

Multiple Transformers oil temperature monitoring with automatic circuit breaker operation with SMS based alerts

This project aims at monitoring the oil temperature of a multiple transformers continuously and protects them from overheating. Since transformers are vital elements of the electric power transmission and distribution infrastructure, they need to be monitored to prevent any potential faults. Failures in a transformer can easily costs several million dollars to either repair or replace, and will also cause a loss of service to customers and revenue until the symptom is found and repaired.

In transformers the need for monitoring the oil temperature is very much necessary. Turning the transformers OFF whenever the temperature is greater than its maximum operating temperature protects the transformer from damage and also the life-time of the transformers can also be increased. Since the oil is present inside the transformer there is a necessity to develop a system which can sense the temperature of the oil inside the transformer and automatically switches ON the Circuit breaker if temperature exceeds the limit and also informs the electricity department through SMS to predefined numbers and also alerts through LCD display. The oil temperature of multiple transformers can be continuously monitored on LCD display provided in the system.

We developed this project, which is relatively inexpensive to sense the temperature. The temperature is read by the ADC (Analog to Digital Converter) module of the microcontroller Unit. This ADC data is processed and converted into the actual temperature reading by the microcontroller.

The microcontroller is provided with the instructions such as maximum Threshold temperature after which the transformer need be turned OFF etc. The microcontroller will dynamically decide the status to which the transformer should be driven OFF depending on the temperature input received from the temperature sensor. The controller also displays the oil temperature over an LCD display for the reference of us.

The objectives of the project include:

1. Continuous oil temperature reading of multiple transformers.
2. GSM SMS based alerts.
3. LCD displays based visual alerts and continuous monitoring.
4. Reliable for industrial needs

The project provides us exposure on:

1. Initialization of ADC module of microcontroller.
2. Temperature sensor characteristics.
3. Embedded C programming.
4. PCB designing.
5. Serial communication protocols.
6. GSM modem.
7. LCD interfacing to Microcontroller.

The major building blocks of this project are:

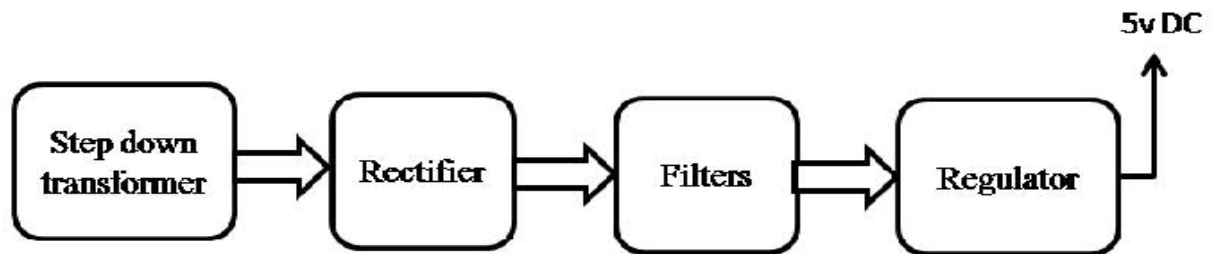
1. Regulated power supply.

2. Microcontroller.
3. Temperature sensors.
4. Relay with driver.
5. GSM modem.
6. LCD display with driver.
7. Reset.
8. Crystal oscillator.
9. LED indicators.

Software's used:

1. PIC-C compiler for Embedded C programming.
2. PIC kit 2 programmer for dumping code into Micro controller.
3. Express SCH for Circuit design.
4. Proteus for hardware simulation.

Regulated Power Supply:



Block Diagram:

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