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Monitoring and Controlling of Power Management System

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***Abstract:** In day to day energy consumption is increases rapidly. Today energy Conservation is the important concept because it is not possible to establish or installing the new power plant because it's more costly. Therefore we focus on reduce energy Consumption but no compromise with our comfort level. Than need to install new power plant to fulfill this energy requirement. Installing of new power plant is costly. Therefore controlling of energy consumption is required. Electricity is very basic need of the living thing, electricity provider is not able to fulfill the requirement hence it is all of our duty to save energy in all respect for our light and bright future. In this project a controller can monitor the load can consume large amount of power as compare to their rated value. According to them it detect and switch off the various load like fan, refrigerator, air conditioner, mixer etc, in additional so controller can control the maintenance load device operator can control by sending massage, In this project added one more thing i.e. voltage protection and under voltage protection when voltage goes below the 180 volt the relay trip and disconnect the device same as over voltage above 250 volt. All the operation are monitoring and controlling with the help of microcontroller and display on the LCD. This project is very useful in domestic as well as industrial application also. This project is good concept for*
Controlling this type of problems occurs in domestic as well as industries. In this project controller continuously monitoring the power consumption of the load and display the parameter like current and voltages of the particular device.

I. INTRODUCTION

This project is good concept for controlling problems occurs in domestic as well as industries. In this project controller continuously monitoring the power consumption of the load and display the parameter like current and voltages of the particular device.
If the device consume more power than its manufacturers rating than controller give command to the relay driver IC to disconnect the device from supply.
In this project, aim of model is to monitor the load throughout its life for its proper working and average power consumption. In this project the actual power consumption is monitor with the help of Microcontroller and some electrical and electronics components.
After getting a power supply ON a step down transformer converts a 220v AC into a 12v AC, further the requirement of circuit is of a DC, hence used a rectifier circuit with filter to convert the 12vAC in 12vDC. As in thus project use the PIC microcontroller which requires the constant 5vDC.
For generation of 5vdc from a 12v, using a 7805 regulator IC, further this 5vdc is used by entire circuit components. Initially PIC controller monitors an input voltage and a Current through the load.
To monitor a voltage we are using a PT with voltage divider and a Current Transformer is used with a forward biased Diode with filter capacitor. In our PIC, onboard ADC of 10 bit is available which converts a 0-5vdc in 5v signal in equivalent 10 bit digital conversion.
After monitoring a power, PIC controller take decision to TRIPP the load or NOT with the help of relays. In our project we are using a 12v SPDT relay. PIC gives only its output and relay requires a 12v, hence to increase a 5v signal to a 12v we are using a Driver IC ULN 2003, which is a Voltage as well as current amplifier.
All the parameters like voltage, current and set point for the current TRIPP are displayed on 16*2 LCD.

II. BLOCK DIAGRAM

Below fig. shows the block diagram of monitoring and controlling system for power management system. Main of aim this project to monitor the load throughout its life for its proper working and average power consumption .In this project the actual power consumption is monitor with the help of microcontroller and some electrical and electronics components.

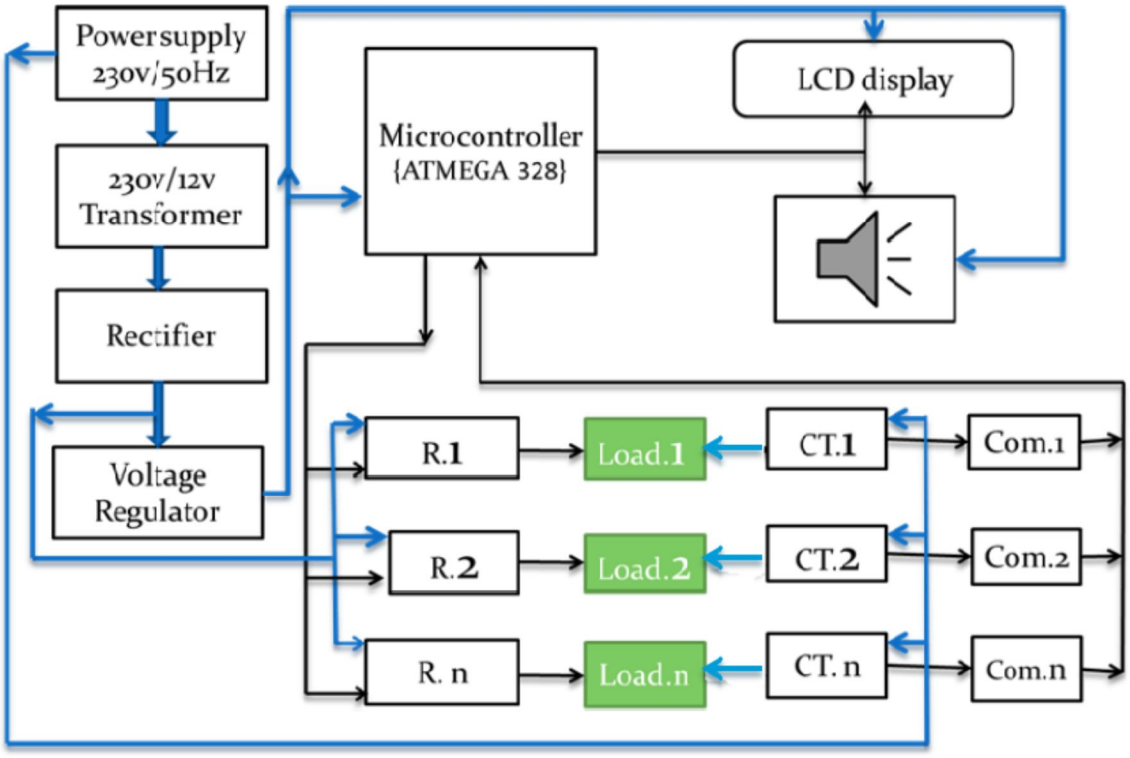

Fig. Block diagram of monitoring and controlling system for power Management System.

A. Block Description

1) *Power Supply:* It is used to give a constant power supply of 5 volt to all the electronics circuits. In this we are using a regulator IC which converts a 12v dc to constant 5 volt.
2) *Transformer:* A Transformer is device that transfers an alternating current from one circuit to one or more other circuit, usually with an increase (step-up) or decrease (step-down) of voltage. The input current is fed to primary winding, the output being taken from a secondary winding.
3) *Relay Driver:* A microcontroller is not capable to drive high voltage devices like fan and light directly, hence we used a relays to switch on/off the devices, but microcontroller gives max. 5v / 20ma at its port output and the relay are used 12 volt.
4) *LCD:* It is used to display room temp, room light, number of persons available inside the classroom.
5) *Microcontroller:* We used a PIC microcontroller to execute the number of operations. It is an 8 bit microcontroller having 32 kb flash ROM, 2KB of EEPROM, and 1.2kb of ram. It has 28 pins, out of them 25 pins are usable as digital input/output as well as all the pins have various functions like ADC, comparator, timers, etc.

III. WORKING

In these experiment four loads L1, L2, L3 & L4 are connected in series connection. Four relays are used for separate operation of loads. When the power supply is ON a step down transformer converts a 230v AC into 12v AC, further the requirement of DC hence used a rectifier circuit with filter to convert the 12Vac in 12vDC. As used the PIC microcontroller which requires the constant 5vDC. For generation of 5vdc from a 12v, using a 7805 regulator IC, further this 5v Dc is used by entire circuit components. Initially PIC Controller monitors an input voltage and a Current through the load. To monitor a current we are using a Current Transformer with forward biased Diode with filter capacitor. After monitoring a power, PIC controller take decision to TRIPP the load or NOT with the help of relays. PIC gives only 5v signal in its output and relay requires a 12v, hence to increase a 5v signal to a 12v using a Driver IC UIN 2003, which is a Voltage as well as current amplifier. All the parameters like voltage, current and set point for the current TRIPP are displayed on 16*2 LCD. Comparator compares the current from the current transformer with the stored value of rated current. When the rated value is greater than the present value than relay connect the device to the supply and

display the load is ON LCD Display. At this time load is operate in normal condition .If the load is consume more power than its normal rating or its set point value than the controller sense this and display in the LCD and give a command to the relay circuit to disconnect the device from the supply. Same time with the help of Buzzer give notification to the user and Display on LCD Display that the load is on maintenance.

A. Problem formulation

1) Calculation Of Power

$$P = V*I*\cos\square$$

Where,

P = power in watts

V = voltage in volts

I = Current in amperes

Cos □□= power factor

Assume power, voltage, and power factor are constant. Then current can be calculated below.

$$I = P/V* \cos\square$$

Consider Load = 200W, V = 230V and Cos □□= 0.9

$$I = 200/230 *0.9$$

$$I = 0.96 \text{ amp}$$

Therefore, I = 0.96 amp is the rated current drawn by 200 w of load.

IV. BRIEF LITERATURE SURVEY

In recent progress in the energy consumption–economic growth and electricity consumption–economic growth causality nexus. The survey highlights that most empirical studies focus on either testing the role of energy. In the relationship between electricity consumption and real gross domestic product (GDP) for Malaysia in a vicariate and multivariate framework. We use time series data for the period 1971–2003 and apply the bounds testing approach to search for a long-run relationship. In analysis the level of electricity consumption can be regarded as an appraisal criterion of a country's development level. This study analyses the causality between electricity consumption and human development and assesses the changing trend of electricity consumption.

In investigates the Granger causality between electricity consumption (EL) and economic growth for Taiwan during 1980–2007 using the co integration and error correction models. The results indicate that EL and real GDP are co integrated, and that there is unidirectional short and long run Granger causality from economic growth to EL but not vice versa.

In the causal relationship between carbon dioxide emissions, electricity consumption and economic growth within a panel vector error correction model for five ASEAN countries over the period 1980–2006. The long-run estimates indicate that there is a statistically significant positive association between electricity consumption and emissions and a non-linear relationship between emissions and real output, consistent with the environmental Kuznets curve.

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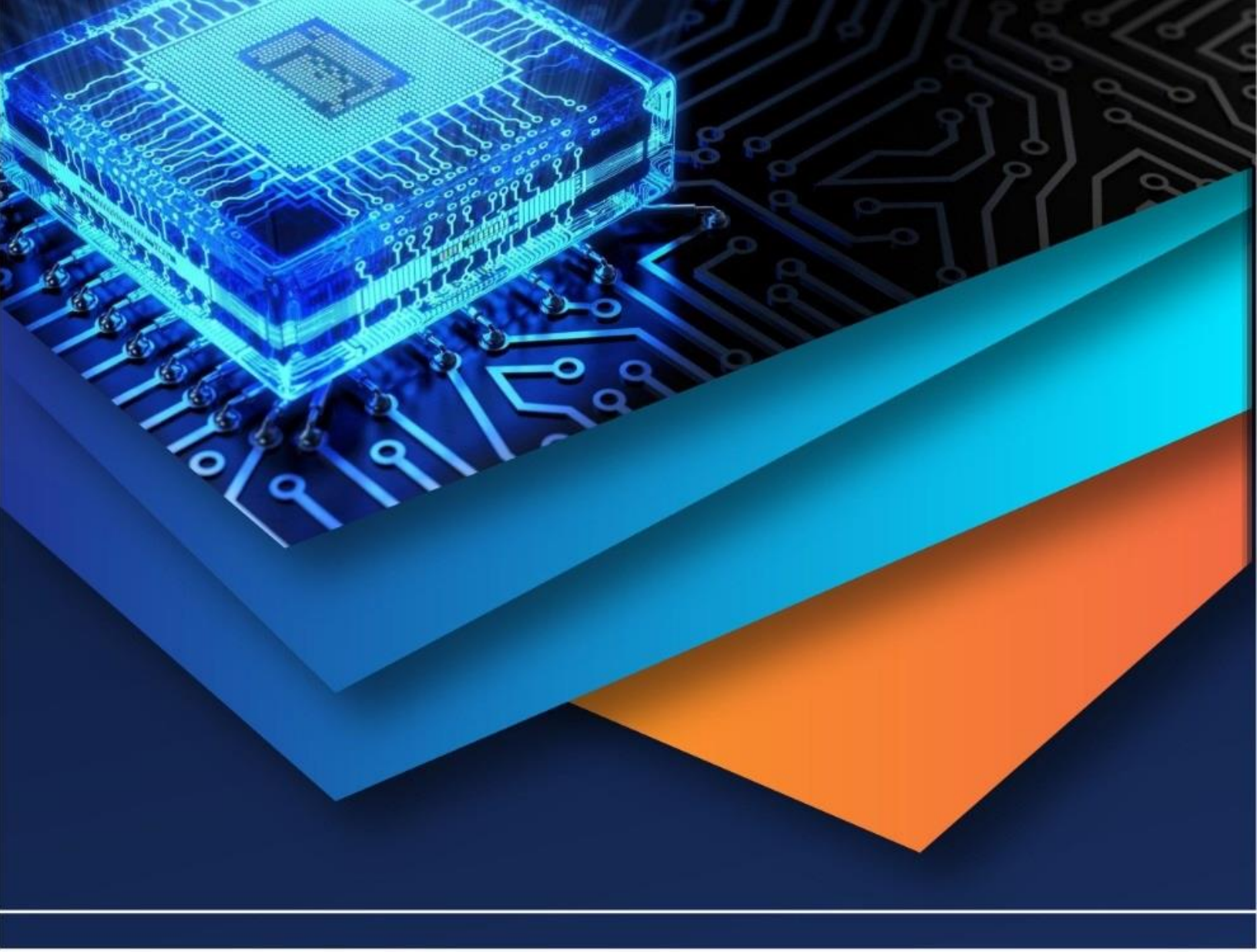
APPLICATION

A. This project is use for domestic, commercial as well as small scale Industries.

B. We can detect fault condition easily.

C. Replacement or repair of equipment where fault is occurred easy and economical without loss of money and time



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