





(How does a bimetallic switch function?)

A bimetallic strip, consisting of two plane metal strips of different thermal expansion coefficients which are connected together, bends on being heated in the direction of the metal which has the lower thermal expansion coefficient. The bimetallic strip is therefore suitable for opening electric circuits (e.g. in cut-outs, or as heat safety switch in electric irons or power supply equipment) or for closing them (e.g. in alarm systems) when the temperature of the surrounding air exceeds a maximum permissible value.

### Notes on Set-Up and Procedure

It is not difficult to set up the circuit.

The bimetallic strips provided are so sensitive that only gentle heating is sufficient in each of the two parts of the experiment. It is important to inform the students only to heat gently, so that despite repeated carrying out of this procedure, not too much teaching time is lost in waiting until the bimetallic strip has again straightened out.

### Observations

1. When the bimetallic strip is warmed, it bends away from the contact screw. The circuit is so opened and the lamp goes out.  
When the bimetallic strip cools, it straightens out, closes the circuit and the lamp lights up again.

2. When the position of the bimetallic strip is reversed and the strip is warmed, it bends towards the contact screw until the circuit is closed and the lamp shines. When the bimetallic strip cools, it straightens out, opens the circuit and the lamp goes out.

### Evaluation

1. a): It has the function of an off switch (opener).  
b): It has the function of an on switch (closer).
2. For a): In electric irons the bimetallic strip breaks the circuit as soon as the set temperature of the iron is exceeded. (Further examples: Cut-outs, controlled fan heaters).  
For b): In refrigerators the bimetallic strip closes the circuit for the cooling system when the refrigerator is no longer cold enough. (Further example: Fire alarm).

### Remark

The bimetallic switch is a temperature dependent switch. It is still nowadays extensively used, although temperature dependent semi-conductor sensors have taken over its function in many pieces of equipment and systems.

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## The bimetallic switch



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Room for notes