



TRANSFORMER HEALTH MONITORING OVER IOT

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ABSTRACT

A recent huge interest in Machine to Machine communication is known as the Internet of Things (IoT), to allow the possibility for autonomous devices to use Internet for exchanging the data. This work presents design and execution of real time monitoring and fault detection of transformer and record key operation indicators of a dispersion transformer like load ,fire, gas, oil level, transformer temperature and humidity. They have to look at it continuously. By using this project it can minimize working efforts and improve accuracy, stability, efficiency. In this project, sensors are used to sense the main parameters of equipment such as fire,gas,temperature. This sensed data is sent to microcontroller and this controller checks parameter limits which further send to the IoT web server Adafruit software using Wi-Fi module. Of these data make sure the right information is in hand to the operator and operator can make useful decisions before any catastrophic failure on the basis of data of parameters.

1. INTRODUCTION

Power assumes a significant part in our life. Each snapshot of our life relies on power. Power has a few parts and gear assisting human with moving and control the conveyance as indicated by utilization. The most vital hardware of transmission and appropriation of electric power is transformer. In Power framework, an electrical part transformer straightforwardly appropriates capacity to the low-voltage clients and its activity condition is a measures of the whole organization activity. Most of the gadgets have been in assistance for a long time in various (electrical, mechanical, natural) conditions. They are the principle parts and establish the enormous piece of capital speculation. Activity of conveyance transformer under appraised condition (according to determination in their name plate) ensures their long help life. Anyway their life is essentially decreased in the event that they are exposed to over-burdening, warming low or high voltage current bringing about startling disappointment and loss of supply to an enormous number of clients accordingly is affecting framework dependability.

2. LITERATURESURVEY

In most power organizations, for web based observing of force transformers, utilize administrative control and information procurement (SCADA) framework, however for web based checking of force transformer, the broadening the SCADA framework is a costly recommendation. Power transformers are presently observed physically, where an individual visits a transformer site, for support and taking records reason. However, principle disadvantages of these frameworks are, it can't give data about over-burdens (Voltage and Current) and overheating of transformer oil and windings. Because of these, the transformer life is diminished. Monika Agarwal et al. This paper addresses that they are planning a framework where there exits correspondence among framework and administrator. For this we are utilizing Transformer, microcontroller, rationale level converter and GSM for example worldwide framework for portable correspondence modem. This GSM modem assists with checking transformer health by sending message to the framework.

WORKING

The fundamental target of the proposed project is to get continuous information of transformer somewhat over the web falling under the class of Internet of Things (IOT). For this continuous perspective, we take one temperature sensor, one expected transformer and one current transformer for observing T, V, I information of the transformer and afterward send them to a far off area. These three simple qualities are taken in multiplexing mode and associated with programmable Arduino. Then the upsides of the multitude of sensors are sent consecutively according to the recurrence of multiplexing of the Arduino.Wi-Fi module under TCP IP convention to a committed IP that shows the information continuously graph structure in any web associated PC/Laptop for show in various diagrams. The ongoing information is additionally seen at the sending end LCD show interacted with the Arduino.

3. HARDWARE REQUIREMENTS

ARDUINO UNO:

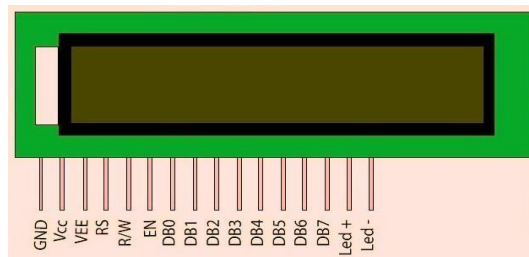
The Arduino Uno is an open-source microcontroller board in light of the Microchip ATmega328P microcontroller and created by Arduino.cc.The board is furnished with sets of computerized and simple info/yeild (I/O) sticks that might be interfaced to various development sheets (safeguards) and

different circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) by means of a kind B USB link. It very well may be fueled by the USB link or by an outside 9-volt battery, however it acknowledges voltages somewhere in the range of 7 and 20 volts. It is likewise like the Arduino Nano and Leonardo. The equipment reference configuration is dispersed under a Creative Commons Attribution Share-Alike 2.5 permit and is accessible on the Arduino site. Design and creation documents for certain renditions of the equipment are likewise accessible.

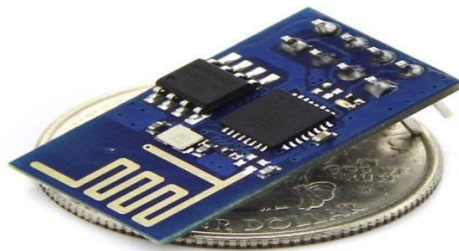


- A. **LIQUID CRYSTAL DISPLAY (LCD):** LCD (Liquid Crystal Display) screen is an electronic presentation module and track down a wide scope of utilizations. A 16x2 LCD show is exceptionally essential module and is normally utilized in different gadgets and circuits. These modules are liked more than seven fragments and other multi portion LEDs. The reasons being: LCDs are affordable; effectively programmable; have no restriction of showing exceptional and even custom characters (not at all like in seven fragments), liveliness, etc.

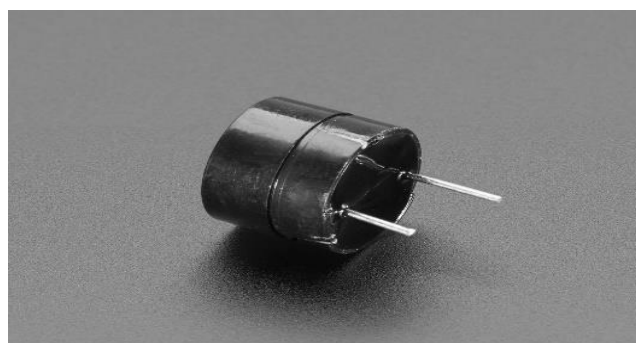
A 16x2 LCD implies it can show 16 characters for each line and there are 2 such lines. In this LCD each character is shown in 5x7 pixel network. This LCD has two registers, in particular, Command and Data.



- B. **ESP8266 WI-FI MODULE:** In this instructional exercise we will tell the best way to interface ESP8266 Wi-Fi module to Arduino. We will utilize programming sequential port. HW serial port will be accessible for program transferring and troubleshooting. ESP8266 WiFi module is WiFi chronic handset module, in light of ESP8266. Little size and minimal expense makes it appropriate for sensor hubs. It chips away at 3.3V and consumes current up to 250mA. Current utilization is very huge so it's typically not turned on battery. If you are utilizing 5V Arduino, then read ESP8266 WiFi and 5V Arduino association.



- C. **BUZZER:** A sign takes some sort of information and produces a sound as a result of it. They could use various means to make the sound; everything from metal clappers to electromechanical devices. A sign necessities to have a couple of way to deal with taking in energy and transforming it over to acoustic energy. Various ringers are fundamental for a greater circuit and take their power directly from the device's power source. In various cases, regardless, the chime may be battery powered so it will go off if there should be an occurrence of a mains power outage. A couple of devices that give emergency power have ringers on them so the client understands that they are running on support power and not on mains power.

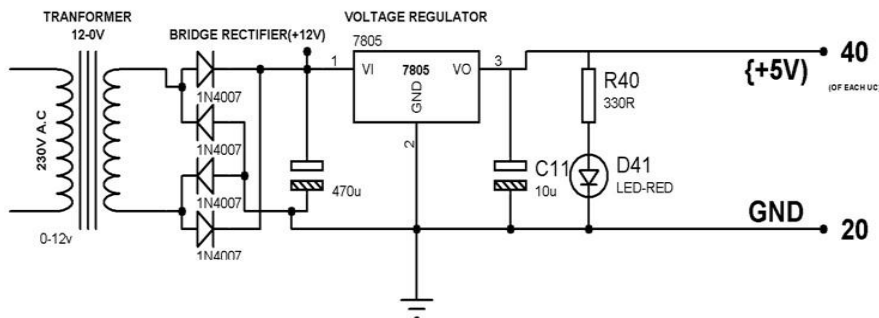
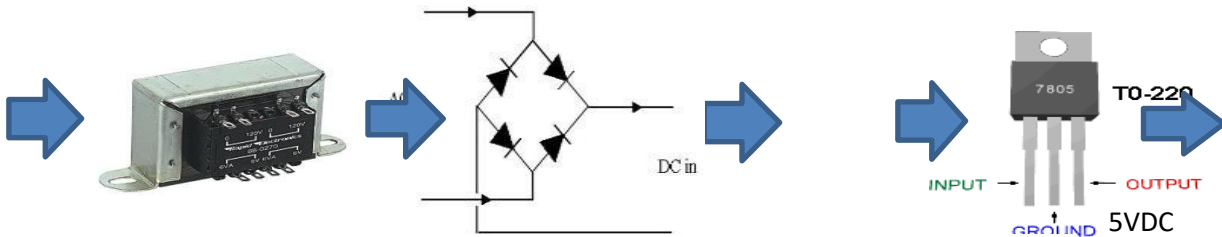


POWERSUPPLY

12Vstepdown

Bridge rectifierTransformer

Filter(470µf) 5vRegulator



DESCRIPTION OF POWER SUPPLY

- The circuit uses standard power supply including phase down transformer from 230v to 12v and 4 diodes shaping a Bridge Rectifier that conveys beating dc which is then isolated by an electrolytic capacitor of around 470microf to 100microF.
- The isolated dc being un worked with IC LM7805 is used to get 5v strong at its pin no 3 freed from data dc separating from 9v to 14v.
- The arranged 5volts dc is also filtered by a little electrolytic capacitor of 10 restricted scope f for any disturbance so conveyed by the circuit.
- One LED is associated of this 5v point in series with a resistor of 330ohms to the ground for instance terrible voltage to show 5v power supply openness.

VOLTAGE TRANSFORMER: The justification behind changing the voltage to a lot more significant level is that higher appropriation voltages infers lower flows for a similar power and accordingly lower I²R misfortunes along the arranged matrix of links. These higher AC transmission voltages and flows can then be decreased to a much lower, more secure and usable voltage level where it tends to be utilized to supply electrical hardware in our homes and work environments, and this is conceivable because of the fundamental

VOLTAGE TRANSFORMER.



ULTRASONIC SENSOR

Ultrasonic sensor gives a simple strategy for distance estimation. This sensor is ideally suited for quite a few applications that expect you to perform estimations between moving or fixed objects. Interfacing to a microcontroller is a simple task. A solitary I/O pin is utilized to set off a ultrasonic burst (well above human hearing) and afterward "tune in" for the reverberation bring beat back. The sensor estimates the time expected for the reverberation return, and returns this worth to the microcontroller as a variable-width beat by means of a similar I/O pin.



RESULT

Shortcoming No.1-Voltage level When gadget recognizes low voltage or high voltage (set values), it will send the message to set number that "Transformer no. - - Low/High Voltage Occur", moreover

it will set off electrical switch for cut off supply.

Issue No. 2-Over Load When gadget recognizes current coursing through framework high then it accepted that framework is over-burden. After recognize over-burdening gadget send message "Transformer No. - - Overload Occur", and will break framework through line by opening electrical switch.

Issue No.3-Oil Level In this framework in transformer oil level is low or high it sense the by utilizing float sensor it gives the back rub through Wi-fi Module. Shortcoming No.4-Temperature Ambient temperature of Transformer is high or it will be increment it sense through the sensor LM-35 and gives msg. Through Wi-Fi module.

ADVANTAGES

- Transformer Protection.
- Programmed Detection.
- Transformer Health Monitoring will assist with distinguishing or perceive startling circumstances before any genuine disappointment which prompts more noteworthy unwavering quality and huge expense reserve funds.
- In the event that transformer is in strange condition we can know from anyplace. No human power need to screen the transformer.

4. APPLICATIONS

- Flux based inter turn fault detection
- Over current Protection alarm and Protection
- Overvoltage insurance alarm and Protection
- Oil Quality monitoring using optical sensor
- Kva and power factor alert
- Oil level monitoring using ultrasonic sensor

5. CONCLUSION

The proposed procedure with results has shown that the security conspire works appropriately with precision, awareness of this plot exceptionally high for the unusual and defective circumstances. Transformer Health Monitoring will assist with distinguishing or perceive startling circumstances before any genuine disappointment which prompts more noteworthy Dependability and tremendous expense investment funds. Assuming transformer is in unusual condition we can know from anyplace. No human power need to screen the transformer.

6. FUTURESCOPE

A server module can be incorporated to this framework for getting and putting away transformer boundaries data intermittently pretty much all the circulation transformer of a specific utility in an information base application. This data set will be valuable wellspring of data on the utility transformer. Investigation of these put away information helps the utility in observing the functional behavior of their circulation transformer and characters deficiencies before any disappointments hence bringing about huge expense saving as well as further developing framework unwavering quality

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