

AUTOMATIC BOTTLE FILLING SYSTEM USING PLC

Shweta Suryawanshi¹, Dhananjay Shelke², Akshay Patil³,

Mangesh Tandale⁴

¹Assistant Professor, Department Of E&T C,,DYPIEMR,Akurdi,Pune

^{2,3,4}Student of BE(E&TC) ,DYPIEMR,Akurdi,Pune

ABSTRACT

Nowadays, the application of PLC is widely well-known. In this digital world PLC's application is used mostly and applied at the industrial sector. Normally, the PLC's that have been mostly used at the industrialized field is generally to control a mechanical movement either of the machine or heavy machine in order to create an production efficiently and accurate signal handling. In this project, a discussion about PLC application will be clarified in more details and identified. Whereby, a machine that used to prepare automatic mixing and filling into the bottle is fully controlled by the SIEMENS PLC S7-1200. This is acts as the heart of the system. The system order of operation is planned by ladder diagram and the programming of this project totally integrated automation portal software (V-10.5).numerous electronics and electric devices that usually controlled by using the PLC are submersible motor pump, sensor, conveyor belt, solenoid valve, push buttons, relays and other devices..

KEYWORDS – Plc, Photo Electric Sensor, Flow Sensor, Conveyor Belt, Solenoid Valve.

I. INTRODUCTION

A programmable logic controller (PLC) is a solid state device. It designed to before accomplish by electromechanically relays. PLC is a basically a controller logic state that is on-off controller. Hence arrangements of logic states are programmed. All operation is to control a process, operation of industrial equipment and apparatus. PLCs are in the processor family. They are used in commercial and manufacturing applications Initially the plc was used to replace relay logic, but now its ever-increasing range of function means that it is found in the many and more complex applications. As the structure of a plc is based on the same principle as those employed in computer architecture, it is capable of performing not only relay switching responsibilities but also other applications such as counting, calculating comparing and the processing of analog signals.

II. LITERATURE REVIEW

NAME SR.NO	TOPIC	AUTHOR NAME	YEAR OF PUBLICATION	METHODOLOGY USED
1.	By using programmable logic controller Automatic liquid filling to bottles of different height.	mallaradhya h m	Oct 2013	Bottles of different Heights are Filled using PLC
2.	Using PLC & SCADA Automatic Liquid Filling System	DheerajPongallu	December 2014	Bottle filling using PLC and Conveyor belt
3.	Automation of Bottle Filling Plant with Industry 4.0	Sagar T. Payghan1	March 2016	Bottle filling using the Industry 4.0

III. METHODOLOGY

PROPOSED METHODOLOGY:

1. Sensing the Bottles.
2. Dispensing the desired amount of liquid.
3. Moving the bottle over conveyor belt.

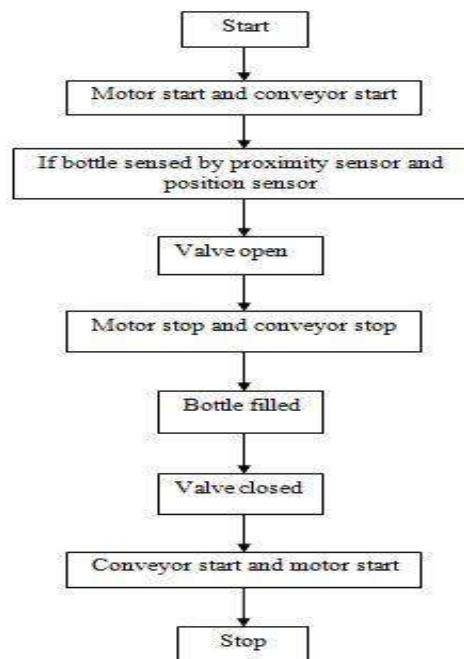


Fig.No.1 FLOW CHART FOR AUTOMATIC BOTTLE FILLING USING PLC

BLOCK DIAGRAM

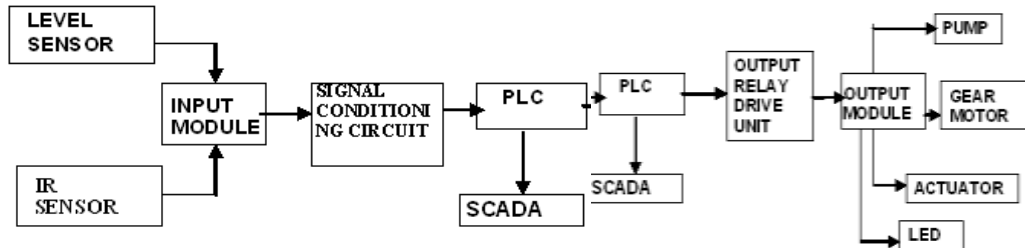


Fig.No.2 BLOCK DIAGRAM OF AUTOMATIC BOTTLE FILLING SYSTEM USING PLC

IV. COMPONENTS USED TO IMPLEMENT IDEA

1. Horizontal Level switch: NO type, Operating Voltage 24V DC, Current 5 to 20 mA DC, Magnetic type
2. Float Level Switch: Float type: NC type, Operating Voltage 24V DC, Current 5 to 20 mA DC
3. DC motor : Operating voltage 12VDC, 1000 rpm, 12 kg cm torque, No-load current = 60 mA (Max), Load current = 300 mA(Max)
4. Solenoid valve SLC2 : Operating voltage 24V DC, NC, Material: Plastic, 0 to 120 psi, 1/4"
5. Proximity Switch: Photo electric type, Outer diameter 18 mm, Operating voltage: 10-35 V DC, PNP, NO, 3wire, Sensing range 300 mm(Adjustable by pot)
6. Tank size – Upto 5 to 6 Liter
7. Conveyor size – Width(4inch) Length(65inch)

V. MODEL OF AUTOMATIC BOTTLE FILLING SYSTEM USING PLC

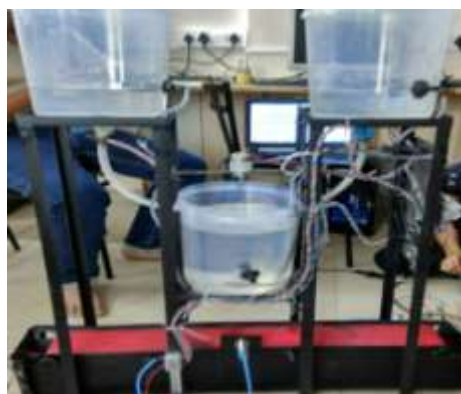


fig. MODEL OF AUTOMATIC BOTTLE FILLING SYSTEM

VI. ADVANTAGES

1. Reduce the human efforts
2. Replacing human work by technologies.
3. Economy improvement.
4. Perform the tasks which are beyond the human capabilities of size, weight, speed.

APPLICATIONS

1. It is used in process robotics
2. It is used to enhance the process
3. By using PLCs numerous applications are possible in the industry.
4. It is used to integrate the different handling level .

VII. CONCLUSION

The main objective of this paper is to develop a bottle filling system based on certain specifications. This system can perform the task of autonomous quality control system used in industrial manufacture and the most appropriate for small scale industries. We develop a bottle filling system based on arrangement of dispensing liquid. We obtain the excessive knowledge about the automation.

VIII. REFERENCES

- [1]. "Automatic Multivariate Liquid Filling System & Conveyor Control Using PLC & SCADA" , Dheraj Pongalu, Prof. S. R. Suralkar , International Journal of Emerging Technology and Advanced Engineering (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 4, Issue 12, December 2014)
- [2]. "Automation of Bottle Filling Plant with Industry 4.0" , Sagar T. Payghan¹, Rani H. Deshmukh², Puja P. Magar³, Vinod M. Manure⁴, International Journal of Advanced Research in Electrical ,Electronics and Instrumentation Engineering (An ISO 3297: 2007 Certified Organization) Vol. 5, Issue 3, March 2016
- [3]. "Application of PLC for Arranging Bottle in Beer Filling Production Line" ZHANG Tianxia, DONG Feng , YUAN Hao Tianjin Key Laboratory of Process Measurement and Control, School of Electrical Engineering and Automation Tianjin University, Tianjin 300072, China.
- [4]. "Introduction to Programmable Logic Controllers" - Dunning Gray (1998) , Delmar publishers, pp.421-428.