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IMPLEMENTATION OF PLC BASED FOOD PACKAGING MACHINE

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***Abstract* -- The scope of this paper is to introduce a packaging machine using Programmable Logic Controller (PLC) in automation industry. The main aim of the paper is to design and fabricate a small and a simple packaging system using PLC.The food materials are dropped into the hopper and the DC motor is used to shake the food materials. The weights of the three loads are measured accurately by using weighting unit. All the components of this block are controlled using the PLC. Weights are displayed in the display unit. PLC and display are interfaced together.PLC technology have been increasing rapidly and proving its role in automation beneficially. PLC is used to control and automate the system. The result was able to fully automate the packaging system. In addition the system able to decrease product time and increase the product rate as compared with traditional manual system. The purpose of this paper is to develop a automation technique using PLC.This paper is implemented by means of hardware.**

***Index terms*- automation ,PLC, packaging,.**

I.INTRODUCTION

The main purpose of this paper is to increase the speed and consume the time. Packaging is a stage that is important because to make product safe and good in condition. PLC is a digital electronic device that uses a programmable memory to store instruction. It scans memory, input and output in determined manner. Packaging machines are machines that complete stages of the packaging process. Food packaging is packaging of food. Filling machines are used for packaging, mainly for food/beverage but for other products as well. This project will help to try help and improve the packaging system to make the process run systematic and make the product good in condition. This paper is to design and construct a food packaging machine using programmable logic controller.

II.LITERATURE SURVEY

Automation is mostly used in various industry for increasing speed, accuracy and effectiveness of the production and also reduce risky hazards. This paper is used to check the weight of the object in automation technique. Wires were used for connecting the input. Separate machines were used for packaging. Usage of separate machines will consume more time. Human workforce is used in filling and packaging industries in the existing system. No automation machines were used[1]. They used PLC for Traffic control. In this work they use load cell for weighting vehicles.[2]. They have used and implement fire detection for security purpose in ships using PLC.[3] developed PLC based elevator system for color sensing capabilities for material handling in industrial plant. In this system they used PLC for controlling the elevator and used some sensors to give input to the PLC. Compared with the traditional weighing instrument control, application PLC and touch screen control system composed of easy to switch settings, reset and set and improve the machine speed and accuracy

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III.PROBLEM IDENTIFICATION

The problems of packaging machine now-a-days are when company has demand of the product higher than ordinary. So, the operators employed in work at packaging section must finish before the due date. However, it will make problems like the product is broken or cannot use and also they are expensive because the component and the material that they use are of a high quality. The sizes of the machine also take a lot space in the factory. In the filling section, filling can only be done. This increases the cost and time consumption is very high. In the checking section, the load was set through manual operation.This increases the accuracy in weight measurement. In the sealing station, the products are sealed for distribution. In the proposed system, all the three process are integrated together.A single machine performs all the packaging functions. The system is totally an automated system with the aid of automatic machines. It will perform filling, checking and sealing station in a single machine.

IV. OBJECTIVE

The main aim of the paper is to design and fabricate a small and a simple packaging system using PLC. The objective of this paper is to design and automation that can be used as an food production industry by using PLC techniques. The main objective of the project is PLC controlled-automatic food packaging machine with PLC integration. To develop a filling machine which can fill different sizes on the bases of loads same principle can be used in different industries like medicine, agriculture ,plastics, cement, pigments, salt,

chemical industries for filling grains to different sized component by one machine.

V.PROPOSED SYSTEM

In proposed system, cables are used for connecting the inputs. A single machine performs all the packaging functions. The system is totally an automated system with the aid of automatic machines. It developed automation technique using PLC and increase the speed and accuracy of the process of production. It used one load cell for measuring the weight. Especially in pharmaceutical and chemical industry packaging automation will avoid many humans to handle hazardous components. . It is mainly used increase the speed and accuracy and there is an elimination of wires.

VI.SYSTEM ARCHITECTURE

The block diagram of food packaging machine is shown.

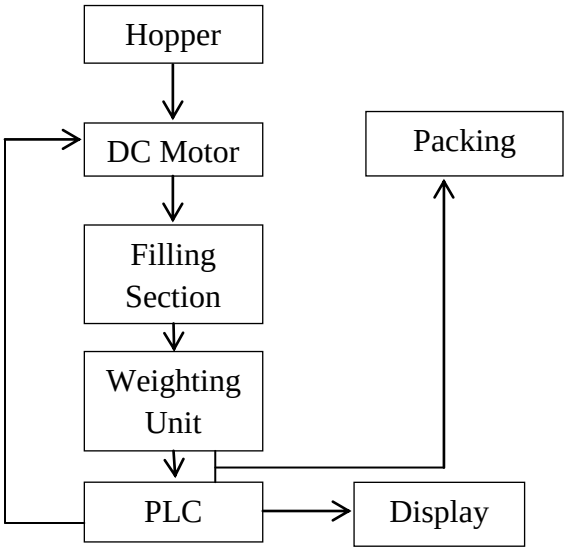

Fig 1. Block diagram of food packaging machine

PLC is heart of our project. PLC is a digitally operating electronic device which uses programmable memory for the internal storage of instruction by implementing specific function such as logic sequencing, timing, counting and arithmetic to control through digital or analog input/output, various types of machines.

A. HOPPER

The food materials are dropped into the hopper.It is a container for a bulk material that tapers downward and is able to discharge its content at the bottom.

Fig 2. Hopper

B. DC MOTOR

DC motor is used as output actuators for the machine to move the food materials to the filling section. It is mainly used to convey the food materials. DC Motor shakes the food material and send to the filling section.

Fig 3.DC Motor

C. FILLING SECTION

Food materials are filled according to their needs in the filling section.It is used to fill the food materials depending on the product. Filling machines are used for packaging, mainly for food/beverage but for other products as well. These are used to fill either a bottle or a pouch, depending on the product.

D. WEIGHTING UNIT

In the weighting unit, the weights are measured with 100% accuracy and the values are displayed in the display.The weights are displayed according to the predefined values i.e the value of 1kg is set, the packaging is filled at regular intervals (with values 900g, 950g and 1kg). A weighting unit

automatically checks the weight of packaged commodities. This increases the accuracy in weight measurement.

E. PLC

All the components of this block are controlled using the PLC. The food material from the hopper is passed to the filling section through the DC motor. The DC motor is controlled using the PLC.Using PLC, the measured weights are displayed in the display unit. The packaging unit is also controlled by the PLC.Programmable logic controller is used for control different processes in industry, automotive, intelligent buildings and other applications. A programmable logic controller is a digital computer used for automation of electromechanical processes. The term logic is use primarily concerned with implementing logic and switching operation.PLC is a digital electronic device that uses a programmable memory to store instruction.It scans memory, inputs and outputs in predetermined manner.

Fig 4. PLC Kit

F. DISPLAY

Weights are displayed in the display unit. PLC and display are interfaced together. It consists of an array of tiny segment that can be manipulated.

Fig 5. LCD Display

G. RS-232

PLC communications facilities normally provide the serial transmission of information. RS 232 is used in short distance computer communication. It is an asynchronous communicationmethod. RS 232 is simple and universal. It is used to interconnect both the display and weighting unit by using PLC.

H. PACKAGING UNIT

In the end, all the entities are tends to the packaging unit for packaging the food materials. It is used to combine both the filling and weighting section in the packaging unit.In the packaging unit, the products are packed for distribution. A single machine is used to pack all the products to reduce the delay and the cost.

VIII.CONCLUSION

This paper is about an efficient packaging machine which uses automated machines to control the packaging area of an industry. PLC components can be used effectively in order to increase the speed and the accuracy. This paper will use to make the system running step by step by using PLC. The PLC was more reliable than relay, contact. Automated factories and processes are too expensive to be rebuilt for every modification and design change. So they have to be highly configurable and flexible. To successfully reconfigure an entire production line or process requires direct access to most of its control elements. PLCs are evolving and continue to be the best option for a variety of industrial automation applications. In industry the production speed should be high because the demand of the product is more. But when we check weight of the object manually then it will take more time for checking the weight and overall speed will decrease. So by using this food packaging machine we totally overcome this problem.

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