

Home Usable Microcontroller Based Mini PFI

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Abstract

This paper presents home usable microcontroller based mini PFI using microcontroller chip PIC16F877A based on message scheduling which basically belongs to Micro C Program with the help of ADC (Analog to Digital Converter). It is automatically and maintenance free system. So, there is no need any user for controlling this system.

Index Item Introduction, Block Diagram, Circuit Diagram, Circuit Description

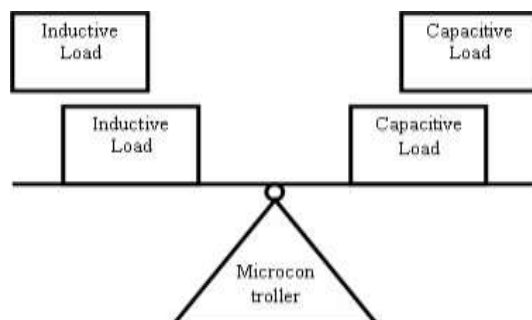
1.Introduction

PFI is generally used in a factory to improve the power factor for reduce the electricity bill. But it is not used in a house because its system is unknown for most of us. Its cost is so high and it occupies a large space. Nowadays microcontroller is used most of appliance all over the world. For using microcontroller it is possible to improve the efficiency and we can also reduce its cost.

In this project there are four types of advantages. This are- its size is small, cost is low, suitable to utilize in household chore and it is maintenance free system.

2. Methodology

The methodology of this project is shown in below:

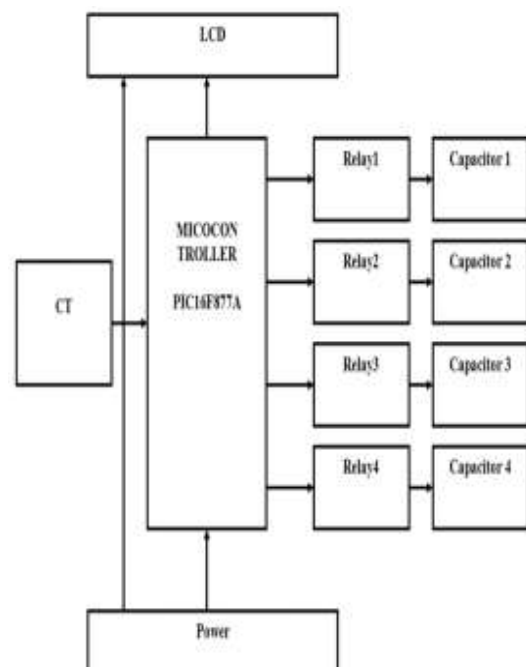


It measures the load when inductive load is increased.

- Necessary capacitive load is increased according to the inductive load.
- It measures the load when inductive load is decreased.
- Necessary capacitive load is decreased according to the inductive load.
- If there is no load available, all capacitive loads are reduced.

3. Block Diagram

The block diagram of Home Usable Microcontroller Based Mini PFI shown in below:

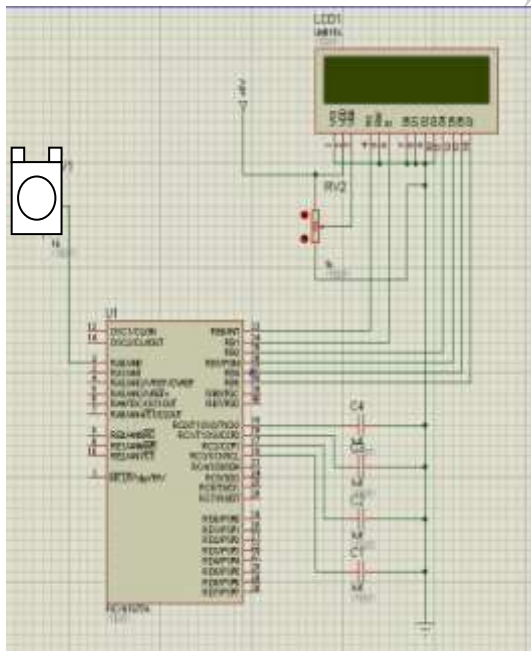


4. Working Principle

It measures the load by using microcontroller based ADC (Analog to Digital Converter) and the peripheral of ADC (Analog to Digital Converter) current transformer. With the help of microcontroller operated relay, capacitor is connected to improve the power factor for reduce the electricity bill.

5. Component Used

- Microcontroller PIC16F877A, for controlling the whole system of Home Usable Microcontroller Based Mini PFI.
- Relay, for interfacing between microcontroller and capacitor.
- LCD screen or LED light, for knowing the position of load and capacitor and also the microcontroller.
- Capacitor, for improvement of power factor.
- Current transformer, for calculating load.
- Variable resistor, for adjusting microcontroller.
- IC7805, for supplying +5Volt as a power factor.
- Transformer, for making 220Volt to 12Volt AC supply.
- Rectifier IN4007, for making alternative current to direct current.
- Other accessories, for helping



6. Circuit Operation

Power supply provides +5 Volt supply by using regulator IC7805. Then the system is on.

Current transformer sends a signal to the microcontroller through the variable resistance. This signal is always between 0 Volts to +5 Volts.

Microcontroller takes signal through a variable resistor so we can adjust the signal.

Now microcontroller measures current, voltage and ascertain Watt. After ascertain the Watt, microcontroller connect the necessary capacitive load with the help of relay.

Here transistor workings as a relay operating switch.

LCD shows the inductive load, capacitive load and also power factor in the screen. In order to cost reducing we can also use LED.

Like the similar way microcontroller reduce3 all capacitive load when inductive load is zero.

7. Algorithm

- Step-1 Initialize the controller.
- Step-2 Initialize the LCD.
- Step-3 Port 2 as Input port.
- Step-4 Confirm port 15, 16, 17 & 18 as Output port.
- Step-5 Take the Input from Current Transformer.
- Step-6 Connect the required capacitor through the relay.
- Step-7 Repeat from step.

8. Result

This project is successfully run like our expectation.



When load increases Microcontroller sense the load and connect capacitors. Microcontroller sense the load like a clip on ammeter we can see the result in LCD screen.

9. Conclusion

This PFI works precisely with the help of microcontroller. We should have to use the value of capacitor in this PFI on the load of the house. To make this PFI more precise, we should have to increase the number of capacitor. To use this PFI it is possible to save the electricity bill with low cost.

10. Future Scope

- It is possible to connect any kinds of meter with this system.
- It can be transfer into PLC base system.
- It can also provide safety switch inside the system which can able to give us the safety of electric circuit with low cost.

11. References

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