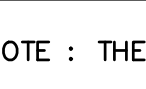
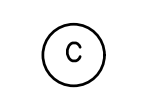
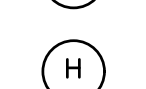
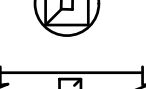
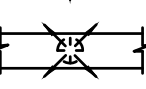
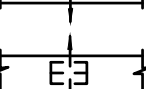
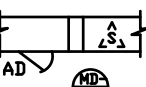
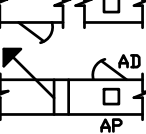
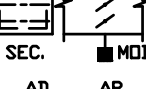
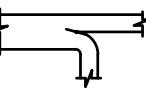
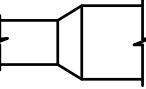
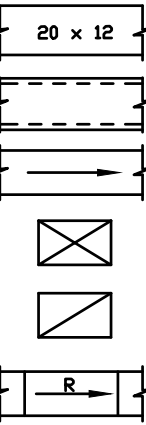


GENERAL SPECIFICATIONS

- ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED AND COMPLETED IN FIRST CLASS WORKMANLIKE MANNER. ANY MATERIALS INSTALLED, WHICH SHALL NOT PRESENT AN ORDERLY AND REASONABLY NEAT OR WORKMANLIKE APPEARANCE, SHALL BE REMOVED AND REPLACED WHEN SO DIRECTED BY THE ARCHITECT/ENGINEER AT THE CONTRACTOR'S EXPENCE.
- NEW DUCTWORK SHOWN IS SCHEMATIC. PLAN ROUTING OF DUCTWORK AND COORDINATE LOCATION OF DUCTS AFTER INSPECTION OF EXISTING CONDITIONS AND BEFORE FABRICATION. SLIGHT VARIATION OF ROUTING AND/OR CONSTRUCTION SHOULD BE ANTICIPATED AND IS EXPRESSLY INCLUDED AS PART OF THE WORK WHENEVER REQUIRED, AT NO ADDITIONAL COST TO OWNER. IGNORANCE ON THE PART OF THE CONTRACTOR WILL IN NO WAY EXCUSE HIM OR SHE FROM THE OBLIGATIONS AND RESPONSIBILITIES OF THIS CONTRACT.
- ANY CONFLICTS OR DISCREPANCIES ON THESE DRAWINGS SHALL BE CALLED TO THE ATTENTION OF THE ARCHITECT/ENGINEER DURING THE BIDDING PERIOD FOR RESOLUTION. OTHERWISE, ALL SUCH CONFLICTS OR DISCREPANCIES SHALL BE RESOLVED AT THE CONTRACTOR'S EXPENSE.
- ALL CONTROL WIRING SHALL BE PROVIDED BY THE CONTRACTOR.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION WITH ALL OTHER TRADES FOR CLEARANCES AND USE OF AVAILABLE SPACE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL PERMITS, FEES, INSPECTIONS AND TEST.
- THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY FOR THE INSTALLATION OF A COMPLETE MECHANICAL SYSTEM, READY FOR CONTINUOUS AND SATISFACTORY OPERATION BY THE OWNER.
- THE ENTIRE INSTALLATION SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL CODES, INCLUDING ALL LOCAL RULES AND ORDINANCES.
- PROVIDE MANUAL VOLUME DAMPERS AT ALL DUCT TAKE-OFFS AND DIFFUSERS. DAMPERS SHALL BE MANUFACTURED ACCORDING TO SMACNA "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE" FIRST EDITION AND SHALL HAVE LOCKING QUADRANT WITH WING NUT.
- DUCTWORK MATERIAL
SUPPLY AIR DUCTWORK SHALL BE CONSTRUCTED OF FIVE POUNDS DENSITY 1/2" THICK GLASSFIBER DESIGNED, CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH SMACNA'S LOW PRESURE DUCT MANUAL. ALL DUCT JOINTS SHALL BE SEALED AND TAPED.
- ALL EXHAUST DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL, INSTALLED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE" FIRST EDITION.
- FLEXIBLE DUCTS SHALL BE UL LISTED CLASS 1 AIR DUCT. THERMAFLEX TYPE M-KE OR EQUAL. DUCTS SHALL BE INSTALLED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE" FIRST EDITION.
- DUCTWORK DIMENSIONS INDICATED, ARE INSIDE CLEAR AIR PASSAGE. ALL EQUIPMENT AND MATERIAL SHALL BE VARRENTIED FOR ONE YEAR AFTER DATE OF ACCEPTANCE BY THE OWNER.
- AIR DISTRIBUTION DEVICES SHALL BE OF ALL ALUMINUM CONSTRUCTION WITH TYPE #25 FINISH. ALL DIFFUSERS, REGISTERS AND GRILLS SHALL HAVE OPPOSED BLADE DAMPERS IN THROAT OR NECK. MANUFACTURER SHALL BE METALAIR OR PRE-APPROVED EQUAL.
- REFRIGERANT LINES SHALL BE TYPE "L" SOFT DRAWN, COPPER TUBING DEHYDRATED FOR REFRIGERANT USE. SIZE SHALL BE SHOWN ON DRAWINGS OR AS PER MANUFACTURERS RECOMMENDATION.
- REFRIGERANT LINE INSULATION SHALL BE 1" FDM PLASTIC INSULATION (R-4), FIRE RETARDANT TYPE. SEAL JOINTS WITH MANUFACTURERES APPROVED ADHESIVE. INSULATION SHALL HAVE A EXTERNAL PERMEANCE NOT EXCEEDING 0.05 PERM WHEN TESTED
- THE INSIDE OF ALL VISIBLE DIFFUSERS SHALL BE PAINTED BLACK.
- A/C/ CONTRACTOR TO INCLUDE 1 YEAR MAINTENANCE OF THE SYSTEM.
- DRYER EXHAUST DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL (28 GAGE), INSTALLED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE" FIRST EDITION.
- PROVIDE BACKDRAFT DAMPERS AT ALL EXHAUST DUCTWORK.
- CONDENSATE RISERS SHALL BE CONSTRUCTED OF SCHEDULE 40 PVC. CONDENSATE LINES INSIDE OF AC CLOSET SHALL BE CONSTRUCTED OF TYPE "L" COPPER
- THE CONTRACTOR SHALL CAREFULLY REVIEW AND VERIFY THE MECHANICAL DRAWINGS AND SPECIFICATIONS IN ADDITION TO OTHER RELATED TRADES AND SECTIONS. SHOULD ANY DISCREPANCIES BE FOUND THE ARCHITECT/ENGINEER MUST BE NOTIFIED. THIS COORDINATION SHALL BE DONE PRIOR TO SUBMITTING THE BID.
- THERE SHALL BE NO STORAGE OF FLAMMABLE MATERIAL IN AC. CLOSET
- PRIOR OF CLOSING OF WALL AND CEILINGS, CONTRACTOR TO SCHEDULE A FIELD VISIT BY E.Q.R. TO CONDUCT A SITE INVESTIGATION OF DUCTWORK AND ALL RELATED HVAC SYSTEMS AND EQUIPMENTS TO VERIFY THAT THE COMPLETED INSTALLATION MEETS THE DESIGN INTENT. FAILURE TO DO SO WILL NOT BE ACCEPTED AS A REASON FOR EXTRA PAY REQUESTING WHERE THE CONDITIONS ADVERSELY AFFECT THE DESIGN INTENT ANY DEFECTS SHALL BE COMPLETED WITHOUT ADDITIONAL CHARGES AND SHALL INCLUDE REPLACEMENTS OR REPAIRS OF ANY OTHER PHASE OF THE INSTALLATION.
- TESTING:
 - ALL REFRIGERANT HIGH SIDE PIPING TO 300 PSIG. LOW SIDE TO 150 PSIG. AFTER TESTING, EVACUATE SYSTEM TO 28" MERCURY GAUGE PRESSURE WITH VACUUM PUMP. HOLD FOR 25 HOURS WITH PUMP OFF. BREAK VACUUM WITH REFRIGERANT.
 - BALANCE AIR SYSTEM TO DELIVER QUANTITIES AT EACH OUTLET WITHIN 5% USING A.A.B.C. PROCEDURES AND TESTS. SUBMIT AIR BALANCE TEST RESULTS FOR APPROVAL PRIOR TO FINAL INSPECTION.
- FOR INSTALLATION OF EQUIPMENT IN EXTERIOR REFER TO ADDITIONAL SUBMITTED INFORMATION (NOA's, STRUCTURAL CALCULATIONS, ETC.)
- CONTRACTOR SHALL BE RESPONSIBLE IN OBTAINING AND CONSERVING THE ABOVE DESCRIBED INFORMATION LIKE GUIDANCE FOR INSTALLATION AND INSPECTION.
- THE DRYER EXHAUST TERMINATION IS IN COMPLIANCE WITH THE FBC RES. M1502 AND M1502.4.2 EXHAUST TERMINATION OUTLET AND PASSAGEWAY SIZE. THE PASSAGEWAY OF DRYER EXHAUST DUCT TERMINALS SHALL BE UNDIMINISHED IN SIZE AND SHALL PROVIDE AN OPEN AREA OF NOT LESS THAN 12.5 SQUARE INCHES.
- THIS DESIGN IS COMPLIANCE TO THE FBCM-2023, 8TH EDITION.
- COMPLY WITH BLOWER DOOR TEST FOR DWELLING UNITS
- ALL REFRIGERANT LINES SHALL BE INCASED IN A FIRE RATED, AIR TIGHT ENCLOSURE.

DOUBLE LINE



A/C SYMBOL LEGEND

DUCT (1ST. DIMENSION, SIDE SHOWN; 2ND. DIMENSION, SIDE NOT SHOWN)

ACOUSTICAL LINING (DUCT DIMENSIONS FOR NET FREE AREA)

DIRECTION OF FLOW

DUCT SECTION UP OR DOWN (SUPPLY)

DUCT SECTION UP OR DOWN (EXHAUST OR RETURN)

INCLINE RISE (R) OR DROP (D) ARROW IN DIRECTION OF AIR FLOW.

TRANSITIONS

STANDARD BRANCH FOR SUPPLY & RETURN (NO SPLITTER)

SPLITTER DAMPER

VOLUME DAMPER (MANUAL OPERATION)

AUTOMATIC DAMPERS (MOTOR OPERATED)

ACCESS DOOR (AD) ACCESS PANEL (AP)

FIRE DAMPER IN VERTICAL DUCT / IN HORIZONTAL DUCT

SMOKE DAMPER & RADIANT DAMPER

DYNAMIC MOTORIZED DAMPER

BACK DRAFT DAMPER

CEILING DIFFUSER, SQUARE

CEILING DIFFUSER, RECTANGULAR

CEILING DIFFUSER, ROUND

SMOKE DETECTOR, DUCT MOUNTED

EXHAUST FAN, CEILING MOUNTED

RETURN AIR GRILLE, CEILING MOUNTED

THERMOSTAT

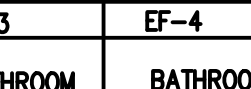
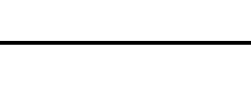
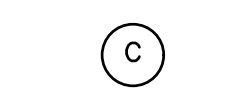
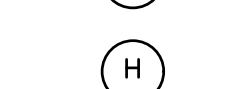
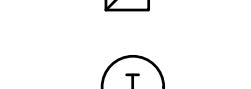
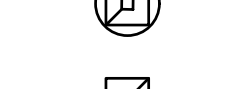
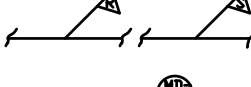
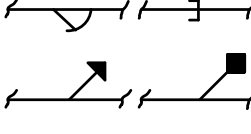
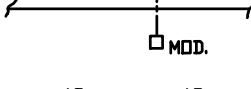
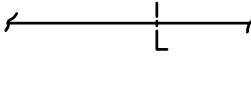
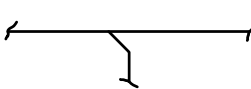
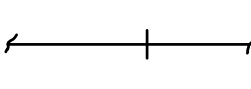
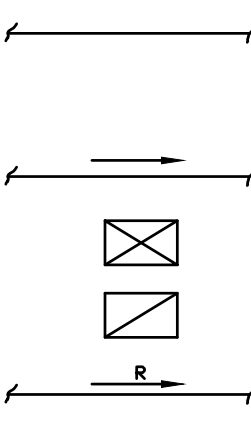
HUMIDISTAT

CO² SENSOR

CENTRIFUGAL EXHAUST FAN ROOF MOUNTED

NOTE : THESE ARE STANDARD SYMBOLS AND MAY NOT ALL APPEAR ON PROJECT DRAWINGS

SINGLE LINE



VENTILATION FAN SCHEDULE

UNIT DESIGNATION	EF-1	EF-2	EF-3	EF-4
AREA SERVED	BATHROOM	BATHROOM	BATHROOM	BATHROOM
OPERATING WEIGHT LBS.	43	43	10	43
LOCATION	CEILING	CEILING	ROOF	CEILING
FAN TYPE	IN-LINE	IN-LINE	CENT.	IN-LINE
TOTAL AIR CFM	50	100	154	150
DRIVE TYPE	DIRECT	DIRECT	DIRECT	DIRECT
FAN WHEEL TYPE	F.C.	F.C.	F.C.	F.C.
FAN TIP SPEED,RPM MAX	-	-	-	-
FAN SPEED,RPM	2894	2894	1755	2576
TOTAL STATIC PRESSURE,IN. OF H2O	0.6	0.6	.6	0.6
FAN MOTOR HP(NON OVERLOAD)	20 watts	20 watts	34 watts	68 watts
FAN MOTOR STARTER TYPE	-	-	-	-
STARTER FURNISHED BY	-	-	-	-
ELECTRICAL SERVICE AVAILABLE	120/1/60	120/1/60	115/1/60	120/1/60
MCA/MOP	-	-	-	-
DESIGN MANUFACTURER	FANTECH	FANTECH	FANTECH	FANTECH
MODEL NUMBER	FR100	FR100	REC B XL	FR150
SERVICE SWITCH	YES	YES	YES	YES
SMOKE DETECTORS	NO	NO	NO	NO
FIRE DAMPER	NO	NO	NO	NO
CONSTRUCTION	PLASTIC	PLASTIC	ALUMINUM	PLASTIC
MULTIBLADE BACKDRAFT DAMPER	YES	YES	YES	YES
BIRDSCREEN	NO	NO	YES	NO
SOLID STATE SPEED CONTROL	YES	YES	YES	YES
10 MIN. TIME OFF RELAY CONTROL	NO	NO	NO	NO
FACTORY FABRICATED CURB	NO	NO	YES	NO
SONES	2.5	2.5	0.3	2.5
NOTE	1	1	1	1

NOTE: 1. PROVIDE DEDICATE SWITCH

AIR DISTRIBUTION SCHEDULE

SYM	USE	TYPE	ACCESSORIES	NECK SIZE	CFM	MFR & MODEL NO
A	SUPPLY	1-1.5" SLOT FLOWBAR JET THROW	OBD	SEE DRAWING		TITUS FL-15
B	RETURN	1-1.5" SLOT FLOWBAR HIGH THROW	OBD	SEE DRAWING		TITUS FL-15
C	SUPPLY	GRILLE	OBD	14X4 14X8 20X8	0-100 101-175 176-275	METAL AIRE 4002
D	RETURN	GRILLE	OBD	14X4 14X8 20X8	0-100 101-175 176-275	METAL AIRE 4002
E	EXHAUST	1-1.5" SLOT FLOWBAR HIGH THROW	OBD	SEE DRAWING		TITUS FL-15

NOTES:

- CONTRACTOR TO PROVIDE ROUND TO SQUARE NECK TRANSITION.
- CONTRACTOR SHALL COORDINATE ALL DIFFUSERS WITH CEILINGS.

HVAC DESIGN REQUIRES:	YES	NO
DUCT SMOKE DETECTOR		✓
FIRE DAMPER(S)		✓
SMOKE DAMPER(S)		✓
FIRE RATED ENCLOSURE		✓
FIRE RATED ROOF/FLOOR CEILING ASSEMBLY		✓
FIRE STOPPING		✓
SMOKE CONTROL		✓

INSULATION AND FENESTRATION VALUES USED FOR ENERGY CALCULATIONS AND TO BE INSTALLED IN BUILDING ENVELOPE

ROOF = R-30
WALLS = R-6.5
GLASS = U-VALUE : 1.04
SHGC : 0.25

AIR CONDITIONING UNIT SCHEDULE

UNIT NUMBER	AC-1	AC-2	AC-3	AC-4
AREA SERVED	SEE DWG.	SEE DWG.	SEE DWG.	SEE DWG.
TOTAL SUPPLY AIR CFM	1725	600	600	1725
OUTSIDE AIR CFM	-	-	-	-
EXTERNAL STATIC PRESS. H2O	0.5	0.5	0.5	0.5
FAN MOTOR HP/FLA	3/4-5.7	1/2-4.0	1/2-4.0	3/4-5.7
ELEC. CHAR. V/B/~	240-1-60	240-1-60	240-1-60	240-1-60
COOL COIL CAP. BTU/HR	58.3	23.2	23.2	58.3
TOTAL SENS. HEAT BTU/HR	42.7	18.7	18.7	42.7
ENT. AIR TEMP. °F DB/ °F WB	80/67	80/67	80/67	80/67
MODEL NUMBER	-	-	-	-
UNIT MANUFACTURER	CARRIER	CARRIER	CARRIER	CARRIER
MODEL NUMBER	FES5NBD060	FES5NBD36	FES5NBD36	FES5NBD060
WEIGHT LBS.	203	168	168	203
REF. PIPING RS/RL	7/8"-3/8"	3/4"-3/8"	3/4"-3/8"	7/8"-3/8"
MCA/MOCP	56.4/60.0	29.6/30.0	29.6/30.0	56.4/60.0
UNIT NUMBER	CU-5	CU-3	CU-3	CU-5
LOCATION	SEE DWG	SEE DWG	SEE DWG	SEE DWG
AMBIENT TEMP. °F	95°	95°	95°	95°
REFRIGERANT R	R-454B	R-454B	R-454B	R-454B
COMPRESSOR RLA	23.7-	11.6-	11.6-	23.7-
COMP./COND. FAN FLA	0.88	0.88	0.88	0.88
ELEC. CHAR. V/B/~	240-1-60	240-1-60	240-1-60	240-1-60
MANUFACTURER	CARRIER	CARRIER	CARRIER	CARRIER
MODEL NUMBER	27VNA360-3	27VNA324-3	27VNA324-3	27VNA360-3
WEIGHT LBS.	399	334	334	399
EFFICIENCY SEER2	20.0	21.5	21.5	20.0
MCA	36.9	19.7	19.7	36.9
MOCP	50.0	25.0	25.0	50.0
UNIT MTD. ELEC. HEAT CAP.	60.5MBH	28.0MBH	28.0MBH	60.5MBH
HSPF2	8.5	10.5	10.5	8.5
ELEC. CHAR. V/B/~	240-1-60	240-1-60	240-1-60	240-1-60
MODEL NUMBER	-	-	-	-
HEATER CAPACITY	10.0KW	5.0KW	5.0KW	10.0KW

NOTE:

- CONTRACTOR TO PROVIDE AN AUTOMATIC SHUT OFF SWITCH IN CONDENSATE PAN. SWITCH TO SHUT OFF CONDENSING UNIT AND AIR HANDLER AT TIME OF ACTIVATION.
- PROVIDE PROGRAMMABLE THERMOSTAT/HUMIDISTAT SIMILAR TO WHITE RODGERS 1F95-1291

HEAT PUMP SCHEDULE

UNIT NUMBER	AC-5	
AREA SERVED	SEE DWG.	
TOTAL SUPPLY AIR CFM	618	
OUTSIDE AIR CFM	-	
EXTERNAL STATIC PRESS. H2O	-	
FAN MOTOR HP/FLA	-	
ELEC. CHAR. V/B/~	240-1-60	
COOL COIL CAP. BTU/HR	22.6	
TOTAL SENS. HEAT BTU/HR	16.9	
ENT. AIR TEMP. °F DB/ °F WB	80/67	
MODEL NUMBER	-	
UNIT MANUFACTURER	CARRIER	
MODEL NUMBER	45MAHAQ24XA3	
WEIGHT LBS.	44	
REF. PIPING RS/RL	5/8"-3/8"	
MCA/MOCP	-	
UNIT NUMBER	CU-5	
LOCATION	SEE DWG	
AMBIENT TEMP. °F	95°	
REFRIGERANT R	R-454B	
COMPRESSOR RLA	-	
COMP./COND. FAN FLA	-	
ELEC. CHAR. V/B/~	240-1-60	
MANUFACTURER	CARRIER	
MODEL NUMBER	37MARAQ24AA3	
WEIGHT LBS.	122	
EFFICIENCY SEER2	23.1	
MCA	24	
MOCP	25	
UNIT MTD. ELEC. HEAT CAP.	22.5MBH	
HSPF2	11.7	
ELEC. CHAR. V/B/~	240-1-60	
MODEL NUMBER	-	
HEATER CAPACITY		

NOTE:

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- PROVIDE PROGRAMMABLE THERMOSTAT/HUMIDISTAT SIMILAR TO WHITE RODGERS 1F95-1291

Fine Line Engineers Inc.

Electrical, Mechanical, Plumbing, Fire Protection, Construction Administration Services
2088 WEST 76TH STREET, HIALEAH, FLORIDA 33016
Tel: 786-953-4901
E-mail: cad@fineengineers.com



REVISION BLOCK	DESCRIPTION
NO.	DATE

SUBMITAL BLOCK	DESCRIPTION
NO.	DATE

HUBER RESIDENCE
12020 SW 77th Ave
Pinecrest, FL 33156

M-1



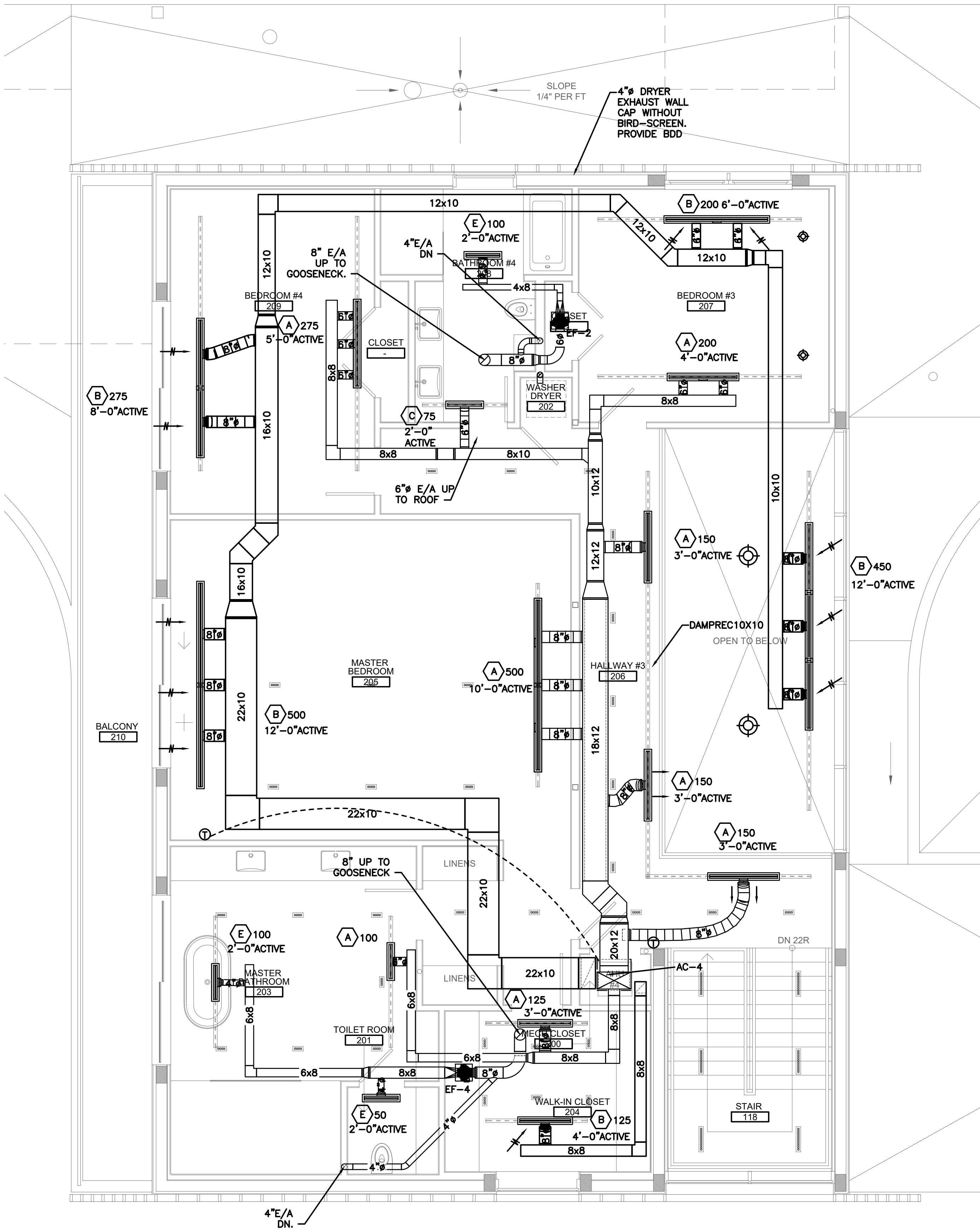
Fine Line Engineers Inc.

Electrical, Mechanical, Plumbing
Fire Protection, Construction Administration
2086 W. 76TH Street Hialeah, FL 33016
Voice: 786.953-4901 - Fax: 786.953-4907
E-mail: cad@fineengineers.com

GEORGE FREIJO, P.E.
REGISTERED ENGINEER NO. 32578
STATE OF FLORIDA. CAP: 20796

04/10/2024





MECHANICAL SECOND FLOOR PLAN
1/4" = 1'-0"



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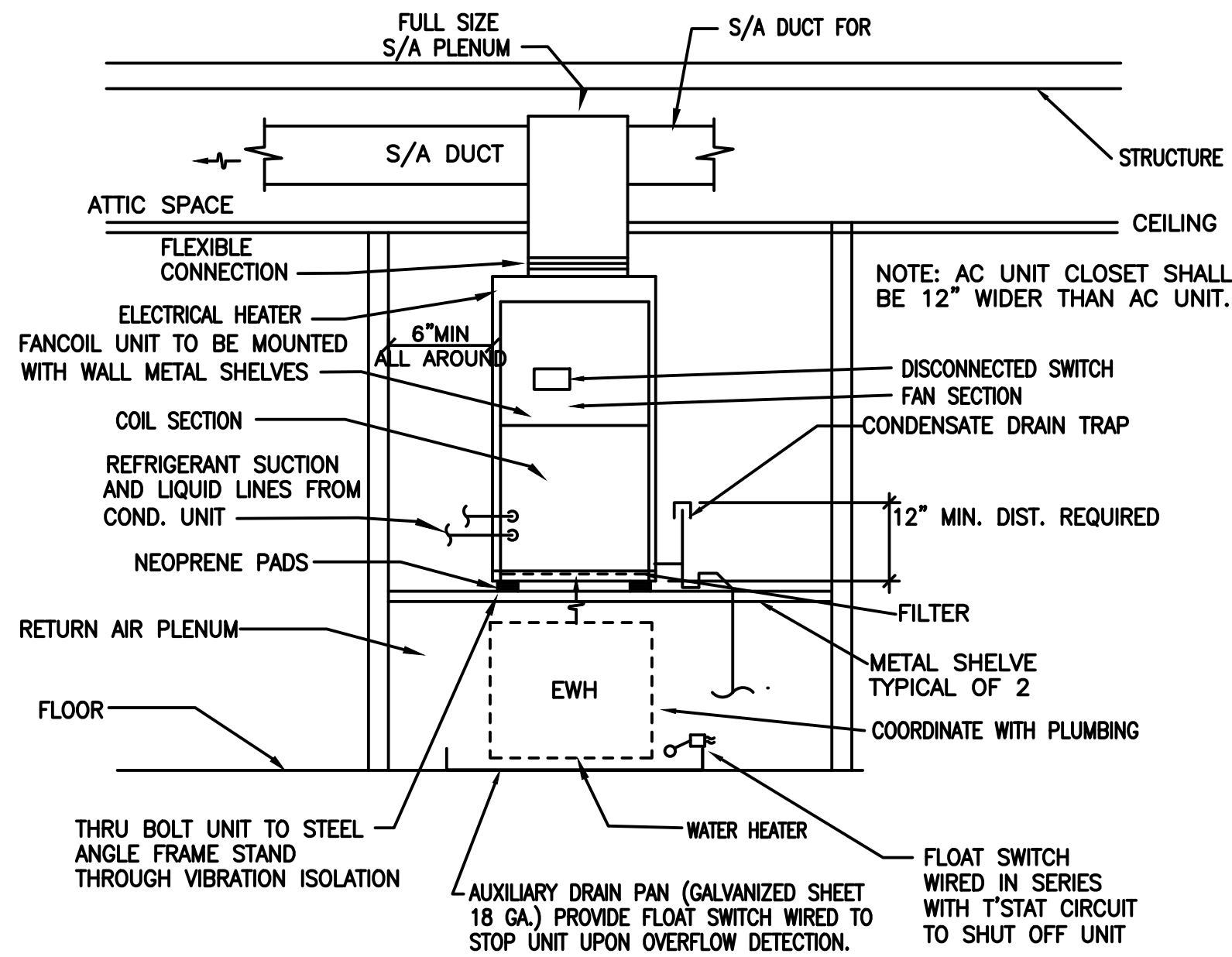
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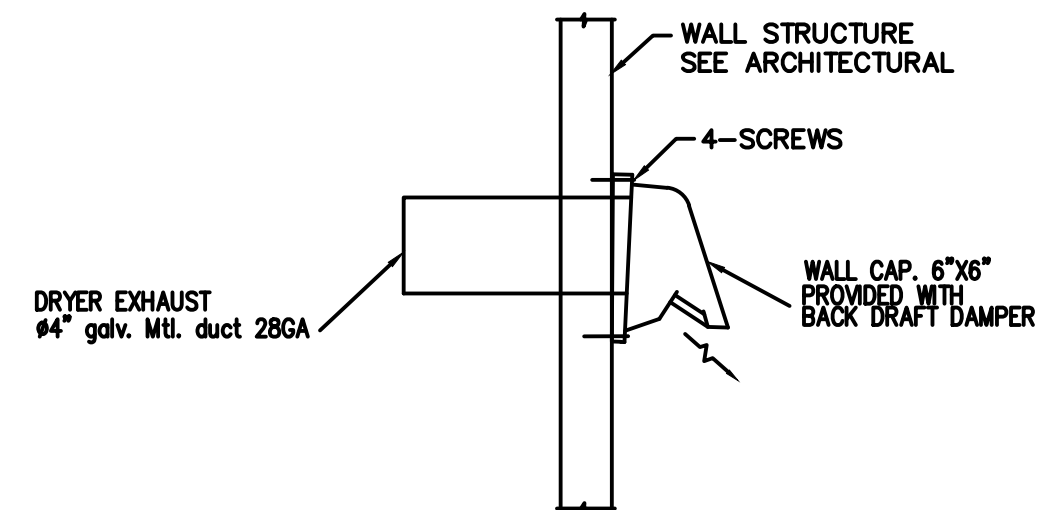
M-3



- NOTES:
1. INSULATE DRAIN PAN WITH 1/2" THICK FIBERGLASS BLANKET WITH VAPOR BARRIER OR SHEET FOAMED PLASTIC INSULATION WITH APPROVED FIRE RATING ON OUTSIDE SURFACE ONLY.
 2. PROVIDE MIN. 4" CLEARANCE AROUND ALL AIR DISTRIBUTION SYSTEM
 3. THE AUXILIARY DRAIN PAN FOR THE AHU SHALL HAVE A MINIMUM DEPTH OF 1-1/2 INCHES, SHALL NOT BE LESS THAN 3 INCHES LARGER THAN THE UNIT, OR THE COIL DIMENSIONS IN WIDTH AND LENGTH.
 4. IF LOCATED WITHIN PLENUM TYPE AC CLOSET.

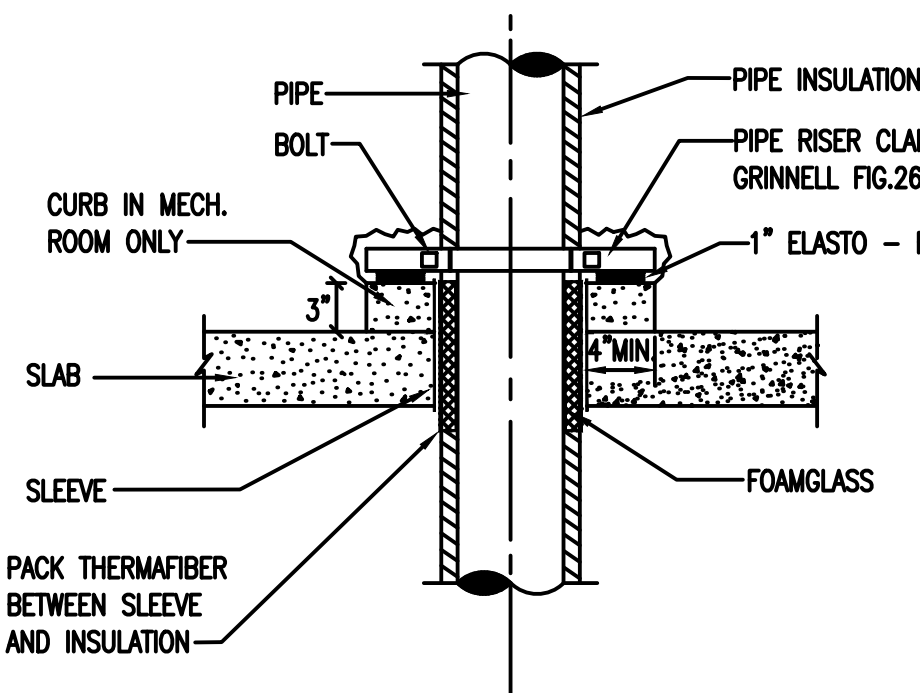
TYPICAL VERTICAL AIR UNIT DETAIL

N.T.S.



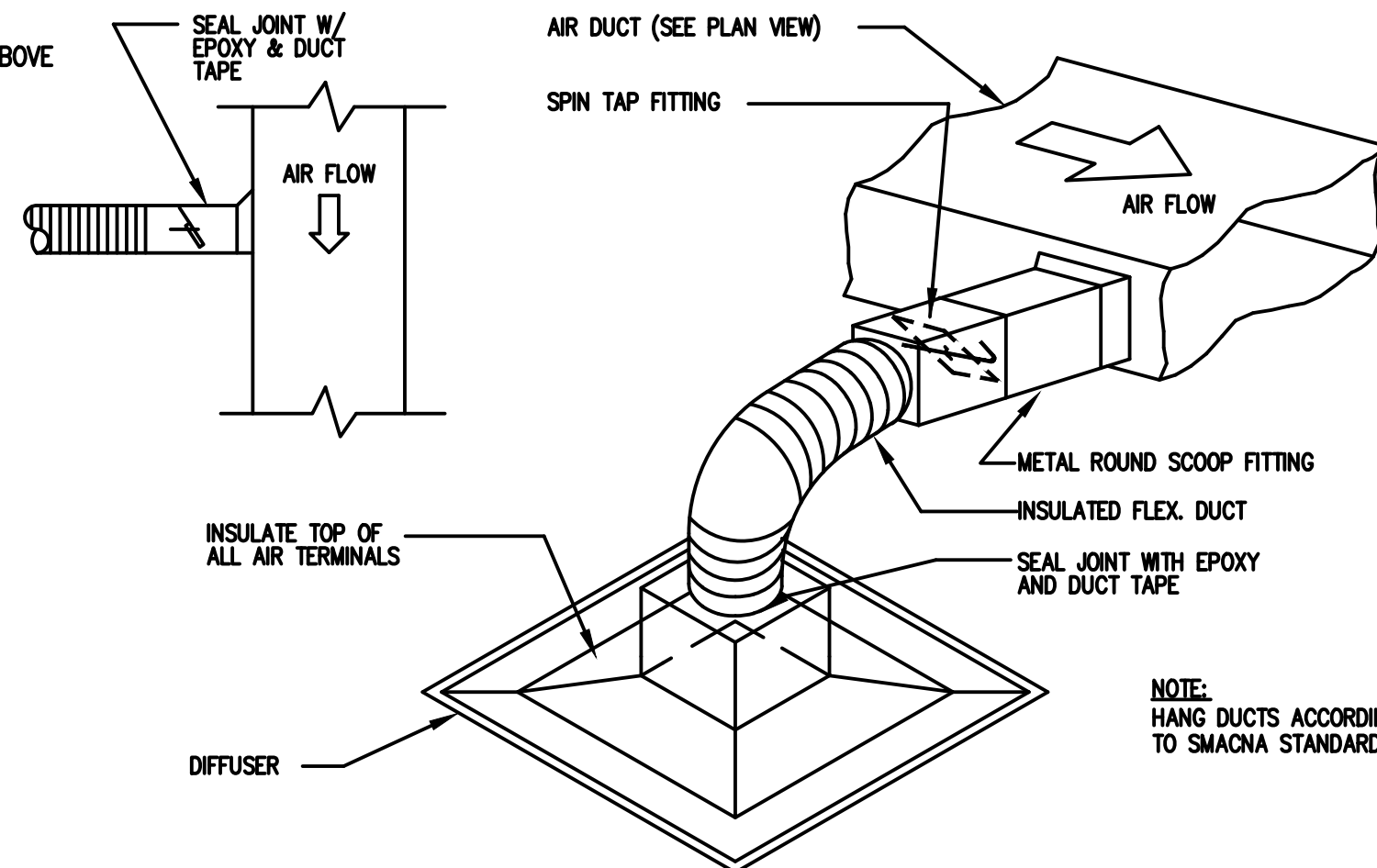
DRYER EXHAUST WALL CAP DETAIL

N.T.S.



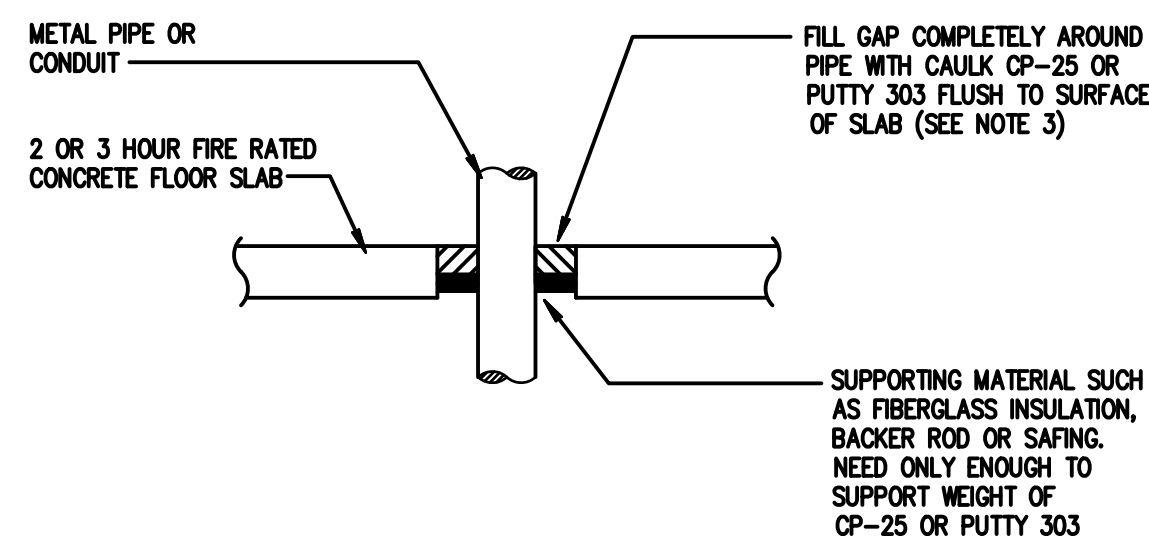
TYPICAL REFRIGERANT INSULATED PIPE RISER SUPPORT

N.T.S.

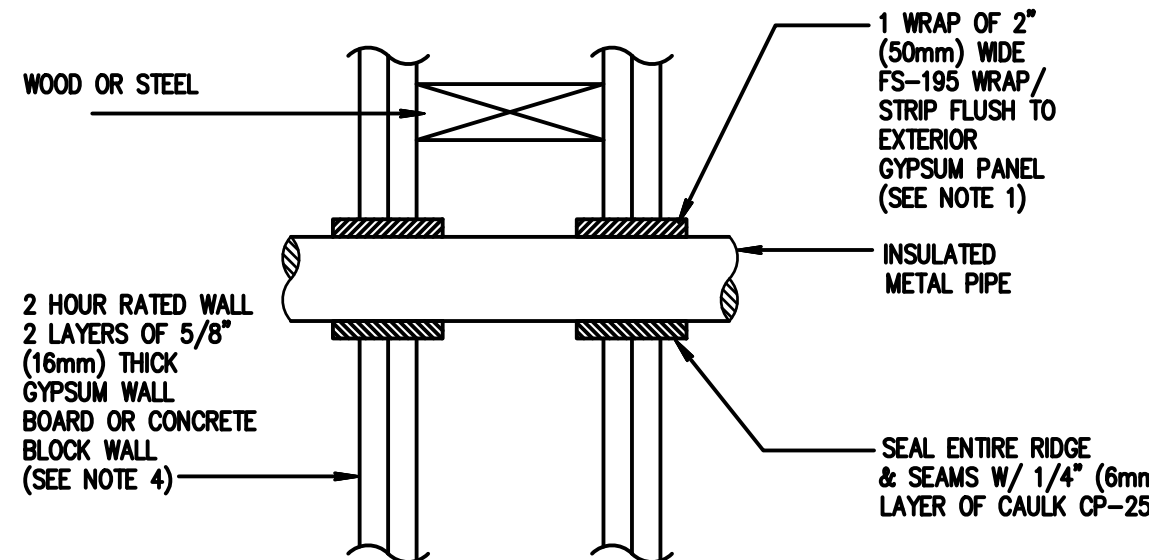


FLEXIBLE DUCT CONNECTION DETAIL

N.T.S.



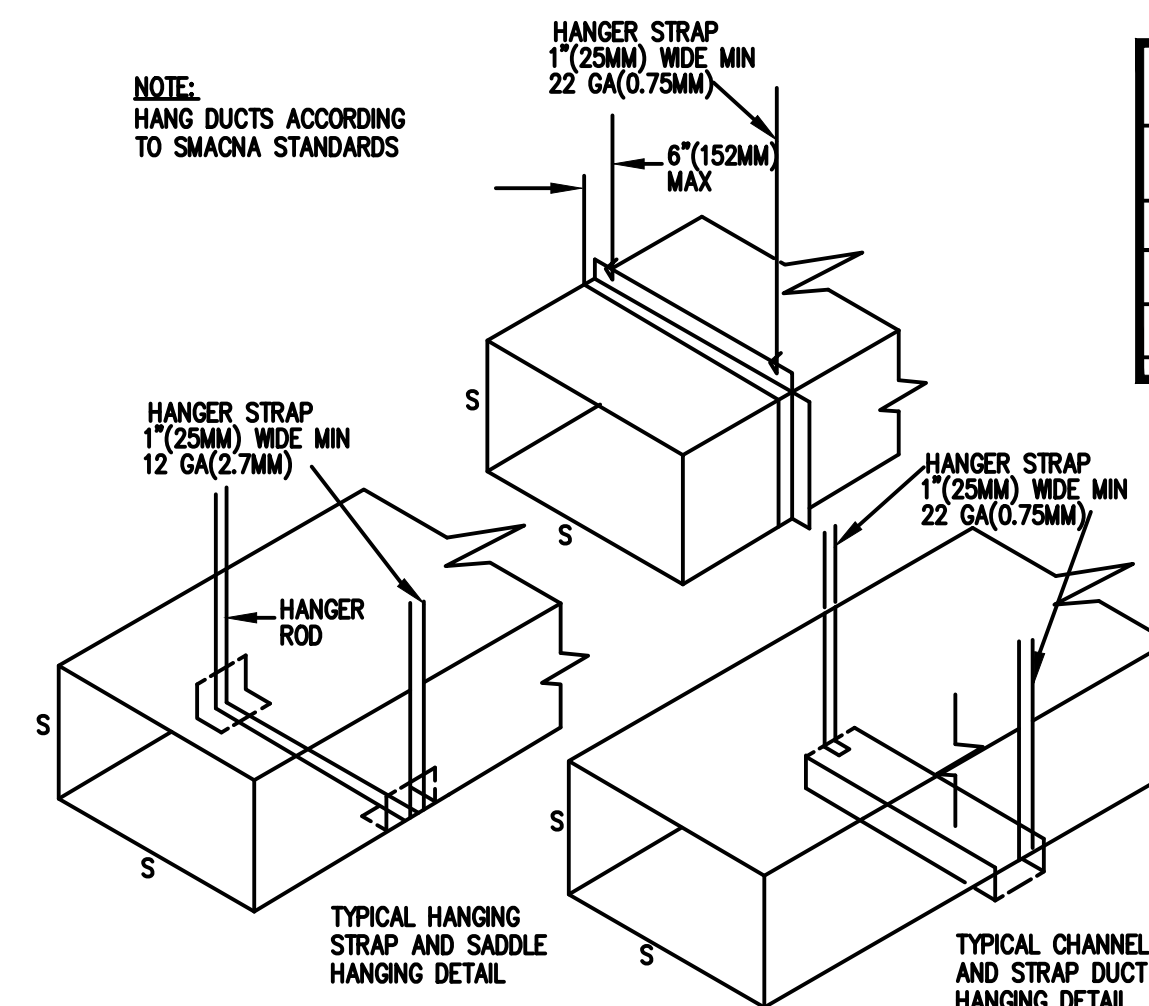
SECTION VIEW



SECTION VIEW

PIPE SLEEVE DETAIL

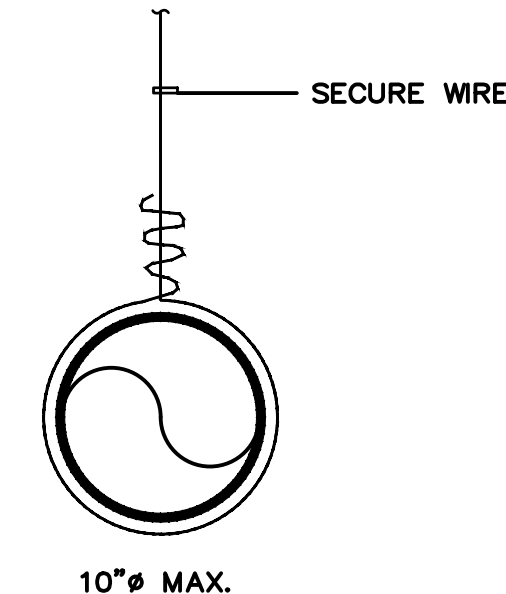
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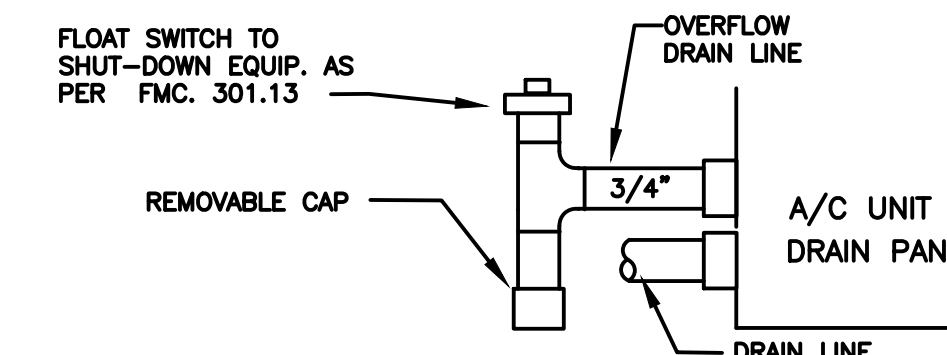
METHODS OF HANGING

N.T.S.

CHANEL SELECTION		
IF TOTAL EXTENSION IS NOT GREATER THAN	MINIMUM CHANNEL GAGE	MINIMUM CHANNEL PROFILE
6"(152MM)	24	3" X 1.5" (75MM X 38mm)
18"(457MM)	22	3" X 2" (75MM X 50mm)
30"(762MM)	18	3" X 2" (75MM X 50mm)

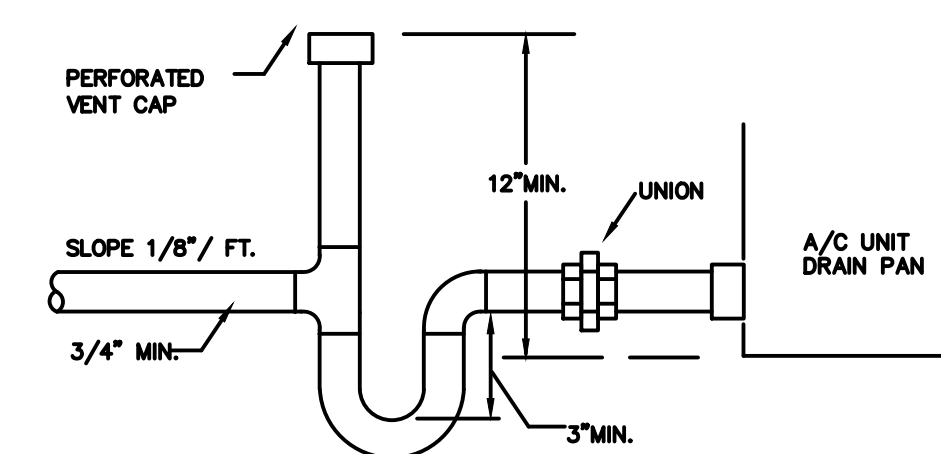


INSULATION AND FENESTRATION VALUES USED FOR ENERGY CALCULATIONS AND TO BE INSTALLED IN BUILDING ENVELOPE	
ROOF	= R-30
WALLS	= R-4.2
GLASS	= U-VALUE : 1.04
	SHGC : 0.5



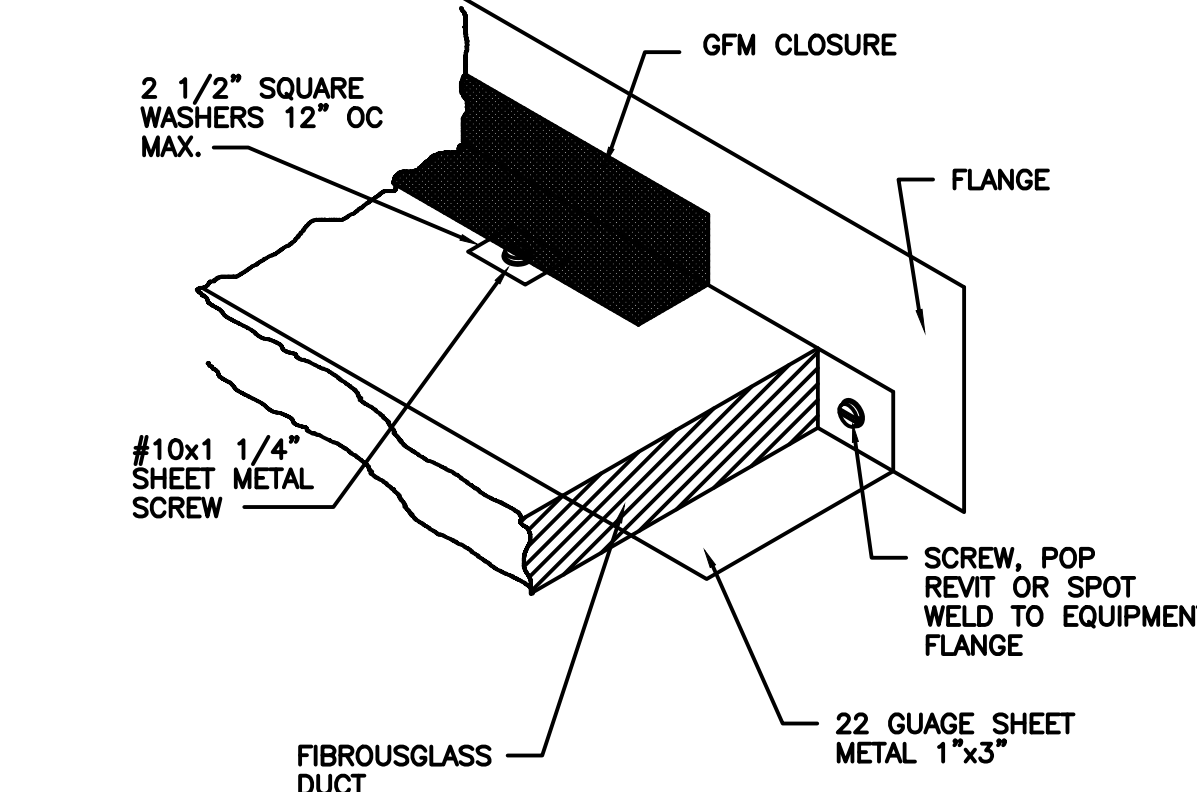
AUX. OVERFLOW DRAIN LINE DETAIL

N.T.S.



CONDENSATE DRAIN TRAP DETAIL

N.T.S.



MECHANICAL ATTACHMENT DETAIL

N.T.S.

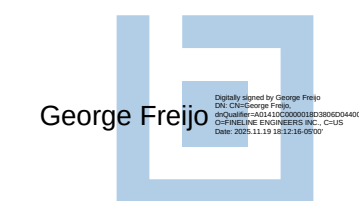
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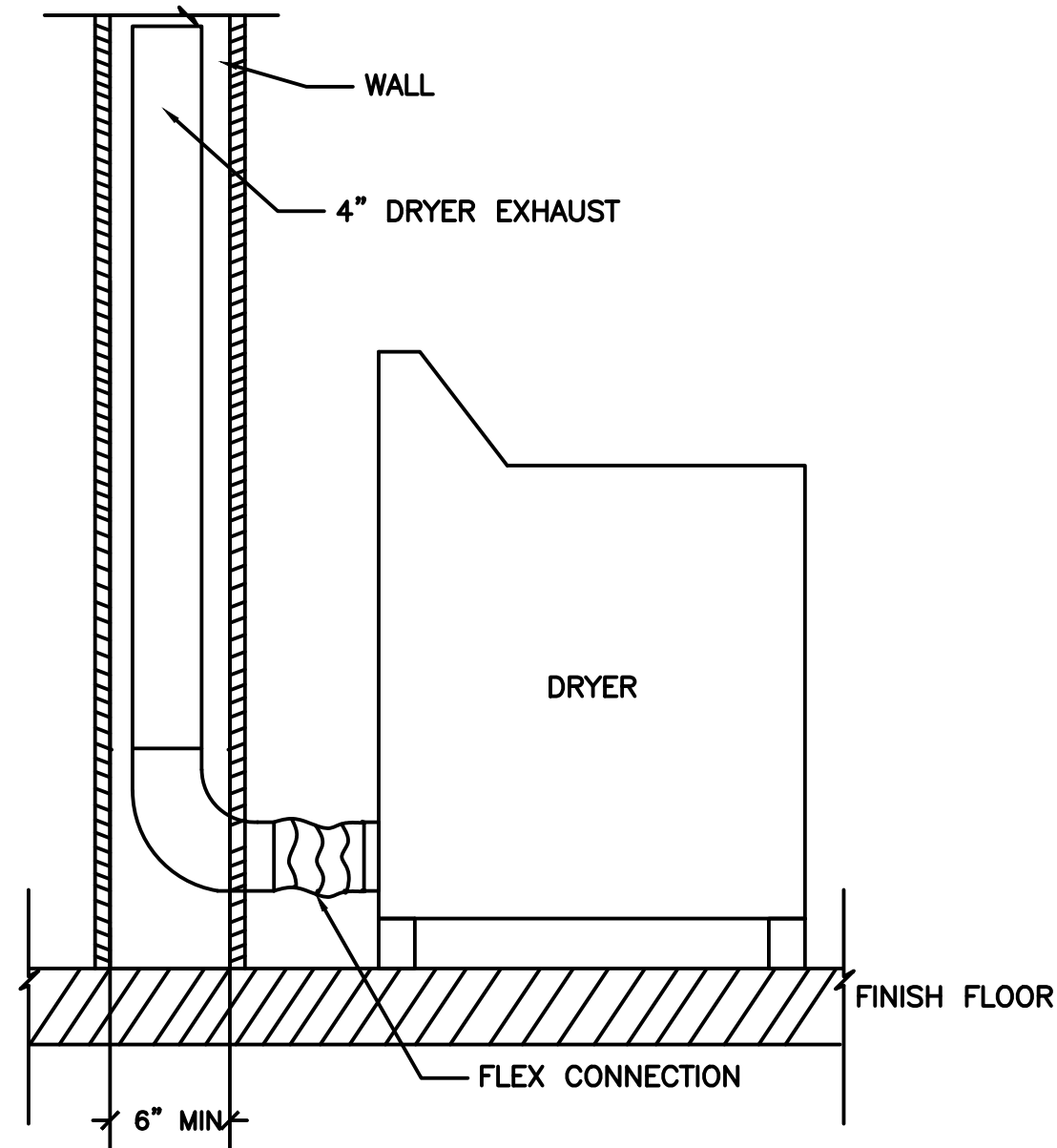
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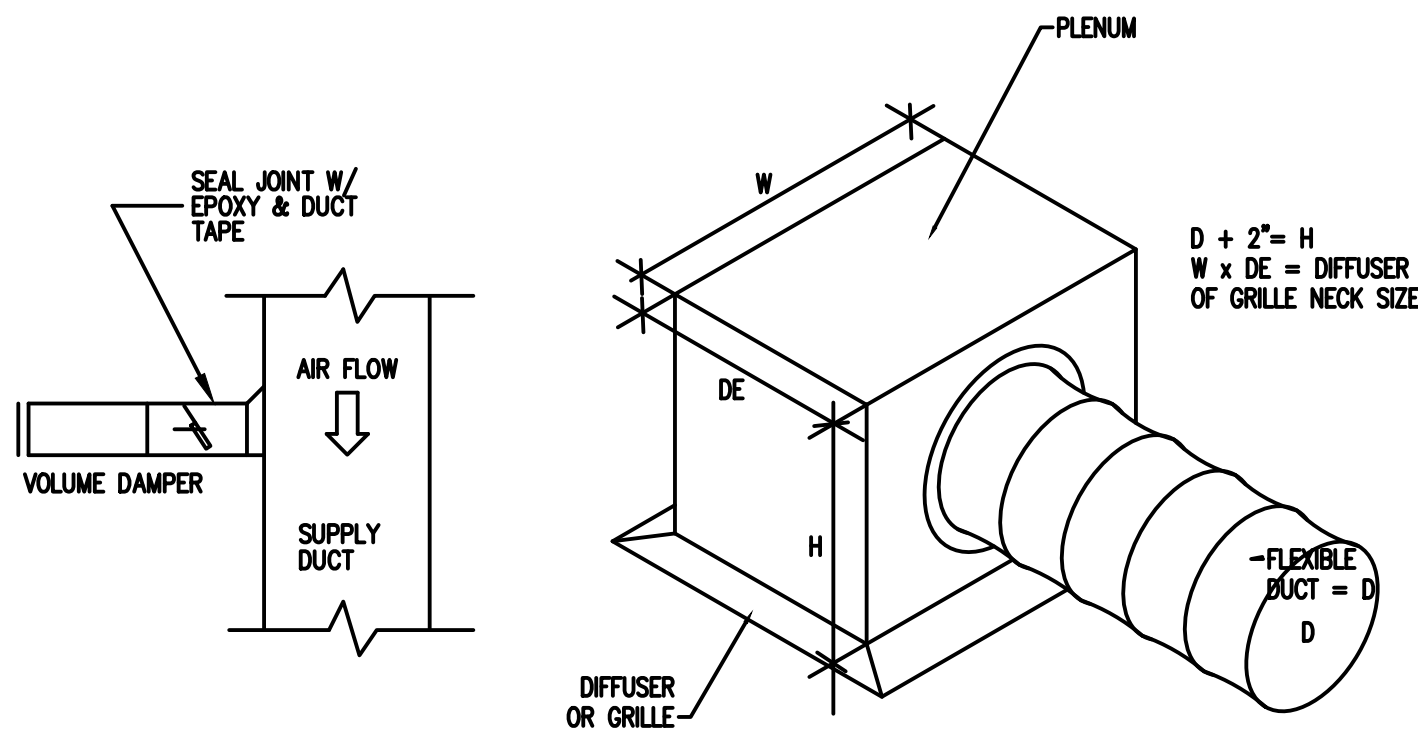


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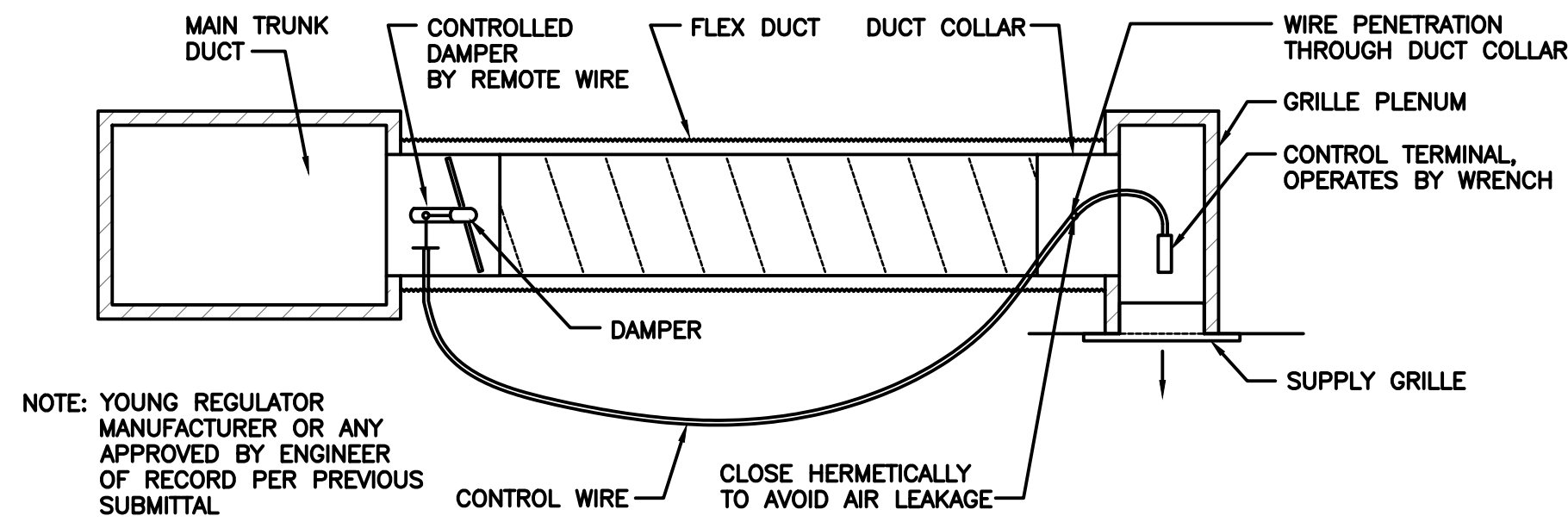
GEORGE FREIJO, P.E.
REGISTERED ENGINEER NO. 32578
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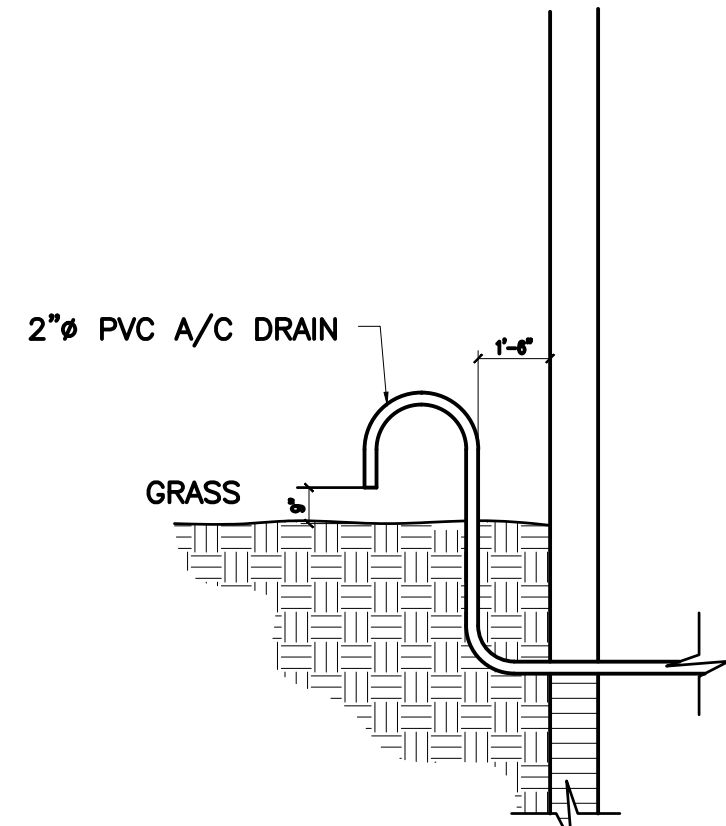
DRYER EXHAUST DETAIL
N.T.S.



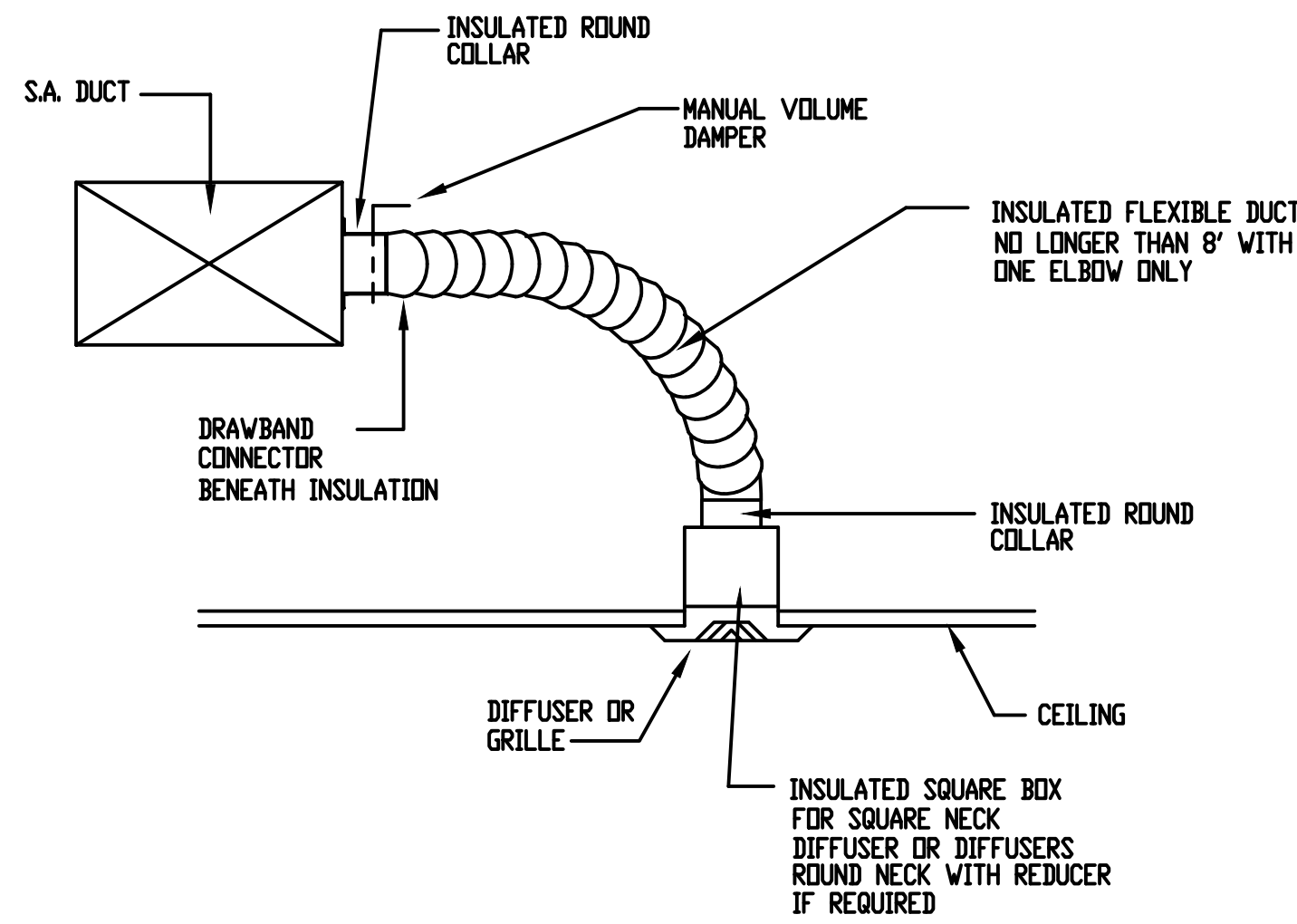
FLEXIBLE DUCT CONNECTION DETAIL
N.T.S.



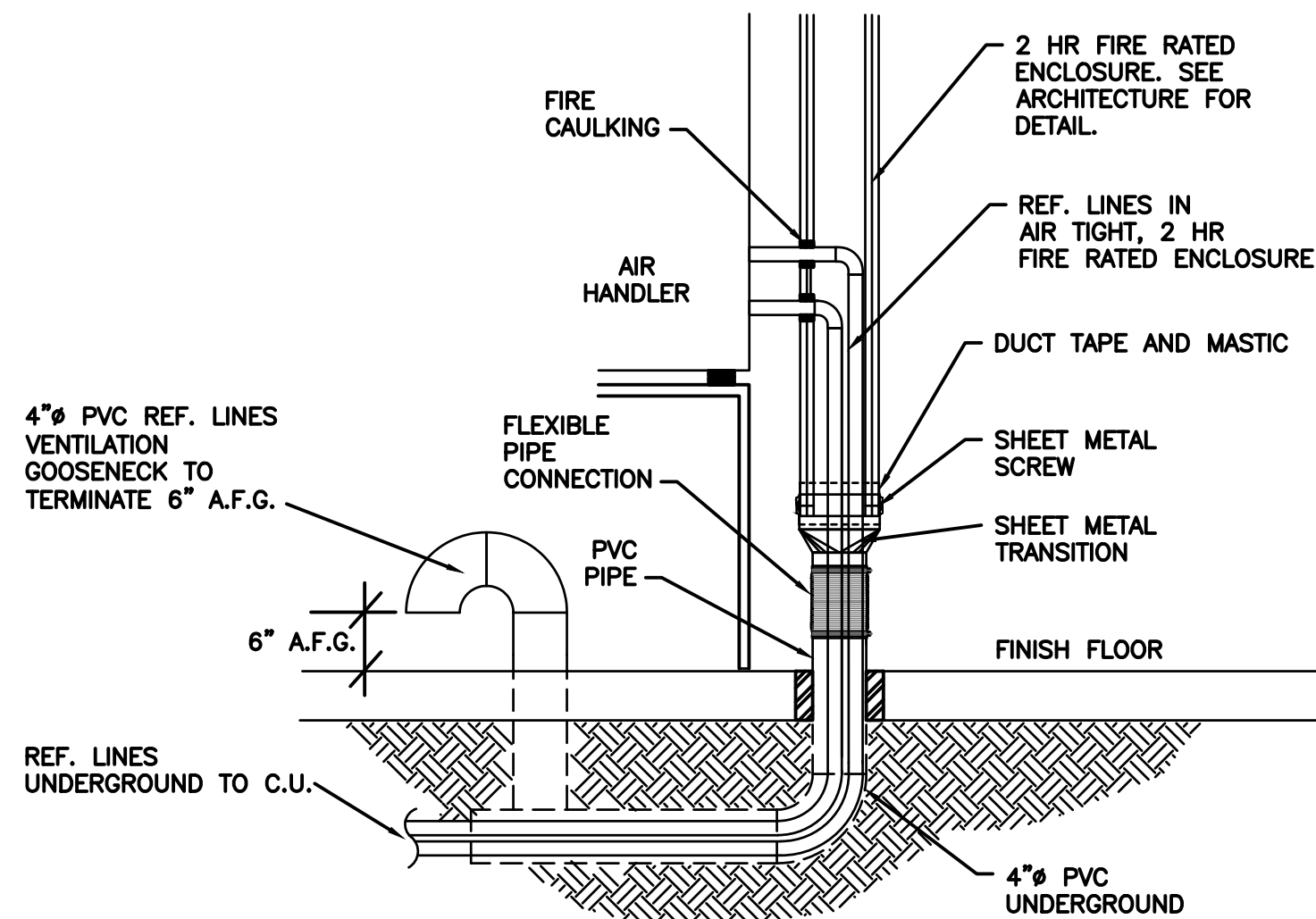
CONTROLLED - DAMPER BY REMOTE WIRE (RWD)
N.T.S.



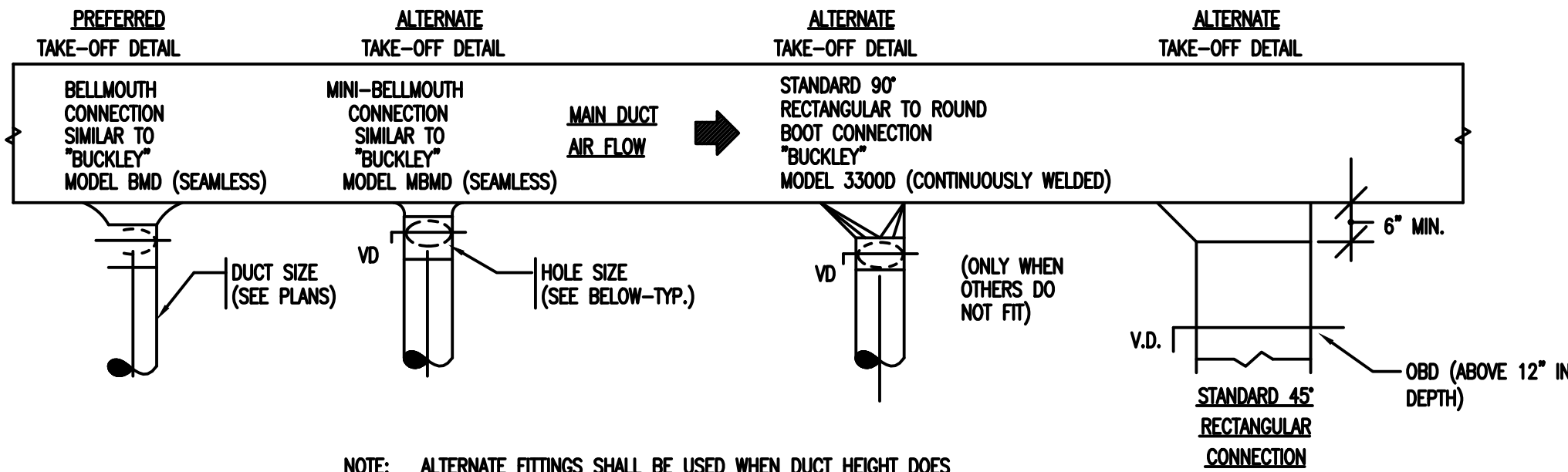
CONDENSATE LINE TERMINATION DETAIL
N.T.S.



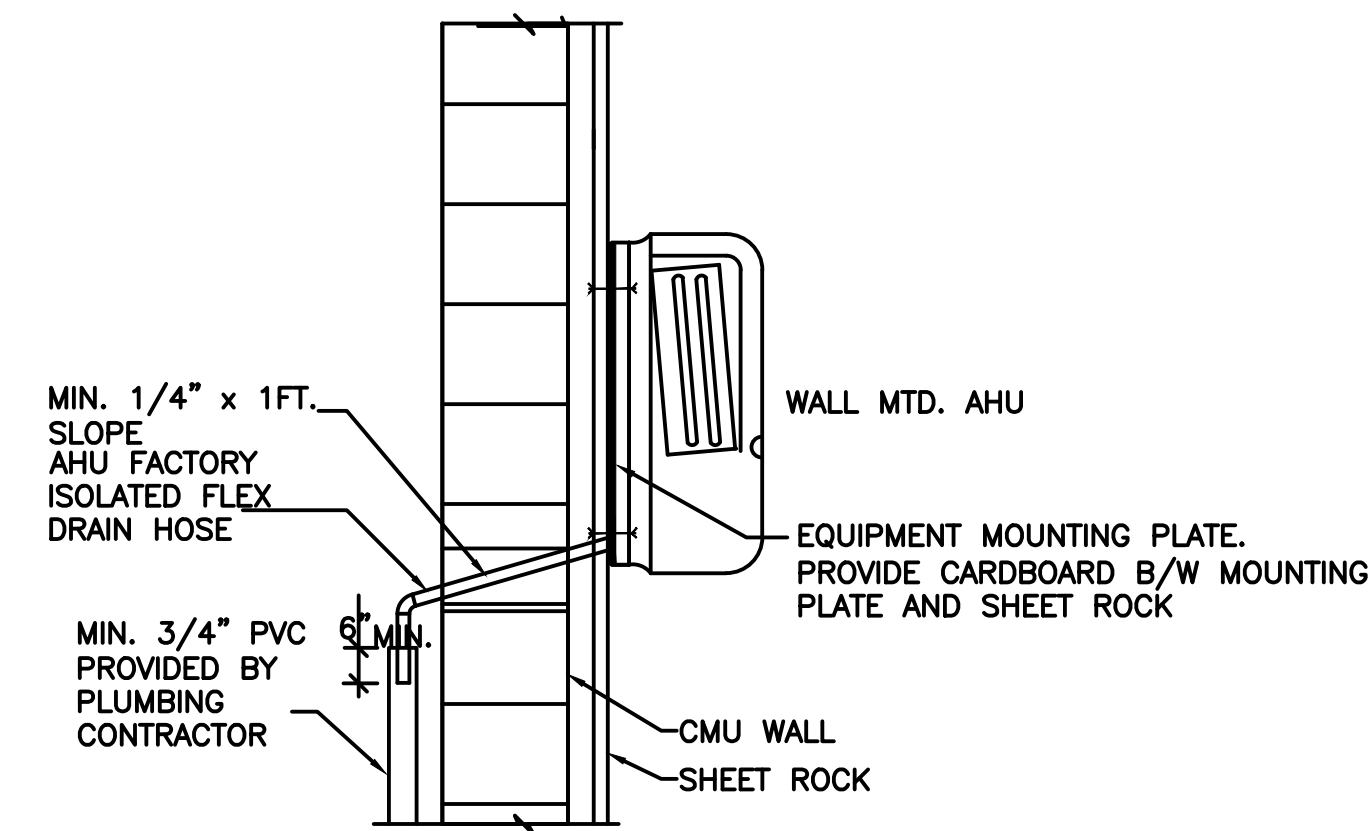
TYPICAL CONNECTION TO AIR DIFFUSER
N.T.S.



REFRIGERANT LINES FIRE RATED ENCLOSURE CONNECTION DETAIL
N.T.S.



DUCT TAKEOFFS DETAIL
N.T.S.



FAN COIL ON WALL MOUNTING ISOLATION/CONDENSATE DETAIL
N.T.S.

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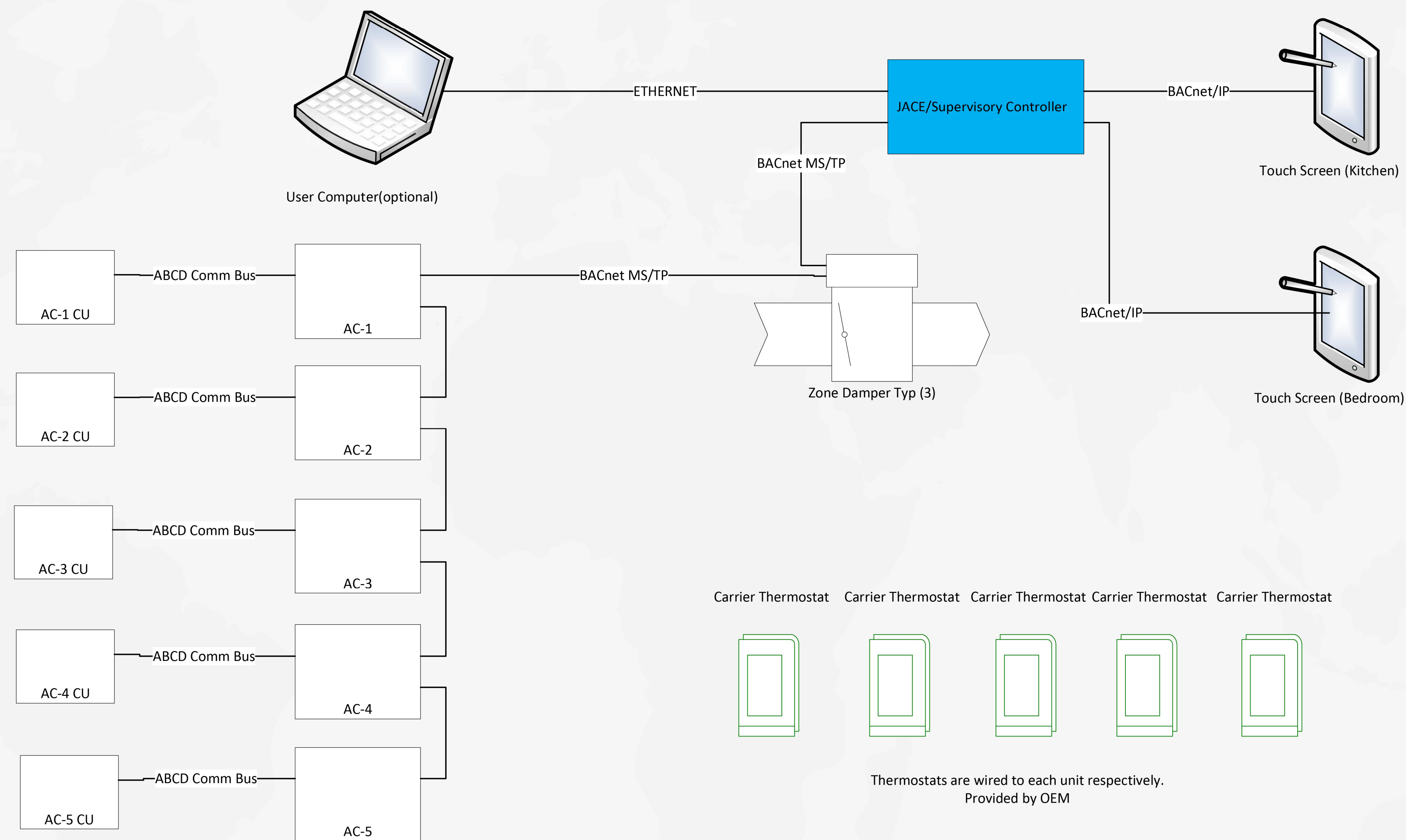
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E-mail: cadinfo@fineengineers.com
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REGISTERED ENGINEER NO. 32578
STATE OF FLORIDA - CA# 20796
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10-20-2009-3

Network Layout Building Automation System



CONTROLS DIAGRAM
N.T.S.

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M-6

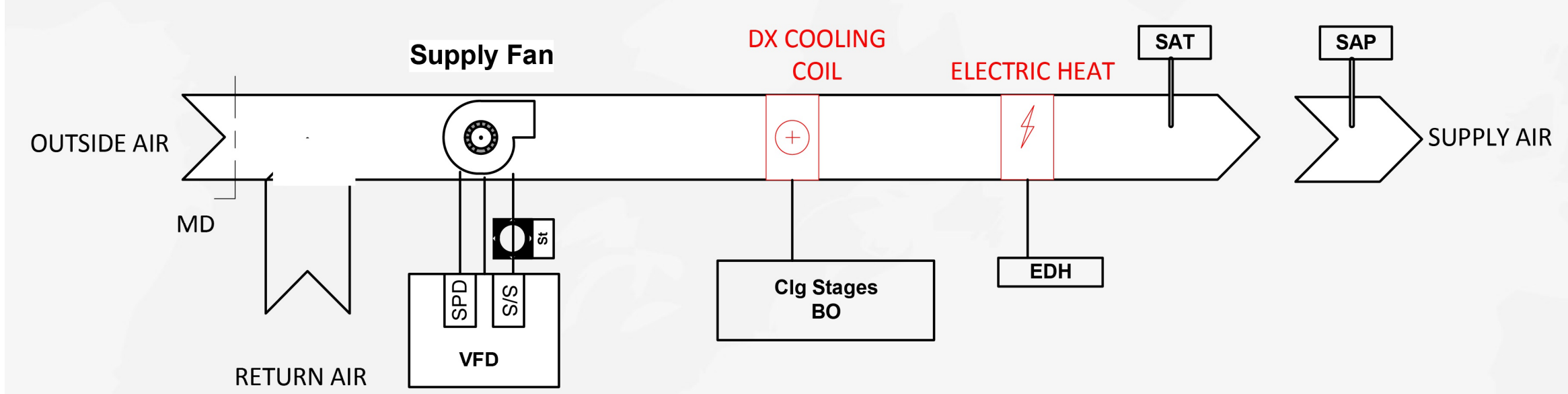


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Voice: 786.953.4901 - Fax: 786.953.4907
E-mail: cadinfo@fineengineers.com

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REGISTERED ENGINEER NO. 32578
STATE OF FLORIDA - CAFE 20796
CHL 04/10/2009 10:30:00AM

Controls Diagram and Point Schedule

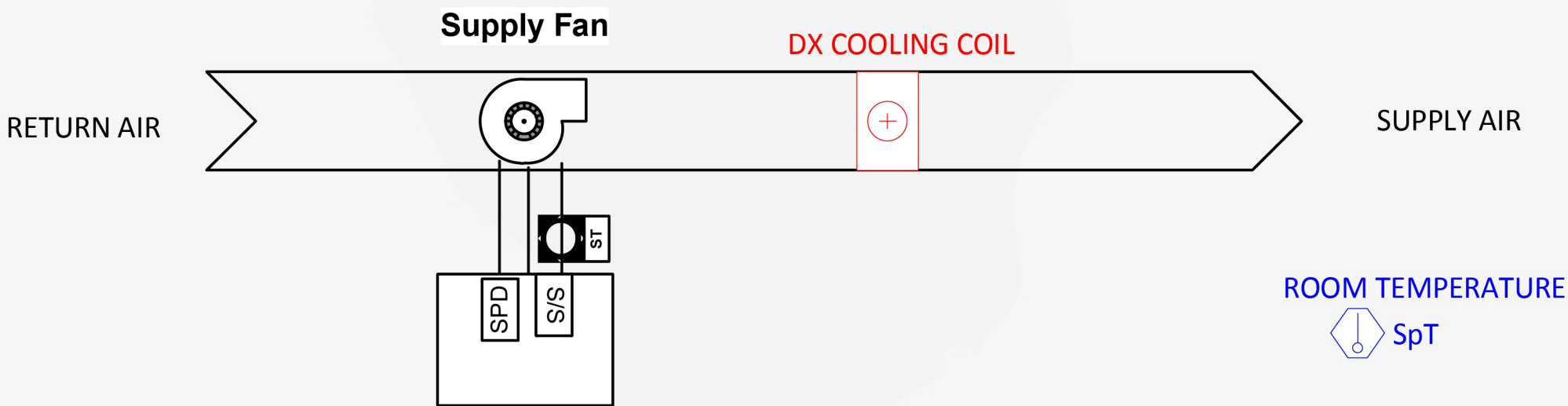
AC-1
Point Summary (via BACnet Card)



PointIndex	PointName	PointDescription	AI	AO	DI	DO
UI1	SAT	SUPPLY AIR TEMPERATURE	X			
UI2	SAP	SUPPLY AIR STATIC PRESSURE	X			
UO1	MD	MIXED AIR DAMPER COMMAND		X		
UO2	VFD-FB	VFD SPEED FEEDBACK		X		
DI1	SF-SS	SUPPLY FAN STATUS			X	
DO1	CLG-STG	COOLING STAGE 1 ENABLE				X
DO2	EDH	ELECTRIC HEAT ENABLE				X

Note:
Controls factory mounted with BACnet card.

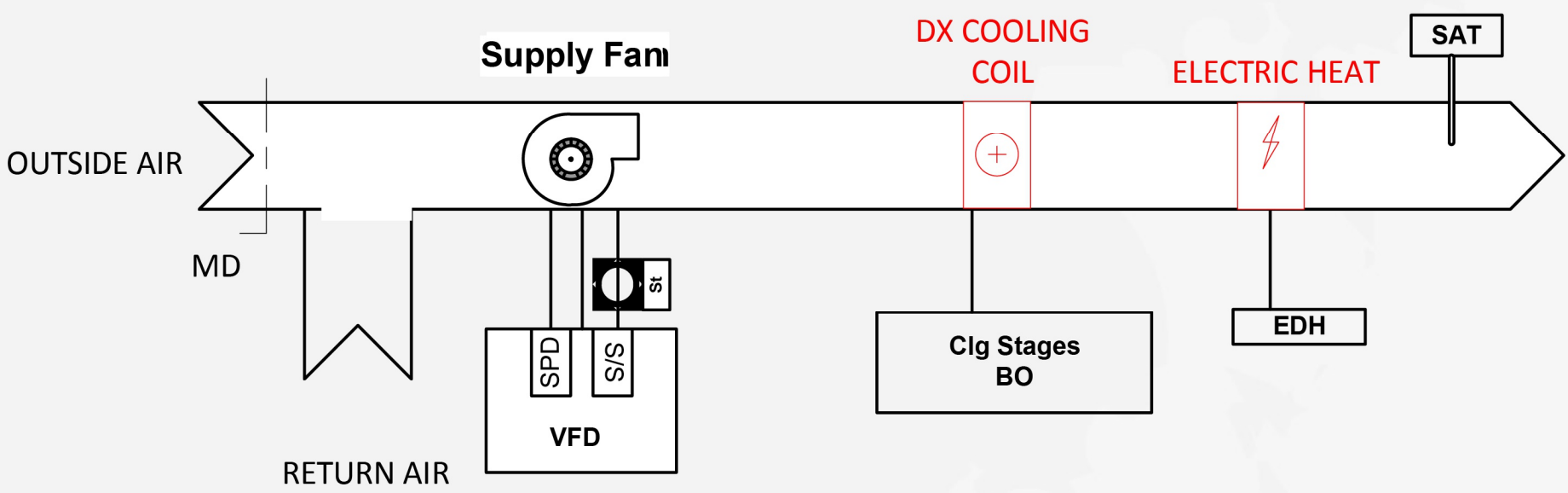
AC-5 Mini Split (With BACnet Card)



PointIndex	PointName	PointDescription	AI	AO	DI	DO
UI1	ZNT	ZONE TEMPERATURE	X			
UO2	FAN-SPD	VFD SPEED FEEDBACK		X		
DI1	SF-SS	SUPPLY FAN STATUS			X	
DO1	CLG-STG	COOLING STAGE 1 ENABLE				X

Note:
Controls factory mounted with BACnet card.

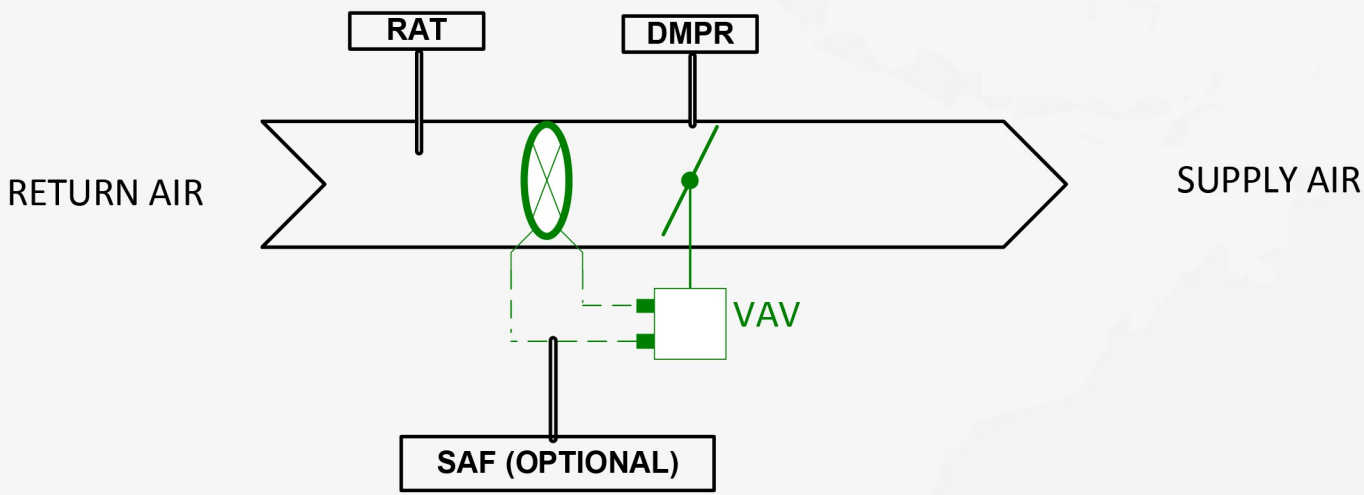
AC-2 Through AC-4
Point Summary (via BACnet card)



PointIndex	PointName	PointDescription	AI	AO	DI	DO
UI1	SAT	SUPPLY AIR TEMPERATURE	X			
UI2	SAP	SUPPLY AIR STATIC PRESSURE	X			
UO1	MD	MIXED AIR DAMPER COMMAND		X		
UO2	VFD-FB	VFD SPEED FEEDBACK		X		
DI1	SF-SS	SUPPLY FAN STATUS			X	
DO1	CLG-STG	COOLING STAGE 1 ENABLE				X
DO2	EDH	ELECTRIC HEAT ENABLE				X

Note:
Controls factory mounted with BACnet card.

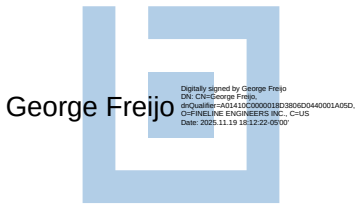
ZONE DAMPER (ZN-1, 2, & 3)



PointIndex	PointName	PointDescription	AI	AO	DI	DO
UI1	RAT	SUPPLY AIR TEMPERATURE	X			
UI2	SAF	SUPPLY AIR FLOW	X			
UO1	ZN-DMP-O	ZONE DAMPER OUTPUT		X		

Note:

CONTROLS DIAGRAM
N.T.S.



Fine Line Engineers Inc.
Electrical, Mechanical, Plumbing
Fire Protection, Construction Administration
2086 W. 76TH Street Hialeah, FL 33016
Voice: 786.953-4901 - Fax: 786.953-4907
E-mail: cadmin@fineengineers.com

GEORGE FREIJO, P.E.
REGISTERED ENGINEER NO. 32578
STATE OF FLORIDA - CAFE 20796

ENR. 10/10/2009 13

Fine Line Engineers Inc.
Electrical, Mechanical, Plumbing, Fire Protection,
Construction Administration Services
2086 WEST 76TH STREET, HIALEAH, FLORIDA 33016
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M-7

Sequence of operation

SEQUENCE OF OPERATION – AC-1 (FIRST FLOOR ZONED DX UNIT)

System Description:

AC-1 is a DX cooling system serving three zones. Each zone has a Zone Damper Controller with a built-in actuator and a return air temperature sensor.

Unit operation is coordinated by the S-1000 over BACnet MS/TP using points exposed by the factory BACnet card.

Cooling Mode

1. The BAS monitors the Zone 1, Zone 2, and Zone 3 Return Air Temperature Sensors.

2. When ANY zone temperature rises above its cooling setpoint:

- The BAS commands Cooling Stage 1 Enable (CLG-STG) via BACnet.

- The system supply fan is enabled.

3. The zone calling for the most cooling modulates its damper OPEN.

4. Non-calling zones:

- Dampers modulate toward CLOSED to prevent overcooling.

5. When all zones satisfy setpoint:

- Cooling is disabled.

- Zone dampers drive to minimum or closed position.

Supply Fan Control

1. Fan is enabled by BAS during any heating or cooling demand.

2. Fan status is monitored via SF-SS.

3. VFD feedback VFD-FB is monitored for alarm detection.

2. Fail position: CLOSED upon loss of communication.

Mixed Air Damper (MD)

1. BAS modulates Mixed Air Damper (MD) command in response to SAT and ventilation requirements.

2. If low SAT or fault, MD drives CLOSED.

Zone Dampers

1. Each zone damper modulates between 0–100% based on zone temperature error.

2. Fail position: CLOSED upon loss of communication.

Alarms

1. Loss of SAT sensor, VFD FB, Excessive SAT (high/low), Fan Start/Stop failures.

2. Zone communication failure.

DX alarm/fault relayed from BACnet card.

SEQUENCE OF OPERATION – AC-2 / AC-3 / AC-4 (TYPICAL SINGLE-ZONE DX UNITS)

System Description:

Each DX unit is factory-controlled and integrated to BAS via a BACnet MS/TP card.

A hidden thermostat with a wall sensor provides the space temperature setpoint.

Cooling Mode

1. BAS monitors room temperature from the wall sensor.

2. When temp exceeds cooling setpoint by deadband:

3. BAS writes Cooling Enable command to BACnet card (if gateway supports cooling control).

4. Fan runs per factory sequence.

BAS monitors:

1. SAT, Fan status, Compressor status, Stage status

2. Cooling is disabled when temperature falls below setpoint.

Supply Fan

1. BAS monitors fan status through BACnet point.

2. Fan alarms reported to BAS.

Setpoints

1. BAS writes:

- Cooling Setpoint

- Heating Setpoint

2. Mode (Heat/Cool/Auto)

3. All overridden values revert to factory defaults on BAS loss of communication.

Alarms

1. Fault Codes

2. Mode lockouts

3. High/Low SAT warnings

4. Communication loss

SEQUENCE OF OPERATION – AC-5 MINI-SPLIT

System Description:

Mini-split operates through factory onboard logic. BAS integration is via BACnet MS/TP gateway. BAS reads room temp from wall sensor and writes setpoints/mode.

Cooling Mode

1. BAS monitors room temperature from wall sensor.

2. If temperature exceeds cooling setpoint:

3. BAS commands unit to “Cool Mode” and “Unit On.”

Fan speed commanded based on:

1. Temperature error

2. Gateway-supported modes (Low/Med/High/Auto)

3. Unit disables cooling when temp is satisfied or per factory logic.

Fan Operation

1. BAS can command fan speed (Auto/Low/Med/High).

2. If unit reports a fan fault, BAS generates an alarm.

Alarms

1. Mini-split gateway exposes error code(s) to BAS.

2. BAS logs: Communication Loss, Unit Offline, Fault Active, Setpoint & Mode Control

3. BAS writes: Cooling setpoint, Heating setpoint, Mode (Heat / Cool / Auto / Off), Fan Speed

4. Unit reverts to local mode if BAS communication is lost.

SEQUENCE OF OPERATIONS – ZONE DAMPER (ZN 1, 2, & 3)

1. Dampers modulate 0–100% based on zone temperature demand. On a rise of the room temperature above the setpoint damper modulates open and vice versa a room temperature decrease below the setpoint.

Fine Line Engineers Inc.
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Tel: 786-953-4901
E-mail: cadinfo@fineengineers.com



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