Human Life Safety System With Electrical Information By Using IOT

C.Pratheeba[1], S.Manojkumar[2], M.Megala[3], S.Poomathi[4], M.Indhumathi[5]
[1]Assistant professor, Dept of EEE
[2, 3, 4, 5]Dept of EEE
[1, 2, 3, 4, 5] Nandha Engineering College, Erode, Tamilnadu, India.

Abstract- *An electric shock is the effect of an electric current through the body. The minimum current a human can feel is thought to be about 1 milliampere (mA). The effect can range from minor tingling to muscle spasms, tissue damage, fibrillation of the heart, loss of consciousness, and even death. In general we use electrical things in our home applications. Sometimes high voltage electric shock may pass in the wiring line. The safety watch is designed for sensing our body pulse rate by using a heart beat sensor. Information is transferred to the receiver kit and sends the notification to the near EB chief electrician by using IOT. An IOT based control system will introduce the early warning and control technique for the electric shock.*

Keywords- PIC16F887A, Energy Meter, GSM Module, ESP8266, MAX232, LCD Display.

I. INTRODUCTION

A device providing for discharging static electricity between a person and an a grounded object to prevent unpleasant static shock to the person includes an insulated housing supporting a first contact arranged for manual engagement, a second contact for contacting the grounded object and a conductor of high resistance there between for allowing transmission of current at a rate which is sufficiently low to avoid shock. An electric shock preventer provides electrical shock protection for humans, which consist of shock sensing element and transceiver module. A current sensing circuit includes a power transistor, a sensing transistor configured to copy a current flowing through the power transistor at a predetermined ratio, a current sensing resistor configured to detect a voltage from the current copied by the sensing transistor, an input resistor configured to convert an input voltage to a current, a cross self biasing cascade block configured to adjust currents at both ends of the input resistor, and a common gate transistor and a reference resistor configured to convert a current output of the input resistor to a final sense voltage. The RF Transceiver uses RF modules for high-speed data transmission in the digital-RF architecture works at speeds up to 433MHZ. Protection under normal conditions is provided by basic protective provisions (protection against the direct contact in the fourth edition), and protection under single fault conditions is provided by fault protective provisions (protection against the indirect contact). The following protective measures are generally permitted: protection by automatic disconnection of supply, double or reinforced insulation (Class II equipment), electrical separation, and extra low voltage (safety extra low voltage and protective extra low voltage).

II. RELATED WORKS

The main supply is coming from the EB to the energy meter. It is used to measure the amount of energy will be utilized. Basically, the rotating iron type of energy meter is suitable for measuring, energy utilization measurement is dependent upon the number of disc rotations. After that the meter MCB (miniature circuit breaker) is connected. The MCB act as a one kind of protective device, any fault occurs in the system the MCB will be tripped off. The whole structure of the system is connecting through MCB .And output of the MCB is connected to the load .In Electrical system there are basically three kinds of loads used They Are resistive, inductive and capacitive loads. These kinds of loads are used for requirements. Any fault detected in the supply line the MCB will be tripped off and isolating the load from the main supply through the energy meter.According to Giuseppe parise[1].A Summary of IEC Protection Against Electric Shock the protection practice against electric shock points to solve the contact “collision” by the active measure of automatic disconnection limiting the time duration. Analyzing the components of electric hazard as waves evolving in time, the fault opens a time window of risk, and the protection has to close it. According to Trevor W. Dawson, Krys Caputa, Maria A.Stuchly, and R. Kavet [2].Electric Fields in the Human Body Resulting From 60-Hz Contact Currents Contact currents in anatomically realistic models of an adult and a child have been computed using accurate and previously validated numerical methods. Induced electric field and current-density quantities are provided for specific organs and body segments, normalized to a common 0.1-Ma current-to-ground. According to Theodore Bernstein[3].The Standard for Electrical Safety in the Workplace, NFPA 70E, and relevant

OSHA electrical safety standards evolved to address the hazards of 60-Hz power that are faced primarily by electricians, linemen, and others performing facility and utility work. This leaves a substantial gap in the management of electrical hazards in Research and Development (R&D) and specialized high voltage and high-power equipment. According to LaRocca, R.L[4].Personnel Protection devices for use on appliances an immersion detection circuit interrupter provides protection against electric shock resulting from the immersion of an appliance in an isolated or grounded tub. The application of the device to an end product may require modification in the strain relief and power supply cord and the addition of internal sensing wires or Electrodes.

III. SYSTEM DESIGN

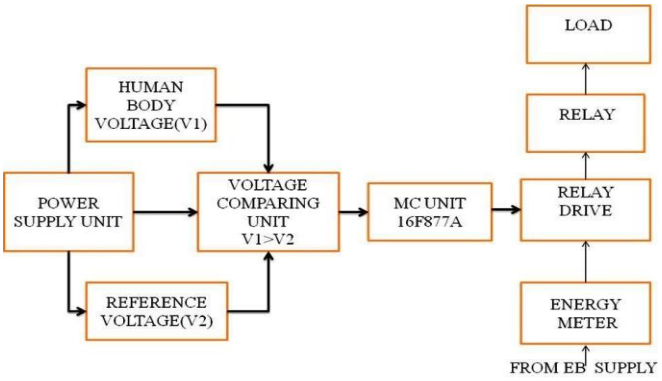

Fig.1 Block diagram

The power supply unit is to gives the operating voltage for the constrained device as comparator, voltage sensing unit and reference unit.Then the comparator acts the major role in this circuit .It is used to compare the two voltage levels they are human body voltage (v1) and Reference voltage(v2). When the v1 voltages are greater than the v2 voltage. In this condition the comparator produces the output signal. This signal goes to microcontroller unit PIC16F877A.The input signal is flowing through the microcontroller continuously .In this condition the microcontroller is generating the controlling signal .And this signal is applied to the relay drive. The relay drive is used to drive the relay unit. The relay gets any input signal through the relay drives. It will be tripped offduring fault condition.

TRANSMITTERBLOCK DIAGRAM

This transmitter circuit is used sense the fault and transmit the signal to receiver through ZIGBEE . This circuit contains power supply, sensing unit, comparator, reference voltage, pic16F877A and ZIGBEE. Then the power supply unit is used to give operating voltage for whole system. Comparators have the two input. The first pin connected to the reference second was connected to the sensor. Reference unit gives the reference voltage and sensor is used to sense the faulted voltage and gives to comparator. When the sensing voltage is greater than the reference voltage output will produced in comparator to pic16F877A and encode the input signal. And the encoded signal is gives to transmitter.

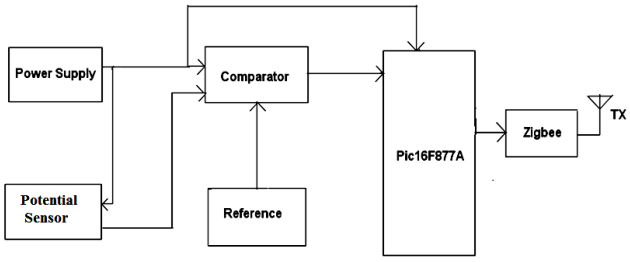

Fig.2 Transmitter Block Diagram

RECEIVER BLOCK DIAGRAM

Transmitted signal will be received by ZIGBEE receiver. These ZIGBEE module act for both transmitter and receiver. Received signal gives to pic16F877A and input signal is decoded for required relay drive voltage. When the input signal was sensed through the relay was tripped off and disconnect load from the main supply. In case any fault like discontinuous in conductor or short circuit occurs before the energy meter, also the fault was sensed and transmit through same ZIGBEE.

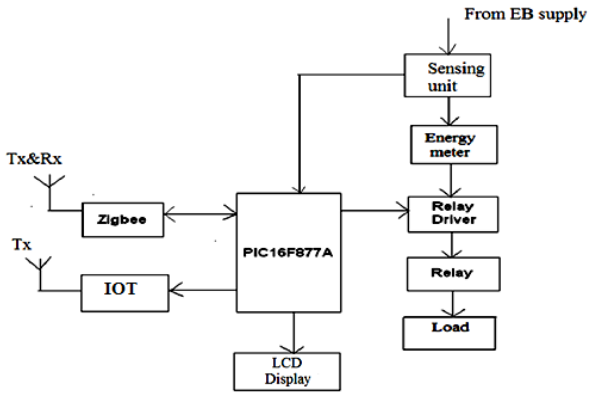

Fig.3 Receiver Block Diagram

IV. RESULT

The power supply unit is used to gives the operating voltage for the constrained device as comparator, voltage sensing unit and reference unit. Then the comparator act the major role in this circuit .It is used to compare the two voltage level they are human body voltage (v1) and Reference voltage (v2). When the v1 voltages are greater than the v2 voltage .In this condition the comparator is produced the output signal.

This signal is goes to microcontroller unit PIC16F877A.after receiving the signal to the microcontroller the signal pass to the zigbee in the transmitter side. Then the signal pass through the receiver said zigbee the signal pass to the microcontroller. The input signal is flowing through the microcontroller in continuously. In this condition the microcontroller is generating the controlling signal. And this signal is applied to the relay drive. The relay drive is used to drive the relay unit. The relay is got any input signal through the relay drives. It will be tripped off during fault condition. The IOT said an message pass to the chief electrician.

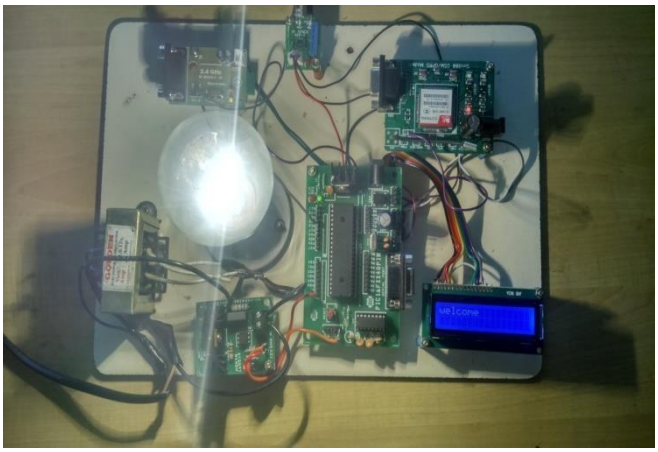

Fig.4 Receiver Normal Operating Condition

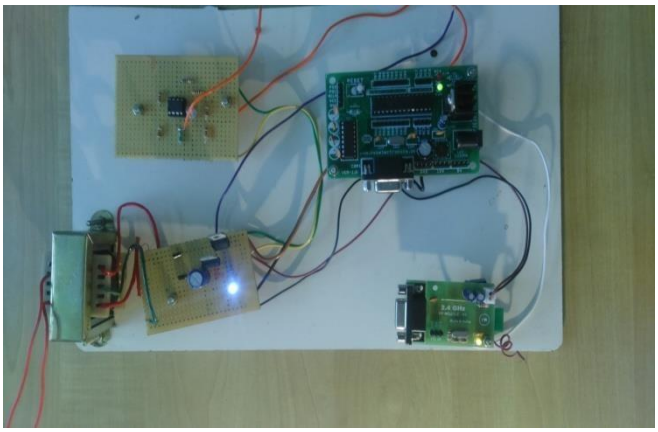

Fig.5 Transmitter In Normal Condition

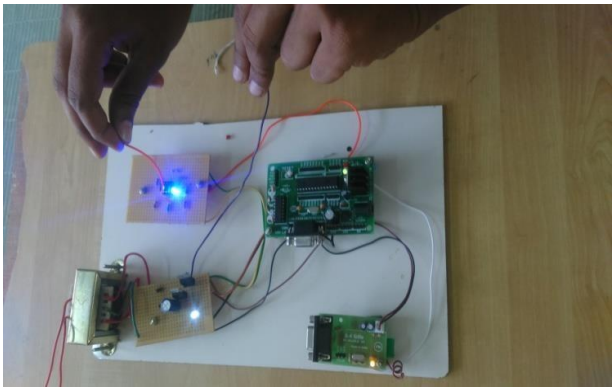

Fig.6 Transmitter Operate In Fault Condition

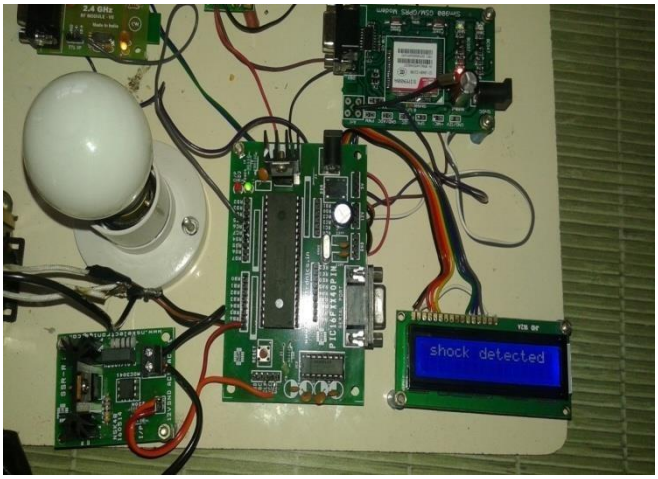

Fig.7 Shock was Detected, It Is Shown In Receiver

Fig.8 Data and temperature characteristics

Fig.9 Dataandvoltagecharacteristics

Fig.10 Data and current characteristics

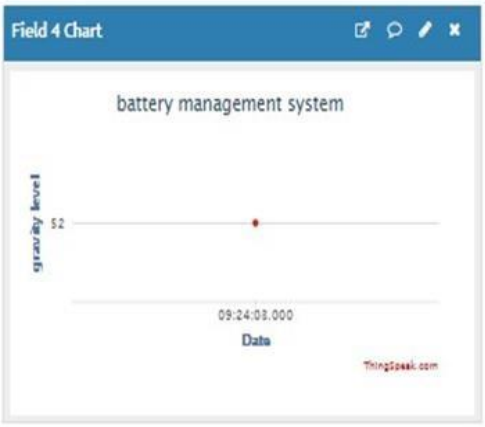

Fig.11 Result of IOT

V. CONCLUSION

The protection practice against electric shock points to solve the contact "collision" by the active measure of automatic disconnection limiting the time duration. Analyzing the components of electric hazard as waves evolving in time, the fault opens a time window of risk, and the protection has to close it. In electrical installations, safe protection is conventionally guaranteed if the colliding time makes permissible the prospected touch voltage or at least assumes a value as low as possible (additional protection). In fact, as a minimal objective, the protection has to limit fault exposure persistence in a conventional time (probable protection).

In a complementary way, operating on the single components of the electrical installation in the case of portable electrical equipment, a practical recommendable criterion to avoid or mitigate the injury or damage occurring with electrical equipment is to prevent the appearance of electrical potential using double insulation and Class II equipment. Whereas in the case of fixed electrical equipment, it can be sufficient to limit the persistence of electrical potential by grounding and automatic disconnection of supply.

VI. RESULT COMPARISON

Existing method	Proposed work
➢ 50% safe device ➢ Controlling technique difficult ➢ Cost high ➢ Communication level low ➢ Low frequency 2.4GHz	➢ 95% safe device ➢ Ease to controlling IOT technique ➢ Low cost ➢ High level Communication by using Zigbee ➢ Highfrequency 4.2GHz

REFERENCES

[1] Trevor W. Dawson, KrysCaputa, Maria A. Stuchly, and R. Kavet, "Electric Fields in the Human Body Resulting From 60-Hz Contact Currents", IEEE Transactions of Biomedical Engineering, vol. 48, no. 9,September 2001.

[2] Giuseppe Parise, "A Summary of IEC Protection Against Electric Shock", IEEE Transactions on Industry Applications, vol. 34, no. 5, September 1998.

[3] LaRocca, R.L., "Personnel Protection devices for use on appliances", IEEE Transactions on Industry Applications, vol. 28, issue 1, part 1, Jan.-Feb.1992.

[4] Theodore Bernstein, "Electrical Shock Hazards and Safety Standards", IEEE Transactions on Education, vol. 34, no. 3, August 1991.

[5] Biegelmeier G., "Discrimination and nuisance tripping of residual current operated devices in domestic and similar installations", Proceedings of Third International Conference on Installation Engineering Designing and Maintaining Successful System, 1988.

[6] Brennan, P.V., "Residual Current Devices with high immunity to nuisance tripping", IEE Proceedings on Circuits, Devices and Systems, vol. 140,issue 2, April 1993.

[7] F.P. Dawalibi, R.D. Southey, and R.S. Baishiki, "Validity of Conventional Approaches for Calculating Body Currents Resulting from Electric Shocks", IEEE Transactions on Power Delivery, vol. 5, no. 2, April 1990.