SMART MONITORING SYSTEM FOR INDUSTRIAL MOTOR

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Abstract

Situation monitoring means, it is an upholding process for monitoring. The explicit parameter like over current, speed, vibration, temperature, emanation for early finding of impending failure and require to maintenance previous to failure or to guesstimate the machine vigor. It is technique that serves for situation-based safeguarding. In stipulation-based maintenance provide the current status of machine and indicate clearly where and what type of maintenance is essential so that it be able to reduce manpower consumption, optimal utilize of machine parts and will assurance that crashs will not transpire suddenly.

Keywords *– Mobile control system-GSM monitoring, potential transformer, current transformer, electric drive, induction motor, activity control system.*

I. INTRODUCTION

In view of the fact that technology for activity control of electric drive befall available. The crash of motor proves to be very expensive as it increases down time on the machines. So it befalls essential to swell some cost capable and steadfast stipulation monitoring system for the fortification of motors to shun unexpected crashes. Stipulation monitoring techniques be able to be classified into two categories: Firstly the classical method and secondly the digital method. In classical method, electromechanical tools are expensive, less efficient, having very slow response and not reliable as some of the tools have even shorter life than the motor itself.

The digital method is the newest method for the stipulation monitoring and it involves integrated circuit, microcontrollers, microprocessors and programmable logic controllers. There are numerous factors which give to burning of motors and some of them are thermal overloading, due to objectionable stress, air gap eccentricity, speed oscillations, stator winding failure, Broken rotor bars, bearing failure and deranged voltages. According to a assessment the percentage crash of the faults is as follows:

Bearing related Motor faults	41%
Stator related Motor faults	37%
Rotor related Motor faults	10%
Additional faults	12%

This document provides a sensor-less method to widen stipulation monitoring system for the over current, over voltage, speed, temperature via microcontroller. The anticipated system has the capability to detect faults at the time of working motor. This system endlessly monitored the status of motor on mobile screen. The anticipated system could be applied to AC motors of all sizes, particularly in severe environment stipulation where access to motor is not effortless.

II. METHODOLOGY

In this work the system consist of a 3 phase AC induction motor. The system has current and voltage transformer attach to the supply which is fed with power switching circuit shown in Fig. 1. The switching circuit is linking with three phase supply with a three phase AC motor. The current andvoltage transformer give defense of switching circuit or the control panel form the uncharacteristic current and voltage.

The interfacing tool interfaced or connects with control panel system and gives the stipulation forcontrol the motor. The driver circuit also connect to the microcontroller for the reason that all parameter control by the microcontroller. Driver circuit be able to utilize for motor and the relay which give the signal to the three phase contactor tool for either on or off the stipulation. All the system is digitally so that we easily understand what the process is going on. The complete process shows in the diagram in Fig.1.

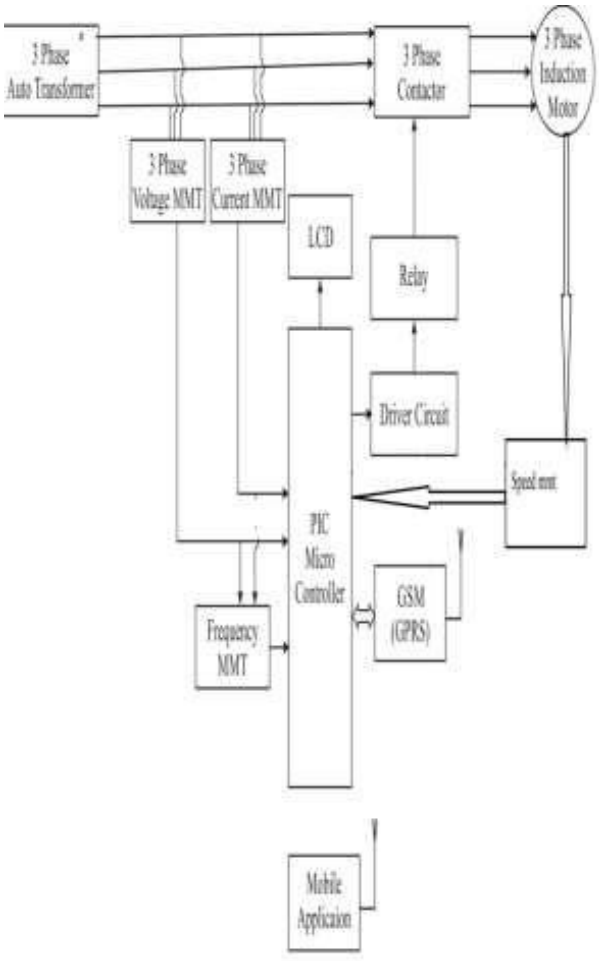

Figure 1.Diagram of the CM system

For voltage and current measurement a voltage and current transformer utilized. The supply current and voltage that has to monitor is step down by the current transformer and voltage transformer. The step down current is transformed by voltage with the help of shunt register in current transformer. We are using 0 to 6 volt potential transformer. The step down voltage is rectified by meticulousness rectifier. The exactitude rectifier is a arrangement obtained with an set amplifier IC 741 in order to have a circuit behaving like an ideal diode or rectifier.

Temperature is big issue for burning of induction motor, consequently we utilized LM35 sensor for measurement of temperature. The LM35 is an exactitude integrated-circuit temperature tool with an output voltage linearly comparative to the Centigrade temperature. It is a defined temperature sensor which has 3 main connectors. VCC, GND and OUTPUT. The first and second are fixed value of circuit and the third is output provide the voltage is proportional to the temperature. Its Range from −55°C to 150°C.

For speed measurement the Proximity sensor (Inductive Type) utilized, this sensor is kept near orin front of the shaft. This tools which generates output signal or electrical signal when metal objects are either inside or entering into its sensing area from any direction.

All the statistics are composed in analogue form of voltage signal, and then folk's voltages are stepped up correctly by step up transformer. Folks stepped up analogue voltage signal are converted to

d.c voltage by using rectifier. Folk's analogue voltages are given to the analogue to digital converter. Consequently the PIC Microcontroller IC which we utilized is ATMEGA16 .It is 40 Pin IC. Microcontroller receives signal from various monitoring unit of Induction motor. The statistics collectedfrom the motor are displayed in Liquid Crystal Display (LCD).

III. HARDWARE DISCRIPTION

Figure 2. Mounted Hardware System

This fig.2 is the main hardware system which is indicate the condition monitoring , a power supply arrangement available which has used a IC7805 for +5V and IC7812 and IC7912 used for +12V and -12V supply arrangement for current and voltage measurement devices.The PIC Microcontroller IC which we utilized is ATMEGA16 for controlling and programming the system.It is 40 Pin IC. Microcontroller receives signal from various monitoring unit of Induction motor. The statistics collected from the motor are displayed in Liquid Crystal Display (LCD).A GSM Module is mounted in Monitoring Kit which is initialize by a Number or the aneroid mobile phone.

Figure 3.GSM Module

This is a plug and play GSM Modem with a simple to interface serial interface. Use it to send SMS, make and receive calls, and do other GSM operations by controlling it through simple AT commands from micro controllers and computers. It uses the highly popular SIM800 module for all its operations. It comes with a standard RS232 interface which can be used to easily interface the modem tomicro controllers and computers.

The modem consists of all the required external circuitry required to start experimenting with the SIM300 module like the power regulation, external antenna, SIM Holder, etc.

IV. SOFTWARE DISCRIPTION

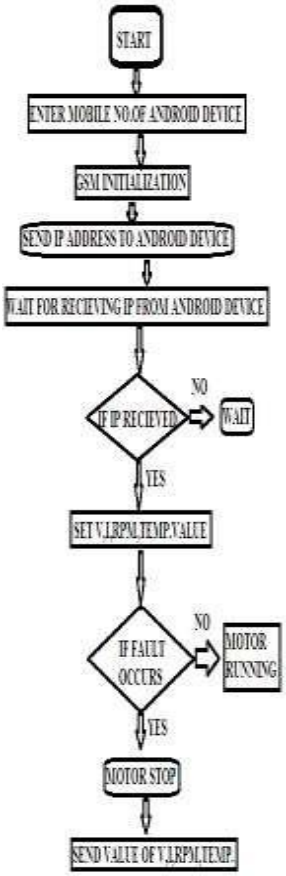

Figure 4.GSM Initialisation Main Program

This is the main initialise program when I fix a SIM in module slot at first it is send IP address to the android device ,we wait few minutes for IP from android device when it received it start the process and giving the result as per already settled program value of voltage, current, speed, etc.If fault will occur then motor stop until no then continuous and then after send value to the mobile phone.

V. RESULTS

Result on LCD Result of user system

Result of user system

(Over Voltage & Under Voltage)

Case I-If Motor supply voltage or the time when load is connected goes above than 240V then systemwill intimate as for overvoltage for before precaution if it cross thee limit i.e above than 260V then motor get trip.

Case II- If Motor supply voltage or the time when load is connected is below the 150V then systemintimate as the under voltage if it crossed then motor trip.

VI. RESULTS AND DISCUSSIONS

Our project proposed a stipulation monitoring and fault diagnostic system or the smart controlling system and monitoring system with microcontroller or processor which will control and protection the motor in easy way. Design a system without complexity and which be able to be easily handled. This tool is so that reduce the burning rate of motor and save/conserve the energy. This paper is based on ongoing project whose testing is yet to be done. Consequently authentic results have not been accessible. The system is likely to monitor the parameters of induction motor and send message on mobile phone when the values of folks parameters crosses the limitations prearranged in programming of microcontroller. Consequently, preventative action is able to be taken for protection of motor before definite fault occurs in the system.

VII. CONCLUSIONS

This research able to produce new non-intrusive method based on the microcontroller for the diagnosis of faults related to over current, over voltage, speed, temperature of AC motors. This system aims to provide a reliable protection to AC motors against unexpected crashes. Thus the system facilitates supervision for defensive maintenance and prognostic failure analysis.

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