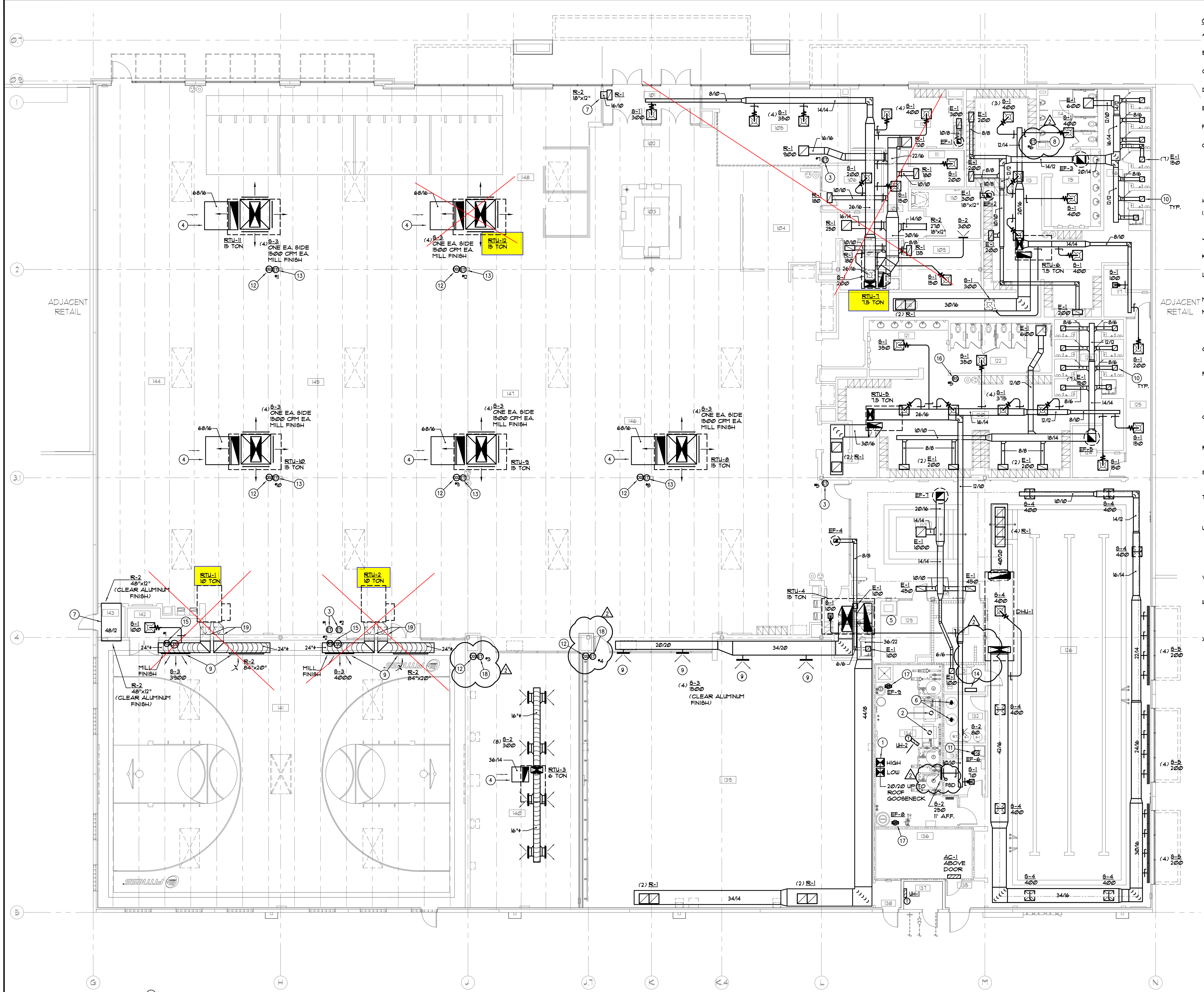


GENERAL NOTES:

A. ALL DUCT SIZES SHOWN ARE CLEAR AIRSTREAM DIMENSIONS. ADJUST SIZES TO ACCOMMODATE INSULATION.

B. PROVIDE A FLEXIBLE CONNECTION AT THE INTAKE AND DISCHARGE OF ALL MOTOR DRIVEN AIR HANDLING EQUIPMENT.

C. FLEXIBLE BRANCH DUCTWORK SHALL HAVE A MAXIMUM LENGTH OF FIVE (5) FEET AND (1) RADIUS ELBOW (90 DEGREES).

D. CONTRACTOR SHALL REFER TO ARCHITECTURAL CEILING PLANS AND INTERIOR ELEVATIONS FOR EXACT LOCATION OF DIFFUSERS/GRILLES.

E. CEILING DIFFUSER DUCT SIZE SHALL BE SAME SIZE AS NECK SIZE INDICATED.

F. PROVIDE A TRANSITION FROM FULL SIZE OF RTU OPENING TO SIZE OF DUCTWORK SHOWN ON PLANS.

G. FIRE AND SMOKE DAMPERS SHALL COMPLY WITH THE REQUIREMENTS OF BOTH UL 555 AND UL 555S, AND SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 716 OF IBC AND PER LISTED MANUFACTURER'S INSTALLATION INSTRUCTION. ACCESS FOR TESTING AND MAINTENANCE SHALL BE PROVIDED FOR ALL DAMPERS IN ACCORDANCE WITH IMC AND NFPA 90A. LABEL ALL AIR VOLUME DAMPERS ON OUTSIDE OF DUCT INSULATION WITH BRIGHT COLORED RIBBON AND TAPE LABEL ALL FIRE DAMPER ACCESS DOORS. PROVIDE EXTENDED LOCKING QUADRANTS.

H. ALL SIZES SHOWN ON PLANS ARE IN INCHES, UNLESS NOTED OTHERWISE.

I. CONTRACTOR SHALL COORDINATE EXACT LOCATION, OF EQUIPMENT, EXACT ROUTING AND SIZE OF DUCTWORK WITH STRUCTURAL MEMBERS AND ARCHITECTURAL FEATURES.

J. ALL DUCTWORK SHALL COMPLY WITH LOCAL CODES AND SMACNA STANDARDS.

K. PROVIDE CONDENSATE DRAIN PIPING TO APPROVED TERMINATION POINT WHETHER SHOWN OR NOT.

L. ALL HVAC UNITS SHOULD BE MANUALLY SHUTDOWN PER SECTION 4-2, NFPA 90.A FROM THIS LOCATION OR APPROVED LOCATION BY THE FIRE INSPECTOR.

M. NO FLEXIBLE DUCT IS ALLOWED IN EXPOSED-TO-VIEW AREAS.

N. AIR CONDITIONING SUPPLY AND RETURN SHALL BE GALVANIZED STEEL CONSTRUCTED AND SEALED TO SMACNA AND LOCAL CODES. ALL EXHAUST AIR DUCTS IN WET AREAS SHOULD BE ALUMINUM CONSTRUCTION AND INSTALLED IN ACCORDANCE WITH SMACNA AND LOCAL CODES. JOINTS SHALL BE SEALED WATER TIGHT WITH HARDCAST OR EQUAL.

O. ALL SMOKE DETECTORS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 72. ACCESS SHALL BE PROVIDED TO SMOKE DETECTORS FOR INSPECTION AND MAINTENANCE.

P. BY DETECTION OF SMOKE, SMOKE DETECTORS SHALL SHUT DOWN ALL OPERATIONAL CAPABILITIES OF AIR DISTRIBUTION SYSTEM IN ACCORDANCE WITH THE LISTING AND LABELING OF APPLIANCES USED IN THE SYSTEM. AIR DISTRIBUTION SYSTEMS THAT ARE PART OF A SMOKE CONTROL SYSTEM SHALL SWITCH TO THE SMOKE CONTROL MODE UPON ACTIVATION OF A DETECTOR.

Q. ALL FLEXIBLE DUCTS SHALL CONFORM TO THE REQUIREMENT OF UL 181. SUCH DUCTS SHALL BE LISTED AND LABELED AS CLASS 0 OR CLASS 1 FLEXIBLE AIR DUCTS AND SHALL BE INSTALLED IN ACCORDANCE WITH IMC REQUIREMENT.

R. ALL JOINTS IN DUCT SYSTEM MUST BE TIGHT IN ORDER TO ENSURE PROPER AIR DISTRIBUTION AND STRUCTURAL INTEGRITY. DUCT SUPPORTS SHALL NOT EXCEED 10 FEET.

S. ALL AIR INTAKE AND EXHAUST LOUVERS SHALL BE EQUAL TO RUSKIN 375DX DRAIN ABLE STATIONARY LOUVER AND SHALL BE CORROSION RESISTANCE AND SHALL BE SIZED PER IMC TABLE 401.5.

T. ALL OPENINGS INTO THE FIRE RESISTANCE RATED CONSTRUCTION SHALL BE PROTECTED BY SELF CLOSING FIRE RESISTANCE RATED DEVICES IN ACCORDANCE WITH SECTION 7 OF INTERNATIONAL BUILDING CODE FOR ENCLOSURE WALL OPENING PROTECTION AND LOCAL CODE.

U. WHERE DRAWING OR SPECIFICATIONS CONFLICT OR ARE UNCLEAR, ADVISE OWNER'S REPRESENTATIVE IN WRITING BEFORE AWARD OF CONTRACT. OTHERWISE, INTERPRETATIONS OF CONTRACT DOCUMENTS BY THE OWNERS REPRESENTATIVE SHALL BE FINAL. NO ADDITIONAL COMPENSATIONS SHALL BE PERMITTED DUE TO DISCREPANCIES OR INCONSISTENCIES IN THE DOCUMENTS RESOLVED ACCORDING TO THE OWNER'S REPRESENTATIVES INTERPRETATION.

V. SHOULD THERE BE CONFLICTS IN CONTRACT DOCUMENTS, PROVIDE THE GREATER QUALITY, THE HIGHER QUALITY AND THE MORE RESTRICTIVE OF EQUIPMENT AND WORK.

W. WATER HEATER SHALL BE PROVIDED WITH D-2 POWER VENT. FLUE PIPE SHALL BE 4" STAINLESS STEEL AS REQUIRED FOR INSTALLATION OF CATEGORY III APPLIANCE AND PER RAYPAK POOL WATER HEATER. CONTRACTOR SHALL COORDINATE WITH POOL WATER HEATER MANUFACTURER FOR EXACT SIZE AND MATERIAL OF WATER HEATERS FLUE PIPES FOR ANY OTHER BRANDS.

X. INSTALL VENT PIPES IN ACCORDANCE WITH LOCAL CODES AND PROVISIONS, NATIONAL FUEL GAS CODE, ANSI Z223.1 AND THE VENT MANUFACTURER'S RECOMMENDATIONS. U.O.N., FLUE VENT SHALL BE TERMINATED ABOVE THE ROOF MINIMUM 3'-0" ABOVE THE POINT OF EXIT OR AT LEAST 2'-0" ABOVE THE PARAPET WALL, OR ABOVE ANY SURFACE/EQUIPMENT ON ROOF, AND MINIMUM 3'-0" ABOVE ANY FORCED AIR WITHIN 10'-0" OF THE TERMINATION.

NOTES BY SYMBOL "○":

1. 20"x20" COMBUSTION AIR DUCT UP TO ROOF GOOSENECK. IT IS THE MINIMUM SIZE REQUIRED BASED ON MECHANICAL CODE. FOLLOW MANUFACTURER RECOMMENDATION FOR ANY SIZE LARGER THAN REQUIRED BY CODE. ONE DUCT SHALL BE WITHIN 12" FROM THE CEILING AND THE OTHER 12" FROM THE FLOOR. PROVIDE ST. STL. SCREEN.
2. PROVIDE RAYPAK D2 POWER VENT 406A (120V) 4" VENT THRU EXTERIOR WALL. CONTRACTOR SHALL COORDINATE WITH WATER HEATER MANUFACTURER ON THE RECOMMENDED INSTALLATION PROCEDURE. TURN UP 3' ABOVE ADJACENT LOUVER.
3. MOUNT ENTOUCH CONTROLLERS @ 5'-0" A.F.F. PROVIDE COMBINATION BOXES WHERE MULTIPLE SENSORS ARE USED. ENTOUCH CONTROLLERS ARE DESIGNED TO BE ACCESSED VIA WEB PORTAL TO GIVE AUTHORIZED FACILITIES PERSONNEL ACCESS TO MANAGE THEIR FACILITY REMOTELY VIA WEB PORTAL INTERFACE. THESE DEVICES ARE FULLY LOCKED OUT FROM PUBLIC USE WITH PASSCODE PROTECTION. ADA REQUIREMENTS ARE NOT APPLICABLE.
4. COVER DUCT OPENING WITH 1/2" GALV. HARDWARE CLOTH.
5. SAUNA CONTRACTOR SHALL PROVIDE HIGH AND LOW LOUVERS FOR SAUNA ROOM.
6. PROVIDE TWO (2)-3" PVC PIPES FOR EACH WATER HEATER COMBUSTION INTAKE AND FLUE VERTICALLY TO VENT TERMINATION KIT PER MANUFACTURER INSTALLATION MANUAL. CONTRACTOR SHALL COORDINATE WITH WATER HEATER MANUFACTURER FOR EXACT SIZE AND MATERIAL OF WATER HEATERS FLUE PIPES AND RECOMMENDED INSTALLATION PROCEDURE.
7. TRANSFER DUCT AND GRILLES. SIZE AS SHOWN ON THE PLAN.
8. MOUNT ENTOUCH TEMPERATURE/HUMIDITY CONTROLLER AT 6'-6" A.F.F. (2)
9. COORDINATE WALL REGISTER/GRILLE LOCATIONS WITH ARCHITECTURAL ELEVATIONS. LOCATE AS HIGH AS POSSIBLE. (NO EXCEPTIONS)
10. EXHAUST GRILLES TO BE CENTERED IN SHOWERS. (NO EXCEPTIONS)
11. 6"⌀ E/A DUCT UP TO ROOF CAP W/ BIRDSCREEN AND BACKDRAFT DAMPER 36" ABOVE ROOF.
12. MOUNT CO2 SENSOR AT 6'-0" A.F.F. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL CO2 SENSOR.
13. ~~MOUNT ENTOUCH CONTROLLER AT 8'-0" A.F.F.~~
14. REMOTE PANEL TO BE PROVIDED BY SERESCO AND INSTALLED BY MECHANICAL CONTRACTOR. CONTRACTOR TO RUN CAT-5 CABLES FROM SERESCO UNIT ON ROOF TO REMOTE PANEL LOCATED IN STEAM GENERATOR ROOM. (2)
15. MOUNT CO2 AND REMOTE TEMPERATURE SENSOR AT 8'-6" A.F.F. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL CO2 SENSOR.
16. MOUNT REMOTE TEMPERATURE/HUMIDITY SENSOR AT 6'-6" A.F.F.
17. ~~SEE DETAIL M4.1/41 FOR FILTER EXHAUST SYSTEM.~~
18. MOUNT ENTOUCH TEMPERATURE/HUMIDITY CONTROLLER @ 5'-0" A.F.F. (2)
19. ~~TRANSITION TO 24" DUCT BEFORE PENETRATING WALL.~~

01 FLOOR PLAN - HVAC

SCALE: 1/8" = 1'-0

Basharkhah Engineering Inc. Plot Stamp
F:\18\18195\195-M2.1.DWG
Date/Time Plotted: 10/18/2019 11:52 AM
USER: JHICKS
Plotted by: James K. Hicks

24 HOUR FITNESS

9026 SIENNA CROSSING DR.
MISSOURI CITY, TX 77459

sma + architects
115 west main street
allen, texas 75013
tele 972 / 359-8788
fax 972 / 359 -1706

STATE OF TEXAS — S. BASHARKHAH — 53894 — LICENSED PROFESSIONAL ENGINEER
6/27/19

bei
1 BASHARKHAH
2 ENGINEERING
3 INCORPORATED
Texas Registered Engineering Firm F-1026
13101 Preston Road Suite 601
Dallas, Texas 75240
(214) 659-9000
BEI Job # 18195

ISSUE DATES

6-28-19
(2) 10-18-19

TITLE

FLOOR PLAN – HVAC

M2.1

DEHUMIDIFICATION PACKAGED SYSTEM

DEHUMIDIFICATION UNIT	
DESIGNATION	DHU-1
SERVICE	POOL
DESIGN DATA	
OUTDOOR AIR (CFM)	1200
ROOM CONDITIONS (°FDB%RH)	84/61
ELECTRICAL DATA	
UNIT VOLTAGE (V/Ph/Hz)	460V-480V/3PH/60
UNIT FULL LOAD AMPS - FLA (A)	33.6
UNIT MCA (A) (MIN CIRCUIT AMPACITY)	40
UNIT MOP (A) (MAX OVERCURRENT PROTECT)	60
SUPPLY AIR BLOWER	
UNIT TOTAL AIR FLOW (CFM)	5600
UNIT ESP (IN WC)	1.5
NUMBER OF MOTORS	2
MOTOR HP	3.9
MOTOR FLA (A)	3.7
MOTOR DRIVE	DIRECT
PURGE AIR (CFM)	-
NUMBER OF MOTORS	-
MOTOR HP	-
MOTOR FLA (A)	-
COMPRESSOR	
TYPE	SCROLL
NUMBER OF COMPRESSORS	1
REFRIGERANT	R410A
MOTOR RLA/LRA (A)	22.6/137.0
EVAPORATOR COIL	
TOTAL COOLING CAPACITY (MBH)	150.1
SENSIBLE CAPACITY (MBH)	75.2
MAX AC SENSIBLE CAPACITY (MBH)	89.4
LATENT CAPACITY (LBS/h)	69.4
REHEAT COIL	
TOTAL REHEAT REJECTION (MBH)	187.6
AUXILIARY HEAT	
COIL LOCATION	UNIT MOUNTED
TYPE	GAS HEATER
CAPACITY (MBH)	200
CONTROL	MODULATED
PACKAGED OUTDOOR AIR-COOLED CONDENSER	
MODEL	SERESCO / NE-012
DEISGN AIR ON TEMP (°F)	105 F
NUMBER OF MOTORS	2
MOTOR HP	1.5
MOTOR FLA (A)	1.8
WEIGHT	3800 LBS

NOTES:
POOL DEHUMIDIFICATION UNIT SHALL BE PROVIDED WITH THE FOLLOWING:

- BOTTOM SUPPLY AND RETURN AIR CONFIGURATION.
- DOUBLE-WALL CONSTRUCTION THROUGHOUT CABINET (NOT JUST DOORS) WITH SERVICE VESTIBULE (ALL MOVING PARTS, INCLUDING MOTORS, TO BE LOCATED OUTSIDE OF CORROSIVE AIRSTREAM.
- R-410A REFRIGERANT.
- DIRECT-DRIVE PLENUM FAN (NO BELTS) MADE FROM CORROSION-RESISTANT COMPOSITE MATERIAL.
- COATED ALUMINUM DRAINPAN FOR CORROSION RESISTANCE-STAINLESS STEEL NOT ALLOWED.
- VFD FOR BALANCING.
- FACTORY-MOUNTED NON-FUSED DISCONNECT.
- UNIT MOUNTED MICRO-PROCESSOR COMMAND CENTER WITH REMOTE PANEL FOR INDOOR MOUNTING.
- RETURN AIR DUCT COLLAR WITH MANUAL DAMPER AND FILTER.
- OUTSIDE AIR INTAKE WITH MOTORIZED DAMPER AND FILTER.
- STANDARD ROOF CURB FIELD INSTALLED BY OTHERS.
- CONDENSATE DRAIN TO BE LOCATED ON THE BOTTOM OF THE UNIT. CONDENSATE DRAIN LINE TO BE RAN DOWN THROUGH THE CURB.

GENERAL DEHUMIDIFICATION PACKAGED SYSTEM NOTES:

1. FOR NATIONAL ACCOUNT PRICING FOR NATATORIUM UNITS, PLEASE CONTACT CODY MASON OR MATT SPEARS AT TEXAS AIRSYSTEMS - 972.570.4700 OR MASONNA@TEXASAIRSYSTEMS.COM. NO SUBSTITUTIONS ALLOWED. (2)
2. ONSITE STARTUP BY FACTORY AUTHORIZED TECHNICIAN.
3. DELETED. (2)
4. DELETED.
5. CONTRACTOR TO PULL A TOTAL OF 2 CAT-5 CABLES FROM SERESCO UNIT ON ROOF TO STEAM GENERATOR ROOM. CONNECT ONE OF THE CABLES TO MANUFACTURER-PROVIDED REMOTE PANEL (FIELD MOUNTED ON WALL BY INSTALLING CONTRACTOR). CONNECT THE SECOND CAT-5 CABLE TO WEBSENTRY JUNCTION BOX (JUNCTION BOX TO BE PROVIDED AND INSTALLED BY 24 HOUR FITNESS' IT GROUP).

PACKAGED ROOFTOP UNIT SCHEDULE

DESIGNATION	RTU-1	RTU-2	RTU-3	RTU-4	RTU-5	RTU-6
SERVES	BASKETBALL	BASKETBALL	CYCLE	GROUP X	WOMEN'S LOCKER	MENS LOCKER
NOMINAL TONNAGE	10	10	6	15	7.5	7.5
EER	11.5	11.5	12.0	12.0	12.0	12.0
IEER	12.7	12.7	16.0	13.5	13.8	13.8
TOTAL COOLING (MBH)	119.48	119.48	77.20	183.40	92.10	92.10
SENS. COOLING (MBH)	89.56	89.56	55.50	138.50	69.40	69.40
SUPPLY CFM	4000	4000	2400	6000	3000	3000
O.A. CFM **	480	480	360	720	450	450
E.S.P. (IN. W.G.)	1.0	1.0	0.5	1.0	0.5	0.5
BLOWER BHP	2.93	2.93	1.24	3.50	1.35	1.35
HEAT CAPACITY (MBH)	120/180	120/180	50/72	176/220	90/125	90/125
VOLTAGE/PHASE	460/3	460/3	460/3	460/3	460/3	460/3
UNIT MCA/MOCP	28/30	28/30	19/25	46/50	21/25	21/25
WEIGHT	1449	1449	765	2764	1355	1355
UNIT HEIGHT. (IN) ***	49.4	49.4	41.3	49.4	49.4	49.4
MODEL	48HCDD12	48HCDD12	48HCDE07	48HCDE17	48HCDE08	48HCDE08

DESIGNATION	RTU-7	RTU-8	RTU-9	RTU-10	RTU-11	RTU-12
SERVES	RETAIL	CARDIO	WORKOUT	FREE WEIGHTS	SELECTORIZE	FUNCTIONAL T.
NOMINAL TONNAGE	7.5	15	15	15	15	15
EER	12.0	12.0	12.0	12.0	12.0	12.0
IEER	13.8	13.5	13.5	13.5	13.5	13.5
TOTAL COOLING (MBH)	93.30	183.38	183.38	183.38	183.38	183.38
SENS. COOLING (MBH)	72.19	138.50	138.50	138.50	138.50	138.50
SUPPLY CFM	3000	6000	6000	6000	6000	6000
O.A. CFM **	450	900	900	900	900	900
E.S.P. (IN. W.G.)	0.5	0.5	0.5	0.5	0.5	0.5
BLOWER BHP	1.17	2.19	2.19	2.19	2.19	2.19
HEAT CAPACITY (MBH)	90/125	176/220	176/220	176/220	176/220	176/220
VOLTAGE/PHASE	460/3	460/3	460/3	460/3	460/3	460/3
UNIT MCA/MOCP	21/25	39/50	39/50	39/50	39/50	39/50
WEIGHT	1275	2523	2523	2523	2523	2523
UNIT HEIGHT. (IN) ***	49.4	49.4	49.4	49.4	49.4	49.4
MODEL	48HCDD08	48HCDD17	48HCDD17	48HCDD17	48HCDD17	48HCDD17

NOTES:

CARRIER 48HC - CAN BE EITHER DIRECT OR BELT DRIVE, NOT SPECIFIED

1. NEW ROOFTOP UNITS SHALL BE CARRIER 48HC HIGH EFFICIENCY MODELS IN GAS HEATING AND ELECTRIC COOLING WITH THE FOLLOWING ACCESSORIES:
   - A. 14" HIGH STANDARD FLAT ROOF CURBS SHALL BE FACTORY SUPPLIED AND FIELD INSTALLED BY MECHANICAL CONTRACTOR.
   - B. INTEGRATED ECONOMIZER WITH BAROMETRIC DAMPER SHALL BE FACTORY PROVIDED (INSTALLED AND WIRED). ECONOMIZER SHALL BE ENTHALPY CONTROLLED.
   - C. DISCONNECT SWITCH SHALL BE FACTORY PROVIDED (INSTALLED AND WIRED).
   - D. SUPPLY AND RETURN AIR DUCT SMOKE DETECTORS TO BE PROVIDED BY FIRE ALARM CONTRACTOR, INSTALLED BY MECHANICAL CONTRACTOR, AND WIRED BY ELECTRICAL CONTRACTOR. (2)
   - E. VERIFY INDOOR BLOWER (EVAPORATOR FAN) MOTOR AND DRIVE REQUIREMENTS FOR EACH UNIT PER CFM/STATIC PRESSURE REQUIREMENTS SHOWN ON SCHEDULE. PROVIDE HIGH STATIC DRIVE WHENEVER AVAILABLE.
   - F. 115 VOLT GFI OUTLET SHALL BE FACTORY PROVIDED (INSTALLED AND WIRED) EXCEPT FOR 10 TON UNITS.
   - G. HAIL GUARDS SHALL BE FACTORY SUPPLIED AND FIELD INSTALLED BY THE MECHANICAL CONTRACTOR FOR CARRIER UNITS.
   - H. TEMPORARY THERMOSTATS INSTALLED IN THE RETURN AIR DUCT..
   - I. ALL RTU'S SHALL BE EQUIPPED FOR HVAC SHUTDOWN (SHUTDOWN WITHIN 10 SECONDS MAX) AND BE TIED IN TO THE MAIN FIRE ALARM CONTROL PANEL TO GENERATE A SUPERVISORY SIGNAL.
   - J. PROGRAMMABLE THERMOSTATS WITH REMOTE SENSORS. COORDINATE WITH ENTOUCH CONTROLS. (2)
   - K. PROVIDE CONDENSATE WATER LEVEL SENSING DEVICE. A WATER LEVEL SENSING DEVICE SHALL BE INSTALLED IN THE PRIMARY DRAIN PAN OF THE UNIT. THIS DEVICE SHALL SHUT OFF THE APPLIANCE IN THE EVENT THE PRIMARY DRAIN BECOMES RESTRICTED. INLINE OVERFLOW DEVICE INSTALLED IN THE PRIMARY DRAIN LINE SHALL NOT BE PERMITTED. PROVIDE A PILOT LIGHT AT THE RECEPTIONIST AREA TO INDICATE AFFECTED RTU.

- PROVIDE DEMAND CONTROL VENTILATION FOR RTU'S -1, 2, 3, 4, 8, 9, 10, 11, & 12.
- CARRIER HUMIDI-MIZER REQUIRED ON RTU'S-3, 4, 5, & 6.
- PROVIDE POWER EXHAUST FOR RTU-3 & 4. (2)

** Minimum outside air required for ventilation per 2014 IMC. HVAC shall be per 2015 IECC.
*** 14" curb height needs to be added to each unit for total unit's height above the roof.

GENERAL RTU NOTES:

1. FOR INFORMATION ON EQUIPMENT AVAILABILITY OR JOBSITE COORDINATION CONTACT ENRICA GALASSO WITH CARRIER NATIONAL ACCOUNTS.

GENERAL CONTRACTOR SHALL BALANCE AND PROVIDE AN AIR BALANCE REPORT FROM A THIRD PARTY ENGINEER ACCEPTABLE TO LANDLORD AND TENANT CERTIFYING THE HVAC SYSTEM IS FULLY FUNCTIONAL BALANCED AND PERFORMS CONSISTENT WITH APPLICABLE SPECIFICATIONS. WITHOUT LIMITING THE GENERAL REQUIREMENT ABOVE THAT ALL OF LANDLORD'S WORK COMPLY WITH THE DESIGN CRITERIA. LANDLORD SHALL CAUSE THE HVAC SYSTEM TO COMPLY WITH THE DESIGN CRITERIA. LANDLORD'S HVAC CONTRACTOR IS TO PERFORM ALL START-UP OF THE SYSTEM IN COORDINATION WITH THE DIRECTOR OF CONSTRUCTION.

FAN SCHEDULE

DESIGNATION	EF-1	EF-2	EF-3	EF-4	EF-5	EF-6	EF-7	EF-8, 9
SERVICE	TEAM	WORK ROOM	W. LOCKERS	UNISEX	M. LOCKERS	JANITOR	POOL AREA	POOL EQUIP.
TYPE	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	CEILING	CENTRIFUGAL	CENTRIFUGAL
CFM	300	300	2450	200	2450	100	2000	260
S.P. (IN W.G.)	0.6	0.6	1.0	0.5	1.0	0.2	1.0	0.8
DRIVE	BELT	BELT	BELT	BELT	BELT	DIRECT	BELT	DIRECT
ELECTRICAL DATA								
HORSEPOWER	1/4	1/4	3/4	1/4	3/4	57 WATTS	3/4	158 WATTS
VOLTS/PHASE	277/1	277/1	277/1	277/1	277/1	120/1	277/1	120/1
COOK MODEL NO.	ACE-B 70C3B	ACE-B 70C3B	ACE-B 180	ACE-B 70C3B	ACE-B 180	GEMINI GC142	ACE-B 150C6B	FANTECH FG 6XL
LOCATION	ROOF	ROOF	ROOF	ROOF	ROOF	CEILING	ROOF	INLINE
NOTES	3, 5	3, 5	2, 5	1, 5	2, 5	1, 6, 7	2, 4, 5	8

NOTES:

1. CONTROL WITH LIGHT.
2. RUNNING 24 HOURS.
3. CONTROL WITH SWITCH.
4. PROVIDE WITH ACID - RESISTANT FINISH.
5. PROVIDE 12" HIGH FACTORY INSULATED CURB, DISCONNECT SWITCH & BIRD-SCREEN
6. PROVIDE ROOF CAP.
7. PROVIDE SPEED CONTROLLER.
8. WITH SPEED CONTROL AND WALL SWITCH FOR CONTINUOUS OPERATION. FANTECH IS THE ONLY ACCEPTABLE MANUFACTURER.

APPROVED MANUFACTURER ARE: COOK, GREENHECK, AND ACME.

AIR DEVICE SCHEDULE

DESIGNATION	DESCRIPTION
S-1	12"x12" OR 24x24" SUPPLY DIFFUSER WITH ROUNDNECK 4-WAY THROW, EQUAL TO TITUS MODEL TMS. 6" DIA. 0 - 100 CFM 8" DIA. 101 - 220 CFM 10" DIA. 221- 400 CFM 12" DIA. 401- 600 CFM 14" DIA. 601 - 850 CFM
S-2	SIDEWALL SUPPLY GRILLE WITH 2 SETS OF ADJUSTABLE BLADES, 3/4" SPACING, FRONT SET PARALLEL TO LONG DIMINSION, SEE PLAN FOR FINISH. EQUAL TO: TITUS 272 FL WITH O.B.D. 10"X6" 0 - 200 CFM 18"X6" 201 - 350 CFM 24"X6" 351 - 550 CFM 24"X10" 551 - 800 CFM
S-3	DRUM LOUVER, HIGH CAPACITY, LONG THROW. SEE PLAN FOR FINISH. EQUAL TO: TITUS DL WITH O.B.D. 20"x10" 0 - 800 CFM 50"x10" 801 - 1800 CFM 50"x15" 1801 - 2700 CFM 70"x15" 2701 - 4000 CFM
S-4	24x24" SUPPLY DIFFUSER WITH ROUND NECK. 4-WAY OR AS INDICATED ON PLANS, EQUAL TO TITUS MODEL TDCA-AA 10" DIA. 251- 350 CFM 12" DIA. 351- 600 CFM
S-5	4' LINEAR SLOT DIFFUSER WITH PLENUM 4 SLOT @ 1½" WIDTH , EQUAL TO TITUS ML-40.
R-1	24"x12" OR 24"x24" EGGCRATE RETURN GRILLE EQUAL TO TITUS MODEL 50F
R-2	SIDEWALL RETURN GRILLE WITH ONE SET OF FIXED BLADES PARALLEL TO LONG DIMENSION, 1/2" SPACING, 30° DEFLECTION. SEE PLAN FOR FINISH. EQUAL TO: TITUS 25-RL. WITH O.B.D. , SIZE AS SHOWN IN THE DRAWINGS.
E-1	EXHAUST GRILLE WITH ONE SET OF FIXED BLADES, 45° DEFLECTION, 3/4" SPACING. EQUAL TO: TITUS 3-FL WITH O.B.D. 12"x12" , 12"x24" , 24"x24" NOMINAL FACE DIMENSION, OR AS SHOWN IN DRAWINGS. ALL 12"x12" GRILLES IN SHOWERS SHALL BE BRUSHED ALUMINUM FINISH. NECK DIMENSION MAY BE ADJUSTED TO PROVIDE EQUIVALENT AREA: EXHAUST / NECK 0-220 CFM / 8 x 8 221-500 CFM / 12 x 12 501-1000 CFM / 14 x 14

NOTES:

1. OBD-OPPOSED BLADE DAMPER (REQUIRED AT GYP. CEILINGS).
2. ALL GRILLES IN RESTROOMS, LOCKER ROOMS, AND POOL AREA TO BE ALUMINUM. ALL OTHERS STEEL UNLESS NOTED OTHERWISE.
3. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND ELEVATION OF DEVICES.
4. PROVIDE BALANCING DAMPERS AT BRANCH TAP.
5. ALL AIR DEVICES COLOR TO BE SELECTED WHITE UNLESS IT IS SPECIFIED IN THE FLOOR PLAN.
6. CONTRACTOR IS RESPONSIBLE TO PROVIDE THE AIR DEVICE FRAME AND MOUNTING SYSTEM TO MATCH THE ARCHITECT CEILING TYPES. SEE ARCHITECTURAL DRAWINGS FOR COORDINATION.
7. APPROVED MANUFACTURER IS TITUS.

BUILDING AIR BALANCE

RTU	OUTSIDE AIR CFM	EXHAUST AIR CFM
1	480	
2	480	
3	360	
4	720	
5	450	
6	450	
7	450	
8	900	
9	900	
10	900	
11	900	
12	900	
DHU-1	1,200	
EF		
1		300
2		300
3		2,450
4		200
5		2,450
6		100
7		2,000
8		260
9		260
TOTAL	9,090	8,320

BUILDING PRESSURIZATION = 9,090 - 8,320 = 770 CFM (POSITIVE)

DX SPLIT SYSTEM (ELEC. RM.)

(AC-1) HIGH WALL MOUNTED	
NOMINAL CAPACITY (TONS)	1.5
SEER	17
CFM	344/422/506/550
CARRIER MODEL	40MHHC18
OUTDOOR UNIT (CU-1) ROOF MTD.	
NET COOLING (BTUH)	17,400
VOLTAGE	208/1
COMPRESSOR RLA	7
MCA / MOCP	11 / 15
CARRIER MODEL	38MHRC18

NOTES:

1. CONDENSING UNIT SHALL BE PROVIDED WITH SINGLE POINT ELECTRICAL CONNECTION. INDOOR UNIT POWER IS SUPPLIED BY THE OUTDOOR UNIT.
2. PROVIDE CONTROL MODULE, THERMOSTAT.
3. SELECT CONDENSING UNITS FOR 105 DEGREE F AMBIENT.
4. PROVIDE UNIT WITH REFRIGERANT 410A.
5. LOCATED CONDENSING UNIT OF EQUIPMENT SUPPORT.
6. PROVIDE CONDENSATE PUMP

UNIT HEATER SCHEDULE

DESIGNATION	UH-1	UH-2
MARK	FIRE RISER	POOL EQUIP.
HEATING - INPUT, KW	4.0	10.0
VOLTS	208	480
PHASE	1	3
MCA	19.2 (AMPS)	12 (AMPS)
MANUFACTURER	QMARK	QMARK
MODEL NO.	SSH04008	MUH-10-4

NOTES:

1. PROVIDE INTEGRAL THERMOSTAT.
2. PROVIDE MEANS OF DISCONNECT FROM MANUFACTURER.
3. CONTRACTOR SHALL FOLLOW INTERNATIONAL BUILDING CODE, INTERNATIONAL MECHANICAL CODE, MANUFACTURER'S RECOMMENDATIONS AND ARCHITECTURAL GUIDELINES IN MOUNTING UNITS IN FIRE RATED AREAS.

01 SCHEDULES - HVAC
SCALE: N.T.S

24 HOUR FITNESS
9026 SIENNA CROSSING DR.
MISSOURI CITY, TX 77459

sma + architects
115 west main street
allen, texas 75013
tele 972 / 359-8788
fax 972 / 359 -1706

STATE OF TEXAS
S. BASHARKHAH
53894
LICENSED PROFESSIONAL ENGINEER
6/27/19

bei
1 BASHARKHAH 2 ENGINEERING 3 INCORPORATED
Texas Registered Engineering Firm F-1026
13101 Preston Road Suite 601
Dallas, Texas 75240
(214) 659-9000
BEI Job # 18195

ISSUE DATES
6-28-19
(2) 10-18-19

TITLE
SCHEDULES - HVAC

M3.1

NON-EMS CONTROLS

GENERAL NON-EMS CONTROLS NOTES:

1. LOCAL THERMOSTATS
   - I. LOCAL THERMOSTAT CONTROL (LINE OR LOW VOLTAGE) OF CABINET UNIT HEATERS (CUH), ELECTRIC UNIT HEATERS (EUH), GAS UNIT HEATERS (UH), OR OTHER SPOT HEATING AND/OR VENTILATION EQUIPMENT INCLUDING THERMOSTATICALLY CONTROLLED EXHAUST FANS, SHALL BE FURNISHED AND INSTALLED UNDER THE PROVISIONS OF THE MECHANICAL AND ELECTRICAL BID DOCUMENTS. THESE ARE NON-EMS ITEMS AND SHOULD NOT BE CONSTRUED AS PART OF THE EMS SYSTEM.

2. COMBUSTION AIR VENTILATION AND OTHER POOL EQUIPMENT
   - I. CONTROLS FOR COMBUSTION AIR VENTILATION AND ANY OTHER EQUIPMENT NOT SPECIFICALLY MENTIONED IN THE EMS SCHEDULES SHALL BE FURNISHED AND INSTALLED ACCORDING TO THE MECHANICAL AND ELECTRICAL BID DOCUMENTS.

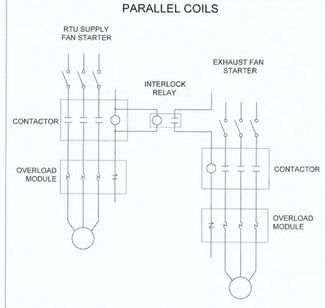
3. EXHAUST FAN, TRANSFER FAN AND OTHER "HARD-WIRED" INTERLOCKS (SEE INTERLOCK EXAMPLES BELOW)
   - I. INTERLOCKING IS NOT PART OF THE EMS SYSTEM. DO NOT USE THE EMS SYSTEM TO INTERLOCK EQUIPMENT.
   - II. WHEN HARD-WIRED INTERLOCKING IS SPECIFIED IN THE MECHANICAL AND/OR ELECTRICAL SCHEDULES, THE INTERLOCKS SHALL BE FURNISHED AND INSTALLED BY THE TRADES AS SPECIFIED.
   - III. WHERE EXHAUST FAN AND RTU INTERLOCKS ARE CALLED OUT WITHOUT INTERCONNECTION DETAILS, EXAMPLES HAVE BEEN PROVIDED BELOW.

4. LIFE SAFETY AND FIRE ALARM SYSTEMS
   - I. LIFE SAFETY AND FIRE ALARM SYSTEMS ARE NOT PART OF THE EMS SYSTEM AND SHALL BE FURNISHED AND INSTALLED AS SPECIFIED IN THE MECHANICAL AND ELECTRICAL BID DOCUMENTS.
   - II. MECHANICAL EQUIPMENT SHUTDOWN SHALL BE WIRED AS TO NOT AFFECT THE EMS SYSTEM.

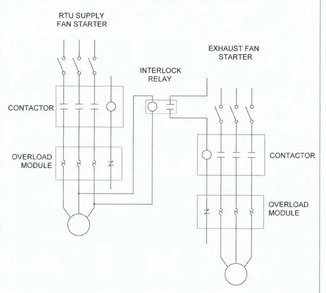
5. MANUFACTURER SUPPLIED HUMIDITY CONTROLLERS
   - I. POOL ROOFTOP UNIT
     - a. THE POOL RTU MAY COME EQUIPPED WITH A MANUFACTURER SUPPLIED HUMIDITY SENSOR. THIS SENSOR SHALL BE INSTALLED IN ADDITION TO THE EMS SYSTEM AND ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
   - II. DEHUMIDIFYING ROOFTOP UNITS
     - a. SOME ROOFTOP UNITS MAY COME EQUIPPED WITH A DEHUMIDIFICATION CYCLE AND SPACE HUMIDITY SENSOR. THIS SENSOR SHALL BE INSTALLED IN ADDITION TO THE EMS SYSTEM AND ACCORDING TO THE MANUFACTURER'S INSTRUCTION.

EXAMPLES FOR 3-PHASE EQUIPMENT INTERLOCKING

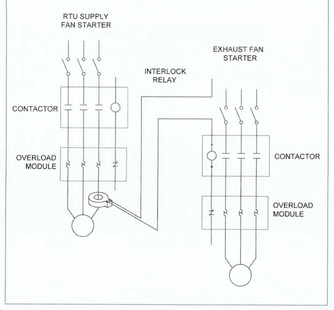
PARALLEL COILS



LOAD SIDE COIL



CURRENT SWITCH



EMS SCHEDULES

DEVICE SCHEDULE

SYMBOL	DEVICE	QUANTITY	DEVICE LOCATION	DEVICE CABLE TYPE
T	THERMOSTAT	SEE MECHANICAL SCHEDULE	SEE MECHANICAL DWGS.	SEE MFG. INSTRUCTIONS
CT	CURRENT TRANSDUCER	1 PER ROOFTOP UNIT		18/2
DS	DUCT TEMPERATURE SENSOR	1 PER ROOFTOP UNIT	BOTTOM OF MAIN SUPPLY AIR DUCT DROP	18/2 TO ET1
CP	LIGHT CONTROL PANEL	1	IN ELECTRICAL CLOSET	(2) 18/2, (1) UPS SERIAL CABLE, (1) 5VDC WIRE HARNESS, OTHER (SEE POINT TO POINT DWGs)
EM	ENERGY METER	1 PER MDP & RTU PANEL	MAIN 3-PHASE SUPPLY NEAR UTILITY METER	24/1P (COMM CABLE TO SLP)
HS	HUMIDITY SENSOR (RTU MFG. SUPPLIED)	SEE MECHANICAL SCHEDULE	SEE MECHANICAL DWGS.	SEE MFG. INSTRUCTIONS
S	SPACE TEMPERATURE SENSOR	SEE MECHANICAL SCHEDULE	SEE MECHANICAL DWGS.	18/2 TO ENTOUCH ONE SERVING ZONE
HY	RELATIVE HUMIDITY SENSOR	MINIMUM 2	MAIN SPACE (CARDIO), GROUP-X, BASKETBALL / RACQUETBALL COURT AND POOL	18/4

INSTALLATION RESPONSIBILITIES

SYMBOL	DEVICE	PROVIDED BY	MOUNTING	BOX/RACEWAYS	INSTALL CABLE/WIRE, TERMINATE BOTH ENDS	NOTES
C	CARBON DIOXIDE SENSOR	M.C	M.C	E.C.	M.C	
CT	CURRENT TRANSDUCER	ENTOUCH	ENTOUCH	E.C.	ENTOUCH	1
D	DUCT TEMPERATURE SENSOR	ENTOUCH	ENTOUCH	E.C.	ENTOUCH	2
ET	ZONE CONTROLLER	ENTOUCH	ENTOUCH	E.C.	ENTOUCH	3
EM	ENERGY METER (GM8)	ENTOUCH	ENTOUCH	E.C.	ENTOUCH	4
H	HUMIDITY SENSOR (NOT PART OF EMS)	MFG.	M.C	E.C.	M.C.	5
N/A	SAUNA CONTROL RELAY	ENTOUCH	ENTOUCH	N.A.	ENTOUCH	
P	PURGE SWITCH TIMER	M.C.	M.C.	E.C.	M.C.	
T	THERMOSTAT (NOT PART OF EMS)	M.C	M.C	E.C.	M.C	9
HY	RELATIVE HUMIDITY SENSOR	ENTOUCH	ENTOUCH	E.C.	ENTOUCH	
RP	DCZ REMOTE PANEL	ENTOUCH	ENTOUCH	E.C.	ENTOUCH	
S	SPACE TEMPERATURE SENSOR	ENTOUCH	ENTOUCH	E.C.	ENTOUCH	

NOTES:
1. ONE CT ONLY (INCLUDING 3-PHASE EQUIP.) FOR EACH RTU.
2. ONE DUCT SENSOR IN EACH RTU SUPPLY AIR DUCT.
3. ONE ENTOUCH CONTROLLER FOR EACH ROOFTOP. WHEN ENTOUCH CONTROLLER'S ARE LOCATED OUTSIDE THE ROOM, ONE ROOM SENSOR PER CONTROLLER.
4. MOUNT ENERGY METER CT'S ON 3-PHASE BUSS BARS AT MDP AFTER UTILITY METER AND BEFORE BRANCH CIRCUITS.
5. WHEN NON-EMS HUMIDITY CONTROLLERS/SENSORS ARE SUPPLIED BY MFG. , MOUNT DEVICE NEAR EMS ROOM TEMPERATURE SENSOR.
6. ENTOUCH SHALL INSTALL LOW VOLTAGE CABLE IN RACEWAYS PROVIDED BY E.C. AND TERMINATE BOTH ENDS. - LINE VOLTAGE WIRING AND TERMINATIONS BY E.C.
7. E.C. SHALL PROVIDE AND INSTALL A DEDICATED 120V, 20A CIRCUIT TO POWER THE LCM, LABEL BREAKER EMS-2
8. A PURGE CYCLE RELAY WILL BE INSTALLED AT EACH RTU WITH A CO2 SENSOR TO FORCE THE DAMPERS OPEN TO FLUSH THE SPACE BEING SERVED. REFER TO BINDER DRAWINGS FOR SPECIFIC REQUIREMENT. PURGE TIMERS, RELAYS, AND CO2 SENSORS ARE TO BE INSTALLED BY THE M.C. ALL REQUIRED WIRING CONTAINED WITHIN RTU.
9. LINE VOLTAGE THERMOSTATS, IF ANY, SHALL BE FURNISHED BY M.C AND INSTALLED BY OTHERS
10. M.C. SHALL PROVIDE AND INSTALL THERMOSTATS FOR EXHAUST FANS, TERMINAL UNITS, DUCT OR HANGING HEATERS AND LOCATIONS WHERE A DHU IS INSTALLED.

GENERAL EMS CONSTRUCTION NOTES:

1. ENTOUCH SHALL PROVIDE THE INSTALLATION LABOR AND MATERIALS TO INSTALL THE LOW VOLTAGE PORTION OF THE CUSTOMER SUPPLIED EMS SYSTEM ACCORDING THE EMS SCHEDULES AND THE FOLLOWING:
   - I. INSTALL EMS DEVICES AT LOCATIONS SHOWN ON THE MECHANICAL DRAWINGS AND MOUNT ACCORDING TO THE EMS DETAILS.
   - II. PROVIDE AND INSTALL THE LOW VOLTAGE CABLING FROM THE EMS DEVICES TO THE RTU'S, SLP & DZC.
   - III. TERMINATE THE LOW VOLTAGE CABLING AT BOTH ENDS.
   - IV. CLEARLY IDENTIFY (LABEL) THE CABLES AT BOTH ENDS.

2. THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE INSTALLATION LABOR AND MATERIALS TO INSTALL THE LINE VOLTAGE PORTION OF THE CUSTOMER SUPPLIED EMS SYSTEM ACCORDING THE EMS SCHEDULES AND THE FOLLOWING:
   - I. PROVIDE AND INSTALL ELECTRICAL BOXES WITH 3/4" EMT STUB-UPS TO ABOVE CEILING GRID FOR WALL MOUNTED EMS AND CONTROL DEVICES.
   - II. MOUNT EMS PANELS AND PIPE TOGETHER ACCORDING TO THE EMS DRAWINGS.
   - III. PROVIDE AND INSTALL (1) EACH 120V, 20A CIRCUIT TO POWER THE LCM PANEL. LABEL LCM BREAKER EMS-2.
   - IV. PROVIDE AND INSTALL 120V DUPLEX OUTLET NEXT TO WATER HEATERS, EACH ELECTRICAL ROOM, NEXT TO SAUNA CONTACTOR IN STEAM GEN. EQUIP ROOM, TELCO ROOM AND WORK ROOM. SEE MORE DETAILS UNDER INSTALLATION DETAILS SECTION.

CABLE SCHEDULE

CABLE	SIZE	TYPE	MFG./MODEL
18/2	18AWG/2-CONDUCTOR	SHIELDED, STRANDED, PLENUM	BELDEN/6300FE NON-PAIRED
			COMTRAN/3644
			TAPPAN/1880AB2M-CMP
18/4	18AWG/4-CONDUCTOR	SHIELDED, STRANDED, PLENUM	BELDEN/6302FE NON-PAIRED
			LAKE CABLE/P184CS
			TAPPAN/1880AB4M-CMP
18/10	18AWG/10-CONDUCTOR	UNSHIELDED, STRANDED, PLENUM	BELDEN/6308UE NON-PAIRED
			LAKE CABLE/P1810C-WIN
			TAPPAN/1880AB10-CMP
24/1P	24AWG/1-TWISTED PAIR	SHIELDED, STRANDED, PLENUM, TWISTED PAIR	BELDEN/82841 PAIRED
			LAKE CABLE/PF242CS
			TAPPAN/2469ATIM-CMP
CAT 5	24AWG/4-UTP	UNSHIELDED, SOLID CONDUCTOR, TWISTED PAIR	BELDEN/ 1583A CAT5

INSTALLATION SUMMARY

1. EQUIPMENT DELIVERY
   - I. ENTOUCH SHALL PROVIDE THE EMS EQUIPMENT IN 1 SHIPMENT.
   - II. IT SHALL BE UP TO THE G.C. TO CALL FOR EMS EQUIPMENT DELIVERY
     THE EQUIPMENT WILL BE SHIPPED WITHIN 2 DAYS OF RECEIVING A VALID REQUEST
     A VALID REQUEST SHALL CONSIST OF THE FOLLOWING:
     1-NAME AND PHONE NUMBER OF PERSON RESPONSIBLE FOR RECEIVING THE EMS EQUIPMENT AND CLUB NUMBER.
     2-A VALID SHIPPING ADDRESS (CONFIRMABLE BY THE DELIVERY AGENT).
2. INSTALLATION AND COMMISSIONING
   IT SHALL BE UP TO THE GC TO SCHEDULE INSTALLATION OF LOW VOLTAGE PORTION OF EMS WITH A TWO WEEK NOTICE.
   THE FOLLOWING ITEMS MUST BE COMPLETE PRIOR TO ENTOUCH ARRIVAL TO INSTALL LOW VOLTAGE PORTION OF EMS.
   1-RTUs POWERED UP AND RAN THROUGH START UP BY THE MC
   2-ALL BOXES AND CONDUIT FOR EMS DEVISES IN PLACE AND COMPLETED BY EC
   3-ALL LIGHTING FIXTURES AND EXTERIOR SIGNAGE INSTALLED
   4-ROOFTOP EXHAUST FANS INSTALLED AND POWERED UP
   5-SAUNA GENERATORS INSTALLED
   ITEMS ABOVE THAT ARE NOT COMPLETE PRIOR TO ENTOUCH ARRIVAL WILL CAUSE A DELAY IN THE INSTALLATION OF THE EMS. IF A RETURN TRIP IS REQUIRED ENTOUCH WILL REQUEST A PO FOR $1,300 TO RESCHEDULE A FOLLOW UP VISIT TO COMPLETE THE EMS INSTALLATION.
3. NON-STANDARD MECHANICAL DESIGNS
   - I. THIS DESIGN APPLIES TO USE OF STANDARD PACKAGE ROOFTOP UNITS.
   - 2. ADDITIONAL DESIGN DOCUMENTS AND MATERIAL WILL BE REQUIRED FOR CONTROLLING OTHER MECHANICAL EQUIPMENT SUCH AS BOILERS, CHILLERS, VAV AIR HANDLERS AND TERMINAL BOXES.
4. CONTACT INFORMATION
   - I. PLEASE DIRECT ALL SHIPPING REQUESTS TO ENTOUCH @ (877) 755-1609

ENTOUCH OVERVIEW:

1. ENTOUCH CONTROLLERS ARE DESIGNED TO BE ACCESSED VIA WEB PORTAL TO GIVE AUTHORIZED FACILITIES PERSONNEL ACCESS TO MANAGE REMOTELY. THESE DEVICES ARE FULLY LOCKED FROM PUBLIC USE WITH PASS-CODE PROTECTION. ADA REQUIREMENTS ARE NOT APPLICABLE.

2. INSTALLATION DETAIL
   E.C SHALL INSTALL 120VAC DUPLEX OUTLETS IN THE FOLLOWING AREAS FOR EMS EQUIPMENT
   - I. 6' AFF IN ROOMS NEXT TO WATER HEATERS. NON-GFCI. TYPICAL LOCATIONS ARE LAUNDRY ROOM, JANITORS ROOM, OR POOL PUMP ROOM TO POWER RSM
   - II. 6' AFF IN MAIN ELECTRICAL ROOM NEAR MDP AND SECONDARY ELECTRICAL ROOMS IF ON SECOND FLOOR
   - III. IN STEAM GENERATOR ROOM NEXT TO SAUNA TIMER CONTROLLER
   - IV. 6' AFF IN TELCO ROOM FOR ROUTER
   - V. 6' AFF IN WORK ROOM TO POWER ROUTER
   - VI. E.C. TO PROVIDE AND INSTALL DEDICATED 3-POLE BREAKER IN THE MDP AND AT PANELS THAT HAVE RTU BREAKERS

3. CONDUIT AND PENETRATION REQUIREMENTS FOR EMS EQUIPMENT:
   E.C. SHALL INSTALL CONDUITS, BOXES, MUD RINGS, AND PENETRATIONS FOR ENTOUCH EQUIPMENT
   E.C. SHALL INSTALL DEDICATED ¾" CONDUIT PENETRATION TO EACH RTU FOR ENTOUCH CONTROL WIRING. FIRE ALARM WIRING CANNOT SHARE THE SAME CONDUIT
   CONDUIT PENETRATION MUST CONNECT TO THE UNITS CONTROL BOARD COMPARTMENT
   ALL CONDUIT DROPS FOR SENSORS AND ENTOUCH CONTROLLERS SHALL BE A MINIMUM 3/4" E.M.T.
   CONDUIT STUBS AND PENETRATIONS SHALL BE ABOVE THE DROP TILE AND AT CEILING JOIST HEIGHT IN THE OPEN CEILING AREAS WHERE APPLIES.
   CONDUIT STUBS FOR ENTOUCH CONTROLLERS SHALL POINT TOWARDS THE RTU CONDUIT PENETRATION
   CONDUIT STUBS FOR ENTOUCH SENSORS SHALL POINT TOWARDS THE ENTOUCH CONTROLLER
   WHERE MULTI-LEVEL BLDG. IS CONCERNED, E.C. SHALL PROVIDE A MINIMUM 2" CONDUIT RISER BETWEEN FLOORS AT EACH RTU RISER LOCATION TO ALLOW ENOUGH ROOM TO RUN THERMOSTAT AND SENSOR WIRES TO THE RTU

24 HOUR FITNESS
9026 SIENNA CROSSING DR. MISSOURI CITY, TX 77459

sma + architects
115 west main street
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tele 972 / 359-8788
fax 972 / 359 -1706

STATE OF TEXAS
S. BASHARKHAH
53894
LICENSED PROFESSIONAL ENGINEER
5/27/19

bei
1 BASHARKHAH
2 ENGINEERING
3 INCORPORATED
Texas Registered Engineering Firm F-1026
13101 Preston Road Suite 601
Dallas, Texas 75240
(214) 659-9000
BEI Job # 18195

ISSUE DATES
6-28-19

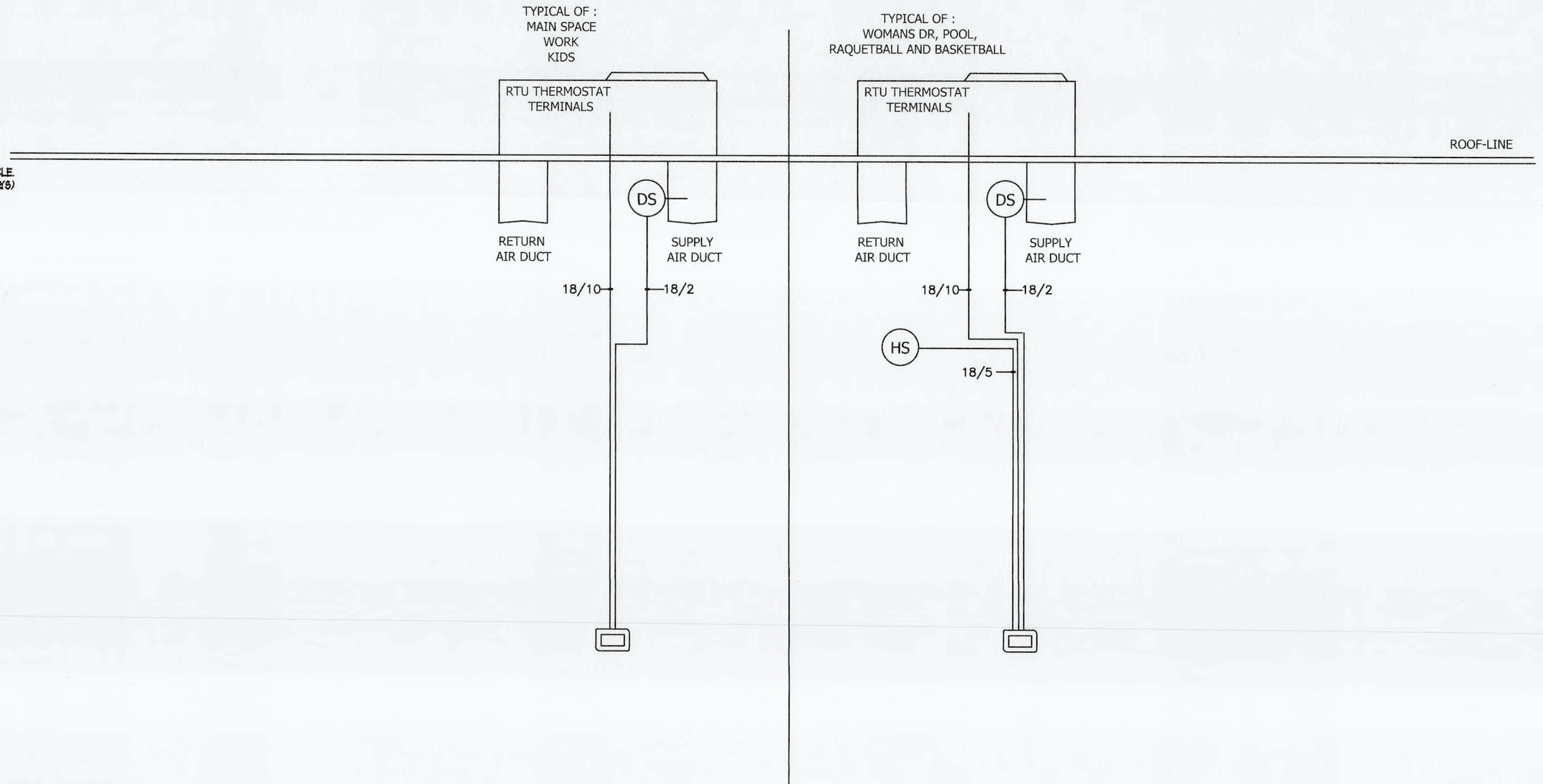
TITLE
EMS - SCHEDULES

M3.2

EMS SINGLE LINE DIAGRAM

KEYED NOTES

1. TWO CONDUCTOR CABLE FOR EACH DEVICE.
2. FOR RTU's SERVING THE RACQUETBALL, BASKETBALL COURTS, WOMENS LOCKER, AND POOL AREAS, INSTALL REMOTE HUMIDITY ROOM SENSOR.
3. ADDITIONAL CONTROLS MAY BE REQUIRED AND PROVIDED BY OTHERS FOR THE POOL UNIT. REFER TO MANUFACTURER'S INSTRUCTIONS
4. HUMIDITY SENSOR PROVIDED BY OTHERS FOR EACH RTU DEHUMIDIFICATION CYCLE. REFER TO MECHANICAL SCHEDULE FOR RTU OPTIONS. INSTALL HUMIDITY SENSOR(S) PER MANUFACTURER'S INSTRUCTIONS.OTHERS
5. USES WIRELESS MIWI COMMUNICATION



DEVICE SCHEDULE

SYMBOL	DESCRIPTION
CT	CURRENT TRANSDUCER
DS	DUCT TEMPERATURE SENSOR
ET1	ENTOUCH ONE ZONE CONTROLLER
EM	ENERGY METER
HS	HUMIDITY & TEMPERATURE SENSOR (ENTOUCH SUPPLIED)
LCP	LIGHT CONTROL PANEL
CB	CONTACTOR BOX

(SUPPLIED BY CONTRACTORS) CABLE SCHEDULE

CABLE	SIZE	TYPE	MFG./MODEL
18/2	18AWG/2-CONDUCTOR	SHEILED, STRANDED, PLENUM	BELDIN/6300FE NON-PAIRED
			COMTRAN/3644
			TAPPAN/1880AB2M-CMP
18/10	18AWG/10-CONDUCTOR	UNSHEILDED, STRANDED, PLENUM	BELDIN/6300UE NON-PAIRED
			LAKE CABLE/P1610C-WN
			TAPPAN/1880AB10-CMP
24/1P	24AWG/1-TWISTED PAIR	SHEILDED, STRANDED, PLENUM, TWISTED PAIR	BELDIN/82841 PAIRED
			LAKE CABLE/PF242C8
			TAPPAN/2400AT1M-CMP

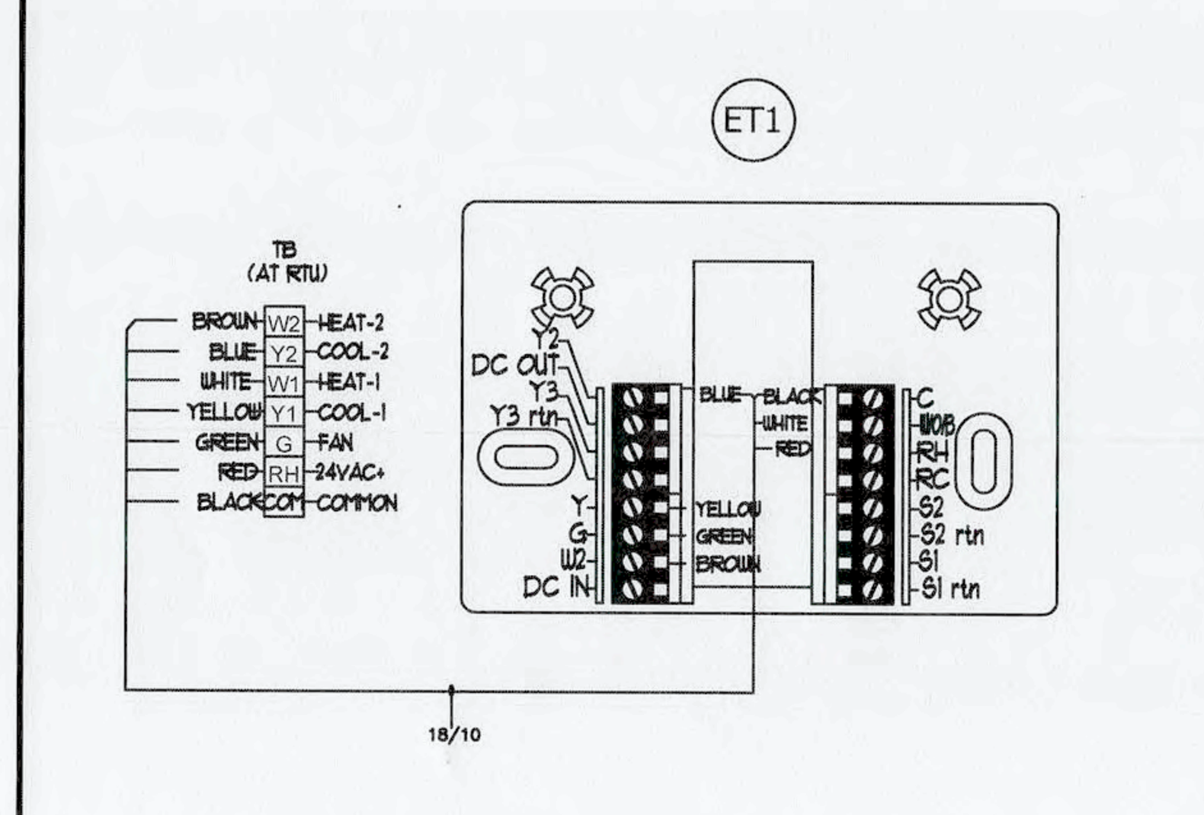
EMS SINGLE LINE DIAGRAM

GENERAL INSTALLATION INSTRUCTIONS

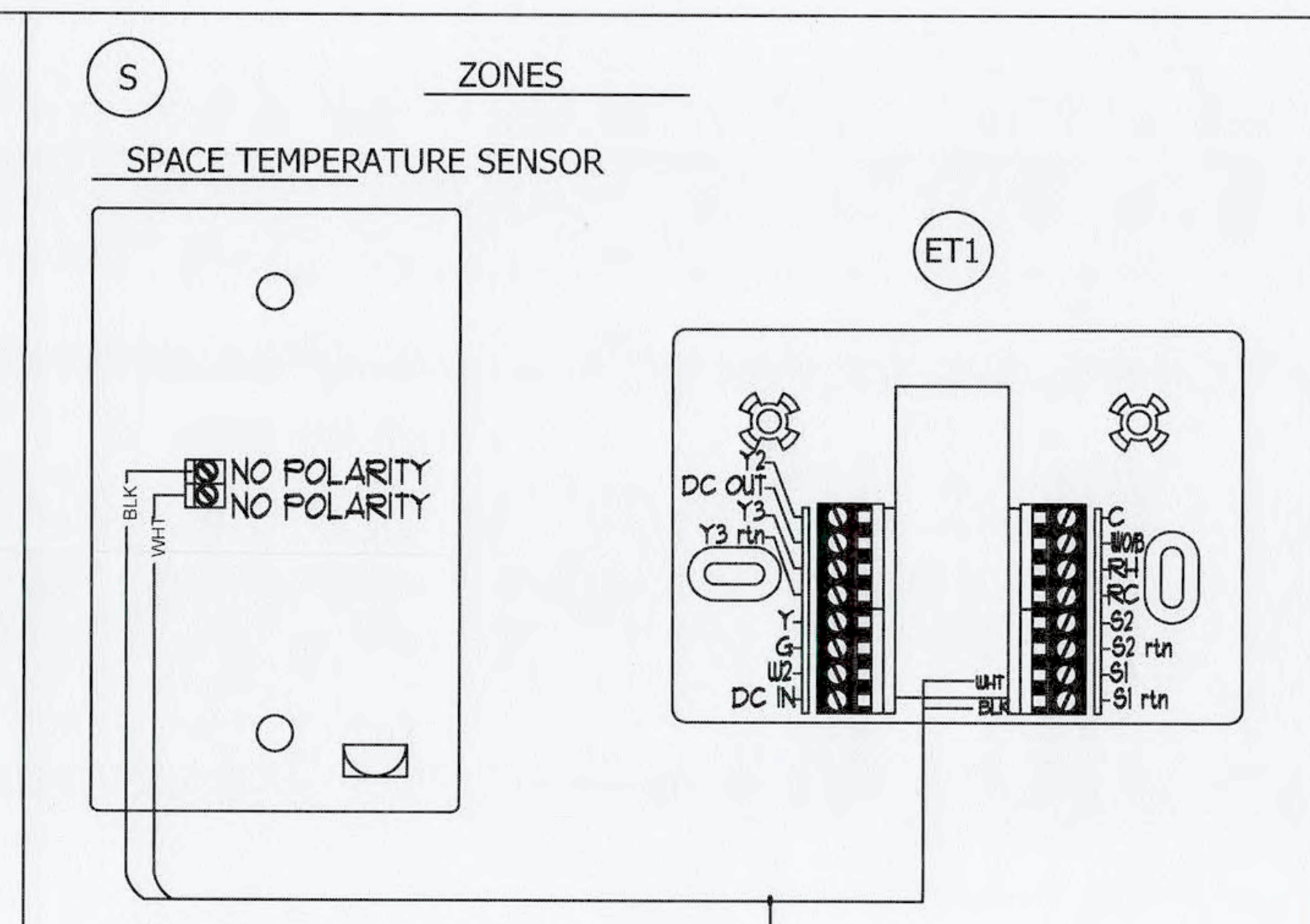
1. HOME RUNS
   I. LOW VOLTAGE CABLES SHALL BE PULLED FROM DEVICE TO CONTROLLER WITHOUT SPLICING
2. SENSOR WIRING
   I. EACH SENSOR SHALL BE WIRED PER INSTRUCTIONS THAT COME WITH THE TEMPERATURE, HUMIDITY AND ROOM SENSOR. ALL TEMPERATURE CONNECTIONS WILL BE USING RESISTIVE SET UP AND ALL DC IN WILL UTILIZE THE 0-10VDC OPTION.

STANDARDS FOR EMS CONTROLLERS AND SENSOR LOCATIONS

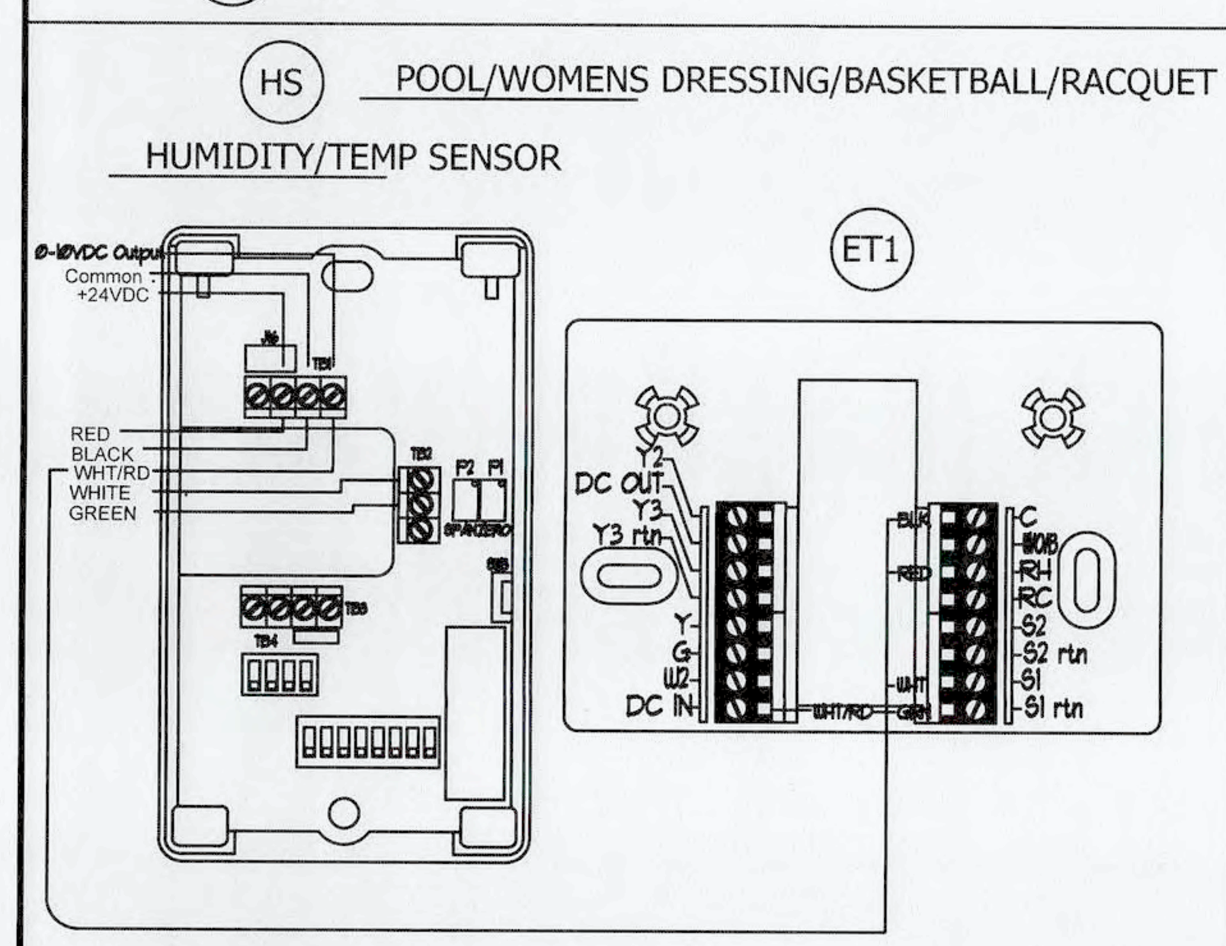
* ALL ENTOUCH CONTROLLERS SHALL BE MOUNTED IN THE ZONES THEY REGULATE UNLESS OTHERWISE SPECIFIED BELOW.
* ENTOUCH CONTROLLERS SHALL BE MOUNTED ON A HORIZONTAL SINGLE GANG MUD RING @ 5′ AFF UNLESS OTHERWISE SPECIFIED BELOW.
* ENTOUCH CONTROLLERS ON COLUMNS SHALL BE MOUNTED ON A HORIZONTAL SINGLE GANG MUD RING @ 8′ AFF.
* ENTOUCH CONTROLLER FOR MENS LOCKER SHALL BE MOUNTED ON A HORIZONTAL SINGLE GANG MUD RING @ 6.6′ AFF.
* ENTOUCH CONTROLLER FOR WOMENS LOCKER SHALL BE MOUNTED OUTSIDE LOCKER ENTRY (FACING WORKOUT FLOOR) ON HORIZONTAL SINGLE GANG MUD RING @ 5′ AFF WITH REMOTE HUMIDITY ROOM SENSOR ON A VERTICAL SINGLE GANG MUD RING 8′ AFF IN THE LOCKER.
* ENTOUCH CONTROLLERS FOR BASKETBALL COURT SHALL BE MOUNTED OUTSIDE OF BASKETBALL COURT FACING WORKOUT FLOOR ON A HORIZONTAL SINGLE GANG MUD RING @ 5′ AFF WITH REMOTE HUMIDITY ROOM SENSORS ON A VERTICAL SINGLE GANG MUD RING @ 8.6′ AFF IN BASKETBALL COURT.
* ENTOUCH CONTROLLER FOR RACQUETBALL COURT SHALL BE MOUNTED OUTSIDE OF RACQUETBALL COURT ON A HORIZONTAL SINGLE GANG MUD RING @ 5′ AFF WITH REMOTE ROOM SENSOR ON A VERTICAL SINGLE GANG MUD RING @ 8′ AFF IN THE COURT, NEAR THE GLASS WALL. WILL INSTALL HUMIDITY SENSOR IN RETURN DUCT IF RETURN DUCT INTAKE IS IN THE COURT.
* ENTOUCH CONTROLLER FOR A STANDARD POOL PACKAGE UNIT SHALL BE MOUNTED IN THE STEAM GENERATOR EQUIPMENT ROOM ON A HORIZONTAL SINGLE GANG MUD RING IN THE POOL AREA @ 8' AFF.



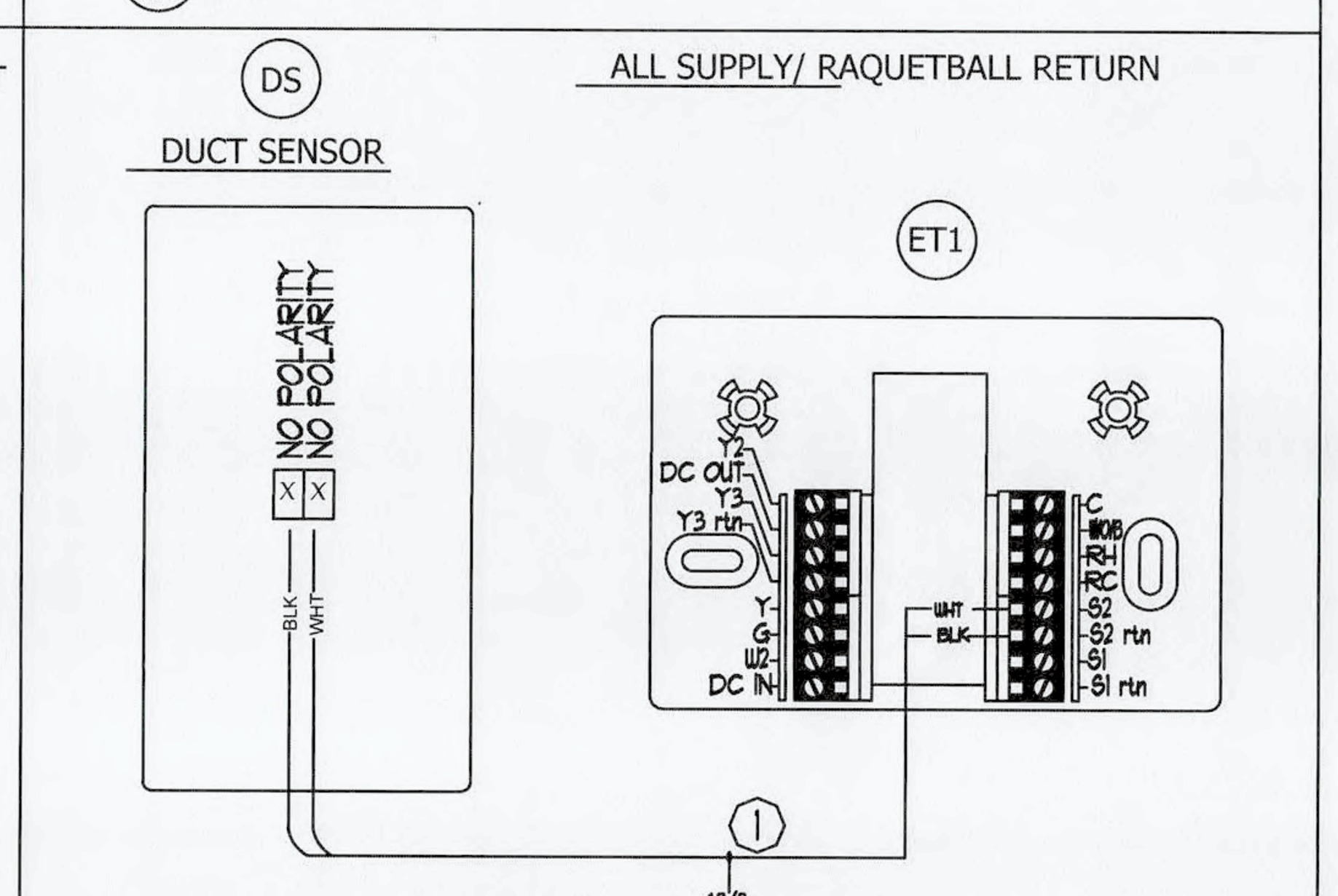
ET1 TO ROOFTOP WIRING (RTU, No Scale)



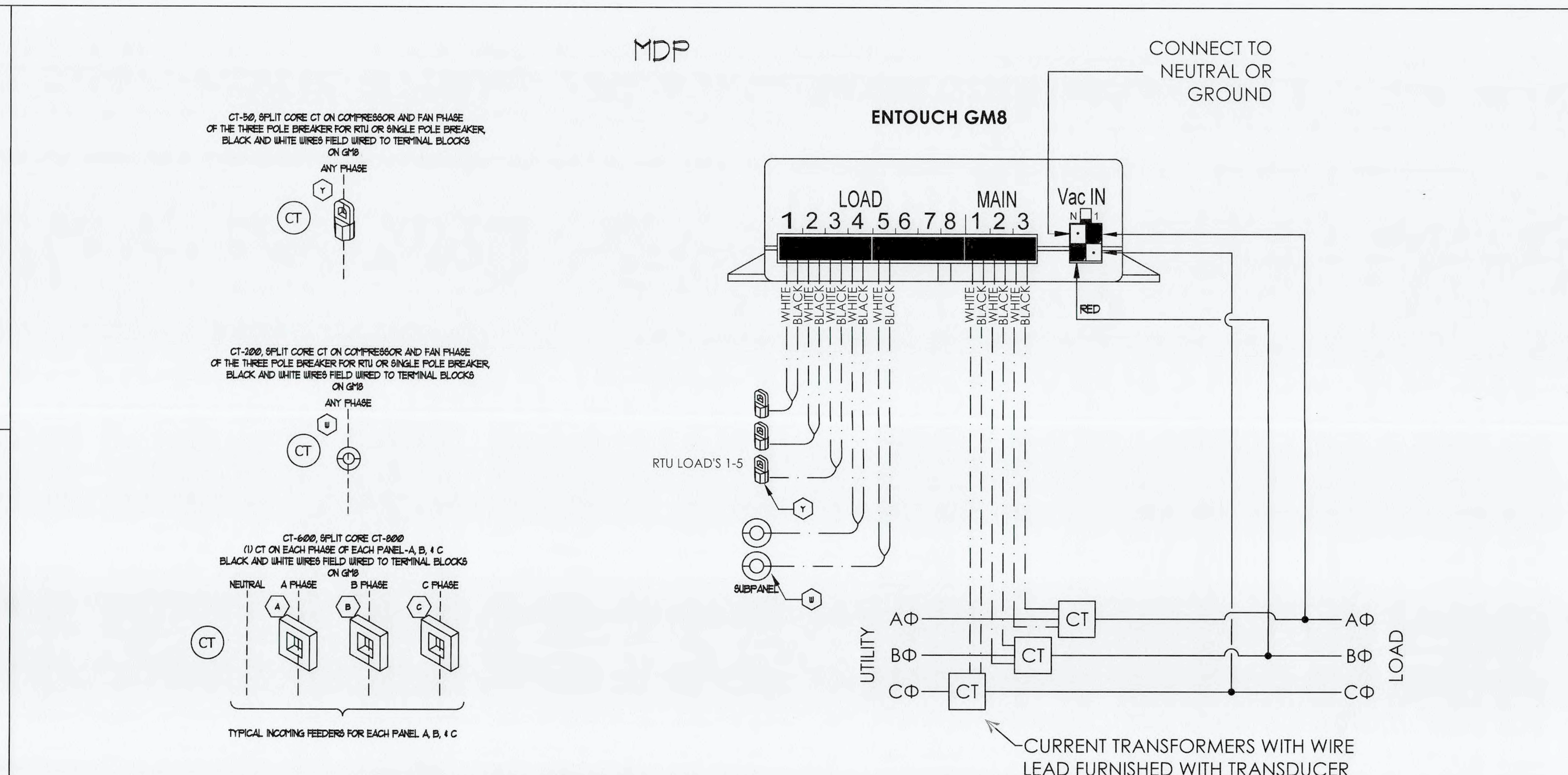
ET1 TO SS SPACE TEMP SENSOR (S, No Scale)



ET1 TO HUMIDITY/TEMP (HS, No Scale)



ET1 TO DUCT SENSOR (DS, No Scale)



ENERGY METER MOUNTING & WIRING DETAILS (EM 1, No Scale)

ENTOUCH
661 N. PLANO RD., SUITE 323
RICHARDSON, TX 75081
PH. 877-755-1609

ENTOUCH ENERGY MANAGEMENT

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REVISION
REVISION

24 HOUR FITNESS

SITE CONTROL EMS DETAILS

ENTOUCH PROJECT #
ENTOUCH DRAWING #
SHEET: 1
DATE: 02/01/2018
DRAWN BY: CSM

24 HOUR FITNESS
9026 SIENNA CROSSING DR.
MISSOURI CITY, TX 77459

sma + architects
115 west main street
allen, texas 75013
tele 972 / 359-8788
fax 972 / 359-1706

STATE OF TEXAS, S. BASHARKHAH, 53894, LICENSED PROFESSIONAL ENGINEER
6/27/19

bei
1 BASHARKHAH
2 ENGINEERING
3 INCORPORATED
Texas Registered Engineering Firm F-1026
13101 Preston Road Suite 601
Dallas, Texas 75240
(214) 659-9000
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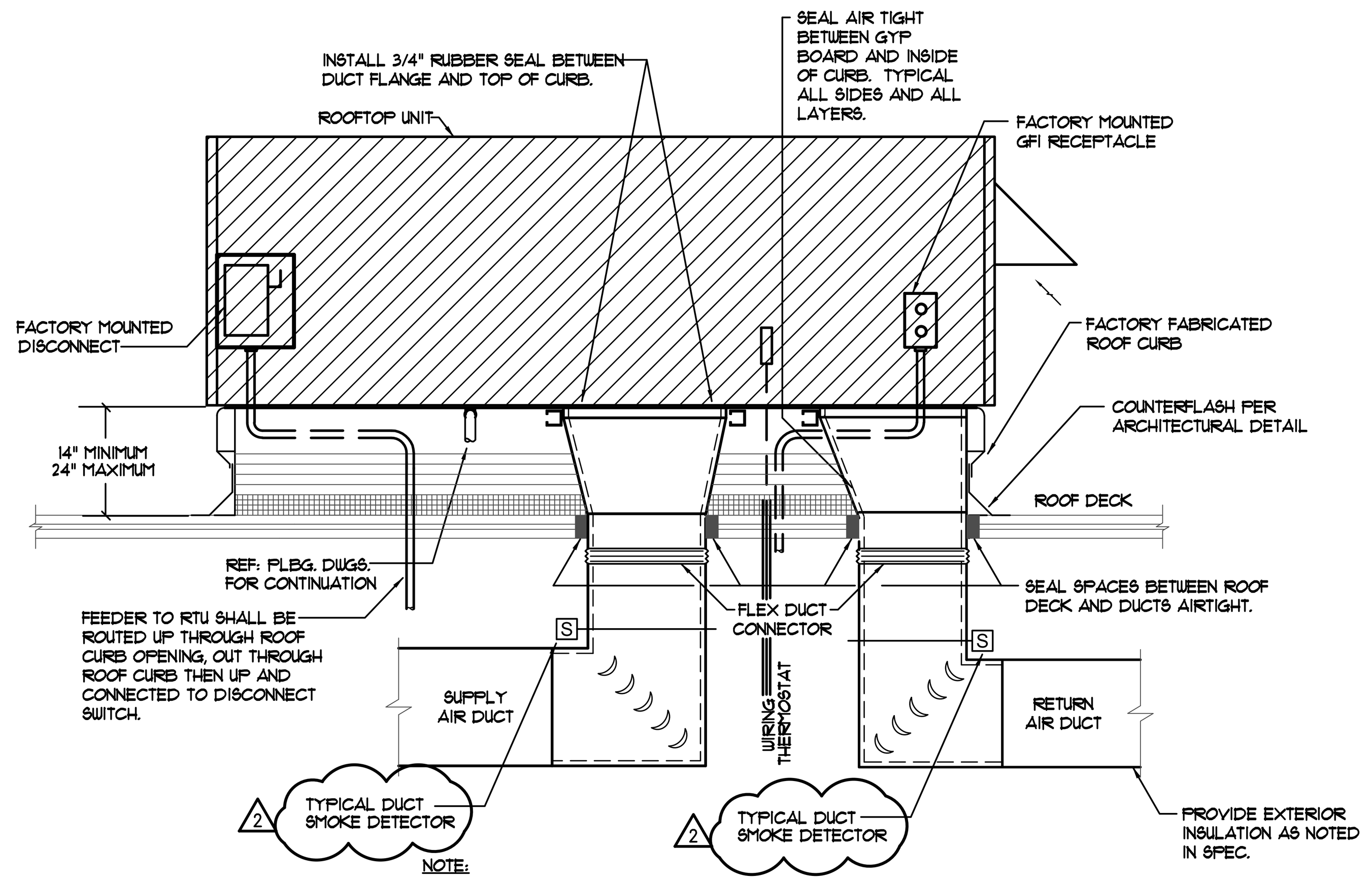
ISSUE DATES
6-28-19

TITLE
EMS - SINGLE LINE DIAGRAM

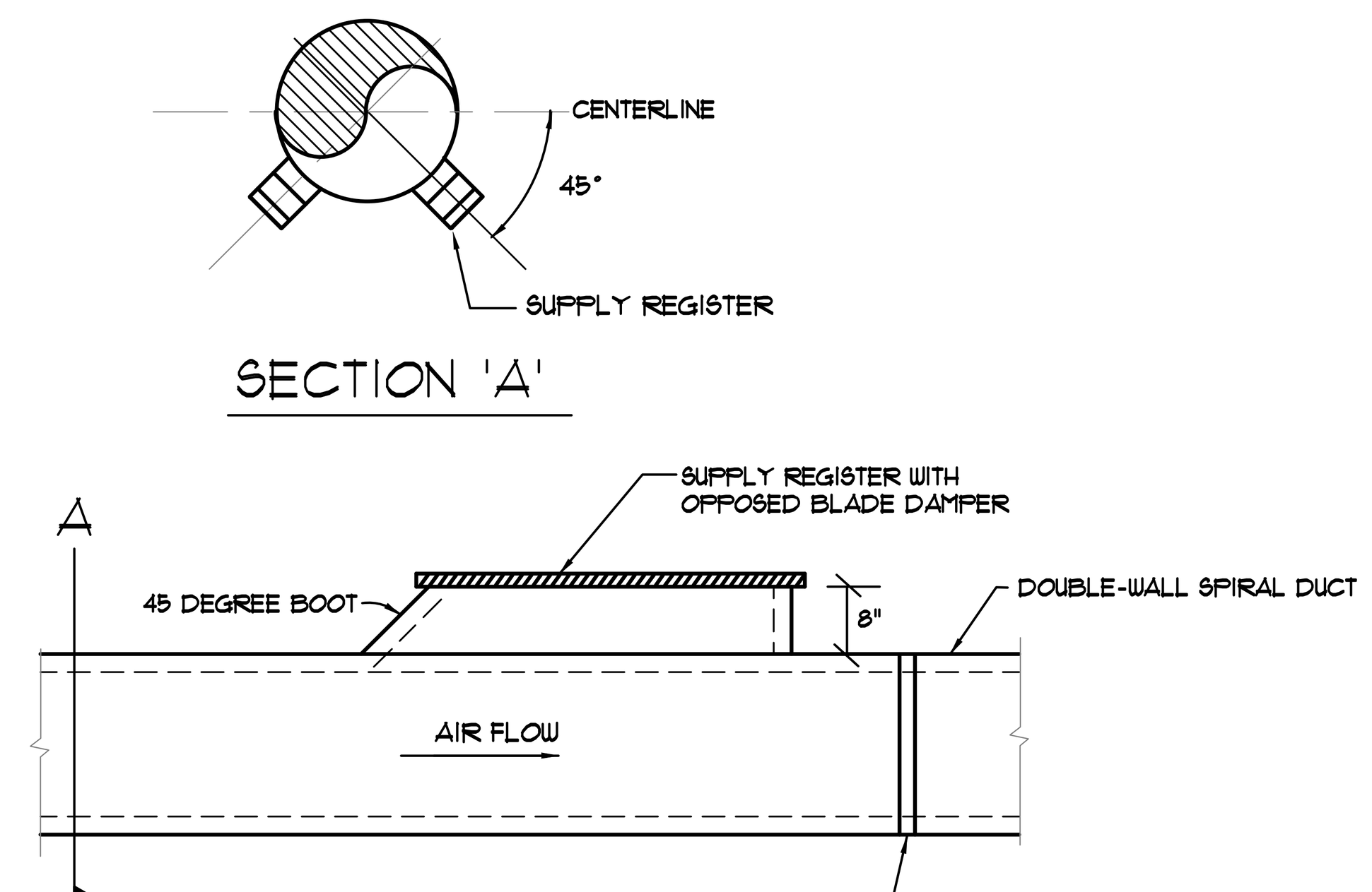
M3.3



NOTE:

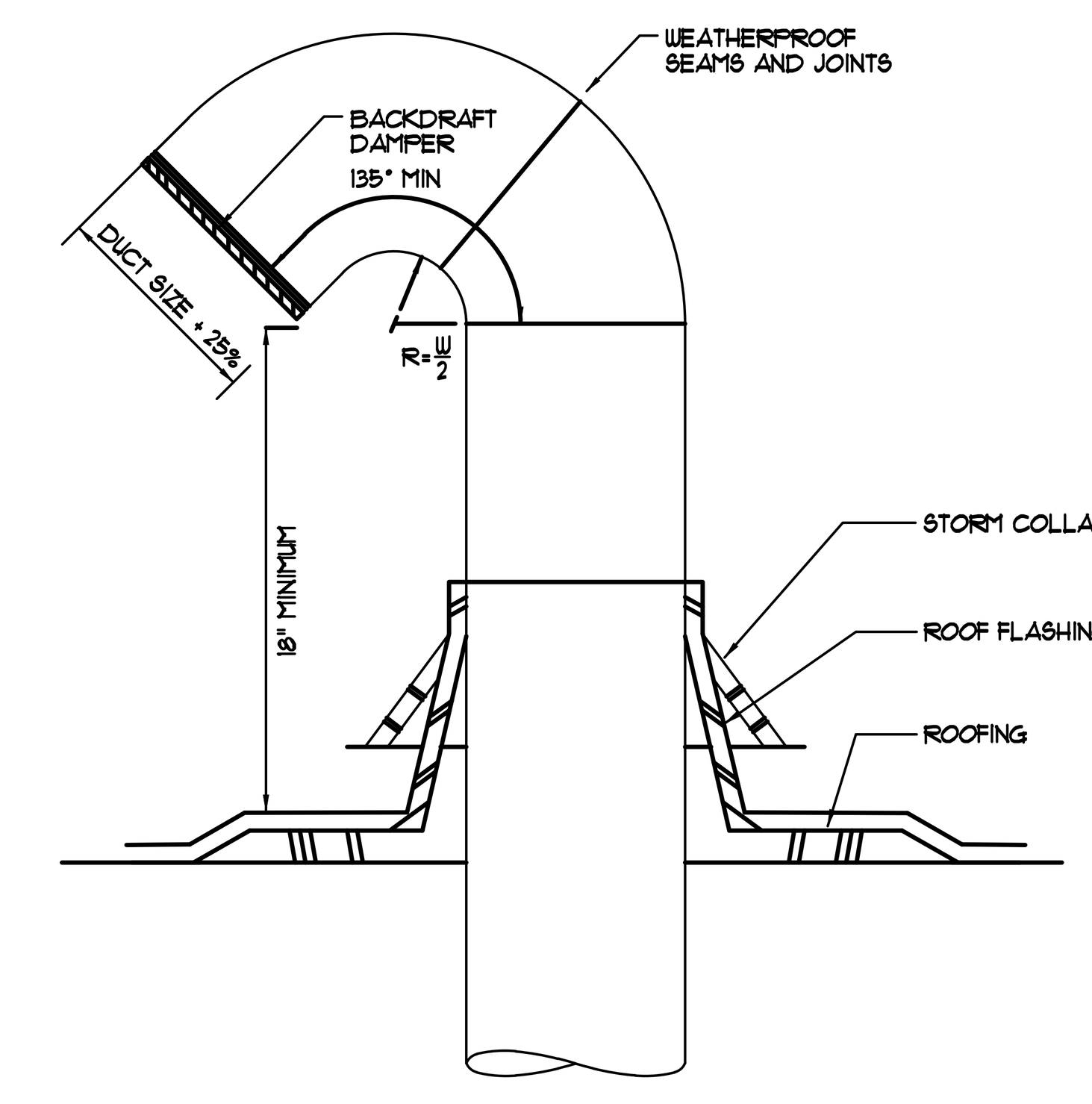
1. PROVIDE AT LEAST 15'-0" OF ACOUSTICAL LINING OR TO THE FIRST ELBOW OF EACH DUCT RISER OF THE UNIT. FOR OTHER INSULATION REQUIREMENTS REFER TO THE SPECIFICATIONS.
2. PROVIDE FACTORY HAIL GUARD
3. DUCT SMOKE DETECTOR TO BE PROVIDED BY FIRE ALARM CONTRACTOR, INSTALLED BY MECHANICAL CONTRACTOR, AND WIRED BY ELECTRICAL CONTRACTOR. DUCT SMOKE DETECTOR TO BE PROVIDED FOR ROOFTOP UNITS WITH A DESIGN CAPACITY GREATER THAN 2000 CFM. A REMOTE ANNUNCIATOR AND TEST SWITCH SHALL BE INSTALLED FOR EACH DETECTOR IN THE AREA OF DETECTOR INSTALLATION. THE TEST SWITCH SHALL BE LOCATED IN AN EASILY ACCESSIBLE LOCATION.

01 ROOFTOP UNIT DETAIL
SCALE: N.T.S.

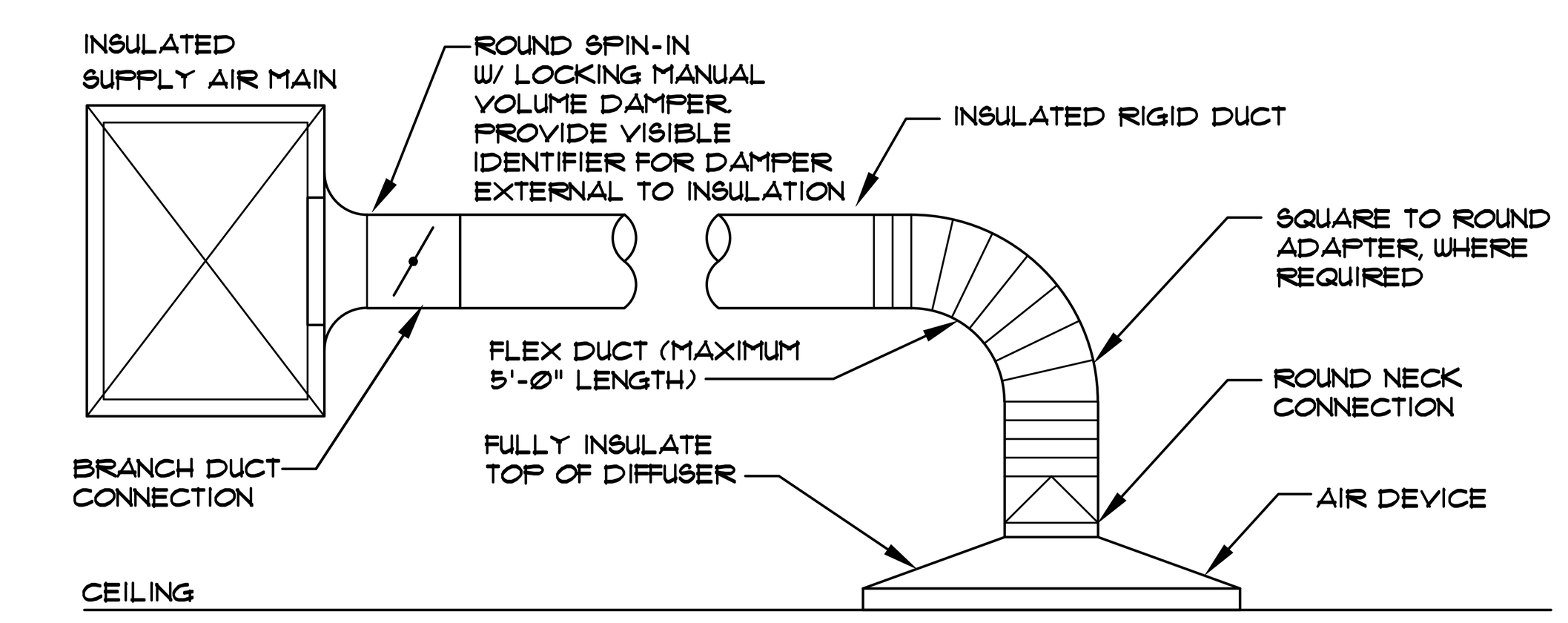


LOWER HANGER ATTACHMENT SHALL BE GALVANIZED STRAP. ALL EXPOSED ROUND DUCTWORK SHALL BE HUNG WITH A SINGLE ALL-THREAD UPPER HANGER ATTACHMENTS AND LOAD RATED FASTENERS WITH RECOMMENDED SPACING. ALL HANGERS, RODS, AND DUCTWORK WILL BE INSTALLED PER THE LATEST EDITION OF THE SMACNA LOW PRESSURE DUCTWORK CONSTRUCTION STANDARDS.

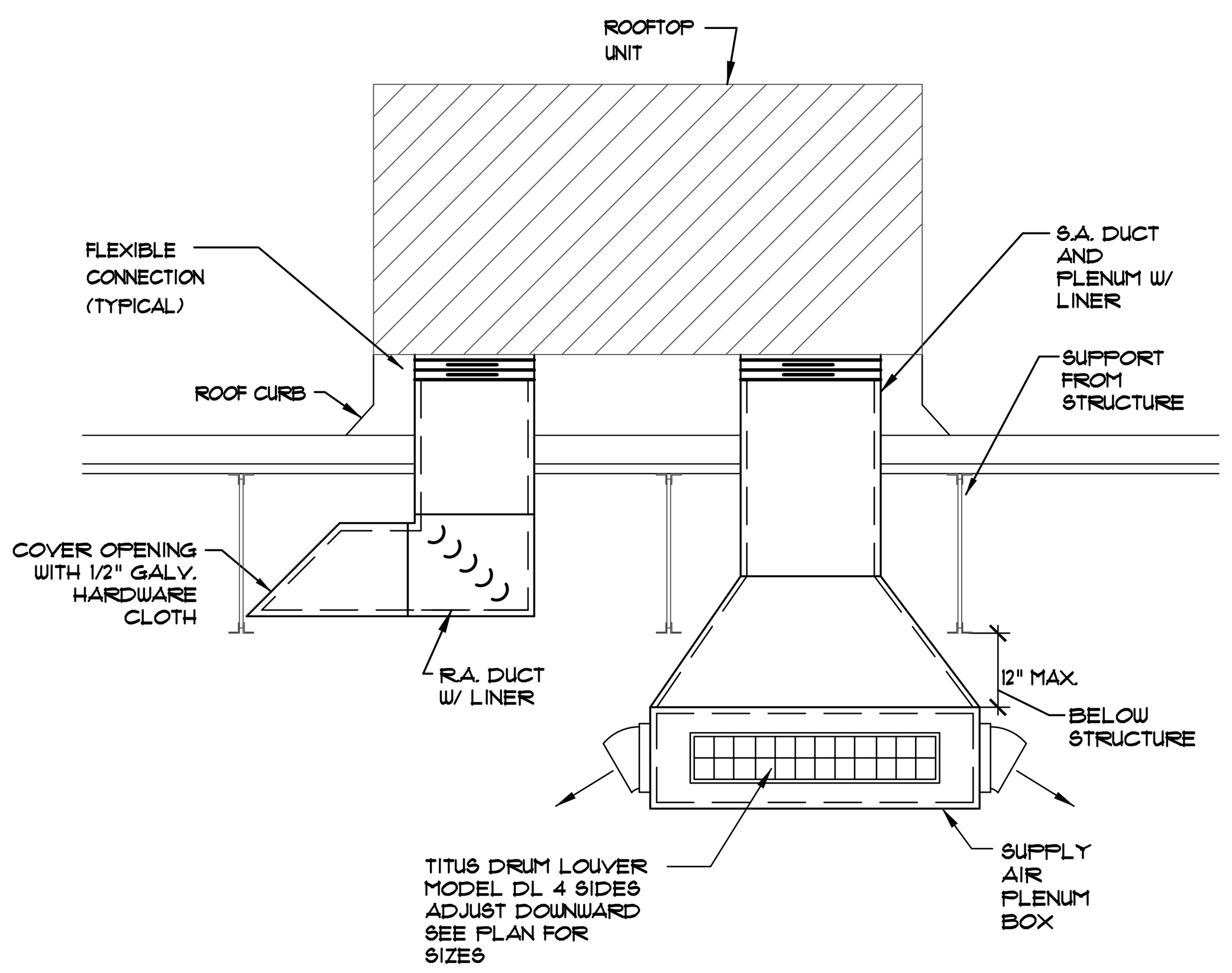
02 REGISTER DETAIL IN CYCLE
SCALE: N.T.S.



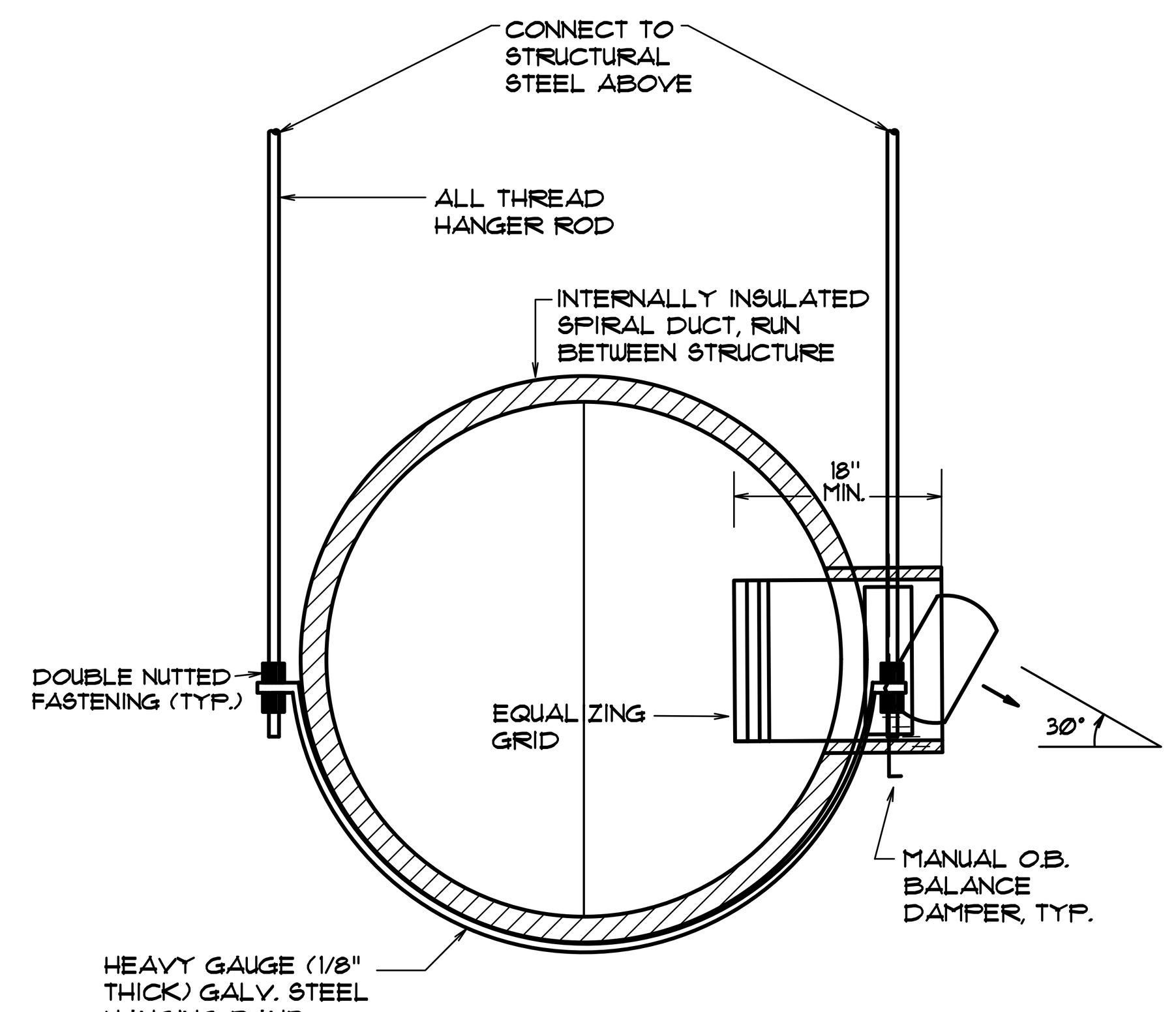
03 SHEET METAL GOOSENECK
SCALE: N.T.S.



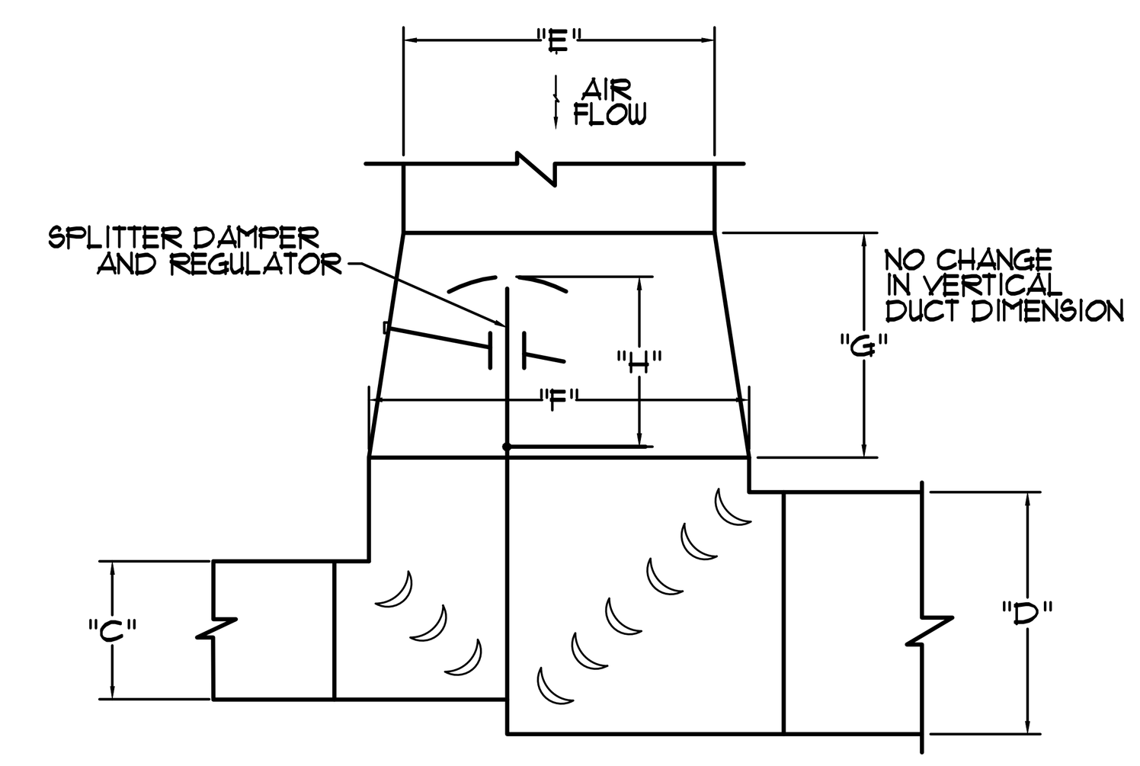
04 TYPICAL LOW PRESSURE BRANCH DUCT TO DIFFUSER DETAIL
SCALE: N.T.S.



05 RTU & DRUM LOUVER DETAIL
SCALE: N.T.S



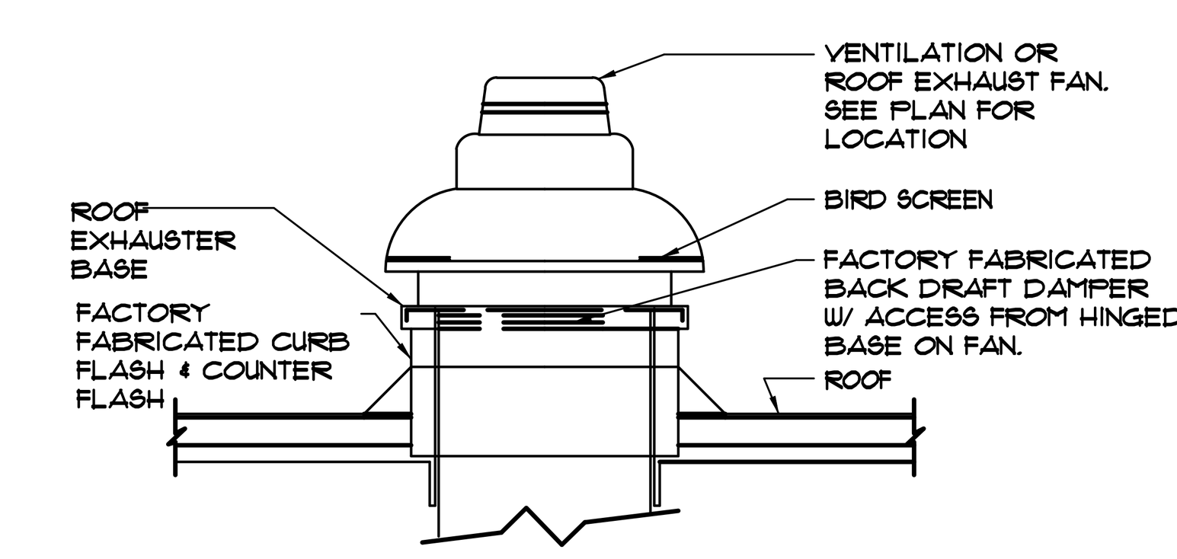
06 DRUM LOUVER DETAIL
SCALE: N.T.S.



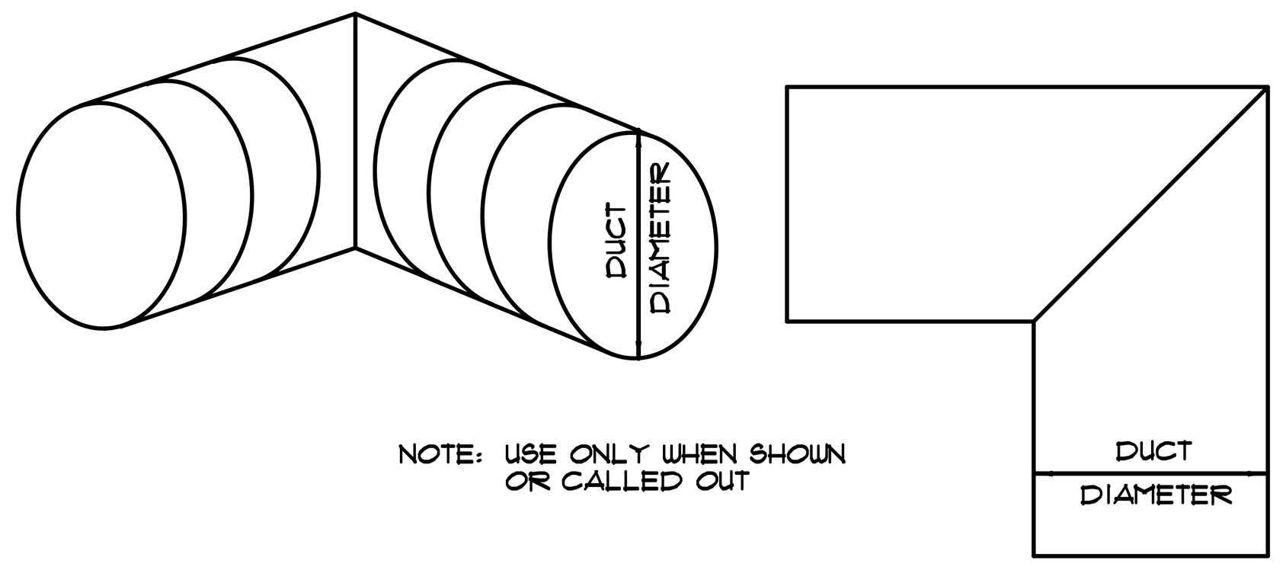
DIMENSION RELATIONSHIPS

1. ANGLES A & B EACH TO BE 15 DEGREES OR LESS
2. SEE DUCT PLANS FOR VALUES FOR C, D & E.
3. F = C + D
4. H = 1.5 X C
5. G = H + 3" (MINIMUM)
6. HEIGHT OF FITTING EQUAL TO THAT OF HIGHEST OF THREE DUCTS.
7. CHANGE IN HEIGHTS OF DOWNSTREAM DUCTS TO OCCUR AFTER THE TURN.

07 SPLITTER DAMPER DETAIL
SCALE: NTS

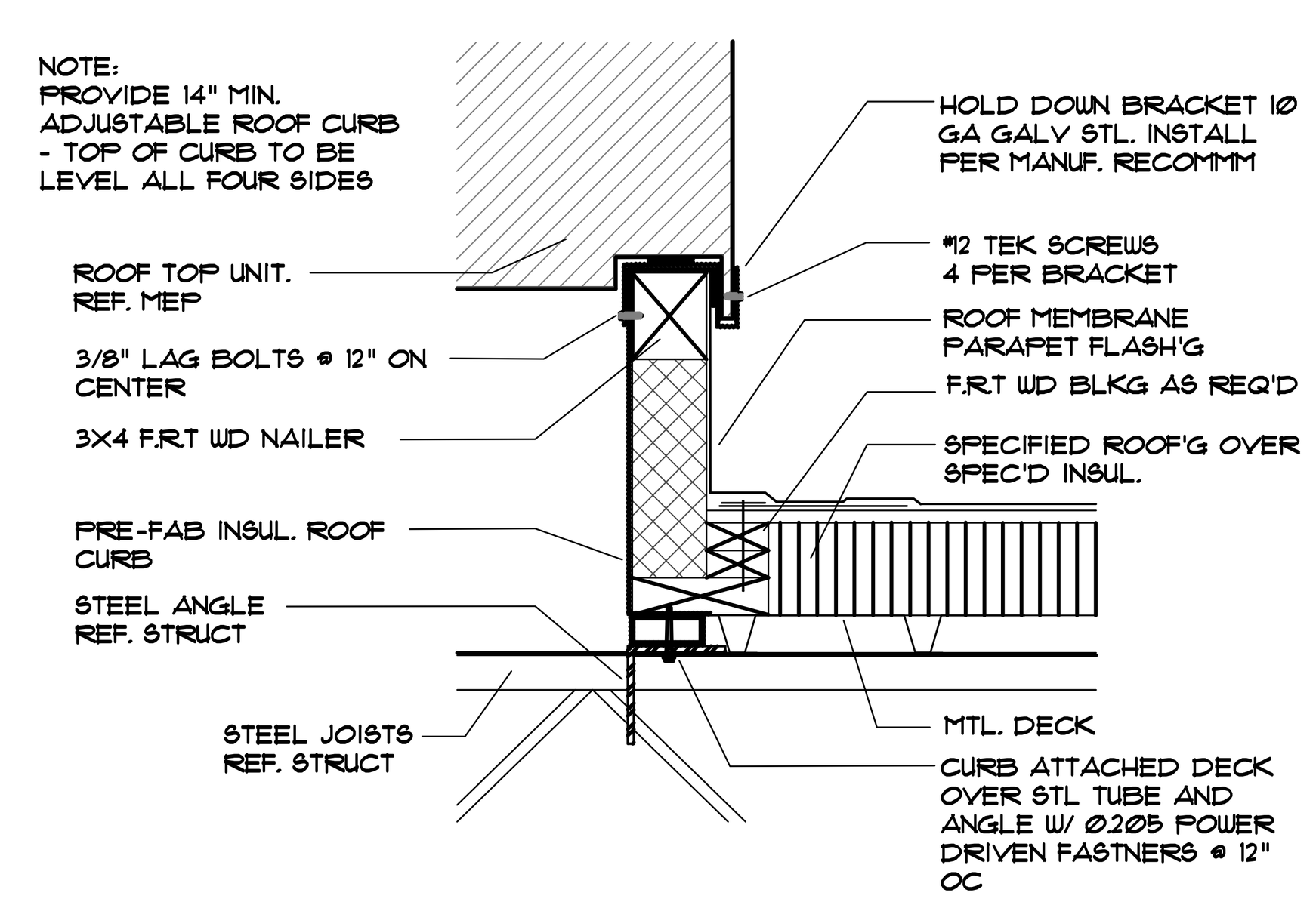


08 ROOF MOUNTED EXHAUST FAN DETAIL
SCALE: N.T.S



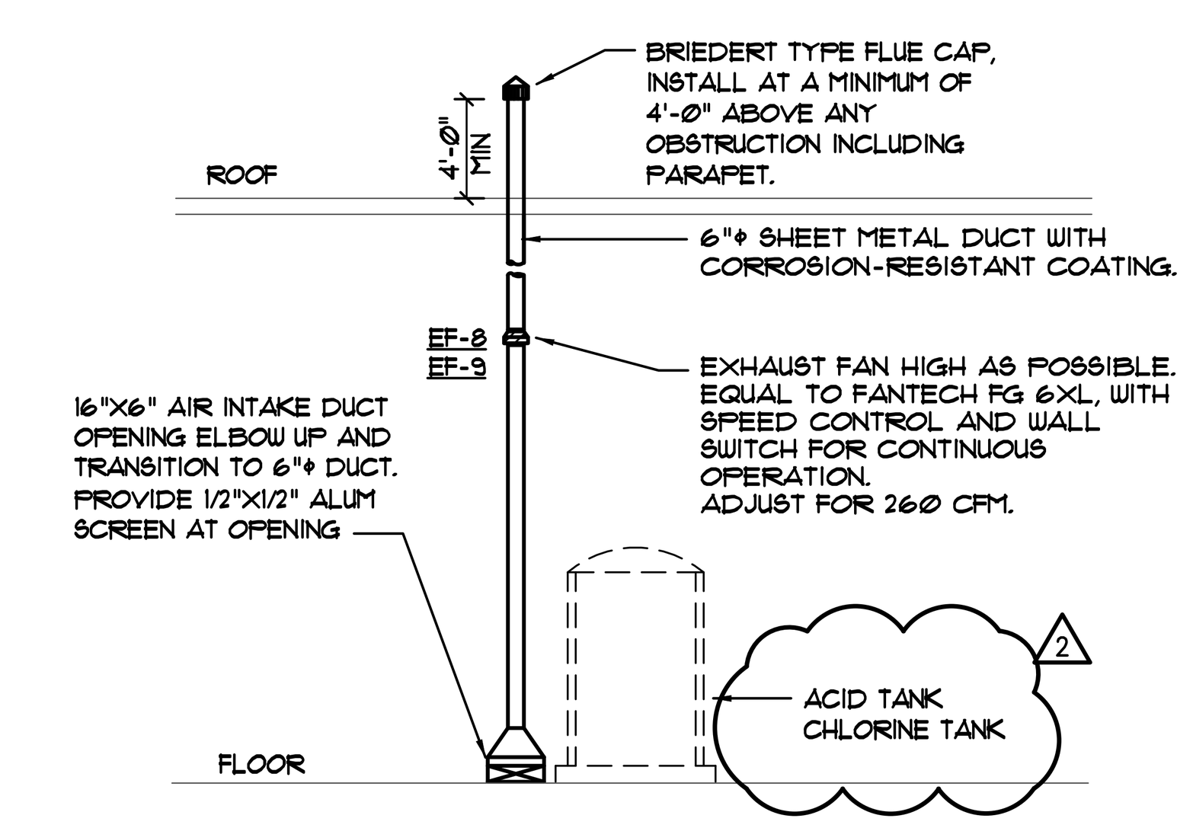
NOTE: USE ONLY WHEN SHOWN OR CALLED OUT

09 MITERED ELBOW DETAIL
SCALE: N.T.S



NOTE:
PROVIDE 14" MIN. ADJUSTABLE ROOF CURB - TOP OF CURB TO BE LEVEL ALL FOUR SIDES

10 RTU CURB ANCHOR DETAIL
SCALE: N.T.S



11 ACID/CHLORINE TANK EXHAUST SYSTEM
SCALE: N.T.S

9026 SIENNA CROSSING DR.
MISSOURI CITY, TX 77459

sma + architects

115 west main street
allen, texas 75013

tele 972 / 359-8788
fax 972 / 359 -1706

STATE OF TEXAS
S. BASHARKHAH
53894
LICENSED PROFESSIONAL ENGINEER
6/27/19

1 BASHARKHAH
2 ENGINEERING
3 INCORPORATED
Texas Registered Engineering Firm F-1026
13101 Preston Road
Suite 601
Dallas, Texas 75240
(214) 659-9000

BEI Job # 18195

ISSUE DATES

6-28-19
2 10-18-19

TITLE

DETAILS - HVAC

M4.1

DRAWING ABBREVIATIONS AND SYMBOL MODIFIERS

ABBREVIATION	DESCRIPTION
A	AMPERES OR TRIP AMPERES
ABV	ABOVE
A/C	AIR CONDITIONING
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AIC	AMPERE INTERRUPTING CAPACITY
ALT	ALTERNATE
ARCH	ARCHITECT
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTC	BRANCH TO CONNECTION
BTUH	BRITISH THERMAL UNIT PER HOUR
C	CONDUIT
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CFM	CUBIC FEET PER MINUTE
CKT	CIRCUIT
℄	CENTER
CLG	CEILING
COL	COLUMN
COMP	COMPRESSOR
COND	CONDENSER
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CU	COPPER
DBT	DRY BULB TEMPERATURE
DCO	DUPLEX CONVENIENCE OUTLET
DEG	DEGREES
DFA	DOWN FROM ABOVE
DIA	DIAMETER
DN	DOWN
DP	DISTRIBUTION PANEL
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DTL	DETAIL
DWG	DRAWING
DX	DIRECT EXPANSION
E/A	EXHAUST AIR
EXIST.	EXISTING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EFF	EFFICIENCY
ERR	ENERGY EFFICIENCY RATING
EJ	EXPANSION JOINT
ELEC	ELECTRICAL
ELEV	ELEVATOR
EMCS	ENERGY MONITORING AND CONTROL SYSTEM
EMERG	EMERGENCY
EMT	ELECTRIC METALLIC CONDUIT
EQ	EQUIPMENT
ESP	EXTERNAL STATIC SYSTEM
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
F	FAHRENHEIT
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FCO	FLOOR CLEAN OUT
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FDS	FUSED DISCONNECT SWITCH
FF	FINISH FLOOR
FG	FINISH GRADE
FHC	FIRE HOSE CABINET
FLA	FULL LOAD AMPS
FLUOR	FLUORESCENT
FPM	FEET PER MINUTE
FT	FEET/FOOT (')
FVNR	FULL VOLTAGE NON-REVERSING
GA	GAUGE
GALV	GALVANIZED
GCO	GRADE CLEAN OUT
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
GPM	GALLONS PER MINUTE
HB	HOSE BIB
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HR	HOUR
HT	HEIGHT
HTR	HEATER
HV	HIGH VOLTAGE (ABOVE 600 VOLTS)
HVAC	HEATING VENTILATION AND AIR CONDITIONING
HZ	HERTZ-FREQUENCY IN CYCLE PER SECOND
ID	INSIDE DIAMETER
IN	INCH/INCHES (")
INCAD	INCANDESCENT
JB	JUNCTION BOX
K	KEY INTERLOCK
Kcmill	1000 CIRCULAR mils
KV	KILOVOLTS (THOUSAND VOLTS)
KVA	KILOVOLTS-AMPS (THOUSAND VOLT-AMPS)
KW	KILOWATT (THOUSAND WATTS)
KWD	KILOWATT DEMAND
KWH	KILOWATT HOUR
LA	LIGHTING ARRESTOR
LAN	LOCAL AREA NETWORK
LAT	LEAVING AIR TEMPERATURE
LAV	LAVATORY
LBS	POUNDS
LL	LIVE LOAD
L-L	LINE TO LINE
L-N	LINE TO NEUTRAL
LS	LIFE SAFETY
LTG	LIGHTING
LTS	LIGHTS
LV	LOW VOLTAGE (BELOW 50 VOLTS)
LWT	LEAVING WATER TEMPERATURE

ABBREVIATION	DESCRIPTION
MATV	MASTER ANTENNA TELEVISION
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROLLED CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MOCP	MAXIMUM OVER CURRENT PROTECTION
MTD	MOUNTED
MTG	MOUNTING
MTS	MANUAL TRANSFER SWITCH
N	NEUTRAL
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NFDS	NON-FUSED DISCONNECT SWITCH
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN, NITROUS OXIDE
NTS	NOT TO SCALE
O/A	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFD	OVER FLOW DRAIN
OFOI	OWNER FURNISHED, OWNER INSTALLED
OH	OVERHEAD
OHP	OVERHEAD PRIMARY
OHS	OVERHEAD SECONDARY
OHE/T	OVERHEAD ELECTRIC/TELEPHONE
OPP	OPPOSITE
P	PRIMARY OR POLES
PA	PUBLIC ADDRESS
PB	PULL BOX
PE	PHOTO ELECTRIC
PF	POWER FACTOR
PH	PHASE
PNL	PANEL BOARD
PLBG	PLUMBING
PSI	POUND PER SQUARE INCH
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
PWR	POWER
Q	QUARTZ RESTRIKE
QTY	QUANTITY
R	RELOCATE AS SHOWN
R/A	RETURN AIR
RECEPT	RECEPTACLE
RECIRC	RECIRCULATION
RE	REFERENCE
REF,	REFER TO,
REQ	REQUIRED
RF	RADIO FREQUENCY
RGC	RIGID GALVANIZED STEEL CONDUIT
RH	RELATIVE HUMIDITY
RD	ROOF DRAIN
RLA	RATED LOAD AMPS
RPM	REVOLUTION PER MINUTE
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SCO	SINGLE CONVENIENCE OUTLET
SD	SMOKE DAMPER, STORM DRAIN, SHOWER DRAIN
SEC	SECONDARY
SEER	SEASONAL ENERGY EFFICIENCY RATING
SF	SQUARE FOOT
SIM	SIMILAR
SP	STATIC PRESSURE
SPECS	SPECIFICATIONS
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SQ	SQUARE
SR	SPECIAL RECEPTACLE
S/S	STAINLESS STEEL
SW	SWITCH
SWBD	SWITCH BOARD
SYM	SYMMETRICAL
TC	TIME CLOCK
TEL	TELEPHONE
TEMP	TEMPERATURE
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TOS	TOP OF SLAB
TP	TAMPERPROOF
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TTB	TELEPHONE TERMINAL BOARD
TTC	TELEPHONE TERMINAL CABINET
TV	TELEVISION
TYP	TYPICAL
UH	UNIT HEATER
UG	UNDERGROUND
UGP	UNDERGROUND PRIMARY
UGS	UNDERGROUND SECONDARY
UGT	UNDERGROUND TELEPHONE
UL	UNDERWRITER'S LABORATORY
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTED POWER SUPPLY
V	VOLTS
VA	VOLT AMPERES
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
W	WIRE
W/	WITH
W/O	WITHOUT
WB	WET BULB (TEMPERATURE)
WCO	WALL CLEAN OUT
WG	WATER GAUGE
WP	WATER PROOF
WT	WATERTIGHT
XFMR	TRANSFORMER
YCO	YARD CLEAN OUT
% Z	PERCENT IMPEDANCE

GENERAL SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
(1)	NOTE BY SYMBOL DESIGNATION		CONTINUATION OF SYSTEM OR LINE

NOTES:
1. ALL ABBREVIATIONS AND SYMBOLS ARE NOT NECESSARILY USED.
2. EXISTING WORK THAT IS TO BE REMOVED IS DENOTED BY DASHED LIGHT LINEWORK OR BY NOTE.
3. ALL EXISTING WORK TO REMAIN IS DENOTED BY SOLID LIGHT LINEWORK OR BY NOTE.
4. ALL MATERIALS, LABOR, COORDINATION, AND SUPERVISION IS BY CONTRACTOR UNLESS SPECIFICALLY NOTED "BY OWNER" OR "NIC". CONTRACTOR SHALL COORDINATE AND INSTALL EQUIPMENT WHEN NOTED "OWNER FURNISHED".
5. LIGHT FIXTURE SYMBOLS MAY VARY. REFER TO LIGHTING PLAN AND ARCHITECTURAL REFLECTED CEILING PLAN.
6. SYMBOLS USED, BUT NOT ON THE LEGEND ARE NOTED ON THE PLAN.

ELECTRICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION
A	2'X4' FLUORESCENT LIGHT FIXTURE (LETTER DENOTES TYPE)
A	2'X2' FLUORESCENT LIGHT FIXTURE (LETTER DENOTES TYPE)
	4' OR 8' FLUORESCENT LIGHT FIXTURE
	LIGHT FIXTURE CONNECTED TO NIGHT LIGHT/EMERGENCY CIRCUIT OR EQUIPPED W/ INTEGRAL BATTERY PACK
	4' OR 8' FLUORESCENT STRIP LIGHT FIXTURE
	4' OR 8' EMERGENCY FLUORESCENT STRIP LIGHT FIXTURE
	4' OR 8' LIGHT FIXTURE CONNECTED TO NIGHT LIGHT/ EMERGENCY CIRCUIT OR EQUIPPED W/ INTEGRAL BATTERY PACK
	WALL MOUNTED LIGHT FIXTURE
O A	CEILING MOUNTED LIGHT FIXTURE-UON-(LETTER DENOTES TYPE)
	WALL WASHER
	EGRESS LIGHT FIXTURE W/ BATTERY PACK
	EXIT LIGHT FIXTURE, CEILING MOUNTED, WITH ARROW
	EXIT LIGHT FIXTURE, WALL MOUNTED (SHADED PORTION INDICATES LIGHTED FACE)
$	SINGLE POLE SWITCH, 48" AFF TO HIGHEST OPERABLE PART
$2	DOUBLE POLE SWITCH, 48" AFF TO HIGHEST OPERABLE PART
$3	THREE WAY SWITCH, 48" AFF TO HIGHEST OPERABLE PART
$4	FOUR WAY SWITCH, 48" AFF TO HIGHEST OPERABLE PART
$D	DIMMER SWITCH, 48" AFF TO HIGHEST OPERABLE PART
$F	VARIABLE SPEED FAN CONTROL SWITCH, 48" AFF TO HIGHEST OPERABLE PART
$J	JAMB SWITCH, 48" AFF TO HIGHEST OPERABLE PART
$K	KEY OPERATED SWITCH, 48" AFF TO HIGHEST OPERABLE PART
$M	MANUAL MOTOR STARTER SWITCH, 48" AFF TO HIGHEST OPERABLE PART
$P	SWITCH AND PILOT LIGHT, 48" AFF TO HIGHEST OPERABLE PART
$V	VOLUME CONTROL SWITCH, 48" AFF TO HIGHEST OPERABLE PART
	SIMPLEX RECEPTACLE, +16" AFF TO HIGHEST OPERABLE PART
	CLOCK HANGER RECEPTACLE
	DUPLEX RECEPTACLE, +16" AFF TO CENTERLINE-UON
	DUPLEX RECEPTACLE, (ABOVE COUNTER)
	QUADPLEX RECEPTACLE, +16" AFF TO CENTERLINE-UON
IG	ISOLATED GROUND RECEPTACLE, +16" AFF TO CENTERLINE-UON
	DUPLEX RECEPTACLE HALF SWITCHED,+16" AFF TO CENTERLINE-UON
H	HOSPITAL GRADE DUPLEX RECEPTACLE, +16" AFF CENTERLINE-UON
GFI	GFI DUPLEX RECEPTACLE
H	HOSPITAL GRADE DUPLEX RECEPTACLE ON EMERGENCY POWER (RED DEVICE AND COVER PLATE WITH CIRCUIT NUMBER ENGRAVED ON FACE) ON CRITICAL BRANCH.
	SPECIAL PURPOSE RECEPTACLE
	TWIST LOCK RECEPTACLE
	FLOOR RECEPTACLE (FLUSH-UON)
	MULTIOUTLET ASSEMBLY
	MAIN OR DISTRIBUTION PANELBOARD (SHOWN TO SCALE ON PLAN)
	BRANCH CIRCUIT PANELBOARD (SINGLE SECTION)
	RECESSED BRANCH CIRCUIT PANELBOARD (SINGLE SECTION)
T	TRANSFORMER (SHOWN TO SCALE ON PLAN)
	DISCONNECT SWITCH
	DISCONNECT SWITCH, FUSED
100/100/3	FDS SIZE/FUSE SIZE/NUMBER OF POLES
	DISCONNECT SWITCH, WITH INTEGRAL STARTER
	MOTOR STARTER/CONTROLLER
H	HEATER CONNECTION
	MOTOR CONNECTION
J	JUNCTION BOX
J	JUNCTION BOX - WALL MOUNTED
	BELL
	BUZZER
TV	TELEVISION ANTENNA OUTLET, 16" AFF TO CENTERLINE-UON
	SYSTEM CLOCK ("M" DENOTES MASTER; DF DENOTES DOUBLE FACE) 90" AFF TO CENTERLINE
	CIRCUIT WITH NEUTRAL, HOT, SWITCHLEG, AND GROUND (3-WAY SWITCH TRAVELERS SHOWN AS SWITCHLEGS)
- - - -	CIRCUIT UNDERFLOOR OR UNDERGROUND
	CIRCUIT TO BE REMOVED
	CIRCUIT WITH 2#12, 1#12G. CONDUCTORS AND 1/2" C. IS REQUIRED WHEN NO MARKS ARE SHOWN UON
	CONDUIT STUBBED UP AND CAPPED
	LOW VOLTAGE WIRING
	FLEX CONNECTION
A-1	HOMERUN TO PANEL A, CIRCUIT 1
A-1,3,5	CIRCUIT HOMERUN - THREE CIRCUITS INDICATED
(UH-2)	EQUIPMENT DESIGNATION (FURNISHED BY OTHER DIVISIONS, OWNER OR ETC...) SEE EQUIPMENT SCHEDULE
*	ADJACENT TO DEVICE DENOTES ABOVE COUNTER TOP, COORDINATE EXACT PLACEMENT WITH ARCHITECTS ELEVATION; IF NOT SHOWN, INSTALL 6" ABOVE COUNTER TOP
	GROUND
	PUSHBUTTON
	START/STOP STATION
EPO	EMERGENCY POWER "OFF" PUSHBUTTON
	CEILING FAN (LETTER DENOTES TYPE)
	CEILING FAN WITH LIGHT KIT (LETTER DENOTES TYPE)
F	FIRE ALARM PULL STATION, 48" AFF TO HIGHEST OPERABLE PART
F	FIRE ALARM VISUAL STATION, 80" AFF OR 6" BELOW CEILING WHICHEVER IS LOWER
F	FIRE ALARM AUDIO/VISUAL STATION, 80" AFF OR 6" BELOW CEILING WHICHEVER IS LOWER
AV	FIRE ALARM AUDIO/VISUAL STATION, CEILING MOUNTED
F	FIRE ALARM AUDIO STATION
S	FIRE ALARM SMOKE DETECTOR
S	FIRE ALARM SINGLE STATION SMOKE DETECTOR WITH INTEGRAL HORN
D	FIRE ALARM DUCT SMOKE DETECTOR
H	HEAT DETECTOR
CO	CARBON MONOXIDE DETECTOR
DH	MAGNETIC DOOR HOLDER
TS	FIRE SPRINKLER TAMPER SWITCH
FS	FIRE SPRINKLER FLOW SWITCH
FACP	FIRE ALARM CONTROL PANEL
COP	CARBON MONOXIDE PANEL
FARA	FIRE ALARM REMOTE ANNUNCIATION
P/C	PHOTOCELL
T/S	TIMESWITCH
C	CONTACTOR
A	INTRUSION ALARM
OS	WALL OCCUPANCY SENSOR
OS	CEILING OCCUPANCY SENSOR
SCP	SECURITY CONTROL PANEL
	CLOSED CIRCUIT TV CAMERA
TWP	CLOSED CIRCUIT TV CAMERA WITH OUTDOOR HOUSING AND TILT, PAN ZOOM LENS
KP	KEY PAD
ES	ELECTRIC STRIKE
CR	CARD READER
	TELEPHONE OUTLET, 16" AFF TO CENTERLINE
*	TELEPHONE OUTLET ABOVE COUNTER
WF	WALL MOUNTED TELEPHONE OUTLET, 48" AFF TO CENTERLINE
P	PAY TELEPHONE OUTLET, 36" AFF TO CENTERLINE
	FLOOR TELEPHONE OUTLET (FLUSH-UON)
	DATA OUTLET, 16" AFF TO CENTERLINE
	FLOOR DATA OUTLET (FLUSH-UON)
	COMBINATION TELEPHONE/DATA OUTLET, 16" AFF TO CENTERLINE
	FLOOR DATA/TELEPHONE OUTLET (FLUSH-UON)
S	CEILING SPEAKER ("LS" DENOTES LIFE SAFETY)
S V	CEILING SPEAKER WITH VOLUME CONTROL ("LS" DENOTES LIFE SAFETY)
S	WALL SPEAKER ("LS" DENOTES LIFE SAFETY)
M	MICROPHONE FLOOR OUTLET
M	MICROPHONE OUTLET - WALL MOUNTED
TTC	TELEPHONE TERMINAL CABINET WITH PLYWOOD BACKBOARD
TTB	TELEPHONE TERMINAL BOARD - 4'X8'X3/4" PLYWOOD-UON
I	INTERCOM STATION
I M	INTERCOM MASTER STATION
M	ELECTRIC METER AND METER SOCKET

MECHANICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION
— SS —	SANITARY SEWER
— GW —	GREASE WASTE
- - - - -	PLUMBING VENT
— SD —	STORM DRAIN
— OFD —	OVERFLOW STORM DRAIN
— · —	DOMESTIC COLD WATER
— · · —	DOMESTIC HOT WATER
— · · · —	DOMESTIC HOT WATER RECIRC
— A —	AIR LINE
— F —	FIRE LINE
— G —	GAS LINE
— RL —	REFRIGERANT LIQUID LINE
— RS —	REFRIGERANT SUCTION LINE
— RD —	REFRIGERANT DISCHARGE LINE
— CHS —	CHILLED WATER SUPPLY
— CHR —	CHILLED WATER RETURN
— HWS —	HEATING WATER SUPPLY
— HWR —	HEATING WATER RETURN
— CWS —	CONDENSER WATER SUPPLY
— CWR —	CONDENSER WATER RETURN
	DIRECTION OF FLOW
— D —	EQUIPMENT OR FIXTURE DRAIN LINE
— — —	SUBSOIL DRAIN
— V —	VACUUM
— O —	OXYGEN
— NO —	NITROUS OXIDE
— N —	NITROGEN
— MA —	MEDICAL AIR
— A —	COMPRESSED AIR
— UF —	UNDERFLOOR
— P —	PUMPED WASTE OR STORM LINE
— AW —	ACID WASTE
- - AV - -	ACID VENT
	PIPING TO BE INSTALLED
	EXISTING PIPING TO REMAIN
	EXISTING PIPING TO BE REMOVED
	POINT OF CONNECTION TO EXISTING
	O.S.&Y VALVE
	TEST PLUG
	BALL VALVE
	PLUG VALVE (BALANCE COCK)
	SOLENOID VALVE
	CHECK VALVE
	GAS COCK
	GATE VALVE
	BUTTERFLY VALVE
	MOTORIZED BUTTERFLY VALVE
	THERMOMETER
HB	HOSE BIBB
NFWH	NON-FREEZE WALL HYDRANT
YH	YARD HYDRANT
SD	SHOWER DRAIN
FD	FLOOR DRAIN
AD	AREA DRAIN
RD	ROOF DRAIN
OD	OVERFLOW DRAIN
HD	HUB DRAIN
OSD	OPEN SIGHT DRAIN
VTR	VENT THRU ROOF
CO	CLEANOUT
FCO	CLEANOUT IN FLOOR
GCO	CLEANOUT IN GRADE
DCO	DOUBLE CLEANOUT
WCO	CLEANOUT IN WALL
	CAP
	STRAINER
	UNION
	SHOCK ARRESTOR
	PRESSURE GAUGE
	DIRECTION OF SLOPE W/ INCHES/FT DROP
	FLOOR SINK (1/2 GRATE & FULL GRATE)
	AUTO. SPRINKLER VALVE ASSEMBLY - WET SYSTEM
	AUTO. SPRINKLER VALVE ASSEMBLY - DRY SYSTEM
	FIRE DEPARTMENT CONNECTION
	PIPING DOWN
	PIPING UP

SINGLE LINE	DOUBLE LINE	DESCRIPTION
		90 DEGREE ROUND DUCT DOWN
		90 DEGREE ROUND DUCT UP
		ROUND RADIUS ELBOW
		SIZE OR SHAPE TRANSITION
		FLEXIBLE DUCT TAP
		90 DEGREE S/A ELBOW DOWN
		90 DEGREE S/A ELBOW UP
		90 DEGREE OR RADUIS RETURN AIR OR EXHAUST ELBOW DOWN
		90 DEGREE OR RADIUS RETURN AIR OR EXHAUST ELBOW UP
		SUPPLY DUCT RISER
		RETURN OR EXHAUST DUCT RISER
		DUCT RISER MAKE-UP AIR
		RECTANGULAR RADIUS ELBOW
		RECTANGULAR ELBOW WITH TURNING VANES
		BRANCH TAKE-OFF WITH ADJUSTABLE VANED EXTRACTOR
		TEE WITH SQUARE ELBOWS, TURNING VANES & SPLITTER DAMPER
		LINED DUCTWORK (OR AS SPECIFIED)
		SIDEWALL SUPPLY GRILLE OR REGISTER WITH AIR EXTRACTOR
		EXISTING DUCTWORK TO REMAIN
		EXISTING DUCTWORK TO BE REMOVED
		NEW DUCTWORK
		S/A GRILLE OR REGISTER
		R/A / EXH. GRILLE OR REGISTER
		VOLUME DAMPER
SD	SD	SMOKE DAMPER
FD	FD	FIRE DAMPER
F/S	F/S	FIRE / SMOKE DAMPER
M	M	MOTORIZED DAMPER
T	T	THERMOSTAT
H	H	HUMIDISTAT
RS	RS	REMOTE SENSOR
TS	TS	TEMPERATURE SENSOR
HT	HT	HUMIDITY TRANSMITTER
S-1 400	S-1 400	DIFFUSER/REGISTER/GRILL DESIGNATION CFM
DEF-	DEF-	DRYER EXHAUST FAN.

01 SYMBOLS LEGEND-MEP
SCALE: N.T.S

24 HOUR FITNESS

9026 SIENNA CROSSING DR.
MISSOURI CITY, TX 77459

sma + architects
115 west main street
allen, texas 75013
tele 972 / 359-8788
fax 972 / 359-1706

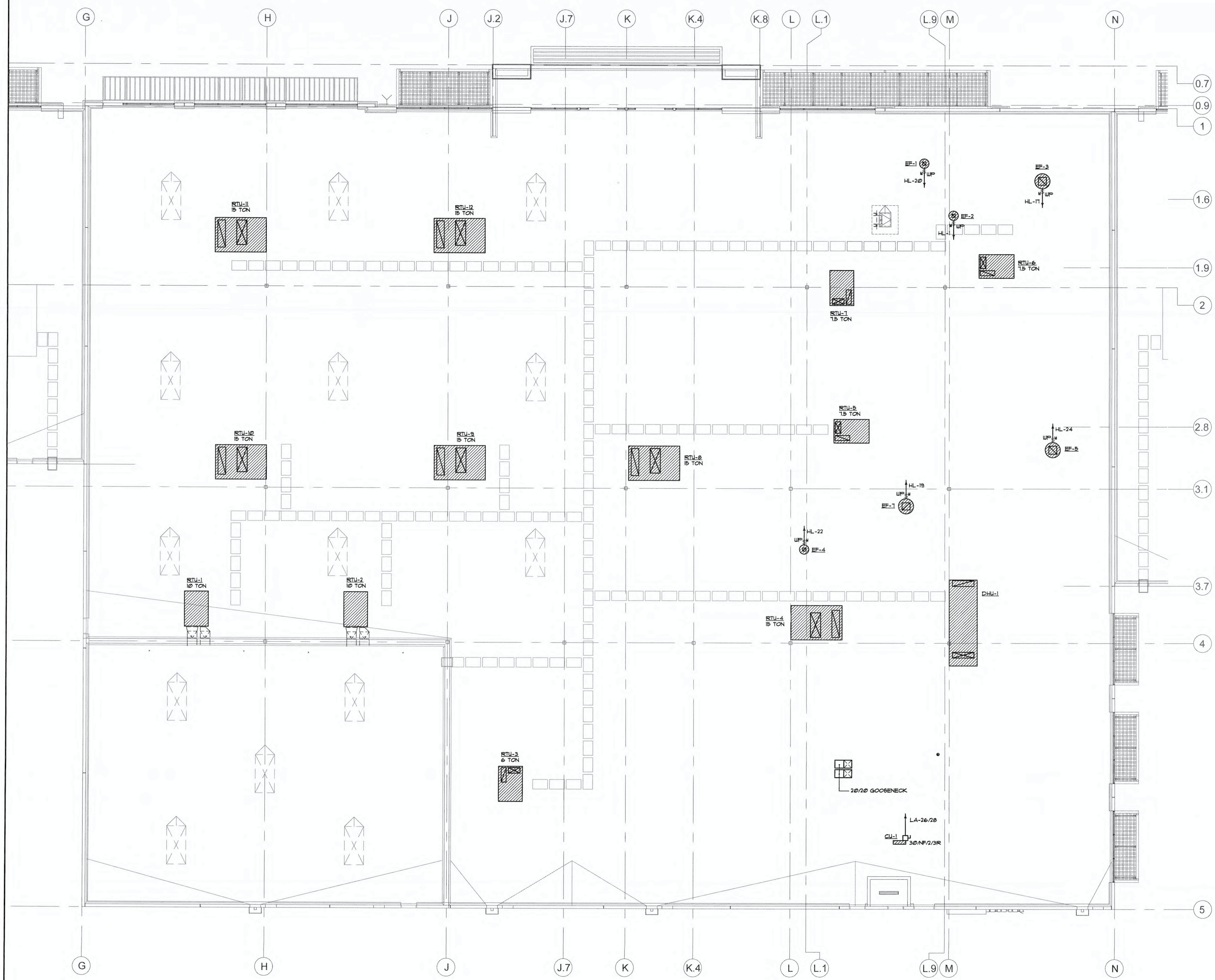
STATE OF TEXAS
S. BASHARKHAH
53894
LICENSED
PROFESSIONAL ENGINEER
6/27/19

bei
1 BASHARKHAH
2 ENGINEERING
3 INCORPORATED
Texas Registered Engineering Firm F-1026
13101 Preston Road
Suite 601
Dallas, Texas 75240
(214) 659-9000
BEI Job # 18195

ISSUE DATES
6-28-19

TITLE
SYMBOL LEGEND - MEP

MEP1.1



NOTE BY SYMBOL "○"

1. ELECTRICAL CONTRACTOR SHALL PROVIDE A DEDICATED 3/4" CONDUIT PENETRATION TO EACH RTU FOR CONTROL WIRING.

01 ROOF PLAN - MEP

SCALE: N.T.S

24 HOUR FITNESS

9026 SIENNA CROSSING DR.
MISSOURI CITY, TX 77459

sma + architects

115 west main street
allen, texas 75013

tele 972 / 359-8788
fax 972 / 359-1706

STATE OF TEXAS
B. BASHARKHAH
63894
LICENSED
PROFESSIONAL ENGINEER
6/27/19

bei
1 BASHARKHAH
2 ENGINEERING
3 INCORPORATED
Texas Registered Engineering Firm F-1026
13101 Preston Road Suite 601
Dallas, Texas 75240
(214) 659-9000
BEI Job # 18195

ISSUE DATES

6-28-19

TITLE

ROOF PLAN - MEP

MEP1.3

COMcheck Software Version 4.1.1.0
Interior Lighting Compliance Certificate

Project Information

Energy Code: 2015 IECC
Project Title: 24HR Fitness - Missouri City, TX
Project Type: Alteration

Construction Site:
9026 Sienna Crossing Dr.
Missouri City, TX 77459

Owner/Agent:
24HR Fitness

Designer/Contractor:
BEI
13101 Preston Road
Dallas, TX 75240

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts (B X C)
1-Work out (Exercise Center)	35399	0.84	29735
		Total Allowed Watts =	29735

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
Work out (Exercise Center 35399 sq ft)				
LED 1: AB: Other:	1	12	179	2148
LED 2: AG: Other:	1	56	131	7336
LED 3: B1: Other:	1	18	97	1746
LED 3 copy 1: B2: Other:	1	5	74	370
LED 5: G: Other:	1	10	15	150
Incandescent 1: H: Incandescent 100W:	1	6	100	600
LED 6: H2: Other:	1	19	15	285
Track lighting 1: SP1: Wattage based on circuit breaker capacity (20 amps x 120 volts)	0	0	2400	2400
Linear Fluorescent 1: M: 48" T8 32W: Electronic:	2	17	64	1088
Linear Fluorescent 2: Ma: 48" T8 32W: Electronic:	4	4	128	512
Linear Fluorescent 3: N: 48" T8 32W: Electronic:	2	5	64	320
LED 7: O: LED Other Fixture Unit 60W:	1	10	25	250
LED 9: Q2: Other:	1	123	26	3198
LED 10: T: Other:	1	20	16	320
		Total Proposed Watts =		20723

Interior Lighting PASSES

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2015 IECC requirements in COMcheck Version 4.1.1.0 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Ken Stovall - Electrical Designer — Ken Stovall — 6-27-2019
Name - Title — Signature — Date

Project Title: 24HR Fitness - Missouri City, TX
Data filename: F:\18\18195\Energy\24HR Fitness Missouri City Comcheck.cck
Report date: 06/27/19
Page 2 of 6

COMcheck Software Version 4.1.1.0
Mechanical Compliance Certificate

Project Information

Energy Code: 2015 IECC
Project Title: 24HR Fitness - Missouri City, TX
Location: Missouri City, Texas
Climate Zone: 2a
Project Type: Alteration

Construction Site:
9026 Sienna Crossing Dr.
Missouri City, TX 77459

Owner/Agent:
24HR Fitness

Designer/Contractor:
BEI
13101 Preston Road
Dallas, TX 75240

Mechanical Systems List

Quantity	System Type & Description
2	RTU-1, 2 (Single Zone): Heating: 2 each - Central Furnace, Gas, Capacity = 180 kBtu/h Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE Cooling: 2 each - Single Package DX Unit, Capacity = 120 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 11.50 EER, Required Efficiency: 11.00 EER + 12.6 IEER Fan System: None
1	RTU-3 (Single Zone): Heating: 1 each - Central Furnace, Gas, Capacity = 72 kBtu/h Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE Cooling: 1 each - Single Package DX Unit, Capacity = 72 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 12.00 EER, Required Efficiency: 11.00 EER + 12.6 IEER Fan System: None
6	RTU-4, 8, 9, 10, 11, 12 (Single Zone): Heating: 6 each - Central Furnace, Gas, Capacity = 220 kBtu/h Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE Cooling: 6 each - Single Package DX Unit, Capacity = 180 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 12.00 EER, Required Efficiency: 10.80 EER + 12.2 IEER Fan System: None
3	RTU-5, 6, 7 (Single Zone): Heating: 3 each - Central Furnace, Gas, Capacity = 125 kBtu/h Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et or 78% AFUE Cooling: 3 each - Single Package DX Unit, Capacity = 90 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 12.00 EER, Required Efficiency: 11.00 EER + 12.6 IEER Fan System: None
1	AC-1 (Single Zone): Cooling: 1 each - Split System, Capacity = 18 kBtu/h, Air-Cooled Condenser, No Economizer, Economizer exception: None Proposed Efficiency = 17.00 SEER, Required Efficiency: 13.00 SEER Fan System: None
1	UH-1 (Unknown): Heating: 1 each - Unit Heater, Electric, Capacity = 14 kBtu/h No minimum efficiency requirement applies Fan System: None
1	UH-2 (Unknown): Heating: 1 each - Unit Heater, Electric, Capacity = 34 kBtu/h

Quantity	System Type & Description
	No minimum efficiency requirement applies Fan System: None
2	WH-1: Gas Storage Water Heater, Capacity: 100 gallons, Input Rating: 75 kBtu/h w/ Circulation Pump No minimum efficiency requirement applies
1	EWH-1: Electric Instantaneous Water Heater, Capacity: 0 gallons Proposed Efficiency: 1.00 SL, %/h (if > 12 kW), Required Efficiency: 1.00 SL, %/h (if > 12 kW)
2	Pool Heater - 1, 2: Gas Instantaneous Water Heater, Capacity: 0 gallons, Input Rating: 399 kBtu/h w/ Circulation Pump and Heat Trace Tape Installed Proposed Efficiency: 80.00 % Et, Required Efficiency: 80.00 % Et

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2015 IECC requirements in COMcheck Version 4.1.1.0 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Sasan Davani - Mechanical Designer — Sasan Davani — 06/26/2019
Name - Title — Signature — Date

Project Title: 24HR Fitness - Missouri City, TX
Data filename: F:\18\18195\Energy\24HR Fitness Missouri City Comcheck.cck
Report date: 06/26/19
Page 2 of 17

⊘1 ENERGY CALCULATIONS - MEP
SCALE: N.T.S

Plotted by: Karina Bourdurant
Date/Time Plotted: 6/27/2019 2:49 PM
USER: KBOURDURANT

24 FITNESS
9026 SIENNA CROSSING DR. MISSOURI CITY, TX 77459

sma
+ architects
115 west main street
allen, texas 75013
tele 972 / 359-8788
fax 972 / 359 -1706

STATE OF TEXAS
S. BASHARKHAH
53894
LICENSED
PROFESSIONAL ENGINEER
6/27/19

bei
1 BASHARKHAH
2 ENGINEERING
3 INCORPORATED
Texas Registered Engineering Firm
F-1028
13101 Preston Road
Suite 601
Dallas, Texas 75240
(214) 659-9000
BEI Job # 18195

ISSUE DATES
6-28-19

TITLE
ENERGY CALCULATIONS - MEP

MEP1.4

DIVISION 15 - MECHANICAL

15-01. GENERAL:

1. Furnish all labor, materials, services equipment and appliances required for the complete furnishing and installing of the mechanical systems.

15-02. UTILITIES, LOCATIONS AND ELEVATIONS:

1. Locations and elevations of the various utilities, included within the scope of this contract, have been obtained from utility maps and/or other substantially reliable sources and are offered separate from the Contract Documents as a general guide only, without guarantee as to accuracy. Examine the site and verify the locations and elevations of all utilities relating to this work.

15-03. PERMITS AND APPROVALS:

1. All work done under this contract shall comply with all local and state codes having jurisdiction and with the requirements of the utility companies whose services may be used. All modifications required by these codes shall be made without additional charge. Where code requirements are less than those shown on the plans or in the specifications, the plans and specifications shall be followed. Where applicable, EPA, FDA, USDA, NFPA and Department of Health requirements shall be met.

2. Obtain all permits, inspections and approvals as required by all authorities having jurisdiction. All fees and costs of any nature whatsoever incidental to these permits, inspections and approvals must be assumed and paid for.

15-04. INTENT:

1. It is the intent of the plans and specifications to provide a complete installation which will operate satisfactorily.
Any apparatus, appliance, material, appurtenance or labor that may be necessary to complete the work in accordance with the intent or purpose of these specifications shall be furnished and installed without extra cost, as if mentioned in the specification or shown on the drawings.

15-05. PIPING, VALVES AND ACCESSORIES:

1. Furnish and install, including all labor and material required, the various piping systems as specified, adhering to the general routing and methods of distribution shown on the drawings, including all required pipes, fittings, valves, hangers, sleeves, inserts, other items and appurtenances as may be required for the satisfactory operation of the various systems.

2. All exposed pipes passing through floors, ceilings, or walls in finished occupied areas shall be provided with nickel or chrome-plated floor and ceiling escutcheon plates of approved pattern.

3. Access doors shall be furnished and installed where valves are concealed. Doors shall be at least 12" by 12" in size, and shall be Milcor doors made by Inland Steel. Bilco, or Babcock-Davis.
Type M doors shall be used in gypsum drywall, ceramic tile and masonry surfaces. All doors shall have Screwdriver operated cam locks. Must be painted to match adj finish.

4. Individual hangers for overhead piping shall generally have adjustable swivel pipe rings with suspended rods of ample strength, Grinnell No. 107 or 104. Such service pipes, as are practical, shall be placed at the same elevation and the various trades shall cooperate with each other and install multiple trapeze hangers wherever possible. "Clevise" type pipe hangers such as Elcen No. 12 will be acceptable. Size and spacing as per Grinnell.

5. Pipe hanger guards shall be provided for all insulated pipe. Hanger guards shall be constructed of No. 16 gauge galvanized sheet steel.

6. PIPE APPLICATIONS AND MATERIAL

A. Domestic Water Underground piping Exterior and Under Slab: Type K, ASTM B88, Soft Copper annealed temper. No lead solder.

B. Sanitary Waste and Vent within Building: Cast Iron ASTM A74 soil pipe.

C. Gas Pipe: Schedule 40 ASTM A53 black.

D. Condensate Drain: Type "M" ASTM B306 Copper.

E. Exterior Sanitary Sewer and overflow: Schedule 40 ASTM-D2665- 73 PVC.

7. PIPE MATERIALS

A. Copper Pipe: Type K, and L, and M Copper pipe shall be manufactured in accordance with ASTM B88.

B. Cast Iron Soil Pipe:

a. Cast Iron Soil pipe shall be service weight cast soft pipe ASTM-A-74 with neoprene gasket compression joints.
b. "No Hub" neoprene sleeve and stainless steel band and clamp type joints will be allowed for above slabs only.

8. Exterior sanitary sewer piping beyond 5'-0" of building, Schedule 40 PVC Drainage Pipe: Drainage piping shall be poly-vinyl chloride drainage waste and vent piping ASTM-D-2665-73. Sanitary drainage pattern fitting shall be used throughout. Install in complete accordance with IAMPOIS 9-75.

9. Drainage Piping: Copper drainage pipe shall be Type DWV copper drainage tubing, ASTM-B-306 with cast bronze solder joint DWV fittings, Drainage pattern ANSI-B-16.23. Solder material 50-50 tin lead ASTM-b-32.

10. Carbon Steel:

a. Steel pipe shall be black conforming to ASTM-A-120, a-135, or A-53, Grade B, 3/4" - 1 1/2" Type F and 2" - 24" type E or S, or hot dipped Galvanized as indicated. Size 2" and smaller shall be threaded and joined with 150 pound malleable iron fittings conforming to ASTM A-47. Pipe shall be joined by using standard weight, factory fabricated fittings and weld on 2 1/2" and larger pipe. Galvanized stell pipe shall be joined by couplings. Welding and threading shall not be used to join galvanized pipe.

11. Weatherproofing: The annular space between a pipe and its sleeve in exterior walls or through floor to below grade shall be filled and made watertight with a permanent elastic compound. Seal surfaces of wall or floor.

12. Natural gas piping shall be schedule 40 black steel pipe with screwed malleable fittings. Piping 3" and above shall be welded.

15-06. FIRE PROTECTION:

1. Furnish and install all labor, materials, equipment, tools and services and perform all operations required in connection with or properly incidental to the design and construction of a complete fire protection sprinkler system that meets NFPA 13 and building insurance carriers requirements.
2. Drawings: The fire protection contractor shall be responsible for obtaining and submitting all necessary documents, specifications and drawings to all approving agencies and authorities having jurisdiction.
3. Acceptable Manufacturers: All materials, equipment, and accessories used in a fire protection system shall be labeled and listed in the Fire Protection List as published by U.L. Inc. and/or in the Approval Guide as published by Factory Mutual Engineering and Research Corporation.
4. Piping: All piping and sprinklers shall meet usage and code approval including check valves, alarm valves, mechanical alarms, electrical alarms, test points, fire department connections, exterior hydrants, and water gong. The fire protection contractor is responsible for coordinating all riser, piping, and automatic sprinkler locations with other drawings and trades.
Particular attention is to be paid to ductwork, domestic piping, and lighting locations.
Relocation and repairs caused by the lack of coordination and communication shall be the responsibility of and paid by the fire protection contractor. The piping shall be laid-out as close to the bottom of the main structure as possible.
It will be designed using the hydraulically design method.
Sprinkler piping should be located so as to minimize the possibility of damage due to impact, etc.

15-07. INSULATION:
General: All duct insulations R value shall be as noted.
1. All surfaces to be insulated shall be clean and dry before applying the insulation. All sections of molded pipe covering shall be firmly butted together. Where coverings are used, they shall lap the adjoining section of insulation by at least 3".
Where insulation terminates, it shall be neatly beveled and finished.
No insulation shall be applied until the pipe, duct, etc., has been pressure tested and found tight.
piping flexible connections, flanges, and unions shall not be covered. Flexible connections on duct shall not be covered.
All materials shall be fire retardant or nonflammable.
2. Where vapor barriers are required, the vapor barrier shall be on the outside. Extreme care shall be taken so vapor barrier is unbroken. All joints shall be sealed. Where insulation whith a vapor barrier terminates, it shall be sealed off with the vapor barrier being continuous to the surface being insulated. Ends shall not be left raw.
3. Where hangers or supports are on the outside of the insulation as specified under the Pipe Hangers section, use a section of foam glass insulation at hanger or support locations and
4. Where hangers or supports are on the outside of the insulation as specified under the Pipe Hangers section, use a section of foam glass insulation at hanger or support locations and provide No. 16 gauge galvanized steel sleeves to protect the insulation. Sleeves shall be half cylinders with edges hemmed to prevent cutting the insulation.
5. All materials used shall have a flame spread rating of not more than 25 without evidence of continuous progressive combustion, and with a smoke developed rating not higher than 50.
Shop drawing submittals shall show this information.
6. Do not insulate any nameplate, stamps, etc. Carefully bevel insulation around nameplates, stamps, etc.
7. Provide 1" Acoustical Lining 15 Feet Downstream from discharge Of all A/C Unit and 15 Feet Upstream from intake of all A/C units.
8. All Concealed round and rectangular supply and return air ductwork Shall be insulated with Minimum 1", 1½# approved foil face duct wrap to include ceiling diffuser cans. Minimum R=4 installed.
9. All exposed supply and return air ductwork shall be insulated with Minimum 1", 3# approved duct liner. Minimum R-5 installed.
10. All Exposed to Weather supply and return air ductwork Shall be Sealed with hardcast compound on all joints and seams to perfectly prevent air and water leaks. All Exposed to weather ductwork shall have 1½" interior lining and in addition, shall be externally insulated with 2" of external insulation. The insulation shall be encased with air and water tight jacket to prevent weather damage. All ducts and Plenums exposed to weather shall have proper slop to prevent water accumulation on top. Minimum R=8 installed.
11. All Accotherm and Fiberglass insulation shall be furnished with service jackets.
12. All cold water (city water) and hot water shall be furnished with 1" thick Accotherm or 1/2" thick three-pound fiberglass.
13. All refrigeration piping shall be insulated with Minimum 1" approved Armaflex with weatherproof Aluminum Jacket.
14. All A.C. condensate drain piping and other drain lines subject to condensation shall be insulated with Armaflex insulation 1/2" thick. Cover fittings and valve bodies with cut or mitered sections of the pipe insulation.

15-08. SANITARY WASTE AND VENT SYSTEM:

1. All sanitary drainage lines (soil, waste, and vent) shall be ATSM A-74 service weight cast iron soil pipe and fittings, coated inside and out. Joints shall be fabricated by the use of dry oakum packing, forced into the annular space, and then the joint shall be filled with ingot lead, poured in, with one pound of lead used for each 1" diameter of pipe. The joint shall then be well caulked and the lead shall be one inch minimum depth and brought to the top of the joint and faced. Compression type joints similar to Tyler acceptable if approved by Plumbing Inspector. "No-Hub" piping shall be limited to above ground installations. P.V.C. pipe shall be used if allowed by local governing authorities.

2. Vents shall be extended at least 15" above roof and then properly flashed with 4 pound lead with the base extending at least 10" in every direction from the stack. The vertical portion of the flashing shall extend upward the entire length of the vent pipe and shall be turned down inside the pipe at least 2" to provide a weather-tight joint. Furnish flashings to Roofing Contractor for installation.

3. Floor drains and floor sinks shall be as scheduled. Cast iron drain with Nikaloy top, flashing clamp and deep seal P-trap.

4. Clean-outs shall be provided in waste lines at each change in direction, at the bottom of each stack, at the end of each branch in horizontal runs at intervals not exceeding 50 feet in lines within building and intervals not exceeding 100 feet outside the building. The sizes of clean-outs shall be identical with the size of waste line in which they are placed, but no larger than 4" clean-outs shall be required. Clean-outs shall be easily accessible, identifiable and located in closets or other unfinished areas when possible.
Exact location of each shall be approved by the Architect before installation. All clean-out threads shall be lubricated with "Key-grease" for easy removal.

5. The building main shall have a double clean-out within 5 feet of the building. Outside clean-outs shall be encased in 14" by 14" by 6" concrete pads. Outside cleanouts not subject to traffic shall be equal to Josam 58490.

6. Wall clean-outs shall have bronze recessed plug equal to Josam 58550 and polished stainless steel cover equal to Josam 58600.

7. Floor clean-outs in finished areas shall have square satin Nikaloy tops with scoriated surface equal to Josam 56030.
Floor clean-outs in unfinished areas and in sidewalks shall have round satin Nikaloy tops with scoriated surface equal to Josam 58400.
Floor clean-outs in wheel traffic areas shall have heavy-duty access frame with ductile iron top equal to 58860-5.

15-09. PLUMBING FIXTURES AND EQUIPMENT:

PLUMBING FIXTURES

1. Furnish and install all labor, materials equipment, tools and services and perform all operations required in connection with or properly incidental to the installation of complete plumbing fixtures and plumbing equipments, as indicated on drawings, reasonably implied therefrom, or as specified herein, unless specifically excluded.

2. Plumbing fixtures shall be supplied, set and connected as listed herein and as shown on drawings. Fixtures shall be protected from damage during construction, and shall be listed herein and as shown on drawings. Fixtures shall be protected from damage during construction, and shall be thoroughly cleaned of all tape and adhesives prior to final acceptance.

3. Commercial Water Heaters shall be equal to model, capacity, and all other requirements as indicated on drawings. 94% thermally efficeint, factory assembled and wired, gas fired, vertical storage, 150 psi working pressure. Glass lined welded steel tank. Automatic immersion water thermostat; externally adjustable temperature range 60 to 180 degrees F, flanged or screw-in nichrome elements, high temperature limit thermostat. Brass water connections and dip tube, drain valve, high-density magnesium anode, and ASME rated temperature and pressure relief valve.

15.10 ROOF TOP UNITS (GAS HEAT)

1.02 Quality Assurance

A. Unit shall be rated in accordance with ARI Standards 210/240 or 360 and 270.

B. Unit shall be designed to conform to the latest version of ASHRAE15 and in accordance with UL 1995.

C. Unit shall be UL tested and certified in accordance with ANSI-Z21.47 Standard and UL listed & certified under Canadian Standards as a total package for safety requirements.

D. Roof curb shall be designed to conform to NRCA Standards.

E. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

F. Unit casing shall be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 500-hour salt spray test.

G. Each Carrier 48HC unit is subjected to a completely automated run testing on the assembly line. Each unit contains a factory-supplied printout indicating tested pressures, amperages, data and inspectors, providing certification of the unit status at the time of manufacture.

2.02 Carrier Air Conditioning Equipment

A. Unit Cabinet:
1. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a baked enamel finish on all externally exposed surfaces, and have primer coated interior panels.

2. Evaporator fan cabinet interior shall be insulated with a minimum 1/2" thick flexible fiberglass insulation coated on the airside. Aluminium foil faced fiberglass insulation shall be used in the heating compartment.
3. Carrier 48HC (3 to 10 Ton) cabinet panels shall be easily removable for servicing.
Carrier 48HC (10 Ton and larger) cabinet panels shall be hinged with tool less entry.

4. Holes shall be provided in the base rails for rigging shackles to facilitate overhead rigging, and forklift slots shall be provided to facilitate maneuvering.
5. Unit shall have a factory installed, sloped condensate drain pan made of a noncorrosive material, providing a minimum 1/2 " connection with both vertical and horizontal drains and shall comply with ASHRAE 62.
6. Unit shall have factory installed filter access panel to provide filter access with tool less removal.
7. Unit shall have standard thru-the-bottom power connection capability.

B. Fans:
1. Carrier 48HC (3 to 10 ton) indoor blower (evaporator fan) motor shall be of the belt driven, double inlet, forward curved centrifugal type. Belt drive shall include an adjustable pitch motor pulley. Indoor blower (evaporator fan) motor shall be made from steel with a corrosion resistant finish and shall be dynamically balanced. Bearings shall be of the sealed, permanently lubricated, ball bearing type for longer life and lower maintenance.
2. Carrier 48HC (10 ton and larger) supply air blower shall have ball bearings with an adjustable belt drive.

Blower assembly shall slide out of unit for servicing.
3. Condenser fan shall be of the direct driven propeller type and shall discharge air vertically upward.
4. Condenser fan shall have aluminum blades riveted to corrosion resistant steel spiders and shall be dynamically balanced.
5. Condenser fan motor shall be totally enclosed.
6. Induced draft blower shall be of the direct driven, single inlet, forward curved, centrifugal type. It shall be made from steel with a corrosion resistant finish, and shall be dynamically balanced.
7. All blower and exhaust motors to be enclosed type for Pool/Spa Area ventilators and air conditioning units.

C. Compressor(s):
1. Fully hermetic scroll type and internally protected.
2. Units 15, 18, and 20 tons in size shall have three (3) scroll compressors on independent circuits for low load control.
3. Units 7.5, 10, and 12 tons in size shall have two (2) scroll compressors on independent circuits.
4. Factory rubber shock mounted and internally spring mounted for vibration isolation.

D. Coils:
1. Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to enhanced copper tubes with all joints brazed.
2. Tube sheet openings shall be belled to prevent tube wear.
3. Evaporator coil shall be of the full-face active design.
4. All outdoor units within coastal or high corrosion areas (0-15 miles from the coast) shall have copper/copper condenser coils.

E. Heating Section:
1. Induced draft combustion type with energy saving direct spark ignition system, redundant main gas valve, and two-stage heat.
2. The heat exchanger shall be of the tubular section type constructed of a minimum of 20 gauge steel coated with a nominal 12 mil aluminum-silicone alloy for corrosion resistance and shall have a 10 year warranty.
3. Burners shall be of the in shot type constructed of aluminum coated steel.
4. All gas piping shall enter the unit cabinet at a single location.
5. The Integrated Gas unit Control (IGC) board shall provide timed control of evaporator fan functioning and burner ignition. An LED (Light-Emitting Di-ode) shall provide diagnostic information. The LED shall be visible without removing the control box access panel.
6. IGC board contains anti-cycle protection for gas heat operation (after 4 continuous cycles on high temperature limit switch and one cycle on the flame rollout switch).

F. Refrigerant Components:
1. Carrier 48HC (3 to 10 ton) units include Acutrol TM feed system.
2. Carrier 48HC (10 ton and larger) units include thermostatic expansion valves.
3. Refrigerant strainer.
4. Service gage connections on suction, discharge, and liquid lines.
5. Filter drier.

G. Filter Section:
1. Standard filter section to consist of 2" flat filters.
2. Filter face velocity shall not exceed 300 fpm at nominal airflows.
3. Filter section shall use only one size filter.
4. Filters shall be accessible through an access panel with tool-less removal.

H. Controls and Safeties:
1. Unit Controls: Unit shall be complete with self-contained low voltage control circuit protected by a fuse on the 24V transformer side.
2. Control Panels: Do not locate in the Operation Manager's Office.
3. Carrier 48HC units (3 to 10 ton):
a. Unit shall incorporate a solid state compressor protector that provides anti cycle reset capability at the space thermostat should any of the following standard safety devices trip and shut off compressor:
1) Compressor overtemperature, over current
2) Loss of charge protection/low-pressure switch
3) Freeze protection thermostat on evaporator coil
4) High pressure switch with lockout protection that shall be easily disconnected at the control board, if necessary
b. Heating section shall be provided with the following minimum protections:
1) High temperature limit switch
2) Induced draft motor speed sensor
3) Flame rollout switch
4) Flame proving controls
4. Carrier 48HC (10 ton and larger) units:
a. Unit shall incorporate a solid sate compressor lockout which provides optional reset capability at the space thermostat should any of the following devices trip and shut off compressor:
1) Compressor lockout protection for internal/external overload
2) Loss of charge protection/low-pressure switch
3) Freeze protection thermostat on evaporator coil
4) High pressure switch or internal compressor reverse rotation protection
5) Low pressure switch
b. Heating section shall be provided with the following minimum protections:
1) High temperature limit switch
2) Induced draft motor speed sensor
3) Flame rollout switch
4) Flame proving switch
5) Redundant gas valve
c. Scrolling marquee display shall be configurable for use in 4 languages (English, French, Spanish, Portuguese)
d. Network capable
e. Unit control with standard suction pressure transducers and condensing temperature thermostats.
f. Shall provide a 5 F temperature difference between cooling and heating set points to meet ASHRAE 90/1
g. Shall provide and display a current alarm list and an alarm history list
h. Compressor redundancy
i. Configurable alarm light shall be provided which activate when certain types of alarms occur
j. Compressor minimum run time (3 minutes) and minimum off time (5 minutes) are provided
k. Service diagnostic mode
l. Economizer enthalpy control shall be field installed
m. Multiple capacity stages
n. Unit shall be complete with self contained low voltage control circuit
o. Supply air sensor shall be located in the unit and detect both heating and cooling operation

I. Operating Characteristics:
1. Unit shall be capable of starting and running at 125 F ambient outdoor temperature, meeting maximum load criteria of ARI Standard 210/240 or 360 at +/- 10% voltage.
2. Compressor with standard controls on Carrier 48HC (3 to 10 ton) units shall be capable of operation down to 25 F ambient outdoor temperature. Compressor with standard controls on Carrier 48HC (10 ton and larger) units shall be capable of operation down to 40 F ambient outdoor temperature. Units 15, 18, and 20 tons in size shall have three (3) scroll compressors on independent circuits for 33% loading.

J. Electrical Requirements:
1. All unit power wiring shall enter unit cabinet at a single factory predrilled location.

K. Motors:
1. Compressor motors shall be cooled by refrigerant passing through motor windings and shall have line break thermal and current overload protection.
2. Indoor blower (evaporator fan) motor shall have permanently lubricated bearings and inherent automatic reset thermal overload protection.
3. Totally enclosed condenser fan motor shall have permanently lubricated bearings and inherent automatic reset thermal overload protection.
4. Induced draft motor shall have permanently lubricated, sealed bearings and inherent automatic reset thermal overload protection.
5. All indoor fan motors 5 hp and larger shall meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT) effective October 24, 1997.

L. Special Features:
1. Roof Curbs:
a. Roof curbs shall be 14" high standard flat curbs or adjustable pitch curbs (when required) and field installed by mechanical contractor. Refer to schedule for any other sizes.
2. Integrated Economizers:
a. Integrated integral modulating type capable of simultaneous economizer and compressor operation.
b. Includes all hardware and controls to provide cooling with outdoor air.
c. Equipped with low leakage dampers not to exceed 3% leakage, at 1" wg pressure differential (variable sliding economizer).
d. Capable of introducing up to 100% outdoor air for minimum ventilation as well as free cooling.
e. Equipped with a gravity relief sliding plate damper (variable sliding economizer). Damper shall close upon unit shutoff.
f. All units be equipped with a barometric relief damper.

g. Outdoor Air dampers shall be normally closed, electrically opened with spring returns to reduce freeze potential in a device or power failure.

M. Acceptable Manufacturers:

equipment for a 24 Hour Fitness facility they should contact Deborah Roy-Jones at Carrier National Accounts.

Corporation and no equals are acceptable.
3. A specification note should be include into the mechanical footnotes reading:
24 Hour Fitness has an exclusive usage agreement with Carrier

development program. For information on these products call Deborah Roy-Jones (800) 690-1086.

15-11. EXHAUST FANS:

Approved Manufacturer are Cook, Greenheck, and ACME.

1. Furnish and install all exhaust fans with supports, counter flashings, louvers, back draft dampers, bird screens, disconnects and accessories.
2. General: Provide fans that are factory fabricated and assembled, factory tested, and factory finished with indicated capacities and characteristics.
3. Fans and Shafts: Statically and dynamically balanced and designed for continuous operation at the maximum rated fan speed and motor horsepower.
4. Fan Shaft: Turned, ground, and polished steel designed to operate at no more than 70 percent of the first critical speed at the top of the speed range of the fan's class.
5. Belt Drives: Factory mounted, with final alignment and belt adjustment made after installation.
A. Service Factor: 1.4.
6. Belts: Oil-resistant, non-sparking, and non-static.
7. Motors and Fan Wheel Pulleys: Adjustable pitch for use with motors through 15 HP; fixed pitch for use with motors larger than 15 HP. Select pulley so that pitch adjustment is at the middle of the adjustment range at fan design conditions.
8. Belt Guards: Provide steel belt guards for motors mounted on the outside of the fan cabinet. Complying with OSHA and other governing authorities.
9. Shaft Bearings: Provide type indicated, having a median life "Rating Life" (AFBMA L(50)) of 200,000, calculated in accordance with AFBMA Standard 9 for ball bearings and AFBMA Standard 11 for roller bearings.
10. Factory Finish: The following finishes are required:
11. Sheet Metal Parts: Prime coating prior to final assembly.
12. Exterior Surfaces: Baked-enamel finish coat after assembly. Final finish as directed by architect.

(FOR MEP SPECIFICATIONS CONTINUATION REFER TO MEP1.6)

01 SPECIFICATIONS - MEP
SCALE: N.T.S

24 HOUR FITNESS

9026 SIENNA CROSSING DR.
MISSOURI CITY, TX 77459

sma + architects
115 west main street
allen, texas 75013
tele 972 / 359-8788
fax 972 / 359-1706

STATE OF TEXAS
S. BASHARKHAH
53894
LICENSED PROFESSIONAL ENGINEER
6/27/19

bei
1 BASHARKHAH
2 ENGINEERING
3 INCORPORATED
Texas Registered Engineering Firm F-1026
13101 Preston Road Suite 601
Dallas, Texas 75240
(214) 659-9000
BEI Job # 18195

ISSUE DATES
6-28-19

TITLE
SPECIFICATIONS - MEP

MEP1.5

01 SPECIFICATIONS - MEP

SCALE: N.T.S

DIVISION 15 - MECHANICAL CONTINUED

15-12. AIR OUTLETS:

Approved Manufacturer is TITUS.

1. Furnish and install all diffusers, grilles, outside louvers, diffuser boots and roof hoods.
2. Provide grilles, registers and diffusers as indicated on drawings and herein specified. All units shall be constructed to have a neat, well-made appearance. Grille framework shall be rigidly constructed, flange corners shall be mitered and supported for hairline crack. All face bars shall be heavy gauge metal to adequately resist bending or twisting and fit tightly and closely within the framework. The units shall have a neck to slip inside ductwork for an airtight noise-less condition. Units not meeting the above specifications shall be rejected at the job site.
3. The manufacturer furnishing the grilles, registers and diffusers shall verify sizes against CFM requirements for each outlet to get the intended throw without objectionable noise when outlet is applied to the system. Coordination shall be made to any approved differences from the drawings with the Contractor. It shall be the Contractor's responsibility to furnish proper framework, boots and install devices approved.

15-13. SHEET METAL WORK AND ACCESSORIES:

1. Contractor shall submit a complete duct layout with sizes, type of duct and grille locations for approval by Architect before installation.
2. All sheetmetal shown on drawings, specified or required for heating, ventilating, and air conditioning systems shall be constructed and erected in a first-class, workmanlike manner. The work shall be guaranteed for a period of one year from and after the date of acceptance of the job against noise, chatter, whistling or vibration, and shall be free from pulsation under all operating conditions. Should these defects occur after the system is in operation, they shall either be removed and replaced, or reinforced as directed by the Architect. Sizes shown on plans are inside dimensions (inside duct liners where used) unless otherwise indicated.
3. All ducts shall be erected in the general locations shown on drawings, but must conform to all structural and finish conditions of the building. Before fabricating any ductwork, contractor shall check the physical conditions at any jobsite and shall make necessary changes in cross sections, offsets, etc., whether specifically indicated or not. Because of space requirements of Owner's equipment, contractor shall verify space allocated to ductwork.
4. All holes in ducts for damper rods and other necessary devices shall be either drilled or machine punched (not pin punched), and shall not be any larger than necessary. All duct openings shall be provided with sheet metal caps if openings are to be left unconnected for any length of time. All panels of factory uninsulated ducts 12" and larger shall be cross broken. In general, sheet metal screws shall not be used in duct construction unless the head (not the point) of screw is in the air steam. Transformations shall have a ratio of not more than 1" in transformation to each 7" of length.
5. Air Conditioning supply and return air Ductwork should be constructed of new galvanized prime grade steel and sealed per SMACNA requirements and local codes.
6. All Exhaust air ducts in wet areas should be Aluminum constructed and installed in accordance with SMACNA and local codes. All Joints shall be sealed water tight with hardcast or equal.
7. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
8. Galvanized Sheet Steel:Comply with ASTM A 653/A 653M.
   A. Galvanized Coating Designation: G60 (Z180).
   B. Finishes for surface exposed to view: Hot dipped galvanized steel. No painting.

15-14. TESTING, BALANCING, AND STERILIZATION:

1. Water systems shall be properly tested to a hydrostatic pressure of 150 psi for a period of not less than 8 hours.
2. Sanitary sewer shall have all outlets temporarily plugged. Pipes shall be filled with water testing the system with no less than 10 feet of head water.
3. Heating, Ventilating and Air conditioning systems shall be operated separately or in conjunction with each other to demonstrate the ability of the equipment to perform. Systems shall be properly balanced by an approved balancing contractor.
4. After completion of the testing, the entire water piping systems with attached equipment shall be thoroughly sterilized with a solution containing not less than 50 parts per million of available chlorine. This will include both existing and new systems.

DIVISION 16 - ELECTRICAL

16-01. GENERAL:

A. The work covered by this section of these specifications shall be performed in accordance with the respective drawings, information, or instructions to bidders and the general conditions of these specifications. Any supplementary conditions or directives which may be issued by the Owner or Architect, herewith, or otherwise shall be complied with in every respect.

B. The listing herein of an article or material, operation or method, requires that the contractor shall furnish and install each item listed, unless specified or noted to the contrary. The contractor shall furnish labor, materials, tools, equipment and related items required for complete installation of electrical systems, as indicated by the Contract Documents.

C. Examine the site and verify the locations and elevations of all utilities relating to this work.

16-02. SCOPE:

A. Drawings accompanying these specifications show extent of work to be performed. Contractor shall comply with every evident intent of these documents in every respect.

B. Examine Architects drawings and specifications for fixtures and finishes in connection with this work, determine general construction conditions and be familiar with all limitations caused by such conditions. Exact location and arrangement of parts shall be determined after equipment has been approved by Architect, as the work progresses, to conform in the best possible manner with surroundings, and as directed by Architect.

C. All work shall be performed with the highest quality of workmanship by skilled electricians and personnel. All work shall be installed per manufacturers suggested manner for a piece of equipment or per an acceptable practice current in the trade. No work shall be deemed satisfactory unless approved and accepted by the Architect and Owner.

16-03. CODES:

A. Meet the requirements of the Americans with disabilities ACI (ADA) National Fire Prevention Association (NFPA), and the latest edition of National Electrical Code (NEC), local and state and national codes having jurisdiction. Codes and ordinances having jurisdiction over work shall be absolute minimum requirements. Should there be any conflicts between Contract Documents and codes or ordinances having jurisdiction, report these immediately to the Architect.

16-04. SUBMITTALS:

A. Contractor shall submit for approval data on all equipment to be installed. Contractor shall not install any equipment until approval has been granted by the Architect, Engineer and Owner.

16-05. PRODUCTS:

A. Products, materials and equipment shall meet requirements of Contract Documents, shall be free from defects, shall conform to published construction standards, and shall be UL listed and labeled where such requirements exist for a product.

B. Quality basis shall be interpreted to include material, workmanship, weight, finish, gauges of material, appearances, capacity and performance. Contractor shall be responsible to make all necessary adjustments in the work which may be affected as a result of an approved substitution at no additional cost to the owner.

16-06.INSPECTION OF SITE:

A. It shall be the responsibility of the Contractor to visit the site before submitting proposals and familiarize himself with site conditions. All proposals shall preclude that Contractor is familiar with job conditions and utility locations and the lack of specific information on the drawings shall not relieve the Contractor of any responsibility.

16-07. FEES AND PERMITS:

A. This Contractor shall secure and pay for all fees and permits which are required for the work under this section of the specifications. Permit fee must be paid at the time of the permit document submittal.

16-08. EQUIPMENT IDENTIFICATIONS

A. Identify major equipment with name plates constructed from laminated phenolic engraved plastic labels. Attach labels to equipment by a permanent method. Complete identification cards in all panels and similar equipment on a typewriter in a neat manner.

B. Label all conductors at all locations throughout the system with appropriate wire markers. Label all junctions and outlets with permanent markings for future identification.

16-09. RACEWAYS AND FITTINGS:

A. Rigid Metal Conduit: Use hot-dipped galvanized rigid steel conduit and fittings conforming to UL 6 and NEC 346. Use threaded fittings.

B. Electrical Metallic Tubing (EMT): Use galvanized electrical metallic tubing conforming to UL 797 and NEC 348. Use compression type fittings. Connectors shall have insulated throat.

C. All conduit which is run in finished areas of the building shall be concealed. In unfinished areas, the conduit shall be run concealed where construction permits, otherwise it may be run exposed. All exposed conduit shall be run perpendicular to building lines, strapped tight to deck, and left in a ready to paint condition.

D. Minimum diameter of 3/4" conduit permitted.

16-10. WIRE AND CABLE:

A. All conductors shall be copper. Insulation shall be color coded throughout. Wire sizes #8 and larger shall be stranded with type THHN/THWN insulation. Branch circuit wiring shall be type THHN/THWN per Article 310 of NEC as allowed by local governing authorities.

B. All wiring shall be run in conduit and strapped tight to deck. NO EXCEPTIONS.

C. <u>MC CABLE NOT PERMITTED UNLESS SPECIFICALLY NOTED OTHERWISE.</u>

16-11. PULL AND JUNCTION BOXES:

A. Use pull and junction boxes that comply with NEC 370 as to size and construction. Install boxes in accessible locations.

16-12. OUTLET BOXES:

A. All outlet boxes shall be boxes that comply with NEC 370 as to size and construction. For lighting fixture outlets use 4" x 1 1/2" deep octagonal boxes. For flush outlet boxes 4x4 box with single faceplate receptacles and switches, use 2" x 4" x 1 1/2" deep boxes to suit particular devices.

B. This contractor shall carefully check the architectural building plans and coordinate exact locations of all outlets before installation.

16-13. WIRING DEVICES:

A. Wall Switches: Use UL listed 20-amp 120 volt by Leviton Decora series or equal unless scheduled on drawings or as directed by architect.

B. Receptacles: Use UL listed receptacles to match style of switches. Use GFI or isolated ground receptacle where indicated.

C. Device and plate color shall be 302 stainless steel. Confirm final selection with Architect.

D. After devices are installed and energized, test each receptacle for proper wiring and grounding.

16-14. PANEL BOARDS:

A. Panel boards shall consist of a box, front, interior and circuit protective devices as scheduled on the drawings. Panel boards shall bear UL label.

B. Bussing shall be aluminum arranged for sequence phasing. Voltage rating, phase, number of wires and ampere rating shall be as shown on the plans. Panel boards shall be Cutler Hammer or equal.

C. Panels shall be fully rated. Series rated panels not acceptable.

D. All panel schedules shall be typed.

16-15. FUSES:

A. Fuses shall be installed in all switches as scheduled or as required. Fuses shall be Class L time delay Bussman KRP-C or equal for 601 amps and larger and Bussmann LPN-R or equal for fuses 600 amp and smaller.

16-16. GROUNDING:

A. All electrical equipment installed on this project shall be properly grounded in strict accordance with Article 250 of the National Electrical Code. All grounding connections shall be by means of solderless high-pressure connectors.

16-17. LIGHTING FIXTURES:

A. Furnish and install a light fixture or fixtures, as designated, on each and every outlet as shown on the drawings. It shall be the Contractors responsibility to check and coordinate the architectural finishes and to purchase lighting fixtures with the proper trim, supports, etc., as required. Provide lamps for all fixtures as scheduled. At completion of project, Contractor shall clean and adjust all fixtures and replace damaged parts and test fixtures.

B. Fixtures shall be as indicated on the Lighting plans and install as shown on the RCP.

B. Electrical contractor shall provide extensions for lights and ceiling fans to allow fixtures to hang at elevations shown on MEP and/or Architectural drawings.

16-18. TESTS:

A. Before final acceptance of the job, the Contractor shall test all circuits for proper wiring. All loads shall be properly balanced on the phases of the systems. Contractor shall repair or replace any and all defective or faulty wiring.

16-19. TELEPHONE/DATA SYSTEM ROUGH-IN:

A. Furnish and install telephone outlets, conduits and telephone service as indicated on the drawings and as required by owner.

16-20. FIRE ALARM SYSTEM

A. Furnish and install all devices and components required to meet TAS, ADA and local codes. Device color as selected by Architect. Fire alarm shall be designed, furnished and install by a licensed fire alarm contractor with approved drawings by the fire marshal.

16-21. GUARANTEE:

A. Contractor shall guarantee all materials and workmanship for a period of one (1) year from the date of acceptance of the work. During this period, all parts found to be defective shall be replaced without costs to the owner.

24 HOUR FITNESS

9026 SIENNA CROSSING DR.
MISSOURI CITY, TX 77459

sma + architects

115 west main street
allen, texas 75013

tele 972 / 359-8788
fax 972 / 359 -1706

S. BASHARKHAH
53894
LICENSED PROFESSIONAL ENGINEER
6/27/19

bei
1 BASHARKHAH
2 ENGINEERING
3 INCORPORATED
Texas Registered Engineering Firm F-1026
13101 Preston Road
Suite 601
Dallas, Texas 75240
(214) 659-9000
BEI Job # 18195

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SPECIFICATIONS - MEP

MEP1.6