



# COOLING TOWER BASIN HEATER CONTROL PANEL ADDENDUM INSTRUCTIONS FOR CIRCUIT BOARDS WITH ADJUSTABLE SETTINGS

(Use in Conjunction with Instructions 76-2000-83)

## 1.0 GENERAL INFORMATION

The adjustable settings on the circuit board allow "fine tuning" of the heaters to meet specific application requirements. The adjustments include:

- Temperature
- Sensitivity (Resistivity)
- Time Delay

**CAUTION**

IT IS VERY IMPORTANT TO USE THE CORRECT SENSOR. SERIES 316 SENSORS SHOULD BE USED WITH 551 PRINTED CIRCUIT BOARD. CHECK MARKINGS ON CIRCUIT BOARD AND SENSOR CORD.

## 2.0 ADJUSTMENT DESCRIPTION

2.1 Temperature Adjustment – The set point adjuster knob (0-10 scale) is located on the circuit board. The "0" setting always corresponds to a temperature near the lowest setting of the temperature range while the "10" setting always corresponds to a temperature close to the highest setting of the temperature range.

2.2 Sensitivity Adjustment – The sensitivity can be set by adjusting the screw labeled "Resist." See Table 1 for the resistivities of common fluids.

TABLE 1

FLUID	SPECIFIC RESISTANCE (OHMS)
Most Water, Water Soluble Solutions	2,000 – 6,000
Very Soft Water	12,000 – 15,000
De-mineralized or Distilled Water	25,000 – 100,000

2.3 Delay Adjustment – Delay is the time span between when the probe is initially covered with liquid (or uncovered) and the time the output relay responds. This eliminates false signals from splashing liquids. The time delay can be set by adjusting the screw labeled "Delay". The span is 2 to 30 seconds.

## 3.0 START-UP

Follow these steps in numerical order to assure the most trouble-free operation:

- 3.1 Check to insure that all electrical connections are at the correct location. All wiring should be completed per the wiring diagram.
- 3.2 Make sure the sensor probe is completely immersed in the liquid to be controlled.
- 3.3 Set the resistivity and delay potentiometers to their lowest setting by turning the screws counter clockwise. Set the temperature set point adjuster knob to "10".
- 3.4 Energize the panel. The green LED on the controller should be lit; if not, increase resistivity potentiometer (the screw labeled Resist) until the green light comes on. Using a separate device, monitor the temperature of the liquid in the basin until it reaches the desired control temperature.
- 3.5 Slowly decrease the temperature set point adjuster knob until the green LED light goes off. This should be the setting for your control temperature.
- 3.6 Set the delay adjuster (screw labeled Delay) to prevent false level readings due to splashing liquids. The delay will be approximately 2 seconds at the minimum setting and 30 seconds at the maximum setting. Note: The delay setting affects the turn on/turn off time associated with the liquid level sensing only.
- 3.7 Panel should now be ready for operation.

## 4.0 TROUBLESHOOTING

**CAUTION**

THESE TROUBLESHOOTING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY.

**WARNING**  
 DANGEROUS VOLTAGES MAY BE PRESENT IN THIS EQUIPMENT. DISCONNECT ELECTRICAL SERVICE AT THE SOURCE AND TAG CIRCUIT OUT FOR MAINTENANCE BEFORE SERVICING THIS EQUIPMENT.

- 4.1 Perform visual inspection to verify:
  - 4.1.1 Basin has adequate liquid level and is not frozen. If liquid level is low, check liquid level controls and add water as required. If basin is frozen, see Section 2, Abnormal Operation of I.O.M 76-2000-83.
  - 4.1.2 All components appear to be undamaged and in sound operating order. Correct as required.
- 4.2 To verify panel operations:
  - 4.2.1 Check voltage on incoming power line at the heater control panel. The voltage on all phases should match the nameplate rating. Correct as required.
  - 4.2.2 Remove the heater control panel required.
  - 4.2.3 Disconnect sensor cord and install test resistor (See Table 2 for size) across T1 and T2 and a jumper across terminals G1 and G2 of the terminal strip on the circuit board.

**TABLE 2**

TEST RESISTOR SELECTION FOR SERIES 316 SENSOR			
TEMP. OF SET POINT °F	RESISTOR (OHM) VALUE	TEMP. OF SET POINT °F	RESISTOR (OHM) VALUE
32	8.5K	60	4.5K
40	7 K	65	4 K
45	6.5K	75	3 K
50	5.5K	85	2.5K
55	5K	95	2 K

- 4.2.4 Energize the system.
  - 4.2.4.1 Measure the voltage at terminals "C/24V" and "24V" on the circuit board. The voltage should be 21

to 29 volts. If not, the transformer is defective. Replace it.

- 4.2.4.2 Measure the voltage at terminals "C/24V" and "NO" on the circuit board. The voltage should be between 21 to 29 volts. If not, replace the circuit board.
  - 4.2.4.3 The green LED light should be "On" and the red LED light "Off" when the contactor is energized. If not, replace the contractor(s).
  - 4.2.4.4 De-energize the system.
  - 4.2.4.5 Remove the resistor and jumper from the circuit board.
- 4.3 To check sensor probe operations:
    - 4.3.1 Remove the sensor probe from the liquid. Wipe the sensor probe with a clean cloth to remove all external material.
    - 4.3.2 Connect an ohm meter across T1 and T2. The approximate value at room temperature for 1-100°F board is ~3000 ohms. If you do not read the value the sensor is defective; replace it.
    - 4.3.3 Connect an ohm meter across G1 and G2. You should read an open connection (infinity). If you do not read this value the sensor is defective; replace it.
    - 4.3.4 Connect a jumper between the inner and outer tubes of the probe and measure the resistance across G1 and G2. It should read approximately 2.0 ohms. If you do not read this value the sensor is defective; replace it.
    - 4.3.5 When these tests are completed and the operation verified, ensure all jumpers and/or test resistors are removed and permanent wiring is installed and tightened. Replace control panel cover and install sensor probe.

For any further information or instructions, see Cooling Tower Basin Heater Control Panel Installation, Operating and Maintenance Instructions, No. 76-2000-83.

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