Direct current wikipedia

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Direct current (DC) is one-directional flow of electric charge. An electrochemical cell is a prime example of DC power. Direct current may flow through a conductor such as a wire, but can also flow through semiconductors, insulators, or even through a vacuum as in electron or ion beams. The electric current flows in a constant direction, distinguishing it from alternating current (AC). A term formerly used for this type of current was galvanic current.[1]

The abbreviations AC and DC are often used to mean simply alternating and direct, as when they modify current or voltage.[2][3]

Direct current may be converted from an alternating current supply by use of a rectifier, which contains electronic elements (usually) or electromechanical elements (historically) that allow current to flow only in one direction. Direct current may be converted into alternating current via an inverter.

Direct current has many uses, from the charging of batteries to large power supplies for electronic systems, motors, and more. Very large quantities of electrical energy provided via direct-current are used in smelting of aluminum and other electrochemical processes. It is also used for some railways, especially in urban areas. High-voltage direct current is used to transmit large amounts of power from remote generation sites or to interconnect alternating current power grids.

Although DC stands for "direct current", DC often refers to "constant polarity". Under this definition, DC voltages can vary in time, as seen in the raw output of a rectifier or the fluctuating voice signal on a telephone line.

A direct current circuit is an electrical circuit that consists of any combination of constant voltage sources, constant current sources, and resistors. In this case, the circuit voltages and currents are independent of time. A particular circuit voltage or current does not depend on the past value of any circuit voltage or current. This implies that the system of equations that represent a DC circuit do not involve integrals or derivatives with respect to time.

In electronics, it is common to refer to a circuit that is powered by a DC voltage source such as a battery or the output of a DC power supply as a DC circuit even though what is meant is that the circuit is DC powered.

In a DC circuit, a power source (e.g. a battery, capacitor, etc.) has a positive and negative terminal, and likewise, the load also has a positive and negative terminal. To complete the circuit, positive charges need to flow from the power source to the load. The charges will then return to the negative terminal of the load, which will then flow back to the negative terminal of the battery, completing the circuit. If either the positive or negative terminal is disconnected, the circuit will not be complete and the charges will not flow.

In some DC circuit applications, polarity does not matter, which means you can connect positive and negative backwards and the circuit will still be complete and the load will still function normally. However, in most DC applications, polarity does matter, and connecting the circuit backwards will result in the load not working properly.

DC is commonly found in many extra-low voltage applications and some low-voltage applications, especially where these are powered by batteries or solar power systems (since both can produce only DC).

Domestic DC installations usually have different types of sockets, connectors, switches, and fixtures from those suitable for alternating current. This is mostly due to the lower voltages used, resulting in higher currents to produce the same amount of power.

Telephone exchange communication equipment uses standard -48 V DC power supply. The negative polarity is achieved by grounding the positive terminal of power supply system and the battery bank. This is done to prevent electrolysis depositions. Telephone installations have a battery system to ensure power is maintained for subscriber lines during power interruptions.