

Chapter – 5

Applications of power supply

Application of Power Supply

- The power supply is the basic part of any electronic device so it used in numerous industrial machines. So let's discuss their different applications with the detail.

Computer

- The power supply used in computers is a switch-mode power supply that transforms AC signal coming from main into dc voltages.
- These power supplies preferred over the linear power supply due to less price, high efficiency and less weight.

Electric Vehicles

- Electrical vehicles operate on electricity. In these vehicles, different power supplies are used to provide power.

Aircraft

- In different aircraft, DC to DC or AC to DC power supplies is used for usage of power.
- The frequency of these power supplies is four hundred hertz.

Medical Instruments

- Different medical instruments such as ventilators, infusion pumps, surgical instruments operate on the power supply.

A power supply is used in a wide range of applications, smartphones, medical equipment, industrial machinery, communication systems, transportation vehicles, and more, essentially any device that requires a stable DC voltage to operate ; it converts AC mains power to the necessary DC voltage levels for different components within a system.

Key applications of power supplies:

- Consumer electronics: Desktops, laptops, tablets, smartphones, smartwatches, televisions, gaming consoles.
- Industrial applications: Factory automation systems, robotics, machine control systems, PLC(programmable logic controllers).
- Medical devices: Patient monitors, imaging equipment (CT scanners, MRI machines), surgical instruments, defibrillators.
- Communication systems: Routers, switches, cellular towers, base stations, satellite communication systems.
- Transportation: Electric vehicles(Evs), aircraft, trains.
- Test and measurements equipment: Benchtop power supplies for circuit testing, oscilloscopes.

Important aspects of power supplies:

- Voltage regulation: Maintaining a stable output voltage even when the load current changes.
- Current rating: The maximum current a power supply can deliver.
- Efficiency: How effectively the power supply converts AC power to DC power.

- Noise reduction: Minimizing unwanted electrical noise on the output.

Given below are some key applications of power supplies:

-
- Desktop computers, laptops, servers - Converts AC mains to various DC levels like 5V, 12V required by different components.
- Communication systems - Provides steady DC to sensitive circuits in routers, switches, cellular towers, etc.
- Industrial equipment - Ensures reliable operation of machines, and automation systems with large power requirements.
- Medical devices - Deliver precise voltage levels for instruments, monitors, and implants avoiding fluctuations.
- Transportation - Popular in electric vehicles, aircraft, boats for efficient energy distribution.
- Backup power - UPS solutions provide temporary power during outages via batteries to save data, and prevent downtime.
- Power supplies are necessary building blocks in all kinds of electronic and electrical systems, catering to their diverse power needs.