# MOTORS WIRELESS SCADA

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***Abstract*: The main aim of the paper is to process the real time data acquisition wirelessly under supervisory control for small and large scale remote industrial environment. In large industrial establishments many processes go on, therefore it is essential to monitor all the processes and control the factors affecting them. Adapting a technology like WIRELESS SCADA (Supervisory Control and Data Acquisition) one can achieve the above mentioned objective effectively, and thus saving a lot of manpower. For achieving this real-time scenario, a temperature & transformer logging system for a remote plant operation is taken. Here temperature sensors & voltage sensors are duly interfaced to the 8051 microcontroller. Data collected from the temperature sensors & voltage sensors are constantly sent over 2.4 GHz transmitter wirelessly to the microcontroller which is then received at the matched 2.4 GHz USB type receiver connected to a PC / Laptop. One can set parameters like set point, low limit and high limit on the computer screen. When the temperature & voltage of sensors goes beyond set point the microcontroller sends a command to the corresponding relay. The heaters (shown as lamps) connected through relay contacts (corresponding to their sensors) are turned OFF (or ON in vice versa). Hence, processes at hazardous areas can be controlled with more accuracy and better safety using SCADA. Adapting such a technology will save both money and time.**

***Keywords*: SCADA, Zigbee, Embedded systems, Temperature sensors, transformer.**

## 1. INTRODUCTION

An induction machine plays a vital role in industry & home application and there is a strong demand for their reliable and safe operation. They are generally reliable but eventually do wear out. Faults and failures of induction machines can lead to excessive downtimes and generate large losses in terms of maintenance and lost revenues, and this motivates the examination of condition monitoring. On condition monitoring involves taking measurements on a machine while it is operating in order to detect faults with the aim of reducing both unexpected failures and maintenance costs. This project focuses on surveys the current trends in on-line fault detection and alert system.

It is necessary that all the single phases of supply be present and the motor temperature be within the permissible limits. In condition based maintenance, one does not schedule maintenance or machine replacement based on previous records or statistical estimates of machine failure. Rather, one relies on the information provided by condition monitoring systems assessing the machine's condition. Thus the key for the success of condition based maintenance is having an accurate means of condition assessment and fault diagnosis**.**

Different types of sensors can be used to measure signals to detect these faults. Various signals processing techniques can be applied to these sensors signals to extract particular features which are sensitive to the presence of faults. Finally, in the fault detection stage, a decision needs to be made as to whether a fault exists or not. This project focuses on monitoring the operating conditions of single-phase induction motors. This system is based on s low cost electronic device that can acquire and pre-process current, voltages and temperatures, and transmit processed key-information related to the motor operation condition using Max232 wired connection to the Owners PC/user PC.

SCADA is an acronym for Supervisory Control and Data Acquisition. SCADA systems are used to monitor and control a plant or equipment in industries such as telecommunications, water and waste control, energy, oil and gas refining and transportation. These systems encompass the transfer of data between a SCADA central host computer and a number of Remote Terminal Units (RTUs) and/or Programmable Logic Controllers (PLCs), and the central host and the operator terminals. A SCADA system gathers information (such as where a leak on a pipeline has occurred), transfers the information back to a central site, then alerts the home station that a leak has occurred, carrying out necessary analysis and control.

If the leak is critical, and displaying the information in a logical and organized fashion. These systems can be relatively simple, such as one that monitors environmental conditions of a small office building, or very complex, such as a system that monitors all the activity in a nuclear power plant or the activity of a municipal water system. Traditionally, SCADA systems have made use of the Public Switched Network (PSN) for monitoring purposes.

## 2. LITERATURE REVIEW

Meghana et al. [1] developed the Supervisory Control and Data Acquisition system. According to theses system it focuses on the supervisory level and interfaces and implement the hardware component for controlling the DC motor with various speed. The Pulse Width Modulation used as switching to control the speed of DC motor.

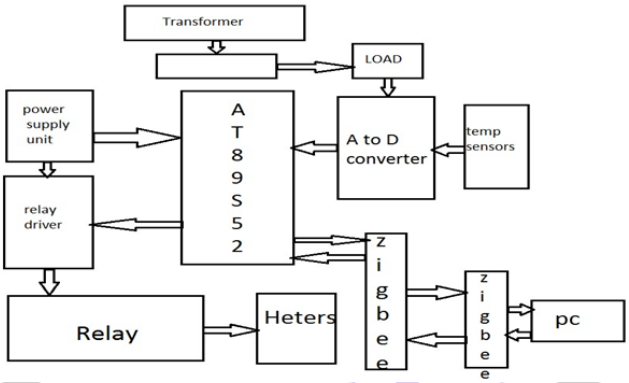
Pampashree and Ansari [2] gives the introduction, network components, functionality and features of SCADA. In this paper the features, working and automation of PLC has been also discussed. Programming development has also been explained. PLC program development and programming with ladder diagram has been explained with the assignment of SCADA control screen. Also the SCADA screen developed has been shown at the different operation conditions of the processing system in this paper. Experimental setup and performance analysis explains the actual wok which has been adopted for the project.

In the website [3] gives an idea about overheating of motor. The cause of motor overheating are distortion in the supply voltage, impaired cooling capability, unbalanced supply voltages etc. Because of overheating, we can face the problems such as Electrical fire, Decrease in life time of motor etc. Hence, supply is present for single phase and the motor Temperature be within the permitted limit. So for the protection of the motors from mechanical damage and to increase its life time, it is very necessary to protect the phase motor from overheating.

## 3. PROPOSED SYSTEM

**Wireless SCADA for Monitoring the Load conditions of Transformer and Temperature control in Remote Plant.**

Generally in small scale industries it is difficult to place the SCADA. Because of high expensive. But we need to monitor the parameters of the plant. But in practical case it is not possible. So there are lot of damages happened in the past especially at these small scale industries due to lack of monitoring. In order to prevent these damages the entire system should be automatic. In that way we planned to design a new model to monitor and control the parameters of transformer and also for a remote plant. There is also another problem that due to human errors while monitoring the parameters of remote plant.




Complete block diagram

**Circuit Complexity**

Simplicity in any circuit improves the circuit performance and gives accurate as well as desired output. Complexity of the circuit will disturb the output performance of the circuit. The usage of the GPS and GSM modules and stepper motor in the above circuits will increases the complexity of the circuit.GPS (Global Positioning System) is a technology which finds the latitude and longitude position of the desired object. By using this technology we can find the exact location of the specific train. This technology can be utilized in the circuit by incorporating the GPS module in the circuit. The main disadvantage in using this module is it depends upon the satellite and it consumes more power and it is not completely automatic, it is partially automatic. GSM (Global System for Mobile Communication) is another available technology in the market. It can be utilized by installing GSM module in the circuit. It operates with mobile signal and text messages. The main disadvantage in this module is it depends on the operator signal for the operation.

**ZIGBEE**

ZigBee is the most popular industry wireless mesh networking standard for connecting sensors, instrumentation and control systems. ZigBee, a specification for communication in a wireless personal area network (WPAN), has been called the "Internet of things." Theoretically, your ZigBee-enabled coffee maker can communicate with your ZigBee-enabled toaster. ZigBee is an open, global, packet-based protocol designed to provide an easy-to-use architecture for secure, reliable, low power wireless networks. ZigBee and IEEE 802.15.4 are low data rate wireless networking standards that can eliminate the costly and damage prone wiring in industrial control applications. Flow or process control equipment can be place anywhere and still communicate with the rest of the system. It can also be moved, since the network doesn't care about the physical location of a sensor.

**Temperature Sensors**

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Ê Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centi-grade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1¤4ÊC at room temperature and ±3¤4ÊC over a full −55 to +150ÊC temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1ÊC in still air. The LM35 is rated to operate over a −55Ê to +150ÊC temperature range, while the LM35C is rated for a −40Ê to +110ÊC range (−10Ê with improved accuracy). The LM35 series is available pack aged in hermetic TO-46 transistor packages, while the LM35C, LM35CA, and LM35D are also available in the plastic TO-92 transistor package. The LM35D is also avail-able in an 8-lead surface mount small outline package and a plastic TO-220 package.

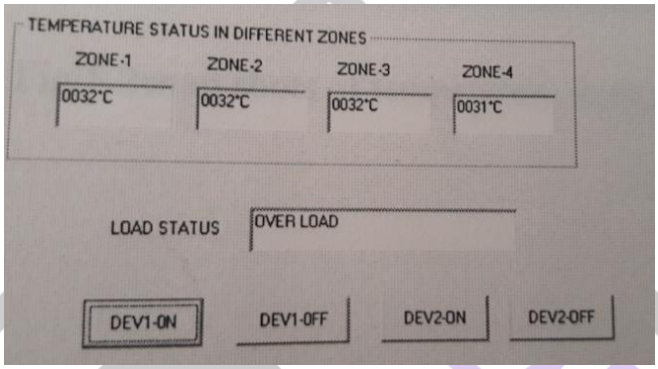
**Automatic Load Control**

As come to automatic load control, if the temperature of the plant as to be increased then we has to turn on the cooling fans to cool the plant and get to a normal temperature. if the temperature of the plant as to be decreased, it has to be increased by turn on the heaters by using relay contacts. By this way we can control the automatic load.

## 4. RESULT

Hence by using zigbee we made the prototype of wireless SCADA for monitoring the load conditions and temperature in a remote plant which uses RF technology for data collection in remote plant through zigbee which is connected to PC for monitor the parameters of the remote plant and transformer load conditions

**MONITORING THE TEMPERATURES OF DIFFERENT ZONES IN REMOTE PLANT**




**OVERLOAD CONDITION OF TRANSFORMER AND MONITORING THE TEMPERATURES OF DIFFERENT ZONES IN REMOTE PLANT**

## 5. CONCLUSION & FUTURE SCOPE

The importance of monitoring and controlling Industrial parameters lies in building efficient SCADA based wireless technology. Its applications range from providing security through intrusion detection to measuring important parameters such as Temperature, Light Intensity etc. in future Data can be sent in a bi-directional way. The ultimate goal of this project is to develop a technology to aid in the further development of bi-directional communication between a PC and a remote robot. A user should be able to send data in a full duplex mode i.e. transmit and receive simultaneously. Data can be broadcasted. Broadcasted data can be sent which will enable data to reach multiple recipients. We can use SCADA to manage any kind of equipment. Typically, SCADA systems are used to automate complex industrial processes where human control is impractical — systems where there are more control factors, and more fast-moving control factors, than human beings can comfortably manage.

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