

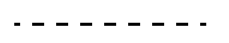
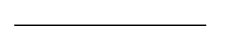
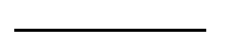

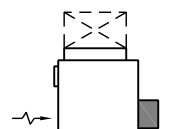
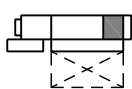

















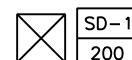
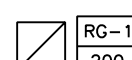


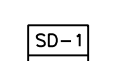
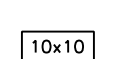
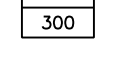
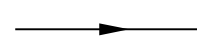
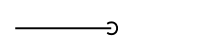
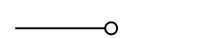

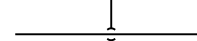
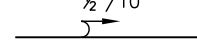












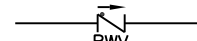
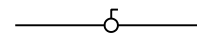
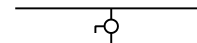
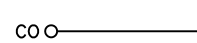

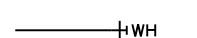

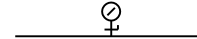





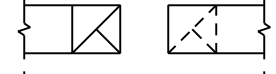
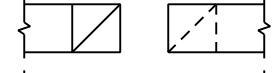
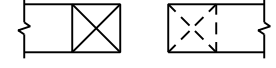
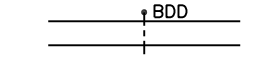
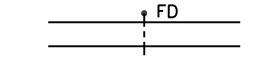
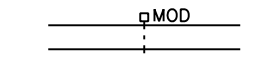
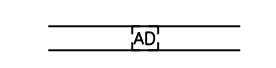
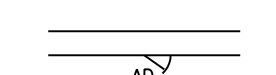
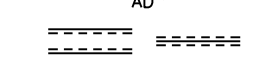
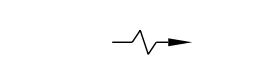
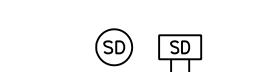
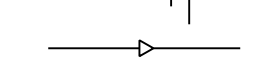

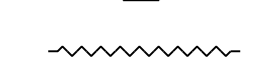
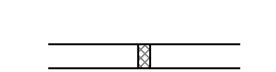


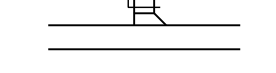

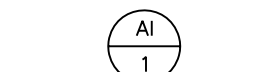

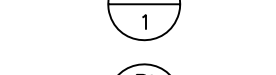
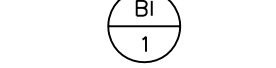
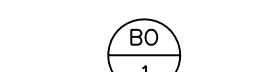
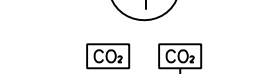
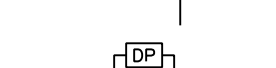

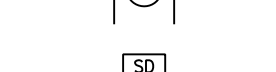
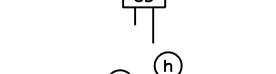
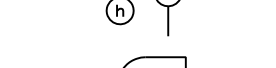
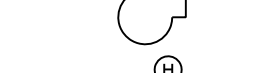
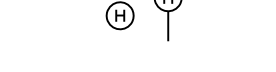
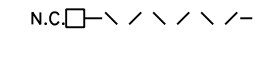
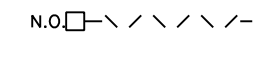
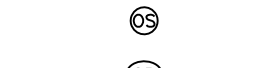



## LEGEND AND ABBREVIATIONS

ABBREVIATIONS		SHEET DESIGNATIONS		PIPING SYSTEMS		DUCT SYSTEMS	
ACCU AFF AHU APD ATC BDD BTUH BWV CD CFM CO CUH CW DB DN DX EAT EBR EG EL ESP EWH EX °F FCU FD FF FLA FPM FPVAV FT GPM HD HP HPU HR HW HZ IN. INV KW LAT LBS MBH MIN N.C. NO. N.O. PH, Ø PSIG PVC RG RPM RX SAN SD SP SW TPV TYP V VAV VTR W/ W/O WB W.C.	AIR-COOLED CONDENSING UNIT ABOVE FINISHED FLOOR AIR HANDLING UNIT AIR PRESSURE DROP AUTOMATIC TEMPERATURE CONTROL BACKDRAFT DAMPER BRITISH THERMAL UNITS PER HOUR BACK WATER VALVE CONDENSATE DRAIN CUBIC FEET PER MINUTE CLEANOUT CABINET UNIT HEATER COLD WATER DRY BULB DOWN DIRECT EXPANSION ENTERING AIR TEMPERATURE ELECTRIC BASEBOARD RADIATOR EXHAUST FAN EXHAUST AIR GRILLE ELEVATION EXTERNAL STATIC PRESSURE ELECTRIC WATER HEATER EXISTING DEGREES FAHRENHEIT FAN-COIL UNIT FLOOR DRAIN FINISHED FLOOR FULL LOAD AMPS FEET PER MINUTE FEET-POWERED VARIABLE AIR VOLUME GALLONS PER MINUTE HUB DRAIN HORSEPOWER HEAT PUMP UNIT HOUR HOT WATER HERTZ INCHES INVERT KILOWATT LEAVING AIR TEMPERATURE POUNDS THOUSANDS OF BTU PER HOUR MINIMUM NORMALLY CLOSED NUMBER NORMALLY OPEN PHASE POUNDS PER SQUARE INCH GAUGE POLYVINYL CHLORIDE RETURN AIR GRILLE REVOLUTIONS PER MINUTE REMOVE EXISTING SANITARY SUPPLY AIR DIFFUSER STATIC PRESSURE STORM WATER TRAP PRIMING VALVE TYPICAL VOLTS VARIABLE AIR VOLUME VENT THRU ROOF WITH WITHOUT WET BULB WATER COLUMN	                                   	CONNECT TO EXISTING EXTENT OF DEMOLITION DEMOLITION WORK EXISTING TO REMAIN NEW WORK  EQUIPMENT FAN POWERED TERMINAL UNIT WITH ELECTRIC HEAT SINGLE-DUCT VAV TERMINAL UNIT WITH ELECTRIC HEAT INLINE CIRCULATING PUMP  EQUIPMENT TAGS WITH ELECTRICAL CONNECTION WITHOUT ELECTRICAL CONNECTION AIR COOLED CONDENSING UNIT AIR HANDLING UNIT CABINET UNIT HEATER ELECTRIC BASEBOARD RADIATOR EXHAUST FAN ELECTRIC UNIT HEATER ELECTRIC WATER HEATER FAN-COIL UNIT HEAT PUMP UNIT PUMP SINGLE-DUCT VARIABLE AIR VOLUME TERMINAL UNIT FAN-POWERED VARIABLE AIR VOLUME TERMINAL UNIT  DIFFUSERS, REGISTERS, AND GRILLES SUPPLY AIR DIFFUSER (TYPE AND AIRFLOW INDICATED) RETURN AIR GRILLE (TYPE AND AIRFLOW INDICATED) EXHAUST AIR GRILLE (TYPE AND AIRFLOW INDICATED)  DIFFUSER, REGISTER, AND GRILLE TAGS TYPE AIRFLOW (NECK SIZE GIVEN IN SCHEDULE) NECK SIZE TYPE AIRFLOW	                               	DIRECTION OF FLOW PIPE DOWN PIPE UP PIPE TEE (TOP TAKEOFF) PIPE TEE (BOTTOM TAKEOFF) PIPE SLOPE CONDENSATE DRAIN DOMESTIC COLD WATER DOMESTIC HOT WATER DOMESTIC HOT WATER RECIRCULATING FOUNDATION DRAIN HOT (REFRIGERANT) GAS REFRIGERANT LIQUID REFRIGERANT SUCTION SANITARY STORM WATER VENT  VALVES AND SPECIALTIES BACKWATER VALVE BALL VALVE HOSE-END DRAIN VALVE FLOOR CLEANOUT FLOOR DRAIN FREEZEPROOF WALL HYDRANT HORIZONTAL CLEANOUT PRESSURE GAUGE PRESSURE REDUCING VALVE SANITARY WYE CONNECTION STRAINER THERMOMETER UNION	                                    	EXHAUST AIR DUCT UP, DOWN RETURN AIR DUCT UP, DOWN SUPPLY AIR DUCT UP, DOWN BACKDRAFT DAMPER FIRE DAMPER MOTOR OPERATED DAMPER (SHOWN ON PLANS) ACCESS DOOR (BOTTOM) ACCESS DOOR (SIDE) ACOUSTICALLY LINED DUCTWORK DIRECTION OF AIR FLOW DUCT SMOKE DETECTOR DUCT TRANSITION ELBOW (RECTANGULAR WITH TURNING VANES) FLEXIBLE DUCT FLEXIBLE DUCT CONNECTOR TAKE-OFF (FLANGED ROUND WITH INTEGRAL VOLUME DAMPER - SIDE, TOP) TAKE-OFF (RECTANGULAR TO ROUND) VOLUME DAMPER  ATC SYSTEMS ANALOG INPUT POINT ANALOG OUTPUT POINT BINARY INPUT POINT BINARY OUTPUT POINT CARBON DIOXIDE SENSOR (SPACE, DUCT) DIFFERENTIAL PRESSURE SWITCH DIFFERENTIAL PRESSURE SENSOR DUCT SMOKE DETECTOR ENTHALPY SENSOR (SPACE, DUCT) FAN HUMIDITY SENSOR (SPACE, DUCT) MOTOR OPERATED DAMPER (NORMALLY-CLOSED) MOTOR OPERATED DAMPER (NORMALLY-OPEN) OCCUPANCY SENSOR DUCT STATIC PRESSURE SENSOR TEMPERATURE SENSOR (SPACE, DUCT) VARIABLE FREQUENCY DRIVE

## GENERAL NOTES (APPLY TO ALL HVAC AND PLUMBING DRAWINGS)

1. GENERAL NOTES SHALL APPLY TO ALL MECHANICAL AND PLUMBING DRAWINGS.
2. ALL KEY NOTES INDICATED ON THE DRAWINGS AS "TYPICAL" ARE TO BE CONSIDERED AS SHOWN AT ALL OTHER SIMILAR CONDITIONS WHETHER NOTED OR NOT.
3. ALL MECHANICAL AND PLUMBING WORK SHALL BE COMPLETE AND READY FOR SATISFACTORY SERVICE.
4. THE CONTRACT DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY THE GENERAL ARRANGEMENT OF THE WORK.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE MEANS, METHODS, AND WORK SCHEDULING ASSOCIATED WITH THE INSTALLATION OF THE MECHANICAL AND PLUMBING SYSTEMS.
6. EXAMINE THE SITE AND OBSERVE THE CONDITIONS UNDER WHICH THE WORK WILL BE INSTALLED. NO ALLOWANCES WILL BE MADE FOR ERRORS OR OMISSIONS RESULTING FROM THE FAILURE TO COMPLETELY EXAMINE THE SITE.
7. COORDINATE THE SIZE AND LOCATION OF ROOF PENETRATIONS AND FLASHING REQUIREMENTS WITH THE WORK OF OTHER TRADES.
8. ROUTE PIPING AND DUCTWORK SYSTEMS PARALLEL AND PERPENDICULAR TO THE BUILDING LINES. MOUNT AT ELEVATIONS SHOWN OR AS CLOSE AS POSSIBLE TO THE UNDERSIDE OF THE BUILDING STRUCTURE.
9. COORDINATE THE INSTALLATION OF THE MECHANICAL AND PLUMBING SYSTEMS WITH THE EXISTING CONDITIONS AND THE WORK OF OTHER TRADES. PROVIDE OFFSETS IN PIPING AND DUCTWORK AS REQUIRED AT NO ADDITIONAL COST TO AVOID OBSTRUCTIONS.
10. MOUNT ROOM SENSORS AND SWITCHES AT 4'-0" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE.
11. SUPPORT ALL EQUIPMENT FROM THE BUILDING STRUCTURE TO PROVIDE A VIBRATION-FREE INSTALLATION.
12. DUCTWORK DIMENSIONS SHOWN ON THE DRAWINGS ARE INTERNAL AIRFLOW DIMENSIONS. INCREASE THE SHEET METAL DUCTWORK DIMENSIONS BY 2" TO ACCOMMODATE 1" DUCT LINER WHERE REQUIRED.
13. PROVIDE FLEXIBLE CONNECTIONS ON ALL DUCTWORK CONNECTIONS TO FANS OR AIR HANDLING UNITS.
14. PROVIDE 1"x1" MESH ALUMINUM SCREEN OVER THE OPENING OF ALL OPEN-ENDED DUCTWORK.
15. INSURE THAT ADEQUATE CLEARANCE EXISTS FOR THE INSTALLATION AND MAINTENANCE OF ALL WORK SHOWN ON THE DRAWINGS AND DESCRIBED IN THE SPECIFICATIONS.
16. PROVIDE ACCESS PANELS (INSTALLED IN WALLS OR CEILINGS) AND/OR ACCESS DOORS (INSTALLED IN DUCTWORK) THAT ARE INDICATED OR REQUIRED FOR ACCESS TO CONCEALED MECHANICAL AND PLUMBING DEVICES WHICH MAY REQUIRE FUTURE INSPECTION, REPAIR, OR ADJUSTMENT.
17. IDENTIFY ALL MECHANICAL AND PLUMBING PIPING AND EQUIPMENT AS TO ITS FUNCTION AND EQUIPMENT NUMBER INDICATED ON THE DRAWINGS.
18. IDENTIFY ALL PIPING SYSTEMS WITH CYLINDRICAL SELF-COLING PLASTIC SHEET THAT SNAPS OVER PIPING INSULATION AND IS HELD TIGHTLY IN PLACE WITHOUT THE USE OF ADHESIVE TAPE OR STRAPS. PIPE IDENTIFICATION SHALL BE PROVIDED WITH FLOW ARROWS AND LETTERING THAT IS AT LEAST ONE INCH HIGH.
19. IDENTIFY ALL MECHANICAL AND PLUMBING EQUIPMENT WITH ENGRAVED, COLOR-CODED LAMINATED PLASTIC MARKERS WITH CONTACT-TYPE, PERMANENT ADHESIVE. MATCH EQUIPMENT SCHEDULES ON THE DRAWINGS AS CLOSELY AS POSSIBLE FOR EQUIPMENT DESIGNATIONS.
20. PROVIDE SLEEVES AND CAULK ALL PIPING PENETRATIONS THROUGH WALLS AND FLOORS, AND PATCH TO MATCH THE ADJACENT CONSTRUCTION. PROVIDE CHROME-PLATED ESCUTCHEONS ON ALL PIPING PENETRATIONS IN EXPOSED LOCATIONS.
21. PROVIDE SLEEVES AND PATCH ALL DUCT PENETRATIONS THROUGH WALLS AND FLOORS TO MATCH THE EXISTING CONSTRUCTION. SLEEVE DIMENSIONS SHALL BE 1" LARGER THAN INSULATED DUCT DIMENSIONS. THE SPACE BETWEEN THE DUCT AND THE SLEEVE SHALL BE PACKED WITH MINERAL FIBER AND CAULKED.
22. FIRESTOP ALL PENETRATIONS THROUGH FIRE-RESISTANCE-RATED WALLS, FLOORS, OR ASSEMBLIES IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS.
23. SEAL ALL PENETRATIONS THROUGH WATERPROOF CONSTRUCTION IN ACCORDANCE WITH THE WATERPROOFING MANUFACTURER'S INSTRUCTIONS. ALL WORK SHALL BE PERFORMED BY APPROVED CONTRACTORS IF REQUIRED BY THE MANUFACTURER TO MAINTAIN THE WARRANTY ON THE MATERIAL.

SEAL:	PROFESSIONAL CERTIFICATION:	DATE	REVISIONS
	I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF _____.		
	LICENSE NO.: _____		
	EXPIRATION DATE: _____		

OWNER:

OWNER

ENGINEER:

# ENGINEER

PROJECT:

# PROJECT

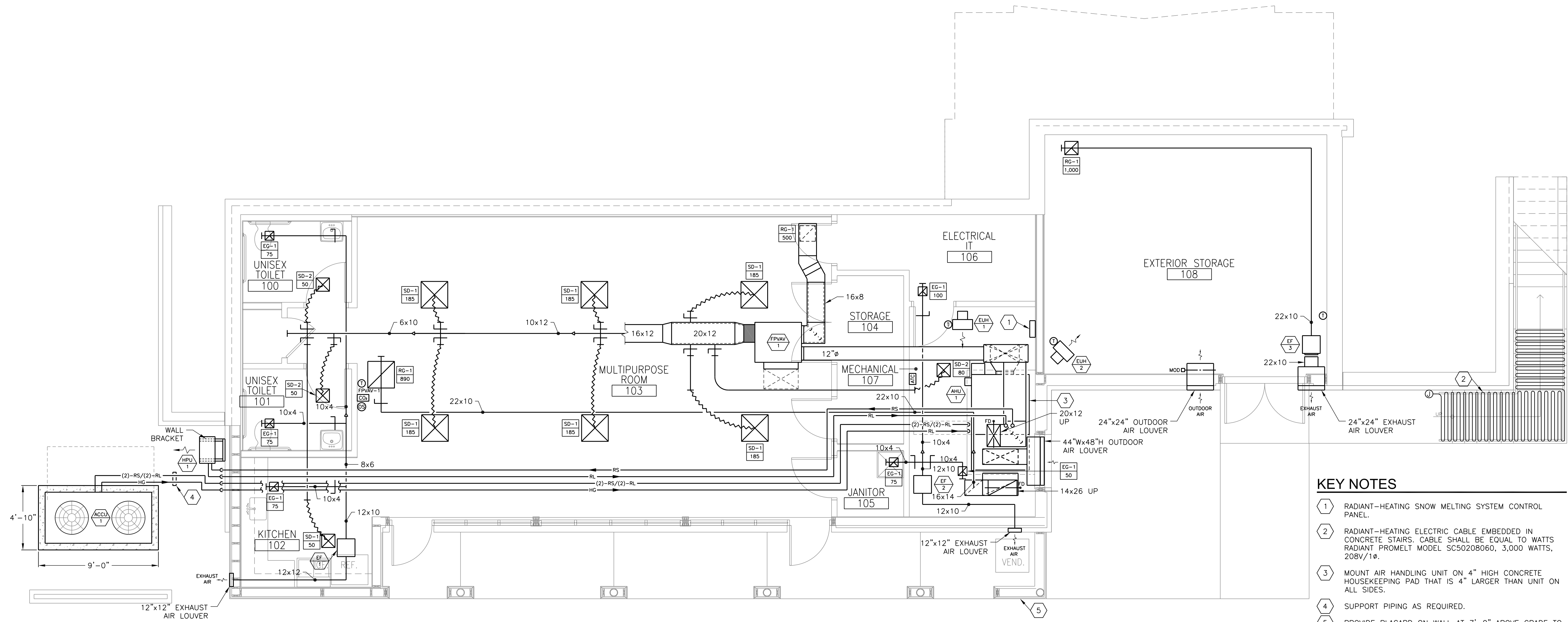
**DRAWING:**

## LEGEND AND ABBREVIATIONS

DRAWING NO.:

M-001





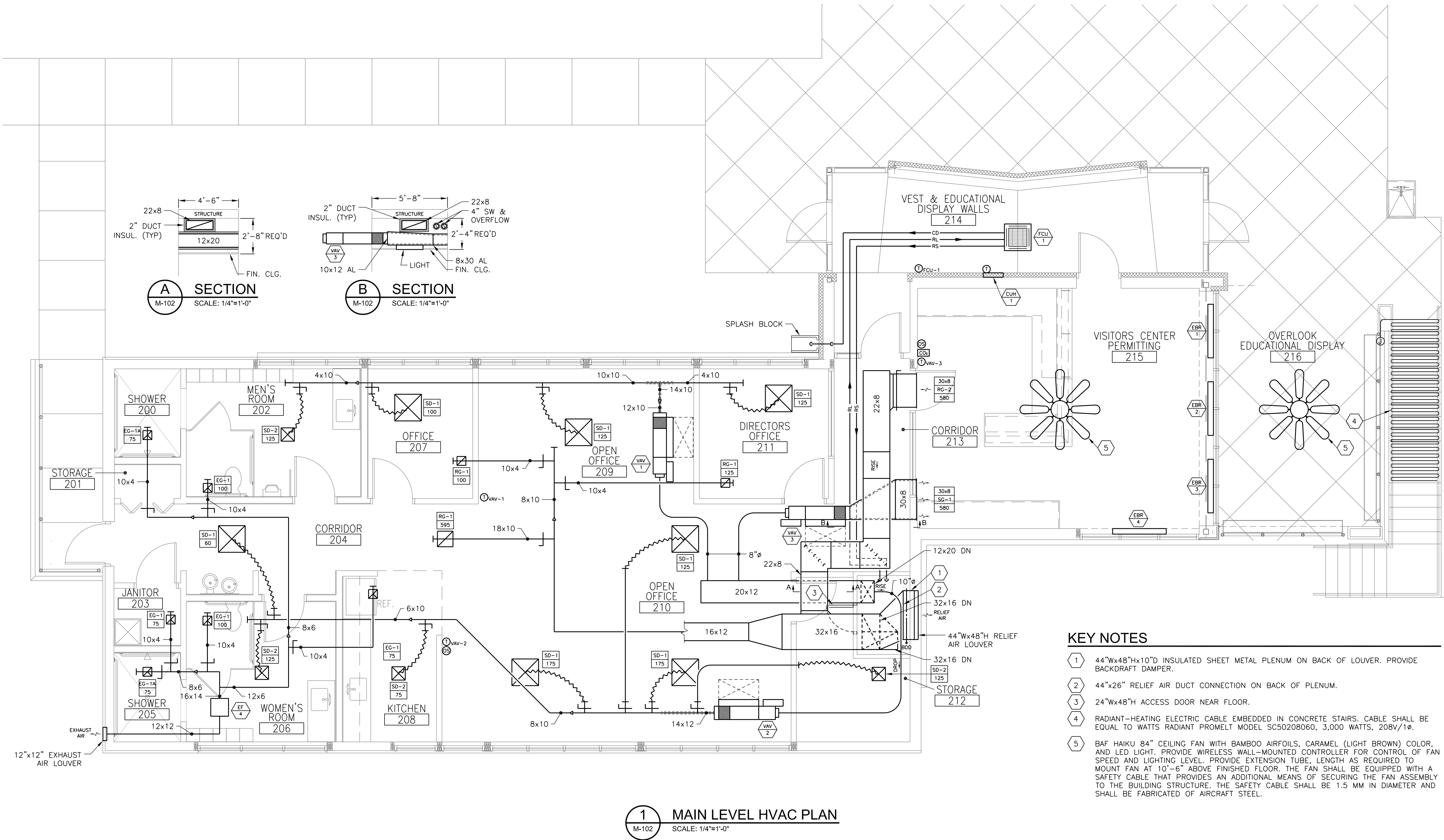
- KEY NOTES**
- 1 RADIANT-HEATING SNOW MELTING SYSTEM CONTROL PANEL.
  - 2 RADIANT-HEATING ELECTRIC CABLE EMBEDDED IN CONCRETE STAIRS. CABLE SHALL BE EQUAL TO WATTS RADIANT PROMELT MODEL SC50208060, 3,000 WATTS, 208V/1Ø.
  - 3 MOUNT AIR HANDLING UNIT ON 4" HIGH CONCRETE HOUSEKEEPING PAD THAT IS 4" LARGER THAN UNIT ON ALL SIDES.
  - 4 SUPPORT PIPING AS REQUIRED.
  - 5 PROVIDE PLACARD ON WALL AT 7'-0" ABOVE GRADE TO BOTTOM WHICH READS, "DO NOT IDLE VEHICLES." PLACARD SHALL HAVE 2" WHITE LETTERS ON BLACK BACKGROUND.

**1 LOWER LEVEL HVAC PLAN**  
M-101 SCALE: 1/4"=1'-0"

SEAL:	PROFESSIONAL CERTIFICATION:  I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF _____.  LICENSE NO.: _____ EXPIRATION DATE: _____	DATE	REVISIONS

OWNER:	ENGINEER:	PROJECT:	DRAWING:	DRAWING NO.:
OWNER	ENGINEER	PROJECT	LOWER LEVEL HVAC PLAN	M-101





- KEY NOTES**
- 44"Wx48"Hx10"D INSULATED SHEET METAL PLENUM ON BACK OF LOUVER. PROVIDE BACKDRAFT DAMPER.
  - 44"x26" RELIEF AIR DUCT CONNECTION ON BACK OF PLENUM.
  - 24"Wx48"H ACCESS DOOR NEAR FLOOR.
  - RADIANT-HEATING ELECTRIC CABLE EMBEDDED IN CONCRETE STAIRS. CABLE SHALL BE EQUAL TO WATTS RADIANT PROMELT MODEL SC50208060, 3,000 WATTS, 208V/1Ø.
  - BAF HAIKU 84" CEILING FAN WITH BAMBOO AIRFOILS, CARAMEL (LIGHT BROWN) COLOR, AND LED LIGHT. PROVIDE WIRELESS WALL-MOUNTED CONTROLLER FOR CONTROL OF FAN SPEED AND LIGHTING LEVEL. PROVIDE EXTENSION TUBE, LENGTH AS REQUIRED TO MOUNT FAN AT 10'-6" ABOVE FINISHED FLOOR. THE FAN SHALL BE EQUIPPED WITH A SAFETY CABLE THAT PROVIDES AN ADDITIONAL MEANS OF SECURING THE FAN ASSEMBLY TO THE BUILDING STRUCTURE. THE SAFETY CABLE SHALL BE 1.5 MM IN DIAMETER AND SHALL BE FABRICATED OF AIRCRAFT STEEL.

OWNER:	ENGINEER:	PROJECT:	DRAWING:	DRAWING NO.:
OWNER	ENGINEER	PROJECT	MAIN LEVEL HVAC PLAN	M-102



AIR HANDLING UNIT SCHEDULE - DX COOLING ONLY																							
DESIG.	SERVICE	SUPPLY FAN								DIRECT EXPANSION COOLING COIL						ROWS	FILTERS			DIMENSIONS (L x W x H)	WEIGHT (LBS)	BASIS OF DESIGN	NOTES
		SUPPLY AIR (CFM)	OUTDOOR AIR (CFM)	ESP (IN. W.C.)	TSP (IN. W.C.)	FAN SPEED (RPM)	BRAKE (HP)	MOTOR (HP)	ELEC. (VOLT./PH)	TOTAL (MBH)	SENSIBLE (MBH)	AREA (SF)	FACE VEL (FPM)	EAT DB/WB (°F)	LAT DB/WB (°F)		THICKNESS	TYPE	EFFICIENCY				
AHU-1	LOWER AND MAIN LEVELS	3,700	990	1.00	2.87	2,338	2.68	3	208/3	166.1	110.8	7.68	482	81.9/68.5	54.5/54.1	6	2"	PLEATED	MERV 8	83"x51"x38"	924	TRANE UCCAG08AO	1-4
NOTES: 1. DIRECT DRIVE PLENUM FAN WITH TOP DISCHARGE. 2. UNIT-MOUNTED VARIABLE FREQUENCY DRIVE. 3. ANGLE FILTER/MIXING BOX WITH INTEGRAL PARALLEL BLADE DAMPERS. 4. 2-CIRCUIT INTERTWINED DIRECT EXPANSION COOLING COIL.																							

AIR-COOLED CONDENSING UNIT SCHEDULE																		
DESIG.	SERVICE	REFRIG.	COOLING		NO. OF CIRCUITS	COMPRESSORS			CONDENSER FANS			MCA (AMPS)	MOCP (AMPS)	EER	DIMENSIONS (L x W x H)	WEIGHT (LBS)	BASIS OF DESIGN	NOTES
			CAPACITY (MBH)	AMBIENT (°F)		QUAN.	RLA (EACH)	ELEC. (VOLT./PH)	QUAN.	FLA (EACH)	ELEC. (VOLT./PH)							
ACCU-1	AIR HANDLING UNIT AHU-1	R-410A	180.0	95	2	2	25	208/3	2	5	208/1	66.3	80	12.6	96"x46"x45"	723	TRANE TTA180E3	1
<b>NOTES:</b> 1. MOUNT UNIT ON NEOPRENE VIBRATION ISOLATORS. 2. HOT GAS BYPASS. 3. CONDENSER COIL HAILGUARD. 4. MICROPROCESSOR CONTROLS WITH BACNET COMMUNICATION INTERFACE.																		

VAV TERMINAL UNIT SCHEDULE - PARALLEL FAN-POWERED WITH ELECTRIC HEAT																
DESIG.	SERVICE	AIRFLOW (CFM)		FAN			ELECTRIC HEATING COIL					MODEL	SIZE			NOTES
		MAX	MIN	CFM	ESP	HP	CFM	KW	EAT/LAT	VOLT./PH	CONTROL		UNIT	INLET	OUTLET	
FPVAV-1	MULTIPURPOSE 103	1,340	400	500	0.3	1/4	1,360	8.5	55/75	208/3	ATC	DTQP-12	3	12" DIA	14"x11"	1
<b>NOTES:</b> 1. SELECTIONS BASED ON TITUS AS MANUFACTURER. 2. DOOR-INTERLOCKED DISCONNECT SWITCH FOR ELECTRIC HEATING COIL.																

VAV TERMINAL UNIT SCHEDULE - SINGLE-DUCT WITH ELECTRIC HEAT												
DESIG.	SERVICE	AIRFLOW (CFM)		ELECTRIC HEATING COIL					MODEL	SIZE		NOTES
		MAX	MIN	CFM	KW	EAT/LAT	VOLT./PH	CONTROL		UNIT	OUTLET	
VAV-1	WEST OFFICES	500	320	320	3.5	55/90	208/3	ATC	DESV-8	8" DIA	12"x10"	1
VAV-2	EAST OFFICES	860	540	540	6.0	55/90	208/3	ATC	DESV-10	10" DIA	14"x12"	1
VAV-3	VISITORS CENTER 215	580	400	400	4.5	55/91	208/3	ATC	DESV-8	8" DIA	12"x10"	1
<b>NOTES:</b> 1. SELECTIONS BASED ON TITUS AS MANUFACTURER. 2. DOOR-INTERLOCKED DISCONNECT SWITCH FOR ELECTRIC HEATING COIL.												

CABINET UNIT HEATER SCHEDULE							
DESIG.	SERVICE	SUPPLY AIR (CFM)	HEATER CAPACITY (KW)	ELEC. (VOLT./PH)	DIMENSIONS (W x H x D)	BASIS OF DESIGN	NOTES
CUH-1	VESTIBULE 214	100	2.0	208/1	9" x 12" x 3 5/8"	MARKEL F3052T2DWB	1,2
<b>NOTES:</b> 1. UNIT-MOUNTED 2-POLE LINE VOLTAGE THERMOSTAT. 2. UNIT-MOUNTED DISCONNECT SWITCH.							

ELECTRIC BASEBOARD RADIATOR SCHEDULE							
DESIG.	TYPE	LENGTH	ELECTRICAL			BASIS OF DESIGN	NOTES
			WATTS/FT	WATTS	ELEC. (VOLT./PH)		
EBRs-1-4	PEDESTAL MOUNT	4'-0"	250	1,000	208/1	BERKO CPLAS-4-250-20-1-2T-DS	1,2
<u>NOTES:</u> 1. UNIT-MOUNTED 2-POLE LINE VOLTAGE THERMOSTAT. 2. UNIT-MOUNTED DISCONNECT SWITCH.							

ELECTRIC UNIT HEATER SCHEDULE					
DESIG.	SERVICE	HEATER CAPACITY (KW)	ELEC. (VOLT./PH)	BASIS OF DESIGN	NOTES
EUHs-1,2	MECH RM & STORAGE	3.3	208/3	MARKEL F3F5103N	1-3
<b>NOTES:</b> 1. MODEL T5100 UNIT-MOUNTED THERMOSTAT. 2. MODEL DSC403/5100 DISCONNECT SWITCH. 3. MODEL A5105 WALL BRACKET.					

DIFFUSER, REGISTER, AND GRILLE SCHEDULE							
DESIG.	SERVICE	BORDER	CFM RANGE	NECK SIZE	DESCRIPTION	BASIS OF DESIGN	NOTES
SD-1	SUPPLY	LAY-IN	0 - 175	8"Ø	24"x24" CEILING MODULE WITH 18"x18" LOUVERED FACE SUPPLY AIR DIFFUSER, 4-WAY BLOW UNLESS NOTED OTHERWISE, STEEL CONSTRUCTION, WHITE FINISH.	TITUS TDC WITH LAY-IN BORDER.	1
			176 - 275	10"Ø			
			276 - 400	12"Ø			
SD-2	SUPPLY	SURFACE MOUNT	0 - 175	8"Ø	12"x12" LOUVERED FACE CEILING SUPPLY AIR DIFFUSER, 4-WAY BLOW UNLESS NOTED OTHERWISE, STEEL CONSTRUCTION, WHITE FINISH.	TITUS TDC WITH SURFACE MOUNT BORDER.	1
			176 - 275	10"Ø			
			276 - 400	12"Ø			
SG-1	SUPPLY	SURFACE MOUNT	NOTED ON PLANS		35" SINGLE-DEFLECTION SUPPLY AIR GRILLE, 3/4" BLADE SPACING, FRONT BLADES PARALLEL TO SHORT DIMENSION, STEEL CONSTRUCTION, WHITE FINISH.	TITUS 301RS WITH SURFACE MOUNT BORDER.	2
RG-1	RETURN	SURFACE MOUNT	0 - 200	8"x8"	35" FIXED-BLADE RETURN AIR GRILLE, 3/4" BLADE SPACING, BLADES PARALLEL TO SHORT DIMENSION, STEEL CONSTRUCTION, WHITE FINISH.	TITUS 350RL WITH SURFACE MOUNT BORDER.	1
			201 - 300	10"x10"			
			301 - 400	12"x12"			
			401 - 500	14"x14"			
			501 - 700	16"x16"			
			701 - 800	18"x18"			
			801 - 1,000	20"x20"			
1,001 - 1,300	22"x22"						
RG-2	RETURN	SURFACE MOUNT	NOTED ON PLANS		35" FIXED-BLADE RETURN AIR GRILLE, 3/4" BLADE SPACING, BLADES PARALLEL TO SHORT DIMENSION, STEEL CONSTRUCTION, WHITE FINISH.	TITUS 350RS WITH SURFACE MOUNT BORDER.	1
EG-1	EXHAUST	SURFACE MOUNT	0 - 200	8"x8"	35" FIXED-BLADE EXHAUST AIR GRILLE, 3/4" BLADE SPACING, BLADES PARALLEL TO LONG DIMENSION, STEEL CONSTRUCTION, WHITE FINISH.	TITUS 350RL WITH SURFACE MOUNT BORDER.	1
			201 - 300	10"x10"			
			301 - 400	12"x12"			
			401 - 500	14"x14"			
			501 - 700	16"x16"			
			701 - 800	18"x18"			
			801 - 1,000	20"x20"			
1,001 - 1,300	22"x22"						
EG-1A	EXHAUST	SURFACE MOUNT	0 - 200	8"x8"	35" FIXED-BLADE EXHAUST AIR GRILLE, 3/4" BLADE SPACING, BLADES PARALLEL TO LONG DIMENSION, ALUMINUM CONSTRUCTION, WHITE FINISH.	TITUS 350FL WITH SURFACE MOUNT BORDER.	1
			201 - 300	10"x10"			
			301 - 400	12"x12"			
			401 - 500	14"x14"			
			501 - 700	16"x16"			
			701 - 800	18"x18"			
			801 - 1,000	20"x20"			
1,001 - 1,300	22"x22"						
NOTES:							
1. RUNOUT DUCT SIZE SHALL BE SAME AS NECK SIZE.							
2. PROVIDE 12" DEEP FIELD-FABRICATED ACOUSTICALLY-LINED PLENUM.							

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OWNER:	ENGINEER:	PROJECT:	DRAWING:	DRAWING NO.:
OWNER	ENGINEER	PROJECT	SCHEDULES	M-601



DUCTLESS SPLIT SYSTEM UNIT SCHEDULE - HEAT PUMP DX WITH BACKUP ELECTRIC HEAT

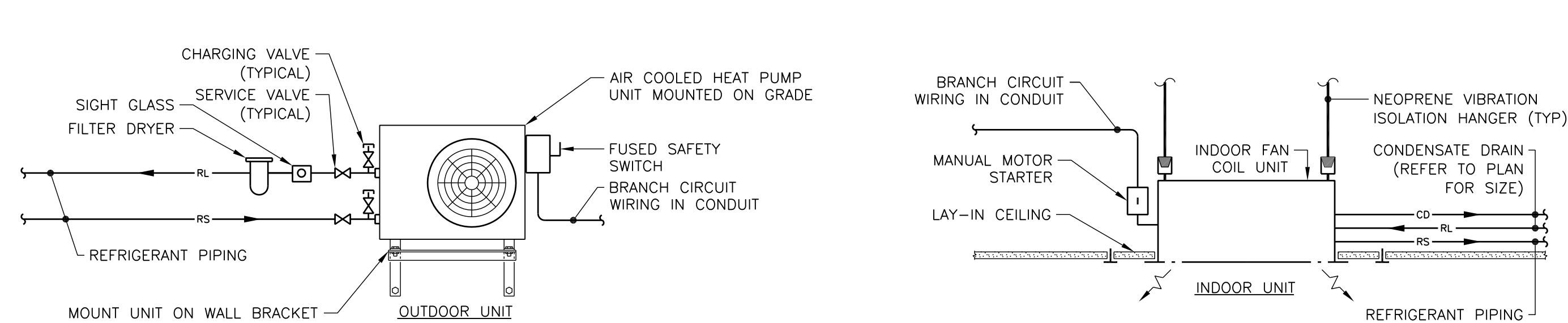
FAN COIL UNIT									AIR COOLED HEAT PUMP UNIT				NOTES
DESIG.	SERVICE	DESCRIPTION	AIRFLOW LOW/MED/HIGH (CFM)	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	ELEC. HTG. COIL (KW)	ELEC (VOLT./PH)	BASIS OF DESIGN	DESIG.	ELEC (VOLT./PH)	SEER	BASIS OF DESIGN	
FCU-1	VESTIBULE 214	CEILING MODULE	335/355/380	12.0	8.8	1.5	208/1	EMI MODEL NO. CAH-V-12-D-1	HPU-1	208/1	15.8	EMI MODEL NO. S1H-V-2000-D-00	1-9

- NOTES:  
1. HARD-WIRED, WALL-MOUNTED THERMOSTAT.  
2. THREE-SPEED FAN WITH AUTOMATIC FAN SPEED CONTROL.  
3. PROVIDE REFRIGERANT PIPING BETWEEN FAN COIL UNIT AND AIR COOLED HEAT PUMP UNIT.  
4. COOLING CAPACITY AT 95°F OUTDOOR TEMPERATURE, 80°F INDOOR TEMPERATURE.  
5. HEATING CAPACITY AT 17°F OUTDOOR TEMPERATURE, 70°F INDOOR TEMPERATURE.
6. MICROPROCESSOR CONTROLS WITH SELF-CHECK FUNCTION AND AUTO RESTART FOLLOWING A POWER OUTAGE.  
7. REFRIGERANT R-410A.  
8. ONE YEAR PARTS WARRANTY.  
9. SIX YEAR COMPRESSOR WARRANTY.

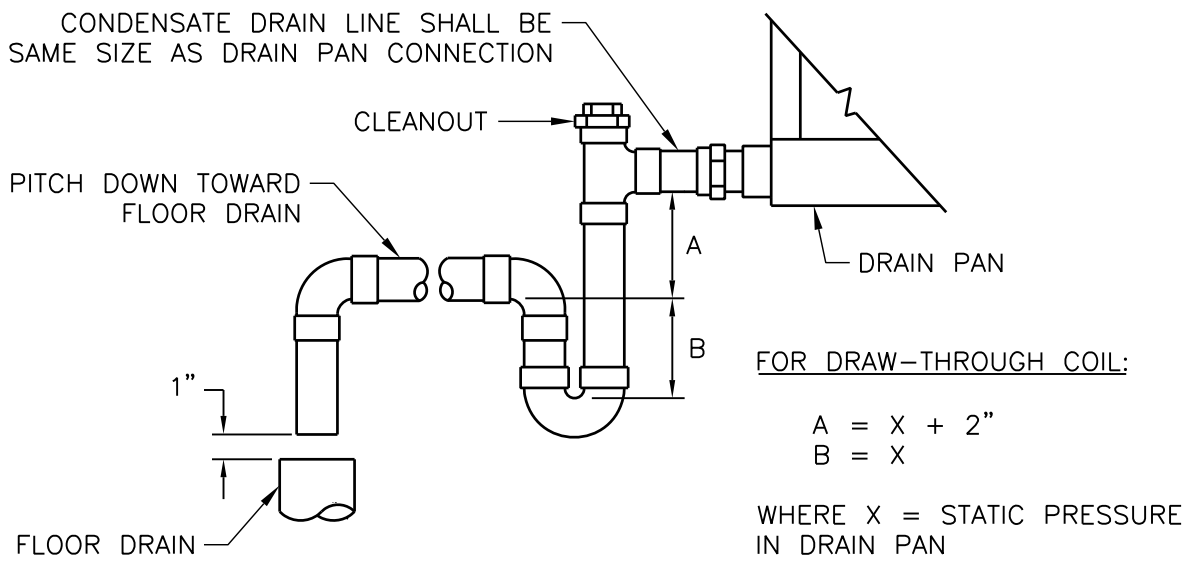
FAN SCHEDULE

DESIG.	SERVICE	TYPE	DRIVE	AIRFLOW (CFM)	TOTAL S.P. (IN. W.C.)	SPEED (RPM)	CONTROL	MOTOR (WATTS)	ELEC. (VOLT./PH)	SONES	WEIGHT (LBS)	BASIS OF DESIGN	NOTES
EF-1	LL TOILETS AND KITCHEN	IN-LINE	DIRECT	225	0.375	1,050	ATC	85	120/1	3.0	24	GREENHECK CSP-A290	1,2
EF-2	ELEC, MECH, AND JANITOR	IN-LINE	DIRECT	225	0.250	1,000	ATC	95	120/1	1.5	24	GREENHECK CSP-A250	1,2
EF-3	EXTERIOR STORAGE 108	IN-LINE	DIRECT	1,000	0.250	1,095	ATC	798	120/1	2.5	60	GREENHECK CSP-A1050	1,3
EF-4	ML TOIL/SHOWERS, KITCHEN	IN-LINE	DIRECT	500	0.375	1,080	ATC	528	120/1	2.0	37	GREENHECK CSP-A710	1,2

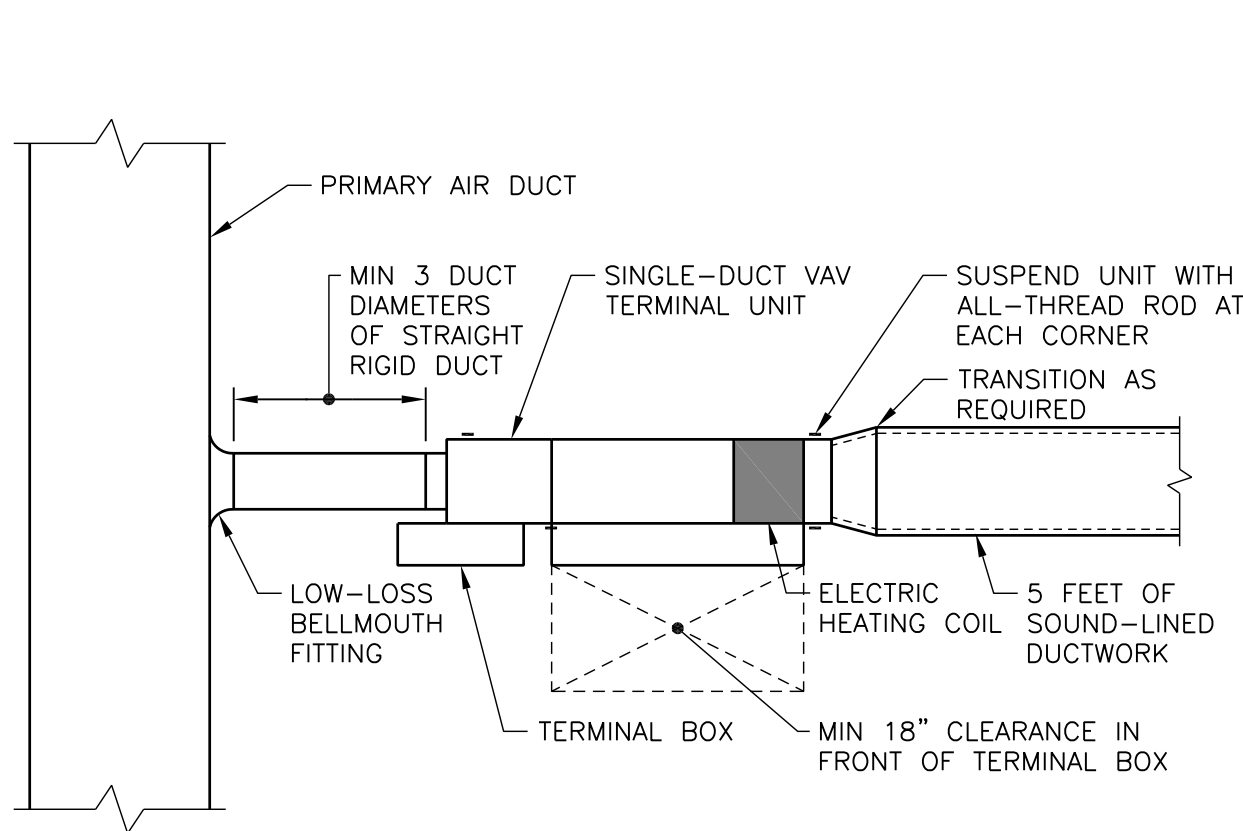
- NOTES:
- SUPPORT FROM STRUCTURE WITH VIBRATION ISOLATION HANGERS.
  - INTERLOCK WITH AHU-1.
  - CONTROLLED BY THERMOSTAT IN STORAGE 108.



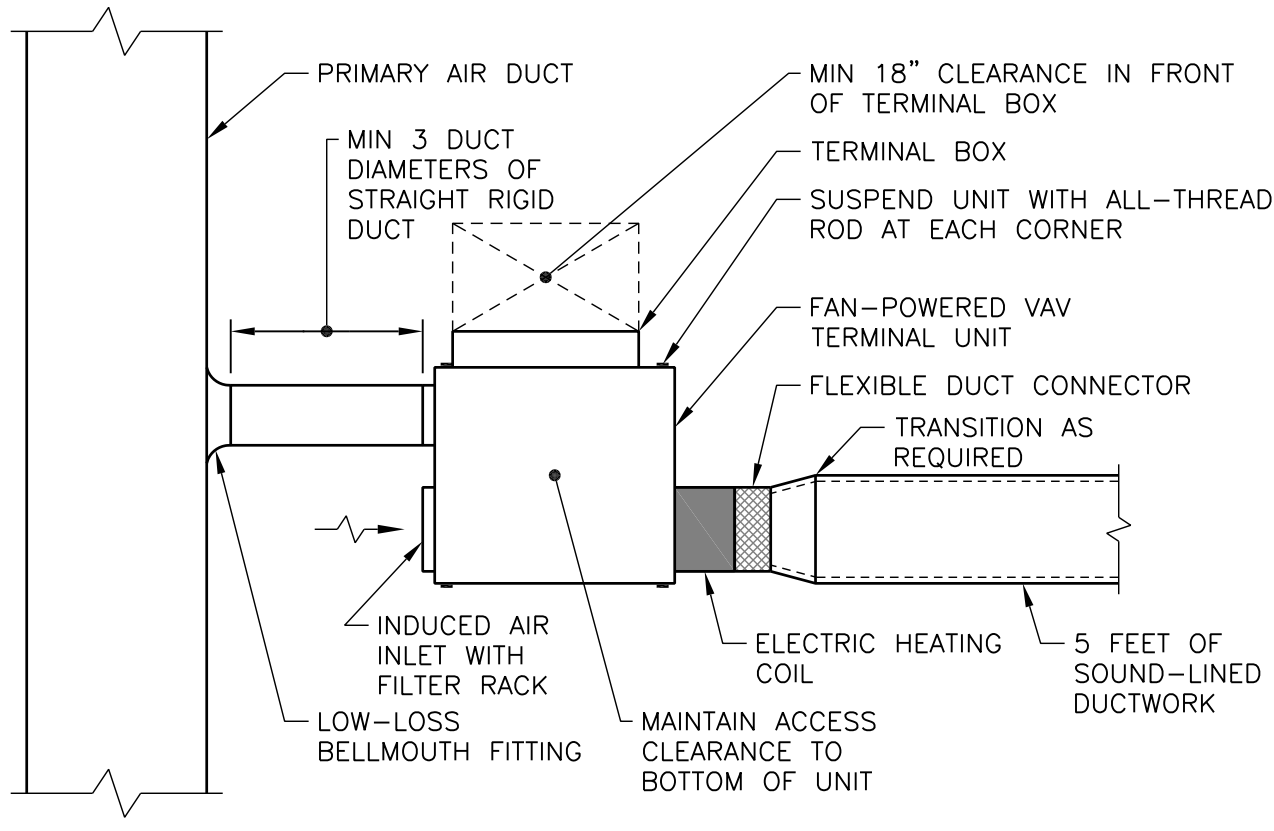
1 DUCTLESS SPLIT SYSTEM HEAT PUMP UNIT DETAIL  
M-602 NO SCALE



2 CONDENSATE DRAIN TRAP DETAIL  
M-602 NO SCALE



3 SINGLE DUCT VAV TERMINAL UNIT WITH ELECTRIC HEAT DETAIL  
M-602 NO SCALE

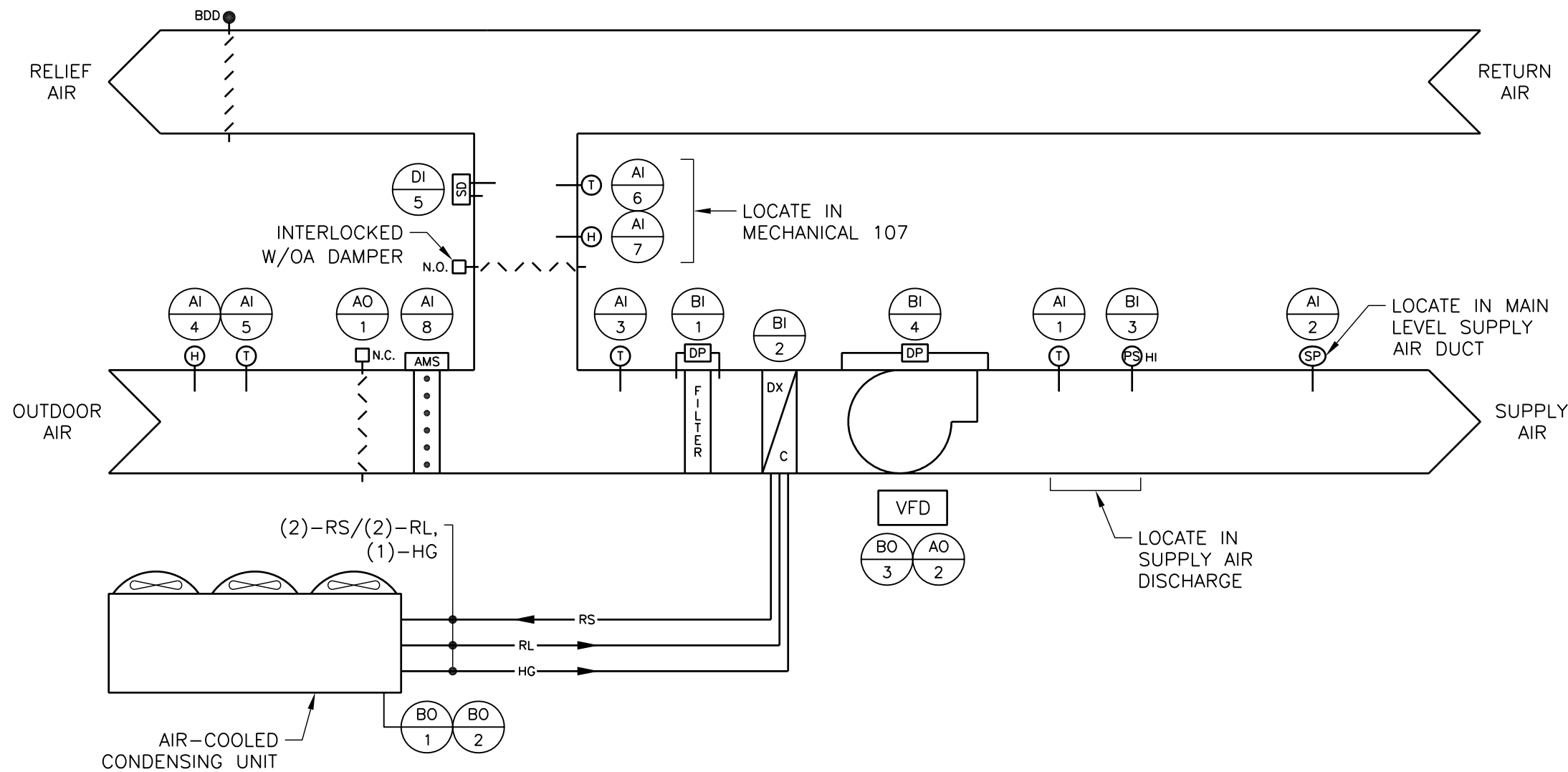


4 FAN-POWERED VAV TERMINAL UNIT WITH ELECTRIC HEAT DETAIL  
M-602 NO SCALE

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OWNER:	ENGINEER:	PROJECT:	DRAWING:	DRAWING NO.:
OWNER	ENGINEER	PROJECT	SCHEDULES AND DETAILS	M-602





1  
M-603 NO SCALE

**SPLIT-SYSTEM VAV AHU CONTROL DIAGRAM**

SEQUENCE OF OPERATION

BUILDING AUTOMATION SYSTEM INTERFACE

THE BUILDING AUTOMATION SYSTEM (BAS) SHALL SEND THE CONTROLLER OCCUPIED BYPASS, PRE-COOL, AND OCCUPIED/UNOCCUPIED MODES. THE BAS SHALL ALSO SEND THE DISCHARGE AIR TEMPERATURE SETPOINT AND THE DUCT STATIC PRESSURE SETPOINT. IF A BAS IS NOT PRESENT, OR COMMUNICATION IS LOST WITH THE BAS THE CONTROLLER SHALL OPERATE USING DEFAULT MODES AND SETPOINTS.

OCCUPIED MODE

DURING OCCUPIED PERIODS, THE SUPPLY FAN SHALL RUN CONTINUOUSLY AND THE OUTDOOR AIR DAMPER SHALL OPEN TO MAINTAIN MINIMUM VENTILATION REQUIREMENTS. THE DX COOLING SHALL STAGE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. IF ECONOMIZING IS ENABLED THE OUTDOOR AIR DAMPER SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. IF THE DISCHARGE AIR TEMPERATURE SENSOR FAILS THE DX COOLING SHALL BE DISABLED AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS.

UNOCCUPIED MODE

WHEN THE SPACE TEMPERATURE IS ABOVE THE UNOCCUPIED COOLING SETPOINT OF 85 DEG F (ADJ.) THE SUPPLY FAN SHALL START, THE OUTDOOR AIR DAMPER SHALL OPEN IF ECONOMIZING IS ENABLED AND REMAIN CLOSED IF ECONOMIZING IS DISABLED AND THE DX COOLING SHALL BE ENABLED. WHEN THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED COOLING SETPOINT OF 85 DEG F MINUS THE UNOCCUPIED DIFFERENTIAL OF 4 DEG F (ADJ.) THE SUPPLY FAN SHALL STOP, THE DX COOLING SHALL BE DISABLED, AND THE OUTDOOR AIR DAMPER SHALL CLOSE.

OPTIMAL START

THE BAS SHALL MONITOR THE SCHEDULED OCCUPIED TIME, OCCUPIED SPACE SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL START OCCURS.

PRE-COOL MODE

DURING OPTIMAL START, IF THE AVERAGE SPACE TEMPERATURE IS ABOVE THE OCCUPIED COOLING SETPOINT, PRE-COOL MODE SHALL BE ACTIVATED. WHEN THE PRE-COOL MODE IS INITIATED THE UNIT SHALL ENABLE THE FAN AND COOLING OR ECONOMIZER. THE OUTDOOR AIR DAMPER SHALL REMAIN CLOSED, UNLESS ECONOMIZING. WHEN THE SPACE TEMPERATURE REACHES OCCUPIED COOLING SETPOINT (ADJ.), THE UNIT SHALL TRANSITION TO THE OCCUPIED MODE.

OPTIMAL STOP

THE BAS SHALL MONITOR THE SCHEDULED UNOCCUPIED TIME, OCCUPIED SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL STOP OCCURS. WHEN THE OPTIMAL STOP MODE IS ACTIVE THE UNIT CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE TO THE SPACE TEMPERATURE OFFSET SETPOINT. OUTDOOR AIR DAMPER SHALL REMAIN ENABLED TO PROVIDE MINIMUM VENTILATION.

OCCUPIED BYPASS

THE BAS SHALL MONITOR THE STATUS OF THE "ON" AND "CANCEL" BUTTONS OF THE SPACE TEMPERATURE SENSORS. WHEN AN OCCUPIED BYPASS REQUEST IS RECEIVED FROM A SPACE SENSOR, THE UNIT SHALL TRANSITION FROM ITS CURRENT OCCUPANCY MODE TO OCCUPIED BYPASS MODE AND THE UNIT SHALL MAINTAIN THE SPACE TEMPERATURE TO THE OCCUPIED SETPOINTS (ADJ.).

SUPPLY AIR TEMPERATURE RESET CONTROL

THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET TO THE OPTIMAL SETPOINT COMMUNICATED BY THE BAS. THE BAS SHALL RESET THE SUPPLY AIR TEMPERATURE SETPOINT BASED ON THE CURRENT OUTDOOR AIR TEMPERATURE, BUT SHALL OVERRIDE THIS RESET FUNCTION AND RETURN THE SUPPLY AIR TEMPERATURE SETPOINT TO 55 DEG F (ADJ.) IF MORE THAN TWO (ADJ.) ZONES BEGIN TO OVERHEAT. ALSO, THE BAS SHALL OVERRIDE THIS RESET FUNCTION WHENEVER OUTDOOR DEW POINT IS HIGHER THAN 60 DEG F (ADJ.) OR INDOOR RELATIVE HUMIDITY IS HIGHER THAN 60% RH (ADJ.). IF THE SUPPLY AIR TEMPERATURE DROPS BELOW THE MINIMUM LIMIT, A LOW TEMPERATURE ALARM SHALL BE ANNUNCIATED AND THE UNIT SHALL SHUT DOWN. IF THE SUPPLY AIR TEMPERATURE RISES ABOVE THE MAXIMUM LIMIT, A HIGH TEMPERATURE ALARM SHALL BE ANNUNCIATED.

ECONOMIZER

THE DISCHARGE AIR TEMPERATURE SENSOR SHALL MEASURE THE DRY BULB TEMPERATURE OF THE AIR LEAVING THE COOLING COIL WHILE ECONOMIZING. WHEN ECONOMIZING IS ENABLED AND THE UNIT IS OPERATING IN THE COOLING MODE, THE ECONOMIZER DAMPER SHALL BE MODULATED BETWEEN ITS MINIMUM POSITION AND 100% TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.

ONCE THE OUTDOOR AIR DAMPER REACHES ITS FULLY OPEN POSITION, UPON A FURTHER RISE IN DISCHARGE AIR TEMPERATURE ABOVE SETPOINT, THE REFRIGERATION SYSTEM SHALL BE ENERGIZED AND ITS CAPACITY SHALL BE MODULATED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.

THE ECONOMIZER DAMPER SHALL MODULATE TOWARD MINIMUM POSITION IN THE EVENT THE MIXED AIR TEMPERATURE FALLS BELOW THE LOW TEMPERATURE LIMIT SETTING.

COMPARATIVE ENTHALPY

OUTDOOR AIR (OA) ENTHALPY SHALL BE COMPARED WITH RETURN AIR (RA) ENTHALPY. THE ECONOMIZER SHALL BE ENABLED WHEN OA ENTHALPY IS LESS THAN RA ENTHALPY BY 2.0 BTU/LB.

THE ECONOMIZER SHALL BE DISABLED WHEN OA ENTHALPY IS GREATER THAN RA ENTHALPY.

SUPPLY FAN

THE FAN SHALL BE OFF IN THE UNOCCUPIED MODE. WHEN THE UNIT CONTROLLER IS IN THE OCCUPIED MODE, THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY AND ITS SPEED SHALL BE MODULATED TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT. THE DUCT STATIC PRESSURE SETPOINT SHALL BE SENT BY THE BAS AND SHALL BE RESET BETWEEN THE MINIMUM AND MAXIMUM STATIC PRESSURE LIMITS TO MAINTAIN THE CRITICAL ZONE VAV AIR DAMPER IN A POSITION BETWEEN 75% AND 85% OPEN.

IF THE SUPPLY FAN FAILS TO PROVE STATUS FOR 30 SECONDS (ADJ.), THE FAN SHALL BE COMMANDED OFF, THE OUTDOOR AIR DAMPER SHALL CLOSE, DX COOLING STAGES SHALL BE DISABLED, AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS. A MANUAL RESET IS REQUIRED TO RESTART THE FAN. A HARDWIRED, HIGH STATIC PRESSURE CUT-OFF SWITCH SHALL BE ELECTRICALLY INTERLOCKED WITH THE VARIABLE FREQUENCY DRIVE. IF THE HIGH STATIC PRESSURE CUT-OFF SWITCH IS TRIPPED THE FAN SHALL STOP, THE OUTDOOR AIR DAMPER SHALL CLOSE, ALL STAGES OF DX COOLING STAGES SHALL BE DISABLED, AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS. A MANUAL RESET OF THE HIGH STATIC PRESSURE CUT-OFF SWITCH SHALL BE REQUIRED TO RESTART THE FAN.

MIXED AIR LOW LIMIT

THE INITIAL DAMPER OPENING RATE SHALL BE LIMITED TO 2% PER MINUTE (ADJ.) UNTIL THE DAMPER HAS REACHED ITS MINIMUM VENTILATION POSITION. THE OUTDOOR AIR DAMPER SHALL MODULATE TO A POSITION LESS THAN THE MINIMUM DAMPER POSITION IF THE MIXED AIR TEMPERATURE DROPS BELOW 50.0 DEG F (ADJ.). IF THE MIXED AIR TEMPERATURE SENSOR FAILS, AN ALARM SHALL BE ANNUNCIATED AT THE BAS AND THE OUTDOOR AIR DAMPER SHALL RETURN TO THE MINIMUM POSITION.

FILTER STATUS

A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSSES DURING NORMAL OPERATION, A DIRTY FILTER ALARM SHALL BE ANNUNCIATED AT THE BAS.

VENTILATION OPTIMIZATION

THE BAS SHALL REGULARLY DETERMINE THE HIGHEST ZONE OUTDOOR-AIR FRACTION, SUM THE OUTDOOR AIRFLOW REQUIREMENTS FOR ALL VAV ZONES, AND SUM THE CURRENT PRIMARY AIRFLOWS FOR ALL VAV ZONES TO DETERMINE THE TOTAL SYSTEM PRIMARY AIRFLOW. THIS INFORMATION SHALL BE USED IN EQUATION EQUATION 6-8 AND APPENDIX A OF ASHRAE STANDARD 62.1-2013 TO CALCULATE THE MINIMUM REQUIRED OUTDOOR AIRFLOW FOR THE SYSTEM. THIS MINIMUM OUTDOOR AIRFLOW SETPOINT SHALL BE RECALCULATED EVERY 15 MINUTES (ADJ.).

THE AIR HANDLING UNIT SHALL CONTROL OUTDOOR AIR DAMPER TO MINIMUM BY MEASURING OUTDOOR AIR AT THE AIRFLOW MEASURING STATION.

AHU - 1/ACCU-1 POINT LIST

AHU - 1/ACCU-1 POINT LIST																		
CONTROLLER: UC600		POINT TYPE								ALARMS								
SYSTEM POINT DESCRIPTION		GRAPHIC	HARDWARE INPUT	HARDWARE OUTPUT	SOFTWARE POINT	HARDWARE INTERLOCK	WIRELESS	NETWORK	DEFAULT VALUE	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL	DIAGNOSTICS	NOTES	
DISCHARGE AIR TEMPERATURE LOCAL		X	AI-1							X	X			X		SENSOR FAILURE		
DUCT STATIC PRESSURE LOCAL		X	AI-2															
MIXED AIR TEMPERATURE LOCAL		X	AI-3							X	X			X		SENSOR FAILURE		
OUTDOOR AIR RELATIVE HUMIDITY		X	AI-4							X	X			X		SENSOR FAILURE		
OUTDOOR AIR TEMPERATURE		X	AI-5			X				X	X			X		SENSOR FAILURE		
RETURN AIR RELATIVE HUMIDITY LOCAL		X	AI-6							X	X			X		SENSOR FAILURE		
RETURN AIR TEMPERATURE LOCAL		X	AI-7							X	X			X		SENSOR FAILURE		
OUTDOOR AIRFLOW MEASUREMENT		X	AI-8											X		SENSOR FAILURE		
DIRTY FILTER ALARM OPEN		X	BI-1										X			DIRTY FILTER		
FROST DETECTION INPUT		X	BI-2									X	X					
HIGH STATIC ALARM CLOSE		X	BI-3			X										DUCT STATIC PRESSURE HIGH LIMIT	NOTE 1	
SUPPLY FAN STATUS OPEN		X	BI-4															
DUCT SMOKE DETECTOR		X	BI-5													DUCT SMOKE DETECTION	NOTE 1	
MIXED AIR DAMPER		X		AO-1														
SUPPLY FAN SPEED COMMAND		X		AO-2														
COMPRESSOR 1 COMMAND		X		BO-1														
COMPRESSOR 2 COMMAND		X		BO-2														
SUPPLY FAN START STOP COMMAND		X		BO-3														
OCCUPIED COOLING SETPOINT					X				74.0 deg. F									
OCCUPIED HEATING SETPOINT					X				70.0 deg. F									
OCCUPIED STANDBY COOLING SETPOINT					X				80.0 deg. F									
OCCUPIED STANDBY HEATING SETPOINT					X				65.0 deg. F									
UNOCCUPIED COOLING SETPOINT					X				85.0 deg. F									
UNOCCUPIED HEATING SETPOINT					X				60.0 deg. F									
MINIMUM OUTSIDE AIR FLOW REQUIREMENT					X													
OCCUPIED BYPASS TIMER					X				2.0 HRS									
DISCHARGE AIR TEMPERING SETPOINT					X				55.0 deg. F									
DISCHARGE AIR TEMPERATURE CONTROL POINTS					X													
BAS COMMUNICATION STATE		X			X										X		NOTE 2	
MAINTENANCE REQUIRED					X				600 HRS									
GENERAL NOTES																		
		1. DEVICE IS HARDWIRE INTERLOCKED. MANUAL RESET IS REQUIRED.																
		2. DISPLAYED AT THE BAS USER INTERFACE IF PRESENT.																

OPERATING SAFETY CONTROLS

THE RETURN AIR DUCT SMOKE DETECTOR SHALL BE HARD-WIRED THROUGH THE SUPPLY FAN VARIABLE FREQUENCY DRIVE. WHEN THE RETURN AIR DUCT SMOKE DETECTOR DETECTS THE PRESENCE OF SMOKE, THE SUPPLY FAN SHALL BE COMMANDED OFF, THE OUTDOOR AIR DAMPER SHALL CLOSE, DX COOLING STAGES SHALL BE DISABLED, AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS. THE DUCT SMOKE DETECTOR SHALL REQUIRE A MANUAL RESET FOR THE UNIT TO BE RESTARTED.

REFRIGERATION SAFETY CONTROLS

REFRIGERATION SAFETY CONTROLS SHALL BE PROVIDED BY THE UNIT MANUFACTURER AND SHALL INCLUDE CRANKCASE HEATERS, PHASE MONITORS, AND HIGH AND LOW REFRIGERANT PRESSURE CUTOUTS.

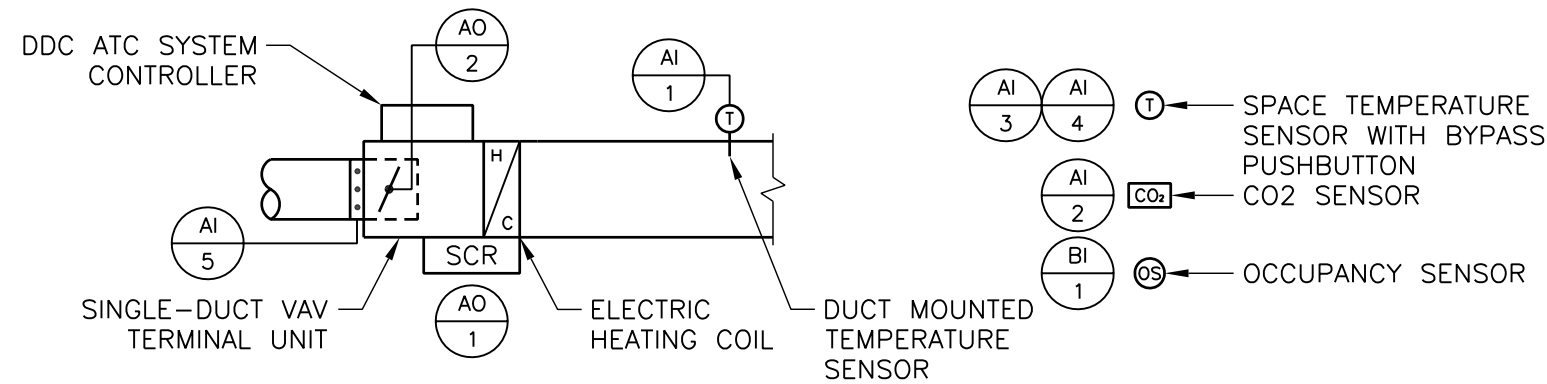
A FROST PROTECTION SWITCH SHALL BE PROVIDED FOR THE DX COOLING COIL WHICH SHALL DE-ENERGIZE THE REFRIGERATION SYSTEM IF THE COIL TEMPERATURE DROPS BELOW 30 DEG F. THE SWITCH SHALL AUTOMATICALLY RESET WHEN THE COIL TEMPERATURE RISES ABOVE 40 DEG F.

THE PACKAGED CONTROLS SHALL SIGNAL AN ALARM AT THE BAS FOR FOLLOWING CONDITIONS THAT WOULD CAUSE A UNIT SHUTDOWN: PHASE LOSS, HIGH OR LOW REFRIGERANT PRESSURE, AND DX COIL FROST PROTECTION.

SEAL:	PROFESSIONAL CERTIFICATION:  I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF _____.  LICENSE NO.: _____ EXPIRATION DATE: _____	DATE	REVISIONS

OWNER:	ENGINEER:	PROJECT:	DRAWING:	DRAWING NO.:
OWNER	ENGINEER	PROJECT	ATC DIAGRAM	M-603





**1 VAV BOX WITH ELECTRIC HEAT**  
**CONTROL DIAGRAM**  
NO SCALE

SEQUENCE OF OPERATION

BUILDING AUTOMATION SYSTEM INTERFACE

THE BUILDING AUTOMATION SYSTEM (BAS) SHALL SEND THE CONTROLLER OCCUPIED AND UNOCCUPIED COMMANDS. THE BAS MAY ALSO SEND A HEAT/COOL MODE, PRIORITY SHUTDOWN COMMANDS, SPACE TEMPERATURE AND/OR SPACE TEMPERATURE SETPOINT. IF COMMUNICATION IS LOST WITH THE BAS, THE VAV CONTROLLER SHALL OPERATE USING ITS LOCAL SETPOINTS.

OCCUPANCY MODE

THE OCCUPANCY MODE SHALL BE COMMUNICATED TO THE VAV VIA A BINARY INPUT.

OCCUPIED

OCCUPIED MODE IS THE NORMAL OPERATING MODE FOR OCCUPIED SPACES, OR DAYTIME OPERATION. WHEN THE UNIT IS IN THE OCCUPIED MODE, THE VAV SHALL MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE OCCUPIED HEATING OR COOLING SETPOINT. APPLICABLE VENTILATION AND AIRFLOW SETPOINTS SHALL BE ENFORCED. THE OCCUPIED MODE SHALL BE THE DEFAULT MODE OF THE VAV.

OCCUPIED STANDBY

THE OCCUPANCY SENSOR SHALL BE USED TO INDICATE THAT THE SPACE IS UNOCCUPIED, EVEN THOUGH THE BAS HAS SCHEDULED THE SPACE AS OCCUPIED. IN THE OCCUPIED STANDBY MODE, THE ACTIVE COOLING AND HEATING SETPOINTS SHALL BE RELAXED (SEE COOLING AND HEATING MODE) AND BOTH THE VENTILATION AIRFLOW AND MINIMUM AIRFLOW SETPOINTS SHALL BE LOWERED (SEE VAV SCHEDULE).

UNOCCUPIED

UNOCCUPIED MODE IS THE NORMAL OPERATING MODE FOR UNOCCUPIED SPACES, OR NIGHTTIME OPERATION. WHEN THE UNIT IS IN UNOCCUPIED MODE, THE VAV CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE AT THE STORED UNOCCUPIED HEATING OR COOLING SETPOINT REGARDLESS OF THE PRESENCE OF A COMMUNICATED SETPOINT. WHEN THE SPACE TEMPERATURE EXCEEDS THE ACTIVE UNOCCUPIED SETPOINT, THE VAV SHALL MODULATE FULLY CLOSED.

OCCUPIED BYPASS

OCCUPIED BYPASS MODE IS USED TO TEMPORARILY PLACE THE UNIT INTO THE OCCUPIED OPERATION. TENANTS SHALL BE ABLE TO OVERRIDE THE UNOCCUPIED MODE FROM THE SPACE SENSOR. THE OVERRIDE SHALL LAST FOR A MAXIMUM OF 4 HOURS (ADJ.). THE TENANTS SHALL BE ABLE TO CANCEL THE OVERRIDE FROM THE SPACE SENSOR AT ANY TIME. DURING THE OVERRIDE, THE UNIT SHALL OPERATE IN OCCUPIED MODE.

HEAT/COOL MODE

THE HEAT/COOL MODE SHALL BE SET BY A COMMUNICATED VALUE OR AUTOMATICALLY BY THE VAV. IN STANDALONE OR AUTO MODE THE VAV SHALL COMPARE THE PRIMARY AIR TEMPERATURE WITH THE CONFIGURED AUTO CHANGEOVER SETPOINT TO DETERMINE IF THE AIR IS "HOT" OR "COLD". HEATING MODE SHALL COMMAND THE VAV TO HEAT ONLY; IT IMPLIES THE PRIMARY AIR TEMPERATURE IS HOT. COOLING MODE SHALL COMMAND THE VAV TO COOL ONLY; IT IMPLIES THE PRIMARY AIR TEMPERATURE IS COLD.

HEAT/COOL SETPOINT

THE SPACE TEMPERATURE SETPOINT SHALL BE DETERMINED EITHER BY A LOCAL (E.G., THUMBWHEEL) SETPOINT, THE VAV DEFAULT SETPOINT, OR A COMMUNICATED VALUE. THE VAV SHALL USE THE LOCALLY STORED DEFAULT SETPOINTS WHEN NEITHER A LOCAL SETPOINT NOR COMMUNICATED SETPOINT IS PRESENT. IF BOTH A LOCAL SETPOINT AND COMMUNICATED SETPOINT EXIST, THE VAV SHALL USE THE COMMUNICATED VALUE.

COOLING MODE

WHEN THE UNIT IS IN COOLING MODE, THE VAV CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE COOLING SETPOINT BY MODULATING THE AIRFLOW BETWEEN THE ACTIVE COOLING MINIMUM AIRFLOW SETPOINT TO THE MAXIMUM COOLING AIRFLOW SETPOINT.

THE VAV SHALL USE THE MEASURED SPACE TEMPERATURE AND THE ACTIVE COOLING SETPOINT TO DETERMINE THE REQUESTED COOLING CAPACITY OF THE UNIT. THE OUTPUTS WILL BE CONTROLLED BASED ON THE UNIT CONFIGURATION AND THE REQUESTED COOLING CAPACITY.

REHEAT CONTROL

REHEAT WILL ONLY BE ALLOWED WHEN THE PRIMARY AIR TEMPERATURE IS 5 DEG F BELOW THE CONFIGURED REHEAT ENABLE SETPOINT OF 70 DEG F (ADJ.). THE REHEAT SHALL BE ENABLED WHEN THE SPACE TEMPERATURE DROPS BELOW THE ACTIVE HEATING SETPOINT AND THE MINIMUM AIRFLOW REQUIREMENTS ARE MET. DURING REHEAT THE VAV SHALL OPERATE AS FOLLOWS:

SILICON CONTROLLED RECTIFIER (SCR) CONTROL OF HEATING COIL

IF THE SPACE TEMPERATURE IS AT THE HEATING SETPOINT, THE ELECTRIC HEATER SHALL MODULATE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT WHILE THE VAV OPERATES AT ITS MINIMUM HEATING AIRFLOW SETPOINT. IF THE DISCHARGE AIR TEMPERATURE REACHES THE DESIGN HEATING DISCHARGE AIR TEMPERATURE SETPOINT OF 65 DEG F (ADJ.), THE VAV SHALL MODULATE AIRFLOW BETWEEN THE MINIMUM HEATING AIRFLOW SETPOINT AND THE MAXIMUM HEATING AIRFLOW SETPOINT AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT, WHILE THE ELECTRIC HEATER MODULATES TO MAINTAIN DISCHARGE AIR TEMPERATURE AT THE DESIGN HEATING DISCHARGE AIR TEMPERATURE SETPOINT. IF THE AIRFLOW REACHES THE MAXIMUM HEATING AIRFLOW SETPOINT, THE VAV SHALL MODULATE THE ELECTRIC HEATER AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT, WHILE THE VAV OPERATES AT ITS MAXIMUM HEATING AIRFLOW SETPOINT

VENTILATION CONTROL (OCCUPANCY AND CO2)

THE BAS SHALL INCLUDE A TIME-OF-DAY SCHEDULE TO INDICATE WHETHER A ZONE IS NORMALLY OCCUPIED OR UNOCCUPIED. WHEN THE SCHEDULE INDICATES THAT THE ZONE IS NORMALLY UNOCCUPIED, THE REQUIRED OUTDOOR AIRFLOW FOR THE ZONE SHALL BE ZERO. WHEN THE SCHEDULE INDICATES THAT THE ZONE IS NORMALLY OCCUPIED, THE REQUIRED OUTDOOR AIRFLOW FOR THE ZONE SHALL EQUAL THE DESIGN OUTDOOR AIRFLOW (BASED ON DESIGN OCCUPANCY). UNLESS THE ZONE IS EQUIPPED WITH AN OCCUPANCY SENSOR AND/OR A CARBON DIOXIDE (CO2) SENSOR.

FOR THOSE ZONES EQUIPPED WITH AN OCCUPANCY SENSOR, THE REQUIRED OUTDOOR AIRFLOW FOR THE ZONE SHALL BE CONTINUOUSLY DETERMINED BASED ON WHETHER PEOPLE ARE PRESENT OR NOT. WHEN THE OCCUPANCY SENSOR INDICATES THAT PEOPLE ARE PRESENT IN THE ZONE, THE REQUIRED OUTDOOR AIRFLOW SHALL EQUAL THE DESIGN OUTDOOR AIRFLOW. WHEN THE OCCUPANCY SENSOR INDICATES THAT NO PEOPLE ARE PRESENT IN THE ZONE, THE REQUIRED OUTDOOR AIRFLOW SHALL EQUAL THE "OCCUPIED STANDBY" OUTDOOR AIRFLOW.

FOR THOSE ZONES EQUIPPED WITH A CO2 SENSOR, THE REQUIRED OUTDOOR AIRFLOW FOR THE ZONE SHALL BE CONTINUOUSLY CALCULATED USING THE MEASURED CO2CONCENTRATION AS AN INDICATOR OF THE CURRENT PER-PERSON VENTILATION RATE.

THE REQUIRED OUTDOOR-AIR FRACTION SHALL BE CONTINUOUSLY CALCULATED FOR EACH VAV TERMINAL ZONE. OUTDOOR-AIR FRACTION IS DEFINED AS THE CURRENT REQUIRED OUTDOOR AIRFLOW FOR THE ZONE DIVIDED BY THE CURRENT PRIMARY AIRFLOW TO THE ZONE. THE BAS SHALL DETERMINE THE HIGHEST ZONE OUTDOOR AIR FRACTION TO DETERMINE MINIMUM REQUIRED OUTDOOR AIRFLOW.

SPACE SENSOR FAILURE

IF THERE IS A FAULT WITH THE OPERATION OF THE ZONE SENSOR, AN ALARM SHALL BE ANNUNCIATED AT THE BAS. SPACE SENSOR FAILURE SHALL CAUSE THE VAV TO DRIVE THE DAMPER TO MINIMUM AIRFLOW IF THE VAV IS IN THE OCCUPIED MODE, OR DRIVE IT CLOSED IF THE VAV IS IN THE UNOCCUPIED MODE.

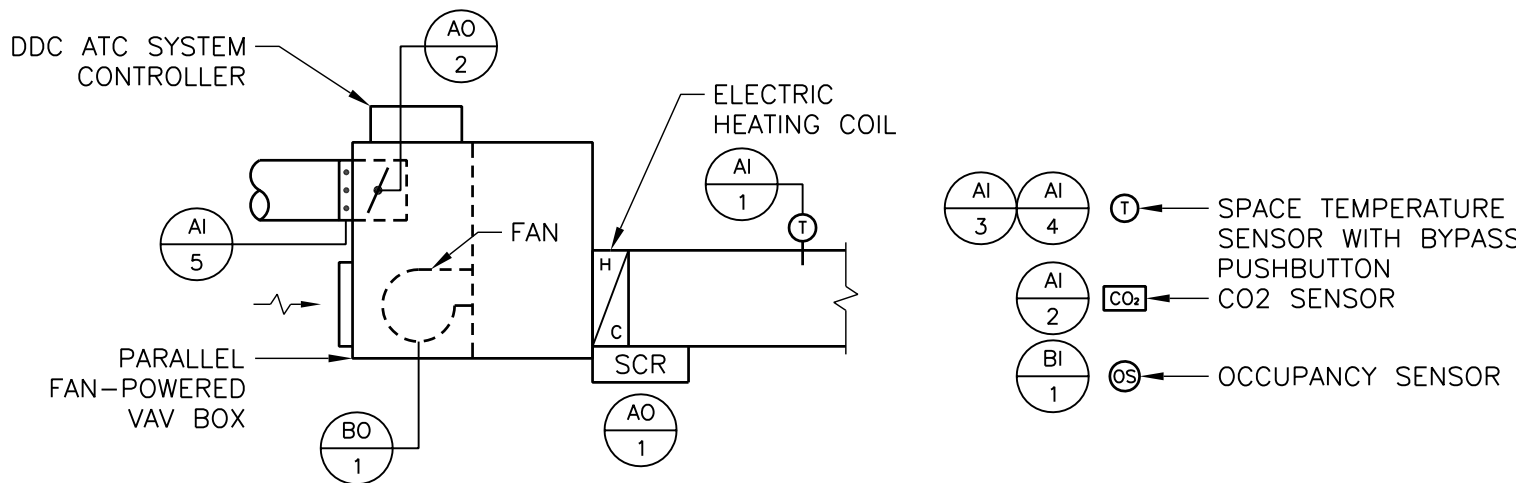
VAV - 1 THROUGH VAV-3 POINT LIST

VAV - 1 THROUGH VAV-3 POINT LIST														
CONTROLLER: UC210 VAV	POINT TYPE							ALARMS						
SYSTEM POINT DESCRIPTION	GRAPHIC	HARDWARE INPUT	HARDWARE OUTPUT	SOFTWARE POINT	HARDWARE INTERLOCK	WIRELESS	NETWORK	DEFAULT VALUE	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL
DISCHARGE AIR TEMPERATURE	X	AI-1							X	X			X	
SPACE CO2 CONCENTRATION LOCAL		AI-2							X	X			X	NOTE 1
SPACE TEMPERATURE LOCAL		AI-3				X			X	X			X	NOTE 2
SPACE TEMPERATURE SETPOINT LOCAL		AI-4				X							X	NOTE 2
VAV AIRFLOW	X	AI-5												
OCCUPANCY INPUT OPEN		BI-1												
SCR HEAT COMMAND	X		AO-1											
AIR VALVE DRIVE COMMAND	X		AO-2											
OCCUPIED COOLING SETPOINT				X				74 deg. F	X	X				
OCCUPIED HEATING SETPOINT				X				71 deg. F	X	X				
OCCUPIED STANDBY COOLING SETPOINT				X				78 deg. F	X	X				
OCCUPIED STANDBY HEATING SETPOINT				X				67 deg. F	X	X				
UNOCCUPIED COOLING SETPOINT				X				85 deg. F						
UNOCCUPIED HEATING SETPOINT				X				60 deg. F						
MINIMUM COOLING AIRFLOW SETPOINT				X										NOTE 3
MAXIMUM COOLING AIRFLOW SETPOINT				X										NOTE 3
MINIMUM HEATING AIRFLOW SETPOINT				X										NOTE 3
MAXIMUM HEATING AIRFLOW SETPOINT				X										NOTE 3
OCCUPIED BYPASS TIMER				X										
BAS COMMUNICATION STATE				X				2 HRS						X
HEATING DISCHARGE AIR TEMP. SETPOINT				X										
GENERAL NOTES														
	1. VAV-2 AND VAV-3 ONLY.													
	2. DISPLAYED AT THE BAS USER INTERFACE IF PRESENT.													
	3. SEE VAV SCHEDULE FOR VALUES.													

SEAL:	PROFESSIONAL CERTIFICATION:  I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF _____.  LICENSE NO.: _____ EXPIRATION DATE: _____	DATE	REVISIONS

OWNER:	ENGINEER:	PROJECT:	DRAWING:	DRAWING NO.:
OWNER	ENGINEER	PROJECT	ATC DIAGRAM	M-604





**1 FAN-POWERED VAV BOX WITH ELECTRIC HEAT CONTROL DIAGRAM**  
M-605  
NO SCALE

SEQUENCE OF OPERATION

BUILDING AUTOMATION SYSTEM INTERFACE

THE BUILDING AUTOMATION SYSTEM (BAS) SHALL SEND THE CONTROLLER OCCUPIED AND UNOCCUPIED COMMANDS. THE BAS MAY ALSO SEND A HEAT/COOL MODE, PRIORITY SHUTDOWN COMMANDS, SPACE TEMPERATURE AND/OR SPACE TEMPERATURE SETPOINT. IF COMMUNICATION IS LOST WITH THE BAS, THE VAV CONTROLLER SHALL OPERATE USING ITS LOCAL SETPOINTS.

OCCUPANCY MODE

THE OCCUPANCY MODE SHALL BE COMMUNICATED TO THE VAV VIA A BINARY INPUT.

OCCUPIED

OCCUPIED MODE IS THE NORMAL OPERATING MODE FOR OCCUPIED SPACES, OR DAYTIME OPERATION. WHEN THE UNIT IS IN THE OCCUPIED MODE, THE VAV SHALL MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE OCCUPIED HEATING OR COOLING SETPOINT. APPLICABLE VENTILATION AND AIRFLOW SETPOINTS SHALL BE ENFORCED. THE OCCUPIED MODE SHALL BE THE DEFAULT MODE OF THE VAV.

OCCUPIED STANDBY

THE OCCUPANCY SENSOR SHALL BE USED TO INDICATE THAT THE SPACE IS UNOCCUPIED, EVEN THOUGH THE BAS HAS SCHEDULED THE SPACE AS OCCUPIED. IN THE OCCUPIED STANDBY MODE, THE ACTIVE COOLING AND HEATING SETPOINTS SHALL BE RELAXED (SEE COOLING AND HEATING MODE) AND BOTH THE VENTILATION AIRFLOW AND MINIMUM AIRFLOW SETPOINTS SHALL BE LOWERED (SEE VAV SCHEDULE).

UNOCCUPIED

UNOCCUPIED MODE IS THE NORMAL OPERATING MODE FOR UNOCCUPIED SPACES, OR NIGHTTIME OPERATION. WHEN THE UNIT IS IN UNOCCUPIED MODE, THE VAV CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE AT THE STORED UNOCCUPIED HEATING OR COOLING SETPOINT REGARDLESS OF THE PRESENCE OF A COMMUNICATED SETPOINT. WHEN THE SPACE TEMPERATURE EXCEEDS THE ACTIVE UNOCCUPIED SETPOINT, THE VAV SHALL MODULATE FULLY CLOSED.

OCCUPIED BYPASS

OCCUPIED BYPASS MODE IS USED TO TEMPORARILY PLACE THE UNIT INTO THE OCCUPIED OPERATION. TENANTS SHALL BE ABLE TO OVERRIDE THE UNOCCUPIED MODE FROM THE SPACE SENSOR. THE OVERRIDE SHALL LAST FOR A MAXIMUM OF 4 HOURS (ADJ.). THE TENANTS SHALL BE ABLE TO CANCEL THE OVERRIDE FROM THE SPACE SENSOR AT ANY TIME. DURING THE OVERRIDE, THE UNIT SHALL OPERATE IN OCCUPIED MODE.

HEAT/COOL MODE

THE HEAT/COOL MODE SHALL BE SET BY A COMMUNICATED VALUE OR AUTOMATICALLY BY THE VAV. IN STANDALONE OR AUTO MODE THE VAV SHALL COMPARE THE PRIMARY AIR TEMPERATURE WITH THE CONFIGURED AUTO CHANGEOVER SETPOINT TO DETERMINE IF THE AIR IS "HOT" OR "COLD". HEATING MODE SHALL COMMAND THE VAV TO HEAT ONLY; IT IMPLIES THE PRIMARY AIR TEMPERATURE IS HOT. COOLING MODE SHALL COMMAND THE VAV TO COOL ONLY; IT IMPLIES THE PRIMARY AIR TEMPERATURE IS COLD.

HEAT/COOL SETPOINT

THE SPACE TEMPERATURE SETPOINT SHALL BE DETERMINED EITHER BY A LOCAL (E.G., THUMBWHEEL) SETPOINT, THE VAV DEFAULT SETPOINT, OR A COMMUNICATED VALUE. THE VAV SHALL USE THE LOCALLY STORED DEFAULT SETPOINTS WHEN NEITHER A LOCAL SETPOINT NOR COMMUNICATED SETPOINT IS PRESENT. IF BOTH A LOCAL SETPOINT AND COMMUNICATED SETPOINT EXIST, THE VAV SHALL USE THE COMMUNICATED VALUE.

COOLING MODE

WHEN THE UNIT IS IN COOLING MODE, THE VAV CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE COOLING SETPOINT BY MODULATING THE AIRFLOW BETWEEN THE ACTIVE COOLING MINIMUM AIRFLOW SETPOINT TO THE MAXIMUM COOLING AIRFLOW SETPOINT.

THE VAV SHALL USE THE MEASURED SPACE TEMPERATURE AND THE ACTIVE COOLING SETPOINT TO DETERMINE THE REQUESTED COOLING CAPACITY OF THE UNIT. THE OUTPUTS WILL BE CONTROLLED BASED ON THE UNIT CONFIGURATION AND THE REQUESTED COOLING CAPACITY.

INTERMITTENT FAN CONTROL

DURING ALL OCCUPIED MODES, AS THE SPACE TEMPERATURE FALLS BELOW THE ACTIVE COOLING SETPOINT, THE VAV SHALL MODULATE TO ITS MINIMUM COOLING AIRFLOW SETPOINT. UPON A CONTINUED DROP IN TEMPERATURE AND/OR UNIT AIRFLOW, THE PARALLEL FAN SHALL BE ENERGIZED. DURING THE UNOCCUPIED MODE, THE PRIMARY AIR VALVE SHALL MODULATE FULLY CLOSED. THE TERMINAL FAN SHALL CYCLE AS NEEDED TO MAINTAIN A REDUCED SPACE TEMPERATURE.

REHEAT CONTROL

REHEAT WILL ONLY BE ALLOWED WHEN THE PRIMARY AIR TEMPERATURE IS 5 DEG F BELOW THE CONFIGURED REHEAT ENABLE SETPOINT OF 70 DEG F (ADJ.). THE REHEAT SHALL BE ENABLED WHEN THE SPACE TEMPERATURE DROPS BELOW THE ACTIVE HEATING SETPOINT AND THE MINIMUM AIRFLOW REQUIREMENTS ARE MET. DURING REHEAT THE VAV SHALL OPERATE AS FOLLOWS:

SILICON CONTROLLED RECTIFIER (SCR) CONTROL OF HEATING COIL

IF THE SPACE TEMPERATURE IS AT THE HEATING SETPOINT, THE ELECTRIC HEATER SHALL MODULATE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT WHILE THE VAV OPERATES AT ITS MINIMUM HEATING AIRFLOW SETPOINT. IF THE DISCHARGE AIR TEMPERATURE REACHES THE DESIGN HEATING DISCHARGE AIR TEMPERATURE SETPOINT OF 85 DEG F (ADJ.), THE VAV SHALL MODULATE AIRFLOW BETWEEN THE MINIMUM HEATING AIRFLOW SETPOINT AND THE MAXIMUM HEATING AIRFLOW SETPOINT AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT, WHILE THE ELECTRIC HEATER MODULATES TO MAINTAIN DISCHARGE AIR TEMPERATURE AT THE DESIGN HEATING DISCHARGE AIR TEMPERATURE SETPOINT. IF THE AIRFLOW REACHES THE MAXIMUM HEATING AIRFLOW SETPOINT, THE VAV SHALL MODULATE THE ELECTRIC HEATER AS REQUIRED TO MAINTAIN SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT, WHILE THE VAV OPERATES AT ITS MAXIMUM HEATING AIRFLOW SETPOINT

VENTILATION CONTROL (OCCUPANCY AND CO2)

THE BAS SHALL INCLUDE A TIME-OF-DAY SCHEDULE TO INDICATE WHETHER A ZONE IS NORMALLY OCCUPIED OR UNOCCUPIED. WHEN THE SCHEDULE INDICATES THAT THE ZONE IS NORMALLY UNOCCUPIED, THE REQUIRED OUTDOOR AIRFLOW FOR THE ZONE SHALL BE ZERO. WHEN THE SCHEDULE INDICATES THAT THE ZONE IS NORMALLY OCCUPIED, THE REQUIRED OUTDOOR AIRFLOW FOR THE ZONE SHALL EQUAL THE DESIGN OUTDOOR AIRFLOW (BASED ON DESIGN OCCUPANCY), UNLESS THE ZONE IS EQUIPPED WITH AN OCCUPANCY SENSOR AND/OR A CARBON DIOXIDE (CO2) SENSOR.

FOR THOSE ZONES EQUIPPED WITH AN OCCUPANCY SENSOR, THE REQUIRED OUTDOOR AIRFLOW FOR THE ZONE SHALL BE CONTINUOUSLY DETERMINED BASED ON WHETHER PEOPLE ARE PRESENT OR NOT. WHEN THE OCCUPANCY SENSOR INDICATES THAT PEOPLE ARE PRESENT IN THE ZONE, THE REQUIRED OUTDOOR AIRFLOW SHALL EQUAL THE DESIGN OUTDOOR AIRFLOW. WHEN THE OCCUPANCY SENSOR INDICATES THAT NO PEOPLE ARE PRESENT IN THE ZONE, THE REQUIRED OUTDOOR AIRFLOW SHALL EQUAL THE "OCCUPIED STANDBY" OUTDOOR AIRFLOW.

FOR THOSE ZONES EQUIPPED WITH A CO2 SENSOR, THE REQUIRED OUTDOOR AIRFLOW FOR THE ZONE SHALL BE CONTINUOUSLY CALCULATED USING THE MEASURED CO2CONCENTRATION AS AN INDICATOR OF THE CURRENT PER-PERSON VENTILATION RATE.

THE REQUIRED OUTDOOR-AIR FRACTION SHALL BE CONTINUOUSLY CALCULATED FOR EACH VAV TERMINAL ZONE. OUTDOOR-AIR FRACTION IS DEFINED AS THE CURRENT REQUIRED OUTDOOR AIRFLOW FOR THE ZONE DIVIDED BY THE CURRENT PRIMARY AIRFLOW TO THE ZONE. THE BAS SHALL DETERMINE THE HIGHEST ZONE OUTDOOR AIR FRACTION TO DETERMINE MINIMUM REQUIRED OUTDOOR AIRFLOW.

SPACE SENSOR FAILURE

IF THERE IS A FAULT WITH THE OPERATION OF THE ZONE SENSOR, AN ALARM SHALL BE ANNUNCIATED AT THE BAS. SPACE SENSOR FAILURE SHALL CAUSE THE VAV TO DRIVE THE DAMPER TO MINIMUM AIRFLOW IF THE VAV IS IN THE OCCUPIED MODE, OR DRIVE IT CLOSED IF THE VAV IS IN THE UNOCCUPIED MODE. THE PARALLEL FAN SHALL BE DISABLED ALONG WITH THE REHEAT.

FPVAV-1 POINT LIST

FPVAV-1 POINT LIST																
CONTROLLER: UC210 VAV	POINT TYPE								ALARMS							
SYSTEM POINT DESCRIPTION																
	GRAPHIC	HARDWARE INPUT	HARDWARE OUTPUT	SOFTWARE POINT	HARDWARE INTERLOCK	WIRELESS	NETWORK	DEFAULT VALUE	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL	DIAGNOSTICS	NOTES
DISCHARGE AIR TEMPERATURE	X	AI-1							X	X			X			
SPACE CO2 CONCENTRATION LOCAL		AI-2							X	X			X			
SPACE TEMPERATURE LOCAL		AI-3				X			X	X			X			NOTE 1
SPACE TEMPERATURE SETPOINT LOCAL		AI-4				X							X			NOTE 1
VAV AIRFLOW	X	AI-5														
OCCUPANCY INPUT OPEN		BI-1														
SCR HEAT COMMAND	X		AO-1													
AIR VALVE DRIVE COMMAND	X		AO-2													
FAN OUTPUT	X		BO-1													
OCCUPIED COOLING SETPOINT				X				74 deg. F	X	X						
OCCUPIED HEATING SETPOINT				X				71 deg. F	X	X						
OCCUPIED STANDBY COOLING SETPOINT				X				78 deg. F	X	X						
OCCUPIED STANDBY HEATING SETPOINT				X				67 deg. F	X	X						
UNOCCUPIED COOLING SETPOINT				X				85 deg. F								
UNOCCUPIED HEATING SETPOINT				X				60 deg. F								
MINIMUM COOLING AIRFLOW SETPOINT				X												NOTE 2
MAXIMUM COOLING AIRFLOW SETPOINT				X												NOTE 2
MINIMUM HEATING AIRFLOW SETPOINT				X												NOTE 2
MAXIMUM HEATING AIRFLOW SETPOINT				X												NOTE 2
OCCUPIED BYPASS TIMER				X												
BAS COMMUNICATION STATE				X				2 HRS						X		NOTE 1
HEATING DISCHARGE AIR TEMP. SETPOINT				X												NOTE 2
GENERAL NOTES																
	1. DISPLAYED AT THE BAS USER INTERFACE IF PRESENT.															
	2. SEE VAV SCHEDULE FOR VALUES.															

SEAL:	PROFESSIONAL CERTIFICATION:  I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF _____.  LICENSE NO.: _____ EXPIRATION DATE: _____	DATE	REVISIONS

OWNER:	ENGINEER:	PROJECT:	DRAWING:	DRAWING NO.:
OWNER	ENGINEER	PROJECT	ATC DIAGRAM	M-605