

## 5.1 UNINTERRUPTIBLE POWER SUPPLIES (UPS)

UPS *i.e* uninterruptible power supply as the name suggests is an arrangement to get continuous A.C. power for the critical loads like computers, hospitals and other emergency loads even in case of A.C power / mains failure.

The main objective of a UPS system is to provide uninterruptible power to the critical load connected to it. The second main objective of a UPS is to provide a clean and stable power to the sophisticated and sensitive electronic equipment. The critical loads like computer system, communication systems, continuous process industries require constant voltage supply. Moreover, failure of mains supply can cause loss of data in computers, wastage of materials in continuous process industries etc. For that reasons these critical loads are always fed from UPS.

An U.P.S is just such as alternative source. A static UPS, in general, consists of a rectifier, a battery charging unit, a battery bank and an inverter. The rectifier converts the commercial AC input into dc suitable for input to the battery bank and the inverter. The system should be capable of supplying power to the inverter when the commercial supply is either slightly below the normal voltage or slightly above.

The block diagram of a commonly used U.P.S is shown in figure 5.1

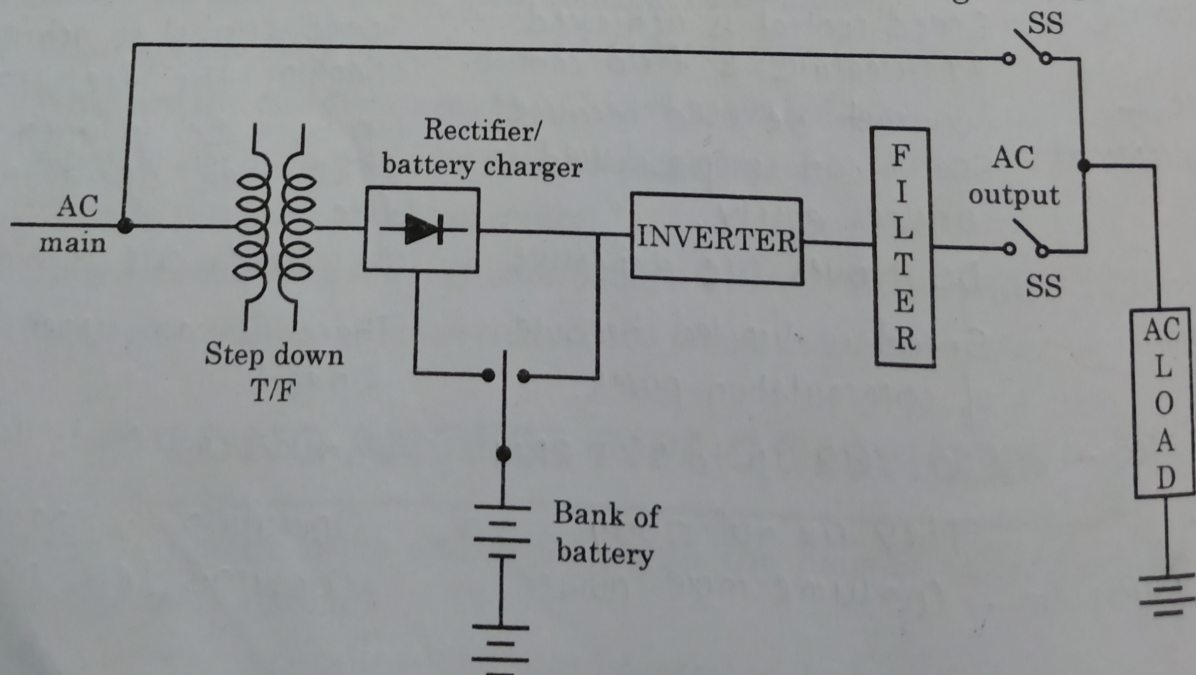


Fig. 5.1. Uninterrupted Power Supply

Its basic parts are as follows :

- (i) **Battery charger** : It is used for charging the battery. It converts ac to dc. It has specified V/I characteristics, so that the battery is not overcharged. It will charge a discharged battery at a constant rate, so an SCR converter with a V/I controller is used.
- (ii) **Bank of Battery** : It supply the full load current in case of main supply failure. So its choice depends upon the load current and voltage and duration say ten minutes.
- (iii) **Rectifier / Inverter** : It rectify the main supply to dc then invert it to have desired constant supply frequency and voltage. The output of the inverter should be sinusoidal.
- (iv) **Filter** : It eliminate the higher order harmonics.
- (v) **Switch** : A static contractor switch is used to connect the load from inverter or from the supply. It should be able to disconnect the faulty part and switch to the other portion without interruption. Its required operating time is 10ms.

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## Applications of UPS

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① Data Centers - IT Server and Storage  
Power Backup

② Medical! - Beds & Cart Batteries

③ Security Systems! - Battery Backup, Cameras,  
Lights

④ Telecom! - Tower Backup, Cable/Fiber Node  
Backup

⑤ UPS Systems! - Used in computers in offices

⑥ Electric Mobility! - Wheelchairs, Scooters, E-bikes

Electric Toys