Password Base Circuit Breaker Using Gsm Modem

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Abstract- ***This paper presents Internet of Thing (I.O.T) based monitoring & control of circuit breaker. Circuit breaker is an important component of Industrial Electrical System. It is used for protection & switching. Hence, reliable operation of circuit breaker is essential. Circuit breaker ages over time & number of operations. This raises a concern regarding reliability of circuit breaker operation. In order to ascertain reliability of circuit breaker, it is general practice to carry out preventive maintenance at fixed time intervals. The main disadvantage of this maintenance approach is unnecessary downtime & offline usage of separate diagnostics equipment although the circuit breaker is healthy. This increases the maintenance cost of circuit breakers. Moreover, in present practice, the control of circuit breaker is realized through hardwired control logic which increases the size of control & metering cabinet of the circuit breaker & prevents integration of Internet of Things. This put a limitation on decision making process as circuit breakers data are not accessible on the fly. Presently monitoring of circuit breaker is being carried out through proprietary solutions like Remote Terminal Units & SCADA. Proprietary solution raises a concern regarding reliability & security of the safety/safety related/strategic application as the backend implementation of proprietary solution is not accessible by the user.***

In this paper, an attempt was made to develop monitoring & control scheme of a typical circuit breaker using Arduino Mega 2560 embedded microcontroller along with Ethernet Shield for integration of Internet of Things. Circuit breaker parameters like load current, trip coil current, close coil current, spring charging motor current, number of closing operations, number of tripping operations etc. are monitored. The monitored data are uploaded to Internet of Things platform "Thing Speaks" in order to make circuit breaker data available on the fly for effective decision making. Monitored circuit breaker parameters are used to determine health of the circuit breaker in order to ascertain its reliable operation & to determine its maintenance/replacement needs. This paper is an effort to develop automated circuit breaker monitoring & control systems that diagnose the electrical and mechanical health of circuit breaker in real time. This is a shift in the maintenance paradigm from time-based maintenance to as needed maintenance. This shift comes with the benefit of maintaining adequate circuit breaker performance while reducing overall maintenance costs & unnecessary downtime.

Moreover, open-source platform is used which eliminates the concern regarding reliability & security of the safety/safety related/strategic application as complete source code implementation is open & fully accessible by the user.

Indexed Terms- Internet of Thing, Circuit Breaker, Thing Speak, Arduino.

I. INTRODUCTION

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. 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 found in the literature [1]. The use of

communication networks increases the efficiency of the remote-controlled objects or devices. The GSM technology connects the end device from remote and provides an opportunity to control [2]. The proposed low-cost Arduino controlled GSM message based secured password operated control panel and circuit breaker ON/OFF is the best suited mechanism in preventing the injuries or death of working men on the line by any accidental charging of line un knowingly [3]. The unauthorized access of the secured systems is prevented by authorization password or login for the security purpose. The lack of communication and coordination between the maintenance staff and the electric substation staff can be minimized. This system provides a solution to ensure the safety of the maintenance staff.

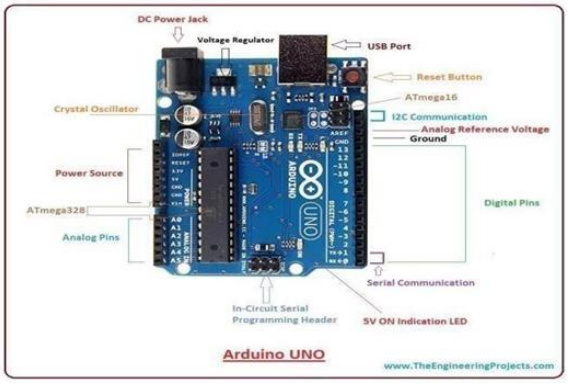
II. METHODOLOGY

Using the board is also very easy, simply connect it to a computer with a USB cable or power it with DC adapter or battery to get started.

III. FEATURES

- Microcontroller: ATmega328P.
- Operating Voltage: 5V.
- Input Voltage: 7-12V.
- Digital I/O Pins: 14 (of which 6 provide PWM output) Analog Input Pins: 6DC
- See the scientific journals and studies which related to the project topic.
- Drawing the block diagram of the system.
- Search about a different type of controlling circuit and circuit breakers.
- Search about the model of circuit component.
- Test the system using protest program.
- The Design of real circuit of the system will be proposed.
- Current: 40mA.
- Flash Memory: 32 KB.
- EEPROM: 1 KB.; Clock Speed: 16 MHz

IV. ARDUINO UNO



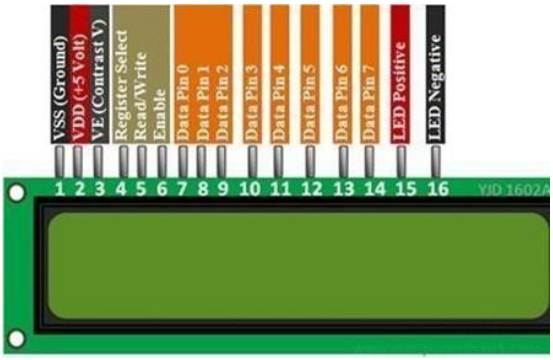
The Arduino Uno R3 is an open-source microcontroller board based on the ATmega328 chip. This Board has 14 digital input/output pins, 6 analog input pins, Onboard 16 MHz ceramic resonator, Port for USB connection, Onboard DC power jack, An ICSP header and a microcontroller reset button. It contains everything needed to support the microcontroller.

V. LCD

This is LCD 1602 Parallel LCD Display that provides a simple and cost-effective solution for adding a 16×2 White on Liquid Crystal Display into your project. The display is 16 character by 2-line display has a very clear and high contrast white text upon a blue background/backlight.

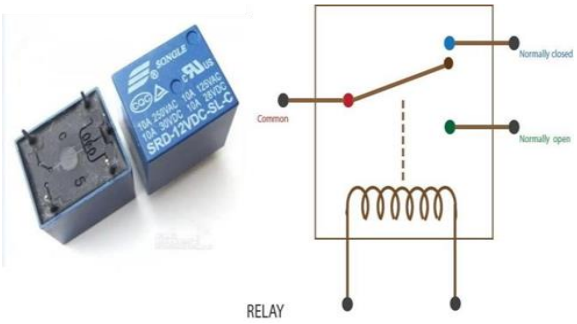
VI. SPECIFICATIONS & FEATURES

- Arduino IIC/I2C interface was developed to reduce the IO port usage on Arduino board
- I2C Reduces the overall wirings.
- 16 characters wide, 2 rows
- White text on the Blue background
- Single LED backlight included can be dimmed easily with a resistor or PWM.
- Supply voltage: 5V

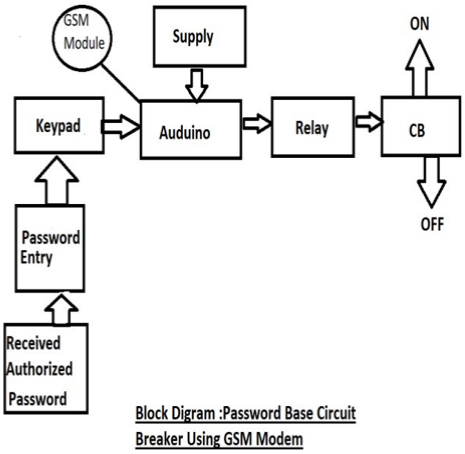


VII. RELAY

A relay an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very usefully device and allow one circuit to switch another one while they are completed separated. The required current to run the relay coil is more than can be supplied by various integrated circuits like operation amplifier, etc.



VIII. BLOCK DIAGRAM



Block Digram :Password Base Circuit Breaker Using GSM Modem

IX. OBJECTIVE OF THESIS

a) The main objective of this paper is to use open-source platform to continuously monitor and control the circuit breaker.
b) There is a shift in the maintenance paradigm from time-based maintenance to as-needed maintenance. This shift comes with the benefit of maintaining adequate circuit breaker performance while reducing overall maintenance costs & unnecessary downtime.

X. LITERATURE REVIEW

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XI. PROPOSED WORK

Circuit breakers are used for protection & switching in industrial electrical system. Hence, reliable operation of circuit breaker is essential. Failure of circuit breaker can cause huge damage to industrial electrical system including revenue loss & fatality. circuit breakers are subjected to stress during their operation as they contain many mechanical/electrical components, has to carry rated or fault power & participates in arc quenching methods. Due to this circuit breaker ages over time & number of operations. This raises a concern regarding reliability of circuit breaker operation.

XII. PROGRESS

Firstly, we decide a concept we start working on it we done all related concept and note it down after that we finalized the block diagram and components required for the project. Now we are start working on circuit diagram and the circuit fixing

CONCLUSION

This paper shows a conceptual implementation of password-based Circuit Breaker Monitoring & Control which will reduce the size of the circuit breaker & facilitate the concept of as needed maintenance approach. Moreover, this will eliminate the concern regarding security vulnerability of third-party system as the platform is open source. Being a prototype conceptual implementation, future work can be done on EMI/EMC compliance, implementation of open-source inferential engine in order to receive recommendation on maintenance, integration with computerized maintenance management software, development of open-source hosting server etc.

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