

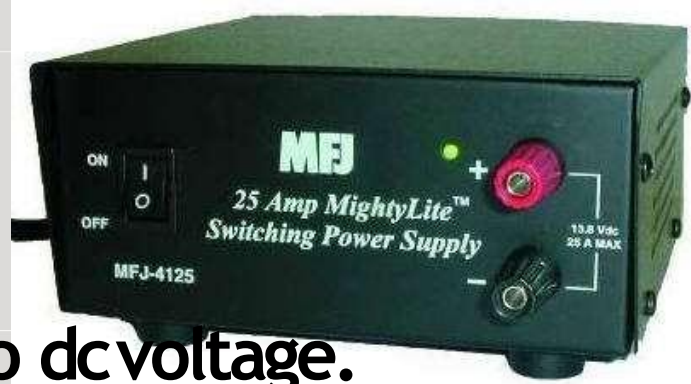
Contents:-

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- Basic principle of PSU and description of main parts
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- What is UPS
- Type of UPS
- UPS Component
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- Advantages/Disadvantages of UPS
- Applications of UPS



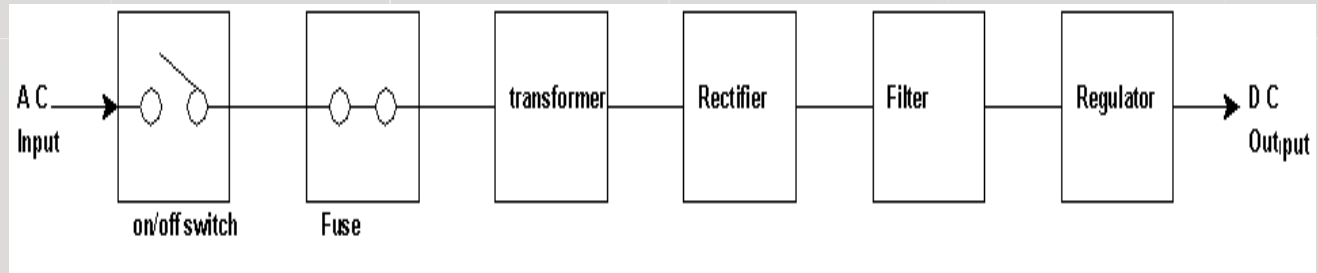
Why power supplies?

- Power supplies provide the necessary power, voltage and current requirements for electronic devices.



- They usually change ac to dc voltage.
 - For example, 120 volts ac is changed to 13.8 volts dc.

Basic Principles of PSU Circuits

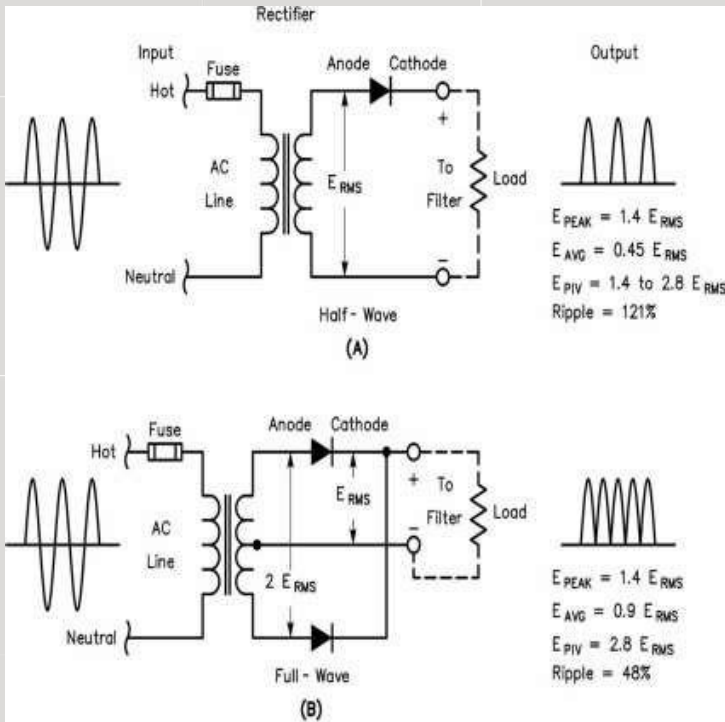


Consist of:

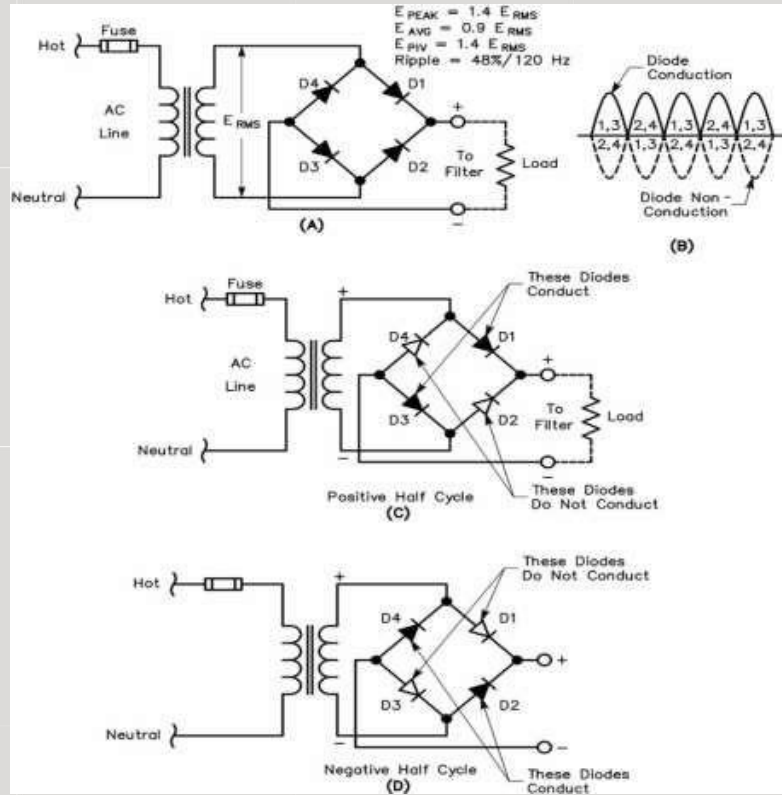
- 1. Transformer - steps ac voltage up or down.**
- 2. Rectifier Diodes - change ac to “ripple” dc.**
- 3. Filter Network - includes capacitors and inductors, smooth out the ripples.**
- 4. Voltage Regulator - keeps the voltage constant.**

Power Supply Specifics

Half Wave - Full Wave Rectifier

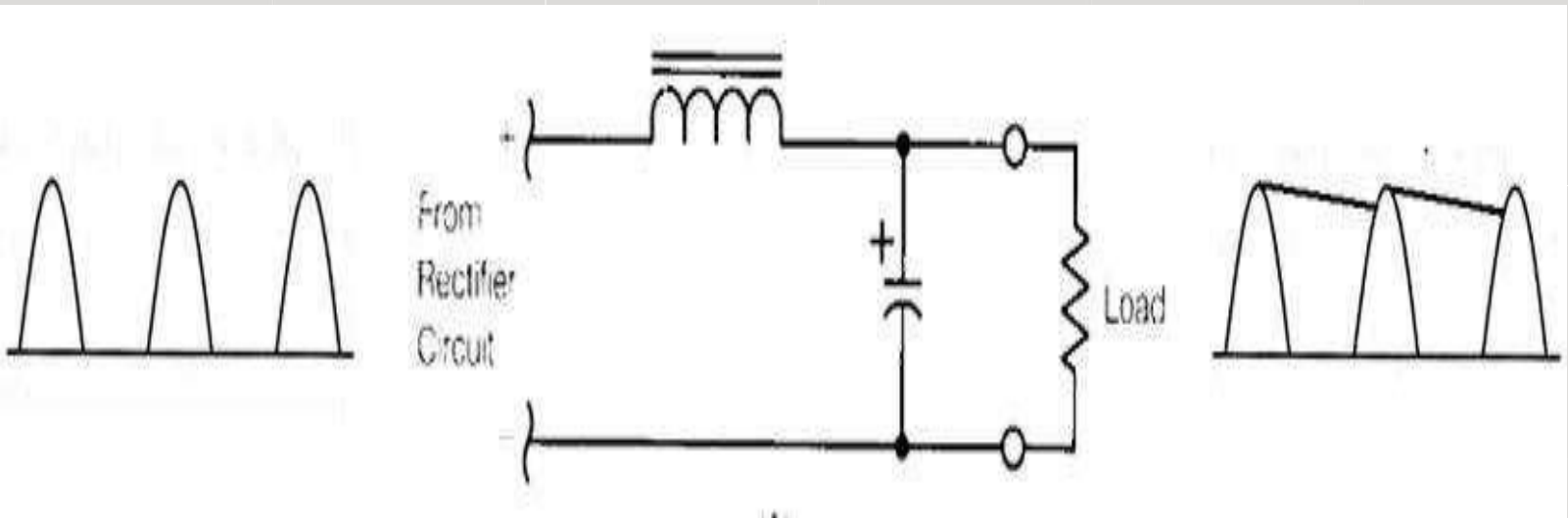


Bridge Rectifier



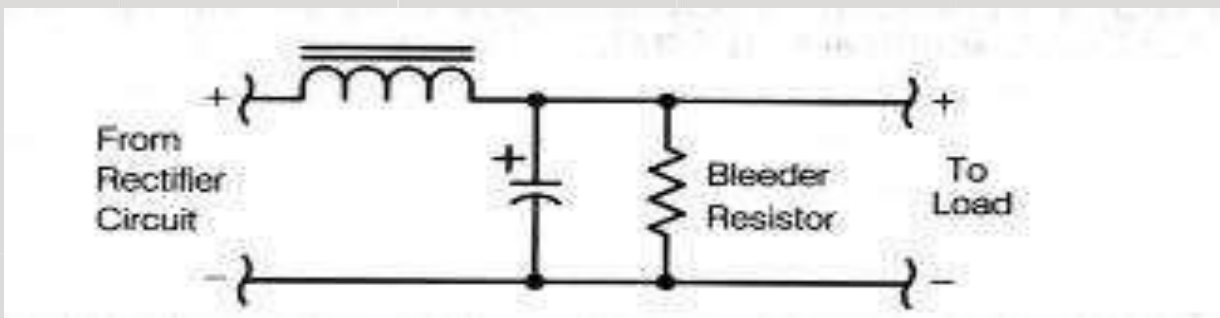
Power Supply Filters

- Capacitors and inductors are used in power supply filter networks. The capacitors and inductors smooth out the “ripple” ac to dc.



Power Supply Safety

- Grounding is important.
- Connection integrity is important.
 - Somewhere neutral and ground are connected together.
- Bleeder resistors across the filter capacitors “bleed off” charge when supply is turned off.



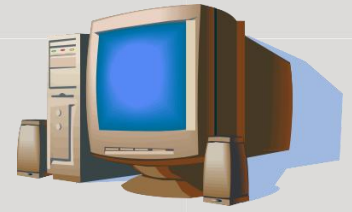
Switched Mode Power Supply:

- ❑ An electrical power supply that incorporates a switching regulator to convert electrical power efficiently.

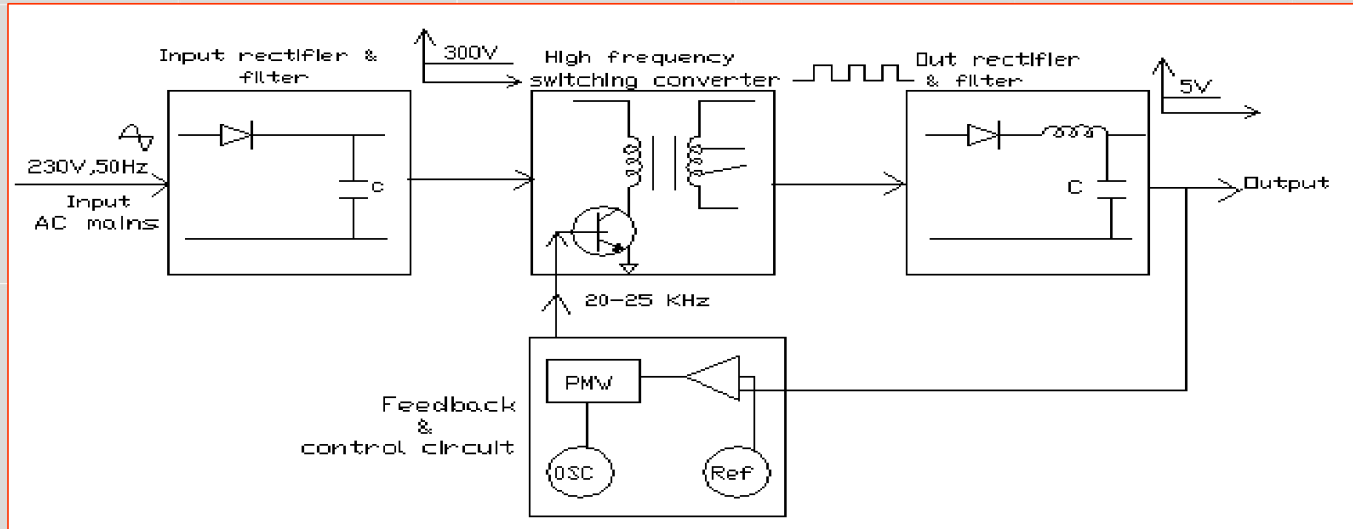


- ❑ It transfers power from a source, to a load, while converting voltage and current characteristics.
- ❑ Voltage regulation is achieved by varying the ratio of on-to-off time.

Block diagram of a SMPS

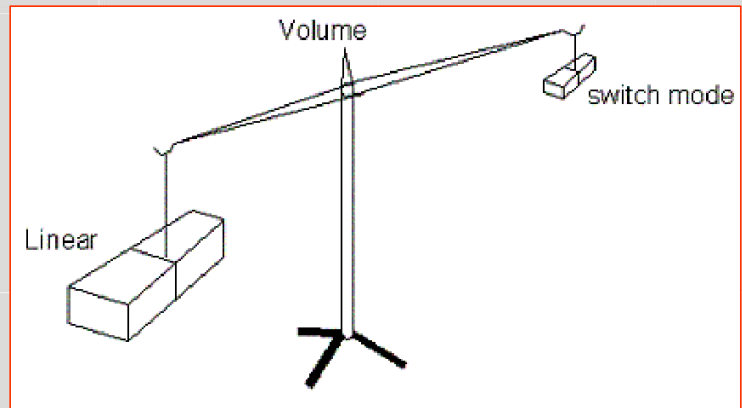


Functional Block Diagram of SMPS



Linear and SMPS Comparison

- Volume / Weight :



- Adjustable Frequency :

Switch mode allows adjusting the frequency

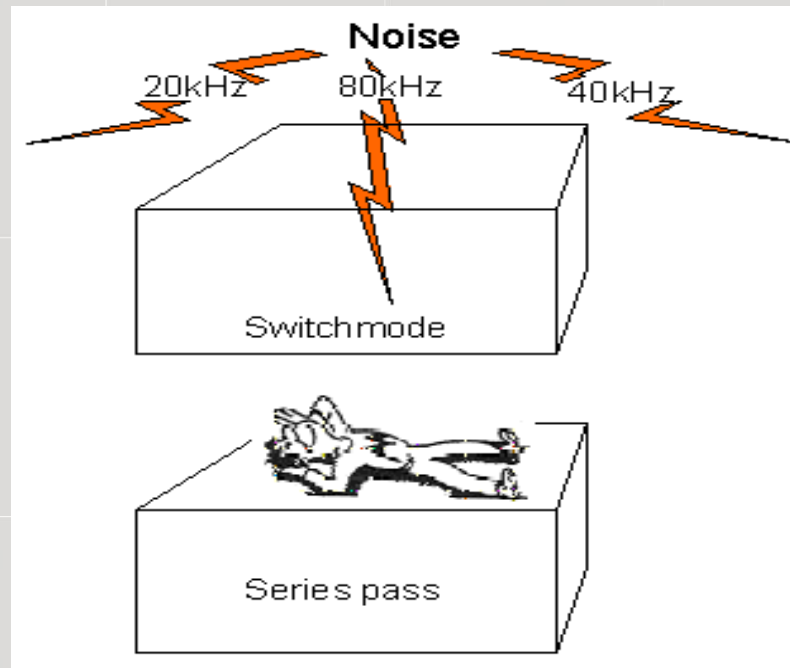
from 1 to 300 kHz

- Flexibility :

SMPS more flexible due to capability of adjusting frequency

Linear and SMPS Comparison

- **Noise :**



Noise comparison between series pass and SMPS

Advantages & Disadvantages of SMPS over Linear Power Supplies:

Advantages of SMPS:

1. Lower weight
2. Smaller size
3. Higher efficiency
4. Lower power dissipation
5. Wide ac input voltage range
6. Reduced costs

Disadvantages of SMPS:

1. Complexity of the circuit



Applications of SMPS:-

- 1. Machine tool industries
- 2. Security Systems
(Closed circuit cameras)
- 3. Support supplies with PLC's
- 4. Personal Computers
- 5. Mobile Phone chargers



SMPS in Indian markets:



iball 600W
Rs. 4700



Antec 750W
Rs. 6600



Cooler master 550W
Rs. 3800



Seasonic 500W
Rs. 3600



UMAX 450W
Rs. 570



Corsair 750W
Rs. 10700

UNINTERRUPTIBLE POWER SUPPLIES

AN UNINTERRUPTIBLE POWER SUPPLY (UPS) IS A DEVICE THAT HAS AN ALTERNATE SOURCE OF ENERGY THAT CAN PROVIDE POWER WHEN THE PRIMARY POWER SOURCE IS TEMPORARILY DISABLED



THE SWITCHOVER TIME MUST BE SMALL ENOUGH TO NOT CAUSE A DISRUPTION IN THE OPERATION OF THE LOADS