

Application and Research of Electrical Engineering and Automation in Electrical Engineering

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ABSTRACT. *In recent years, the development of economy has promoted the improvement of science and technology level in China. With the development of science and technology, electrical technology has become a more important technology in modern science and technology. Electrical engineering is also a more important knowledge category in human society now, such as electrical design, electronic technology, computer technology and so on, and the application of this technology in many modern occasions, requires modern practitioners to have comprehensive knowledge theory and technology. Electrical automation is the most core technology in modern electrical engineering, which has been widely used in various electrical systems to promote the improvement of modern industrial production efficiency and ensure the safety and stability of the system. This paper discusses the application of electrical engineering and its automation in electrical engineering.*

KEYWORDS: *electrical engineering, electrical automation, application*

1. Introduction

The development of modern social economy has greatly promoted the development of science and technology, among which electrical automation technology is a relatively representative technology. It has been widely used in various fields, and has played an important role in the development of society. And with the development of science and technology, the technology is still developing, so in the long run, electrical automation technology will show greater applicability, and the future development prospects will be more broad. Hence, it is necessary to study the electrical automation related technology, explore the greater application potential of electrical automation technology, and promote the development and maturity of related technology.

2. Overview of Electrical Automation Technology

In recent years, electrical automation technology has been widely used because of its own characteristics of safety, economy and accuracy, and the technology has developed into a core field in modern society. For the development of electrical automation technology in our country, the development of this discipline is divided into four stages. From the beginning of "industrial enterprise automation specialty" in the 1950s to the adjustment of "industrial electrification and automation" in the 1960s. By the end of 1970s, the subject name was further adjusted to "industrial electrical automation specialty ". Until 1995, all the major related to automation technology in the field of strong and weak electricity was merged and unified into the present " automation specialty ", of course, this automation technology covers a wide range, including electrical automation technology.

Since the development of electrical automation technology, it belongs to a kind of comprehensive application technology which covers a wide range of applications, including microcomputer-related control application technology, computer network application technology and power electronics technology. The application of electrical automation technology can satisfy the principle of matching, adaptability and rationality in the application of electrical automation technology in electrical engineering. That is, to meet the relevant display requirements in electrical engineering must be matched with electrical automation technology, and electrical automation technology must be completed before the application of the relevant electrical equipment compatibility inspection. Electrical automation technology in the application of electrical engineering must be reasonable, effective, not blind.

3. Characteristics of Electrical Automation Technology

Power system in the normal operation process needs to maintain safety and stability, so as to ensure daily power supply. To do this ,24-hour real-time monitoring is required. Staff should always pay attention to whether there is a failure of the power system, once the failure will be the first time to repair. However, people's energy is limited after all, there will still be some errors and loopholes in the work. The research of electrical automation can effectively prevent the occurrence of human accidents, but also reduce the consumption of manpower and material resources, and can effectively maintain the stable operation of power system. Electrical automation technology features automation and intelligence. Through the automatic intelligent system to the power system management planning, can effectively achieve real-time monitoring, in the process of operation once found problems can be timely automatic maintenance. The more difficult issues will also be dealt with in a simple manner, thereby reminding the staff to carry out repairs. In the process of maintenance can also provide a certain reference for staff, which effectively saves the time of inspection and maintenance, maximizes the stable operation of the power system, and ensures the daily power supply.

4. Advantages of Electrical Engineering and Automation Technology

4.1 Monitoring advantages

For electrical engineering, the operation effect of monitoring system will directly affect the stability and safety of electrical engineering. At the same time, only on the basis of stable monitoring and reliable monitoring data, can we find the fault area of electrical engineering in time and accurately, and realize the troubleshooting. The application of electrical engineering and its automation technology can monitor every component equipment of electrical engineering in real time, and monitor its operation data, Compare with the normal operation data, it can accurately realize the fault finding and judgment, and eliminate the fault efficiently. When it is found that there is a fault problem in electrical engineering, an early warning can be issued automatically, and the fault information can be provided to the maintenance personnel to help them judge the type and cause of the fault. If the failure of electrical engineering has a great influence, the electrical engineering and its automation system can automatically interrupt the power supply in the fault area or suspend the operation of the whole electrical engineering, so as to avoid the expansion of the fault range.

4.2 Intelligence advantages

At present, the electrical automation technology has made the system realize the function of semi-automatic operation, and the automatic production has been realized in the large industrial field, so as to avoid the heavy manual labor, reduce the labor cost and improve the production efficiency. Now people are actively studying electrical automation systems to make the performance of electrical automation systems more automatic, and then achieve intelligent, intelligent electrical systems, which can ensure more stable operation of the system, application in industry and improve production efficiency.

4.3 Linkage advantages

From a certain point of view, the electrical automation network needs to be based on the extensive use of automation technology. Electrical engineering and its automation system can effectively combine each link related to electric power production, realize integrated management, and promote its linkage effect to improve continuously.

5. Electrical engineering and automation

5.1 PLC Technology

The so-called PLC technology is a programmable logic controller. PLC technology mainly uses a programmable memory to complete the related logic operation, timing, calculation, counting and sequence control and other related PLC operation instructions. A combination of modern computer application function technology and relay control technology has made it a very new and high PLC technology. PLC technology has been applied more and more in electrical engineering because of its low resource consumption and strong adaptability. In the process of electrical application function, the relevant data in the application process are continuously analyzed and sorted by using PLC technology, on the basis of comprehensive processing, so as to continuously improve the PLC technology and make it better applied in electrical engineering, thus promoting the stability and continuous development of electrical engineering.

5.2 Remote monitoring technology

Remote monitoring technology is a kind of technology that can realize the operation of target equipment remotely, even if the staff can not reach the site for some reason. It can supervise and control the operation condition of electrical engineering and its equipment. Cost of traditional field control mode is relatively high, and it needs manpower to carry out 24 h field monitoring. The use of remote monitoring technology can effectively solve this problem, and the supervision and control of electrical engineering will get rid of the constraints of time and space, so as to improve the effectiveness and timeliness of monitoring work. It is important to note that remote monitoring technology has high requirements for hardware equipment, and low configuration equipment can not play the main role of remote monitoring technology. At the same time, because this technology is not perfect at present, so there are certain shortcomings and defects, in special cases, it will even lead to the decrease of monitoring work efficiency, and it is not suitable for large-scale electrical engineering, so it is generally common in small and medium-sized electric power enterprises.

5.3 Intelligent Control and Fault Detection Technology

The application of electrical automation technology in electrical engineering makes it appear that the related control of electrical engineering becomes more intelligent, and the application of intelligent control technology in electrical process has a great development prospect. Through the application of intelligent control technology, some complex problems in electrical engineering become simplified, thus solving some difficult problems encountered in electrical engineering. At the same time, electrical automation technology can also be used in electrical engineering fault diagnosis, and even quickly find fault points, so as to give the

relevant fault warning signal, the first time to pass the fault problem to the monitoring personnel, Hence, greatly reducing the possibility of further increase in electrical engineering fault.

5.4 Fieldbus technology

Fieldbus technology is an important part of automation control technology, which can make management plan based on actual situation, and then better guarantee the effective operation of automation electrical engineering. At present, the modern bus monitoring technology is relatively mature. Under the relatively independent control module, it not only guarantees the efficiency of the system operation, but also avoids the interaction between the systems, and can reflect the application value of electronic automation technology in the stable operation of high efficiency. From this we can know that in the construction of fieldbus technology, we can realize efficient and automatic electrical engineering operation through more flexible and stable electrical engineering control, which is the inherent demand of the development of electrical engineering in the new period.

5.5 Centralized monitoring technology

The emergence of centralized monitoring technology has changed the traditional multiprocessor monitoring mode of electrical engineering, and also reduced the data processing burden of the core host. On the basis of this technology, the supervision and control of the whole electrical engineering can be realized by using only one processor, which means that the energy consumption of the monitoring system is reduced, and the pressure of the host data processing is reduced. Even if there is a fault problem in the monitoring system, it is not necessary to check one by one, which can ensure that the repair of the processor is realized in the shortest time. In addition, the requirement of centralized monitoring system for hardware and software equipment is relatively low, and it can be used in multiple environments and multiple scenarios without complicated preliminary design. On the basis of the reduction of operation cost and difficulty of maintenance, the maintenance and management of centralized monitoring system has also been simplified to a certain extent, and the system update and the maintenance of hardware equipment can be integrated.

6. Application of Electrical Automation in Electrical Engineering

6.1 Application Principles of Electrical Automation Technology

As a cutting-edge technology, electrical automation technology has a high degree of system complexity. It also involves more technical points in its application. It is difficult to give full play to the advantages of electrical automation technology without mastering the basic principles. Therefore, it is necessary to grasp the

scientific, basic and practical principles in its application so as to maximize the application potential and application value of electrical automation technology, ensure the efficient and smooth operation of the system

6.2 Application of power grid dispatching system

Power group often needs to use the power grid dispatching system to dispatch power when transmitting power to our people. The system is mainly composed of control center main station system, power grid dispatching workstation, central server, display, computer network and so on. The main work flow of the power grid dispatching system is to collect and process the data information of the power grid system, to analyze and store the data information, and finally to control the power grid system. The power dispatching automation system can realize the real-time monitoring of the operation condition of the power system, and then dispatch the power system through the collected data to realize the functions of economic dispatching and safety analysis. The system can realize automatic monitoring and automatic monitoring because of the application of electrical automation technology in the system, the application of this technology brings great convenience to the daily operation of power grid dispatching system. The power grid dispatching system realizes the control of the power system by analyzing the collected data, so it should be monitored in real time for the acquisition process, so that the system can be collected in real time, and the electrical automation technology can make the power grid dispatching system run stably and safely, so that the system can analyze the most correct instructions and improve the production efficiency of the whole system.

6.3 Application in decentralized monitoring of power plants

The decentralized monitoring system of power plant is mainly hierarchical structure, which is composed of Ethernet, process control unit and communication plate respectively. It bear different work responsibilities and tasks, and the data of each monitoring point of power plant will eventually be collected on the core computer. In general, both process monitoring and module monitoring can be displayed directly in the operation stage of electrical engineering, which also provides work convenience for the monitoring personnel of electric power enterprises. For example, when using electrical engineering and its automation technology in hydropower plants, the safety situation of the whole plant area can be monitored in real time. Both the control supervision of single machine electrical equipment and public electrical equipment can realize automatic processing, at the same time, it can ensure the safety of electrical engineering operation in the whole plant area, ensure the stability of the power supply network, and avoid the unsafe phenomenon caused by the fluctuation of electric power. In the thermal power plant, the use of electrical engineering and its automation technology can effectively coordinate the relationship between generator, combustion furnace and power transportation system, so as to achieve the effect of integrated control and integrated

management. When there are potential safety risks in electrical engineering, it can also be found by means of data analysis, the error is small, and the accuracy is extremely high. In addition, electrical engineering and its automation system can automatically adjust the operation parameters of each component of electrical engineering in thermal power plants to ensure that it can achieve the best configuration, and then realize the mining of the production potential of electrical engineering.

6.4 Technical applications in power grids and substations

In the application of electrical automation technology in power grid dispatching, the power grid staff can better analyze and manage the power grid work by collecting the relevant power grid operation data and the relevant operation rules of the power grid. And it give early warning to the fault signals that appear in the power grid, so that the power grid staff can be notified at the first time to make further adjustments to avoid greater problems. In addition, the application of electrical automation technology in substation, thus can meet the substation related equipment operation monitoring work has become simplified, automatic, intelligent, greatly save manpower, through the analysis of electrical automation technology in substation application data, so that the technology is constantly improved. So it can better meet the substation control work.

6.5 Application of Automatic Monitoring System

With the development of modern science and technology, the monitoring system has been applied in all major industries. At present, the monitoring system has been fully automated. Modern monitoring systems can be divided into two types: bus monitoring and remote monitoring. For small and medium-sized monitoring systems, remote monitoring is mostly used, and lines are created through computer networks. The cost of the system is low and the configuration is relatively simple. Large monitoring system is usually bus control, which can realize centralized supervision of the whole power system, and automatically collect and process information, if the system failure will also warn the staff. Compared with the two monitoring systems, bus monitoring system has better stability. The setting of dual redundant channels improves the security and stability of the system operation, and if the system fails, it will not affect the whole system operation.

7. Conclusion

The wide application of electrical automation technology in the field of electrical engineering makes electrical engineers understand the functions of automatic control, real-time monitoring, automatic measurement, intelligent operation, timely protection and so on, which provides safer, more stable and more reliable technical support for my country's energy production, energy production and use, and further improves economic efficiency, thereby providing effective energy support for my

country's various industrial activities.

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