

DISTRIBUTION TRANSFORMER MONITORING & PROTECTION SYSTEM USING IOT

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Abstract - A machine is designed to display the Transformer in the course of its operation, using Arduino. additionally, a protection scheme is employed with the help of the relay circuit. An LCD is associated with Arduino which continuously shows the transformer's parameters. Values of parameters like oil stage & temperature are pre-set in the gadget already, the values are surpassed buzzer units the alarm to suggest that a fault has occurred and simultaneously the values are updated over Wi Fi in addition, if the fault is excessive the relay circuit will perform and the system will shut down. One-of-a-kind circuits like extremely-Sonic sensor, NTC-10K, etc. are used to display the parameters and skip the statistics to Arduino. After receiving the facts those values are in comparison with the predetermined values and moves are taken for this reason. all the information of the parameters can be stored and used for similarly evaluation with the help of Wi Fi module. Henceforth, the monitoring in addition to protection of the transformer is carried out neatly.

Key Words: Transformer, Faults & Protection, Arduino, Relay Circuit, Wi-Fi Module, IOT Module

1.INTRODUCTION

A transformer is a static electric device which is used to switch electric strength among two or greater circuits. Transformers can be used either to growth the voltage i.e., stepping up or lower the voltage i.e., step down. beneath ordinary running situations, the power gadget and lines deliver everyday voltages and currents which results in a more secure operation of the gadget. however, while fault happens, it reasons excessively high currents to go with the flow, which causes harm to device and devices, a larger than intended electric present day exists through a conductor it results in excessive era of heat, and the chance of harm or hearth to device.

Over voltage because of surges can bring about spark over and flash over among section and floor at the weakest point within the network. there is usually a risk of prevalence of unusual over voltages in electrical strength device. additionally, it's far vital for oil tiers within the transformer important tanks to be complete, as they act as an insulator and allows the transformers to feature Wi-Fi. Adil Naseem et al.(2015) states that the system designed is sensitive and reliable for abnormal conditions because the scheme needs to be operated inside fraction of seconds. preserving the proper oil level is extremely crucial because if the oil stage falls below the predetermined level the transformer will overheat. as a result, to overcome these types of mishaps passed off within the

transformer a tracking gadget can be useful which is using Arduino as the important thing aspect. A single-phase transformer of 220/12 VA is used right here; extraordinary parameters like oil temperature and oil degree are monitored continuously. When temperature of oil exceeds a preset cost then the sign is passed to Arduino and buzzer is became on and relay is tripped. this could shut down the gadget. This entire operation may be monitored through Wi-Fi module. As an end result, the transformer parameters are monitored constantly.

2.BLOCK DIAGRAM

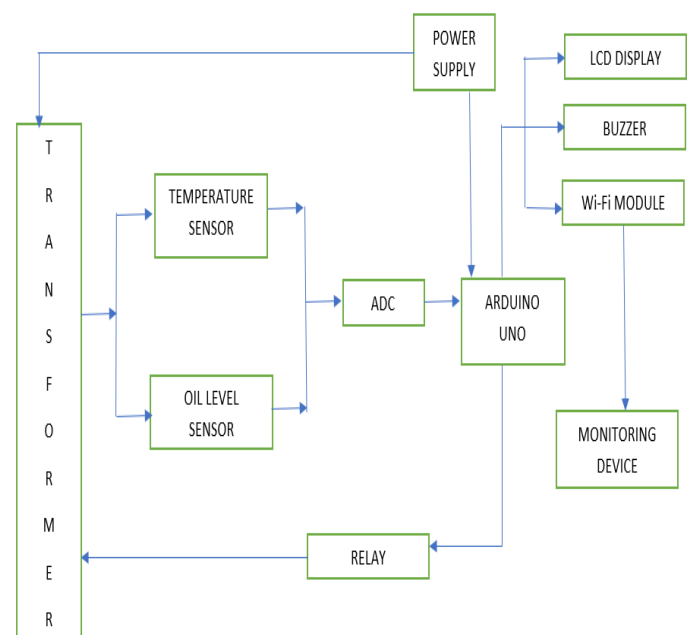


Fig -1 Block diagram of transformer protection system

We are utilizing the maximum latest innovation to develop this project; it is a model since this assignment or this framework can be utilized in a high evaluating transformer that's exorbitant to us and because of whole wellbeing conditions we're indicating the whole intimation shape on a model. in this shape, we're acquainting extraordinary sensors with experience specific parameters of the transformer in specific climate conditions. This data can use for the coverage of the framework and use to decrease debacle takes

place because of a flaw condition. we're additionally associating these statistics to the IoT module for non-stop observing and within the occasion that any faults happens in the framework, at that factor the administrator can without much of a stretch recognize shortcoming location and difficulty type so it could decrease recovery time and increment talent.

3.CIRCUIT DIAGRAM OF PCB

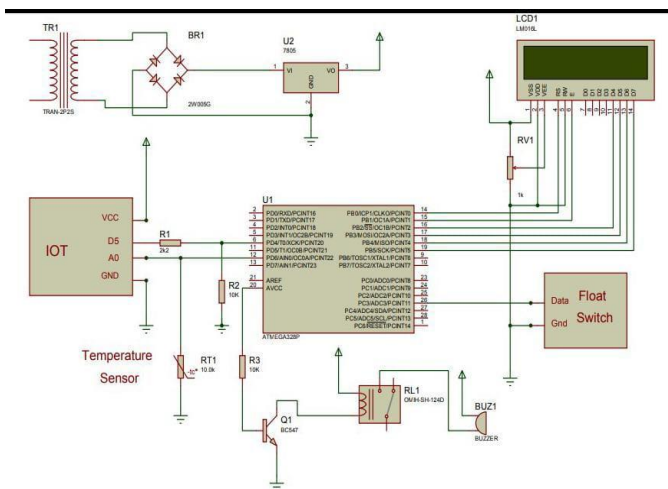


Fig -2 Circuit diagram of transformer protection system

4.COMPONENTS

I. Arduino Uno:

Arduino uno is microcontroller primarily based on ATMEGA-328P. It works with a mini-USB cable. It's a small sized one and its working voltage is 5V, with an enter Voltage version of seven to 12 V. It has 14 digital pins, 8 analog pins, 2 reset pins & 6 energy pins.

II. Node MCU:

Node MCU is an open supply IoT platform. It includes wireless rewire which runs at the ESP866 Wi-Fi module SoC from Espressif device, and hardware that is based at the ESP-12 module. This is a single board microcontroller. The operating system is XTOS that is V3 and its primarily based-on ESP-12E.

III. IOT Technology:

IoT is an interconnection of many physical devices with the help of the internet. The controlling and monitoring of any physical tool or parameters are possible with the help of IoT technology.

IV. Temperature Sensor (NTC-10K):

NTC (Negative Temperature Coefficient) thermistor is a semiconductor crafted from metal oxides. It reveals an electrical resistance that has a very predictable exchange with temperature. The resistance varies drastically with temperature, greater so than in popular resistors. They are extraordinarily sensitive to temperature change, very correct and interchangeable.

They have an extensive temperature envelope and may be hermetically sealed to be used in humid environments. It exhibits an electrical resistance that has a very predictable change with temperature. The resistance varies significantly with temperature, more so than in standard resistors. They are extremely sensitive to temperature change, very accurate and interchangeable. They have a wide temperature envelope and can be hermetically sealed for use in humid environments.



Fig -3 NTC10K

V. Oil Level Sensor:

The float switch is a form of level sensor, a device used to detect the extent of oil inside a transformer tank. The switch is used as an indicator, an alarm, or to manipulate the oil stage of the transformer. In which the switch detects the rising stage of oil in the transformer tank and energizes an electrical pump which then pumps liquid out until the stage of the liquid has been significantly decreased, at which factor the pump is switched off again. Float switches are frequently adjustable and may consist of large hysteresis. This is, the switch's "switch on" factor may be plenty higher than the "shut off" factor.



Fig -4 FLOAT SWITCH

VI. Voltage Regulator:

The voltage supply in a circuit may also have fluctuation and might now not provide the constant voltage output. Voltage regulator (LM7805) is used to keep a steady out voltage of +5V.it's miles a member of 78xx series of constant linear voltage regulator ICs. The voltage of +12 volt is applied to the enter & it gives out +five volt of output which is the requirement of microcontroller, liquid crystal display show and numerous different gadgets used inside the project.



Fig -5 IC LM7805

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5.FUTURE SCOPE

- This kit can be used for all form of transformer which offers safety and real time tracking.
- As according to their rating, we are able to alternate programing and used.
- In future we are able to introduce new technology in step with future improvements.
- If we can able to form a centralized operation room, then we will track all the transformer from one location.

6.CONCLUSION

Compared to manual monitoring, transformer status using IoT and protection is very helpful and reliable. The reason is that it is not always done by hand to monitor the ambient temperature and the recommended oil level. However, the system can quickly take steps to prevent a catastrophic failure of the transformer after receiving an unusual message and in the event of any unusual situation in the transformer, the system will automatically run. The results of this study are very simple to prevent transformer failure, so the economic costs of replacing the transformer are saved. In addition, the research design may also plan for large-scale power outages in advance, thus reducing the amount of time it takes to reduce the load.

6.REFERENCES

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