

# Automatic Multiwire Cutting Machine Using Pnuematic System and Arduino

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**Abstract:** This Paper gives the detailed information about the design and development of automatic wire cutting machine. At present conventional method is used for wire cutting and measuring which takes more time which requires man power. The accuracy obtained by conventional method is also poor. The automation system solves the labour problems it saves cost, increases accuracy, decreases human errors. By using automation our objectives to achieve low cost cutting which works fast and reduces cutting time. The practical objective of automatic wire cutting machine is to cut required length of wire in required number of pieces.

This system uses pneumatic pressure and Arduino for cutting operation. In our project solenoid valve is used for automation. The wire cutting machine works with the help of pneumatic single acting cylinder. So we had designed an automatic wire machine which gives more accuracy and reduces the human error, man power, reliable work done and save the wastage of wire.

**Keywords:-** Solenoid, Arduino Mega, LCD display, Keypad, automatic wire cutting

## I. INTRODUCTION

In the underdeveloped small scale industries, nowadays labour is a major problem for the industries. Many a time's situations happen that laborers strike for their personal benefits. As a result the company owners have to bear great loss and hence cannot achieve their desired profit and goals. The system of automation in industry can solve this problem in a very effective way. The automation system solves labour problems which saves cost, increases accuracy and decreases human errors. After surveying various electrical and electronics industries we conclude that, nowadays the industries have introduced automation in their systems to some extent but for some basic processes which are time consuming like wire cutting, packaging etc. they use human resources. If we introduce automation to these basic processes then it will be fruitful regarding the company's development and profit gain as it improves the system in many ways. One such industry found out in which they need a solution that is very efficient, fast and economical for cutting various lengths of wires which are required for producing panels. The wire measurement and cutting is traditional and human efforts are required for it. The proposed system will automatically calculate wire length and cutting machine will cut it.

The project is based on Arduino which can easy to use and flexible. The system can measure wire length accurately as per given input. The motors are driven by

Arduino with required speed(revolution per meter). The cutting tool is precisely designed to measure wire length in proper format.

## II. PROPOSED SYSTEM

The proposed system consists of all the additional features to the existing system. The database of BILL OF MATERIAL is created which has specifications of wires required in the harness. It also includes the sequence according to which the wires should be cut as per required length.

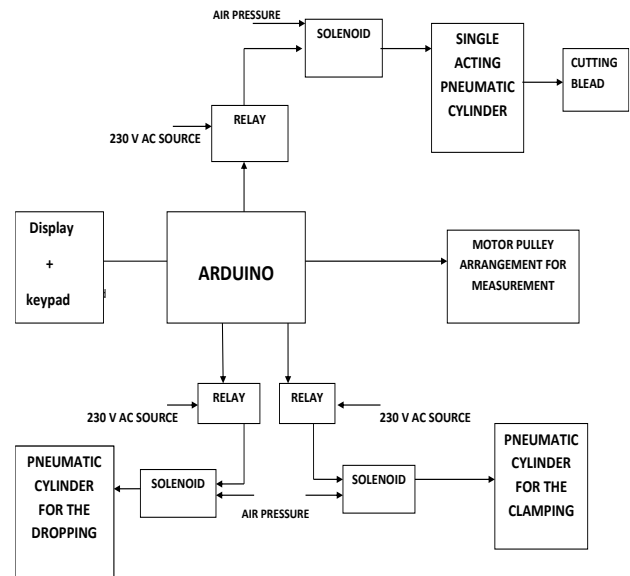


Fig: Block diagram of proposed system

### 1. Arduino Mega:

Arduino mega having the large I/O system design with inbuilt 16 analog transducers and 54 digital transducers that supports with USART and other communication modes. Secondly, it has inbuilt RTC and other features like analog comparator, advanced timer interrupt for controller. Arduino mega having a fast speed of operation with 16Mhz crystal. It has more than 5pins for  $V_{cc}$  and  $G_{nd}$  to connect other devices to Arduino Mega.

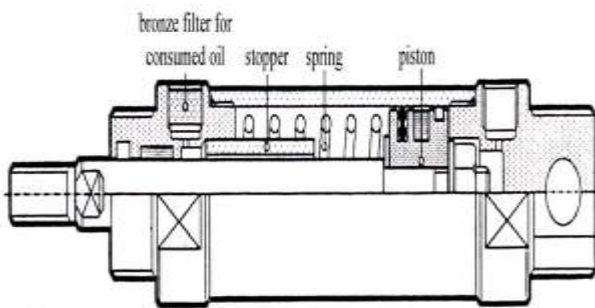


**2. Single Acting Pneumatic Cylinder:**

A single acting cylinder has only one entrance that allows compressed air to flow through. Therefore, it can only produce thrust in one direction. The piston rods propelled in the opposite direction by an internal spring, or by the external force provided by mechanical movement or weight of a load. The thrust from the piston rod is greatly lowered because it has to overcome the force from the spring. Therefore, in order to provide the driving force for machines, the diameter of the cylinder should be increased. In order to match the length of the spring, the length of the cylinder should also be increased, thus limiting the length of the path.

**4. Solid State Relay:**

A solid-state relay (SSR) is an electronic switching device that switches on or off when a small external voltage is applied across its control terminals. An SSR based on a single MOSFET, or multiple MOSFETs in a paralleled array, can work well for DC loads.



**3. Solenoid Valve:**

Solenoid valve is an electromechanical device in which solenoid uses electric current to generate magnetic field and thereby operate a mechanism which regulates the opening of fluid flow in a valve. Pneumatic solenoid valves are used to control the flow of direction of compressed air. A moving part inside the valve blocks or opens the ports of the valve. The moving part is called piston.

**III. PROPOSED WORK**

The human efforts in electrical wiring are high and the material used for the manufacturing of the wires is costly. Therefore it should be used very effectively therefore this paper is proposed to solve the above problem to minimize the human efforts and to avoid wastage of wires.

This system is accurately measured wire length and cutting machine can cut wire into no of pieces. The system operates very flexible by using proper input given by keyboard and displaying the input on led.

**IV. FUTURE SCOPE**

This system can be used for the wireless automatic wire cutting system using GPS and GSM. This will have a great impact on the electrical industry. And in order to operate it

from mobile and cell phones, Android application can be developed. These are the future aspects of system development in this particular field.

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