How Does a Thermostat Work?

Older Thermostat

Traditionally, thermostats have been powered by a thermometer coil. A thermometer coil is made of a bimetallic strip, two metals attached side by side and looped around in a coil. When the temperature rises, the metals expand. Because they expand at different rates, the shape of the coil changes. When the coil expands past a certain point, it bumps into a switch, turning on the fan.

Digital Thermostats

Digital thermostats are more accurate and more compact, making them the best choice among modern thermostat makers. The central component in a digital thermostat is a special kind of resistor called a thermistor. A resistor is an electronic component which resists the flow of electric current by a certain very precise amount. A thermistor is a resistor which changes in value with the temperature. The digital thermometer runs an electric current and measures how much the current drops, using that to calculate the value of the thermistor. When the circuit knows what the value of the thermistor is, it can tell what the temperature is. When that temperature rises above a certain level, it turns on the circuit.

Heating and Cooling

Either system can be used to power an entire heating and cooling system. Older systems which use thermometer coils can use two switches, one for heating and one for cooling. When the coil expands enough, it bumps into the switch that turns on the heating fan and furnace. When it contracts past a certain amount, it bumps into the switch that turns on the air conditioning compressor and circulation fan. Similarly, the digital system can compare the temperature registered by the thermistor to two values, one for the heating and one for the cooling.