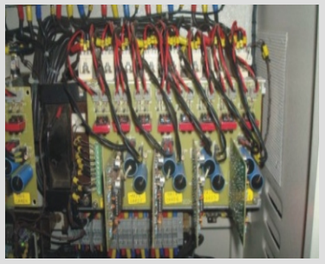
TROPICAL ELECTRONIC EQUIPMENT CO.

AUTOMATIC POWER FACTOR CORRECTION BY THYRISTOR-SWITCHED CAPACITOR BANKS



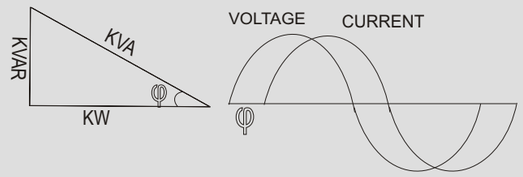
Salient Features

* No Harmonics and voltage spike generation due to Thyristorised zero-current switching of the Capacitors.
* Repeated number of switching operations.
* Closed loop control and measuring circuit.
* Accurate control of Power Factor of the System by means of Ultra fast reactive power compensation.
* Display of various electrical parameters
* RS 232 C serial port facility available to read out voltage, Current, Capacitor Current, PF, Active, Reactive, Apparent and Capacitive power.

Most advanced Technology to continuously correct and maintain the Power Factor of the Electrical switching of Capacitors at zero curerent Installations Near unity by Solid State(Thyristorised)

Introduction

The total power supplied by Electric Utilities consists of Real Power (KW) which produce energy and Reactive Power and the Total Power.
loading capacity and the efficiency of the supply system.
The Power factor is defined as the ratio between the Real power (KVAR) generated by Inductive Machines which decreases



$$\text{POWER FACTOR(PF)} = \frac{\text{REAL POWER(KW)}}{\text{APPARENT POWER(KVA)}} = \cos\varphi$$

Electric Supply Companies charge a heavy penalty to the Consumer if PF of the System is can be controlled by switching capacitors as per KVAR demand with the help of Power Factor Controllers (PFC below a average value. PF of the System

DESCRIPTION

The modern Industries use numbers of AC,

DC motors and Drives, Rectifiers, Inverters,
Induction Furnaces and Welding Machines adding reactive power to Electrical System
Uncompensated reactive power results in poor PF, voltage instability, flickering, high current consumption, increased maximum demand, high losses, low supply loading capacity, overrating of switchgears and cables, high Electric consumption and penalties. The reactive Power requirement in such industries varies rapidly within every few cycles.

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The conventional PFC system cannot take care of such varying loads due to their inherent slow response due to the Contactor switching of the capacitors. When Capacitors are switched at any

point in the waveform other than that at zero-current crossing, instantly very high short circuit current flows in the system causing serious stress on Capacitors, Transformers, and switchgear computers, PLCs and many other sensitive systems
switchgear contacts are regular phenomenon. The inrush current caused by the Capacitor switching also generates high voltage spikes affecting all types of sophisticated Electronic installations like contacts. In such situation, blowing of fuses, fast deterioration of Capacitors and wear tear of

To overcome all the shortcomings of conventional means of PF correction, we employ the latest technology of zero-current switching of required Capacitor Banks through Thyristorised Solid state the maximum saving in Electrical Power
In this scheme a high speed reactive load compensation on cycle to cycle basis is possible to effect switches in response to KVAR demand computed by a microcontroller- based PF controller

Advantages of Thyristor switched Capacitor Banks

- ■ No inrush current and no voltage spikes due to zero-current static switching of Capacitors. Distribution transformer very often not subjected to short circuit current, its life increases
- ■ Absence of voltage and current surges in distribution network increases the life and reliability of Electronic Systems and Equipments.
- □ Smooth connection and disconnection of Capacitor enhances its life minimum three to four times
- ■ Rebate, no penalty and a substantial reduction in monthly Electric bill.
- □ Compensation at low voltage is possible
- □ Very reliable and maintenance free system as no Contactor switching of Capacitors are involved
- ◘ No over compensation, under compensation and unbalanced compensation of Reactive Power

APPLICATIONS

The APFC System is even very effective for fast varying loads where reactive power consumption varies within a cycle or two. It is most useful and invariably to be installed in following locations

1. Moulding shop, employing large numbers of injection & Blow moulding Machines Plastic Extrusion & Printing Plants. Automobile Industries & Railway workshops using large number of Spot & Arc Welding Machines.
2. Hospitals, Hotels, Banks, Office Complexes, Tele-communication, Shopping Molls, Large Housing Societies where Air conditioning Plant, Lifts, Tube lights and Motor Pumps are in operation
3. Crushers, Rolling & Textile Mills, Sugar Mills, Press Shop, Chemical and Process Industries.

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