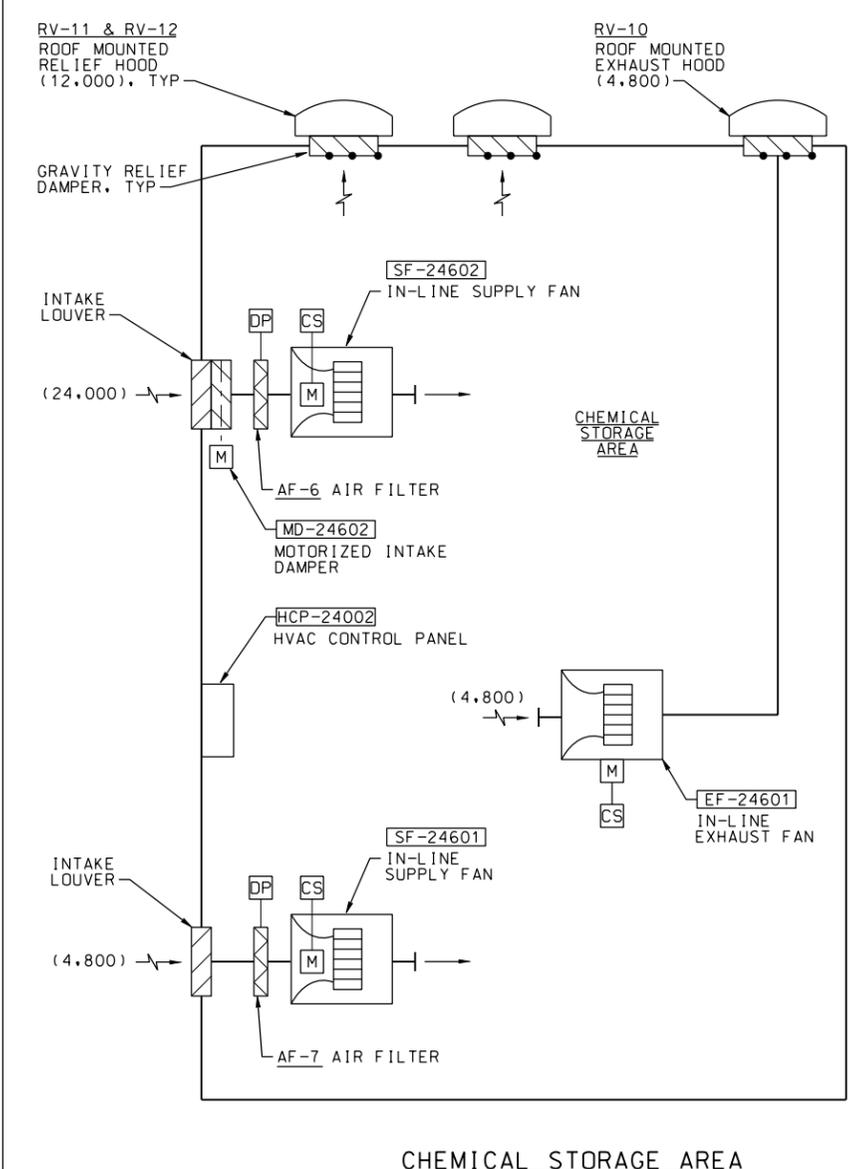
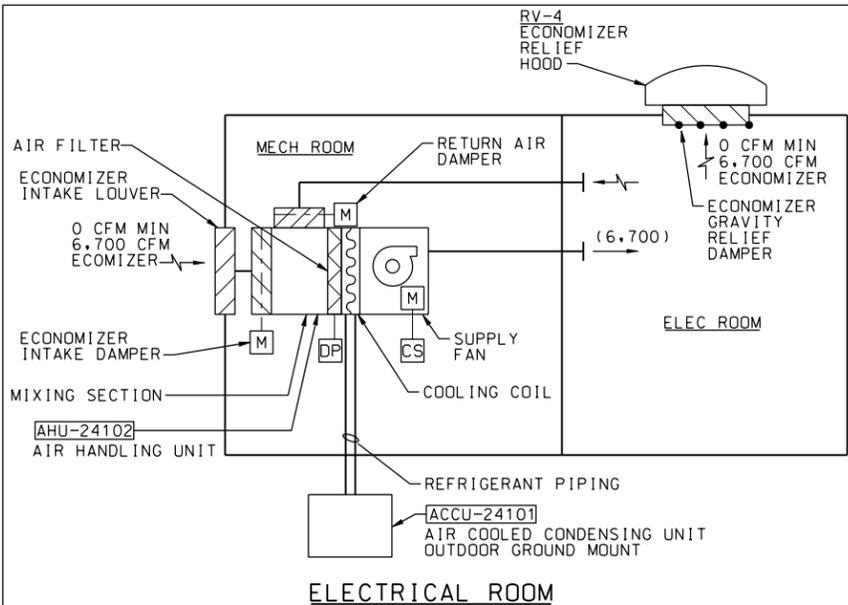


PLOT DATE: 2/19/2010 PLOT TIME: 11:04:50 AM

NDM-SCO-EMWD USACE PERRIS II: PDF.m601d.dgn



AIR FLOW CONTROL DIAGRAMS
NTS

**SEQUENCE OF OPERATION
OPERATIONS BUILDING - CHEMICAL STORAGE AREA
HVAC CONTROL PANEL**

HCP-24002

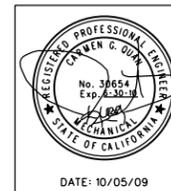
- HCP-24002 SHALL BE DDC (DIRECT DIGITAL CONTROL).
- LOCATE HCP-24002 IN CHEMICAL STORAGE ROOM #1.
- THE FOLLOWING EQUIPMENT IS SERVED BY THIS HCP:
 - ♦ SF-24601, EF-24601, SF-24602, AND RELATED MOTORIZED DAMPERS.
- PROVIDE A MANUAL ON/OFF/AUTO SWITCH FOR SF-24602.
 - ♦ THE FAN SHALL BE ENABLED TO RUN IN THE ON POSITION.
 - ♦ THE FAN SHALL BE DISABLED IN THE OFF POSITION.
 - ♦ THE FAN SHALL BE CONTROLLED AS SPECIFIED HEREIN WHEN IN THE AUTO POSITION.
- PROVIDE MANUAL ON/OFF SWITCHES FOR SF-24601 AND EF-24601.
- PROVIDE RED ON INDICATOR LIGHTS FOR SF-24601, EF-24601, AND SF-24602.
- PROVIDE FLASHING AMBER FAN FAILURE ALARM INDICATOR LIGHTS FOR SF-24601, EF-24601, AND SF-24602.
 - ♦ WHEN UNIT FAILURE IS SENSED, THE AMBER ALARM INDICATOR LIGHT FOR THAT UNIT SHALL LIGHT AND THE HCP SHALL SEND AN "HCP-24002 HVAC SYSTEM FAILURE" ALARM SIGNAL TO THE PLANT INSTRUMENTATION AND CONTROL SYSTEM.
 - ♦ WHEN THE PROBLEM IS PROVEN CORRECTED THE ALARM INDICATOR LIGHT SHALL GO OFF.
- PROVIDE FLASHING AMBER FILTER CHANGE INDICATOR LIGHTS FOR DUCT MOUNTED AIR FILTERS AF-6 AND AF-7. MONITOR FILTER PRESSURE DROP FOR EACH FILTER BANK BY MEANS OF DIFFERENTIAL PRESSURE SWITCHES THAT CLOSE ELECTRICAL CONTACTS WHEN FILTER PRESSURE DIFFERENTIAL EXCEEDS THE ADJUSTABLE SET POINT. INITIAL SET POINT SHALL BE 1.00-INCHES WATER GAUGE.
- PROVIDE SINGLE-SPEED VENTILATION COOLING CONTROL FOR SF-24602.
 - ♦ IN THE AUTO POSITION THE FAN SHALL RUN WHEN THE WALL THERMOSTAT CALLS FOR COOLING.
 - ♦ THE FAN SHALL BE OFF WHEN THE THERMOSTAT NO LONGER CALLS FOR COOLING.
 - ♦ THE INITIAL COOLING SET POINT SHALL BE 85 DEG FOR SF-24101 AND 90 DEG FOR SF-24201. THE SET POINT SHALL BE ADJUSTABLE.
- SF-24601 AND EF-24602 SHALL RUN CONTINUOUSLY SUBJECT TO EMERGENCY SHUTDOWN CONTROL.
- PROVIDE EMERGENCY SHUTDOWN CONTROL FOR ALL FAN SYSTEMS CONTROLLED THROUGH HCP-24002. ALL FAN SYSTEMS SHALL SHUTDOWN WHEN THE HCP RECEIVES SIGNAL FROM AN EMERGENCY SHUTDOWN SWITCH LOCATED OUTSIDE OF THE SOUTH DOOR.
- PROVIDE MOTORIZED DAMPER CONTROL FOR MD-24602, INTERLOCKED WITH SF-24602. INTERLOCK THE MOTORIZED DAMPER TO THE FAN TO OPEN WHEN THE FAN IS CALLED TO START, BEFORE THE FAN STARTS, AND TO CLOSE WHEN THE FAN IS OFF.

**SEQUENCE OF OPERATION
OPERATIONS BUILDING - MECHANICAL ROOM
HVAC CONTROL PANEL**

HCP-24001

- HCP-24001 SHALL BE DDC (DIRECT DIGITAL CONTROL).
- LOCATE HCP-24001 IN THE OPERATIONS BUILDING MECHANICAL ROOM.
- THE FOLLOWING EQUIPMENT IS SERVED BY THIS HCP:
 - ♦ AHU-24101, AHU-24102, HTP-24101, ACCU-24101, EF-24101, SF-24301, SF-24302, SF-24401, SF-24402, SF-24501, AND RELATED VARIABLE VOLUME TERMINAL CONTROL UNITS AND MOTORIZED DAMPERS.
- PROVIDE MANUAL ON/OFF/AUTO SWITCHES FOR AHU-24101, AHU-24102, EF-24101, SF-24301, SF-24302, SF-24401, SF-24402, AND SF-24501.
 - ♦ UNIT FAN SHALL BE ENABLED TO RUN AT ITS HIGHEST SPEED IN THE ON POSITION.
 - ♦ THE UNIT FAN AND COOLING AND/OR HEATING SHALL BE DISABLED IN THE OFF POSITION.
 - ♦ THE UNIT FAN, COOLING AND/OR HEATING SHALL BE CONTROLLED AS SPECIFIED HEREIN WHEN IN THE AUTO POSITION.
- PROVIDE RED ON INDICATOR LIGHTS FOR AHU-24101, AHU-24102, EF-24101, SF-24301, SF-24302, SF-24401, SF-24402, AND SF-24501.
- PROVIDE FLASHING AMBER FAN FAILURE ALARM INDICATOR LIGHTS FOR AHU-24101, AHU-24102, EF-24101, SF-24301, SF-24302, SF-24401, SF-24402, AND SF-24501.
 - ♦ WHEN FAN FAILURE IS SENSED, THE AMBER ALARM INDICATOR LIGHT FOR THAT UNIT SHALL LIGHT AND THE HCP SHALL SEND AN "HCP-24001 HVAC SYSTEM FAILURE" ALARM SIGNAL TO THE PLANT INSTRUMENTATION AND CONTROL SYSTEM.
 - ♦ WHEN THE FAN PROBLEM IS PROVEN CORRECTED THE ALARM INDICATOR LIGHT SHALL GO OFF.
- PROVIDE FLASHING AMBER FILTER CHANGE INDICATOR LIGHTS FOR AHU-24101, AHU-24102 AND DUCT MOUNTED AIR FILTERS AF-1, AF-2, AF-3, AF-4, AND AF-5. MONITOR FILTER PRESSURE DROP FOR EACH FILTER BANK BY MEANS OF DIFFERENTIAL PRESSURE SWITCHES THAT CLOSE ELECTRICAL CONTACTS WHEN FILTER PRESSURE DIFFERENTIAL EXCEEDS THE ADJUSTABLE SET POINT. INITIAL SET POINT SHALL BE 1.00-INCHES WATER GAUGE.
- PROVIDE SMOKE DETECTION SHUTOFF CONTROL FOR AHU-24101.
 - ♦ UPON DETECTION OF SMOKE IN THE SUPPLY AIR DUCT SYSTEM, SHUT THE FAN OFF AND SEND AN ALARM SIGNAL TO THE BUILDING FIRE ALARM PANEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE CALIFORNIA MECHANICAL CODE.
 - ♦ PREVENT THE FAN FROM RESTARTING UNTIL THE SMOKE DETECTOR HAS BEEN RESET.
 - ♦ FOLLOWING RESET SIGNAL, PROVIDE ADJUSTABLE TIME DELAY (30 TO 120 SECONDS) BEFORE RESPONDING TO ANOTHER ALARM SIGNAL TO ALLOW SMOKE TO CLEAR.

- PROVIDE SPLIT SYSTEM HEAT PUMP CONTROL FOR HTP-24101, IN CONJUNCTION WITH AHU-24101.
 - ♦ CONTROL COOLING/HEATING AS REQUIRED TO MAINTAIN SUPPLY TEMPERATURE AT SET POINT. INITIAL SET POINT IS 55 DEG.
 - ♦ WHEN THE AIR SUPPLY UNIT ON/OFF/AUTO SWITCH IS IN THE AUTO POSITION THE HEAT PUMP SYSTEM MANUFACTURER'S UNIT MOUNTED CONTROL PANEL SHALL COORDINATE OPERATION OF THE AIR SUPPLY UNIT COOLING/HEATING COIL AND THE OUTDOOR UNIT IN RESPONSE TO THE DUCT TEMPERATURE SENSOR. WHEN THE COMPRESSOR CANNOT PROVIDE ADEQUATE HEAT, ACTIVATE THE SUPPLEMENTAL ELECTRIC RESISTANCE HEATER.
- PROVIDE SPLIT SYSTEM AIR CONDITIONING CONTROL FOR ACCU-24101, IN CONJUNCTION WITH AHU-24102.
 - ♦ CONTROL COOLING AS REQUIRED TO MAINTAIN SUPPLY TEMPERATURE AT SET POINT. INITIAL SET POINT IS 55 DEG.
 - ♦ WHEN THE AIR SUPPLY UNIT ON/OFF/AUTO SWITCH IS IN THE AUTO POSITION THE AIR CONDITIONING SYSTEM MANUFACTURER'S UNIT MOUNTED CONTROL PANEL SHALL COORDINATE OPERATION OF THE AIR SUPPLY UNIT COOLING COIL AND THE OUTDOOR UNIT IN RESPONSE TO THE DUCT TEMPERATURE SENSOR.
- PROVIDE OCCUPIED/UNOCCUPIED SET POINT CONTROL FOR THE AHU-24101 SYSTEM.
 - ♦ PROVIDE PROGRAMMABLE 7-DAY AND HOLIDAY PROGRAMMING FOR ONE OCCUPIED AND ONE UNOCCUPIED TIME RANGE FOR EACH DAY.
 - ♦ FAN SHALL RUN CONTINUOUSLY IN THE OCCUPIED MODE AND INTERMITTENTLY ON DEMAND FOR HEATING OR COOLING IN THE UNOCCUPIED MODE.
 - ♦ UNOCCUPIED COOLING SET POINT SHALL BE INITIALLY SET AT 5 DEGREES F ABOVE OCCUPIED SET POINT AND UNOCCUPIED HEATING SET POINT SHALL BE INITIALLY SET AT 5 DEGREES BELOW OCCUPIED SET POINT.
 - ♦ PROVIDE MOMENTARY CONTACT FOR MANUAL OVERRIDE OF UNOCCUPIED SETBACK AT ROOM TEMPERATURE SENSOR. INITIALLY SET UNOCCUPIED OVERRIDE DURATION FOR 1 HOUR.
- MIXING BOX ECONOMIZER CONTROL FOR AHU-24101 AND 24102.
 - ♦ PROVIDE DRY BULB ECONOMIZER CONTROL.
 - ♦ MODULATE OUTSIDE AIR AND RETURN AIR MOTORIZED DAMPERS TO MAINTAIN DRY BULB MIXED AIR TEMPERATURE OF 55 DEGREES F MINIMUM, FIELD ADJUSTABLE.
 - ♦ THE MIXING BOX DAMPERS SHALL MODULATE IN SEQUENCE WITH MECHANICAL COOLING AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SET POINT.
- PROVIDE VARIABLE AIR VOLUME TERMINAL CONTROL UNIT CONTROL FOR VAV-24101 THROUGH VAV-24107.
 - ♦ COOLING TEMPERATURE CONTROL: MODULATE THE UNIT PRIMARY AIR DAMPER OPEN AS NEEDED FOR COOLING, TO MAINTAIN SPACE COOLING TEMPERATURE SET POINT.
 - ♦ HEATING TEMPERATURE CONTROL: BEFORE HEATING IS INITIATED, THE CONTROLS SHALL ENTER A NO-LOAD BAND AND THE PRIMARY AIR DAMPER SHALL BE SET TO ITS MINIMUM POSITION. THE ELECTRIC HEATING COIL SHALL CYCLE ON AS NEEDED TO MAINTAIN THE SPACE TEMPERATURE SET POINT.
 - ♦ SUPPLY AIR TEMPERATURE CONTROL: MONITOR ROOM AIR TEMPERATURE FROM EACH ZONE. RESET SUPPLY AIR TEMPERATURE TO SATISFY THE ZONE THAT IS FARTHEST FROM SET POINT. RESET SUPPLY AIR TEMPERATURE SO THAT AT LEAST ONE UNIT IS FULL OPEN.
- PROVIDE BYPASS AIR DAMPER CONTROL FOR MD-24101A. THE BYPASS AIR DAMPER SHALL MODULATE TO BYPASS AIR FROM THE SUPPLY AIR DUCT TO THE RETURN AIR DUCT TO MAINTAIN SUPPLY AIR STATIC PRESSURE AND TEMPERATURE.
- PROVIDE EXHAUST FAN CONTROL FOR EF-24101 INTERLOCKED WITH THE AHU-24101 SUPPLY FAN. THE EXHAUST FAN SHALL BE INTERLOCKED TO THE SUPPLY FAN TO OPERATE WHENEVER THE SUPPLY FAN OPERATES.
- PROVIDE SINGLE-SPEED VENTILATION COOLING CONTROL FOR SF-24301, SF-24302, SF-24401, SF-24402, AND SF-24501.
 - ♦ IN THE AUTO POSITION THE FAN SHALL RUN WHEN THE ROOM TEMPERATURE SENSOR CALLS FOR COOLING.
 - ♦ THE FAN SHALL BE OFF WHEN THE TEMPERATURE SENSOR NO LONGER CALLS FOR COOLING.
- PROVIDE LEAD/LAG UNIT CONTROL FOR SF-24301 AND SF-24302, ALSO FOR SF-24401 AND SF-24402.
 - ♦ OPERATE DESIGNATED UNITS IN LEAD/LAG ARRANGEMENT. AUTOMATICALLY ALTERNATE THEIR STATUS ON WEEKLY BASIS.
 - ♦ THE INITIAL COOLING SET POINTS SHALL BE 85 DEG FOR THE LEAD FAN AND 90 DEG FOR THE LAG FAN. THE SET POINTS SHALL BE ADJUSTABLE.
 - ♦ IF EITHER LEAD OR LAG UNIT FAILS TO OPERATE ON COMMAND, LOCK IT OUT, REASSIGN LAG UNIT TO REPLACE IT, AND INITIATE FAN FAILURE ALARM.
- PROVIDE MOTORIZED DAMPER CONTROL FOR MD-24301, MD-24302, MD-24401, MD-24402, AND MD-24501. INTERLOCK THE MOTORIZED DAMPERS TO THE RESPECTIVE FAN TO OPEN WHEN THE FAN IS CALLED TO START, BEFORE THE FAN STARTS, AND TO CLOSE WHEN THE FAN IS OFF.
 - ♦ INTERLOCK MD-24301 WITH SF-24301.
 - ♦ INTERLOCK MD-24302 WITH SF-24302.
 - ♦ INTERLOCK MD-24401 WITH SF-24401.
 - ♦ INTERLOCK MD-24402 WITH SF-24402.
 - ♦ INTERLOCK MD-24501 WITH SF-24501.



DESIGNED BY: K. WELP		DRAWN BY: S. HOSTETLER		CHECKED BY: B. GIFFORD		CADD FILE NAME: PDF.m601d.dgn	
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS		EASTERN MUNICIPAL WATER DISTRICT PERRIS DESALINATION FACILITY PERRIS, CALIFORNIA		OPERATIONS BUILDING CONTROL DIAGRAMS/SEQUENCE OF OPERATION		REVISIONS	
SUBMITTED BY: ART. JUNG, P.E. CHIEF, DESIGN BRANCH		SPEC. NO.: NOT APPLICABLE		L.A. DISTRICT FILE NO. XXX-XXXX		DATE: 10/05/09	