

Research on Key Technologies of Automatic Acceptance of OCS Four Telemetry Signals

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Keywords: OCS; Electric power dispatch; four remote anomalies

Abstract: Generally speaking, the so-called power system dispatching automation, in fact, refers to the use of computer remote communication technology and remote control technology to monitor and coordinate the operation of the power system, and then process the problems and faults in the process of operation, and ultimately achieve the automated management and operation of the power system. In view of the development of smart grid, this paper introduces a fully automatic combined wave generator based on OCS system and human-machine interface. The power dispatching automation system needs the development of automation, intelligence and self-healing, and puts forward the importance of ensuring the normalization of the dispatching automation four remote signals. And the method of efficient point-to-point debugging starting from the master control unit or the remote engine node under the condition that the device is completely unpowered, and the functional requirements of the point-to-point debugging software using the method are elaborated in detail. Through the signal transmission, the monitoring main station analyzes and processes the information centrally, and finally realizes the unattended and remote monitoring of the substation.

1. Introduction

With the deepening of transformer substation integrated automation transformation, new requirements are put forward for the "four remote" function of basic automation. If the communication system of substation fails in operation, there may be four remote anomalies in the power dispatching automation system, as well as anomalies in remote signal, remote measurement, remote control and remote adjustment. When the power grid is in abnormal and accident, it still needs to be judged and handled by manual experience [1]. The large number of graphical pictures, alarm signals and video information surveillance faced by regulators in many substations are totally different from the previous single substation surveillance. When the substation database is newly built, there are many errors in input information artificially, so that peer-to-peer is quite time-consuming and laborious [2]. After being put into operation, the database of each monitoring terminal is updated frequently, such as the cutting of the remote channel. Effectively maintaining the integrated automation communication system of the substation and reducing the defect occurrence rate of the substation integrated automation communication system is conducive to improving the operational stability and reliability of the dispatching automation system and the substation automation system [3].

Dispatching automation not only promotes the technical level of the grid, but also plays an important role in improving the overall management level. It has become more and more prominent in the transition from conventional substation to intelligent operation, computerization, screen and operation mode to unattended and centralized control. The substation system model distinguishes the intelligent electronic devices in different areas of the communication system, and distinguishes on which subnet the smart device performs the model establishment of the device according to the access point of the network [4]. Every database change needs to be peer-to-peer. The debugging method is to consume labor on the actual intact equipment and circuit. The workload is huge and dangerous, which brings a lot of troubles to the smooth operation of the power grid. How to further optimize the function of the system, sort out and improve all kinds of complex signals, accurately

predict and process all kinds of alarm information, quickly isolate fault points, and improve the level of dispatch monitoring and management is of great significance to the reliable power supply of the whole power grid.

2. Methodology

Dispatching automation plays an important role in power system automation, which can provide a solid guarantee for the smooth implementation of the overall automation of power system. OCS is a man-machine interface device based on PLC, with CPU, memory, I/O port, various functional modules, LCD display screen and operation button panel. In debugging, the actual state of the relevant equipment in the station is changed, and virtual remote signal is to add analog signals to the protection device to generate signals, and check whether the state of the equipment is consistent with the actual situation in the monitoring terminal [5]. The communication subnet associates the network access points of the intelligent electronic device, but does not have physical characteristics. When the substation equipment is to connect to the communication subnet through the network access point, the network access point used should be a logic of the substation equipment. The address on. The classification of protection information is realized by monitoring the internal database of the system. The main station monitoring system establishes a database for reasonable preservation and effective use of each protection device [6]. Different types of information are distinguished by the associated operations of Tables, records, and menus in the database. Causes the line to trip, short circuit, or cause other equipment failure, thus affecting the normal operation of the power automation system.

The signal consists of a state quantity and a digital quantity. The state quantity includes the state of the circuit breaker, the state of the isolating switch, the position of the main transformer tap, the state of the synchronous check, the relay protection action signal, and the operation alarm signal. Another principle for selecting thyristors and partial conversion response switches is that their triggering and switching times do not affect the synchronism of the control [7]. Collecting, transmitting and processing information in various power grids is the main function of power dispatching automation. The commands of power dispatching can be transmitted through the power communication network, and data collection, management and monitoring functions are realized. It can not only shield the space interference, but also replace the appropriate parameters as a whole according to the waveform. Its action instructions are issued by the OCS internal control program [8]. Generally speaking, it mainly refers to the abnormal phenomena such as frequent displacement of a remote signal location during the operation of dispatching automation system or when debugging automation system. Dispatching automation plays an important role in power system automation, which can ensure the smooth implementation of the overall automation of power system.

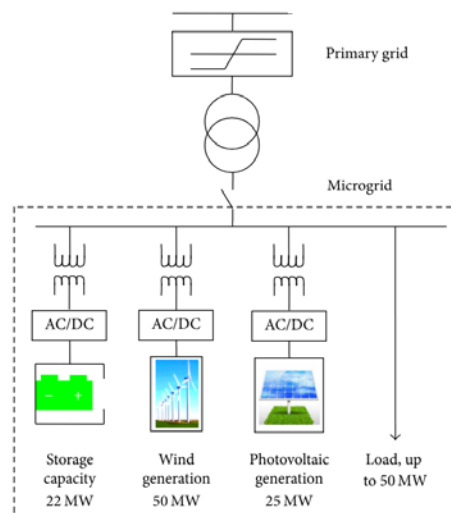


Fig.1. Industrial park microgrid construction

As shown in Figure 1, the Industrial Park microgrid consists of different types of loads, showing the power output of wind power generation and photovoltaic power generation, as well as the typical load distribution throughout the day. In order to better demonstrate the quantitative comparison between power output and consumption power, photovoltaic power output and wind power output are superimposed.

After the substation is put into operation, the update, supplement and modification of each database are frequent, such as the transformation or replacement of the background machine, the channel cutover, the operation station needs to expand the scope of “four remotes“, and the station is classified as another centralized control station. As long as the correct communication subnet and network access point are properly named and the node is reasonably connected, an effective association with the actual physical device can still be established [9]. The setting of the monitoring system accident action: the accident signal should be treated first, the level is the highest, the prevention signal is blocked; when the switch displacement and the “accident total“ signal appear at the same time, the “accident trip“ voice alarm is synthesized, and the accident push screen is triggered at the same time. In the telemetering process of power dispatching automation system, abnormal database situation is common, mainly manifested as data will not automatically refresh, data errors and disordered code, and the speed of telemetering change is too slow. The auxiliary contacts of circuit breakers and disconnectors in substations are in a harsh electromagnetic interference environment. These auxiliary contacts are connected to the switching input circuit through long leads, which will inevitably bring interference information. Because PLC is specially designed for industrial control, it adopts a variety of anti-interference measures and selected components, which can be used together with high-power equipment in harsh industrial environment, and has high operational stability and reliability.

3. Result Analysis and Discussion

Usually, for the common abnormal situation of telemetry in power dispatching automation system, it mainly includes data not refreshed, data errors, slow change of telemetry and so on. The commands of power dispatching can be transmitted through power communication network, and the functions of data acquisition, management and monitoring are realized. Generally, it is simplified as manual short connection or disconnection of the input loop at the terminal row connected by the measuring and controlling device to simulate the auxiliary contacts or open contacts action of the equipment to correspond to the change of the state of the relevant equipment. Multiple communication subnets can run different communication protocols. If these communication subnets are connected together, the physical device can be used to carry any of the protocols using the subnets therein. The principles of accident and exception handling include: “Rapidly restricting the development of accidents, eliminating the root cause of accidents, and lifting threats to people, power grids and equipment. The main reason for the mis-control phenomenon is that the equipment between the main station and the station does not match, such as the serial number. The numbering method is different, which will cause the remote control serial number to be misplaced, resulting in false control.

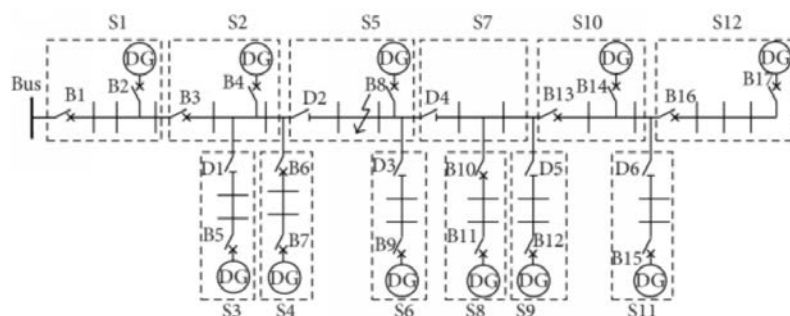


Fig.2. Power distribution system with WTG, PV and Bess

The sampling method is shown in Figure 2: First, the probability of all states is added to the number between the two axes, and the random number indicates the state of the PV array. The sampling method of the running state is the same as that of the photovoltaic array, and the reduced state is part of the reason for the failure of the bass.

The system is based on OCS interface operation, using high-speed counter module, each module has two high-speed counters that can set 15MHz internal counting pulse or external counting pulse. For the database anomaly that occurs during the telemetry process, it mainly includes the error of the coefficient calculation program, and the data blockade is not removed after the manual setting, so that the telemetry data cannot be refreshed. Dispatching automation not only promotes the technical level of the grid, but also plays an important role in improving the overall management level. Under the mode, the data of the monitoring terminal on the debugging side can be checked correctly one by one, and the signal of the power outage equipment can be debugged at one time, and the debugging period is short. However, the reliability of power supply of the power grid decreases due to the sound of the equipment shutdown. Generally speaking, the client in the communication subnet can only access the servers in the subnet, but can not access the servers in other communication subnet. If the router is added to the communication network, the access problem between different subnets can be solved. The supervisory and duty personnel monitor, analyze and process the alarm information of the system so as to quickly and correctly judge all kinds of alarm signals, isolate faults as soon as possible and ensure the stability of the whole power grid system.

Optimize information transmission and select information Tables according to the actual situation as far as possible. In view of the large amount of information in the integrated automation system, the necessary information diversion is carried out. Three-phase unbalance and power factor change during telemetry, or errors occur in single-phase measurement and calculation. In the four telemetry technology, telemetry and telecommunication functions can enable the supervisors to implement remote monitoring and understand the situation of each monitoring area, while remote control and telecontrol can realize the remote control of managers. It is easy to mistakenly touch the control circuit when short-connected remote communication circuit, which makes the switch jump, YK outlet inspection easily lead to switch misoperation, and it is easy to slip when the circuit is disconnected in a large number of point-to-point. The significance of using an information model is not only in the modeling of objects, but also in the description of the correlation between objects. When the single-phase grounding fault occurs, the power grid is not allowed to operate for a long time. Because the two relative ground voltages of the non-faulty rise to the line voltage, the weak link of the insulation may be broken down, and the phase-to-phase short circuit may be developed to expand the accident and affect the normal power consumption of the user. Telemetry overflow is a phenomenon that is easy to occur in the field operation. The root cause is that the telemetry value is not within the control range of the variable. In response to this situation, it is necessary to check the specific aspects of the telemetry overflow.

4. Conclusions

In summary, the "four remote" anomalies in the power dispatching automation system are caused by many reasons, and it is difficult to completely eradicate them. Only by actively taking various measures to effectively deal with them, the probability of occurrence of abnormal conditions is reduced. On the basis of the fundamental wave method, the line monitoring system adopts improvement measures such as obtaining reference signals from the coupling capacitors, system time-sharing processing, self-calibration and current sampling, which better meets the needs of on-site monitoring. According to the important level, the alarm signal is hierarchically partitioned and marked with different colors; Normalize the naming and screening rules of switch information, and achieve effective screening and sorting of all kinds of alarm information. Make out all kinds of realistic current and voltage exceeding limits to avoid the occurrence of false alarm signals caused by too high or too low operating limits. Dispatching operation and automation maintenance personnel should have a good sense of responsibility and management, improve professional quality,

conduct regular inspection, timely detection of the "four remote" signal in the automation system, and timely processing. The telecontrol communication between substation and main station will change greatly, which requires the open system of point-to-point debugging software.

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