Application Research of Electrical Automation Control Technology in Power System

Cao Yuhan

North China Electric Power University, Hebei, China, 071003

Keywords: Electrical automation; control technology; power system

Abstract: With the rapid development of science and technology, the power system industry has also made rapid progress, and the voltage level has been constantly rising. The traditional operation mode of power system has been unable to meet people's requirements for power system. The new generation of power industry main force is no longer the traditional operation mode of power system, but gradually replaced by electric automation control technology. This technology can not only maintain the efficient operation of equipment, but also save manpower and material resources and reduce costs. In power supply system, electrical automation technology is the core of power network. The control of electrical automation technology directly affects power supply reliability of power system. This paper briefly introduces the general situation of the development of electrical automation control technology, focusing on the analysis of the application of electrical automation control technology in power system, for the reference of related personnel of power system.

1. Introduction

With the rapid development of the social economy, the continuous advancement of science and technology, people pursue a better quality of life, and technology benefits people. People have been working hard to promote the progress of human society with the development of science and technology, as well as the use of electric energy. People can't be satisfied with the existing working methods, that is, the control of production and work in society depends on electric energy. This work method is not suitable for the current production and living requirements, and the staff involved in the power system must constantly Innovation. At the same time, due to the rapid development of society, even if the automation technology is more efficient, it can not meet the changes in social demand. Therefore, new technologies for power systems have emerged, namely electrical automation control technology [1].

2. Overview of the development of electrical automation control technology

As early as the 1950s, electrical automation control technology developed. Although the electrical automation control technology at that time was quite different from today's electrical automation control technology, and it was mainly mechanical control at that time, it still had great significance, and its appearance pointed out the development direction for future research on

DOI: 10.23977/iceccs.2018.001

electrical automation control technology[2].

Figure 1 Electrical automation control technology

By the 1980s, electrical automation control technology had been further developed. All of this was due to the development of computer network technology, which formed the basic system and infrastructure of electrical automation control technology, and gradually matured network technology to enable local electrical automation control. Technology can be controlled under a small amount of computer management, and the system is gradually maturing.

In recent years, electrical automation control technology has really formed. In the new era, with the influx of a large number of advanced technologies, such as artificial intelligence technology, computers, networks and so on, it has accelerated the use of electrical automation, and has also accelerated a series of technologies, such as integrated control, remote monitoring, remote sensing and more.

3. Application of electrical automation control technology in power system

Due to the development needs of today's society, the application of electrical automation control technology has put forward higher requirements that meet the characteristics of the times. It is precisely because in the power system, the application of the technology realizes real-time simulation and can make stability and temporarily stable two states tend to be stable. Nowadays, in all aspects of the power system, the application of electrical automation control technology has a certain positive effect, making up for the defects of traditional power production and transportation, so that the working efficiency of the power system is continuously improved. With the development and maturity of electrical automation control technology, the power system intelligent service technology has gradually emerged, and the electrical automation control technology will be beneficial to the further improvement of the system intelligent service level. The application of electrical automation control technology in power systems is mainly in the following three aspects:

3.1 Application of multi-functional integration technology

As electrical automation develops toward a unified and integrated direction, various functional technologies are also integrated in the power system. The application of multi-functional integrated

technology effectively improves the economic benefits of the enterprise on the basis of cost saving, and meets the various needs of customers. The multi-function integration technology manages each control system in the power system. It includes computer technology and PLC technology. The technology utilizes cutting-edge technologies to integrate the management of various departments, enhances the overall strength of the power system, and integrates two independently operated systems of power, namely, management and maintenance systems, to introduce power automation. The power system of control technology has been standardized, rationalized and unified.

3.2 Application of PLC technology

In the aspects of data collection, analysis, integration and conversion, PLC technology has shown its unique advantages. The application of PLC technology is mainly embodied in: the technology realizes the control program of intelligent control of some flexible operations in the power system. In the application of power systems, the status of PLC technology is extremely important. The application of PLC technology reduces the energy consumption of power systems and makes the operation of power systems more flexible. PLC technology is a combination of two technologies, one is relay contact control technology, and the other is computer technology.

In the control power system, PLC realizes the sequential control of power system work by controlling the information of individual modules in the power system and communicating with the information bus, which greatly promotes the coordination of the related production process of the power system. The application of PLC technology in power system, not only on the power switch is in the process of production of logic control, and the automation control of input and output points without limit, thus improve both the economic benefit, and realize the efficient use of human resources, and make power system work instructions implements the information record and calculation and automatic programming. Switching quantity control and sequence control are often used in thermal power generation systems at this stage [3].

3.3 Application of computer technology

In the operation of the power system, the most widely used electrical automation control technology is computer technology, involving power distribution, power transformation and power supply. Grid transfer technology is a prominent technology in computer technology and has been organically integrated with national grid equipment. For grid systems, grid mobilization technology plays an important role in monitoring. In addition, it is closely related to the automation level of the entire power system, which is conducive to the information collection of the power system. With the effective use of this technology, it is possible to mobilize all levels of power grids in various regions. In the supply and distribution of power and transmission and distribution, the application of smart grid technology is both extensive and representative, which promotes the realization of intelligent distribution network [4].

Table 1 Application Research of ZigBee Technology in Smart Grid System

ID	name	Voltage /V	Temp /℃	Light /Lum	Mag_x /m	Mag_y /m
0	Gateway	3.28	20.22	875	20.19	24.32
1	Node 1	2.63	21.46	0	103.43	104.2
2	Node 2	2.55	22.33	0	31.5	33.63
3	Node 3	2.28	22.03	0	56.78	58.6
4	Node 4	2.62	20.26	0	98.46	96.23

In the operation process of the power system, the application of computer technology changes the previous manual analysis method, effectively improves the accuracy of the analysis, and can automatically perform accurate analysis on the existing obstacles and provide intelligent services. In addition, in the power system, the information technology of computer network has been widely used nowadays, which effectively integrates and integrates the relevant data information of the power system. Both the printing equipment and the substation terminal equipment in the power grid, as well as the server and the display, can be uniformly deployed after being connected by a computer in a dedicated wide area network[5].

4. Conclusions

"Science and technology is the primary productive force", and technology is used to benefit the people and improve human civilization. The application of electrical automation control technology in power system is a good proof. The work operation and system construction of power system are inseparable from the continuous progress of electrical automation control technology. The automation control technology moving towards intelligent direction not only meets the needs of the electric power system for the social and economic development, but also greatly improves the intelligent service quality of the electric power system. In order to give full play to the value and great role of information science and technology in work practice, we need to increase the positive application of advanced science and technology in actual work.

The effective application of electric power system to electric automation control technology has made rapid development and great progress in China's electric power system construction. Our country's emphasis on the development of electrical automation control technology in the power system reflects our country's emphasis on the development of public utilities. The power system, as the basic public utilities of the country, is related to the supply of power resources in the whole society.

References

[1] Ge Wei. Analysis on the Application of Electrical Automation Control Technology in Power System [J]. Research, 2017(2): 00035-00035.

[2] Hua Neng. On the Application of Electrical Automation Control Technology in Power System [J]. Industry, 2016(9): 00240-00240.

[3] Mei Huihui. Application Research of Electrical Automation Technology in Power System [J]. City Construction Theory Research: Electronic Edition, 2012(22).

[4] Zhong Chunlin. On the application of electrical automation control technology in power system [J]. Engineering Technology: Citation: 00177-00177.

[5] Lai Peikun. On the Application of Electrical Automation Control Technology in Power System [J]. Communication World, 2014(14): 53-54.