

Automation of Bfp-160 Horizontal Milling Machine using PLC

Ms. A. P. Nithya Priya¹, V. Mavitha Sri², S. Monisha³, P. Prathibaa⁴, K. Rekha⁵

¹Assistant Professor, ^{2,3,4,5}UG Scholars, Department of Electronics and Communication Engineering, Adhiyamaan College of Engineering, Krishnagiri district, Tamilnadu, India.

nithyapriyadpi@gmail.com¹, mavithakishore@gmail.com², monisha1606s@gmail.com³, prathibaapandurangan@gmail.com⁴, rekhakarnan1998@gmail.com⁵

Abstract – In present the machine gets operated manually and also by command raised by computer. Mostly conventional machines operation done by humans. This leads to seek attention keenly by humans also increases time consumption to drill or milling. This project totally based in conventional BFP-160 machine by introducing PLC control technique. PLC control technique for trouble-free changes and error rectification in the system by reducing number of contactors held by relays and this logic was replaced by a swift. It reduces breakdown to the lesser time thus increasing operated speed and overall equipment efficiency (OEE) of the machine. A conventional machine gets automated using PLC which gets programmed using ladder logic programming. Here the machine availability gets increased as the breakdown time gets reduced and efficiency of certain machine is improved. Here logic gets programmed and simulated using PLC software which is based on number of inputs and outputs.

Key Words: BFP-160 Milling Machine, Siemens PLC, Ladder Logic, Drilling, Boring

1. INTRODUCTION

In every field now a days there is atomization, it is used to improve accuracy and quality and it save material, labor and energy. By using automation several solutions are solved which include the combination of electronics, pneumatic, mechanical, electrical, hydraulic and computer. Boring is used to enlarge the drilled area using a single point cutting tool or a tool of boring head. Milling cutter is used to remove the material from the work piece surface. This process is called milling. A rotary cutting tool with multiple cutting point is known as milling cutter. These processes play major role in machining. It is always been challenge to design a machine which brings customers huge production with high precision, easy operation, and low production costs.

Turning, boring, slide-facing boring, and milling can be integrated and fulfilled by machining requirements. The PLC was invented in response to the needs of the American automotive industry. The sequencing, plc, safety inter locked, control logic for auto mobiles was achieved using closed loop controller, relay and timer. The updating process for these facilities change over is very expensive and time consuming.

A programmable logic controller (PLC) is used for the electro mechanical automation process for control of machines on assembly lines.

The plc can be programmed to function an energy management system for boiler control for maximum efficiency and safety. In burner management system it can be used to control the process of purging, pilot, light off flame safety checks. Also monitors the conditions necessary for safe running of the equipment and trip the equipment. Remote device monitoring, production line monitoring, building automation, printing machine, container filler (recipe application). It is also a digital computer used in machines and industries. This project is to "Implement the automatically controlled BFP 160 Horizontal milling machine using PLC". Machining parameters can be easily set through PLC which enables better machining efficacy. Finalized components are in low cost, fast and précised. The components are easy to adjust and change position. This is stable and efficient with accurate dimensions. This machine is operated by a single operator called a programmer. This machine is capable of performing various operations automatically and economically.

2. LITERATURE SURVEY

2.1. Manufacturing Boring Technology by Valery Marino

Boring is a process of producing circular internal profiles on a hole made by drilling or another process. It uses single point cutting tool called a boring bar. In boring, the bar can be rotated, or the work part can be rotated. Machine tools which rotate the boring barS against a stationary work piece are called boring machines. In this section, we will consider only boring on boring machines.

2.2. Milling machines operation's sub course no. od1644 edition 8 by Thru Growth.

Milling machine removes metal with a cutting tool called milling cutter. with various attachments, milling machines can be used for boring, slotting, circular milling dividing, and

drilling. For cutting key ways, racks and gears and for fluting taps and reamers machines are used.

3. EXISTING SYSTEM

The Existing methods consist of high content of relay logics, timers which is enrolled for any machine operation in certain manners. The difficulties in identifying faults and rectifying will longer duration in manual operation. The time required for hold on of a certain machine is quite larger time which also wastes time and also the efficiency of a machine reduced and also the manpower which also getting increased and which collapse the entire production in delay.

4. PROPOSED SYSTEM

Proposed System is done with advance automation through a understandable and clear vision of programming languages through programmable logic controller (PLC). According to present onset of various technologies in industries automation took a predominant role. This initializes for inputs and outputs already inside the controller which in turn weeds out the breakdown time to be lesser and also eliminates the burden of wiring arrangement which also find difficulty in fault clearance and also the manpower. This incorporates all rugged and designed construction to witted the vibrations, temperature, humidity, etc.

Enhancing this technique also saves the installation cost and also magnifies the speed of the machine which successively ignites the efficiency of the machine to higher level. Here this logic gets programmed and simulates using PLC software which is available based on number of inputs and outputs. This design work done for Programmable logic controller (PLC) serves to be a "work horse" of industrial automation. This focused on welding out the relay control logic to an automation which is a machine control.

The processes are operated by human or non-automation yield lesser productivity and may not be energy efficiency but such practices were inevitable till the advent of the concept automation. The automation brought the revolution in every filed of application to a greater extent incorporating technologies and machine to do activities in efficiency manner by reducing human intervention.

5. BLOCK DIAGRAM

A programmable controller (PLC) is the hardware that is adapted to control manufacturing processes or any activity that requires logic, counting, timing and network communication. It is a good example of a tangible real - time system that produces output results with in a limited time in response to input condition. In case the input condition is not met, it can result in an unintended operation that affects the entire process. This article discusses the main

components of a PLC system to understand how they control activities that require high reliability process fault diagnosis and alone case of programming programmable logic controllers have become popular in both industrial and commercial applications as they produce output results with in a limited time in response to input condition. Although they span a wide range of sizes, they all perform the basic functions but on a different scale based on sizes. All the above physical components of PLC work together to provide logic and fulfill the input condition by delivering desirable outcomes.

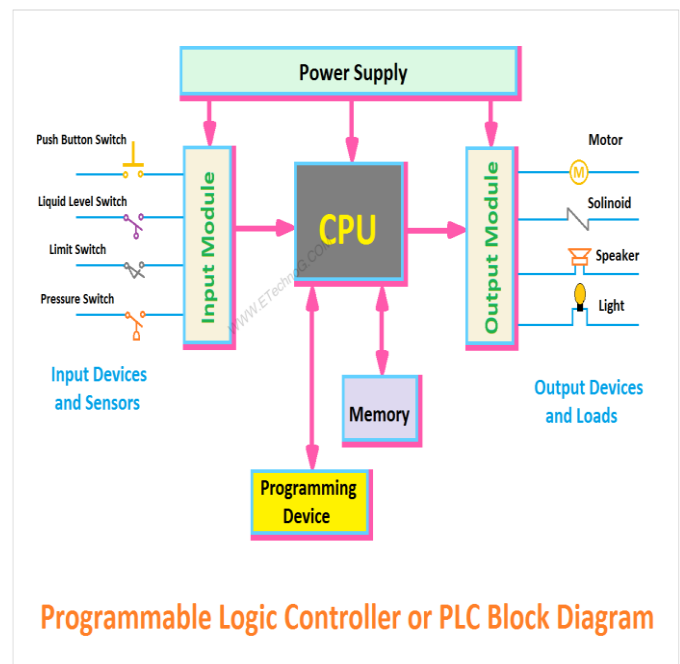


Fig-1 Block Diagram

6. CIRCUIT DIAGRAM

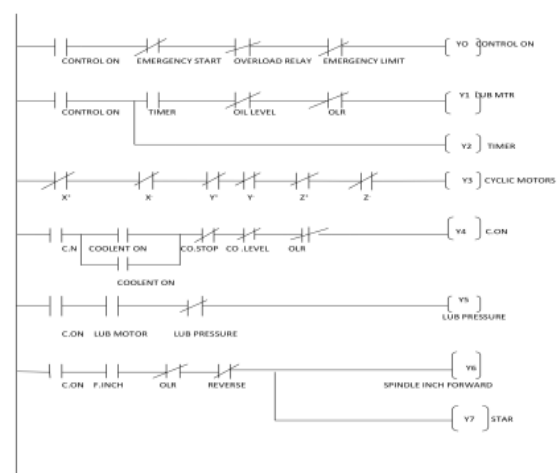


Fig-2 y1 Control on-y7 star delta

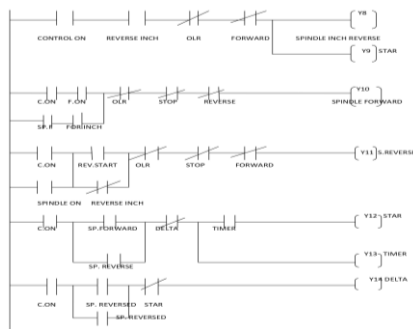


Fig-3 y8 Spindle Reverse to y14 delta

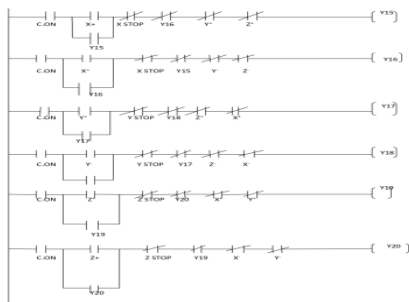


Fig-4 y15 to y20

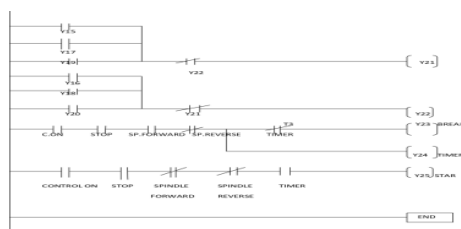


Fig-5 y21 to end

The ladder diagram was a diagram language for automation developed in the WWII period, which is most widely adopted language in automation. After the invention of programmable logic controllers (PLC), the devices displayable on the ladder diagram are added with differential contact, latched coil and the application commands which were not in a traditional power panel, for example the addition, subtraction, multiplication and division operations.

The working principles of the traditional ladder diagram and PLC ladder diagram are basically the same. The only difference is that the symbols on the traditional ladder diagram are more similar to its original form, and PLC ladder diagram adopts the symbols that are easy to recognize and shown on computer or data sheets. In terms of the logic of the ladder diagram, there are combination logic and sequential logic.

7. RESULT

The final result of the project is boring and milling can be automatically controlled to produces the machine runs. The boring process is used to the accurate diameter by the

reversal process and the milling process is used to remove the unwanted material from the surface and the whole process time is reduced from 1hour to 10-12 min per product and labors are reduced.

8. CONCLUSION

A simple and manual operated machine are used for boring and milling process, which is time consuming and several labor power is required which was the disadvantage in terms of labor, production and maintenance. With the help of automated controllers, the machine will become flexible and productive. the old machine can be restored by improving the original performing levels. The newly introduce concept is cost effective and beneficial to small and large industries. This project undergoes automation which is controlled by PLC control panel, speed of the motors used for boring and milling.

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BIOGRAPHY:



Ms. A. P. Nithyapriya,
Assistant Professor,
Engineering Department,
Adhiyamaan College of Engineering,
Anna University.