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 ijrset@gmail.com

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Password Based Circuit Breaker

**Prof. Vishal.M.Joshi¹, Master. Kakde Akash Keshav², Master. Pawar Shaneshwar Babasaheb³,
Master. Pawar Pratik Rajesh⁴**

Professor, Department of Electrical Engineering, Adsul's Technical Campus Ahmednagar, Maharashtra, India¹.

UG Student, Department of Electrical Engineering, Adsul's Technical Campus Ahmednagar, Maharashtra, India².

UG Student, Department of Electrical Engineering, Adsul's Technical Campus Ahmednagar, Maharashtra, India³.

UG Student, Department of Electrical Engineering, Adsul's Technical Campus Ahmednagar, Maharashtra, India⁴

ABSTRACT: In developing countries like India, fatal errors & accidents may occur. The main concern that everyone believes is the restoration in continuity in supply. Due to geological diversities every section is sub-divided into numerous sub-sections. While faults in some sections are addressed automatically due to development in smart-grids, there exists a large portion of section which is still addressed by individual lineman agents. Not so common Scenario when operated manually we see fatal electrical accidents to the line man are increasing during the electric line repair due to the lack of communication and coordination between the maintenance staff and the electric substation staff. Our system is designed to control the control panel doors and circuit breaker by using a password for the safety. The system has an arrangement such that a password is required to operate the doors of the control panel and circuit breaker (ON/OFF). A secured password is requested from the control room by the lineman for the point of repair or service. The control to turn ON or OFF the line is maintained by the lineman. The password is entered through the matrix keypad. The entered password is compared with the password previously saved in the system. This ensures security of the worker because no one can turn ON the supply line without his permission.

KEYWORDS: Vibration, Transducer, transformer

I. INTRODUCTION

The need for a well sophisticated energy source is a milestone that has been achieved due to electrical energy. The electrical energy is the clean and cheapest form of energy for the specific needs of domestic, corporate and industrial consumers. The electric distribution is a very wide network of wires to deliver the supply by incorporating various electrical elements. Presently the accidental cases of death or injuries of linemen is noticed while working on the section of line for the repair or maintenance. electrical accidents to the line man are increasing, while repairing the electrical lines due to the lack of communication between the electrical substation and maintenance staff. The present work focuses on the regular practice and flaws of line clearance (LC) for the repair request and closing of LC after the repair is done. The draw backs of current LC system are charging of the line by accidental or by mistake of the operators at substation may be due to lack of information or criticality has evidenced injuries or even death of working linemen on the line. The use of intelligent micro controllers for various control mechanisms is the best solution for this problem.

This system is fully controlled by a microcontroller from the 8051 family. A matrix keypad is interfaced to the microcontroller to enter the password. The entered password is compared with the password stored in the ROM of the microcontroller. If the password entered is correct, then only the line can be turned on/off. The activation/deactivation of the circuit breaker is indicated by a lamp that turns on or off. Ultra sonic sensors are the devices that use electrical – Mechanical energy transformation to measure to distance from the sensor to the target object. These sensors are categorized into two types according to their working phenomenon piezoelectric sensors and electro static sensors. Here we are using the piezoelectric principle. PIR sensors are small, inexpensive, low power, easy to use and don't wear o

II. LITERATURE SURVEY

The Authors *Pramod M. Murari, Mahabal V. Kinnerkar, Prashant S. Koppa, Vishal S. Kamble, Rashmitha R. Menda*, have works on "Electric Line Man Safety with Password Based Circuit Breaker and Intimation of HT Wire Sag using GSM" which could be found on International Journal of Scientific Development and Research (IJS DR), ISSN: 2455-2631 © July 2017 IJS DR, Volume 2, Issue 7. The authors have proposed that their proposed system can be used as an



effective application in the present working system and provides safety to lineman and also corrective measures can be taken after HT wire sag intimation.

The Authors *Mallikarjun G. Hudedmani**, *Nitin Ummannanavar*, *Mani Dheeraj Mudaliar*, *Chandana Sooji*, *Mala Bogar*, have works on, “Password Based Distribution Panel and Circuit Breaker Operation for the Safety of Lineman during Maintenance Work” which could be found on Advanced Journal of Graduate Research, ISSN: 2456-7108 Volume 1, Issue 1, pp. 35-39, January 2017. The authors have proposed that their proposed system can The Arduino microcontroller and GSM based work demonstrate the security of the lineman as switching ON/OFF of circuit breaker and opening or closing of control panel door is done for the purpose of repair or maintenance. The method overcomes the deficiency of existing system of LC opening and closing request for the line. The secured authentic password from the substation to the working lineman ensures the operation of the panel doors and circuit breaker for the beginning of work. Similarly, a request to close the lines after the work by authentic password and charging up of the line by the substation operators is done. The method double cross checks the completion and ensures the safety. Any unauthorized access into the system by wrong password for specific number of trials send a message to the LCD display and a message to substation for the security purpose.

III.EXISTING SYSTEM

A. Existing system:

Circuit breakers play a vital role in maintaining system security. Since their malfunctioning could results in further component outages and may lead to the insecure operating conditions. During maintenance of distribution lines there is a chance of communication gap between the electric line and sub-station operator or staff. This communication gap may risk life of electric line man. The control to turn ON/OFF the line lies with the line man only. During maintenance the entire line is turned off this cause inconvenience to the consumers.

B. Disadvantages of existing system

1. During maintenance the entire line is turned off this cause inconvenience to the consumers.
2. Improper communication between maintenance staff and substation causes the electrical accidents.

IV. PROPOSED SYSTEM

At present if there is any maintenance work at the distribution the entire line will be turned off which causes inconvenience to the consumers. The proposed system uses a microcontroller of the 8051 family and a rectified power supply. A matrix keypad is interfaced to the microcontroller to enter a password. The password entered is displayed in the LCD. The entered password is compared with password stored in the ROM of the microcontroller. If the password entered is correct, then only the line can be turned ON/OFF. A relay is controlled by a relay driver IC, which is interfaced to the microcontroller also it is interfaced with the GSM modem .Whenever there is a maintenance work in the main line ,the line can be disconnected only when the password entered will match with the stored password. The relay ON/OFF operation will be indicated by the LED's; also it sends a message to the receiver about the line disconnection. As soon as the maintenance work is finished then line man should enter the same password as used to disconnect the line earlier.

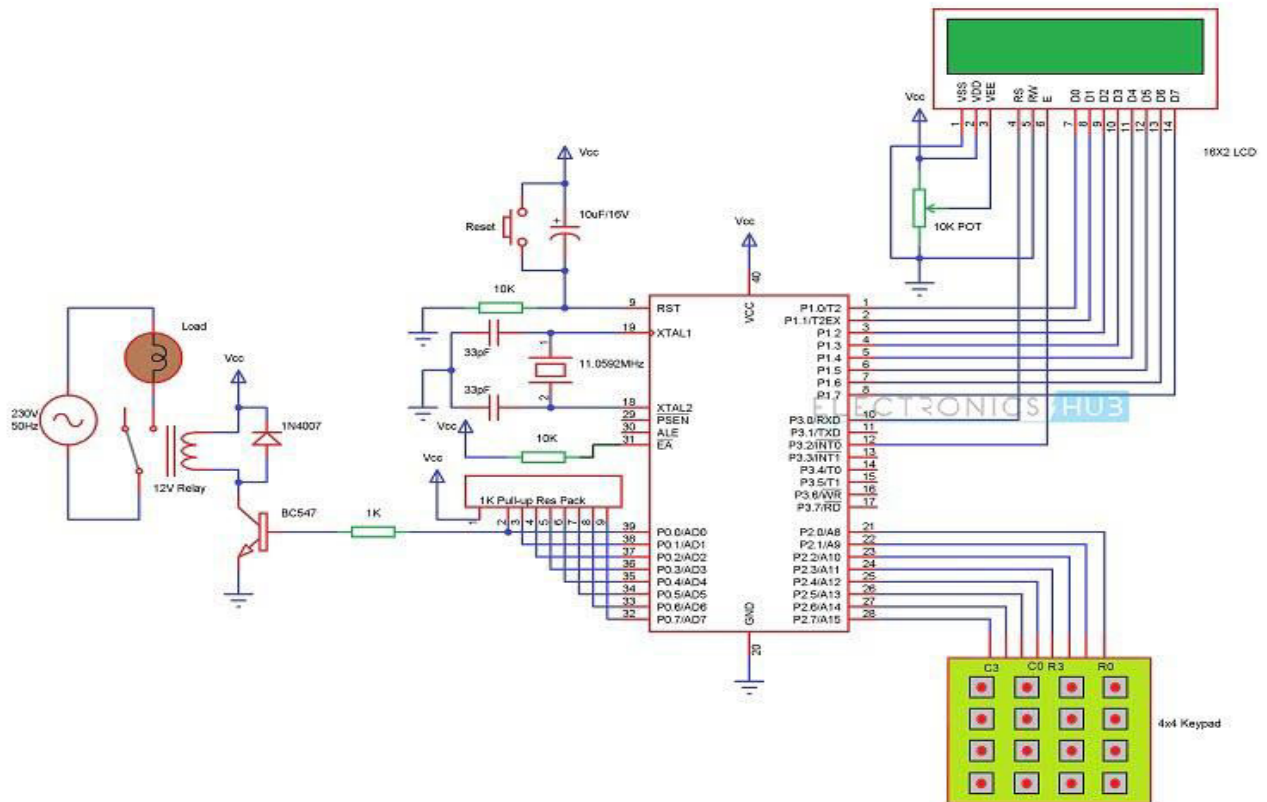


Figure 1: Schematic Circuit diagram of our proposed system

V. SCHEME OF IMPLEMENTATION

The circuit uses standard power supply comprising of a step down transformer from 12V and 4 diodes forming a bridge rectifier that delivers pulsating dc which is then filtered by an electrolytic capacitor of about 470µF. 5V power supply circuit is to be used to provide regulated 5V DC to the controller.

The working procedure of the model begins with the service request by the area lineman to the control room for a secured password to switch off the circuit breaker and open the doors of the specified control panel. The control room operator acknowledges the request and sends a secured password to the control panel & lineman’s mobile. Only after the entry of correct password the circuit breaker is turned OFF by the controller before opening the panel doors. A relay is simulated as a circuit breaker for ease of demonstration. The status is indicated by LEDs and message on LCD display allowing to the service or repair activity by the lineman without any doubt with security. The turn ON of the circuit breaker is interlocked with the closure of the panel doors for the safety reasons. On the completion of the repair or service the lineman sends a request for the password to turn ON the circuit. The working procedure of the model begins with the service request by the area lineman to the control room for a secured password to switch off the circuit breaker and open the doors of the specified control panel. The control room operator acknowledges the request and sends a secured password to the control panel GSM receiver and to the lineman’s mobile. Only after the entry of correct password the circuit breaker is turned OFF by the controller before opening the panel doors. A relay is simulated as a circuit breaker for ease of demonstration. The status is indicated by LEDs and message on LCD display allowing to the service or repair activity by the lineman without any doubt with security. The turn ON of the circuit breaker is interlocked with the closure of the panel doors for the safety reasons. On the completion of the repair or service the lineman sends a request for the password to turn ON the circuit.

VI. SYSTEM OVERVIEW

The system was successfully tested and the prototype was assembled. Figure 2 shows the prototype panel which we designed. The keypad must be entered with correct password then and only then the relay will be given signal. The



relay will operate giving the signal to motor which operates the lock.

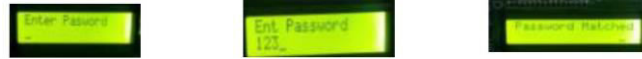


Figure 2: Actual LCD display & request for password.



Figure 3: Front view of switchgear panel in which incomer MCCB is situated with password keypad and indication.

The above circuit consists of 8051 series controller (AT89C52), 4x4 Matrix Keypad, 16 x 2 LCD Display, 4 – Channel Relay Module and Four Loads. LCD data pins are connected to PORT1 and control pins RS, RW and EN pins are connected to P3.0, GND and P3.1 respectively. Here, the LCD is used to display the information related to the load.

Keypad is connected to PORT2 of the microcontroller. The four Row Pins of the Keypad are connected to P2.0 to P2.3 and the four Column Pins are connected to P2.4 to P2.7. Using this keypad, we need to enter the password.

Four Lamps (acting as Electrical Lines) are connected to P0.0 to P0.3 through the 4 – Channel Relay Module. These are used to indicate circuit breaker state (Light ON – Line Active and Light OFF – Line Not Active). If you are not using the Relay Module, then you need to use 4 BC547 NPN Transistors (along with its current limiting base Resistor)

In order to drive the relays. LCD displays “enter password”. Enter the password with help of keypad. Now, if the password is correct, then circuit breaker changes its state (i.e. if it is already ON, now it becomes OFF and if it is already OFF, now it becomes ON) and displays line (or load) status on LCD. If the password is wrong, then the LCD displays “wrong password”. After some time, the microcontroller asks to enter password by displaying “enter password

VII. CONCLUSION

The method overcomes the deficiency of existing system of LC opening and closing request for the line. The method double cross checks the completion and ensures the safety. Any unauthorized access into the system by wrong password for specific number of trials send a message to the LCD display and a message to substation for the security purpose

It can work on a single given known password. No other person can reclose the breaker until the stored password is entered. It gives no scope of password stealing. It is effective in providing safety to the working staff. It is economical and it can be easily installed. It can be concluded that the proposed system can be used as an effective application in the present working system and provides safety to lineman and also corrective measures can be taken after HT wire sag intimation.

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BIOGRAPHY



Kakde Akash Keshav

His higher studies were done in Vishweshwarayya Polytechnic, Latur and the UG is from Adsul's Technical Campus Ahmadnagar. The trend he is intrested is Electrical Engineering. My Ambition is to work in Electric vehicle technology (R&D Department)



Pawar Shaneshwar Babasaheb

His higher studies were done in Ajit Dada Pawar college of Polytechnic, Wadala Mahadev Shirampur Ahmednagar and the UG is from Adsul's Technical Campus Ahmadnagar. The trend he is intrested is power systems. My ambition is to work in R&D (Research & Development) Department of RDSO.



Pawar Pratik Rajesh

His higher studies were done in Government Polytechnic Ahmednagar and the UG is from Adsul's Technical Campus. The trend he is interested is Electrical Engineering. His Ambition is to work in Product Development Department



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