

Password Protected Circuit Breaker Using IoT

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Abstract- A circuit breaker is an electrical switch that protects an electrical circuit from damage caused by overload or a short circuit by operating automatically. Because of a lack of communication and coordination between maintenance staff and the electric substation team when electric line repairs are done manually, fatal electrical accidents to linemen are on the rise. To minimize similar mishaps, this project was created to fix the problem by constructing a circuit breaker that can only be operated by an authorized person using a password. The ATMEGA328 microcontroller is in charge of the entire system. To open or close the circuit breakers, a keypad is needed to enter the password, which is indicated by a bulb.

Key Words-Circuit Breaker, Password, Wireless communication, Notifications, Current flow.

1. INTRODUCTION

Human life must be safeguarded at all costs. Switchgear safeguards the electrical circuit in a high-current switching system. The most crucial factor in our daily lives is safety. Everyone should feel as safe as possible. For the protection of the electric lineman, the electric lineman safety system is designed to control switchgear using a password. Critical electric accidents to linemen are on the rise during electric line repair due to a lack of communication and coordination between the maintenance crew and the electric substation team. This project proposes a system that protects maintenance linemen's safety. Because this system is set up in such a way that a lineman can turn on or off the line, the linemen will be in charge of doing so.

1.1 Objectives

The project's major goal is to assist in the control of electrical lines through the use of a password. Due to a lack of communication between the electrical substation and maintenance employees, lineman accidents are on the rise while repairing electrical lines. This initiative provides a solution to this challenge, ensuring the safety of linemen. The lineman is in charge of controlling (on/off) the electrical lines in this suggested system. Our project will be constructed in such a way that it will prioritize the lineman's safety while on the job. And fewer deadly electrical mishaps occur as a result of miscommunication between maintenance and electric substation personnel. To prevent accidents, the project is set up such that only authorized users can access it using a password.

1.2 Problem Statement

This password-protected circuit breaker system using IoT should provide us solution which ensures the protection of lineman.

2. METHODOLOGY

Check out the journals and research related to Project topics.

1. The circuit diagram of the system is shown.
2. Look for another type of control circuit and circuit breaker.
3. Find the circuit component model.
4. Test the system using the Proteus program.
5. The actual circuit design of the system has been proposed.

2.1 Circuit Diagram

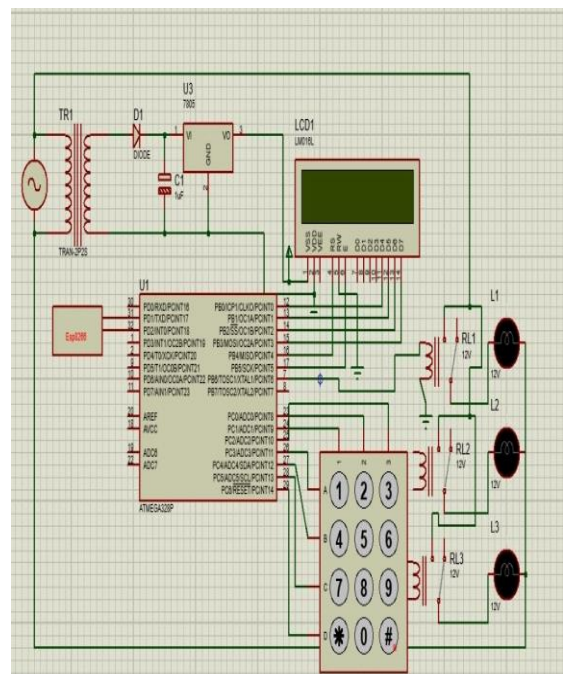


Fig.1: Circuit diagram

The answer to this difficulty was to use a password to toggle the circuit breaker on and off. It is not a felony to switch off a circuit breaker; the issue is that doing so when a lineman is performing a duty could result in a

fire, blast, or burning; we also can't overlook the damage that could result from burning the station, which could result in financial losses.

2.2 Working Principle

The need of a turn-off circuit breaker has represented adding abuses to the station or to treatment (lines, transformers, generators ... etc). The manual part consists of using the keypad to enter a password that will appear on the LCD screen to ensure that you have entered the password you have chosen. The password will be stored on the ATMEGA328, and the output will rotate a motor that will break the circuit by separating a moving contact. The lineman has been given a safeguard since the moving contact will not move until we use the same password as the lineman.

3. LITERATURE REVIEW

The safety of human life is paramount. The production and verification of password-based switchgear are two of the most important responsibilities of this system. The Password-Based Circuit Breaker contributes to lineman safety by preventing mishaps caused by electric shock during repairs. [1]

When given a certain input, a control system comprises subsystems and processes, or plants, that are constructed to produce the intended output with the desired performance. The four main reasons for using building control systems are power amplification, input-form ease, disturbance correction, and remote control. [2]

The device is based on an ATMEGA 328 microcontroller and can work up to 16MIBS, lowering the cost and making the system more compact. The system's main features are a 50Hz, 230V sinusoidal voltage output, a wide input range, and 350-watt power output. It is completely controlled by a microcontroller. The lineman must input the password to turn on or off the electrical line. Now, if there is a failure in the electrical line, the lineman will enter the password to turn off the power supply to the line, allowing him to comfortably repair the line. After arriving at the substation, the lineman will input the password to turn on the power supply to that specific line. [3]

4. RESULT

Now we see how the model works. Firstly, when the power is turned ON, the LCD displays a "Password Based Circuit Breaker" in screen, Figure 4.1.



Figure 4.1: Operation Begin

After tapping the # key, the opportunity to enter a password appears.

Then asks you to enter the password to unlock it as shown in Figure 4.2 below.

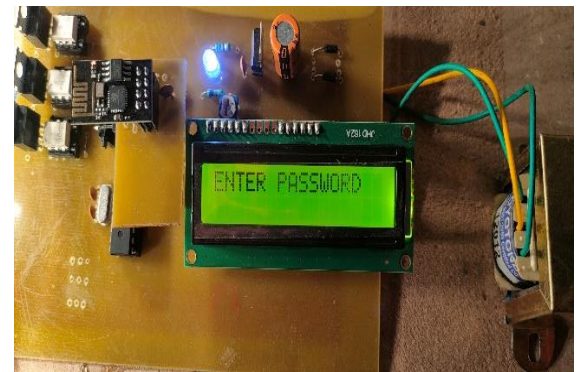


Figure 4.2: Desiring of password

In our case, the password is fixed which is '1234' for switching operations in any phase and it is seen on the LCD as shown in Figure 4.3.



Figure 4.3: An example of a password being entered

Then, on the LCD, there are options for various switching possibilities are given below



Figure 4.4: Different phase Options for switching operation

We have three alternatives for turning off any phase.

We must press 1 to turn ON or OFF the R phase, then 2 and 3 to turn ON or OFF the Y and B phases, respectively.

Switching operations in R phase is given below



Figure 4.5: R Phase OFF



Figure 4.6: R Phase ON

The output of the LCD is shown below if we enter an erroneous password.



Figure 4.7: Incorrect password

If we enter the wrong password three times in a row, the system will be blocked. We must also reset it by pressing the push button to access the password entry option.

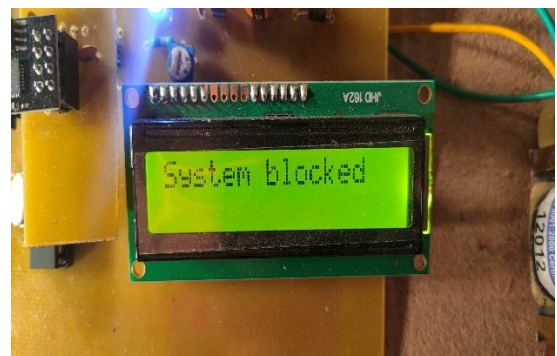


Figure 4.8: System blocked

Figure 4.9 shows the final form of the project circuit. It is designed to control three different phases and issue a notification on the mobile phone connected to the model immediately after the operation is processed.

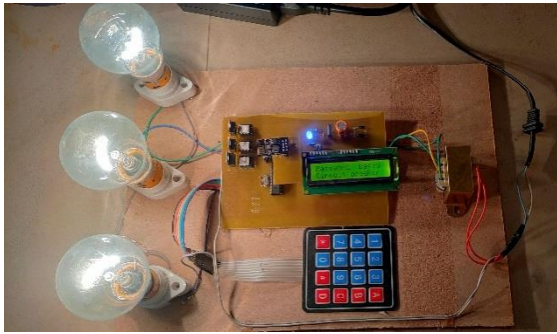


Figure 4.9: Illustrate the project circuit

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5. CONCLUSION

A circuit breaker can be activated by a single known password. The operating password can be changed, and the system can be used effectively with the new password. Other than the person who changed the password, no one else may reclose the breaker once it has been entered into the system. It eliminates the possibility of password theft. It is effective in ensuring the safety of the workers. It is cost-effective and simple to install.

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