Abstract

In the industrial sector the various motoring loads are continuously running and increasing the inductive load. So the power factor in this system get reduces due to the inductive reactive power. But the electricity board has a standard limit regarding the power factor values and if the power factor goes below the specified limit the electricity company charges the penalty to the industrial consumers. Power factor correction is the process of compensating a lagging current by a leading current, through connecting capacitance to the supply.

This project is designed to minimize penalty for industrial units by using automatic power factor correction unit. Power factor is defined as the ratio of real power to apparent power. This definition is often mathematically represented as KW/KVA, where the numerator is the active (real) power and the denominator is the (active + reactive) or apparent power. Reactive power is the non working power generated by the magnetic and inductive loads, to generate magnetic flux. The increase in reactive power increases the apparent power, so the power factor also decreases. Having low power factor, the industry needs more energy to meet its demand, so the efficiency decreases.

In this proposed system the time lag between the zero voltage pulse and zero current pulse duly generated by suitable operational amplifier circuits in comparator mode are fed to two interrupt pins of the microcontroller. It displays the time lag between the current and voltage on an LCD. The program takes over to actuate appropriate number of relays from its output to bring shunt capacitors into the load circuit to get the power factor till it reaches near unity. The microcontroller used in the project belongs to 8051 family.