

GENERAL NOTES

- THE DRAWINGS SHOW THE GENERAL ARRANGEMENT AND LOCATION OF EQUIPMENT, DUCTWORK, PIPING, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE MECHANICAL INSTALLATION W/ THE STRUCTURE AND OTHER TRADES AND SHALL PROVIDE ADDITIONAL OFFSETS AND FITTINGS AS NECESSARY.
- COORDINATE WORK WITH AUTHORITY HAVING JURISDICTION AND OBTAIN ALL PERMITS AND INSPECTIONS.
- THE HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS SHALL COMPLY WITH THE 2012 EDITION OF THE INTERNATIONAL MECHANICAL CODE, NFPA 90A, AND LOCAL CODE OFFICIAL REQUIREMENTS. IN THE EVENT OF A CONFLICT BETWEEN CODES, THE MOST STRINGENT SHALL ALWAYS GOVERN.
- DUCT DIMENSIONS ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
- THE CONTRACTOR SHALL CHECK AND VERIFY ALL CLEARANCES PRIOR TO FABRICATION OR INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING SYSTEMS. WHERE CONDITIONS REQUIRE A CHANGE IN DUCT OR PIPE ROUTING, NOTIFY THE COR FOR AN ACCEPTABLE ALTERNATIVE METHOD. AVOID ROUTING DUCTWORK DIRECTLY OVER LIGHT FIXTURES, DIFFUSERS, AND OTHER CEILING MTD. DEVICES. LOCATE ALL MECHANICAL EQUIPMENT SO THAT FILTERS AND COMPONENTS REQUIRING ACCESS (SERVICE AND MAINTENANCE) ARE FULLY ACCESSIBLE.
- PROVIDE CURVED RADIUS ELBOW AT FIRST SUPPLY & RETURN FITTING FOR ALL HVAC UNITS. PROVIDE TURNING VANES IN ALL 90 DEGREE ELBOWS IN ALL RECTANGULAR SUPPLY/RETURN/EXHAUST DUCT SYSTEMS. ANY OFFSETS REQUIRED IN DUCT SYSTEMS SHALL BE INSTALLED PER SMACNA STANDARDS. SHARP ANGLED TRANSITIONS OR OFFSETS WILL NOT BE ALLOWED. PROVIDE DUCT ACCESS DOORS AT LOCATIONS SPECIFIED.
- INSTALL ALL DUCT MOUNTED DEVICES (DAMPERS, ACCESS DOORS, ETC.) AND PIPING SPECIALTIES IN EASILY ACCESSIBLE LOCATIONS. ADVISE THE COR IN ADVANCE OF INSTALLATION IF ACCESS WILL BE HINDERED SO AN ALTERNATE LOCATION CAN BE SELECTED.
- ALL DUCT TAKE-OFFS SHALL BE INSTALLED AS SHOWN BY DETAILS ON THE PLANS WITH A MANUAL BALANCE DAMPER AT EVERY TAKE-OFF. WHERE DUCT RUN-OUT SIZE IS NOT SHOWN PROVIDE DUCT SAME SIZE AS GRILLE NECK SIZE. PRE-INSULATED FLEXIBLE DUCT MAY BE USED FOR FINAL CONNECTION TO SUPPLY/RETURN GRILLES (MAX. LENGTH 5')
- ALL ROTATING MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH VIBRATION ISOLATION. PROVIDE FLEXIBLE NEOPRENE DUCT CONNECTORS BETWEEN DUCTWORK AND ISOLATED MECHANICAL EQUIPMENT.
- THE CONTRACTOR SHALL FIRESTOP ALL PENETRATIONS OF FIRE RATED WALLS/FLOORS/CEILINGS BY DUCTWORK, PIPING, ETC., WITH U.L. LISTED FIRE STOPPING MATERIAL TO MAINTAIN FIRE RATING OF THE BARRIER.
- SEISMIC PROTECTION OF EQUIPMENT, DUCTWORK, PIPING AND UTILITIES SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 16 OF THE 2012 EDITION OF THE INTERNATIONAL BUILDING CODE. ALL SEISMIC RESTRAINT AND BRACING SHALL BE SUBSTANTIATED BY MANUFACTURER'S SUBMITTALS PER THE SPECIFICATIONS.
- BALANCE ALL AIR DISTRIBUTION DEVICES, EXHAUST FANS, AND OUTSIDE AIR QUANTITIES AS SCHEDULED OR SHOWN ON THE DRAWINGS. PROVIDE MARKERS AT ALL DAMPER LOCATIONS SHOWING FULL OPEN/CLOSED POSITIONS AND DAMPER SETTING FOR REQUIRED AIRFLOW. PROVIDE FINAL TEST AND BALANCE REPORT ALONG W/ SCHEMATIC DRAWINGS SHOWING DIFFUSER LOCATION W/ DESIGN AND ACTUAL CFM. THE DIFFUSER TAGS ON THE DRAWINGS SHALL CORRESPOND TO THE DIFFUSER TAGS ON THE REPORT. THIS REPORT SHALL BE SUBMITTED BEFORE THE FINAL INSPECTION IS PERFORMED. SEE THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

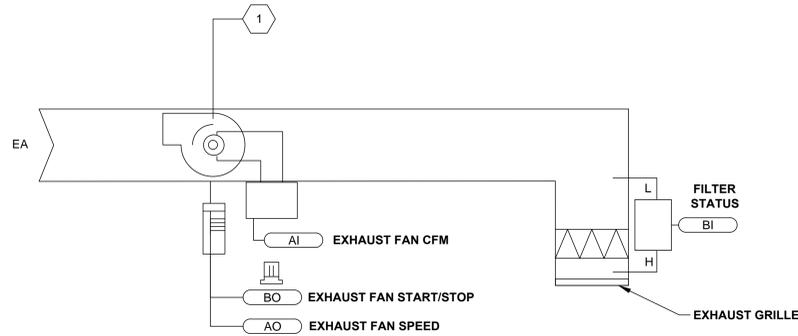
MECHANICAL LEGEND

- AHU AIR HANDLING UNIT
- ACCU AIR COOLED CONDENSING UNIT
- EF EXHAUST FAN
- EXF EXFILTRATION
- FD FLOOR DRAIN
- INF INFILTRATION
- OA OUTSIDE AIR
- SA SUPPLY FAN
- TYP. TYPICAL
- XA EXHAUST AIR
- ① NOTE NUMBER (SEE SCHEDULE)
- T THERMOSTAT, "1" INDICATES DEVICE CONTROLLED
- CO CARBON MONOXIDE SENSOR
- CO2 CARBON DIOXIDE SENSOR
- ⊠ LAMINAR FLOW DIFFUSER, DIRECTION OF FLOW AS INDICATED
- ⊠ DIFFUSER, DIRECTION OF FLOW AS INDICATED
- ⊠ EXHAUST AIR OUTLET
- FD FIRE DAMPER
- SD SMOKE DETECTOR
- C CONDENSATE
- MANUAL DAMPER
- NEW CONNECTION SYMBOL
- STEAM STEAM LINE

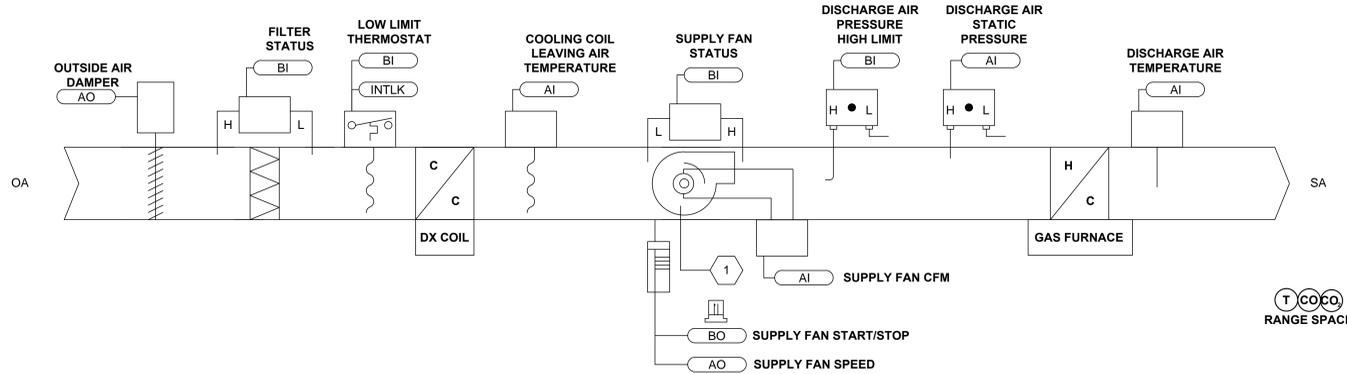
three eighths inch = one foot
 one and one half inches = one foot
 one inch = one foot
 three eighths inch = one foot
 one half inch = one foot
 three eighths inch = one foot
 one half inch = one foot
 three eighths inch = one foot
 one quarter inch = one foot
 one eighth inch = one foot

CONSTRUCTION DOCUMENTS UNSPRINKLERED

Revisions: _____ Date _____	CONSULTANTS: _____ _____		ARCHITECT/ENGINEERS:  BES DESIGN/BUILD, LLC 766 Middle St, Fairhope, AL 36532 Phone: 251.990.5778 Fax: 251.990.3716	Drawing Title MECHANICAL LEGENDS, GENERAL NOTES, AND ABBREVIATIONS Approved: Project Director	Project Title LETC FIRING RANGE SITE ADAPTATION Location NORTH LITTLE ROCK, ARKANSAS	Project Number 598-12-207 Building Number 195 Drawing Number MH001 Dwg. 39 of 58	CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM 
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3 EXHAUST FAN CONTROL DIAGRAM
NTS



2 AIR HANDLING UNIT-CONTROL DIAGRAM
NTS

CONTROL NOTE:
1 DDC CONTROL PANEL - INTERLOCK SPEEDS OF VFDS ON AHU & EF FANS, TIE SYSTEM INTO EMCS ARCHITECTURE UPSTREAM.

ABBREVIATIONS:
AI ANALOG INPUT
AO ANALOG OUTPUT
BI BINARY INPUT
BO BINARY OUTPUT

SEQUENCE OF OPERATIONS

NORMAL OPERATIONS:

EXHAUST FAN EF-3: FAN SHALL OPERATE CONTINUOUSLY TO MAINTAIN A CONSTANT AIR EXHAUST FLOW RATE OF 1200 CFM. THE VFD CONTROLLER ON THE DIRECT DRIVE SHALL MODULATE TO OVERCOME STATIC PRESSURE DROP ACROSS THE FILTER. AN INTERLOCK SHALL SIGNAL AHU SUPPLY FAN AHU-SF-1 TO PROVIDE MAKE UP AIR AT A CONTINUOUS RATE OF 1800 CFM TO MAINTAIN SPACE PRESSURIZATION. FAN OPERATION STATUS, SPEED, AND CFM SHALL BE COMMUNICATED BACK TO THE EMCS.

EXHAUST FANS EF-1 & EF-2: FANS SHALL OPERATE CONTINUOUSLY TO MAINTAIN A MINIMUM AIR EXHAUST FLOW RATE OF 500 CFM. THE VFD CONTROLLER ON THE DIRECT DRIVE SHALL MODULATE TO OVERCOME STATIC PRESSURE DROP ACROSS THE FILTER. FAN OPERATION STATUS, SPEED AND CFM SHALL BE COMMUNICATED BACK TO THE EMCS.

EXHAUST FAN FILTER STATUS: SHOULD ANY OF THE EXHAUST FAN FILTERS DIFFERENTIAL PRESSURE SENSOR MONITORS REACH A VALUE OF 1" H₂O, AN ALARM STATUS SIGNAL SHALL BE COMMUNICATED BACK TO THE EMCS.

SPACE AIR TEMPERATURE - HEATING: SHOULD ANY SPACE AIR TEMPERATURE SENSOR DROP BELOW 60 DEGREES F, THE SENSOR SHALL SIGNAL THE DUCT FURNACE TO OPERATE AND PROVIDE SUPPLY AIR TEMPERATURE AT 80 DEGREES FAHRENHEIT. THE DUCT FURNACE SHALL CONTINUE TO OPERATE UNTIL ALL SPACE TEMPERATURE SENSORS HAVE MET A MINIMUM OF 68 DEGREES F AT WHICH POINT THE DUCT FURNACE WILL TURN OFF. DUCT FURNACE OPERATION STATUS SHALL BE COMMUNICATED BACK TO THE EMCS.

SPACE AIR TEMPERATURE - COOLING: SHOULD ANY SPACE AIR TEMPERATURE SENSOR RISE ABOVE 80 DEGREES F, THE SENSOR SHALL SIGNAL THE COOLING COIL TO OPERATE AND PROVIDE SUPPLY AIR TEMPERATURE AT 60 DEGREES FAHRENHEIT. THE COOLING SHALL CONTINUE TO OPERATE UNTIL ALL SPACE TEMPERATURE SENSORS HAVE MET A MAXIMUM OF 72 DEGREES F AT WHICH POINT THE COOLING COIL WILL TURN OFF. COOLING COIL OPERATION STATUS SHALL BE COMMUNICATED BACK TO THE EMCS.

AIR HANDLING UNIT SUPPLY FAN AHU-SF-1: THE SUPPLY FAN PURPOSE IS TO PROVIDE MAKE-UP AIR TO MAINTAIN PRESSURIZATION THROUGHOUT THE FACILITY. OPERATION SHALL BE CONTROLLED PRIMARILY THROUGH INTERLOCK SIGNALS SENT FROM THE EXHAUST FANS. THE VFD SHALL MODULATE THE SPEED BASED ON THE MAKE-UP CFM REQUIRED FOR THE EXHAUST FANS PLUS OVERCOMING THE PRESSURE DROPS ACROSS THE UNITS FILTER, COOLING COIL AND GAS FURNACE IN ORDER TO MAINTAIN THE REQUIRED MAKE-UP AIR CFM. FAN STATUS, SPEED AND CFM SHALL BE COMMUNICATED BACK TO THE EMCS.

DUCT FURNACE: THE DUCT FURNACE PURPOSE IS TO PROVIDE HEATING OF THE SUPPLY AIR TO THE SPACE. THE FURNACE SHALL NOT TURN ON UNTIL FAN STATUS PROVES OPERATIONAL AND WILL MODULATE GAS FLOW RATE BASED ON SUPPLY AIR FLOW TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 80 DEGREES F.

D/X COOLING COIL: THE D/X COOLING COIL PURPOSE IS TO PROVIDE COOLING AND DEHUMIDIFICATION OF THE SUPPLY AIR TO THE SPACE. THE COOLING COIL SHALL NOT TURN ON UNTIL FAN STATUS PROVES OPERATIONAL AND WILL MODULATE REFRIGERANT FLOW RATE BASED ON SUPPLY AIR FLOW TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 60 DEGREES F. SHOULD THE HUMIDISTAT IN THE AIR HANDLING UNIT SENSE RELATIVE HUMIDITY ABOVE 55%, UPON PROOF OF FAN OPERATION STATUS, THE COOLING COIL SHALL TURN ON AND RUN CONTINUOUSLY UNTIL THE RELATIVE HUMIDITY REACHES 50%. THE COIL THEN SHALL TURN OFF. COOLING COIL OPERATION STATUS SHALL BE COMMUNICATED BACK TO THE EMCS.

OUTSIDE AIR DAMPER: THE OUTSIDE AIR DAMPER POSITION SHALL MODULATE BASED ON SYSTEM REQUIRED AIR FLOW.

AHU-1 FILTER STATUS: SHOULD THE FAN FILTERS DIFFERENTIAL PRESSURE SENSOR MONITORS REACH A VALUE OF 0.75" H₂O, AN ALARM STATUS SIGNAL SHALL BE COMMUNICATED BACK TO THE EMCS.

SMOKE DETECTOR: UPON DETECTION OF SMOKE IN SUPPLY DUCT, SUPPLY FAN SHALL COMPLETELY SHUT DOWN AND EXHAUST FAN SHALL CONTINUE TO RUN.

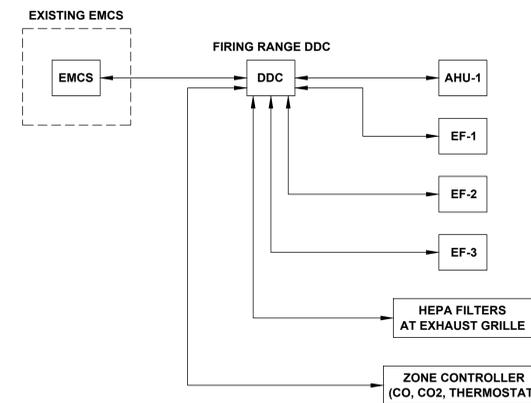
TRAINING OPERATIONS:

MINIMUM SETPOINT SWITCH: A MINIMUM SETPOINT SWITCH HAS BEEN STRATEGICALLY LOCATED THROUGHOUT THE RANGE SPACE. DURING ITS USE, THIS MANUAL SWITCH SHALL BE ACTUATED PRIOR TO USING THE RANGE. THE SWITCH WILL SIGNAL EXHAUST FANS EF-1 AND EF-2 TO OPERATE AT 750 CFM EACH. THE SUPPLY FAN AHU-SF-1 WILL FOLLOW SUIT AS DESCRIBED ABOVE.

CARBON MONOXIDE SENSORS: CARBON MONOXIDE (CO) SENSORS HAVE BEEN STRATEGICALLY LOCATED THROUGHOUT THE RANGE SPACE. SHOULD ANY OF THE CO SENSORS SENSE ROOM AIR CONTAMINATION LEVELS AT 20 PPM, A SIGNAL SHALL BE SENT TO EXHAUST FANS EF-1 AND EF-2 TO SLOWLY INCREASE THE AIR FLOW CFM RATES UNTIL ALL SENSORS HAVE BEEN SATISFIED AT CONTAMINATION LEVELS LESS THAN 10 PPM. THE SUPPLY FAN AHU-SF-1 WILL FOLLOW SUIT AS DESCRIBED ABOVE.

CARBON DIOXIDE SENSORS: CARBON DIOXIDE (CO₂) SENSORS HAVE BEEN STRATEGICALLY LOCATED THROUGHOUT THE RANGE SPACE. SHOULD ANY OF THE CO₂ SENSORS SENSE ROOM AIR CONTAMINATION LEVELS AT 700 PPM, A SIGNAL SHALL BE SENT TO EXHAUST FANS EF-1 AND EF-2 TO SLOWLY INCREASE THE AIR FLOW CFM RATES UNTIL ALL SENSORS HAVE BEEN SATISFIED AT CONTAMINATION LEVELS LESS THAN 500 PPM. THE SUPPLY FAN AHU-SF-1 WILL FOLLOW SUIT AS DESCRIBED ABOVE.

AIR HANDLER UNIT & EXHAUST FAN		POINT LEGEND		SYSTEM OUTPUTS		SYSTEM INPUTS		SYSTEM SOFTWARE / CONTROL		REMARKS
SYSTEM COMPONENT	POINT ID	ABBREVIATIONS	PRIORITY/ADD-ALTERNATE NO.	BINARY	ANA-LOG	BINARY	ANALOG	ALARM PROCESSING	APPLICATION / FUNCTION	
COOLING COIL TEMPERATURE	AI-6	CCT								
DISCHARGE AIR TEMPERATURE	AI-7	DAT								
DISCHARGE STATIC PRESSURE	AI-8	DASP								
DISCHARGE AIR HUMIDITY	AI-9	DAH								
SUPPLY AIR FLOW (CFM)	AI-10	SAF								
EXHAUST AIR FLOW (CFM)	AI-11	EAF								
EXHAUST AIR FILTER STATUS	AI-12	EAF-ST5								
OUTSIDE AIR FILTER STATUS	AI-13	OAF-ST5								
SUPPLY FAN STATUS	BI-3	SF-ST5								
STATIC PRESSURE HIGH LIMIT	BI-5	SPS-2								
HUMIDITY HIGH LIMIT	BI-6	HHL								
SUPPLY FAN VSMC ALARM	BI-7	SF-ALA								
EXHAUST FAN VSMC ALARM	BI-8	EF-ALA								
EXHAUST FAN VSMC	AO-1	EF-SPD								FULL COMMUNICATION
SUPPLY FAN VSMC	AO-2	SF-SPD								FULL COMMUNICATION
OUTSIDE AIR DAMPER	AO-3	OAD								
MINIMUM OUTSIDE AIR DAMPER	AO-7	MIN-OAD								
SUPPLY FAN START / STOP	BO-2	SF-SST								
EXHAUST FAN START / STOP	BO-3	EF-SST								



1 EMCS SYSTEM ARCHITECTURE
NTS

**CONSTRUCTION DOCUMENTS
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