

Theft Energy Detection with GSM300

Patel Dipal Ashwinbhai¹ Dhameliya Jinal Ashokbhai² Modi Bijal Kaniyalal³
 Prajapati Poorvee Ambalal⁴

^{1, 2, 3, 4}Department of Electronics & Communication Engineering
^{1,2,3,4}Government Engineering College, Bharuch, Gujarat, India

Abstract—Energy Meter Is A Device That Calculates The Cost Of Electricity Consumed By A Home, Business, Or Electrically Powered Device. In This Project Our Meter Box Made Of Current Transformer, potential transformer, ADE7751 energy meter IC and controller IC. To The Energy Meter Calculates the Reading with the Help of the Current Transformer .energy meter IC & controller Are Used to Detect the Theft in Energy Meter. The Project Model Reduces the Manual Manipulation Work and Theft .Use Of GSM in Our System Provides the Numerous Advantages of Wireless Network Systems. The Government Saves Money by the Control of Theft in Energy Meter and Also More Beneficial For Customer Side and the Government Side. The Metering IC Ensure The Accurate And Reliable Measurement Of Power Consumed. Cost Wise Low When Compared To Other Energy Meter without Automatic Meter Reading and Theft Control.

Keywords: Electrical Meter, Electro-mechanically Meter, Theft Detection Meter with GSM for Electricity.

I. INTRODUCTION

Electricity Theft, A Common Form Of commercial losses, Involves Tampering with Meters to distort the billing Information or Direct Connections to the power System. Commercial Losses Are nearly impossible To Measure Using Traditional power system Analysis Tools. This Is due To the Lack of information On Both Commercial and the Legitimate Loads in the System, Which Translates to insufficient inputs For Any Meaningful Loss Calculations. Despite the Best Efforts By Utilities, The Current Results of commercial Losses Measurements Are often inaccurate At Best, Because The Figures Rely heavily on The Records Of Detected Cases, Rather Than by actual Measurement Of The Electrical Power System. Certainly Utilities Have Some Control Over the magnitude Of Commercial Losses; But Even with their Best Efforts, Some Commercial Losses Will still continue. An Algorithm for the Design Of electricity theft Monitoring System Has Been generated using the Backtracking Algorithm Type.

II. VISION

- This system would provide a simple way to detect an electrical power theft without any human interface.
- It would indicate exact zone and distribution line on which unauthorized tapping is done in realtime.

III. BACKGROUND

Theft of Electricity Is The Criminal Practice By Stealing Electric Power. It Is A Crime and Punishable By Heavy Fines and, In Some Cases, Imprisonment. The Most Basic Method Of Stealing Electricity Is A Direct Wire-Connection To A Main Power Route Passing By A House Or Shop So

That Electricity Can Flow To The Consumer Without Crossing The Electric Meter Installed By A Governmental Agency Which Is Responsible For Providing Electrical Services To Customers, Other Methods May Include Opening The Meter Itself, Without Damaging Its Seals And Reversing The Dials, A Complicated Procedure That Requires Expert Skill.

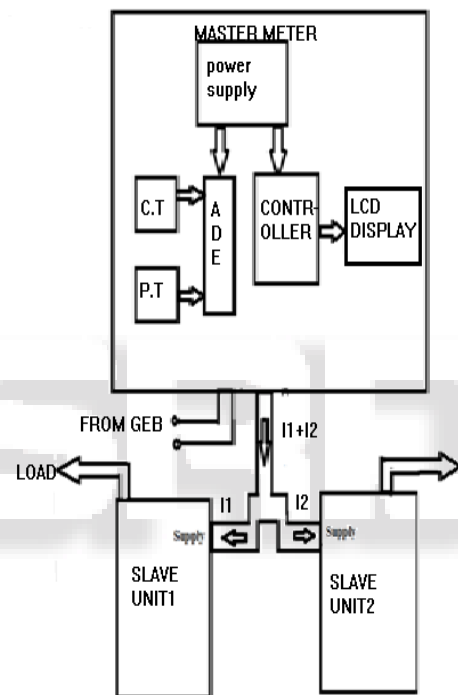


Fig. 1: Meter

IV. TYPES OF THEFT

There are various types of electrical power theft done in all over the world. Huge amount of theft of power is done by tapping from line or bypassing the energy meter. According to a study 80% of total theft detected all over the world is from dwelling places and 20% from commercial and industrial premises. The various types of electrical power theft are as follows.

- Direct hooking from line
- Bypassing the energy meter
- Injecting foreign element in to the energy meter
- Drilling holes in electromechanical meter

A. Direct Hooking from Line

It Is The Most Used Method For Theft Of Power, 80% Of Total Power Theft All Over The World Is Done By Direct Tapping From Line. The Consumer Taps into a Direct Power Line from a Point Ahead Of the Energy Meter. This

Energy Source Therefore Is Unmeasured In Its Consumption and Procured With or Without Switches.

B. Bypassing the Energy Meter

In this method the input terminal of the energy meter has been shorted by a wire. So energy cannot be registered in the energy meter.

C. Injecting Foreign Element into the Energy Meter

Sometimes skilled individual injection foreign elements such as transistor, resistors or IC chips in to the electrical meter which causes a lower consumption of electricity. Also some meters are manipulated with a remote control circuit by installing the circuit inside the meter which can be operated remotely and the meter can be slowed down at any time consumer desires. If someone tests the meter for its accuracy by external inspection, it always found correct unless the remote is turned on.

D. Drilling Holes in Electromechanical Meter

Drilling holes is a visible type of manipulating an electrical meter. This type of tampering is done to electromechanical type meter. The individual inserts foreign material inside the meter to obstruct the free movement of the rotating disc.

V. MEDIA FOR ENERGY THEFT

The theft of the electricity is the major concern of the transmission and distribution losses in the supply of the electricity worldwide. Mainly the electricity is being stolen via bypassing the energy meter therefore this wireless system is utilizes to overcome this type of the theft of the electricity and is very beneficial for the authorized to control its revenue loss as all of us know that the cost of fuel is increasing day by day.

A. WIRED TECHNIQUES

- Coaxial cable
- Optical fiber

B. WIRELESS TECHNIQUES

- GSM technique
- Wi-Fi
- Infrared
- Wi-max
- Bluetooth

Here this system utilizes all the problems associated with the wired techniques. There are a lot of problems related with the wired techniques such as installation problem, complexity and cost also matters in the case of long haul. The main problem associated is about the rural areas where it's really very much difficult to install the wired system to convey the information. This module provides an efficient way to convey this information to the authorized official at low cost as compare to that of the gsm modem and also utilizes a cell-phone to send the message to the officials having a long battery life.

VI. CIRCUIT DIAGRAM

Here mainly three units are used. Working of all 3 units are identically same, but they are arrange in such a way that each unit will behave as a special unit, to provide special function. First unit is 'master unit' which is mounted on the

distribution pole to be protected. Since the energy meter used is of single phase type, so master unit i.e. energy meter is connected between phase & neutral wires of distribution line. Remaining two units are 'slave units' which are connected to the load at two (or as per desired) domestic houses respectively. Since master unit is connected between GEB. Lines, so it takes supply from it while its load terminal is connected to supply terminals of both slave units. Load terminals of both slave units are connected to loads of one of the both domestic houses respectively.

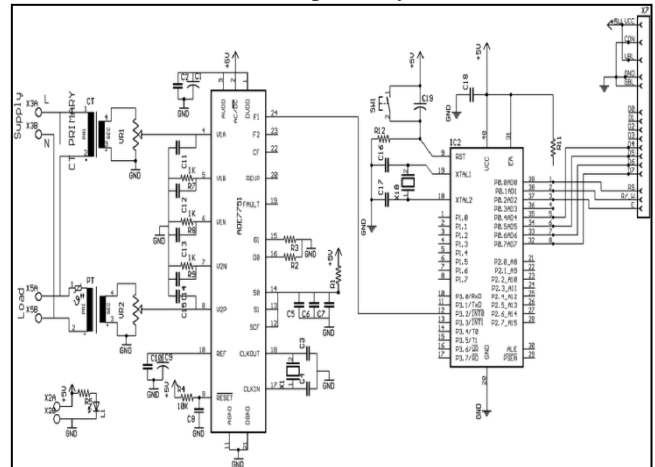


Fig. 2: Circuit Diagram

VII. SOFTWARE IMPLEMENTATION

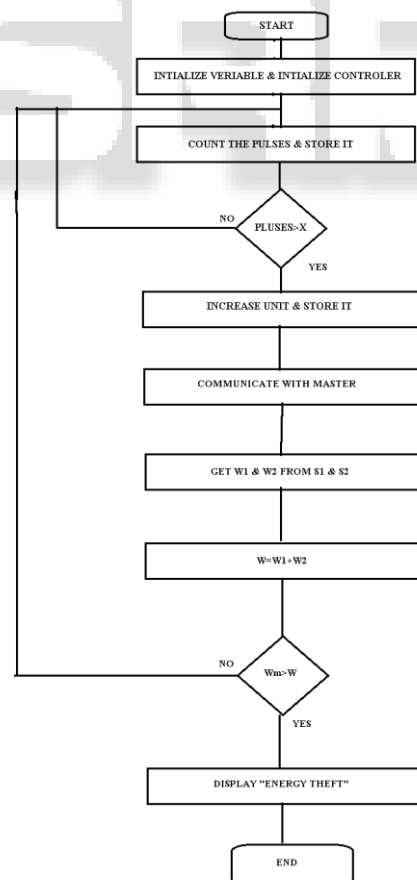


Fig. 3: Flow chart

As shown from the flow chart of master unit. First of all initialize the variable and counter, also initialize the display i.e. "WELCOME DISPLAY" then count the pulses and store it into microcontroller. If the Pulses $>X$ Than Increase .01 Unit And Store It And Communicate With Master If Not $>X$ Than Again Count The Pulses And Store It. Now the O/P of Both the slave units is W1 and W2 respectively. These o/p w1 and w2 are taken by master unit by means of Rx, TX pins which are further adds to get w o/p. Now this W o/p of both slave units is compare with Wm o/p of master unit. If $W_m > W$ then display "ENERGY THEFT" on distribution pole and if not then there is no energy theft on distribution pole.

VIII. CONCLUSIONS

It is wireless tech. Used for the low power consumption and low cost of the GSM module. Meters can be manipulated to make them under-register, effectively allowing power use without paying for it. This theft or fraud can be dangerous as well as dishonest. Power companies often install remote-reporting meters specifically to enable remote detection of tampering, and specifically to discover energy theft. The change to smart power meters is useful to stop energy theft.

IX. APPLICATION

- For security purpose to detect the energy stealing.
- To save the time, electricity, money.
- Wireless GSM techniques based system is much useful to detect the stealing of the electricity worldwide.
- To control the revenue losses the authorized officials need to detect the theft of the electricity.
- In power industries, residential industries. It is mostly used for the GEB & TORRENT etc.

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