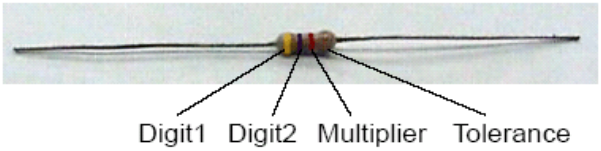
Resistor Colour Code

Most resistors and some capacitors use a colour code system to identify their value. It's easy to follow once you know how it works. Notice that the resistor below has four colour bands.



Digit 1 = Yellow
Digit 2 = Violet
Multiplier = Red
Tolerance = Gold

Use the colour code chart, below, to determine the resistance based on the colour bands.

Colour	1st Band (Digit 1)	2nd Band (Digit 2)	3rd Band (Multiplier)	4th Band (Tolerance)
Black	-	0	1	-
Brown	1	1	10	1%
Red	2	2	100	2%
Orange	3	3	1 000	-
Yellow	4	4	10 000	-
Green	5	5	100 000	-
Blue	6	6	1 000 000	-
Violet	7	7	10 000 000	-
Grey	8	8	-	-
White	9	9	-	-
Silver	-	-	0.01	10%
Gold	-	-	0.1	5%

To find the resistance of the resistor, follow these steps:

Step 1. Use the chart to make a number out of the first two digits.

In this case yellow is 4, and violet is 7, so the number is 47.

Step 2. Multiply the number by the multiplier for that colour.

The multiplier for red is 100, so the resistance is 4 700 Ohms.

Step 3. Add the tolerance from the chart.

Gold has a tolerance of ±5%, so the final value of this resistor is 4 700 Ohms ±5%.

This means that the actual resistance will be within 5% of the rated value of 4 700 Ohms.

5% of 4 700 is 235. So the resistance will be between 4 465 Ohms and 4 935 Ohms.

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Electrical Units and Prefixes

There are three basic measurements in electrical circuits – Voltage, current and resistance.

The following table describes each quantity, and their symbols:

Quantity		Unit of measure		Function
Name	Symbol	Unit	Symbol	
Voltage	V, emf or E	Volt	V	Pressure or force that makes current flow in a circuit
Current	I	Ampere or Amp	A	Flow of electrons (negative charges) through the circuit
Resistance	R	Ohm	Ω	Opposition to the flow of electrons (current)

Sometimes the basic units – volt, ampere or ohm – are either too small or too large to work with. For example a cell phone or television antenna the voltage may be 0.0000025V, but in a large power station the voltage may be 25000V. In such cases, metric prefixes are used.

The following table shows the common metric prefixes used. It shows the symbols for each and their equivalent decimal.

Number		Prefix	Symbol	Power of ten
One billion	1000000000	Giga	G	10^{9}
One million	1000000	Mega	M	10^{6}
One thousand	1000		k	10^{3}
One (base)	1	---	---	10^{0}
One thousandth	0.001	milli	m	10^{-3}
One millionth	0.000001	micro	μ	10^{-6}
One billionth	0.000000001	nano	n	10^{-9}
One trillionth	0.000000000001	pico	p	10^{-12}

Knowing how to convert metric prefixes to and from the base unit is needed when using a multimetre or when using electrical formulas.

The figure below shows how many positions the decimal point is moved to get from the base unit to a multiple or a fraction of the base unit or to get back to the base unit.