Embedded system integrated into a wireless sensing element networking online dynamic torque and potency observation in induction motor

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I. ABSTRACT

The planned system is intended to observe the force and potency in noninvasive manner and additionally for getting a lot of accuracy and to plot typical potency-versus-load curves by integration embedded system into wireless detector for deed electrical signals from the motor and acting native process for force and efficiency estimation. The worth calculated by embedded system transmitted to watching unit through wireless detector network. At the bottom unit numerous motors will be monitored in real time. Analysis of induction motor is far essential to seek out out utilization index of a motor for higher performance. After we analyzing associate potency of an induction motor we want to amass several parameters like voltage, current, KW, Power issue, speed, force from motors. All the higher than said parameters should be non-heritable at quickest speed to gift a direct potency indication. After we analyze these parameters we are able to simply establish whether the motor is appropriate for specific operations or not, will be known.

Keywords: Embedded system, Induction motor, Torque, Efficiency, Wireless Sensor Network

II. INTRODUCTION

The proposed system is designed to monitor the torque and efficiency in noninvasive manner and also for obtaining more accuracy and to plot typical efficiency-versus-load curves. This is done by connecting embedded system into wireless sensor for obtaining electrical signals from the motor and to perform the process for torque and efficiency estimation. The value calculated by embedded system transmitted to monitoring unit through wireless sensor network. At the bottom unit varied motors may be monitored in real time. Analysis of induction motor is far essential to search out utilization index of a motor for higher performance. When we associate degree potency of an induction motor we had like to analyze several parameters like voltage, current, KW, Power factor, speed, torque from motors. All the on top of same parameters should be non-heritable at quickest speed to gift an instant potency indication. When we analyze these parameters we will establish whether the motor is appropriate or not. There are lot of methods to measure efficiency in induction motor such on dynamometer, duplicate machines, and equivalent circuit approaches. Wireless sensor networks (WSNs) provide self-organization and native processing capability. Therefore, these networks appear as a flexible and cheap solution for building industrial monitoring and control systems. the AGT is additionally wont to measure efficiency during a much less invasive manner.

In this study, the AGT method was used for the estimation of the motor shaft torque and efficiency, because it's the noninvasive method for determining torque and efficiency that has less uncertainty . Basically monitoring and fault detection in industrial systems are performed in an manner of offline or through networks called wired. The installation of cables and sensors usually features a higher cost than the value of the sensors themselves . In aadition to the high cost, the wired approach offers mimimum flexibility, making the network as deployment and maintenance a harder process. In this context, wireless networks present variety of benefits compared to wired networks as, for instance , the convenience and speed of deployment

and maintenance, low cost.

III. THEORETICAL BACKGROUND

In our project, we are getting to use all sort of sensing system. The sensors are going to be connected to signal conditioning circuits to convert signals suitable for interfacing with embedded controller. The state of art PIC microcontroller manufactured by microchip will be used in our project to satisfy the need of software and hardware .

A.MP LAB IDE

A development system for embedded controllers could also be a system of programs running on a PC to help write, edit, correct and program code. It runs on a PC and contains all the data needed to deploy embedded systems applications. The quality tasks for developing associate embedded controller application are:
\• Create the high level style. From the options and performance desired, decide that PIC micro or DSPIC device is best suited to the appliance, then style the associated hardware electronic equipment.
• Compile, assemble and link the software package exploitation in the program and/or compiler and linker to convert your code into "ones and zeroes" – computer code for the PIC microcontroller.

B.VISUAL BASICS

Visual basic is ruled by an occurrence processor. Nothing happens till an occurrence is detected. Once an occurrence is detected, the code equivalent to that event is dead. It may be a tool that enables you to develop windows .

C. LCD

Liquid crystal show (LCD) is show device that is employed to show the parameters of motor. LCD's square measure utilized in similar applications wherever led's square measure used. These applications will measure the show of numeric and alphabetical characters in matrix and segmental displays.

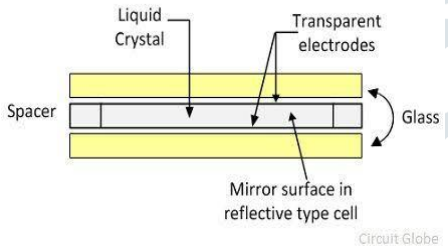


Fig1 : Structure of LCD

D.CURRENT SENSOR

Current sensor is used to sense this flow of motor. Current sensor work like as current transformer and it is central to all or any of the ac power transducers is the measurement of current.

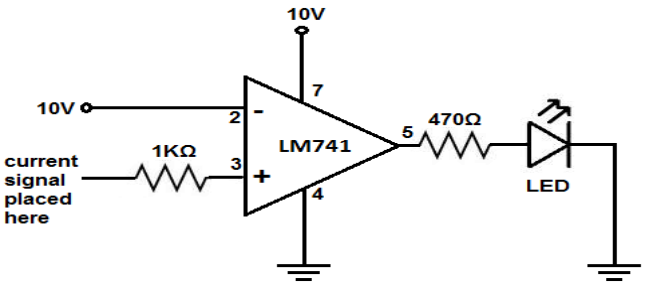


Fig.2 : Structure of Current sensor

E. VOLTAGE SENSOR

It is a tool that detects the voltage changes within the environment and send the information to other processor. It converts the voltage into physical signal proportional to the physical signal proportional to the voltage.

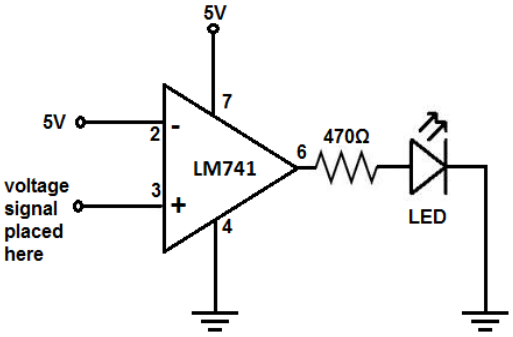


Fig.3 : Structure of Voltage sensor

F. SPEED SENSOR

It is a form of tachometer. It is a tool called sender used for measuring the speed of a motor. It consists of a toothed ring and pickup.

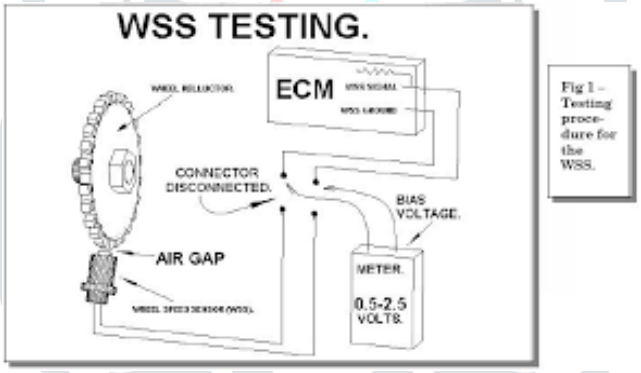


Fig.4 : Structure of Speed sensor

G. PIC MICROCONTROLLER16F877A

PIC has 40 pins. PIC16F877A could also be a PIC microcontroller and is usually employed in embedded projects like home automation system, bank security system, etc. It uses two sorts of timers namely eight bit and 16 bit.

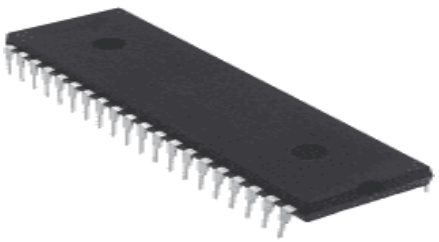


Fig.5 : Structure of PIC Microcontroller16F877A

H.WIRELESS SENSOR NETWORK

It is a bunch of dedicated sensors for monitoring and recording the physical conditions of the environment. It's

node called sensor node that is attached with sensors which sense and act as a transceiver to speak with other nodes.

Fig.6 : Structure of Wireless Sensor Network

I.INDUCTION MOTORS

A three-phase induction motor that converts the voltage into an energy and it is supplied to different variety of loads. They will be classified as synchronous, single phase, three-phase, and special purpose motors.

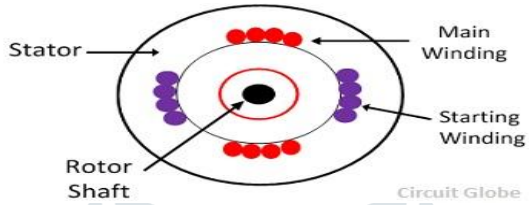
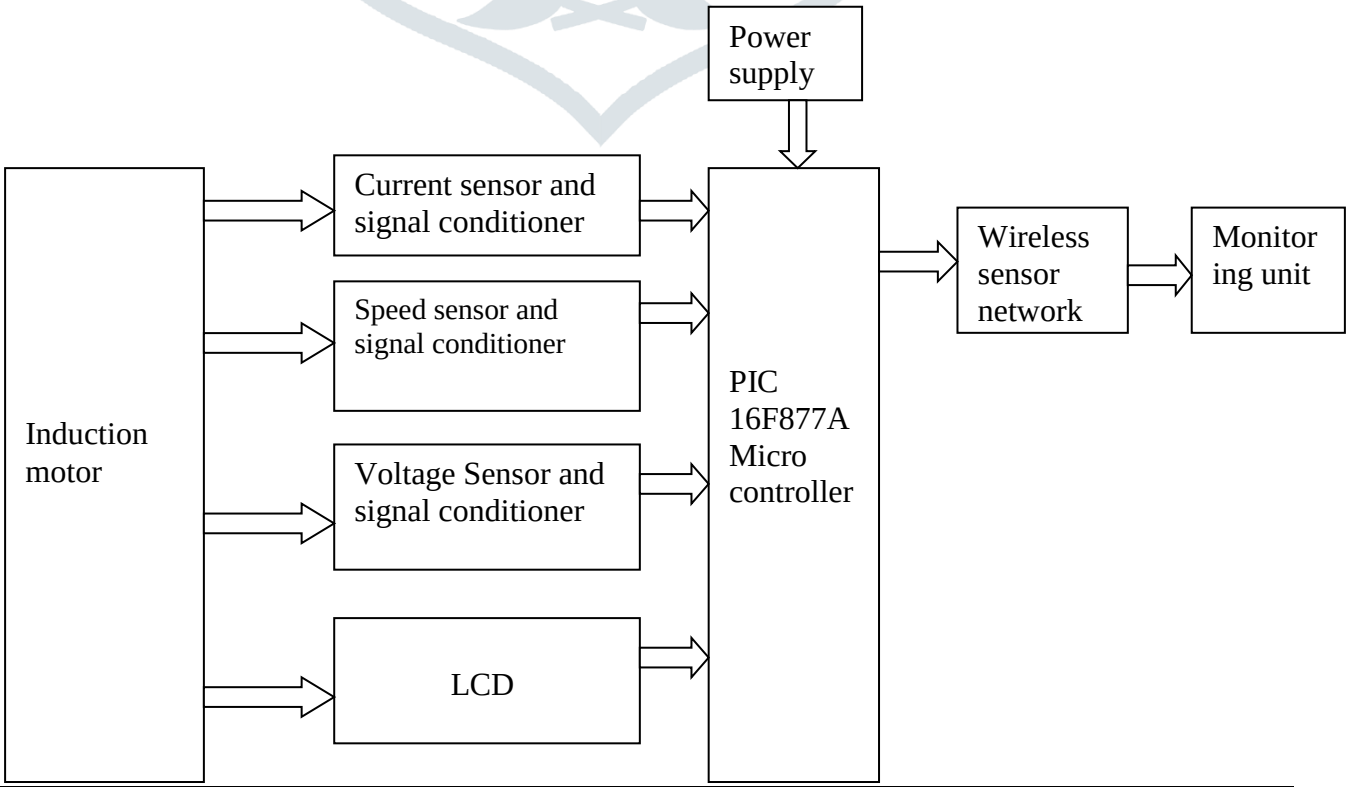


Fig.7 : Structure of Induction motor

IV.PROPOSED BLOCK DIAGRAM

In this system, the AGT method is employed for the estimation of the motor shaft torque and efficiency and it is the noninvasive manner for determining the torque and efficiency that less uncertainaity measures the voltage and current taken by the three-phase induction motor, and therefore, the torque is measured. The speed of the rotor is measured by using the sped sensor. Then the efficiency is estimated with these two obtained values and transmitted to the sensor. Finally less efficient motor are detected and removed immediately.



IV. RESULT AND DISCUSSION

For this project in clinical trial we are implementing the net dynamic torque and efficiency monitoring in induction motors. We used the AGT method to estimate shaft torque, and motor efficiency. The calculations for estimating the target values are done locally so transmitted to a monitoring base unit through an IEEE 802.15.4WSN. Experimental tests were performed to research the torque values obtained by the system, so compared with torque values supported the workbench dynamic model.

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