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Over Power Detection of Induction Motor

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Abstract: Induction motors are most commonly used as compared with any the other type of electric motors due to its low cost, robustness, and less maintenance requirement (especially squirrel-cage types), and the ability to perform in rough conditions. The aim of this project is to detect, indicate and protect the 3 phase induction motor from various faults using some technique. The circuit will control the 3 phase induction motor and faults of motor like over voltage, under voltage, over current, under current will be indicated first and after circuit will indicate that faults and at least it will protect induction motor from faults. These also protect induction motor from temperature imbalances i.e. overheating of motor and after that circuit will switch on motor under safe condition. There is microcontroller used for control of circuit and it will detect and indicate voltage and current of 3-phases as well as faults occur in IM. If fault occurs it will cut off power to motor and switch off motor until they are normal. We have implemented a GSM Module so that SMS can be sent to the registered mobile phone to indicate the condition of the Induction motor. In the project work undertaken, GSM technology based automatic control system is designed to monitor and control speed of an Induction motor.

Keywords: Short Message Service (SMS), Global Systems for Mobile Communication (GSM), AT Command, GSM Modem, monitoring and control, Radio frequency (RF), Induction Motor.

I. INTRODUCTION

The manner in which the utilization of microcontroller is shaping our lives in breath taking. Today's this versatile devise are often found in a very variety of control applications. A microcontroller unit uses microchip as its electronic equipment and it Incorporates memory, timing reference, I/O peripherals etc., on same chip. In our project microcontroller is employed to regulate the 3 section induction motor. 3 section induction motors are wide utilized in industries as industrial drives as a result of the rugged, less expensive, reliable and economical. It use to rework electric power into mechanical power, thus there are necessary have to be compelled to protection of IMs from faults occur motor in motor. conjointly there are have to be compelled to sight the faults and superfluous condition happens in induction motor as a result of undetected faults could cause failure of motor. Failure of motor is biggest downside in industries and at several different places wherever induction motor wide used. Motor failure could cause production finish off and loss of time interval. The motor faults are as a result of electrical and mechanical hassles. Mechanical faults caused by overload and changes of load, which might cause bearing fault in motor still as bar breakage of rotor of induction motor. Electrical faults are connected with power provide, electrical faults occur in induction motor because of over voltage, underneath voltage, over current, underneath current, temperature imbalance, single phasing, section reversal, warming, etc. in our project we tend to elect a number of faults from these like over voltage, underneath voltage, over current, underneath current, temperature imbalance. thus circuit can sight these faults and indicate the faults. Through show and LEDs and then circuit can defend the IM from these faults once fault sight through circuit logic gate can cut of power to motor and switch of the motor till the conventional. Here we tend to used mechanically management of motor thus once there are traditional condition once faulty condition. Circuit can automatic activate the IM**.**

II. LITERATURE REVIEW

V. Bhaskar& T. Gowri (2001) given the simulation of 3 section induction motor drive system with stress on the electrical faults of the induction motor. using the essential parts of MATLAB/ SIMULINK tool boxes, the drive system is sculptured. it's shown that the stator coil current is used for detection of the electrical faults within the induction motor.

Muhammad Waseem Khan (2000) given a technique by that induction motor electrical faults is diagnosed. The projected methodology is predicated on the Park's vector approach. Nakamura et al (2006) projected a brand new methodology for fault designation of induction motors supported Hidden MarkoffModel, that is wide employed in the sector of speech recognition.

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Kliman et al (1996) model these unbalances that additionally includes instrument asymmetries. Detection of stator coil voltage unbalance and single phasing effects using advanced signal process techniques are represented in Benbouzid et al (1999).

Javed A. and Izhar T. have projected the protection of 3 section induction motor supported voltage measure and isn't enough to shield the motor if the fault happens at distribution electrical device or at station feeder. If fault happens at motor terminals then the voltage measure will defend the motor okay. this measure device ought to be enforced inside the protecting device. they need additionally projected a section measure device which may live the section distinction of the voltages as a result of once the fault happens at the other location instead of the motor terminals, then the faulted section can draw negative sequence current and work as a voltage generator. The voltage developed is near line voltage however the measure theme isn't able to discover the fault, but the phasor distinction of the faulted section changes.

Chen, P.J, Jiang, X.H. et.al. delineate the protection of the induction motor beneath varied conditions like over voltage, beneath voltage, voltage unbalance and over current exploitation PIC16C84 microcontroller. Potential electrical device and current electrical device ar used for this method. Later the values from these electrical device ar reborn into digital values exploitation ADC convertor. The tripping circuit has been given some delay.

Analysis of the steady state performance of an induction motor connected to unbalanced 3 section voltages is given by Yaw – Juen Wang (2001). Dynamic behavior of an induction motor beneath voltage unbalance was involved by Harley et al (1989). data of however and to what extent the voltage unbalance influences the steady state performance of induction motors has been vital and well documented by Woll (1975), Lawril (1991), Smollack (1992), Kerstings and Phillips (1997), Wang (2000).

III. PROPOSED METHODOLOGY

In our project there is a motor which is driving a conveyer belt. At the time of heavy load the conveyer belt stops but the motor keeps on rotating and because of this it consumes extra power. So in order to detect this situation we are developing this project . Whenever the conveyer belt stops the current sensor attached in our circuit will sense the current in the induction motor. If it is above the threshold limit the sensor will send a signal to the relay circuit. The relay circuit immediately trips the motor circuit and hence the motor stops. This condition will be notified to the registered mobile number with the help of GSM module.

Under normal condition of the industrial conveyor belts, the belt keeps rotating according to the effect of the load. On varying loads, the conveyor belt sometimes gets blocked due to over power and the motor still keeps on rotating which results into an enormous consumption of power. This results in damaging the windings and other parts of the motor. This condition of power loss is indicated with the help of over current which is measured by the current sensors.Current sensor measures this current and if it is above the threshold then the relay trips the induction motor.

IV. BLOCK DIAGRAM OF SYSTEM

Various components are integrated in sections such as bridge rectifier, ac voltage controller. The output from the sections are provided to the microcontroller. 12V ac supply is directly given to the microcontroller. The microcontroller ATMEGA 32 executes the command sand controls the motor depending on the command given through the SMS.

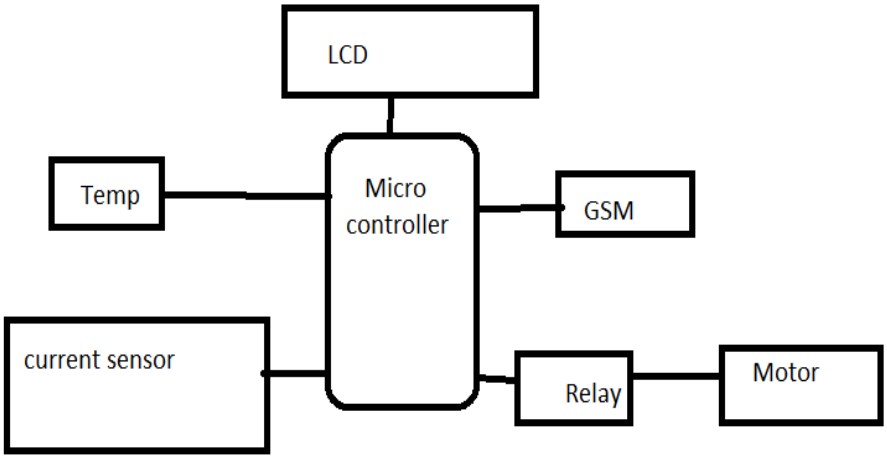

Figure:1 (A) System Diagram

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V. SYSTEM COMMUNICATION

As shown in the figure a pair of the wireless transference of industrial observation messages mentioned during this paper is made on the SMS of the GSM network. information messages made at one finish of the observance system are encapsulated into a brief message by the gateway and sent to remote observance devices at another end. Once a short message is received, it is remodeled to its original industrial type by removing the SMS PDU head.

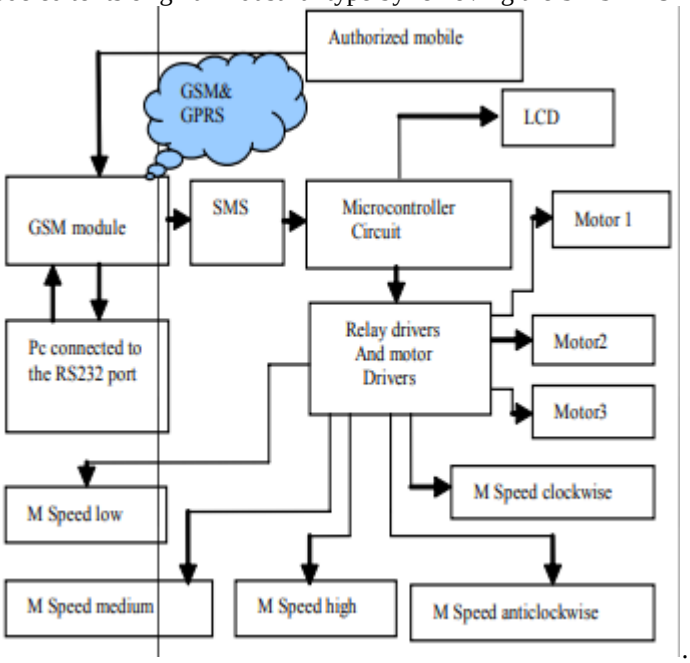

Figure:2(A) System Architecture

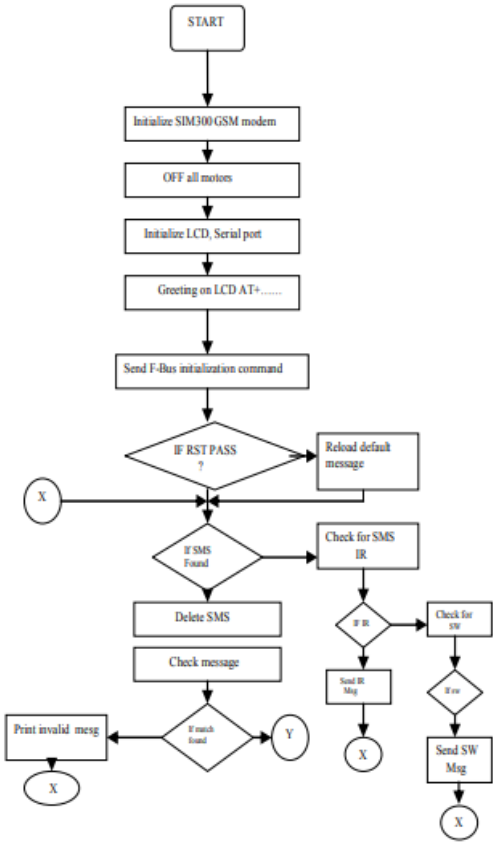

Figure:2 (B) Flow Chart of System Diagram

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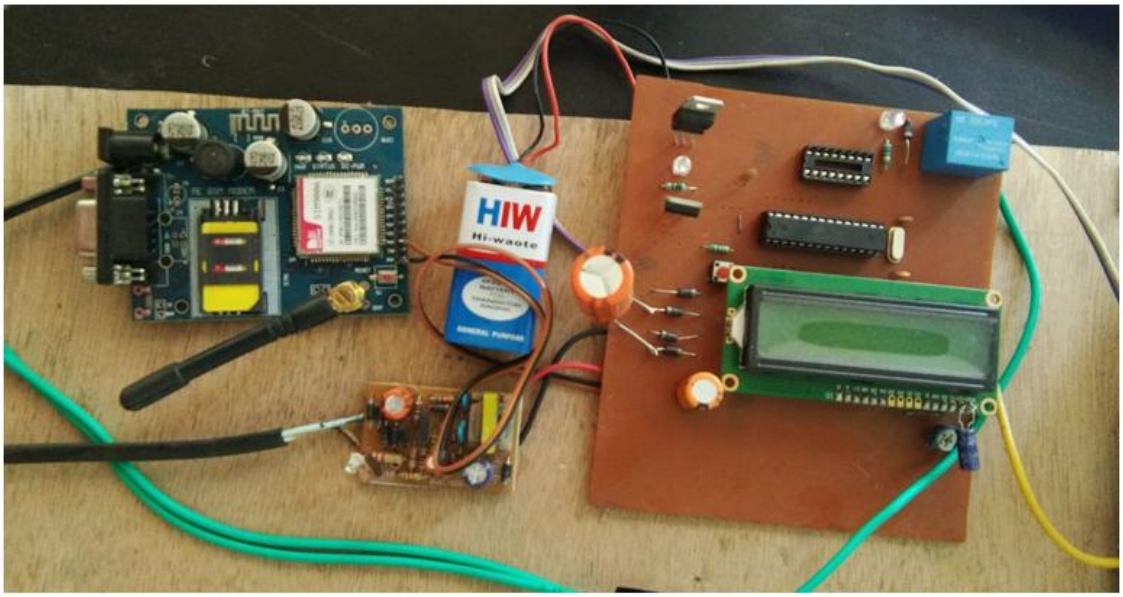

Figure:3 (A) Microcontroller Based Diagram

VI. RESULT AND CONCLUSION

In the paper low price, secure, ubiquitously accessible, auto-configurable, remotely controlled resolution for automation of various motors has been introduced. The approach mentioned within the paper has achieved the target to manage industrial appliances remotely victimization the GSM -based system satisfying user desires and necessities.

GSM technology capable resolution has verified to be controlled remotely, offer industrial security and has achieved the target to manage completely different industrial appliances remotely using the SMS-based system satisfying user desires and necessities GSM technology capable resolution has verified to be controlled remotely, offer industrial security and is cost-efficient as compared to the antecedently existing systems. thence we will conclude that the specified goals and objectives of GSM-based induction motor watching and speed management of dc motors are achieved. the fundamental level of business appliance management and remote watching has been enforced for agriculture purpose to manage and monitor induction motor.

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