

CONTROLLING AND PERFORMANCE ANALYSIS OF INDUCTION MOTOR USING GSM MODULE

Ankit A. Khant¹, Chhatrajit V. Khachar², Jaydip K. Kandoriya³

Asst.Prof. Ketan M. Solanki⁴.

^{1,2,3} B.E. Student, Department of Electrical Engineering, Dr.Subhash Technical Campus, Junagadh, Gujarat, India

⁴ Assistant Professor, Department of Electrical Engineering, Dr.Subhash Technical Campus, Junagadh, Gujarat, India

Abstract: GSM based motor is able to control the motor from remote place, looking over its operating conditions, it gets feedback from the motor itself. The target here is to control the motor from distant place by mobile and also to get feedback by SMS while it is in ON or OFF condition. It also ensures the safe operation of the motor by detecting the voltage of the source and ensures feedback from system while it is over or under voltage. It can also receive these feedbacks by SMS as GSM network is everywhere around the globe and that's why it is highly convenient. With the help of GSM network to operate motor, it also transfers feedback information through. Also implementation of GSM network is very fruitful because it does not need extra equipment for networking.

Keywords: Induction motor, GSM, controlling, ATMEGA 32 microcontroller, LED, SIM

INTRODUCTION

The "Controlling and Performances Analysis of Induction Motor Using GSM Module" implements the emerging applications of the GSM technology. With GSM networks, a control system has been proposed which acts as an embedded system and it can monitor or control appliances and other devices locally using various peripherals.

It is a very good example of integrated embedded system as all its operations are controlled by the preplanned program inside the microcontroller. Target here is to ON/OFF and speed control of

different kind of motors, the electrical or electronic appliances connected to this system.

System allows user to effectively monitor and control motor via mobile phone by sending commands in form of SMS and receive the status of appliance.

The main concept behind is to receive the sent SMS and process it further as required to perform various operations. Kind of the operation to be performed depends on the nature of the SMS sent and by making necessary changes, operation can be changed or improved. In whole operation, the sent SMS is stored and analyzed from the receiver mobile station and soon the required control signal is generated and later sent to the intermediate hardware will be designed and its nature will be according to command received from sent message.

A particular kind of GSM model is the soul of whole working operation. The sent message containing command motions the process later to perform the required task accordingly. The system here provides method to control the motor from a remote distance with the help of microcontroller and the program.

BLOCK DIAGRAM

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 and controls the motor depending on the command given through the SMS.

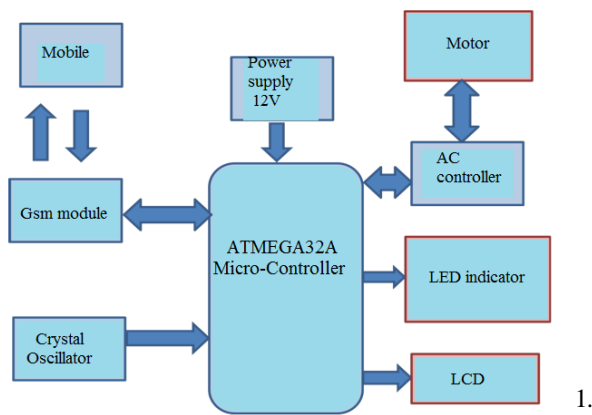


Fig.1 Block diagram

WORKING

Whole operation is dependent on GSM module and microcontroller. Each component has its own characteristics and operation. Voltages are reduced to 12V ac and supplied to the controlling device, microcontroller. The operation happens to be dependent on many other components such as LCD, AC voltage controller and mobile. Command is sent from the mobile to the GSM module.

The message contains some commands related to controlling like MOTOR ON, SPEED ++2 etc. On the other hand we can even set numerical values as command. These commands are given to the microcontroller for execution. It executes that commands for performing the controlling action. ATMEL software is helpful in developing the program which is implemented in the system. The LCD implemented in the system display sent message from mobile and also displays current status of motor speed.

MAIN COMPONENTS

- 1 GSM module
- 2 Atmega32 Microcontroller
- 3 Ac motor
- 4 Triac BT136

1. GSM MODULE M590

One of the advanced system of communication, GSM stands is elaborated as “Global Service for Mobile Communication”. It is widely used mobile communication system in comparison with its counterpart CDMA system. GSM is an open and

digital cellular technology for transmitting mobile voice and data services. It operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

Many GSM module happened to have GPRS characteristics that permit communication of data over TCP/IP. Various systems and methods are also available for transmission of data using GSM module.

2. ATMEGA 32 MICROCONTROLLER

ATmega 32 is one of the unique 8-bit high performance microcontroller and it belongs of Atmel’s Mega AVR family. They are based on enhanced RISC (Reduced Instruction Set Computing) architecture with around 131 extremely powerful instructions. Most of the instructions execute in one machine cycle.

3. AC MOTOR

As soon as the single phase ac supply is given to the stator winding of the motor, the alternating current starts flowing through the main winding of motor. The flowing alternating current produces main flux or alternating flux which is later linked with the rotor conductors and hence cutting it. Faraday’s law of electromagnetic induction suggests that emf gets induced in the rotor in these situations. Current starts flowing in the rotor as the rotor circuit is closed one. This current is called as the rotor current. The rotor current have the ability to produce its own flux called rotor flux. Induction principle plays an important role in the operation of the motor and hence it is known as induction motor.

4) Triac Bt136

With formal name being bidirectional triode thyristor or bilateral triode thyristor, it provides variance in the voltage and current. It is analogous to a relay in a way that a small voltage and current can control a very much larger voltage and current.

Triac Bt136, the semiconductor device is widely used in power control and switching applications of various areas including industrial as well as domestic. The power control system is helpful in controlling the distribution level of AC or DC. This kind of power control system can be used to switch power to

appliances manually or when temperature or light levels go beyond a preset level.

WORKING STEPS FOR THE SYSTEM

The connections for the system can be given as per the below figure which includes Triac Bt136, Crystal oscillator, capacitor, LCD display, relay, IC, GSM Module, resistor LED and transistor.

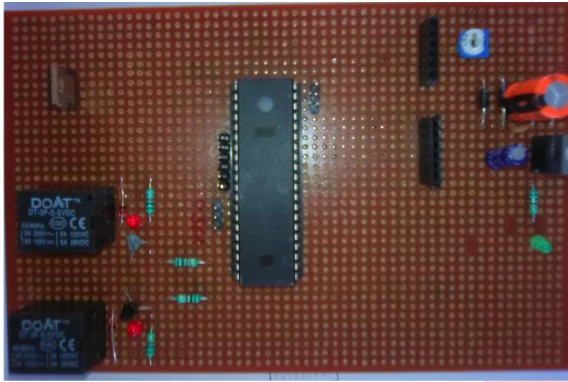


Fig. 2 Connection of components

Fig-3 represents the connection of components and the whole system is implemented on the printed circuit board.

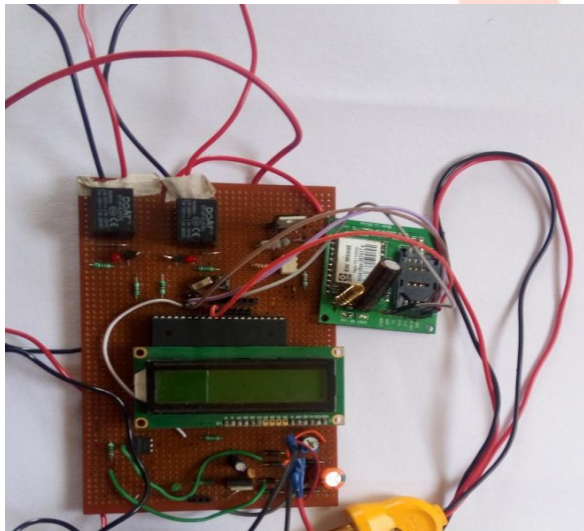


Fig. 3 Display shows the sent message

ADVANTAGES

- Possible remote operation
- Controller is not required.
- More useful for the farmer and domestic areas.
- Remote controlled

APPLICATION

- Not necessary to carry separate remote.
- It can be implemented in large pumps as well.
- Useful in college laboratories.
- Useful to the farmers and domestic users

CONCLUSION

“Controlling and Performances Analysis of Induction Motor Using GSM Module” can be helpful in controlling the three phase induction motor from a remote distance and we can see the speed of it on LED display.

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