

# DETECTION AND MONITORING OF CURRENT LEAKAGE IN POWER TRANSMISSION LINE INSULATOR USING IOT

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**ABSTRACT-** Electrical insulation is an important of all electrical system. A hall effect Sensor for real-time leakage current monitoring on high voltage power line insulators was developed. The level of insulation safety provided by an insulator depends on the amount of leakage current flowing on its surface. To monitor and keep low leakage current is an important parameter to be considered by designers and electric supply companies. The Hall Effect sensor is having the phase-in and phase-out pins. The phase-in pin is connected to the insulator. When the current is flow the phase, EMF is induced in line. Then the sensor senses the leakage current. New advanced technique of IOT (Internet of Things) is used to send the information in substations and android mobiles.

**Keywords:** IOT(Internet of Things), Insulator, Hall effect and temperature sensor,Transmission line.

## 1.OVERVIEW

Insulators are key components in energy distribution systems, and, after being installed, remain in field for long periods of time. Insulator leakage current is the current flowing from high voltage conductor to ground over the outside surface of the insulator. Leakage current occurs in any high voltage insulator, either in transmission lines or in distribution lines installed outdoors due to the progressively coating of conductive deposit from environment pollution. These pollutants can be dust, ashes, smoke, and clay powder, chemicals from nearby industries or salt-spray on seashore areas. In the presence of wet atmospheric conditions.

## 2.LEAKAGE CURRENT

Insulator leakage current is the current flowing from high voltage conductor to ground over the outside surface of the insulator. current occurs in any high voltage insulator,

either in transmission lines (TL) or in distribution lines installed outdoors due to the progressively coating of conductive deposit environment pollution. Leakage current is very harmful to the electricity. In this project, to detect the leakage current in insulator.

## 3.EXISTING SYSTEM

The leakage current drives an ultra bright light-emitting diode producing amplitude modulated light signal. The optically intensity-encoded signal is coupled to a plastic optical fiber cable and transmitted from the high potential measurement point to the remote unit in ground potential.

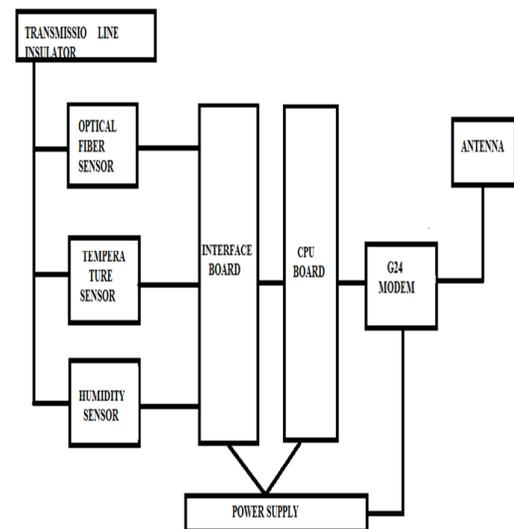


Fig. 1 Block Diagram

An photoelectric sensor for real-time leakage current monitoring on high-voltage (kV) and medium- voltage (13.8 kV) power line insulators was developed. The leak- age current drives an ultra bright light-emitting diode producing amplitude modulated light signal. After the demodulation, A remote station 150-km away by general packet radio service

technology. An opto electronic sensor for real-time leakage current monitoring on high-voltage (500 kV) and medium- voltage (13.8 kV) power line insulators was developed. After the demodulation, the leakage current root mean square values are concentrated in a data logger and sent to a remote station 150-km by general packet radio service technology for real-time leakage current monitoring on high-voltage (500 kV) and medium- voltage (13.8 kV) power line insulators was developed.

#### 4. PROPOSED SYSTEM

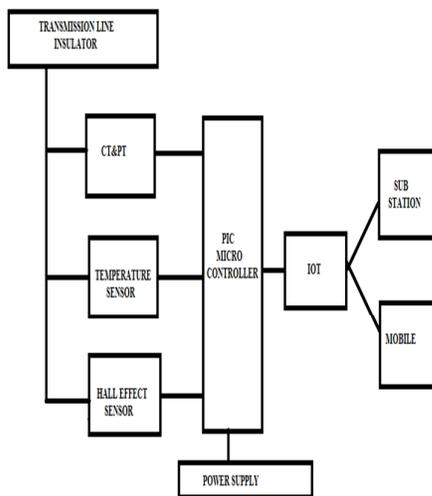


Fig. 2 Block Diagram

In this proposed system, used to temperature sensor, Hall Effect sensor, current and voltage sensor and the micro-controller and LCD (to show display), and new technology of IOT (Internet of things) is used in this paper. Hall Effect sensor is electronic devices. It can act as a transducer in magnetic field. The application of Hall Effect sensor is used to switching, spacing, positioning, speed detection and current sensing application. Temperature sensor is used to detect the temperature in power transmission line insulator. Micro-controller is used to connect the external devices.

#### 5. CIRCUIT DIAGRAM

The center tapping transformer connected the rectifier circuit, it is convert the ac to dc supply. The rectifier connected to the capacitor, the capacitor is used to remove the

harmonics. The ability to network embedded devices with limited CPU, memory and power resources means that IOT finds applications in nearly every field. Such systems could be in charge of collecting information in settings ranging from natural ecosystems to buildings and factories, thereby finding applications in fields of environmental sensing and urban planning.

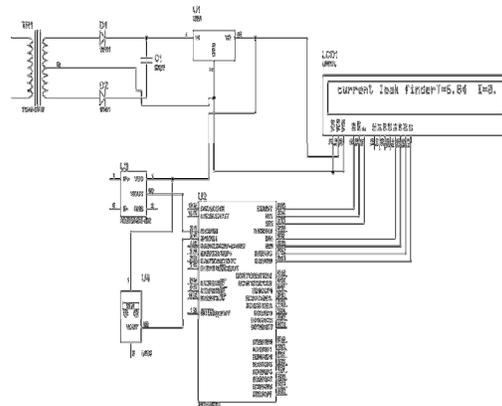


Fig. 3 Circuit Diagram

#### 6. SYSTEM DESCRIPTION

##### HALL EFFECT SENSOR

A Halleffect is transducer that varies its output voltage in response to a magnetic field. Hall effect sensors are used for proximity, switching, positioning, speed detection, current sensing applications.

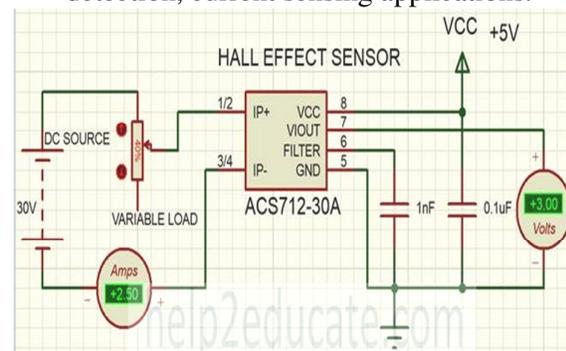


Fig. 4 Hall effect sensor

In a Hall effect sensor a thin strip of metal has a current applied.

##### TEMPRATURE SENSOR

Temperature sensor vary from simple ON/OFF thermostatic devices.the movement of molecules and atoms produces heat (kinetic energy) and the greater the movement, the more heat that generated.

Temperature Sensors measure the amount of heat energy or even coldness that is generated by an object or system, allowing us to “sense” or detect any physical change to that temperature producing either an analogue or digital output.

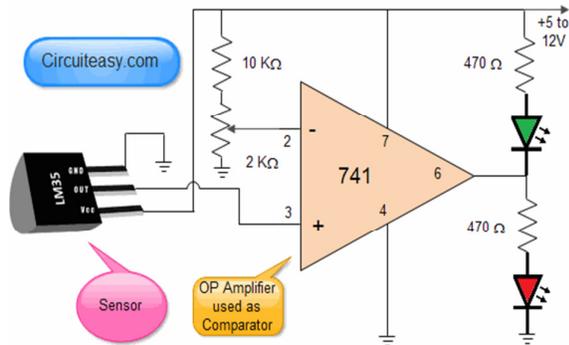


Fig. 5 Temperature sensor

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### LCD(Liquid crystal display)

A liquid-crystal display (LCD) is flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals.Liquid crystals do not emitting backlight or reflector to produce images in colour or monochrome.LCD's are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock.

### PIC MICRO CONTROLLER

PIC (usually pronounced as "pick") is a family of microcontrollers made by Microchip Technology, from the PIC1650 originally developed by General Instrument's Microelectronics Division.The name PIC

initially referred to Peripheral Interface Controller.The EEPROM data memory allows single-byte read and writes. The Flash program memory allows single-word reads and four-word block writes.



Fig. 6 Micro controller chip

Program memory write operations automatically perform an erase-before write on blocks of four words.EEPROM memory automatically erases the location and writes the new data (erase-before-write).

## 6.SOFTWARE DESCRIPTION

### INTERNET OF THINGS

The Internet of things (IOT) is the network of physical devices, vehicles. Items embedded with electronics, software,sensors,actuators,and connectivity which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system.It was decided to try to document them, in order to use them for useful purposes such as selecting the right features for proposed solutions, or to identify new.

### STRUCTURE OF IOT

Nowadays, the IOT connected machine approaches is, one inside factory where information regarding productivity of a machine.The new technology of IOT used in this paper. IOT (Internet of things) is sending the information in substation and android mobiles. It is very fast and quickly transfers the information and mobile tracker.This has led to a need to understand organizational culture in order to facilitate organizational design processes and to test new innovation management practices.

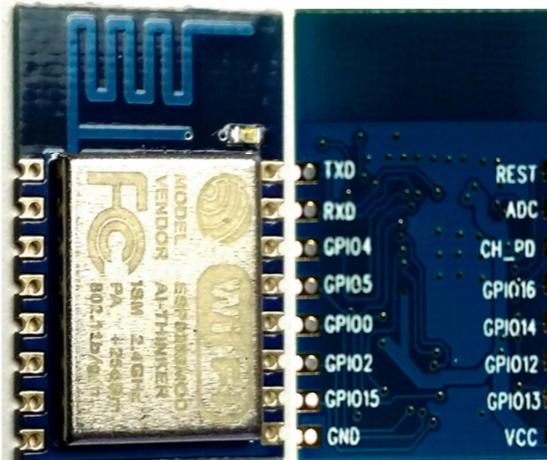


Fig. 7 Structure of IOT

IOT Connected machines create an ecosystem using Internet of Things (IOT) to connect different machines transforming them into intelligent broader embedded systems. The data of these machines can be best supplied to the machine maker's.

### FEATURES OF IOT

IOT is a game-changer and there is enough potential for professionals to innovate further. If you need more information about IOT or if you want to be an IOT professional, Collaborator TACT offers comprehensive IOT training. There were many common features that appeared again and again.

### 7. CONCLUSION

In this paper, a new technology is proposed for data transmission about the leakage current through IOT to mobile phones and substation. The system has been operating for several months in the field with continuous monitoring and sending data to the web page providing information. It is efficient, easy installation, robustness and reliability to electrical system and it is necessary to transform the data into information in our android mobile phones.

### 8. REFERENCES

[1] L. H. Meyer *et al.*, "A study of the correlation of leakage current, humidity and temperature of 25 kV insulators in urban and rural areas," in *Proc. Annu. Rep. Conf. Elect.*

*Insul. Dielectr. Phenomena (CEIDP)*, Oct. 2011, pp. 398–402.

[2] I. Ramirez, R. Hernandez, and G. Montoya, "Measurement of leakage current for monitoring the performance of outdoor insulators in polluted environments," *IEEE Elect. Insul. Mag.*, vol. 28, no. 4, pp. 29–34, Jul./Aug. 2012.

[3] Z. Tingtao, L. Tianyu, C. Ke, and H. Xiaoguang, "On-line monitoring system of insulator leakage current based on ARM," in *Proc. 6th IEEE Conf. Ind. Electron. Appl. (ICIEA)*, Jun. 2011, pp. 365–369.

[4] A. G. Kanashiro and G. F. Burani, "Leakage current monitoring of insulators exposed to marine and industrial pollution," in *Proc. IEEE Int. Symp. Elect. Insul.*, Montreal, QC, Canada, Jun. 1996, pp. 271–274.

[5] C. Muniraj and S. Chandrasekar, "Analysis of leakage current on polluted polymer insulator by high resolution spectrum estimation method," in *Proc. 3rd Int. Conf. Power Syst.*, Kharagpur, India, Dec. 2009, pp. 1–5.

[6] *Guide for the Selection and Dimensioning of High-Voltage Insulators for Polluted Conditions*, document IEC60815, 2008.