



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35



**Accredited by NBA-AICTE and Accredited by NAAC – UGC with A++ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS
ENGINEERING**

**COURSE NAME: 23EET101/BASIC ELECTRICAL AND
ELECTRONICS ENGINEERING**

I YEAR / I SEMESTER

Unit IV – ANALOG ELECTRONICS

Topic : Applications



UPS (Uninterruptible Power Supply)

- an **electrical device** used to provide **emergency electrical power** to different electrical loads in the case of a **main power supply failure**.
- uses batteries and supercapacitors **to store electrical energy** and delivers this stored electrical energy when the main input power supply fails.
- **also protects sensitive equipment** such as computers, data centers, TV sets, industrial process control and monitoring systems and many other electronic devices.





MAIN PARTS OF UPS

- **Battery** – The battery works as the energy storage unit in the UPS system. It provides the stored electrical energy for a sufficient amount of time during main power failure.
- **Rectifier or Charger Circuit** – It converts the supply voltage of 240 VAC into 12 V (or any other battery voltage) DC. It supplies this rectified DC power to the battery for storage.
- **Inverter** – It converts the DC output power of the battery into ac power to supply the load during mains power failure.
- **Static Switch** – It is a semiconductor device such as a thyristor which transfers the load from the utility to the inverter (and the inverter to the utility) without any interruption in the power supply to the load.



OFF-LINE UPS (STANDBY UPS)

- The system will start operating only when there is a power failure in the supply mains.

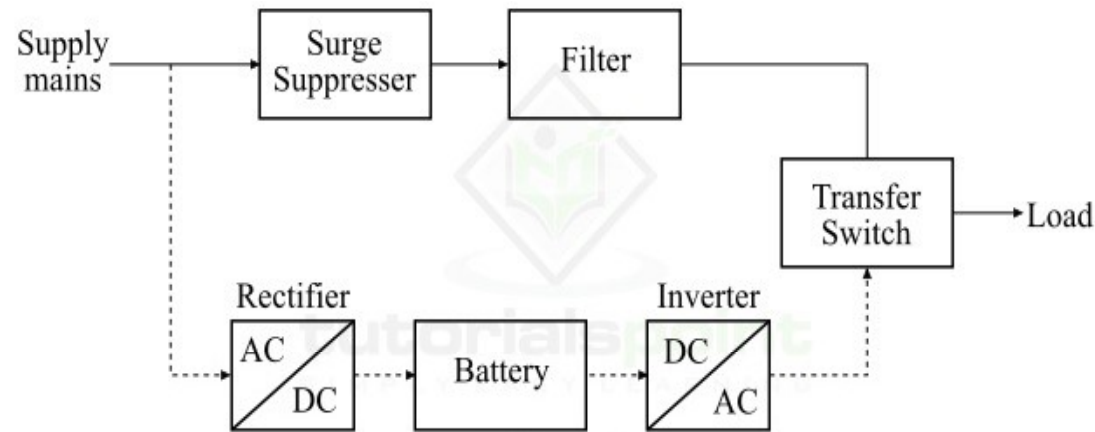


Figure 1 - Off Line UPS

- The ac power from the supply mains is first converted into DC power using a rectifier circuit and then stored in the battery connected to the output port of the rectifier. When, there is any power failure that occurs in the supply mains, the dc power of the battery is converted into ac power using a power inverter and is then transferred to the load connected to the ups system.



ON-LINE UPS (DOUBLE CONVERSION METHOD)

- The input AC power is first converted into DC power by a rectifier to charge the UPS battery, and then this DC power is converted back into AC power by a power inverter to power the load equipment.
- commonly used in such systems where electrical isolation is required between the input and output.
- It involves two simultaneous conversion processes (Double Conversion Process)

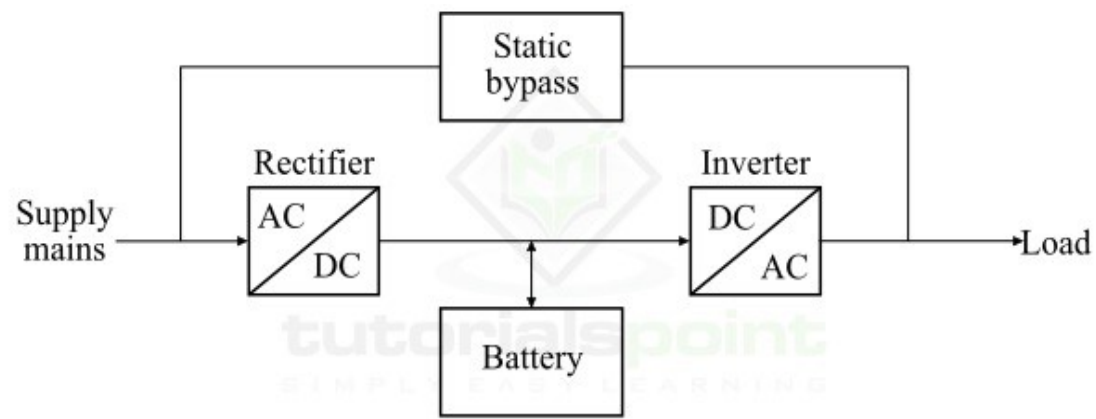


Figure 2 - On Line UPS



LINE INTERACTIVE UPS

- System is connected in parallel with the AC mains in a standby configuration so that these systems can interact with the AC input system.
- mainly used in small businesses and offices.
- bypass is also provided which transfers the load to a bypass AC input when the UPS fails to function.

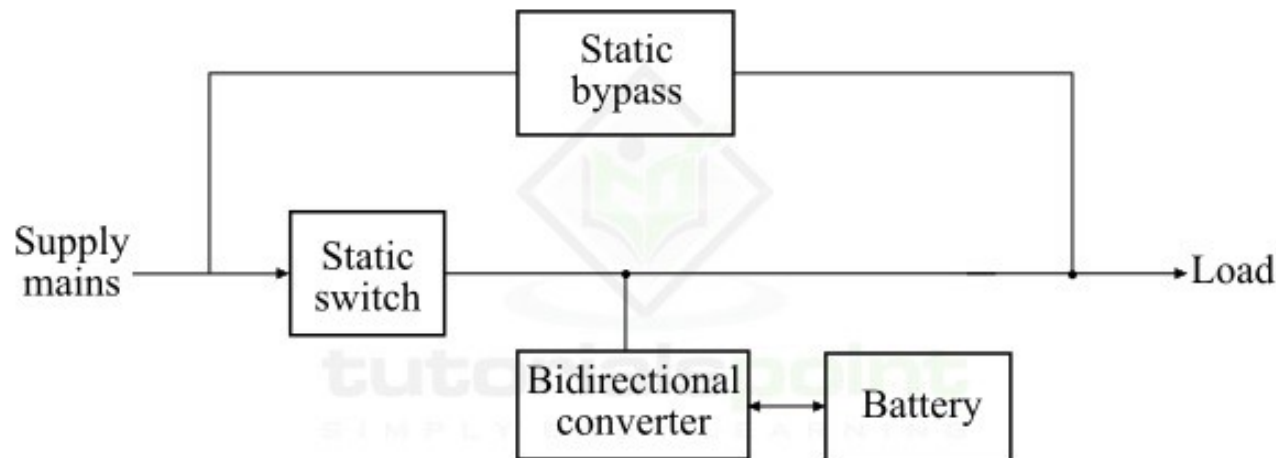


Figure 3 - Line Interactive UPS



*Thank
you!*