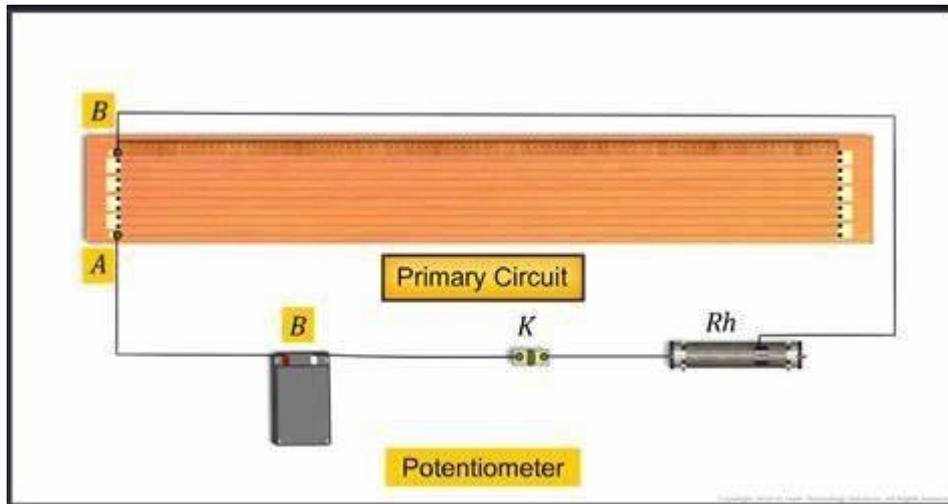




DEPARTMENT OF PHYSICS
MAR THOMA COLLEGE FOR WOMEN, PERUMBAVOOR

POTENTIOMETER



A potentiometer, often referred to as a pot, is a three-terminal variable resistor used to control electrical voltage. It consists of a resistive element with a movable contact (wiper) that can be adjusted to change the resistance between the wiper and the two other terminals. Here's a detailed explanation of potentiometers:

1. Three Terminals: A potentiometer has three terminals: the input terminal (often referred to as the "1"), the output terminal (often referred to as the "3"), and the wiper terminal (usually labeled as the "2"). The input and output terminals are connected to the ends of the resistive element, while the wiper is connected to a movable contact that slides along the resistive track.
2. Resistive Element: The resistive element in a potentiometer is typically made of a resistive material, such as carbon, cermet, or conductive plastic. It extends along the path between the input and output terminals. The resistance of the element is constant.
3. Variable Voltage Divider: A potentiometer operates as a variable voltage divider. As you adjust the wiper's position along the resistive element, it changes the ratio of the resistances between the wiper and the two outer terminals. This variation in resistance results in a variable voltage output between the output terminal and the wiper.
4. Linear vs. Logarithmic Potentiometer: Potentiometers are available in two common types - linear and logarithmic (also known as audio or log). Linear potentiometers provide a linear relationship between the wiper's position and the output voltage. Logarithmic potentiometers offer a more gradual change in resistance and are often used in audio equipment because our perception of loudness is logarithmic.
5. Applications: Potentiometers have a wide range of applications, including:



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- Volume control in audio equipment, like radios and amplifiers.
- Adjusting the brightness of displays and screens.
- Setting the position of a servo motor or variable resistor in many electronic circuits.
- Calibrating and fine-tuning electronic devices and instruments.
- Control in potentiometric sensors, such as rotary position sensors.

6. Trimmer Potentiometers: Trimmer potentiometers are miniature potentiometers designed for fine adjustment or calibration within electronic circuits. They are often mounted on circuit boards and are not meant for frequent manual adjustments.

7. Limitations: Potentiometers can wear out over time, resulting in reduced precision. They are also sensitive to environmental conditions and can accumulate dust or debris, affecting their performance.

8. Electronic Potentiometers: In some applications, digital or electronic potentiometers (e-pots) are used. These are digitally controlled devices that can replace traditional potentiometers and offer precise and programmable control.

Potentiometers are fundamental components in electronics, serving as versatile controls for adjusting variables like voltage, current, and position. They are widely used in a variety of consumer and industrial electronics to provide adjustable settings and fine-tuning capabilities.