

Speed Control and Monitoring of Single Phase Induction Motor using Zigbee: a Review

Aman Bangale¹

Shubham Chaudhari²

Pallavi Gajbhiye³

Shubhangini Nikose⁴

Jagruati Gowardhan⁵

Ankush Dharkar⁶

Assistant Professor

**Department of Electrical Engineering
JD College of Engineering and Management, Nagpur, Maharashtra,
India.**

Abstract:- In the world of industrial technology as advancing leading to the efficient use of tools in customized way leads to Automation. Induction motor plays an important role in the industry with smart controls. This paper is a part of wireless automation, to control the speed of the motor and its monitoring with Zigbee Protocol. The communication between receiver and transmitter can be made by Zigbee. A speed control system using a stator voltage control method and monitoring the parameter such as temperature, current, voltage and speed of induction motor with wireless technology is proposed.

method. The speed of induction motor can be varied slightly by varying the applied voltage to stator winding. The terminal voltage across the stator winding of the motor is varied for obtaining the desired speed by controlling firing angle of semiconductor power device such as a Triac. Monitoring parameter of induction motor is a fast up and upcoming technology for the detection of fault initially. A module of transducer and sensors monitor the parameter of induction motor and transmit the data through Zigbee communication protocol.

Keywords:- Zigbee protocol, LCD, Motor Drive, Controllers, Sensors.

Introduction:- In global competitive world wireless technology becomes more necessary. Induction motor is widely using commercial, industrial areas. The advantages of using single phase induction motor is having low manufacturing cost, high efficiency and robust in construction. The speed of the single phase induction motor is controlled by various methods such as pole changing method, stator voltage control method, supply frequency control method and rotor resistance control

Literature Survey:-

(1) Zigbee Based Parameter Monitoring and Controlling System For Three Phase System

The whole arrangement is divided into two part transmitter and receiver. Transmitter and sensors are used to monitor parameter of induction motor and transmit data through Zigbee protocol to display parameter and motor on laptop or computer screen. In transmitter mainly part used sensors transducer and microcontroller which lead the current, voltage, temperature and speed of induction motor at any nearby distance.

(2) Zigbee Based Parameter Monitoring System of Induction Motor

The wireless system of any network not only reduce overall cost but also provided flexibility in term of location. The main advantages of Zigbee is it able to make mesh network for remote system two part essential (a) transmitter (b) receiver. In transmitter part various sensor and transducer used for parameter to be measure. The monitoring data is simultaneously feed to the microcontroller.

(3) Speed Control of Induction Motor Using Zigbee Wireless Technology

This paper is give idea about wireless speed control of induction motor as the speed can virial by various method one of which using stator voltage control method. Zigbee typically used low rated data, long better life. In transmitting section microcontroller is used to read the key. In receiver section receive the command from transmitter and send data to microcontroller. The microcontroller is used to determine alpha angle and trigger track to speed control of induction motor. In these way the are ON and OFF and speed can be control. This is simple transmit the data and control of speed.

(4) Zigbee based parameter monitoring and controlling

The proposal system consist of single phase induction motor. Current sensor, voltage sensor, temperature sensor and relay are used to controlling the system. The Zigbee wireless technology used, which is less in power consumption the data rate is 250 kbps. Operating in 2.4GHz frequency. The software used is the flash magic GS PC tool. It is used for programming flash loose microcontroller from NXP via serial of Ethernet protocol. Flash magic software is open source software which installed in PC. All the parameter monitoring and controlling system are done by using these software.

Methodology:-

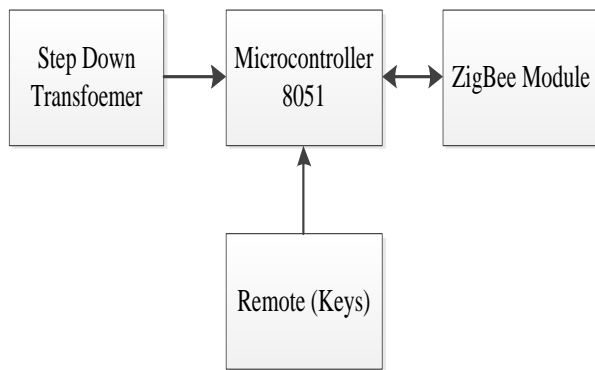


Fig 1:- Block diagram of Zigbee Transmitter

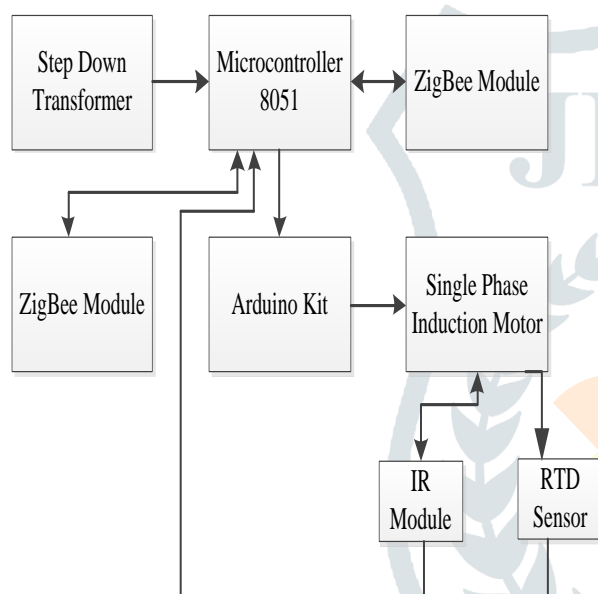


Fig 2:- Block diagram of Zigbee Receiver

In this method transmitter and receiver are separate parts are used. Which is kept at a far certain distance from each other. As soon as the switch are pushed accordingly required then controller get the command and transmit to the Zigbee. The LCD which is connected across the controller represents or shows switches. The output of transmitter side Zigbee is read by the Zigbee on the receiving side. As per the information given by the Zigbee the controller will behave. The motor drive is used to driven the motor. The single phase ac supply of 230V is feed to the motor drive. The sensor like RTD(resistance temperature detector) and speed measuring sensor (SMS)(sensor) are installed in near by the induction motor. The RTD is used to detect the temperature of motor and SMS sensor

are sense the speed of motor. The all resultant parameter will shows the receiving side LCD.

Results and Conclusion:-

This paper concerned on the experimental studies on simple motor load for speed control using wireless Technology through the microcontroller. The experiment is conducted by placing motor at a distance of about 20-25 meters and tested the motor to obtain various speeds by pressing the different keys in the keypad. Here t_{ON} is maintained constant and t_{OFF} is varied accordingly.

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