

# Application of Plc Technology in Automatic Control of Electrical Equipment

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**Keyword:** Plc Technology; Industrial Production; Electrical Equipment; Application

**Abstract:** in Recent Years, with the Continuous Improvement of the Economic Level of China, the Plc Technology Has Been Greatly Improved and Popularized in China. in Particular, the Application of Plc Technology in Automatic Control of Electrical Equipment Greatly Improves the Automatic Control Level of the Electrical Equipment, and Has Played an Important Role in the Industrial Development of China. Therefore, This Paper Analyzes and Discusses the Application of Plc Technology in the Automatic Control of Electrical Equipment, So as to Provide Some References for the Improvement and Development of the Application of the Plc Technology in the Future.

## 1. Introduction

In essence, PLC technology is a kind of electronic automatic technology based on computer technology. PLC, is the acronym for "Programmable Logic Controller". By means of a lot of researches and practices, it has been shown that the application of PLC technology can not only optimize the traditional technology of automation, but also effectively promote the development of the industrial production. Therefore, it is very significant to research PLC technology and its application.

## 2. Structure and Characteristics of Plc Technology

From the functional point of view, PLC technology is a very important digital electronic operation system in the industrial field. At present, the PLC technology used in the industrial field of our country usually mainly includes CPU, display monitor, memory, power supply and so on. In recent years, with the integration of electrical equipment, instrument, computer and the continuous improvement and development of the control theory, the role of PLC technology in automatic control of electrical equipment has been significantly improved. The memory of PLC has a strong dependence on the I/O module, and compared with the I/O module in traditional industrial environment, the I/O module in PLC has certain particularity. From the perspective of application, the main application scope of PLC technology is in the field of industrial production. By the unique modular design of PLC, the control flow of industrial production can be greatly simplified. At the same time, the stability in the production process can be improved and the efficiency of industrial production can be improved. In addition, PLC technology has also constantly been developed and perfected in the process of gradually practical application. And now, PLC technology has gradually shown the developmental trend of deep integration with distribution control system, communication technology and computer technology.

As mentioned above, PLC technology has been widely used in the industrial field of China. Compared with the past, today's PLC technology integrates more achievements of computer science, and it can endow the electrical equipment with functions of high-capacity storage, intelligence and rapidity in the process of practical application. From the current situation and development trend of the application, PLC technology is bound to become a kind of electrical automatic control system which can be applied to the whole industrial field in the future.

## 3. Application Principle of Plc Technology

In the process of practical application, PLC technology is mainly divided into three main steps

(shown as the diagram below). When receiving the sampling, the PLC system will transfer the sampling to the image area of I/O by the form of data scanning. After the data information input is completed, the data will be automatically output and refreshed. In terms of running order, the order in which PLC runs is usually from top to bottom. When the data is being output and refreshed, the running state of the CPU will be adjusted according to the actual state of I/O image, and the peripheral driver will be operated accordingly after completing the circuit latching.

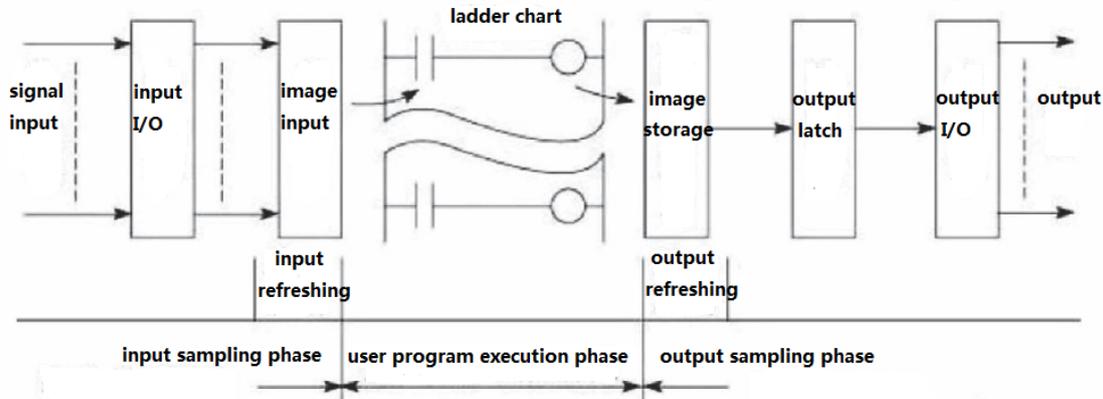


Fig.1 Application Steps of PLC Technology

## 4. Application of Plc Technology in Automatic Control of Electrical Equipment

### 4.1 Application of Plc Technology in Nc( Numerical Control) System

With the continuous of industrial development of China, the scale of industrial production is getting larger and the complexity of the production is getting stronger, so the requirement for numerical control system is also getting higher and higher. In the actual industrial production, the accuracy of the NC system must meet the needs of industrial production. If there is intolerable deviation in NC system, it will cause the failure of the whole production control system, which will not only affect the efficiency of industrial production, but also affect the economic benefits of industrial enterprises. However, by applying PLC technology to NC system, the accuracy of NC system can be effectively guaranteed. Programmers only need to design the corresponding operation program according to the specific requirements of industrial production for NC system, and then, the tool can move accurately on the pre-designed line, so as to ensure the stability and efficiency of the operation of NC system.

### 4.2 Application of Plc Technology in Traffic System

Traffic system is also an important application direction of PLC technology, because PLC technology has strong adaptability and stability, traffic signals can be automatically controlled by PLC technology in practical application. Especially, in recent years, with the rapid development of the traffic situation and more and more serious traffic jams that appear in some places, the importance of PLC technology in the traffic system is becoming more and more significant. The research and investigation show that the application of PLC technology in traffic system can effectively alleviate the pressure of traffic administrative departments and reduce the frequency of traffic accidents; on the other hand, it can effectively optimize the urban road network system and give full play to the role of urban traffic network.

### 4.3 Application of Plc Technology in Central Air Conditioning System

From the composition of the central air conditioning system, the most critical part is the refrigeration system, which is directly related to the stability and functionality of the whole air conditioning system. At present, there are three kinds of refrigeration systems widely used in air conditioning system, namely relay cooling, digital cooling and PLC cooling. Among them, digital cooling has some defects, such as weak anti-interference ability, weak adaptability and so on, so it has a small range of application in China; and relay cooling has not been popularized in a wide

range because of its complex production process, high production cost and large energy consumption in the actual application. Compared with other cooling systems, PLC cooling not only has stronger stability and reliability, but also has very strong adaptability, at the same time, it has little dependence on the operating environment, so most of the central air conditioning systems adopt to PLC cooling system.

#### **4.4 Application of Plc Technology in Elevator Control System**

With the deepening of urbanization and the increasing number of high buildings in the city, elevators have naturally become a necessary means of transportation. From the type of elevator, it is mainly divided into residential ladder, passenger ladder, cargo ladder, sightseeing ladder and tower elevator and so on. Different kinds of elevators have different scope of use so as to meet different needs. However, no matter what kind of elevator, the most important thing is to ensure the safety and stability. In the past, most elevators used relays to control the electrics, this traditional method of elevator control not only has low control efficiency, but also is difficult to effectively guarantee the safety and stability of elevator operation, so that the failure rate of elevators is high. By applying PLC technology to elevator control system, the signal can be detected and controlled in real time. Once the elevator fails in the process of operation, it can issue alarm and emergency safety treatment at the first time, so as to ensure the personal and property safety of passengers. Nowadays, most of the elevators are composed of PLC host, car operation panel, floor display, door machine, main drive system and so on; and the software is based on PLC control software to monitor and control all kinds of elevator signals. In addition, the late-model elevator also realizes the integration of software and hardware by PC-LINK network, which further improves the control level of the elevator, and which greatly improves the safety and comfort of the elevator.

#### **4.5 Application of Plc Technology in Sequential Control System.**

Sequential control system is a very common system in most industrial enterprises, which is mainly used in automatic control of electrical equipment. Taking coal enterprises as an example, PLC technology is widely used in sequential control. For example, in coal mining system and coal transportation system, the application of PLC technology not only greatly increases the yield and improves the production efficiency of coal, but also greatly improves the economic benefits of the coal enterprises. In addition, another advantage of PLC technology in sequential control is that it can monitor each aspect of production and processing in real time and comprehensively. Once a fault occurs in a certain aspect, it can warn the operators at the first time, so as to shorten the time for troubleshooting, improve the stability of production and processing, and avoid the emergence of safety accidents.

### **5. Application Prospect of Plc Technology in Automatic Control of Electrical Equipment.**

According to the present situation and development trend of the application of PLC technology, PLC technology is bound to be more perfect in the future, its application scope will be wider and wider, and the application depth will be further improved. Nowadays, by applying PLC technology to automatic control of electrical equipment, we can not only give full play to the advantages of automatic control of electrical equipment, but also lay a foundation for the improvement and development of PLC technology in the future. In addition, with the rapid development in industrial field and the gradual improvement of the development level, the scale of equipment for industrial production is bound to become larger and larger, and the dependence on PLC technology will become stronger and stronger, so PLC technology will play a more important role in the future industrial production field.

Different from small PLC electrical automatic equipment, large PLC electrical automatic equipment has its unique advantages and can meet some special industrial production needs. Therefore, in the process of industrial production, it is necessary to select the appropriate automatic production mode of electrical equipment according to the actual production situation and demand, so as to give full play to the advantages of PLC technology. Although PLC technology in China has

been widely used and developed rapidly in recent years, there are still some defects and shortcomings compared with developed countries. Therefore, in the process of future development, we still need to strengthen the research and improvement of PLC technology, further expand the scope of application of PLC technology, improve the security, intelligence and stability of this technology, and give full play to the application value of this technology.

## 6. Conclusion

Generally speaking, with the continuous improvement of industrial level in China, the traditional relay control mode is gradually unable to meet the needs of industrial production in the automatic control of electrical equipment. By applying PLC technology to the automatic control of electrical equipment, on the one hand, it can effectively improve the safety and stability of the control system; on the other hand, it can effectively simplify the control segment of industrial production, reduce the amount of tasks of manual management, save the human resources of industrial enterprises, and improve the control efficiency of industrial production, so as to improve the economic benefits of industrial enterprises. In addition, PLC technology has very important application value in many fields, such as numerical control system, traffic system, elevator control system, central air conditioning control system and so on. Moreover, PLC technology has very prosperous application prospect. In the future development process, we must further strengthen the research and application of PLC technology, constantly improve and perfect this technology, broaden its application scope, improve the security, intelligence and reliability of its application, so that PLC technology can play its greater value in the future industrial development.

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