ABBREVIATIONS

(A)	ABANDON	DTR	DUAL TEMPERATURE WATER RETURN	IN	INCHES	RHS	REHEAT WATER SUPPLY
AAV	AUTOMATIC AIR VENT	DTS	DUAL TEMPERATURE WATER SUPPLY	INCL	INCLUD(E), (ING)	RL	REFRIGERANT LIQUID
AC	AIR CONDITIONER	DWG	DRAWING	INSL	INSULAT(E), (ED), (ION)	RP	RADIANT PANEL
ABS	ABSOLUTE	(E)	EXISTING	INT	INTERIOR	RPM	REVOLUTIONS PER MINUTE
ABV	ABOVE	EA	EXHAUST AIR	I/O	INPUT/OUTPUT	RS	REFRIGERANT SUCTION
AD	ACCESS DOOR	EAT	ENTERING AIR TEMPERATURE	IPS	INTERNATIONAL PIPE STANDARD	RTU	ROOFTOP UNIT
AFF	ABOVE FINISHED FLOOR	EBH	ELECTRIC BASEBOARD HEATER	KW	KILOWATT	RV	RELIEF VALVE
AFS	AIR FLOW STATION	EC	ELECTRICAL CONTRACTOR	L	LOUVER OR LENGTH	SA	SUPPLY AIR
AHU	AIR HANDLING UNIT	EER	ENERGY EFFICIENCY RATIO	LAT	LEAVING AIR TEMP	SD	SUPPLY DIFFUSER
AI	ANALOG INPUT	EF	EXHAUST FAN	LB	POUND	SEC	SECONDS
AO	ANALOG OUTPUT	EG	EXHAUST AIR GRILLE	LD	LINEAR DIFFUSER	SF	SUPPLY FAN
AP	ACCESS PANEL	EHC	ELECTRIC HEATING COIL	LF	LINEAR FEET	SG	SUPPLY GRILLE
APD	AIR PRESSURE DROP	ELEC	ELECTRICAL	LPG	LIQUEFIED PETROLEUM GAS	SP	STATIC PRESSURE
ATC	AUTOMATIC TEMPERATURE CONTROL	ELEV	ELEVATION	LPR	LOW PRESSURE STEAM CONDENSATE RETURN	SQ	SQUARE
ATM	ATMOSPHERE	ENT	ENTERING	LPS	LOW PRESSURE STEAM	SR	SUPPLY REGISTER
AS	AIR SEPARATOR	EQUIP	EQUIPMENT	LVG	LEAVING	ST	SOUND TRAP
AVG	AVERAGE	ER	EXHAUST REGISTER	LVR	LOUVER	STC	STEAM CONDENSATE
AWT	AVERAGE WATER TEMPERATURE	ERU	ENERGY RECOVERY UNIT	LWT	LEAVING WATER TEMP	STM	STEAM
BCU	BLOWER COIL UNIT	ESP	EXTERNAL STATIC PRESSURE	MAU	MAKEUP AIR UNIT	TDH	TOTAL DYNAMIC HEAD
BDD	BACK DRAFT DAMPER	ET	EXPANSION TANK	MAV	MANUAL AIR VENT	TDV	TRIPLE DUTY VALVE
BFP	BACKFLOW PREVENTER	EWH	ELECTRIC WALL HEATER	MAX	MAXIMUM	TG	TRANSFER GRILLE
BFW	BOILER FEEDWATER	EWT	ENTERING WATER TEMPERATURE	MBH	1,000 BTUH	TSP	TOTAL STATIC PRESSURE
BFWP	BOILER FEEDWATER PUMP	EXP	EXPANSION	MC	MECHANICAL CONTRACTOR	TYP	TYPICAL
BI	BINARY INPUT	F	FAHRENHEIT	MECH	MECHANICAL	UC	UNDER CUT
BLR	BOILER	FA	FACE AREA	MIN	MINIMUM	UH	UNIT HEATER
BLW	BELOW	FBD	FACE & BYPASS DAMPER	MISC	MISCELLANEOUS	UNO	UNLESS NOTED OTHERWISE
BNR	BURNER	F&T	FLOAT & THERMOSTATIC	(N)	NEW	UV	UNIT VENTILATOR
BO	BINARY OUTPUT	FC	FLEXIBLE CONNECTION	NC	NOISE CRITERIA	VA	VOLT AMPERE
BOD	BOTTOM OF DUCT	FCU	FAN COIL UNIT	NK	NECK	VAV	VARIABLE AIR VOLUME
BOP	BOTTOM OF PIPE	FD	FIRE DAMPER	NTS	NOT TO SCALE	VB	VACUUM BREAKER
BTU	BRITISH THERMAL UNIT	FF	FINAL FILTER	OA	OUTSIDE AIR	VD	VOLUME DAMPER
BTUH	BTU PER HOUR	FIN	FINISH	OAD	OUTSIDE AIR DAMPER	VEL	VELOCITY
BYP	BYPASS	FLR	FLOOR	OAI	OUTSIDE AIR INTAKE	VFD	VARIABLE FREQUENCY DRIVE
C	CONVECTOR	FO	FUEL OIL	OAT	OUTSIDE AIR TEMPERATURE	VP	VELOCITY PRESSURE
CAP	CAPACITY	FOP	FUEL OIL PUMP	OD	OUTSIDE DIMENSIONS OR OUTSIDE DIAMETER	W	WIDTH
CAV	CONSTANT AIR VOLUME	FOR	FUEL OIL RETURN	OED	OPEN END DUCT	W/	WITH
CC	COOLING COIL OR CEILING CASSETTE	FOS	FUEL OIL SUPPLY	OS&Y	OUTSIDE SCREW & YOKE	WB	WET BULB
CD	CONDENSATE DRAIN	FOV	FUEL OIL VENT	P	PUMP	W/O	WITHOUT
CFM	CUBIC FEET PER MINUTE	FTR	FINNED TUBE RADIATION	PD	PRESSURE DROP	WC	WATER COLUMN
CH	CHILLER	G	NATURAL GAS	PF	PRE FILTER	WH	WATER HEATER
CHWP	CHILLED WATER PUMP	GAL	GALLON	PH	PHASE	WMS	WIRE MESH SCREEN
CHWR	CHILLED WATER RETURN	GC	GENERAL CONTRACTOR	PHC	PREHEAT COIL	WT	WEIGHT
CHWS	CHILLED WATER SUPPLY	GPH	GALLONS PER HOUR	PHR	PREHEAT WATER RETURN		
CKT	CIRCUIT	GPM	GALLONS PER MINUTE	PHS	PREHEAT WATER SUPPLY		
CLG	CEILING	GRV	GRAVITY RELIEF VENTILATOR	PLMB	PLUMBING		
CONT	CONTINUATION	H	HUMIDIFIER	PPM	PARTS PER MILLION		
COP	COEFFICIENT OF PERFORMANCE	HC	HEATING COIL	PRV	PRESSURE REDUCING VALVE		
CP	CONDENSATE PUMP	HOA	HAND OFF AUTO	PSI	POUNDS PER SQUARE INCH		
CRP	CONDENSATE RETURN PUMP	HORIZ	HORIZONTAL	PSIA	POUNDS PER SQUARE INCH ABSOLUTE		
CT	COOLING TOWER	HP	HEAT PUMP OR HORSEPOWER	PSIG	POUNDS PER SQUARE INCH GAUGE		
CU	CONDENSING UNIT	HPLR	HEAT PUMP WATER LOOP RETURN	PTAC	PACKAGED TERMINAL AIR CONDITIONER		
CUH	CABINET UNIT HEATER	HPLS	HEAT PUMP WATER LOOP SUPPLY	PUH	PROPELLER UNIT HEATER		
CW	COLD WATER (DOMESTIC)	HPR	HIGH PRESSURE STEAM CONDENSATE RETURN	PVC	POLYVINYL CHLORIDE		
CWP	CONDENSER WATER PUMP	HPS	HIGH PRESSURE STEAM	QTY	QUANTITY		
CWR	CONDENSER WATER RETURN	HR	HOUR	(R)	REMOVE		
CWS	CONDENSER WATER SUPPLY	HT	HEIGHT	RA	RETURN AIR		
DB	DRY BULB TEMPERATURE	HW	HOT WATER	RAG	RELIEF AIR GRILLE		
DDC	DIRECT DIGITAL CONTROL	HWP	HOT WATER PUMP	RAV	RELIEF AIR VENT		
DEG	DEGREE	HWR	HEATING HOT WATER RETURN	(REL)	RELOCATE		
DIA	DIAMETER	HWS	HEATING HOT WATER SUPPLY	RF	RETURN FAN		
DN	DOWN	HZ	HERTZ	RG	RETURN GRILLE		
DOAS	DEDICATED OUTSIDE AIR SYSTEM	ID	INSIDE DIMENSIONS OR INSIDE DIAMETER	RH	RELATIVE HUMIDITY		
DS	DUCT SILENCER	IL	INTERNALLY LINED	RHR	REHEAT WATER RETURN		

GENERAL NOTES

1. THE FOLLOWING NOTES APPLY TO ALL MECHANICAL DRAWINGS.
2. ALL WORK SHALL BE IN ACCORDANCE WITH THE INTERNATIONAL MECHANICAL CODE 2021 AND ALL OTHER APPLICABLE CODES AND STANDARDS.
3. MECHANICAL CONTRACTOR SHALL ENSURE 36" MIN. CLEARANCE IN FRONT OF ALL ACCESS PANELS.
4. ALL DRAWINGS ARE DIAGRAMMATIC. MECHANICAL CONTRACTOR SHALL CAREFULLY EXAMINE EXISTING CONDITIONS PRIOR TO STARTING WORK.
5. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS, SIZES, CLEARANCES AND LOCATIONS PRIOR TO THE START OF CONSTRUCTION. WHEN CONFLICTS ARISE, MAKE ANY NECESSARY CHANGES TO ROUTING OF DUCTWORK AND PIPING AT NO ADDITIONAL COST.
6. ALL FLOOR MOUNTED HVAC EQUIPMENT SHALL BE INSTALLED ON 4" HIGH CONCRETE HOUSEKEEPING PADS PROVIDED BY THE MECHANICAL CONTRACTOR.
7. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING COORDINATION DRAWINGS SHOWING ALL TRADES. NO EQUIPMENT, PIPING, DUCTWORK, ETC. IS TO BE INSTALLED WITHOUT APPROVAL BY THE ENGINEER.
8. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
9. SCHEDULES DO NOT REPRESENT EQUIPMENT QUANTITIES. REFER TO THE PLANS FOR ACTUAL QUANTITIES.
10. DUCT SIZES SHOWN ON DRAWINGS REFER TO INSIDE CLEAR DIMENSIONS UNLESS OTHERWISE NOTED.
11. ALL BRANCH DUCTS TO SUPPLY/RETURN/EXHAUST REGISTERS AND DIFFUSERS SHALL BE 2" LARGER (WIDER) THAN REGISTER/DIFFUSER NECK SIZE, UNLESS NOTED OTHERWISE.
12. MECHANICAL CONTRACTOR SHALL PROVIDE FLEXIBLE CONNECTIONS AT ALL DUCTWORK TO EQUIPMENT CONNECTIONS.
13. PROVIDE SUPPLY, RETURN AND EXHAUST DUCTWORK TRANSITIONS AS REQUIRED BY THE PLANS, SPECIFICATIONS, AND ACTUAL JOB CONDITIONS.
14. COORDINATE ALL THERMOSTAT/TEMPERATURE SENSOR LOCATIONS WITH THE ARCHITECT PRIOR TO INSTALLATION.
15. COORDINATE ALL HUMIDISTAT/HUMIDITY SENSOR LOCATIONS WITH THE ARCHITECT PRIOR TO INSTALLATION.
16. MECHANICAL CONTRACTOR SHALL PROVIDE "UL" LISTED FIRE DAMPERS FOR ALL DUCTWORK PENETRATIONS THROUGH FIRE RATED SURFACES AND "UL" LISTED FIRE/SMOKE DAMPERS FOR ALL DUCTWORK PENETRATIONS THROUGH FIRE/SMOKE RATED SURFACES.
17. MECHANICAL CONTRACTOR SHALL PROVIDE "UL" LISTED THROUGH PENETRATION FIRESTOP SYSTEMS WITH FIREPROOF SLEEVES AT ALL NEW PIPING PENETRATIONS THRU FIRE RATED WALLS AND FLOORS.
18. INDICATED DUCT AND PIPING ARE DIAGRAMMATIC. MECHANICAL CONTRACTOR SHALL DETERMINE ALL REQUIRED OFFSETS AND DIRECTION CHANGES BEFORE FABRICATION AND INSTALLATION TO AVOID INTERFERENCE WITH OTHER TRADES.
19. UNLESS OTHERWISE NOTED, ALL DUCTWORK AND PIPING IS OVERHEAD, TIGHT TO UNDERSIDE OF SLAB/STEEL, WITH SPACE FOR INSULATION.
20. MANUFACTURERS AND MODEL NUMBERS INDICATED ON THE PLANS, SCHEDULES AND SKETCHES ARE PROVIDED AS A BASIS OF DESIGN ONLY. BIDDERS SHALL REFER TO THE SPECIFICATIONS FOR A LISTING OF MULTIPLE ACCEPTABLE MANUFACTURERS FOR EACH OF THESE ITEMS. SIMILAR PRODUCTS FROM ANY OF THESE MANUFACTURERS MAY BE FURNISHED PROVIDED THEY MEET THE INTENT OF THE SPECIFICATIONS. ANY CHANGES TO THE DESIGN REQUIRED AS A RESULT OF A SUBSTITUTION ARE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.
21. PROVIDE P-TRAP OF SUFFICIENT SEAL DEPTH TO OVERCOME UNIT STATIC PRESSURE ON ALL AIR HANDLING UNITS.
22. REFER TO ELECTRICAL DRAWINGS FOR SMOKE DETECTOR LOCATIONS.

LIST OF DRAWINGS

M001	MECHANICAL COVER SHEET
MD101	MECHANICAL DEMOLITION PLAN
M101	MECHANICAL DUCT NEW WORK PLANS
M201	MECHANICAL PIPING NEW WORK PLANS
M301	MECHANICAL SCHEDULES
M302	MECHANICAL SCHEDULES
M401	MECHANICAL CONTROLS
M402	MECHANICAL CONTROLS
M501	MECHANICAL DETAILS
M502	MECHANICAL DETAILS
M503	MECHANICAL DETAILS

SYMBOL LEGEND

- SF / 1 — EQUIPMENT MARKER (TYPE SF, NUMBER 1)
- 1 / M301 — SECTION INDICATOR (SECTION 1 ON DWG M301)
- 1 / M501 — DETAIL INDICATOR (DETAIL 1 ON DWG M501)
- 1 OR 1 — KEY NOTE INDICATOR (REFERS TO NOTES ON SAME SHEET)
- 14x12 — INSIDE DUCT DIMENSIONS (IN INCHES, FIRST DIM AS VIEWED) DASHED LINED INDICATES INTERNAL LINING
- RECTANGULAR SUPPLY DUCT TURNED UP
- RECTANGULAR SUPPLY DUCT TURNED DOWN
- ROUND DUCT TURNED UP
- ROUND DUCT TURNED DOWN
- RECTANGULAR RETURN/EXHAUST DUCT TURNED UP
- RECTANGULAR RETURN/EXHAUST DUCT TURNED DOWN
- SQUARE ELBOW WITH TURNING VANE
- ROUND ELBOW OR RADIUS ELBOW
- OGEE OFFSET
- MITRE OFFSET
- FLEXIBLE DUCT CONNECTION
- BELLMOUTH TAKE-OFF
- DUCT TO OFFSET UP IN DIRECTION OF ARROW TO AVOID OBSTRUCTION
- FLEXIBLE DUCT
- F — FIRE DAMPER
- S — SMOKE DAMPER
- B — BACKDRAFT DAMPER
- M — MOTORIZED ATC DAMPER
- C — COMBINATION FIRE/SMOKE DAMPER
- MANUAL VOLUME DAMPER
- A / 8"ø 200 S — GRILLE, REGISTER, DIFFUSER (GRD) MARKER (TAG A, 8"ø NECK, 200 CFM) S=SUPPLY R=RETURN E=EXHAUST T=TRANSFER
- SUPPLY AIR DIFFUSER (BLACK TRIANGLE INDICATES BLANK-OFF)
- SUPPLY AIR DIFFUSER W/RIGID ELBOW AT NECK
- RETURN/EXHAUST GRILLE OR REGISTER
- BALL VALVE
- LOCKSHIELD BALL VALVE
- BUTTERFLY VALVE
- GATE VALVE
- OS&Y GATE VALVE
- GLOBE VALVE
- PLUG VALVE
- 3-WAY CONTROL VALVE
- 2-WAY CONTROL VALVE
- PRESSURE REDUCING VALVE
- GAS PRESSURE REGULATOR
- CHECK VALVE
- C — CALIBRATED BALANCING VALVE
- A — AUTOMATIC FLOW CONTROL VALVE
- TDV — TRIPLE DUTY VALVE (COMBINATION CHECK, BALANCING, SHUTOFF)
- PIPE ANCHOR
- PIPE GUIDE
- PIPE EXPANSION JOINT/EXPANSION COMPENSATOR
- FS — FLOW SWITCH
- PS — PRESSURE SWITCH
- VENTURI FLOW MEASURING DEVICE
- PITOT DEVICE
- PIPE REDUCER
- PIPE FLANGE
- PIPE UNION
- Y-TYPE STRAINER
- FUNNEL DRAIN
- RELIEF VALVE
- AIR VENT
- THERMOMETER IN THERMOWELL
- PRESSURE GAUGE W/SHUTOFF COCK
- PRESSURE GAUGE W/SNUBBER AND SHUTOFF COCK
- PRESSURE GAUGE W/SYPHON AND SHUTOFF COCK
- TEMPERATURE AND PRESSURE PORT
- FLEXIBLE PIPE CONNECTION
- PIPE CAP
- PIPE TURNED DOWN
- PIPE TURNED UP
- TEE TURNED DOWN
- TEE TURNED UP
- CHWS — CHILLED WATER SUPPLY PIPE
- CHWR — CHILLED WATER RETURN PIPE
- CWS — CONDENSER WATER SUPPLY PIPE
- CWR — CONDENSER WATER RETURN PIPE
- DTS — DUAL TEMPERATURE SUPPLY PIPE
- DTR — DUAL TEMPERATURE RETURN PIPE
- HPLS — HEAT PUMP LOOP SUPPLY PIPE
- HPLR — HEAT PUMP LOOP RETURN PIPE
- HPS — HIGH PRESSURE STEAM SUPPLY PIPE
- HPR — HIGH PRESSURE STEAM RETURN PIPE
- HWS — HOT WATER SUPPLY PIPE
- HWR — HOT WATER RETURN PIPE
- FOS — FUEL OIL SUPPLY PIPE
- FOR — FUEL OIL RETURN PIPE
- LPS — LOW PRESSURE STEAM SUPPLY PIPE
- LPR — LOW PRESSURE STEAM RETURN PIPE
- PC — PUMPED STEAM CONDENSATE
- CD — COOLING COIL CONDENSATE DRAIN
- PHS — PREHEAT SUPPLY PIPE
- PHR — PREHEAT RETURN PIPE
- RHS — REHEAT SUPPLY PIPE
- RHR — REHEAT RETURN PIPE
- PUMP
- T — THERMOSTAT/TEMPERATURE SENSOR
- H — HUMIDITY SENSOR
- SP — STATIC PRESSURE SENSOR
- S — CARBON DIOXIDE SENSOR
- UC — DOOR TO BE UNDERCUT 3/4"
- DENOTES CONNECT TO EXISTING
- DENOTES LIMIT OF DEMOLITION
- EXISTING WORK TO REMAIN
- WORK TO BE REMOVED
- NEW WORK

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HSA PROJECT # :26-004

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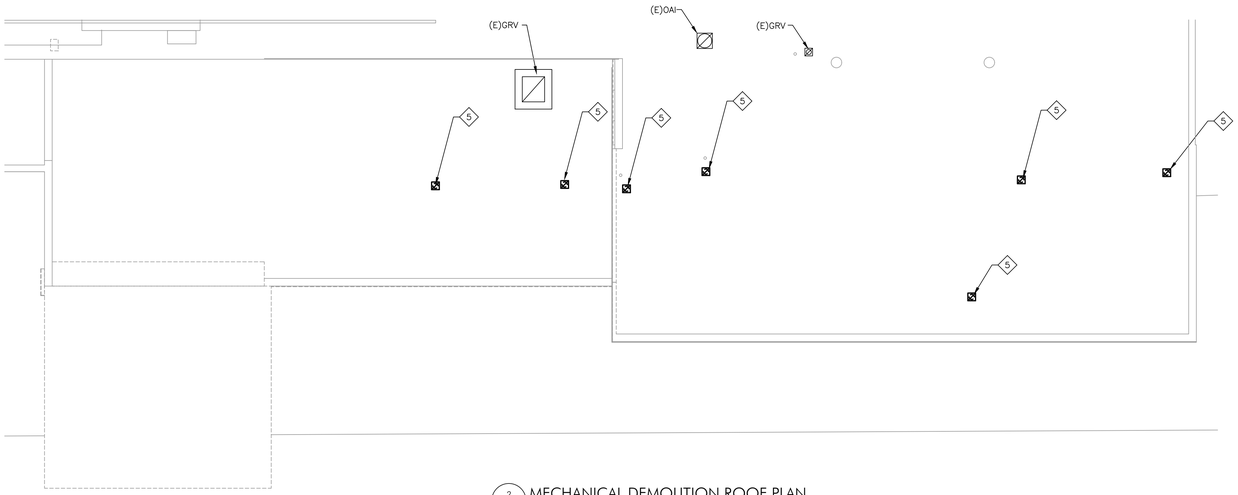
MECHANICAL COVER SHEET

DRAWING NUMBER

M001

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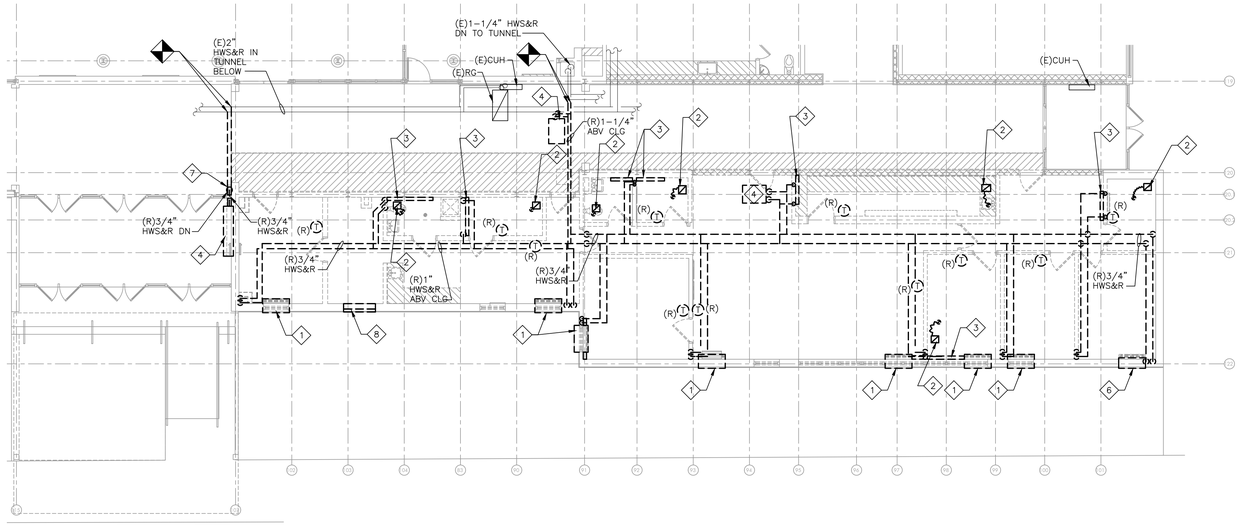
2 MD101 MECHANICAL DEMOLITION ROOF PLAN
SCALE:1/8"=1'-0"

GENERAL NOTES:

1. REFER TO M0-1 FOR FURTHER GENERAL DEMOLITION NOTES.
2. TEMPORARILY REMOVE AND REINSTALL CEILING TILES & GRID AS REQUIRED FOR WORK ABOVE CEILINGS.
3. PROVIDE ALL ASSOCIATED HOT WATER SYSTEM ISOLATION, DRAINAGE AND RE-FILLING AS REQUIRED FOR WORK ON DRAWINGS AND SPECIFICATIONS. DO NOT ASSUME THAT THE ISOLATION VALVES SHOWN WILL HOLD.

DEMOLITION KEY NOTES:

1. REMOVE PTAC UNIT IN ITS ENTIRETY, INCLUDING BUT NOT LIMITED TO, HOT WATER PIPING, WALL BOX, LOUVER AND CONTROLS. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING WALL TO MATCH EXISTING.
2. REMOVE CEILING EXHAUST FAN AND ASSOCIATED DUCTWORK UP TO ROOF CAP ABOVE, HANGERS & SUPPORTS AND CONTROLS.
3. REMOVE FINNED TUBE RADIATION AND ASSOCIATED BRANCH PIPING AND CONTROLS. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF WALLS AND FLOOR.
4. REMOVE CABINET UNIT HEATER IN ITS ENTIRETY, INCLUDING BUT NOT LIMITED TO, ASSOCIATED & HOT WATER PIPING TO LIMITS SHOWN, HANGERS & SUPPORTS AND CONTROLS.
5. REMOVE ROOF CAP AND ASSOCIATED CURB. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING OF ROOF.
6. REMOVE PTAC WALL BOX AND LOUVER. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING WALL TO MATCH EXISTING.
7. TEMPORARY REMOVE AND REINSTALL PIPE COVER AS REQUIRED FOR DEMOLITION AND INSTALLATION OF NEW PIPING.
8. REMOVE ABANDONED LOUVER AND WALLBOX. REFER TO ARCHITECTURAL DRAWINGS FOR PATCHING WALL.



1 MD101 MECHANICAL DEMOLITION FLOOR PLAN
SCALE:1/8"=1'-0"

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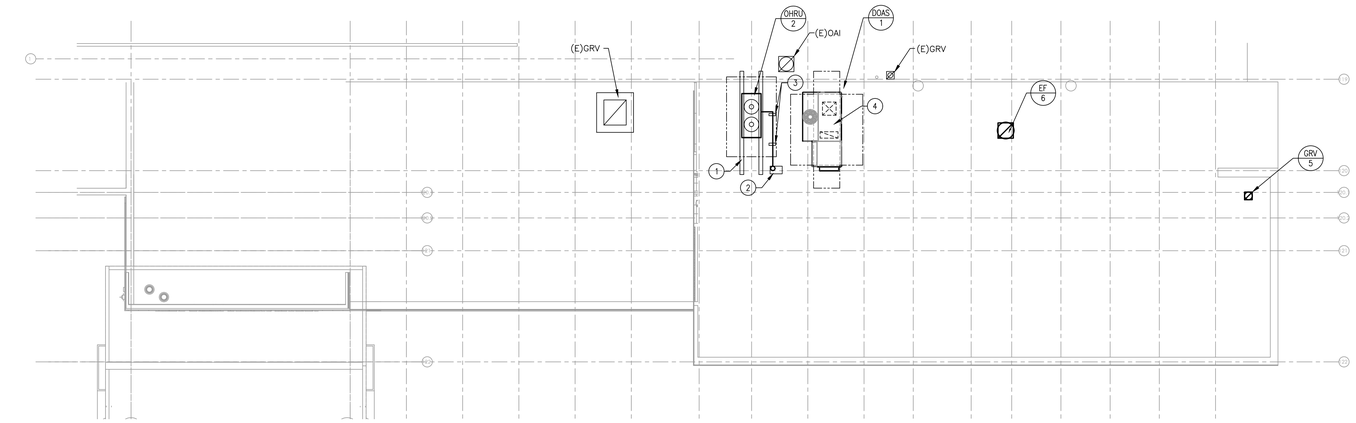
MECHANICAL DEMOLITION PLAN

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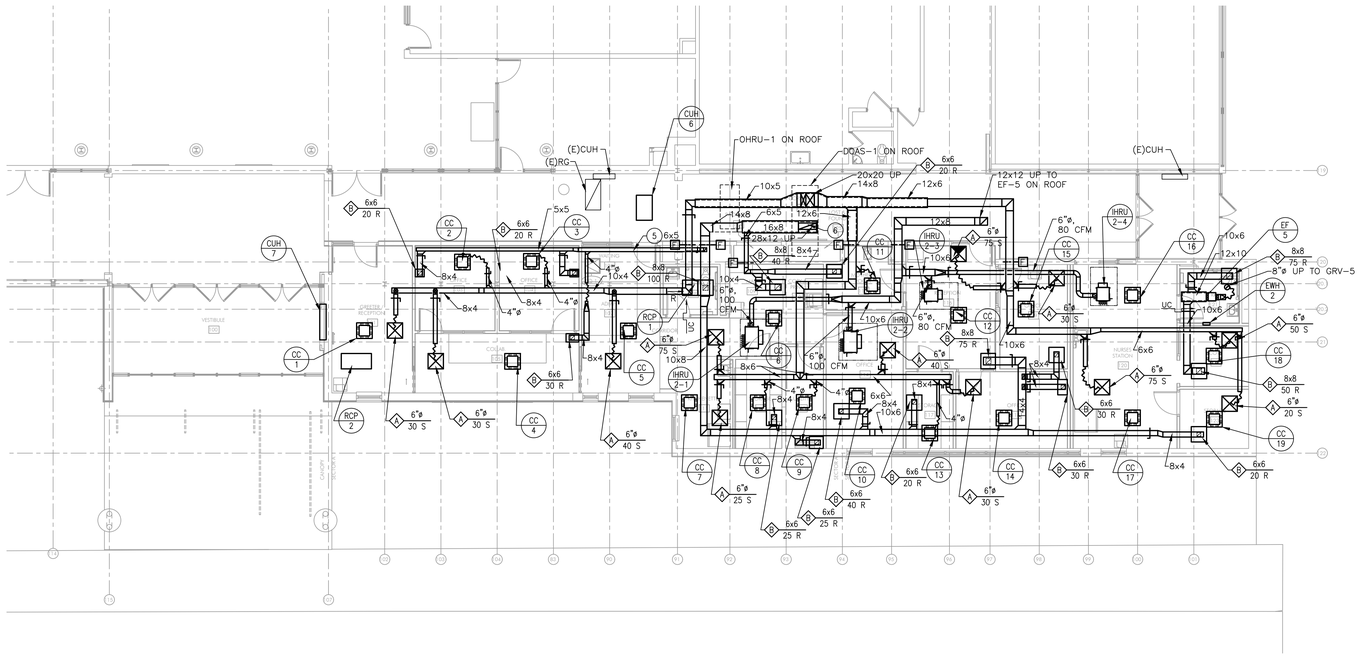
MD101

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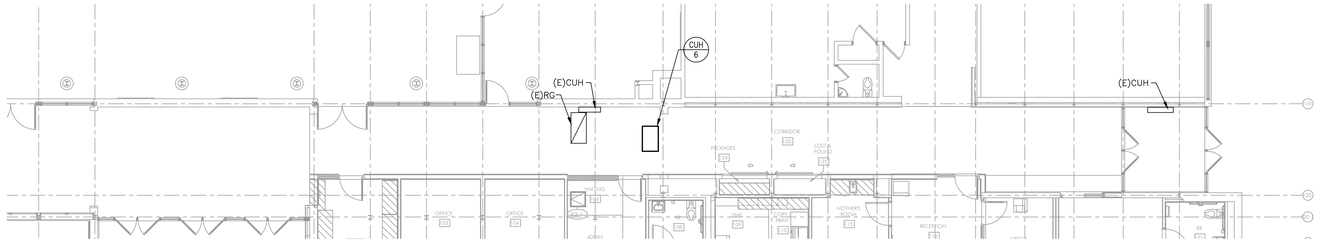
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2 M101 MECHANICAL -NEW WORK ROOF PLAN
SCALE:1/8"=1'-0"



1 M101 MECHANICAL DUCT-NEW WORK FLOOR PLAN (BASE-BID)
SCALE:1/8"=1'-0"



3 M101 MECHANICAL DUCT-NEW WORK FLOOR PLAN (ALTERNATE-BID)
SCALE:1/8"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR FURTHER GENERAL NOTES.
2. PROVIDE MINIMUM 1ST 15 FT OF DUCTWORK UPSTREAM AND DOWNSTREAM OF ALL DOAS WITH 1" THICK ACOUSTICAL LINING.
3. PROVIDE ALL EXPOSED DUCTWORK IN PAINTABLE GALVANNEAL SHEET METAL. DUCTWORK SHALL BE SHOP PRIMED AND FIELD PAINTED BY GC IN CUSTOM COLOR CHOSEN BY THE ARCHITECT. ALL EXPOSED DUCTWORK SHALL BE INTERNALLY LINED.
4. ALL EXTERIOR WALL PENETRATIONS REQUIRED FOR MECHANICAL WORK TO BE MADE BY THE GC. REFER TO THE ARCHITECTURAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

NEW WORK KEY NOTES:

1. PROVIDE AND INSTALL EQUIPMENT SUPPORTS SIMILAR TO PATE MODEL ES AND ANCHOR UNIT TO CURB. REFER TO DWG M502 DETAIL 8 FOR ADDITIONAL REQUIREMENTS.
2. REFRIGERANT PIPING DN TO INDOOR UNIT. PROVIDE AND INSTALL NEW PIPE CURB SIMILAR TO ROOF PENETRATION HOUSING AW SERIES WITH WITH ALL BOOTS AND CLAMPS AS REQUIRED FOR NEW REFRIGERANT PIPING AND ELECTRICAL CONDUITS. COORDINATE WITH EC FOR LOCATIONS AND QUANTITY OF CONDUITS. CUT OPENINGS AS REQUIRED. ANCHOR CURB TO STRUCTURE. REFER TO ARCHITECTURAL PLANS FOR FLASHING OF ROOF.
3. PROVIDE PIPE SUPPORTS SIMILAR TO MIRO INDUSTRIES MODEL BASE-STRUT-12 FOR PIPING AND CONDUIT ON ROOF. PROVIDE AND PLACE ROOF PIPING SUPPORTS ON SUPPORT PADS THAT ARE MANUFACTURED BY THE EPDM ROOF MANUFACTURER. SPACE SUPPORTS PER MANUFACTURER'S RECOMMENDATIONS.
4. PROVIDE ROOF CURB BASE WITH VIB-ISO SOUND CLOAK SC-44 SOUND ATTENUATION PANEL.
5. PROVIDE ALL EXPOSED DUCTWORK IN PAINTABLE GALVANNEAL SHEET METAL. SUPPLY AND RETURN DUCT SHALL BE INFERNALLY LINED. DUCTWORK SHALL BE SHOP PRIMED AND FIELD PAINTED BY GC IN CUSTOM COLOR CHOSEN BY THE ARCHITECT.
6. REFER TO DETAIL 14, DWG M502.

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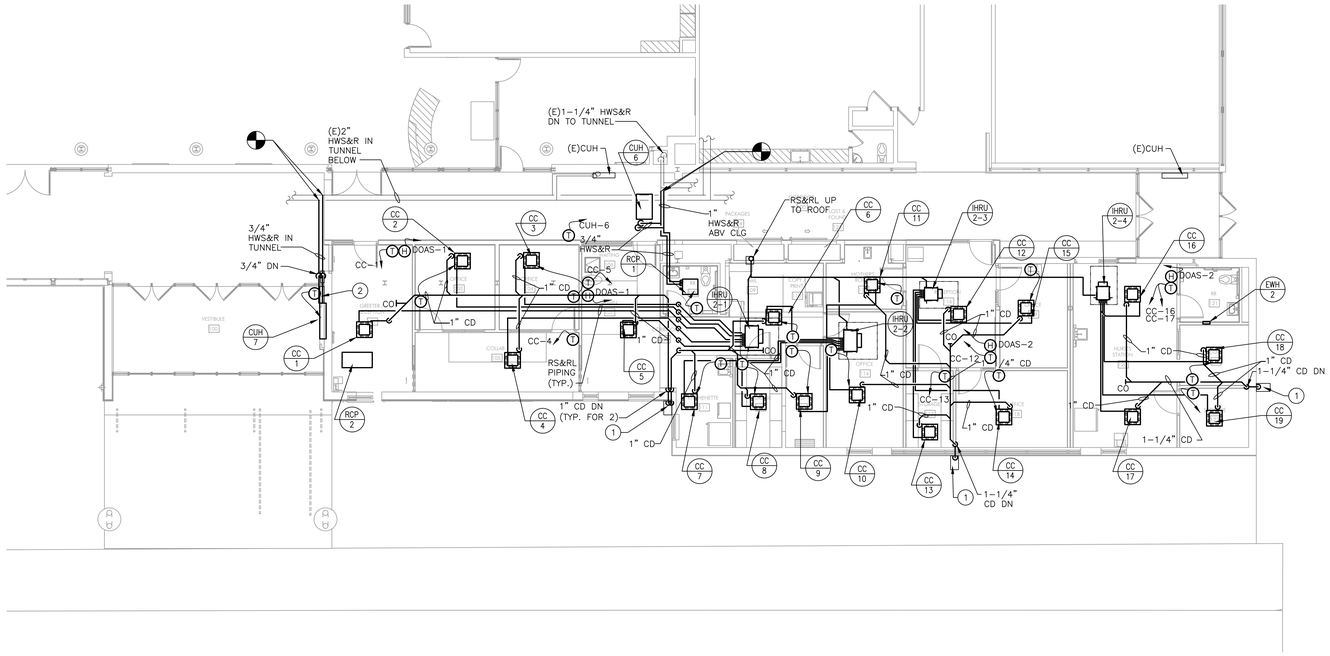
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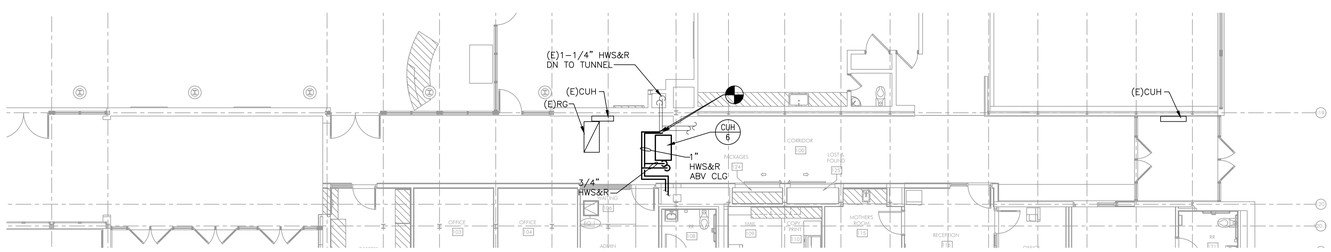
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1 M201 MECHANICAL PIPING-NEW WORK FLOOR PLAN (BASE-BID)
SCALE:1/8"=1'-0"



2 M201 MECHANICAL PIPING-NEW WORK FLOOR PLAN (ALTERNATE-BID)
SCALE:1/8"=1'-0"

GENERAL NOTES:

1. REFER TO M001 FOR FURTHER GENERAL NOTES.
2. ALL EXTERIOR WALL PENETRATIONS REQUIRED FOR MECHANICAL WORK TO BE MADE BY THE GC. REFER TO THE ARCHITECTURAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. REFER TO DWG M503 FOR ALL VRF SYSTEM REFRIGERANT PIPE SIZING.

NEW WORK KEY NOTES:

(1) RUN CONDENSATE DOWN IN WALL TO EXTERIOR, W/ ELBOW AND SPILL 4" ABOVE GRADE ONTO CONCRETE SPLASH BLOCK. MAKE PENETRATION THROUGH WALL WEATHER-TIGHT. CONNECT CONDENSATE PIPING TO INDOOR UNITS. REFER TO DETAII 9/DWG M502.

(2) PROVIDE EXPOSED PIPING AND CONDUIT IN HORIZONTAL 2-SIDED 16 GAUGE STEEL PIPE ENCLOSURE MATCHING EXPOSED DEPTH AND HEIGHT OF ADJACENT CUH FOR A CONTINUOUS APPEARANCE WITH CUH. PIPE ENCLOSURE SHALL BE JG INNOVATIONS, INC. SOFFI-STEEL SYSTEM IN CUSTOM POWDER-COATED COLOR CHOSEN BY THE ARCHITECT. FIELD VERIFY ALL DIMENSIONS PRIOR TO ORDERING.

AGCS STATE ROAD ADMINISTRATION

110 E State Rd, West Grove, PA 19390

HSA PROJECT # :26-004

Heckendorn Shiles Architects

PROJECT TEAM

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PLAN NORTH

ISSUE HISTORY

Δ	DATE	ISSUED FOR
1	11-09-2026	BID ISSUE

SHEET TITLE
MECHANICAL PIPING NEW WORK PLANS

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DOAS/RTU FAN SCHEDULE

FAN UNIT NO	TAG	QTY	DOAS/RTU MODEL #	MANUFACTURER	BLOWER	TOTAL CFM	MAX OUTSIDE AIR CFM	RETURN AIR CFM	WEIGHT (LBS)	ESP	ELECTRICAL INFORMATION					COOLING INFORMATION										REHEAT INFORMATION				ELECTRIC HEAT INFORMATION					HEAT PUMP INFORMATION					A2L MINIMUM ROOM VOLUME			NOTES
											HP	PHASE	VOLT	MCA	MOCP	OUTSIDE AIR		MIXED AIR		LEAVING AIR			CAPACITY		IEER	ISMRE2	DISCHARGE		CAPACITY		MOISTURE REMOVAL RATE	DSGN. KW'S	MAX. KW'S	VOLTS	AMPS	TEMP RISE	ENTERING TEMP	MAX TEMP RISE	DISCHARGE TEMP	COP	CAPACITY	ROOM AREA (FT2)	AIRFLOW (CFM)	HEIGHT (FT)	
																DB	WB	DB	WB	DB	WB	DP	TOTAL	SENS.			DB	WB	DESIRED	MAX													
1	DOAS-1	1	CAS-HVAC1-E.152-13-3T-ERV	CAPTIVEAIRE	13P-1	650	650	0	1641	1.000	1.00	3	208	59.5A	70A	93.0°F	76.0°F	80.5°F	66.9°F	46.1°F	46.1°F	46.1°F	38.4 MBH	24.3 MBH	17.9	5.4	70.0°F	56.4°F	17.5 MBH	31.8 MBH	12.6 LBS/HR	8	15	208	36.1	35 °F	45.0°F	36.0°F	81.0°F	3.5	24.2 MBH	168.9	304	7.2	1 - 26

NOTES:

1. INVERTER SCROLL COMPRESSOR WITH INTEGRATED OIL SENSOR. DIGITAL OR STAGED SCROLL NOT AN APPROVED EQUAL
2. DIRECT DRIVE PLENUM BLOWER. BELT DRIVEN BLOWERS ARE NOT ACCEPTABLE
3. INTEGRATED MONITORING VIA CELLULAR CONNECTION BY MANUFACTURER
4. REFRIGERATION PRESSURE MONITORING ON HIGH AND LOW PRESSURE SIDE OF SYSTEM INCLUDED THROUGH DIGITAL INTERFACE
5. EC MOTOR CONDENSING FANS
6. ELECTRONIC EXPANSION VALVE. TXV NOT ACCEPTABLE
7. SUCTION LINE ACCUMULATOR
8. FACTORY COMMISSIONING WITH 5 YEAR PARTS WARRANTY
9. AVERAGING INTAKE, EVAP AND DISCHARGE TEMPERATURE SENSORS (DISCHARGE SENSOR TO BE FACTORY MOUNTED WITHIN UNIT)
10. TOTAL ENERGY RECOVERY WHEEL WITH SPEED CONTROLS FOR FROST PROTECTION AND MODULATION TO CAPACITY. INCLUDES SUPPLY AND EXHAUST FILTER & WHEEL MONITORING
11. UNIT SHALL INCLUDE A SERVICE SAFE STOP FEATURE – PROTECTS THE COMPRESSOR FROM DAMAGE DURING SHUTDOWN FOR SERVICE
12. EXHAUST CFM MONITORING INTEGRAL TO UNIT WITH CFM MEASUREMENT INCLUDED THROUGH DIGITAL INTERFACE
13. MERV 13 FILTERED SUPPLY AND EXHAUST AIR STREAMS WITHIN ENERGY RECOVERY VENTILATOR MODULE
14. SUPPLY CFM MONITORING INTEGRAL TO UNIT WITH CFM MEASUREMENT INCLUDED THROUGH DIGITAL INTERFACE
15. FULLY MODULATING HOT GAS REHEAT
16. LOW AMBIENT COOLING OPERATION DOWN TO 0°F
17. BAROMETRIC RELIEF DAMPER
18. 1" EXTERIOR DUAL-WALL CONSTRUCTION W/ R-4.3 INSULATION-MINIMUM 24GA EXTERIOR W/ 18GA BASE
19. DOWN DISCHARGE/DOWN RETURN
20. SINGLE POINT POWER CONNECTION FOR UNIT & ELECTRIC HEATER
21. MINIMUM ROOM AREA ASSUMED 7.2' SUPPLY DIFFUSER HEIGHT AND IS CALCULATED PER UL60335-2-40 4TH ED. VALUES BASED ON FACTORY CHARGE. ACTUAL SITE CHARGE MAY DIFFER.
22. UNIT IS OUTFITTED WITH HEAT PUMP WITH SUPPLY AIRFLOW OVER 200 CFM/TON & OVER 50% OUTDOOR AIR, AND AS A RESULT MAY BE AT RISK OF RUNNING ONLY BACKUP HEAT AT OUTDOOR TEMPERATURES BELOW 35F
23. SCCR RATING OF 10kAMP
24. STANDARD HEAT PUMP OPERATION DOWN TO 40°F MIXED INTAKE TEMPS & 20°F OUTDOOR TEMPS – NOTE: UNIT MAY EXPERIENCE DEFROST CYCLES DEPENDING ON WEATHER CONDITIONS, USE OF BACKUP HEAT HIGHLY RECOMMENDED
25. CLOGGED FILTER PRESSURE TRANSDUCER WITH ADJUSTABLE THRESHOLD AND MONITORABLE OUTPUT. SWITCH NOT ACCEPTABLE.
26. FACTORY INSTALLED 120V CONVENIENCE OUTLET.

DOAS/RTU ENERGY RECOVERY SCHEDULE

FAN UNIT NO	TAG	EXHAUST AIR FAN (ECM)				SUPPLY AIR SUMMER		RETURN AIR DB/WB TEMP(°F)	DESIGN RECOVERED SUMMER CAPACITY			SUPPLY AIR WINTER		RETURN AIR DB/WB TEMP(°F)	DESIGN RECOVERED WINTER CAPACITY		
		CFM	ESP	MOTOR HP	V/ø/HZ	ENTERING AIR DB/WB TEMP(°F)	LEAVING AIR DB/WB TEMP(°F)		TOTAL	SENSIBLE	LATENT	ENTERING AIR DB/WB TEMP(°F)	LEAVING AIR DB/WB TEMP(°F)		TOTAL	SENSIBLE	LATENT
1	DOAS-1	500	0.75	2.5	208/3/60	93.0/76.0	80.5/66.9	75.0/62.0	21.5 MBH	8.2 MBH	13.3 MBH	0.0/0.0	45.5/40.3	69.0/55.0	42.3 MBH	31.7 MBH	10.6 MBH

CURB ASSEMBLIES

NO	ON FAN	TAG	R-VALUE	WEIGHT	ITEM	SIZE
1	# 1	DOAS-1	4.3	122 LBS	CURB	41.000"W X 111.000"L X 18.000"H INSULATED.

1" R4.3 FOIL FACED FIBERGLASS INSULATION. COMPLIES WITH UL/ULC,ASTM, & ASHRAE STANDARDS.

CABINET UNIT HEATER SCHEDULE

UNIT TAG	CFM	SPEED	ELECTRICAL CHARACTERISTICS					CAPACITY MBH	ROWS	WATER				MOUNTING HEIGHT, IN.	MAXIMUM DIMENSIONS LxWxH, IN.	WEIGHT LBS.	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
			HP	VOLTS	PHASE	HZ	FLA			GPM	ENT °F	LVG °F	PD FT.				
CUH-6	300	HIGH	1/5	120	1	60	0.5	14.1	1	0.8	180	144	0.1	CEILING	38x10x27	90	ZEHNDER RITTLING RFRC-420-03
CUH-7	450	MEDIUM	1/5	120	1	60	0.5	22.5	1	1	180	134	0.2	6	56x10x27	125	ZEHNDER RITTLING RFRW-340-06

PROVIDE ALL UNITS COMPLETE WITH UNIT MOUNTED DISCONNECT SWITCH, ECM MOTOR & 1" THROWAWAY FILTERS.
PROVIDE ALL UNITS COMPLETE WITH BOTTOM LOUVER INTAKE AND TOP LOUVERED SUPPLY.
PROVIDE CUH-7 WITH 14 GAUGE FRONT PANEL IN CUSTOM COLOR AS CHOSEN BY THE ARCHITECT.
PROVIDE ALL UNITS WITH DELUXE 2-WAY VALVE PIPING KITS INCLUDING UNIONS, BALL VALVES, STRAINER AND MANUAL CIRCUIT SETTER..

ELECTRIC WALL HEATER SCHEDULE

UNIT TAG	AREA SERVED	ELECTRIC HEATER					MOUNT HT	MAXIMUM DIMENSIONS LxDxH, IN.	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
		BTU/HR CAP.	KW	VOLTS	PHASE	AMPS			
EWH-1	TOILET	5,120	1.5	120	1	12.5	2' AFF	11"x5"x12"	BERKO SRA1512DSAF

PROVIDE ALL UNITS COMPLETE WITH BUILT-IN DISCONNECT SWITCH & BUILT-IN INTEGRAL TAMPER RESISTANT THERMOSTAT.
PROVIDE ALL UNITS COMPLETE WITH RECESSED WALL MOUNTING FRAME.

HYDRONIC RADIANT CEILING PANEL SCHEDULE

RCP No.	AREA SERVED	CAP. BTUH	WATER				NUMBER OF PIPES	NUMBER OF HOSES	DIMENSIONS LxDxH	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
			GPM	EWT	LWT	PD IN.				
RCP-1	TOILET	1,710	0.4	180	176	0.05	2	2	48"x24"x2"	ZEHNDER RITTLING CARBOLINE

ELECTRIC RADIANT CEILING PANEL SCHEDULE

UNIT TAG	AREA SERVED	ELECTRICAL CHARACTERISTICS						MAXIMUM DIMENSIONS LxDxH, IN.	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
		CAPACITY BTUH	WATTS	VOLTS	PHASE	HZ	FLA		
RCP-2	GREETER 101	2,559	750	120	1	60	6.3	24x48x1	BERKO CP751F

THE UNIT DISCONNECT SWITCHES PROVIDED BY THE EC.
PROVIDE UNIT COMPLETE WITH REMOTE WALL MOUNTED LINE VOLTAGE THERMOSTAT.

EXHAUST FAN SCHEDULE

UNIT TAG	LOCATION	SERVICE	CFM	ESP IN. WC	FAN RPM	BHP (WATTS)	MOTOR HP (WATTS)	SONES (dB)	DRIVE: DIRECT/ V-BELT	ELECTRICAL CHARACTERISTICS			MAXIMUM DIMENSIONS L x W x H, IN.	WEIGHT LBS.	BASIS OF DESIGN MANUFACTURER AND MODEL NO.	REMARKS
										VOLTS	PHASE	CYCLE				
EF-5	RR 121	EXHAUST	125	0.4	721	(57)	1/15	0.4	DIRECT	120	1	60	14x12x12	30	GREENHECK SP-A200	1
EF-6	ROOF	EXHAUST	360	0.06	1140	0.06	1/6	5.4	BELT	120	1	60	25"ø x27"H	100	GREENHECK CUBE-099-B	2

1. PROVIDE UNIT COMPLETE WITH BACKDRAFT DAMPER, UNIT MOUNTED DISCONNECT SWITCH, FACTORY WIRED VARIABLE SPEED DIAL.
2. PROVIDE UNIT COMPLETE WITH BACKDRAFT DAMPER, UNIT MOUNTED DISCONNECT SWITCH, AUTO BELT TENSIONER, UL 705 AMCA 99 SPARK RESISTANT CONSTRUCTION, AND 18" HIGH PREFABRICATED ROOF CURB WITH HINGED CAP. THE EXHAUST FAN SHALL OPERATE UPON LEAK DETECTION SIGNAL FROM A2L REFRIGERANT SENSOR IN IHRUs AND RECEIVE AN ENABLE SIGNAL FROM VRF SYSTEM ENABLE EXHAUST FAN. PROVIDE ALL ASSOCIATED TRANSFORMER, CONTACTS, WIRING AND RELAYS.

GRAVITY RELIEF SCHEDULE

GRV NO.	LOCATION	AREA SERVED	CFM	S.P. "WC	THROAT OPENING SIZE (IN)	TYPE	REMARKS	MAX DIM.	WEIGHT (LBS)	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
GRV-5	ROOF	RR 121	125	0.02	8	GRAVITY ROOF	W/ BDD	21x21x8	30	GREENHECK GRSR

PROVIDE COMPLETE W/ 18" ROOF CURB, W/ DAMPER TRAY & BACK DRAFT DAMPER.

GRILLES, REGISTERS, & DIFFUSERS SCHEDULE

TAG	STYLE	CFM	MOUNT	FACE	BASIS OF DESIGN MANUFACTURER & MODEL #	MAX NC	REMARKS
A	LOUVERED FACE DIFFUSER	VARIES	AS REQ'D	24x24	PRICE SMD	25	1, 2, 3
B	FIXED FACE BAR GRILLE	VARIES	AS REQ'D	VARIES W/NECK SIZE	PRICE 530	20	1, 2

1. REFER TO PLANS FOR QUANTITIES, NECK SIZE, CFM, AND PATTERN.
2. PROVIDE ROUND TO SQUARE TRANSITION.
3. PROVIDE LAY-IN PANEL FOR ALL ACT CEILING INSTALLATIONS.

SPLIT SYSTEM CEILING CASSETTE UNIT SCHEDULE

UNIT TAG	AREA SERVED	TOTAL SUPPLY CFM MEDIUM SPEED	TOTAL COOLING BTU/HR	CORRECTED COOLING BTU/HR (72/61 °F)	CORRECTED HEATING BTU/HR (70° F)	ELECTRICAL CHARACTERISTICS					MAXIMUM DIMENSIONS, IN. LxWxH	OPERATING WEIGHT LBS.	BASIS OF DESIGN MANUFACTURER & MODEL NO.	SERVED BY
						VOLTS	PHASE	CYCLE	MCA	MOP				
CC-1	GREETER/RECEPT. 101	335	15,000	11,944	17,057	208	1	60	0.4	15	24x24x12	37	DAIKIN FXZA15AAVJU	OHRU-2
CC-2	OFFICE 103	264	7,500	6,142	8,527	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA07AAVJU	OHRU-2
CC-3	OFFICE 104	264	7,500	6,142	8,527	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA07AAVJU	OHRU-2
CC-4	COLLAB. 105	282	9,500	7,507	10,574	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA09AAVJU	OHRU-2
CC-5	ADMIN 107	441	18,000	14,332	20,121	208	1	60	0.6	15	24x24x12	42	DAIKIN FXZA18AAVJU	OHRU-2
CC-6	MAIL 109 / COPY 110	264	7,500	6,142	8,527	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA07AAVJU	OHRU-2
CC-7	KITCHENETTE 111	264	7,500	6,142	8,527	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA07AAVJU	OHRU-2
CC-8	STORAGE 112	247	5,000	4,777	6,483	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA05AAVJU	OHRU-2
CC-9	UTILITY 113	282	9,500	7,507	10,574	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA09AAVJU	OHRU-2
CC-10	OFFICE 114	335	15,000	11,944	17,057	208	1	60	0.4	15	24x24x12	37	DAIKIN FXZA15AAVJU	OHRU-2
CC-11	MOTHERS RM 115	247	5,000	4,777	6,483	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA05AAVJU	OHRU-2
CC-12	RECEPTION 116	300	12,000	9,555	13,642	208	1	60	0.4	15	24x24x12	37	DAIKIN FXZA12AAVJU	OHRU-2
CC-13	STORAGE 117	264	7,500	6,142	8,527	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA07AAVJU	OHRU-2
CC-14	OFFICE 118	335	15,000	11,944	17,057	208	1	60	0.4	15	24x24x12	37	DAIKIN FXZA15AAVJU	OHRU-2
CC-15	OFFICE 119	264	7,500	6,142	8,527	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA07AAVJU	OHRU-2
CC-16	NURSES STATION 120	282	9,500	7,507	10,574	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA09AAVJU	OHRU-2
CC-17	NURSES STATION 120	282	9,500	7,507	10,574	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA09AAVJU	OHRU-2
CC-18	COTS 122	247	5,000	4,777	6,483	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA05AAVJU	OHRU-2
CC-19	STORAGE 123	264	7,500	6,142	8,527	208	1	60	0.3	15	24x24x12	37	DAIKIN FXZA07AAVJU	OHRU-2

1. PROVIDE ALL UNITS WITH NON-FUSED, UNIT MOUNTED DISCONNECT SWITCH BY THE EC.
2. PROVIDE ALL UNITS COMPLETE W/ WALL MOUNTED HARD-WIRED THERMOSTAT DAIKIN MODEL BRC1NRV71.
3. PROVIDE ALL CC UNITS WITH INTEGRAL CONDENSATE PUMP.

VRF INDOOR HEAT RECOVERY UNIT SCHEDULE

UNIT TAG	UNITS SERVED	NO. OF PORTS	MAX PORT CAPACITY BTUH	MAX UNIT CAPACITY BTUH	ELECTRICAL CHARACTERISTICS					MAXIMUM DIMENSIONS, IN. LxWxH	OPERATING WEIGHT LBS	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
					VOLTS	PHASE	CYCLE	AMPS	MOCP			
IHRU-2-1	CC-1 – CC-5	6	54,000	216,000	208	1	60	1.9	15	34x29x10	110	DAIKIN BSF6A54AAVJ
IHRU-2-2	CC-6 – CC-11	6	54,000	216,000	208	1	60	1.9	15	34x29x10	110	DAIKIN BSF6A54AAVJ
IHRU-2-3	CC-12 – CC-15	4	54,000	144,000	208	1	60	1.2	15	21x20x10	70	DAIKIN BSF4A54AAVJ
IHRU-2-4	CC-16 – CC-19	4	54,000	144,000	208	1	60	1.2	15	21x20x10	70	DAIKIN BSF4A54AAVJ

1. PROVIDE UNIT COMPLETE WITH NON-FUSED, UNIT MOUNTED DISCONNECT SWITCH BY THE EC.
2. PROVIDE UNIT COMPLETE WITH VENTILATED ENCLOSURE.

OUTDOOR HEAT RECOVERY UNIT SCHEDULE

UNIT TAG	TONS	RATED COOLING CAPACITY BTUH	CORRECTED COOLING CAPACITY BTUH 95° F	HEATING CAPACITY BTUH 0 °F AMBIENT	HEAT RECOVERY CAPACITY BTUH	COMPRESSOR			CONDENSER FAN MOTOR			ELECTRICAL CHARACTERISTICS					MAX. AMBIENT TEMP. °F	SEER (EER)	HSPF (COP)	MAXIMUM DIMENSIONS, IN. LxWxH	MAXIMUM SOUND PRESSURE LEVEL dB(A)	OPERATING WEIGHT LBS	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
						QTY.	H.P. EA.	kW, COMP.# 1/2	QTY.	KW EA.	FLA EA.	VOLTS	PHASE	CYCLE	MCA	MOCP							
OHRU-2	16	184,000	139,526	133,346	184,000	2	–	–	2	–	–	208	3	60	64.2	80	95	(11.4)	(3.4)	69x31x66	69	1010	DAIKIN REYA192AATJA

1. PROVIDE UNIT COMPLETE WITH NON-FUSED, UNIT MOUNTED DISCONNECT SWITCH BY THE EC.
2. PROVIDE UNIT COMPLETE WITH HEAT RECOVERY FOR SIMULTANEOUS HEATING & COOLING.
3. PROVIDE COMPLETE WITH HERO SIMPLE EDGE CLOUD COMMUNICATION ADAPTOR AND INTELLIGENT TOUCH MANAGER DCM601B71 W/ BACNET GATEWAY.
4. PROVIDE UNIT COMPLETE WITH OVER/UNDER VOLTAGE AND PHASE LOSS PROTECTION KIT.

NEEDLEPOINT BIPOLAR IONIZATION

UNIT SERVED	AIRFLOW CAPACITY RANGE (CFM)	TOTAL ION OUTPUT (MILLION IONS/CC/SEC)	QTY. PER HVAC UNIT	ELECTRICAL CHARACTERISTICS (PER UNIT)					MAXIMUM DIMENSIONS L x W x H	BASIS OF DESIGN MANUFACTURER AND MODEL NO.	REMARKS
				VOLTS	PHASE	CYCLE	WATTS	AMPS			
CC-1 – CC-19	0-2400	>160	1	208	1	60	7	0.5	4.2 x 1.1 x 2.6	GLOBAL PLASMA SOLUTIONS CI-2	1
DOAS-1	0-2400	>160	1	24	1	60	7	0.5	4.2 x 1.1 x 2.6	GLOBAL PLASMA SOLUTIONS CI-2	2

1. CONTRACTOR TO VERIFY ALL QUANTITIES PRIOR TO ORDERING. UNIT SHALL BE PROVIDED WITH PS-2 POWER SUPPLY AND WIRED DIRECTLY TO AHU 208V POWER CIRCUIT.
2. MC TO INSTALL UNIT. ATC TO PROVIDE 24V TRANSFORMER AND 24 POWER WIRING TO BIPOLAR IONIZATION UNIT.

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AGCS STATE ROAD ADMINISTRATION

110 E State Rd, West Grove, PA 19390

HSA PROJECT # :26-004

Heckendorn Shiles Architects

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ISSUE HISTORY

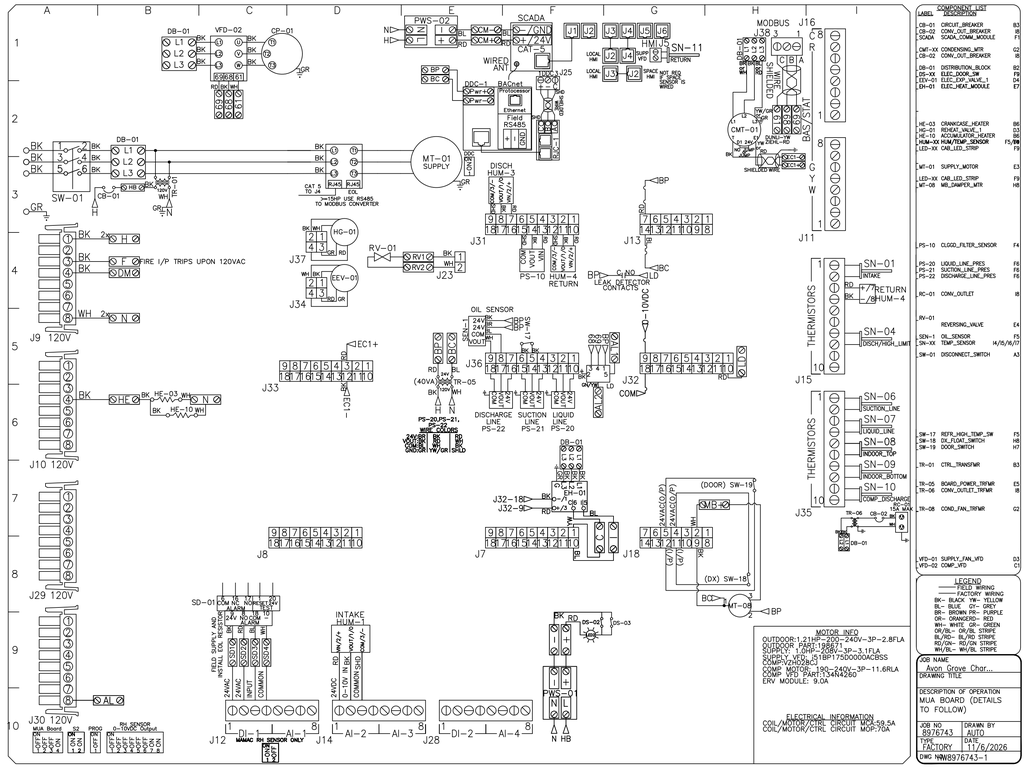
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1	11-09-2026	BID ISSUE

SHEET TITLE

MECHANICAL SCHEDULES

DRAWING NUMBER

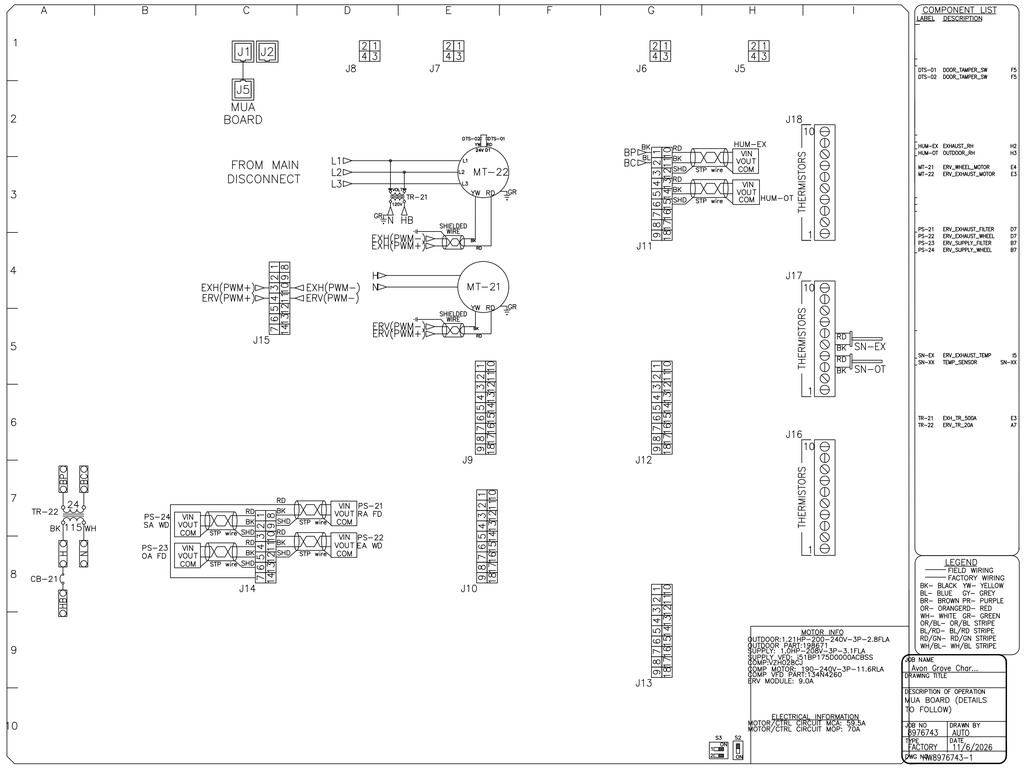
M301



LABEL	COMPONENT LIST DESCRIPTION	
CB-01	CIRCUIT_BREAKER	B3
CB-02	CONV_OUT_BREAKER	IB
SCADA	SCADA_COMM_MODULE	F3
CMT-XX	CONDENSING_MTR	C2
CB-02	CONV_OUT_BREAKER	IB
DB-01	DISTRIBUTION_BLOCK	B2
DS-XX	ELEC_DOOR_SW	F8
EEV-01	ELEC_EXP_VALVE_1	D4
EH-01	ELEC_HEAT_MODULE	E7
HE-03	CRANKCASE_HEATER	B6
HE-10	REVERSING_VALVE_HEATER	D3
HUM-XX	HUMIDITY_SENSOR	F5,H8
LED-XX	CAB_LED_STRIP	F8
MT-01	SUPPLY_MOTOR	E3
LED-XX	CAB_LED_STRIP	F8
MT-08	MIX_DAMPER_MTR	H8
PS-10	CLOGD_FILTER_SENSOR	F4
PS-20	LIQUID_LINE_PRES	F8
PS-21	SUCTION_LINE_PRES	F8
PS-22	DISCHARGE_LINE_PRES	F8
RC-01	CONN_OUTLET	I8
RV-01	REVERSING_VALVE	E4
SEN-1	OIL_SENSOR	F5
SN-XX	TEMP_SENSOR H/S/6/17	
SW-01	DISCONNECT_SWITCH	A3
SW-17	REFR_HIGH_TEMP_SW	F5
SW-18	DX_FLOAT_SWITCH	H8
SW-19	DOOR_SWITCH	H7
TR-01	CTRL_TRANSFMR	B3
TR-05	BOARD_POWER_TRFMR	E5
TR-06	CONV_OUTLET_TRFMR	I8
TR-08	COND_FAN_TRFMR	C2
VFD-01	SUPPLY_FAN_VFD	D3
VFD-02	COMP_VFD	C1

LEGEND
FIELD WIRING
FACTORY WIRING
BK– BLACK YW– YELLOW
BL– BLUE GY– GREY
BR– BROWN PR– PURPLE
OR– ORANGERD– RED
WH– WHITE GR– GREEN
OR/BL– OR/BL STRIPE
BL/RD– BL/RD STRIPE
RD/GN– RD/GN STRIPE
WH/BL– WH/BL STRIPE

JOB NAME Avon Grove Char...
DRAWING TITLE
DESCRIPTION OF OPERATION
MUA BOARD (DETAILS TO FOLLOW)
JOB NO 8976743 | DRAWN BY AUTO
TYPE FACTORY | DATE 11/6/2026
DWG NW8976743-1



LABEL	COMPONENT LIST DESCRIPTION	
DTS-01	DOOR_TAMPER_SW	F5
DTS-02	DOOR_TAMPER_SW	F5
HUM-EX	EXHAUST_RH	H2
HUM-OT	OUTDOOR_RH	H3
MT-21	ERV_WHEEL_MOTOR	E4
MT-22	ERV_EXHAUST_MOTOR	E3
PS-21	ERV_EXHAUST_FILTER	D7
PS-22	ERV_EXHAUST_WHEEL	D7
PS-23	ERV_SUPPLY_FILTER	B7
PS-24	ERV_SUPPLY_WHEEL	B7
SN-EX	ERV_EXHAUST_TEMP	I5
SN-XX	TEMP_SENSOR	SN-XX
TR-21	EXH_TR_500A	E3
TR-22	ERV_TR_20A	A7

LEGEND
FIELD WIRING
FACTORY WIRING
BK– BLACK YW– YELLOW
BL– BLUE GY– GREY
BR– BROWN PR– PURPLE
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JOB NAME Avon Grove Char...
DRAWING TITLE
DESCRIPTION OF OPERATION
MUA BOARD (DETAILS TO FOLLOW)
JOB NO 8976743 | DRAWN BY AUTO
TYPE FACTORY | DATE 11/6/2026
DWG NW8976743-1

MOTOR INFO
OUTDOOR:1.21HP~200~240V~3P~2.8FLA
OUTDOOR PART:1986T1
SUPPLY:1.0HP~208V~3P~3.1FLA
SUPPLY VFD:.5(1BP17S0D0004CABSS
COMPVZH029C1
COMP MOTOR:1.9KW~190~240V~3P~11.6RLA
COMP VFD PART:134N4260
ERV MODULE: 9.0A

ELECTRICAL INFORMATION
MOTOR/CTRL CIRCUIT MCA: 58.5A
MOTOR/CTRL CIRCUIT MOP: 70A

SMV VFD PARAMETER SETTINGS

P100	(START SOURCE) = 01
P150	(TB-30 OUTPUT) = 1
P194	PASSWORD = 225
P410	MODBUS ADDRESS = 21

ADJUST MANUALLY ON ALL DRIVES	
P103	VFD MAX FREQUENCY
P107	00 (IF 120 OR 208 VAC)
	01 IF(230, 480 OR 575VAC)
P108	(MOTOR FLA X 100) / DRIVE OUTPUT RATING
P167	REFERENCE BUILD SHEET
P171	P108 – 1

*NOTE: THE DEFAULT FOR THE DRIVE IS "225".

All external control wires to motor speed control should be 16–20 AWG shielded multi-conductor cables and must not be run in the same conduit or raceway with any high power wiring. Ground Shielded Cable at the drive chassis ONLY.

PG. 11, 19, 23 OF THE DRIVE MANUAL DESCRIBES THE PROPER HANDLING OF THE VARIABLE FREQUENCY DRIVE.

IT MAY BE REQUIRED TO FULLY POWER DOWN THE DRIVE AND TURN BACK ON IN ORDER TO INITIATE NEW PARAMETER SETTINGS.

**Min. and Max. Frequency Settings override all other Preset speeds/Parameters. Do not adjust these on the VFD. Min. and Max. Frequency should be adjust on the RTU HMI.

I500 PARAMETER SETTINGS

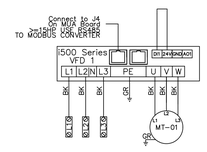
P200.00	[0] Flexi0
P440.01	[1] 0–10 VDC (A01 Range)
	PASSWORD = 225
P510.01	MODBUS ADDRESS = 21

ADJUST MANUALLY ON ALL DRIVES	
P211.00	60.0
P208.01	[0] 230V [1] 400V [2] 480V
	[3] 120V [6] 600V
P308.01	150%
P303.02	REFERENCE BUILD SHEET
P323.00	Blower Motor FLA
P324.00	99%

I500 SERIES VFD

TERMINAL	FUNCTION
DI1	Digital Input:(Start/Stop) If P400.02 = [11]
GND	Analog Common
AI1	Analog Input: 0–10 VDC
10V	Internal DC Supply for Speed Pot: +10 VDC
AI2	Analog Input: 4–20 mA, P431.01 = [4]
AO1	Analog Output: Configurable by P440.01
GND	Digital Reference/Common
24V	Internal 24VDC Supply for External Devices
DI2	Digital Input: Configurable with P400.XX
DI3	Digital Input: Configurable with P400.XX
DI4	Digital Input: Configurable with P400.XX
DO1	Digital Output: Configurable with P420.02
16	Relay Output: Configurable with P420.01
17	
RJ45	MODBUS CONNECTIONS
GND	Analog Common
PE	Ground Terminal
L1	3 Phase Input or Single Phase Input
L2	3 Phase Input or Single Phase Input
L3 (N)	3 Phase Input (Neutral for 120v)
U	3 Phase AC Motor
V	3 Phase AC Motor
W	3 Phase AC Motor

*Note: Not Suitable for Corner Grounded 3 Phase Input power

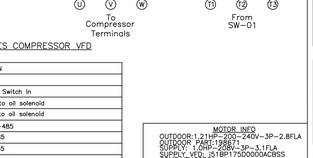


COMPRESSOR DRIVE PARAMETER SETTINGS MUST BE CONFIGURED BEFORE STARTUP

0–60	225
1–71	10 SECONDS
3–02	30
3–15	[0] NO FUNCTION
3–16	[0] NO FUNCTION
3–41	200.00s
3–42	200.00s
4–18	If 208V = 7632(8), 6533(), 10823(4)
	If 480/575v = 7632(8), 8023(5), 11539(4)
8–01	[2] CTRL WORD ONLY
8–03	20 SECONDS
8–04	[2] STOP
8–30	[2] MODBUS RTU
8–31	1
8–32	19200
8–33	[0] EVEN PARITY, 1 STOP BIT
8–43–2	10
8–43–3	10
8–43–4	13
8–43–5	13
8–43–6	14
8–43–7	14
8–43–8	33
8–43–9	33
8–43–10	19
8–43–12	35
8–43–13	35
28–00	DISABLE
28–11	1440m
28–12	24h
28–15(14)	100Hz (3000RPM)
28–17(15)	140Hz (4200RPM)

*Must be programmed using software

*Changing 8–30 will reset 8–01 and 8–03 if programmed after 8–01 and 8–03 are set



VZH SERIES COMPRESSOR VFD

TERMINAL	FUNCTION
13	24+
37	Pressure Switch In
1	Relay 1 to oil solenoid
2	Relay 1 to oil solenoid
61	COM RS–485
68	N RS–485
69	P RS–485
95	INPUT Ground
L1 (91)	3 Phase Input or Single Phase Input
L2 (92)	3 Phase Input or Single Phase Input
L3 (93)	3 Phase Input
T1 (96)	Compressor
T2 (97)	Compressor
T3 (98)	Compressor
99	Compressor Ground

MOTOR INFO
OUTDOOR:1.21HP~200~240V~3P~2.8FLA
OUTDOOR PART:1986T1
SUPPLY:1.0HP~208V~3P~3.1FLA
SUPPLY VFD:.5(1BP17S0D0004CABSS
COMPVZH029C1
COMP MOTOR:1.9KW~190~240V~3P~11.6RLA
COMP VFD PART:134N4260
ERV MODULE: 9.0A

ELECTRICAL INFORMATION
COIL/MOTOR/CTRL CIRCUIT MCA:58.5A
COIL/MOTOR/CTRL CIRCUIT MOP:70A

RTU VFD SCHEMATIC

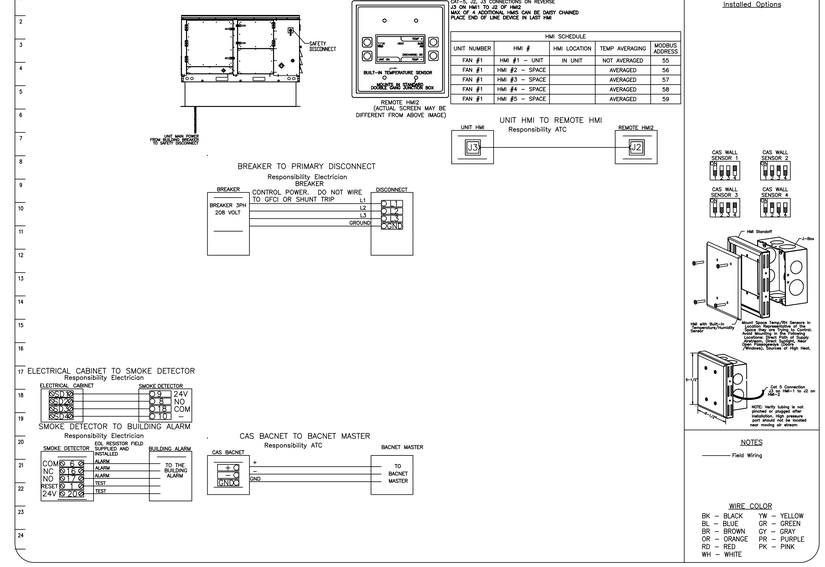
COMPONENT LIST

LABEL	DESCRIPTION
PWS-01	24VDC Power Supply
SW-01	Main Disconnect Sw
VFD-2	Compressor VFD

LEGEND
FIELD WIRING
FACTORY WIRING
BK– BLACK YW– YELLOW
BL– BLUE GY– GREY
BR– BROWN PR– PURPLE
OR– ORANGERD– RED
WH– WHITE GR– GREEN
OR/BL– OR/BL STRIPE
BL/RD– BL/RD STRIPE
RD/GN– RD/GN STRIPE
WH/BL– WH/BL STRIPE

JOB NAME Avon Grove Char...
DRAWING TITLE
DESCRIPTION OF OPERATION
MUA BOARD (DETAILS TO FOLLOW)
JOB NO 8976743 | DRAWN BY AUTO
TYPE FACTORY | DATE 11/6/2026
DWG NRTUVFD8976743-1

RTU Installation Wiring	JOB	Avon Grove Charter School – Office Area...
DRAWING NUMBER INST8976743–1	SHIP DATE 11/6/2026	MODEL CAS–HVAC1–E.152–13–3T–ERV



HMI SCHEDULE				
UNIT NUMBER	HMI #	HMI LOCATION	TEMP AVERAGING	MODBUS ADDRESS
FAN #1	HMI #1 – UNIT	IN UNIT	NOT AVERAGED	55
FAN #1	HMI #2 – SPACE		AVERAGED	56
FAN #1	HMI #3 – SPACE		AVERAGED	57
FAN #1	HMI #4 – SPACE		AVERAGED	58
FAN #1	HMI #5 – SPACE		AVERAGED	59

Installed Options

NOTES
Field Wiring

WIRE COLOR

BK – BLACK	YW – YELLOW
BL – BLUE	GR – GREEN
BR – BROWN	GY – GRAY
OR – ORANGE	PR – PURPLE
RD – RED	PK – PINK
WH – WHITE	

1 DOAS–1 SCHEDULE AND DETAILS
NO SCALE

AGCS STATE ROAD ADMINISTRATION

110 E State Rd, West Grove, PA 19390

HSA PROJECT # :26-004

Heckendorn Shiles Architects

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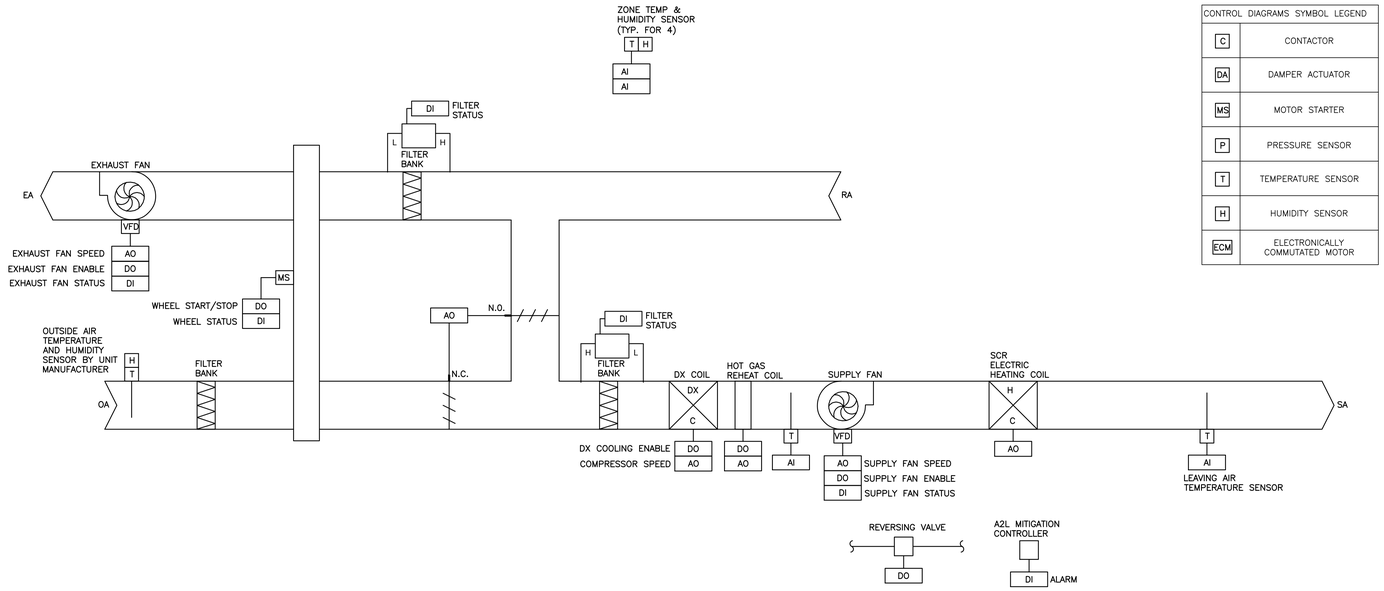
ISSUE HISTORY

Δ	DATE	ISSUED FOR
1	11-09-2026	BID ISSUE

SHEET TITLE
MECHANICAL SCHEDULES

DRAWING NUMBER
M302

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CONTROL DIAGRAMS SYMBOL LEGEND	
C	CONTACTOR
DA	DAMPER ACTUATOR
MS	MOTOR STARTER
P	PRESSURE SENSOR
T	TEMPERATURE SENSOR
H	HUMIDITY SENSOR
ECM	ELECTRONICALLY COMMUTATED MOTOR

DOAS-1 SEQUENCE OF OPERATION:
UNIT HAS FACTORY INSTALLED AND WIRED CONTROLLER TO CONTROL ALL FUNCTIONS OF THE UNIT WITH FACTORY INSTALLED BACNET COMMUNICATIONS INTERFACE FOR BAS TO MONITOR, CONTROL AND DISPLAY UNIT STATUS, SETPOINTS AND ALARMS. CONTROLLER SHALL BE FULLY PROGRAMMED PER THE SEQUENCE OF OPERATION BELOW. PROVIDE BACNET INTEGRATION FOR SUPERVISORY CONTROL INTO THE THE NEW BAS BY THE ATC CONTRACTOR. THE ATC CONTRACTOR SHALL PROVIDE PROGRAMMING FOR DEHUMIDIFICATION SEQUENCE AS NOTED IN SEQUENCE BELOW. ALL CONTROLS PROVIDED BY UNIT MANUFACTURER UNLESS OTHERWISE NOTED. ANY LOOSE ITEMS SHIPPED FOR FIELD INSTALL, SHALL BE INSTALLED BY THE MECHANICAL CONTRACTOR.

PROVIDE COMPLETE INDIVIDUAL UNIT SCHEDULING FUNCTION THROUGH THE UNITARY CONTROLLER. THE OPERATOR WILL BE ABLE TO ADJUST THE UNIT START/STOP USING THE CONTROLLER INTERFACE. PROVIDE ALL CONTROLLER PROGRAMMING AS NOTED BELOW.

A. OCCUPANCY
- UNIT SHALL OPERATE BASED ON (ONBOARD OCCUPANCY SCHEDULE / OCCUPANCY OVERRIDE SIGNAL FROM BAS)

B. SPACE TEMPERATURE AND HUMIDITY AVERAGING SENSORS
- UNIT TO BE FURNISHED WITH UP TO FOUR (4) SPACE TEMPERATURE AND HUMIDITY AVERAGING SENSORS
- UNIT ONBOARD LOGIC WILL MODULATE HEATING/COOLING/DEHUMIDIFICATION COMPONENTS TO MAINTAIN THE AVERAGED TEMPERATURE AND HUMIDITY SETPOINTS ACROSS ALL FOUR (4) AVERAGING SENSORS
- BUILDING AUTOMATION SYSTEM (BAS) WILL MONITOR THE HUMIDITY LEVELS OF EACH SENSOR. IF ANY INDIVIDUAL ZONE EXCEEDS TARGET HUMIDITY SETPOINT, BAS WILL RESET THE SPACE DEW POINT SETPOINT (AV:42 ON BACNET POINTS LIST) LOWER UNTIL THE ZONE REACHES SETPOINT.

C. SUPPLY BLOWER
- OCCUPIED MODE: BLOWER ON, CONSTANT AIR VOLUME
- UNOCCUPIED MODE: BLOWER OFF (UNIT IDLE)

D. MIXING BOX DAMPER
- OCCUPIED MODE: 100% OA
- UNOCCUPIED MODE: 0% OA (UNIT IDLE)

E. EXHAUST FAN (ENERGY RECOVERY MODULE)
- OCCUPIED MODE:FAN ON, CONSTANT AIR VOLUME
- UNOCCUPIED MODE:FAN OFF (UNIT IDLE)

F. ENERGY RECOVERY (TOTAL ENTHALPY WHEEL)
- ENERGY RECOVERY WHEEL WILL SERVE AS THE FIRST STAGE OF HEATING / COOLING / DEHUMIDIFICATION
- HEATING: ENERGY RECOVERY WHEEL WILL ACTIVATE WHEN THE OA ENTHALPY IS BELOW THE RETURN AIR ENTHALPY AND THE ONBOARD LOGIC IS CALLING FOR HEATING. ONBOARD LOGIC WILL MODULATE THE WHEEL TO MAINTAIN DESIRED SPACE SETPOINT.
- COOLING/DEHUM: ENERGY RECOVERY WHEEL WILL ACTIVATE WHEN THE OA ENTHALPY IS ABOVE THE RETURN AIR ENTHALPY AND THE ONBOARD LOGIC IS CALLING FOR COOLING OR DEHUMIDIFICATION. ONBOARD LOGIC WILL MODULATE THE WHEEL TO MAINTAIN DESIRED SPACE SETPOINT.

G. HEATING
- WHEN EITHER ENTERING AIR TEMPERATURE FALLS BELOW 65° F (ADJ.) OR SPACE TEMPERATURE FALLS BELOW 65° F (ADJ.), HEATING IS ENABLED.
- RTU ONBOARD LOGIC ENABLE THE REVERSING VALVE MODULATES THE COMPRESSOR AND ELECTRIC HEAT TO MAINTAIN SPACE TEMPERATURE USING HEATING PID CONTROLS TO AUTOMATICALLY ADJUST FOR FLUCTUATIONS IN ENTERING AIR TEMPERATURE, SPACE TEMPERATURE, ETC. MAINTAIN A CONSTANT DISCHARGE AIR TEMPERATURE OF 70 DEG F (ADJ.)

H. COOLING
- WHEN EITHER ENTERING AIR TEMPERATURE RISES ABOVE 72° F (ADJ.) OR SPACE TEMPERATURE RISES ABOVE 75° F (ADJ.), COOLING IS ENABLED.
- RTU ONBOARD LOGIC MODULATES THE INVERTER COMPRESSOR TO MAINTAIN SPACE TEMPERATURE USING COOLING PID CONTROLS TO AUTOMATICALLY ADJUST FOR FLUCTUATIONS IN ENTERING AIR TEMPERATURE, SPACE TEMPERATURE, ETC. MAINTAIN A CONSTANT DISCHARGE AIR TEMPERATURE OF 70 DEG F (ADJ.)

I. DEHUMIDIFICATION
- WHEN EITHER ENTERING AIR DEW POINT OR AVERAGE SPACE DEW POINT RISES ABOVE RESPECTIVE SET POINTS OF 55° DP (ADJ.), DEHUMIDIFICATION IS ENABLED.
- RTU ONBOARD LOGIC MODULATES THE INVERTER COMPRESSOR TO MAINTAIN SPACE DEW POINT USING COOLING PID CONTROLS TO AUTOMATICALLY ADJUST FOR FLUCTUATIONS IN ENTERING AIR DEW POINT, SPACE DEW POINT, ETC. MAINTAIN A CONSTANT DISCHARGE AIR TEMPERATURE OF 70 DEG F (ADJ.)
  RTU ONBOARD LOGIC MODULATES THE HOT GAS REHEAT VALVE TO MAINTAIN SPACE TEMPERATURE DRY BULB SET POINT.
- IF ANY ONE OF THE SPACE DEW POINT SENSOR RISES MORE THAN 3 DEGREES ABOVE SETPOINT, THE ATC CONTRACTOR SHALL OVERRIDE THE COOLING COIL LEAVING AIR TEMPERATURE VIA THE BACNET INTERFACE AND RESET THE TEMPERATURE LOWER UNTIL THE SPACE SETPOINT IS REACHED.

I. LOW TEMPERATURE PROTECTION: AN SUPPLY AIR TEMPERATURE SENSOR DIRECTLY AFTER THE HEATING COIL DE-ENERGIZES THE SUPPLY & EXHAUST FAN WHEN TEMPERATURES BELOW 40 DEGREES F ARE SENSED. ALL DAMPERS (OA DAMPER SHALL CLOSED/RA DAMPER SHALL OPEN). AFTER THE TEMPERATURE RISES 5 DEGREES ABOVE THE LOW TEMPERATURE SETTING, THE UNIT WILL RESET AND THE UNIT WILL RESUME ITS NORMAL CONTROL SEQUENCE.

K. WHEN ANY OF THE UNIT'S A2L SENSORS DETECT AN A2L REFRIGERANT LEAK OR CONTROLLER DOES NOT DETECT A SENSOR CONNECTION, THE CONTROLLER SHALL ENABLE THE SUPPLY FAN, DISABLE THE COMPRESSORS AND ENABLE THE A2L ALARM. THE ATC CONTRACTOR SHALL RECEIVE THE A2L ALARM AND DISPLAY ON OPERATOR WORKSTATION.

1 DOAS-1 CONTROLS
NO SCALE

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AGCS STATE ROAD ADMINISTRATION

110 E State Rd, West Grove, PA 19390

HSA PROJECT # :26-004

Heckendorn Shiles Architects

PROJECT TEAM

CLIENT
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110 E State Rd
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484-667-5000

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STRUCTURAL
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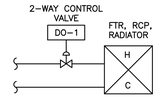
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ISSUE HISTORY

Δ	DATE	ISSUED FOR
1	11-09-2026	BID ISSUE

SHEET TITLE
MECHANICAL CONTROLS

DRAWING NUMBER
M401

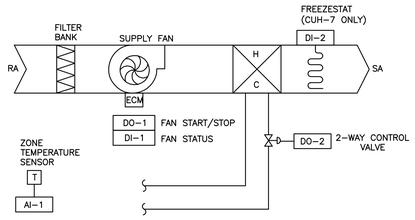


RCP SEQUENCE OF OPERATION:

THE RCP VALVE WILL BE CONTROLLED BY A SPACE THERMOSTAT. THE RADIATION VALVE WILL CONTROL THE SPACE TEMPERATURE TO WITHIN +/- 0.5 DEGREES OF THE HEATING SET-POINT. IF THE SPACE TEMPERATURE IS MORE THAN 0.5 DEGREE F BELOW THE HEATING SET-POINT, THE VALVE WILL OPEN. WHEN THE SPACE TEMPERATURE IS 0.5 DEGREE F ABOVE THE HEATING SET-POINT, THE VALVE WILL CLOSE. THERE SHALL BE ONE RCP CONTROL VALVE PER ZONE. RCP SHALL BE PROVIDED WITH A SPACE TEMPERATURE SENSOR WITH TEMPERATURE ADJUSTMENT WITHOUT LCD DISPLAY.

RCP POINTS LIST																			
		INPUTS								OUTPUTS						FUNCTION			
		DIGITAL			ANALOG					DIGITAL		ANALOG							
POINT TAG	POINT DESCRIPTION	SAFETY SHUT DOWN	STATUS	OCC OVERRIDE	PRESSURE	TEMPERATURE	SETPOINT	HUMIDITY		OPEN/CLOSED	ON/OFF	VALVE ACTUATOR	MODULATE	SPEED		ALARM			REMARKS
COM	SETPOINT ADJUSTMENT						X												
COM	ZONE TEMPERATURE					X										X			
DO-1	HOT WATER VALVE											X							

2 RCP CONTROLS
NO SCALE



UNIT HEATER POINTS LIST																			
		INPUTS								OUTPUTS						FUNCTION			
		DIGITAL			ANALOG					DIGITAL		ANALOG							
POINT TAG	POINT DESCRIPTION	SAFETY SHUT DOWN	STATUS	OCC OVERRIDE	PRESSURE	TEMPERATURE	SETPOINT	HUMIDITY		OPEN/CLOSED	ON/OFF	VALVE ACTUATOR	MODULATE	SPEED		ALARM			REMARKS
DO-1	FAN MOTOR STARTER										X								
COM	SETPOINT ADJUSTMENT						X												
COM	ZONE TEMPERATURE					X										X			
DI-1	FAN STATUS		X																
DI-2	FREEZESTAT	X	X													X			
DO-2	HOT WATER VALVE											X							

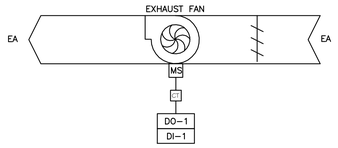
CUH SEQUENCE OF OPERATION:

A. PROVIDE SPACE TEMPERATURE SENSOR WITHOUT LED TEMPERATURE DISPLAY OR TEMPERATURE ADJUSTMENT. THE SPACE THERMOSTAT WILL OPEN THE HOT WATER VALVE AND CYCLE THE FAN WHENEVER THERE IS A CALL FOR HEAT. IF THE SPACE TEMPERATURE IS MORE THAN 0.5 DEGREE F BELOW THE HEATING SET-POINT, THE VALVE WILL OPEN. WHEN THE SPACE TEMPERATURE IS 0.5 DEGREE F ABOVE THE HEATING SET-POINT, THE VALVE WILL CLOSE.

B. FAN STATUS: THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

C. SAFETIES:

1. LOW TEMPERATURE PROTECTION (CUH-7 ONLY): A LOW TEMPERATURE DETECTOR (FREEZESTAT) DIRECTLY AFTER THE PRE-HEAT COIL DE-ENERGIZES THE SUPPLY FAN WHEN TEMPERATURES BELOW 38 DEGREES F ARE SENSED.



EXHAUST FAN POINTS LIST																			
		INPUTS								OUTPUTS									
		DIGITAL			ANALOG					DIGITAL		ANALOG							
POINT TAG	POINT DESCRIPTION	SAFETY SHUT DOWN	STATUS	OCC OVERRIDE	PRESSURE	TEMPERATURE	SETPOINT	HUMIDITY	POSITION	START/STOP	ON/OFF	DAMPER ACTUATOR	MODULATE	SPEED		ALARM			REMARKS
DI-1	EXHAUST FAN STATUS		X													X			
DO-1	EXHAUST FAN START/STOP										X								

EXHAUST FAN (EF-5) SEQUENCE OF OPERATION:

A. THE EXHAUST FAN SHALL BE INTERLOCKED TO OPERATE ON BUILDING OCCUPANCY SCHEDULE WITH ASSOCIATED DOAS-1.

B. OCCUPIED MODE: THE EXHAUST FAN SHALL START.

C. UNOCCUPIED MODE: THE FAN SHALL STOP.

D. THE BAS SHALL MONITOR THE STATUS OF THE EXHAUST FAN (VIA CS) AND GENERATE AN ALARM IF THE FAN FAILS TO RESPOND TO A START/STOP COMMAND.

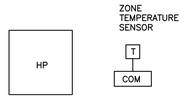
EXHAUST FAN (EF-6) SEQUENCE OF OPERATION:

A. THE EXHAUST FAN SHALL OPERATE UPON LEAK DETECTION SIGNAL FROM A2L REFRIGERANT SENSOR IN IHRU AND RECEIVE AN ENABLE SIGNAL FROM VRF SYSTEM ENABLE EXHAUST FAN.

B. THE BMS SHALL MONITOR THE STATUS OF THE EXHAUST FAN (VIA CS) AND GENERATE AN ALARM IF THE FAN FAILS TO RESPOND TO A START/STOP COMMAND.

1 EF CONTROLS
NO SCALE

3 CUH CONTROLS
NO SCALE



VRF SEQUENCE OF OPERATION:

A. VRF SYSTEM SHALL BE OPERATED BY MANUFACTURER CONTROLS. THE CONTROLLER SHALL INDEX THE INDOOR UNIT SUPPLY FAN TO RUN CONTINUOUSLY WHILE IN OCCUPIED MODE. ALL NEW UNITS SHALL BE INTEGRATED INTO THE OPERATOR'S WORKSTATION UTILIZING THE BACNET INTERFACE PROVIDED BY THE UNIT MANUFACTURER.

B. VRF REFRIGERANT LEAK DETECTION: UPON LEAK DETECTION FROM INTEGRAL A2L REFRIGERANT SENSOR, MANUFACTURER PROVIDED CONTROLS SHALL CLOSE AUTOMATIC SHUTOFF VALVES AND ENABLE INDOOR FAN. AN EXTERNAL SIGNAL SHALL BE SENT TO THE BAS. THE ASSOCIATED DOAS-2 SHALL BE PROGRAMMED TO ENABLE IN OCCUPIED MODE BY THE ATC CONTRACTOR. THE IHRU EXHAUST FAN EF-6 SHALL BE ENABLED TO RUN.

C. DISPLAY THE FOLLOWING INFORMATION:

1. ROOM #
2. OCCUPANCY MODE
3. ZONE TEMPERATURE & SETPOINT
4. ZONE TEMPERATURE ALARM
5. UNIT ON/OFF
6. FAN SPEED
7. A2L REFRIGERANT LEAK ALARM
8. FULL GRAPHICAL REPRESENTATION OF UNIT AND ALL ASSOCIATED POINTS.

3 VRF CONTROLS
NO SCALE

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ISSUE HISTORY

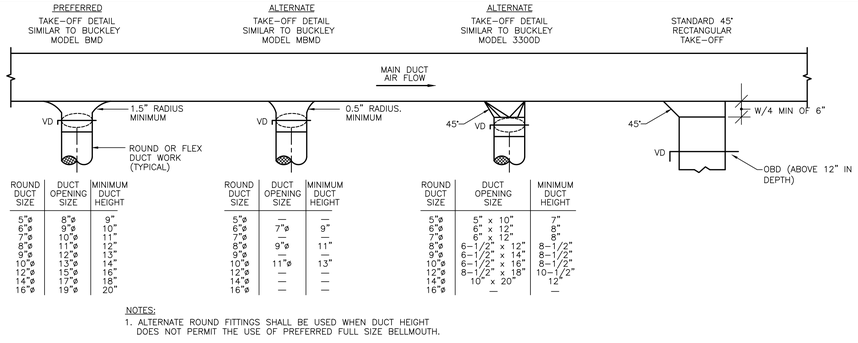
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SHEET TITLE

MECHANICAL CONTROLS

DRAWING NUMBER

M402



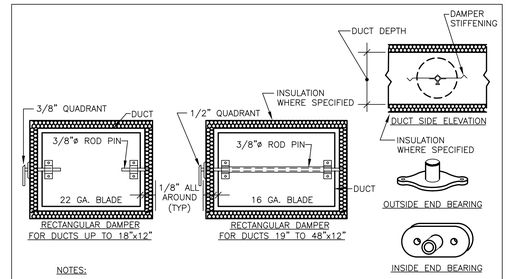
ROUND DUCT SIZE	DUCT OPENING SIZE	MINIMUM DUCT HEIGHT
5"ø	8"ø	9"
6"ø	9"ø	10"
7"ø	10"ø	11"
8"ø	11"ø	12"
9"ø	12"ø	13"
10"ø	13"ø	14"
12"ø	15"ø	16"
14"ø	17"ø	18"
16"ø	19"ø	20"

ROUND DUCT SIZE	DUCT OPENING SIZE	MINIMUM DUCT HEIGHT
5"ø	—	—
6"ø	7"ø	9"
7"ø	—	—
8"ø	9"ø	11"
9"ø	—	—
10"ø	11"ø	13"
12"ø	—	—
14"ø	—	—
16"ø	—	—

ROUND DUCT SIZE	DUCT OPENING SIZE	MINIMUM DUCT HEIGHT
5"ø	5" x 10"	7"
6"ø	6" x 12"	8"
7"ø	6" x 12"	8"
8"ø	6–1/2" x 12"	8–1/2"
9"ø	6–1/2" x 14"	8–1/2"
10"ø	6–1/2" x 16"	8–1/2"
12"ø	8–1/2" x 18"	10–1/2"
14"ø	10" x 20"	12"
16"ø	—	—

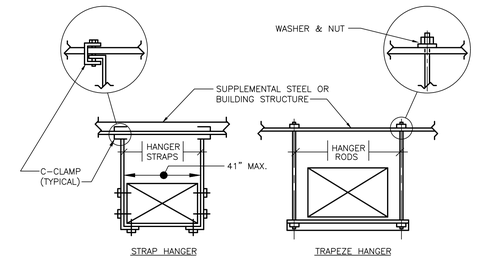
NOTES:
1. ALTERNATE ROUND FITTINGS SHALL BE USED WHEN DUCT HEIGHT DOES NOT PERMIT THE USE OF PREFERRED FULL SIZE BELLMOUTH.

1 DUCT TAKEOFF DETAIL — NOT TO SCALE



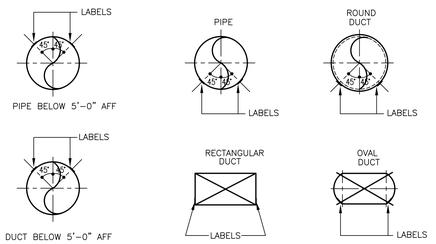
NOTES:
1. FOR RECTANGULAR DUCTS OVER 12" HIGH, PROVIDE OPPOSED BLADE DAMPER.
2. ALL BRANCH DUCTS (SUPPLY, RETURN & EXHAUST) SHALL HAVE VOLUME DAMPERS, INCLUDING RUNOUTS TO DIFFUSERS.
3. ALL QUADRANT OPERATORS SHALL BE EXTENDED TO OUTSIDE OF INSULATION.

2 VOLUME DAMPER DETAIL (SINGLE BLADE) — NOT TO SCALE

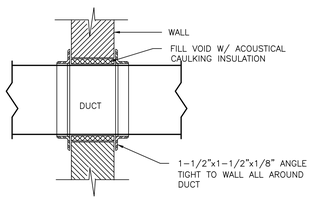


NOTES:
1. NO POP RIVETS ALLOWED, USE SELF-TAPPING SHEETMETAL SCREWS ONLY.

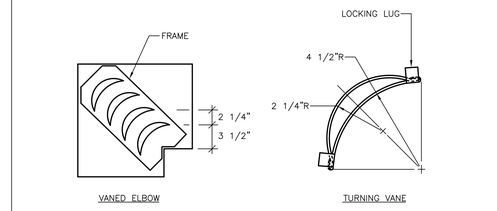
3 DUCT HANGER DETAIL — NOT TO SCALE



4 DUCT AND PIPE IDENTIFICATION LABELING DETAIL — NOT TO SCALE

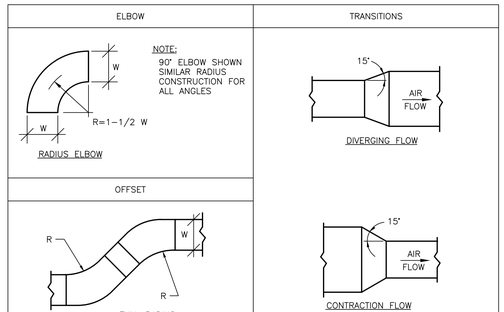


5 ACOUSTICAL CAULKING OF DUCT DETAIL — NOT TO SCALE

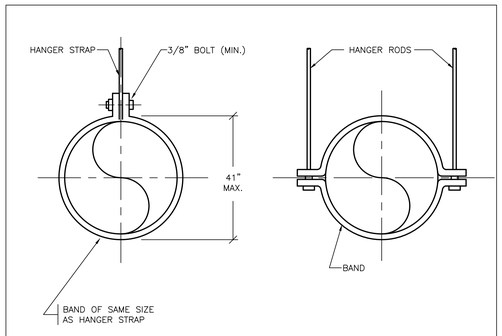


NOTES:
1. LOCKING LUGS INTEGRAL WITH VANE.
2. MAXIMUM UNSUPPORTED VANE LENGTH 48"
3. FRAMES – BOLTED OR RIVETED TO ELBOW
4. VANES AND FRAMES – SAME GAUGE AS ELBOW

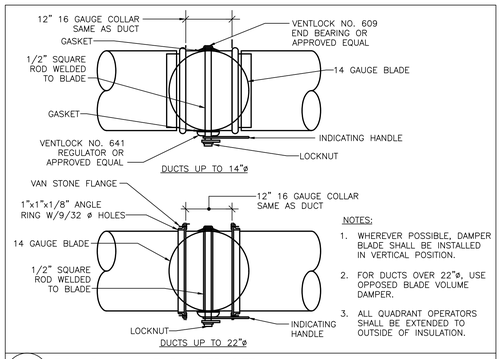
6 DOUBLE THICKNESS TURNING VANES FOR SQUARE ELBOW DETAIL — NOT TO SCALE



7 RECTANGULAR TRANSITIONS, OFFSETS AND ELBOWS DETAIL — NOT TO SCALE

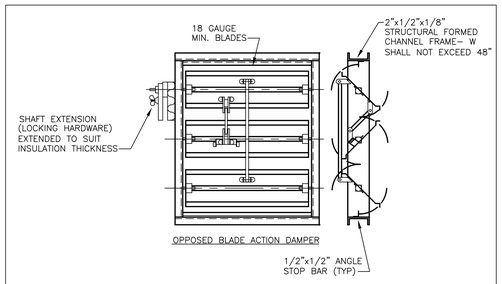


8 ROUND DUCT HANGER DETAIL — NOT TO SCALE



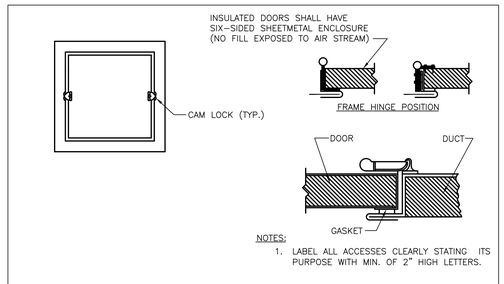
NOTES:
1. WHEREVER POSSIBLE, DAMPER BLADE SHALL BE INSTALLED IN VERTICAL POSITION.
2. FOR DUCTS OVER 22"ø, USE OPPOSED BLADE VOLUME DAMPER.
3. ALL QUADRANT OPERATORS SHALL BE EXTENDED TO OUTSIDE OF INSULATION.

9 ROUND VOLUME DAMPER DETAIL — NOT TO SCALE



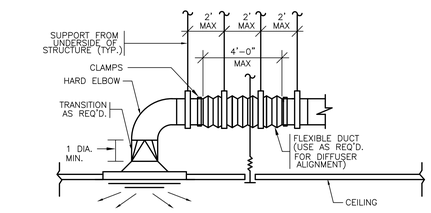
NOTES:
1. FOR RECTANGULAR DUCTS OVER 12" HIGH, PROVIDE OPPOSED BLADE DAMPER.
2. ALL BRANCH DUCTS (SUPPLY, RETURN & EXHAUST) SHALL HAVE VOLUME DAMPERS, INCLUDING RUNOUTS TO DIFFUSERS.

10 OPPOSED BLADE VOLUME DAMPER DETAIL — NOT TO SCALE



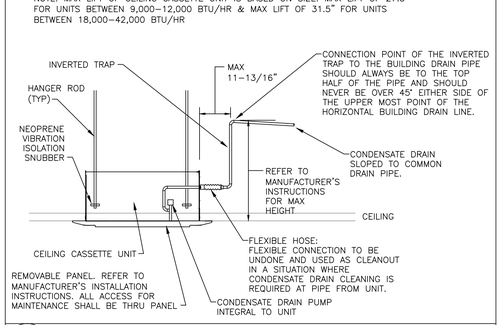
NOTES:
1. LABEL ALL ACCESSES CLEARLY STATING ITS PURPOSE WITH MIN. OF 2" HIGH LETTERS.

11 OUTDOOR DUCT INSULATED ACCESS DOOR DETAIL — NOT TO SCALE

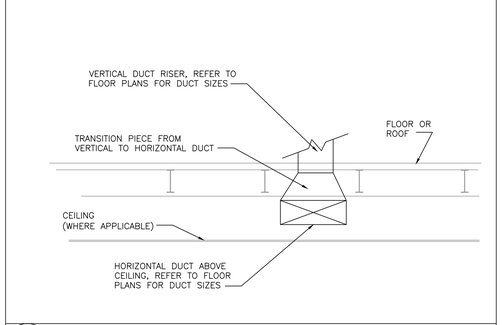


NOTES:
① MAXIMUM SAG 1/2" PER FOOT.

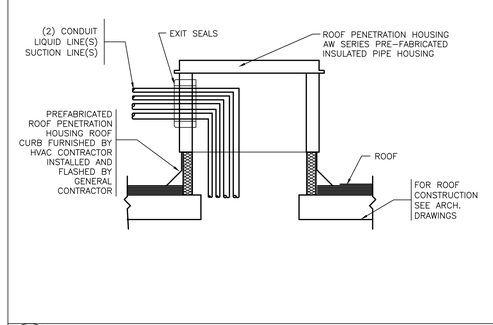
12 SUPPLY DIFFUSER CONNECTION DETAIL — NOT TO SCALE



13 CEILING CASSETTE UNIT DRAIN DETAIL — NOT TO SCALE



14 TYPICAL VERTICAL TO HORIZONTAL DUCT TRANSITION DETAIL — NOT TO SCALE



15 RS & RL PIPE ROOF CURB DETAIL — NOT TO SCALE

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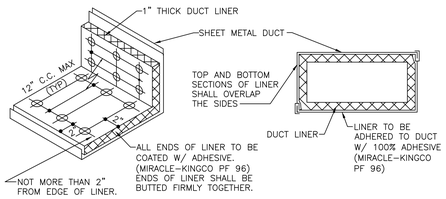
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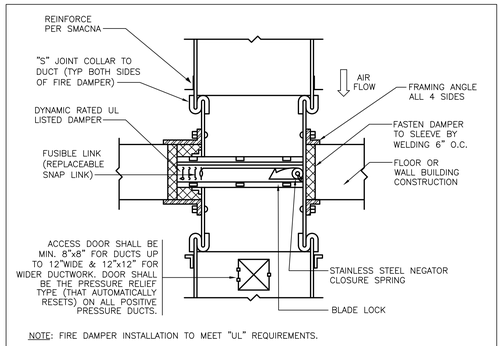
MECHANICAL DETAILS

DRAWING NUMBER

M501

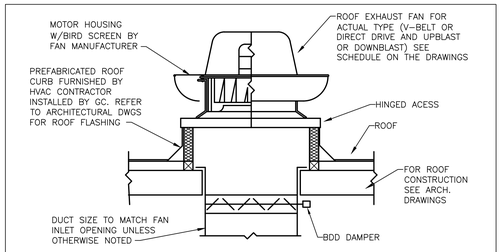


1 DUCT LINER INSTALLATION DETAIL — NOT TO SCALE



NOTE: FIRE DAMPER INSTALLATION TO MEET "UL" REQUIREMENTS.

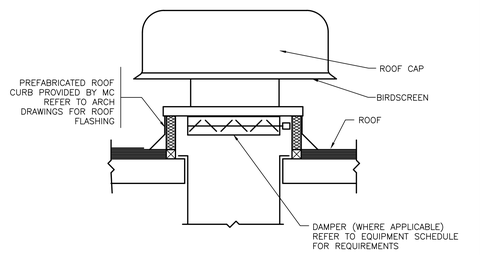
2 FIRE DAMPER WITH BLADES OUTSIDE THE AIRSTREAM DETAIL — NOT TO SCALE



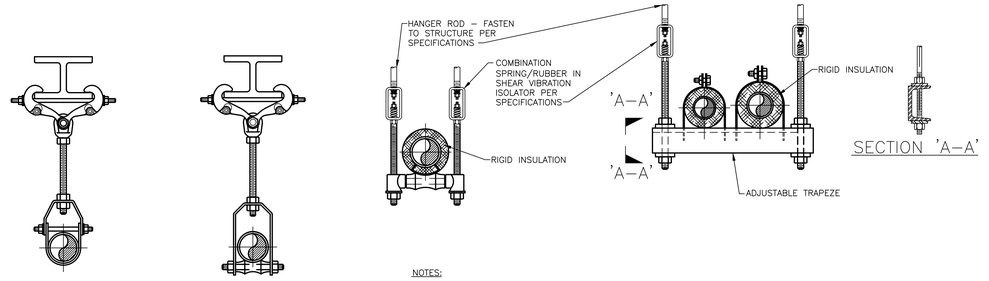
NOTE:

1. FOR HINGED FAN CURB REQUIREMENTS (WHERE REQUIRED), REFER TO SCHEDULES ON THE DRAWINGS AND/OR SPECIFICATION.

3 ROOF EXHAUST FAN DETAIL (UPBLAST TYPE) — NOT TO SCALE



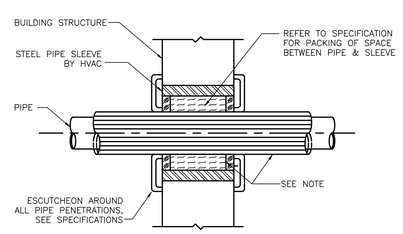
4 ROOF CAP DETAIL — NOT TO SCALE



NOTES:

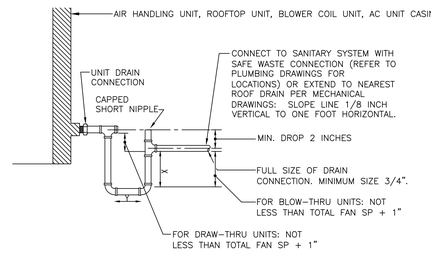
1. SIZE HANGER CLAMP TO ADEQUATELY SUPPORT LOAD.
2. IF USING INSULATED PIPE, SIZE HANGER PROPERLY AND USE INSULATION SHIELDS FOR COLD LINES AND PROTECTION SADDLES FOR HOT LINES.

5 PIPE HANGER AND PIPE ROLLER DETAIL — NOT TO SCALE



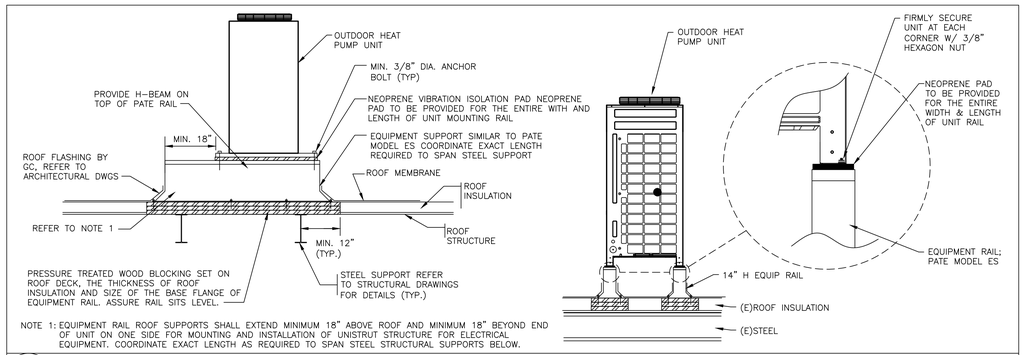
NOTE: PIPE SLEEVES SHALL BE LARGE ENOUGH TO ALLOW PIPE & INSULATION WHERE PIPES ARE COVERED. THEY SHALL ALSO ALLOW FOR EXPANSION & CONTRACTION.

6 PIPE SLEEVE THROUGH WALL AND SLAB DETAIL — NOT TO SCALE



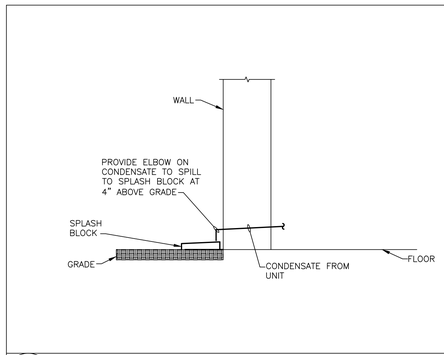
NOTE: 2X+Y SHALL EQUAL TOTAL FAN SP+2" (MINIMUM)

7 TYPICAL AIR HANDLING UNIT/BLOWER COIL/ AC, RTU UNIT CASING DRAIN DETAIL — NOT TO SCALE

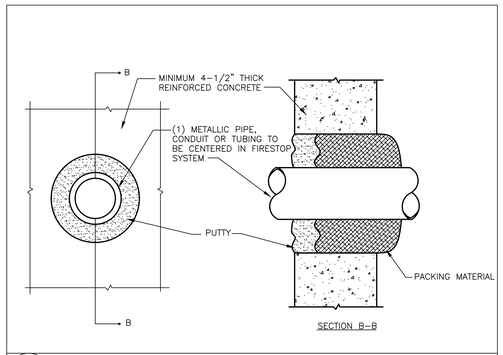


NOTE 1: EQUIPMENT RAIL ROOF SUPPORTS SHALL EXTEND MINIMUM 18" ABOVE ROOF AND MINIMUM 18" BEYOND END OF UNIT ON ONE SIDE FOR MOUNTING AND INSTALLATION OF UNISTRUT STRUCTURE FOR ELECTRICAL EQUIPMENT. COORDINATE EXACT LENGTH AS REQUIRED TO SPAN STEEL STRUCTURAL SUPPORTS BELOW.

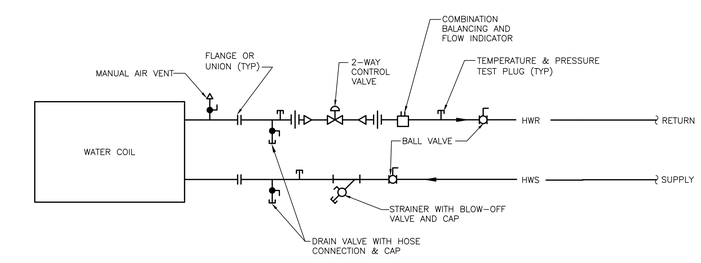
8 ROOF MOUNTED HEAT RECOVERY UNIT SUPPORT DETAIL — NOT TO SCALE



9 CONDENSATE SPILL TO GRADE DETAIL — NOT TO SCALE



10 UL 1479 THROUGH-PENETRATION FIRESTOP SYSTEM C-AJ-5347 (TYP) — NOT TO SCALE



11 COIL PIPING DETAIL (2-WAY VALVE) — NOT TO SCALE

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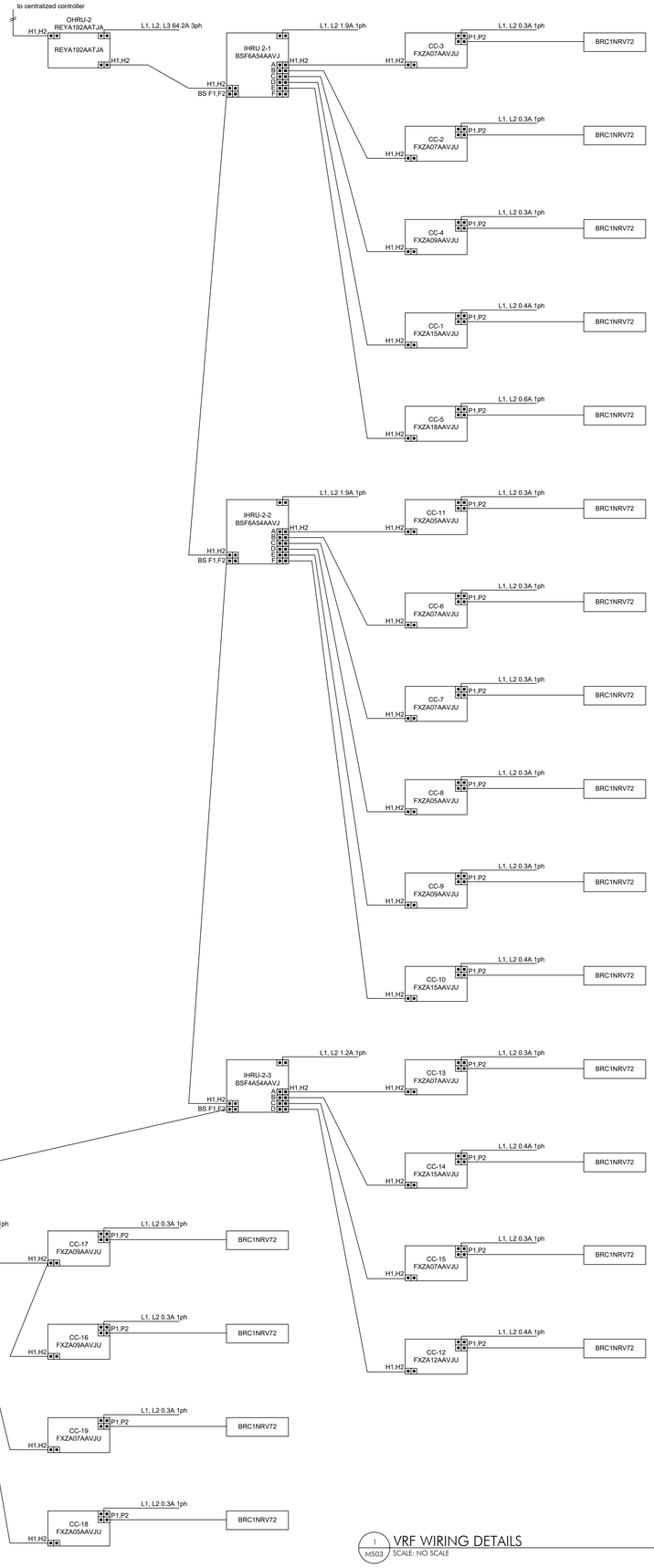
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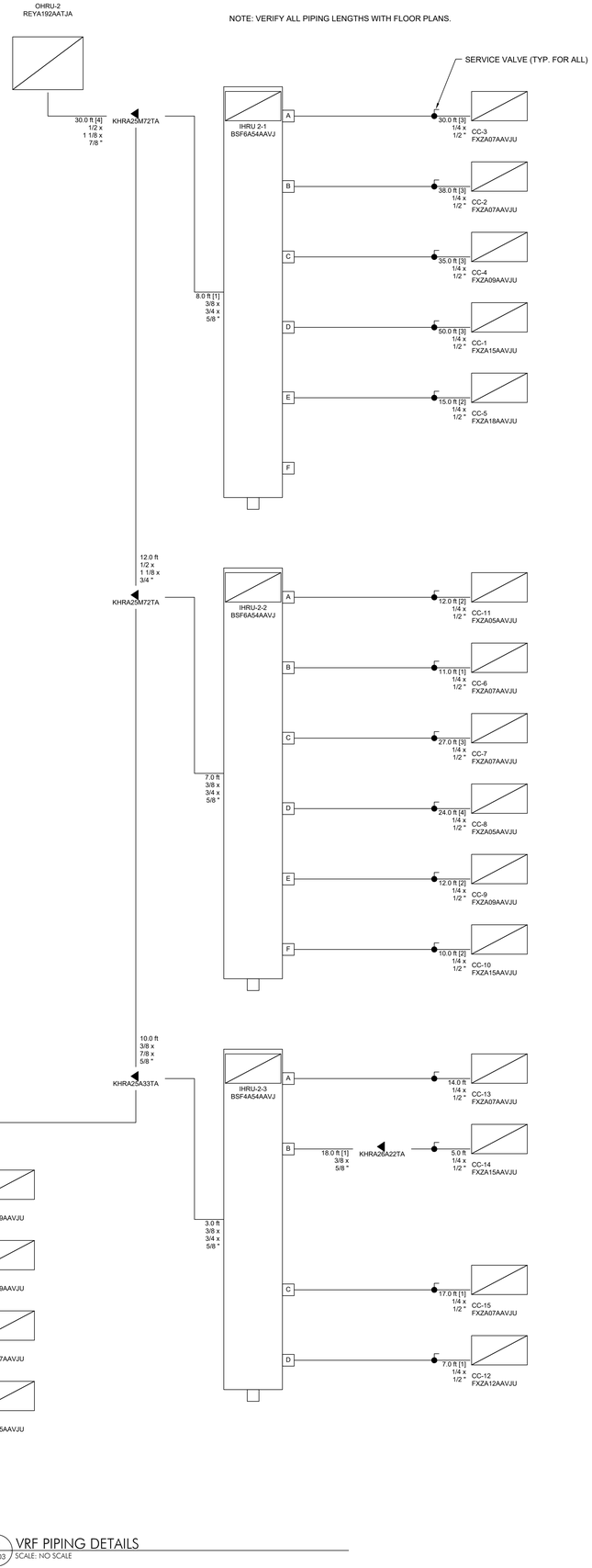
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1 M503 VRF WIRING DETAILS
SCALE: NO SCALE



2 M503 VRF PIPING DETAILS
SCALE: NO SCALE

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