SMART COMMUNICATION SYSTEM FOR HUMAN LIFE SAFETY SYSTEM WITH ELECTRICAL INFORMATION

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ABSTRACT: *An electric shock is the effect of passing an electric current through the body. The minimum current a human can feel is thought to be about 1 milli-Ampere (mA). The effect can range from minor tingling to muscle spasms, tissue damage, fibrillation of the heart, loss of consciousness, and even death. These effects depend on a variety of factors, including the strength of the current, duration of the current, the area of the body through which the current passes, and whether the person is grounded or insulated from the ground. Death caused by an electric shock is referred to as electrocution. An IOT based control system will introduce the early warning and control technique for the electric shock.*

Keywords: Electric Shock, Electrical Installations, Internet of Things, Tissue Damage.

1. INTRODUCTION

A device providing for discharging static electricity between a person and an grounded object to prevent un pleasant 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 human, 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 work at speeds up to 433MHZ.

2. EXISTING SYSTEM MODEL

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 rotating iron type of energy meter is suitable for measuring, energy utilization measurement is depend upon the number of disc rotation. 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 are used .they are resistive, inductive and capacitive load. These kinds of loads are used for requirement. 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.

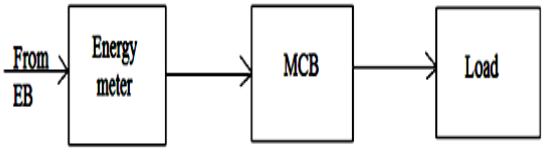

Fig.-1. Existing System Block Diagram

3. PROBLEM IDENTIFICATION

- Accidents that happened due to unsafe conditions.
- Accidents that happened due to unsafe acts.
- Every activity has certain inherent potential for accidents.

4.PROPOSED SYSTEM MODEL

4.1.GENERAL BLOCK DIAGRAM

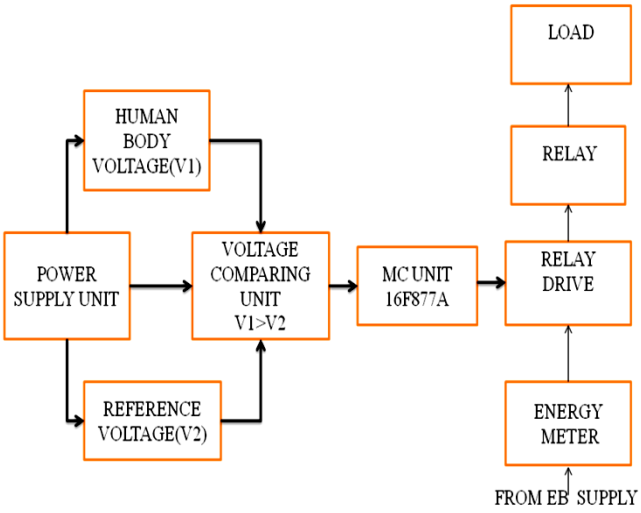

Fig.- 2. General Block Diagram

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.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.

4.2.TRANSMITTER BLOCK DIAGRAM

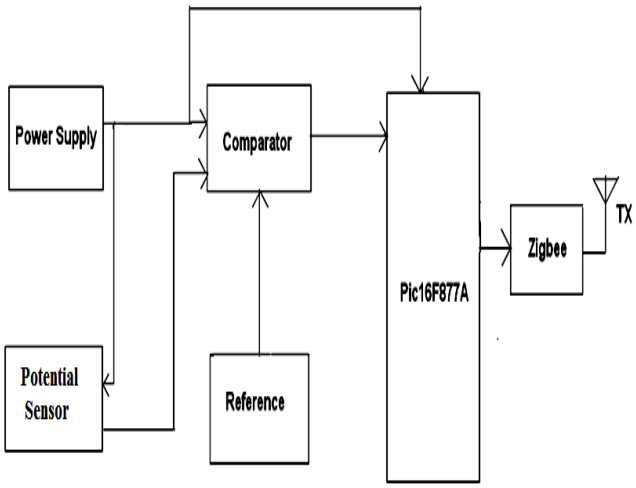

Fig.- 3. Transmitter Block Diagram

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.

4.3.RECEIVER BLOCK DIAGRAM

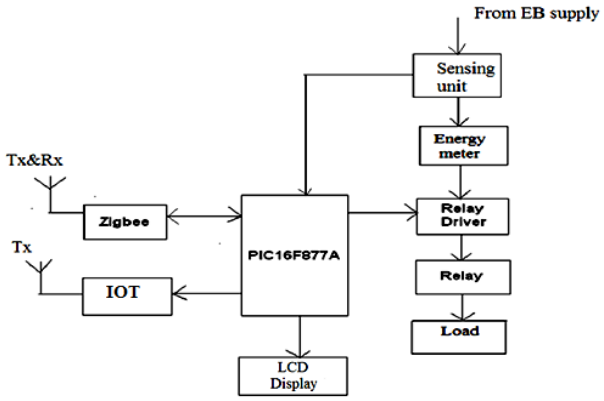

Fig.- 4. Receiver1Block Diagram

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.

4.4. CIRCUIT DIAGRAM OF TRANSMITTER

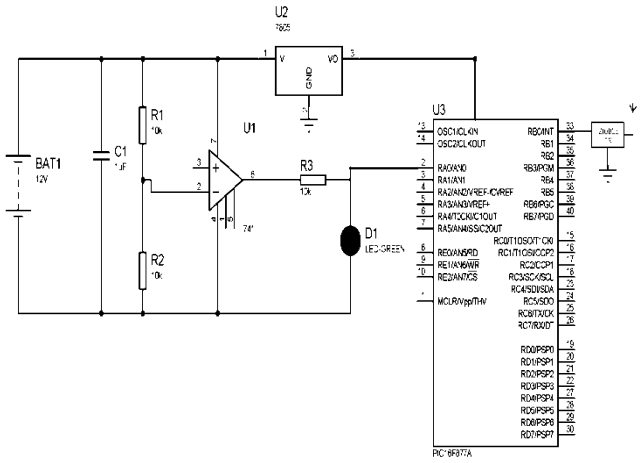

Fig.- 5. Transmitter circuit diagram

This transmitter circuit is used to transmit the signal during fault condition. Where there is a external battery needs to applied voltage for all component. Capacitor c1 connected in parallel to the battery. Capacitor is used for filter purpose. Then there are number of resistors connected in series together. It will be act as voltage divider. Then the operational amplifier is connects the output of the voltage divider and sensed signal. When the sensed signal is greater than the reference signal. Output is produce in the comparator. Then this signal is applied to ZIGBEE transmitter. Regulator 7805 is used to get the constant voltage output from 7805 regulator. R3 resistor is used to limit the flow of voltage to ZIGBEE for production purpose. LED (D1) will be glow, when the signal is passing through ZIGBEE transmitter.

4.5. CIRCUIT DIAGRAM OF RECEIVER

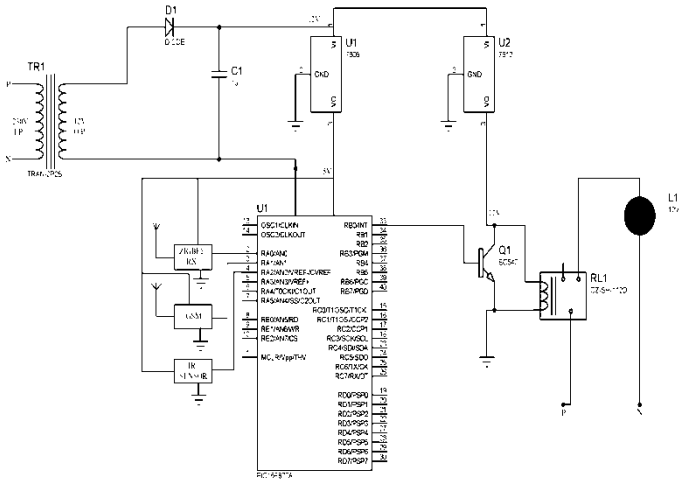

Fig.-6. Receiver Circuit Diagram

Transmitted signal is received by using ZIGBEE receiver. Port A(pin 2) is connected in ZIGBEE receiver. As like pin 3 for GSM and pin 4 for IR sensor. Step down transformer gives the 12 volt output voltage to diode rectifier. Where input AC voltage is rectified to DC. As like capacitor for filter purpose, there are two 7805 voltage regulators are used to give the constant output voltage. Port B act for output of pic16F877A. this pin is connected in transistor for switching purpose or to drive the relay unit. When the signal passed through transistor at the same time relay is tripped off and isolate the load from the main supply. Before the main supply IR sensor is fixed, it will sense the distribution line fault. Additionally. time saving purpose electrical information is automatically transfer through the IOT.

5. HARDWARE PROTOTYPE MODEL

Fig.-7. Receiver Normal Operating Condition

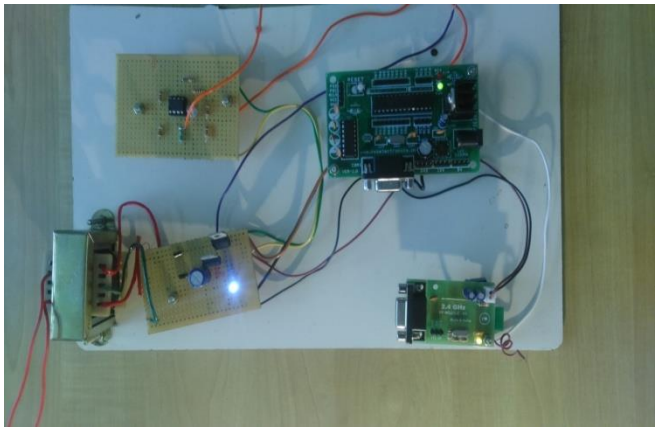

Fig.- 8. Transmitter In Normal Condition

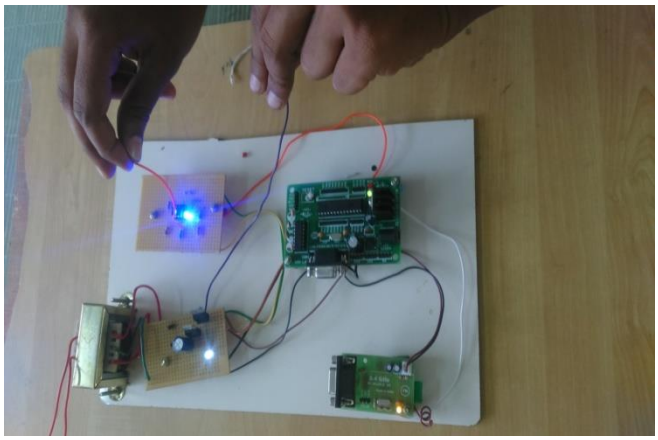

Fig.- 9. Transmitter Operate In Fault Condition

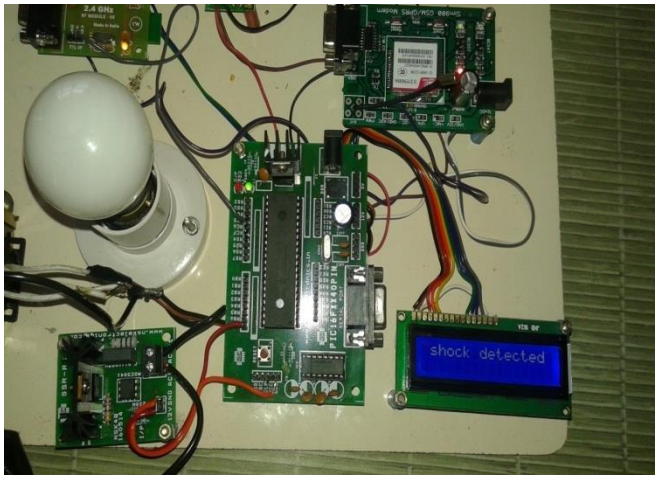

Fig.- 10. Shock was Detected, It Is Shown In Receiver

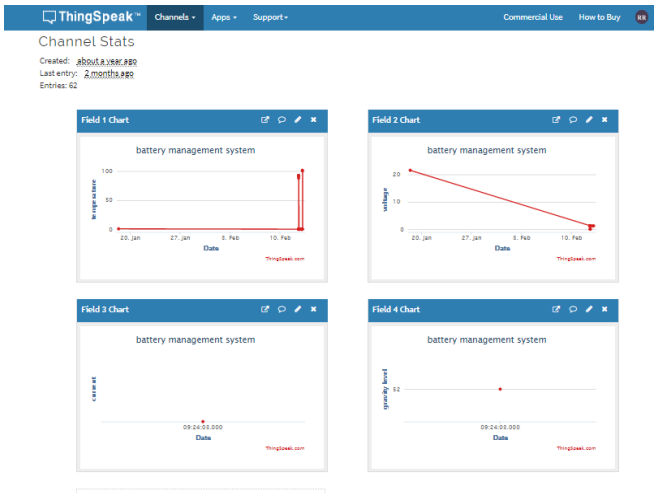

Fig.-11.IOT

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 saide. 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.

6.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 (mobile) 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.

6.1.FEATURE EXPANSION

- Workers in building construction can use this application where as they will be using driller machine and more electrical appliances for construction.
- It can be used in automobile industries.
- It helps the people who works in the industries, where they use more electricity and more electrical equipments.

7.REFERENCES

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