



A Review on Electrical Safety System with Circuit Breaker

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Abstract : Safety is our highest priority in daily life Whenever you are engaged in any activity. Currently, Accidents resulting in death are not uncommon among network operators. Based on the current way of working, it is noted that It is absolutely necessary to take safety measures to protect the operator This is an important area. Doors and circuit breakers on the control panel The safety of an electrician controls the breakers Security system with passwords. A lack of Coordination and communication between the Electricity company workers and the maintenance team substation may be the cause of the increase in heavy electrical accidents involving line workers repairing power lines. This technique offers a remedy that ensures success the safety of grid operators. Lines are able to switch off/on the guard. Users can easily operate the devices thanks to their layout the use of a password to open the door is required of the circuit breaker and the control panel. A protected. The control room will be contacted to provide a password, and the installer at the repair or maintenance site. This request has been made. And a password is transmitted to the 'control panel and the cell phone of the fitter device. The password is transmitted with the help of The Arduino Uno is connected to the matrix keypad. Microcontroller. The entered password is compared with Arduino on the control panel to receive a password. Should the password is entered correctly, the circuit breaker will switch on and off. The electrician can perform the repair with the Activate the option OPEN /CLOSE.

IndexTerms -Arduino, Relay, LCD.

I. INTRODUCTION

Due to lack of communication between electrical substation workers and maintenance workers, electrical accidents are becoming more common during power line repairs. This idea provides a solution to this problem to ensure the safety of electricians. In this proposed system, the electrician is responsible for switching the electrical lines on and off. The project is designed in such a way that an electrician or maintenance worker has to enter the password to turn the power line on or off. Now ,if there is a problem with an electrical line, the electrician will turn off the power supply. into the line by entering a password and conveniently repairs the line. Upon returning to the substation, the line worker turns back on the supply to the line in question. Electricity transmitted over commercial, industrial, and residential power lines can be hundreds of thousands of volts and high currents. Measuring the voltage on a transmission line necessarily involves some risk because contact with the line is required. Even the proximity of a high-voltage line can be enough to create a spark that travels through the air to the nearest object. Nevertheless, contact occurs all the time during the installation, maintenance and repair of power lines. This project is a simple project that helps to control the power line with the help of a password. Nowadays, accidents involving employees are becoming more and more common when repairing power lines.

This is due to the lack of communication between the electrical substation and the maintenance personnel. This project provides a solution to this problem to ensure the safety of the line personnel. In this proposed project work, the control system(ON / OFF) of the electrical line in the hand of the conductor. The concept is such that the maintenance personnel or the installer must enter the password to ON / OFF control the electric line. If there is a fault in the electrical line or if a repair is to be made to the line, entering the password will cut off the supply to the electrical line and the line can be conveniently repaired. After the repair of the line, the supply of the electric line is restored by entering the password again. Separate passwords can be assigned to the different electrical phase lines.

The system is designed with three outputs with three different passwords. A relay is connected to each output, the contact of which interrupts or establishes the supply to the electrical line. To enter the password, a small keyboard with twelve keys is used, which is connected to the microcontroller. This keyboard is in the form of a 3X4 matrix, and the data generated by the keyboard is stored in RAM. Depending on the program prepared for the controller and the information generated by the keyboard, if it matches the predefined program, the corresponding relay is automatically activated. The data entered from the keypad are displayed via LCD in the form of asterisks to ensure secrecy. If the entered data is correct, the display will indicate that the corresponding electrical line is deactivated. To reactivate the line, the password must be entered again. Moreover, via GSM, which is also

connected to the controller, this information can be sent to the relevant person or authority in the form of SMS. The new power grid is currently struggling with large power grids and similar electrical devices. The power grid suffers from high voltage of fault current in them during the electrical fault or short circuit, which can permanently damage the machines.

The fault current should be removed from the power grid as soon as possible to protect the power grids and equipment. The proposed password based circuit breaker provides a way to provide line protection to solve this problem. Control of the electrical lines remains with the grid operator for this project. The project is designed to require maintenance personnel or the line attendant to enter the password for the electrical line. Today, if there is a fault in the electric line, the electrician will control the power supply to that line by pressing the password and happily repairing the electric line. Different passwords are assigned for each power line.

Everyone must have as much security as possible. The electric line safety system is designed to control a circuit breaker by password to ensure the safety of electrical personnel. Nowadays, the electrical accidents that happen to the line personnel when repairing the electrical lines are increasing because the communication between the electrical substation and the maintenance personnel is not working. This project provides a solution to this problem to ensure the safety of the line personnel. In this proposed system, the control (ON /OFF) of the electrical lines lies with the installer. The project is designed in such a way that the maintenance personnel or the installer must enter the OTP to switch the electrical line ON OFF. Now, when there is a fault in the electric line, the line personnel will turn off the power to that line by entering the OTP and conveniently repair the electric line, and after coming to the substation, the line personnel will turn on the power to that line again by entering the OTP.

II. RESEARCH METHODOLOGY

B. Sai kumar et al [1] Safety is the main concern in our daily life when we do any activity. In the present scenario, accidental death of electricians is often read and seen. In this direction, a safety measure to protect the operator is considered very necessary considering the present way of working. The electrical circuit breaker is an automatically operated electrical switch designed to protect a circuit from damage due to overload or short circuit. Its basic function is to detect a fault condition and interrupt the flow of current. Unlike a fuse, which trips once and then must be replaced, a circuit breaker can be reset (either manually or automatically) to resume normal operation. When manually operated, deadly electrical accidents are becoming more common during power line repairs due to a lack of communication and coordination between maintenance personnel and substation personnel. To avoid such accidents, the breaker can be designed to be operated only by authorized personnel with a password. This ensures the safety of the worker as no one can turn on the line without his permission. The system is fully controlled by an 8-bit 8051 family microcontroller. The password is stored in an EEPROM connected to the microcontroller. The password can be changed at any time, unlike a fixed password that is permanently burned into the microcontroller.

The password is entered via a keypad, and the circuit breaker is switched on and off via a relay, which is indicated by a lamp. Any incorrect attempt to open the breaker (by entering an incorrect password) triggers an alarm, which is indicated by another LED. The system is designed to control the panel doors and circuit breaker using a password. Mallikarjun G. Hudedmani et al, [2] Security is the main concern in our daily life while performing any activity. In present scenario accidental death of electricians is often read and seen. In this direction, safety measure to protect the operator is considered very necessary considering the present working mode. The safety system for electricians is designed to control the panel doors and circuit breaker with a password for safety. Serious electrical accidents are becoming more common during power line repairs due to lack of communication and coordination between maintenance personnel and power system personnel. Nowadays, the power grid is equipped with a huge electrical network and corresponding electrical devices. In the event of an electrical fault or short circuit, the power grid is subjected to a high fault current that can permanently damage the equipment. To protect the power networks and equipment, the fault current must be removed from the system as soon as possible. Nowadays, accidents involving employees are becoming more common during power line repairs. This is due to inadequate communication between the electrical substation and maintenance personnel.

The proposed system provides a solution that ensures the safety of line personnel. The control of whether the line ON or OFF is switched is in the hands of the installer. The system is designed in such a way that a password is required to open the doors of the control panel and the circuit breaker(ON /OFF). The installer requests and receives a secured password from the control room for the repair or maintenance point. This request is registered and a password is sent to the GSM module of the fitter and the control room for further work. The password is entered using the matrix keypad connected to the Arduino Uno microcontroller. The entered password is compared with the password received from the GSM receiver of the control panel. If the entered password is correct, the function of the circuit breaker ON /OFF and the door OPEN /CLOSE will be activated for the installer to perform the repair. If an intruder tries to operate the mechanism with an incorrect password three times, a message will be displayed on the LCD display and a message is sent to the control room about the unauthorized access to the system for security reasons. Pramod M. Murari et al. [3] A circuit breaker is an automatically operated electrical switch designed to protect a circuit from damage due to overload or short circuit. Its basic function is to detect a fault condition and interrupt the flow of current. Unlike a fuse, which trips once and then must be replaced, a circuit breaker can be reset (either manually or automatically) to resume normal operation. When manually operated, deadly electrical accidents are becoming more common during power line repairs due to a lack of communication and coordination between maintenance personnel and substation personnel. To avoid such accidents, the breaker can be designed to be operated only by authorized personnel with a password. This ensures the safety of the worker, as no one can turn on the line without his permission. The system is completely controlled by the 8-bit microcontroller of the 8051 family. The password is stored in an EEPROM connected to the microcontroller. The password can be changed at any time, unlike a fixed password that is permanently burned into the microcontroller. The password is entered via a keypad, and the circuit breaker is switched on and off via a relay, which is indicated by a lamp. Any incorrect attempt to open the breaker (by entering an incorrect password) will trigger an alarm, indicated by another LED. This project provides a solution to this problem to ensure the safety of line personnel. A luminaire with a group of LED' is connected in each line and a light sensor LDR is connected directly under the luminaire. This LDR is connected to a trigger circuit designed with a 555 timer chip. This trigger circuit sends a signal to the controller whether the line is operating or not. When the line is not working, a message in the form of SMS is automatically sent to

the leader's cell phone to inform him that the line is down. To repair the line, he enters the password and disconnects the line to the concerned line and works conveniently. After repairing the line, he can restore it himself.

Prof. Hemant P. Pawar et al, [4] A circuit breaker is an automatically operated electrical switch designed to protect a circuit from damage due to overload or short circuit. Its basic function is to detect a fault condition and interrupt the flow of current. Unlike a fuse, which trips once and then must be replaced, a circuit breaker can be reset (either manually or automatically) to resume normal operation. When manually operated, deadly electrical accidents are becoming more common during power line repairs due to a lack of communication and coordination between maintenance personnel and substation personnel. To avoid such accidents, the switch can be designed so that only an authorized person can operate it with a password. Again, there is an option to change the password. The system is completely controlled by an 8-bit microcontroller of the 8051 family. The password is stored in an EEPROM connected to the microcontroller. The password can be changed at any time, unlike a fixed password that is permanently burned into the microcontroller. The password is entered via a keypad, and the circuit breaker is switched on and off via a relay, which is indicated by a lamp. Any incorrect attempt to open the breaker (by entering an incorrect password) triggers an alarm, which is indicated by another lamp.

III. SYSTEM METHODOLOGY

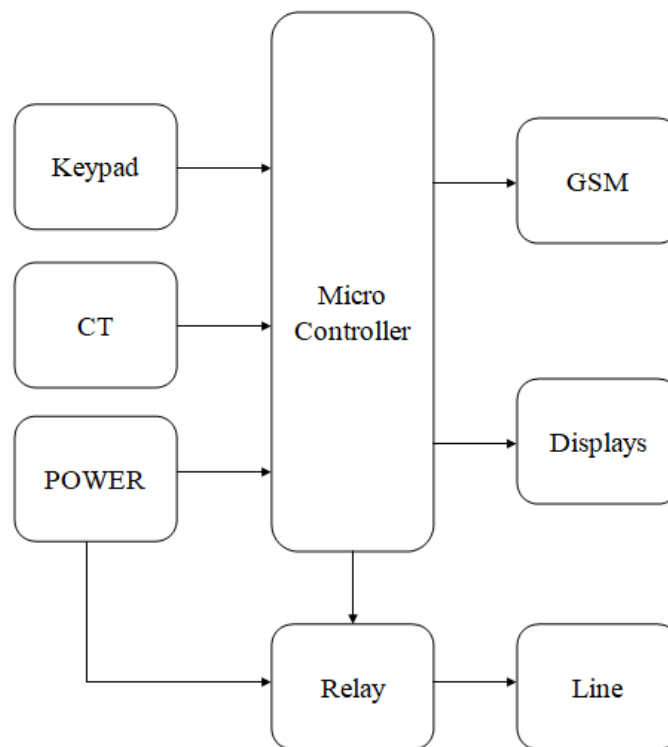


Fig 1:Block Diagram

The basic block diagram of the system is shown in the block diagram. OTP generation and OTP verification are the main steps performed by this system. Depending on the users request, the system generates an OTP and sends it to the user's phone. After entering this OTP from the keypad, it is compared with the generated OTP. If the OTPs match, the power to the line is disconnected. If a different OTP is used, the line is turned back on. If the OTPs do not match up to three times or more, an alarm is generated. We also measure the current with a current sensor. If more current flows, the circuit will be automatically triggered and an SMS will be sent to the registered number.

3.1 MATRIX KEYPAD

This 16-button keypad offers a useful human interface element for microcontroller projects. There are several handy adhesive backing provides a simple method for mounting the keypad. For microcontroller gambles, this 16- button keypad offers a precious human interface element. In a number of uses, accessible tenacious backing gives an easy way to install the keypad.

3.2 POWER SUPPLY

An embedded circuit known as a regulated power supply changes unregulated AC (Alternating Current) into a steady DC. A rectifier is used to convert the AC supply into DC. Its purpose is to provide a circuit or device that must be operated within particular power supply parameters with a stable voltage (or, less frequently, current).

3.3 RELAYS

A circuit used to switch on and off a light bulb or any other load connected to main supply. It works on the principle of electromagnetic operation where magnetic field is created to operate the lever to control the flow of current in specific direction to turn on/off the load. Here the load given is LED to specify the on/off conditions of relay.

3.4 ATMEGA 328

The high-performance pico Power 8bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1024B EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, a 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts.

3.5 LIQUID CRYSTAL DISPLAY

Liquid crystal display (LCD) is also called as flat panel display which works on the principle of blocking light. It is used for displaying numeric and alphanumeric characters in dot matrix and segmental way. The entered password will be processed by the Arduino and will displayed by the LCD. It consists of 16 rows and 2 columns to display the numeric and alphanumeric contents.

3.6 WORKING

The OTP based electric line man safety system is designed to control a circuit breaker by using a GSM for the safety of electric man, the line man send SMS. There are many critical electrical accidents are rises during the electric line repair. These accidents are happen due to lack of communication and co-ordination between the maintenance staff and electric substation staff. In this proposed system the security of the line man is its own hand. The control by sending SMS & will be maintained by the line man .The system is fully controlled by a microcontroller from ATMEGA 328. A matrix keypad and GSM is interfaced to the microcontroller to send SMS. the line can be turned ON/OFF.

V CONCLUSION

From the above information finally, we can conclude that this system provides An expected solution which can ensure that only the lineman can control the system and thus no possibility of someone else interfering the system. The lineman can simply work the loads from the major center rather than come to every circuit breaker source. Thus, it is an extremely useful, inexpensive and safe way of using circuit breakers. The project work is designed and in process. For the demonstration purpose, a prototype module is constructed. The major and critical task is preparing the software for performing the tasks depending on the inputs.

VI REFERNCES

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