INVERTERS

The converters which converts the power into ac power popularly known as the inverters,. The application areas for the inverters include the uninterrupted power supply (UPS), the ac motor speed controllers, etc.

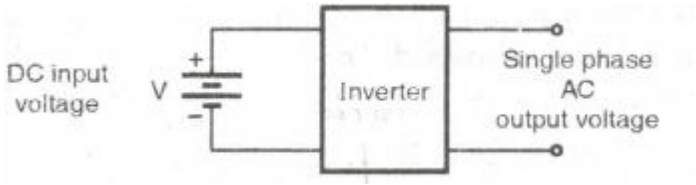

Fig.8.1 Block diagram of an inverter.

The inverters can be classified based on a number of factors like, the nature of output waveform (sine, square, quasi square, PWM etc), the power devices being used (thyristor transistor, MOSFETs IGBTs), the configuration being used, (series. parallel, half bridge, Full bridge), the type of commutation circuit that is being employed and Voltage source and current source inverters.

The thyristorised inverters use SCRs as power switches. Because the input source of power is pure de in nature, forced commutation circuit is an essential part of thyristorised inverters. The commutation circuits must be carefully designed to ensure a successful commutation of SCRs. The addition of the commutation circuit makes the thyristorised inverters bulky and costly. The size and the cost of the circuit can be reduced to some extent if the operating frequency is increased but then the inverter grade thyristors which are special thyristors manufactured to operate at a higher frequency must be used, which are costly.

Typical applications
Un-interruptible power supply (UPS), Industrial (induction motor) drives, Traction, HVDC.

8.1 Classification of Inverters

There are different basis of classification of inverters. Inverters are broadly classified as current source inverter and voltage source inverters. Moreover it can be classified on the basis of devices used (SCR or gate commutation devices), circuit configuration (half bridge or full bridge), nature of output voltage (square, quasi square or sine wave), type of circuit (switched mode PWM or resonant converters) etc.

8.2 Principle of Operation:

1. The principle of single phase transistorised inverters can be explained with the help of Fig. 8.2. The configuration is known as the half bridge configuration**.**
2. The transistor Q1 is turned on for a time $T_0/2$, which makes the instantaneous voltage across the load Vo = V*12.*
3. If transistor Q_2 is turned on at the instant $T_0/2$ by turning Q1 off then -V/2 appears across the load.

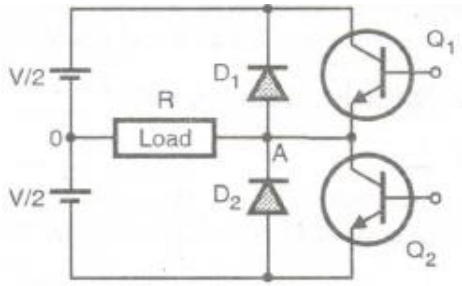

Fig.8.2 Half bridge inverter

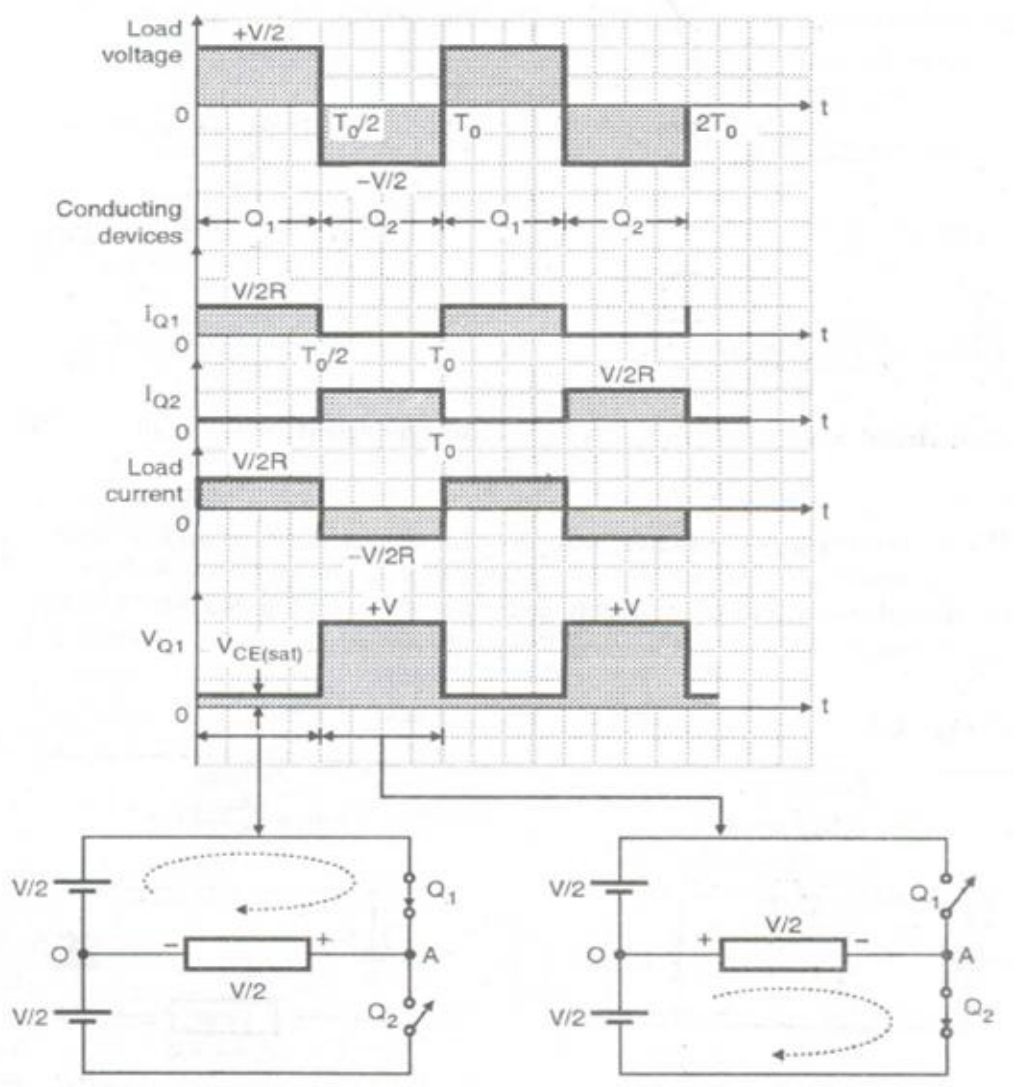

Fig. Load voltage and current waveforms with resistive load for half bridge inverter.