AUTOMATIC CAR WASH USING PLC

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Abstract : Automation is new era of technology which performs operations without human assistance. In present environment Automation helps in reducing cost, time as well as human efforts. Use of public and private vehicles for transportation is increasing rapidly and it will increase more in future. Exterior cleanliness of a vehicle should be maintained for better performance of exterior sensors and their respectively controlled subsystems, outside visibility and a good attire. Our paper focuses on such exterior washing of a car using PLC. In some foreign countries like America and United Kingdom car washing system is already in use. Yet in developing countries like India it is not being used extensively. Hence there is very large scope available for development and design of a system. As the time required for washing process is less this system can be implemented at fuel stations, garage also because of less space requirement this system can be implemented at township level. Our car washing system includes car detection and exterior washing by controlling the operations of conveyor belt and various motors and pumps.

IndexTerms- PLC, Automation, Proximity Sensor, Relay, Conveyor, water pump**.**

I. INTRODUCTION

Car washing is relatively simpler process in order to keep exterior of a car clean. Mostly manual workers do this job. It results into increase in time consumption and low quality of service. The automatic car wash system proposed in this paper removes human operator involvement. This is done using PLC.

Our car wash system includes prewashing, foaming, brushing, final washing and drying. All these processes are controlled by a single Programmable Logic Controller (PLC). In the initial stage car is detected on the conveyor belt using proximity sensor. We are using only one proximity sensor. Then conveyor starts rotating and water as well as

foaming processes starts after pre-decided time period. The processes of brushing and drying are followed after prewashing and final washing respectively.

The components used for prewashing and final washing are same. It reduces space and cost requirements. To get these benefits the conveyor is rotated in forward and reverse direction. Using automatic car wash system many cars can be cleaned with exact same efficiency.

II. BLOCK DIAGRAM AND WORKING PRINCIPLE

A) Block diagram

Fig 1. Block Diagram
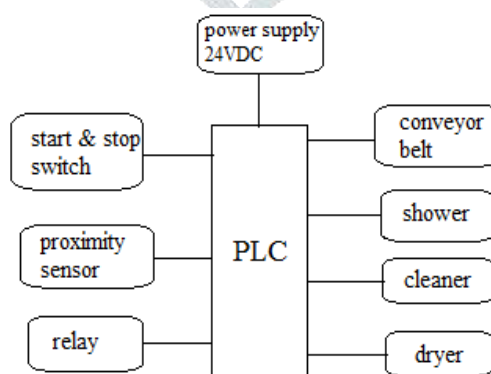
B) Block Diagram Explanation

1. Programmable Logic Controller types either analog or digital. Here in is used as all input and output signals on number of required inputs and selected. Here one input and six outputs PLC of 8 inputs and 8 outputs is used. for operation of the PLC. PLC has which program of process/operation and effective programming- uses ladder diagram programming reprogramming if required is very easy Depending upon input status and stored are decided. available in the market is of two this proposed system a digital one are in digital form only. Depending outputs, appropriate PLC can be of PLC are used. Hence digital 24VDC power supply is required microprocessor and memory in can be stored. PLC provides easy reprogramming technique. PLC hence its programming and and less time consuming. programmed logic, output actions

2. Proximity sensor detects the presence of any object without any physical contact. Proximity sensors are of two types inductive and capacitive for detection of metal and plastic target respectively. Here we are using a photoelectric proximity sensor for detection of car on conveyor.

3. Switched Mode Power Supply simply SMPS is used to obtain 12V and 24V DC power supply from 230V AC mains. For working of PLC 24V power and for relays, motors and pumps 12V is required. SMPS does rectifying job with higher conversion efficiency.

4. Conveyor is used for transportation of car from one place to other for performing various operations over it. A brushless DC gear motor is used at one end to drive the conveyor belt in both directions as per requirement. Whereas on other end simple pulley is used.

5. For operation of Conveyor in both directions Relay circuitry is required. It allows use of same motor for operation in either direction. Relays also provide protection to PLC connected to it. Motors and pumps are connected to PLC's outputs through relays.

6. One motor is used for operation of conveyor and two separate motors are used for brushing process.

7. On the similar line two pumps are required for plain water and foam water.

8. DC fans are used for drying process. They are directly connected to PLC output as they work on 24V DC power supply.
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III. Software implementation
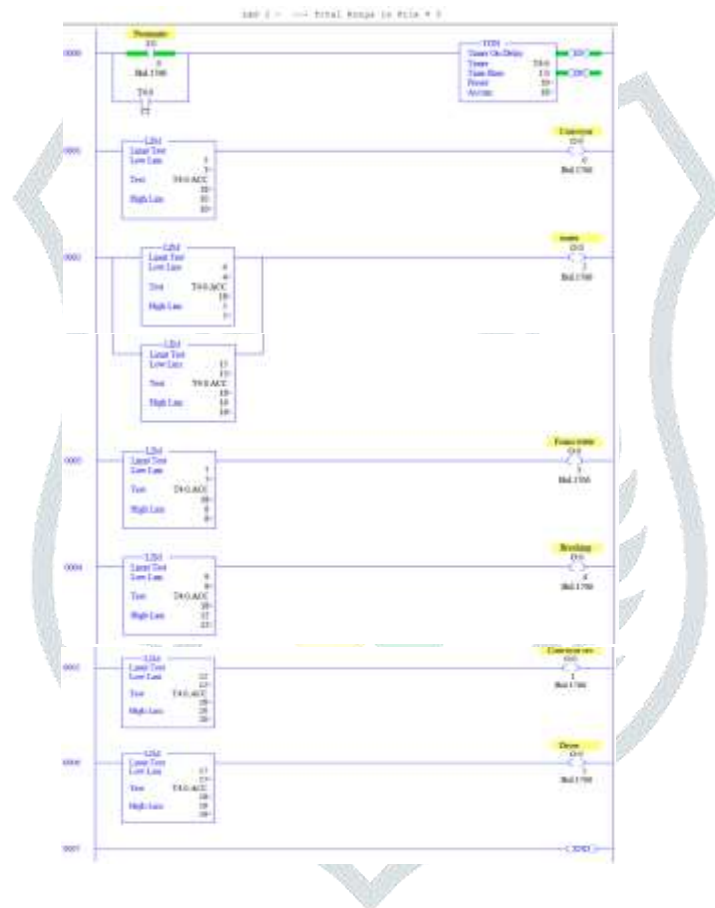
IV. Results

Fig. 3 Working Model (a)

Fig. 4 Working Model (b)

V. CONCLUSION

In this paper we have proposed a new design for car washing system which requires less space and very cost efficient as the requirement of large moving mechanical assembly is removed.

VI. REFERENCES

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