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Result Paper On IOT Based Induction Motor Parameters Monitoring And Controlling.

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Abstract: Todays application of single phase induction motor is increased due to it simple operation and availability of single phase supply in every place. The single phase motor available in different rating, Different speed and application. The single induction motor is used for particular operation need to protect motor and need to control parameters of single phase induction motor and monitor this data to user operator. This is possible with help of IOT in this project single phase induction motor monitoring and control is done through IOT base system. In this project the parameters of the motor is continuously recorded and send to the user operator through the cloud internet to end user application module. The automatic protection is also provided to motor.

***Index Terms*–single phase motor ,IOT,monitoring, speed control.**

I. INTRODUCTION

The application single phase induction motor is common in a days so the controlling of single phase induction motor and monitoring is very important this done through IOT and protection system. Internet of things used to monitor a data through the online mode through the cloud. Monitoring like speed, humidity, temperature, overloading, overcurrent, overvoltage. Over current and overloading is measure by overcurrent relay, temperature by temperature sensor, humidity by humidity sensor, speed by digital tachometer, overvoltage by overvoltage relay. This recorded data converted from analog to digital signals and finally given to IOT system to send to user operator.In protection scheme the motor need to be protect from the abnormal conditions, like over current relay protect motor from fault current, over voltage condition of motor protected by overvoltage relay, increased in temperature value above the rated value and over load condition from rated value protected by temperature sensor relay. The most of the application of singlephase induction motor need speed control this is possible thorough cyclo-converter. In cycloconverter frequency of supply get change this control the speed of motor.

II. SYSTEM DEVELOPMENT

The system consists of Oscillator unit, Reset circuit. power supply unit, IR sensor, Speed Sensor, ATMEL AVR microcontroller, I2C communication With Node MCU & LCD DISPLAY 16X2.

Block Diagram:

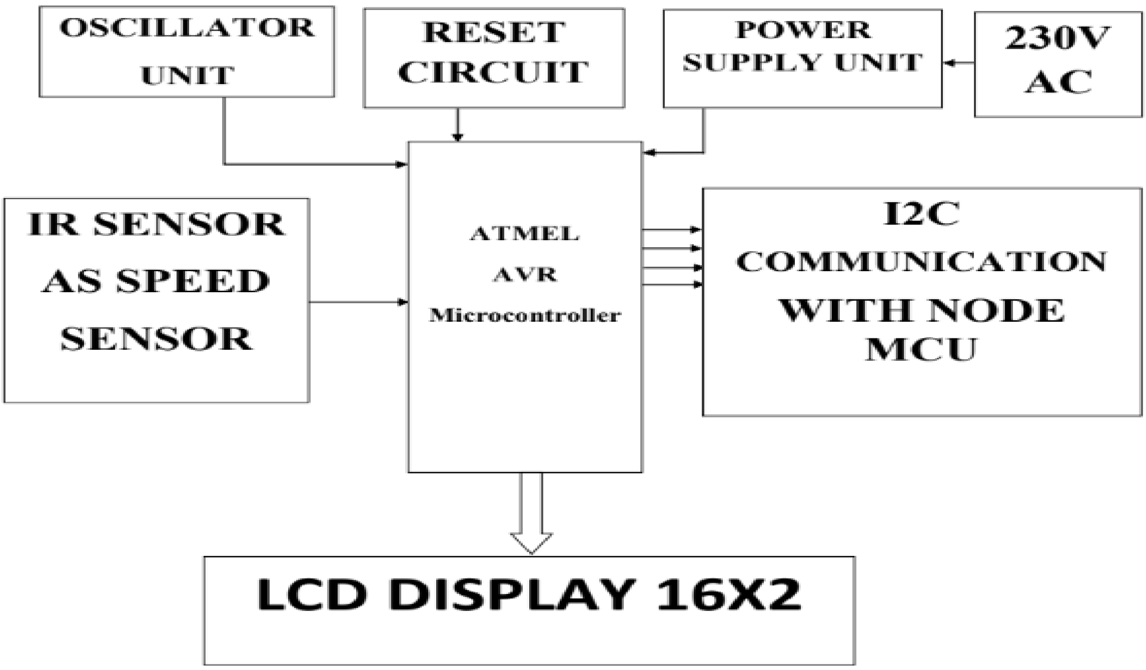

Fig.1 Block Diagram of System

1. **Power supply unit:** The power supply unit provide power to digital equipments connected in system, which contain 230 volt/ 12 volt transformer, which step-down voltage from 230 volt to 12 volt AC. The output of transformer connected to rectifier unit which convert AC to DC by rectification process. This DC output filter by filtering process and finally given to appliances which operated on Regulated DC.

2. **IR sensor:** IR sensor work as speed sensor of motor, Which sense the speed of motor and convert this signal to digital signals and finally gives to the Microcontroller. The microcontroller process the speed data and gives to IC communication with Node MCU and LCD display 16*2 dimension.
3. **Oscillator unit:** Provide the operating crystalline frequency to the microcontroller for this operation that in Mhz
4. **LCD display 16*2:** this is Liquid crystal display which shows data or parameters of the single phase induction motor
5. **Cyclo-converter:** It is consist of power semiconductor devices and This will change the frequency from input to output such as low frequency and high frequency **as** per the requirement.

Working of system: The single phase motor is connected to supply through the Cyclo-converter. The single phase cyclo- converter is basically used for speed control of AC motor. The cyclo-converter is used for changing the supply frequency of motor and according to the speed formula of motor N=120f/P that means, Speed is directly proportional to frequency. When speed required is more the increased the frequency of cyclo-converter and to decreased the speed of motor reduced the frequency by cyclo-converter. The cyclo-converter consists of power semiconductor devices like MOSFET, BJT. IJBT etc. This method control the motor speed above the rated speed and below the rated speed.

This controlled speed signals are recorded by speed sensor and given to microcontroller for the data processing, microcontroller gives this data to Liquid crystal display and I2C communication With Node MCU. This LCD display of size 16*2 shows live speed of motor in RPM and power input to the motor in Kilowatt.

I2C communication With Node MCU takes signals from the Microcontroller like speed, power in digital form and send to the cloud. The user or receiver used the some application to take this signals from the cloud like mobile, PC & laptop.

III. RESULTS 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

Observation Table:

Sr.No	Speed Control (Offline) In Percentage	Live Motor (Wattage)	Current (Amp)	Voltage (Volt)
1	10	180	0.50	228
2	20	230	0.85	228
3	30	260	1.10	228
4	40	290	1.50	229
5	50	320	1.90	229
6	70	360	2.10	229
7	90	400	2.50	230
8	100	430	2.85	230

For the 10% of speed control motor takes 180 wattage from the supply and 0.50 amp current with voltage 228 volt.
For the 20% of speed control motor takes 230 wattage from the supply and 0.85 amp current with voltage 228 volt.
For the 30% of speed control motor takes 260 wattage from the supply and 1.10 amp current with voltage 228 volt.
For the 40% of speed control motor takes 290 wattage from the supply and 1.50 amp current with voltage 229 volt.
For the 50% of speed control motor takes 320 wattage from the supply and 1.90 amp current with voltage 229 volt.
For the 60% of speed control motor takes 360 wattage from the supply and 2.10 amp current with voltage 229 volt.
For the 70% of speed control motor takes 400 wattage from the supply and 2.50 amp current with voltage 230 volt.
For the 90% of speed control motor takes 400 wattage from the supply and 2.50 amp current with voltage 230 volt.
For the 100% of speed control motor takes 430 wattage from the supply and 2.85 amp current with voltage 230 volt.

Simulation Results :

1. **Line Current of Motor:** This wave form shows at initially starting current of motor is large as compare to full load current and after some time it will stabilized to normal value .

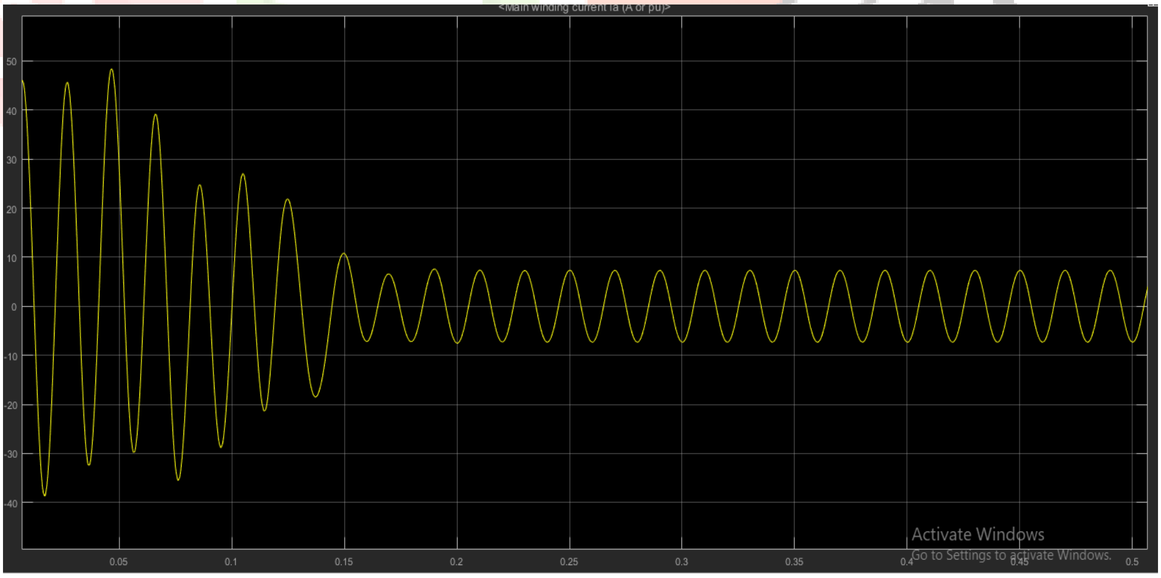

Fig2.Current waveform of motor

2. **Wave form of controlled speed of motor:** This wave form shows the speed controlled with time
How the speed control system response with time. The speed change from one value to other value during the speed change the finally speed don't get settle at the instance it will oscillate the system about this point.

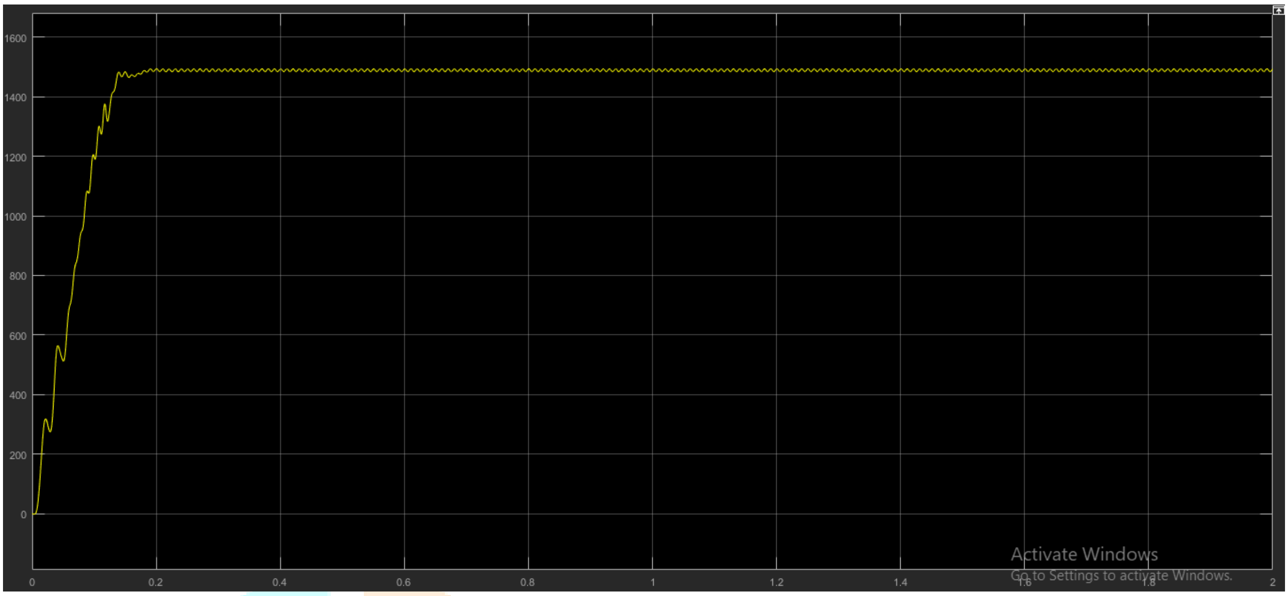

Fig.3 Speed control of motor

3. **Wave form of The line voltage across motor :**

Fig.4 line voltage

Complete Simulation block:

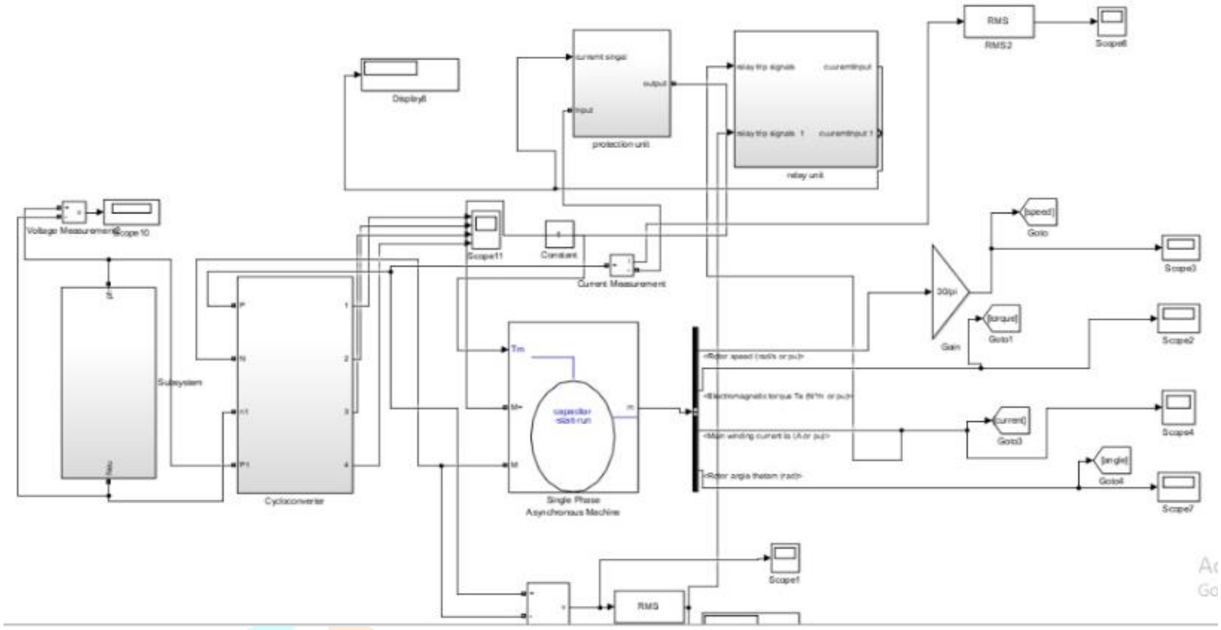

Fig.5 Complete Simulation block

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