

AUTOMATIC COIL WINDING MACHINE

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ABSTRACT

In this project "AUTOMATIC COIL WINDING MACHINE" main objective is to bring out a machine which can implement the idea of automation in Transformer winding or any type of coil windings. Here in real time application let us consider Transformer Manufacturer where the winding is important criterion. A transformer changes (transforms) an alternating voltage from one value to another.

It consists of two coils, called the primary and secondary winding, which are not connected electrically. The windings are either one on top of the other or are side by side on an iron, iron-dust or air core.

A transformer works by electromagnetic induction: a.c. is supplied to the primary and produces a changing (alternating) voltage in the secondary. It is important that as much as possible of the magnetic field produced by the primary passes through the secondary.

A practical arrangement designed to achieve this in an iron-cored transformer. In which the secondary is wound on top of the primary. You should also notice that the induced voltage in the secondary is always of opposite polarity to the primary voltage.

Too large a current in a transformer causes magnetic saturation of the core i.e. the magnetization of the core is a maximum and it is no longer able to follow changes of magnetizing current. Particular care is required when there is a d.c. component.

In block consists of keypad, Microcontroller, display, Stepper motor, Stepper driver circuit, coil winding machine. This demo works on the basis that the keypad provided is for entering the set values that is the number of windings can be given. In case of transformer the primary winding & secondary winding can be entered.

INTRODUCTION

A winding machine winds a material such as metal wire, thread, or paper, onto a core, spool, or bobbin. There are several different types of winding machines, from simple manual feed machines to complex computer-numeric-control (CNC) machines. An automated system ultimately aims to reduce man power and labor task. The common applications for a coil winding machine are to wind coils for transformer, inductors, motor and chokes. The fabrication of coil winding machine is done using arduino controller for automation purpose, stepper motor for rotation of threaded shaft on which bobbin are mounted and Pulleys are used for maintaining constant tension.

PROBLEM DEFINATION

To study complete coil winding manually will be of waste of time. Further more to have a good quality of automatic coil winding machine requires expensive tools and it is not so user friendly. Therefore, fabrication of coil winding machine will be done in this project which is controlled by a simple motors arrangement also adjoining the use of CNC, signaling device i.e Bluetooth, arduino etc.

NEED OF AUTOMATION

Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources for low cost automation. Automation plays an important role in mass production.

The advantages of Automations are:

- Reduction of labour and material cost

- Reduction of overall cost
- Increased storage capacity and higher production rates and increased productivity.
- Improved quality or increased predictability of quality.
- Increased consistency of output.

OBJECTIVES

- To study a coil winding machine that has a small-scale size and at a lower cost.
- To avoid accidents that occurs during manual universally applicable to all gauges of wires
- To avoid delays in delivery and to reduce skilled manpower requirement.
- To ensure that the prepared machine will work at faster speed than existing one.

WORKING

In this coil winding machine two stepper motor are use. One is use for rotation motion and another is use for linear motion. This two stepper motors runs in synchronization such that one revolution of shaft the slider advances according to the diameter of bobbin . This help in winding without gap. This is done by the program set in arduino, As per the winding i.e. for motor or transformer the program can easily change. Initially the coil setup is done i.e., the coil is firstly attached to the armature manually through the slider assembly. The power supply is connected and Arduino is started. Then the program is allowed to run. According to the program this two stepper motor rotate, after one revolution of shaft the slider linearly advanced. The program helps in synchronizing these two shafts and slider to obtain accurate rotation. In this project Bluetooth model is use for communication purpose between arduino and android phone. we give command by phone using a GRBL application, as per the command stepper motor rotates and coil wound on the bobbin or rotor.

ADVANTAGES

- Less space is required.
- Skill worker is not required.
- Cost of the machine is less.
- More production in less time.
- Assembling and disassembling is easy.
- Production is easy.
- Accuracy and control.
- Reduce paper insulation and coil wastages.
- Efficiency and maintenance is easy.

CONCLUSION

The earlier method of manual coil winding was time consuming. The accuracy of winding was very low and even spacing between two consecutive winding could not be achieved. While the Automatic winding machine currently used in the industry is complex, bulky and costly. The main objective of the project was to overcome these hurdles by building a low cost and compact automatic coil winding machine.

FUTURE SCOPE

- This project if produce on a large scale would be cheaper.
- This saves considerable time in production of coils.
- Reducing costs of transformer, condensers etc.

- This project could be commercialized if modified.

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