# Research on the Discussion on China's Power Distribution System and Its Automation Technology

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**Abstract:** The application automation technology of the distribution system is completely adapted to the development of the society, which fundamentally guarantees the user's power requirements. With the continuous development of automation technology, the level of automation of distribution systems is constantly improving, but there are still some problems that have not been effectively solved. This paper mainly analyzes the problems existing in distribution automation and we put forward the solutions to better understand the distribution automation system.

## 1. Introduction

With the promotion of information technology such as network and communication, the automation of power systems is developing from spontaneous multi-island automation to unified and systematic integrated automation. The development of integrated automation is bottom-up. Substation integrated automation is based on the protection of power system and the informationization of measurement and control unit, with information and network technology as the core. Up to now, substation integrated automation has been widely recognized and widely promoted. At present, distribution automation, which is led by substation integrated automation, is becoming an emerging hot spot in power systems.

At present, in the people's life and production process, the demand for electric energy is increasing, which promotes the construction of the power grid. During the construction process, the power system plays an important role, mainly due to the safe, normal and sTable operation of the power system. Only the quality of the power supply can be guaranteed. With the support of science and technology, the power system combines automation technology. On this basis, the power system is more perfect, mainly because it realizes automatic management and monitoring, and it can timely deal with the problems existing in it and also improve the efficiency of the relevant personnel.

## 2. Advantages of Distribution Automation Systems

Power system automation has greatly improved the management capability of the power system, and has realized the automation of the problems in its operation, thus ensuring the safety and stability of the power system. It is composed of many devices, and it can be operated in an orderly manner through mutual cooperation. Among the many equipments, the most important is the central computer, as well as information service devices and monitoring devices for substations and power plants. On the basis of orderly and accurate transmission of information and instructions, the central computer realizes the power system. Effective control, the monitoring device is mainly to recover abnormal operations, process related reports, and so on.

In order to better understand and understand the distribution automation system, this section will mainly analyze the huge advantages of the distribution automation system: (1) The stability of the power supply system is effectively guaranteed. The distribution system applies some relevant automation technology to the system in order to fundamentally ensure the stability of the power supply system. When the power distribution system fails, the distribution automation system can quickly determine the specific location of the fault and then effectively protect the faulty location. In addition, the distribution automation system can isolate the faulty location from the location

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where the fault does not occur, so as to ensure that the fault does not affect the normal operation of the entire power supply system. The advantages of the distribution automation system in this way greatly reduce the scope of the failure and greatly reduce the difficulty of maintenance, but also reduce the cost of maintenance. The distribution automation system fundamentally guarantees the stability of the entire power supply system and ultimately ensures the normal use of the power by the user. (2) Initial investment and maintenance costs are greatly reduced. The use of automation systems in distribution systems has greatly reduced initial investment and maintenance costs. After the application of the automation system in the power distribution system, problems such as the cost of the line investment, the power outage time, and the maintenance cost are effectively solved. The application of the automation system in the power supply system greatly reduces the difficulties in finding the fault location, and also greatly shortens the repair time, and finally ensures the normal life of the user. (3) Under the influence of science and technology, the power distribution system also actively uses automation technology, such as: medium and low-voltage network digital electronic carrier technology, which mainly uses digital signal processing technology to improve the ability of information reception and make it more sensitive. At the same time, it also effectively deals with the interference problem of the power system. At the same time, the distribution system, with the support of information technology and network technology, has achieved effective integration with the transmission network. The operation process of the power distribution system is monitored through an automated system, and some fault problems can be discovered in time. The power supply department can arrange for maintenance personnel to solve the problem as quickly as possible, thus ensuring the quality of the power supply.

## 3. Problems with the Distribution Automation System

However, the technology required for realizing distribution automation has matured, and the distribution automation system has achieved certain achievements in some aspects. However, there are still some problems in the process of distribution automation development, which seriously hinder the rapid development of the system distribution automation. In order to have a deeper understanding and understanding of the distribution automation system, this section will mainly analyze some problems existing in the distribution automation system: (1) The management level needs to be improved. For power companies, it is necessary to ensure that its system platform provides reliable and effective supply of its application services. In different regions, it mainly maintains and manages data in the region, and it forms for databases of different levels. The database can also be distributed, and data can be called and shared through the network and between regions. Since the automation system has been gradually developed in recent years, the distribution system staff did not have enough knowledge of the automation related equipment, which eventually led to a certain degree of lack of management level. In order to fundamentally improve the stability of the operation of the distribution system, the management level of the staff must be effectively improved. (2) The automation equipment has not been updated in time. The distribution system has to achieve greater economic benefits in order to maximize the investment cost, and there is no timely update of the automation equipment. Old distribution automation equipment has seriously hampered the development of distribution automation systems. In order to fundamentally guarantee the stability of the entire distribution system during operation, some automation equipment in the distribution system must be updated in time. Only the timely updating of the distribution automation related equipment can fundamentally make the entire distribution system achieve greater development. (3) The level of automation is still relatively backward. Due to the limitations of science and technology, the technology related to distribution automation is still not mature enough. In order to make the distribution system more developed and to create a safe and sTable operating environment for the distribution system, the researchers must conduct further research on the distribution automation technology. This section mainly analyzes the problems existing in the distribution automation system from three aspects, which makes us have a deeper understanding and understanding of the distribution automation system. Only by fully recognizing the problems existing in the distribution automation system can we more clearly analyze and study

these problems and finally propose solutions.

## 4. Optimization Measures for Distribution Automation Systems

Nowadays there are still some outstanding problems i have seriously hindered the development of distribution automation systems and the safe and sTable operation of the entire power supply system. In order to solve the problems in the distribution automation system and fundamentally ensure the safe and sTable operation of the entire distribution system, this section mainly proposes several solutions to how to optimize the distribution automation system in the future: (1) Improve the automation of the staff Management level. In order to ensure that the distribution automation system can be better developed, it is necessary to effectively improve the management level of the distribution system staff. The power supply management department shall regularly train the staff in the automation management and conduct regular assessments of the staff. After the staff's automation management level is effectively improved, the entire distribution system can be fundamentally guaranteed to operate normally. (2) Focus on the development of automation related control software. The distribution automation system controls the entire power distribution system mainly by relying on relevant automation software. At this stage, some of the control software in the distribution automation system is still not perfect. In order to better enable the automation system to serve the entire distribution system, the power distribution department must put the timely update of the automation related software in the first place for consideration. Only when the automation software is updated in time can the basic operation of the entire power distribution system be fundamentally ensured. (3) Pay attention to the improvement and improvement of relevant rules and regulations. Whether the rules and regulations are perfect or not is directly related to whether the distribution automation system can operate normally. In order to ensure the safe and sTable operation of the entire distribution system, the rules and regulations of the power distribution department must be continuously improved and improved according to the actual situation. In the process of improvement and improvement of the rules and regulations, it is necessary to listen to the opinions of the staff based on the actual situation and extensively. At this stage, the main reason for the slow development of China's distribution automation system is that the rules and regulations of the power distribution department are not perfect enough, and the staff members have not implemented it seriously in their daily work.

The development of distribution automation in foreign countries has gone through the process of development from a variety of single automation, the distribution automation system known as “multi-island automation” to open, integrated and integrated automation. At present, it has a considerable scale, and it has brought about improving the reliability and efficiency of distribution network operation, improving power supply quality, reducing labor intensity, making full use of existing equipment, shortening power outage time and reducing power outage area. A considerable economic and social benefits. Of course, China's distribution network automation should be combined with China's actual situation, comprehensive planning, and gradually implemented, without having to follow the development path of foreign distribution network automation.

In the current situation of improving the level of China's distribution automation has become a top priority, we can not blindly pursue the full realization of the distribution management system, and we should learn from the experience of the development of transmission grid automation, first realize some practical distribution automation functions, and In the use, the system automation level is continuously improved, the system functions are enriched, and the power distribution management system is gradually improved and optimized.

At present, the technology needed to realize distribution automation has matured. The work that the power company has to do is to analyze the potential functions required by the company's distribution network to determine the appropriate implementation. It is worth noting that each power company's distribution network has its own particularities, such as geographical environment, scope and scale, management style, user nature, etc. Technically speaking, there is no difficulty in realizing distribution automation, but still faces two problems: First, the power supply enterprise should seek a “performance price ratio” according to its actual situation, in line with the

development direction of contemporary technology, “Unified planning, step-by-step implementation”, “systems that are not pushed back” due to system development or technological advancement; second, many mature technologies for transmission grid automation can be used for reference, but distribution automation has its own characteristics, such as capacity. Large, fault record information, fixed value remote transmission, remote meter reading, etc., the traditional communication protocol can not meet the requirements of use well, so it is necessary to propose a standardized communication protocol that meets the requirements of the distribution network as soon as possible, so as not to cause manufacturers themselves. Set the mess. For power companies, distribution network is ready-made Actively adopt digital power distribution carrier technology to improve the technical level; use various technical and economic means to improve the service to users, guide users to rational and economical use of electricity, encourage users to participate and cooperate with power companies to manage electricity supply and use. control.

## 5. Conclusion

This paper mainly analyzes the three advantages of the distribution automation system, the problems in the development process of the distribution automation system and the optimization measures proposed for the existing problems. The distribution automation system is gradually developed to meet the needs of social development and to better ensure people's normal electricity demand. The distribution automation system must be continuously researched in the future to make the entire distribution system more developed.

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