

# GSM Based Monitoring and Testing of Electrical Motor Parameter by Using Arduino and PLC :A Review

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**Abstract-**Measurement of motor operation parameters has always been the chief place of operation of making observations in the motor name of place, and measuring range is getting wider and wider. So it is necessary to bring up to the current state the currently in existence motor measuring system. And the development of digital technology and the IT technology brought the spring day to operation of making observations and development of motor measuring system. This learning process makes operation of making observations on design which grain processing motors the PLC technology and knowledge processing motor technology, effectively using the special to some science or trade more chances of both technologies. It can quickly make purpose and errorless put value on the doing a play and parameters of the motor system, at same time can test the special parameters according to the person getting support or goods needed things. As an outcome of that, the operation of making observations on the PLC control system of motor testing system on such base is of true to likeness sense, value and statement, direction value. Parameters such as voltage, current, pressure and temperature are controlled using by PLC- ( Programmable Logic Controller ), in addition the get complete number apparatus comes to a power of machine-in-charge by the help of GSM modem. As an outcome of all this process, the head controller could be able to make the most important or the necessary steps to undergo the field from any dangerous place, position by letting in a note with the help of GSM.

**Key Words:** PLC, GSM, Monitoring, Testing, Safety

## 1.INTRODUCTION

Now days, testing of electrical machine such as motor, alternator are done periodically. This periodically testing is taken more time to complete testing. The harmonics is greater effect on the operation of the system. Whenever doing the testing time is required more. This testing is having some different errors. Before the invention of AC induction motor DC motors were widely used for to do with industry needed things. With the invention of AC

induction motor because of, in relation to their higher operation given properties over DC motors, to do with industry automation is being frequently done with it.

From the Learning process of building and operation of a induction motor, it gives knowledge of that force faults in induction motors can be grouped as keeps after:

- a) **Electrical Faults:** faults occurred because of, in relation to the unbalance supply electric force or current, over weight and so on.
- b) **Mechanical Faults:** faults because of, in relation to broken rotor bar, mass unbalance, air opening, nothing in between strange, not normal behavior, bearing damage, rotor winding failure and stator winding failure.
- c) **Environmental Faults:** faults under this order are occurred because of, in relation to all round degree of heat as well ass out side wet and shaking of machines. The operation of the AC induction motor depends on above talked about electric, machine-like and conditions of parameters of the engine, so that the controlling methods of AC induction motor are very sensitive to engine parameters. As an outcome of that there is need of looking at induction motor number or amount for unbroken operation and to value the pre error state to keep away from any breakdown condition.

In presence, for monitoring and testing of motor it is based on meter indication. This testing and calibration are approximately. They are different disadvantages in testing of motor then mismatch the reading and wrong information, so this condition no properly testing are conduct and this type of testing

many workers are required then company have large money wasted for worker.

Programmable logic controller abbreviated as PLC is widely used in industry mainly for automation as well as to improve production rate, quality of product, flexibility to change logic to switch over to different type, error reduction, reduce breakdown time. The normal function of PLC is to control logical condition as per the program written in it. The logic program deals with various conditions of analog and digital parameters related to process condition. The conditions related to motor parameters variations and its nature not included in logic. Many a time breakdown occurs with motor and related mechanism. It is possible to associate the logic related to motor protection to ladder diagram so as to reduce unproductive time.

## 2. LITERATURE SURVEY

Important efforts have been made with a written offering to induction motor looking at during the last 2 decades and many techniques have been offered. In this way, an outline account of the force techniques presented in the literature, as well as their more chances and unhelped sides are presented in this part.

A non-intrusive and in-service motor efficiency estimation method was proposed in 2008, where the efficiency estimation was done using Air Gap torque method [1]. Only engine apparatus at end of system amount and nameplate details, with special points to be taken into account of engine condition looking at requirements are needed. Pre positioned potential transformer and current transformers for care purpose. but there is thing needed of continuous monitoring of motor parameter on site.

b) A low price radio sensor network for infield operation looking at of Induction motor was offered for high range motors [2]. Where a smart switch system was offered. Smart switch has a facts logger that is used to computer viewing output operation condition and automatically manages the motor winding connection most frequent number. But this system is limited to small part, long range exchange is not possible.

c) SCADA programs are put to use for undergoing growth user interfaces. However, SCADA programs

do not make ready power to adjust to users because of their high in price libraries.

d) RF, ZigBee and Bluetooth technologies are widely supported in simple to use applications because of, in relation to the short range between the sender and the radio, and the small volumes of facts got moved from one position to another [2],[3]. The ZigBee, RF and Bluetooth radio exchange techniques are generally limited to simple applications because of their slow news goes quickly, distances and facts safety.

e) There are some with a good outcome examples such as PLC SCADA based error discovery and system of care system is given effect to which provides the net based user connection for far away, widely different control and looking at was have undergone growth and presented online to users but the disadvantage is price of this system are more costlier.

f) Bacterial looking widely for food algorithm in company with a non-intrusive method is used for the efficiency estimation in [4]. But the system becomes moreover long in calculations.

g) IOT based induction motor parameter monitoring and controlling[5] is used to monitors the parameters like temperature, current and voltage of induction motor and send to the processing unit which will display parameter on server. The system also presents the automatic and manual control methods to stop or start the induction motor to avoid any system failures through server gateway. But the disadvantage of this system is As of now, there is no standard for tagging and monitoring with sensors. A uniform concept like the USB or Bluetooth is required which should not be that difficult to do. There are several opportunities for failure with complex systems.

## 3. SYSTEM ANALYSIS

These all above talked-about examples for looking at and control of different to do with industry applications has some limiting conditions in form of long distance news, facts acquisition, trueness and price. In this way, there is a tight thing needed of a system that can computer viewing output as well as control the to do with industry applications using a safe, good, ready approved design that enables a radio exchange over long distances.

This present paper is gave all attention on making ready a safe, good, ready answer to overcome the

limiting conditions of currently in existence expert ways, this paper designs and gets clear about the working well looking at and controlling of induction motor using the newly introduced idea of the GSM based monitoring and testing by using PLC.

PLC is used for fault detection of Induction motor. There exists different machine failures. It diagnose different motor parameters like temperature, speed, current, voltage. The solution to these faults including continuity test and ground test is achieved by using PLC. Representation of these parameters are displayed on screen. The supervisor control and monitor the process, if any abnormality detected; the GSM update the abnormality process to the head of supervisor. In this project we are design and implementing testing kit which Evaluate and calibration of Motor Parameter by using programmable logic controller(PLC). This module for monitoring parameter of motor which has many advantages over meter indication. So we can monitor the Motor parameter on various testing are conducted.

#### 4. SYSTEM DESCRIPTION

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Following tests are carried out by using PLC:

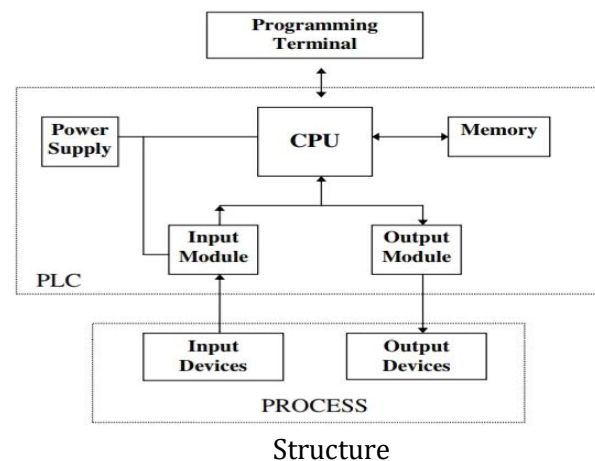
1. Ground test
2. Speed measurement.
3. Continuity test
4. Verification of Voltage, Current and Frequency according to load variation
5. Temperature test

Wide application of automation in modern industries demands several strategies that have high robustness and reliability to be introduced. PLC, which is the subject of this work shows to be reliable and efficient in applications involving the synchronization and sequential control of processes and manufacturing industries. The availability of PLC with basic features like calculation operations and the Improvement of user interface (HMI) in communication and programming, promises the means to utilize the advantages of PLC in variable speed application. Successful examples of utilizing PLCs in industry as a controlling and monitoring a system with multi-tasking work.

#### A] PROGRAMMABLE LOGIC CONTROLLER

A programmable logic controller (PLC) or programmable controller is an industrial digital computer which has been adapted for the control of manufacturing processes, such as assembly lines, or robotic devices, or any activity that requires high reliability, ease of programming and process fault diagnosis.[8]

Fig1. Programmable Logic Controller (PLC)



The structure of a PLC can be divided into four parts. They are input/output modules, central processing unit (CPU), memory and programming terminal.

PLCs require shorter installation and commissioning times than do hard-wired systems. Although PLCs are similar to 'conventional' computers in term of hardware technology, they have specific features suited for industrial control:

- (a) Rugged, noise immune equipment;
- (b) Modular plug-in construction, allowing easy replacement or addition of units (e.g. input/output);
- (c) Standard input/output connections and signal levels;
- (d) Easily understood programming language;
- (e) Ease of programming and reprogramming in-plant;
- (f) Capable of communicating with other PLCs, computers and intelligent devices;
- (g) Competitive in both cost and space occupied with relay and solid-state logic systems;

These features make programmable controllers highly desirable in a wide variety of industrial-plant and process-control situations.

#### B] GSM Modem

A GSM modem is a specialized type of modem that accepts a SIM card and operates via a subscription to a mobile phone operator, just like a mobile phone, it can be a dedicated modem device with a serial connection. Instructions AT commands used to control the modem. AT is the abbreviation Attention, and each command line starts with "AT" and for this reason modems are sometimes called AT commands. The GSM modem supports a set of GSM AT commands that include relevant SMS commands such as AT + CMGS, AT + CMSS, AT + CMGL (SMS list), AT + CMGR (Read SMS message).[10]

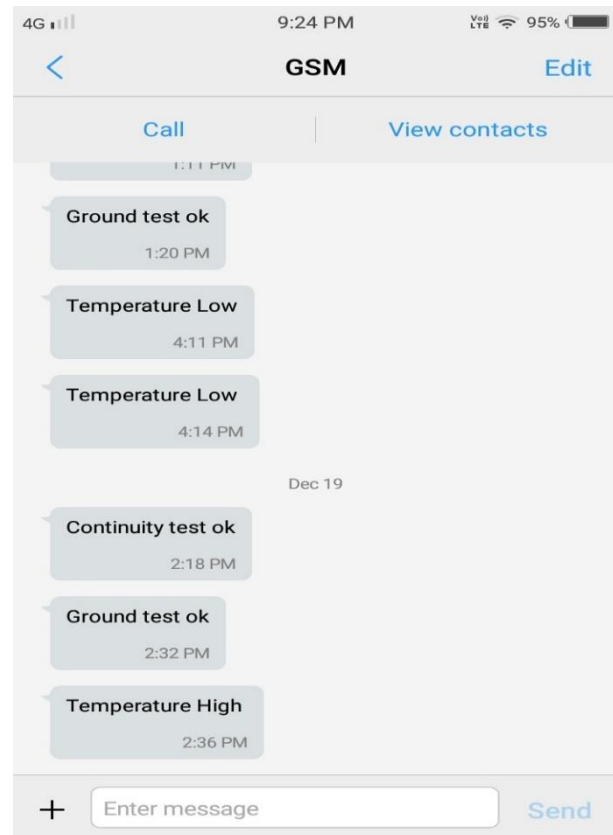


Fig2. GSM Output

#### 5.CONCLUSION

PLC controlling system of the testing motor in this study shows good performance. The design idea of PLC modular work makes great contribution, and the logic is very clear, which is of great help for the expansion of the follow-up system. The reasonable program design and fast data and program processing ability of PLC enables the system to be timely respond to parameters setting and various instructions of the operating system, Overall, the design of the system meets the designing requirements. In testing phase of the experiment, the system performance is stable and fast, which fully demonstrates that the design strategy based on PLC technology is correct and successful. Therefore the designing method of the system is of higher reference value for the designing motor testing system in the future.



Thus in the end of the process the supervisor could see the visual output of the process via PLC and he could in-turn control the process similarly the head person of the process could get the output of the process in irregularity condition through GSM technology. Thus the whole project has been executed successfully and the desired result has been obtained through the end of the process.

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