-5-1 AND D-11-1 AND ND SWITCHES. EACH EXHAUST FAN SHALL BE PROVIDED WITH A SAIL	CROSS ZONED CEILING SMOKE DETECTORS, HVAC SMOKE DETECTORS, OR SPRINKLER WATER FLOW ALARM WITHIN THE ATRIUM WILL ENERGIZE THE 3S EXHAUST SYSTEM THROUGH THE FIRE ALARM SYSTEM. WHEN A START SIG HAS BEEN RECEIVED, FOUR (4) SMOKE EXHAUST FANS SEF-7A,7B,89 WILL ST
	SWITCH TO PROVIDE POSITIVE STATUS FOR OPERATION ON THE ATRIUM WILL BE DE-ENERGIZED AND ALL OF THEIR DA SMOKE EXHAUST IS ENERGIZED. ATRIUM SMOKE EXHAUST I	N THE FIRE ALARM SYSTEM. AIR HANDLING UNITS AHU-1 AND 4 SERVING MPERS WILL RETURN TO THEIR NORMALLY CLOSED POSTION WHEN THE FANS WILL BE AUTOMATICALLY AND MANUALLY STARTED AND STOPPED IE FIRE ALARM PANEL.	AND RUN CONTINUOUSLY AFTER INTAKE DAMPERS D-10-1 AND D-7-1 AND EXH AIR DAMPERS HAVE BEEN PROVEN OPEN BY END SWITCHES. EACH EXHAUST SHALL BE PROVIDED WITH A SAIL SWITCH TO PROVIDE POSITIVE STATUS F
SERVICE LEVEL	BILL OF MATERIALS	$\vdash$	OPERATION ON THE FIRE ALARM SYSTEM. AIR HANDLING UNITS AHU-2 AND SERVING THE ATRIUM WILL BE DE-ENERGIZED AND ALL OF THEIR DAMPERS U RETURN TO THEIR NORMALLY CLOSED POSTION WHEN THE SMOKE EXHAUS ENERGIZED. ATRIUM SMOKE EXHAUST FANS WILL BE AUTOMATICALLY AN
	Estimate: smoke exh Desig. QtyPart # Descript 	70520098.pre C NC SOLENOI tion NO VALVE	AND AIR AND AND AND AND AND AND AND AND AND AND
	AIR FLCW 10 AFS-222 FAN AIR D-5-1,D-7-1,4 SEE DAME D-10-1,D-11-	FLOW SWITCH PER SCHEDULE END SWITCH BY JU	CI DATE OLIADA & D
	SOLE VALVE 12 V11HAA-100 3-W SOLE Panel Devices:	ITION SWITCH INPUT AND IN MODULES S	OUTPUT TIME Project Title SUPPLIED 03:43 PM PALTIMORE NEL CTARUM
		G MOD, SING, W/50VA BY , 4BI, 8BO, 8K OUT FIRE ALARM UNDER DIV	A SYSTEM /ISION 16 FILE NAME PAL TIMORE MARXY AND
			SMOKE.vsd BALTIMORE, MARYLAND



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ull Spreadshee			Software				[	igital Controller Info	ormation		T		Ponel Informa	alion			1	ntermediate Dev	ice			Fie	ld Device		Í	
Tag Point Ty	oe Syster Nam		Expanded ID	Displ	ay Units DO	СТуре: М	N2 Trunk N2 A	Cable ddr Destination Bay/Termina	1	Termination	Panel	Panel Locati	on Slat. Numbær	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/T tubing	Terminations	Device	Location	Ref Detail	Comment
	SEF-B			1	I IVA'	V					EN-EXH	AT FAN	1	1												Power to Controller
	SEF-B	•		1	VAV	V	1	3			EN-EXH		0	l .												N2 Trunk
Al-1	SEF-8			1	VAV	V	1	3 AI-1			EN-EXH		0	1	EXH-3-AI-1	l										
AI-2	SEF-8				VAV	V	1	3 AI-2		•	IEN-EXH		(	1	EXH-3-AI-2											
AI-3	SEF-8				VAV	V	1	3 AI-3			EN-EXH		0		EXH-3-AI-3											
AI-4	SEF-B				VAV		1	3 Al-4			EN-EXH		0		EXH-3-AI-4											
AI-5	SEF-8				VAV		1	3 AI-5			EN-EXH			)[	EXH-3-AI-5		<u> </u>									
AI-6	SEF-B				VAV	-	1	3 AI-6			EN-EXH			1	EXH-3-AI-6	1							<u> </u>			
81-1	SEF-B		Smoke Exh Fan 7A Status		On VA		1	3 BI-1		BI#,24VAC	EN-EXH		(		EXH-3-BI-1	1					2/22		t Aux Contact (NO)		U70	
B1-2	SEF-B		Smoke Exh Fan 7B Status		On VA		1	3 81-2		BI#,24VAC	EN-EXH			)	EXH-3-BI-2								t Aux Contact (NO)		U70	
BI-3	SEF-B	SEF8-S	Smoke Exh Fan 8 Status	Off	On VA		1	3 BI-3		BI#,24VAC	EN-EXH		(	)	EXH-3-BI-3						2/22	Device dependen	t Aux Contact (NQ)		U70	
BI-4	SEF-B				VA		1	3 BI-4			EN-EXH				EXH-3-BI-4						1					
BO-1	SEF-B			1	VAV		1	3 BO-1			EN-EXH		(	)	EXH-3-BO-1	§	<u> </u>									······
BO-2	SEF-B			1	IVA	·		3 BO-2			EN-EXH			)	EXH-3-BO-2				1			<u> </u>			L	
BO-3	SEF-B				VAV		1	3 BO-3			EN-EXH			<u>)</u>	EXH-3-BO-3	1							1			
BO-4	SEF-B				VA	·	1	3 BO-4			EN-EXH		(	) <u> </u>	EXH-3-80-4	ļ						4	1		<u>  </u>	
BO-5	SEF-B				VA		1	3 BO-5			EN-EXH			)	EXH-3-BO-5			1			<u> </u>					
BO-6	SEF-B				VA	-	1	3 BO-6			EN-EXH		(	)	EXH-3-BO-6			L								
:BO-7	ISEF-B				VA	· · · · · · · · · · · · · · · · · · ·	1	3 BO-7			EN-EXH			)	EXH-3-BO-7						l					
BO-8	SEF-B			1	VA	V .	1	3 BO-8			EN-EXH	AT FAN		)	EXH-3-BO-8	-	1			1	1					

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ull Spre	adsheet	Software Digital Controller Information				I		Panel Informa	ntion			!	ntermediate Dev	ice		Field Device												
Tag P	Point Type	System Name	Object Name	Expanded ID	Display	y Units	DC Type	N2 Trunk	N2 Addr	Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Locatio	n Silot Number	Reference Drawing	Cable Number	Wining/T ubing	Termination In	Device	Termination Out	Location	Wiring/T ubing	Terminations	Dəvicə	Location	Rəf Dətail	Comment
		SEF-C			1	1V	AV		1				EN-EXH		1		1	1							1			Power to Controller
		SEF-C	•	1			'AV	1	6				EN-EXH	AT FAN	0		1						1					N2 Trunk
A		SEF-C					'AV	1	6	Al-1			EN-EXH		0	1	EXH-6-Al-1						2					
A	1-2	SEF-C		1		1	'AV	1	6	AI-2			EN-EXH		0		EXH-6-AI-2						2					
A	4-3	SEF-C				N IN	'AV	1	6	AI-3			EN-EXH		0		EXH-6-AI-3						1					
A	1-4	SEF-C					'AV	1	6	Al-4			EN-EXH	AT FAN	0		EXH-6-AI-4	1					1					
A	d-5	SEF-C				1	AV	1	6	Al-5				AT FAN	0		EXH-6-AI-5						ļ.					
A	1-6	SEF-C					AV	1	6	Al-6			EN-EXH		0		EXH-6-AI-6						<u> </u>					
В	11-1	SEF-C		Exh Fan 1 Status	Off	On \		1		BI-1		BI#,24VAC		AT FAN	0		EXH-6-BI-1			1					(NO) tAux Contact		JU70	
8		SEF-C		Exh Fan 1 Status	Off	On  \		1	6	BI-2		BI#,24VAC	(EN-EXH		0		EXH-6-BI-2	1							t Aux Contact (NO)		U70	
iB	11-3	SEF-C	SEF10B-S	Exh Fan 1 Status	Off	On \		1		BI-3		BI#,24VAC		AT FAN	0		EXH-6-81-3						1:2/22	Device dependent	tiAux Contact (NO)		U70	
В	1-4	SEF-C					AV	1	6	BI-4				AT FAN	0		EXH-6-BI-4	1					ŀ					
В	10-1	SEF-C					AV.	11		BO-1			EN-EXH	AT FAN	0	L	EXH-6-BO-1			L								
B	0-2	SEF-C					AV	1	6	BO-2			EN-EXH		0		EXH-6-BO-2	ļ										
B B B	10-3	SEF-C					AV	1	6	BO-3				AT FAN	0	1	EXH-6-BO-3	L							1			
В	0-4	SEF-C					AV	1		80-4			EN-EXH		0	·	EXH-6-BO-4							L				
В	10-5	SEF-C					AV	1		BO-5			EN-EXH		1 0	1	EXH-6-80-5	1				1		ļ			ļ	
8	0-6	SEF-C					AV	<u> </u>		BO-6				AT FAN	0	1	EXH-6-80-6	1					1	ļ		1		
в		SEF-C					AV	1		BO-7			EN-EXH		0	1	EXH-6-BO-7	1					<u></u>					
B	10-8	SEF-C	1	i		1	/AV	1	1 61	80-8	1		EN-EXH	IAT FAN	· C	H	EXH-6-BO-8	1	1	1			1	1	1			

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Full Spreadsheet			Software		1		Digite	al Controller Info	mation			P	anel Infarma	ion		1	ntermediate Dev	vice			Fiel	d Device		i	
Tag Point Type	Name	Object Name	Expanded ID	Display Units	DC Туфе	N2 Trun	k N2 Addr	Cable Destination Bay/Terminal	Module Type	Termination	Panəl	Panel Locatio	on Slist Numbe	Reference Drawing	Cable Number	Wiring/T ubing	Device	Termination Out	Location	Wiring/T ubing	Terminations	Device	Location	Rəf Dətail	Comment
	ISEF-D	1		: <u>i</u>	VAV						EN-EXH														Power to Controller
	SEF-D	•			VAV		1 4				EN-EXH			0										1	N2 Trunk
	SEF-D				VAV			Al-1			EN-EXH				EXH-4-Al-1										
AI-2	SEF-D				VAV		·	AI-2			EN-EXH	AT FAN			EXH-4-AI-2										
AI-3	SEF-D				VAV			AI-3			EN-EXH				EXH-4-AI-3										
AI-4	SEF-D			· · · · · · · · · · · · · · · · · · ·	VAV			AI-4			EN-EXH				EXH-4-Al-4										
AI-5	SEF-D			·	VAV		·	AI-5			EN-EXH				EXH-4-AI-5		1								
AI-6 BI-1	SEF-D				VAV			AI-6			EN-EXH				EXH-4-AI-6										
	SEF-D		Smoke Exh Fan 11 Status	Off On				81-1			EN-EXH				EXH-4-BI-1						Device dependent			U70	
81-2 81-3	SEF.D	SEF12-S	Smoke Exh Fan 12 Status		VAV			81-2			EN-EXH				EXH-4-BI-2					2/22	Device dependent	Aux Contact (NO)		U70	
181-3	SEF-D				VAV	<u> </u>		81-3			EN-EXH				EXH-4-BI-3										
81-4	SEF-D	I			VAV	1		81-4			EN-EXH				EXH-4-BI-4										
BO-1	SEF-D				VAV			80-1			EN-EXH			0	EXH-4-80-1										
BO-2	ISEF-D				VAV			80-2			EN-EXH			0	EXH-4-BO-2										
	SEF-D			1	VAV			BO-3			EN-EXH			0	EXH-4-BO-3					1				L İ	
BO-4	SEF-D	ļ		1	VAV	1.		80-4			EN-EXH			0	EXH-4-BO-4					1	1				
BO-5	SEF-D		1	<u> </u>	VAV		1 4	80-5			EN-EXH			0	EXH-4-BO-5					1					
BO-6	SEF-D	1			VAV		1 4	BO-6			EN-EXH			0	EXH-4-BO-6		1			1					
80-7	SEF-D				VAV		1 4	80-7		1	EN-EXH	AT FAN		0	EXH-4-BO-7					1					
80-8	ISEF-D	1			VAV		1 4	BO-8	1	1	EN-EXH	AT FAN		0	EXH-4-BO-8		1			1	1				

## ELECTRICAL SUBSTATIONS

TMP-S

HIGH TEMPERATURE ALARM IN SUBSTATION ENCLOSURE (CONTACT BY DIVISION 16)



DIGITAL ELECTRIC METER IN SUBSTATION ENCLOSURE (CONTACT BY DIVISION 16)

SUBSTATION	LOCATION	JCI PANEL
SS1-PRA	PRESS LEVEL ELECTRICAL ROOM QUAD A	EN-ELEC-A1
SS2-PRA	PRESS LEVEL ELECTRICAL ROOM QUAD A	EN-ELEC-A2
SS1-PRB	PRESS LEVEL ELECTRICAL ROOM QUAD B	EN-ELEC-B1
SS2-PRB	PRESS LEVEL ELECTRICAL ROOM QUAD B	EN-ELEC-B2
SS1-PRC	PRESS LEVEL ELECTRICAL ROOM QUAD C	EN-ELEC-C1
SS2-PRC	PRESS LEVEL ELECTRICAL ROOM QUAD C	EN-ELEC-C2
SS1-PRD	PRESS LEVEL ELECTRICAL ROOM QUAD D	EN-ELEC-D1
SS2-PRD	PRESS LEVEL ELECTRICAL ROOM QUAD D	EN-ELEC-D2
SS1-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B	EN-ELEC-S1
SS2-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B	EN-ELEC-S2
SS3-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B	EN-ELEC-S3
SSFP-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B	EN-ELEC-S4
SSGE-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B	EN-ELEC-S5
SSGL-SRB	SERVICE LEVEL ELECTRICAL ROOM QUAD B	EN-ELEC-S6

## **HEAT TRACE PANELS**

HTP-S

PANEL ALARM CONTACT IN ENCLOSURE (CONTACT BY DIVISION 16)

HEAT T	RACE LOC	ΑΠΟΝ	JCI PANEL
QUAD /	a Main	I CONCOURSE ELECTRICAL ROOM QUAD A	EN-ELEC-A1
QUAD I	3 MAIN	I CONCOURSE ELECTRICAL ROOM QUAD B	EN-ELEC-B1
QUAD (	C MAIN	I CONCOURSE ELECTRICAL ROOM QUAD C	EN-ELEC-C1
QUAD I	D MAIN	I CONCOURSE ELECTRICAL ROOM QUAD D	EN-ELEC-D1

## **CONCOURSE LEVEL TOILET EXHAUST FANS**

TEFA4-C

EXHAUST FAN	LOCATION	JCI PANEL
TEF-A4	MAIN CONCOURSE LEVEL QUAD A	EN-ELEC-A1
TEF-A5	MAIN CONCOURSE LEVEL QUAD A	EN-ELEC-A1
TEF-A6	MAIN CONCOURSE LEVEL QUAD A	EN-AHU-1
TEF-A9	MAIN CONCOURSE LEVEL QUAD A	EN-AHU-1
TEF-B9	MAIN CONCOURSE LEVEL QUAD B	EN-AHU-2
TEF-B10	MAIN CONCOURSE LEVEL QUAD B	EN-AHU-2
TEF-B12	MAIN CONCOURSE LEVEL QUAD B	EN-AHU-2
TEF-B13	MAIN CONCOURSE LEVEL QUAD B	EN-AHU-2
TEF-C1	MAIN CONCOURSE LEVEL QUAD C	EN-ELEC-C1
TEF-C2	MAIN CONCOURSE LEVEL QUAD C	EN-ELEC-C1
TEF-C3	MAIN CONCOURSE LEVEL QUAD C	EN-AHU-3
TEF-D1	MAIN CONCOURSE LEVEL QUAD D	EN-AHU-4
TEF-D4	MAIN CONCOURSE LEVEL QUAD D	EN-ELEC-D1
TEF-D5	MAIN CONCOURSE LEVEL QUAD D	EN-ELEC-D1

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### ELECTRICAL SUB-STATIONS

SYSTEM.

### ELECTRIC HEAT TRACE SYSTEMS

## CONCOURSE LEVEL TOILET ROOMS

CONCOURSE LEVEL TOILET ROOMS HAVE THREE (2) MODES OF STANDARD OPERATION AS FOLLOWS:

THE METASYS SYSTEM WILL HAVE THE ABILITY TO CONTROL INDIVIDUAL TOILET ROOM COMPONENTS (ON/OFF) AS REQUIRED BY THE MODE OF OPERATION. IN THE OCCUPIED MODE, INDIVIDUAL TOILET EXHAUST FANS WILL START AND RUN CONTINUOUSLY. GRAVITY OPERATED BACKDRAFT DAMPER ON FAN WILL RESPOND TO FAN OPERATION. IN THE UNOCCUPIED MODE INDIVIDUAL TOILET EXHAUST FANS WILL BE DE-ENERGIZED AND BACKDRAFT DAMPERS WILL CLOSE. PLUMBING LINE ARE VALVED OFF AND DRAINED, FIXTURES HAD TRAPS ARE PROTECTED FROM FREEZING WITH GLYCOL. THE JANITOR'S CLOSET ASSOCIATED WITH EACH TOILET ROOM WILL REMAIN HEATED THROUGHOUT THE HEATING SEASON. ISOLATION OF WATER PIPING AND DRAINING OF TOILET ROOM BRANCH LINES OCCURS IN THIS ROOM. HEATERS IN JANITOR'S CLOSET WILL BE ADJUSTED TO MAINTAIN FIFTY-FIVE (55F).

OCCUPIED OR UNOCCUPIED MODE .

REVISION	Drawing Title SUBSTATION ELEC METERING
NUMBER	HEAT TRACE PANELS MAIN CONCOURSE TOILET
DATE 07/18/00	EXHAUST FANS
TIME 03:44 PM	Project Title BALTIMORE NFL STADIUM AT CAMDEN YARDS
FILE NAME ELECTRIC.VS	

		BILL OF MATERI.	ALS	
Estimate: ele	ectr.	ic		70520098.pre
Desig.	Qty:	Part #	Description	
Field Devices	5:			
TEF, CUH	14	BZ-1000-11	ENCL, 4-5/8X 5-1	/8 I 3-3/8
	14	PD-101-35	RLY BASE, 3PDT, 1	1PIN., 10A
	14	PD-109-51	RELAY PLUG-IN 3	PDT 24VAC
Panel Device:	s :			
DC-1	14	AS-VAV110-1	VAV 6AI,4BI,8BO	, 8K
EN-ELEC-x	14	EN-EWC15-0	UNIV PKG MOD, SI	NG,W SOVA

SUBSTATION TRANSFORMER HIGH TEMPERATURE ALARMS AND SUBSTATION ELECTRIC USAGE WILL BE MONITORED THROUGH THE METATSYS

THE FOUR (4) MAIN HEAT TRACE SYSTEM PANEL ALARMS WILL BE MONITORED THROUGH THE METAYS SYSTEM.

1. OCCUPIED - FULLY OPERATIONAL DURING STADIUM EVENT. 2. UNOCCUPIED - NOT VENTILATED BETWEEN STADIUM EVENTS DURING THE NFL SEASON.

CABINET HEATERS FAN AND HEATING ELEMENTS WILL BE CYCLED ON AND OFF TO MAINTAIN A FIFTY-FIVE (55F) SPACE TEMPERATURE IN THE

AS-BUILT								7/18/00	СМЕ
REFERENCE	ORAWING	NO.		REVISION	OCATIO	N	ECN	DATE	ВY
Sales Engineer	Project Manager	Application		1	DRAW	N		APPROVED	
JDP	WJT	R1	rs	BY RTS	DATE	09/11/97	ЗY	DATE	
	JOHN TROLS	SO	N	Branch Informat Johnson 60 Lovet Sparks,	Contr on Cir	cle	CONTRACT 70	52-00	98
CON	IROLS	>					SRAWING	NUMBER	
Systems	& Services [	Divisio	n				BL	-6559	-47

## Baltimore NFL Stadium

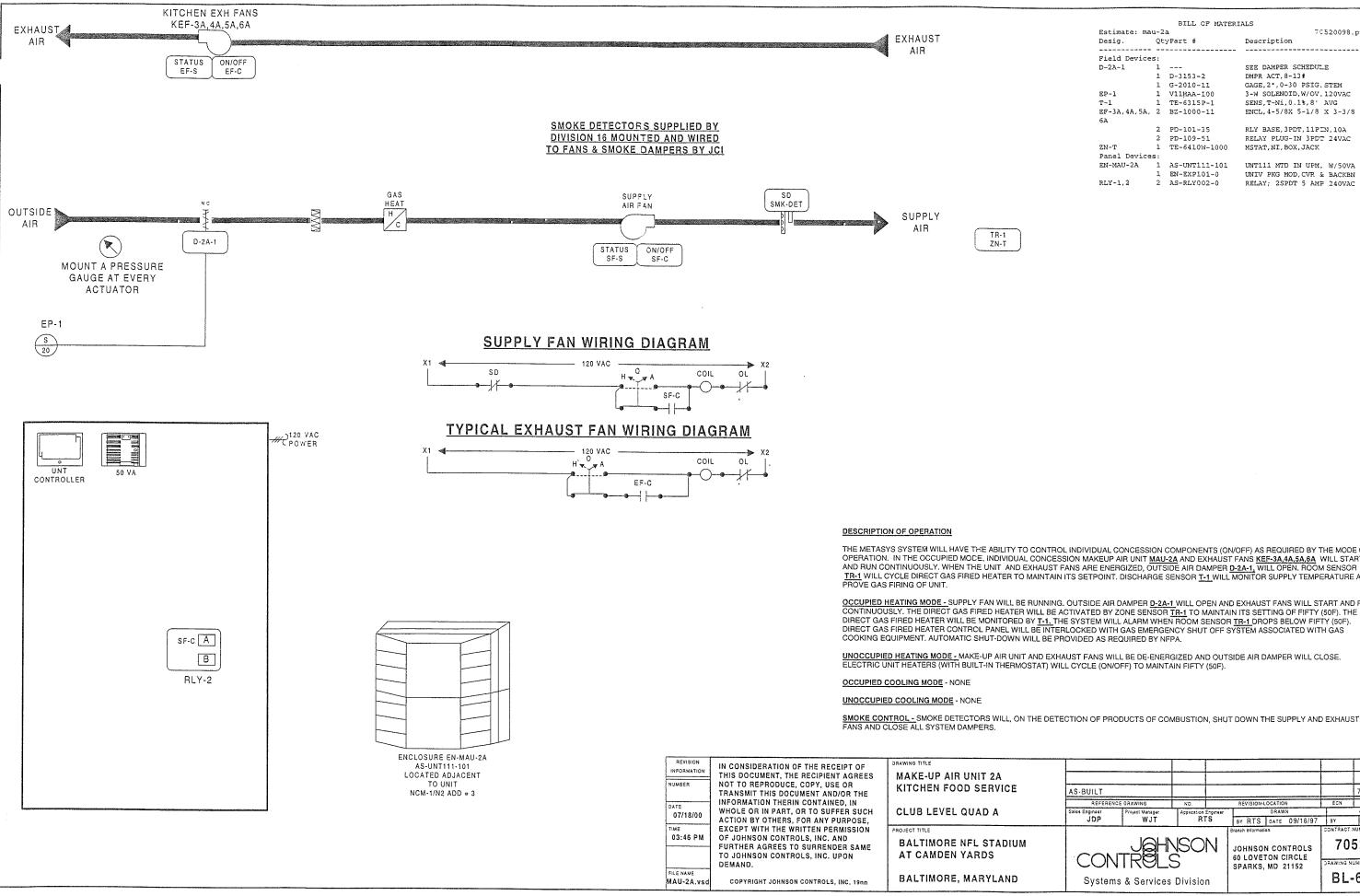
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Spreads	system Object Expanded ID Display Units DC Tup					Digital Control	The first of the second second second second second second second second second second second second second se			1	Panel Informa	tion	1			Intermediate Dev	lice		{	Fiol	Device		F			
g Poin		Name	Object Name	Expanded ID	Display Uni	Is DCT	/pe N2 Trunk	N2 Addr Destin Bay/Te	ation Module Type	Termination	Panel	Panel Locati	ion Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	1		Termination Out	Location	Wiring/T ubing	1	Device	Location	Ref Detail	Comme
_		ELEC-A1				VA'V	1	1			IEN-ELECA								1					J		
		ELEC-A1	*		1	VA'I	1	4			EN-ELECA															Power to Controller
Al-1		ELEC-A1				VA'I/	1	4 Al-1			EN-ELECA				ELECA-4-AI-1						·					N2 Trunk
AI-2		ELEC-A1				VAW	1	41AI-2			EN-ELECA			0	ELECA-4-AI-2											
AI-3		ELEC-A1		1	1	VAW	1	4 AI-3			EN-ELECA			0	ELECA-4-AI-2											
A!-4	][	ELEC-A1				VA'V	1	4 AI-4	~~~	<u> </u>	EN-ELECA			<u>.</u>				L								
AI-5		ELEC-A1				VAW		4 AI-5			EN-ELECA			01	ELECA-4-AI-4											
AI-6	l	ELEC-A1				VAW		4 Al-6			EN-ELECA				ELECA-4-AI-5											
BI-1	E	ELEC-A1				VAW		4iBI-1			IEN-ELECA			0	ELECA-4-AI-6											
BI-2	E	ELEC-A1	HTP-A	Heat Trace Panel Quad A	Normal Alar	n VA'ı/		4181-2		BI#.24VAC	EN-ELECA			0	ELECA-4-BI-1							1	***			
81-3	88	ELEC-A1		Substation SS1-PRA Temp				4.81-2		BI#.24VAC				0	ELECA-4-BI-2			1			:2/22	Device dependent	Panel Contact (NO)	~ ·····	U70	
81-4	le.	ELEC-A1	ELE-A1	Substation SS1-PRA Elec	Kw	IVA'		4 81-3		BI#,24VAC	EN-ELECA			0	ELECA-4-BI-3						:2/22	Device dependent	Panel Contact (NO)		U70	
BO-1		ELEC-A1		Toilet Exh Fan A4 Chtrl	Off Or			4 80-1		BO#,24VAC	EN-ELECA			0	ELECA-4-BI-4			1			:2/22		Panel Contact (NO)	<u> </u>	U70	
BO-2	iF			Toilet Exh Fan A5 Chtrl	Off Of			4180-1			EN-ELECA			01	ELECA-4-80-			PD-109-51			2/18	Device dependent			1151	
80-3		ELEC-A1	121710-0	TOUCE CALL AT AS CHILL		VAV	_	4180-2 4180-3		BO#,24VAC	EN-ELECA			0	ELECA-4-80-2			PD-109-51			:2/18	Device dependent			U51	
BO-4		ELEC-A1				IVA'I		4 BO-3 4 BO-4			EN-ELECA			0	ELECA-4-BO-C			1								
BO-5		ELEC-A1									EN-ELECA			0	ELECA-4-BO-4				1	1						
80.6		ELEC-A1			ļ	VAW		4 80-5			EN-ELECA			01	ELECA-4-BO-5					1						
80-7		ELEC-A1	····			VA'ı'		4 80-6		l	EN-ELECA			oj	ELECA-4-BO-6			· · · · · · · · · · · · · · · · · · ·	1							
BO-8		ELEC-A1				VA'+		4 80-7			EN-ELECA			0	ELECA-4-BO-7	7		1								
100-0		LLLU-AI		L		VA'i/	1	4IBO-8			EN-ELECA	AT UNIT	1	2	ELECA-4-BO-8	8										

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BILL OF MATERIALS Estimate: mau-2a 70520098.pre Desig. QtyPart # Description ----------\_\_\_\_\_ Field Devices: D-2A-1 SEE DAMPER SCHEDULE D-3153-2 DMPR ACT, 8-13# GAGE, 2\*, 0-30 PSIG, STEM G-2010-11 EP-1 V11HAA-100 3-W SOLENOID, W/OV, 120VAC T-1 TE-6315P-1 SENS,T-Ni,0.1%,8' AVG EF-3A,4A,5A, 2 BZ-1000-11 ENCL, 4-5/8X 5-1/8 X 3-3/8 6A PD-101-35 RLY BASE, 3PDT, 11PIN, 10A PD-109-51 RELAY PLUG-IN 3PDT 24VAC 2 ZN-T 1 TE-6410W-1000 MSTAT.NI.BOX.JACK Panel Devices: EN-MAU-2A 1 AS-UNT111-101 UNT111 MTD IN UPM, W/50VA EN-EXP101-0 UNIV PKG MOD, CVR 🕿 BACKBN RLY-1,2 2 AS-RLY002-0 RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL HAVE THE ABILITY TO CONTROL INDIVIDUAL CONCESSION COMPONENTS (ON/OFF) AS REQUIRED BY THE MODE OF OPERATION. IN THE OCCUPIED MODE, INDIVIDUAL CONCESSION MAKEUP AIR UNIT <u>MAU-2A</u> AND EXHAUST FANS <u>KEF-3A,4A,5A,5A</u> WILL START AND RUN CONTINUOUSLY. WHEN THE UNIT AND EXHAUST FANS ARE ENERGIZED, OUTSIDE AIR DAMPER <u>D-2A-1</u>, WILL OPEN, ROOM SENSOR TR-1 WILL CYCLE DIRECT GAS FIRED HEATER TO MAINTAIN ITS SETPOINT. DISCHARGE SENSOR T-1 WILL MONITOR SUPPLY TEMPERATURE AND

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING. OUTSIDE AIR DAMPER <u>D-2A-1</u> WILL OPEN AND EXHAUST FANS WILL START AND RUN CONTINUOUSLY. THE DIRECT GAS FIRED HEATER WILL BE ACTIVATED BY ZONE SENSOR <u>TR-1</u> TO MAINTAIN ITS SETTING OF FIFTY (50F). THE DIRECT GAS FIRED HEATER WILL BE MONITORED BY <u>T-1.</u> THE SYSTEM WILL ALARM WHEN ROOM SENSOR <u>TR-1</u> DROPS BELOW FIFTY (50F). DIRECT GAS FIRED HEATER CONTROL PANEL WILL BE INTERLOCKED WITH GAS EMERGENCY SHUT OFF SYSTEM ASSOCIATED WITH GAS

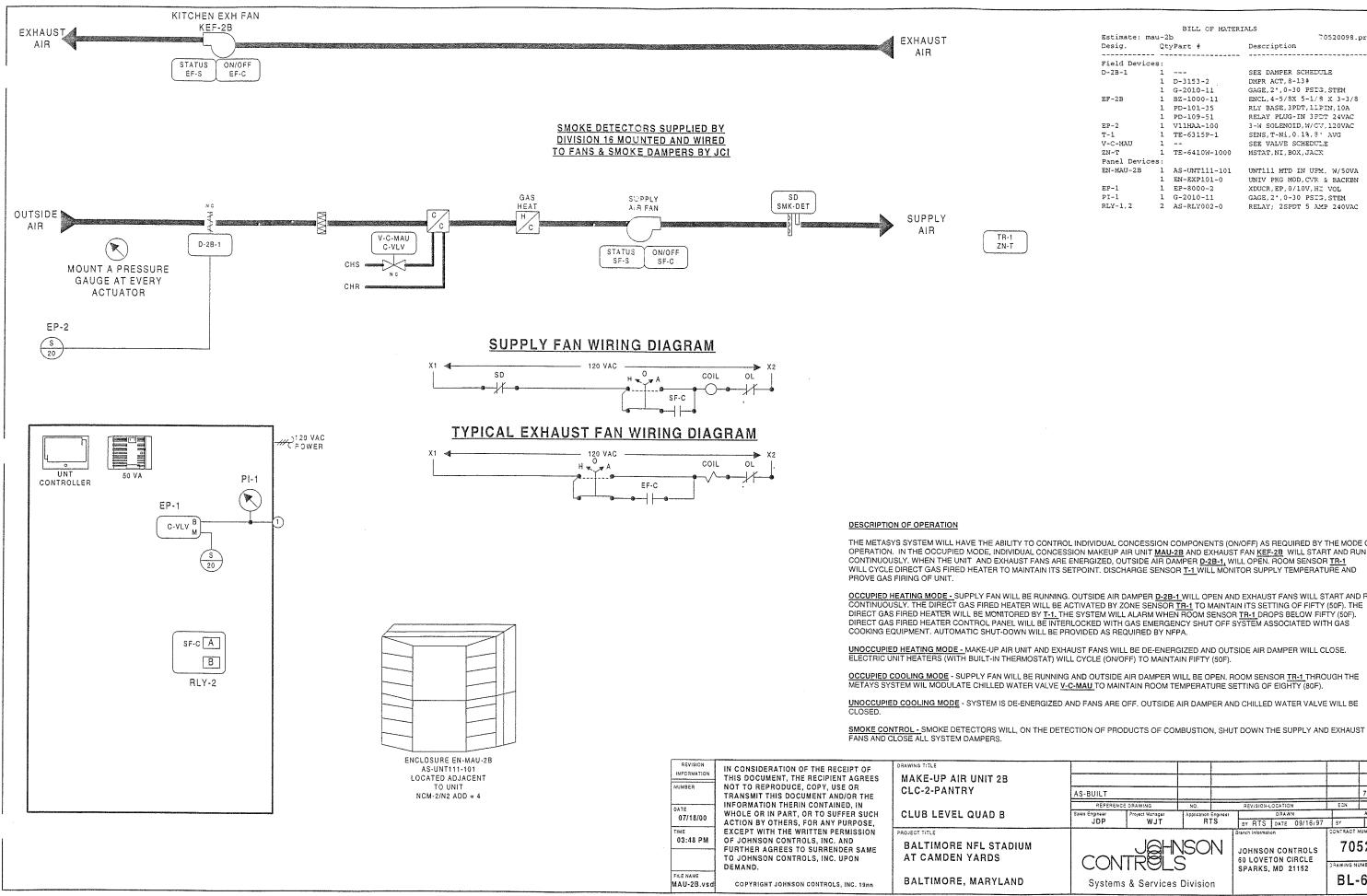
AS-BUILT								7/18/00	CME
REFERENCE	DRAWING	NO.		REVISION-L	OCATION	ł	ECN	DATE	BY
Sales Engineer	Project Manager	Application		T	ORAW	N		APPROVED	
JDP	WJT	R	rs	BY RTS	DATE	09/16/97	BY	DATE	
				Branch Informatio	n		CONTRACT	NUMBER	
	JOHN TROLS	SO	N	JOHNSON 60 LOVET			70	52-00	98
	IROLS	)		SPARKS,	* · · ·		DRAWING N	IUMBER	
Systems	& Services [	Divisio	n				BL	-6559	-48

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ull Spi	eadsheet		Quantum construction	Software				Di	gital Controller Inf	ormation			Pan	ai Informa	tion				Intermediate Dev	ice			Fiel	d Device	1	·····	
ĩag	Point Type	Name	Object Name	Expanded ID	Display Unit	ЭС Туре	N2 Tru	unk N2 Ac	Cable Destination Bay/Termino		Terminction	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Locatiom	Wiring/T ubing	Terminations	Device	Location	Ref Detcil	Comment
		MAU-2A	L			UNT	1				1	EN-MAU2B		-		1			1			•					ower to Controller
		MAU-2A				UNT		1	3			EN-MAU2B		(						1		d.					N2 Trunk
	Al-1	MAU-2A				UNT		1	3 Al-1			EN-MAU2B		(		MAU2B-3-AI-	1		· · · · · · · · · · · · · · · · · · ·			N.					
	AI-2	MAU-2A				UNT		1	3 AI-2			EN-MAU2B		(		MAU2B-3-AI-	2		1			1					
	AI-3	MAU-2A				UNT		1	3 AI-3			EN-MAU2B				MAU2B-3-AI-	3					4					
	Al-4	MAU-2A	ZN-T	Zone Temperature	Deg F	UNT		1	3 Al-4		PHONE JACK	EN-MAU2B		(		MAU2B-3-AI-	4					8/26	PHONE JACK	TE-6410W-1000		U2	
	AI-5	MAU-2A	l			UNT		1	3 AI-5			EN-MAU28	AT UNIT			MAU2B-3-AI-	5					1			1		
	AI-6	MAU-2A	l			UNT		1	3 AI-6		ç.	EN-MAU2B		(		MAU2B-3-AI-I	6					1					
	81-1	MAU-2A		Supply Fan Status	Off On			1	3 BI-1		BI#.24VAC	EN-MAU2B		(		MAU2B-3-BI-	1					2/22	Device dependent	Aux Contact (NO)		U70	
	BI-2	MAU-2A		Exh Fan Status	Off On	UNT		1	3 BI-2		81#,24VAC	EN-MAU2B	AT UNIT	(	)	MAU2B-3-BI-	2					12/22	Device dependent			U70	
	BI-3	MAU-2A	SMK-DET	Smoke Detectors	Normal Alarn	LIVINT		1	3 BI-3		BI#,24VAC	EN-MAU2B	AT UNIT	(		MAU2B-3-BI-	3	1					Device dependent			U70	
	81-4	MAU-2A				UNT		1	3 BI-4			EN-MAU2B		(		MAU2B-3-BI-	4				·····	1					
1	BO-1	MAU-2A				UNT		1	3 80-1		1	EN-MAU28	AT UNIT	(		MAU2B-3-BO	-1		1			1					
	80-2	MAU-2A				LINT		1	3 80-2		1	EN-MAU28		(		MAU2B-3-BO	-2					1		·····			
	BO-3	MAU-2A		Supply Fan Control	Off On	UNT		1	3 80-3	RLY	80#.24V.CCM			(		MAU2B-3-BO	3/18	A,COILS,COM	RELAY-A	NO.COM		2/14	See starter detail	Starter (NO)-(sw lo)		U60	
_	BO-4	MAU-2A	EF-C	Exh Fan Control	Off On			1	3 BO-4		80#,24VAC	EN-MAU2B			0	MAU2B-3-80	1-4		PD-109-51		1			24VAC OUT (sw lo)		U51	
	BO-5	MAU-2A				CENT		1	3 80-5			EN-MAU28		(		MAU2B-3-BO	-5	1									
	BO-6 AO-1	MAU-2A	L			UNT		1	3 80-6		1	EN-MAU2B		(	D	MAU2B-3-BO	1-6		-								
		MAU-2A				LINT		1	3 AO-1			EN-MAU28		(		MAU28-3-AO	-1			1		1					
	AO-2	MAU-2A				LINT		1	3 AO-2		i	EN-MAU28	AT UNIT			MAU2B-3-AO		-		+		1			-		



		BILL OF MATERI	IALS
Estimate: m	au-2	ь	70520098.pre
		yPart ‡	Description
Field Devic			
D-2B-1	1		SEE DAMPER SCHEDULE
	1	D-3153-2	DMPR ACT, 8-13#
			GAGE, 2*, 0-30 PSIG, STEM
EF-2B	1	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3FDT 24VAC
EP-2	1	V11HAA-100	3-W SOLENOID, W/CV, 120VAC
T-1	1	TE-6315P-1	SENS, T-N1, 0.1%, 8° AVG
V-C-MAU	1		SEE VALVE SCHEDULE
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Devic	es:		
EN-MAU-2B	1	AS-UNT111-101	UNTI11 MTD IN UFM, W/50VA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V, HI VOL
PI-1	1	G-2010-11	GAGE, 24, 0-30 PSIG, STEM
RLY-1,2	2	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL HAVE THE ABILITY TO CONTROL INDIVIDUAL CONCESSION COMPONENTS (ON/OFF) AS REQUIRED BY THE MODE OF OPERATION. IN THE OCCUPIED MODE, INDIVIDUAL CONCESSION MAKEUP AIR UNIT <u>MAU-2B</u> AND EXHAUST FAN <u>KEF-2B</u> WILL START AND RUN CONTINUOUSLY. WHEN THE UNIT AND EXHAUST FANS ARE ENERGIZED, OUTSIDE AIR DAMPER <u>D-2B-1</u>, WILL OPEN. ROOM SENSOR <u>TR-1</u> WILL CYCLE DIRECT GAS FIRED HEATER TO MAINTAIN ITS SETPOINT. DISCHARGE SENSOR <u>T-1</u> WILL MONITOR SUPPLY TEMPERATURE AND DEVENSION CONTINUES IN THE OPEN ROOM SENSOR TR-1

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING. OUTSIDE AIR DAMPER D-28-1 WILL OPEN AND EXHAUST FANS WILL START AND RUN CONTINUOUSLY. THE DIRECT GAS FIRED HEATER WILL BE ACTIVATED BY ZONE SENSOR TR-1 TO MAINTAIN ITS SETTING OF FIFTY (50F). THE DIRECT GAS FIRED HEATER WILL BE MONITORED BY T-1. THE SYSTEM WILL ALARM WHEN ROOM SENSOR TR-1 DROPS BELOW FIFTY (50F). DIRECT GAS FIRED HEATER CONTROL PANEL WILL BE INTERLOCKED WITH GAS EMERGENCY SHUT OFF SYSTEM ASSOCIATED WITH GAS

UNOCCUPIED HEATING MODE - MAKE-UP AIR UNIT AND EXHAUST FANS WILL BE DE-ENERGIZED AND OUTSIDE AIR DAMPER WILL CLOSE. ELECTRIC UNIT HEATERS (WITH BUILT-IN THERMOSTAT) WILL CYCLE (ON/OFF) TO MAINTAIN FIFTY (50F).

OCCUPIED COOLING MODE - SUPPLY FAN WILL BE RUNNING AND OUTSIDE AIR DAMPER WILL BE OPEN. ROOM SENSOR <u>TR-1</u> THROUGH THE METAYS SYSTEM WIL MODULATE CHILLED WATER VALVE <u>V-C-MAU</u> TO MAINTAIN ROOM TEMPERATURE SETTING OF EIGHTY (80F).

UNOCCUPIED COOLING MODE - SYSTEM IS DE-ENERGIZED AND FANS ARE OFF. OUTSIDE AIR DAMPER AND CHILLED WATER VALVE WILL BE

AS-BUILT								7/18/00	CME
REFERENCE	ORAWING	NO.		REVISION-	OCATIO	N	ECN	DATE	θY
Sales Engineer	Project Manager	Application Er		1	DRAW	N		APPROVED	
JDP	WJT	RTS	5	BY RTS	DATE	09/16/97	ЗY	DATE	
	•		T	Branch Informal	ion		CONTRACT	NUMBER	
	-J <u>a</u> h	ISO	N	JOHNSO 60 LOVE			70	52-00	98
CON	IKULS	>		SPARKS.			<b>DRAWING N</b>	IUMBER	
Systems	& Services	Division					BL	-6559	-49

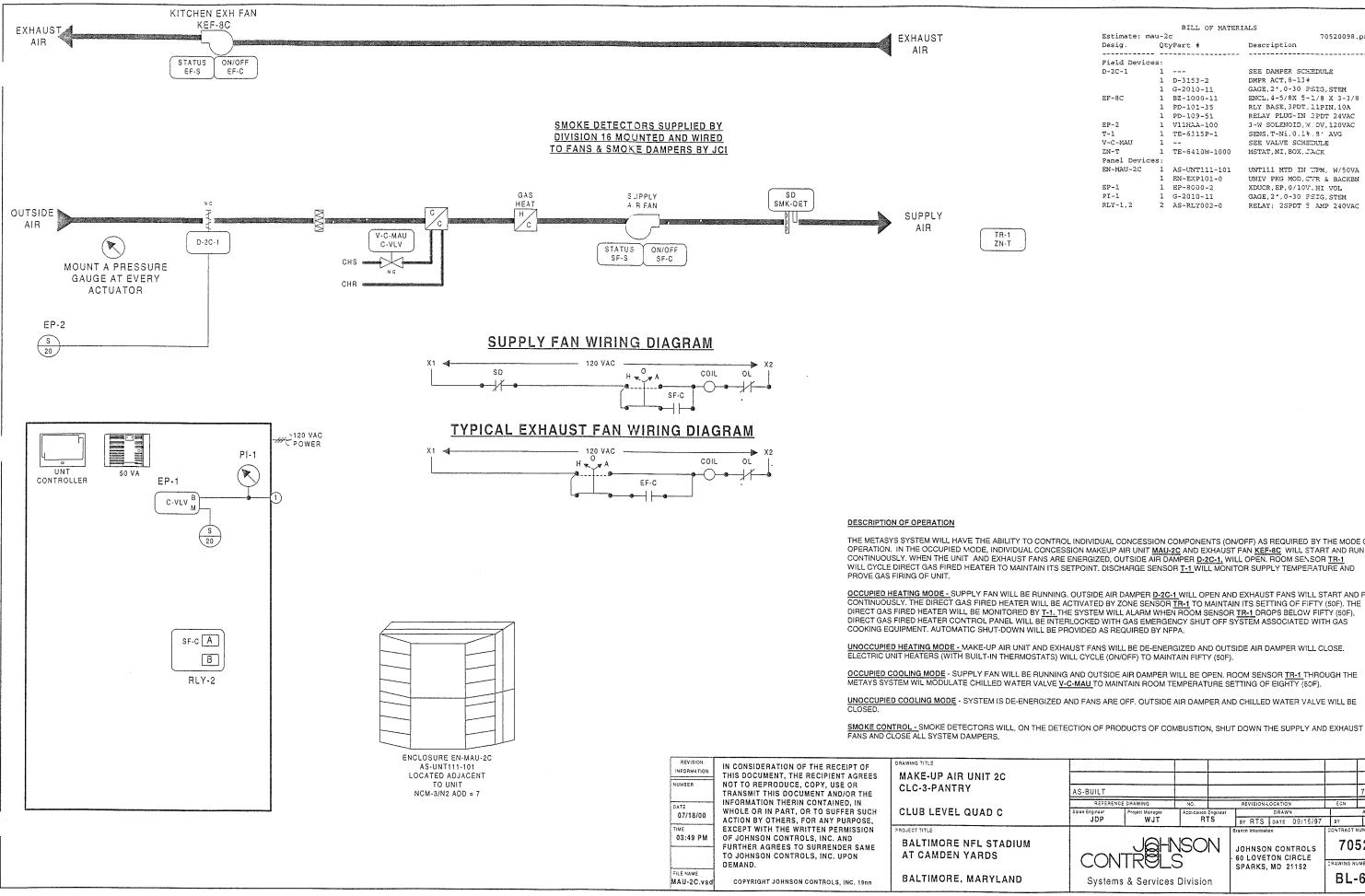
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II Spreads	heet			Software				Digital Controller Int	omation		1	Po	anel Informe	ition				Intermediate Dev	vice		1	Fie	ld Device		<b>I</b>	
lag Poin		System Name	Object Name	Expanded ID	Display Unit	s DC Type	N2 Trunk	Cable N2 Addr Destination Bay/Termina		Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/1 ubing		Device	Location	Ref Detail	Comment
		MAU-2B	l			TMU					EN-MAU28		i			1		- <del>Lanses </del>			1			-	<u> </u>	Power to Controller
		MAU-2B	·			UNT	1	4			EN-MAU2B	AT UNIT	1 0								1					N2 Trunk
Al-1	ļ!	MAU-2B	ļ			JUNT	1	4 Al-1			EN-MAU2B	AT UNIT	C		MAU2B-4-AI-1		•				1					
AI-2		VAU-2B	L			UNT	1	4 AI-2			EN-MAU2B	AT UNIT	C		MAU2B-4-AI-2	1									h	
AI-3		MAU-2B	1			JNT	1	4 AI-3			EN-MAU2B		: C		MAU2B-4-AI-3	1		1								
AI-4			ZN-T	Zone Temperature	Deg F	UNT	1	4 Al-4		PHONE JACK	EN-MAU2B		: 0		MAU2B-4-AI-4	1				1	8/26	PHONE JACK	TE-6410W-1000		112	
AI-5		MAU-2B	L			JUNT	1	4 AI-5			EN-MAU28		0		MAU2B-4-AI-5	1	-			i			12 011011 1000		02	
AI-6		MAU-2B		l		UNT	1	4 AI-6			EN-MAU28		· · · · · ·		MAU2B-4-AI-6	1			-			*	<u>+</u>		·	- 444
BI-1			ISF-S	Supply Fan Status		UNT	1	4 BI-1		BI#,24VAC	EN-MAU28		; C		MAU2B-4-BI-1				-		2/22	Device dependent	Aux Contact (NO)		U70	
81-2				Exh Fan Status	Off On	or other	1	4 81-2		8I#,24VAC	EN-MAU28	AT UNIT	1 0		MAU2B-4-BI-2	1				1	2/22	Device dependent			U70	
81-3			SMK-DET	Smoke Detectors	Normalj Alarn		1	4 BI-3		8I#,24VAC	EN-MAU2B		C		MAU2B-4-BI-3	1					2/22	Device dependent			U70	
BI-4	N	AU-2B				UNT	1	4 BI-4			EN-MAU2B		0		MAU2B-4-BI-4										010	
BO-1		AU-28				UNT	1	4 BO-1			EN-MAU2B		C	1	MAU2B-4-BO-1	1	1			·····	1	1				
BO-2		MAU-2B				UNT	1	4 BO-2			EN-MAU2B		. 0		MAU2B-4-BO-2										]	
BO-3				Supply Fan Control	Olf On		1	4 BO-3			EN-MAU2B		·		MAU2B-4-BO-3		A,COILS,COM	RELAY-A	NO,COM		2/14	See starter detail	Starter (NO)-(sw lo)		U60	
80-4			EF-C	Exh Fan Control	Off On		1	4 BO-4		BO#,24VAC	EN-MAU2B		) C		MAU2B-4-80-4	1		PD-109-51			2/18		24VAC OUT (sw lo)		U51	
80-5	N	AU-2B				<u> </u> 'JNT	1	4 BO-5			EN-MAU28		C		MAU2B-4-BO-5	ľ				1	<u> </u>				<u> </u>	
BO-6		AU-2B				['_INT	1	4 BO-6			EN-MAU28			1	MAU2B-4-BO-6			1	1		<u> </u>	1	<u> </u>			
AO-1			C-VLV	Cooling Coil Valve	% Open	JNT	1	4 AO-1		AO#,AOCM.24VA					MAU2B-4-AO-1	2/18	+,-	EP-8000-2	SUPPLY, O		3/18	Device dependent	0-10V OUT		U23	
AO-2	j N	/AU-2B				JNT	1	4 AO-2			EN-MAU28	AT UNIT			MAU2B-4-AO-2			+		i	1				020	



		BILL OF MATERI	TALS
Estimate: m	au-2	c	70520098.pre
		yPart #	
Field Devic			
D-2C-1	1		SEE DAMPER SCHEDULE
	1	D-3153-2	DMPR ACT, 8-13 #
	1	G-2010-11	GAGE, 2*, 0-30 FSIG, STEM
EF-8C	1	BZ-1000-11	ENCL, 4-5/8X 5-1/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
EP-2	1	V11HAA-100	3-W SOLENOID, W. OV, 120VAC
T-1	1	TE-6315P-1	SENS, T-N1, 0.13, 8' AVG
V-C-MAU	1		SEE VALVE SCHEDULE
ZN-T	1	TE-6410W-1000	MSTAT, NI, BOX, JACK
Panel Devic	es:		
EN-MAU-2C	1	AS-UNT111-101	UNTILL MTD IN TPM, W/50VA
	1	EN-EXP101-0	UNIV PKG MOD, CVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/10V. HI VOL
PI-1	1	G-2010-11	GAGE, 2*, 0-30 FEIG, STEM
RLY-1,2	2	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

THE METASYS SYSTEM WILL HAVE THE ABILITY TO CONTROL INDIVIDUAL CONCESSION COMPONENTS (ON/OFF) AS REQUIRED BY THE MODE OF OPERATION. IN THE OCCUPIED MODE, INDIVIDUAL CONCESSION MAKEUP AIR UNIT <u>MAU-2C</u> AND EXHAUST FAN <u>KEF-3C</u> WILL START AND RUN CONTINUOUSLY. WHEN THE UNIT AND EXHAUST FANS ARE ENERGIZED, OUTSIDE AIR DAMPER <u>D-2C-1</u>, WILL OPEN. ROOM SENSOR <u>TR-1</u> WILL CYCLE DIRECT GAS FIRED HEATER TO MAINTAIN ITS SETPOINT. DISCHARGE SENSOR <u>T-1</u> WILL MONITOR SUPPLY TEMPERATURE AND SENSOR <u>TR-1</u> WILL CYCLE DIRECT GAS FIRED HEATER TO MAINTAIN ITS SETPOINT. DISCHARGE SENSOR <u>T-1</u> WILL MONITOR SUPPLY TEMPERATURE AND

OCCUPIED HEATING MODE - SUPPLY FAN WILL BE RUNNING. OUTSIDE AIR DAMPER <u>D-2C-1</u> WILL OPEN AND EXHAUST FANS WILL START AND RUN CONTINUOUSLY. THE DIRECT GAS FIRED HEATER WILL BE ACTIVATED BY ZONE SENSOR <u>TR-1</u> TO MAINTAIN ITS SETTING OF FIFTY (50F). THE DIRECT GAS FIRED HEATER WILL BE MONITORED BY 1-1. THE SYSTEM WILL ALARM WHEN ROOM SENSOR TR-1 DROPS BELOW FIFTY (50F). DIRECT GAS FIRED HEATER CONTROL PANEL WILL BE INTERLOCKED WITH GAS EMERGENCY SHUT OFF SYSTEM ASSOCIATED WITH GAS

OCCUPIED COOLING MODE - SUPPLY FAN WILL BE RUNNING AND OUTSIDE AIR DAMPER WILL BE OPEN. ROOM SENSOR <u>TR-1</u> THROUGH THE METAYS SYSTEM WIL MODULATE CHILLED WATER VALVE <u>V-C-MAU</u> TO MAINTAIN ROOM TEMPERATURE SETTING OF EIGHTY (50F).

AS-BUILT								7/18/00	CME
REFERENCE	DRAWING	NO.		REVISIONI	OCATIO	N	EGN	DATE	BY
Sales Engineer	Project Managar	Application			DRAW	N .		APPROVED	
JDP	WJT	R1 R1	rs	ay RTS	DATE	09/15/97	BY	DATE	
				Branch Informati	on		CONTRACT	NUMBER	
		ĮSO	N	JOHNSO			70	52-00	98
	IROLE	>		SPARKS,			DRAWING	NUMBER	
Systems	& Services I	Divisio	n				BL	-6559	-50

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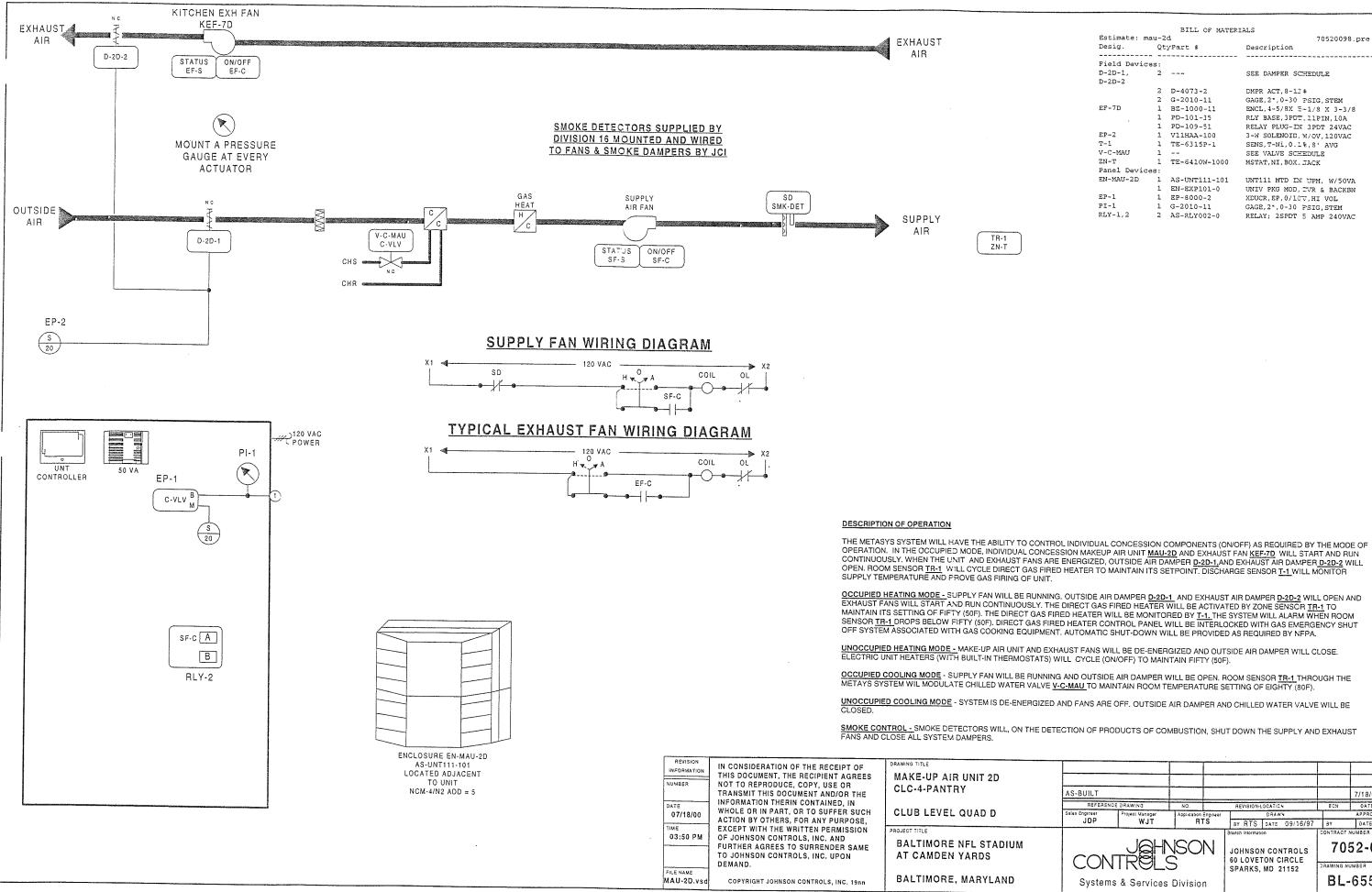
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Spreadsh	eet			Software				Digite	al Controller Info	mation			4	anel Informa	ation				Intermediate Dev	ice			Field	Device			
xg Point		System Name	Object Name	Expanded ID	Display Units	DC Type	N2 Trunk	N2 Addr	Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/I ubing	Terminations	Device	Location	Ref Detail	Comment
		AU-2C	1			UNT					1	EN-MAU2C			1	1	1	1	i i	1							Power to Controller
		AU-2C	ľ		<u> </u>	UNT	1	7				EN-MAU2C		0			1		1	1							N2 Trunk
Al-1		AU-2C				UNT	1		Al-1			EN-MAU2C		0		MAU2C-7-AI-1	4										
AI-2		AU-2C				UNT	1		Al-2			EN-MAU2C		0		MAU2C-7-AI-2	1		1					1			
AI-3		AU-2C				UNT	1	7	AI-3			EN-MAU2C		0		MAU2C-7-AI-3	1										
AI-4		AU-2C	ZN-1	Zone Temperature	Deg F	UNT	1		AI-4		PHONE JACK	EN-MAU2C		0		MAU2C-7-AI-4	1					8/26	PHONE JACK	TE-6410W-1000	1	U2	
AI-5		AU-20 AU-20				UNT	1		A1-5			EN-MAU2C	AT UNIT	0		MAU2C-7-AI-5	1										
IAI-6 IBI-1		AU-2C	000	C		UNT			Al-6 Bl-1		21	EN-MAU2C		0		MAU2C-7-AI-6						}					
BI-1		AU-2C	131-3	Supply Fan Status		UNT			Bi-1 Bi-2		BI#,24VAC	EN-MAU2C		0		MAU2C-7-8I-1	1		1	· · · ·		2/22	Device dependent	Aux Contact (NO)		U70	
	i	AU-2C	CHIL DET	Smoke Detectors	Normall Alarm	UNT	1				BI#,24VAC	EN-MAU2C		0		MAU2C-7-8I-2	1						Device dependent	Aux Contact (NO)		U70	
BI-3		AU-20 AU-20	SMR-DET	Smoke Detectors			1		BI-3 BI-4		BI#,24VAC	EN-MAU2C		0		MAU2C-7-BI-3	ŧ	·	<u> </u>	· · · · ·		2/22	Device dependent	(NO)		U70	
BO-1		AU-2C	·			UNT		7	B0-1		<u> </u>	EN-MAU2C		0		MAU2C-7-8I-4	<u> </u>					1					
BO-2		AU-20				UNT	1		BO-2			EN-MAU2C		0		MAU2C-7-80-1	1										
80-2	M	AU-2C	SELC	Supply Fan Control					BO-3	BLY	BO#,24V.COM	EN-MAU2C				MAU2C-7-BO-2 MAU2C-7-BO-3		1.0011.0.0011									
BO-4			IFF-C	Exh Fan Control		UNT			BO-4		BO#.24V.COM	EN-MAU2C		0		MAU2C-7-BO-3 MAU2C-7-BO-4		A,COILS,COM		NO,COM				Starter (NO)-(sw lo		U60	
80-5		AU-2C		CATTATOSING		UNT			BO-5			EN-MAU2C	AT UNIT	0		MAU2C-7-BO-4 MAU2C-7-BO-5			PD-109-51			2/18	Device dependent	24VAC OUT (sw lo	>)	U51	
80-6		AU-2C				UNT	1		BO-6			EN-MAU2C				MAU2C-7-80-6			- <u> </u>					<u></u>			
AO-1			C-VLV	Cooling Coil Valve	% Open	UNT	1		AQ-1		AO#,AOCM,24VA					MAU2C-7-AO-1			EP-8000-2	SUPPLY. O		0/10	D				
AO-2		AU-2C	1	g en turo		UNT	1		AO-2			EN-MAU2C				MAU2C-7-AO-2		<del>+</del> ,•	En-000-2	SUFFLY.U		3/18	Device dependent	10-10V OUF		U23	

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		yPart #	-
Field Devic			
D-2D-1, D-2D-2	2		SEE DAMPER SCIMEDULE
	2	D-4073-2	DMPR ACT, 8-13#
	2	G-2010-11	GAGE, 2*, 0-30 PSIG, STEM
EF-7D	1	BZ-1000-11	ENCL, 4-5/8X E-1/8 X 3-3/8
	1	PD-101-35	RLY BASE, 3PDT, 11PIN, 10A
	1	PD-109-51	RELAY PLUG-IN 3PDT 24VAC
EP-2	1	V11HAA-100	3-W SOLENOID, W/OV, 120VAC
T-1	1	TE-6315P-1	SENS, T-Ni, 0.1%, S' AVG
V-C-MAU			SEE VALVE SCHEDULE
ZN-T		TE-6410W-1000	MSTAT, NI, BOX. JACK
Panel Devic			
EN-MAU-2D	1	AS-UNT111-101	UNT111 MTD IN UPM, W/50VA
			UNIV PKG MOD, TVR & BACKBN
EP-1	1	EP-8000-2	XDUCR, EP, 0/107, HI VOL
PI-1			GAGE,2*,0-30 PSIG,STEM
RLY-1,2	2	AS-RLY002-0	RELAY; 2SPDT 5 AMP 240VAC

SENSOR TR-1 DROPS BELOW FIFTY (50F). DIRECT GAS FIRED HEATER CONTROL PANEL WILL BE INTERLOCKED WITH GAS EMERGENCY SHUT

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AS-BUILT								7/18/00	СМЕ	
REFERENCE	DRAWING	NO.		REVISION-L	OCATIC	N	ECN	DATE	8Y	-
Sales Engineer	Project Manager	Application			DRAW	4		APPROVED		
JDP	WJT	RT	rs	ay RTS	DATE	09/16/97	BY	DATE		
			NI	Branch Informati			CONTRACT	52-00	0.8	
	TRELS	50		JOHNSON 60 LOVET					30	
	MOLS	>	}	SPARKS,	MD 2	1152	DRAWING 1	IUMBER		
Systems	& Services [	Divisio	n				BL	-6559	-51	

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## Baltimore NFL Stadium

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I Spreadsheet								Digit	al Controller Infor	mation			Pa	nel Informa	ion			1	Intermediate Dev	ice		1	Fig	d Device						
Point Type	Name	Object Name	Expanded ID	Display	Umits	DC Type	N2 Trunk	N2 Addr	Cable Destination Bay/Terminal	Module Type	Termination	Panel	Panel Location	Slot Numbei	Reference Drawing	Cable Number	Wiring/T ubing	Termination In	Device	Termination Out	Location	Wiring/1 ubing	}	Device	Location	Ref Detail	Comment			
	MAU-2D					UNT			ĺ			EN-MAU2E		1	·/		1		L		i	1			- <u> </u>		Power to Controller			
	MAU-2D *					UNT	1	5				EN-MAU2E		1	5				1		1					1	N2 Trunk			
Al-1	MAU-2D				-	UNT	1		AI-1	1		EN-MAU2E			0	MAU2B-5-AI-1		1	1			1								
A1-2	MAU-2D				1	UNT	1		AI-2			EN-MAU2E			5	MAU2B-5-AI-2					1			*						
	MAU-2D		-		i	UNT	1		AI-3			EN-MAU2E			D	MAU2B-5-AI-3			1			1	1				(			
	MAU-2D ZN	N-1	Zone Temperature	Deg	F	UNT	1		Al-4		PHONE JACK	EN-MAU2E			0	MAU2B-5-AI-4			1	1		8/26	PHONE JACK	TE-6410W-1000		U2				
AI-5 AI-6	MAU-2D					UNT	1		AI-5			EN-MAU2E		1		MAU2B-5-AI-5			;	1		1	1			02				
	MAU-2D					UNT	1		AI-6			EN-MAU2E			)	MAU2B-5-AI-6	1		1	1		1	1							
BI-1	MAU-2D SP		Supply Fan Status	0#			1		BI-1		BI#,24VAC	EN-MAU2E			)	MAU2B-5-BI-1				1	· · · · · · · · · · · · · · · · · · ·	2/22	Device depender	nt Aux Contact (NO)		U70				
	MAU-2D EP		Exh Fan Status	Off			1		BI-2			EN-MAU2E			)	MAU2B-5-8I-2			1		1	2/22		t Aux Contact (NO)		U70	[			
		MAJUET	Smoke Detectors	Normali	alaim		1		BI-3		BI#,24VAC	EN-MAU2E				MAU2B-5-BI-3						2/22	Device depender			U70				
	MAU-2D MAU-2D					UNT	1		BI-4	ļ		EN-MAU2E			)	MAU2B-5-8I-4			1	1	1									
	MAU-2D					UNT	<u> </u>		BO-1			EN-MAU2E				MAU2B-5-BO-			1	1		1	1							
	MAU-2D SF	=	Supply Fan Control			UNT	1		BO-2			EN-MAU2E				MAU2B-5-BO-			1	1	[		İ							
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	MAU-2D Er		Exit Fait Control	Off			1			I	BO#,24VAC	EN-MAU2E			)	MAU2B-5-BO-			PD-109-51			2/18	Device depender	t 24VAC OUT (sw lo)		U51	·			
	MAU-2D MAU-2D				i	UNT	]		BO-5			EN-MAU2E			)	MAU2B-5-BO-			1	1	1		1		1					
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	IMMU-20 I					UNT	1	5	AU-2	1		EN-MAU2E	IAT UNIT			MAU2B-5-AO-	2		1			1	1							

# Damper Schedule

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	· · · · · · · · · · · · · · · · · · ·					4.4		<u>"28</u>								071X075-2A9OC	1 C				
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# RALTIMORE NFL STADIUM 8000-S205

# BALTIMORE NFL STADIUM 7052-0098

# Damper Schedule

D-9-3 D-9-4 "A" "B" "C" "D" "B" "B" "B" "B" "B" "B" Elev Elev D-24-1 D-25-1 D-26-1 D-26-1 D-5-1 "A" S	AHU-26 Smoke Intake	VF-25 Intake VF-25 Intake VF-25 Intake VF-24 Intake	Ref. Dwg. M.3-13 M.3-13 M.3-09 M.3-10 M.3-11 M.3-12 M.3-17 M.3-17 M.3-17 M.3-17 M.3-17 M.3-26 M.3-26 M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A M.4-03	1 1 1 1 1 1 2 1 1 1 1 1 4 4 4 1 1 1 - 1	Code No. COPAS-380X180 COPAS-300X160 COPAS-320X320 COPAS-320X320 COPAS-320X320 COPAS-340X360 COPAS-360X360 COPAS-760X360 COPAS-720X720 COPAS-720X7	Pos.         T           Co         Co           Co         Co	ntrol Oppo ntrol Oppo	ber. Dsed	Blade Bea Type Typ Double Aceta Double Aceta	e Seals I Standard I Standard	W (in.) 38" 30" 32" 32" 24" 36" 96" 72" 72" 72" 36" 30"	Size H (in.) 18" 16" 32" 32" 32" 24" 36" 72" 72" 72" 72" 36" 30"	W (in.) 38" 30" 32" 32" 24" 36" 96" 72" 72" 72" 36"	18" 16" 32" 32" 24" 36" 36" 72" 72" 72" 36"	ize Area (ft²) 4.8 3.3 7.1 7.1 7.1 4.0 9.0 24.0 36.0 36.0 36.0 9.0	Mtg.	1 1 1 1 1 1 1 2 2 2	Code No. D-3153-2 D-3153-1 D-4073-2 D-4073-2 D-4073-2 D-4073-2 D-4073-2 D-3153-2 D-3153-1 D-3153-1	Pilot           n/a           D-9502           n/a           n/a           n/a           n/a           n/a           D-9502           D-9502           D-9502           D-9502           D-9502           D-9502           D-9502           D-9502           D-9502	TypePneu	Control Signal 8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13#	Mtg.	Coupld. Detail	Comments
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"B" "C" "D" "B" "B" "B" "B" "B" Elev D-24-1 D-25-1 D-26-1 D-26-1 D-5-1 "A" S	B" Press MER " Press MER " Press MER B" Plant MER B" Plant MER B" Plant MER B" Plant MER B" Plant MER EV Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	VF-25 Intake VF-25 Intake VF-25 Intake VF-24 Intake VF-11,12,13 VF-11 Exh VF-12 Exh VF-13 Exh Out Intake VF-30 Exh Outside Air Outside Air	M.3-10 M.3-11 M.3-12 M.3-17 M.3-17 M.3-17 M.3-17 M.3-26 M.3-26 M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A	1 1 2 1 1 1 1 1 4 4 4 1 1 1 1 -	COPAS-320X320 COPAS-320X320 COPAS-240X240 COPAS-360X360 COPAS-960X360 COPAS-720X720 COPAS-720X720 COPAS-720X720 COPAS-360X360 COPAS-360X360 COPAS-360X300 COPAS-160X140 COPAS-160X140		ntrol Oppo ntrol Oppo	osed osed osed osed osed osed osed osed	Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta	I Standard I Standard I Standard I Standard I Standard I Standard I Standard I Standard I Standard	32" 32" 24" 36" 96" 72" 72" 72" 36" 30"	32" 32" 24" 36" 36" 72" 72" 72" 36"	32" 32" 24" 36" 95" 72" 72" 72" 36"	32" 32" 24" 36" 36" 72" 72" 72" 36"	7.1 7.1 4.0 9.0 24.0 36.0 36.0 36.0		1 1 1 1 1 1 2 2 2 2	D-4073-2 D-4073-2 D-4073-2 D-4073-2 D-4073-2 D-3153-2 D-3153-1 D-3153-1	n/a n/a n/a n/a n/a n/a D-9502 D-9502	Pneu Pneu Pneu Pneu Pneu Pneu Pneu Pneu	8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13#			
"C" "D" "B" "B" "B" "B" "B" Elev Elev D-24-1 D-25-1 D-26-1 D-26-1 D-5-1 "A" S	" Press MER " Press MER 3" Plant MER 3" Plant MER 3" Plant MER 3" Plant MER 3" Plant MER ev Core MER ev Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	VF-25 Intake VF-25 Intake VF-24 Intake VF-11,12,13 VF-11 Exh VF-12 Exh VF-13 Exh Out Intake VF-30 Exh Outside Air Outside Air Outside Air	M.3-11 M.3-12 M.3-17 M.3-17 M.3-17 M.3-17 M.3-26 M.3-26 M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A	1 2 1 1 1 1 4 4 1 1 - 1	COPAS-320X320 COPAS-240X240 COPAS-360X360 COPAS-960X360 COPAS-720X720 COPAS-720X720 COPAS-720X720 COPAS-360X360 COPAS-360X360 COPAS-160X140 COPAS-160X140		ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo	osed osed osed osed osed osed osed osed	Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta	I Standard I Standard I Standard I Standard I Standard I Standard I Standard I Standard	32" 24" 36" 96" 72" 72" 72" 36" 30"	32" 24" 36" 36" 72" 72" 72" 36"	32" 24" 36" 95" 72" 72" 72" 36"	32" 24" 36" 36" 72" 72" 72" 36"	7.1 4.0 9.0 24.0 36.0 36.0 36.0		1 1 1 1 2 2 2 2	D-4073-2 D-4073-2 D-4073-2 D-4073-2 D-3153-2 D-3153-1 D-3153-1	n/a n/a n/a n/a n/a D-9502 D-9502	Pneu Pneu Pneu Pneu Pneu Pneu Pneu Pneu	8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13#			
"D" "B" "B" "B" "B" Elev D-24-1 D-25-1 D-26-1 D-5-1 "A" S	9" Press MER 3" Plant MER 3" Plant MER 3" Plant MER 3" Plant MER 4" Plant MER ev Core MER ev Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	VF-25 Intake VF-24 Intake VF-11,12,13 VF-11 Exh VF-12 Exh VF-13 Exh Out Intake VF-30 Exh Outside Air Outside Air Outside Air	M.3-12 M.3-17 M.3-17 M.3-17 M.3-17 M.3-26 M.3-26 M.3-26 M.2-02C M.2-02C M.2-02D M.3-10 M.2-04A	1 2 1 1 1 4 4 1 1 1 -	COPAS-240X240 COPAS-360X360 COPAS-960X360 COPAS-720X720 COPAS-720X720 COPAS-720X720 COPAS-360X360 COPAS-360X360 COPAS-160X140 COPAS-160X140		ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo	osed osed osed osed osed osed osed osed	Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta	I Standard I Standard I Standard I Standard I Standard I Standard I Standard	24" 36" 96" 72" 72" 72" 36" 30"	24" 36" 36" 72" 72" 72" 36"	24" 36" 95" 72" 72" 72" 36"	24" 36" 36" 72" 72" 72" 36"	4.0 9.0 24.0 36.0 36.0 36.0		1 1 1 2 2 2	D-4073-2 D-4073-2 D-4073-2 D-3153-2 D-3153-1 D-3153-1	n/a n/a n/a D-9502 D-9502	Pneu Pneu Pneu Pneu Pneu Pneu Pneu Pneu	8-13# 8-13# 8-13# 8-13# 8-13# 8-13# 8-13#			
"B" "B" "B" "B" Eley D-24-1 D-25-1 D-26-1 D-5-1 "A" S	B" Plant MER B" Plant MER B" Plant MER B" Plant MER B" Plant MER ev Core MER ev Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	VF-24 Intake VF-11,12,13 VF-11 Exh VF-12 Exh VF-13 Exh Out Intake VF-30 Exh Outside Air Outside Air Outside Air	M.3-17 M.3-17 M.3-17 M.3-17 M.3-26 M.3-26 M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A	2 1 1 1 4 4 1 1 1 -	COPAS-360X360 COPAS-960X360 COPAS-720X720 COPAS-720X720 COPAS-720X720 COPAS-360X360 COPAS-360X360 COPAS-160X140 COPAS-160X140		ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo	osed osed osed osed osed osed osed osed	Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta	I Standard I Standard I Standard I Standard I Standard I Standard	36" 96" 72" 72" 72" 36" 30"	36" 36" 72" 72" 72" 36"	36" 95" 72" 72" 72" 36"	36" 36" 72" 72" 72" 36"	9.0 24.0 36.0 36.0 36.0		1 1 2 2 2	D-4073-2 D-4073-2 D-3153-2 D-3153-1 D-3153-1	n/a n/a n/a D-9502 D-9502	Pneu Pneu Pneu Pneu Pneu Pneu Pneu Pneu	8-13# 8-13# 8-13# 8-13# 8-13# 8-13#			
"B" "B" "B" Elev D-24-1 D-25-1 D-26-1 D-5-1 "A" S	3" Plant MER 3" Plant MER 3" Plant MER 9" Plant MER ev Core MER ev Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	VF-11,12,13 VF-11 Exh VF-12 Exh VF-13 Exh Out Intake VF-30 Exh Outside Air Outside Air Outside Air	M.3-17 M.3-17 M.3-17 M.3-26 M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A	1 1 1 4 4 1 1 1 1 1 1 1	COPAS-960X360 COPAS-720X720 COPAS-720X720 COPAS-720X720 COPAS-360X360 COPAS-360X300 COPAS-160X140 COPAS-160X140		ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo	osed osed osed osed osed osed osed	Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta	I Standard I Standard I Standard I Standard I Standard	96" 72" 72" 72" 36" 30"	36" 72" 72" 72" 36"	96" 72" 72" 72" 36"	36" 72" 72" 72" 36"	24.0 36.0 36.0 36.0		1 1 2 2 2	D-4073-2 D-3153-2 D-3153-1 D-3153-1	n/a n/a D-9502 D-9502	Pneu Pneu Pneu Pneu Pneu Pneu Pneu	8-13# 8-13# 8-13# 8-13# 8-13#			
"B" "B" Elev D-24-1 D-25-1 D-26-1 D-5-1 "A" S	3" Plant MER 3" Plant MER ev Core MER ev Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	VF-11 Exh VF-12 Exh Otf-13 Exh Out Intake VF-30 Exh Outside Air Outside Air Outside Air	M.3-17 M.3-17 M.3-26 M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A	1 1 4 4 1 1 1 1 -	COPAS-720X720 COPAS-720X720 COPAS-720X720 COPAS-360X360 COPAS-300X300 COPAS-160X140 COPAS-160X140 COPAS-160X140		ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo	osed osed osed osed osed osed	Double Aceta Double Aceta Double Aceta Double Aceta Double Aceta	I Standard I Standard I Standard I Standard	72" 72" 72" 36" 30"	72" 72" 72" 36"	96" 72" 72" 72" 36"	36" 72" 72" 72" 36"	24.0 36.0 36.0 36.0		1 2 2 2	D-3153-2 D-3153-1 D-3153-1	n/a D-9502 D-9502	Pneu Pneu Pneu Pneu Pneu	8-13# 8-13# 8-13# 8-13#			
"B" "B" Elev D-24-1 D-25-1 D-26-1 D-5-1 "A" S	3" Plant MER 3" Plant MER ev Core MER ev Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	VF-12 Exh VF-13 Exh Out Intake VF-30 Exh Outside Air Outside Air Outside Air	M.3-17 M.3-26 M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A	1 4 4 1 1 1 -	COPAS-720X720 COPAS-720X720 COPAS-360X360 COPAS-300X300 COPAS-160X140 COPAS-160X140 COPAS-160X140		ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo	osed osed osed osed osed	Double Aceta Double Aceta Double Aceta Double Aceta	I Standard I Standard I Standard	72" 72" 36" 30"	72" 72" 72" 36"	72" 72" 36"	72" 72" 72" 36"	36.0 36.0 36.0		2 2 2	D-3153-1 D-3153-1	D-9502 D-9502	2 Pneu 2 Pneu 2 Pneu	8-13# 8-13# 8-13#			
"B"         Elev           D-24-1         D-25-1           D-26-1         D-26-1           D-5-1         "A" S	3" Plant MER ev Core MER ev Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	VF-13 Exh Out Intake VF-30 Exh Outside Air Outside Air Outside Air	M.3-17 M.3-26 M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A	1 4 4 1 1 1 -	COPAS-720X720 COPAS-360X360 COPAS-300X300 COPAS-160X140 COPAS-160X140 COPAS-160X140	Cc Cc Cc Cc Cc Cc Cc	ntrol Oppo ntrol Oppo ntrol Oppo ntrol Oppo	osed osed osed osed	Double Aceta Double Aceta Double Aceta	I Standard Standard	72" 36" 30"	72" 36"	72" 36"	72" 72" 36"	36.0 36.0		2 2	D-3153-1	D-9502	2 Pneu 2 Pneu	8-13# 8-13#			
Elev Elev D-24-1 D-25-1 D-26-1 D-5-1 "A" S	ev Core MER ev Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	Out Intake VF-30 Exh Outside Air Outside Air Outside Air	M.3-26 M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A	4 4 1 1 -	COPAS-360X360 COPAS-300X300 COPAS-160X140 COPAS-160X140 COPAS-160X140	Co Co Co Co Co	ntrol Oppo ntrol Oppo ntrol Oppo	osed osed osed	Double Aceta Double Aceta	I Standard	72" 36" 30"	72" 36"	72" 36"	72" 36"	36.0		2			2 Pneu	8-13#			
Elev D-24-1 D-25-1 D-26-1 D-5-1 "A" S	ev Core MER AHU-24 AHU-25 AHU-26 Smoke Intake	VF-30 Exh Outside Air Outside Air Outside Air	M.3-26 M.2-02C M.2-02D M.3-10 M.2-04A	4 1 1 - 1	COPAS-300X300 COPAS-160X140 COPAS-160X140 COPAS-160X140	Co Co Co Co Co	ntrol Oppo ntrol Oppo ntrol Oppo	osed osed osed	Double Aceta Double Aceta	I Standard	36" 30"	36"	36"	36"				D-3153-1						
D-24-1 D-25-1 D-26-1 D-5-1 "A" S	AHU-24 AHU-25 AHU-26 Smoke Intake	Outside Air Outside Air Outside Air	M.2-02C M.2-02D M.3-10 M.2-04A	1 1 1 -	COPAS-160X140 COPAS-160X140 COPAS-160X140	Co Co Co	ntrol Oppo	osed		I Standard	30"						1	D-4073-2	n/a	Pneu	8-13#			
D-25-1 D-26-1 D-5-1 "A" S	AHU-25 AHU-26 Smoke Intake	Outside Air Outside Air	M.2-02D M.3-10 M.2-04A	- 1 - 1 	COPAS-160X140 COPAS-160X140	Co Co Co	ntrol Oppo	osed				00	30"	30"	6.3			D-4073-2	n/a	Pneu				
D-26-1 D-5-1 "A" S	AHU-26 Smoke Intake	Outside Air	M.3-10 M.2-04A	1   -   1	COPAS-160X140	Co Co			Loonne Aceta	I Standard	16"	14"	16"	14"	1.6			D-4073-2	n/a	Pneu				
D-5-1 "A" S	Smoke Intake		M.2-04A	- 1		Co		osed	Double Aceta		16"	14"	16"	14"	1.6			D-4073-2	n/a	Pneu				
		Outside Air		1	(Coupled Damper)				Double Aceta		16"	14"	16"	14"	1.6			D-4073-2	n/a	Pneu				
D-7-1 "B" S	Smoka Intaka		M.4-03		(	Co			Double Aceta		192"	64"	192"	64"	85.3			D-3153-1	D-9502					
D-7-1 "B" S	Smaka Intaka				COPAS-480X640								48"	64"	21.3	·		D-3153-2	n/a	Pneu				
D-7-1 "B" S	Smoke Intako			1	COPAS-480X640								48"	64"	21.3			0100-2		1 neu	0-10#		1	
D-7-1 "B" S	Smaka Intaka	1		: 1	COPAS-480X640								48"	64"	21.3								1	
D-7-1 "B" S	Smoka Intaka			1	COPAS-480X640						-		48"	64"	21.3									
	Smoke make	Outside Air	M.2-04B		(Coupled Damper)	Cc	ntrol Oppo	osed	Double Aceta	Standard	192"	108"	192"	108"	144.0		2	D-3153-1	D-9502	Doou	8-13#			
			M.4-03		COPAS-480X540						102	100	48"	54"	18.0			D-3153-1	n/a					
					COPAS-480X540					_			48"		18.0			D-3153-2	11/a	Pneu	8-13#			
					COPAS-480X540								48"		18.0								1	
					COPAS-480X540								48"		18.0					_				
				· · · · · · · · · · · · · · · · · · ·	COPAS-480X540							·····	48"	<u>54</u> "	18.0									
					COPAS-480X540								48"		18.0									
					COPAS-480X540								48"	54"	18.0									
			· · · · · · · · · · · · · · · · · · ·		COPAS-480X540								48"		18.0			······			·			
D-10-1 "C" S	Smoke Intake	Outside Air	M.2-04C		(Coupled Damper)	Co	ntrol Oppo	hsed	Double Aceta	Standard	192"	108"	40 192"	108"	144.0		~				0.40			
			M.4-03		COPAS-480X540				Double / look		192	100	48"	54"	18.0			D-3153-1	D-9502					
					COPAS-480X540								40	54"			5	D-3153-2	n/a	Pneu	8-13#		;	
					COPAS-480X540										18.0								1	
					COPAS-480X540								48"	54"	18.0									
					COPAS-480X540								48"	54"	18.0					_				
				÷	COPAS-480X540						<u> </u>		48"	54"	18.0						<u> </u>			
i				· · · · · · · · · · · · · · · · · · ·	COPAS-480X540	<u> </u>							48"	54"	18.0						· · · ·	ļ		
				• • • • • •	COPAS-480X540								48"	54"	18.0									
D-11-1 "D" S	Smoke Intake	Outside Air	M.2-04D		(Coupled Damper)		ntrol Oppo	haer	Double Aceta	Standard	100"	0.4%	48"	54"	18.0									
			M.4-03		COPAS-480X640			Jaeu	Double Aceta	Jandard	192"	64"	192"	64"	85.3			D-3153-1	D-9502					
			U		COPAS-480X640								48"	64"	21.3		3	D-3153-2	n/a	Pneu	8-13#	ļ		
			·		COPAS-480X640 COPAS-480X640								48"	64"	21.3							L	r	
					COPAS-480X640 COPAS-480X640								48"	64"	21.3						`	ļ		
D-2A-1 N	MAU-2A	Outside Air			COPAS-480X640 COPAS-840X600		ntral One		Cincila A.				48"	64"	21.3					1				
		Outside Air		t					Single Aceta			60"	84"	60"	35.0			D-3153-2		Pneu			(	
		Outside Air			COPAS-360X360				Double Aceta			36"	36"	36"	9.0			D-4073-2		Pneu	8-13#			
					COPAS-360X360			osed	Double Aceta	I Standard		36"	36"	36"	9.0			D-4073-2		Pneu	8-13#			
		Outside Air			COPAS-360X360		ntrol Oppo	bsed	Double Aceta	I Standard	+	36"	36"	36"	9.0			D-4073-2		Pneu				
· · · · · · · · · · · · · · · · · · ·		Exhaust Air			COPAS-360X240		ntrol Oppo	sed	Double Aceta	I Standard	36"	24"	36"	24"	6.0		1	D-4073-2		Pneu	8-13#			
		Outside Air			COPAS-360X720		ntrol Oppo	bsed	Double Aceta	I Standard	36"	72"	36"	72"	18.0		1	D-3153-2	n/a	Pneu				
		Return Air			COPAS-400X300	Co	ntrol Oppo	bsed	Double Aceta	I Standard	40"	30"	40"	30"	8.3		1	D-3153-2	n/a	Pneu				
D-273Johnso	dri Controls	Exhaust Air		1 (	COPAS-240X240	Co	ntrol Oppo	bsed	Double Aceta	I Standard	24"	24"	24"	24"	4.0			D-4073-2	n/a	Pneu				