

## CONVECTION CURRENTS

### MAINTENANCE INSTRUCTIONS

#### GENERAL INFORMATION:

Using a light source with a small (nearly pin-point) filament, Convection Currents allows the visitor to see images of convection currents in a tank of water cast as shadows on a wall. The exhibit consists of a table, water tank, light source and an electric heater. The museum visitor can control the heater and projector.

Water, like air, expands as it warms, making it less dense than cooler water. As the heated water is threading its way through the cooler water it produces turbulence caused by the friction of water rubbing on water and against the glass sides of the tank. Since turbulence is chaotic behavior the swirling patterns change unpredictably. In effect, the chaotic streams of warm and cool water sculpt lenses of ever changing shape and these anomalies are projected on the wall.

#### Cleaning:

The tank has tempered glass sides, clean them with glass cleaner. To keep algae from growing in the tank, you may want to add one tablespoon of benziconium chloride to the water before filling. Clean the rest of the exhibit with mild soap and water.

#### Filling:

Unscrew the eye and the button head cap screw and remove the top of the tank. Fill the tank until the water level just reaches the bottom of the vinyl tube that connects the heater to the handle above it. If it becomes necessary to drain the water, place a 2 gallon pail under the drain and remove the drain cap.

**NOTE: DO NOT PLUG IN THE EXHIBIT  
WITHOUT WATER IN THE TANK.  
THIS WILL CRACK THE GLASS AND RUIN THE HEATER.**

### Bulb Replacement:

To replace a light bulb, use snap ring pliers to remove the snap ring from the front of the light fixture. Then remove the glass lens and the metal tube. You can now reach in and extract the light bulb with your fingers. Take care when installing a new light bulb that the pins line up with the clips in the socket and that your fingers do not touch the quartz halogen bulb. (Remove finger prints from the bulb with alcohol.)

### Potentiometer replacement:

Be sure the power is off. The potentiometer is accessed from underneath by loosening the two white nylon thumb-nuts and pulling on the potentiometer firmly but slowly until it releases. To reassemble, first turn the pot shaft and the knob both completely clockwise. This will avoid a 'spongy' feel at the knob stops. Then align the plate with the threaded studs and push the pot shaft into the rubber coupling. Replace the nylon thumb-nuts hand tight.

### Electronics:

To access the electronics, unlock and remove the table bottom. The circuit breaker is near the left rear leg under the exhibit. The timer is set for 50 seconds at the time of shipping. The "on time" is displayed on the timer and may be adjusted with the buttons on the face.

The 1 ohm resistor is adjusted for 9.5V across the #794 bulb, (rated 10V) to insure its maximum life rating of 5000 hours. Do not reduce the voltage below 90% rating.

The dimmer control, (Ohmitrol) has a trimpot in the side that adjusts the minimum setting. This is set so the current to the heater just turns off when the user control is turned all the way down. The shaft in the center of the Ohmitrol, which can limit the user control, is turned all the way up for maximum power to the heater.

### Glass Replacement:

The tank has tempered glass panels that are replaceable if damaged. The tank is easily removable, if necessary. Disconnect the heater and ground wire, then remove the two Allen cap screws located under the table that retain the tank and lift it from the table. Remove the flat head screws in the bezel to access the glass. A 3/16 inch section O-ring seals the glass to the metal as well as providing padding. Replacing this seal will be necessary. The frame will accommodate either 6mm or 1/4 inch glass. Simply install the proper thickness of backing tape on the bezels. It is important that the bezels all have the same thickness of padding (Either 1 or 2 layers of 3M™, 1/32 inch Rubber Splicing Tape) on them when replacing. Replace all of the screws loosely at first and tighten them in stages in a criss-crossing pattern so that the glass will have even pressure on it.