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PLC Approach to StudyTimer -BasedProcess Controlling

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Abstract

To control any industrial process, PLC is the basic tool used for controlling purpose. Monitoring of particular process for specific duration of time and controlling of devices based on that is one of the most important things in an automation. Timer ensures one that how much time is required to complete the process, so one can sure about waiting time of the process. Timing based controlling operations needed precise control of timing. In an industrial plant there is an peration where one has to start the process at particular time, keep the delay between two processes, stop the process atparticular time, alternate repetition of processes etc., which requires the timer as an essential one to take decision based on program designed. The paper aims to build atimer-based controlling of processes/devices using PLC, so that one can understand the use of timer and types of timers used in an operation. It also includes the detailed information regarding hardware wiring of various components or devices with PLC and the basic ladder logic programming ideas to control the processes based on timer.

Keywords - PLC, Hardware components, software-based timers, Input Switches/Sensors, Ladder diagram, Process design way.

Introduction

A programmable logic controller (PLC) is a tool used in an industry for the automation purpose to monitorand control the particular process operation. Quality improvement, cost reduction, work efficiency, time saving, safe working environment, work accuracy etc., are some of the objectives behind the implementation of an automation process.Ladder logic programming is most commonly used programming to program a PLC. There are various operations which are based on conditions of inputs. Some process or operations needs to start at particular time, sometime delay is required between processes or operations, end of process at particular time etc. are also the requirement of the processes. Timer based programming is one of the important aspects in ladder programming to design time-based operations or controlling of devices. According to conditions of process or operations, one has the knowledge how to use a timer, how the parameters are filled in software timer, which type of timer is used and also need a knowledge of timer TT bit, EN bit and DN bit as Allen Bradley PLC is there.

The paper aims to build some basic operations based on timer conditions to understand its use and requirement of types of timers as per need of condition

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Experimental Work

I. Circuit Connections with PLC





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II. **Designed PLC Based Control Panel**



III. Ladder Programs

To ON the Process/ Device for particular duration of time.



1. To ON Multiple Process/ Device for particular duration of time.



2. To ON Process/ Device at particular time and further

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3. Understanding of Timer – EN, TT and DN Bit



5. 3 Devices ON at a time and Sequentially OFF using TOFF Timer



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Outcome

- Low-costdesigning of various timer-based operations using PLC is possible. •
- By changing ladder logic programming, monitoring and controlling of various processes are possible.
- Provide automatic monitoring of the process and make controlling based on conditions mentioned in a program.

Conclusion

The circuit for various Timer based processes using PLCis properly constructed and testing of various operations are doneby running a ladder logic program. The ladder programming and communications are done using RSLogix 500andRSLinx Classic programming and communication software. The designed PLC-basedcircuits for particular processes are successfully run and errorless operation is possible.

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