Programmable Logic Controller Based On Automatic Loom Machine

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ABTRACTS
At present, the rapier loom has gradually become the mainstream equipment in the manufacturing industry.This paper was customizing design system which increases production and efficiency of loom in various aspects without increasing cost. PLC is used for handling, controlling all necessary computational and control. Thus, proposed system will be cost effective and efficient. The main aspect of the paper is to modify the basic power loom to function as an auto looms utilizing benefits of Programmable logic Controller (PLC) as the heart of the system The process generating fabric by interlacing warp and weft threads is called as loom and the tool used for this is known as loom machine. In proposed system is based on "Automatic power loom" which is mainly controlled by mechanically and have electronic controlling and monitoring system.
Keywords: DELTA PLC, PLC Training kit, DC motor

I. INTRODUCTION

At present, there is still a big gap between China's loom level and developed countries like India. Each loom is based on a unified platform for easy upgrade and improvement. Among the main products recently launched by the German company DORNIER, the PLC series rigid rapier loom adopts a unique positive central weft transfer method, which can produce a variety of difficult industrial fabrics. In summary, the rapier looms have fully applied the latest and comprehensive modular design concepts to expand and evolve the original model. From the analysis of the production status of domestic textile machines, mostmanufacturing use PLC as the control core and equipment with detection original.This design not only simplifies the hardware design, reduces the point of failure, but also improve the reliability and stability of the system, and its programmability features greatly reduce maintenance costs, which has been affirmed by users although the maintenance cost is greatly reduced, because the PLC production technology is far higher than the domestic level, the market has basically been monopolized by foreign manufacturing, so the cost of purchasingthese system is very high. Some manufacturing will be discouraged by the high cost when choosing the corresponding PLC as the core of their control system.

II. OBJECTIVES OF THE PROJECT

The objectives of an automatic loom machine with PLC (Programmable Logic Controller) can vary depending on the specific needs and requirements of the user, but some common objectives include,

➢ Improved efficiency: One of the primary objectives of an automatic loom machine with PLC is to improve efficiency in the textile manufacturing process. PLCs can be programmed to optimize production speed, reduce downtime, and minimize waste, which can lead to increased productivity and profitability.

➢ Flexibility: Automatic loom machines with PLCs can be programmed to produce a wide variety of fabrics with different patterns, colours, and textures.

➢ Data collection and analysis: PLCs can be equipped with sensors and other monitoring devices to collect data on various aspects.

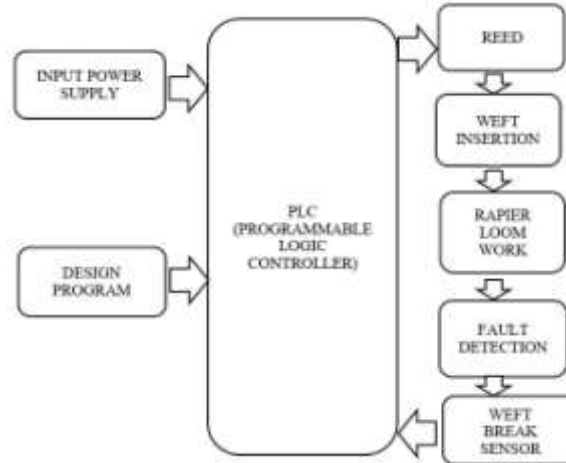## III.   BLOCK DIAGRAM OFPROPOESD SYSTEM

FIG.1: Block diagram of the proposed system

POWER SUPPLY

There are two ways to give supply to the PLC 230V AC candirectly to the PLC or we can use 24VDC SMPS also to power on the PLC and its components.

SENSORS

In proposed system various sensors are used for different parameters like weft break, slay and measurement of cloth. Weft break stop sensor is a device used in textile manufacturing to detect a weft yarn break in a weaving machine. The weft yarn is the thread that runs perpendicular to the warp yarn in a woven fabric. A weft break occurs when the weft yarn breaks during the weaving process, which can result in defective fabric.

PLC

The controller is used for this system is PLC, that is"Programmable logic controller". It is mainly adapted forIndustrial automation and factoryApplication. Allen Bradley's Micrologix1100 PLC is used. The programmable logic controller is solid stateequipment, basically design to perform logical decisionmaking for industrial control applications and automation purpose.

IV.   PROPOSED SYSTEM

An automatic loom machine with a PLC (Programmable Logic Controller) can greatly increase the efficiency and productivity of a textile

manufacturing process. Here's a proposed system for such a machine.

User interface: The automatic loom machine will have a user interface that allows the operator to control the machine and monitor its performance. This can include a touch screen display that shows real-time data about the weaving process and allows the operator to input settings. Overall, an automatic loom machine with a PLC can greatly improve the efficiency and accuracy of a textile manufacturing process. With careful design and programming, such a machine can produce high-quality textiles with minimal operator intervention.

V.   EXISTING SYSTEM

A pic controller based automatic loom machine is a type of textile manufacturing machine that uses a pic controller for automated control of the loom. A pic controller is a type of programmable logic controller (PLC) that is used for automation in various industries, including textiles.

In a pic controller based automatic loom machine, the controller receives input signals from sensors that monitor the loom's operation, such as yarn tension, speed, and position. Based on these inputs, the pig controller sends signals to various actuators, such as motors and solenoids, to adjust the loom's operation and maintain consistent and high-quality output.

Overall, a pic controller based automatic loom machine is a valuable tool for textile manufacturers

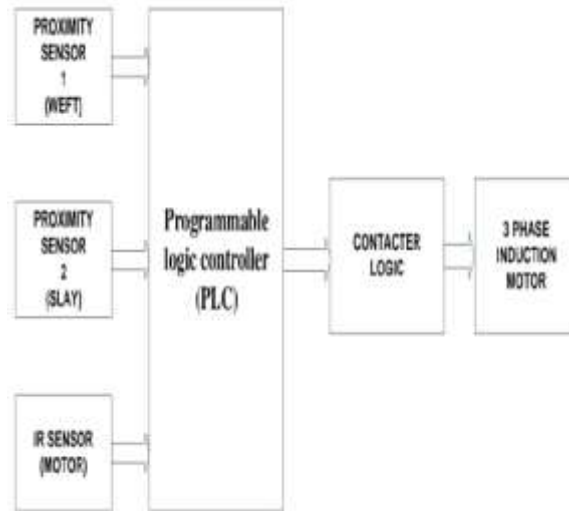looking to increase efficiency, reduce costs, and improve quality control in their operations.

FIG -3 Block Diagram Of Existing System

VI.   HARDWARE SYSTEM

The hardware part of system compromises of following modules,
PLC Allen Bradley Micrologix 1100:
Input Power: 24V
DC Digital Input :(6) 24V

DC Digital Output :(6) relay
Analog Input: Embedded, 2 in local, with additional 1762 analog modules
Ethernet Ports: (1) 10/100 Mbps
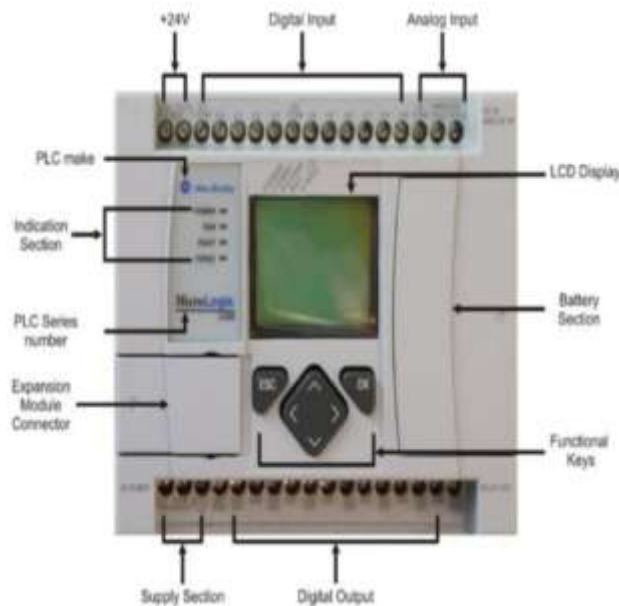Port Serial Ports: (1) RS-232/RS-485 Combo Port

FIG-2: micrologix 1100

VII.   CONCLUSION

In this proposed is automatic loom machine with **PLC** are an essential tool for modern textile manufacturing. They can be easily programmed to weave different patterns and fabric, and the machine settings can be quickly adjusted to adapt to changes in the production process.The programmable logic controller is based Electronic weft stop sensor will help to detect the thread break, more accurately over traditional mechanical

system.In this system will reduce cost effect and less man power.This will result in quality assurance of fabric.

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