

Analysis on application of electronic information technology in power automation system

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Abstract. With the long-term development of information technology, and science and technology in China, the electronic information technology of electric power automation has been widely used in the operation of the electric power system, driving the intellectualization and modernization in the process of power generation in China. As shown in what mentioned above, electronic information technology is quite important for the power automation system; therefore, power enterprises and their technicians should strengthen the improvement and innovation of the electronic information technology, so as to ensure the efficient and smooth operation of the power automation system, and thus meeting the actual demand for electricity from all walks of life. Meanwhile, power enterprises should strengthen the study and introduction of advanced electronic information technologies at home and abroad, to make their contributions to the development of the electric power industry in China.

Keywords. power automation system, electronic information technology, analysis on application.

1. Introduction

The quality of life of China's people has been improved significantly, arousing great attention to the automation industry. More technicians have been engaged in the study of the related technical means, directly promoting the rapid development of the electric industry. The electronic information technology can constantly supervise and control each process, and provide a large amount of information and data for the staffs, helping them to reduce the work intensity, realize the systematic operation, strictly regulate the entire workflow, and perfectly resolve the weakness of the automation system. Therefore, it can provide all cities with more continuous and stable electricity, and meet the demands of people's lives.

2. Status of application of electronic information technology in the power automation system

Electric power system mainly consists of three parts, namely substation automation, electric power system, and power grid, which can guarantee automatic operation with a variety of electric power systems and devices. The power automation system can provide power measuring instrument automation, testing equipment automation, and system monitoring equipment automation. Data signals can be transmitted and exchanged between devices, so as to control the operation of the electric power system as a whole, and further promote the operation effect of the electric power system. In practical application, electric power automation has enjoyed a gradual tendency towards maturity, and has formed a strong coordination and control function. It has been gradually developed towards intellectualization, to meet the demands of the people for electricity. Researchers have developed many advanced technologies through combining the power automation system with electronic information technology, such as the electronic technology, communication technology, and computer science and technology, which may play an important role in promoting the economic development of enterprises. The design and research of the electric power system are independent of each other. Upon maintenance and repair, there would be a lot of resources consumed; therefore, it is necessary to constantly optimize the electronic information technology, so as to provide technical support for the development of the power system. Electronic information technology mainly consists of the hardware equipment and software system, in which, the hardware equipment, with a high level of technology, can realize automatic intelligent operation, independently complete information collection, share and transfer the information between equipment, thus promoting the automation application of equipment. The software system is the other important part of the electric power system, which may pose high requirements for the level of designers. The designers should design in strict accordance with the requirements. In the process of data collection, the energy system and data collection system in the software system would come into play, which may increase the degree of automation. The software system can collect and organize the data in the hardware equipment, and then transfer them to the monitoring system, which can perform detailed data analysis, and determine the error data, thus helping to carry out timely improvement and correction. The energy system can reasonably regulate and distribute electrical supply, and generate the relevant data, so as to provide convenience for the operators to record and organize such data.

3. Specific application of electronic information technology in the power automation system

3.1. Application in the distribution automation system

The distribution automation system mainly consists of computer technology, communication technology, electronic technology, and automatic control technology. The operators may supervise and control the power distribution equipment, to accelerate the automation process of the electric power system, and make the power distribution network more stable. In the process of reforming and managing the power distribution network, offline and online methods can

be used to make the operation of the power grid more secure and reliable, thus ensuring the long-term development. The structure of the distribution network is quite complex. Fig. 1 shows the diagram of the distribution network automation system. It involves multiple devices, such as cables, transformers, and overhead lines, which are of great significance to the stable operation of the system. In the traditional mode, simple operation is manually carried out, while in the distribution network, with modern science and technology, distributed power supply in the system can be effectively used, which can promote the development of power grid, and make the grid operation more sensitive and selective. As for the protection scheme for the distribution network, distributed power supply is connected, which can play a key role in the over/under frequency protection, over/under voltage protection and protection of grid connection points. In the phase of actual operation, the automation technology of distribution network is mainly expressed as information analysis automation, equipment management automation, mapping automation, and feeder automation. The intelligent terminals can organize and unify the background database, improve the utilization of electric energy, and realize automation of the distribution network.

3.2. Application in the grid dispatch automation system

Grid dispatch plays an important role in the operation of the automation system, and has a certain impact on stability of the system. Under normal circumstances, transformers, servers, and central control computers combine and form a grid dispatch system, which is more complex than the automation system. Therefore, it is necessary to rationally allocate power resources and effectively implement grid dispatch. The electronic information technology can be used to collect and distribute power production data, and provide the operators with the running conditions of the power grid, so as to adjust the electric power system. At the same time, it can also deal with problems during operation in a timely manner, resolve hidden safety hazards and avoid system failure.

In the new era, the relevant personnel have continuously applied and developed science and technology, and improved the application level of the grid dispatch system. There is mainly relay protection equipment, fault recording equipment, and online detection equipment. The electronic information technology can effectively connect the protection devices, and achieve sharing and communication of data and equipment resources; in addition, it can also express the characteristics and advantages of the master dispatch system, improve grid operation efficiency and significantly enhance grid stability and safety. Firstly, the electronic information technology can effectively monitor the operation of the power grid, acquire thermal operating condition indexes and data, as well as operating parameters such as voltage and load. It can appropriately adjust the operation rate of the power grid according to the actual demands of the users. Secondly, it can help to determine the reasonable economic dispatch, lower the power supply frequency, and reduce the using pressure and consumption of resources, thus achieving the goal of saving electricity. Thirdly, it can be used to deal with system failures during daily operation, and perform an in-depth analysis on the operation of the power grid. Furthermore, it can help to design solutions through online operation, so as to reduce the possibility of grid operation failures, and guarantee the safety of the automation system.

4. Conclusion

Electric power is the indispensable source in daily life. Power enterprises should pursue high-quality electric power, attach importance to energy conversion, and fully combine the automation system with information technology, so as to provide new forms of power supply while maintaining the traditional power supply process unchanged, and make up for the existing defects, thus providing efficient and stable power supply.

References

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