

# Control Application of PLC Technology in Electrical Automation

Jiang Jing<sup>1</sup>, Li Linpeng<sup>2</sup>, Jiang Cheng<sup>3</sup>

<sup>1</sup>Qingdao Institute of Technology, Jiaozhou, Shandong 266300, China

<sup>2</sup>Qingdao Technical College, Qingdao, Shandong 266555, China

<sup>3</sup>Qingdao Institute of Technology, Jiaozhou, Shandong, 266300, China

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**Abstract:** The information age puts forward higher development requirements for various technologies and at the same time, various technologies realize high development and mature application, providing better assistance for system operation and operation. With the rational use of PLC technology, we can enhance the further development of automation, change the control technology and way of traditional electrical equipment, reduce the use of human resources in the control system, which help reduce the final control cost of electrical equipment. Therefore, PLC technology should be integrated into electric chemical production to improve the maturity of control technology and reasonably solve the problems of traditional electrical equipment in automatic operation to eventually improve the overall efficiency and quality of industrial production.

## 1. Introduction

From the essence of PLC technology, it belongs to the scope of the programming controller. Technicians can implement mechanized control by inputting programming code into the control system, improve the operability and digitalization of the control system and issue control instructions according to logic programming, thus strengthening the scientific nature of system control. Based on the advantages of such technology, PLC technology can be used for electrical automation control to gradually improve the traditional control problems and ensure the final automatic control effect. Therefore, this paper mainly considers the advantages of PLC technology in automatic control in order to ensure the compatibility of the control system and improve the control effect.

## 2. Introduction of PLC Technology

### 2.1 Connotation

PLC is an innovative electronic system device to provide more technical support to industrial students with the help of digital operation of microprocessor. PLC technology can control the internal storage, operation sequence and timing operation through programmable electronic memory and then implement reasonable control on different production processes through digital simulation. At the same time, PLC technology is based on the combination of relay contact control and microcomputer technology, which can ensure the reliability and flexibility of the control system, fully reflect the technical application advantages of the microprocessor and improve the control ability of automation <sup>[1]</sup>. The core technology of PLC is CPU technology that can process the data reasonably through central control and accurately position the fault problem to accurately implement the analysis of the state of the system operation and timely find the problems in the system operation. In this way, a scientific way can be developed to ensure the stability of electrical system operation, which well help improve the operating efficiency of automation equipment and the final quality of work.

### 2.2 Feature

It is pointed out that PLC technology can improve the operability and digitalization of the control

system and send out the control instructions according to logic programming, thus strengthening the scientific nature of system control. PLC technology in the use of automation control reflects the following aspects of application advantages: first, it presents a strong reliability. This is because PLC technology can achieve effective interference through isolation or shielding and other operations to protect electromagnetic compatibility and help enterprises save the human cost on automatic control. Second, it has distinctive universality and use function <sup>[2]</sup>. PLC technology can achieve logical control on electrical equipment through a simple program to reduce the economic expenditure in automation control. Third, the programming difficulty is relatively low. Technical personnel with the help of PLC technology programming control process reflects a bright advantage because it can carry out programming control with the help of high-level language and improve the use of control procedures.

### **3. Advantages of Using PLC Technology in Automatic Control**

Enterprises using PLC technology to implement automatic control can strengthen their competitiveness with the help of technical force to further improve the control effect of electrical equipment. With better performance of equipment, they can better adapt to the development needs of the society. This paper thinks that the use of PLC technology in automatic control reflects a variety of advantages and it will discuss in details through the following aspects of implementation. First, independent control information storage can be formed with the help of technical advantages, which has relatively strong control and analysis ability. The user program is placed in the technical area of the application software with relatively large capacity, which can increase the actual storage amount of the automatic control system. Then, according to the actual requirements of the control system and the previous control data, the operational faults are checked and scientific solutions are formulated to solve various problems in the system control <sup>[3]</sup>. Therefore, the reasonable use of PLC technology can improve the comprehensive ability of electrical control and data analysis, which can also be applied in the fields of aerospace and transportation and reflect a distinct technical advantage.

Second, with the reasonable use of computer technology to improve the overall response speed of electrical equipment, it can not only ensure the final efficiency of the equipment but also is conducive to the realization of intelligent development of electrical equipment. With the scientific application of PLC technology, it can improve the control ability of the technical personnel to the system software and enhance the working efficiency of the equipment through the series way. The central core of PLC technology is the key content of system control. It can control and process the overall data of the system and judge the running state of the system according to the data information. Finally, the data on the register can be accurately transmitted to the control equipment. With the application of software programming, technicians can write the product information and related operational indicators into the control program to control the information system scientifically, which will well enhance the effect of intelligent development of electrical equipment.

## **4. Implementation and Analysis of PLC Technology in Electrical Automatic Control**

### **4.1 Reasonable Use in Sequence Control**

The study pointed out that with the scientific application of PLC technology, it can improve the control ability of the technical personnel to the system software. However, the series way to improve the working efficiency of the equipment needs to be carried on the reasonable application in the automation control. Modern industry gets better development under the support of advanced technology and the production procedure is more explicit. To complete a technical work, it is necessary to carry out the control operation according to the relevant sequence so as to enhance the effect of automatic operation by means of sequence control. The early control technology can only allow the mechanical equipment to operate in a certain sequence, but it is unable to adjust the operation data and technical parameters of the mechanical equipment in a reasonable way. If there

are problems in the operation of the equipment or the sequence of nodes, it will restrict the subsequent mechanization work. With the reasonable use of PLC technology, technicians can retain the early control equipment sequence and carry out technical detection on different mechanical equipment according to the sequence node<sup>[4]</sup>. When the mechanical equipment is running fault, PLC technology can timely find the equipment running problems according to the programming logic of the failure of the equipment for reasonable debugging so that the equipment can return to normal operation. If the debugging process can't get the support of debugging conditions, PLC technology can carry out scientific debugging on the whole process to provide a better guarantee for the production line.

#### **4.2 Scientific Application of Switching Logic**

Based on the modern needs of industrial production, technicians can use PLC technology to improve the final quality of equipment operation and strengthen the control ability and effect of automation. Since mechanization is an important support for the development of modern industry and switching logic plays an important role in the operation of mechanization, if we want to ensure the scientific running of all the equipment, it is necessary to control the operability of the switching time of the equipment so that we can guarantee the final control ability and operation effect of the electrical equipment. With the full use of PLC technology, technicians can improve the accuracy and technology of switch logic control, which can provide better technical support for system control. At the same time, PLC technology reflects a strong technical application advantage, including the design of magnetic ring and other advanced technology. Moreover, it also reflects a strong anti-interference ability that makes up for the defects of the control technology before.

#### **4.3 Technology is applied scientifically in data processing to provide technical support for data processing.**

The core of PLC technology is what is important for system control including the control and process of the overall data of the system. It can also show a bright technical application value on the basis of the judgement on the running statues of the system according to the data. The final ability of data nursing reflects the level of electrical automation. With the reasonable application of PLC technology, a more scientific circular data displacement path can be constructed and then the conversion of various data can be realized by means of instruction operation, which can provide better technical guarantee for automatic data processing.

#### **4.4 Reasonable Use in Closed Loop Control**

In the process of industrial production, closed-loop control should be done well to provide better technical support for the control of pump equipment, which is conducive to the improvement of the overall industrial production efficiency. In the early control operation, the closed-loop control mode was distributed and hardware equipment was set according to the operation of each pump equipment while industrial production needed to use a large number of pump equipment, which caused a great burden on industrial production -- increasing the complexity of the control program. The application of PLC technology to closed-loop control can enhance the capability of technical reserve, make all pump equipment well connected, let the whole closed-loop operation of pump equipment and data integrated processing, store these data in the database and give feedback to different closed-loop problems. At the same time, the application of PLC technology in closed-loop control can also analyze the actual situation of closed-loop operation and judge the function performance. For example, it cannot only find out the operation time of the power pump, technical parameters and other information accurately but also conduct an overall analysis according to the PLC technology on the pump equipment operation and analyze the equipment overload or the situation of high load of the equipment and then scientifically manage the equipment based on logic programming.

#### **4.5 Control Analog Quantity in the Use of PLC Technology**

Reasonable use of PLC technology can improve the comprehensive ability of electrical control

and data analysis but also conduct trouble shooting according to the actual needs of the control system and previous control data to solve various problems in the system control. Since the commonly used area of electrical automation is industrial production, there will be a variety of parameter changes in industrial production at the same time, such as temperature changes or pressure changes, which will generate a large amount of simulation. If the simulation quantity needs to be controlled by human, it will consume a large amount of human resources. By introducing PLC technology, it can realize the automatic control of the simulation quantity through the commands of FORM and TO instruction to set the unit specifically, which will eventually achieve the automatic control effect by means of programming or executing commands.

## **5. Conclusion**

The study pointed out that PLC technology can process the data reasonably through the central control and accurately position fault problems to precisely analyze the state of the system operation and timely find the problems occurred in the system. Therefore, PLC technology should be integrated into electric chemical production to improve the maturity of control technology, reasonably solve the problems of traditional electrical equipment in automatic operation and strengthen the ability of system control so that we can improve the overall effect of equipment operation. This can fully reduce the consumption of human resources, improve the control effect of automation and provide better technical support for production operation.

## **References**

- [1] Zhou Mingang, Cen Yi. Application analysis of PLC technology in electrical automation control [J]. Internal Combustion Engine & Parts, 2019(16):248-249.
- [2] Wang Zhiguo, Zhang Yue, Li Yanmin. Control application of PLC technology in electrical automation [J]. World Nonferrous Metal, 2019(11):251+253.
- [3] Song Li. PLC The control and application of technology in electrical automation [J]. Sme management and technology (Mid-month), 2019(07):181-182.
- [4] Chen Shanshan. Control application of PLC technology in electrical automation [J]. Electronic technology and software engineering, 2019(13):116.