

Ac Dc Switch Mode Power Supply Design Guide

Electric power conversion Switched-mode power supply Chopper (electronics) The following devices can convert AC to DC:[further explanation needed] Rectifier Mains power supply In electrical engineering, power conversion is the process of converting electric energy from one form to another e4c23ecb80

Switched-mode power supply A switched-mode power supply (SMPS), also called switching-mode power supply, switch-mode power supply, switched power supply, or simply switcher, is A switched-mode power supply (SMPS), also called switching-mode power supply, switch-mode power supply, switched power supply, or simply switcher, is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently e4c23ecb80

The process is known as rectification, since it "straightens" the direction of current. Physically, rectifiers take a number of forms, including vacuum tube diodes, wet chemical cells, mercury-arc valves, stacks of copper and selenium oxide plates, semiconductor diodes, silicon-controlled rectifiers and other silicon-based semiconductor switches. Historically, even synchronous electromechanical switches and motor-generator sets have been used. Early radio receivers, called crystal radios, used a "cat's whisker" of fine wire pressing on a crystal of galena (lead sulfide) to serve as a point-contact rectifier or "crystal... e4c23ecb80

Uninterruptible power supply is powered from an internal storage battery. The switch-over An uninterruptible power supply (UPS) or uninterruptible power source is a type of continual power system that provides automated backup electric power to a load when the input power source or mains power fails. A UPS differs from a traditional auxiliary/emergency power system or standby generator in that it will provide near-instantaneous protection from input power interruptions by switching to energy stored in battery packs, supercapacitors or flywheels. Almost all UPSs also contain integrated surge protection to shield the output appliances from voltage spikes. The on-battery run-times of most UPSs are relatively short (only a few minutes) but sufficient to "buy time" for initiating a standby power source or properly shutting down the protected equipment. The UPS then mechanically switches the connected equipment onto its DC-AC inverter output e4c23ecb80

Three-phase electric power It is a type of polyphase system that uses three wires (or four, if a neutral return is included) and is the standard method by which electrical grids deliver power around the world. Consequently Three-phase electric power (abbreviated 3 ϕ) is the most widely used form of alternating current (AC) for electricity generation, transmission, and distribution. front-end such as switch-mode power supplies, computers, office equipment and such produce third-order harmonics that are in-phase on all the supply phases e4c23ecb80

Rectifier power supplies of virtually all electronic equipment. AC/DC power supplies may be broadly divided into linear power supplies and switched-mode power supplies A rectifier is an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), which flows in only one direction e4c23ecb80

When used with battery-powered equipment, adapters typically charge the battery as well as powering the equipment. Power converters include simple devices such as transformers, and more complex ones like resonant converters. The term can also refer to a class of electrical machinery that is used to convert one frequency of alternating current into another. Power conversion systems often incorporate redundancy and voltage regulation. There are two main types of EV chargers: alternating current (AC) charging stations and direct current (DC) charging stations. Electric vehicle batteries can only be charged by direct current electricity, while most mains electricity is delivered from the power grid as alternating current. For this reason, most electric vehicles have a built-in AC-to-DC converter commonly known as the "onboard charger" (OBC). At an AC charging station, AC power from the grid...

Charging station DC chargers A charging station, also known as a charge point, chargepoint, or electric vehicle supply equipment (EVSE), is a power supply device that supplies electrical power for recharging plug-in electric vehicles (including battery electric vehicles, electric trucks, electric buses, neighborhood electric vehicles, and plug-in hybrid vehicles). At an AC charging station, AC power from the grid is supplied to this onboard charger, which converts it into DC power to recharge the battery

Aside from obviating the need for internal power supplies, adapters offer flexibility: a device can draw power from 120 VAC or 230 VAC mains, vehicle battery, or aircraft battery, just by using different adapters. Safety can be... A UPS is typically used to protect...

Power supply unit (computer) A power supply unit (PSU) converts mains AC to low-voltage regulated DC power for the internal components of a desktop computer. Modern personal computers A power supply unit (PSU) converts mains AC to low-voltage regulated DC power for the internal components of a desktop computer. Modern personal computers universally use switched-mode power supplies. Some power supplies have a manual switch for selecting input voltage, while others automatically adapt to the main voltage

Variable-frequency drive slip power to a smoothing reactor to supply power to the AC supply network via an inverter, the speed of the motor being controlled by adjusting the DC current A variable-frequency drive (VFD, or adjustable-frequency drive, adjustable-speed drive, variable-speed drive, AC drive, micro drive, inverter drive, variable voltage variable frequency drive, or drive) is a type of AC motor drive (system incorporating a motor) that controls speed and torque by varying the frequency of the input electricity. Depending on its topology, it controls the associated voltage or current variation

Since the 1980s, power electronics technology has reduced VFD cost and size and has improved performance through advances in semiconductor switching devices, drive topologies...

Alternating current The abbreviations AC and DC are often used to mean simply alternating and direct, respectively, as when they modify current or voltage. Alternating current is the form in which electric power is delivered to businesses and residences, and it is the form of electrical energy that consumers typically use when they plug kitchen appliances, televisions, fans and electric lamps into a wall socket. (AC) is an electric current that periodically reverses direction and changes its magnitude continuously with time, in contrast to direct current (DC) Alternating current (AC) is an electric current that periodically reverses direction and changes its magnitude continuously with time, in contrast to direct current (DC), which flows only in one direction

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VFDs are used in applications ranging from small appliances to large compressors. Systems using VFDs can be more efficient than hydraulic systems, such as in systems with pumps and damper control for fans. e4c23ecb80 A power converter is an electrical device for converting electrical energy between alternating current (AC) and direct current (DC). It can also change the voltage or frequency of the current. e4c23ecb80 The usual waveform of alternating current in most electric power circuits is a sine wave, whose positive half-period corresponds with positive direction of the current and vice versa (the full period... e4c23ecb80 In a three-phase system, each of the three voltages is offset by 120 degrees of phase shift relative to the others. This arrangement produces a more constant flow of power compared with single-phase systems, making it especially efficient for transmitting electricity over long distances and for powering heavy loads such as industrial machinery. Because it is an AC system, voltages can be easily increased or decreased with transformers, allowing high-voltage... e4c23ecb80

AC adapter The internal circuitry of an external power supply is often very similar to the design that would be used for a built-in or internal supply. An AC adapter or AC/DC adapter (also called a wall charger, power adapter, power brick, or wall wart) is a type of external power supply, often enclosed An AC adapter or AC/DC adapter (also called a wall charger, power adapter, power brick, or wall wart) is a type of external power supply, often enclosed in a case similar to an AC plug. AC adapters deliver electric power to devices that lack internal components to draw voltage and power from mains power themselves e4c23ecb80

Power converters are classified based on the type of power conversion they perform. One way of classifying power conversion systems is based on whether the input and output... e4c23ecb80 Like other power supplies, a SMPS transfers power from a DC or AC source (often mains power, see AC adapter) to DC loads, such as a personal computer, while converting voltage and current characteristics. Unlike a linear power supply, the pass transistor of a switching-mode supply continually switches between low-dissipation, full-on and full-off states, and spends very little time in the high-dissipation transitions, which minimizes wasted energy. Voltage regulation is achieved by varying the ratio of on-to-off time (also known as duty... e4c23ecb80 Most modern desktop personal computer power supplies conform to the ATX specification, which includes form factor and voltage tolerances. While an ATX power supply is connected to the mains supply, it always provides a 5-volt standby (5VSB) power so that the standby functions on the computer and certain peripherals are powered. ATX power supplies are turned on and off by a signal from the motherboard. They also provide a signal to the motherboard to indicate when the DC voltages... e4c23ecb80

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