

# Automation in Manufacturing of Winding

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**Abstract**— In this paper, we introduce a technology of electrical engineering transformer coil, The Very Important Part sensitive and Important part. From multi-speed Machines medium, large and extra-large Machines, in various types and categories of Machines these, performing a range of functions. For a coil winding machines were common Applications the wind coils for transformers, Inductors, motor and Chokes. Complete a coil winding machine then I will be Using Manual coil Inconvenient and marshalling OF TIME. Therefore, I will fabrication OF coil winding machine scoops is this project in ten motor Overlays Sequential Controller B. This is controlled. IMPLEMENTATION OF After Cain is this model work in industries Gap between Demand and Supply were continuously and Decreases. Such machine for there the Labour Division of the No Need No Human Error. Human error was the better end product quality were without OF PRODUCTION OF walled definitely Decreases costs. This was where one Negative Motivation Factor this cost effective automation Research. Excluded is this project Sequential consists controllers, ten motor, step-down transformer, coil winding machines, sensors, display. An automated machine Instead OF TODAY'S Fast Growing Industries Require Operated Machines manually. Highly Advanced Automation for the Small Scale Industries economical. Tablet Design Project shows this was the machine for automatic winding for transformers High accuracy.

**Key words:** Sequential controller, DC motor, Step down transformer

## I. INTRODUCTION

Paper deals with industrial automation. The transformer is now producing the manual. Especially insulation, are the machine production is done through the air, and copper wire windings. There complex computer numerical control (CNC) machine is a machine simple manual machine with different types of feed. Wire winding machine, line winding, and some of the more common use of continuous filament winding turn. Several industry, textiles, electronics, and the use of these tools, including wire industry. The winding machines, wire, rope, especially in the major axis, the user simply feeds or other content. They will guide you to control the user-controlled spindle speed and feed of user content, stress and stress patterns by hand. The bench-top size is quite large, it can be hit or alone in a simple machine.

The transformer windings as well as the use of large-sized high ratings giant. It is time-consuming work as the building work itself windings or coil. Production automation is needed to provide windings. The project is the use of a wire model of the wind machine. Coil winders can be classified according to their speed and ability levels. Medium, large and extra large machine series come in a variety of these machines and multi-function fast machine range.

A wire machines, transformers, inductors, common applications and the air motor coil winding techniques to stop

for breath. A wire coil machine design, material stress limits of the machine versatility, and automation / operator intervention, and volume production is determined by the complexity of budgetary matters. Medium enterprises, large enterprise, to form a complete machine model.

## II. LITERATURE SURVEY

Nowadays, there are various types of transformer coils or used motor winding machine. The size of the network is important to wrap or roll formers pharmacy production. The size of the tension applied to the coil wound a significant impact on the quality of existence. Most of them are round and rectangular bobbin. Previous studies, many of them bobbin rectangular bobbin-round pick. Because it allows for bobbin winding a coil on the body size and the same goal scorer.

Compare the size of a rectangular coil causing the coil windings as the rest of the book itself, was uneven. In addition, rectangular coil is difficult to maintain control of the tension. While absorb the stress applied to the device, and a rectangular bobbin 4 points is required to maintain the control handle results per revolution. In addition, rectangular coil winding speed is very limited.

Or scroll wheel shaft, a rectangular coil wire is wound as a coil feeding speed accelerates and decelerates to turn on. The length of the wire speed is going to be the way to look constantly changes, the following figure. This round bobbin coil wire contact point is not a problem as fixed

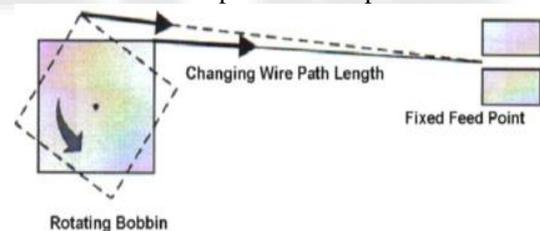


Fig. 1: Acceleration Due To the Changing Wire Path Length during Winding

The coordination of rotational and translational motions is necessitating when transferring wire to bobbin. There are many methods to winds a coil nowadays. Previous study shows there are two of the most common methods of winding coils are spindle winding and fly winding. In the spindle winding process, the coil is wound by rotating its core or bobbin. In the fly winding process, the bobbin is fixed and the wire is wrapped around it.

Spindle winding are easiest compare to fly winding process because it can control the wire position uniformly and smooth compare to fly winding. Fly winding are tend to get twisted because of inconsistent twisting and inaccurate wire displacement. The centripetal force in spindle winding machine wire tension is required to rotate the wire in circular path. It leads to a looser coil and reduces the coil tightening forces. If there is less reduction, spindle winding are desirable because of the ability to control the wire position. [3]

### III. PROPOSED PLAN

According to the desired machine operation is required to be smooth and controlled.

It is useful with a separate transformer winding machine that will ensure that should also be able to create. [2]

In many applications, both positive and negative voltage output amplifier, should be included in the motor circuit switch write, not that. One method is to use a double-pole relay. Relay contact Motor terminal is connected to a positive voltage, and the terminal B is connected to the positive voltage terminal and the terminal so effectively reversed polarity, a negative voltage is used.

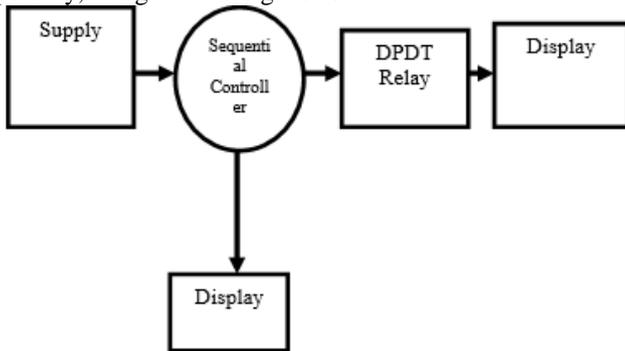


Fig. 2: Simple Block Diagram of Sequential Controller

### IV. WORK FLOW CHART

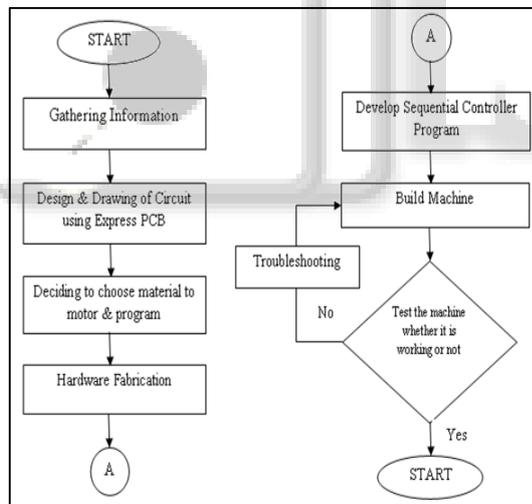


Fig. 3: Flow Chart of Proposed System

### V. HARDWARE USED

#### A. Relay (Double Pole Double Throw):

Terminal 2 and 4 connectors 2 single pole double throw SPDT relays, and you can see it as equivalent to DPDT relay. Double Pole Double Throw DPDT relay is used. Two different electrical circuit and magnetic device used to connect to an electromagnetic relay. Relay 6V, 9 V, 12 V, 24 V operating voltage, etc. is available in different configurations

In our case, when a fan coil voltage is turned on and the green LED. We relay coil and contact, and when you turn on the voltage applied to the red LED light bulbs switch

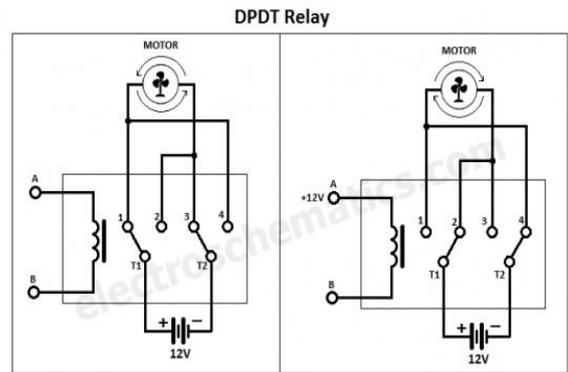


Fig. 4: Switch between 2 Different Loads with DPDT Switch

#### B. Transformers:

Based on a simple fact about the power transformers: Fluctuating electric current through a wire Flus, this all-around a magnetic field (an invisible pattern Magnetism) and "magnetic flux" and Generates. Excluded power law (magnetic flux density dropped but the technological drivers and) were excluded about the size of Di- electric current. Excluded large amount of current, the magnetic field String. Generates a magnetic field around the wire piece fluctuates, an electric current when a wire. And if that one, the bricks, the second roll were the first son of the stars and the sand was the first book on electricity fluctuating, they will be ready to turn a second electric wire.

Usually put this on the wire in the first primary coil current and the secondary current. Listen to what they have done an electric current through the empty space from one another coil of wire. The first roll was called on the electric installation because reasons. They can know more about wrapping a soft iron bar stopped non-B (called core) and a roll.

#### C. Motors:

We have almost every mechanical movement is done by the electric motor, which is around us. The machine is a tool for converting electrical energy. Motors for the production of electrical energy and mechanical energy. Hundreds of tools used in everyday life we are used to power electric motors. Motors come in various sizes. Especially in larger horsepower motors used in industry can take a load of 1000. Lift motor, electric vehicles, and heavy metal rolling mills have s application examples



Fig. 5: DC Motor

#### D. Moisture Sensor:

Soil moisture sensor measures the volumetric soil water content. Measured change of the property and must be calibrated in such a relationship between soil moisture and soil type, temperature, or depending on environmental factors

such as electric conductivity. Reflected microwave radiation is not affected by moisture in the soil and the Hydrology and remote sensing is used for agriculture. Portable diagnostic tools that can be used by farmers or gardeners.

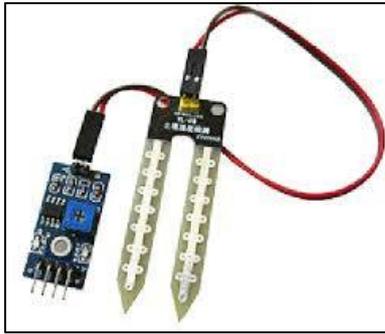


Fig. 6: Moisture Sensor

#### E. Piezoelectric Sensor:

An electric charge, acceleration, temperature, uses the piezoelectric effect of a piezoelectric sensor device adapted to measure pressure changes in strain or force

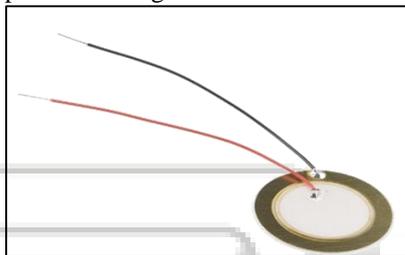


Fig. 7: Piezoelectric Sensor

### VI. METHODOLOGY

The working of model is based upon the principle of sequential controller. The 230 volts AC input is given to the sequential controller to A1 & A2 terminal. The transformers are used to step down the supply from 230V to 15 Volts. Then conversion of 15V AC to 15 V DC is done through rectifier and the filter circuit is used to reduce the harmonics and fluctuation in supply.

The LM7812 & LM 7805 are connected so that the 12V of DC supply can be given to the common input of sequential controller.

The assembly of relay is used to run the motor as per the controller input command. The input to relay is fed from output of sequential controller. The neutral supply to (motor, relay) is given from the 0V supply. Thus all the three dc motor of 300 RPM run on the same principle. The three DC motor are used for different purpose i.e First motor for rotation of winding platform wheel inside the chamber, second for move the platform in or out of chamber and third for opening and closing of door.

As the project is concern with the automation in manufacturing ,an alignment is set for operation of model with the help of giving input to channels of sequential controller .the opening of door is operated by connecting channel 2(common terminal) with channel 4.it is similar to the chamber of VPD in company. When channel 2 is connected to channel 4, the relay output from sequential controller is fed to relay which drives the motor which is connected to above of motor for lifting the chamber's door.

Then the platform based on which winding is best for manufacturing is taken out with the help of motor 2 by connecting the channel 2 with channel 5.

Motor 2 is connected outside the chamber for moving the platform inside and outside of chamber .Motor 3 which is used to rotate the winding formers in clockwise as well as anticlockwise direction for making winding or coil. The motor 3 is connected across the platform through wheel for rotation.

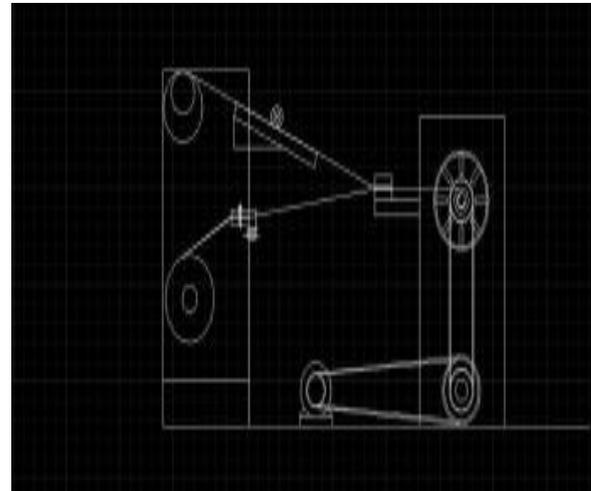


Fig. 8: Operation of Motor

Time of operation of removing moisture while heating is set according to the size and rating of coil. Then mode of operation is switch to RUN after the PROGRAM mode, so that the program which has been installed or command of operation which has been given to sequential controller is switch to RUN mode and automatically operation of system runs.

After, this the whole operation will start by initiating S1 &S2 .Switch both through connecting each other.

While the operation is running the moisture sensor sense the level of moisture content inside the chamber. A continuous monitoring across the chamber is essential so that to take an account of level of moisture in coil is only reducing. If the moisture remain constant or increase then there must be a fault in circulation of heating in chamber for particular winding as the coil of the temperature is set through thermostat. So, that it should not over exceed which can lead to burning of coil inside the chamber.

In 10 channel sequential controller we have used 6 channels in our project so that to cover all operation of system. The total no of cycle displayed are 6. The time required for each cycle has been displayed for different operation in second. Thus when all the six channels are completed the processes continue, if more similar no of winding has to be made.

### VII. RESULT

In this project the time in sequential controller which have been already set is observed by us for the smooth functioning of the project.

In this project we have set the time in the sequential controller and are observing it so that the time which we have set is working or not at regular interval and the moisture and temperature is also measured by using moisture sensor and thermostat.

### VIII. CONCLUSION

The machine will produce the transformer to improve the quality of interpretation and reduce the cost of new or developing innovative design and transformers, increased demand for skilled manpower and time efficiency.

Paper machines require a detailed study of the development of automatic winding transformers. Current automatic winding machine (manual) method is able to remove the defect, depending on the need of skilled manpower (training). This will increase productivity and increase production speed.

### ACKNOWLEDGMENT

We sincerely thank to the HOD of Electrical Engineering Department, Dr. P. M. Daigavane for their motivation, inspiration. We would like to thank Assistant Prof. Pankaj Ramtekkar for his kind support, guidance and encouragement.

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