

Thermo - Generator

Peltier Effect



HL4052-001 Thermo - Generator

Description:

This demonstration device consists of a special cell mounted to a heat sink to demonstrate an unusual principle of absorbing heat and liberating heat on the one device. This is called the '**Peltier Effect**'. There are no specific experiments associated with this instrument, although other instruments are available where quantitative experiments can be performed using similar cells and by measuring rises and falls in temperature of vessels containing water.

A Thermocouple is a simple device consisting of two wires of different metals intimately bonded together at one end. When the bond is heated, a small current flows between the non-heated ends of the wires. The Thermocouple is used as a temperature measuring sensor in various instruments, especially where high temperatures of thousands of degrees are to be measured in furnaces and kilns.

This 'Peltier Effect' cell is the reverse of a Thermocouple. It consists of many thermocouple joints all bonded to two flat plates. When electricity is passed through these joints, one side of the cell becomes hot and the other side becomes cold. It is important that the cold and the hot sides cannot conduct heat to each other.

These cells are used in electronic circuits to keep electronic devices cool. They are used also in food and drink mini coolers for cars and they run from the 12 volt car battery.

Length: 115mm	Width: 110mm	Height: 40mm	Weight: 230g
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The Heat Sink:

The thick heavy piece of metal to which the 'Peltier Device' is clamped is called a 'heat sink'. It absorbs heat from any device and radiates it to the surrounding air. Heat sinks are used inside almost all electronic equipment to keep the electronic components cool while they are working. Usually, the fins on heat sinks are to increase the surface area so there is maximum contact with the surrounding air to remove heat. Some high power heat sinks are cooled by passing water through them.

Using The Cell:

Max. supply voltage: 8V.DC. Max. current: 4 amps.

Observing the polarity, apply DC voltage to the terminals provided. Begin at low voltages of 2 or 3 volts and begin to feel the heat sink becoming warmer and the top surface becoming colder. Raise the voltage but do not increase beyond 10 Volts.

To demonstrate the fall in temperature on the cold side, place a drop of water on the cold side and watch it turn to ice.

If The Cold Side Does Not Get Cold Enough:

The cell can provide only a certain maximum difference between the hot and the cold sides, therefore, to make the cold side colder, reduce the temperature of the hot side by placing it in a small tray and then add cold water so the tips of the heat sink fins are immersed by say 3 or 4mm. This will pull the heat from the heat sink and cause the cold side to become colder to freeze water.

DO NOT IMMERSE THE THERMO-GENERATOR DEVICE IN WATER – only the tips of the heat sink fins.

Caution:

- The hot side of the cell can become very hot, so ALWAYS provide supervision when this equipment is being used.
- If the current is flowing the opposite direction, the cold side will become hot. Since the cold side has very little heat sinking, it can become VERY HOT and can burn skin. Also it can destroy the joints inside the cell to make the cell useless. Do not permit the upper surface to become too hot.

Designed and Manufactured in Australia