RESEARCH ARTICLE   OPEN ACCESS

WINDING BENCH FOR AFPM GENERATOR

R.Ramprakash [1], G.Syed Zabiyullah[2], A.Jayanthi[3],R.Gunasekaran[4]
[3](PG, Excel college of Engineering and Technology, Komarapalayam)
[1,2,4] (Assistant Professor/EEE, Excel college of Engineering and Technology,Komarapalayam)

Abstract:

A coil winding machine could be a machine for winding coil onto a spool, spool and plenty of a lot of this coil winding machine is one among styles of winding machine that out there in industries nowadays. From multi speeded machines to medium, giant and extra-large machines, these machines are available in varied sorts and classes, playacting a variety perform. The common applications for a coil winding machine are to wind coils for electrical device, inductors, motor and chokes. To complete a coil mistreatment manual coil winding machine are going to be inconvenience and waste of your time. Therefore, fabrication of coil winding machine are going to be wiped out this project that is controlled by two DC motor mistreatment 16f877A program. This machine is cheap, simple to work and incorporate atiny low scale size. This machine is cheap, simple to work and incorporate a small-scale size. This project can also be used for coaching students in winding of tiny transformers & relay coils.

Keywords ─ *DC motor, Microcontroller, Winding.*

I.INTRODUCTION

Coil Winding machines ar used to wind coils for electrical device, stators of motor and chokes. To wind a coil victimisation manual coil winding machine are going to be inconvenient and waste of your time. numerous automatic coil winding machines ar out there within the market to beat the drawbacks gift in manual winding machine. The machines gift within the market are large, difficult and expensive. So, during this project these drawbacks of automatic machine ar overcome. Therefore, fabrication of coil winding machine are going to be tired this project that is controlled by two DC motor victimisation PIC16f877a program. This machine is cheap, simple to work and integrate atiny low scale size. during this project PIC 16f877A programming is employed for automation purpose. Stepper motors ar used for the rotation of rib shafts on that bobbins and coil is mounted. the entire assembly can contain 3 shafts to mount wire drum spool and coil. the stress is maintained by the spool. The wire is wounded on coil through spool from wire drum. PIC16f877A controls the feed of coil.

II. RESEARCH PROBLEM

A coil winder could be a device that is employed to form tight, equally wound coils. hand-held winding machines square measure good for home physical science comes to business packaging of merchandise usually sold-out in coils.

Multi winder Winding Machines square measure automatic winding machines designed to wind coils requiring complicated wind, wrap, cut & routing functions. These machines square measure Equipped with AC Servo motors for axes & spindle management give outstanding performance, maintenance free operation & higher productivity A stepper motor could be a brushless DC motor that divides a full rotation into variety of equal steps. The motor's position will then be commanded to makeover and hold at one in all these steps with none position detector for feedback (an open-loop controller), as long because the motor is rigorously sized to the applying in regard to force. The full assembly is fastened to the bottom plate that is created of picket with guide ways that. These guide ways that permits wide selection of lengths of armatures to induce work on the shaft for

winding. The clips square measure fastened on the bottom plate by bolting. These clips square measure trained at the precise position to carry the motor co-axially and to own minimum eccentricity.

The stepper motor is connected to the shaft via versatile mechanical device fabricated from Al. mechanical device helps to compensate the angular deflection that helps just in case of eccentric shaft. The Slider contains Roller moreover as pen mechanism to supply tensioning. 2 stepper motors square measure used, one for gyration of slider and second for movement of coil. The Automation is completed by the Ardiuno. Slider assembly consists of rib shaft and slider, rib shaft is of eight millimeter diameter and one.25 millimeter pitch. Slider has holes and internal thread of same hand and same pitch i.e. 1.25 mm. The earlier technique of manual coil winding was agitated and time overwhelming.

The accuracy of winding was terribly low and regularity between two consecutive winding couldn't be achieved. Whereas the automated winding machine presently utilized in the business is complicated, large and dear. The most objective of the project was to beat these hurdles by building an occasional price and compact automatic coil winding machine. The literature gap found throughout the literature survey provided United States of America with a tangle statement. presently industrial coil winding machines uses PLC that wants complicated and extended programming. Instead the project employs Nano Ardiuno that has easier programming and is low in price. correct tensioning of wire was sophisticated task because the coil drum needs to move alongside the slider. The stepper motor used for the rotation of the rib shaft enabled precise winding and equal distance between the consecutive windings with variable diameters of the wire.

III. PROPOSED SYSTEM

In the earlier section that the only section 0.5-wave rectifier produces associate output wave each half cycle which it had been not sensible to use this sort of circuit provide a gradual DC supply. The full-wave bridge rectifier but, offers America a bigger mean DC worth with less superimposed ripple whereas the output wave shape is doubly that of the frequency of the input offer frequency. We will thus increase its average DC output level even higher by connecting an acceptable smoothing capacitance across the output of the bridge.
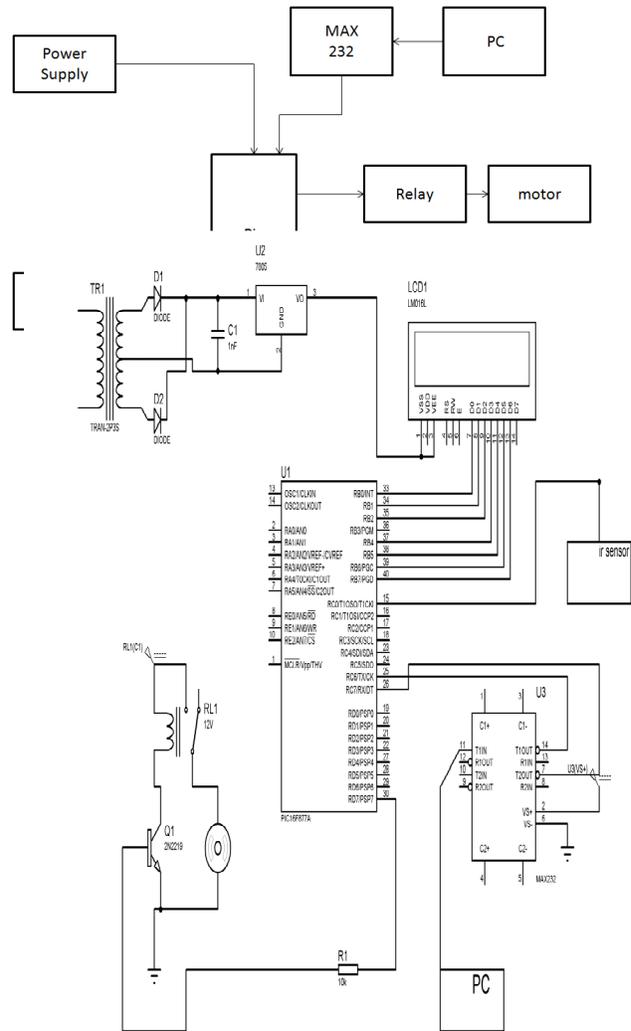

Figure.1. Block diagram

IV. CIRCUIT DIAGRAM

Figure.2. Circuit diagram

PIC has a Low power, high speed CMOS FLASH technology with a fully static design. It provides a wide operating voltage range of 2.0V to 5.5V.It has Low power consumption and used in commercial and industrial temperature ranges. There are three memory blocks in the PIC16F87XA device. The program memory and also the knowledge memory have separate buses so synchronous access will occur. The PIC16F87XA devices have 13 bit program counter capable of addressing an 8K x 14 bit program memory space.

V. SYSTEM DESCRIPTION

HARDWARE NECESSITIES
- Power Supply
- Microcontroller Unit
- Driver Circuit
- IR sensing element
- LCD Display

SOFTWARE NECESSITIES
- MPLAB IDE
- PICKIT
- CODING

5.1. POWER SUPPLY

A power provide may be a device that provides electrical energy to at least one or a lot of electric hundreds. The term is most typically applied to devices that convert one variety of current to a different, though it's going to additionally discuss with devices that convert another variety of energy (e.g., mechanical, chemical, solar) to current.

An AC battery-powered unregulated power provide typically uses a chopper to convert the voltage from the wall outlet (mains) to a unique, today typically lower, voltage. If it's accustomed manufacture DC, a rectifier is employed to convert alternating voltage to a rhythmic direct voltage, followed by a filter, comprising one or a lot of capacitors, resistors, and typically inductors, to filtrate (smooth) most of the pulsation. a small remaining unwanted alternating voltage element at mains or double mains power frequency (depending upon whether or not half- or full-wave rectification is used) ripple is ineluctably superimposed on the direct output voltage.

A power provide will by dampened into a series of blocks, every of that performs a specific operate for instance a 5V regulated provide.

5.2. TRANSFORMER

An electrical device may be a static device that transfers current from one circuit to a different through inductively coupled conductors—the transformer's coils. A variable current within the 1st or primary creates a variable magnetic flux within the transformer's core and therefore a variable field of force through the secondary coil. This variable field of force induces a variable electrical phenomenon (EMF) or "voltage" within the secondary coil. This impact is termed mutual induction
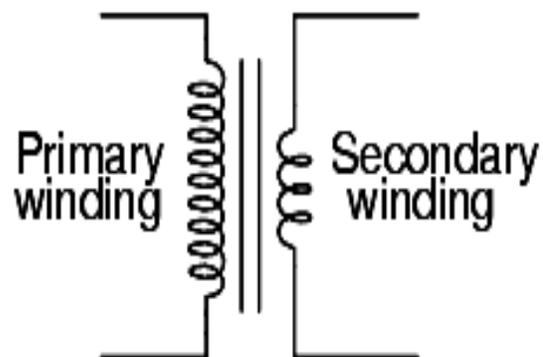

Figure 3. Transformer circuit diagram

This is a really helpful device, indeed. With it, we will simply multiply or divide voltage and current in AC circuits. Indeed, the electrical device has created long-

distance transmission of electrical power a sensible reality, as AC voltage will be "stepped up" and current "stepped down" for reduced wire resistance power losses on power lines connecting generating stations with hundreds. At either finish (both the generator and at the loads), voltage levels square measure reduced by transformers for safer operation and fewer dearly-won instrumentality. A electrical device that will increase voltage from primary to secondary (more secondary coil turns than primary turns) is termed a transformer. Conversely, a electrical device designed to try and do simply the alternative is termed a transformer.

VI.APPLICATIONS

➢ The basic applications of the RF power electronic equipment embody driving to a different high power supply, driving a transmittal antenna, microwave heating, and exciting resonant cavity structures.
➢ Among these applications, driving transmitter antennas is most standard.
➢ The transmitter–receivers ar used not just for voice and electronic communication however additionally for weather sensing (in the shape of a RADAR).
➢ Microwave or RF heating is Associate in Nursing industrial application that is additionally benefiting our homes within the variety of microwave ovens.
➢ Exciting cavity resonators is sort of a research laboratory Associate in nursing industrial application of an RF supply.

VII.CONCLUSION

The earlier methodology of manual coil winding was agitated and time intense. The accuracy of winding was very low and regularity between two consecutive winding couldn't be achieved. Whereas the automated winding machine presently utilized in the business is complicated, large and dear. the most objective of the project was to beat these hurdles by building an occasional price and compact automatic coil winding machine. The literature gap found throughout the literature survey provided USA with a retardant statement.

Currently industrial coil winding machines uses PLC that wants complicated and long programming. Instead the project employs Nano Ardiuno that has less complicated programming and is low in cost. Correct tensioning of wire was complicated task because the coil drum should move alongside the slider. The stepper motor used for the rotation of the threaded shaft enabled precise winding and equal distance between the consecutive windings with varied diameters of the wire. the target of compactness of the project was achieved with correct style and adequate thickness of the part.

REFERENCES

1. *Biegelmeier G., "Discrimination and nuisance tripping of residual current operated devices in domestic and similar installations", Proceedings of Third International Conference on Installation Engineering Designing and Maintaining Successful System, 1988.*

2. *Brennan, P.V., "Residual Current Devices with high immunity to nuisance tripping", IEE Proceedings on Circuits, Devices and Systems, vol. 140,issue 2, April 1993.*

3. *F.P. Dawalibi, R.D. Southey, and R.S. Baishiki, "Validity of Conventional Approaches for Calculating Body Currents Resulting from Electric Shocks", IEEE Transactions on Power Delivery, vol. 5, no. 2, April 1990.*

4. *Giuseppe Parise, "A Summary of IEC Protection Against Electric Shock", IEEE*

Transactions on Industry Applications, vol. 34, no. 5, September 1998.

5. *LaRocca, R.L., "Personnel Protection devices for use on appliances", IEEE Transactions on Industry Applications, vol. 28, issue 1, part 1, Jan.-Feb.1992.*

6. *Theodore Bernstein, "Electrical Shock Hazards and Safety Standards", IEEE Transactions on Education, vol. 34, no. 3, August 1991.*

7. *Trevor W. Dawson, Krys Caputa, Maria A. Stuchly, and R. Kavet, "Electric Fields in the Human Body Resulting From 60-Hz Contact Currents", IEEE Transactions of Biomedical Engineering, vol. 48, no. 9,September 2001.*