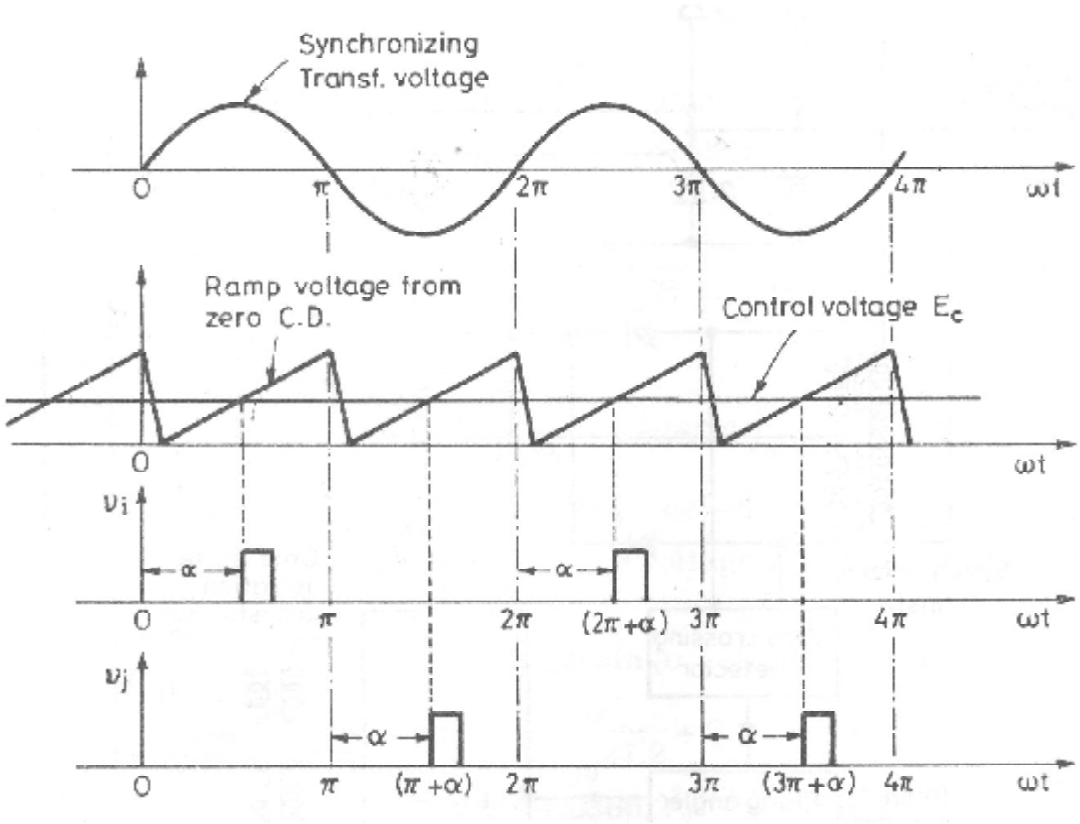
Rectifier Firing Circuit Using IC TCA785:

TCA785 IC is phase control IC used for generating gate signals for single phase rectifier. For synchronization step down transformer is used to step down the supply voltage suitable for zero crossing detectors. The zero crossing detector converts AC input voltage signal into square wave and then generate ramp voltage and synchronizes this ramp voltage with the zero crossing of the AC supply voltage as shown in figure. The constant amplitude ramp voltage is compared with control voltage E_C. When rising ramp voltage equals control voltage E_C, a pulse signal of controlled duration is generated as shown in fig. These signal are indicated as Vi employed to turn on the SCR's in the positive half cycle and Vj is used to trigger SCR's in the negative half cycle for the power circuit. If E_C is lowered, firing angle is decreased and in case E_C rose, firing angle increased. This shows the firing angle is directly proportional to the control signal.



Synchronize Signal:

The main function of the synchronizing circuit is to derive low voltage signals to the control circuit which operates at low voltages. These low voltage signals must be synchronized to the voltages supplied to the main power circuit. Step down transformers may be used for this purpose with filter circuit to avoid waveform distortion if any.

Zero Cross Detector:

The main function of the zero cross detector is to convert synchronize signal to square wave signal.

Ramp Generator:

The main function of this section is to generate the ramp signal using the zero cross detector output.

Ramp Comparator:
The main function of this section is to compares the ramp signal with the reference voltage signal and generates the gate signal with variable angle.

Pulse Transformer:

The pulse transformer section provides isolation between firing circuit and the power circuit circuit.