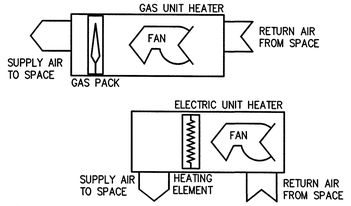


SINGLE-ZONE UNIT HEATERS

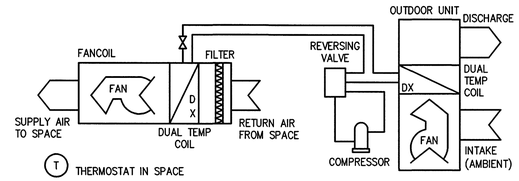
NOT TO SCALE

SINGLE ZONE UNIT HEATER SEQUENCE OF OPERATION:

RUN CONDITIONS:
SYSTEM SHALL RUN ACCORDING TO OCCUPANCY SCHEDULES AND/OR SETPOINTS; BOTH USER-DEFINABLE AT THE THERMOSTAT. INITIALLY PROGRAMMED SETPOINTS SHALL BE 70°F IN OCCUPIED MODE AND 55°F IN UNOCCUPIED MODE.

FAN CONTROL:
THE SUPPLY FAN SHALL CYCLE WITH HEATING LOADS.

HEATING MODE:
UPON A DROP IN SPACE TEMPERATURE BELOW HEATING SETPOINT, THE EQUIPMENT SHALL STAGE OR CYCLE HEATING TO MAINTAIN SETPOINT.



NOTE 1: CONFIGURATION OF FANS, FILTERS, AND COILS MAY VARY BY MANUFACTURER.
NOTE 2: FOR COOLING-ONLY SYSTEMS, REVERSING VALVE IS OMITTED.

SINGLE-ZONE SPLIT SYSTEM HEAT PUMPS

NOT TO SCALE

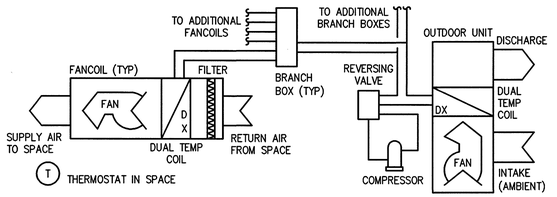
SINGLE ZONE SPLIT SYSTEM HEAT PUMP SEQUENCE OF OPERATION:

RUN CONDITIONS:
SYSTEM SHALL RUN ACCORDING TO OCCUPANCY SCHEDULES AND TEMPORARY SETPOINT OVERRIDES; BOTH USER-DEFINABLE AT THE THERMOSTAT. INITIALLY PROGRAMMED SETPOINTS SHALL BE 75°F IN COOLING, 70°F IN HEATING FOR OCCUPIED MODE AND 80°F IN COOLING, 65°F IN HEATING FOR UNOCCUPIED MODE.

FAN CONTROL:
BOTH THE SUPPLY FAN AND OUTDOOR UNIT FAN SHALL CYCLE WITH HEATING/COOLING LOADS.

COOLING MODE:
UPON A RISE IN SPACE TEMPERATURE ABOVE COOLING SETPOINT, THE EQUIPMENT CONTROLLER SHALL STAGE COOLING TO MAINTAIN SETPOINT TEMPERATURE.

HEATING MODE:
UPON A DROP IN SPACE TEMPERATURE BELOW HEATING SETPOINT, THE EQUIPMENT CONTROLLER SHALL STAGE HEATING TO MAINTAIN SETPOINT TEMPERATURE. (FOR SYSTEMS CAPABLE OF HEATING)



NOTE 1: CONFIGURATION OF FANS, FILTERS, AND COILS MAY VARY BY MANUFACTURER.
NOTE 2: FOR COOLING-ONLY SYSTEMS, REVERSING VALVE IS OMITTED.
NOTE 3: FOR SYSTEMS LESS THAN 4 TONS, BRANCH BOXES ARE OMITTED AND ALL LINES RUN TO OUTDOOR UNIT.

MULTI-ZONE SPLIT SYSTEM HEAT PUMPS

NOT TO SCALE

MULTI-ZONE SPLIT SYSTEM HEAT PUMP SEQUENCE OF OPERATION:

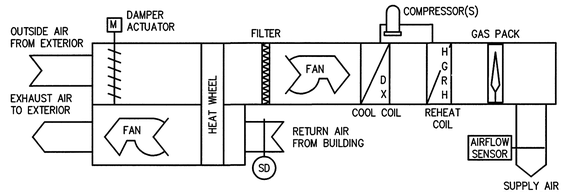
RUN CONDITIONS:
SYSTEMS SHALL RUN ACCORDING TO OCCUPANCY SCHEDULES AND TEMPORARY SETPOINT OVERRIDES; BOTH USER-DEFINABLE AT EACH ZONE LEVEL THERMOSTAT. INITIALLY PROGRAMMED SETPOINTS SHALL BE 75°F IN COOLING, 70°F IN HEATING FOR OCCUPIED MODE AND 80°F IN COOLING, 65°F IN HEATING FOR UNOCCUPIED MODE.

FAN CONTROL:
ZONE LEVEL SUPPLY FANS SHALL CYCLE WITH HEATING/COOLING LOADS. FANS IN ZONES WITH A CALL FOR HEATING SHALL NOT CYCLE ON WHEN SYSTEM IS IN COOLING MODE OR WHEN THERE IS A CALL FOR COOLING WHEN THE SYSTEM IS IN HEATING MODE. OUTDOOR UNIT FAN SHALL CYCLE WITH HEATING/COOLING LOAD.

MODE CONTROL:
EACH SYSTEM SHALL BE CAPABLE OF AUTOMATIC CHANGEOVER BETWEEN HEATING AND COOLING MODES BASED ON NET TOTAL DEMAND FOR COOLING OR HEATING BY ALL CONNECTED ZONES.

COOLING MODE:
UPON A RISE IN SPACE TEMPERATURE ABOVE COOLING SETPOINT, THE EQUIPMENT CONTROLLER SHALL STAGE COOLING TO MAINTAIN SETPOINT TEMPERATURES IN EACH ZONE.

HEATING MODE:
UPON A DROP IN SPACE TEMPERATURE BELOW HEATING SETPOINT, THE EQUIPMENT CONTROLLER SHALL STAGE HEATING TO MAINTAIN SETPOINT TEMPERATURES IN EACH ZONE. (FOR SYSTEMS CAPABLE OF HEATING)



NOTE 1: CONFIGURATION OF FANS, FILTERS, AND COILS MAY VARY BY MANUFACTURER.

PACKAGED DEDICATED OUTSIDE AIR SYSTEMS

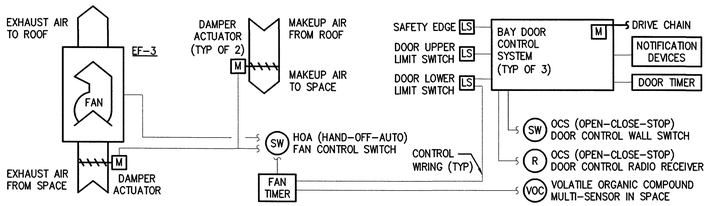
NOT TO SCALE

PACKAGED OUTSIDE AIR UNIT SEQUENCE OF OPERATION:

RUN CONDITIONS:
SYSTEM SHALL RUN CONTINUOUSLY WHEN BUILDING IS OCCUPIED AND DELIVER "NEUTRAL" TEMPERATURE SUPPLY AIR BETWEEN 70°F AND 75°F, THE UNIT SHALL BE CAPABLE OF AUTOMATICALLY SWITCHING BETWEEN COOLING AND HEATING, INCLUDING REHEAT, AS NECESSARY TO MAINTAIN THE STATED SUPPLY AIR CONDITIONS.

FAN CONTROL:
BOTH THE SUPPLY AND EXHAUST FANS SHALL RUN CONTINUOUSLY WHILE UNIT IS IN OPERATION.

MAINTENANCE MODE:
ALL MECHANICAL SYSTEMS (SUCH AS, BUT NOT LIMITED TO, MOTORS AND PUMPS) SHALL BE DE-ENERGIZED AND THE OUTDOOR AIR DAMPERS CLOSED. FUEL GAS REGULATING VALVES SHALL BE SET TO THE CLOSED POSITION.



APPARATUS BAY DOOR AND EXHAUST SYSTEMS

NOT TO SCALE

APPARATUS BAY DOOR AND EXHAUST SEQUENCE OF OPERATION:

RUN CONDITIONS:
SYSTEM SHALL UTILIZE SENSORS, TIMERS, DOOR CONTROLS, AND FAN CONTROLS TO REMOVE VEHICLE EXHAUST AND OTHER CONTAMINANTS FROM THE APPARATUS BAY THROUGH MANUAL AND AUTOMATIC ACTIVATION METHODS, IN ACCORDANCE WITH STATION OPERATIONAL REQUIREMENTS.

DOOR CONTROL:
EACH ONE OF THREE APPARATUS BAY DOORS SHALL BE PROVIDED WITH DOOR CONTROL MOTORS, "OPEN-CLOSE-STOP" TYPE PUSH-BUTTON WALL SWITCHES, RADIO CONTROL SWITCHES, A PROGRAMMABLE TIMER, AND ALL REQUIRED NOTIFICATION DEVICES SUCH AS ALARM BELLS AND/OR STROBE LIGHTS. COORDINATE AND VERIFY NOTIFICATION REQUIREMENTS AND CONTROLS EQUIPMENT COMPATIBILITY WITH OWNER.

WHEN A CALL FOR "OPEN" IS RECEIVED BY THE WALL SWITCH, PULL STATION, OR RADIO CONTROLLER, THE CORRESPONDING DOOR SHALL OPEN AND THE TIMER SHALL BE INITIATED. THE DOOR MOTOR SHALL STOP UPON ACTIVATION OF THE UPPER LIMIT SWITCH. SUBSEQUENT CALLS FOR "OPEN" WHILE THE DOOR IS IN THE OPEN POSITION SHALL RESET THE TIMER COUNTDOWN. COORDINATE TIMER INTERVAL PRESETS WITH OWNER.

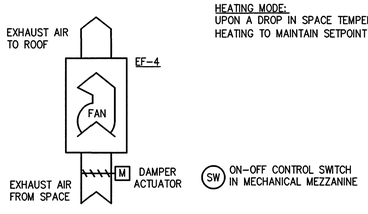
UPON COMPLETION OF THE PROGRAMMED TIME INTERVAL, OR UPON RECEIVING A "CLOSE" SIGNAL, THE DOOR SHALL CLOSE. THE NOTIFICATION DEVICES (BELL AND STROBE) SHALL SOUND AND/OR FLASH CONTINUOUSLY AS THE DOOR IS CLOSING. THE DOOR MOTOR SHALL STOP UPON ACTIVATION OF THE LOWER LIMIT SWITCH. EACH DOOR SHALL ALSO BE PROVIDED WITH AN ELECTRONIC SAFETY EDGE, THE FULL WIDTH OF THE DOOR, WHICH WHEN TRIGGERED WILL REVERSE THE DIRECTION OF THE DOOR (CLOSING TO OPENING) TO PREVENT INJURY TO ANY PERSONS OR COLLISIONS WITH ANY OBJECTS OBSTRUCTING THE PATH OF THE DOOR.

UPON RECEIVING A "STOP" SIGNAL, BOTH THE DOOR AND TIMER SHALL BE IMMEDIATELY HALTED AND REMAIN AT THE CURRENT POSITION UNTIL A NEW CALL FOR "OPEN" OR "CLOSE" IS RECEIVED.

FAN CONTROL:
THE OPERATIONAL MODE OF THE EXHAUST FAN SHALL BE DETERMINED BY A PANEL MOUNTED HOA (HAND-OFF-AUTO) SWITCH LOCATED WITHIN THE BAY. IN "HAND" MODE, THE MOTORIZED DAMPERS SHALL OPEN AND THE FAN SHALL RUN CONTINUOUSLY. UPON FAILURE OF A MOTORIZED DAMPER TO OPEN, THE FAN SHALL BE PREVENTED FROM ACTIVATING.

IN "OFF" MODE, THE MOTORIZED DAMPERS SHALL CLOSE AND THE FAN DE-ENERGIZED.

IN "AUTO" MODE, THE EXHAUST FAN SHALL ENERGIZE UPON BEING TRIGGERED BY EITHER THE VOC SENSOR OR BY ACTIVATION OF A DOOR. THE MOTORIZED DAMPERS SHALL BE INTERLOCKED WITH THE EXHAUST FAN SUCH TO BE OPEN WHEN THE FAN IS ENGAGED AND CLOSE WHEN THE FAN IS DISENGAGED. UPON FAILURE OF A MOTORIZED DAMPER TO OPEN, THE FAN SHALL BE PREVENTED FROM ACTIVATING. THE FAN SHALL RUN IN ACCORDANCE WITH A PROGRAMMABLE TIMER, TO AUTOMATICALLY SHUT OFF AFTER A SET AMOUNT OF TIME HAS ELAPSED OR WHEN VOC LEVELS HAVE BEEN LOWERED TO BELOW THE SET LIMIT. SUBSEQUENT ACTIVATION SIGNALS RECEIVED WHILE THE FAN IS RUNNING SHALL RESET THE COUNTDOWN TIMER. COORDINATE TIMER PRESETS WITH OWNER.



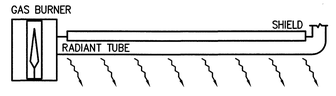
TURN-OUT ROOM EXHAUST

NOT TO SCALE

TURN-OUT ROOM EXHAUST SEQUENCE OF OPERATION:

RUN CONDITIONS:
SYSTEM SHALL RUN CONTINUOUSLY WHILE THE BUILDING IS OCCUPIED, TO EXHAUST CONTAMINATED AIR FROM THE TURNOUT GEAR ROOM.

FAN CONTROL:
THE EXHAUST FAN SHALL BE ENERGIZED WHEN THE WALL SWITCH IS SET TO THE "ON" POSITION. THE MOTORIZED BACK-DRAFT DAMPER SHALL BE INTERLOCKED TO OPEN WHEN THE FAN IS ENERGIZED. UPON FAILURE OF THE MOTORIZED DAMPER TO OPEN, THE FAN SHALL BE PREVENTED FROM ACTIVATING AND THE SYSTEM SHALL ALARM.



RADIANT TUBE HEATERS

NOT TO SCALE

RADIANT TUBE HEATER SEQUENCE OF OPERATION:

RUN CONDITIONS:
SYSTEM SHALL RUN ACCORDING TO OCCUPANCY SCHEDULES AND/OR SETPOINTS; BOTH USER-DEFINABLE AT THE THERMOSTAT. INITIALLY PROGRAMMED SETPOINTS SHALL BE 70°F IN OCCUPIED MODE AND 55°F IN UNOCCUPIED MODE.

FAN CONTROL:
THE EQUIPMENT SHALL CYCLE WITH HEATING LOADS.

HEATING MODE:
UPON A DROP IN SPACE TEMPERATURE BELOW HEATING SETPOINT, THE EQUIPMENT SHALL STAGE OR CYCLE HEATING TO MAINTAIN SETPOINT.

GENERAL CONTROL NOTES

PROVIDE COMPLETE STAND-ALONE MANUFACTURER'S CONTROLS, INCLUDING ALL DEVICES AND WIRING, REQUIRED FOR COMPLETE OPERATION OF ALL SYSTEMS, INCLUDING SENSING AND ALARMS AS REQUIRED. COORDINATE WITH COUNTY IT PERSONNEL TO INTEGRATE HVAC SYSTEMS INTO EXISTING AUTOMATION INFRASTRUCTURE. INTEGRATION SHALL CONSIST OF SENSING DEVICES FOR CRITICAL EQUIPMENT FUNCTIONS, ALARMS, AND SET-POINTS TO BE COMMUNICATED TO AN OFF-SITE MANAGEMENT CENTER.

PROVIDE MANUFACTURER'S THERMOSTATS WITH ALL EQUIPMENT, WALL MOUNTED, DIGITAL DISPLAY PROGRAMMABLE TYPE, CAPABLE OF NIGHT AND WEEKEND SETBACK, AUTOMATIC CHANGEOVER, AND AUTO-ON FAN SWITCHING. WIRELESS TECHNOLOGY SHALL NOT BE USED. CONTROL WIRING SHALL ONLY REQUIRE CONDUIT WHERE EXPOSED.

ALL PACKAGED AIR HANDLING UNITS (INCLUDING DEDICATED OUTDOOR AIR SYSTEMS) SHALL BE EQUIPPED WITH SMOKE DETECTORS IN THE RETURN AIRSTREAM. SYSTEMS CAPABLE OF CONVEYING GREATER THAN 2000 CFM OF SUPPLY AIR SHALL ALSO BE EQUIPPED WITH SMOKE DETECTORS IN THE SUPPLY AIRSTREAM. DETECTORS SHALL BE EITHER INTEGRAL TO THE UNIT OR LOCATED WITHIN THE MAIN DUCT, AHEAD OF ALL DUCT BRANCHES.

EACH SPACE CONTAINING FUEL-BURNING APPLIANCES OR EQUIPMENT SHALL BE PROVIDED WITH A CARBON MONOXIDE DETECTOR/ALARM. AT LEAST ONE CARBON MONOXIDE DETECTOR/ALARM SHALL BE PROVIDED FOR EACH FUEL-BURNING AIR HANDLER SERVING MULTIPLE SPACES (INCLUDING DEDICATED OUTDOOR AIR SYSTEMS), INSTALLED WITHIN 10FT OF AN ASSOCIATED SUPPLY DIFFUSER SERVING AN OCCUPIED SPACE.

ALL AUDITORY AND/OR VISUAL ALARMS (SUCH AS BUT NOT LIMITED TO SMOKE, FIRE, CARBON MONOXIDE, AND CARBON DIOXIDE) SHALL BE INSTALLED IN CONSPICUOUS UNOBSTRUCTED LOCATIONS AND BE ACCESSIBLE FOR TESTING AND MAINTENANCE BY BUILDING OCCUPANTS.

ALL SYSTEMS SHALL BE PROVIDED WITH MANUFACTURER'S STANDARD CONTROL SEQUENCES, INCLUDING PROVISIONS TO ALARM AND SHUTDOWN UPON FAILURE BY ANY FAN, PUMP, CONTROL VALVE, OR COMPRESSOR TO START OR STOP AS COMMANDED. SHUTDOWN SEQUENCE SHALL CONFORM TO MANUFACTURER'S REQUIREMENTS AND SAFELY DE-ENERGIZE ALL COMPONENTS AND CLOSE ALL GAS VALVES SERVING THE EQUIPMENT.

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COUNTY OF ALBEMARLE

PANTOPS PUBLIC SAFETY FACILITY

IFB # 2017-11223-20

CHARLOTTESVILLE, VIRGINIA

REVISIONS

NO.	DATE	DESCRIPTION

COMMISSION NUMBER
2160310

SCALE:	AS NOTED
DESIGNED:	ASH
DRAWN:	ASH
CHECKED:	PGB
DATE:	10.28.2016

SHEET TITLE
DIAGRAMS AND CONTROLS

SHEET NUMBER
M-601
56 OF 68