Practical Application Analysis of Electronic Information Technology in Power Automation System

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Abstract: With the improvement of people's quality of life, the demand and requirement for electricity in daily production and life have also been improved. The normal operation of power system can effectively guarantee the improvement of economic level, especially in the context of global economic development, which requires healthy development in the field of power. The emergence of new technologies has played a positive role in ensuring the automation of power systems. Electronic information technology is a prominent application technology. This paper mainly expounds the function of electronic information technology and the requirements of power system automation control, then analyzes the importance and application status of electronic information technology in power automation system, and finally explores the specific application and development trend of electronic information technology in power automation system in combination with the actual situation, hoping to play a role in ensuring the good operation of power automation system through this theoretical research.

1. Introduction

In recent years, China has accelerated the pace of reform in the field of electric power, and some new technologies have been widely used in the field of electric power. Among them, the application of electronic information technology is more common, which plays a positive role in ensuring the safe and stable operation of power automation system. Facing the new development stage, it is more important to improve the degree of power automation system, which requires continuous strengthening in the scientific application and optimization of electronic information technology. Through theoretical research on the application of electronic information technology in power automation system, it can provide basis for the reliable operation of actual power automation system.

2. The Function of Electronic Information Technology and the Requirement of Automation Control in Power System

2.1 Analysis of the role of electronic information technology

With the development of electronic information technology, the technical level has been greatly improved. The combination of electronic information technology and power system is an important driving force for the improvement of power system automation. At present, in the development environment of advocating energy conservation in the world, while the level of industrialization of our country is improving, we should also pay full attention to the protection of the environment and the improvement of production efficiency. The optimization of power automation systems is more important. The power automation system is a comprehensive application of various technologies. Under the combination of computer technology and communication technology, it can realize the automatic operation of the power system, and the investment in human resources, material resources and financial resources is greatly reduced, and the power engineering can be effectively the overall level of work efficiency has been improved.

The application of electronic information technology in the power automation system can effectively promote the operation of the grid automation, so that the failure rate of the power grid

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can be effectively reduced. In the process of reform and development of the power industry in China, the application of electronic information technology is indispensable. Under the comprehensive application of computer technology and information technology, unified management of substation electrical equipment can be implemented. With the application of electronic information technology, real-time management and monitoring of substation equipment can be implemented. In the automatic comparison of data sent by electrical measuring equipment, the accuracy analysis of data information is more effective, thus greatly reducing the degree of repetitive work of staff. With the application of electronic information technology, it can effectively contact with the outside world and provide convenient conditions for fault handling.

2.2 Requirement analysis of power system automation control

The automatic control of the power system needs to be in accordance with the corresponding requirements, so as to help improve the control efficiency. The power system is relatively large in scale and involves many contents. If the power system wants to realize automatic control, it must be able to meet the requirements of intelligent management control. It is necessary for the electric power department to strengthen the research work of automation control, reduce the input of manpower, financial and material resources, and improve the operation efficiency of the power system as a whole. Intelligent system management should be well implemented in data collection and real-time monitoring of electrical equipment and meters, and timely checking and solving of abnormal data.

In power system automation control, attention should be paid to the implementation of security and stability requirements. With the rapid development of industrialization in China, the demand for power is increasing year by year. Under the current situation of energy shortage, it is particularly important to improve the operation efficiency of power system. The application of electronic information technology in power automation system can effectively guarantee the security and stability of the system. In the actual selection process of power automation technology, it is necessary to pay full attention to the interference factors of instruments and equipment, strengthen the safe and stable operation of the power system, and improve the troubleshooting efficiency of the power system, so as to greatly improve the play of the autonomous restoration function of the power grid.

3. Importance and Application Status of Electronic Information Technology in Power Automation System

3.1 Importance analysis of electronic information technology application in power automation system

The application of electronic information technology in power automation system is of great importance. With the rapid improvement of energy utilization efficiency in China, the overall technical level of power engineering has also been improved. With the combination of power automation technology and distribution network, the development of power system has been optimized. Different science and technology in the power system have been applied, and the goal of remote monitoring of power engineering has been achieved, and the overall work efficiency of the power system has been improved. Under the scientific application of electronic information technology, it is more beneficial to ensure the safety and stability of power engineering, and it can effectively improve the management level of the power system.

The development of new technologies has also driven the electronic information industry. The demand for electronic information technology in the work of some power enterprises has also been met, which is beneficial to the stability of power grid operation. Closely combining electronic information technology with computer technology and constructing a perfect electronic information management system can optimize the management of power generation and power transformation system equipment and effectively improve the efficiency of troubleshooting problems in the system. The combination of electronic information technology and power automation system also promotes

the good development of actual management.

3.2 The current status of electronic information technology application in power automation systems

The application of electronic information technology in power automation systems will involve related equipment. In the development of power system, electronic information equipment is a combination of software and hardware. In the hardware equipment, it mainly collects information during the operation of the power grid, collects and analyzes the telemetry and the remote signal, and adjusts the operating parameters of the equipment under different adjustment commands to ensure the good operation of the power system. The software system is the energy management system, which involves data monitoring system, data acquisition and security analysis, management and other related systems. In the application of electronic information technology in power automation system, the hardware equipment acquisition system of electronic information collects data parameters and state information, then carries out analysis and processing, and transmits the results to the main station, so as to realize the operation goal of power system automation.

The application of electronic information technology in power automation system. In the process of hardware equipment involved, in the data acquisition of system operation, the information such as switching state, voltage and current is collected first, then the collected information is transmitted to the monitoring room, and then the corresponding instructions are issued according to the actual situation. It can adjust automatically. In order to realize the goal of power system automation, we should not only pay more attention to the application of corresponding equipment, but also pay more attention to the scientific application of corresponding software systems. This is an important application software for power system operation fault elimination, which can ensure the normal operation of the power grid.

4. The Application and Development Trend of Electronic Information Technology in Power Automation System

4.1 Analysis of specific application of electronic information technology in power automation system

4.1.1 Application of electronic information technology in power grid dispatching

Electronic information technology can be applied in many aspects in power automation system. Applying electronic information technology in power grid dispatching link can play a positive role and ensure the realization of the optimization goal of power grid dispatching. During the actual operation of the power grid, the control should be strengthened at the data operation equipment level of power grid load and parameters. The implementation of supervision and control of these equipment is based on the thermal energy index. In order to effectively meet the actual demand, the utilization of resources in power grid dispatching should be fully and scientifically made to ensure the maximum utilization of resources and energy. Corresponding devices will be involved in the implementation of power grid dispatching. Telecontrol and fault recorder devices have been widely used in the last century. In the face of the new stage of development, the dispatching of power grid must achieve the goal of automation and strengthen the overall real-time monitoring of power grid. In the implementation of specific work, under the application of electronic information technology, the operation of the power grid should be monitored in real time, and the parameters such as thermal energy, voltage and electric load should be strengthened. At the level of economic dispatch, we should make full use of energy. Then, under the application of electronic information technology, the effective solution of the grid fault is strengthened, and the automatic electronic dispatch can automatically diagnose the fault of the grid operation, thus improving the fault resolution efficiency and effectively optimizing the dispatching work of the grid.

4.1.2 The application of electronic information technology in substation systems

The application of electronic information technology in substation systems guarantees the

realization of automation targets for substations. The advent of the information technology era has promoted the development of the entire power industry. The gradual maturity of automation technology has enabled the operation automation objectives of substations to be realized. The power operation equipment in the substation system is quite diverse. Once the substation system has a fault problem, it will inevitably affect the normal operation of the entire power grid system. Therefore, it is very important to ensure the safe and effective operation of the substation system. The combination of electronic information technology and substation system can play an active role in promoting the fault resolution of the substation and improve the fault resolution efficiency. Under the current application of computer intelligent equipment, the application of electronic information technology has also been greatly improved. Data recording and statistical work can be perfectly implemented through computer data interfaces, and data that are difficult to measure can be realized under the application of electronic information technology. The automation of substation system has replaced the traditional devices and effectively strengthened the safety and reliability of the system.

4.1.3 Application of electronic information technology in electric measurement of power system

The traditional measurement of electric energy in the operation of the power system is carried out manually, which is relatively low in working efficiency and prone to errors, errors and missed measurement. The combination of electronic information technology and electric energy metering in power system can help to improve metering efficiency. The scientific and perfect design of electric energy metering management system can automatically meter electric energy. The metering method is also different under the condition of different phase line currents of electric energy metering. For example, two-phase current:

$$I=P\div(U\times\cos\Phi) \tag{1}$$

In the type:P--Power(W);U--Voltage(220V); cosΦ--Power factor (0.8);I--Phase line current(A).

Three-phase current:

$$I=P\div(U\times1.732\times\cos\Phi) \tag{2}$$

In the type:P--Power(W);U--Voltage(380V);cosΦ--Power factor(0.8);I--Phase line current (A).

After defining the basic formulas of the power metering management system, it is necessary to ensure the system extensibility in the application of electronic information technology, so as to pay attention to improving the efficiency and security of the system reuse. Under the application of electronic information technology, by collecting the operation data of watt-hour meter in the concentrator, and then transmitting it to the distribution data center through the network, the electricity can be effectively measured, as shown in Figure 1.

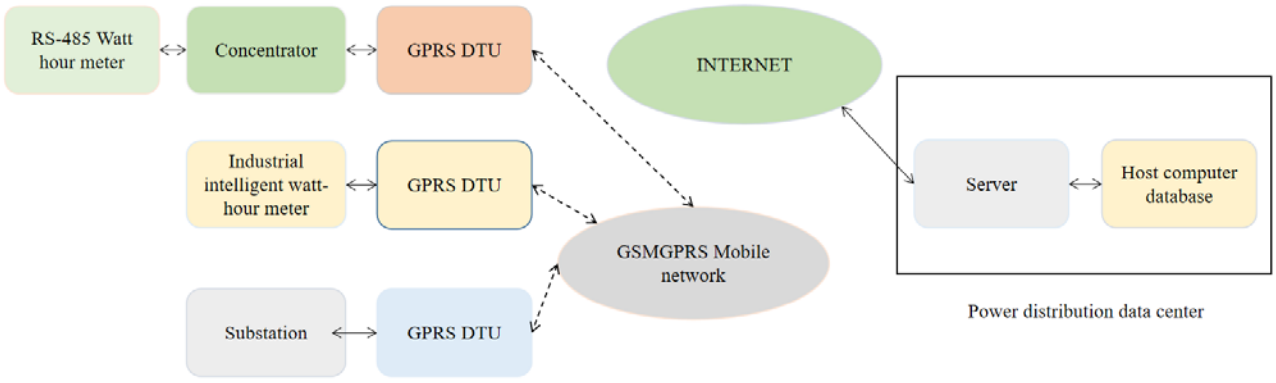

Fig.1. Electric energy metering information system diagram

4.1.4 The application of electronic information technology in power system distribution network

In the process of power distribution network in power system, it is more important to apply

decentralized control system. This is a comprehensive application technology, which can comprehensively apply network communication technology, computer processing technology, power control technology, communication technology, etc., thus realizing decentralized control and centralized management of power. In the process of distribution network, the operation data can be effectively collected under the distributed control technology, displayed on the screen under the application of the computer, and then the data information is shared by the network information technology, so that the automation degree of the distribution network can be strengthened. The stability level of the grid system can also be effectively guaranteed. For distribution transformers and cables, which are more important application equipment in distribution network, it is more advantageous to play a protective role in the network. In the operation process of distribution network, the access of distributed power supply can promote the flexibility selection and reliability guarantee of distribution network. The analysis of information and the analysis of the distribution network and automatic mapping can be automated. Through the application database, intelligent terminal and unified background management technology, on the basis of electronic information technology, it is possible to automate the distribution network to ensure that the role of electric energy is higher in it.

4.2 Application and development trend of electronic information technology in power automation system

With the rapid development and continuous optimization of electronic information technology in power automation system, its application will be more common in the future and play a positive role. The compatibility between electronic information equipment and automation equipment is the development trend. The progress of electronic information technology is relatively rapid, and the compatibility with the software and hardware of automation equipment has become an important development trend. In the actual operation of the power system, the microcomputer-type equipment is widely used, and the research on electronic information technology and microcomputer products should be continuously strengthened in the future to promote the compatibility of electronic equipment and automation equipment.

The upgrading of technology and its wide application are the important driving force to promote the development of power automation system. It will be more and more widely used in the application of electronic high-tech. Especially in recent years, the development of high-tech is relatively rapid. Video technology, infrared imaging technology and image information technology have been applied in the power automation system, playing an important role and improving the degree of the overall power automation system. The update speed of power system automation application of electronic information technology is also getting faster and faster. In recent years, different types of products have been developed, and some power system equipment is constantly being perfected, which provides a basis for simplifying the hardware structure and effectively improves the product quality level, thus improving the automation degree of the power system.

5. Conclusion

To sum up, in the current era of rapid power consumption, it is more critical to strengthen the automation of the power system and promote the efficiency of the power system. The close combination of electronic information technology and power automation system can help to promote the sound development of the overall power system, and also play a guiding role in the direction of the development of power system automation. It is hoped that through this research and analysis, it will be beneficial to the sustainable development and safe and stable operation of the actual power automation system.

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