Calibrate AY-102 Air-Cooled Chiller Master Controller

Tank Farm Maintenance Procedure

PAGE 1

CHANGE HISTORY (≤ LAST 5 REV-MODS)

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Calibrate AY-102 Air-Cooled Chiller Master Controller
1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for calibrating the AY102-CW-OCM-001 Master Controller located in the AY102-CW-CHL-001 chiller cabinet AY102-CW-ENCL-001.

1.2 Scope

This procedure applies to field and bench calibration of the AY-102 Air-Cooled Chiller Master Controller located in the AY102-CW-CHL-001 Control Box.

2.0 INFORMATION

2.1 General Information

None.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 IF working around live circuits, extreme caution should be used. Failure to follow electrical safety practices as outlined in DOE–0359, Hanford Site Electrical Safety Program could result in serious injury.

3.1.2 IF a lock and tag is required during the performance of this procedure, comply with the DOE-0336, Hanford Site Lockout/Tagout Procedure.

3.1.3 Failure to use protective equipment when working on or near energized systems could result in serious injury. Job specific protective equipment requirements should be addressed during the pre-job brief and be in accordance with TFC-ESHQ-S_IS-C-02.

3.2 Radiation and Contamination Control

Work in radiological areas will be performed using a radiological work permit following review by Radiological Control per ALARA Work Planning procedure, TFC-ESHQ-RP_RWP-C-03.
4.0 PREREQUISITES

4.1 Special Tools, Equipment and Supplies

The following supplies may be needed to perform this procedure:
- Tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

4.2 Performance Documents

The following documents may be needed to perform this procedure:
- DOE-0336, Hanford Site Lockout/Tagout Procedure
- DOE–0359, Hanford Site Electrical Safety Program
- Multistack Master Controller user manual
- 57582-VI-001, AY-102 Air-Cooled Chiller System.

4.3 Field Preparation

4.3.1 **REQUEST** Operations to configure system to allow performance of this procedure.

4.3.2 **IF** Lockout/tagout was applied, **ENSURE** lockout/tagout and overlocking requirements have been satisfied per DOE-0336, Hanford Site Lockout/Tagout Procedure.
5.0 PROCEDURE

NOTE - A description of the controller module’s keys and display is presented in Figure 1.
- Multistack Master Controller status screens are referenced in Attachment 1.

Special Instructions
If any step is not required for procedure completions, record “N/A” in the applicable space(s) on the Data Sheet and document the justification in the Data Sheet’s Comments/Remarks section.

5.1 Perform Master Controller Calibration

5.1.1 OPEN door to AY102-CW-ENCL-001 master controller box for access.

5.1.2 REFER to Appendix 1 of this procedure to operate AY102-CW-OCM-001 Master Controller module.

5.1.3 CHECK Set points as specified on Data Sheet.

5.1.4 RECORD As-Found values on Data Sheet.

5.1.5 IF As-Found values are within specified tolerance provided on Data Sheet, GO TO Restoration Section 5.2.

5.1.6 IF As-Found values are not within specified tolerance provided on the Data Sheet, PERFORM the following;

5.1.6.1 PROGRAM the correct offset value into the AY102-CW-OCM-001 Master Controller using the following:
- The Data Sheet
- Attachment 1.

5.1.6.2 Record values on the As-Left column of Data Sheet AND

GO TO Restoration Section 5.2.
5.2 Restoration

5.2.1 CLOSE access door to AY102-CW-ENCL-001.

5.2.2 IF any problems were encountered with calibration, INFORM FWS.

5.2.3 CHECK equipment restoration by observing indications are consistent with expected conditions.

5.2.4 NOTIFY Operations that testing is complete and system may be returned to desired configuration.

5.3 Acceptance Criteria

Acceptance Criteria has been met when Steps in this procedure have been satisfactorily performed and As-Left values meet the specifications and tolerance(s) per the Data Sheet.
5.4 Review

5.4.1 INFORM FWS test is complete.

5.4.2 FWS REVIEW AND ENSURE the following:
- Completed Data Sheets meet the acceptance criteria.
- Comments sections are filled out appropriately.
- Work requests needed as a result of this procedure are identified and generated.
- Work request number(s) of any work documents generated as a result of this procedure, are recorded in the Comments/Remarks section of the Data Sheet.

5.5 Records

This procedure is performed within a work package, as such, the procedure in its entirety will be maintained as a record per the Work Control process.

The record custodian identified in the Company-level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.
Figure 1 – Master Controller

Controller Keys

- The UP arrow button is used to go back to the previous category on the screen or to increase the value of a digit in a numeric variable field.
- The DOWN arrow button is used to advance to the next category on the screen or to decrease the value of a digit in a numeric variable field.
- The ENTER button is used to make a selection from any of the menu screens in the program. It is also used to enter and exit edit mode while in the SYSTEM VARIABLES screens.
- The ALARM button is the menu for current system or module faults. When the backlight is red, it indicates that a fault has occurred.
- The PROGRAM button goes to the MAIN MENU from any screen in the program.
- The ESC button goes to the previous screen or the status screen, if you are at the top of the MAIN MENU.
Attachment 1 – Master Controller System Screens

Master Controller Status Screens
System Screens
The main status screen displays information about the chiller system.

1. **CAPACITY**: A percentage of how many compressors are turned on, compared to the total installed. An asterisk (*) displayed next to capacity indicates that it is being controlled by an external source, either LOAD LIMIT or CHILLED WATER RESET.

2. **DEMAND**: A percentage of current load needed compared to the maximum design load. This value is determined by the system ECHW temperature and the settings of the SYSTEM VARIABLES.

3. **DELAY**: A time in seconds between start up of compressors. A compressor should only turn on or off if the delay time counter is at zero. This is determined by the mechanical cooling module’s system variable T-DIFF.

4. **FAULTS**: A value showing how many current faults are in the system.

5. **ECHW**: The Entering Chilled Water temperature in the system.

6. **LCHW**: The Leaving Chilled Water temperature in the system.

Press the DOWN arrow button once to display the next main status screen with system information.

1. **LEAD COMP**: The compressor shown is the first on and the last off. Displayed as M1-1, M1-2, M2-1, etc. format. (M1-1 represents Module #1, Compressor #1)

2. **LOAD LIMIT**: A percentage value to limit the max number of compressors available at any given time. An asterisk (*) indicates the external LOAD LIMIT RESET signal is enabled.

3. **CHW OFFSET**: Shows value of customer CHW RESET signal. Range 0 to 10°F. An asterisk (*) indicates the external CHW RESET signal is enabled.

Mechanical Cooling Screens – Master Controller
Press the DOWN arrow button again to display information for the first mechanical cooling module. The following information is available:

1. **LCHW**: The Leaving Chilled Water temperature in the module measured leaving the evaporator coil.

2. **SUCT**: The Suction temperature in the module measured on the compressor suction line.

3. **COMP 1 and COMP 2**: This displays the status of the compressors, ON or OFF.

4. **Status Line**: The status line of the module can be the mode in which the module is in or it can be what the current fault is on that module. If nothing appears in the status portion of the screen, then the module is in auto mode and there are no faults. If MANUAL MODE or DISABLED appears on the status line, then the module is in manual mode or disabled mode. The faults that occur on the modular level will also be displayed on the status line when the fault is current.

Press the DOWN arrow button again to display screen #2 for the first module. Information on this screen is as follows:

1. **RUN HOURS**: COMP1 and COMP2: This displays the total number of hours that each compressor has run. To reset the run hours of compressor 1, press and hold the ALARM and DOWN arrow buttons simultaneously on the screen of the module whose hours need to be reset. To reset the run hours of compressor 2, press and hold the PRG and UP arrow buttons simultaneously on the screen of the module whose hours need to be reset. The SYSTEM VARIABLES must be unlocked to clear compressor runhours.

2. **FAN 1 and FAN 2**: Displays the status of the fans, ON or OFF. FAN 2 will always be the first fan on.

3. **HP and LP**: This displays the amount of pressure in psig for the high side and low side pressures in each module.

Press the DOWN arrow button now to display screen #1 for module 2. From there, screen #2 for module 2 and then screen #1 for module 3 and so on.
Appendix 1 – Master Controller Navigation

Notes:

- The greater than sign (>) is the cursor indicator
- A blinking block (▕) cursor will appear in that system variables’ value field indicating that the program is in edit mode
- An asterisk (*) next to the variables indicates that the SYSTEM VARIABLES are locked and cannot be adjusted.

1. **PRESS** the UP or DOWN arrow buttons to locate the SYSTEM VARIABLES in the MAIN MENU
2. **PRESS** the ENTER button to enter the SYSTEM VARIABLES’ MENU
3. **PRESS** the ENTER button again to enter one of the sub-menus
4. **USE** the ENTER button to change the value of a variable,
5. **USE** the UP or DOWN arrow buttons to change the value of the variable
6. **PRESS** the ENTER button to save the new setting,
   
   **OR**

   **PRESS** the ESC button to discard the change.

7. **PRESS** the ESC button to exit to the MAIN MENU.