

Smart Communication System for Human Life Safety System with Electrical Information

Mohan. S¹, Gowri. A², Monisha. P², Bhuvaneshwari. B², Deepika. A²

¹Professor, Department of Electronics and Communication Engineering, AVS College of Engineering, Salem, Tamil Nadu, India

²U.G. Student, Department of Electronics and Communication Engineering, AVS College of Engineering, Salem, Tamil Nadu, India

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.

I. 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.

II. OBJECTIVE

The objective of this project is to describe methods for detection of unsafe electrical conditions with respect to the grounding of electrically operated mining equipment. It also includes a discussion of prototype instruments which effectively monitor the condition of the grounding safety devices currently in use on mining equipment and warn of dangerous conditions as soon as they appear.

III. LITERATURE SURVEY

ELECTRIC SHOCK

It is a sudden agitation of the nervous system of a body due to the passage of electric current. When electric current pass through the body, it causes a

sudden jerk and paralyses the nerve centers, stops breathing and upsets normal heart functions. Its effects are sudden and extremely painful. Victim may become unconscious and even die.

ELECTRICAL ACCIDENTS ARE GROUPED INTO TWO CATEGORIES

- Accidents that happened due to unsafe conditions.
- Accidents that happened due to unsafe acts.
- Every activity has certain inherent potential for accidents.
- Unless the care is taken the accidents are bound to happen.

ELECTRICITY IS DANGEROUS

Whenever you work with power tools or on electrical circuits, there is a risk of electrical hazards, especially electrical shock. Anyone can be exposed to these hazards at home or at work. Workers are exposed to more hazards because job sites can be cluttered with tools and materials, fast-paced, and open to the weather. Risk is also higher at work because many jobs involve electric power tools.

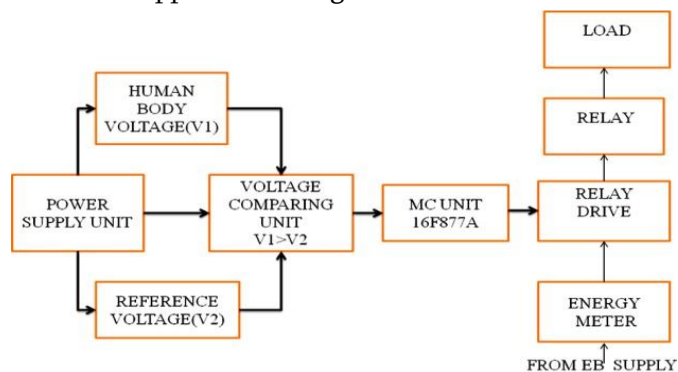
HOW IS AN ELECTRICAL SHOCK RECEIVED

An electrical shock is received when electrical current passes through the body. Current will pass through the body in a variety of situations.

IV. PROPOSED SYSTEM

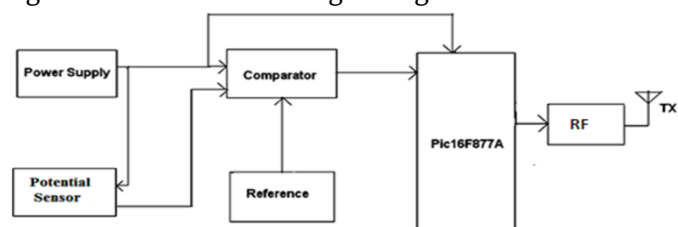
The power supply unit is used to give the operating voltage for the constrained device as comparator, voltage sensing unit and reference unit. Then the comparator act the major role in this circuit .It is used to compare the two voltage level they are human body voltage (v1) and Reference voltage(v2). 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.



V. TRANSMITTER BLOCK DIAGRAM

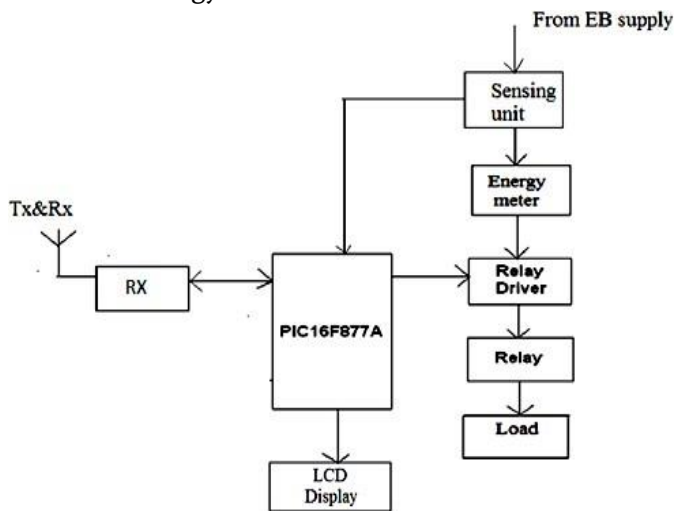
This transmitter circuit is used sense the fault and transmit the signal to receiver through ZIGBEE . This circuit contains power supply, sensing unit, comparator, reference voltage, PIC16F877A and ZIGBEE. Then the power supply unit is used to give operating voltage for whole system. Comparators have 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.



VI. 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.



VII. POWER SUPPLY

A power supply is a device that supplies electrical energy to one or more electric loads. The term is most commonly applied to devices that convert one form of electrical energy to another, though it may also refer to devices that convert another form of energy (e.g., mechanical, chemical, solar) to electrical energy.

VIII. TRANSFORMER

A transformer is a static device that transfers electrical energy from one circuit to another through inductively coupled conductors—the transformer's coils. A varying current in the first or primary winding creates a varying magnetic flux in the transformer's core and thus a varying magnetic field through the secondary winding. This varying magnetic field induces a varying electromotive force (EMF) or "voltage" in the secondary winding. This effect is called mutual induction

IX. RECEIVER

A rectifier is an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), which is in only one direction, a process known as rectification. Rectifiers have many uses including as components of power supplies and as detectors of radio signals.

X. VOLTAGE REGULATOR

Electronic voltage regulators operate by comparing the actual output voltage to some internal fixed reference voltage. Voltage Regulator (regulator), usually having three legs, converts varying input voltage and produces a constant regulated output voltage. They are available in a variety of outputs.

XI. POTENTIAL SENSOR

In potential sensor module we are using comparator for sensing the voltage level. Then the one type of potential sensor is explained in following details

XII. RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw (changeover) switch contacts.

XIII. PIC16F877A

PIC is a family of modified Harvard architecture microcontrollers made by Microchip Technology, derived from the PIC1650 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to "Peripheral Interface Controller". PICs are popular with both industrial developers and hobbyists alike due to their low cost,

wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability.

XIV. 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).

XV. REFERENCES

- [1]. Theodore Bernstein, —Electrical Shock Hazards and Safety Standards|, IEEE Transactions on Education, vol. 34, no. 3, August 1991.
- [2]. 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.
- [3]. 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.