Gate Triggering

Gate Triggering: This is the most commonly used method for triggering SCRs. In laboratories, almost all the SCR devices are triggered by this process. By applying a positive signal at the gate terminal of the device, it can be triggered much before the specified breakover voltage. The conduction period of the SCR can be controlled by varying the gate signal within the specified values of the maximum and minimum gate currents. For gate triggering, a signal is applied between the gate and cathode of the device. Three types of signal can be used for this purpose. They are either DC signals, pulse signals or AC signals.

(1) DC Gate Triggering: In this type of triggering, a DC voltage of proper magnitude and polarity is applied between the gate and the cathode of the device in such a way that the gate becomes positive with respect to the cathode. When the applied voltage is sufficient to produce the required gate current, the device starts conducting. One drawback of this scheme is that both the power and control circuit are DC and there is no isolation between the two another disadvantage of this process is that a continuous DC signal has to be applied, at the gate causing more gate power loss.

(2) AC Gate Triggering: AC source is most commonly used for the gate signal in all application of thyristor control adopted for AC applications. This scheme provides the proper isolation between the power and the control circuits. The firing angle control is obtained vary conveniently by changing the phase angle of the control signal. However, the gate drive is maintained for one half cycles after the device is turned ON, and a reverse voltage is applied between the gate and the cathode during the negative half cycle. The drawback of this scheme is that a separate transformer is required to step down the AC supply, which adds to the cost.

(3) Pulse Gate Triggering: This is the most popular method for triggering the device. In this method, the gate drive consists of a single pulse appearing periodically or a sequence of high frequency pulses. This is known as carrier frequency gating. A pulse transformer is used for isolation. The main advantage of this method is that there is no need of applying continuous signals and hence, the gate losses are very much reduced. Electrical isolation is also provided between the main device supply andits gating signals.