AUTOMATIC POWER FACTOR CONTROLLER

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ABSTRACT

The power factor correction of electrical loads is a common problem to almost all the industrial sector.Most of the loads draw a certain quantity of active power together with reactive power from the mains.The active power(kW) actually performs the work whereas the reactive power(KVAr) could be interpreted as an undesirable burden on supply.The increased flow of reactive power has various disadvantages such as overloading of power Source,higher voltage drops throughout the system,higher KVA demand,additional heating and loss of energy due to increased cable losses,etc.It is therefore essential that all efforts should be made to reduce the flow of reactive power in order to optimize system performance and achieve cost saving.Automatic power factor controller can be applied to industries,power system and house holds to make them stable and due to that the system becomes stable and efficiency of system as well as the appratus increases.The controlling of power is achieved by using a ARM7 controller.

Keyword : *Power factor,reactive power,ARm7*

1. INTRODUCTION

The electricity supply industry is undergoing a profound transformation worldwide.The demand of electrical energy is increasing day by day.More and more inductive loads are main reason for low power factor in power system.Therefore we need to develop a method to improve the power factor automatically.Automatic power factor control is the solution to this problem.This project is designed to improve the power factor automatically whenever it falls a certain level.By improving the power factor automatically ,poor system efficiency can be improved.The input to circuit is applied from a regulated power supply.The output is obtained from pulsating DC voltage.In this project we are going to use capacitor kvar as per the requirement in the line.The control unit checks for Kvar requirement in the running KW load and even if load is changed the control unit selects the appropriate capacitor bank to keep the power factor to unity.The active power(kW) actually performs the work whereas the reactive power(KVAr) could be interpreted as an undesirable burden on supply.The increase flow of reactive power has few disadvantages such as overloading of power sources,higher voltage drop,additional heating etc.It is therefore essential that all efforts should be made to reduce the flow of reactive power in order to optimize system performance and achieve cost saving.

1.1 OBJECTIVE

The primary Goal of this project is to create a circuit or device to control the power factor automatically.Also it controls the load power factor by sensing various available parameters.

1.2 SPECIFICATIONS

The specifications are as follows:
1.Automatic self adjustment to any capacitor value.
2.AUTO enable/disable facility.
3.Digital indication of power factor,present parameters and specified initial data.
4.Digital encoded reading of capacitor sizes.
5.Visual display of target alarm.

6.Digital display of voltage,current,kW,kVAr and kVA.
7.Digital setting of individual parameters including targeting power factor,switching time,step limit etc.
8.Stage indication of steps switched in as well as total banks in operation.

2. LITERATURE SURVEY

2.1 POWER FACTOR

Power factor is the ratio between the KW and the KVA drawn by an electrical load where the KW is actual load power and KVA is apparent load power. It is a measure of how effectively the current is being converted into useful work output and more particularly is a good indicator of effect of load current on efficiency of supply system.

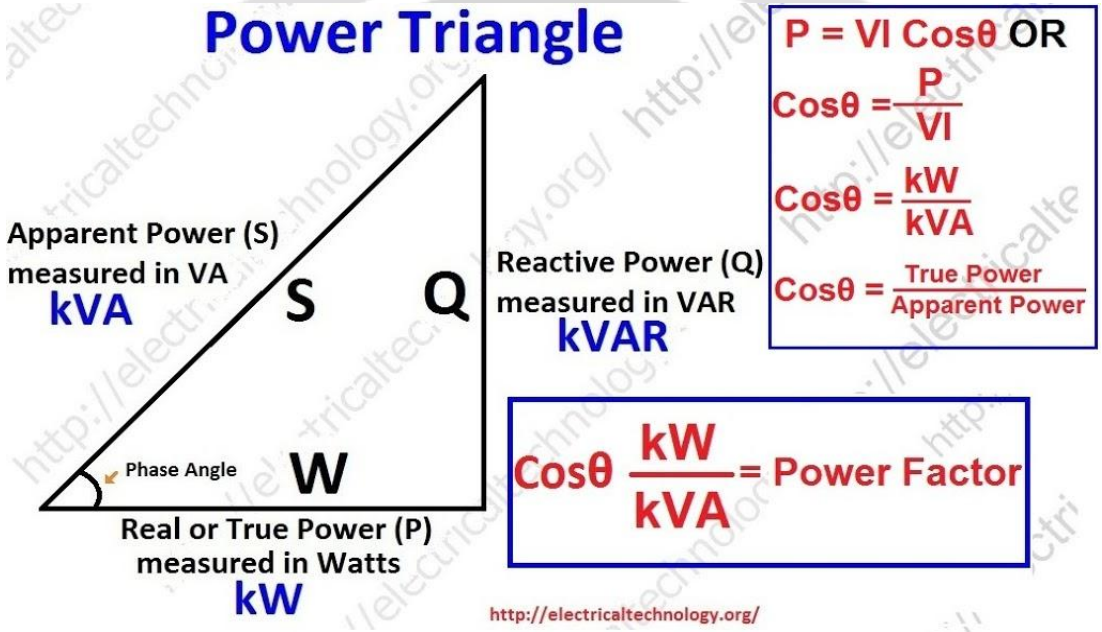

Fig -1

All current will cause losses in supply and distribution system. A load with a power factor of 1.0 results in most efficient loading of supply and a load with a power factor of 0.5 will result in much higher losses in supply system. A poor power factor of 1.0 result in the most efficient loading of supply and a load with power factor of 0.5 will result in much higher losses in supply system.

2.2 CAUSES OF LOW POWER FACTOR

Inductive loads are the sources of Reactive power which includes:

1. Transformers
2. Induction motors
3. Induction generators
4. High intensity discharge lighting

3.CIRCUIT DIAGRAM

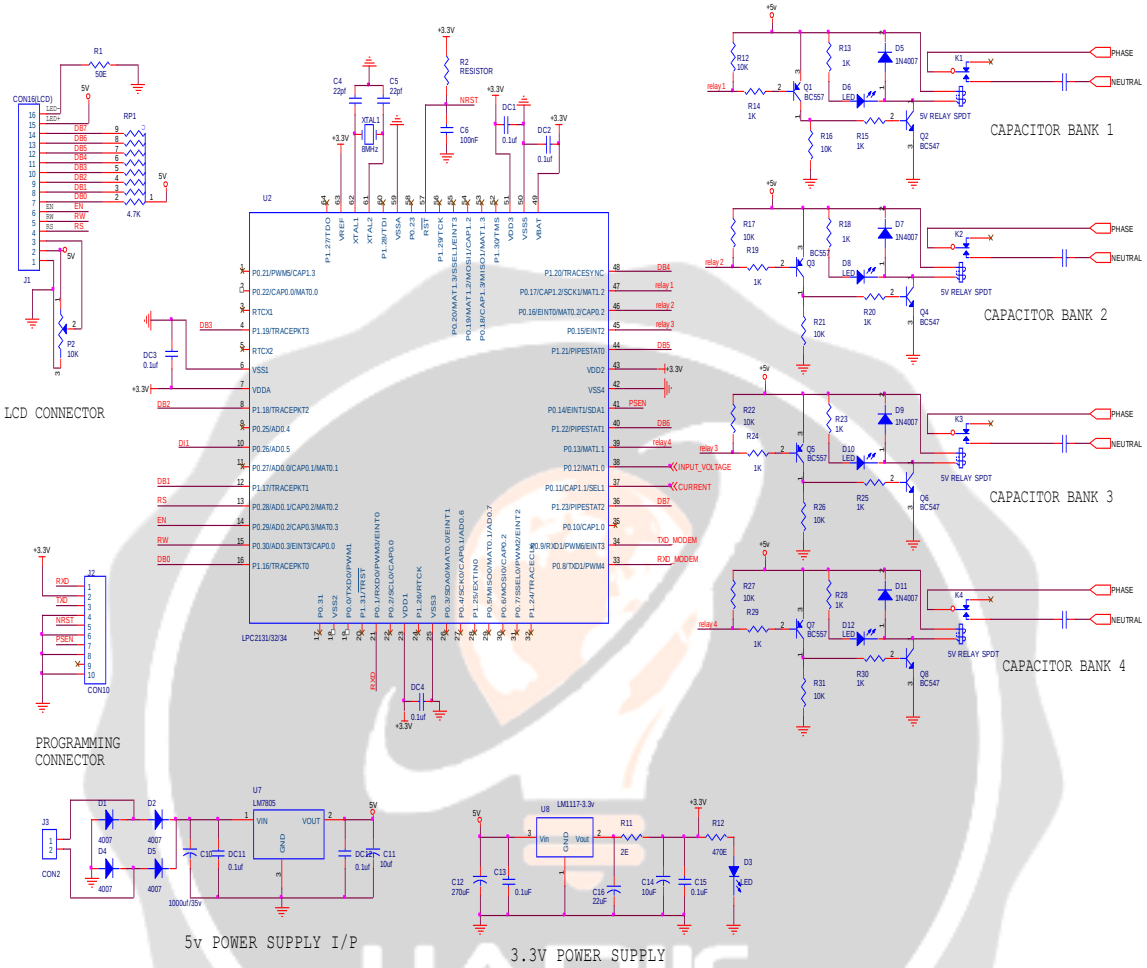

FIG-2

3.1 FLOW CHART

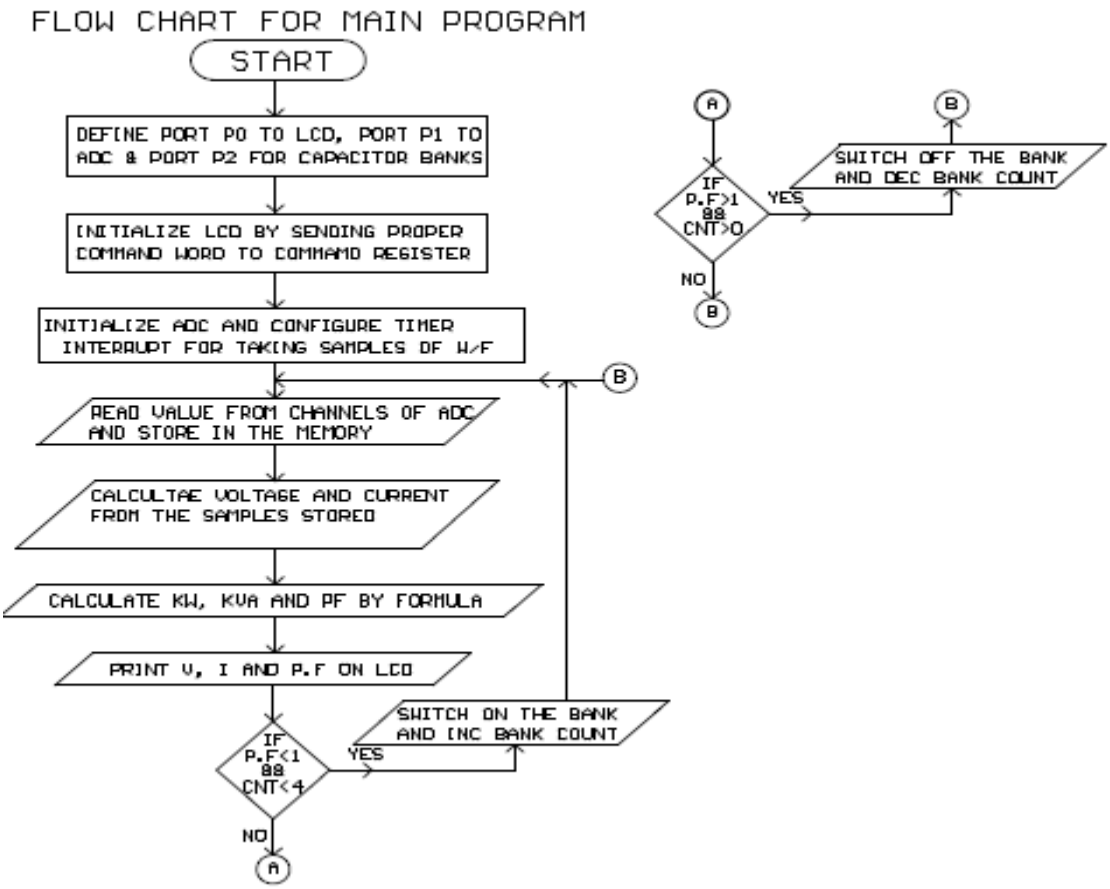

Fig -3

3.2 APPLICATION

Used in process industries
Sugar industries.
Used in molding shops for employing large number of spot injection machine. Automotive Industries for employing large number of spot welding machine. Press shops,Tool cutting machines.
Crushers,Rolling mills,Paper mills,Rice mills.

4. CONCLUSIONS

In this we have introduce the concept of automatic power factor controller. The main motive of the project is to minimize the high power consumption.This project will ensure that by observing all aspects of power factor it is clear that power factor is most significant part for utility company and consumer.Utility companies get rid from power losses while consumers are free from low power factor penalty charges.By installing this device the power factor gets improved thus minimizing line losses and improving efficiency of system.Hence it can be concluded that

power factor controller can be applied to industries,power systems and also house holds to make them stable and more efficient.Also due to use of ARM7 various parameters can be controlled and use of extra hardware can be reduced.

5. ACKNOWLEDGEMENT

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