INSPECTION AND STORAGE OF PRODUCT USING PLC

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Abstract - Industrial Automation has gained importance owing to the ever-increasing demand for more productivity, better quality standard, optimum utilization of available resources and manpower. In India, product handling system having wide scope in modification and development. Product handling system uses different types of sensor, along with pneumatic system. Designing of control system for this system will incorporate the following technical aspects.

- PLC selection, configuration and programming
- Pneumatic system designing
- Selection of sensors
- Procurement of conveyor Accessories

Key words - PLC, Proximity sensors, Conveyor, Pneumatic cylinder, Stepper motor,

I. INTRODUCTION

The objective of this paper is automatic inspection and storage handling system. Inspection is done either manually or by using automation. Inspection of finished product in manufacturing industries for quality is one of the important factor. Finish product required continuous monitoring and inspection at frequent intervals. There are possibilities of error at measuring and various stages involved with human workers and lack of knowledge. Here we are going to discuss about the automation of a quality inspection process and storage of material in industry and its advantages over the manual inspection methods. These processes can be done by using PLC automatically and without human efforts with minimizing errors.
For product sorting [1], first product is placed on conveyor belt. While moving with conveyor belt, it is sense by two proximity sensor and one separator mechanism. Out of which first proximity sensor is used for detecting product of appropriate size and second proximity sensor is used for finished product counting. In between two proximity sensors and separator mechanism is used rejecting product, if it does not have desire specifications. The output of proximity sensor two is connected to input module of plc, which performs the function of total finished products counting. further product are dropped into the box at the end of conveyor when counter count 5 products, the direction control valve connected to pneumatic double acting cylinder get energized by output module of PLC. So finally cylinder lifts box and it stored at particular rack location.

**Flow chart of actual process**

![Flow chart](image)
PLC Programming

Once the pneumatic system is design the next step is to create a suitable ladder logic diagram for the inspection of dimension of the product. The programming is based on the arrangement of pneumatic cylinder the ladder logic diagram is a method in which each logical step of the whole process divided into ladders the ladder contains the logic in the form of relay, switches and coils through which the program will be executed. The program is done using software in the computer which will import the program into the PLC kit through the interface connection apart from the cylinder arrangement various factor are also to be considered for the programming[2].

![Block diagram of PLC](image)

Programmable Logic Controllers

It is defined as a digital electronic apparatus with a programming memory for storing instructions to implement specific functions, such as logic, sequencing, timing, counting and arithmetic, to control machines and processes. It was first developed by General Motors in 1968 to eliminate costly scrapping of assembly line relays during model changeovers.

A programmable logic controller (PLC) or programmable controller is a digital computer used for automation of electromechanical processes, such as control of machinery on factory assembly lines, amusement rides, or lighting fixtures. PLCs are used in many industries and machines, such as packaging and semiconductor machines. Unlike general-purpose computer, the PLC is designed for multiple inputs and output arrangements, extended temperature ranges, immunity to electrical noise, and resistance to vibration and impact. PLCs offers following advantages in comparison to electromechanical relays.

- Economy
- Small physical size
- Suitable modular design
- High reliability
- Ease of programming
- Rugged construction
- Ability to communicate with computer
Proximity sensor

Many types of proximity sensors have been built the simplest sensors are proximity switches capable of merely detecting the presence or absence of an object in the sensors proximity. More complex proximity sensors have the capability of determining continuous three dimensional positions and other information such as intensity and orientation. Different proximity sensors employ various media including magnetic field, electric filed, electric field, air pressure, ultrasonic sound, and light recent advance in inexpensive electro-optical component also has made optical methods attractive.[4]

Light source

Each light source is comprised of a high power emitting diode (LED), an aperture, and a converging lens. This configuration was chosen due to its small size, acceptable intensity, and small divergence of the beam. The light source is designed so that the smallest spot diameter is realized in the operational range of the proximity sensor. The LED used is a Litronix SFH 400-3. It is a narrow beam (±6° at the half power point) infrared emitter with 950 nm peak emission wavelength. The LED is over-driven for a short period of time and the estimated output power is 1.5 mW. The focal length of the collimating lens is 26mm, and together with an aperture of diameter 1.4mm we obtain a spot of diameter about 2 mm in the operating range. An elliptical spot is created when the light beam is projected onto a slanted surface. As will be mentioned, the elliptical shape and the finite size of the light spot do not become a serious problem because of the ability of the sensor chip to find the intensity center.

Advantages
1] Save man power
2] Reduce the time

Application
1] Electrical construction and maintenance
2] Mechatronics Industries

II. CONCLUSION

This paper accomplished the automation of product handling system. Allen Bradley Micrologix 1200 PLC and GX developer software for programming used for implementation. The main purpose of this paper is to monitoring and storage of product by reducing man power with less time in industries and unwanted product or material can be separated. Through this system product failure rate is calculated.
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