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DESIGNER

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SEALS



SUBMITTAL

3.12.2021

CONSTRUCTION DOCUMENTS

REVISIONS

Table with 2 columns: Description, Date. Contains several empty rows for revisions.

SHEET

SEQUENCE OF OPERATIONS

M-702

DESIGN: JPN DRAWN: JPN REVIEW: RHF CN 7904-A

6

DESTRATIFICATION FANS DF-1,2

THE DDC SYSTEM SHALL ENABLE/DISABLE THE FANS ACCORDING TO THE OWNER'S OCCUPANCY SCHEDULE. SPEED SHALL BE MANUALLY CONTROLLED.

EXHAUST FANS EF-1

- 1. WALL MOUNTED DISCONNECT
2. MOTOR CURRENT TRANSDUCER
3. WALL MOUNTED THERMOSTAT

THE FAN MOTOR SHALL BE ENABLED BY THE DDC SYSTEM. WHEN SPACE TEMPERATURE RISES ABOVE 85°F (ADJ.) THE INTAKE AND EXHAUST DAMPERS SHALL BE INDEXED TO THEIR FULLY OPEN POSITIONS...

ALARMS

UPON DETECTION OF AN OUT OF LIMIT SIGNAL FOR A PERIOD OF 6 MINUTES (ADJ.), AN ALARM SHALL BE GENERATED FOR THE FOLLOWING:

- HIGH LIMIT SPACE TEMPERATURE: SETPOINT 108°F (ADJ.)
• FAN START FAILURE
• FAN STOP FAILURE
• DAMPER FAILURE

EXHAUST FAN EF-2&5

- 1. WALL MOUNTED DISCONNECT
2. MOTOR CURRENT TRANSDUCER
3. WALL MOUNTED THERMOSTAT

THE FAN MOTOR SHALL BE ENABLED BY THE DDC SYSTEM. WHEN SPACE TEMPERATURE RISES ABOVE 98°F (ADJ.) THE INTAKE DAMPER SHALL BE INDEXED TO ITS FULLY OPEN POSITION...

ALARMS

UPON DETECTION OF AN OUT OF LIMIT SIGNAL FOR A PERIOD OF 6 MINUTES (ADJ.), AN ALARM SHALL BE GENERATED FOR THE FOLLOWING:

- HIGH LIMIT SPACE TEMPERATURE: SETPOINT 90°F (ADJ.)
• FAN START FAILURE
• FAN STOP FAILURE
• DAMPER FAILURE

EXHAUST FANS EF-3&4

- 1. WALL MOUNTED DISCONNECT
2. MOTOR CURRENT TRANSDUCER

THE FAN MOTOR SHALL BE ENABLED BY THE DDC SYSTEM. FAN MOTOR SHALL RUN CONTINUOUSLY.

UNIT HEATERS UH-1-5
UNIT HEATERS WILL BE STARTED AND STOPPED BY SPACE THERMOSTAT. UNIT HEATERS WILL TURN ON TO KEEP SPACE TEMPERATURE ABOVE 45°F...

4

RTU-3

THE UNIT SHALL OPERATE IN EITHER OCCUPIED OR UNOCCUPIED MODE ACCORDING TO THE OWNER'S OCCUPANCY SCHEDULE PROVIDED THROUGH THE EXISTING DDC SYSTEM. ADDITIONALLY, AN OCCUPANT OVERRIDE SWITCH WILL BE PROVIDED ON THE THERMOSTAT THAT WILL OVERRIDE THE UNIT INTO OCCUPIED MODE FOR A MINIMUM OF 2 HOURS.

DURING SCHEDULED UNOCCUPIED HOURS THE SUPPLY FAN SHALL BE DE-ENERGIZED. IF SPACE TEMPERATURE RISES ABOVE COOLING UNOCCUPIED SETPOINT OF 80°F (ADJ.) OR FALLS BELOW HEATING UNOCCUPIED SETPOINT OF 60°F OR IF SPACE HUMIDITY RISES ABOVE 70%RH (ADJ.) THE FAN SHALL ENERGIZE AND THE UNIT WILL OPERATE AS DESCRIBED HEREIN FOR OCCUPIED MODE...

FANS

SUPPLY FAN: WHEN THE UNIT IS ENABLED THE SUPPLY FAN SHALL BE ENERGIZED AFTER A 30 SECOND DELAY (ADJ.) TO ALLOW FOR OPTIONAL CONTROL DAMPER ACTUATION. AFTER AN ADDITIONAL 15 SECOND DELAY (ADJ.) TO ALLOW FOR AIR PROVING, THE UNIT SHALL OPERATE AS DESCRIBED HEREIN...

ERV FANS: THE ERV FANS WILL BE ENABLED IN CONCERT WITH AND IN THE SAME FASHION AS THE SUPPLY FAN.

SYSTEM MODE

THE UNIT PROVIDES AUTOMATIC CHANGE-OVER BETWEEN COOLING AND HEATING OPERATION. THE COOLING AND HEATING SET POINTS ARE SEPARATED BY A DEAD BAND OF 5°F TO MINIMIZE UNIT CYCLING AND PREVENT SIMULTANEOUS COOLING AND HEATING.

COOLING OPERATION

ON A RISE IN SPACE TEMPERATURE BY 1°F ABOVE COOLING SET POINT OF 75°F (ADJ.) THE UNIT SHALL ENERGIZE THE COMPRESSOR TO SATISFY SPACE TEMPERATURE SET POINT. ON A FALL IN SPACE TEMPERATURE BELOW SET POINT THE COMPRESSORS SHALL DE-ENERGIZE...

HEATING OPERATION

ON A FALL IN SPACE TEMPERATURE BY 1°F BELOW THE HEATING SETPOINT OF 70°F (ADJ.) THE UNIT SHALL ENERGIZE ITS HEATING COIL. THE HEATING COIL SHALL MODULATE TO SATISFY A SUPPLY AIR TEMPERATURE OF 90°F...

OUTSIDE AIR

ECONOMIZING: WHEN THE SPACE CALLS FOR COOLING THE UNIT WILL CHECK OUTSIDE AIR CONDITIONS FOR POSSIBLE REDUCTIONS IN DX COOLING CAPACITY BY UTILIZING FAVORABLE OUTSIDE AIR CONDITIONS.

PARTIAL ECONOMIZING: IF THE OUTSIDE AIR CONDITION IS BELOW THE ECONOMIZER SET POINT OF 75°F AND 29 BTU/LB THE UNIT SHALL MODULATE THE OUTSIDE AIR DAMPER OPEN TO UTILIZE BOTH FAVORABLE OUTSIDE AIR AND DX COOLING CAPACITY...

FULL ECONOMIZING: WHEN THE OUTSIDE AIR TEMPERATURE FALLS BELOW 55°F (ADJ.) THE DX COIL SHALL BE LOCKED OUT AND THE OUTSIDE AIR DAMPER SHALL MODULATE TO MAINTAIN 55°F (ADJ.) AIR INTO THE UNIT...

ENERGY RECOVERY VENTILATOR

ACTIVATE THE ERV MODULATOR WHEN THE UNIT IS POWERED ON. THE ENERGY RECOVERY BYPASS DAMPER SHALL CLOSE EXCEPT WHEN THE UNIT CALLS FOR ECONOMIZING. WHEN UNIT IS IN ECONOMIZING MODE, BYPASS DAMPER OPENS.

SYSTEM ALARMS

AIR PROVING: A DIFFERENTIAL PRESSURE SWITCH CLOSURES TO CONFIRM AIRFLOW PRIOR TO THE ACTIVATION OF OTHER MECHANICAL COMPONENTS. IF THE SWITCH DOESN'T CLOSE AFTER AN ADJUSTABLE TIME DELAY OR OPENS DURING UNIT OPERATION, THE UNIT SHALL LOCK-OUT OPERATION AND ENUNCIATE AN ALARM.

DIRTY FILTER: AN ADJUSTABLE DIFFERENTIAL PRESSURE SWITCH SHALL OPEN WHEN THE PRESSURE DROP ACROSS THE FILTER EXCEEDS THE DESIRED PRESSURE DROP AND ENUNCIATE AN ALARM.

HIGH AND LOW LIMIT ALARMS: HIGH AND LOW LIMIT ALARMS ARE USER-ADJUSTABLE FOR SENSOR POINTS.

3

RTU-2

THE UNIT SHALL OPERATE IN EITHER OCCUPIED OR UNOCCUPIED MODE ACCORDING TO THE OWNER'S OCCUPANCY SCHEDULE PROVIDED THROUGH THE EXISTING DDC SYSTEM. ADDITIONALLY, AN OCCUPANT OVERRIDE SWITCH WILL BE PROVIDED ON THE THERMOSTAT THAT WILL OVERRIDE THE UNIT INTO OCCUPIED MODE FOR A MINIMUM OF 2 HOURS.

DURING SCHEDULED UNOCCUPIED HOURS THE SUPPLY FAN SHALL BE DE-ENERGIZED. IF SPACE TEMPERATURE RISES ABOVE COOLING UNOCCUPIED SETPOINT OF 85°F (ADJ.) OR FALLS BELOW HEATING UNOCCUPIED SETPOINT OF 80°F (ADJ.) OR IF SPACE HUMIDITY RISES ABOVE 70%RH (ADJ.) THE FAN SHALL ENERGIZE AND THE UNIT WILL OPERATE AS DESCRIBED HEREIN FOR OCCUPIED MODE...

FANS

SUPPLY FAN: WHEN THE UNIT IS ENABLED THE SUPPLY FAN SHALL BE ENERGIZED AFTER A 30 SECOND DELAY (ADJ.) TO ALLOW FOR OPTIONAL CONTROL DAMPER ACTUATION. AFTER AN ADDITIONAL 15 SECOND DELAY (ADJ.) TO ALLOW FOR AIR PROVING, THE UNIT SHALL OPERATE AS DESCRIBED HEREIN...

RELIEF FAN: THE RELIEF FAN WILL BE ENABLED WHEN THE OUTSIDE AIR DAMPER IS OPEN. THE RELIEF FAN SPEED WILL MODULATE IN COORDINATION WITH THE SUPPLY FAN.

SYSTEM MODE

THE UNIT PROVIDES AUTOMATIC CHANGE-OVER BETWEEN COOLING, HEATING, AND DEHUMIDIFICATION OPERATION. THE COOLING AND HEATING SET POINTS ARE SEPARATED BY A DEAD BAND OF 5°F TO MINIMIZE UNIT CYCLING AND PREVENT SIMULTANEOUS COOLING AND HEATING.

COOLING OPERATION

ON A RISE IN SPACE TEMPERATURE BY 1°F ABOVE COOLING SET POINT OF 75°F (ADJ.) THE UNIT SHALL ENERGIZE THE COMPRESSORS IN STAGES TO SATISFY COIL DISCHARGE AIR TEMPERATURE OF 55°F (ADJ.). THE FAN SPEED SHALL BE MODULATED TO SATISFY SPACE TEMPERATURE SET POINT. ON A FALL IN SPACE TEMPERATURE BELOW SET POINT THE COMPRESSORS SHALL DE-ENERGIZE...

HEATING OPERATION

ON A FALL IN SPACE TEMPERATURE BY 1°F BELOW THE HEATING SETPOINT OF 70°F (ADJ.) THE UNIT SHALL ENERGIZE ITS HEATING COIL. THE HEATING COIL SHALL MODULATE TO SATISFY A SUPPLY AIR TEMPERATURE OF 90°F...

DEHUMIDIFICATION

IF THE UNIT IS NOT OPERATING IN COOLING OR HEATING MODE AND ON A RISE IN SPACE HUMIDITY LEVEL ABOVE SET POINT OF 57%RH (ADJ.) BY 1%RH, THE UNIT SHALL ENTER DEHUMIDIFICATION MODE. THE UNIT SHALL FULLY ENERGIZE THE COMPRESSOR AND THE REHEAT COIL TO PROVIDE A NEUTRAL SUPPLY AIR TEMPERATURE...

OUTSIDE AIR

DEMAND CONTROL VENTILATION: THE OUTSIDE AIR DAMPER IS SET TO RESPOND TO SPACE CO2 LEVELS TO PROVIDE DEMAND CONTROL VENTILATION. IF SPACE CO2 LEVELS RISE ABOVE 450 PPM (ADJ.) BY 50 PPM, THE OUTSIDE AIR DAMPER SHALL OPEN TO ITS VENTILATION AIR SETTING. IF SPACE CO2 LEVELS RISE ABOVE 1000 PPM (ADJ.) BY 50 PPM, THE OUTSIDE AIR DAMPER SHALL RETURN TO ITS VENTILATION POSITION...

ECONOMIZING: WHEN THE SPACE CALLS FOR COOLING THE UNIT WILL CHECK OUTSIDE AIR CONDITIONS FOR POSSIBLE REDUCTIONS IN DX COOLING CAPACITY BY UTILIZING FAVORABLE OUTSIDE AIR CONDITIONS.

PARTIAL ECONOMIZING: IF THE OUTSIDE AIR CONDITION IS BELOW THE ECONOMIZER SET POINT OF 75°F AND 29 BTU/LB THE UNIT SHALL MODULATE THE OUTSIDE AIR DAMPER OPEN TO UTILIZE BOTH FAVORABLE OUTSIDE AIR AND DX COOLING CAPACITY...

FULL ECONOMIZING: WHEN THE OUTSIDE AIR TEMPERATURE FALLS BELOW 55°F (ADJ.) THE DX COIL SHALL BE LOCKED OUT AND THE OUTSIDE AIR DAMPER SHALL MODULATE TO MAINTAIN 55°F (ADJ.) AIR INTO THE UNIT...

IF BOTH ECONOMIZER AND DEMAND CONTROL VENTILATION OPERATION ARE REQUIRED SIMULTANEOUSLY, THE DAMPER SHALL OPEN TO SATISFY THE LARGER REQUIREMENT.

SYSTEM ALARMS

AIR PROVING: A DIFFERENTIAL PRESSURE SWITCH CLOSURES TO CONFIRM AIRFLOW PRIOR TO THE ACTIVATION OF OTHER MECHANICAL COMPONENTS. IF THE SWITCH DOESN'T CLOSE AFTER AN ADJUSTABLE TIME DELAY OR OPENS DURING UNIT OPERATION, THE UNIT SHALL LOCK-OUT OPERATION AND ENUNCIATE AN ALARM.

DIRTY FILTER: AN ADJUSTABLE DIFFERENTIAL PRESSURE SWITCH SHALL OPEN WHEN THE PRESSURE DROP ACROSS THE FILTER EXCEEDS THE DESIRED PRESSURE DROP AND ENUNCIATE AN ALARM.

HIGH AND LOW LIMIT ALARMS: HIGH AND LOW LIMIT ALARMS ARE USER-ADJUSTABLE FOR SENSOR POINTS.

2

SEQUENCE OF OPERATION

RTU-1

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