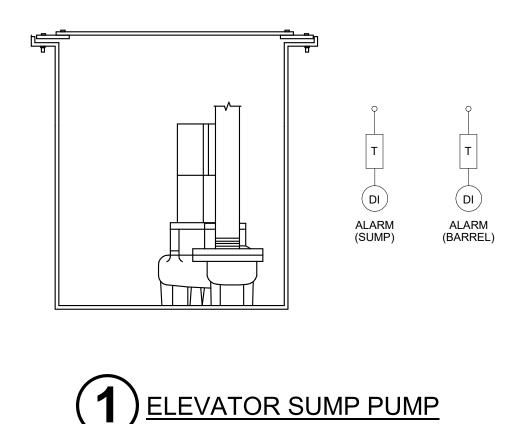
## **ELEVATOR SUMP PUMP SEQUENCE OF OPERATION (TYPICAL)**

ALARM

PUMP FAIL ALARMS SHALL BE DISPLAYED AT THE GRAPHICAL USER INTERFACE AT THE REMOTE OPERATOR WORKSTATION.



# **ROOFTOP UNIT - SEQUENCE OF OPERATION**

ROOFTOP UNIT (DOAS) W/ HOT GAS RE-HEAT (RTU-1)

THE OCCUPIED MODE SHALL CYCLE ON/OFF BY DDC CONTROLS.

MECHANICAL COOLING: THE UNIT IS PROVIDED WITH MODULATING DX REFRIGERANT COOLING.

MODULATING MECHANICAL COOLING: THE MECHANICAL COOLING WILL INCREASE OR DECREASE DX SYSTEM CAPACITY BASED ON WHETHER THE DAT IS GREATER OR LESS THAN THE EFFECTIVE DAT SETPOINT.

GAS HEAT: THE UNIT IS PROVIDED WITH MODULATING NATURAL GAS HEAT.

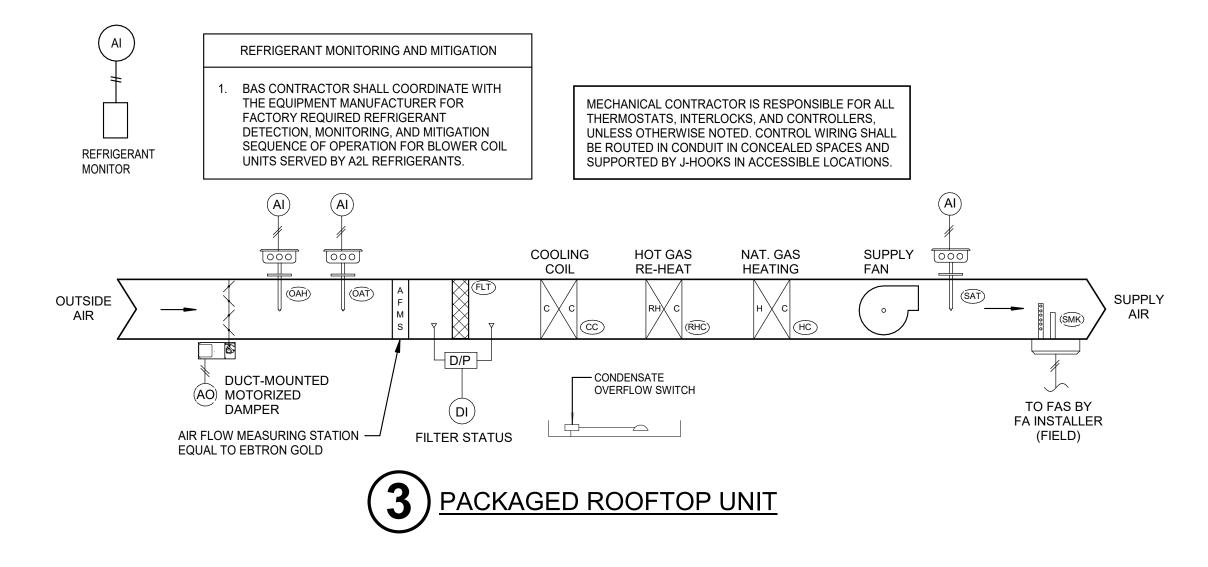
MODULATING GAS HEAT: THE MODULATING GAS HEAT WILL INCREASE OR DECREASE HEATING CAPACITY BASED ON WHETHER THE DAT IS GREATER OR LESS THAN THE EFFECTIVE DAT SETPOINT.

ENTHALPY ECONOMIZER:

THE ENTHALPY ECONOMIZER FREE COOLING MODE SHALL BE ENGAGED WHENEVER THE OUTDOOR AIR ENTHALPY CONDITIONS ARE LESS THAN THE ROOM AIR ENTHALPY CONDITIONS REQUIRED TO UTILIZE OUTSIDE AIR FOR COOLING WITH THE OPERATION OF THE DX COMPRESSORS DISABLED. THE OUTSIDE AIR DAMPER AND RELIEF AIR FAN SHALL MODULATE AS REQUIRED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPER SHALL NOT BE ALLOWED TO MODULATE BELOW THE MINIMUM OUTSIDE AIR SETPOINT, SEE SCHEDULES. ONCE OUTDOOR AIR ENTHALPY CONDITIONS EXCEED REQUIRED ROOM AIR ENTHALPY CONDITIONS, FREE COOLING MODE SHALL BE DISABLED AND THE UNIT SHALL ENABLE THE DX COMPRESSORS AND RETURN TO NORMAL OPERATION.

TO ENABLE THE DEHUMIDIFICATION SEQUENCE THE FOLLOWING OPTIONS ARE AVILABLE:

RELATIVE HUMIDITY - DEHUMDIFICATION WITH HOT GAS REHEAT WILL BE ACTIVATED WHEN THE RELATIVE HUMDITY IN THE SPACE RISES ABOVE THE DEHUMDIFICATION SETPOINT (55%, ADJUSTABLE).



## CHILLED WATER SYSTEM SEQUENCE OF OPERATION

## **CHILLER SEQUENCE OF OPERATION**

THE BUILDING AUTOMATION SYSTEM (BAS) SHALL ENABLE THE CHILLED WATER SYSTEM OPERATION BASED ON OWNER DEFINED SCHEDULE. ONCE THE AIR-COOLED CHILLER HAS BEEN ENABLED, THE CHILLED WATER PRIMARY CHILLED WATER SYSTEM PUMP SHALL BE STARTED. UPON PROOF OF FLOW, THE CHILLER SHALL BE STARTED. ONCE STARTED, THE CHILLER SHALL UTILIZE ITS INTERNAL CONTROLS TO MAINTAIN A CHILLED WATER SYSTEM LEAVING CHILLED WATER SETPOINT OF 45 DEG. F (ADJ.).

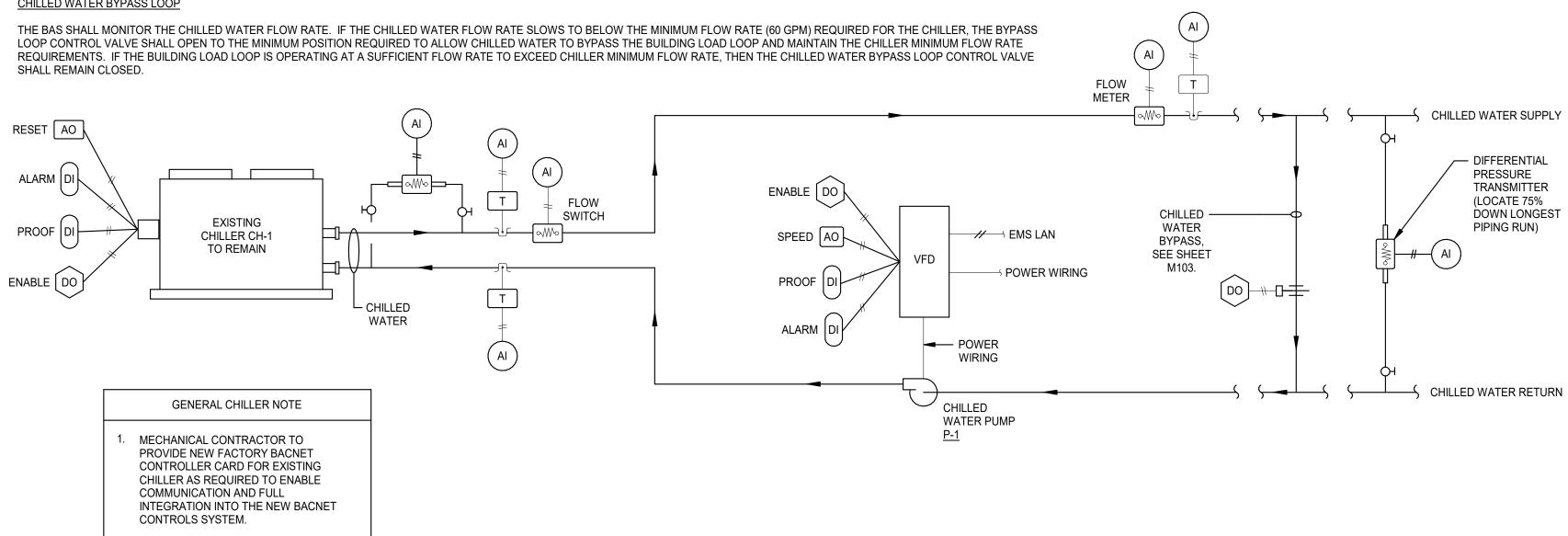
UPON A CALL FOR CHILLED WATER, CHILLER CH-1 AND THE PRIMARY CHILLED WATER PUMP SHALL BE ENABLED. ONCE THERE IS NO LONGER A CALL FOR COOLING, THE CHILLER SHALL BE DISABLED AND THE PRIMARY CHILLED WATER PUMP SHALL BE STOPPED.

THE BAS SHALL ENABLE / DISABLE THE CHILLED WATER SYSTEM OPERATION VIA A DATA COMMUNICATIONS LINK. THE CHILLED WATER PLANT SHALL START IN RESPONSE TO THE OPTIMUM START, NIGHT SETBACK, OR TIMED OVERRIDE OPERATION OF THE BUILDING AIR HANDLING UNITS AND FAN COIL UNITS. IF ANY COMPONENT OF THE CHILLED WATER SYSTEM FAILS TO START ONCE ENABLED, AN ALARM SHALL BE INDICATED AT THE BAS OPERATOR WORKSTATION.

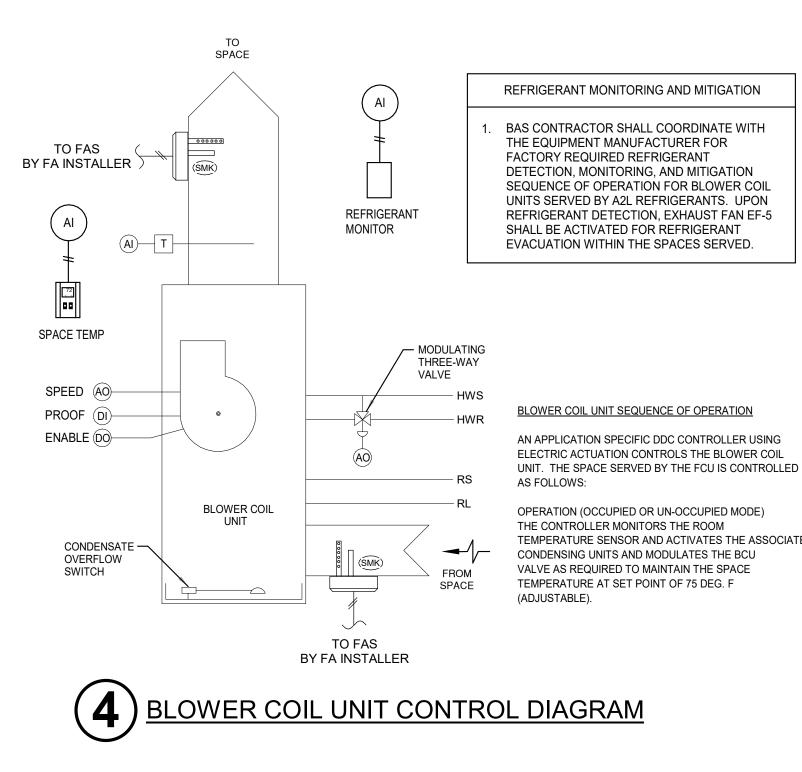
### VARIABLE SPEED PUMPING SEQUENCE OF OPERATION

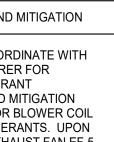
THE BAS SHALL MONITOR THE CHILLED WATER DIFFERENTIAL PRESSURE SENSOR. THE PRIMARY CHILLED WATER PUMP SHALL BE ENABLED BY THE BAS. WHEN ENABLED, THE PRIMARY CHILLED WATER PUMP SHALL START AND SHALL RUN CONTINUOUSLY. WHILE RUNNING, THE PRIMARY CHILLED WATER PUMP VARIABLE FREQUENCY DRIVE SHALL MODULATE PUMP SPEED AS REQUIRED TO MAINTAIN THE MINIMUM CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT OF 15 PSI (ADJ.). IF, FOR ANY REASON, THE PRIMARY CHILLED WATER PUMP FAILS TO START OR THE PUMP STATUS DOES NOT MATCH ITS COMMANDED VALUE, THE STANDBY CHILLED WATER PUMP SHALL BE STARTED AUTOMATICALLY AND AN ALARM FOR THE FAILED PUMP SHALL BE GENERATED AT THE BAS WORKSTATION.

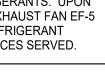
#### CHILLED WATER BYPASS LOOP



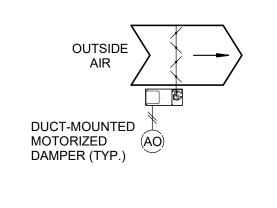
# 2) CHILLED WATER / CONDENSER WATER SYSTEMS CONTROL DIAGRAM

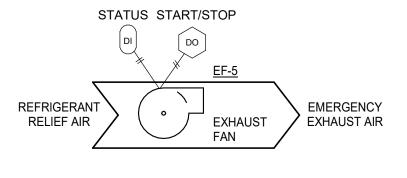


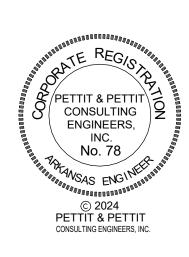


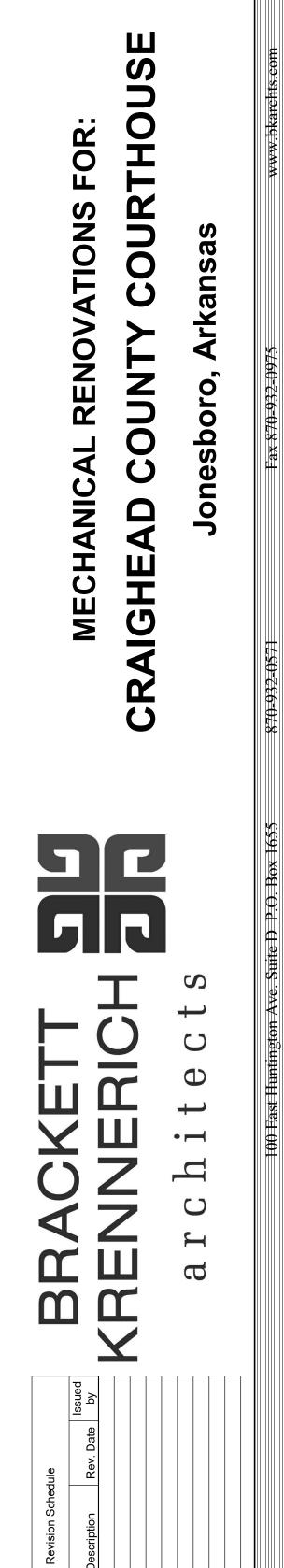


TEMPERATURE SENSOR AND ACTIVATES THE ASSOCIATED









Commission Number

2309D

M502

Date: November 11, 2024