

Trainer of Traffic Light System Based on PLC

K Kurniati* and Y Mulyadi

Department of Electrical Engineering Education, Universitas Pendidikan Indonesia,
Jl. Dr. Setiabudhi No. 207, Bandung 40154, Indonesia

*karlinkurniati@student.upi.edu

Abstract. Currently traffic congestion becomes one of the problems especially in big cities. Therefore, the traffic system needs to be applied in order to avoid severe traffic jams and traffic accidents. This research discusses about traffic system at an intersection that is simulated on the trainer that made in such a way that resembles the street intersection of five in general with based PLC Omron CQM1H-CPU51 series. This traffic system simulation works using a timer that has been set in such a way. On the trainer, there are five paths in which each path is installed green, yellow and red lights and 2 buttons to start and end the program. The green light is on for 25 seconds and the yellow light is on for 5 seconds while the red light keeps on when the green light at another intersection lights up.

1. Introduction

Currently, the traffic system becomes one of the most important things, especially in densely populated urban areas, the more people who have vehicles and roads that remain and many intersections will cause serious congestion. Therefore traffic control system needs to be designed time calculation certain and controlled data can be monitored via computer [1-3].

The task of the traffic system is to arrange a certain time at each lane meeting to pass the car to avoid accidents and accumulation of vehicles in several lanes and also to give time for pedestrians to cross. Traffic light instructions are marked with green, orange and red lights [3-5].

In this research using programmable logic control (PLC) for setting traffic lights of 15 lamps for the intersection of five rows each still 3 lights per line with different colors i.e. green, orange and red as a hint for the vehicle.

2. Methods

In this study using PLC Series CP1L-L20 which has 8 inputs and 16 outputs. In this system used 2 inputs and 15 lamp output because of the amount of output, less expansion unit used to increase the amount of output that can be used. Lights are placed on miniature roads connected to PLC using block terminals [1].

Using source 220 VAC and 24 VDC resulting from internal PLC. The system works when the green button is pressed, the system will turn on continuously and reset when the red button is pressed. Figure 1 illustrates the block diagram system.



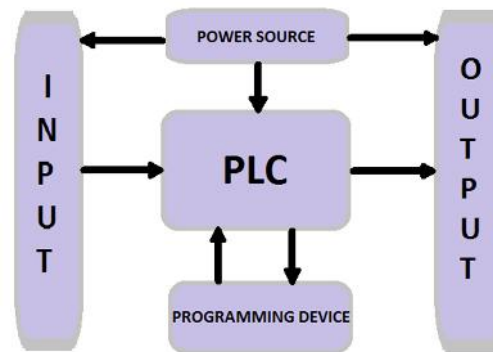


Figure 1. Block diagram system.

This project uses ladder programming language diagram and in the program by software CX programmer 9.6. In this software, the program of traffic light system is designed by utilizing the facilities available in the software such as timers.

This program is designed by an internal timer on the PLC. The timing of each lamp can be seen in figure 2 with the overall time in one cycle up to 60 seconds.



Figure 2. Time diagram.

The component used is a component that has a functional equation with the actual tool. The components used have dimensions and small size simulations can be made with a size that is not too large. In this project a traffic light indicator using a 24VDC lamp pilot placed on a board that has been designed to resemble a five-junction road.

3. Results and discussion

After several experiments, there are several conditions that occur in the process of this traffic light system. At initial condition, all lights are off, after the start button at press system on condition 1 as seen in figure 4 after 25 seconds switch on condition 2 for 5 seconds before switch to condition 3 for 25 seconds and switch to condition 4 with time for 5 seconds as well as on condition 5 lasted for 25 seconds and condition 6 for 5 seconds before return to initial condition. The system will not stop and reset it before the stop button is pressed.

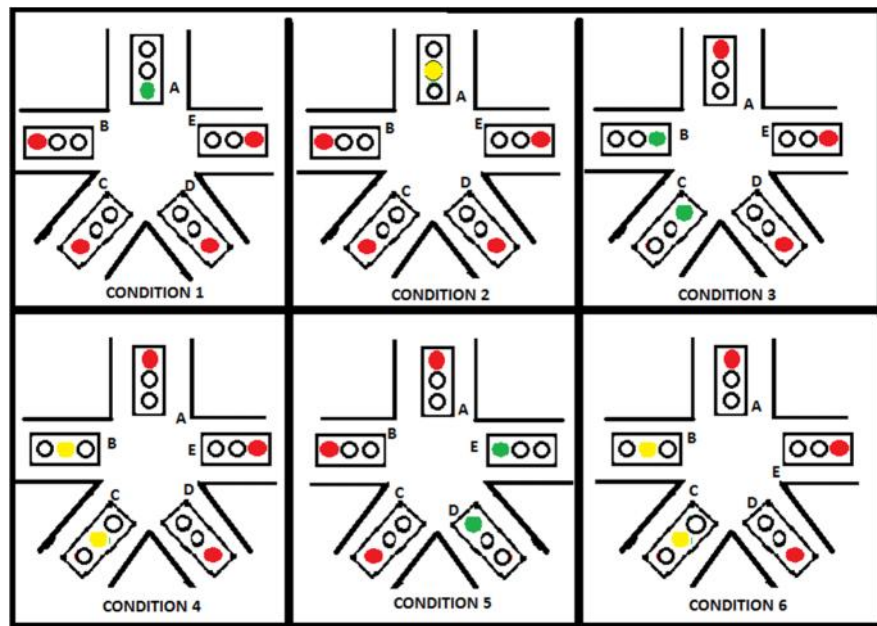


Figure 3. Condition.

4. Conclusions

This research makes the traffic system program with 5 intersections that are displayed directly through the simulation and miniature of the crossroads. The Traffic system program runs continuously before the program is stopped by pressing the stop button.

References

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