Voltage Based Control of Induction Motor Using Advanced Voice Recognition & Command System

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Abstract— It is difficult to work in dangerous environment in numerous of the businesses. Human can survive as it were certain sum of temperature, weight etc. To work in environment over a run will cause risk to human life. Thus the framework is planned to diminish hazard of human life as well is more precise and computerized to alter itself to commanded parameters. The framework has highlight of voice command-based control of IM Drive for mechanical purposes through strategy of voltage variety. Moreover, it has essential highlights of drive assurance based on warm and over current security of drives. Gadget is having closed input circle framework based on tachometer speed sensor to alter speed precisely and keep up it indeed in the event that stack shifts. The voice acknowledgment gadget utilized is Alexa by Amazon and it communicates to custom planned drive control through wi-fi utilizing Hub MCU.

Keywords: 3 phase induction motor, Voice controlled induction motor, Voice recognition module, Microcontroller, Speed control

I. INTRODUCTION

As we all know the numbers of accidents are more in Electrical Industries. While people takes proper precautions but sometimes an industrial accident claimed the lifes of a employing operators. As per analysis of electrical accidents the cases are reduced upto 40% now but still the safety measures of every worker, employer and operator is concernable. Automation in electrical industry is more now a days and it helps reduce the need for human intervention. Automation and control systems enable safe and efficient operation of industrial plants by minimizing risks.

But to create an alternative to work in hazardous environment voice control was developed. voice control is used mainly to reduce the manual operation. Here voice communication plays a major part in this project. We are utilizing voice communication totally different areas for different purposes. Engine speed can be shifted by diverse speed control plans at rotor side and stator side of the engine. In stator side we have voltage control, recurrence control. voice technique we are going to control speed of IM using voltage variation. Speed control of AC/DC motor is used for various applications. the designed system utilizes device named Alexa Echo Dot by Company AMAZON in AI Devices Section this device will be used to recognize voice. the main unit utilizes a NODE MCU which receives the digital data via wi-fi communication. (no need of Internet, hotspot technology). On-board present AT-Mega 328p Microcontroller will process digital data and send signal (PWM in nature) to the servo actuator to rotates the dimmer shaft as per speed requirement. The PWM values are generated with control circuits that have timer features 8bit or more. So it can be analogized that the value of 0means stop and the maximum value of 255 means full deflection. The system is designed to control speed of induction motors in various steps as well as it provides thermal and over current protection to IM.A tachometer feedback system will be attached to Drive for accurate and automatic speed control.

II. BLOCK DIAGRAM

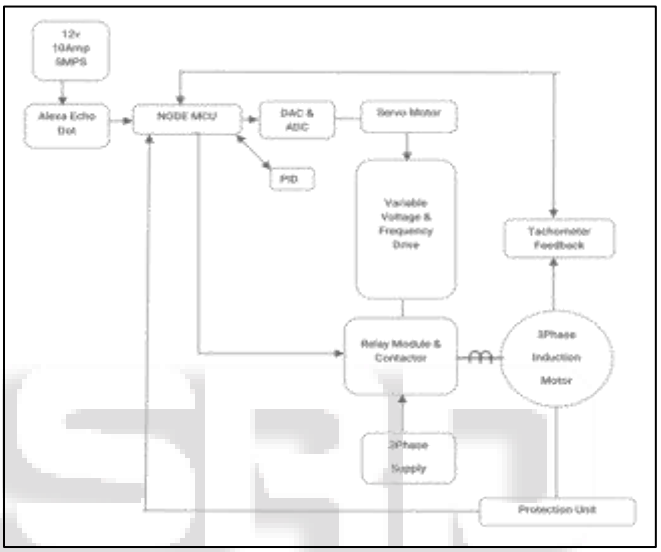

Fig. 1: Block Diagram

Start with the 12 volt 10 amp SMPS power supply which we are going to use we supply Voltage to the Electronic circuit turn we can see there is a alexa echo dot device which we are going to use for voice recognition and the process date will be process by the alexa and signal send to the Node MCU then NODE MCU is going to process the received signal of the voice command it is then going to the process based on the program set in the micro controller the program will identified there required rpm of IM now it will send to the actuating servo motor. The servo motor will actuate the signal in term of degree and will rotate the variable resistor as per the degree wise and which is going to given feedback to the VFD. Now as we know the VFD is a drive which varies speed of induction motor and control the speed of Induction motor using variation voltage and frequency required and VFD will send suitable voltage and frequency required for a suitable rpm to the 3 phase Induction motor .In this system for a suitable RPM to the 3 phase to be supplied by contactor based on relay module, relay Module and Contactor Which is controlled by protection unit For a protection Purpose for over current protection thermal protection which we have going to give.

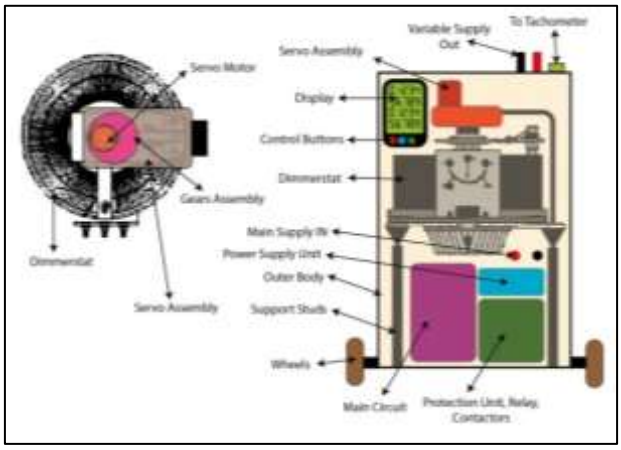

Fig. 2: Design of Experiment

The system is using wireless communication digital command send through wifi to the node MCU. The command received by the microcontroller and actuated by the servo it adjusts the speed in 0 to 360degrees of the shaft. the servo assembly which will control the dimmer stat and microcontroller accurately adjust voltage and feedback speed it will adjust the speed.

The protection parameters are very accurate when the load exceeds the safety parameter, dimmerstat gets tripped and motor gets isolated and the current turned off.

Again the implanted thermister close to the winding gives feedback of winding temperature and core temperature when it exceeds the temp of insulation it sends tripping signal.

Working of alexa is much accurate as compared with other products in a market also this setup can also control upto 50motors if wanted. safety and security criterion is more in this case also comparative to other products its cheaper and efficient to work.

III. Advantages

- High Accuracy and Resolution.
- More Safe and Secure.
- More numbers of motors can be connected.
- Cheap in cost.
- Easily accessible.

IV. Conclusion

Recent developments in the technology are making the life easier. This project work explains the design and construction of Voice controllable motor. This voice command technique will improve the performance of the motor.

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