Design and Analysis of Electronics Energy Meter's Fraud Protection and Data Receive by Optical Port Communication

Diwakar Singh
er.diwakarec@gmail.com

Ajay Saini
erajaysaini@gmail.com

Abstract – **An energy meter is a device that able to measure electric energy at any one time. The energy data is very important for the study about energy demand especially in residential sector. The meters that can be found in the market nowadays are expensive because they work on operation principle that requires the use of expensive hardware. A single-phase digital Electronics Energy Meter is based on microcontrollers; this digital energy meter does not have any rotating parts. The energy consumption is calculated using the output pulses of the energy meter chip and the internal counter of microcontroller. As soon as the supply is restored, energy meter restarts with the stored values. A single-phase energy meter prototype has been implemented to provide measurement up to 40A load current and 230V line to neutral voltage. Necessary program for microcontrollers is written in c-language. Hence, a digital meter that can measure electrical energy consumed by domestic appliances such as kettle, television, toaster, and others has been developed. This meter is robust, user friendly and informative enough for the purpose of simple data gathering.**
The accurate measurement of electricity supply and subsequent billing to residential properties has traditionally been achieved through electromechanical meters. Although, this solution has several disadvantages including long term accuracy, cost of calibration and limited communication. These issues can be overcome using digital power meters where it is possible to achieve long term accuracy by removing analog components which are prone to drift over temperature and time. The goal of this project is to design an electronic energy meter which calculates instantaneous power at all power factor and gives low frequency pulse output which is directly proportional to real power. This low frequency pulse output is further used by a microcontroller which calculates energy in terms of Kwh and Displays it on LCD. The function of microcontroller is not only limited to display of Energy but it also calculates maximum demand, detects different types of tamper such as magnetic tamper, neutral missing etc., it serves as an interface between RTC, EEPROM and the LCD display and also interacts with the outside world. The meter should have all the tamper and fraud protection features Current Reversal (CR), Earth Tamper (ET), Meter Cover (CO), Magnetic Tamper, Neutral Missing, Neutral disturbance. Data Receive by Optical port Communication.

Keywords – **Electronic meter, Microcontroller, Magnet sensor.**