

Password Based Circuit Breaker Using PLC and SCADA

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Abstract: 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 PLC and SCADA system. A 3x4 keypad is interfaced to the PLC to enter the password while a relay driver is used to switch ON / OFF the loads through relays. The complete circuit is built with onboard power supply. The power supply consists of a SMPS. That converts 230 V AC into 24 V DC and supplies it to PLC. Programming device is used to program the PLC and set the password.

Keywords: Circuit breaker, Password, PLC, SCADA, Safety, Security

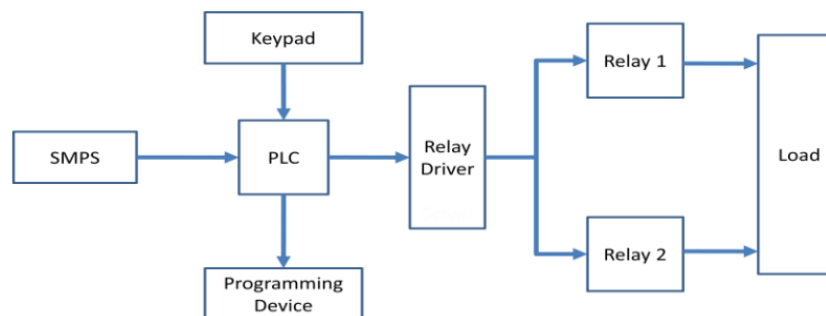
I. INTRODUCTION

Power System fault is defined as undesirable condition that occurs in the power system. The system is designed to control a circuit breaker by using a password for the safety of electric line man. Critical electrical accidents to line men are on the rise during electric line repair due to lack of communication and co-ordination between the maintenance worker and control room. This proposed system provides a solution that ensures safety of maintenance staff or line man. The line man has control of turning ON and OFF circuit breaker using a password. A matrix keypad is interfaced to the PLC to enter the password. The entered password is compared with the password stored in PLC Controller. System has control room for addition of new features also, as one PLC and SCADA can be used to collect data of various other parameters related to the circuit breaker and transmission line. For example digital counter for recording on/off of a circuit breaker which can be used to determine routine maintenance and life expectancy of circuit breaker. Time required for switching operation can be monitored to ensure the tripping mechanism is working properly.

II. METHODOLOGY

This project is divided into two parts hardware development and programming development. The project is built using a concept of controlling a circuit breaker using password. PLC and SCADA system is used for controlling circuit breakers. In this project PLC controller is the brain of whole system. The PLC is interfaced with a keypad for entering the password which is then compared with the password stored in PLC memory unit. PLC will signal relay to operate if the password is correct; if password is not correct it will trigger the alarm to notify the entered password is incorrect. To perform this task PLC requires ladder program. The line is represented by three light bulbs connected in series with three relays. The relays resemble circuit breakers of three phases of the line.

III. Block Diagram



IV. WORKING

The working of this system is simple; for PLC based control the operator has to enter correct password on the keypad connected to PLC. It will provide a signal to the relay and circuit breaker is tripped. For indication of above process indicator lamp is used in system, lamp is turned off. The circuit breaker is tripped it will not close unless the same password is entered again. For remote control operation SCADA based operation is available a user ID and password is required to login in the system and then operate the circuit breaker. SCADA based control is not possible when the circuit breaker is operated using PLC, because it means the line is under maintenance and only one having the password for PLC based control can close the circuit breaker. The SCADA based control is used when there is no maintenance work on the line. The password is provided to the lineman who is scheduled for maintenance. The user ID and password for logging into SCADA system is for higher authorities. The password is changed periodically to add extra safety.

Objectives:

- The main objective of this project is to develop a circuit breaker system.
- Protect the line man who are predisposed to fatal electrical accidents.
- Turns ON/OFF the load with the help of a password.
- The entered password is compared with the stored password in the PLC & SCADA.

Hardware Work: Component Ratings:

- SMPS (convert AC to DC)
230 V AC to 24 V DC, 2 amp
- PLC (it is a controller)
supply required in plc-24 V DC
- Relay (magnetic switch) coil supply-24 V DC
- Keypad
24 V DC, 2amp
- SCADA (it is a software)
- Transmission line
 - Conductor
 - Insulator
 - Pole

V. CONCLUSION

Password based circuit breaker control to ensure electric line man's Safety the PLC & SCADA. This proposed system provides automation and real time supervisory control over circuit breaker system.

VI. RESULT

Sr. No	Conditions	Results	
		Load	Buzzer
01	If password is correct.	ON	OFF
02	If password is incorrect.	OFF	ON

VII. Applications

- Used in electrical substations to ensure line man safety
- This system is used in buildings and house
- Used in hotels and shopping malls to save the power.
- Can also be used as Password based electrical appliance control or Password based Load Control system.

VIII. References

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