

Lab Work N°. 01: Resistance Measurement

Objective

To determine the value of a resistor experimentally, several methods exist, with the most commonly used today being:

- Resistor color code method
- Digital or analog multimeter method

To find the resistance R, Ohm's Law is applied, expressed as:

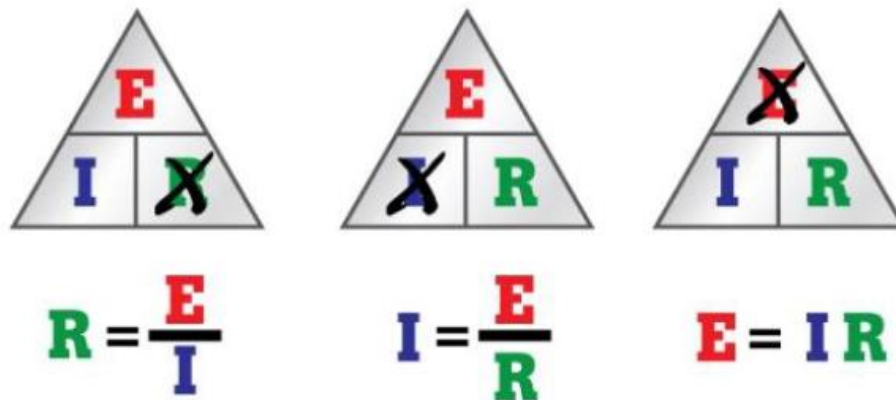
$$E = R \cdot I$$

This formula means **Voltage** = **Current** × **Resistance** or $V = A \cdot \Omega$.

- **R**: Electrical resistance in Ohms (Ω)
- **E**: Electrical voltage applied across the terminals of R in Volts (V)
- **I**: Current flowing through R in Amperes (A)

If two of these values are known, technicians can apply Ohm's Law to calculate the third value. Use the triangle (pyramid) method as follows:

1. **To find Resistance (R)**: Cover R in the triangle.
2. **To find Current (I)**: Cover I in the triangle.
3. **To find Voltage (E)**: Cover E in the triangle.



I.1 Resistor Color Code Method

Each color corresponds to a digit (see the correspondence chart below).

- **First two color bands**: Correspond to the first two digits of the resistance value.
- **Third band**: Corresponds to the number of zero(s) added after these two digits.

- **Last band (spaced slightly further apart, gold or silver):** Corresponds to the tolerance (accuracy) of the value.
- The resistance value determined this way is in ohms (Ω).

Example: A resistor has a **red** band, a **green** band, and an **orange** band: **Red** = 2 ; **Green** = 5 **Orange** = 3 zeros (000)

Its value is therefore **2 5 000**, which equals **25,000 Ω** (or 25 k Ω).

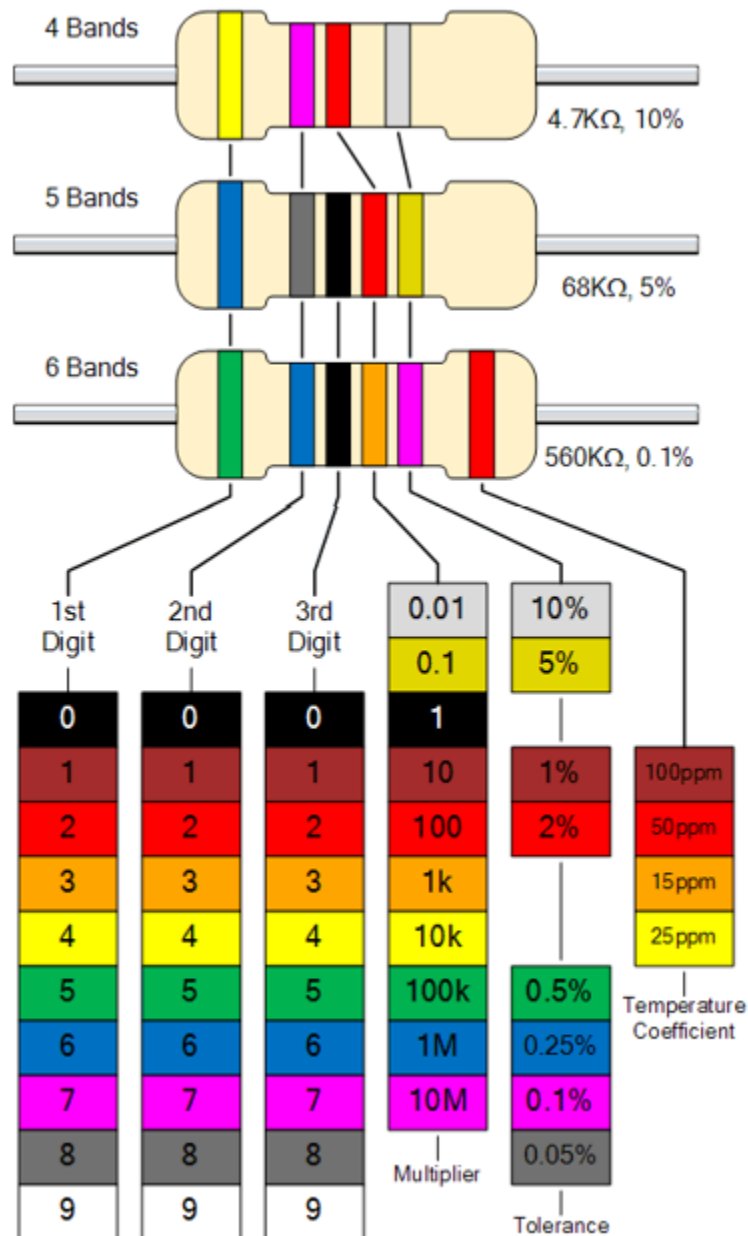


Figure I.1: Standard Resistor Colour Code Chart.

