

HEAT PUMP ROOFTOP UNIT SCHEDULE [RELOCATED EQUIPMENT]

MARK	MANUFACTURER	MODEL	NOMINAL TONS	SUPPLY FAN										COOLING COIL										AUXILIARY ELECTRIC HEATING COIL										ABS MIN OA	ELECTRICAL V/PH	MCA	MOCP	WEIGHT (LBS)	NOTES
				CFM	ESP (IN)	BHP (Y/N)	VFD (Y/N)	TH (MBH)	SH (MBH)	EAT				REFR TYPE	MIN EFF (EER)	MIN NO STAGES	TOTAL HEAT CAP (MBH)	HEAT PUMP HEATING COIL				MIN OUT (MBH)	NOM KW	LAT (°F DB)															
										(°F DB)	(°F WB)	(°F DB)	(°F WB)					R-410A	12.1	16	2				87.8	30	1.8	61.7	85	3.4	57.8	18	85						
RTU-1	TRANE	WHC074H4RDA	6	2,250	1.0	0.54	Y	73	62	75.5	61.9	58.6	50.4	R-410A	12.1	16	2	87.8	30	1.8	61.7	85	3.4	57.8	18	85	325 <td>480/3</td> <td>47</td> <td>50</td> <td>1450</td> <td>A - X</td>	480/3	47	50	1450	A - X							
RTU-2	TRANE	WHC074H4RDA	6	2,250	1.0	0.58	Y	73	62	75.2	61.4	51.1	50.6	R-410A	12.1	16	2	87.8	30	1.8	60.1	85	3.4	57.8	18	85	325 <td>480/3</td> <td>47</td> <td>50</td> <td>1450</td> <td>A - X</td>	480/3	47	50	1450	A - X							
RTU-3	TRANE	WSD180E4RGD	15	4,800	1.2	3.99	Y	184	136	80	65.9	54.2	53.2	R-410A	10.6	13.5	2	183.7	68	1.8	51	85	3.4	115.7	36	85	1335 <td>700 <td>480/3</td> <td>91</td> <td>100</td> <td>2500</td> <td>A - X</td> </td>	700 <td>480/3</td> <td>91</td> <td>100</td> <td>2500</td> <td>A - X</td>	480/3	91	100	2500	A - X						
RTU-4	TRANE	WSD180E4RGD	12.5	4,000	1.2	2.97	Y	154	114	80	65.9	54.2	53.2	R-410A	11	13.5	2	175.7	60	1.8	51	85	3.4	115.7	36	85	1115 <td>580 <td>480/3</td> <td>87</td> <td>90</td> <td>2500</td> <td>A - X</td> </td>	580 <td>480/3</td> <td>87</td> <td>90</td> <td>2500</td> <td>A - X</td>	480/3	87	90	2500	A - X						
RTU-5	TRANE	WHC120H4RDA	10	3,800	1.2	2.58	Y	94	84	70	68	49.4	49.4	R-410A	11.5	16	2	109.8	52	1.8	60	80	3.4	57.8	18	90	0	480/3	51	60	1900	A - X							

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER. MODEL NUMBERS OR NOMINAL TONS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

- REFER TO ROOFTOP UNIT CONTROL MATRIX FOR CONTROL FEATURES, MODULES, AND ACCESSORIES THAT SHALL BE PROVIDED WITH THE EQUIPMENT.
- EQUIPMENT SIZED FOR 90°F AMBIENT TEMPERATURE.
- PROVIDE 2 INCH MERV 13, EFFICIENT PLEATED THROWAWAY AIR FILTERS.
- PROVIDE FACTORY MOUNTED DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.
- STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
- PROVIDE FACTORY MOUNTED VARIABLE FREQUENCY DRIVE OR 2-SPEED MOTOR TO FACILITATE STAGED FAN SPEED CONTROL.
- PROVIDE SHAFT GROUNDING SYSTEM ON MOTOR. REFER TO MOTOR SPECIFICATION FOR ADDITIONAL INFORMATION.
- PROVIDE SINGLE POINT POWER CONNECTION.
- COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.
- PROVIDE 125 VAC, 20 AMP DUPLEX CONVENIENCE RECEPTACLE MOUNTED TO UNIT READY FOR FIELD WIRING WITH A COVER UL LISTED FOR WET AND DAMPER LOCATIONS WHEN IN USE.
- SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT.
- PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
- PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 8 INCHES ABOVE FINISHED ROOF SURFACE. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE.
- COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
- SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT AND CURB.
- COOLING COIL LAT IS LEAVING AIR TEMPERATURE OF COIL.
- PROVIDE GUARDS TO PROTECT CONDENSER COIL FROM HAIL OR OTHER DAMAGE.
- PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT.
- ABS MIN OA IS THE ABSOLUTE MINIMUM OUTSIDE AIR CFM USING VENTILATION RESET OR DEMAND CONTROL VENTILATION.
- PROVIDE UNIT WITH FACTORY INSTALLED TRANE BACNET OPENBOARD WITH SUPPLY AND OUTSIDE AIR TEMPERATURE SENSORS. COORDINATE ALL CONTROLS WITH EMS VENDOR PRIOR TO PURCHASE.

OUTSIDE AIR REQUIREMENTS, IMC-2018 (IP)

SYSTEM DESIGNATION	SYSTEM TAB NAME OR LIST SINGLE	SINGLE-ZONE SYSTEMS ONLY		MULTI-ZONE SYSTEMS ONLY		FLOOR AREA SERVED BY SYSTEM [sq] (SF)	SYSTEM AVERAGED AREA-BASED OUTDOOR AIR RATE (CFM/SF)	SYSTEM POPULATION [P] (PEOPLE)	SYSTEM AVERAGED PEOPLE-BASED OUTDOOR AIR RATE (CFM/PP)	REQUIRED OA INTAKE FLOW [V] (CFM)	REQUIRED DCV OA INTAKE FLOW [V] (CFM)	DESIGN OA INTAKE FLOW [V] (CFM)	NOTES
		SINGLE-ZONE SYSTEM VENTILATION ZONE	SINGLE-ZONE WORST CASE ZONE AIR DISTRIBUTION EFFECTIVENESS [E]	SYSTEM VENTILATION EFFICIENCY [E]	SYSTEM VENTILATION EFFICIENCY [E]								
RTU-1	MULTIZONE (RTU-1)	-	-	0.90	-	1,936	0.02	12	5.00	245	178	275	
RTU-2	SINGLE ZONE	200 STOCKROOM1	0.80	-	-	1,924	0.120	0	0.00	289	289	325	
RTU-3,4,5	MULTIZONE (RTU-3,4,5)	-	-	0.91	-	9,647	0.119	143.07	7.50	2,429	1,279	2,450	
TOTALS										2,962	1,745	3,050	

GENERAL NOTES:

- VENTILATION CALCULATIONS BASED ON IMC-2018.
- SYSTEM POPULATIONS BASED ON MAX SEATING AND/OR CODE MAXIMUM VALUES.
- SINGLE ZONE SYSTEMS (Vent = Vol / Voz): SYSTEM VENTILATION EFFICIENCY CALCULATION IS NOT REQUIRED FOR SINGLE ZONE SYSTEMS. WORST CASE AIR DISTRIBUTION EFFECTIVENESS BETWEEN HEATING AND COOLING MODES OF OPERATION IS SHOWN IN TABLE.
- 100% OA SYSTEMS (Vol = Zvol zones Voz): WHEN ONE AIR HANDLER SUPPLIES ONLY OUTDOOR AIR TO ONE OR MORE ZONES. EACH ZONE IS INDIVIDUALLY CALCULATED WITH ITS WORST CASE ZONE AIR DISTRIBUTION EFFECTIVENESS (HEATING/COOLING).
- MULTI-ZONE REGRULATING SYSTEMS: CALCULATOR USED TO DETERMINE VENTILATION AIRFLOW IN COMPLIANCE WITH IMC-2018 VPP AND ASHRAE 62.1-2018 APPENDIX A. VENTILATION RATE SHOWN IS ACTUAL CALCULATED WITH CORRECTION FACTORS INCLUDED. EACH ZONE IS CALCULATED WITH ITS WORST CASE ZONE AIR DISTRIBUTION EFFECTIVENESS (HEATING/COOLING) AS PART OF CALCULATIONS TO FIND EV.

NOTES:

- VENTILATION AIR PROVIDED VIA TRANSFER FROM SPACES/RETURN FLENUM SERVED BY AHU-X. SYSTEM INCLUDED IN MULTIPLE ZONE CALCULATIONS.
- VENTILATION AIR PROVIDED VIA TRANSFER FROM SPACES SERVED BY EXISTING AHU.
- AIRFLOW IS FOR EXHAUST MAKEUP AS REQUIRED BY THE VENTILATION STANDARD.
- VENTILATION FOR SPACE BASED ON CODE MACHINERY ROOM REQUIREMENTS.

PROJECT DESIGN CONDITIONS

CLIMATE CONDITIONS				BUILDING OPERATING HOURS:			
WEATHER STATION: TULSA JONES, OK, USA				MONDAY - FRIDAY: TBD BY OWNER			
CLIMATE ZONE: 3A				SATURDAY: TBD BY OWNER			
HEATING (DB): 99.6% 14.5 °F				SUNDAY: TBD BY OWNER			
DESIGN HEATING CONDITIONS (DB): 1.8 °F				HOLIDAY: TBD BY OWNER			
HUMIDIFICATION (DP/HR/MCDB): 99.6% 2.1 °F 6.3 gr/lb 19.2 °F							
COOLING (DB/MCWB): 0.4% 100.6 °F 75.9 °F							
DESIGN COOLING CONDITIONS (DB/MCWB): 0.4% 100.6 °F 75.9 °F							
DEHUMIDIFICATION (DP/HR/MCDB): 0.4% 75.8 °F 138.2 gr/lb 85.6 °F							

UNIT / SPACE DESCRIPTION	COOLING / DE-HUMIDIFICATION				SET POINTS				HUMIDIFICATION				ZONE VENTILATION RESET				SPACE OPERATING HOURS OCCUPIED / UNOCCUPIED				NOTES
	OCC °F	UNOCC °F	MAX RH %	MIN RH %	OCC °F	UNOCC °F	MAX RH %	MIN RH %	CONTROL METHOD	BASE PPM	MAXIMUM PPM	M-F	SAT	SUN	M-F	SAT	SUN				
RTU-1 BACK OF HOUSE	72	77	60%	NA	70	60	NA	NA	CO2	400	750	TBD	TBD	TBD	A-D						
RTU-2 STOCKROOM	72	77	60%	NA	70	60	NA	NA	CO2	400	750	TBD	TBD	TBD	A-D						
RTU-3 SALES FLOOR	72	77	60%	NA	70	60	NA	NA	CO2	400	750	TBD	TBD	TBD	A-D						
RTU-4 SALES FLOOR	72	77	60%	NA	70	60	NA	NA	CO2	400	750	TBD	TBD	TBD	A-D						
RTU-5 SOLAR ZONE	72	77	60%	NA	70	60	NA	NA	NA	NA	NA	TBD	TBD	TBD	B-D						

NOTES:

- ZONE LEVEL VENTILATION RESET / DEMAND CONTROL VENTILATION (DCV) CONTROL METHOD: CARBON DIOXIDE SENSOR (CO2).
- ZONE LEVEL SET POINT CONDITIONS SHALL BE AS SCHEDULED UNLESS OTHERWISE SCHEDULED OR NOTED ON THE DRAWINGS FOR ROOM SPECIFIC SPACE CONDITIONS.
- ZONE LEVEL OCCUPANCY HOUR SCHEDULE SHALL BE PER BUILDING OPERATING HOURS UNLESS OTHERWISE SCHEDULED.
- ZONE LEVEL CONTROLS SHALL BE CAPABLE OF OPERATING WITH INDEPENDENT OCCUPANCY SCHEDULES.

UNIT HEATER SCHEDULE (ELECTRIC HEAT)

MARK	MANUFACTURER	MODEL	MOUNTING	MIN OUT (MBH)		NOM (KW)	MIN NO OF STAGES	CFM	MOTOR HP	THROW (FT)	ELECTRICAL			WEIGHT (LBS)	NOTES
				CFM	ESP (IN)						BHP (Y/N)	V/PH	MCA		
EUH-1	Q MARK	MUH05-41	SUSPENDED	17.1	5	2	350	4-W	15	480/3	6	15	75	A - E	

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

- PROVIDE WITH UNIT-MOUNTED THERMOSTAT. COORDINATE INSTALLATION OF UNIT WITH EMS VENDOR. 24V CONTROLS RELAY BY EMS VENDOR.
- PROVIDE MANUAL SUMMER/WINTER CHANGE-OVER SWITCH.
- DIVISION 26 SHALL PROVIDE FUSED DISCONNECT SWITCH.
- PROVIDE NECESSARY MOUNTING BRACKETS FOR SUSPENDED INSTALLATION. COORDINATE EXACT LOCATION WITH ARCHITECT AND FIELD CONDITIONS.
- MOUNT 10'-0" ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW. COORDINATE LOCATION SUCH THAT UNIT HEATER IS FULLY ACCESSIBLE.

VESTIBULE AIR CURTAIN SCHEDULE

MARK	AREA SERVED	MANUFACTURER	MODEL	UNIT SPECS			ELECTRICAL			MAX SOUND POWER (DB)	NOTES
				LENGTH (IN)	MAX AIRFLOW (HP)	MOTOR (HP)	AMPS	V/PH			
EAC-1	MAIN ENTRANCE	BERNER	A08-E-1072A	72	1200	1/5	4.4	120/1	75		ALL

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NOTES:

- EQUIPMENT PROVIDED BY DIVISION 23.
- MOUNT UNIT PER MANUFACTURER'S RECOMMENDATIONS SUSPENDED FROM STRUCTURE.
- COORDINATE EXACT LOCATION AND ELEVATION WITH ARCHITECT PRIOR TO INSTALLATION.
- PROVIDE INTEGRAL STARTER.
- PROVIDE FACTORY INSTALLED DISCONNECT.
- REFER TO SEQUENCE OF OPERATION FOR UNIT CONTROLS.
- PROVIDE AIR CURTAIN WITH MAGNETIC NORMALLY CLOSED DOOR LIMIT SWITCH FOR INSTALLATION ON DOOR.
- PROVIDE WITH TIME DELAY MICROSWITCH WITH ADJUSTABLE DELAY TIMERS PRE MOUNTED IN THE AIR CURTAIN CONTROL PANEL.
- PROVIDE WITH POWDER COATED, COLOR AS SELECTED BY THE ARCHITECT FINISH.

FAN SCHEDULE

MARK	SERVICE DESCRIPTION	MANUFACTURER	MOUNTING	MODEL	CFM	ESP (IN)	BHP	NOM HP	FAN RPM	DRIVE (BELT/DIRECT)	VFD (Y/N)	ELECTRICAL V/PH	WEIGHT (LBS)	NOTES
EF-1	RESTROOM	GREENHECK	ROOF	G-980-VG	325	0.5	0.05	1/10	1548	DIRECT	N	120/1	30	C,D,F,G,J,P
EF-2	IT CLOSET	GREENHECK	INLINE	SQ-100-VG	1000	0.3	0.13	1/4	1385	DIRECT	N	120/1	45	A,E,F,G,I

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NOTES:

- INSTALL FAN WITHIN 16'-0" ABOVE FLOOR OR WITHIN 12" OF CEILING FOR SERVICEABILITY. COORDINATE LOCATION WITH STRUCTURE, LIGHTS, PIPING, AND DUCTWORK SUCH THAT FAN IS FULLY ACCESSIBLE.
- PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 16 INCHES ABOVE FINISHED ROOF SURFACE. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
- INSTALL EXHAUST FAN OR EXTERIOR DUCT TERMINATION TO MAINTAIN A MINIMUM OF 16'-0" FROM AIR INTAKES.
- PROVIDE WITH RUBBER IN SHEAR ISOLATION AND ALL-THREAD HANGING RODS.
- PROVIDE WITH FACTORY-MOUNTED STARTER AND DISCONNECT SWITCH.
- PROVIDE WITH MANUFACTURER'S ELECTRONICALLY COMMUTATED (EC) MOTOR. CONTRACTOR SHALL USE FAN POTENTIOMETER FOR BALANCING PURPOSES.
- INTERLOCK FAN OPERATION WITH SPACE TEMPERATURE SENSOR. 24V RELAY FURNISHED BY EMS VENDOR.
- INTERLOCK FAN OPERATION WITH EMS. 24V RELAY FURNISHED BY EMS VENDOR.
- PROVIDE WITH BIRDSCREEN AND FACTORY INTERNAL BACKDRAFT DAMPER WITH 120VAC ACTUATOR, SPRING RETURN, POWER OPEN, FAIL CLOSED, AUXILIARY SWITCHES (POSITION STATUS).

VAV TERMINAL SCHEDULE (COOLING ONLY)

MARK	SERVED FROM	ZONE SERVED	MANUFACTURER	MODEL	INLET SIZE (IN)	PRIMARY CFM	MIN PRIM CFM	ELECTRICAL		CP TRANS V/PH	SOUND POWER		CONTROL TYPE	NOTES
								MCA	MOCP		RADIATED	DISCHARGE		
VAV-1	RTU-2	FITTING ROOMS	TITUS	DESV	16	1750	875	1	15	120V/1PH	25	25	SINGLE MAX. AUTO CHANGE	A - G

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NOTES:

- INSTALL FLEXIBLE DUCT CONNECTOR AT INLET CONNECTION.
- PROVIDE INTEGRAL DISCONNECT SWITCH.
- PROVIDE CONTROL POWER (CP) TRANSFORMER FACTORY INSTALLED. COORDINATE PRIMARY POWER WITH ELECTRICAL DRAWINGS.
- BOX NOT TO EXCEED SCHEDULED DISCHARGE OR RADIATED SOUND LEVEL USING 0.5 INCH PRESSURE DROP.
- VAV CONTROLS SHALL BE FURNISHED BY EMS VENDOR FOR FIELD INSTALLATION BY DIVISION 23. COORDINATE REQUIREMENTS PRIOR TO INSTALLATION.
- PROVIDE BOX WITH EITHER RIGHT HAND OR LEFT HAND CONFIGURATION AS SHOWN ON DRAWINGS.
- INLET SIZE SHOWN IS THE MINIMUM ALLOWABLE INLET SIZE. NO SMALLER SIZES SHALL BE ACCEPTED.

GRILLE, REGISTER, AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	SERVICE	MODEL	CONSTRUCTION TYPE	FACE TYPE	MOUNTING LOCATION	BORDER TYPE	FACE SIZE (IN)	MAX NC	MAX. PRESS. DROP (IN. W.C.)	NOTES
CEG1	TITUS	EXHAUST	OMNI	STEEL	PLAQUE	CEILING	--	12x12	25	0.1	B, C, F - H
CEG2	TITUS	EXHAUST	PAR	STEEL	PERFORATED	CEILING	--	12x12	25	0.1	B, C, F - H
CRG1	TITUS	RETURN	PAR	STEEL	PERFORATED	CEILING	--	24x24	25	0.1	B, C, F - H
CRG2	TITUS	RETURN	PAR	STEEL	PERFORATED	CEILING	--	12x24	25	0.1	B, C, F - H
CS01	PRICE	SUPPLY	PRODIGY	STEEL	PLAQUE	CEILING	--	24x24	25	0.1	A - C, F, H - J
CS02	TITUS	SUPPLY	OMNI	STEEL	PLAQUE	CEILING	--	24x24	25	0.1	A - C, F - H
CS03	TITUS	SUPPLY	OMNI	STEEL	PLAQUE	CEILING	--	12x12	25	0.1	A - C, F - H
CS04	TITUS	SUPPLY	R-OMNI	STEEL	PLAQUE	CEILING	--	REFER TO PLANS	25	0.1	A - C, F - H
WTG1	TITUS	TRANSFER	350RL	STEEL	LOUVERED	WALL	--	REFER TO PLANS	25	0.1	B - D, G, H

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NOTES:

- 4-WAY THROW PATTERN UNLESS OTHERWISE INDICATED BY FLOW ARROWS ON DRAWINGS.
- NECK SIZE SHOWN ON DRAWINGS. PROVIDE BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
- BAKED ENAMEL FINISH, COLOR TO MATCH WALL, DUCT, AND/OR CEILING COLOR. COORDINATE WITH ARCHITECT PRIOR TO ORDERING.
- FRONT BLADES PARALLEL TO LONG DIMENSION. INSTALL WALL GRILLE HIGH ON WALL WITH AIR BLADES POINTED UPWARD. COORDINATE EXACT LOCATIONS PRIOR TO INSTALLATION.
- PROVIDE WITH RAPID MOUNT FRAMING OPTION FOR LAY-IN TYPE DIFFUSERS INSTALLED IN A HARD CEILING.
- FRAME TYPE TO MATCH CEILING/WALL CONSTRUCTION. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING/WALL PLAN.
- PROVIDE DIFFUSERS AND GRILLES WITH NO EXPOSED MOUNTING SCREWS. COORDINATE WITH MANUFACTURER FOR NECESSARY MOUNTING BRACKETS OR ACCESSORIES.
- VARIABLE VOLUME DIFFUSER TO BE INTERLOCKED WITH SPACE MOUNTED THERMOSTAT. MAXIMUM AIRFLOW SHALL BE AS NOTED ON PLANS. MINIMUM AIRFLOW SHALL BE 30% OF MAXIMUM AIRFLOW. PROVIDE PRESSURE RELIEF COLLAR WITH DIFFUSER. DIFFUSER SHALL BE FURNISHED BY EMS VENDOR. INSTALLED BY MECHANICAL CONTRACTOR.

EMS CONTROLS:
CONTRACTORS ARE RESPONSIBLE FOR COORDINATING ALL EQUIPMENT CONTROLS WITH EMS VENDOR PRIOR TO PURCHASE AND INSTALLATION. CONTRACTORS SHALL COORDINATE WITH EMS VENDOR TO PROVIDE ALL NECESSARY EQUIPMENT AND ACCESSORIES FOR A FULLY FUNCTIONING SYSTEM.

Architect:



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TEMPLATE ISSUE DATE: 01/01/2022

Fixture Package:

UNITE

Stamp:

Issued For:

PERMIT

Issue Date:

12/01/2023

Revisions:

ROOFTOP UNIT (DX HEAT PUMP W/ AUX ELEC HEAT) CONTROL MATRIX

CONTROL FEATURE	UNITS	RTU-1	RTU-2	RTU-3	RTU-4	RTU-5	POINT TYPE INTERFACE WITH DDC (READ/WRITE)	NOTES
		SETPOINT OR Y/N	SETPOINT OR Y/N	SETPOINT OR Y/N	SETPOINT OR Y/N	SETPOINT OR Y/N		
BUILDING AUTOMATION SYSTEM (BAS)								
ENERGY MANAGEMENT SYSTEM INTERFACE		Y	Y	Y	Y	Y	BACNET	A
SETPOINTS								
COOLING - EFFECTIVE OCCUPIED COOLING SETPOINT	"F	72	72	72	72	72	READWRITE	
COOLING - EFFECTIVE UNOCCUPIED COOLING SETPOINT	"F	77	77	77	77	77	READWRITE	
COOLING - MINIMUM COOLING SUPPLY AIR TEMPERATURE (SAT) SETPOINT	"F	60	60	60	50	50	READWRITE	
COOLING - LOCKOUT TEMPERATURE SETPOINT	"F	55	55	55	55	55	READWRITE	
DEAD BAND - MINIMUM HEATING AND COOLING TEMPERATURE SETPOINT DIFFERENCE	"F	2	2	2	2	2		
HEATING - EFFECTIVE OCCUPIED HEATING SETPOINT	"F	70	70	70	70	70	READWRITE	
HEATING - EFFECTIVE UNOCCUPIED HEATING SETPOINT	"F	60	60	60	60	60	READWRITE	
HEATING - MAXIMUM HEATING SUPPLY AIR TEMPERATURE (SAT) SETPOINT	"F	120	120	120	120	120	READWRITE	
ECONOMIZER - HIGH OUTSIDE AIR TEMPERATURE (OAT) LOCKOUT SETPOINT	"F	75	75	75	75	75	READWRITE	
PROGRAMMED CONTROL FEATURES								
HVAC SYSTEM OCCUPIED/UNOCCUPIED MODE - EMS INTERFACE		Y	Y	Y	Y	Y	READ	A
HVAC SYSTEM OCCUPIED/UNOCCUPIED MODE - PROGRAMMABLE THERMOSTAT (TEMPORARY)		Y	Y	Y	Y	Y	READ	DIV 23
REMOTE TEMPERATURE SENSOR		Y	Y	Y	Y	Y	READ	EMS
REMOTE CO2 SENSOR		Y	Y	Y	Y	N	READ	EMS
DEMAND CONTROL VENTILATION (DCV) HIGH ALARM SETPOINT - CO2 SENSOR FEEDBACK	PPM	750	750	750	750	N/A	READWRITE	M
EQUIPMENT ACCESSORIES AND CONTROL MODULES								
OUTSIDE AIR DAMPER - MOTOR OPERATED (MODULATING)		Y	Y	Y	Y	Y	READWRITE	M, N
INTEGRATED ECONOMIZER - DIFFERENTIAL ENTHALPY ENABLE (OA ENTHALPY < RA ENTHALPY)	BTULB	Y	Y	Y	Y	Y	READWRITE	G, H
ECONOMIZER FAULT DETECTION AND DIAGNOSTICS (FDD) SYSTEM		Y	Y	Y	Y	Y	READ	P
RELIEF - BAROMETRIC DAMPER		Y	Y	Y	Y	Y		
RELIEF - CONSTANT VOLUME POWERED EXHAUST FAN		N	N	Y	Y	Y	READ STATUS	O, P
COOLING COIL (DX - STAGED)		Y	Y	Y	Y	Y	READ STATUS	E, F
HEAT PUMP COIL WITH REVERSING VALVE		Y	Y	Y	Y	Y	READ STATUS	J, K, O
HEAT PUMP AUXILIARY HEATING COIL		Y	Y	Y	Y	Y	READ STATUS	J, K, O
SUPPLY FAN CONTROL METHOD								
ON DURING OCCUPIED HOURS		Y	Y	Y	Y	Y		B
CYCLE WITH LOADS DURING UNOCCUPIED HOURS		Y	Y	Y	Y	Y		B
UNIT START AND FAN OFF DELAY		Y	Y	Y	Y	Y		B
CONSTANT VOLUME FAN CONTROL		Y	Y	N	N	N	READ STATUS	B
VARIABLE VOLUME - 2-SPEED FAN CONTROL		N	N	Y	Y	N	READ STATUS	C
OPTIMUM START SEQUENCE		Y	Y	Y	Y	Y		P
SAFETIES, INTERLOCKS, AND ALARMS								
SUPPLY AIR SMOKE DETECTOR - FIRE SAFETY SHUTDOWN		Y	Y	Y	Y	Y	READ	D
RETURN AIR SMOKE DETECTOR - FIRE SAFETY SHUTDOWN		Y	Y	Y	Y	Y	READ	D
LOW LIMIT FREEZE/STAT - FREEZE PROTECTION SAFETY SHUTDOWN		Y	N	N	N	N	READ	D, P
SAFETY CHAIN - SAFETY SHUTDOWN		Y	Y	Y	Y	Y	READ	D
SAT ALARM - SAFETY SHUTDOWN		Y	Y	Y	Y	Y	READ	D
SPT ALARM - SAFETY SHUTDOWN		Y	Y	Y	Y	Y	READ	D
FIRE ALARM CONTROL PANEL - FIRE SAFETY SHUTDOWN INTERLOCK		Y	Y	Y	Y	Y	READ	D, P

EMS VENDOR SHALL PROVIDE CONTROL PANEL, RELAYS, THERMOSTATS, TEMPERATURE SENSORS, HUMIDITY SENSORS, AND/OR CO2 SENSORS WHERE SHOWN ON THE DRAWINGS AND AS REQUIRED TO FACILITATE THE SCHEDULED SEQUENCE OF OPERATION. EACH UNIT SHALL CONTROL BASED ON ITS OWN INTERNAL SAFETIES, TIME DELAYS, AND SEQUENCES UNLESS NOTED OTHERWISE. COORDINATE WITH OWNER FINAL BUILDING AND EQUIPMENT SCHEDULES DURING STARTUP. REFERENCE DIVISION SPECIFICATIONS FOR INDIVIDUAL DEVICE REQUIREMENTS.

NOTES:

- A. EMS SHALL PROVIDE REMOTE SETPOINT ADJUSTMENT, SCHEDULING, AND MONITORING OF THE POINTS LISTED IN THE SCHEDULE FOR EACH UNIT. THE RTU SHALL BE SCHEDULED WITH A MINIMUM OF AN OCCUPIED AND UNOCCUPIED SCHEDULE. ADDITIONAL UNIT SCHEDULES SHALL BE AVAILABLE FOR REMOTE IMPLEMENTATION IF REQUIRED.
- B. THE SUPPLY FAN SHALL RUN CONTINUOUSLY IN OCCUPIED MODE AND SHALL CYCLE ON AND OFF IN UNOCCUPIED MODE. A UNIT START DELAY IS USED WHEN TRANSITIONING FROM UNOCCUPIED TO OCCUPIED. FAN OFF DELAY ALLOWS THE SUPPLY FAN TO CONTINUE TO OPERATE AFTER HEATING AND COOLING STOPS.
- C. VIA FACTORY VFD, THE TRANE BACNET OPENBOARD SHALL DETERMINE FAN SPEED REQUIRED FOR HEATING AND COOLING. FACTORY VFD SHALL CONTROL TO 2 FAN SPEEDS. LOW SPEED SHALL NOT EXCEED 60% OF FULL SPEED AND SHALL DRAW NO MORE THAN 40% OF FAN POWER AT FULL SPEED. DURING FAN ONLY OR SINGLE STAGE COOLING, SUPPLY FAN SHALL OPERATE AT LOW SPEED. DURING HEATING, SECOND STAGE COOLING, DEHUMIDIFICATION OR FULL ECONOMIZER OPERATION, FAN SHALL OPERATE AT HIGH SPEED.
- D. IF A LOCAL UNIT CONTROL ALARM IS ACTIVE, THE SUPPLY FAN TURNS OFF IMMEDIATELY REGARDLESS OF OCCUPANCY STATE OR DEMAND.
- E. COOLING STAGES ARE CONTROLLED BY THE RTU OPEN COOLING CONTROL PID LOOP AND COOLING STAGES CAPACITY ALGORITHM. THEY CALCULATE THE REQUIRED NUMBER OF STAGES NEEDED TO SATISFY THE SPACE BY COMPARING THE SPACE TEMPERATURE TO THE EFFECTIVE OCCUPIED COOLING SETPOINT IN OCCUPIED MODE AND THE EFFECTIVE UNOCCUPIED COOLING SETPOINT IN UNOCCUPIED MODE. THE FOLLOWING CONDITIONS MUST BE TRUE FOR THE COOLING ALGORITHM TO OPERATE:
 - THE OUTDOOR AIR TEMPERATURE IS GREATER THAN THE COOLING LOCKOUT TEMPERATURE SETPOINT.
 - THE SUPPLY FAN HAS BEEN ON FOR AT LEAST 30 SECONDS.
 - THE UNIT HAS A VALID SUPPLY AIR TEMPERATURE INPUT.
 - THE UNIT HAS A VALID SPACE TEMPERATURE INPUT.
 - HEATING MODE IS NOT ACTIVE AND THE TIME GUARD BETWEEN MODES HAS EXPIRED.
 - ECONOMIZER IS UNAVAILABLE OR ECONOMIZER IS ACTIVE AND THE FOLLOWING ARE TRUE: (1) ECONOMIZER IS GREATER THAN 85% OPEN, (2) SUPPLY AIR TEMPERATURE IS GREATER THAN 5 DEGREES ABOVE THE MINIMUM COOLING SAT SETPOINT, AND (3) SPACE TEMPERATURE IS GREATER THAN 0.5 DEGREES ABOVE THE EFFECTIVE OCCUPIED TEMPERATURE SETPOINT.
- F. WHEN THE COOLING ALGORITHM PRECONDITIONS ARE MET, THE COMPRESSORS ARE ENERGIZED IN STAGES, AS APPLICABLE. ANTI-RECYCLE TIMERS ARE EMPLOYED TO PROTECT THE EQUIPMENT FROM SHORT-CYCLING. THERE ARE FIXED THREE-MINUTE MINIMUM ON-TIMES AND FIVE-MINUTE OFF-TIMES FOR EACH COMPRESSOR OUTPUT.
- F. DURING COMPRESSOR OPERATION, THE RTU OPEN CONTROL LOGIC MAY REDUCE THE NUMBER OF ACTIVE STAGES IF THE SUPPLY AIR TEMPERATURE FALLS BELOW THE MINIMUM COOLING SAT SETPOINT. A COMPRESSOR STAGED OFF IN THIS FASHION MAY BE STARTED AGAIN AFTER THE NORMAL TIME-GUARD PERIOD HAS EXPIRED IF THE SUPPLY AIR TEMPERATURE HAS INCREASED ABOVE THE MINIMUM COOLING SAT SETPOINT.
- G. THE SYSTEM SHALL UTILIZE THE FACTORY MODULATING ECONOMIZER FOR FREE COOLING WHEN OUTDOOR AIR CONDITIONS ARE SUITABLE. FOR THE ECONOMIZER TO OPERATE DURING OCCUPIED HOURS, THE FOLLOWING CONDITIONS MUST BE TRUE:
 - OUTDOOR AIR TEMPERATURE IS LESS THAN THE SPACE TEMPERATURE AND LESS THAN THE ECONOMIZER HIGH OAT LOCKOUT SETPOINT.
 - THE INDOOR FAN HAS BEEN ON FOR AT LEAST 30 SECONDS.
 - THE UNIT HAS A VALID SUPPLY AIR TEMPERATURE INPUT.
 - THE UNIT HAS A VALID SPACE TEMPERATURE INPUT.
 - OUTDOOR AIR ENTHALPY IS LESS THAN THE SPACE ENTHALPY. (ENTHALPY STATUS SHALL READ "LOW").
- IF ANY OF THE PRECEDING CONDITIONS ARE NOT TRUE AND THE SUPPLY FAN IS ON HIGH SPEED, THE ECONOMIZER SHALL BE SET TO THE DCV MINIMUM OUTDOOR AIR DAMPER POSITION (TBD BY TAB CONTRACTOR). IF ANY OF THE PRECEDING CONDITIONS ARE NOT TRUE AND THE SUPPLY FAN IS ON LOW SPEED, THE ECONOMIZER SHALL BE SET TO THE LOW FAN ECONOMIZER MINIMUM DAMPER POSITION (TBD BY TAB CONTRACTOR). IF ALL OF THE PRECEDING CONDITIONS ARE TRUE, THE ECONOMIZER PID LOOP SHALL MODULATE THE DAMPER. THE ECONOMIZER POSITION SHALL BE REDUCED AS THE SUPPLY AIR TEMPERATURE FALLS TO WITHIN 5 DEGREES OF THE MINIMUM COOLING SAT SETPOINT, BUT SHALL NEVER CLOSE BELOW THE DCV MINIMUM OUTDOOR AIR DAMPER POSITION.
- H. DURING UNOCCUPIED HOURS, UNOCCUPIED FREE COOLING SHALL BE ENABLED. THE ECONOMIZER SHALL REMAIN CLOSED UNLESS THE FOLLOWING CONDITIONS ARE TRUE:
 - OUTDOOR AIR TEMPERATURE IS BELOW THE ECONOMIZER HIGH OAT LOCKOUT SETPOINT.
 - OUTDOOR AIR TEMPERATURE IS LESS THAN THE SPACE TEMPERATURE
 - OUTDOOR AIR ENTHALPY IS LESS THAN THE SPACE ENTHALPY. (ENTHALPY STATUS SHALL READ "LOW")
- IF ALL OF THE PRECEDING CONDITIONS ARE TRUE AND THE SPACE TEMPERATURE RISES 1 DEGREE ABOVE THE EFFECTIVE UNOCCUPIED COOLING SETPOINT, THE SUPPLY FAN SHALL START AND THE ECONOMIZER DAMPER SHALL OPEN AS NECESSARY TO COOL THE SPACE. THE DAMPER SHALL REMAIN OPEN UNTIL THE SPACE IS SATISFIED OR THE PRECEDING CONDITIONS ARE NO LONGER TRUE. IF ANY OF THE PRECEDING CONDITIONS ARE NOT TRUE, THE ECONOMIZER SHALL CLOSE COMPLETELY.
- J. HEATING STAGES ARE CONTROLLED BY THE RTU OPEN HEATING CONTROL PID LOOP AND HEATING STAGES CAPACITY ALGORITHM. THEY CALCULATE THE REQUIRED NUMBER OF STAGES NEEDED TO SATISFY THE SPACE BY COMPARING THE SPACE TEMPERATURE TO THE EFFECTIVE OCCUPIED HEATING SETPOINT IN OCCUPIED MODE AND THE EFFECTIVE UNOCCUPIED HEATING SETPOINT IN UNOCCUPIED MODE. THE FOLLOWING CONDITIONS MUST BE TRUE FOR THE HEATING ALGORITHM TO OPERATE:
 - OUTDOOR AIR TEMPERATURE IS LESS THAN THE HEATING LOCKOUT TEMPERATURE SETPOINT.
 - THE SUPPLY FAN HAS BEEN ON FOR AT LEAST 30 SECONDS.
 - THE UNIT HAS A VALID SUPPLY AIR TEMPERATURE INPUT.
 - THE UNIT HAS A VALID SPACE TEMPERATURE INPUT.
 - COOLING MODE AND ECONOMIZER ARE NOT ACTIVE AND THE TIME GUARD BETWEEN MODES HAS EXPIRED.
- K. WHEN THE HEATING ALGORITHM PRECONDITIONS ARE MET, THE HEAT IS ENERGIZED IN STAGES, AS APPLICABLE. ANTI-RECYCLE TIMERS ARE EMPLOYED TO PROTECT THE EQUIPMENT FROM SHORT-CYCLING. THERE ARE FIXED ONE-MINUTE MINIMUM ON AND OFF TIMES FOR EACH HEATING OUTPUT.
- K. DURING HEATING OPERATION, THE RTU OPEN CONTROL LOGIC MAY REDUCE THE NUMBER OF ACTIVE STAGES IF THE SUPPLY AIR TEMPERATURE EXCEEDS THE MAXIMUM HEATING SAT SETPOINT. A HEAT STAGE TURNED OFF IN THIS FASHION MAY BE STARTED AGAIN AFTER THE NORMAL TIME-GUARD PERIOD HAS EXPIRED IF THE SUPPLY AIR TEMPERATURE HAS DECREASED BELOW THE MAXIMUM HEATING SAT SETPOINT.
- M. THE SYSTEM SHALL UTILIZE A CO2 SENSOR FOR THE SALES AREA, FITTING ROOM, STOCKROOM AND EACH OFFICE (HIGHEST READING WILL BE TAKEN FOR OFFICE DCV CONTROL). DCV IS CONTROLLED BY THE INDOOR AIR CO2 ALGORITHM. THE ALGORITHM CALCULATES THE CO2 MINIMUM DAMPER POSITION USING A PID LOOP. THE CALCULATED CO2 MINIMUM DAMPER POSITION IS THEN COMPARED AGAINST THE DCV MINIMUM POSITION SETPOINT AND THE GREATEST VALUE BECOMES THE FINAL MINIMUM DAMPER POSITION. DURING OCCUPIED HOURS, THE INDOOR AIR CO2 SENSING SHALL BE ENABLED. THE FOLLOWING CONDITIONS MUST BE TRUE FOR THE INDOOR AIR CO2 ALGORITHM TO OPERATE:
 - THE SUPPLY FAN HAS BEEN ON FOR AT LEAST 30 SECONDS.
 - THE UNIT HAS A VALID CO2 SENSOR READING.
- IF ALL OF THE PRECEDING CONDITIONS ARE TRUE, THE FACTORY OUTDOOR AIR DAMPER SHALL MODULATE BETWEEN ITS MINIMUM (ABS. MIN. O/A) AND MAXIMUM (MIN. O/A CFM) POSITION (TBD BY TAB CONTRACTOR). THE SYSTEM SHALL START TO MODULATE THE DAMPER OPEN WHEN CO2 LEVEL RISES TO 100 PPM (ADJUSTABLE) ABOVE AMBIENT CO2 LEVEL (400 PPM) AND SHALL CONTINUE TO OPEN TO ITS MAXIMUM POSITION AS CO2 LEVEL RISES TO AND ABOVE THE DCV HIGH ALARM SETPOINT. AS THE CO2 LEVEL DROPS, THE DAMPER SHALL START TO MODULATE TO ITS MINIMUM POSITION. DURING UNOCCUPIED HOURS, THE INDOOR AIR CO2 SENSING SHALL BE DISABLED.
- N. EQUIPMENT MANUFACTURER SHALL PROVIDE MODULATING DAMPER AND CONTROLS CAPABLE OF ADJUSTING THE DAMPER POSITION BASED ON DEMAND CONTROL VENTILATION TO MAINTAIN THE SCHEDULED OUTSIDE AIR AS SHOWN ON THE DRAWINGS. TAB CONTRACTOR SHALL COORDINATE DAMPER POSITION SETPOINTS IN FIELD DURING TESTING AND BALANCING TO MAINTAIN MINIMUM VENTILATION WHEN NOT IN ECONOMIZER. DAMPER SHALL BE CLOSED DURING UNOCCUPIED HOURS.
- O. POWERED EXHAUST FAN SHALL STAGE ON AND OFF ACCORDING TO DAMPER POSITION.
- P. DEVICE SHALL BE FACTORY WIRING AND PRE-WIRED FOR OPERATION SUBJECT TO THE RTU OPEN CONTROLLER.
- Q. CONTROLS FOR AUXILIARY HEATING COIL SHALL PREVENT HEATER OPERATION WHEN THE HEATING LOAD CAN BE MET BY THE HEAT PUMP ALONE. AUXILIARY HEATER OPERATION SHALL BE ALLOWED DURING DEFROST CYCLES.

TRANE UNIT STARTUP REQUIREMENTS

INSTALLING CONTRACTOR SHALL COMPLETE THE PRE-START CHECKLIST AND EMAIL JENNIFER.TYE@COMFORTSYSTEMSUSA.COM TWO WEEKS PRIOR TO SCHEDULING EQUIPMENT STARTUP.

COORDINATE EQUIPMENT STARTUP WORK WITH COMFORT SYSTEMS USA EMAIL: JENNIFER.TYE@COMFORTSYSTEMSUSA.COM OFFICE: (317) 246-5176

DEPARTMENT MANAGER EMAIL: KLORI.KARAMAD@COMFORTSYSTEMSUSA.COM OFFICE: 317-246-4656

TECHNICAL SUPPORT

EMAIL: RICK.FARRIS@COMFORTSYSTEMSUSA.COM, MOBILE: 317-638-5363 X4454

PRE-START CHECKLIST (VERIFY FOR ALL UNITS)

- VERIFY ALL ITEMS ON THE EQUIPMENT ORDER RECEIVED.
- VERIFY ALL PACKAGING MATERIAL REMOVED FROM THE UNIT.
- VERIFY CURB GASKETS PROPERLY INSTALLED.
- VERIFY ROOFTOP UNIT INSTALLED LEVEL AND PROPERLY ALIGNED WITH CURB.
- VERIFY DUCTWORK/FABRIC DUCT COMPLETELY INSTALLED PER MECHANICAL PLANS.
- VERIFY O/A HOOD INSTALLED, AIR INLET SCREEN INSTALLED.
- VERIFY POWER EXHAUST ACCESSORY INSTALLED. (IF APPLICABLE)
- VERIFY CLEAN PLEATED FILTERS INSTALLED, MINIMUM MERV 8 RATING.
- VERIFY CONDENSATE DRAIN LINE INSTALLED, MINIMUM 2" DEEP TRAP, DRAIN PAN CHECKLEVEL.
- VERIFY SUPPLY FAN ROTATES FREELY IN THE HOUSING.
- VERIFY PULLEYS ALIGNED AND BELT TENSION CORRECT.
- VERIFY SMOKE DETECTORS INSTALLED IN DUCTWORK, CLEANED AND TESTED.
- VERIFY GAS METER INSTALLED AND GAS AVAILABLE FROM THE UTILITY. GAS PIPING COMPLETED, CHECKED FOR LEAKS AND PURGED (IF APPLICABLE).
- VERIFY GAS PIPING DRIP LEG INSTALLED PROPERLY. (DOWNSTREAM OF SHUTOFF VALVE AND NO INTERFERENCE WITH ACCESS DOOR)
- VERIFY FLUE HOOD INSTALLED.
- VERIFY JOBSITE POWER SUPPLY MATCHES THE VOLTAGE ON THE UNIT DATA PLATE.
- VERIFY ELECTRIC POWER CONNECTED TO UNIT VIA THE ACCESS PROVIDED. IF NOT, DATE POWER WILL BE AVAILABLE.
- VERIFY NO WIRES TOUCHING REFRIGERANT LINES OR SHARP EDGES.
- VERIFY ELECTRIC CONNECTORS AND TERMINALS TIGHT.
- VERIFY THRU-THE-CURB UTILITY CONNECTIONS COMPLETE.
- VERIFY UNIT TRANSFORMER PRIMARY TAPPED FOR JOBSITE VOLTAGE.
- VERIFY VENTSTAR THERMOSTAT INSTALLED IN THE RETURN AIR DUCT DROP AND WIRED FOR TEMPORARY UNIT OPERATION.

EMS INSTALLATION CHECKLIST

ITEMS ON EMS CHECK-OFF LIST MUST BE COMPLETED PRIOR TO EMS AND GBS COMMISSIONING AT THE END OF THE JOB. SOME ITEMS LISTED BELOW MAY NOT BE APPLICABLE.

COORDINATE EQUIPMENT STARTUP WORK WITH COMFORT SYSTEMS USA. EMAIL: PAUL.SAWYER@COMFORTSYSTEMSUSA.COM OFFICE: 317-246-5170

EMS CHECKLIST

- REVIEW EMS PRINT SET AND INSTALL EMS OPUS PANEL AND LCP AS DESCRIBED IN THE EMS PRINT SET.
- REVIEW EMS PRINT SET AND PULL ALL WIRE AND TERMINATE ON DEVICES AS DESCRIBED IN THE EMS PRINT SET.
- REVIEW EMS PRINT SET AND INSTALL ALL EMS HVAC CONTROLS AS DESCRIBED IN THE EMS PRINT SET.
- REVIEW EMS PRINT SET AND INSTALL ALL EMS LIGHTING CONTROLS AS DESCRIBED IN THE EMS PRINT SET.
- REVIEW EMS PRINT SET AND WATTSTOPPER SUBMITTAL AND INSTALL THE WATTSTOPPER LIGHTING SYSTEM AND PULL ALL WIRE AS DESCRIBED IN THE EMS PRINT SET AND WATTSTOPPER SUBMITTAL.

SEQUENCE OF OPERATION

A. ROOFTOP UNIT CONTROL (RTU-1,2,3,4,5)

Refer to Rooftop Unit Control Matrix for sequence of operations.

B. VAV DIFFUSER CONTROL (CSD1)

In occupied mode, the VAV diffuser shall modulate airflow to maintain the room temperature setpoint (adjustable). Set VAV diffuser minimum position to maintain 30% of the maximum airflow.

The room occupancy sensor, upon sensing the space to be vacant for 15 minutes (adjustable), shall signal the diffuser through the EMS to maintain an unoccupied temperature setpoint (adjustable). When occupancy is detected, the EMS shall direct the diffuser to control to the room temperature setpoint.

The room CO2 sensor, upon reading a CO2 level above 100 PPM (adjustable) above ambient CO2 level (400 PPM), shall signal the diffuser through the EMS to modulate the zone damper between its minimum and maximum position. The system shall start to modulate the damper open when CO2 level rises 100 PPM above ambient CO2 level and continue to open to its maximum position as CO2 level rises to and above 700 PPM (adjustable) above ambient CO2 levels. As the CO2 level drops, the system shall start to modulate the dampers to the minimum position.

In unoccupied mode, VAV diffuser control shall be disabled unless occupancy is detected. When occupancy is detected, the EMS shall direct the diffuser to control to the room temperature setpoint.

C. MOTORIZED DAMPER CONTROL SERVING IT ROOM (MD)

When RTU-1 is in heating mode, the motorized damper shall be closed.

When RTU-1 is in cooling mode and the supply air temperature drops below 65 degrees Fahrenheit (adjustable), the motorized damper shall open.

A damper end switch shall prove if the motorized damper is open when called. If failure to open occurs, an alarm shall be generated to the EMS.

D. RESTROOM EXHAUST FAN CONTROL (EF-1)

In occupied mode, the exhaust fan shall be enabled and the motorized damper shall open.

In unoccupied hours, the exhaust fan shall be disabled and the motorized damper shall be closed.

A damper end switch shall prove if the motorized damper is open when called. If failure to open occurs, the fan shall not be enabled and an alarm shall be generated to the EMS.

E. IT ROOM EXHAUST FAN CONTROL (EF-2)

The exhaust fan shall be enabled when the space temperature rises 1 degree above the cooling setpoint (75 degrees Fahrenheit, adjustable) and shall continue to operate until the space temperature drops to 1 degree below the cooling setpoint.

F. UNIT HEATER CONTROL (EUH-1)

In occupied mode, the heater shall be enabled when the space temperature drops below room temperature setpoint (65 degrees Fahrenheit, adjustable).

In unoccupied mode, the heater shall be enabled when the space temperature drops below the unoccupied room temperature setpoint (55 degrees Fahrenheit, adjustable).

The unit heater thermostat shall interface with EMS using 24v relay provided by EMS Vendor. Coordinate Unit Heater installation with EMS Vendor such that thermostat remains fully accessible.

The EMS shall shut down unit heater heating coil stages when the EMS measures an outside air temperature above 55 degrees Fahrenheit (adjustable).

G. ELECTRIC AIR CURTAIN CONTROL (EAC-1)

Interlock air curtain with door limit switch to energize when the door opens. Units scheduled with heating coils shall cycle stages of electric heat to maintain room temperature setpoint (65 degrees Fahrenheit, adjustable). The unit's heater shall be disabled when the outside air temperature is above 55 degrees Fahrenheit (adjustable)

H. FITTING ROOM VAV BOX CONTROL (VAV-1)

For single duct terminal units, upon a rise in space temperature above cooling setpoint (72 degrees Fahrenheit, adjustable), the terminal unit primary damper shall modulate towards its maximum cooling CFM. A drop in space temperature shall result in the unit primary damper modulating towards its minimum cooling CFM.

During unoccupied hours, the unit shall sequence the same as the occupied cycle to maintain a reduced setback space temperature (78 degrees Fahrenheit, adjustable).

Heating/cooling auto-changeover shall sequence terminal unit when associated RTU-3 is in heating mode as follows: when supply temperature is below 70 degrees Fahrenheit, the unit shall operate in the cooling mode, as described above. Upon a rise in supply temperature above 75 degrees Fahrenheit, the unit shall changeover to the heating mode and modulate primary damper to minimum position. A decrease in room temperature below heating setpoint (70 degrees Fahrenheit, adjustable) shall cause primary damper to modulate towards its maximum heating CFM. An increase in room temperature above heating setpoint shall cause primary damper to modulate towards its minimum heating CFM. If supply temperature decreases below 70 degrees Fahrenheit, the unit shall changeover back to the cooling mode.

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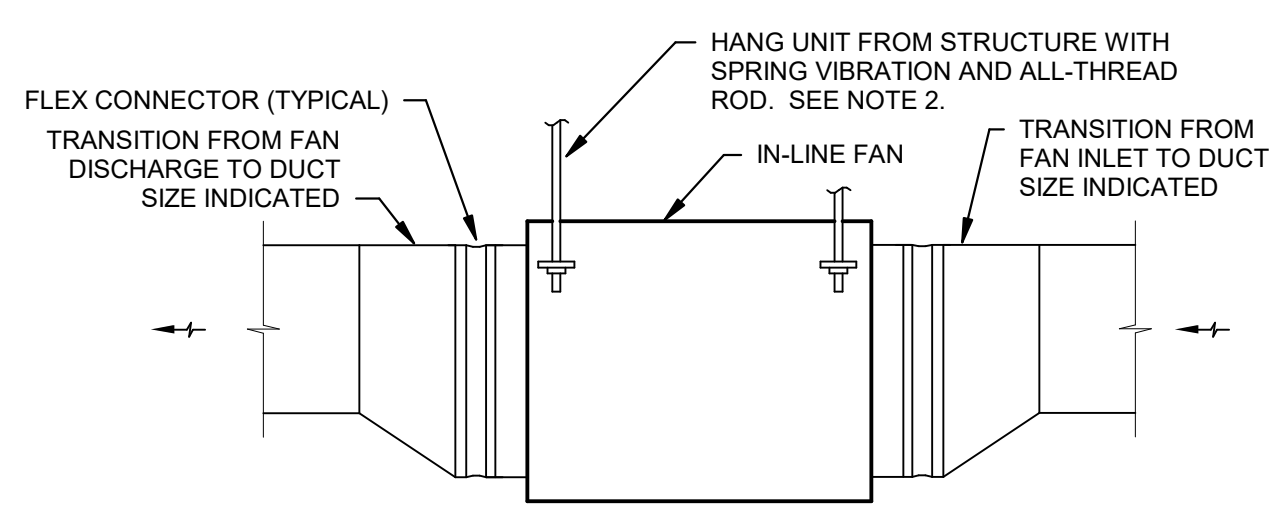
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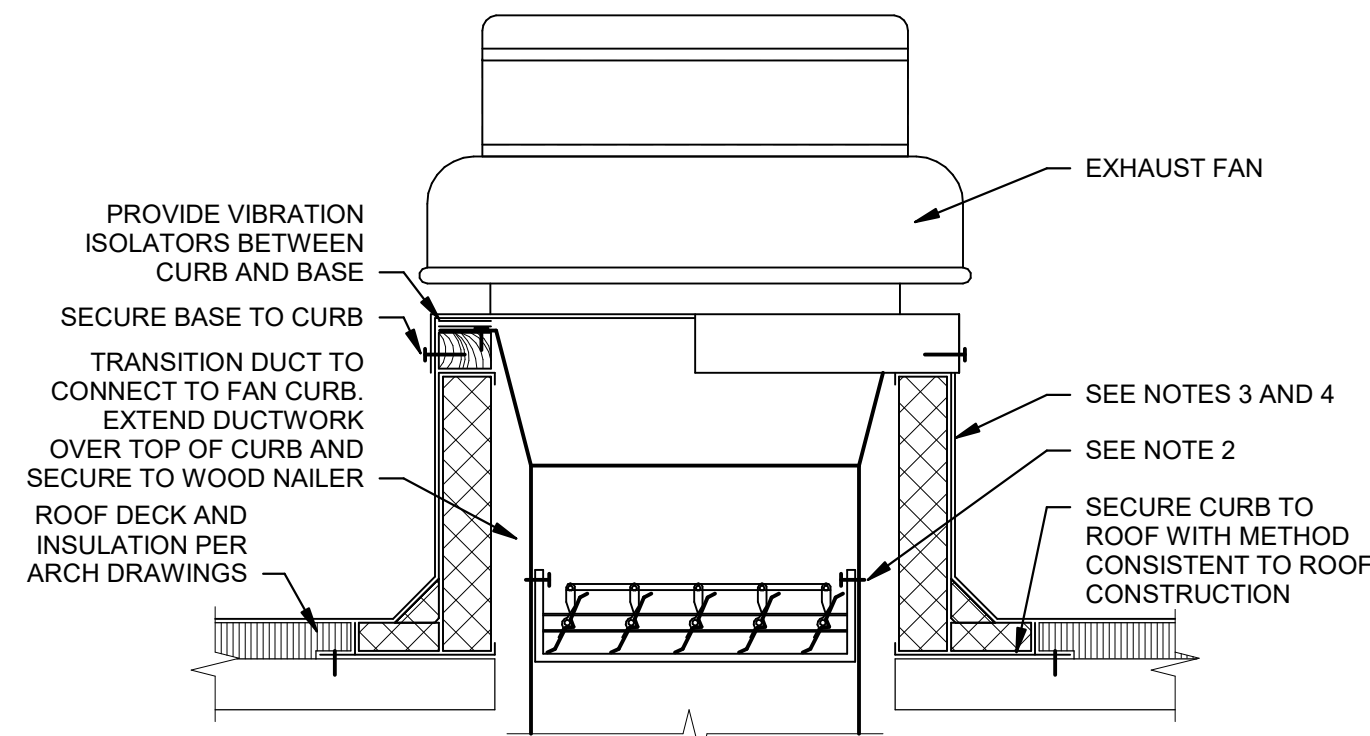
Heating/cooling auto-changeover shall sequence terminal unit when associated RTU-3 is in heating mode as follows: when supply temperature is below 70 degrees Fahrenheit, the unit shall operate in the cooling mode, as described above. Upon a rise in supply temperature above 75 degrees Fahrenheit, the unit shall changeover to the heating mode and modulate primary damper to minimum position. A decrease in room temperature below heating setpoint (70 degrees Fahrenheit, adjustable) shall cause primary damper to modulate towards its maximum heating CFM. An increase in room temperature above heating setpoint shall cause primary damper to modulate towards its minimum heating CFM. If supply temperature decreases below 70 degrees Fahrenheit, the unit shall changeover back to the cooling mode.

Heating/cooling auto-changeover shall sequence terminal unit when associated RTU-3 is in heating mode as follows: when supply temperature is below 70 degrees Fahrenheit, the unit shall operate in the cooling mode, as described above. Upon a rise in supply temperature above 75 degrees Fahrenheit, the unit shall changeover to the heating mode and modulate primary damper to minimum position. A decrease in room temperature below heating setpoint (70 degrees Fahrenheit, adjustable) shall cause primary damper to modulate towards its maximum heating CFM. An increase in room temperature above heating setpoint shall cause primary damper to modulate towards its minimum heating CFM. If supply temperature decreases below 7



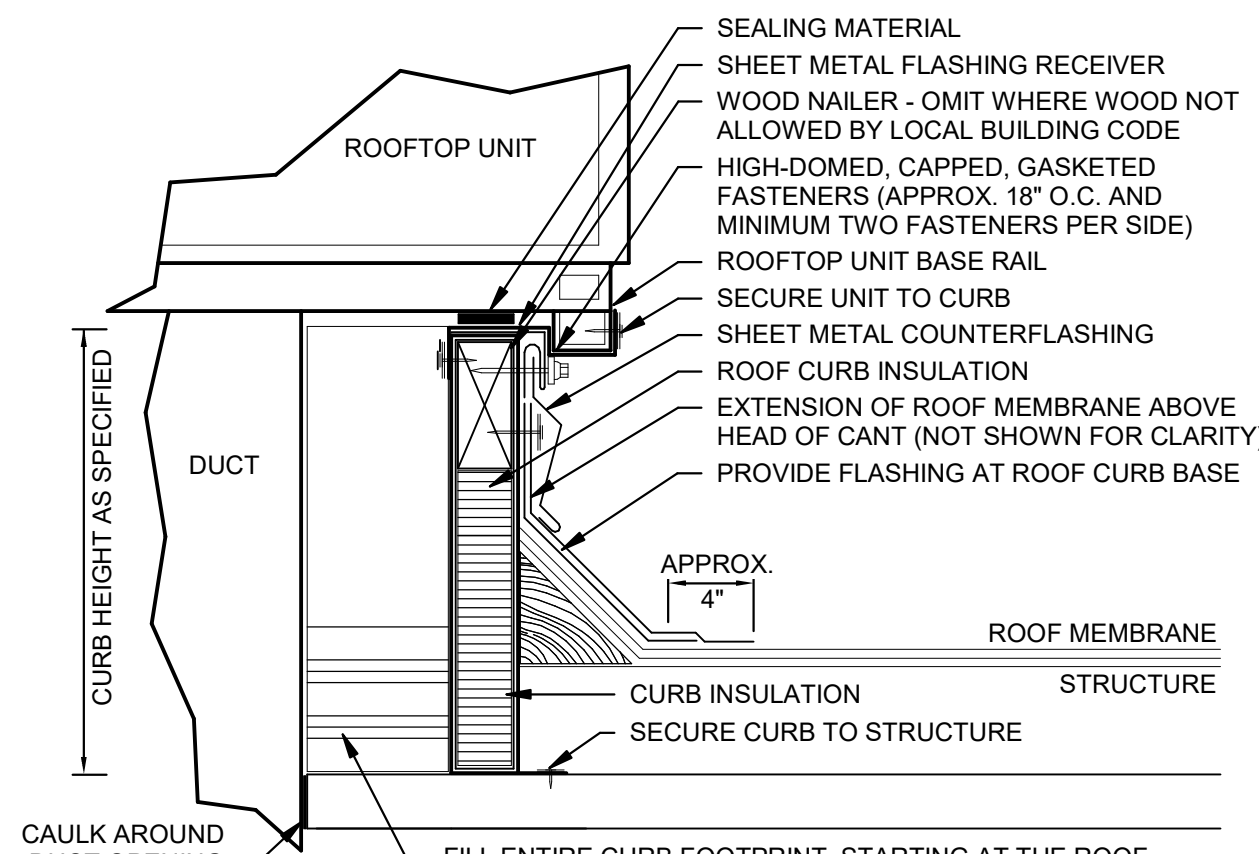
- NOTES:**
- ARRANGEMENT SHOWN IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS AND MEET LOCAL CODE REQUIREMENTS.
 - FOR FANS 1 HP AND LESS, PROVIDE NEOPRENE RUBBER MOUNT HANGER (NR). FOR FANS LARGER THAN 1 HP, PROVIDE SPRING VIBRATION ISOLATION HANGER (SPNH).

4 IN-LINE DUCT-MOUNTED FAN DETAIL NTS



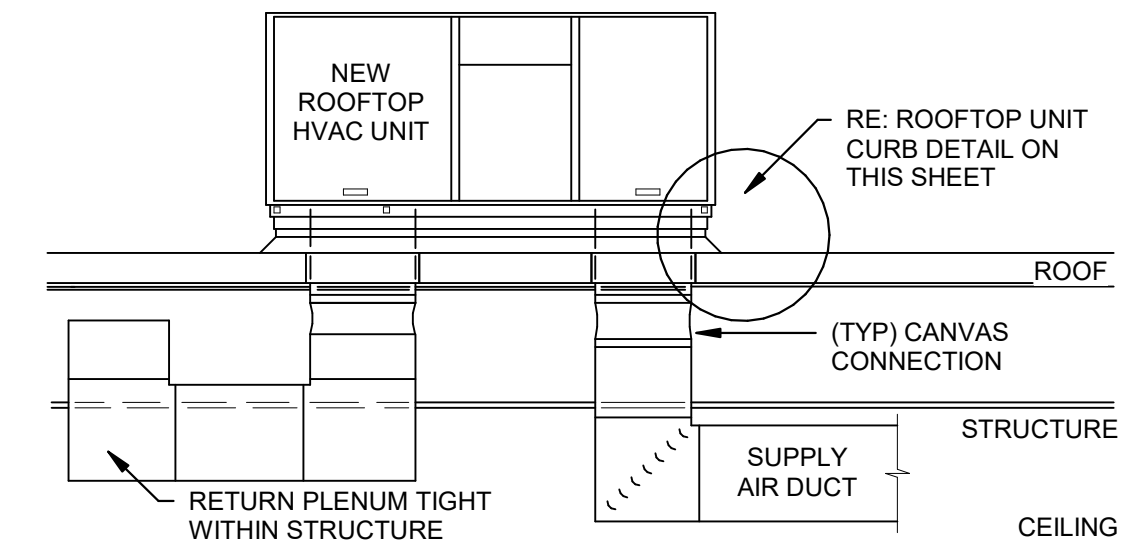
- NOTES:**
- ARRANGEMENT SHOWN IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS AND MEET LOCAL CODE.
 - IF DAMPER IS SPECIFIED IN EQUIPMENT SCHEDULE, INSTALL DAMPER AT BASE OF CURB AND SECURE FROM ABOVE TO ALLOW SERVICE THROUGH TOP OF CURB.
 - PREFABRICATED INSULATED ROOF CURBS WITH TREATED WOOD NAILER, CANT, AND STEP AS REQUIRED TO ACCOMMODATE ROOF INSULATION, FRAME AND SECURE CURB TO ROOF WITH METHOD CONSISTENT WITH ROOF CONSTRUCTION. ROOF CURB SHALL BEAR ON ROOF STRUCTURE. REFER TO ARCHITECTURAL DRAWINGS AND CURB MANUFACTURER'S DETAILS FOR MORE INFORMATION.
 - FOR SLOPED ROOFS, PROVIDE CURB WITH DIMENSIONS CAPABLE OF COMPENSATING ROOF SLOPE TO ENSURE FAN IS INSTALLED LEVEL.

3 ROOF-MOUNTED DOWNBLAST FAN DETAIL NTS



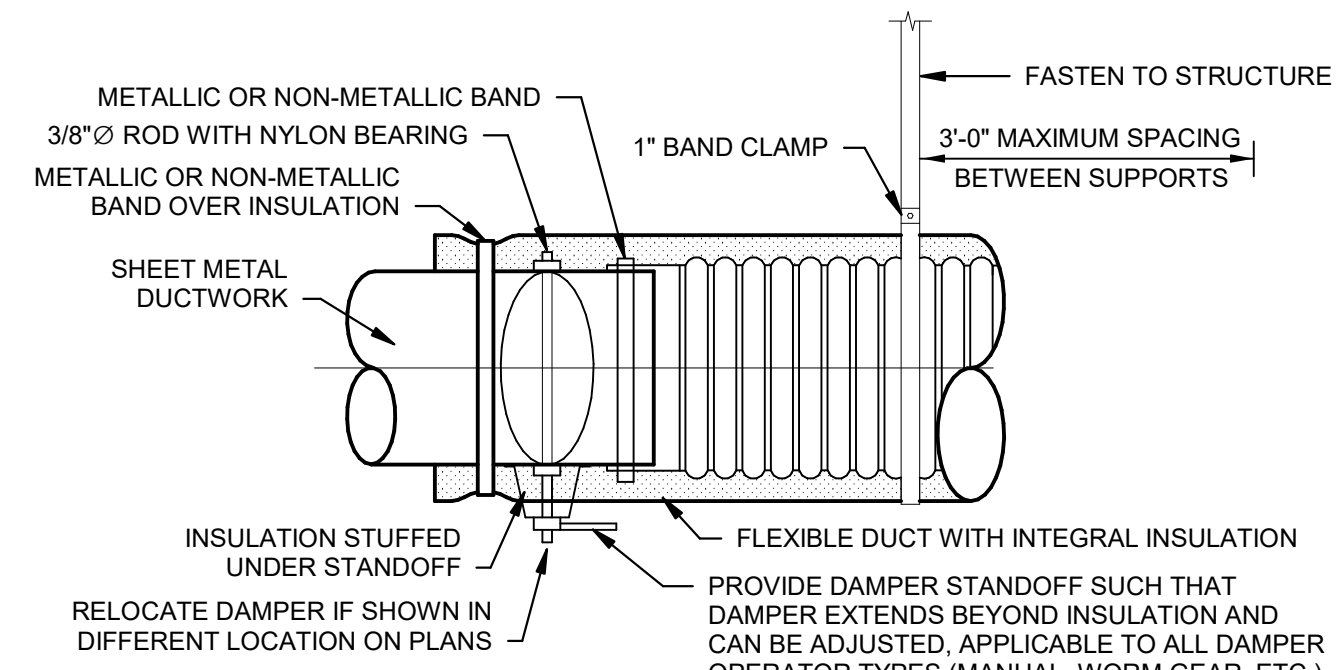
- NOTES:**
- CUT METAL DECKING TO ALLOW CURB INSTALLATION ON STEEL FRAMING. AFTER CURB IS SET IN PLACE, TRIM REMAINING METAL DECKING AND INSTALL WITHIN CURB. TACK WELD DECKING TO SUPPORT STEEL. DO NOT WELD INTERIOR DECKING TO ROOF CURB. PROVIDE ADDITIONAL CROSS FRAMING TO SUPPORT INTERIOR DECKING AND FILL MATERIAL AS REQUIRED.
 - REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR ROOF CURBS, ANCHORING AND SEISMIC/WIND RESISTANCE.

2 STANDARD ROOF CURB DETAIL NTS



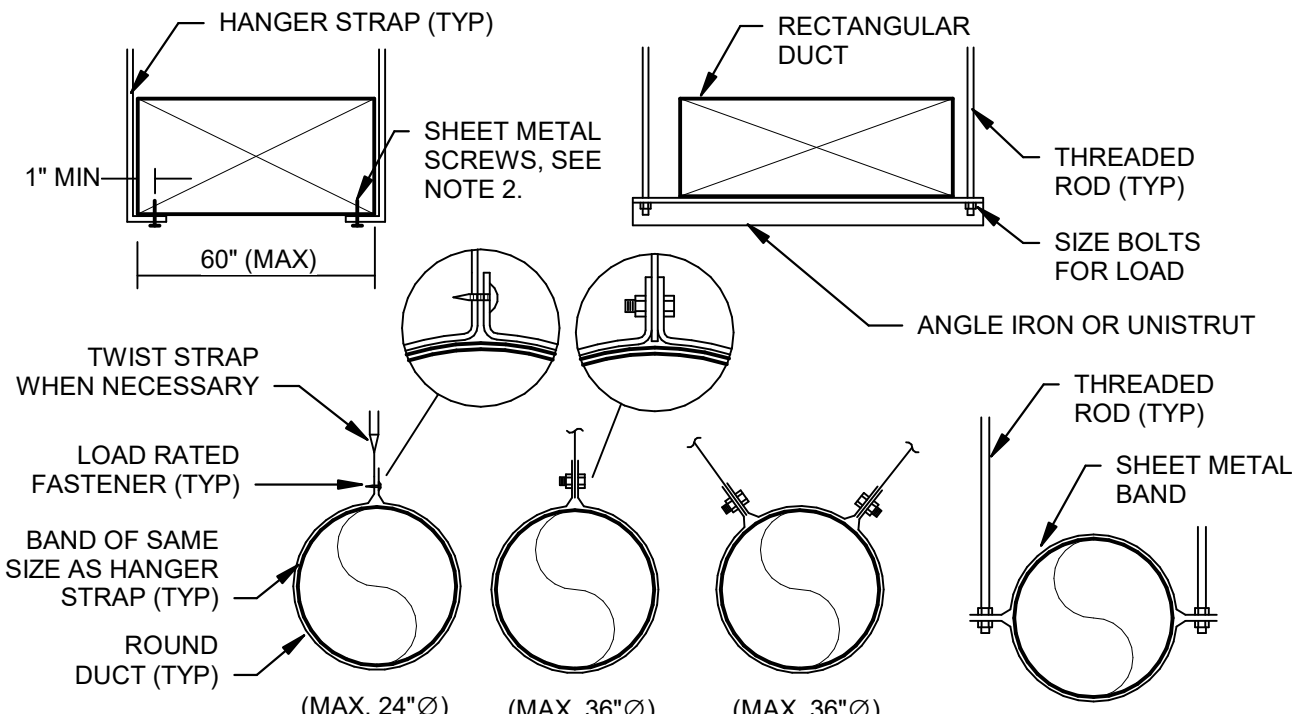
- NOTES:**
- PROVIDE OPENING THROUGH ROOF AND ROOF DECK INSULATION NO LARGER THAN REQUIRED TO ALLOW DUCTS TO PASS THROUGH. REFER TO PLANS FOR DUCT SIZES. TRANSITION AS REQUIRED IN ROOF CURB TO RTU SUPPLY AND RETURN OPENINGS.
 - PROVIDE SLOPED ROOF CURB TO INSTALL ROOFTOP UNIT LEVEL TO ENSURE PROPER DRAINAGE. COORDINATE ROOF SLOPE WITH ARCHITECTURAL FLASH AND COUNTER FLASH ROOF PENETRATIONS, ETC. TO ENSURE WEATHER TIGHT INSTALLATION.

1 ROOFTOP UNIT - NEW CURB DETAIL NTS



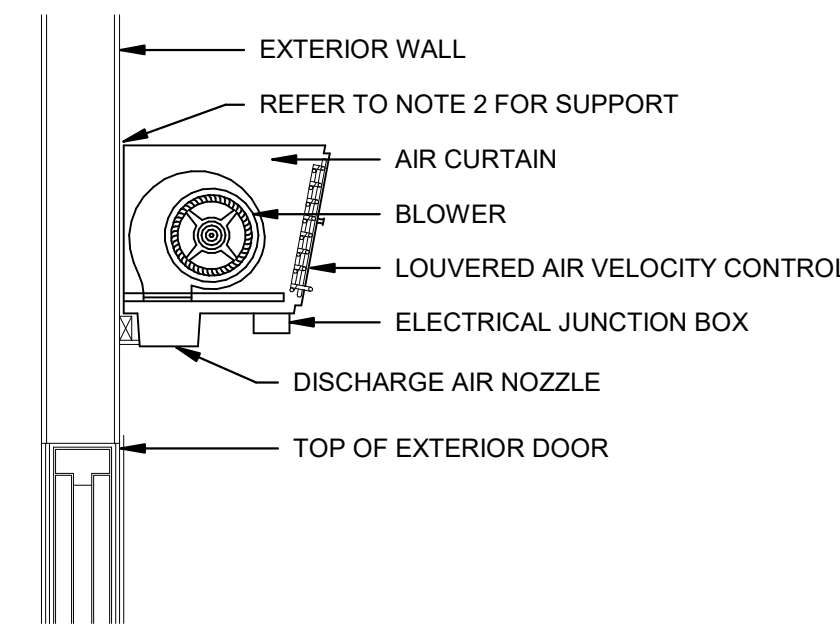
- NOTES:**
- INSTALL FLEXIBLE DUCT IN AS STRAIGHT A RUN AS POSSIBLE. USE LONG RADIUS BENDS WHERE POSSIBLE. PULL DUCT TIGHT AT BOTH ENDS AND SECURE BOTH INNER LINER & OUTER INSULATION SKIN WITH TAPE & METAL CLAMPS.
 - EXTEND DAMPER ROD TO ACCOMMODATE INSULATION IF APPLICABLE. PULL ROD END TO EDGE OF DUCTWORK AS REQUIRED AND SEAL TO MAINTAIN VAPOR BARRIER.
 - INSTALL LOCKING QUADRANT TO HANDLE ON BOTTOM OF DUCT FOR EASE OF SERVICE.
 - FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0\"/>

8 DAMPER AND FLEX DUCTWORK CONNECTION DETAIL NTS



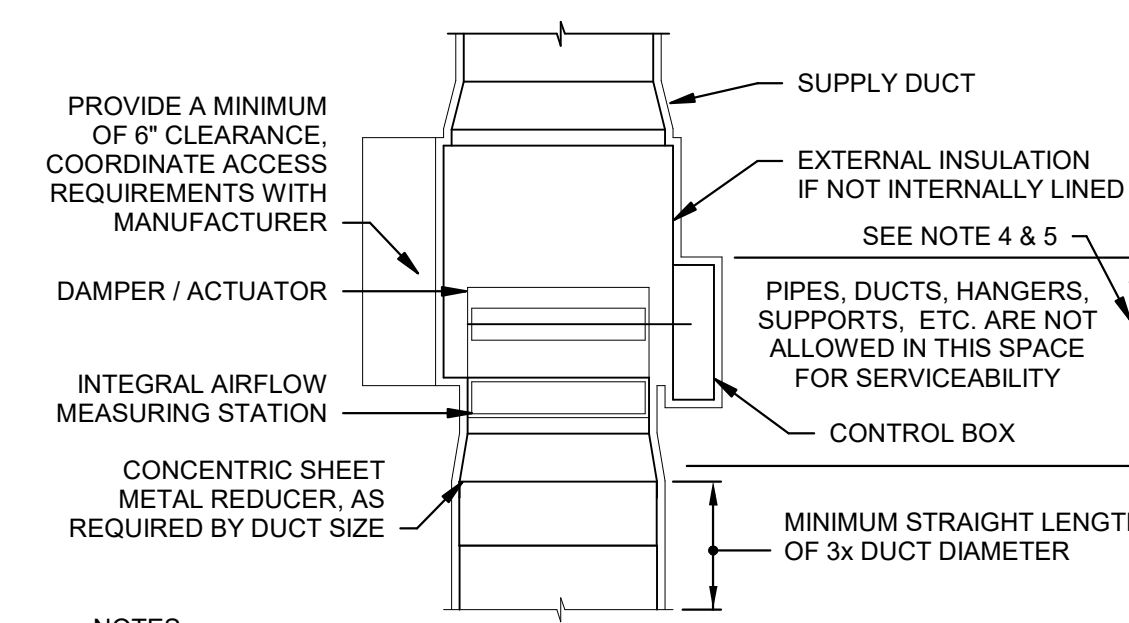
- NOTES:**
- USE THREADED ROD FOR RECTANGULAR DUCTS LARGER THAN 60\"/>

7 DUCT HANGER - LOWER ATTACHMENT DETAILS NTS



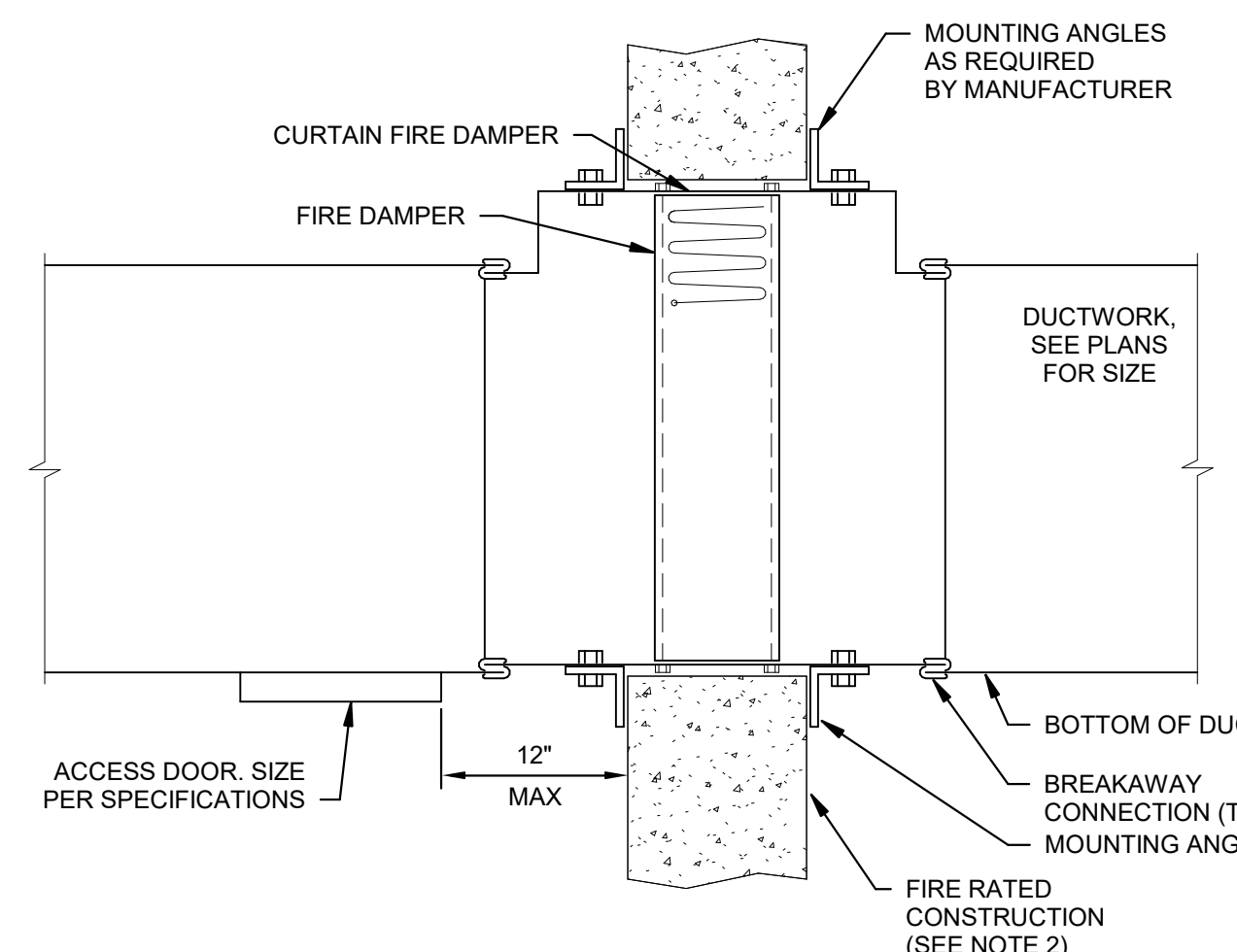
- NOTES:**
- MAINTAIN A MINIMUM 4\"/>

6 AIR CURTAIN - EXPOSED INSTALLATION DETAIL NTS



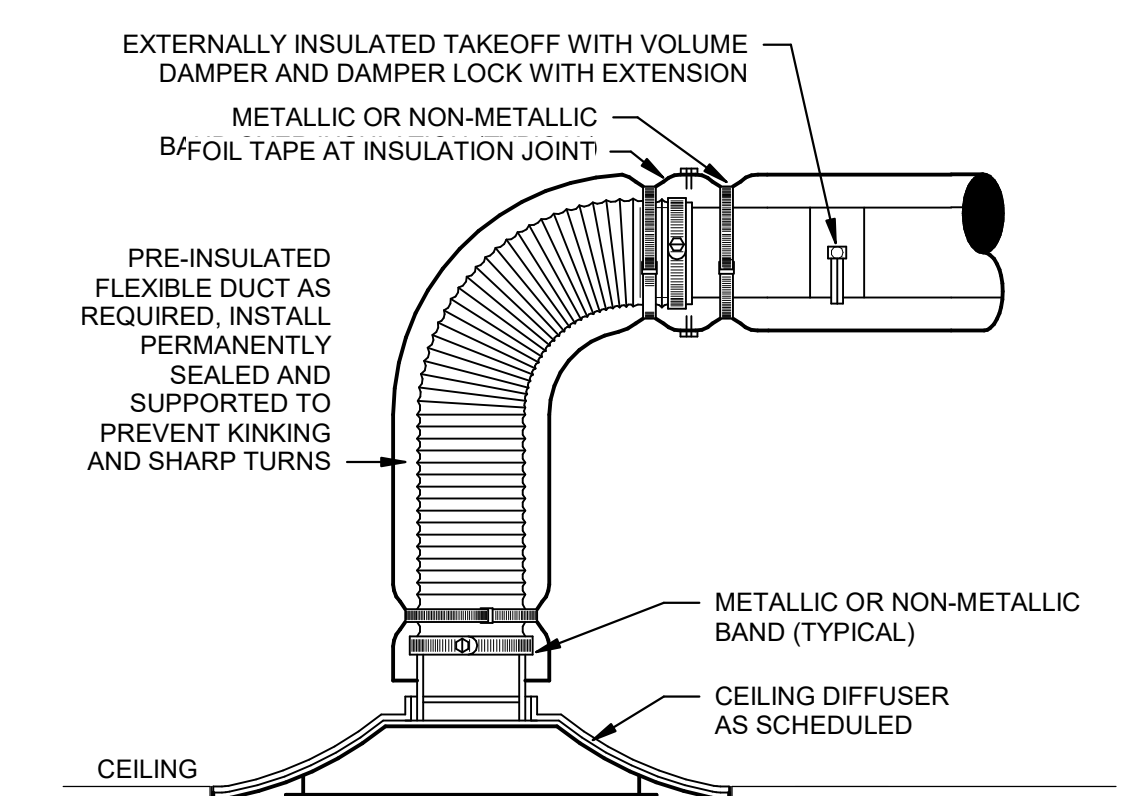
- NOTES:**
- ARRANGEMENT SHOWN IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS AND MEET LOCAL CODE REQUIREMENTS.
 - SUPPORT TERMINAL UNIT AT BOTH ENDS WITH MINIMUM 2 INCH WIDE GALVANIZED 22 GAUGE HANGER STRAPS.
 - INSTALL TERMINAL UNIT NOT MORE THAN 3 FEET ABOVE CEILING FOR ACCESS.
 - THE GREATER OF A 30\"/>

5 SINGLE DUCT VAV TERMINAL UNIT - COOLING ONLY DETAIL NTS



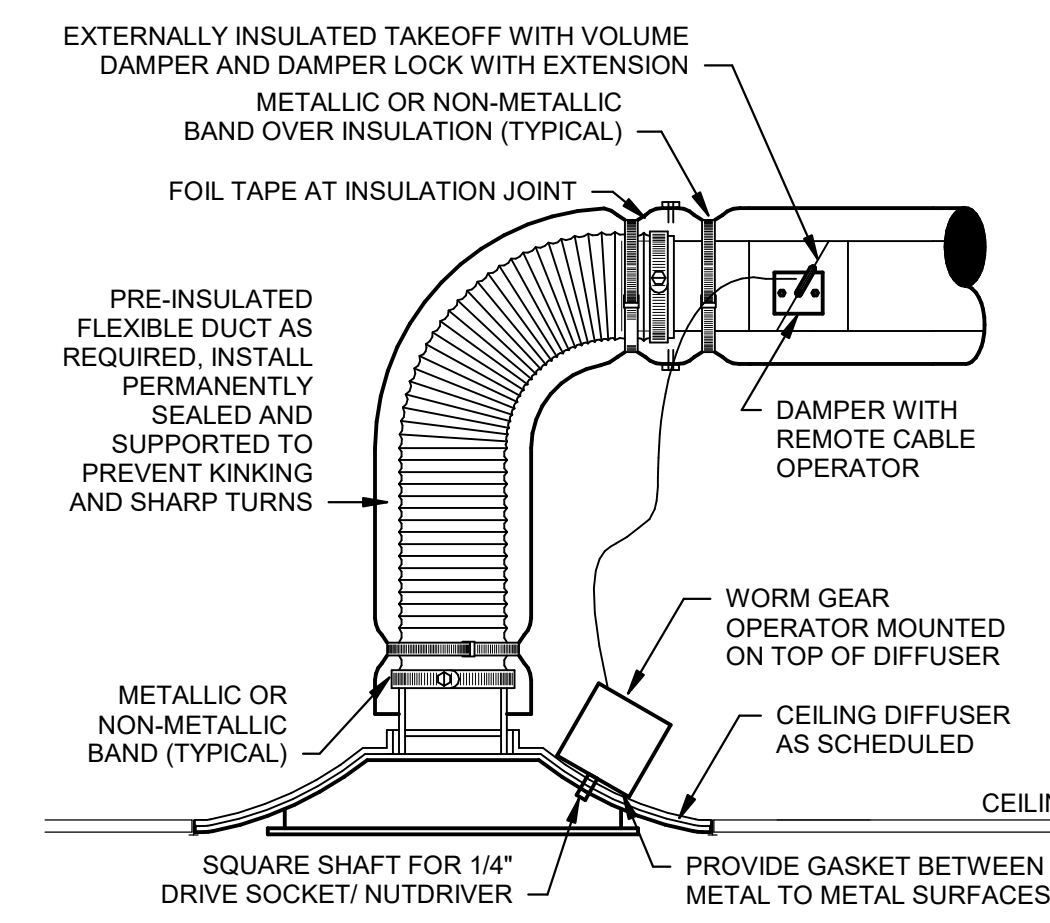
- NOTES:**
- INSTALL DAMPER PER MANUFACTURER'S INSTRUCTIONS/RECOMMENDATIONS.
 - MAKE PENETRATION OPENING 18\"/>

11 FIRE DAMPER IN WALL DETAIL NTS



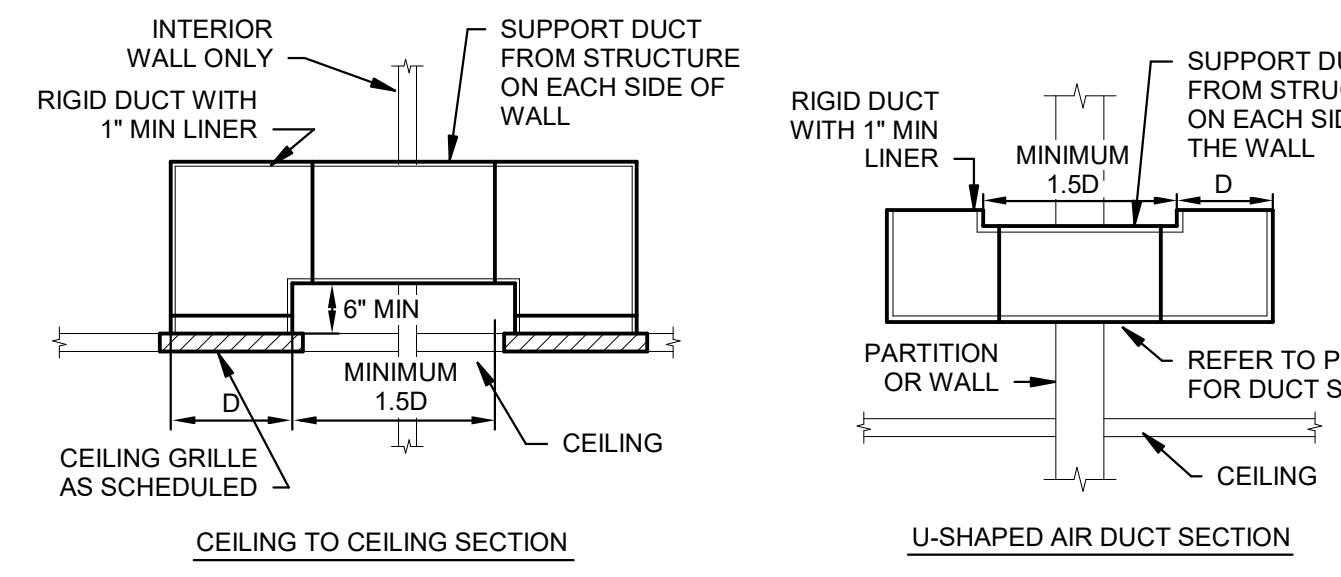
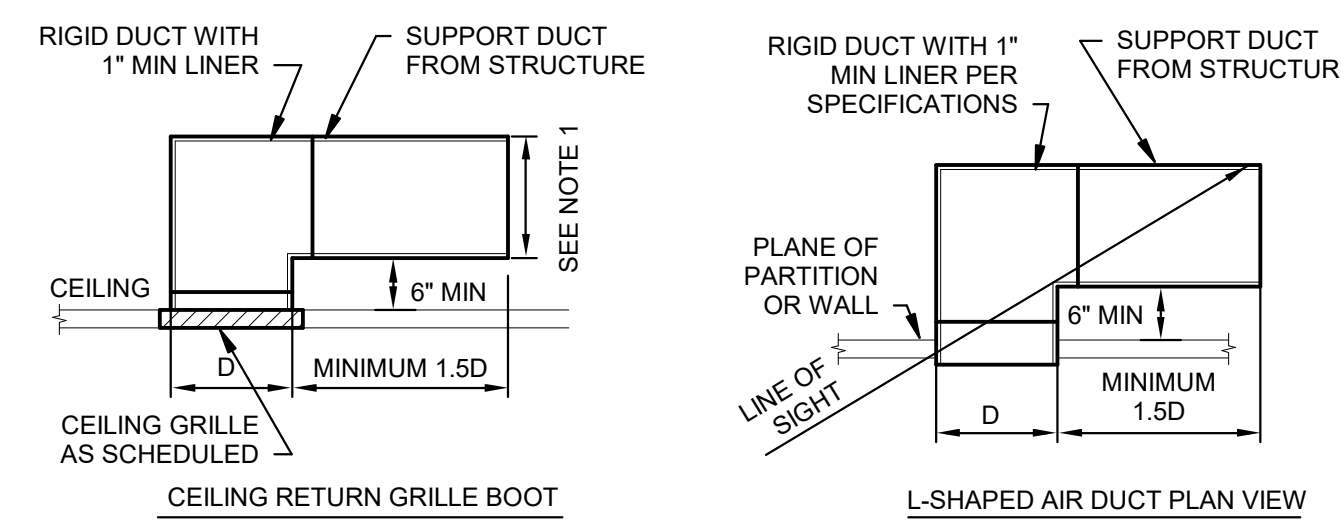
- NOTES:**
- FLEXIBLE DUCT LENGTH MAY NOT EXCEED 5'-0\"/>

10 LAY-IN CEILING DIFFUSER DETAIL NTS



- NOTES:**
- FLEXIBLE DUCT LENGTH MAY NOT EXCEED 5'-0\"/>

9 RETURN/TRANSFER AIR DUCT DETAIL NTS



- NOTES:**
- REFER TO FLOOR PLAN FOR OUTLET DEPTH. WHEN NO DEPTH IS SHOWN, MINIMUM DEPTH SHALL BE AS REQUIRED TO LIMIT AIR VELOCITY TO 500 FPM WITH A MINIMUM SIZE OF 0.5D.

9 RETURN/TRANSFER AIR DUCT DETAIL NTS

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MC

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Author

DRAWN BY:

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Sheet Title:

MECHANICAL

DETAILS

Sheet Number:

M2.0

KEYNOTES ARE PROTOTYPICAL. MISSING KEYNOTE NUMBERS INDICATE A PROTOTYPICAL NOTE IS NOT USED OR REMOVED.

MECHANICAL PLAN NOTES

- M03 INSTALL DAMPER AND ACTUATOR IN LOCATION INDICATED. DAMPER FURNISHED BY DIVISION 23. ACTUATOR FURNISHED BY EMS VENDOR.
- M04 MOTORIZED DAMPER SHALL BE PROVIDED INTEGRAL TO EXHAUST FAN AND ACCESSED THROUGH FAN ON ROOF. MOTORIZED DAMPER IS SHOWN ON PLAN FOR REFERENCE ONLY. REFER TO MECHANICAL SCHEDULES FOR MORE INFORMATION.
- M22 PROVIDE NEW ROOF-MOUNTED EXHAUST FAN AS SCHEDULED FOR GENERAL RESTROOM EXHAUST. REFER TO SCHEDULES FOR MORE INFORMATION.
- M23 EXHAUST FAN SERVES TO PROVIDE TRANSFER AIR ONLY AND SHALL DISCHARGE AIR INTO THE STOCKROOM VIA VERTICAL ELBOW UP.
- M25 INSTALL VAV POWER MODULE FOR CONTROL OF OFFICE VAV DIFFUSERS IN AN ACCESSIBLE LOCATION ABOVE THE CEILING. DIVISION 26 CONTRACTOR SHALL PROVIDE 120V POWER TO MODULE. REFER TO ELECTRICAL DRAWINGS FOR DETAILS.
- M32 ROUTE EXHAUST AIR DUCTWORK TO NEW ROOF MOUNTED EXHAUST FAN. COORDINATE EXACT ROUTING WITH STRUCTURE AND OTHER OBSTACLES. ADJUST ROUTING TO MATCH.
- M36 DUCTWORK PENETRATES FIRE-RATED WALL. REFER TO DETAILS FOR CONSTRUCTION AND INSTALLATION REQUIREMENTS.

FABRIC DUCT GENERAL NOTES:
 PROVIDE FABRIC DUCT THROUGHOUT THE SPACE AS SHOWN ON PLAN. FABRIC DUCT SHALL NOT REPLACE RECTANGULAR DUCT DROPS OR EXHAUST DUCTS. BASIS OF DESIGN SHALL BE "PRIHODA" .MM NONPOROUS FABRIC WITH "PERFORATIONS" (AIR OPENINGS) WITH ADJUSTABLE FLOW DEVICES (I.E. AFD'S) AT OPENINGS, AND ONE ROW, GALVANIZED CABLE. INTERNAL HOOP SUPPORT SYSTEM SHALL BE PROVIDED ON ALL FABRIC DUCT UNLESS NOTED OTHERWISE. INCLUDE ALL COMPONENTS AND ACCESSORIES REQUIRED TO MAKE A COMPLETE SYSTEM AS RECOMMENDED BY PRIHODA DURING BID PHASE, INCLUDING HANGING STRAPS AND CLIPS, END-CAPS, CONNECTIONS TO METAL DUCTS, ETC. PRIHODA FABRIC DUCT SHALL BE SIZED PER FACTORY RECOMMENDATIONS TO PROVIDE MINIMUM AIRFLOWS IN BRANCH DUCTS AS SHOWN. CONFIRM FABRIC DUCT COLOR WITH ARCHITECT PRIOR TO ORDERING ON ALL PROJECTS. (FOR UNITE FIXTURE PACKAGE, WHITE IS BASIS OF DESIGN) (FOR GLOBAL 3.0 FIXTURE PACKAGE, PANTONE 420 - LIGHT GREY IS BASIS OF DESIGN). CONTACT PRIHODA SALES DEPARTMENT (E-MAIL, SALES@PRIHODA-NA.COM, PHONE: 1-855-774-4632) FOR PRICING INFORMATION.

FABRIC DUCT DESIGN GUIDELINE:
 DISTRIBUTE AIRFLOW EVENLY ALONG FABRIC DUCT IN THE DIRECTION OF FLOW ARROWS. ORIENT AND SIZE FABRIC DUCT DIFFUSER OPENINGS TO PROVIDE A 50 FPM THROUGH VELOCITY HALF WAY TO THE NEAREST ADJACENT FABRIC DUCT OR TO THE NEAREST PARTITION/WALL AS APPLICABLE. VENTS ON FABRIC DUCT SHALL BE LOCATED AT 22.5 DEGREES BELOW HORIZONTAL UNLESS NOTED OTHERWISE.

FABRIC DUCT COORDINATION NOTE:
 DURING THE FIRST WEEK OF THE PROJECT, THE GENERAL CONTRACTOR'S SUPERINTENDENT, MECHANICAL SUB-CONTRACTOR, AND A REPRESENTATIVE FROM PRIHODA SHALL MEET AT THE PROJECT SITE FOR CONFIRMATION OF ALL FIELD DIMENSIONS AND POTENTIAL OBSTRUCTIONS. THIS EVENT MUST PRECEDE THE ORDERING OF ANY MATERIALS FROM PRIHODA. CHANGE ORDERS AND EXPEDITING FEES WILL NOT BE APPROVED DUE TO LACK OF ON-SITE COLLABORATION AND/OR MEASUREMENT DURING SITE MEETINGS AT PROJECT COMMENCEMENT.

FABRIC DUCT INSTALLATION NOTE:
 INSTALL FABRIC DUCT ABOVE ARCHITECTURAL LIGHTING SYSTEM. COORDINATE FABRIC DUCT INSTALLATION WITH GENERAL CONTRACTOR AND DIVISION 26. GENERAL CONTRACTOR SHALL VERIFY FABRIC DUCT IS INSTALLED SUCH THAT IT DOES NOT CLASH WITH ARCHITECTURAL LIGHTING SYSTEM, INCLUDING LIGHT FIXTURES, ARCHITECTURAL LIGHTING SYSTEM GRID AND SUSPENSION CABLES, OR ANY OTHER SUSPENDED FIXTURES WHEN DEFLATED.

THE DUCTWORK LAYOUT INDICATED ON THE DRAWINGS IS SCHEMATIC AND SHOWS DESIGNED INTENT ONLY. PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK, DIVISION 23 SHALL HAVE A QUALIFIED, EXPERIENCED SKETCHER PREPARE AND SUBMIT SHEET METAL SHOP DRAWINGS. SHOP DRAWINGS SHALL TAKE INTO ACCOUNT ALL EXISTING CONDITIONS, INCLUDING BUT NOT LIMITED TO, STRUCTURAL MEMBERS, CONDUITS AND PIPING TO REMAIN. SHOP DRAWINGS SHALL ALSO TAKE INTO ACCOUNT ALL NEW DESIGN CONDITIONS, INCLUDING BUT NOT LIMITED TO, STRUCTURAL MEMBERS, PIPING, CEILINGS, SOFFIT HEIGHTS, AND LIGHT FIXTURES.

SHOP DRAWINGS SHALL INDICATE ALL REVISIONS TO THE LAYOUT REQUIRED TO ACCOMMODATE THE EXISTING CONDITIONS AND/OR MAINTAIN THE CEILING HEIGHTS AND CLEARANCES REQUIRED. NOTIFY THE ARCHITECT AND ENGINEER OF ANY LOCATION WHERE THE DESIGN INTENT CANNOT BE MET PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK. REVISIONS TO DUCTWORK, EQUIPMENT, CONDUIT AND/OR PIPING REQUIRED BY CONTRACTOR'S FAILURE TO SUBMIT PROPERLY PREPARED SHOP DRAWINGS SHALL BE THE RESPONSIBILITY OF DIVISION 23 AT NO ADDITIONAL COST TO THE CLIENT OR DELAY TO THE PROJECT SCHEDULE.

GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING TO ARCHITECT, ENGINEER, LANDLORD, AND BUILDING OFFICIAL/INSPECTOR A FINAL TEST AND BALANCE REPORT PER THE SPECIFICATIONS, PROVIDE TEST AND BALANCE REPORT TO ARCHITECT, ENGINEER, AND LANDLORD PRIOR TO THE FINAL BUILDING INSPECTION.

LANDLORD REQUIREMENTS:
 LANDLORD APPROVED ROOFING CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL CUTS THROUGH THE EXISTING ROOF, MODIFYING EXISTING OPENINGS, AND/OR ALTERING CURB FLASHING AT GENERAL CONTRACTOR'S EXPENSE. COORDINATE WITH GENERAL CONTRACTOR.

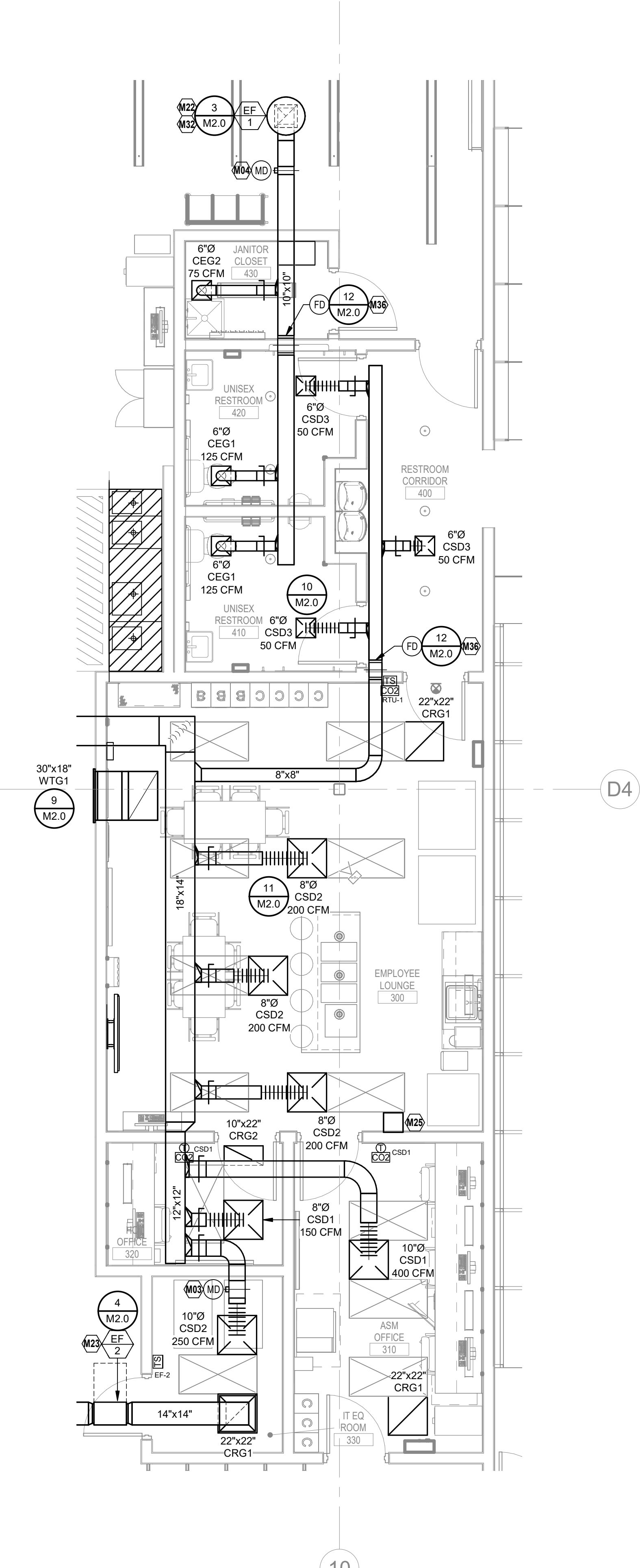
EMS CONTROLS:
 CONTRACTORS ARE RESPONSIBLE FOR COORDINATING ALL EQUIPMENT CONTROLS WITH EMS VENDOR PRIOR TO PURCHASE AND INSTALLATION. CONTRACTORS SHALL COORDINATE WITH EMS VENDOR TO PROVIDE ALL NECESSARY EQUIPMENT AND ACCESSORIES FOR A FULLY FUNCTIONING SYSTEM.

TEMPERATURE CONTROLS:
 EMS VENDOR SHALL FURNISH SENSORS AND CONTROL COMPONENTS AS INDICATED ON PLANS AND AS NECESSARY TO ACCOMPLISH THE INTENT OF THE DRAWINGS. ALL CONTROLS SHALL BE TIED INTO THE EMS SYSTEM UNLESS NOTED OTHERWISE.

GENERAL CONTRACTOR SHALL INSTALL CARRIER FURNISHED TEMPORARY THERMOSTATS AND FEED THE WIRING DOWN INTO THE SPACE FOR START UP AND CONTROL OF RTU(S) UNTIL THE EMS SYSTEM IS OPERABLE. REFER TO M3.0 FOR CARRIER CONTACT INFORMATION.

PROVIDE RFD DUCTWORK MESH OVER TRANSFER GRILLS BELOW 15'-0" AFF BETWEEN THE STOCKROOM AND THE SALES FLOOR, IF APPLICABLE. COORDINATE REQUIREMENTS WITH CONSTRUCTION PROJECT MANAGER.

INSTALL DUCTWORK AND PIPING AS TIGHT TO STRUCTURE AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS. COORDINATE INSTALLATION OF DUCTWORK AND PIPING TO AVOID CONFLICTS WITH ELECTRICAL PANELS, LIGHTING FIXTURES, ETC. DO NOT INSTALL DUCTWORK BELOW THE BOTTOM OF THE LIGHT FIXTURES. NOTIFY CONSTRUCTION PROJECT MANAGER OF CONFLICTS.



1 ENLARGED BACK OF HOUSE HVAC PLAN
 1/4" = 1'-0"



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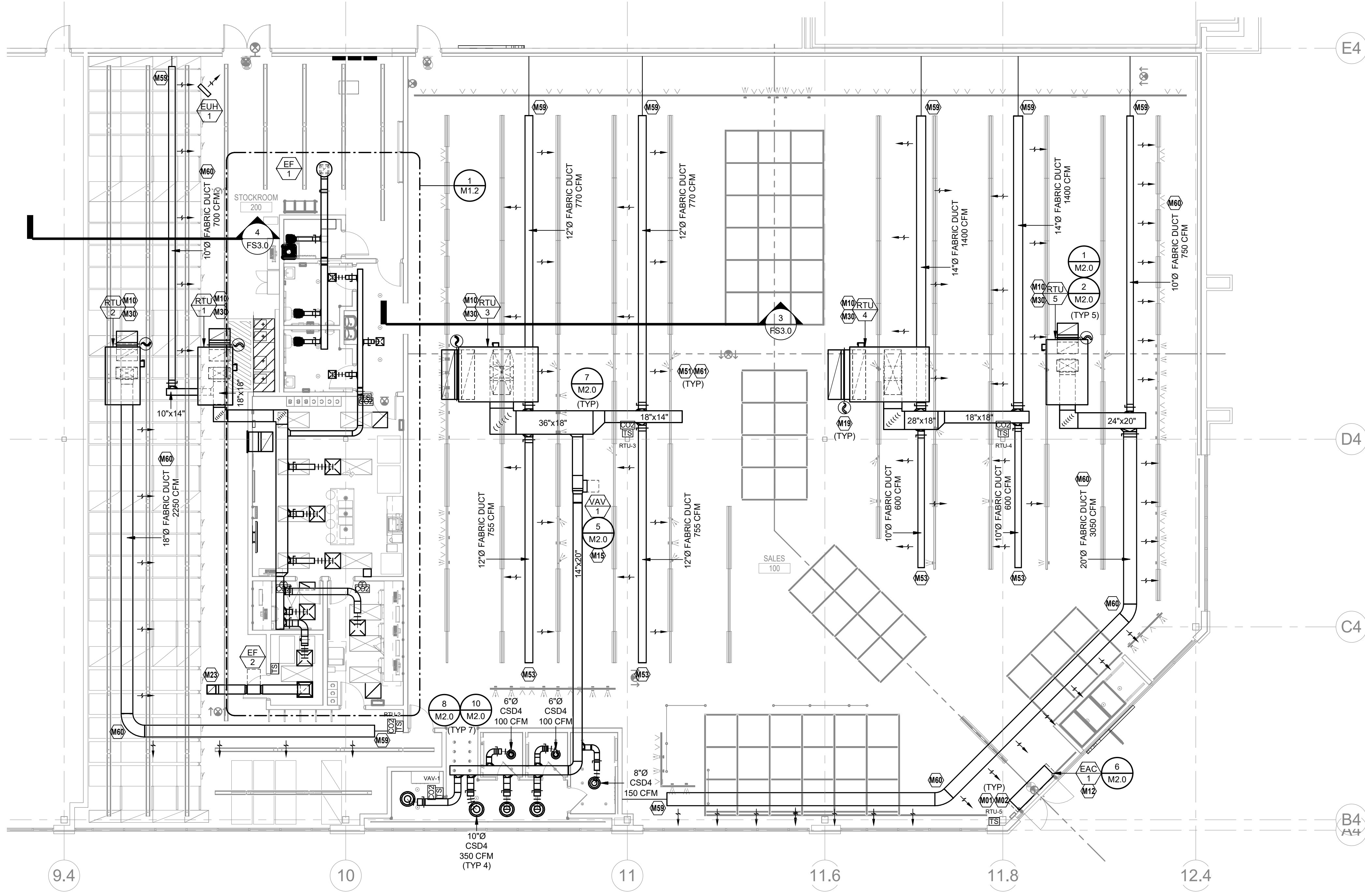
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Project Number:
62301406

Sheet Title:
MECHANICAL ENLARGED PLANS

Sheet Number:
M1.2



KEYNOTES ARE PROTOTYPICAL. MISSING KEYNOTE NUMBERS INDICATE A PROTOTYPICAL NOTE IS NOT USED OR REMOVED.

MECHANICAL PLAN NOTES

- M01 ALL THERMOSTATS AND SENSORS ARE FURNISHED BY EMS VENDOR AND INSTALLED BY DIVISION 26, UNLESS NOTED OTHERWISE. DIVISION 26 SHALL COORDINATE EXACT DEVICE QUANTITIES, LOCATIONS, AND POWER CONNECTION(S) REQUIREMENTS WITH EMS VENDOR PRIOR TO CONSTRUCTION.
- M02 DO NOT INSTALL SENSORS ON WALL GRAPHICS. CONFIRM LOCATIONS OF SENSORS WITH PM PRIOR TO INSTALLATION.
- M10 PROVIDE NEW ROOF TOP UNIT AS SCHEDULED WITH NEW ROOF CURB. PROVIDE A NEW SET OF MERV 13 AIR FILTERS IN UNIT BEFORE TURNING SYSTEM OVER TO OWNER. COORDINATE CONDENSATE PIPING WITH DIVISION 22.
- M12 PROVIDE NEW AIR CURTAIN UNIT WITH ELECTRIC HEATING AS SCHEDULED. INSTALL AS HIGH AS POSSIBLE PER MANUFACTURER'S REQUIREMENTS, OR AT ELEVATION SPECIFIED BY ARCHITECTURAL PLANS. COORDINATE EXACT LOCATION WITH ARCHITECT PRIOR TO INSTALLATION. SUPPORT FROM STRUCTURE ABOVE.
- M15 PROVIDE NEW VAV BOX IN SUPPLY AIR DUCT SERVING FITTING ROOMS. INSTALL VAV BOX IN ACCESSIBLE LOCATION AND COORDINATE CONTROLS WITH EMS VENDOR PRIOR TO ORDERING.
- M19 SMOKE DETECTORS AND WIRING IN RETURN AIR DUCTS SHALL BE PROVIDED BY DIVISION 28 CONTRACTOR. SMOKE DETECTORS SHALL SHUT-DOWN UNIT UPON ALARM.
- M23 EXHAUST FAN SERVES TO PROVIDE TRANSFER AIR ONLY AND SHALL DISCHARGE AIR INTO THE STOCKROOM VIA VERTICAL ELBOW UP.
- M51 ARROWS INDICATE DIRECTION AND DISPERSION OF AIRFLOW VOLUME. PROVIDE VENTS ON FABRIC DUCT TO DIRECT AIRFLOW AS SHOWN ON PLAN.
- M53 FIELD FABRICATE L-BRACKET FOR SUPPORTING END OF FABRIC DUCT. COORDINATE REQUIREMENTS WITH FABRIC DUCT MANUFACTURER.
- M59 PROVIDE FABRIC DUCTWORK WITH ENDCAP TENSIONING. TENSION CABLE SHALL CONNECT FABRIC DUCTWORK TO THE WALL. COORDINATE WITH FABRIC DUCTWORK VENDOR PRIOR TO INSTALL.
- M60 SUPPORT FABRIC DUCTWORK WITH MANUFACTURER'S DOUBLE-CABLE CROSS BRACING SUPPORTS. COORDINATE REQUIREMENTS WITH FABRIC DUCT MANUFACTURER.
- M61 PROVIDE FABRIC DUCT WITH AIRFLOW PERFORATIONS AT AN ANGLE OF 22.5° FROM HORIZONTAL TOWARDS THE SALES FLOOR.

FABRIC DUCT GENERAL NOTES:
 PROVIDE FABRIC DUCT THROUGHOUT THE SPACE AS SHOWN ON PLAN. FABRIC DUCT SHALL NOT REPLACE RECTANGULAR DUCT DROPS OR EXHAUST DUCTS. BASIS OF DESIGN SHALL BE "PRIHODA", "NMI" NONPOROUS FABRIC WITH "PERFORATIONS" (AIR OPENINGS) WITH ADJUSTABLE FLOW DEVICES (I.E. AFS) AT OPENINGS, AND ONE ROW, GALVANIZED CABLE. INTERNAL HOOP SUPPORT SYSTEM SHALL BE PROVIDED ON ALL FABRIC DUCT UNLESS NOTED OTHERWISE. INCLUDE ALL COMPONENTS AND ACCESSORIES REQUIRED TO MAKE A COMPLETE SYSTEM AS RECOMMENDED BY PRIHODA DURING BID PHASE, INCLUDING HANGING STRAPS AND CLIPS, END-CAPS, CONNECTIONS TO METAL DUCTS, ETC. PRIHODA FABRIC DUCT SHALL BE SIZED PER FACTORY RECOMMENDATIONS TO PROVIDE MINIMUM AIRFLOWS IN BRANCH DUCTS AS SHOWN. CONFIRM FABRIC DUCT COLOR WITH ARCHITECT PRIOR TO ORDERING ON ALL PROJECTS. (FOR UNITE FIXTURE PACKAGE, WHITE IS BASIS OF DESIGN) (FOR GLOBAL 3.0 FIXTURE PACKAGE, PANTONE 420 - LIGHT GREY IS BASIS OF DESIGN). CONTACT PRIHODA SALES DEPARTMENT (E-MAIL: SALES@PRIHODA-NA.COM, PHONE: 1-655-774-4632) FOR PRICING INFORMATION.

FABRIC DUCT DESIGN GUIDELINE:
 DISTRIBUTE AIRFLOW EVENLY ALONG FABRIC DUCT IN THE DIRECTION OF FLOW ARROWS. ORIENT AND SIZE FABRIC DUCT DIFFUSER OPENINGS TO PROVIDE A 50 FPM FLOW VELOCITY HALF WAY TO THE NEAREST ADJACENT FABRIC DUCT OR TO THE NEAREST PARTITION/DEMISING WALL AS APPLICABLE. VENTS ON FABRIC DUCT SHALL BE LOCATED AT 22.5 DEGREES BELOW HORIZONTAL UNLESS NOTED OTHERWISE.

FABRIC DUCT COORDINATION NOTE:
 DURING THE FIRST WEEK OF THE PROJECT, THE GENERAL CONTRACTOR'S SUPERINTENDENT, MECHANICAL SUB-CONTRACTOR, AND A REPRESENTATIVE FROM "PRIHODA" SHALL MEET AT THE PROJECT SITE FOR CONFIRMATION OF ALL FIELD DIMENSIONS AND POTENTIAL OBSTRUCTIONS. THIS EVENT MUST PRECEDE THE ORDERING OF ANY MATERIALS FROM "PRIHODA". CHANGE ORDERS AND EXPEDITING FEES WILL NOT BE APPROVED DUE TO LACK OF ON-SITE COLLABORATION AND/OR MEASUREMENT DURING SITE MEETING AT PROJECT COMMENCEMENT.

FABRIC DUCT INSTALLATION NOTE:
 INSTALL FABRIC DUCT ABOVE ARCHITECTURAL LIGHTING SYSTEM. COORDINATE FABRIC DUCT INSTALLATION WITH GENERAL CONTRACTOR AND DIVISION 26. GENERAL CONTRACTOR SHALL VERIFY FABRIC DUCT IS INSTALLED SUCH THAT IT DOES NOT CLASH WITH ARCHITECTURAL LIGHTING SYSTEM, INCLUDING LIGHT FIXTURES, ARCHITECTURAL LIGHTING SYSTEM GRID AND SUSPENSION CABLES, OR ANY OTHER SUSPENDED FIXTURES WHEN DEFLATED.

THE DUCTWORK LAYOUT INDICATED ON THE DRAWINGS IS SCHEMATIC AND SHOWS DESIGNED INTENT ONLY. PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK, DIVISION 23 SHALL HAVE A QUALIFIED, EXPERIENCED SKETCHER PREPARE AND SUBMIT SHEET METAL SHOP DRAWINGS. SHOP DRAWINGS SHALL TAKE INTO ACCOUNT ALL EXISTING CONDITIONS, INCLUDING BUT NOT LIMITED TO, STRUCTURAL MEMBERS, CONDUITS AND PIPING TO REMAIN. SHOP DRAWINGS SHALL ALSO TAKE INTO ACCOUNT ALL NEW DESIGN CONDITIONS, INCLUDING BUT NOT LIMITED TO, STRUCTURAL MEMBERS, PIPING, CEILING, SOFFIT HEIGHTS, AND LIGHT FIXTURES.

SHOP DRAWINGS SHALL INDICATE ALL REVISIONS TO THE LAYOUT REQUIRED TO ACCOMMODATE THE EXISTING CONDITIONS AND/OR MAINTAIN THE CEILING HEIGHTS AND CLEARANCES REQUIRED. NOTIFY THE ARCHITECT AND ENGINEER OF ANY LOCATION WHERE THE DESIGN INTENT CANNOT BE MET PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK. REVISIONS TO DUCTWORK, EQUIPMENT, CONDUIT AND PIPING REQUIRED BY CONTRACTOR'S FAILURE TO SUBMIT PROPERLY PREPARED SHOP DRAWINGS SHALL BE THE RESPONSIBILITY OF DIVISION 23 AT NO ADDITIONAL COST TO THE CLIENT OR DELAY TO THE PROJECT SCHEDULE.

GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING TO ARCHITECT, ENGINEER, LANDLORD, AND BUILDING OFFICIAL/INSPECTOR A FINAL TEST AND BALANCE REPORT PER THE SPECIFICATIONS. PROVIDE TEST AND BALANCE REPORT TO ARCHITECT, ENGINEER, AND LANDLORD PRIOR TO THE FINAL BUILDING INSPECTION.

LANDLORD REQUIREMENTS:
 LANDLORD APPROVED ROOFING CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL CUTS THROUGH THE EXISTING ROOF, MODIFYING EXISTING OPENINGS, AND/OR ALTERING CURB FLASHING AT GENERAL CONTRACTOR'S EXPENSE. COORDINATE WITH GENERAL CONTRACTOR.

EMS CONTROLS:
 CONTRACTORS ARE RESPONSIBLE FOR COORDINATING ALL EQUIPMENT CONTROLS WITH EMS VENDOR PRIOR TO PURCHASE AND INSTALLATION. CONTRACTORS SHALL COORDINATE WITH EMS VENDOR TO PROVIDE ALL NECESSARY EQUIPMENT AND ACCESSORIES FOR A FULLY FUNCTIONING SYSTEM.

TEMPERATURE CONTROLS:
 EMS VENDOR SHALL FURNISH SENSORS AND CONTROL COMPONENTS AS INDICATED ON PLANS AND AS NECESSARY TO ACCOMPLISH THE INTENT OF THE DRAWINGS. ALL CONTROLS SHALL BE TIED INTO THE EMS SYSTEM UNLESS NOTED OTHERWISE.

GENERAL CONTRACTOR SHALL INSTALL CARRIER FURNISHED TEMPORARY THERMOSTATS AND FEED THE WIRING DOWN INTO THE SPACE FOR START UP AND CONTROL OF RTU(S) UNTIL THE EMS SYSTEM IS OPERABLE. REFER TO M3.0 FOR CARRIER CONTACT INFORMATION.

INSTALL DUCTWORK AND PIPING AS TIGHT TO STRUCTURE AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS. COORDINATE INSTALLATION OF DUCTWORK AND PIPING TO AVOID CONFLICTS WITH ELECTRICAL PANELS, LIGHTING FIXTURES, ETC. DO NOT INSTALL DUCTWORK BELOW THE BOTTOM OF THE LIGHT FIXTURES.

Architect:



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Engineer:



Project Owner:



Project Address:

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 TEMPLATE ISSUE DATE: 01/01/2022

Fixture Package:

UNITE

Stamp:

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PERMIT

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PROJECT MANAGER:

MC

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Author

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MECHANICAL PLAN

SHEET NUMBER:

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