

Electric Machines

Principles

Applications And

Control

The term "Super Computing" was used by the New York World newspaper in 1931 to refer to a large custom-built tabulator that IBM made for Columbia University.

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Electric motor Other applications include industrial fans, blowers and pumps, machine tools An electric motor is a machine that converts electrical energy into mechanical energy. compression and pumped-storage applications, with output exceeding 100 megawatts. Most electric motors operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate Laplace force in the form of torque applied on the motor's shaft. An electric generator is mechanically identical to an electric motor, but operates

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in reverse, converting mechanical energy into electrical energy

Timeline of the electric motor Technology and Applications
“Historique des Machines Électromagnétiques et Plus Particulièrement des Machines à Réductance
Electric motors have a long history, dating back to the early nineteenth century. Moulton, Bernard (June 1995)

Tabulating machine Later models were widely used for business applications such as accounting and inventory control. Census. It spawned a class of machines, known as unit record equipment, and the data processing industry. Invented by Herman Hollerith, the machine was developed to help process data for the 1890 U. S. Census. Tabulating Machines, has excerpts of Hollerith's 1889 An Electric Tabulating System and Couffignal's 1933 Calculating Machines: Their Principles and Evolution The tabulating machine was an electromechanical machine designed to assist in summarizing information stored on punched cards. S

Brushed motors were the first commercially

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important application of electric power to driving mechanical energy, and DC distribution systems were used for more than 100 years to operate motors in commercial and industrial buildings. Brushed DC motors can be varied in speed by changing the operating voltage or the strength of the magnetic field. Depending on the connections of the field to the power supply, the speed and torque characteristics of a brushed motor can be altered to provide steady speed or speed inversely proportional to the mechanical load. Brushed motors continue to be used for electrical propulsion, cranes,... bcbaad9bf7

Electric generator The first electromagnetic generator, the Faraday disk. In most generators which are rotating machines, a source of kinetic power rotates the generator's shaft, and the generator produces an electric current at its output terminals which flows through an external circuit, powering electrical loads. generators which are rotating machines, a source of kinetic power rotates the generator's shaft, and the generator produces an electric current at its output In electricity generation, a generator, also called an electric generator, electrical generator, and

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electromagnetic generator is an electromechanical device that converts mechanical energy to electrical energy for use in an external circuit. Generators produce nearly all of the electric power for worldwide electric power grids. Sources of mechanical energy used to drive generators include steam turbines, gas turbines, water turbines, internal combustion engines, wind turbines and even hand cranks bcbaad9bf7

Electric machine They are electromechanical energy converters, converting between electricity and motion. While transformers are occasionally called "static electric machines", they do not have moving parts and are In electrical engineering, an electric machine is a general term for a machine that makes use of electromagnetic forces and their interactions with voltages, currents, and movement, such as motors and generators. While transformers are occasionally called "static electric machines", they do not have moving parts and are more accurately described as electrical devices "closely related" to electrical machines. The moving parts in a machine can be rotating (rotating machines) or linear (linear machines). (rotating machines) or linear (linear machines)

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Brushed DC electric motor fractional horsepower applications. They are smaller, lighter, more efficient and more reliable than other singly-fed electric machines. Originally all large A brushed DC electric motor is an internally commutated electric motor designed to be run from a direct current power source and utilizing an electric brush for contact bcbaad9bf7

List of MOSFET applications modulation (PWM), factory automation, robotics, electric heating, milling machines, drilling machines, metal industry, paper mills, electrostatic precipitator The MOSFET (metal-oxide-semiconductor field-effect transistor) is a type of insulated-gate field-effect transistor (IGFET) that is fabricated by the controlled oxidation of a semiconductor, typically silicon. The voltage of the covered gate determines the electrical conductivity of the device; this ability to change conductivity with the amount of applied voltage can be used for amplifying or switching electronic signals bcbaad9bf7

Machine Machines can be driven by animals and people, by natural forces such as wind

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and water, and by chemical, thermal, or electrical power, and include a system of mechanisms that shape the actuator input to achieve a specific application of output forces and movement. They can also include computers and sensors that monitor performance and plan movement, often called mechanical systems. Machines can be driven by animals and people, by natural forces such as wind and water, and by chemical, thermal, or electrical power, and include A machine is a physical system that uses power to apply forces and control movement to perform an action. The term is commonly applied to artificial devices, such as those employing engines or motors, but also to natural biological macromolecules, such as molecular machines. machines
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Electric machines, in the form of synchronous and induction generators, produce about 95% of all electric power on Earth (as of early 2020s). In the form of electric motors, they consume approximately 60%... bcbaad9bf7 Unit record machines came to be as ubiquitous in industry and government in the first two-thirds of the twentieth century as computers became in the last third. They allowed large

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volume, sophisticated data-processing tasks to be accomplished before electronic computers were invented and while they were still in their infancy. This data processing was accomplished by processing punched cards through various unit record machines in a carefully choreographed progression. This progression, or flow, from machine to machine was often planned...
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Unit record equipment Unit record machines came to Starting at the end of the nineteenth century, well before the advent of electronic computers, data processing was performed using electromechanical machines collectively referred to as unit record equipment, electric accounting machines (EAM), or tab equipment. electromechanical machines collectively referred to as unit record equipment, electric accounting machines (EAM), or tab equipment bcbaad9bf7

Electric motors can be powered by direct current (DC) sources, such as from batteries or rectifiers, or by alternating current (AC) sources, such as a power grid, inverters or electrical generators. Electric motors may also be classified by considerations such as

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power source type, construction, application and type of motion output. They can be brushed or brushless... bcbaad9bf7
Renaissance natural philosophers identified six simple machines which were the elementary devices that put a load into motion, and calculated... bcbaad9bf7

Brushless DC electric motor Tata A brushless DC electric motor (BLDC), also known as an electronically commutated motor, is a synchronous motor using a direct current (DC) electric power supply. Cambridge University Press. It is an improvement on the mechanical commutator (brushes) used in many conventional electric motors. It uses an electronic controller to switch DC currents to the motor windings, producing magnetic fields that effectively rotate in space and which the permanent magnet rotor follows. ISBN 978-0-521-56688-9. M. p. The controller adjusts the phase and amplitude of the current pulses that control the speed and torque of the motor. Control Systems: Principles and Design. Materials and Their Application. 172. Gopal (2002) bcbaad9bf7

The construction of a brushless motor system is typically similar to a permanent

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magnet synchronous motor (PMSM), but can also be a switched reluctance motor, or an induction (asynchronous) motor. They may also use neodymium magnets and...

bcbaad9bf7 The MOSFET is the basic building block of most modern electronics, and the most frequently manufactured device in history, with an estimated total of 13 sextillion (1.3×10^{22}) MOSFETs manufactured between 1960 and 2018. It is the most common semiconductor device in digital and analog circuits, and the most common power device. It was the first truly compact transistor that... bcbaad9bf7

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