INDUSTRIAL CRISIS CONTROL BY USING ARDUINO

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ABSTRACT

In this project we give the new idea about the automation for machine protection. The main objective of our project is to protect the industrial machines from the crisis like over voltage, under voltage over current, single phasing, etc. Induction motors are mostly used for industrial application .Hence industrial automation is required very accurate operation. The project is mainly based on the Arduino. We use the Arduino for automation purpose .This protection is economical; it is beneficial for all types of industries i.e. small scale industry, mediumscale, and large scale industry.

Now a day AC motors are mostly used for industrial application, some industry are run 24/7 in month that's why they are facing more problems.In this project we are going to use the Arduino, by setting the particular value of voltage and current in the Arduino we protect the motor or machine. Also this project helps to protect the motor when any one of the phase is missing from the three phase.Also the protection from current we use the current sensor and relays are also used for the protection from the over voltage and single phasing.

KEYWORDS- Arduino, LCD, SMPS, Relay, induction motor etc.

INTRODUCTION

A large number of motors are used for domestic purpose as well as industrial application. Sometime these motors are run for a long time and due to the electrical faults windings get heated resulting insulation failure. Frequent maintenance reduces the life of motor. Protection to the motor is necessary to prevent the damage due to abnormal condition. When the supply voltage is lower than voltage drop across the resistance is lower than specified value and motor fails to start. As we know that induction motors are suffering from the different fault like over voltage, under voltage, over current, Single phasing etc.These faults occurs due to variation of input to the motorIt is necessary to protect the induction motor from various faults so that the output and efficiency will be maximum.

SYSTEM DESCRIPTION

Proposed system is as shown in fig. In this system used the three single phase step down transformers which gives the output 5 V by using voltage regulator and this supply is given to the three pins of the Arduino i.e. A0,A1 and A2. Display is connected to the Arduino. Arduino is an open source electronics prototyping platform based on flexible, easy to use hardware and software and 5V supply is given to the display from

controller. So that LCD display displays the all fault conditions.Here 16×2 LCD interfaces with the PIC microcontroller. This type of LCD screen can display 2 lines with 16 characters each From the SMPS 5V supply is directly given to the Arduino kit. From the Arduino Drive circuit is connected to the relay. Transistors and resistors are usedto design the driver circuit.

Table no.1 List of Components

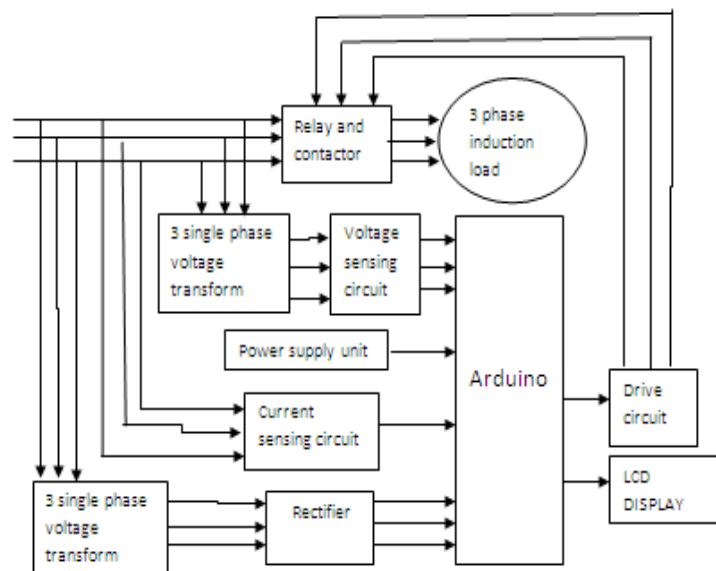| Sr. No.	Particulars
1	UNO Arduino
2	Transformer
3	Connector
4	Indicator
5	LED
6	POT
7	Relay
8	Resistor
9	Current Sensor

SYSTEM DEVELOPMENT

Figure no.1. Protection of 3 Phase Induction Motor by Using Arduino

Above fig shows the block dig protection of the motors from their faults. Now we will see the working of this block dig. For different faults.

WORKING PRINCIPLE

The overall block diagram of three phase induction motor is shown in the above figure.The Arduino is a open source platform. It adoptsRISC (Reduced Instruction Set) as kernel structure,its working excellent than the average 8-bit single chip.The controller is build with ADC (Analog to Digital Converter).and which capable to working less than the 5V signal. The data taken from voltage and current sensing circuit is

transfer to the controller and this data is digital data.As the save or programmed in the controller, the controller compare the data accordingly to limit value.Whenever abnormal situation occurred then it gives the signal to trip the relay via drive circuit and also gives the details on display.

The voltage sensing circuit required 5V supply and which is given to the single phase step down transformer. The output range of voltage sensing circuit is 0V to 5V DC. For under voltage set in the program is less than 180V at that time voltage sensing unit gives the output of 1.25V, similarly over voltage value is greater than 250V and its voltage sensing unit output is 2.25V this value is sensed by Arduino and it gives the signal to the relay.

For the over current fault protection we set the value in the program, The normal condition that is below 25A. Output of the current sensor is bellow 500mV when fault is occurred current becomes greater than 25A, Output of the current sensor above 530mV. It sense by the controller and gives the signal to trip the Relay.

For the single phasing 5V DC is connected to the three pins of the port and as per the command save in the program continuously and check the pins. When any one signal to the pin is absent then gives trip signal to the relay.The abnormal condition is displayed on display and motor will get disconnected from the supply.
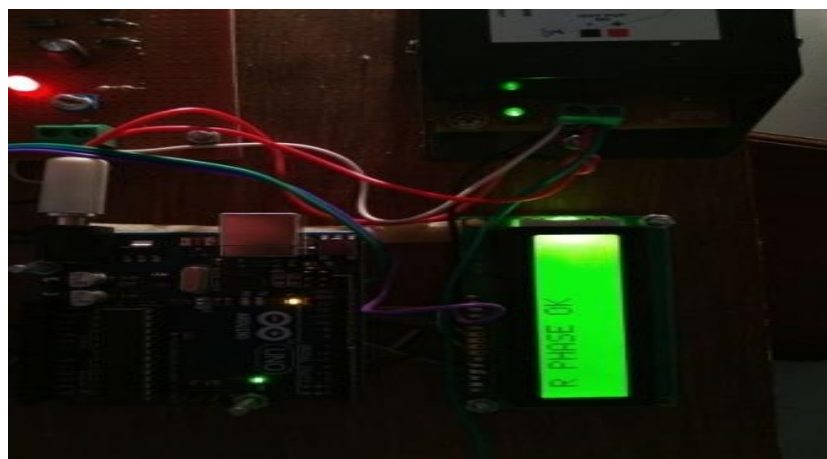
RESULT

Table no.2 Results

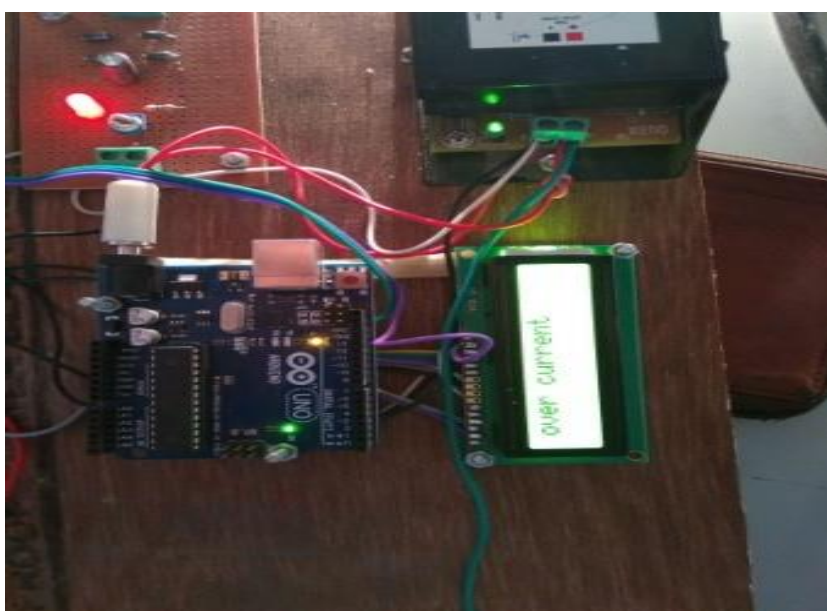| Sr no.	Conditions	At normal condition	At abnormal condition	Output of Arduino
1	Undervoltage	180V	Less than180V	1.25V
2	Overvoltage	Upto 250V	Greater than 250V	2.25V
3	Over current	Upto 25 A	Greater than 25A	530mv
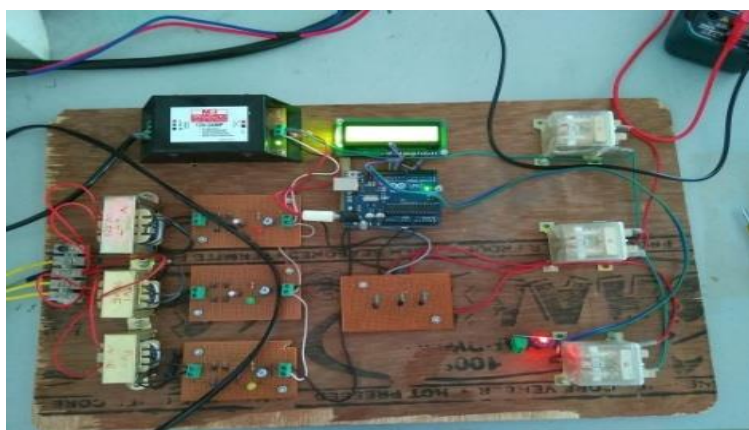
Photograph no.1 Protection of 3 Phase Induction Motor by Using Arduino (Hardware0

Photograph no.2 Single Phasing

Photograph no. 3 Over Voltage

Photograph no. 4 Over Current

CONCLUSION

The system ensures protection against over voltage, over current, under voltage and single phasing etc. It also provides the protection to the industrial machine when the fault occur by using the Arduino and relay.

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