



IJIRCCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 11, Issue 5, May 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.379

9940 572 462

6381 907 438

ijircce@gmail.com

www.ijircce.com

Automatic Packaging Machine Using PLC

Ankesh Sharma, Vasu Verma, Vritika Rathore, Yesveer Singh

Dept. of Electronics & Communication Engineering, SRMS College of Engineering and Technology, Bareilly, U.P, India

ABSTRACT: Automation, a Greek word means self-dedicated. Automation is the key to modernization and has been conceptually understood to increase efficiently and to improve productivity. The process of having machine follow a predetermined sequence of operation with little or no human labor, using special equipment and devices that perform and control manufacturing processes is known as automation. The goals of automation are Integration of various aspects of manufacturing operation to reduce labor cost.

An automatic packaging machine is a system that is designed to automate the packaging process of goods or products. The machine uses a programmable logic controller (PLC) to control the operation of the system. The PLC is responsible for receiving input signals from sensors, controlling the movement of actuators, and providing output signals to control the operation of the machine. The system includes components such as a conveyor belt, hopper, packaging material, and weighing system. The packaging process involves the movement of the product from the hopper onto the weighing system, followed by the packaging material being cut and sealed around the product. The packaging machine using PLC provides a reliable, efficient, and cost-effective solution for the packaging process. The use of PLC ensures that the machine can be easily programmed and controlled to suit the specific packaging requirements of different products.

I. INTRODUCTION

Packaging machines are essential in modern manufacturing, as they automate the process of packaging products, resulting in faster, more efficient, and consistent operations. However, there is always room for improvement, and advancements in technology have led to several improvements in packaging machines. In this literature review, we will discuss some of the improvements that have been made in packaging machines.

Automation: The use of programmable logic controllers (PLCs) has significantly improved the automation of packaging machines. PLCs can control different packaging operations, including filling, capping, labeling, and wrapping. The use of PLCs has resulted in more reliable and efficient packaging machines, which can operate at higher speeds and with greater accuracy.

Flexibility: Modern packaging machines are designed to be more flexible, which means they can handle different types and sizes of products. This is achieved through the use of modular designs and quick changeover mechanisms, which enable the machine to switch between different packaging formats quickly.

Integration: Packaging machines are now designed to be more integrated with other systems, such as quality control and inventory management. This enables manufacturers to have a better understanding of their production process and make real-time adjustments to improve their operations.

Sustainability: There has been a growing focus on sustainability in packaging, and this has led to the development of eco-friendly packaging machines. For example, some packaging machines now use biodegradable materials or reduce the amount of packaging material used.

Safety: Safety features in packaging machines have also been improved. For example, sensors and cameras are now used to detect any dangerous situations and stop the machine automatically to prevent accidents. Additionally, modern packaging machines are designed with safety guards and emergency stop buttons to protect operators from potential hazards.

Data Analytics: Data analytics is becoming increasingly important in the packaging industry. Modern packaging machines are equipped with sensors that collect data on various parameters such as production speed, temperature, and humidity. This data can be used to optimize the production process, reduce downtime, and improve product quality.

II. LITERATURE REVIEW

In this literature review, we will discuss the different applications of PLCs in packaging machines and their impact on the packaging industry.

One of the main advantages of PLCs is their flexibility and the ability to be programmed for specific tasks. PLCs can control different packaging operations, including filling, capping, labeling, and wrapping. In a study by M. Akhondi and A. Safari, PLCs were used to automate the packaging process of potato chips. The PLC controlled the filling, sealing, and labeling operations, resulting in a significant improvement in the packaging speed and accuracy. In another study by H. Cheng and Q. Liu, a packaging machine was designed for liquid soap bottles, which used a PLC to control the filling and capping operations. The machine was capable of filling and capping 20 bottles per minute, and the use of a PLC resulted in a more reliable and efficient operation.

The use of PLCs in packaging machines has also resulted in improved safety features. In a study by M. Paolone and S. Rizzo, a packaging machine was designed for the packaging of cheese, which used a PLC to control the cutting and packaging operations. The use of the PLC resulted in a safer operation, as the machine was able to detect and prevent any dangerous situations.

PLCs have also been used in the food packaging industry to ensure the quality and safety of food products. In a study by H. Chen and Z. Zhang, a PLC-controlled packaging machine was developed for the packaging of frozen dumplings. The PLC was programmed to control the filling and sealing operations, and also to monitor the temperature and pressure during the packaging process. The use of a PLC ensured that the dumplings were properly sealed, and the temperature and pressure were within the recommended limits, resulting in a safe and high-quality product.

In conclusion, PLCs have become an essential part of packaging machines, and their use has greatly improved the efficiency, reliability, and safety of the packaging process. The different applications of PLCs in packaging machines have also resulted in a wide range of benefits, including improved speed, accuracy, and product quality.

III. PROBLEM STATEMENT

To design automatic packaging machine using Programmable Logic Controller (PLC) for the industries.

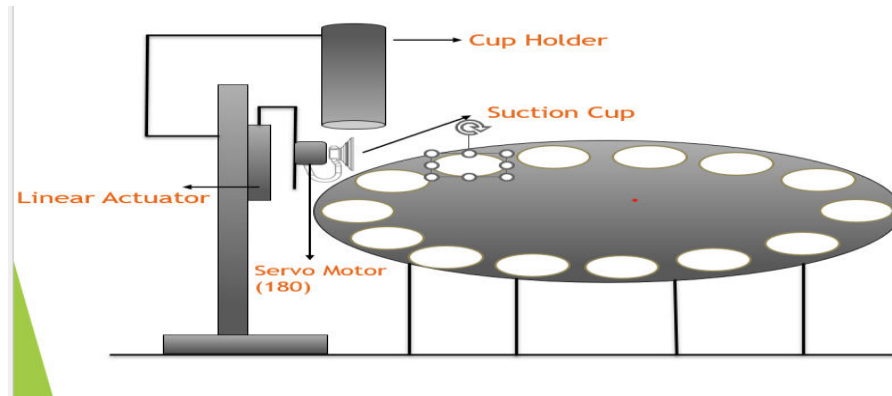
IV. METHODOLOGY

First, we understand the problem or what type of packaging wants by the company. In SRMS we are understanding the concepts of PLC and making an Ice Cream Packaging Machine. Working of Ice Cream Packaging Machine: -

- ▶ A rotating circular plate which must space to hold cup of Ice Cream.
- ▶ Filling the ice cream in ice cream cup.
- ▶ It will completely fill cup in 1 sec (Time will change using PLC).
- ▶ After filling the cup, we are covered the cup or pack the cup.
- ▶ After packaging, we are removing the packed cups.

In the industry we are using this concept and also, we are using Conveyor Belt. In this process there are a motor which is rotating and controlled by the PLC. PLC will control when it will be rotating or not. We are using a sensor which is detecting the cup position which is fixed on the rotating plate. When motor is rotating cup is detected by the sensor the hold the motor or stop the motor then ice cream will fill in the cup then it will move. This part of work is done in the collage. Next step is to cover the ice cream cup and remove from the machine. PLC is connected to in between sensor and motor. It will send the signal to the motor when it rotates or not. When sensor is detected cup then it will give the high signal to the PLC which is stop the motor and fill the ice cream in the cup. When it will fill the cup then motor will start rotating when next cup will not be detected.

BLOCK DIAGRAM



V.RESULT AND DISCUSSION

The packaging machine prototype to be developed in this project can be used in any industry for packaging of different products in food industry such as for ghee, milk, soup, etc. The improvements in packaging machines have resulted in more efficient, reliable, and sustainable operations, while also improving product quality and safety. With the continuous advancements in technology, we can expect further improvements in packaging machines to meet the evolving needs of the packaging industry. The use of linear actuator makes it more efficient to use it. The servo motor moves on first half at 90 degrees to hold the cup of packing. And at second half of 90 degree, it sealed the ice-cream cups or cones. This saves the time and reduce the man power of system. And provide more efficient result.



Fig 2: Ice cream filling machine

VI.CONCLUSION

The packaging machine prototype to be developed in this project can be used in any industry for packaging of different products in food industry such as for ghee, milk, soup, etc. The improvements in packaging machines have resulted in more efficient, reliable, and sustainable operations, while also improving product quality and safety. With the continuous advancements in technology, we can expect further improvements in packaging machines to meet the evolving needs of the packaging industry.



REFERENCES

1. <https://us.idec.com/idec-us/en/USD/Software/c/Software>
2. https://us.idec.com/idec-us/en/USD/Software/Automation-Organizer/c/Automation_Organizer
3. <https://us.idec.com/idec-us/en/USD/Software/WindLDR-PLC-Software/c/WindLDR>
4. https://us.idec.com/idec-us/en/USD/Software/WindO-I-NV3-FT1A-Touch-Programming-Software/c/WindOI_NV3
5. Tawanda Mushiri, Charles Mbohwa, International Conference on Operations Excellence and Service Engineering Orlando, Florida, USA, September 10-11, 2015.
6. Shashank Lingappa M., Vijayavithal Bongale, Sreerajendra, International Journal of Advanced Mechanical Engineering. ISSN 2250-3234 Volume 4, Number 7 (2014), pp. 803-811.
7. Melchizedek Alipio, Angelo A. Beltran Jr., International Journal of Scientific Engineering and Technology (ISSN: 2277 –1581), Volume No. 3, Issue No. 6, pp: 767 –770. 1 June 2014.
8. Mr. Abhishek Shigwan, Mr. Pankaj Shirke, Ms. Snehal Ukarde, Ms. Priyanka Salaskar, Mr. Guru Bhurshe, IJSRD - International Journal for Scientific Research & Development| Vol. 4, Issue 02, 2016 | ISSN (online): 2321-0613.



Impact Factor: 8.379



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

 9940 572 462  6381 907 438  ijircce@gmail.com



www.ijircce.com

Scan to save the contact details