

# **Micro Control Systems**

APPLICATION NOTE

APP-014

## **MCS-8 Chiller Software Version CHL S05.00-O**

### **Revision History**

Date	Author	Description
11/23/98	Kelly Mitchell	Created Application Note for Release

## Version CHL S05.00-O MCS-8 Software

The following is a list of changes made to MCS-8 software release “CHL S05.00N” to produce “CHL S05.00-O”.

- 1) Changed the logic for CIRCUIT FLOW inputs (not the CHILLER FLOW input), no more lockouts. The circuit will not be allowed to run if its flow switch is off (circuit will be forced to the disable state until the flow switch goes on). If the circuit is already running and the flow switch goes off, the circuit will be pumped down and turned off (circuit state will show “DISABLE”).
- 2) Added Common Water-Cooled logic for condensers. This logic is setup to modulate a water valve using the analog output (0-10v) to maintain the discharge pressure (logic picks the high discharge psi from the running circuits). New setpoints overlay the Air-Cooled setpoints #31 to #34 for controlling the water valve.
  - a) #31 COND TARGET = Target discharge pressure. The logic uses a plus and minus 5.0 psi control zone around the target. Once the valve adjustment is made there is a minimum of a 30-second delay before the next adjustment is allowed. This time allows for the valve to move and the discharge pressure to see the effect of the change.
  - b) #32 COND ADJ DIV = Valve adjustment sensitivity. This setpoint is used to adjust the reaction of the valve. The adjustment to the valve is calculated based on how far the actual discharge psi is from target (#31) divided by this setpoint value. It is then bounded by 1 to 15. So a value of 1 in this setpoint will cause a 1 to 1 reaction of the valve, i.e. for every psi away from target the valve will be adjusted 1%. If this setpoint contains a value of 2 then it is a 2 to 1 reaction, i.e. for every 2 psi away from target the valve will be adjusted 1%. So larger numbers slow down the valve reaction.
  - c) #33 COND MIN VLV = Minimum valve opening allowed. The valve will not be allowed to close more than this setpoint's value.
  - d) #34 COND MAX SLP = Maximum position or negative change in discharge pressure allowed. Once the logic sees the discharge psi moving in the right direction and the rate of change is greater than this setpoint the logic will hold the current valve opening.
- 3) Added LOW AMBIENT shutdown logic. Must have an ambient temperature sensor to use this feature. Setpoint #49 which was HI DISCH PSI RELOAD is replaced with LO AMBIENT OFF. This setpoint now contains the value at which to shut off the chiller if the ambient temperature falls below it. Once off on low ambient, the temperature will need to raise above this setpoint's value

plus 5.0 degrees before it will be allowed to run. The high discharge psi reload value has been hard coded to a value of 20.0 psi below setpoint #48 HI DISCH PSI UNLOAD.

- 4) Added Liquid Injection control logic. This logic turns on and off a liquid injection solenoid based on discharge temperature. Requires a liquid injection relay output (Must follow last relay point, LLS, on the compressor block.), discharge temperature sensor and an active setpoint #53 LIQUID INJECT ON. Setpoint #53 was using for HI DISC TEMP RELOAD value. The high discharge temperature reload value has been hard coded to a value of 5.0 degrees below the setpoint #52 HI DISCH TEMP UNLOAD.
- 5) The chiller/capacity control state "DISABLE" was broken out into the following states:
  - a) "STOPPED" = This indicates that the run/stop switch is off
  - b) "SCH OFF" = This indicates that the schedule is false therefore call for the chiller to be off
  - c) "EVP FLW" = This indicates that the evaporator flow switch is off therefore the chiller is off
  - d) "CND FLW" = This indicates that the condenser flow switch is off therefore the chiller is off
  - e) "AMB OFF" = This indicates that there is a low ambient condition therefore the chiller is off
  - f) "PHEATER" = This indicates that the switch for the process heater is ON and the chiller is off