A REVIEW PAPER ON AUTOMATIC POWER FACTOR CORRECTION

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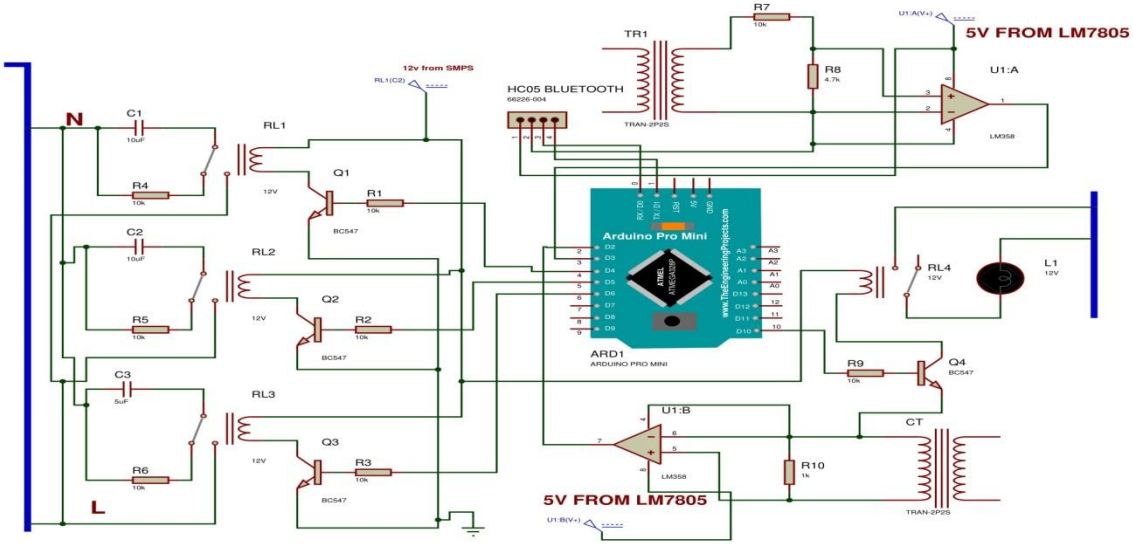
Abstract *:*The greater part of the business and mechanical establishment in the nation has expansive electrical burdens which are severally inductive in nature causing slacking power factor which gives overwhelming punishments to shopper by power board. This circumstance is taken care by PFC.
Power factor rectification is the limit of engrossing the reactive power created by a heap. It comprise of a small scale controller which recognizes the power factor value, if the power factor goes low it consequently associate capacitor bank to enhance it. The primary point of the model is to keep up the power factor as high as conceivable which builds the proficiency of the framework.

IndexTerms **- Power factor, power factor correction, real power, apparent power, reactive power, capacitor bank, rectifier.**

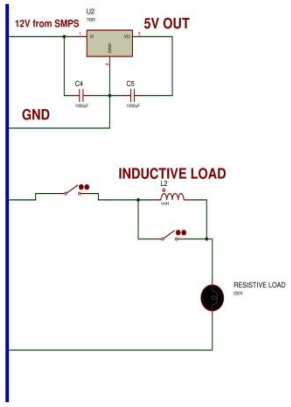
INTRODUCTION

In the present mechanical transformation, control is valuable and the power framework is ending up increasingly complex with each passing day. Accordingly it ends up important to transmit every unit of energy created over expanding separations with least loss of energy. Because of expanding utilization of inductive burdens, the heap power factor diminishes impressively which builds the misfortunes in the framework and subsequently power framework misfortunes its effectiveness. An Automatic power factor rectification gadget peruses power factor from line voltage and line current by deciding the deferral in the landing of the present flag as for voltage motion from the source with high exactness by utilizing an interior clock. It decides the stage point slack (ø) between the voltage and current flags and afterward decides the comparing power factor (cos ø). At that point the micro- controller computes the pay prerequisite and as needs be switches on the required number of capacitors from the capacitor bank until the point that the power factor is standardized to about solidarity. The advancement of this task is to improve and redesign the activity of single stage capacitor banks by building up a small scale processor based control framework. The control unit will have the capacity to control capacitor bank working advances in light of the differing load current. Current transformer is utilized to gauge the heap current for testing purposes. Insightful control utilizing this smaller scale processor control unit guarantees even usage of capacitor steps, limits number of exchanging activities and improves control factor redress**.**

BASIC: Circuit is divided into two parts.



PART-1(CAPACITOR SIDE)



PART-2(LOAD SIDE)

The circuit diagram is as shown in the fig above

WORKING:

The potential transformer measure the voltage level and offers it to the diode and zener diode with current restricting resistors .the flag is changed over to a square wave.

The current transformer measure the current level .since the current level is low it is opened up to a greater incentive with the assistance of an operational amplifier. A similar flag is given to the diode and zener diode course of action; it is changed over to a square wave. Both the square wave signals are bolstered to the smaller scale controller as information, the stage contrast is taken between the square waves and the cosine of the esteem is taken, which gives the power factor. The exchanging gadgets are transistors for the capacitor banks .During crest hours if the power factor turns out to be low ,the smaller scale controller sends a high flag to the base of the transistor, the transistor goes about as a shut switch , consequently the capacitor banks get associated which enhances the power factor .

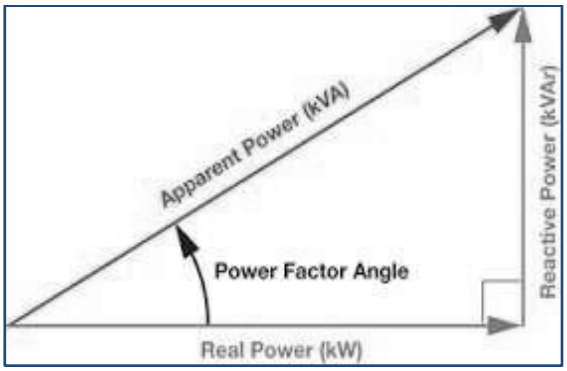
SPECIFICATIONS:

- Transformer – 2nos – primary- 230v
  Secondary- 12v
- PT & CT– (230-12)v & 5A
- SMPS
- Regulator IC– 7805
- Capacitors Capacitor bank– 400 micro-farad
- Relay

POWER FACTOR:

Power factor is a vitality idea that is identified with control stream in electrical frameworks. To comprehend control factor, it is useful to comprehend three unique kinds of energy in electrical frameworks. Real Power (Genuine Power) is the power that is really changed over into valuable work for making warmth, light and movement. Genuine power is estimated in kilowatts (kW) and is totalized by the electric charging meter in kilowatt-hours (kWh). Reactive Power (Responsive Power) is the power used to maintain the electromagnetic field in inductive and capacitive gear. It is the non-working force part. Responsive power is estimated in kilovolt-amperes receptive (kVAR).Responsive power does not show up on the client charging articulation.

Apparent power is the mix of genuine power and responsive power. Apparent power is estimated in kilovolt-amperes (kVA) and is totalized by the electric charging meter in kilovolt-ampere-hours (kVAh). Power factor (PF) is characterized as the proportion of genuine energy to apparent power.



PF = Real Power / Apparent Power

POWER FACTOR CORRECTION: Power factor amendment is the way toward making up for the slacking current by making a main current by interfacing capacitors to the supply. An adequate capacitance can be associated with the goal that the power factor is acclimated to be as near solidarity as would be prudent.

Power factor correction (PFC) is an arrangement of checking the unwanted impacts of electric loads that make a power factor that is short of what one (1). Power factor redress might be connected either by an electrical power transmission utility to enhance the solidness and effectiveness of the transmission system or, adjustment might be introduced by individual electrical clients to diminish the costs charged to them by their power specialist co-op.

There are two kinds of PFCs:

1. Passive

2. Active

PASSIVE PFC: The least difficult approach to control the symphonious current is to utilize a channel: it is conceivable to outline a channel that passes current just at line recurrence 50Hz. This channel lessens the symphonious current, which implies that the non-direct gadget now resembles a straight stack. Now the power factor can be brought to close solidarity, utilizing capacitors or inductors as required. This channel requires vast esteem high-current inductors, in any case, which are cumbersome and costly. A latent PFC requires an inductor bigger than the inductor in a dynamic PFC, yet costs less. This is a basic method for amending the nonlinearity of a heap is by utilizing capacitor banks. It isn't as viable as dynamic PFC. Uninvolved PFCs are regularly more control proficient than dynamic PFC.

ACTIVE PFC: A "dynamic power factor corrector" (dynamic PFC) is a power electronic framework that Controls the measure of energy drawn by a heap so as to acquire a power factor as close as conceivable to solidarity. In many applications, the dynamic PFC controls the info current of the heap with the goal that the present waveform is relative to the mains voltage waveform (a sine wave). The reason for influencing the ability to factor as near solidarity (1) as conceivable is to make the heap hardware that is control factor redressed show up simply resistive (clear power equivalent to genuine power). For this situation, the voltage and current are in stage and the responsive power utilization is zero. This empowers the most proficient conveyance of electrical power from the power organization to the shopper. A few sorts of dynamic PFC are: Boost, Buck and Buck-support. Power factor corrector can be single-organize or multi-arrange. Dynamic PFC is the best.

THE ADVANTAGES OF AN IMPROVED POWER FACTOR:

Higher power factors result in:

(1) Reduction in framework misfortunes and the misfortunes in the links, lines, and feeder circuits and in this way bring down link sizes could be decided on.

(2)Improved framework voltages, along these lines empower keeping up appraised voltage to engines, pumps and other gear. The voltage drop in supply conductors is a resistive misfortune, and squanders influence warming the conductors. Enhancing the power factor, particularly at the engine terminals, can enhance the effectiveness by decreasing the line current and the line misfortunes.

(3) Improved voltage control.

Expanded framework limit, by arrival of KVA limit of transformers and links for a similar KW, consequently allowing extra stacking without quick development.

APPLICATION:

1. Automated Power factor Correction can be used for the industries purpose in the future.
2. It can be used in household purpose for higher efficiency.

CONCLUSION:

The Automatic Power Factor Detection and Correction gives a proficient strategy to enhance the power factor of a power framework by a prudent way. Static capacitors are constantly utilized for control calculates change processing plants or circulation line. Nonetheless, this framework makes utilization of capacitors just when control factor is low else they are cut off from line. Hence, it enhances the power factor as well as builds the life time of static capacitors. The power factor of any dispersion line can likewise be enhanced effortlessly by minimal effort little appraising capacitor. This framework with static capacitor can enhance the power factor of any conveyance line from stack side. As, if this static capacitor will apply in the high voltage transmission line then its rating will be out of the blue substantial which will be uneconomical and wasteful.

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