

101 NORTH THIRD STREET SUITE 500  
WILMINGTON, NORTH CAROLINA 28401  
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JOB # 18058



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No.	Description	Date

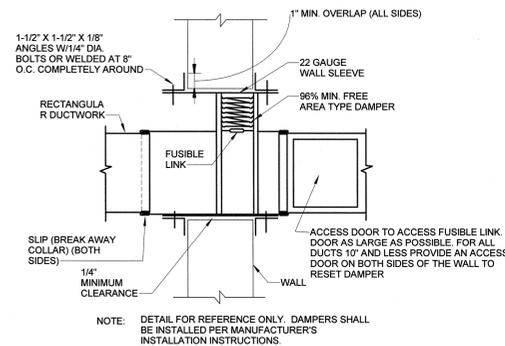
PROJECT: 7103-172820  
DATE: 11.05.2018  
DRAWN BY: NAH  
CHECKED BY: JTK

MECHANICAL LEGEND,  
ENERGY SCHEDULE &  
FIRE PENETRATION  
DETAILS

M-001  
OF 8

LEGEND

	AIR CONDITIONING CONDENSATE PIPING	O.A.	OUTSIDE AIR
	RECTANGULAR DUCTWORK	EX.A.	EXHAUST AIR
	DOUBLE WALL SPIRAL DUCTWORK	N.O.	NORMALLY OPEN
	SUPPLY AIR DUCTWORK TURNED DOWN	N.C.	NORMALLY CLOSED
	RETURN AIR DUCTWORK TURNED DOWN	M.D.	MANUAL DAMPER
	RELIEF AIR/EXHAUST AIR TURNED DOWN	M.O.D.	MOTOR OPERATED DAMPER
	BRANCH TAKEOFF WITH TURNING VANES, SPLITTER DAMPER AND LOCKING QUADRANT	A.F.F.	ABOVE FINISHED FLOOR
	DUCT TEE WITH TURNING VANES, SPLITTER DAMPER AND LOCKING QUADRANT	FIN. FL.	FINISHED FLOOR
	DUCT WITH RUNOUT (SPIN-IN TAKE OFF WITH DAMPER)	A.F.G.	ABOVE FINISHED GRADE
	CEILING RETURN AIR/ EXHAUST AIR REGISTER	CONC.	CONCRETE
	CEILING SUPPLY AIR DIFFUSER	CO	CLEAN OUT
	REGISTER, GRILLE OR DIFFUSER SYMBOL	CONTR.	CONTINUATION
	DISCONNECT SWITCH	CONTR.	CONTRACTOR
	KEYED NOTE SYMBOL	CO	CARBON MONOXIDE SENSOR
	FIRE DAMPER (1-1/2 HOUR RATED) MOUNTED IN WALL WITH DUCT ACCESS DOOR AND CEILING ACCESS DOOR (16'X16' MIN.) WHERE NECESSARY.	TS 2	HEATING AND COOLING THERMOSTAT WITH # INDICATING UNIT
	SUPPLY AIR	VSD	VARIABLE SPEED DRIVE
	RETURN AIR	HT	HUMIDITY SENSOR
		AD	ACCESS DOOR (MIN 16"X16")
			NON-RATED PARTITION TO CEILING
			NON-RATED PARTITION TO DECK
			1 HR. RATED PARTITION TO DECK
			2 HR. RATED PARTITION TO DECK



1 M-001 TYPICAL VERTICAL FIRE DAMPER DETAIL  
SCALE: NONE

GENERAL NOTES:

- HVAC CONTRACTOR SHALL FIELD VERIFY ALL RELEVANT DIMENSIONS, CLEARANCES, LOCATIONS AND ELEVATIONS PRIOR TO ORDERING. FABRICATION AND INSTALLATION OF HIS WORK DISCREPANCIES OR INTERFERENCES 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 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.
- ALL SUPPLY AND RETURN CONNECTIONS TO AHU SHALL BE MADE WITH A FLEXIBLE DUCT CONNECTION.
- PIPING, DUCTWORK, ETC., SHALL NOT BE SUPPORTED FROM ROOF STRUCTURE BRIDGING OR ROOFDECK. DUCTWORK AND PIPING SHALL BE SUPPORTED DIRECTLY FROM STRUCTURAL ELEMENTS OF THE BUILDING. EQUIPMENT SUPPORTED BY ROOF STRUCTURE SHALL HAVE SUPPORTS ATTACHED AS CLOSE AS POSSIBLE TO PANEL POINTS.
- ALL DUCT JOINTS SHALL BE SEALED AS SPECIFIED.
- IN AREAS WITH GYPBOARD CEILINGS, HVAC CONTRACTOR SHALL INSTALL EQUIPMENT, DUCTWORK AND PIPE HANGERS PRIOR TO GYPBOARD INSTALLATION.
- ALL THERMOSTATS AND SWITCHES FOR MECHANICAL SYSTEMS AND TOP OF HVAC CONTROL PANELS SHALL BE MOUNTED 4" A.F.F. MAXIMUM. PROVIDE SERVICE CLEARANCES AS REQUIRED FOR ALL EQUIPMENT.
- AIR CONDITIONING CONDENSATE LINE SIZES ARE MINIMAL SIZE. DO NOT INSTALL SMALLER THAN ACTUAL COIL DISCHARGE SIZE.

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT METHOD OF COMPLIANCE

- COMPLIANCE PER CHAPTER 4 NORTH CAROLINA ENERGY CONSERVATION CODE - SECTIONS C403.2, C403.3 AND C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS.
  - C406.2 MORE EFFICIENT HVAC PERFORMANCE
  - C406.3 REDUCED LIGHTING POWER DENSITY
  - C406.4 ENHANCED LIGHTING CONTROLS
  - C406.5 ON-SITE RENEWABLE ENERGY
  - C406.6 DOAS PROVISION FOR CERTAIN HVAC
  - C406.7 HIGH ENERGY SERVICE WATER HEATING
- COMPLIANCE PER CHAPTER 4 NORTH CAROLINA ENERGY CONSERVATION CODE - SECTIONS C403.2, C403.3, C403.4 AND C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS.
  - C406.2 MORE EFFICIENT HVAC PERFORMANCE
  - C406.3 REDUCED LIGHTING POWER DENSITY
  - C406.4 ENHANCED LIGHTING CONTROLS
  - C406.5 ON-SITE RENEWABLE ENERGY
  - C406.6 DOAS PROVISION FOR CERTAIN HVAC
  - C406.7 HIGH ENERGY SERVICE WATER HEATING
- COMPLIANCE PER CHAPTER 4 NORTH CAROLINA ENERGY CONSERVATION CODE - SECTIONS C402.5, C403.2, C404, C405.2, C405.3, C405.5, C405.6 AND C407 TOTAL BUILDING PERFORMANCE.
- COMPLIANCE PER ANSI/ASHRAE/IESNA 90.1-2013.
- COMPLIANCE PER NORTH CAROLINA SPECIFIC COMCHECK.

CLIMATE ZONE 3A

EXTERIOR DESIGN CONDITIONS  
winter dry bulb: 20°F  
summer dry bulb: 92°F DB/76°F WB

INTERIOR DESIGN CONDITIONS  
winter dry bulb: 70°F  
summer dry bulb: 75°F  
relative humidity: 50%

BUILDING HEATING LOAD: BLOCK LOAD = 343.6 MBH  
BUILDING COOLING LOAD: BLOCK LOAD = 30.9 TONS

MECHANICAL SPACING CONDITIONING SYSTEM

Unitary:  
description of unit: } SEE SCHEDULES ON M-601  
heating efficiency:  
cooling efficiency:  
heat output of unit:  
cooling output of unit: }

Boiler: N/A  
total boiler output: if oversized, state reason.  
Chiller: N/A  
total chiller capacity: if oversized, state reason.

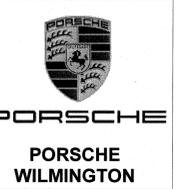
LIST EQUIPMENT EFFICIENCIES (SEE SCHEDULES ON M-601)

EQUIPMENT SCHEDULES WITH MOTORS (MECHANICAL SYSTEMS)  
motor horsepower: } SEE SCHEDULES ON M-601  
number of phases:  
minimum efficiency:  
motor type:  
# of poles: }

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 Energy Conservation Code.

SIGNED:   
NAME: Joseph T. Keipiro, P.E.  
TITLE: Professional Engineer



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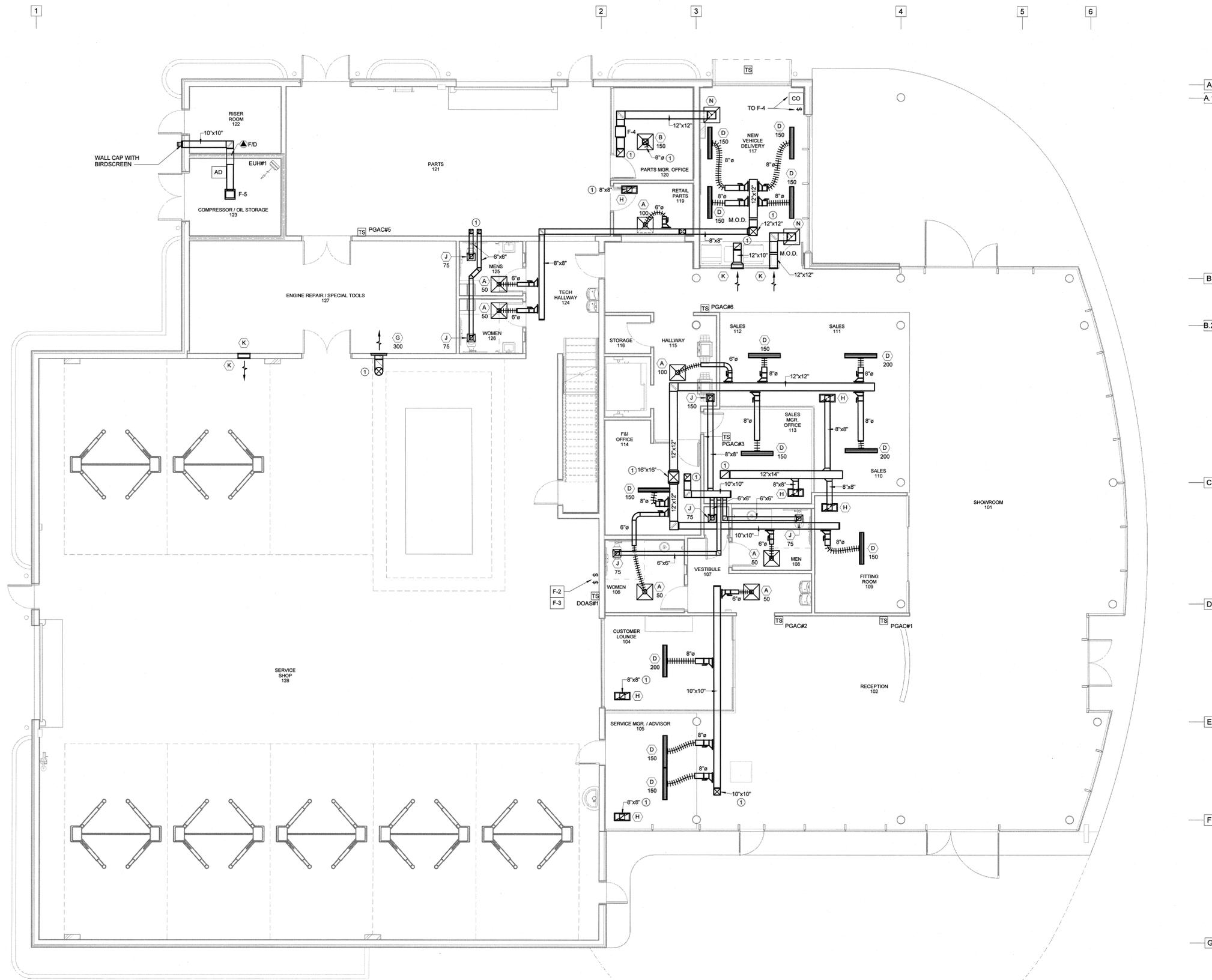
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MECHANICAL FIRST FLOOR

M-101 OF 8

PERMIT SET



1 MECHANICAL FIRST FLOOR  
SCALE: 3/16" = 1'-0"

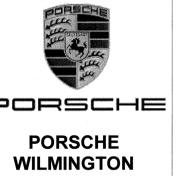
KEYED NOTES: (THIS SHEET ONLY)  
① DUCT CONTINUES TO SECOND FLOOR. SEE PLAN 1M-102.



PARTITION LEGEND

- 1. ALL EXTERIOR WALLS TO BE U.N.O.
- 2. ALL INTERIOR MASONRY PARTITIONS TO BE U.N.O.
- 3. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE U.N.O.
- NON-RATED PARTITION TO CEILING
- NON-RATED PARTITION TO DECK
- 1 HR. RATED PARTITION TO DECK
- 2 HR. RATED PARTITION TO DECK

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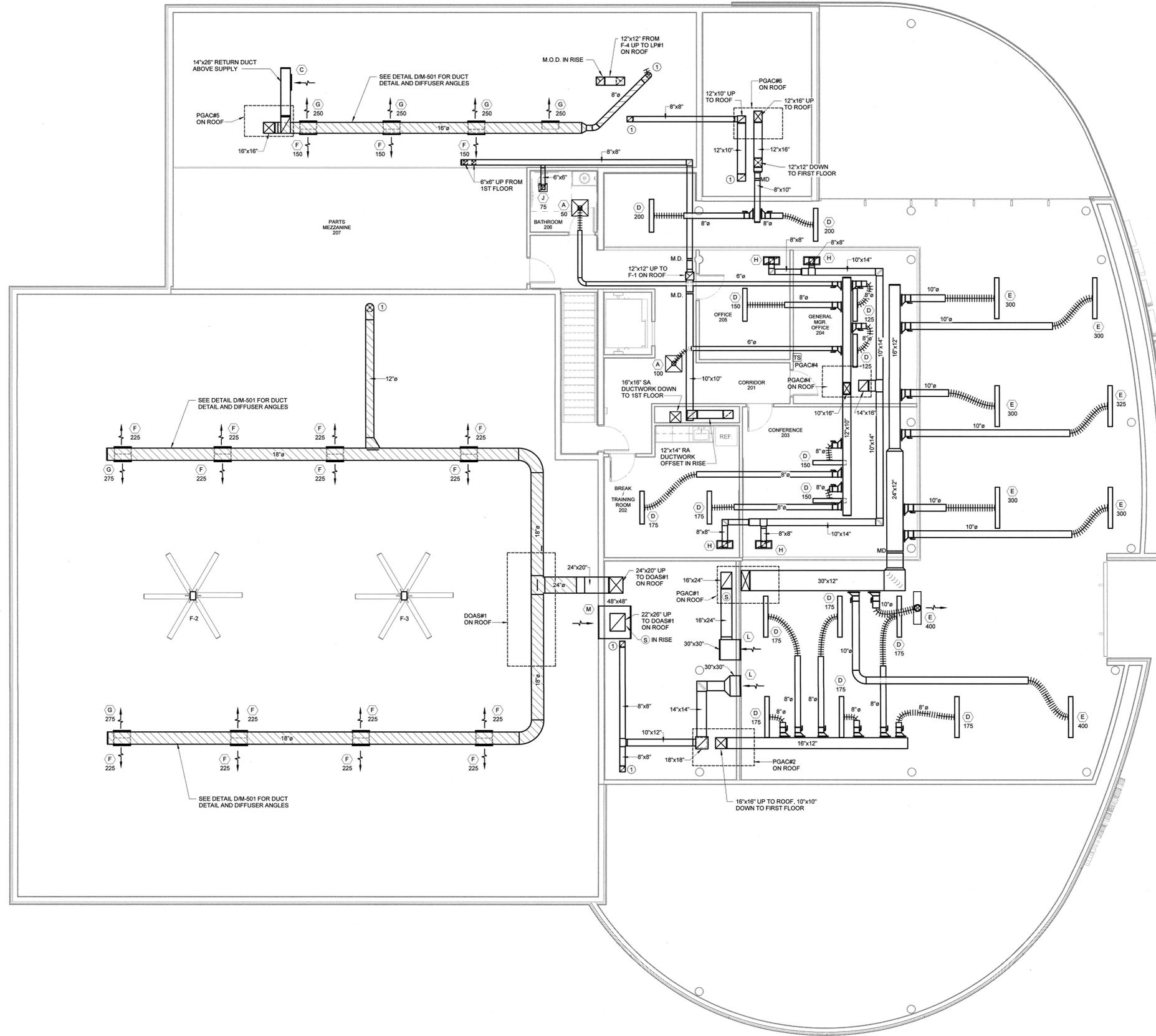
No.	Description	Date

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MECHANICAL SECOND FLOOR

M-102 OF 8

PERMIT SET



**1 MECHANICAL SECOND FLOOR**  
SCALE: 3/16" = 1'-0"

KEYED NOTES: (THIS SHEET ONLY)  
① DUCT CONTINUES TO FIRST FLOOR. SEE PLAN 1/M-101.

GRAPHIC SCALE  
SCALE: 3/16" = 1'-0"

**PARTITION LEGEND**

- ALL EXTERIOR WALLS TO BE U.N.O.
- ALL INTERIOR MASONRY PARTITIONS TO BE U.N.O.
- ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE U.N.O.

- NON-RATED PARTITION TO CEILING
- NON-RATED PARTITION TO DECK
- 1 HR. RATED PARTITION TO DECK
- 2 HR. RATED PARTITION TO DECK

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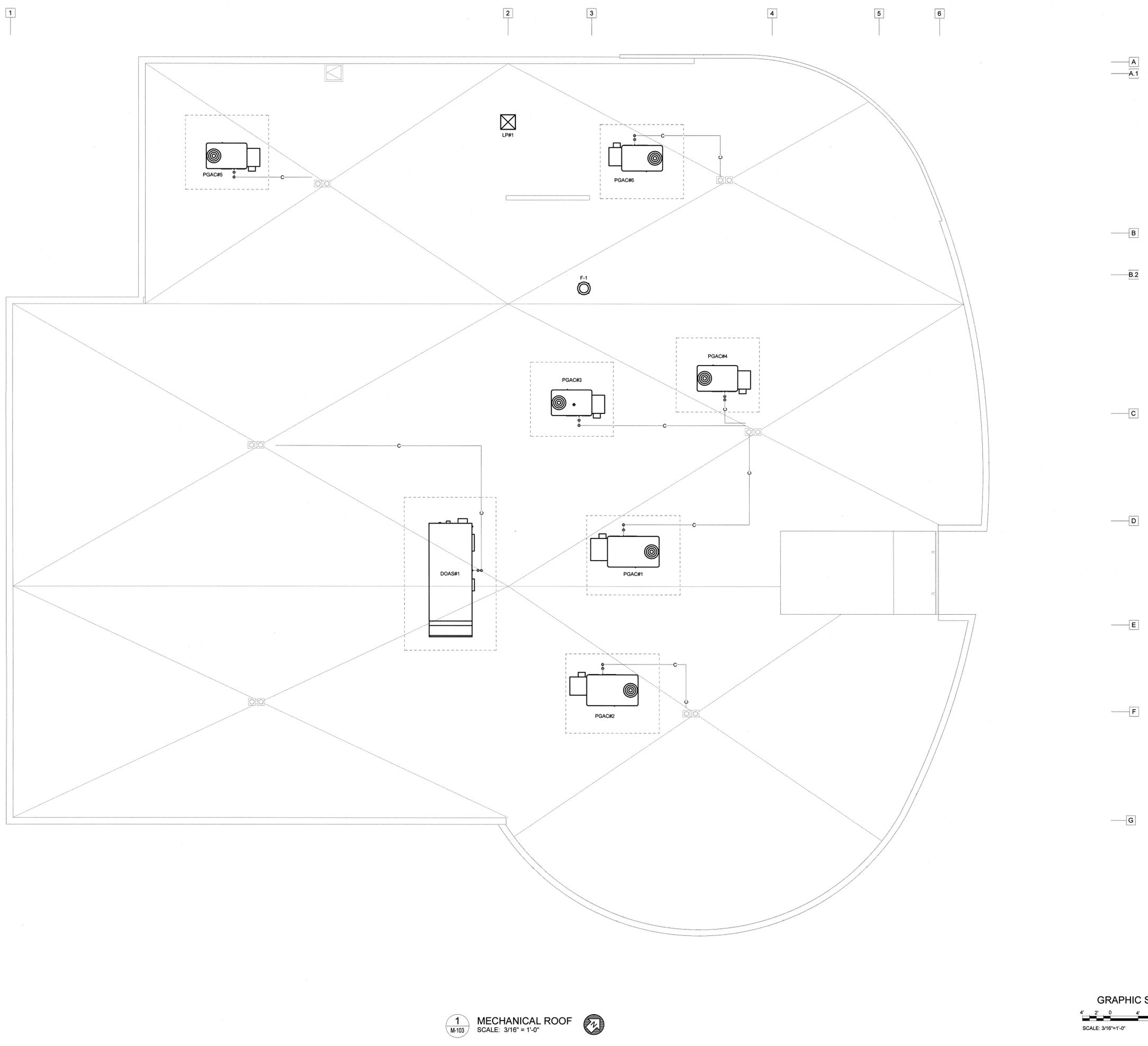
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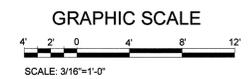
PROJECT: 7103-172820  
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MECHANICAL  
ROOF PLAN

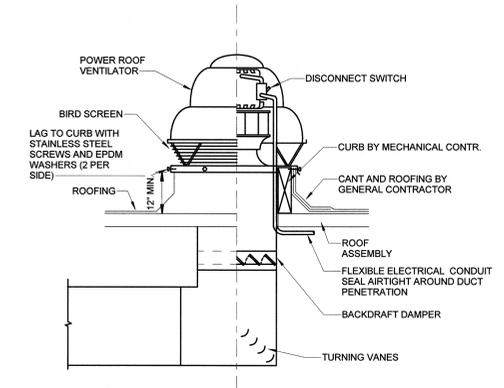
**M-103**  
OF 8



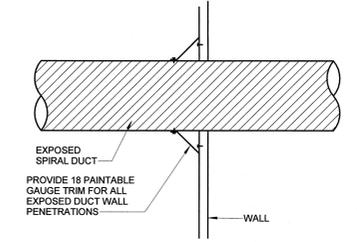
**1** MECHANICAL ROOF  
SCALE: 3/16" = 1'-0"



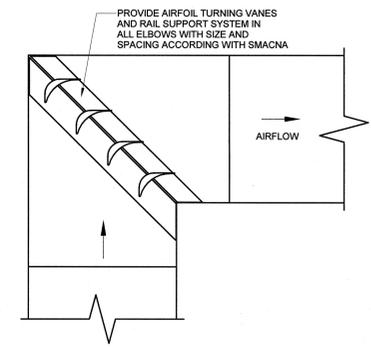
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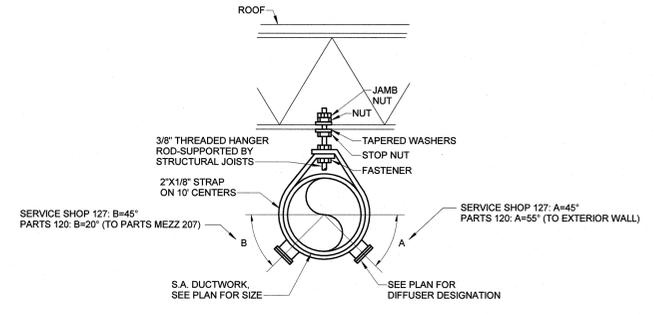
**A** POWER ROOF VENTILATOR DETAIL  
SCALE: NONE



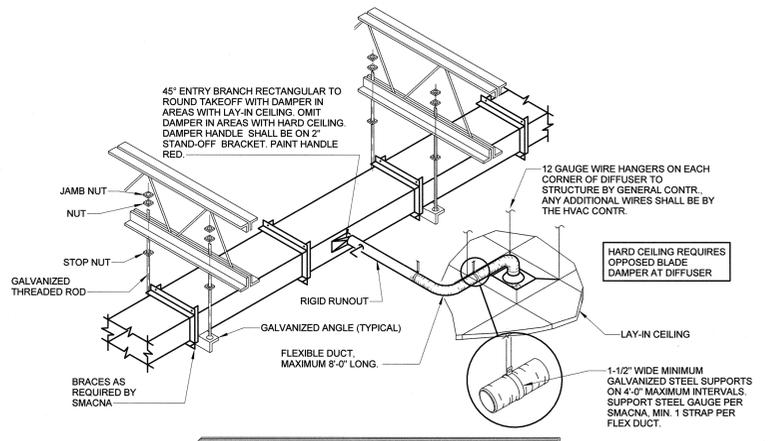
**B** ROUND DUCT COLLAR DETAIL  
SCALE: NONE



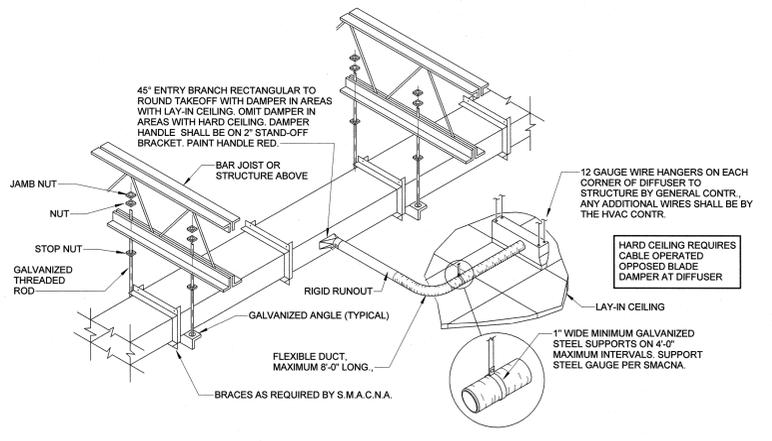
**C** TYPICAL DUCT ELBOW WITH TURNING VANES  
SCALE: NONE



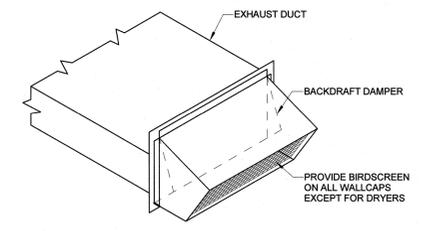
**D** SPIRAL DUCT DETAIL  
SCALE: NONE



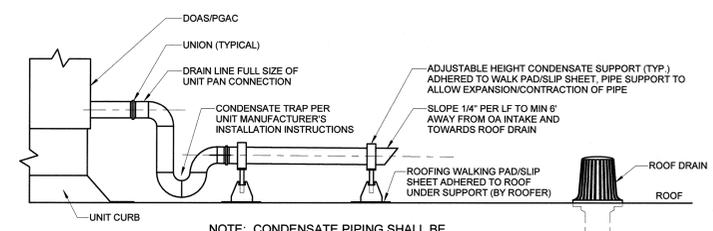
**E** TYPICAL SUPPLY DUCT DETAIL  
SCALE: NONE



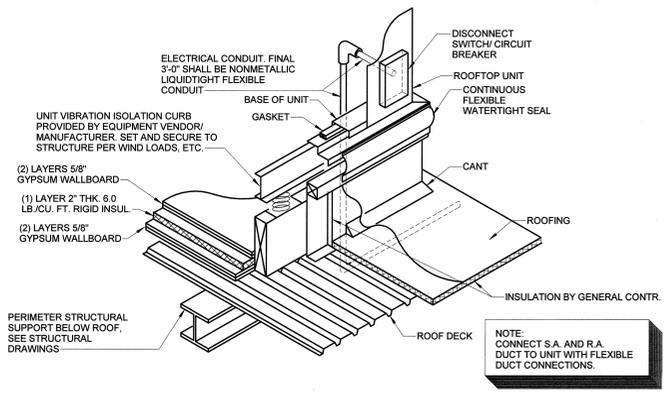
**F** TYPICAL SUPPLY DUCT DETAIL - SLOT DIFFUSER  
SCALE: NONE



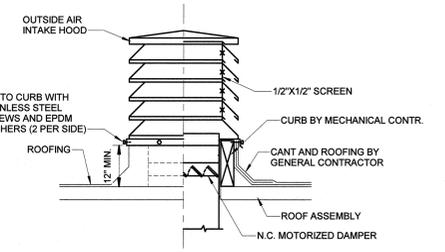
**G** WALL CAP DETAIL  
SCALE: NONE



**H** CONDENSATE PIPE SUPPORT DETAIL  
SCALE: NONE



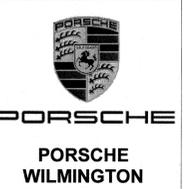
**J** TYPICAL ROOFTOP UNIT CURB AND POWER SUPPLY DETAIL  
SCALE: NONE



**K** LOUVERED PENTHOUSE HOOD DETAIL  
SCALE: NONE

WHERE DUCTWORK CONFIGURATION CAUSES OBSTRUCTIONS FOR SUPPORT PROVISIONS OF OTHER SYSTEMS INSTALLED UNDER DUCTWORK, AS PART OF CONSTRUCTION COORDINATION AMONG CONTRACTORS, MAKE PROVISIONS FOR OTHER CONTRACTORS TO UTILIZE DUCTWORK SUPPORT COMPONENTS, WHERE THIS IS NECESSARY. COORDINATE ADDITIONAL LOADING INTRODUCED BY OTHER SYSTEMS TO INSURE SUPPORT COMPONENTS ARE SUITABLY RATED FOR ALL LOADS TO BE SUPPORTED.

BAKER MOTOR COMPANY OF CHARLESTON, INC.



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MECHANICAL DETAILS

M-501 OF 8

PERMIT SET

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PORSCHE

PORSCHE  
WILMINGTON



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MECHANICAL  
SCHEDULES

M-601

OF 8

PERMIT SET

DEDICATED OUTSIDE AIR UNIT SCHEDULE

SYMBOL	AIR QUANTITY			EXT SP H2O		COOLING				HEATING			ELECTRICAL			REMARKS				
	OUTSIDE AIR CFM	RETURN AIR CFM	EXHAUST AIR CFM	OUTSIDE AIR (1)	RETURN AIR (1)	CAPACITY MBH	DX COOLING COIL LEAVING AIR CONDITIONS		HOT GAS REHEAT COIL MAX SUPPLY AIR LADB °F (3)	APPLICATION MIN EER AT DESIGN CONDITIONS	EAT °F	MIN LAT °F	MBH INPUT	THERMAL EFFICIENCY MIN	GAS SUPPLY (4)		MCA	MOCP	VOLTAGE & PHASE	
							DB °F	WB °F							SIZE					PRESSURE
DOAS#1	4000	4000 (2)	4500 (2)	0.60	0.35	380	53.6	53.2	84.0	10	23.0	97.1	400	80%	3/4"	7" W.C.	77.2	100.0	480V-3Ø	(5)

- (1) EXT. S.P. INCLUDES SUPPLY AIR DUCTWORK. MERV 8 FILTERS AND COILS IN UNIT ARE NOT INCLUDED IN THIS FIGURE.  
 (2) EXHAUST IN OCCUPIED MODE/RETURN IN UNOCCUPIED MODE  
 (3) VIA INTEGRAL MODULATING HOT GAS REHEAT COIL.  
 (4) NATURAL GAS  
 (5) PROVIDE SEISMIC RESTRAINTS AS SPECIFIED.

POWER VENTILATOR SCHEDULE

SYMBOL	CFM	ESP	RPM	TIP SPEED	ELECTRICAL		TYPE	DRIVE	CONTROL	ROOF OPENING (1)	REMARKS
					HP	VOLTAGE					
F-1	600	0.50"	1530	4355	1/8	115V-1Ø	ROOF MOUNTED CENTRIFUGAL	DIRECT	PGAC#1	--	TOILETS & JANITOR
F-2	106,000	--	--	140	1	208V-1Ø	12'-0" HVLS AIR MOVEMENT	DIRECT	(3)	--	SERVICE SHOP AREA 127
F-3	106,000	--	--	140	1	208V-1Ø	12'-0" HVLS AIR MOVEMENT	DIRECT	(3)	--	SERVICE SHOP AREA 127
F-4	300	0.5	1550	4400	1/8	115V-1Ø	IN-LINE CENTRIFUGAL	DIRECT	(4)	--	NEW CAR DELIVERY 117
F-5	150	0.50"	900	1590	50 (2)	115V-1Ø	CEILING EXHAUST	DIRECT	CONTINUOUS	--	COMPRESSOR/OIL STORAGE 122

- (1) FOR BIDDING PURPOSES ONLY  
 (2) WATTS  
 (3) VARIABLE SPEED/ON/OFF/FORWARD/REVERSE FACTORY CONTROLLER  
 (4) VIA WALL MOUNTED CO SENSOR

PACKAGED GAS/ELECTRIC AIR CONDITIONING UNIT SCHEDULE

SYMBOL	AIR QUANTITY		EXT SP H2O (1)	COOLING		HOT GAS REHEAT COIL SADB °F (3)	HEATING			ELECTRICAL			BASIS OF DESIGN	REMARKS	
	TOTAL CFM	OUTSIDE CFM		CAPACITY MBH (2)	MIN EER		TOTAL MBH INPUT	THERMAL EFFICIENCY MIN	GAS SUPPLY (5)		MCA	MOCP			VOLTAGE & PHASE
									SIZE	PRESSURE					
PGAC#1	2625	400 (4)	0.65	89.0	14.2	74	120.0 (6)	80%	3/4"	7" W.C.	20.7	25	480V-3Ø	TRANE YHC092	SHOWROOM (7)
PGAC#2	1600	300	0.55	49.0	14.0	74	80.0	80%	1/2"	7" W.C.	12.8	15	480V-3Ø	TRANE YHC048	CUSTOMER LOUGE / SERVICE AREA (7)
PGAC#3	1200	225	0.55	37.0	12.4	74	80.0	80%	1/2"	7" W.C.	11	15	480V-3Ø	TRANE YHC036	FIRST FLOOR OFFICES (7)
PGAC#4	1200	225	0.60	37.0	12.4	74	80.0	80%	1/2"	7" W.C.	11	15	480V-3Ø	TRANE YHC036	SECOND FLOOR OFFICES (7)
PGAC#5	1600	300	0.50	49.0	14.0	74	80.0	80%	1/2"	7" W.C.	12.8	15	480V-3Ø	TRANE YHC048	PARTS AREA (7)
PGAC#6	1200	225	0.50	37.0	12.4	74	80.0	80%	1/2"	7" W.C.	11	15	480V-3Ø	TRANE YHC036	BACK CORRIDORS / NEW CAR DELIVERY (7)

- (1) EXT. S.P. INCLUDES SUPPLY & RETURN AIR DUCTWORK. MERV 8 FILTERS ARE NOT INCLUDED IN THIS FIGURE.  
 (2) CAPACITY AT AHRI CONDITIONS.  
 (3) VIA INTEGRAL HOT GAS REHEAT COIL.  
 (4) 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.  
 (5) NATURAL GAS  
 (6) MULTI-STAGE HEATING  
 (7) PROVIDE SEISMIC RESTRAINTS AS SPECIFIED.

REGISTER, GRILLE & DIFFUSER SCHEDULE

SYMBOL	C.F.M.	NECK SIZE	TYPE	RUNOUT SIZE	REMARKS
(A)	50-100	6"X6"	2'X2' LAY-IN CEILING S.A. DIFFUSER	6"Ø	
(B)	125-225	9"X9"	2'X2' LAY-IN CEILING S.A. DIFFUSER	8"Ø	
(C)	1500-2000	24"X30"	SIDEWALL R.A. GRILLE	-	
(D)	125-225	-	4' LAY-IN SLOT DIFFUSER	8"Ø	3 SLOT WITH 1" WIDE SLOTS - 2 WAY BLOW (1)
(E)	250-400	-	4' LAY-IN SLOT DIFFUSER	10"Ø	4 SLOT WITH 1-1/2" WIDE SLOTS - 2 WAY BLOW (1)
(F)	150-225	14"X8"	SIDEWALL S.A. REGISTER	8"Ø	
(G)	250-400	16"X8"	SIDEWALL S.A. REGISTER	10"Ø	
(H)	0-750	10"X22"	1'X2' LAY-IN R.A. REGISTER	-	
(J)	0-500	6"X6"	1'X1' EXHAUST REGISTER	-	
(K)	300-550	16"X12"	SIDEWALL R.A. GRILLE	-	
(L)	1500-3000	30"X30"	SIDEWALL R.A. REGISTER	-	
(M)	4000-4500	48"X48"	SIDEWALL R.A. REGISTER	-	
(N)	500-1000	12"X12"	2'X2' EXHAUST GRILLE	-	

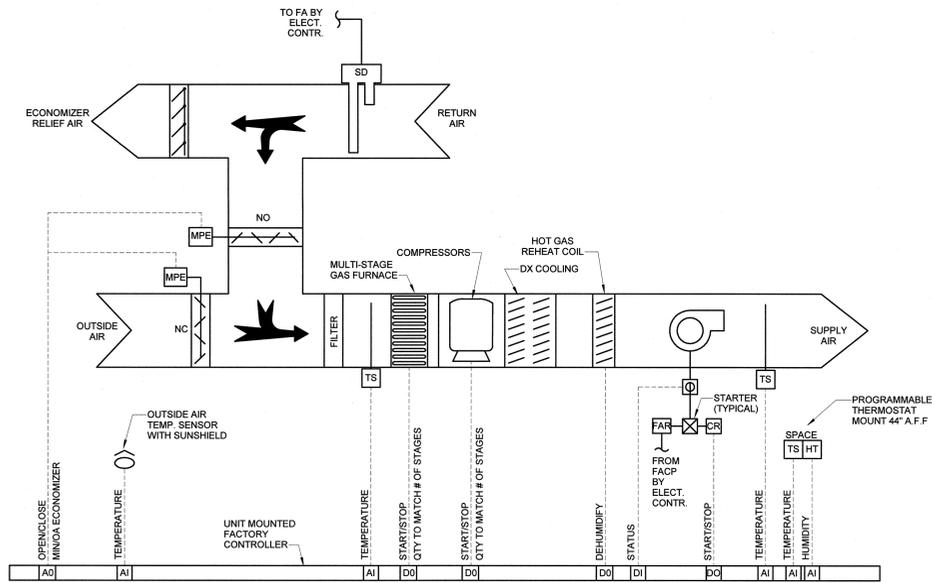
- (1) WITH CABLE OPERATED INLET DAMPER.

ELECTRIC UNIT HEATER SCHEDULE

SYMBOL	CFM	BTU/HR	ELECTRICAL		MINIMUM MOUNTING HEIGHT	REMARKS
			K.W.	VOLTAGE & PHASE		
EUH#1	400	11,200	3.3	208V-1Ø	8'-0"	COMPRESSOR / OIL STORAGE 122

LOUVERED PENTHOUSE SCHEDULE

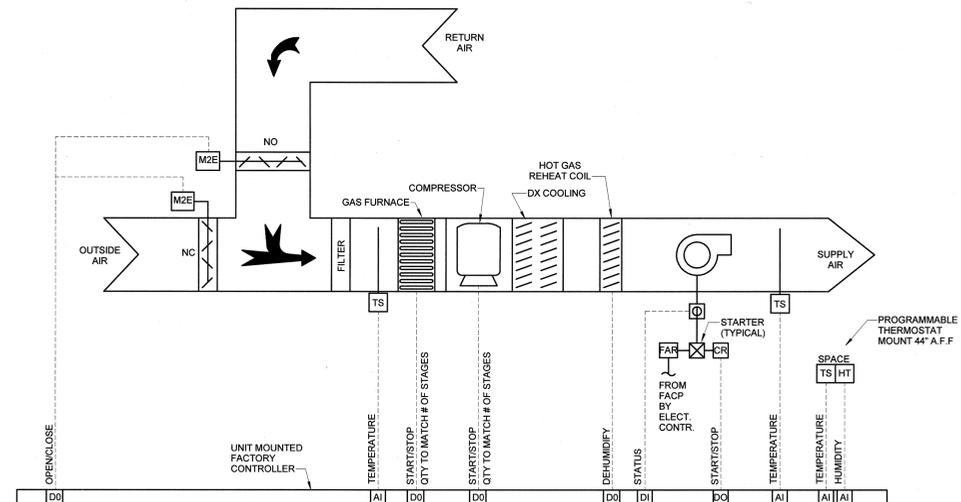
SYMBOL	CFM	THROAT SIZE	HEIGHT	CONN. DUCT SIZE	REMARKS
LP#1	300	20"X20"	12"	12"X12"	EXHAUST AIR FOR NEW CAR DELIVERY 117



PACKAGED GAS/ELECTRIC AIR CONDITIONING UNIT #1

SEQUENCE OF OPERATION

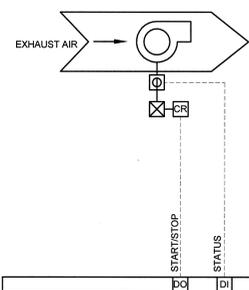
- A. OCCUPIED:**
1. THE PGAC SUPPLY FAN SHALL OPERATE CONTINUOUSLY.
  2. OUTSIDE AIR DAMPER AND RETURN AIR DAMPER SHALL OPEN TO POSITIONS FOR MINIMUM OUTSIDE AIR AIRFLOW.
  3. WHEN THE SPACE TEMPERATURE RISES ABOVE THE COOLING SETPOINT, THE MULTI-STAGE GAS HEATING SHALL BE OFF, THE COMPRESSORS SHALL OPERATE COOLING IN STAGES TO MAINTAIN SPACE TEMPERATURE SETPOINT.
  4. WHEN THE SPACE TEMPERATURE FALLS BELOW THE HEATING SETPOINT, THE COOLING SHALL BE DEENERGIZED AND THE GAS HEATING SECTION SHALL OPERATE IN STAGES AS NECESSARY TO MAINTAIN THE SPECIFIED SPACE TEMPERATURE SETPOINT.
- B. UNOCCUPIED:** DURING THE UNOCCUPIED MODE, THE PGAC SHALL BE ENERGIZED TO MAINTAIN THE UNOCCUPIED OR NIGHT SETBACK SPACE TEMPERATURE SETPOINTS. 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, COMPRESSORS AND MULTI-STAGE GAS HEAT SHALL OPERATE IN COOLING AND HEATING TO MAINTAIN SPACE TEMPERATURE SETPOINTS. 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), PGAC COOLING SHALL BE ENERGIZED. HOT GAS REHEAT SHALL OPERATE AS NECESSARY TO MAINTAIN THE SPACE TEMPERATURE AT COOLING SET POINT. WHEN THE HUMIDITY FALLS TO 50% RH (ADJUSTABLE), THE PGAC 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.



PACKAGED GAS/ELECTRIC AIR CONDITIONING UNITS #2, #3, #4, #5 & #6

SEQUENCE OF OPERATION

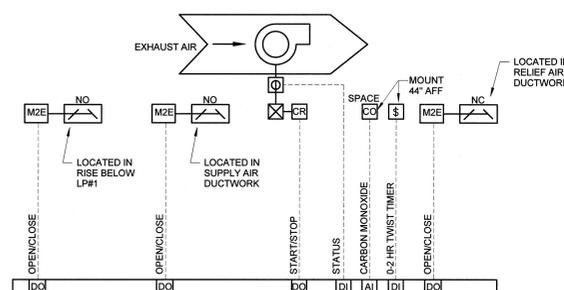
- A. OCCUPIED:**
1. THE PGAC SUPPLY FAN SHALL OPERATE CONTINUOUSLY.
  2. OUTSIDE AIR DAMPER AND RETURN AIR DAMPER SHALL OPEN TO POSITIONS FOR OUTSIDE AIR AIRFLOW.
  3. WHEN THE SPACE TEMPERATURE RISES ABOVE THE COOLING SETPOINT, THE GAS HEATING SHALL BE OFF, THE COMPRESSOR SHALL OPERATE COOLING TO MAINTAIN SPACE TEMPERATURE SETPOINT.
  4. WHEN THE SPACE TEMPERATURE FALLS BELOW THE HEATING SETPOINT, THE COOLING SHALL BE DEENERGIZED AND THE GAS HEATING SECTION SHALL OPERATE AS NECESSARY TO MAINTAIN THE SPECIFIED SPACE TEMPERATURE SETPOINT.
- B. UNOCCUPIED:** DURING THE UNOCCUPIED MODE, THE PGAC SHALL BE ENERGIZED TO MAINTAIN THE UNOCCUPIED OR NIGHT SETBACK SPACE TEMPERATURE SETPOINTS. 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, COMPRESSOR AND GAS HEAT SHALL OPERATE IN COOLING AND HEATING TO MAINTAIN SPACE TEMPERATURE SETPOINTS. 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), PGAC COOLING SHALL BE ENERGIZED. HOT GAS REHEAT SHALL OPERATE AS NECESSARY TO MAINTAIN THE SPACE TEMPERATURE AT COOLING SET POINT. WHEN THE HUMIDITY FALLS TO 50% RH (ADJUSTABLE), THE PGAC SYSTEM SHALL REVERT 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.
  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.



EXHAUST FAN F-1

SEQUENCE OF OPERATION

- EXHAUST FAN F-1:**
- DESCRIPTION:** CONSTANT AIR VOLUME EXHAUST FAN, AS SCHEDULED.
- FAN START/STOP CONTROL:** START/STOP UNIT FAN BASED ON PGAC#1 STATUS.



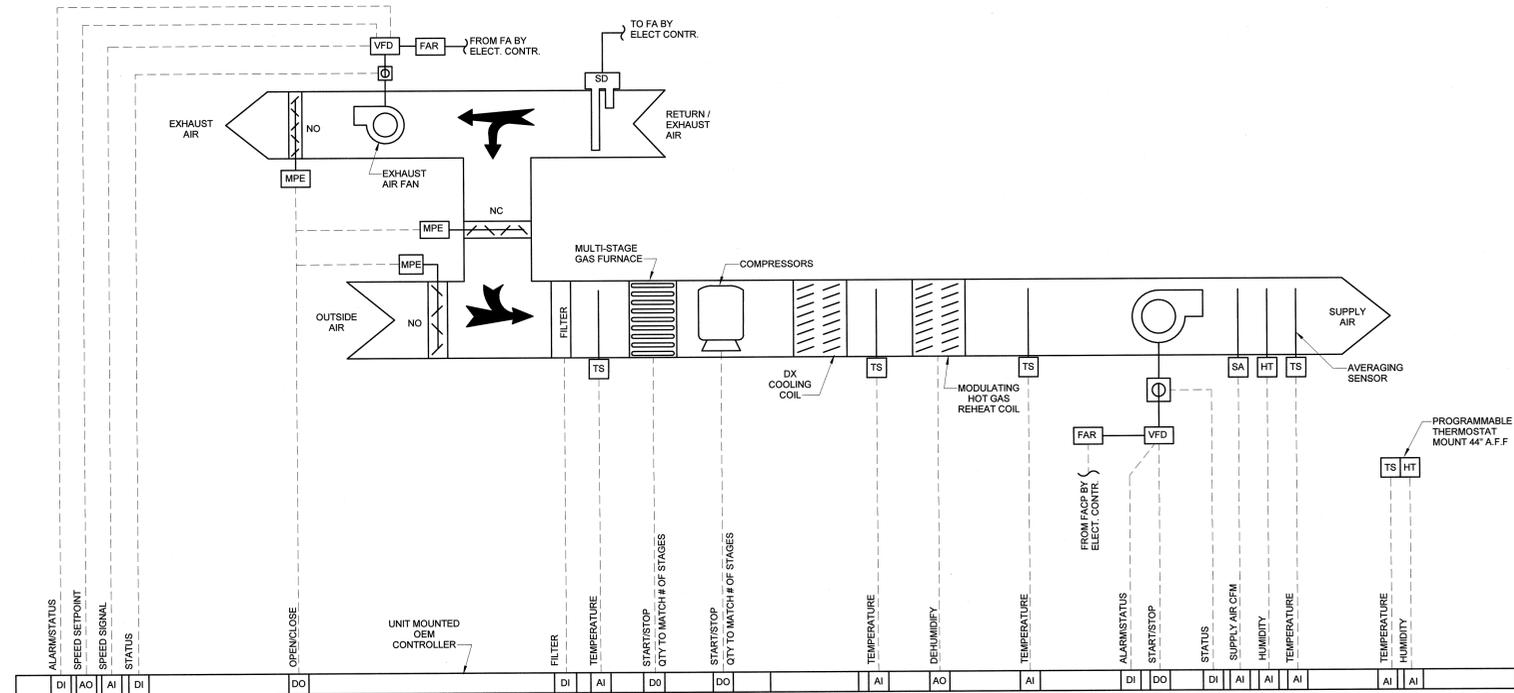
EXHAUST FAN F-4

SEQUENCE OF OPERATION

- EXHAUST FAN F-4:**
- DESCRIPTION:** CONSTANT AIR VOLUME EXHAUST FAN, AS SCHEDULED.
- FAN START/STOP CONTROL:** START/STOP UNIT FAN BASED ON (1) DOOR OPEN/CLOSE SENSOR, (2) SPACE CARBON MONOXIDE SENSOR, OR (3) 0-2 HOUR TWIST TIMER.
- MOTORIZED DAMPER CONTROL:** WHEN UNIT FAN IS INDICATED ON, OPEN DAMPER LOCATED IN RELIEF AIR DUCT AND CLOSE DAMPER LOCATED IN SUPPLY AIR DUCT. WHEN UNIT FAN IS INDICATED OFF RELIEF AIR DAMPER IS TO BE CLOSED AND SUPPLY AIR DAMPER TO BE OPEN FULL.

CONTROL SYMBOL LEGEND

CO	CARBON MONOXIDE SENSOR
TS	TEMPERATURE SENSOR
HT	HUMIDITY SENSOR
VSD	VARIABLE SPEED DRIVE
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
SPS	STATIC PRESSURE SENSOR
OV	OCCUPANCY/VACANCY SENSOR
SA	SUPPLY AIR
RA	RETURN AIR
OA	OUTSIDE AIR
⊕	CURRENT SENSOR
⊗	STARTER



DEDICATED OUTSIDE AIR SYSTEM - DOAS#1

SEQUENCE OF OPERATION

- A. OCCUPIED:
1. THE DOAS SUPPLY FAN AND EXHAUST AIR FAN SHALL OPERATE CONTINUOUSLY.
  2. OUTSIDE AIR DAMPER SHALL OPEN TO POSITION FOR OUTSIDE AIR AIRFLOW.
  3. WHEN THE SPACE TEMPERATURE RISES ABOVE THE COOLING SETPOINT, THE MULTI-STAGE GAS HEATING SHALL BE OFF, THE COMPRESSORS SHALL OPERATE COOLING IN STAGES TO MAINTAIN SPACE TEMPERATURE SETPOINT.
  4. WHEN THE SPACE TEMPERATURE FALLS BELOW THE HEATING SETPOINT, THE COOLING SHALL BE DEENERGIZED AND THE GAS HEATING SECTION SHALL OPERATE IN STAGES AS NECESSARY TO MAINTAIN THE SPECIFIED SPACE TEMPERATURE SETPOINT.
- B. UNOCCUPIED DURING THE UNOCCUPIED MODE, THE DOAS SHALL BE ENERGIIZED TO MAINTAIN THE UNOCCUPIED OR NIGHT SETBACK SPACE TEMPERATURE SETPOINTS. OUTSIDE AIR DAMPER SHALL BE CLOSED, RETURN AIR DAMPER SHALL BE OPEN FULL, AND EXHAUST AIR FAN SHALL BE OFF. COMPRESSOR AND GAS HEAT SHALL OPERATE IN COOLING AND HEATING TO MAINTAIN SPACE TEMPERATURE SETPOINTS. DOAS SUPPLY 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), DOAS COOLING SHALL BE ENERGIIZED. HOT GAS REHEAT SHALL OPERATE AS NECESSARY TO MAINTAIN THE SPACE TEMPERATURE AT COOLING SET POINT. WHEN THE HUMIDITY FALLS TO 50% RH (ADJUSTABLE), THE DOAS SYSTEM SHALL REVERT 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 UNITS CONTROLS ARE IN AUTO OR MANUAL MODES. ANY SIGNAL FROM THE FIRE ALARM SYSTEM WILL MAKE RELAY BREAK OPERATING POWER FOR THE UNIT.