Automatic Wire Measuring & Cutting Machine

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Abstract:-- In small scale industries the wire been cutted manually so it is consuming more time.so the automation system solves unskilled labor problems which save cost, increases accuracy and decreases human errors. In an automatic wire cutting machine a stepper motor driven knurled roller is positioned between two wire guide channels to drive a wire toward a cutting station. The length of wire to be cut is set in a length counter and the wire is driven to the predetermined distance. Then the motor is disabled and cutting blade is energized. This automatic wire cutting machine is fully automated in processing wire(round and flat cable). Hence, introducing automation to these basic processes it will be fruitful regarding the company's development and profit gain as it improves the system in many ways.

Keywords: AT-ATMEL, DC-DIRECT CURRENT,IC-INTIGRATED CIRCUIT,WCCM-WIRE CUTTING &CRIMPING MACHINE, µC-MICRO-CONTROLLER

I. INTRODUCTION

In the underdeveloped small scale industries, nowadays labour is a major problem for the industries. Many a time's situations happen that labourers strike for their personal benefits which results in performance degradation and loss in efficiency. 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.

In an automatic wire cutting machine a DCmotor driven knurled roller is positioned between two wire guide channels to drive a wire toward a cutting station. The length of wire to be cut is set in a length counter. Drive cycles, during which the wire is driven a predetermined distance, are counted in the length counter. Then, the DC motor is disabled and cutting blade is energized. This system prevents operation of the cutting blade solenoid at less than an acceptable duty cycle with short lengths of wire. This automatic cutting machine is fully electric, microprocessor controlled bench machine for processing wire, round and flat cable.

II. RELATED WORK:-

This paper produces design of an embedded system for color detection of insulated electrical wire, which is to be cut, stripped and crimped by an automatic WCCM. These wire segments would be usedin the assembly of Wire Harness. It describes the subsystems which together will compose the required application. Design of the system is performed using Image Processing, Embedded Software, Micro-controller Programming, and hardware design. Each subsystem is shown and key design features are discussed with supporting rational for their implementation.[1]

III.OBJECTIVE & SCOPE:-

The objectives of this project are to design and develop an automatic wire cutting machine to achieve low cost cutting. It works fast and reduces the cutting time. This equipment is not designed using complicated components. This machine is simple and portable. This machine is designed using angle bars, rollers, guide tubes, cutter and controller unit to control the entire operation of machine. The practical objective of the an automatic wire cutting machine is to cut required length of wire in required number of pieces.

The objectives of the project are to design a system for an automatic wire cutting machine which is:

- Automation
- Reduce strenuous and repetitive task
- Functional requirement of proposed system
- Respond as per user's input
- Display user's input

- Multi-length wire input

IV. METHODOLOGY:-

The concept of this project is to lower the cost and time requirements for a small scale user. The brief idea is to develop a system which will perform the wire cutting operation. In this a mechanical assembly interfaced with micro controller based circuit is used to perform these tasks.Mechanical assembly will consist of dc motors which passes the wire with his rotations.

A) Methodology

1) Determine the required functionality for the work

2) Determine what user modules are necessary to realize the required functionality.

3) Determine the analog or digital blocks resources that each user configuration uses.

4) Optimize miscellaneous settings – the interfacing of analog device and dc motor is the main requirement of this work.

B)Description

1) Analysis of different critical parts of mechanism.

2) Selection of materials and drives.

The machine consists of a electronic circuit, mechanism of roller and cutting arrangement. The main heart of project is µCIC 89C52. The input is power supply &keypad Unit .the power supply consist of 12v dc to voltage regulator through bridge circuit .and output of voltage regulator is 5 v dc,input toµC.keypad unit is connected to port 0-p0 to p7.

The LCD displays the input from the keypad unit input ,which displays the length of wire to be cutted and quantity of wires required . The length of wire to be cut is set in a length counter drive cycles during which the wire is driven a pre-determined distance are counted in length counter. Then the DC motor is disabled and cutting blade is energized.
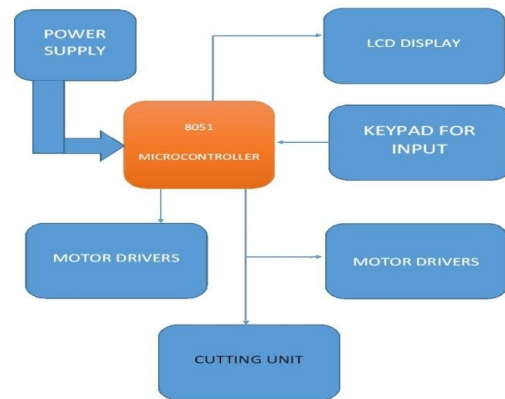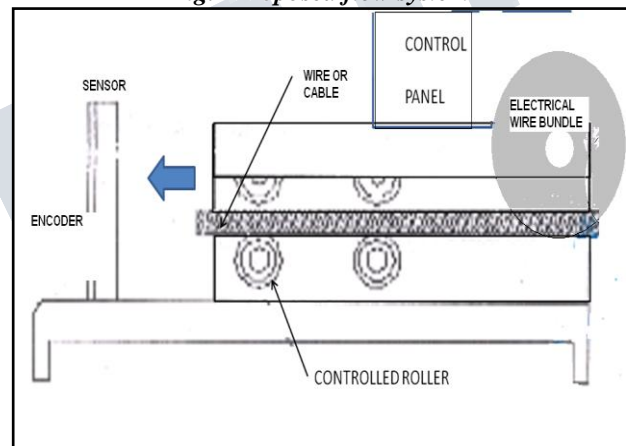

Fig.1 Proposed flow system

Fig 2 Proposed automatic wire measuring and cutting machine.

C)Software Implementation

1) The software part consists of programming in embedded Cprogramming in Keil software

2) Simulation – proteus 8

D) Hardware Implementation

- Mechanical structure.
- microcontroller 89C52
- motor drivers
- DC motors

V.FUTURE SCOPE OF SYSTEM:-

Multi-length wire input :-

In the industry if we implement this system then the time required for cutting the individual wires will be saved and workers cost will also be saved. The system can be improved by making it able to operate on multiple wire length inputs thus making it more efficient as it will give more throughputs. Also a new technique for the initial feeder assembly can be used which can reduce the threshold length and thus we can also cut small pieces of wire.
Wire cutting and both end stripping machine :-

By mounting additional pair of rollers and wire stripper with additional programming the insulation of wire from both end can be removed.

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