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Three-Phase Error Intimation In Sharing System Using IOT

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ABSTRACT

This manuscript develops an automatic tripping mechanism for three phase supply system. The output is giving the information when the any one phase current is zero in three phase supply system. If the fault is happened in a three phase supply system (L-L fault L- G fault) at the time current faulted phase become zero. After few seconds the faulted phase current is will not comes to normal range. It has consider to a phase has been faulted (or) phase current is interrupted in a three phase supply system, so which faulted (or) interrupted in supply system. The respective fault phase information will sended to nearby substation using IOT technique. At the same time by using a relay circuit to disconnect the faulted phase section also to connect the remaining healthy converted into using two phase-three phase converter. The output is verified by the prototype module using Arduino NANO controller. This is intended to understand concerning two basic information of the delay and current transformer in control system. The circuit will segregate the load from the supply if any power variation occurred in a supply system. The major advantage of the research is not only give the information about phase fault (or) phase current interruption and also give the three phase power supply to a load.

Keywords: Three phase fault, IOT, Arduino Nano, Current Sensor, Relay Module, Wifi Module, Two phase to three phase converter.

1. Introduction

The consumption of power is rising at much faster rate. Losses in sharing system are much higher than losses in transmission side and also fault are more frequent in distribution side. The survey indicates that 80% of the consumer's service interruption is due to failures in sharing networks. Detecting and locating defect in power line is very essential for healthy operation of power system. In distribution line multiple faults detection and warning to Electricity Board (EB) deals with the problem of detecting the fault in the transmission lines and the automatically intimate to EB. This deals with the design and production of power supply, microcontroller and Global System for Mobile Communication Wifi module. This proposes deeply reduces the manpower, saves time and operates efficiently without human interference. And also give the information about phase fault (or) phase current interruption and also give the three phase power supply to a load.

1.1 Error finding In control System

Detecting and locating error in power line is very basic for healthy operation of control system. In electrical power line error often occur many times making the power system undependable. In this the using current sensor for detecting error which includes phase to phase, short circuit and mostly line to ground error in power line for better reliable and optimum operation of the system is presented. In the proposed concept power line is divided by WNS (wireless sensor network) nodes that could sense the defective condition in power line, display to operator as well as send SMS through Wifi to service provider. Arduino transmits data to control board or substation so that immediate action can be done with the assist to IOT Technology.

1.2 Existing System

In sharing system most of the losses are caused by error and theft. In this manuscript the focus is on three phase to ground error in power line. When three phase to ground error occurs, it becomes important to detect error speedily and with accuracy. It becomes challenging for the power company to identify and fix the error as quickly as possible. Protection systems are designed to make out the location of error and isolate only the error section in order not to damage the whole equipment in control system. In the proposed perception use with the current sensor. There by providing optimum action of electric power. The objective of this manuscript is to provide with a simple way to detect the error and show the exact which phase occurred fault which finally lead to optimum operation of the whole system and to improve the dependability of sharing network. Various studies have shown that anywhere from 70%, to as high as 90%, of error on most overhead lines are transient. A transient error, such as an insulator flashover, is a error which is cleared by the isolate the error, and which does not recur when the line is revived. Error tend to be fewer transients (near the 80% range) at lower, distribution voltages and more transient (near the 90% range) at higher, sub transmission and immediate tripping of one or more circuit breakers to voltages. Lightning is the most common cause of transient error, partially resulting from insulator flashover from the high transient voltages induced by the lightning. Other probable causes are swinging wires and temporary contact with foreign substance. Thus, transient error can be cleared by for a short time de-energizing the line, in order to allow the error to clear. Auto reclosing can then restore service to the line. The remaining 10 - 30% of error is semi-permanent or permanent in nature. A small branch falling onto the line can cause a semi-permanent fault. In this case, however, an immediate de-energizing of the line and subsequent auto reclosing does not clear the fault. Instead, a coordinated time-delayed trip would allow the branch to be burned away without damage to the system. Semi-permanent error of this type is likely to be most prevalent in highly wooded areas and can be substantially controlled by aggressive line clearance programs. Permanent error is those that will not clear upon tripping and reclosing. An exemplar of a permanent error on an overhead line is a broken wire causing a phase to open, or a broken pole causing the phases to short together. Error on underground cables should be considered permanent. Cable error should be cleared without auto reclosing and the damaged cable repaired before service is restored. There may be exceptions to this, as in the case of circuits composed of both underground cables and overhead lines sows in figure-1.

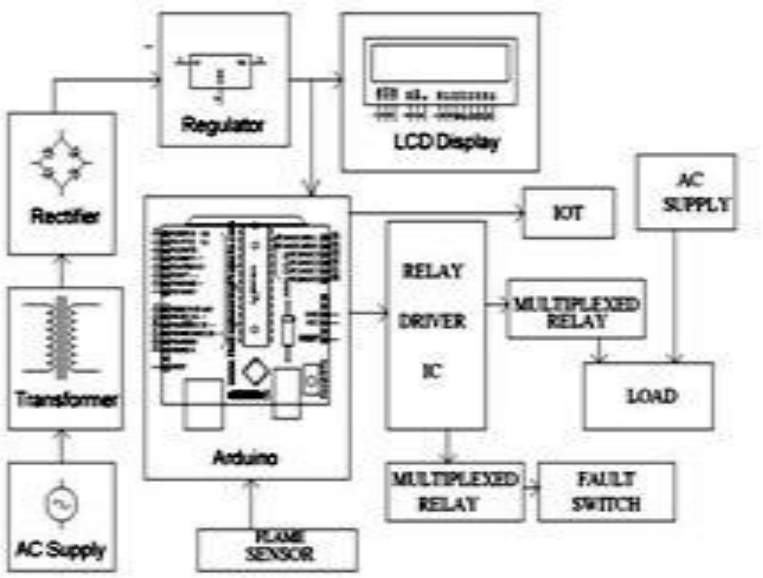

Figure-1: Block Diagram of Existing System

2.Projected System

Distribution line multiple error detection and warning to Electricity Board (EB) deals with the problem of detecting the error in the distribution lines and the automatic intimation to EB. The research deals with the design and the fabrication of Power supply, Micro Controller, Current sensor, Arduino Nano, Relay and Wifi Module. The electric distribution network the Arduino interacts with the power lines and sends message what kind of error held in the line through the Wifi modem figure-2.

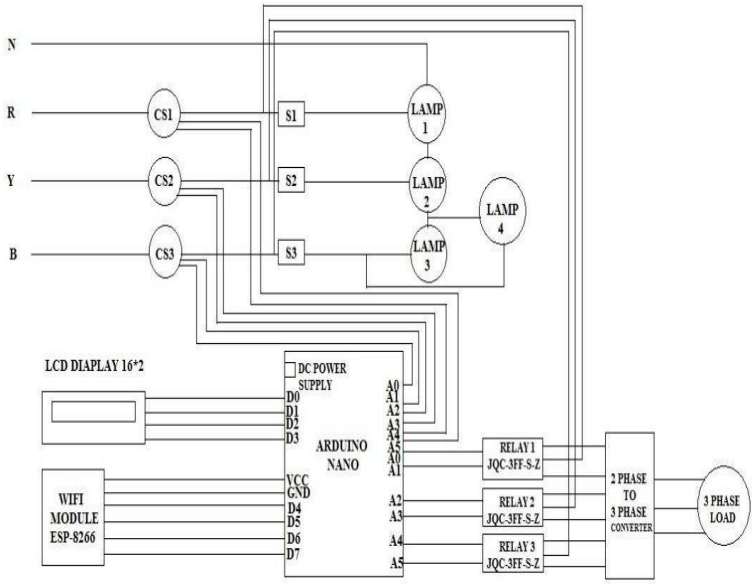

Figure-2: Line diagram of Proposed System

2.1opreation of Proposed System

The distribution line error detection and intimating by using Wifi connection based on the (Arduino) microcontroller. In distribution line has three phases and consist of a single phase has 230v, 50 Hz power supply, as that we can't use the 220 v supply straight to the working kit. The three phase supply is to continuously sensing by the current sensor. Current Sensor give the current flow information to the Arduino and it sensor input is ac supply but the output is gives analog signal to a Arduino in a proposed system. The three phase power system has error in any one phase that phase as intimated by current sensor to give the information about the error phase information to the Arduino nano and it send the signal to wifi module to give information which is error in a three phase power system of a nearby substation. At the same time the relay will act as to disconnect the normal power supply and connect the two to three converters and finally the load can receive the three phase power supply. This proposes very much reduces the manpower, saves time and operates efficiently without human interference. And also give the information about phase error (or) phase current break and the three phase power supply to a load. The conservation of electricity is increasing at much faster rate. Losses in sharing system are much higher than losses in transmission side and also error are more frequent in sharing side. The survey indicates that 80% of the consumer's service interruptions are due to failures in distribution networks. Detecting and locating error in power line is very necessary for healthy operation of power system. In distribution line numerous error detection and indication to Electricity Board (EB) deals with the problem of detecting the error in the sharing lines and the automatic Intimation to EB. This mission deals with the design and fabrication of power supply, Arduino and Wifi module for Communication purpose. This proposes greatly reduces the man power, saves time and operates economically. In power systems, distribution transformer is electrical equipment which distributes power to the low-voltage users directly, and its operation condition is an important component of the entire distribution network operation. Operation of distribution transformer under rated condition(as per specification in their nameplate) guarantees their long life .However, their life is considerably reduced if they are subjected to overfilling, resulting in unexpected failures and loss of supply to a large number of consumers thus effecting system dependability. Overfilling and unsuccessful cooling of transformers are the major causes of breakdown in distribution transformers. The monitoring devices or systems which are presently used for monitoring distribution transformer exist some problems and deficiencies. Few of them are mentioned below. Ordinary transformer measurement system generally detects a single transformer limitation, such as power, current, voltage, and phase. While some ways could detect multi-parameter, the time of acquisition and operation parameters is too long, and

testing speed is not fast enough. Detection system itself is not dependable. The main performance is the device itself instability, poor anti-jamming capability, low measurement accuracy of the data, or even state monitoring system should is no effect. Timely detection data will not be sent to monitoring centre in time, which cannot judge distribution transformers three-phase balance. A monitoring system can only monitor the operation state or guard against steal the power, and is not able to monitor all useful data of distribution transformers to reduce expenses. So if use power carrier communication to send data, the real-time data transmission, reliability cannot be guaranteed. According to the above requirements, we need a distribution transformer real-time monitoring system to detect all operating parameters operation, and send to the monitoring centre in time. It leads to online monitoring of key operational parameters of distribution transformers which can provide useful information about the physical condition of transformers which will help the utilities to optimally use their transformers and keep the asset in operation for a longer period. This will help to identify problems before any serious breakdown which leads to a significant cost savings and greater reliability.

Extensive use of mobile networks and WIFI devices such WIFI modems and their falling costs have made them a good-looking option not only for voice media but for other wide area network applications. It has simple construction and working operation of proposed system and cost of information less comparing the GSM based error intimating systems. The Arduino Nano specifications are shown in Table and the overall proposed prototype module of research as shown in figure-3.

Arduino Nano Specifications:

Parameter	Range
Microcontroller	Atmel ATmega168 or ATmega328
Operating Voltage (logic level)	5 V
Input Voltage (recommended)	7-12 V
Input Voltage (limits)	6-20 V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	8
DC Current per I/O Pin	40 Ma
Flash Memory	16 KB (ATmega168) or 32 KB (ATmega328) of which 2 KB
SRAM	1 KB (ATmega168) or 2 KB (ATmega328)
EEPROM	512 bytes (ATmega168) or 1 KB (ATmega328)
Clock Speed	16 MHz
Dimensions	0.73″ x 1.70″

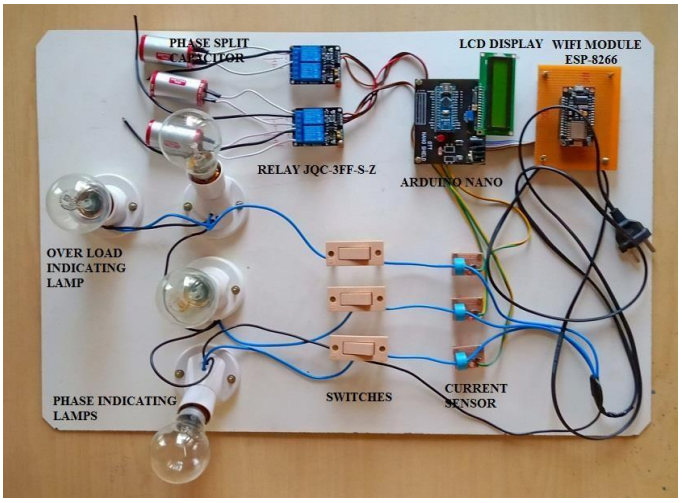

Figure-3 Hardware Circuit

3.Conclusion

In three phase power system while detecting the faulted phase is difficult so we are using a current sensor to detect the faulted phase in a electrical system and by using wifi module. The faulted phase information will be send to nearby substation instantaneously and we are using arduino it will collects the information from current sensor and transfer wifi module at the same time and the relay will act. After the relay action simultaneously load will disconnect from the main power supply and it will connect the load through a two phase to three phase converter. By using the E-mail information is stored to historical data for future references and identification of most faulted phase in a three phase distribution system. This wifi module is used to send the faulted phase information to the nearby substation instantaneously so finally we are concluding that which project will be useful for the agriculture field.

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