

MEP, Motor Starters, and Disconnects

MAKE UP AIR UNIT SCHEDULE (MAU)

UNIT NO.	SERVICE	LOCATION	SUPPLY FAN									INDIRECT G/			
			TOTAL AIRFLOW (CFM)	MIN. OA (CFM)	MIN OA %	STATIC PRESSURE (IN.WG)		WHEEL		RPM	MAX POWER (BHP)	MIN. MOTOR SIZE (HP)	TOTAL MBH	INPUT MBH	EA' (°F)
						TOTAL	EXTERNAL	DIA (IN)	TYPE						
MALL 4	KITCHEN	ROOF A	2,055	-	100.0	1.9	1.5	16.0	PLENUM	2228	1.8	3.0			

1. PROVIDE FAN WITH VFD.
2. PROVIDE 2" MERV 8 AND 12" MERV 11 FILTERS.
3. UNIT SHALL BE MOUNTED ON 18"(H) CURB.

13. Refer to DIVISION 26 ELECTRICAL and to SECTION 230000 HVAC, for division of responsibility of Electrical work. All power wiring of every description shall be provided under DIVISION 26 Electrical, including power to ATC panels. All starters and controllers for mechanical equipment, except where provided as integral with mechanical equipment, shall be provided under DIVISION 26 Electrical. Power wiring does not include any ATC wiring interlocks. Refer to SECTION 230000 PART 4 - AUTOMATIC TEMPERATURE CONTROLS.

Item 33

DCV CONTROL PANEL

Make - Aquamatic DCV or equal by Gaylord or Halton

Power - two 20 amp circuit - 120/208V to logic controller

Scope - Furnish and install complete exhaust control system for the exhaust canopy in accordance with the plans and Manufacturers shop drawings. The system shall include programmable logic controller (PLC), variable frequency drive (VFD), stainless steel control enclosure, exhaust dust temperature sensors, room temperature sensor, LCD screen interface with cable, all specified accessories, and those components required to provide complete and satisfactory systems in accordance with accepted HVAC practice. System shall control Item 30. Mount LCD screen control in UDS riser. Mount system processor in the cabinet mounted on the right end of exhaust ventilator Item 30.

Important: The installation work shall be performed by a fully qualified contractor employing a certified mechanic fully trained in the installation of the DCV hood system. Submittal shall list the installing company and the qualified system installer. Provide wiring diagrams and guidance to related trades to achieve correct operation of the system.

Accessories - Service Design Verification: Factory Services and on site coordination to be performed by the Manufacturers service technician (not a sales representative). On site supervision shall include two site visits: One visit to coordinate preparations for installation, and a second visit at startup and calibration. Provide BacNet monitoring system.

Item 34

DCV CONTROL INTERFACE

Specified as part of Item 33

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MECHANICAL EQUIPMENT SCHEDULE									
FLOOR	TAG	VOLTS/PHASE	LOAD	BRANCH CIRCUIT (EA)	CONDUIT	CKT. BREAKER	MOTOR STARTER	DISC SWITCH	VFD
ROOF	CH-1	480 / 3		3 #1 + #6G	1 1/4"	125A/3P		X	X
ROOF	ERU-1 (SUPPLY)	480 / 3	10.5 HP	3 #10 + #10G	3/4"	35A/3P		X	X
ROOF	ERU-1 (EXHAUST)	480 / 3	6 HP	3 #10 + #10G	3/4"	20A/3P		X	X
ROOF	ERU-1 (WHEEL)	480 / 3		3 #10 + #10G	3/4"	20A/3P		X	X
ROOF	FF-1	120 / 1		#10 + #12G	3/4"	20A/1P	Y	Y	

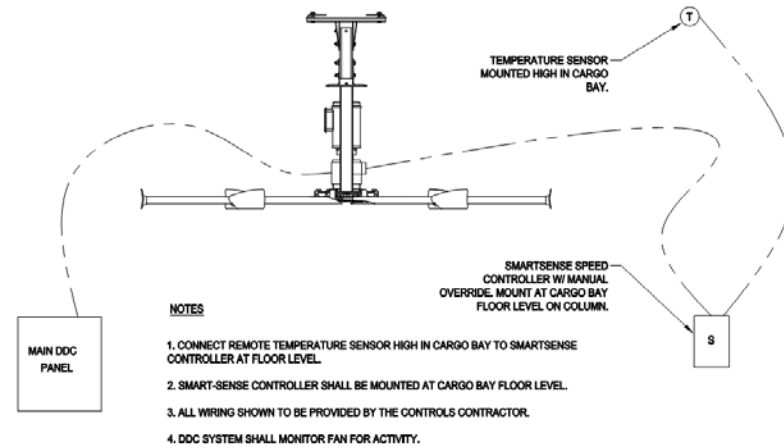
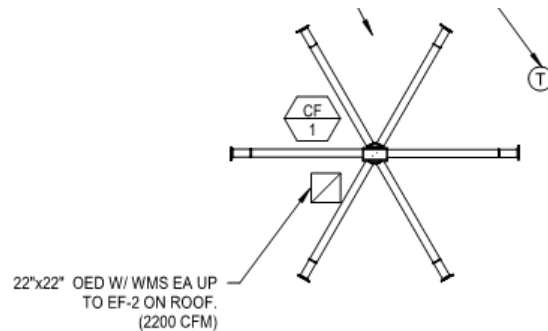
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SYMBOL	SERVICE	LOCATION	CFM	S.P. (IN W.G.)	WHEEL	SONES	FAN		FAN MOTOR (HP)	ELECTRICAL			APPROX. WEIGHT (LBS.)	MANUFACTURER / MODEL NUMBER
					DRIVE		RPM	BHP		V	PH	HZ		
EF-1 THRU EF-11	CARGO BAY, VEHICLE MAINTENANCE BAY	ROOF	2,200	.25"	DIRECT	15.6	1538	0.42	1/2	115	1	60	80	COOK ACED-135C15D
EF-12 & EF-13	CARGO BAY	ROOF	10,900	2"	DIRECT	32	1142	7.28	7.5	460	3	60	400	COOK ACED-270C11D
CF-1 THRU CF-4	CARGO BAY	CARGO BAY	-	-	PROP.	-	86	-	2.0	460	3	60	250	BIG ASS SOLUTIONS BASIC SIX - 18' DIAMETER
CF-5, CF-6	GYM AREA, VEHICLE MAINTENANCE	GYM AREA, VEHICLE MAINTENANCE	-	-	PROP.	-	135	-	1.5	460	3	60	185	BIG ASS SOLUTIONS BASIC SIX - 12' DIAMETER
RF-1	AHU-1 RETURN FAN	LOWER LEVEL MECHANICAL ROOM	14,000	2"	DIRECT	-	1760	7.8	10	460	3	60	700	COOK 225QMXMD17
RF-2	AHU-2 RETURN FAN	LOWER LEVEL MECHANICAL ROOM	14,000	2"	DIRECT	-	1760	7.8	10	460	3	60	700	COOK 225QMXMD17






EF-1 THRU 13 NOTES

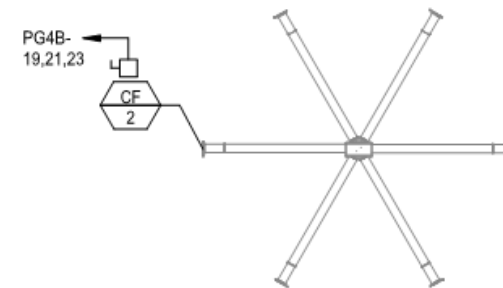
CF-1 THRU CF-6

RF-1 & RF-2 NOTES



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SCHEDULE OF MECHANICAL EQUIPMENT										
SYMBOL	DESCRIPTION	MOTOR				BREAKER	FEEDER	CONDUIT	VFD	NOTES
		HP	VOLT	PH	FLA					
	CARGO BAY FAN	2.0	480V	3	3.4	15A/3P	3 #10 + #10G	3/4	X	
	CARGO BAY FAN	2.0	480V	3	3.4	15A/3P	3 #10 + #10G	3/4	X	
	CARGO BAY FAN	2.0	480V	3	3.4	15A/3P	3 #10 + #10G	3/4	X	
	CARGO BAY FAN	1.5	480V	3	3.0	15A/3P	3 #10 + #10G	3/4	X	
	CARGO BAY FAN	1.5	480V	3	3.0	15A/3P	3 #10 + #10G	3/4	X	



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I will send the coversheet once the issue is resolved. To keep things moving, please provide a RFI- 68 response via email.

RFI-68: Wiring VFD's for CF-1 and CF-6

In reference to drawing E701, detail 01 shows the electrical arrangement for the new cargo bay fans. According to this detail, as well as other referenced drawings, the fan was to come with a prewired, on board VFD with a premade cord whip. The electrical feed and whip were to be installed to the disconnect mounted by the fan. During coordination talks with the mechanical contractor it was discovered that the fan VFDs were supplied as individual enclosures that will need to be mounted, piped and wired. Please advise on the installation and wiring requirements for these VFD's.

Per Contract Drawings, the VFD's integral to the fans. Electrical contractor is responsible for power directly to the fans. If the VFDs are to be installed at the fans, electrical contractor will work with mechanical contractor to complete the work, but if the VFDs are to be installed anywhere else there will be a cost impact. Please advise.

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C. Hot Water Cabinet Type:

1. Provide cabinet unit heaters as manufactured by Vulcan, Airtherm, Trane, Rittling, as noted on the drawings, or equal.
2. Types, sizes, arrangements, and capacities shall be as shown and scheduled on the drawings.
3. Capacities shall be based on entering and leaving water temperatures, pressures indicated on the drawings, rated for the scheduled glycol solution.
4. Note specific arrangements, concealed, exposed, inverted airflow, recessed. Provide all hangers and supports.
5. Furnish with disposable polyfiber filter, built-in starter/disconnect and built-in multi-speed control switch. Refer to 230000 2.1 and 2.2 for motor types and minimum efficiencies.

AIR COOLED CONDENSING UNITS

SYMBOL	SERVICE	HEATING CAPACITY (MBH)	COOLING CAPACITY (MBH)	IEER/EER (COOLING)	SE
ACCU-1	LOUNGE C103	26.0	24.0	24.4	2
ACCU-2	LOUNGE C201	14.0	12.0	27.0	2
ACCU-3	LOUNGE C202	14.0	12.0	27.0	2

1. ALL PIPING SHALL BE SIZED PER MANUFACTURER SPECIFICATIONS. WHERE REQUIRED, PROVIDE LONG LINE PIPING PACKAGES WITH ALL REQUIRED ACCESSORIES.
2. PROVIDE ALL ACCUs WITH SERVICE DISCONNECT SWITCH.
3. MOUNT ALL UNITS ON VIBRATION ISOLATION PAD AND 18" ABOVE ROOF/GRADE ON SNOW STANDS WITH OPEN BASE - QUICKSLING, BIGFOOT, OR SIMILAR.
4. PROVIDE ALL ACCUs WITH WIND BAFFLES FOR 100% COOLING OPERATION DOWN TO 0° F.
5. PROVIDE ALL ACCUs WITH B-SERIES M-MET INTERFACE.

ELECTRIC UNIT HEATER SCHEDULE

SYMBOL	SERVING	MOUNTING ARRANGEMENT	CFM
EUH-1.1	STARTER (Rm.152)	RECESSED MOUNT	300
(NOT USED)			
EUH-1.3	RESTROOM (Rm.128)	RECESSED MOUNT	300
EUH-1.4	RESTROOM (Rm.126)	RECESSED MOUNT	300
EUH-1.5	CSA (Rm.105)	RECESSED MOUNT	300
EUH-1.6	INSPECTOR (Rm.284)	RECESSED MOUNT	300
EUH-2.1	PORTER (Rm. 154)	WALL MOUNT	405
EUH-2.2	ESCR1 (Rm.136)	WALL MOUNT	405
EUH-2.3	FIRE (Rm.160)	WALL MOUNT	405
EUH-2.4	JC (Rm.144)	WALL MOUNT	405
EUH-2.5	COMM (Rm.253)	WALL MOUNT	405
EUH-2.6	ESCR 1 (Rm.249)	WALL MOUNT	405
EUH-2.7	PUMP ROOM (Rm.20)	WALL MOUNT	405
EUH-2.8	AFC (Rm. 122)	WALL MOUNT	405
EUH-2.9	ELECTRIC ROOM (Rm.16)	WALL MOUNT	405
EUH-3.1	ELEV.1 HOISTWAY	CEILING / WALL MOUNT	800
EUH-3.2	ELEV.2 HOISTWAY	CEILING / WALL MOUNT	800
EUH-3.3	ELEV.3 HOISTWAY	CEILING / WALL MOUNT	800

1. PROVIDE THERMOSTAT AND DISCONNECT SWITCH.
2. UNITS SHALL BE UL LISTED.

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Suggested Approaches

Factory integrated controls and disconnects preferred over field installed.

Loose controllers whether VFD or magnetic motor starters, installed by Div 26.

Traditionally loose VFDs furnished Div 23,

- To match motor type, control and load characteristics – Is this still necessary?

Magnetic motors starters by Div 26.

System controlled fractional Hp – Full starters or BMS provided relays?

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Market Norms?

Packaged RTUs, Fan wall, ERU, Dx, split systems – packaged controls

- Split systems - Div 26 provided disconnect switches
- Packaged RTUs, fan wall, ERU, Dx – Single point connections without disconnect switches

Pumps, AHUs

- Typically VFD controlled – VFD furnished by Div 23 installed by Div 26 OR
- Should Div 26 provided entirely?

Cabinet Heaters, EUH

- Factor integrated provided disconnect switches.

Suggestions, Lessons Learned

- Read all complementary dwgs an specs.
- Understand market approaches.
 - Can that unit have single point connection?, integral disconnect?
- Use active language
 - “Provide magnetic motor starter...”
 - Vs
 - “The magnetic motor starter shall be provided..” by who?
- Understand implication of common notes.
 - Does “Provide VFD” on mechanical schedule really mean VFD is furnished and installed by Div 23? –is this reinforced on dwgs.
- Consider which filed sub bid contractor is best positioned for installation