WIRELESS CONTROL OF THREE PHASE INDUCTION MOTOR

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ABSTRACT

The rapid growth of industry and advancement of technology has resulted in reduction of human efforts. Machines are playing an important role in our life. The induction motors are widely used in largely power driven home appliances, agricultural and industrial applications. Induction motors are largely used because of its advantages such as simple and rugged design, low cost, low maintenance. The wireless control technology is simple and less maintenance. The main aim of this project is to design wireless technology that can be used to control the three phase induction motor for required applications such as ON, OFF, FORWARD and REVERSE DIRECTION. In this project, transmitter and receiver are used to control the specified applications. The wireless control technology is simple and less maintenance.

KEYWORDS: Induction motor, Transmitter, Receiver and Wireless technology.

INTRODUCTION

In the evolution of electrical technology, the dc motors are widely used in different industrial applications. After the invention of ac motors especially ac induction motors the view of industry become changed due to the wide advantage of induction motors. An induction motor has two main parts such as stationary part and rotating part. Two parts are interlinked by mutual induction that is transformer principle. An induction motor is also known as rotating transformer. The main advantages of the three phase induction motors are self-starting, rugged in construction, good power factor and low cost. Using wireless technologies in industrial and factory automation is very attractive for many reasons. The wireless way of communicating makes plant setup and modification easier, cheaper, and more flexible. It reduces human efforts. Furthermore, tasks like machine diagnosis and maintenance can be greatly simplified by equipping the maintenance personnel with wireless terminals. In many factory and automation applications, the communication needs are traditionally served by wired technologies. These communication systems have been specifically designed to meet the stringent real-time and reliability requirements found in many industrial applications.

EXISTING METHOD

Three phase induction motor is controlled by GSM through IOT and Wi-Fi network. The three phase induction motor is monitored by the microcontroller and the condition of the motor is displayed in the smart LCD display. The condition of the motor is send to the specified mobile number that number is added in the microcontroller program to send the SMS through GSM. After The controller receives the SMS, the controller ON or OFF the induction motor by using IOT.
PROPOSED METHOD

In proposed method, the three phase induction motor is controlled by using wireless technology. The transmitter is used to send the signals to the receiver for the specified actions such as ON, OFF, FORWARD and REVERSE direction. The receiver receives the signals from the transmitter the specified action to be performed. The relay coil is energized by the transistor which is connected in the receiver. The energized relay coil is operated the contactor to run the motor for the specified action.

POWER SUPPLY POWER SUPPLY

WORKING PRINCIPLE:

The TX-Coil is energized when the power supply is given to the transmitter which is used to send the specified actions such as ON, OFF, FORWARD and REVERSE direction through the antenna. The receiver receives the signals from the transmitter and the specified actions take place. The output of the receiver is connected to the 5v relay through diode. IN4007 is a PN junction rectifier diode. These types of diodes allow only the flow of electrical current in one direction only. If the forward direction is our action, the relay connected in that circuit is closed, remaining circuits are open. The motor run in forward direction by the contactor which is connected between the relay and motor. In reverse direction, the two phases of the three phase induction motor are interchanged in the contactor. It is used to eliminate the manual inter-changing of the three phase induction motor. It is reduced the human effort and easy to operate the reverse direction of the motor.

HARDWARE CONFIGURATIONS
POWER SUPPLY:

The transmitter, receiver and other components in the circuit required 5 volt DC (or) 12 volt DC. But the main line voltage is 230 volt AC. So the step down transformer is used to reduce the small amount of voltage. The output voltage from the transformer is AC voltage. The rectifier is used to convert the AC voltage into DC voltage. In this conversion, power factor is reduced which is improved by the capacitor. The capacitor is also used to remove the ripple in output voltage and act as a filter circuit. The voltage regulator LM 7805 and LM 7812 is used.

![Diagram of LM 7805 Regulated Power Supply Circuit](image)

FIG: LM 7805 REGULATED POWER SUPPLY CIRCUIT DIAGRAM

TRANSMITTER:

The transmitter is an electronic device used in the telecommunications to produce ratio waves in order to transmit or send data with aid of an antenna. This wireless communication may be accomplished through optical communication or through the ratio frequency communication. The TX-Coil is present in the transmitter circuit. The coil is energized when the power supply is given to the transmitter which is used to send the specified actions such as ON, OFF, FORWARD and REVERSE direction through the antenna.

RECEIVER:

The receiver is also an electronic device which is opposite of the transmitter. The receiver receives the signals through antenna and sends it to circuit. Thereceiver have a separate power source. Output of the receiver is connected to the 5v relay through diode. IN4007 is a PN junction rectifier diode. These types of diodes allow only the flow of electrical current in one direction only.
CONTROL CIRCUIT:

RELAY:

A relay is an electromagnetic switch that is used to turn on and turn off a circuit by a low power signal. The pins are coil 1, coil 2, COM(Common), NC(Normally close), NO(Normally open). Relays control one electrical circuit by opening and closing contacts in another circuit. The 5 volt relay is connected to the receiver. The specified actions performed by the corresponding relay close the circuit.

![5volt RELAY and SYMBOL OF THE 5V RELAY](image)

FIG: 5volt RELAY and SYMBOL OF THE 5V RELAY

CONTACTOR:

A contactor is an electrically-controlled switch used for switching an electrical power circuit. A contactor is typically controlled by a circuit which has a much lower power level than the switched circuit, such as a 24 volt coil electromagnet controlling a 230 volt motor switch. When current passes through the electromagnet, a magnetic field is produced, which attracts the moving core of the contactor. The force developed by the electromagnet holds the moving and fixed contacts together. When the contactor coil is de-energized, gravity or spring returns the electromagnet core to its initial position and opens the contacts.

![THREE PHASE CONTACTOR](image)

FIG: THREE PHASE CONTACTOR
CONCLUSION:

In this paper, three phase induction motor is controlled by using wireless technology. The RF transmitter and receiver is used to sends the signal to activate the specified actions such as ON, OFF, FORWARD and REVERSE direction. The wireless technology is simple when compared to the IOT. In this proposed system, reverse direction of the three phase induction motor can be controlled automatically. There is no need of human efforts. It has low power consumption and Cost is low.

REFERENCES:


