

# 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.

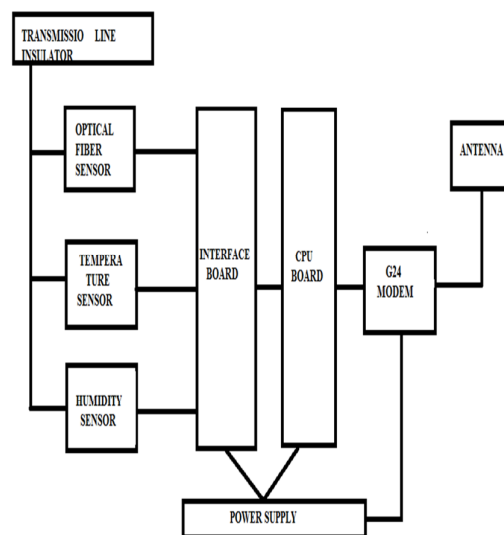


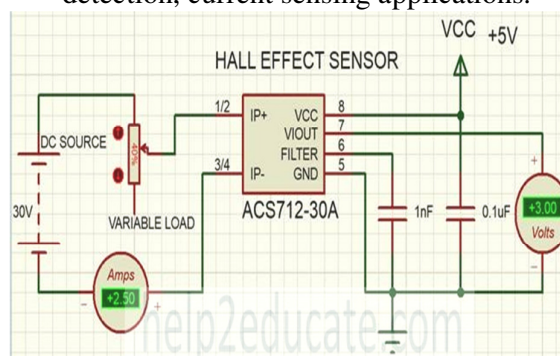
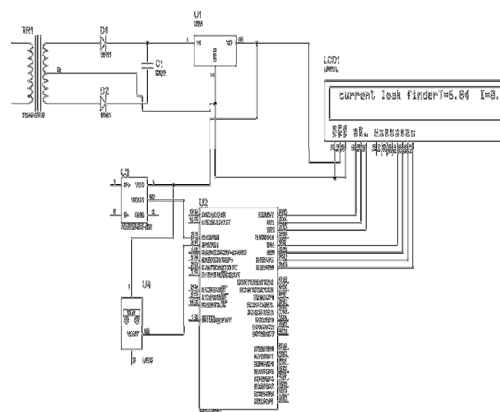
Fig. 1 Block Diagram

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

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.

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graph LR; TLI[TRANSMISSION LINE INSULATOR] --- Bus1[ ]; Bus1 --- CTPT[CT&PT]; Bus1 --- TS[TEMPERATURE SENSOR]; Bus1 --- HES[HALL EFFECT SENSOR]; CTPT --- PIC[PIC MICRO CONTROLLER]; TS --- PIC; HES --- PIC; PIC --- PS[POWER SUPPLY]; PIC --- IOT[IOT]; IOT --- SS[SUB STATION]; IOT --- MOBILE[MOBILE];
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The block diagram illustrates the proposed system architecture. It features a central **PIC MICRO CONTROLLER** block. To its left, a vertical line connects the **TRANSMISSION LINE INSULATOR** to three sensors: **CT&PT**, **TEMPERATURE SENSOR**, and **HALL EFFECT SENSOR**. Each sensor is connected to the PIC MICRO CONTROLLER. Below the PIC MICRO CONTROLLER is a **POWER SUPPLY** block. To the right of the PIC MICRO CONTROLLER is an **IOT** block, which is connected to both a **SUB STATION** and a **MOBILE** device.



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.

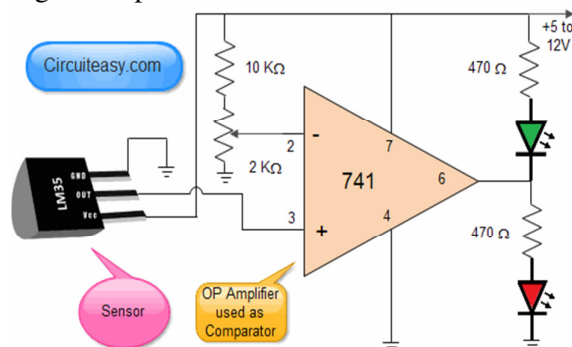


Fig. 5 Temperature sensor

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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.

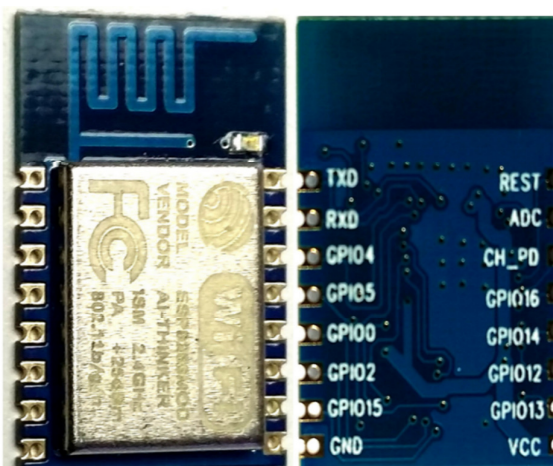


Fig. 7 Structure of IOT

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.

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