

RMCS CONTROL NOTES:

1. CASE CONTROL: CONTROL CASE TEMPERATURE LOCALLY AT EACH EVAPORATOR THROUGH AN APPLICATION SPECIFIC CASE CONTROLLER. UTILIZE DISCHARGE (SUPPLY) TEMPERATURE, THE RETURN TEMPERATURE, THE EVAPORATOR TEMPERATURE, THE SUCTION LINE TEMPERATURE, AND SUCTION PRESSURE TO OPTIMIZE THE ELECTRONIC EXPANSION VALVE OPERATION AND CONCURRENTLY THE OPERATION OF THE EVAPORATOR FAN. UTILIZE THE INPUTS TO OPTIMIZE OPERATION OF THE DEFROST (TIME, ELECTRIC, OR HOT GAS) AND RAIL HEAT AT THE CASE CONTROLLER. CREATE DEFAULT CASE LIGHTING SCHEDULES AT THE RMCS (USER ADJUSTABLE) AND UTILIZE THE CASE CONTROLLER TO ACCEPT AND EXECUTE THE LIGHTING SCHEDULES RESIDING ON THE CONTROL NETWORK LOCALLY. GENERATE ALARMS ON SUPPLY AND RETURN TEMPERATURE FALLING OUT OF THE CASE'S SPECIFIC CONTROL LIMITS AND SET CONTROLLERS IN ALARM TO CONTINUE OPERATION WITH DEFAULT POINTS.
2. UNIT COOLER CONTROL: CONTROL UNIT COOLER TEMPERATURE LOCALLY AT EACH EVAPORATOR THROUGH AN APPLICATION SPECIFIC CASE CONTROLLER. UTILIZE DISCHARGE (SUPPLY) TEMPERATURE, THE RETURN TEMPERATURE, THE EVAPORATOR TEMPERATURE, THE SUCTION LINE TEMPERATURE, AND SUCTION PRESSURE TO OPTIMIZE THE ELECTRONIC EXPANSION VALVE OPERATION AND CONCURRENTLY THE OPERATION OF THE EVAPORATOR FAN. UTILIZE THE INPUTS TO OPTIMIZE OPERATION OF THE DEFROST (TIME, ELECTRIC, OR HOT GAS). GENERATE ALARMS ON SUPPLY AND RETURN TEMPERATURE FALLING OUT OF THE CASE'S SPECIFIC CONTROL LIMITS AND SET CONTROLLERS IN ALARM TO CONTINUE OPERATION WITH DEFAULT POINTS.
3. COMPRESSOR RACK CONTROL: OPTIMIZE COMPRESSOR OPERATION THROUGH THE RMCS UTILIZING THE SUCTION PRESSURE INPUTS. AS THE PRESSURE RISES ABOVE THE TARGET SETPOINT, PLUS A BIAS, THE CONTROLLER WILL ENERGIZE THE FIRST STAGE AFTER A STAGE ON DELAY HAS EXPIRED. IF THE PRESSURE REMAINS ABOVE THE SETPOINT, PLUS A BIAS, AND THE FIRST STAGE DELAY HAS EXPIRED FOR A SECOND TIME THE CONTROLLER WILL ENERGIZE THE NEXT STAGE AND WILL CONTINUE THE SEQUENCE THROUGH ALL OF THE RACK'S AVAILABLE STAGES. THE REVERSE OCCURS WHEN THE PRESSURE FALLS BELOW THE SETPOINT MINUS A BIAS. THE CONTROLLER WILL STEP DOWN THE STAGES USING A STAGE OFF DELAY TIMER UNTIL ALL STAGES ARE OFF.
  - 3.1. WHEN USING A VARIABLE OUTPUT AS THE PRESSURE RISES ABOVE TARGET SETPOINT, PLUS A BIAS, THE VARIABLE SPEED OUTPUT WILL RAMP UP FROM THE EQUIPMENT'S MINIMUM OUTPUT % TO 100% WITHOUT FOLLOWING A STAGE ON DELAY. IF THE PRESSURE STAYS ABOVE THE TARGET SETPOINT AND THE VARIABLE OUTPUT IS AT 100% AND THE STAGE ON DELAY HAS TIMED OUT THEN THE CONTROLLER WILL ENTER THE FIRST STAGE AND THE VARIABLE OUTPUT WILL RESET FROM THE EQUIPMENT'S MINIMUM OUTPUT % AND BEGIN RAMPING UP AGAIN TOWARDS 100%. IF THE PRESSURE STAYS ABOVE THE TARGET SETPOINT AND THE VARIABLE OUTPUT IS AT 100% AND THE STAGE ON DELAY HAS TIMED OUT THEN THE CONTROLLER WILL ENTER THE NEXT STAGE. AS THE PRESSURE DROPS BELOW THE SETPOINT, MINUS A BIAS, THE VARIABLE OUTPUT WILL RAMP FROM 100% DOWN TO THE EQUIPMENT'S MINIMUM OUTPUT %, ONCE THE STAGE OFF DELAY EXPIRES THE CONTROLLER WILL STAGE DOWN THROUGH THE RACK'S AVAILABLE STAGES. IF THE VARIABLE OUTPUT REACHES 100% AND THE STAGE ON DELAY HAS NOT EXPIRED THE OUTPUT WILL REMAIN AT 100% UNTIL THE STAGE ON DELAY HAS EXPIRED.
3. CONDENSER CONTROL: OPTIMIZE CONDENSER FAN OPERATION THROUGH THE RMCS UTILIZING THE CONDENSING HEAD PRESSURE INPUT. AS THE PRESSURE RISES ABOVE THE TARGET SETPOINT, PLUS A BIAS, THE CONTROLLER WILL ENERGIZE THE FIRST STAGE OF CONDENSER FAN(S). IF THE PRESSURE REMAINS ABOVE THE SETPOINT, PLUS A BIAS, THE CONTROLLER WILL ENERGIZE THE NEXT STAGE OF FANS AND WILL CONTINUE THE SEQUENCE THROUGH ALL OF THE CONDENSER'S AVAILABLE FANS. THE REVERSE OCCURS (BEGINNING WITH THE FIRST STAGE FANS TO MAXIMIZE RUN-TIME) WHEN THE PRESSURE FALLS BELOW THE SETPOINT MINUS A BIAS.
  - 3.1. WHEN USING A VARIABLE OUTPUT AS THE HEAD PRESSURE RISES ABOVE TARGET SETPOINT, PLUS A BIAS, THE VARIABLE SPEED OUTPUT WILL RAMP UP FROM THE FAN'S MINIMUM OUTPUT % TO 100% WITHOUT FOLLOWING A STAGE ON DELAY. IF THE PRESSURE STAYS ABOVE THE TARGET SETPOINT AND THE VARIABLE OUTPUT IS AT 100% THEN THE CONTROLLER WILL ENERGIZE THE FIRST STAGE OF CONDENSER FAN(S) AND THE VARIABLE OUTPUT WILL RESET FROM THE FAN'S MINIMUM OUTPUT % AND BEGIN RAMPING UP AGAIN TOWARDS 100%. IF THE PRESSURE STAYS ABOVE THE TARGET SETPOINT AND THE VARIABLE OUTPUT IS AT 100% THEN THE CONTROLLER WILL ENERGIZE THE NEXT STAGE OF FANS. AS THE PRESSURE DROPS BELOW THE SETPOINT, MINUS A BIAS, THE VARIABLE OUTPUT WILL RAMP FROM 100% DOWN TO THE FAN'S MINIMUM OUTPUT %, AND WILL CONTINUE TO STAGE DOWN (BEGINNING WITH THE FIRST STAGE OF FANS TO MAXIMIZE RUN-TIME) THROUGH THE CONDENSER'S AVAILABLE FANS.
  - 3.2. HEAT RECLAIM CONTROL: UTILIZE ANY HEAT RECLAIM CIRCUIT AVAILABLE IN THE SYSTEM AS THE FIRST STAGE OF CONDENSER WHEN AVAILABLE FOR UTILIZATION.

**RMCS REFRIGERATION CONTROL SCHEME**

NO SCALE

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