



Alternating current simple explanation

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Alternating Currents - Key takeaways

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Alternating current (AC) is a type of electric current that periodically reverses its direction of flow. Its polarity changes over time, and its magnitude fluctuates sinusoidally, typically following a waveform like a sine wave. This variation results in the current alternating between positive and negative values as it cycles through different phases, characterized by its frequency. This behavior is opposite to a direct current (DC), where the waveform remains steady over time.

Alternating current (AC) was developed and popularized by Serbian-American inventor and engineer Nikola Tesla in the late 19th century.

An alternator is a type of generator that creates alternating current (AC). It works by having magnets, called the rotor, spin around near a group of wires that are wrapped in coils on a metal core called the stator. As the magnets rotate, they cause an electric current to flow in the wires, which produces AC voltage. This process repeats as the rotor continues to spin.

An alternating current can be represented graphically, showing its periodic nature and how its direction and magnitude continuously change. This waveform illustrates how AC alternates between positive and negative values, corresponding to the changing polarity of the current. The curve smoothly oscillates, peaking at maximum positive and negative values, with zero crossings where the current momentarily equals zero.

Each complete oscillation from one peak to the next represents one cycle, with the time taken for one cycle being the period of the waveform. The frequency, measured in hertz (Hz), defines how many cycles occur per second, and the amplitude of the wave corresponds to the maximum current or voltage. The wavelength of an AC signal is the distance over which the signal's shape repeats.

The symbol for alternating current (AC) is typically represented as a sine wave, reflecting the sinusoidal nature of AC's voltage and current changes over time.

Generating and transmitting AC over long distances is efficient due to the use of high voltages, which are easily converted with transformers. Large generators produce power and then pass through transformers to increase the voltage for long-distance transmission. Once the electricity reaches a substation, the voltage is lowered and distributed through smaller power lines. Local transformers further reduce the voltage for home use. After passing through a household meter, the current enters a service panel with breakers to prevent overloads and is then distributed to outlets and switches throughout the home.

Article was last reviewed on Tuesday, October 1, 2024

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