

Password Based Circuit Breaker Using Arduino

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ABSTRACT- The project is designed to control a circuit breaker with help of a password only. A keypad is connected to the project to enter the password. 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. This proposed system provides a solution, which can ensure the safety of the maintenance staff e.g. line man. The control to turn ON/OFF the line lies with the line man only. This system has an arrangement such that a password is required to operate the circuit breaker (ON/OFF). Line man can turn off the supply and comfortably repair it, and return to the substation, then turn on the line by entering the correct password. The system is fully controlled by an arduino. A matrix keypad is interfaced to the arduino to enter the password. The entered password is compared with the password stored in the ROM of the arduino. If the password entered is correct, then only the line can be turned ON/OFF. Activation / deactivation of the circuit breaker are indicated by a lamp (ON/OFF). We can change the password after every time we use the system to increase the security level of system. A unique password should be known to Some responsible person of the staff only.

Keywords – Line man; Arduino; Keypad; circuit breaker; Relay; LCD

I. INTRODUCTION

Nowadays, 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. This project gives a solution to this problem to ensure line man safety. In this proposed system the control (ON/OFF) of the electrical lines lies with line man. This project is arranged in such a way that maintenance staff or line man has to enter the password to ON/OFF the electrical line. Now if there is any fault in electrical line then line man will switch off the power supply to the line by

entering password and comfortably repair the electrical line, and after coming to the substation line man switch on the supply to the particular line by entering the password. The entered password is compared with the password store in the ROM of the microcontroller. If the entered password is correct, then only the line can be turn ON/OFF. Activation or deactivation of the circuit breaker is indicated by a lamp (ON/OFF). This project is designed to operate the system by only authorized person to avoid such accidents.

II. LITERATURE REVIEW

In the recent years, researches have been focusing their work in the area of staff safety. Maintenance of fault in electrical

Line has always been a challenge to the lineman. The safety and supply control system have to be upgraded to provide a better safety to the maintenance staff. Time and again there have been innovations in the control of circuit breaker and other control system technologies for the secure and smooth functioning of substation and its staff.

Reference paper [1]: Amit Sachan has designed this project is to acquire the remote electrical parameters like Voltage, Current and Frequency and send these real time values over GSM network using GSM Modem/phone along with temperature at power station. This project is also designed to protect the electrical circuitry by operating an Electromagnetic Relay. This Relay gets activated whenever the electrical parameters exceed the predefined values. The Relay can be used to operate a Circuit Breaker to switch off the main electrical supply. User can send commands in the form of SMS messages to read the remote electrical parameters. This system also can automatically send the real time electrical parameters periodically (based on time settings) in the form of SMS.

Reference paper [2]: Mladen Kezunovic and Zhifeng Ren has describes a solution for automated analysis of circuit breaker operation.

The analysis is based on a record of waveforms taken from the circuit breaker control circuit by using a portable recorder and manually forcing an operation of the breaker. This solution was driven by a need to perform the analysis in a more timely and consistent manner than what is available with existing technology. The solution is implemented using advanced wavelet transforms for waveform feature extraction and an expert system for decision making.

Reference paper[3]: Circuit Breaker Monitoring system which is designed is to collect sufficient information for status estimation of the breaker. Real time monitoring finds to be better solution for monitoring status and equipment conditioning of the breaker. The aim of the work done is to design a system that ensures reliable operation of the Circuit breaker and monitor different physical conditions such as over voltage, unbalance voltage, phase failure voltages, voltage and time delay setting, switch on time for relay and the result displayed on the LCD, and hence protection is given against above abnormal conditions.

Reference paper[4]: The password based circuit breaker control system is a system that access only specified password to control the circuit breaker. Here, there is also a provision of changing the password. The system is fully controlled by the 8 bit microcontroller from 8052 family which has an 8KB of ROM for the program memory. A matrix keypad is interfaced to the microcontroller to enter the password while a relay driver IC is used to switch ON / OFF the loads through relays. The complete circuit is built with on board power supply.

Reference paper [5]:Shusmita deb, P.Divya, Sindhu The system is fully controlled by the 8 bit microcontroller of 8051 family. Then the program is stored in an EEPROM, interfaced to the microcontroller and it can be changed any time unlike a fixed one burnt permanently on to the microcontroller. A keypad is used to operate the Remote and a relay to open or close circuit breaker, which is indicated by a lamp

Reference paper [6]: Charles H flourschein In his paper he describes about the various types of circuit breaker and its purposes.

Referencepaper[7]:N.mathavan, B.praveena In this project the developed a system in which the electric linemen spotting the fault in the power transmission system then he power lines can be switched QR code as a password based circuit breaker to control the powerlines. When OFF by scanning the QR code with the help of Android APP. The APP check the password 1 and

send password 2 to the microcontroller through Bluetooth.

Reference paper [8]:Electronicshub.com This websites is used for help in assembling the various components of the project.

Hardware components

2.1 Arduino UNO Board:-

The Arduino Uno is one kind of microcontroller board based on ATmega328, and Uno is an Italian term which means one. This board includes digital I/O pins-14, a power jack, analog I/ps-6, ceramic resonator-A16 MHz, a USB connection, an RST button, and an ICSP header. All these can support the microcontroller for further operation by connecting this board to the computer. The power supply of this board can be done with the help of an AC to DC adapter, a USB cable, otherwise a battery.



Figure 1- Arduino UNO Board

2.2 Relay

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal.



Figure2-Relay

2.3 LCD Display

A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel

matrix. This LCD has two registers, namely, Command and Data.



figure 3-LCD display

2.4 Keypad

A keypad is a set of buttons arranged in a block or "pad" which bear digits, symbols or alphabetical letters. Pads mostly containing numbers are called a numeric keypad.



Figure 4- keypad

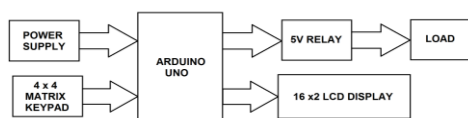


Figure 5- Working block diagram

III. FUTURE ENHANCEMENT

- In future we can send an SMS to switch on the power circuit.
- We can place sensors for each and every line to detect the fault and automatic send fault SMS to lineman for repair of line
- In the near future we can use mobile apps and various wireless system for the increase in efficiency of the project
- We can use QR code scanner or eye and face scanner instead of passwords

IV. CONCLUSION

To conclude with the project it's that the proposed system is a simple designed and low

budget economical system. As we stated earlier the safety and protection of lineman is our first priority. Hence we tried to develop a system that can ensure it with full accuracy. The project completed as per the requirement .Finally the aim of the project i.e. to avoid the fatal accidents for line man.

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