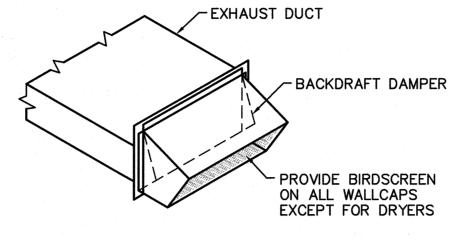
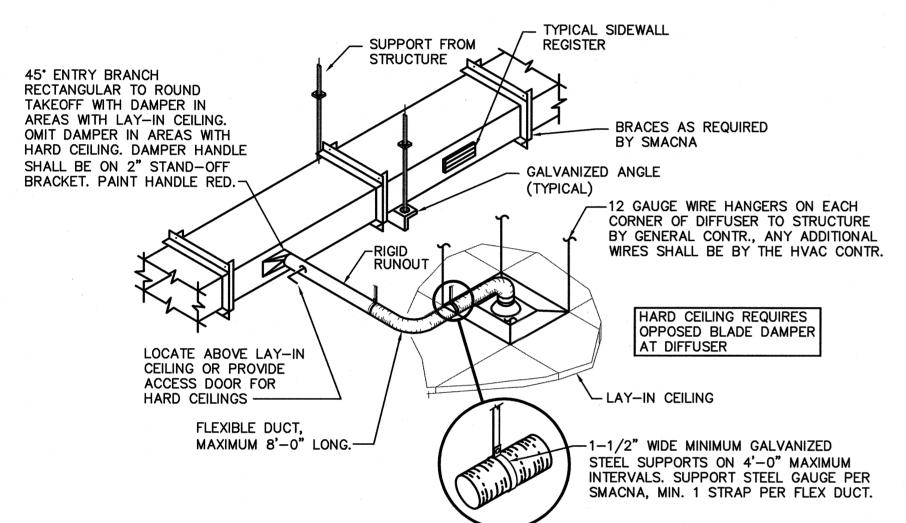
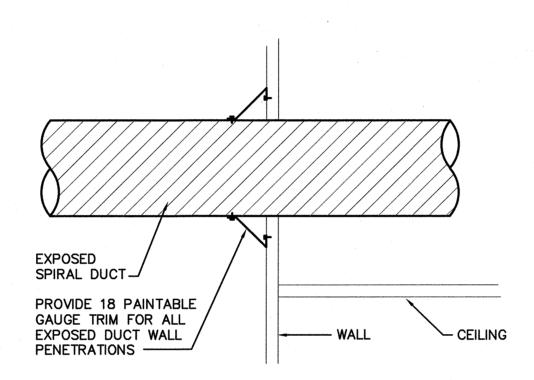


TYPICAL ROOFTOP UNIT CURB AND POWER SUPPLY DETAIL NO SCALE









ROUND DUCT COLLAR DETAIL M0.1 NO SCALE

### MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT METHOD OF COMPLIANCE COMPLIANCE PER CHAPTER 5 NORTH CAROLINA ENERGY CONSERVATION CODE — SECTIONS 503.2, 503.3 SIMPLE SYSTEMS AND 506 ADDITIONAL PRESCRIPTIVE COMPLIANCE REQUIREMENTS.

506.2.1 MORE EFFICIENT MECHANICAL EQUIPMENT **⊠** 506.2.2 REDUCED LIGHTING POWER DENSITY

506.2.3 ENERGY RECOVERY VENTILATION SYSTEMS

506.2.4 HIGHER EFFICIENCY SERVICE WATER HEATING 506.2.5 ON-SITE SUPPLY OF RENEWABLE ENERGY 506.2.6 AUTOMATIC DAYLIGHTING CONTROL SYSTEM

COMPLIANCE PER CHAPTER 5 NORTH CAROLINA ENERGY CONSERVATION CODE — SECTIONS 503.2, 503.4 COMPLEX SYSTEMS AND 506 ADDITIONAL PRESCRIPTIVE COMPLIANCE REQUIREMENTS.

506.2.1 MORE EFFICIENT MECHANICAL EQUIPMENT 506.2.2 REDUCED LIGHTING POWER DENSITY

506.2.3 ENERGY RECOVERY VENTILATION SYSTEMS

506.2.4 HIGHER EFFICIENCY SERVICE WATER HEATING 506.2.5 ON-SITE SUPPLY OF RENEWABLE ENERGY 506.2.6 AUTOMATIC DAYLIGHTING CONTROL SYSTEM

COMPLIANCE PER CHAPTER 5 NORTH CAROLINA ENERGY CONSERVATION CODE — SECTION 507 TOTAL ENERGY PERFORMANCE.

COMPLIANCE PER ASHRAE/IESNA STANDARD 90.1-2007 AND EXCEEDING STANDARD 90.1 APPENDIX G

COMPLIANCE PER NORTH CAROLINA SPECIFIC COMCHECK.

CLIMATE ZONE 3A

EXTERIOR DESIGN CONDITIONS winter dry bulb: 26F summer dry bulb: 92F DB/76F WB

INTERIOR DESIGN CONDITIONS winter dry bulb: 68°F summer dry bulb: 70°F relative humidity: 50%

BUILDING HEATING LOAD: BLOCK LOAD = 175.6 MBH BUILDING COOLING LOAD: BLOCK LOAD = 17.1 TONS

MECHANICAL SPACING CONDITIONING SYSTEM

> SEE SCHEDULES ON SHEET M2.1 cooling efficiency: heat output of unit: cooling output of unit:

Chiller: N/A total chiller capacity. If oversized, state reason.

LIST EQUIPMENT EFFICIENCIES: SEE SCHEDULES ON SHEET M2.1 EQUIPMENT SCHEDULES WITH MOTORS (MECHANICAL SYSTEMS)

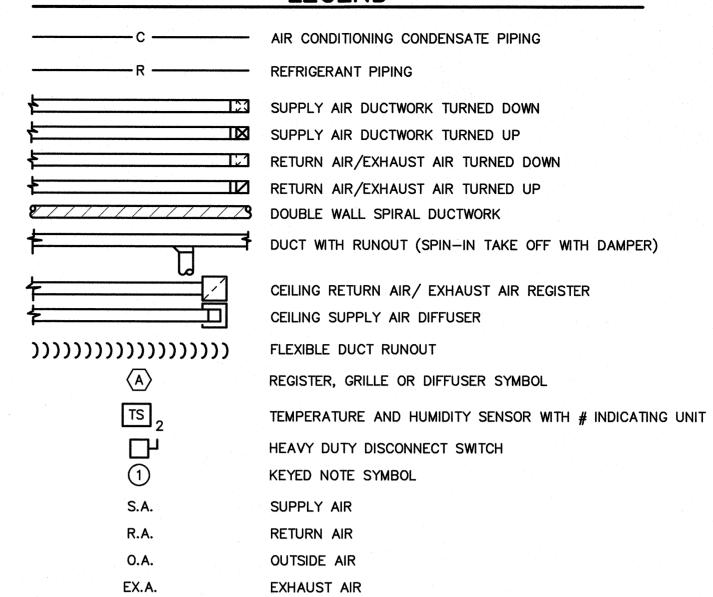
number of phases: SEE SCHEDULES ON SHEET M2.1 minimum efficiency:

#### DESIGNER STATEMENT

To the best of my knowledge and belief, the design of this building complies with the mechanical systems, service systems and equipment requirements of the North Carolina

Professional Engineer

#### **LEGEND**



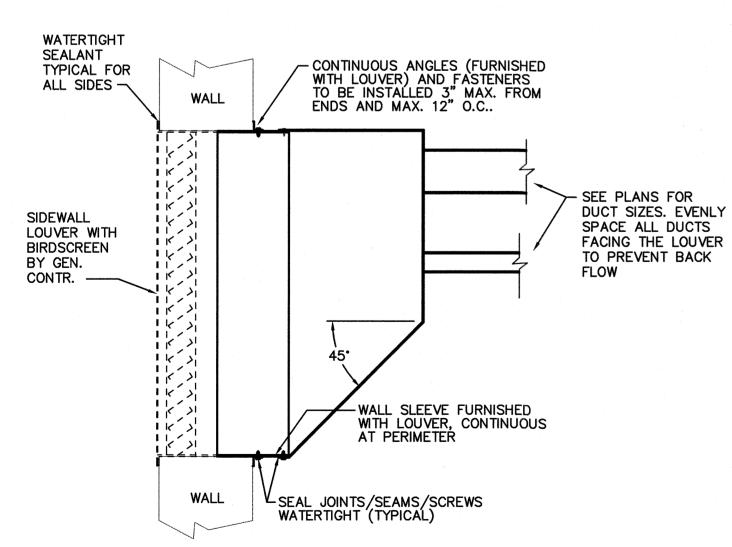
M.D. MANUAL DAMPER M.O.D. MOTOR OPERATED DAMPER A.F.F. ABOVE FINISHED FLOOR FIN. FL. FINISHED FLOOR A.F.G. ABOVE FINISHED GRADE CONC. CONCRETE CONTINUATION

CONT. CONTR. CONTRACTOR SWITCH

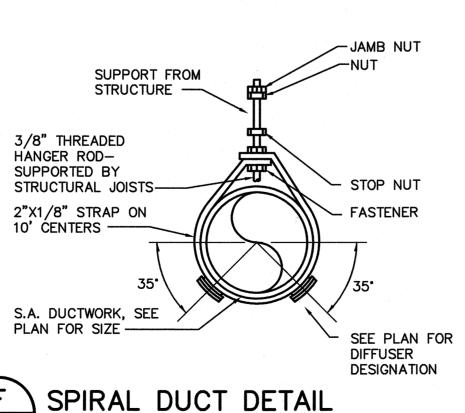
> SMOKE DETECTOR WITH DUCT ACCESS DOOR, ACCESS DOOR BY THE MECH. CONTR., DETECTOR FURNISHED BY THE ELECT. CONTR. AND INSTALLED BY THE MECH. CONTR. PROVIDE CEILING ACCESS DOOR (16"X16" MIN.) WHERE NECESSARY.

### **GENERAL NOTES:**

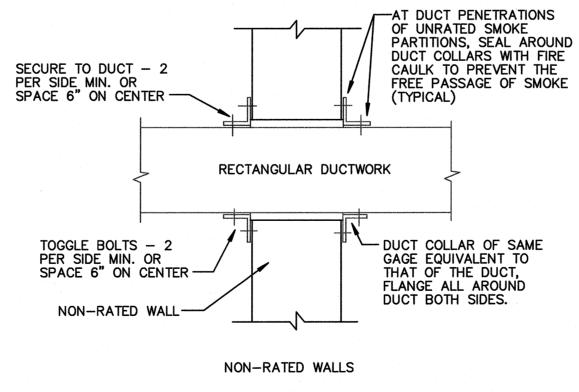
- 1. HVAC CONTRACTOR SHALL FIELD VERIFY ALL RELEVANT DIMENSIONS, CLEARANCES, LOCATIONS AND ELEVATIONS PRIOR TO ORDERING, FABRICATION, AND INSTALLATION OF HIS WORK. DISCREPANCIES OR INTERFERENCE'S SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER AS SOON AS POSSIBLE. THE DRAWINGS DIAGRAMMATICALLY INDICATE THE GENERAL LOCATION OF DUCTS, PIPING AND EQUIPMENT AND DO NOT SHOW ALL SUPPORTS, OFFSETS, FITTINGS, BOLTS, CONNECTIONS, ETC. REQUIRED FOR A COMPLETE SYSTEM. WHILE THE DRAWINGS ARE TO BE FOLLOWED AS CLOSELY AS POSSIBLE, IF IT IS FOUND NECESSARY TO CHANGE THE LOCATION OF ANY WORK TO ACCOMMODATE THE CONDITIONS AT THE BUILDING, SUCH CHANGES SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER, AND AS DIRECTED BY THE ENGINEER.
- 2. ALL SUPPLY AND RETURN CONNECTIONS TO AHU SHALL BE MADE WITH A FLEXIBLE DUCT
- 3. DUCTWORK, ETC., SHALL NOT BE SUPPORTED FROM BAR JOIST BRIDGING OR ROOFDECK. EQUIPMENT SUPPORTED BY BAR JOISTS SHALL HAVE SUPPORTS ATTACHED AS CLOSE AS POSSIBLE TO BAR JOIST PANEL POINTS. HVAC CONTRACTOR SHALL SUPPLY ANY AND ALL STRUCTURAL MEMBERS NECESSARY TO SUPPORT WORK BETWEEN BAR JOISTS, BEAMS, ETC.
- 4. ALL DUCT JOINTS SHALL BE SEALED AS SPECIFIED.
- 5. IN AREAS WITH GYPBOARD CEILINGS, HVAC CONTRACTOR SHALL INSTALL EQUIPMENT. DUCTWORK AND PIPE HANGERS PRIOR TO GYPBOARD INSTALLATION. GENERAL CONTRACTOR TO PROVIDE CEILING ACCESS DOORS TO ANY DAMPERS ABOVE HARD CEILING.
- 6. HVAC CONTRACTOR/ CONTROLS CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR PROVISIONS OF POWER FOR CONTROL SYSTEM. ALL THERMOSTATS AND SWITCHES FOR MECHANICAL SYSTEMS SHALL BE MOUNTED 44" A.F.F..



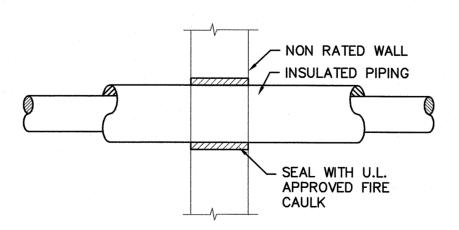








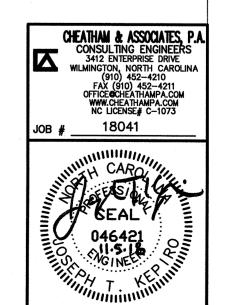




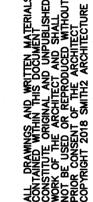
 $\langle H \rangle$ 

M0.1

NON-RATED WALLS WALL PENETRATION DETAIL NO SCALE





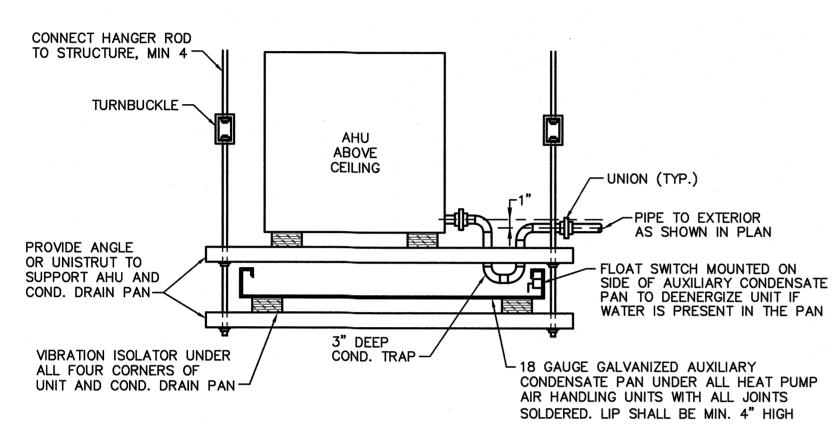




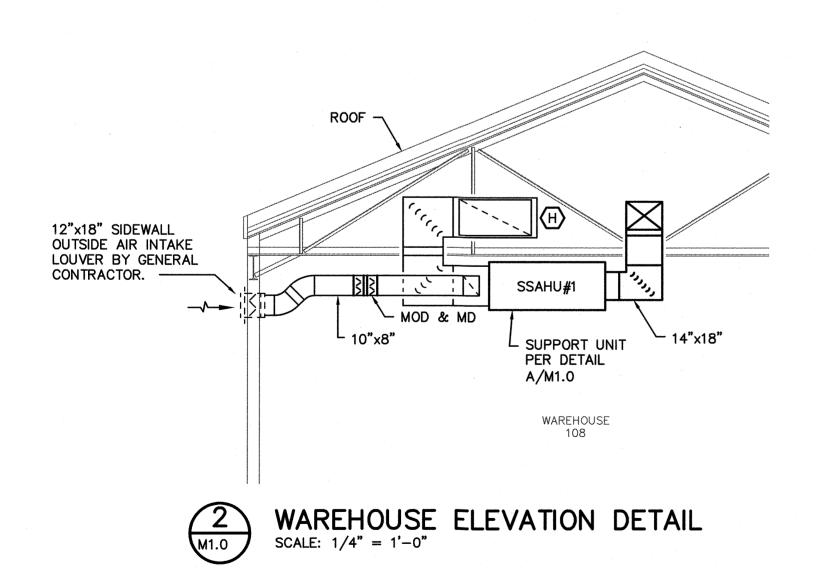
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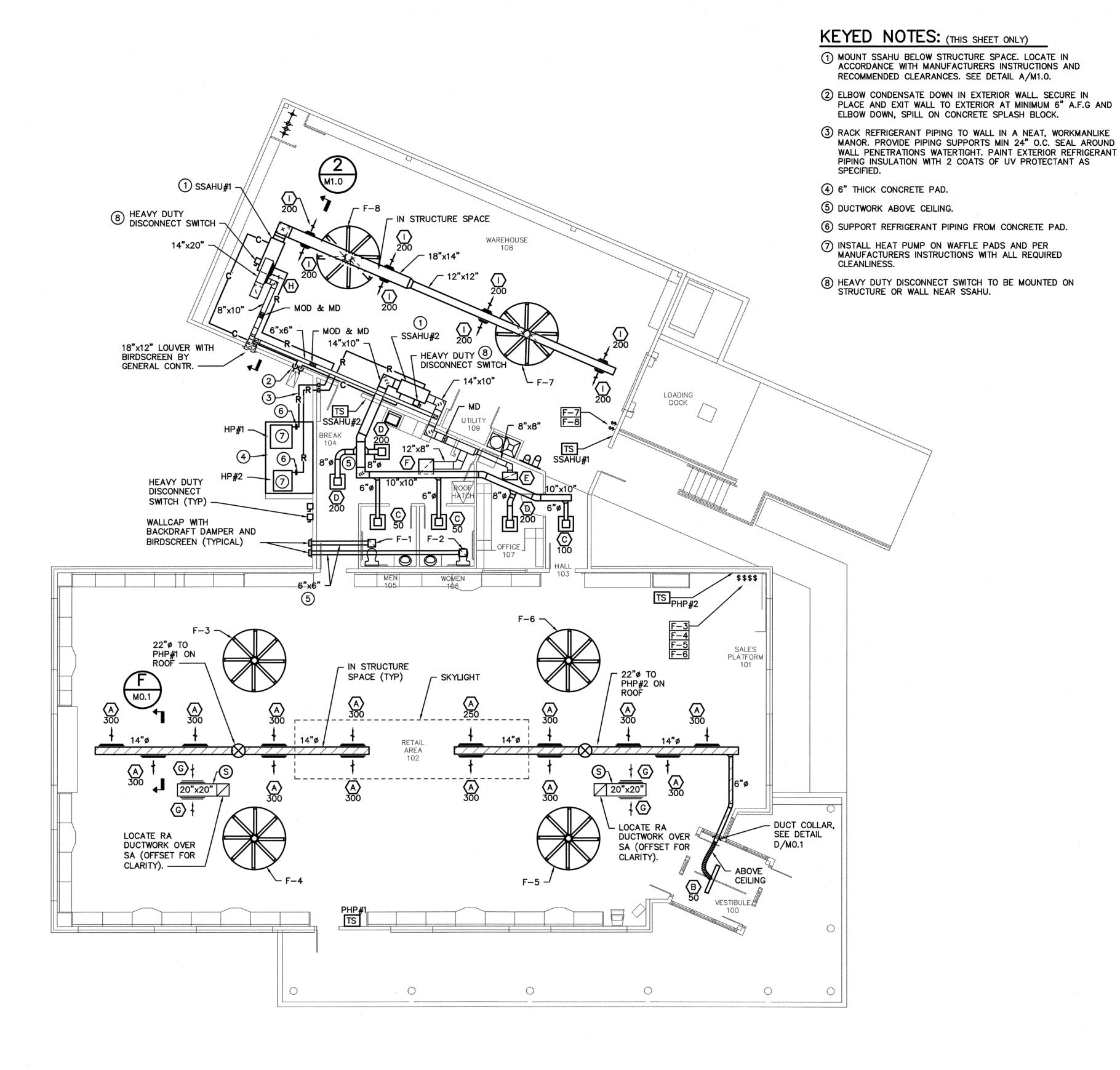
PRINTED DATE REVISION 11/1/18

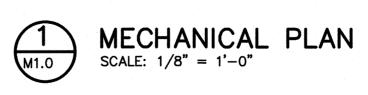
**MECHANICAL** LEGEND, **ENERGY SCHEDULE & DETAILS** 



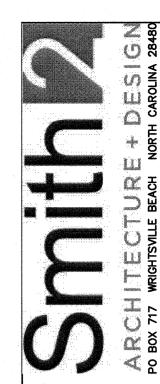
AIR HANDLING SUPPORT AND CONDENSATE PIPING DETAIL
NO SCALE











DRAWINGS AND WRITTEN MATERIA ANED WITHIN THIS DOCUMENT INTO TE ORIGINAL AND UNPUBLISHE OF THE ARCHITECT AND SHALL SE USED OR REPRODUCED WITHOUT CONTROL OF THE ARCHITECT TO THE



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MECHANICAL PLAN

M1.0

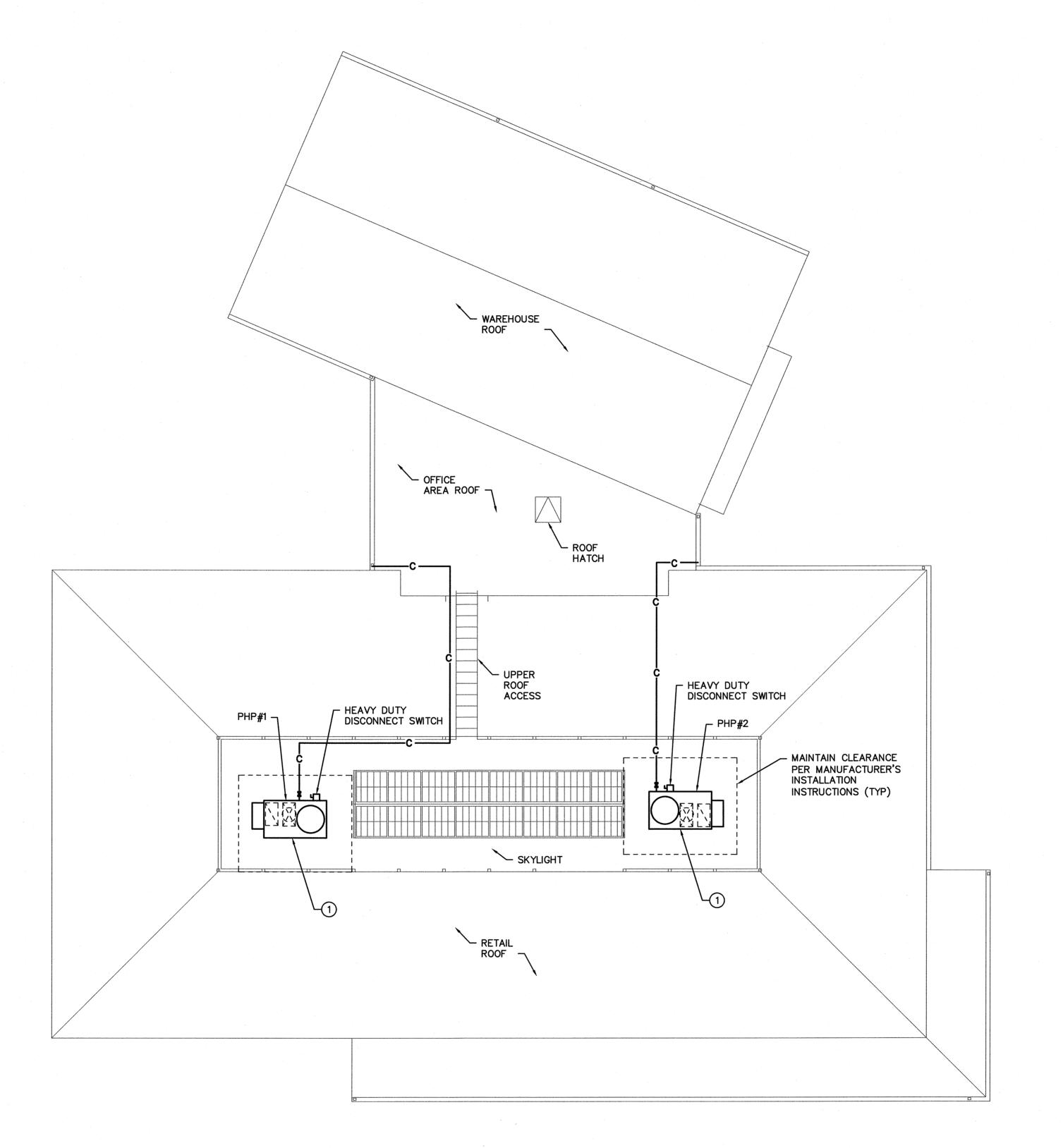
KEYED NOTES: (THIS SHEET ONLY)

1 MOUNT PHP UNITS ON ROOF CURB PER MANUFACTURERS INSTRUCTIONS AND DETAIL A/MO.1.

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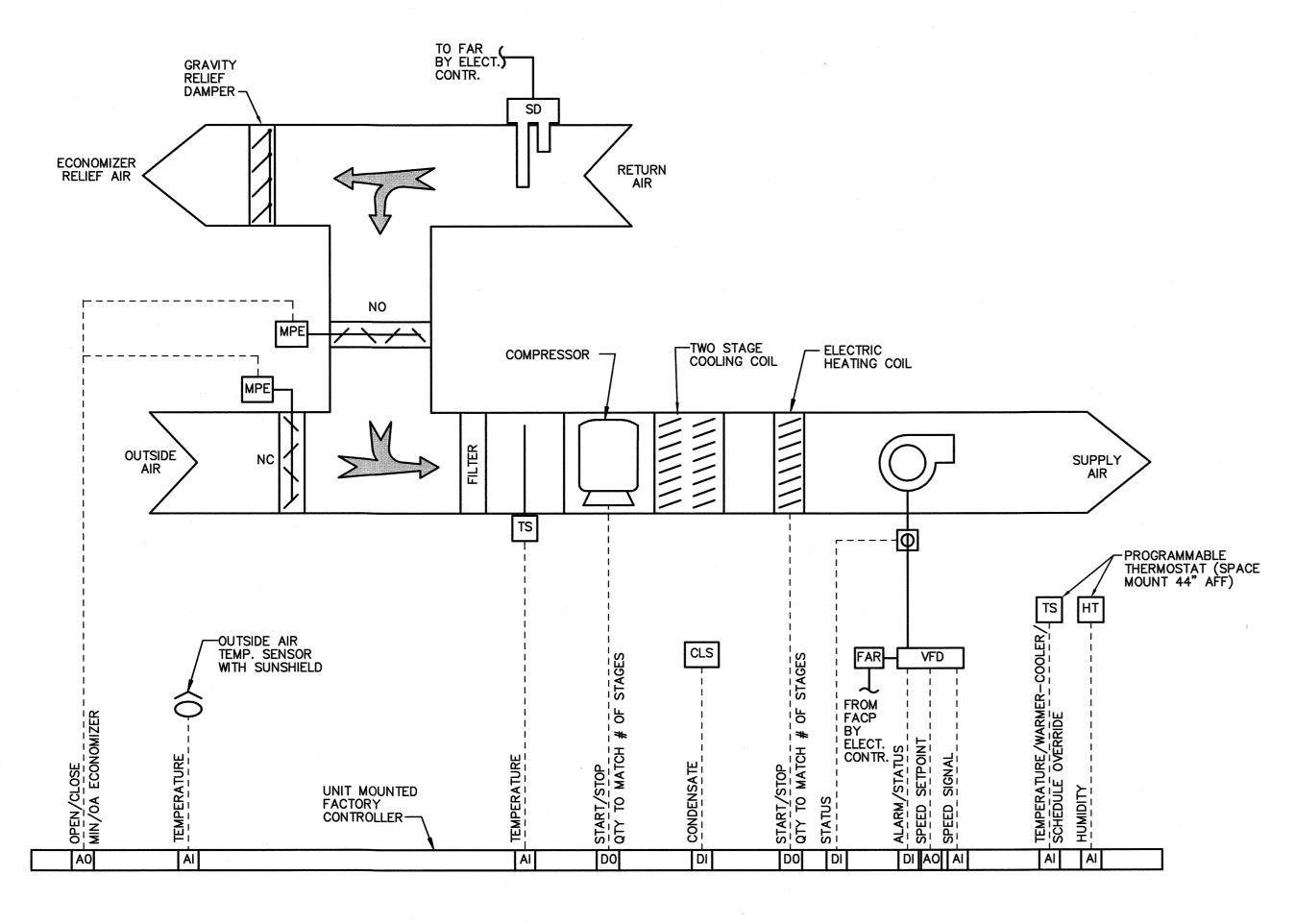
JOB # 18041

M1.1







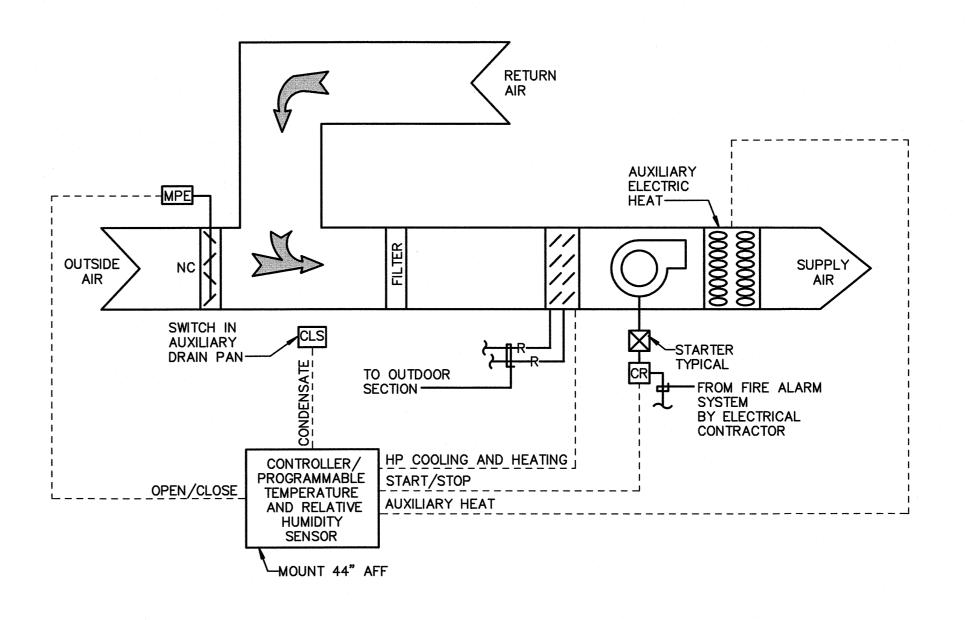


# PACKAGED HEAT PUMP UNIT, OA ECONOMIZER SEQUENCE OF OPERATION

#### A. OCCUPIED:

- THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY.
   OUTSIDE AIR DAMPER AND RETURN AIR DAMPER SHALL OPEN TO POSITIONS FOR MINIMUM OUTSIDE AIR AIRFLOW.
- WHEN THE SPACE TEMPERATURE RISES ABOVE THE COOLING SETPOINT, THE MULTI-STAGE HEAT PUMP IN HEATING AND ELECTRIC HEATING SHALL BE OFF, THE HEAT PUMP COMPRESSOR SHALL OPERATE COOLING IN STAGES TO MAINTAIN SPACE TEMPERATURE SETPOINT.
   WHEN THE SPACE TEMPERATURE FALLS BELOW THE HEATING SETPOINT, THE HEAT PUMP COOLING SHALL BE DEENERGIZED AND THE HEAT PUMP HEATING COMPRESSOR AND ELECTRIC HEAT SHALL OPERATE IN STAGES AS NECESSARY TO MAINTAIN THE SPECIFIED SPACE TEMPERATURE SETPOINT
- B. UNOCCUPIED: DURING THE UNOCCUPIED MODE, THE PHP SHALL BE ENERGIZED TO MAINTAIN THE UNOCCUPIED OR NIGHT SETBACK SPACE TEMPERATURE COOLING SETPOINT. UNIT SUPPLY FAN SHALL BE ON AND SHALL OPERATE THE SAME AS IN OCCUPIED MODE. OUTDOOR AIR DAMPERS SHALL BE CLOSED. RETURN AIR DAMPER SHALL BE OPEN FULL. COOLING COMPRESSORS SHALL OPERATE IN COOLING TO MAINTAIN SPACE TEMPERATURE SETPOINT. FAN SHALL BE OFF WHEN THE SET POINTS ARE SATISFIED. THE UNIT MAY BE RESET TO THE OCCUPIED MODE FOR A PREDETERMINED TIME PERIOD UPON A SIGNAL FROM THE THERMOSTAT.
- C. DE-HUMIDIFICATION: IF THE SPACE RELATIVE HUMIDITY RISES ABOVE A LIMIT OF 65% RH (ADJUSTABLE), PHP COOLING SHALL BE ENERGIZED. ELECTRIC REHEAT SHALL OPERATE AS NECESSARY TO MAINTAIN THE SPACE TEMPERATURE AT COOLING SET POINT. WHEN THE HUMIDITY FALLS TO 50% RH (ADJUSTABLE), THE PHP SYSTEM SHALL REVERT TO NORMAL MODE OF OPERATION.
- D. ECONOMIZER AND VENTILATION CYCLES:
- 1. DURING THE OCCUPIED PERIOD THE DAMPERS SHALL MAINTAIN MINIMUM VENTILATION RATE. MINIMUM VENTILATION RATE IS INDICATED IN PACKAGED UNIT SCHEDULE ON THE DRAWINGS. THE OUTDOOR AIR DAMPER SHALL REMAIN CLOSED DURING UNOCCUPIED PERIODS, UNOCCUPIED LOW/HIGH LIMIT CONDITIONS, AND PREPARATORY PERIODS.
- 2. DURING THE OCCUPIED PERIOD WHEN THERE IS A CALL FOR COOLING BASED ON SPACE TEMPERATURE AND OUTSIDE AIR DRY BULB TEMPERATURE IS 55 °F (ADJUSTABLE) OR LESS, ECONOMIZER MODE SHALL BE ENABLED. UNIT SHALL USE OUTDOOR AIR DAMPERS MODULATING OPEN TO 100%/RETURN AIR DAMPERS MODULATING CLOSED TO 100% TO SATISFY SPACE COOLING SETPOINT. IF OUTDOOR AIR DAMPERS ARE 100% OPEN AND SPACE TEMPERATURE RISES ABOVE THE COOLING SETPOINT, THE COMPRESSORS SHALL OPERATE IN COOLING.
- E. SAFETIES
- 1. THE ELECTRICAL CONTRACTOR WILL PROVIDE A FIRE ALARM SYSTEM RELAY ADJACENT TO EACH FAN CONTROL THROUGH WHICH THE CONTRACTOR SHALL HARDWIRE POWER TO THE UNIT WHETHER OR NOT UNIT'S CONTROLS ARE IN AUTO OR MANUAL MODES. ANY SIGNAL FROM THE FIRE ALARM SYSTEM WILL MAKE RELAY BREAK OPERATING POWER FOR THE UNIT.
- 2. UPON LOW MIXED AIR TEMP DETECTION, ALL ACTIVE COOLING, AND ECONOMIZING MODES SHALL BE DEENERGIZED IMMEDIATELY, THE
- OUTDOOR AIR DAMPERS SHALL CLOSE, RETURN AIR DAMPERS SHALL BE 100% OPEN, AND AN ALARM SHALL BE GENERATED.

  3. UPON HIGH LEVELS OF CONDENSATE IN PAN, COOLING SHALL BE DEENERGIZED.



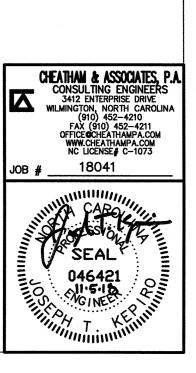
## SPLIT SYSTEM HEAT PUMP SEQUENCE OF OPERATION

- A. OCCUPIED:
  1. INDOOR FAN SHALL OPERATE CONTINUOUSLY.
  - OUTSIDE AIR DAMPERS SHALL BE OPEN.
     CONTROLLER/THERMOSTAT SHALL MONITOR SPACE TEMPERATURE AND CONTROL THE HEAT PUMP COMPRESSORS FOR COOLING (IN STAGES WHEN AVAILABLE) AND HEAT PUMP COMPRESSORS AND AUXILIARY ELECTRIC HEAT IN STAGES FOR HEATING TO MAINTAIN SPACE TEMPERATURE SET POINT.
- B. UNOCCUPIED: INDOOR FAN AND HEAT PUMP COMPRESSORS AND AUXILIARY ELECTRIC HEAT SHALL OPERATE IN STAGES, CYCLING ON AND OFF AS NECESSARY TO MAINTAIN SPACE TEMPERATURE AT UNOCCUPIED HEATING AND COOLING SET POINTS. OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED.
- C. DE-HUMIDIFICATION: IF SPACE RELATIVE HUMIDITY RISES ABOVE A LIMIT OF 65% RH (ADJ.), HEAT PUMP COMPRESSORS SHALL OPERATE FOR COOLING (IN STAGES WHEN AVAILABLE). AUXILIARY ELECTRIC HEATING SHALL OPERATE AS NECESSARY TO MAINTAIN SPACE COOLING TEMPERATURE SET POINT. WHEN SPACE RELATIVE HUMIDITY DROPS TO 50% RH (ADJ.), HEAT PUMP SYSTEM SHALL RETURN TO NORMAL MODE OF OPERATION.
- D. SAFETIES:

  1. THE ELECTRICAL CONTRACTOR WILL PROVIDE A FIRE ALARM SYSTEM RELAY ADJACENT TO EACH FAN CONTROL THROUGH WHICH THE CONTRACTOR SHALL HARDWIRE POWER TO THE UNIT WHETHER OR NOT UNIT'S CONTROLS ARE IN AUTO OR MANUAL MODES. ANY SIGNAL FROM THE FIRE ALARM SYSTEM WILL MAKE RELAY BREAK OPERATING POWER FOR THE UNIT.
- UPON HIGH LEVELS OF CONDENSATE IN PAN, COOLING SHALL BE DE-ENERGIZED.
   FOR SSAHU#1 & HP#1 ONLY, ON SIGNAL THAT OVERHEAD EXTERIOR DOOR IN WAREHOUSE AREA IS OPEN, DEENERGIZE HEATING AND/OR COOLING UNTIL ALL DOORS ARE CLOSED.

$\triangle$	$\bigcirc$	
$( ) \cup ( $	$\sim$ YMH(1)	
CONTROL		

CONT	NOL STRIDOL LLGLIND
PHP	PACKAGED HEAT PUMP UNIT
HP	HEAT PUMP
SSAHU	SPLIT SYSTEM AIR HANDLING UNIT
TS	TEMPERATURE SENSOR
НТ	HUMIDITY SENSOR
VFD	VARIABLE FREQUENCY DRIVE
VAV	VARIABLE AIR VOLUME
CR	CONTROL RELAY
M2E	MOTOR OPERATED TWO POSITION ELECTRIC
MPE	MOTOR OPERATED PROPORTIONAL ELECTRIC
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
FAR	FIRE ALARM RELAY
CLS	CONDENSATE LEVEL SENSOR
SA	SUPPLY AIR
RA	RETURN AIR
OA	OUTSIDE AIR
$\boxtimes$	STARTER
Φ	CURRENT SENSOR









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MECHANICAL CONTROL DIAGRAMS

M2.0

				SPLIT :	SYS	TEM H	EAT P	JMF	UNIT	SCHE	DULE			
	A	IR HANDLI	NG UNI	SECTION	-			OU	ITDOOR HEAT	T PUMP SEC	TION			
					ELECTRICAL			COOLING	HEATING		DEMARKS			
SYMBOL	TOTAL CFM	OUTSIDE CFM	S.P. "H20 (1)	STRIP HEAT (KW)	FAN HP	VOLTAGE & PHASE	SYMBOL	МСА	MAX FUSE	VOLTAGE & PHASE	CAPACITY MBH (2)	CAPACITY MBH (3)	MIN SEER	REMARKS
SSAHU#1	1600	270	0.50	11.53	1/2	208V-3ø	HP#1	18	30	208V-3ø	47,500	29,600	13.25	
SSAHU#2	800	100	0.50	7.2	1/3	208V-3ø	HP#2	14	25	208V-3ø	23,000	13,100	14.5	

- (1) EXT. S.P. INCLUDES SUPPLY & RETURN AIR DUCTWORK. FILTERS IN UNIT ARE NOT INCLUDED IN THIS FIGURE.
- (2) CAPACITY WHEN MATCHED WITH INDOOR HEAT PUMP SECTION AT ARI CONDITIONS.
- (3) CAPACITY AT 17° F OUTSIDE AIR TEMPERATURE.

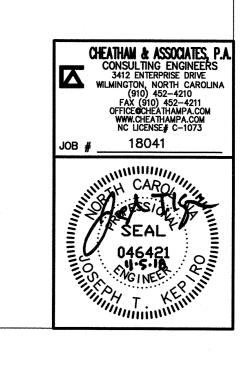
					PACK	AGED	HEA	T P	UMP	UNI	T SCH	EDULE
	AIR QL	JANTITY	EXT	CAP	ACITY				ELE	CTRICAL		
SYMBOL	TOTAL CFM	OUTSIDE CFM (3)	SP "H20 (1)	COOLING BTUH (2)	HEATING BTUH	EER FULL LOAD	COP	STRIP HEAT KW	MCA	моср	VOLTAGE	REMARKS
PHP#1	2100	375	0.50	75.0	39.0	11.4	2.3	13.5	82	90	208-3Ø	RETAIL AREA 106
PHP#2	2100	375	0.50	75.0	39.0	11.4	2.3	13.5	82	90	208-3Ø	RETAIL AREA 106

- (1) EXT. S.P. INCLUDES SUPPLY & RETURN AIR DUCTWORK. MERV 8 FILTERS ARE NOT INCLUDED IN THIS FIGURE.
- (2) CAPACITY AT AHRI CONDITIONS.
- (3) MIN. OUTSIDE AIR CFM INDICATED IS FOR OCCUPIED MODE. MAX CFM SHALL INCREASE HIGHER AS NECESSARY BASED ON 100% OA ECONOMIZER CONTROL WITH BARAMETRIC RELIEF. SEE SPECIFIED SEQUENCE OF OPERATION FOR FURTHER DESCRIPTION OF OA ECONOMIZER OPERATION.

		REGIS1	TER, GRILLE & DIFFUSER	SCHED	ULE
SYMBOL	C.F.M.	NECK SIZE	TYPE	RUNOUT SIZE	REMARKS
A	100/LF MAX	<del>-</del>	3' SPIRAL DUCT LINEAR SLOT S.A. DIFFUSER	_	3 SLOT WITH 1" WIDE SLOTS - MIN. 1" FLANGE, CURVED FRAME TO MATCH DUCTWORK
B	65/LF MAX		4' LINEAR SLOT S.A. DIFFUSER	6"ø	2 SLOT WITH 1" WIDE SLOTS - 2 WAY BLOW
(C)	50-100	6"X6"	2'X2' LAY-IN CEILING S.A. DIFFUSER	6"ø	
D	125-225	9"X9"	2'X2' LAY-IN CEILING S.A. DIFFUSER	8"ø	
E	0-450	10"X22"	1'X2' LAY-IN R.A. REGISTER	_	
(F)	500-1000	22"X22"	2'X2' LAY-IN R.A. REGISTER	_	
G	800-1200	18"X24"	SIDEWALL R.A. REGISTER	_	
H	1225-1600	18"X36"	SIDEWALL R.A. REGISTER	-	
	175-225	14"X6"	SIDEWALL S.A. REGISTER		

						POWER	VENTILATOR SO	CHEDUL	E	
SYMBOL	CFM	ESP	RPM	TIP SPEED	HP	CTRICAL	TYPE	DRIVE	CONTROL	REMARKS
F-1	100	0.50"	900	1600	48 (1)	120V-1Ø	CEILING EXHAUST	DIRECT	(2)	MEN 105
F-2	100	0.50"	900	1600	48 (1)	120V-1Ø	CEILING EXHAUST	DIRECT	(2)	WOMEN 106
F-3					1	208V-3Ø	8'-0" HVLS AIR MOVEMENT	DIRECT	(3)	RETAIL AREA 102
F-4					1	208V-3Ø	8'-0" HVLS AIR MOVEMENT	DIRECT	(3)	RETAIL AREA 102
F-5					1	208V-3Ø	8'-0" HVLS AIR MOVEMENT	DIRECT	(3)	RETAIL AREA 102
F-6				<del></del>	1	208V-3Ø	8'-0" HVLS AIR MOVEMENT	DIRECT	(3)	RETAIL AREA 102
F-7			<u> </u>		1	208V-3Ø	8'-0" HVLS AIR MOVEMENT	DIRECT	(3)	WAREHOUSE 108
F-8					1	208V-3Ø	8'-0" HVLS AIR MOVEMENT	DIRECT	(3)	WAREHOUSE 108

- (1) WATTS
- (2) VIA LIGHTING CONTROL SYSTEMS OCCUPANCY SENSOR.
- (3) VARIABLE SPEED/ON/OFF/FORWARD/REVERSE FACTORY CONTROLLER.









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MECHANICAL SCHEDULES

M2.1