







# Resistors

Resistor		Variable Resistor	
Preset resistor		Fuse	
Thermistor		Light Dependent R	

All the devices above obey Ohm's Law ( $V=I \times R$ ). Remember  $I$  stands for current. If their resistance increases, so will the voltage across them if the current through them remains the same. If the voltage remains the same, then the current through the device will decrease if its resistance increases.

The resistance of a component is measured in ohms, kilo-ohms, or mega-ohms. Resistors in series are simply added:  $R= R_1+ R_2 + R_3$ . Resistors in parallel are calculated as follows:

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

## Resistor colour code

Resistors come in various physical sizes, but they all have their value marked using a colour code. There are usually four stripes. The first and second stripes give digits and the third stripe gives the multiplier or the number of additional zeroes. The resistors we use will all have a fourth gold band which means the resistors actual value is within 5% of what the colour code says. This is the tolerance value. So orange white brown gold means 390R within 5%. Gold can also be used for the third stripe when it means multiply by one tenth, so brown red gold gold means 1.2R.

The Resistor Colour Code	
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Grey	8
White	9

## Preferred values

Resistors are only available in set ranges such as E12, E24 series etc. The most commonly used is the E12 series, which has the following values only: 10 12 15 18 22 27 33 39 47 56 68 82.

The values are these values and the decades above these values eg. 18, 180, 1.8K, 18K, 180K, 1.8M. There is an upper limit no resistor above 10M are made. When selecting a resistor it is good practice to always select the next highest value.

## Using resistors

Resistors can be used to reduce voltage to the rest of a circuit. They can also be used to reduce current, for example in the supply to an LED or to the base of a transistor.