


# Resistors

Resistors are devices **which** provide measured amounts of resistance. **They** are valuable when it comes to making sure the proper amount of voltage is present in a circuit. **They** are useful when generating heat.

Resistors are classified as either *wirewound* or *carbon-composition*. The symbol for a resistor of either type is .

Wirewound resistors are used to provide sufficient opposition to current flow to dissipate power of 5 W or more. A watt is a unit of electric power. A watt is equal to one volt times one ampere.

Wirewound resistors are made of wire that has controlled resistance per unit length.

Resistance causes a voltage drop across a resistor when current flows through **it**. The voltage is dropped or dissipated as heat and must be eliminated into the air.

Some variable resistors can be varied but can also be adjusted for a particular setting. Resistors are available in various sizes, shapes, and wattage ratings.

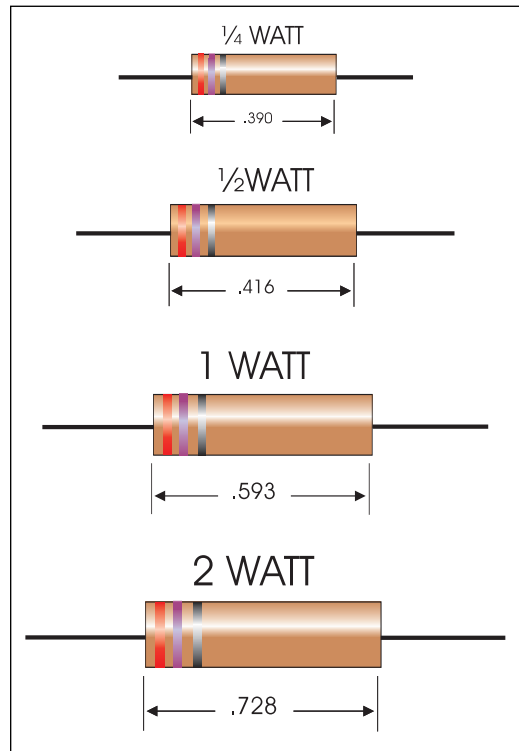


Figure 2-5.

*Wattage ratings of carbon-composition resistors.*

Carbon-composition resistors are usually found in electronics devices. They are of low wattage. **They** are made in 1/8-W, 1/4-W, 1/2-W, 1-W, and 2-W sizes. The physical size determines the wattage rating or **their** ability to dissipate heat (see Figure 2-5).

Carbon-composition resistors are usually marked according to **their** ohmic value with a color code. The colors are placed on the resistors in rings (see Figure 2-6).

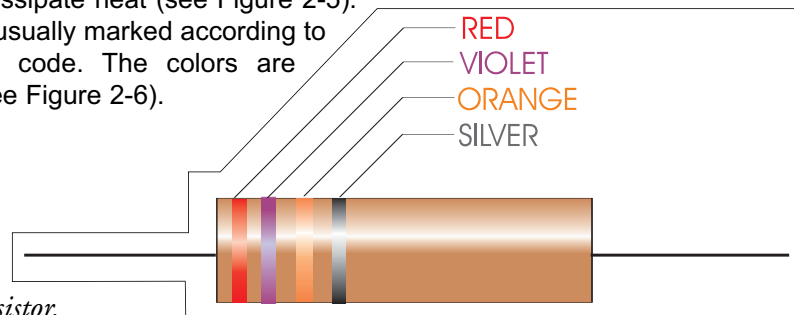


Figure 2-6. A 27,000-ohm ( $\Omega$ ) resistor.

The table below shows the values for reading the color code of carbon-composition resistors.

## RESISTOR COLOR CODE

0 Black	5 Green
1 Brown	6 Blue
2 Red	7 Violet
3 Orange	8 Gray
4 Yellow	9 White

Take a close look at a carbon-composition resistor. The bands should be to your left. Read from left to right. The band closest to one end is placed to the left so you can read **it** from left to right. The first band gives the first number according to the color code. In this case (Figure 2-6) it is red, or 2. The second band gives the next number, **which** is violet, or 7. The third band represents the multiplier or divisor.

If the third band is a color in the 0 to 9 range in the color code, **it** states the number of zeros to be added to the first two numbers. Orange is 3; so the resistor in Figure 2-6 has a value of 27,000  $\Omega$  of resistance.

The 27,000  $\Omega$  is usually written as 27 k $\Omega$ . The k stands for thousand; **it** takes the place of three zeros. In some cases, resistors are referred to as 27 M $\Omega$  (which means 27,000,000, or 27 million  $\Omega$ ), because the M stands for *mega*, and **that** is the unit for million.

If there is no fourth band, the resistor has a tolerance rating of  $\pm 20$  percent ( $\pm$  means plus or minus). If the fourth band is silver, the resistor has a tolerance of  $\pm 10$  percent. If the fourth band is gold, the resistor has a tolerance of  $\pm 5$  percent.

Silver and gold may also be used for the third band. In this case, according to the color code, the first two numbers (obtained from the first two color bands) must be divided by 10 or 100. Silver means divide the first two numbers by 100. Gold means divide the first two numbers by 10. For example, if the bands of resistor are red, yellow and gold, then the value is 24 divided by 10, or 2.4  $\Omega$ . If the third band is silver and the two colors are yellow and orange, then the 43 is divided by 100 to produce the answer of 0.43  $\Omega$ . Keep in mind, though, that the fourth band will still be either gold or silver to indicate the tolerance.

Resistors marked with the color code are available in hundreds of size and wattage rating combinations. Wattage rating refers to the wattage or power consumed by the resistor.

(from "Electronics", "*The Easy Way*" Barron's pag. 15)

a. Answer these questions and underline the answers in the passage.

1. What is a resistor?

.....

2. How many different types of resistors do you know of?

.....

3. What type of resistor uses a colour code?

.....

4. Describe a carbon-composition resistor.

.....

5. How can you read a resistor's ohmic value?

.....

6. What do the silver or gold stripes represent on a resistor?

.....

7. What is "tolerance" and how can you calculate it?

.....

.....

**b.** Look again at the passage and decide which nouns the words, in bold character, refer to:

Example: which ..... devices

they .....

they .....

it .....

they .....

their .....

their .....

it .....

which .....

it .....

it .....

that .....

**c.** Now skim the last three paragraphs of the passage and underline the passive forms.

**d.** Answer these questions about the passive sentences:

- Are they all present tense?
- What is the meaning of “by” in some examples?
- How many of the passive sentences include “by + agent”?
- What is “by” used for?
- Is it always necessary?
- Why? Why not?

**e.** Write a description of the resistor in Figure 2.6.