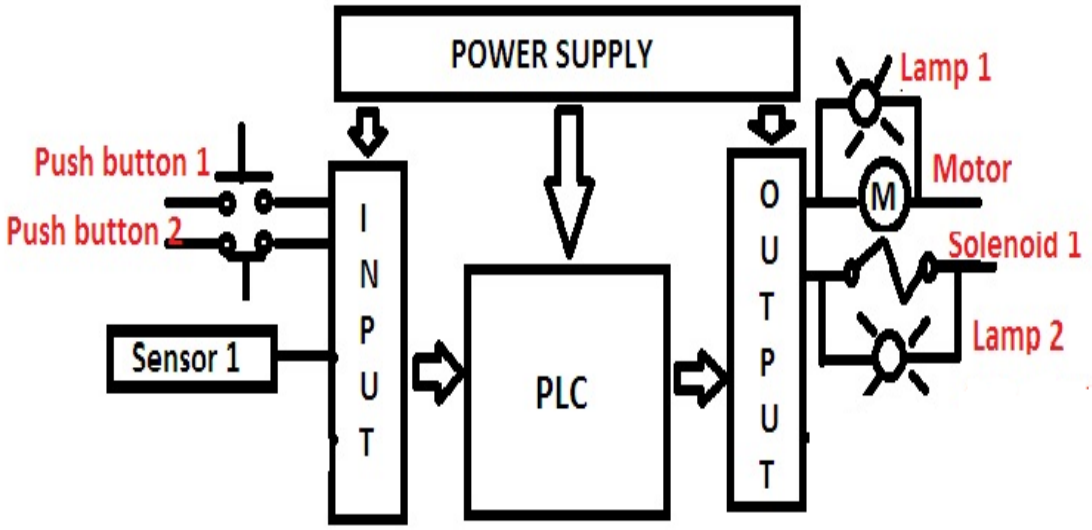
AUTOMATIC STAMPING LABELING MACHINE USING PLC

OVERVIEW:

All product automation processes require stamping as a last step to brand the finished product. Different types of products require different types of stamps. Here we demonstrate a complete stamping system that stamps the logo on the finished product.

The system is automated and controlled by PLC. The system consists of a conveyor belt driven by a DC motor. The process is started using a start push button, and when the product reaches the stamping base, the sensor senses the product and the stamp mounted on the pneumatic cylinder is activated with the help of a solenoid valve which initiates the stamping process. After this the final stamped product is moved ahead and collected in the tray.

BLOCK DIAGRAM



COMPONENTS/INSTRUMENTATION:

- Allen Bradley Programmable Logic Control (PLC)
- Push Buttons
- Led's
- Relay card
- Metal Detector Sensor
- IR Sensor
- Self-inked stamp
- Conveyor Belt
- DC Motor
- Pneumatic Cylinders

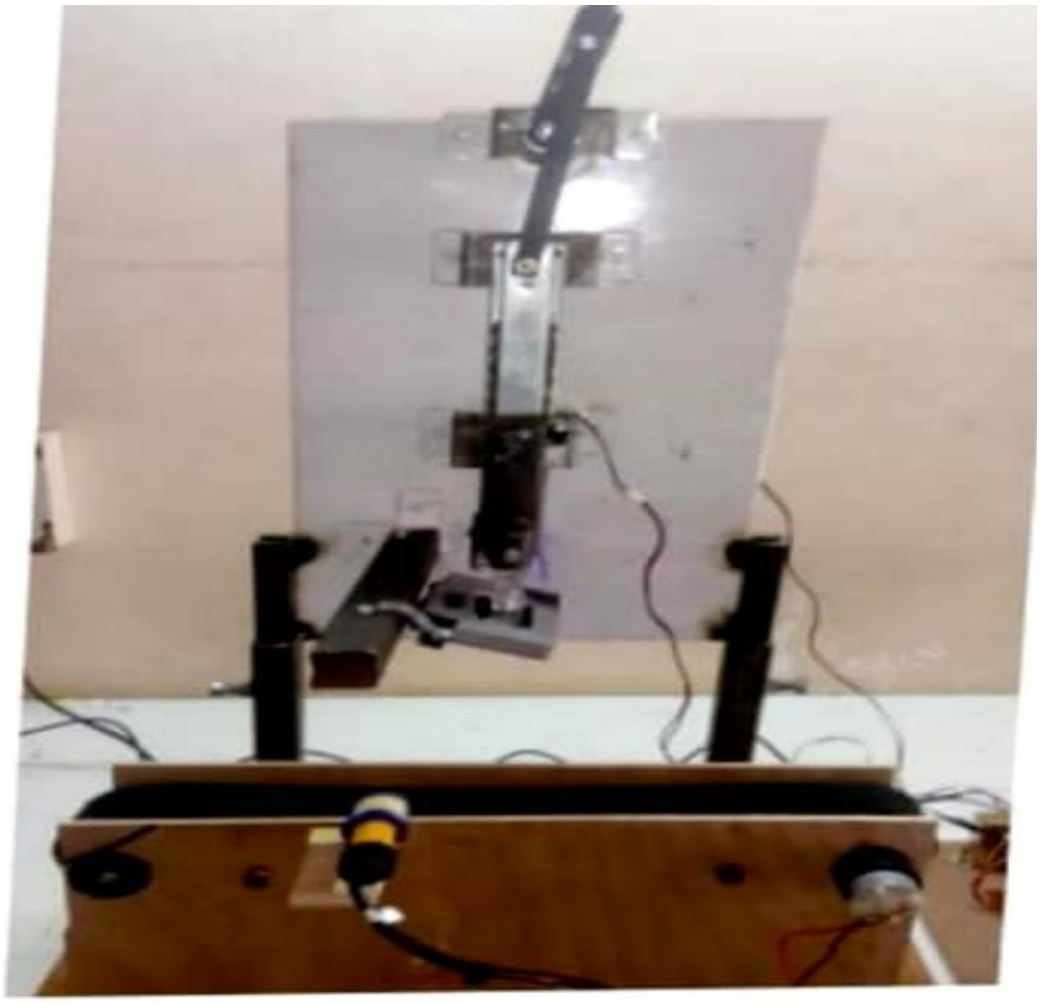
Abstract: This project is based on the concept of Automatic Rubber Stamp object printing machine by using plc. In order to ensure the reliable printing mechanism this replaces traditional hand stamping on any object. In this automated system we replaces traditional hand stamping method by automatic Printing. Now this automatic object printing machine consist of conveyor belt mechanism on which we place any object to be printed also we interface two sensor that IR sensor and limit switch to detect the object . we use DC motor to run the conveyor belt and when the conveyor starts IR sensor will detect the position of the object. When object is detected IR sensor will indicate a signal to the PLC and the PLC will stop the conveyor motor, the second motor will start to print the stamp on the object. After specified time the conveyor will start again and process will continue to print next object.

The conventional method for object printing and counting is manual, time consuming and in non-automatic form. Continuous printing and counting leads to hand and eye fatigue and requires lots of efforts and also affects the accuracy to results so the manual method must be replaced by computer vision as the result of this method is erroneous and time consuming

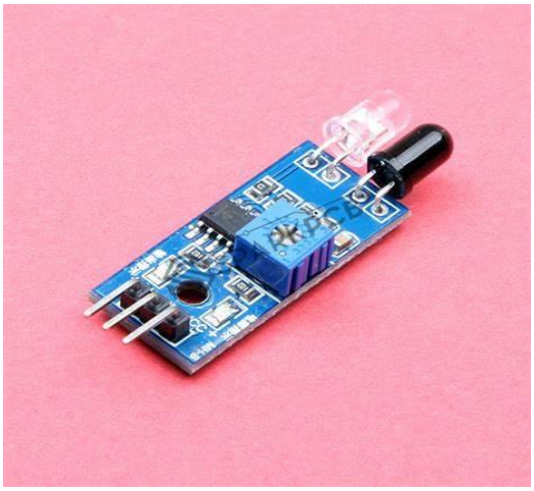
Automatic printing of object has received significant attention because automatic printing is reliable and reproducible. This not only reduces manual efforts but also gives more time for marketing also prevent danger which might occur when human being works in hazardous environment. Automation greatly improves the productivity and it is highly scalable.

In this project, we propose a system which uses low cost and open source software for achieving the goal of printing the objects. We use PLC with IR Sensors to detect the object. The proposed model has a conveyor belt run with the help of dc motor and corresponding pulleys at the motor and its opposite ends which constantly run at a desirable speed with the help of PLC. The conveyor belt is starts with the help of 16 rpm DC motor and then the Material is fed on the feed-side of the belt

This mechanism with the IR sensor it will detect the object on the conveyor as the object is detected the conveyor motor stops after that the stamp motor of 20 rpm will start and the printing on the object is done and meanwhile the counting of object will display on the PLC display, after that the stamp motor will stop and the conveyor motor start and then next object will landed on the rotating conveyor belt and that will be detected by IR Sensor. The pulley that drives conveyor belt is called drive-pulley or transmission drum the other one only used to change conveyor belt movement direction-is called bend pulley. Drive pulley is driven by the DC motor. It can also have a guiding pulley which just guides the motion of the conveyor belt between the drive and the pulley.



ROLE OF SENSOR



The IR sensor will detect the object on the conveyor as the object is detected the conveyor motor stops after that the stamp motor of 20 rpm will start and the printing on the object is done.

PNEUMATIC ACTUATORS

- Pneumatic actuators utilize pneumatic energy provided by a compressor and transforms it into mechanical energy by means of a piston or turbines.
- Pressurized air is used to transmit and control power.
- Pneumatic actuators are devices that cause things to move by taking advantage of potential energy.

ACTUATORS IN ROBOTS

Robots achieve the ability to move or execute specific mechanical tasks with the help of various types of actuators, such as electric, hydraulic, pneumatic, etc. Often called the muscles of robots, actuators significantly impact a robot's functional features, i.e., degrees of freedom (DOF), speed or velocity, accuracy, repeatability, load capacity (payload), etc.

One of the prevalent types of actuators is electric motors such as servomotor, stepper motor, and direct current (DC) motors. A motor allows the robot to control a wheel, a switch, or even an arm.

Robot manufacturers usually use electric actuators since they are fast, efficient, and accurate. They are easy to control, can achieve high velocities (1000 – 10000 rpm), and have ideal torque for driving.

INTERFACING PROXIMITY SENSOR WITH ANY PLC

The PNP sensor is a type of sensor that detects (load externally wired to negative terminal) **The sensor (-) wire is connected directly to the PLC input**. NPN (non-polarized) sensor (load externally wired to positive terminal) The sensor (+) wire is connected directly to the PLC input.