WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Monitoring Parameters of 3 Phase Motor

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ABSTRACT :

This paper focuses on the remote monitoring and control of numerous three-phase induction motors and other electronic gadgets through IOT (Internet of Things). The sensor and transducer modules are configured to supervise measurements for the speed, temperature, current, and voltage of the induction motor and transmit the same to the office. on the server, where the parameters are shown.

The aim is to develop and use IoT technology to monitor and diagnose the condition of asynchronous motors by recording important performance signals. The pr oposed system includes an IoTbased platform for collection and processing of asynchronous motors. The system also provides automatic and manual controls to s top or start asynchronous motors to prevent server port failure. Implementation of this program will ensure the production of the machine through continuous mo nitoring to prevent damage and determine preventive measures.

INTRODUCTION :

In today's industrial economy, machines and electromechanical systems are mostly powered by electric motors. Before the invention of AC induction m otors, DC motors were widely used to meet industrial requirements. Industrial automation with the creation of AC induction motors is often used succes sfully due to their more efficient properties than DC motors. The main advantage of asynchronous motors is that their rotors are easy to use; This means low cost, durability and low maintenance. By studying the structure and operation of asynchronous motors, it can be seen that the main faults of asynch ronous motors can be divided into the following categories:
1 Electrical faults: due to the presence of equal amount of electricity or current, one phase, current. undervoltage, overvoltage, overload etc. It is caused by external moisture and machine vibration. For this reason, the asynchronous motor must be monitored for uninterrupted operation and the situation must be predicted in advance to avoid malfunctions. The Internet of Things (Internet of Things) has received much attention and is expected to benefit many applications The new
Internet of Things
concept helps achieve business automation through remote access. In the Internet of Things, all devices or devices that make up the system can commu nicate with other devices or systems through the platform . Thus, improved communication can be achieved through "systems of systems". So this inclu des relevant information, statistics, logs and
Many other information are not specific to products used to improve their performance which will help the business
achieve, manage and promote better results.

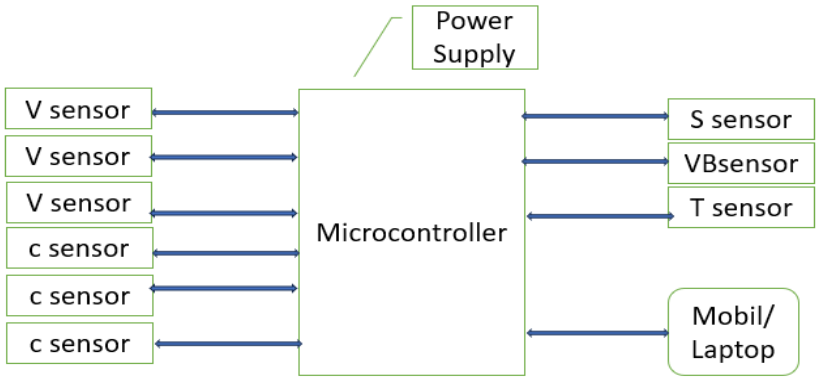
LITRARURE SURVEY

- A non-intrusive and in-service motor efficiency estimation method was proposed in 2008, where the efficiency estimation was done using Air Gap torque method. Only motor terminal quantities and nameplate details, with special considerations of motor condition monitoring requirements are required. Preinstalled potential transformers and current transformers for protection purpose. But there is requirement of continuous monitoring of motor parameter on site.
- A low cost wireless sensor network for in-field operation monitoring of induction motor was proposed for high range motors . Where a smart switch system was proposed. Smart switch has a data logger that is used to monitor operation condition and automatically manages the motor winding connection mode. But this system is limited to small area, long range communication is not possible.
- SCADA programs are utilized for developing user interfaces. However, SCADA programs do not provide adaptability to users because of their expensive libraries

- RF, ZigBee and Bluetooth technologies are widely preferred in easy-to-use applications due to the short range between the sender and the receiver, and the small volumes of data transferred. The ZigBee, RF and Bluetooth wireless communication techniques are generally restricted to simple applications because of their slow communication speeds, distances and data security.
- There are some successful examples such as PLC SCADA based fault detection and protection system is implemented which provides the web based user interface for remote control and monitoring was developed and presented online to users but the main disadvantage is cost this system are more costlier
- Bacterial foraging algorithm along with a non-intrusive method is used for the efficiency estimation in . But the system becomes lengthier in calculations.

BLOCK DIAGRAM AND SYSTEM DESCRIPTION

All of the above examples of monitoring and controlling various business applications have some limitations in terms of communication length, data collection, integrity, and cost. Therefore, the strict requirement of the system is to monitor and manage business applications using reliable methods to ensure long distance communication. This paper uses the new concept of Internet of Things to design and implement effective monitoring and control of asynchronous motors. First, the different sensors used in engines help detect physical conditions and environmental anomalies under which they should be used Second, WiFi based communication between users and business applications needs to be monitored and managed without remote restrictions. environment also improved. Additionally, the management of these business applications can be done via Wi-Fi enabled modems.



1 Block Diagram

The proposed system is having two parts. First is monitoring of Industrial applications and second includes controlling them. first part of monitoring is focused on Industrial applications that will be continuously monitored through a set of sensors as shown in architecture. A set of sensors is place at industry that collects the relevant data from various industrial applications to determine whether they are working well under certain threshold conditions. The sensed data from these sensors is fed to the controlling device

basically an microcontroller. Now Wi-Fi module ESP8266 is connected to Internet via Microcontroller.

A sophisticated Program have been running in the Microcontroller Module which help this device connected to the Arduino cloud Server via Internet.

The Program in the Microcontroller will first On the Wi-Fi Module and help him to connect to internet.

Then it will "ON" the 3 Phase Induction Motor via Contactor and Relay through Sever by this the Motor get ON. Now microcontroller is ready to sense the data and also to send it to server. Thus it will sense the data first through the sensors one by one and send it to Server. At the arduino cloud server, data will be shown in Graphical manner where we can visualize all the parameter of IM motor in remote device.

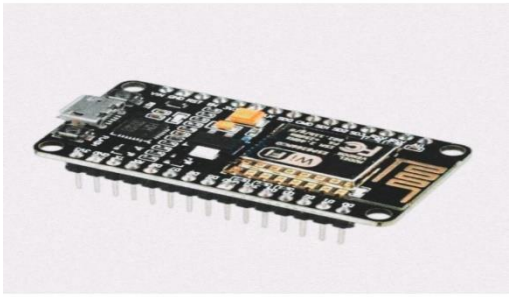
HARDWARE SELECTION

ESP8266 Wi-Fi Module

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes

pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi-ability as a Wi-Fi Shield offers (and that just out of the ESP8266 module is an extremely cost effective board with a huge, and ever growing, community. This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth coexistence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts. There is an almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support. In the

Documents section below you will find many resources to aid you in using the ESP8266, even instructions on how to transforming this module into an IoT (Internet of Things) solution



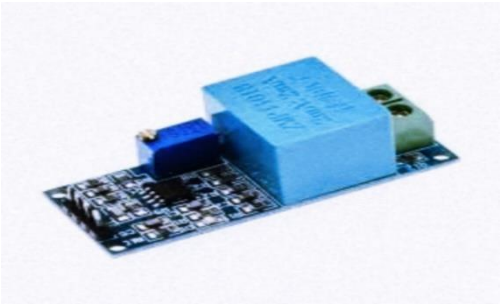
ESP8266 Wi-Fi Module

Induction Motor

Induction Motor

Voltage Sensor

The voltage sensor being used here is implemented using 3 transformers. Since we have to monitor the 3 phase supply (R, Y, B) provided to various industrial applications in industry so we are connecting these 3 transformers which are 230V-12V step-down voltage transformers to corresponding 3 phases of supply. Each transformer having a 230V at its primary winding and delivers a step-down voltage of 12V at its secondary winding. The voltage at secondary winding of each transformer is then rectified to a dc voltage of 5V using 3 Full wave bridge rectifiers and current limiting resistors and fed to the 3 I/O pins of microcontroller system to boot directly into the graphical user interface (GUI) for easy interaction with the information display system.

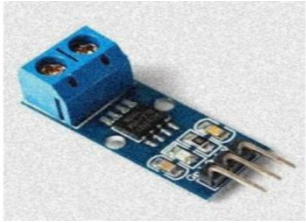


Voltage Sensor

Speed sensor

Speed Sensor

Cureent sensor



Current Sensor

Temprature sensor

Temprature Sensor

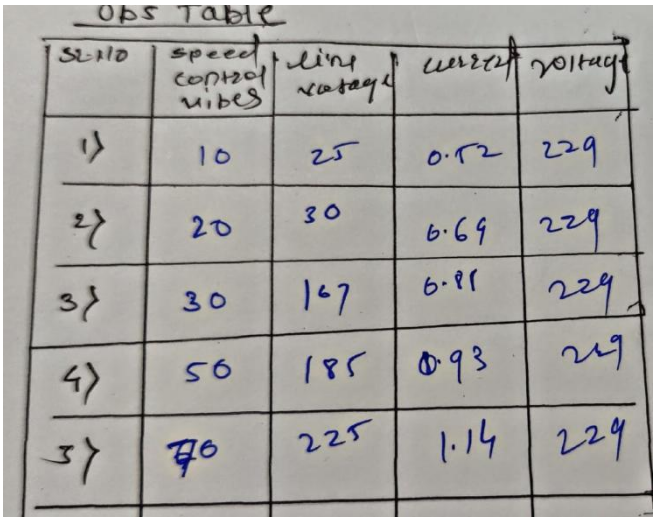
Contactor

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. A basic Contactor s shown in Figure8

Contactor

RESULT AND DISCUSSION

The result of speed control in rpm, motor input power in Watt, live current of motor and live supply voltage of motor is get display on LCD display and application like phone, pc etc through the online mode as shown in observation table.



Obs Table

Sl.no	speed control vibes	line voltage	current	voltage
1)	10	25	0.52	229
2)	20	30	6.69	229
3)	30	167	6.91	229
4)	50	185	0.93	229
5)	70	225	1.14	229

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