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MICROCONTROLLER BASED PROTECTION OF INDUCTION MOTOR AGAINST SINGLE PHASING & OVERHEATING.

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Abstract : Induction motors are employed as a part of colorful ultramodern operation in a variety of working ranges. With respect to view of their introductory and strong structure, and lower manufacturing costs. The reason for refinement of this content is to give safety to artificial motors, lift motors, pumps and so on. The motivation of our setup is to cover an induction motor from many faults, they are (phase fault) single phasing, over-heating due to rise in temperature and over/under-current. If temperature of the motor during normal operation exceeds threshold value or if the current increases or diminishments with respect to the threshold value, motor stops at same moment. The main relay which is powered gets disconnected because of relay lacks force. likewise, we're exercising a microcontroller(µC) for identification of these discovery and an TV show to indicate which type of fault is convinced. This paper has a tendency to develop for protection of single- phase induction motor from single phasing(phase fault),over-heating due to rise in temperature and over-current.

IndexTerms - Microcontroller, Induction Motor, Over-heating, Single-Phasing, LCD, Fault Protection.

I. INTRODUCTION

This design is 3 Φ Induction Motor's protection system using PIC18 microcontroller, protects the 3 Φ Induction Motor from any faults such a current or voltage unusual variation, in any phase of three phase AC force. The main provocation behind this content is to cover an induction motor from faults in general. When any type phase fault if passed in 3 Phase Induction Motor also the winding of motor is hotted which may goes to large fault or may reduce motor's life. thus, the protection of three phase ac motor is important necessary. numerous protection bias are available in request, but not only they are high in cost but also, they aren't important effective and dependable. To surpass these issues then our design named that's called a 3 Phase Induction Motor protection system using snap microcontroller with the help of current detector circuit, temperature detectors, relays with their separate bulbs, power force unit and incipiently PIC microcontroller PIC16F72. This design 3 Φ Induction Motor protection system using snap microcontroller is more effective, dependable and less expensive as compared to other induction motor protection bias, but as of now this system will function only in electrical fault condition. In this design we use 6 bulbs along with 3 relays as representation of three phase force. In this we're connecting two bulbs along with relay in each phase. This system consists of three voltage seeing circuits for seeing the presence of high voltage in the separate circuits. One of the voltage detectors is connected to phase line of the force and the other is connected to neutral line.

Temperature detector uses to descry the temperature. A microcontroller- grounded control system continuously observers the temperature, voltages in all the three phases of the power force circuit. But, when any of the phases gets disconnected also in similar situations the microcontroller will insulate the three- phase power through relays. In this we're using three switches to produce a fault manually.

The main objective of the setup are:

1. Automatic monitoring of all the phases.
2. Automatic switching OFF the motor if any of phases is out.

II. EXISTING SYSTEM

Lately, PLC- grounded protection systems including all variable parameters of three- phase induction motors have been advanced the system is grounded on computers and programmable integrated circuits(snap). This eradicates most mechanical elevation. But the below- mentioned are veritably complicated and more overpriced systems. To overcome these problems, microcontroller- grounded induction motor fault exposure and protection is contemplated In this suggested system, the induction motor is covered using a microcontroller which plays the main part. The proposed system constantly monitors a performing induction motor with least possible mortal commerce. Microcontroller- grounded protection gain advantages over computers.

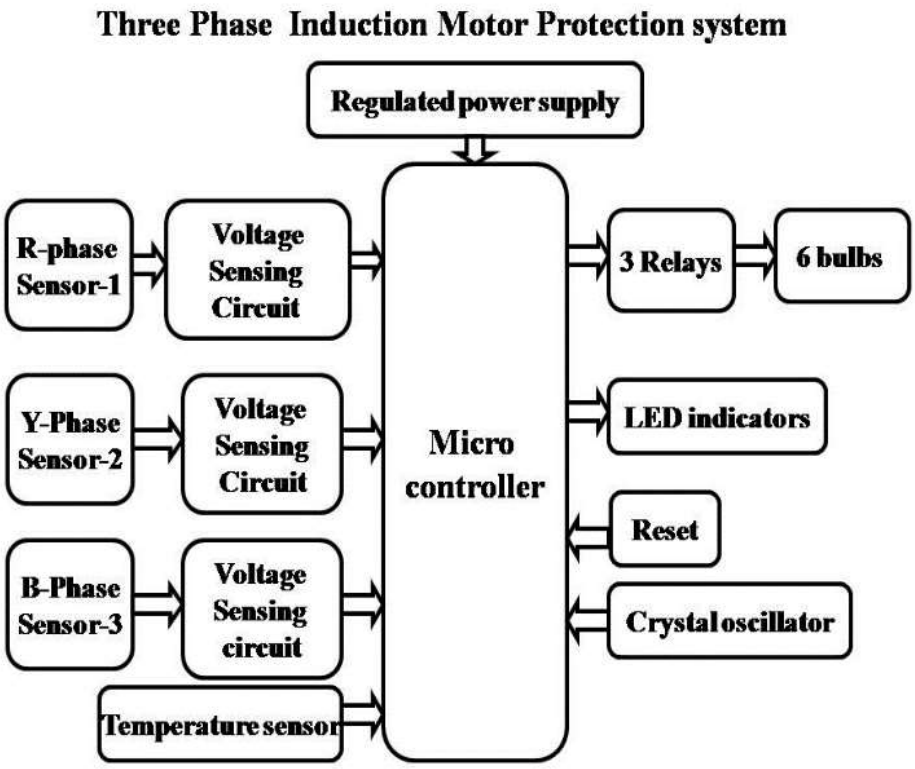
III. PROPOSED SYSTEM

Induction motors can heat just as supplied with voltage beyond the rated voltage. In our substance a variable resistor is used when the force voltage is lower than the putative value, also the voltage drops over the resistor is advanced than it protects the motor from this error When the force voltage is lessened than the voltage drop across the resistor is dropped than the specified value, the motor won't start. It's a single- phase problem when the power force has only one phase, the force voltage is putative and again the motor doesn't start. If the motor overheats, the winding condition is honored using the LM detector, if it outpaces the specified limit, the motor will not renew. It's largely desirable for a three- phase induction motor to conduct without all of these types of failures. The main ideal of this work is to realize an affordable and dependable protection system for three- phase induction motor systems.

The protection system must cover the system against voltage imbalance, single phase, undervoltage, overvoltage and thermal protection. farther ameliorate the motor single- phase operation technology. The ideal of the design is to advance an intelligent system which continually monitors the three- phase voltages and currents and takes preventative measures if one of these three phases is detached. A careful allotment may be to use an electromagnetic relay to incontinently detach the power force from the cargo. provocation

1. Increase effectiveness through robotization as lower community are involved in product.
2. High delicacy(due to conduct i.e., c language).
3. When managed manually, there's further convenience for failure so robotization helps dwindle mortal error.
4. Automatic and reliable

IV. BLOCK DIAGREAM



Block Diagram

V. COMPLETE HARDWARE IMPLEMENTATION

A. Microcontroller and power supply: The microcontroller we account is an Atmega-16. It is a 40-pin integrated circuit. The microcontroller collects signals from the distinct induction motor monitoring system. With this microcontroller, coverage should be more advantageous and achievable. An ADC inside a microcontroller converts a simple origin of information into a high-level signal The information collected from the car is shown on a liquid crystal display (LCD).

B. LM35 temperature sensor: The temperature of the motor windings is measured with a lm35 temperature sensor. The lm35 series is a definitude integrated circuit temperature sensor. The output of this sensor is linearly corresponding to degrees Celsius. For every escalation of 10 mv, the temperature value will increment by 1 degree. It can measure temperatures in the range of -55° to +150°c. The temperature measured by the sensor unit is displayed on the LCD screen and gathered in the computer by the management circuit.

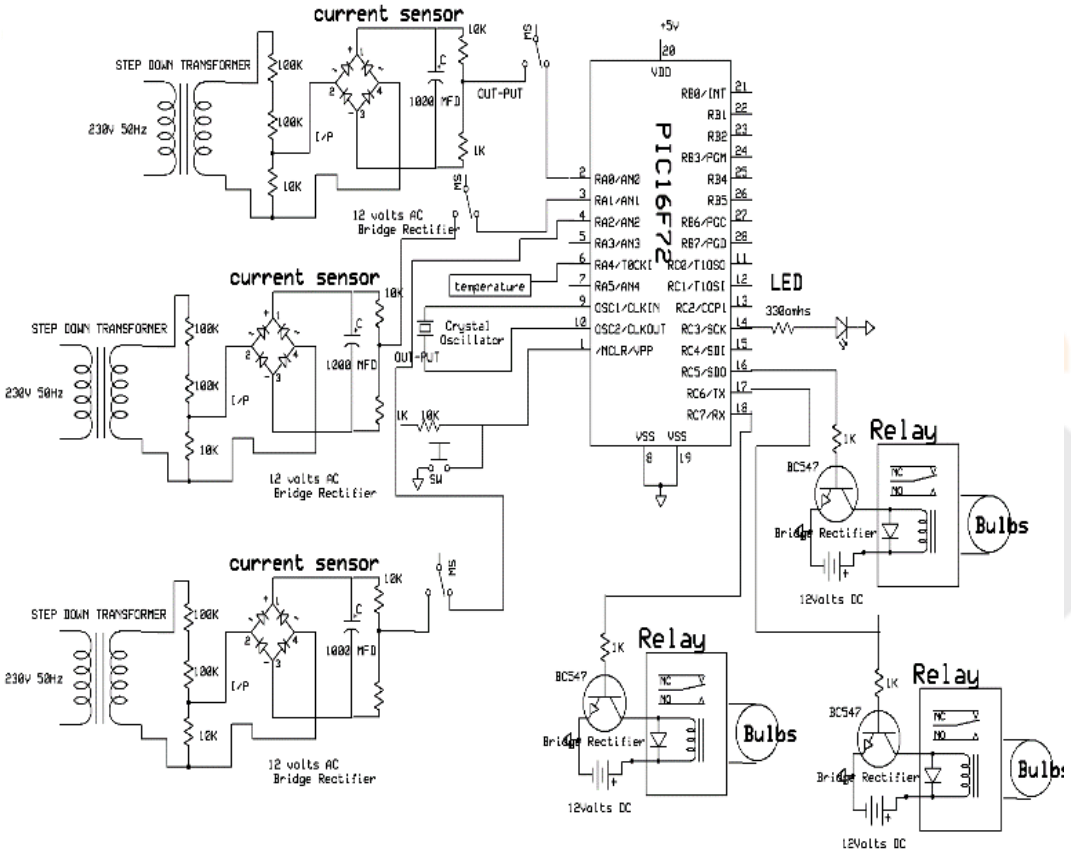
C. Current Coil Sensors: The current in an induction motor is measured via a current coil. CT current sensors use the thesis of converting the measured primary current into a secondary current directly proportional to their turns ratio. Measurement principle:

1. An alternating current proportional to the turn's ratio flows in the secondary side winding to measure the alternating current flowing in the conductor under analysis to eliminate the magnetic flux Φ produced in the magnetic core (primary side of the circuit)

2. This secondary current outflow to the shunt resistor, alternating a voltage between its terminals. This voltage is the output of the calibration circuit and is corresponding to the current flowing in the conductor supporting test. Change contacts.
3. A relay allows one circuit to press an alternative circuit, which may be communal with the first circuit. A relay amidst two circuits has no electrical connection, the contact is magnetic and mechanical. To construct a relay by microcontroller, a ULN2003 relay driver IC is worn

D. Speed sensor (IR pair) An infrared sensor is a photoelectronic device that emits light to detect certain aspects of the environment. Infrared sensors measure the heat of an object and identify its development. These types of sensors only measure infrared emission rather than emit it, and are called passive infrared sensors. All objects beam some form of thermal emission usually in the infrared spectrum. This radiation is not in sight to our eyes and can be detected by infrared sensors. The emitter is just an IR LED (Infra-red LED) (light emitting diode) and the detector is just an Infra-Red photodiode cell, which is conscious to infrared light at the same spectrum that the IR LED emits. When infrared light falls on the photodiode, the resistance and these output voltages shift in proportion to the intensity of the collected infrared light.

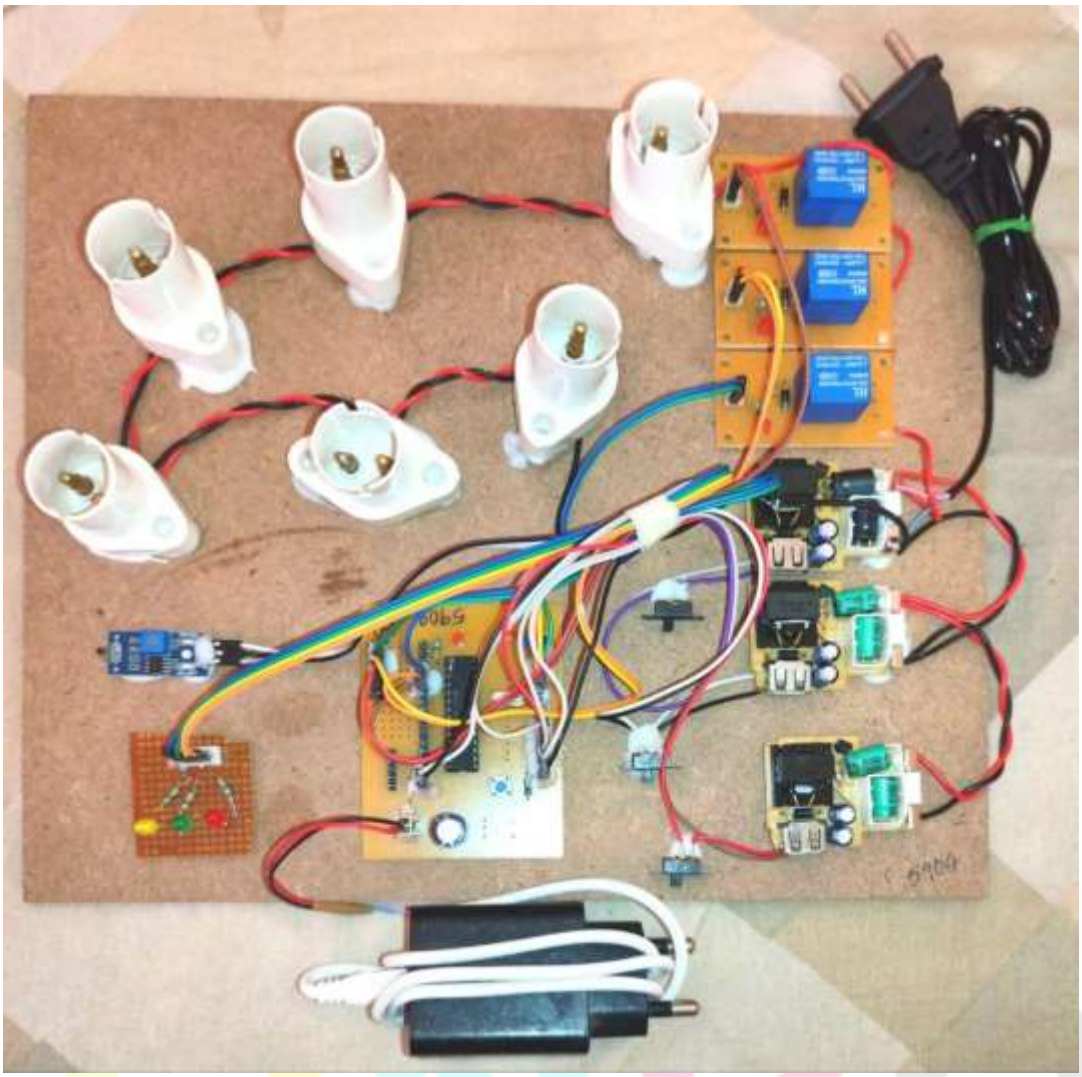
VI. EXPERIMENTAL SETUP



Circuit Diagram

In this arrangement direct 3-phase 50 Hz AC power is first shifted to the gate's integrated logic circuit (OR-NAND) along the Zener diode voltage drop framework to identify the accurate RYB sequence layout. along the fixed-time pulse train. During the action of converting the RYB to YBR sequence, the inherent combination of NOR gates produce an output with a lost pulse for a fixed time. This pulse is now used to administer a trigger as an input signal to the 8051-

list microcontroller. This input is used to complete an LED connected in a circle by a timer. When the sequence is not proposed the activation carried out is designated by the clockwise direction, then the LED in the circular position lights up counter-clockwise, and the sequence advance. The DC current requirements Ckt are equipped using a step-down transformer associated to a filter capacitor, a voltage regulator along with a bridge rectifier. This system can be further improved by providing the ckt with a relay to chop off the power applied to the load.



Experimental setup

The above diagram of the three-phase asynchronous motor protection system clarifies the interface part of each component with the single-chip microcomputer and the temperature sensor module. The 9th and 10th pins of the single-chip microcomputer are connected to the crystal oscillator, the regulated power supply is also associated to the single-chip microcomputer, the LED is also associated to the single-chip microcomputer through a resistance and the motor drive is allied to the single-chip microcomputer.

Project "Microcontroller-Based Three-Phase Induction Motor Protection System" intent to frame a single-phase monitoring and prevention system adopting an 8-bit microcontroller. In the accident of a phase failure, the microcontroller isolates the three-phase supply by dint of the relay.

The integrated nature of all hardware components used in

has been advanced into it. The presence of any module has been reasoned and accordingly placed, thus contributing to the excellent functioning of the whole. Second, using greatly progressive integrated circuits, using ever-increasing technology, the plan has been successfully implemented.

Therefore, the project was victoriously designed and tested. Single phase automated prevention system based on microcontroller for three phase industrial motors

We can develop this project by computing a GSM modem as a means which we can send an alert in case of breakdown We can even add high voltage equipment with protection circuits. The system can also compute wireless modules such as PLCC, zigbee and RF communication, that can assign alarms remotely.

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