

Efficient Power Management and Load Controlling Mechanism for Poor People

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Abstract - This is an electronic device will helpful to the poor people those who are living in rural areas as well as urban areas, and also helpful to the organizations and companies. This device will continuously monitor the consumed units of our electricity and automatically shut down the total power when the power exceeds the described units per day and in this we have a feature that we can add more units by sending the SMS or by calling from the mobile from the mobile or by using the switch. By this device we can continuously monitors the amount of electricity consumed in the homes, offices, institutions, and stations etc. In this we have another option that it will continuously monitors the person is present there or not by using the IR devices. These IR devices can detect the persons from 1m to 10m range. By this device we can control the usage of power and we can carry forward the natural resources to the next generation.

Key Words: Energy meter, voltage, current, sensor, IR pair

1. INTRODUCTION

Now a day the people were suffering with many problems like water management, garbage management and power(electricity) management. In water management we have lot of techniques to preserve the water for future generations and garbage management is done by using the waste separation technique by using that technique they earned lot of money to the state as well as country in Govt. sector.

In this we are concentrating on power(electricity) management and in the market many of the devices are available, which works by the prepaid recharging mechanism and sometimes it will take some time to activate up to that time we are facing the problems. But our developed system, will plays a crucial role in our life.

This device is a low-cost device which works based on microcontroller & the device consists of an energy meter in that we are fixing the electricity consumption units as per our day use by using a push button. After the consumption of entered units of electricity, the device would be turned off the total power supply. If we want more units of electricity it can be given by using the switch or DTMF technology.

In this we are also employing the GSM device which will intimates to the user about how many units of electricity is utilized by that home and how much amount he must be paid all these are send to the user mobile.

In this we are employing the IR sensor pair which will detect the human's. When the device is ON and the human wasn't present there it will simply shutdown the operated devices. By this we can reduce the amount of electricity utilization. And we can transfer the natural resources to future generations.

2. EASE OF USE

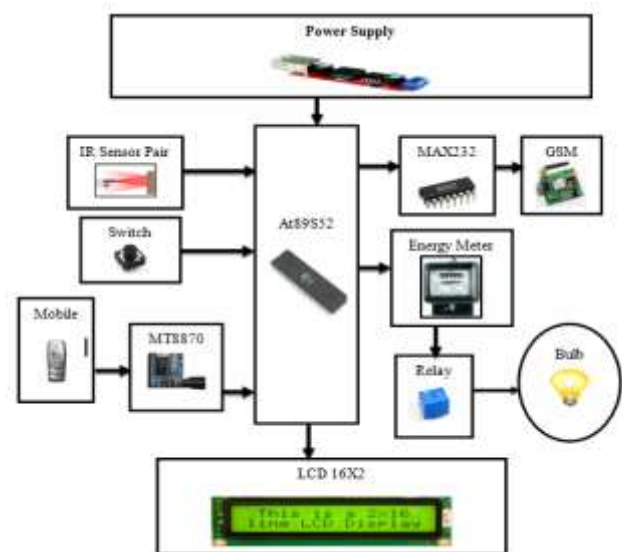


Fig 1: Block Diagram

2.1 DEVICE DESCRIPTION OF ENERGY METER

This energy meter will work on the principle of electromagnetic induction, it consists of metal disk which will rotate when the electric current will flow from two induction coils which are placed above the disk, it can measure the ratings in the range of kilowatt-hour.

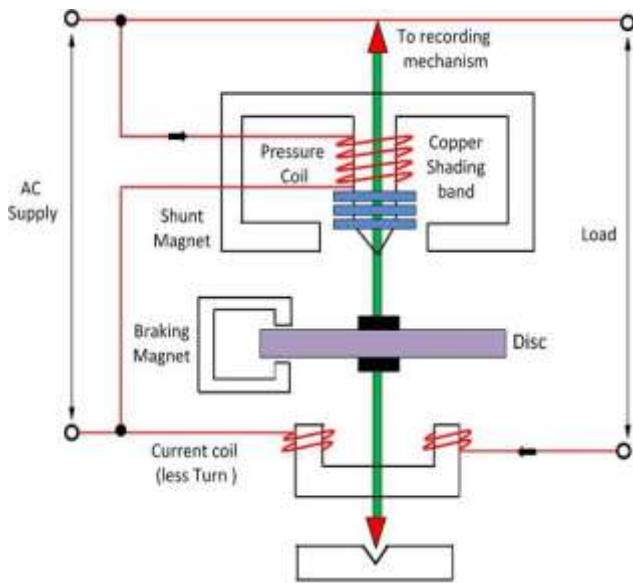


Fig 2: Induction type energy meter

It will note the readings of number of rotations the disk it will follow the phasor diagram approach and is shown below.

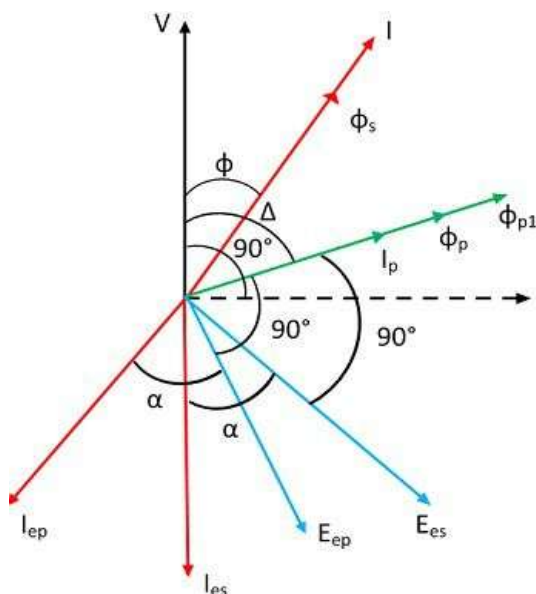


Fig 3: Phasor diagram of energy meter

Here
 V - applied voltage
 I - load current
 ϕ - the phase angle of load current
 I_p - pressure angle of load
 Δ - the phase angle between supply voltage and pressure coil flux
 f - frequency
 Z - impedance of eddy current
 α - the phase angle of eddy current paths
 E_{ep} - eddy current induced by flux

I_{ep} - eddy current due to flux
 E_{ev} - eddy current due to flux
 I_{es} - eddy current due to flux

The net driving torque of the dis is expressed as

$$T_d \propto \phi_1 \phi_2 \frac{f}{Z} \sin \beta \cos \alpha = K_1 \phi_1 \phi_2 \frac{f}{Z} \sin \beta \cos \alpha$$

here K_1 - const.

ϕ_1 and ϕ_2 are the phase angle between the fluxes. For energy meter, we take ϕ_p and ϕ_s .

β - phase angle between ϕ_p and $\phi_s = (\Delta - \phi)$

It will shows the values in terms of KWH then we calculate the number of units utilized in the homes and our device will continuously monitors the how much amount of units utilized in that places by using the feed back mechanism.

In this mechanism it will continuously stores the data and checks the data whether it will exceeds or present in the given prescribed limit.

$$Y(t) = X(t) + G(t)$$

Where: $Y(t)$ = Output

$X(t)$ = Input

$G(t)$ = Feedback

And the device will note the readings in the meter by using the formula of

$$'n' \text{ reading} = \text{wheel diameter} * \text{no. of revolutions} * x \text{ k}$$

This is the formula we are taking into consideration in the place of calculating the number of unit's utilization in a particular place.

2. DEVICE FUNCTIONALITY

In this device we are continuously monitors the how much amount of power is utilized in that places and it will continuously checks the how much amounts of units that are utilized in that place.

If the given units are exceeds the limit it will turn of the device.

Before going to turn of the device it will sends the alert message to the owner. After that it will turn off the devices.

It consist of IR pair it will continuously sends the IR rays in that place and if the person is present there It will run the device otherwise it will shutdown the device.

It has a chance to give the units after the units are consumed. It can add by the person using the mobile phone or the switch present at that place.

1. Initially in this system we must enter the how many units to be utilize for a day by using a switch or mobile with the help of DTMF device.

2. In this system, we were assigned 10 units for single press of switch.

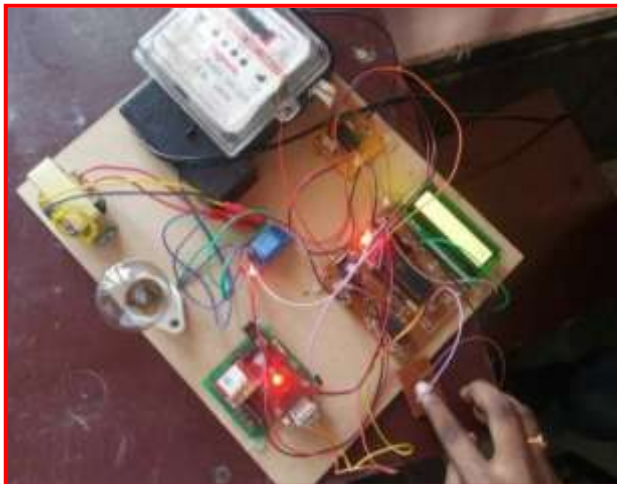


Fig 4: Entering The Units into Device Using Switch



Fig 5: Entering The Units into Device Using Mobile

3.The LCD display gives the readings about how many units are consumed.

4.In this we are employing the IR sensor pair which will operate the device when the human being were present at that place otherwise the device gets turned off.

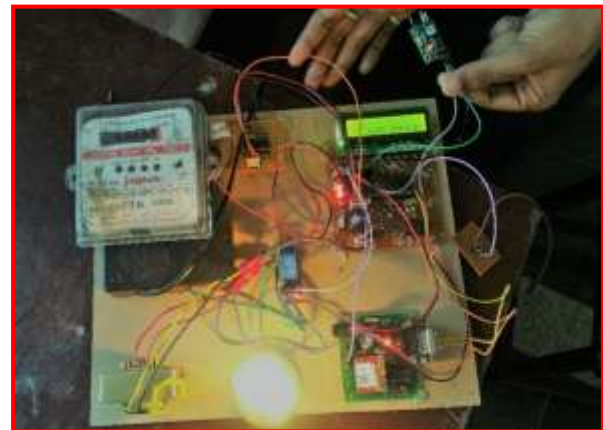


Fig 6: Human Detection by Using IR Pair

5.We are employing GSM module in this system which will sends the alerting message to the user when the device enters in to the low units for example 2units.

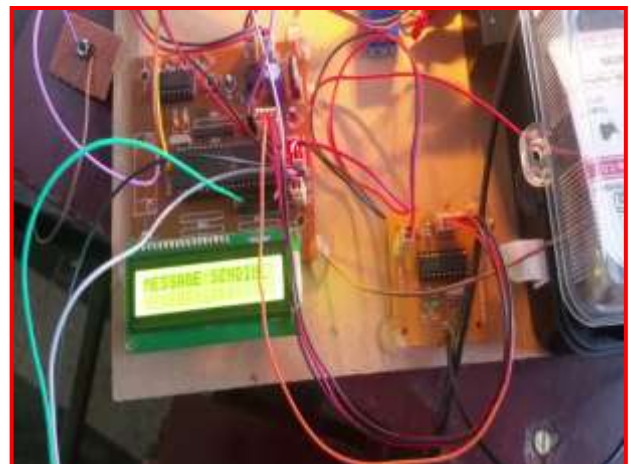


Fig 7: Message Sending When Device Enters to 2 Units

4. APPLICATIONS

The project is used in most of the areas

1. At homes
2. At industries
3. In street light maintenance
4. Offices and Buildings
5. Shopping Malls
6. Mainly in Schools and Colleges

In all power saving applications

4. CONCLUSION AND FUTURE SCOPE

The low cost power controlling and maintaining device may be very helpful to the people, which will helpful to the people to reduce the usage of electricity more effectively.

This project can be extended by connecting the various devices.

In future we can have an ability to pay the electricity bill after the month by the device itself by connecting the various type of devices.

We can extend this project in the way of to operate the power supply operations i.e., to cut down the power supply when they doesn't pay the electricity bill.

We can also extend this project in the way of we can operate the devices from our working places itself.

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BIOGRAPHIES



Mr. Kishore Babu Kodali, Studying M. Tech in St. Mary's Group of Institutions Guntur and Worked as a Research and Development Engineer in Electronics domain. He has done the Researches on Embedded systems, Sensor Designing's and PCB Manufacturing and Developments. Also acts as a trainer who Trains the Students to do their mini and major as their own. Given the Instructions to the Various College Students in their Project Developments.



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