Effective Application of Plc Technology in Electrical Engineering Automation Control

Jing SU

Shandong Vocational College of Science and Technology, Weifang, Shandong, China

renj1985@126.com

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Abstract: With the rapid development of science and technology, the electrical industry has been fully developed, and PLC technology has been widely used in electrical engineering automation. Using PLC technology in electrical engineering automation control not only improves the production efficiency, but also effectively ensures the operation safety of the system. This paper introduces the definition of PLC technology, analyzes the advantages of this technology in electrical automation control, and discusses the strategies to optimize PLC technology, so as to ensure the effective operation of PLC technology in electrical engineering automation control.

1. Introduction

In recent years, with the continuous progress and development of information technology, the automation control level of electrical engineering is higher and higher, and the application of PLC technology in electrical engineering is keeping extensive. Compared with the traditional control technology, PLC technology has better reliability and applicability, and can meet the requirements of the current industrial development. The application of PLC technology in electrical engineering can realize the automatic control of engineering equipment, improve the stability of the whole system, and effectively promote the stable development of electrical engineering.

2. Introduction of PLC Technology

PLC is a new type of industrial control device, integrating computer technology, communication technology and electrical control technology. It realizes the automatic control of electrical equipment through software programming. PLC technology can change parameters and configuration, carry out logic operation and sequence control according to the needs of practical engineering. This technology has good flexibility, convenient and efficient workflow, and can meet the actual needs of current electrical engineering. PLC technology was first applied in the United States. With the growing application scope and higher technical level, it has become the main technology in electrical engineering automation control. In general, PLC technology system structure can be divided into two types: modular structure and box structure. The two system structures have different features. The box structure mainly meets the performance requirements of electrical engineering control, and the modular structure mainly expands the system according to the work needs[1].

In the process of electrical automation control, the application of PLC control system can change the program of electrical automation control system, make the electrical automation control system more stable, and effectively improve the quality of electrical automation control system. In practical work, PLC technology has strong flexibility and practicability, so that it can reduce workload, effectively save resources and improve work efficiency. In addition, if there are problems in the PLC control system while working, PLC technology can automatically diagnose the loopholes, and realize self-repair, simplify the maintenance operation process, thus greatly reducing the maintenance difficulty of the staff.

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3. Important Role of PLC Technology in Electrical Automation Control

In the electrical engineering automation control, there are two common PLC technologies: box type and module type. The advantages of different technology types are different. It is necessary to select the appropriate technology type according to different production needs, so that the technology can improve the work efficiency and quality of electrical automation control. The advantage of PLC technology is strong flexibility and practicability. The box-type technology is the most commonly used type. This type of technology has small volume and occupies little space, which effectively reduces the price of port, thus reducing the cost of PLC technology[2]. It is more suitable for small-scale automatic control system. Each module of modular-type technology exists independently, and can expand according to the needs of field work. Moreover, the replacement and upgrading will not affect other modules, effectively improving the flexibility of the operation process.

4. Effective Application of PLC Technology in Electrical Engineering Automation Control

The application of PLC technology in electrical engineering automation control can be reflected mainly through the following four aspects.

4.1 Application of PLC Technology in Closed-Loop Control

In the process of electrical automation control, continuous changes are easy to affect the work efficiency. In order to effectively avoid this problem, it is necessary to control these continuous changes, so that the digital quantity and analog quantity can be transformed without barrier, and the programmable controller is ensured to control and process the analog quantity. In the regulation process of the closed-loop control system, the application of PLC technology can conduct electronic regulation, supervise and manage the implementation of the closed-loop control application system, and master the basic situation of the closed-loop control system in time. In the regulation process, the relevant staff should fully grasp the PLC technology and closed-loop control application, thoroughly understand the relationship between the two, and closely combine the two, and maximize the advantages of electrical automation control system and PLC technology, so as to make up for the shortcomings of traditional electrical control system and effectively improve work efficiency. For example, in the working process, if the speed changes, PLC technology can be used to convert the analog current signal of the sensor into normal current signal through the module, so as to carry out closed-loop control and ensure the normal operation of the equipment. If the temperature changes, it is necessary to convert the voltage signal into conventional voltage and current, and convert the obtained results into voltage signal or current signal through D/A converter for closed-loop control[3].

4.2 Application of PLC Technology in Switch Control

In the traditional electrical automation control system, the switching value is mainly controlled by electromagnetic relay. With the fast development of science and technology, the electrical industry is also developing. The traditional control mode can’t meet the needs of modern industrial production, and there are still some problems such as unstable performance, affecting the efficiency of industrial production. Therefore, in the production process, we should make full use of the advantages of information technology, constantly innovate the control form, apply PLC technology to the control system, establish the corresponding control system, improve the work quality and efficiency, and meet the needs of the current industrial production. The previous control system has complex workflow and heavy workload. In addition, the stability of the work process is difficult to guarantee. But the application of PLC technology can strengthen the electrical switch control, effectively make up for the lack of traditional switch contacts, and improve the logic of the control system. Therefore, the application of PLC technology can not only control the switching value, but also realize the orderly start and stop of electrical equipment. In the process of industrial production, applying PLC technology in electrical engineering automation control and combining with

traditional control technology can effectively solve the problems of traditional control technology, and improve the level of electrical engineering automation control in China.

4.3 Application of PLC Technology in Sequence Control

In general, the longer the electrical automation control runs, the greater the energy consumption of electrical equipment. In the production process, energy consumption directly affects the economic benefits of enterprises, and too much energy consumption will hinder the development of enterprises. In the process of engineering production, it is necessary to reform the electrical automation control system, optimize the control system, reduce energy consumption as much as possible, and ensure the normal work of the electrical automation control system. The application of PLC technology in the electrical automation control system can realize the sequence control of the electrical automation control system, effectively solve the problem of energy consumption, so as to improve the economic benefits of enterprises. The application of PLC technology needs to be scientific and reasonable enough to improve the safety and stability of the production process. Due to the low sensitivity of the traditional sequential control system, it is necessary to strengthen the function of the electrical automation control system with the help of PLC technology. PLC technology can strengthen the relay hardware logic circuit sequence control work, make the electrical automation control in accordance with a certain order, effectively improve the sensitivity of the control system, so as to improve the work efficiency[4].

4.4 Application of PLC Technology in Electrical Automation Control

With the continuous development of information technology, the advantages of PLC technology are more and more obvious, and the application scope is increasingly wider. The effective operation of PLC technology in electrical engineering automation control not only improves the level of electrical automation control, but also promotes its own development. In the application process, the integration of PLC technology and electrical engineering is more and more reasonable, mainly reflected in the following aspects. The first is the application of PLC technology in the central air conditioning control system. In the past, the central air conditioning control system mainly included relays, digital controllers, etc. There were some shortcomings in the control system. The use of this device is getting less. In this case, PLC programmable controller gradually replaces other devices. This controller has strong anti-interference ability and is safer and more reliable. It has been widely used in central air conditioning control system. The second is the application of PLC technology in traffic control system. In the past, the traffic control system standardization was poor, and the most important signal control often had problems, affecting the normal traffic conditions and even causing traffic accidents. The application of PLC technology in the traffic control system can effectively control the signal lights, quicken the response speed of the signal lights, improve the effectiveness and stability of the signal lights, so as to realize the optimization of the whole traffic system. With the rapid development of information technology, artificial intelligence technology is also applied to the field of transportation, effectively alleviating the traffic pressure. At the same time, applying PLC technology in the traffic electronic monitoring can make the traffic control system more automatic, monitor the real-time traffic situation and grasp the traffic situation in time. The third is the application of PLC technology in the machine tool electrical control system. The traditional machine tools can’t meet the needs of modern production. The application of PLC technology can make the machine tools have hydraulic control and mechanical control at the same time. It makes the whole control system more sensitive, reduces the workload of machine tool control personnel, and improves the automatic control ability of the system. The application of PLC technology in the machine tool electrical control system can not only realize the time control, but also monitor the machine tool equipment. It also has fault alarm function. The last is the application of PLC technology in electrical engineering numerical control system. There are many control methods of numerical control system. Compared with other control methods, the application of PLC technology is more accurate, and the positioning of PLC is accurate and easy to operate. These advantages make PLC technology widely used in electrical engineering, and promote the development of electrical engineering automation technology. In a word, the advantages of PLC

technology make the application scope increasingly wider. PLC has a good application prospect.

5. Conclusion

To sum up, the effective application of PLC technology in electrical engineering automation control can not only improve the stability and safety of the control system, but also improve the control efficiency of electrical engineering. Moreover, PLC technology can effectively reduce the energy consumption of system operation, improve the economic benefits of industrial production, make the electrical automation control system meet the needs of modern production, and promote the long-term and stable development of electrical engineering.

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