ISSN 2616-7433 Vol. 2, Issue 10: 28-30, DOI: 10.25236/FSST.2020.021007

Discussion on Power System Configuration of Iron Tower Machine Room

Nong Jun

China Tower Corporation Limited Nanning Branch, Guangxi Nanning 530001, China

ABSTRACT. *The power supply system of the iron tower room is an important system to ensure the normal operation of the communication equipment in the tower room. A good power configuration in the computer room can significantly improve the stability of the operation of communication equipment in the computer room. The main content of power system configuration of iron tower machine room includes the configuration of switching power supply equipment, battery equipment and AC equipment. In accordance with the relevant national construction specifications and related product technical specifications, this paper briefly describes the main content of power system configuration in iron tower room, aiming to provide some guidance and reference for the power system configuration in new iron tower room.*

KEYWORDS: *Iron tower, Computer room power supply, Power supply system, System configuration*

1. Iron tower machine room power supply system

Communication tower is a high-rise steel structure with communication function. At present, there are five common types of communication towers in our country: common ground tower, landscape tower, simple tower, common floor tower and floor derrick. The tower computer room is a production-type house (special mobile communication computer room) specially equipped with communication equipment. The common types of iron tower machine rooms in China are color steel plate room, frame machine room, brick concrete machine room, integrated machine room and integrated cabinet. The power supply system of the iron tower computer room is an important system to ensure the normal operation of the communication equipment in the computer room. Doing a good job in the configuration of the power supply system of the iron tower computer room is very important for the reliable operation of the communication network. The power configuration of iron tower room is a very scientific and meticulous work. For example, over configuration will increase the cost of investment and lead to low utilization of equipment; under configuration will greatly reduce the reliability of the power system, thus affecting the normal operation of the communication network. Therefore, the staff should pay attention to the power system configuration of the iron tower room.

2. Configuration of Power Supply System in Iron Tower Room

Before carrying out the typical system configuration of the iron tower computer room, the person in charge should carefully study the relevant engineering construction specifications and relevant product technical specifications, such as “Code for Design of Installation Engineering of Communication Power Equipment” (YD/T 5040-2005), “High Frequency Switch Rectifier for Communication” (YD/T 731-2008), “Valve Controlled Sealed Lead Acid Battery for Communication” (YD/T 799-2010) etc. In addition, familiar with the common base station supply mode, such as the macro base station usually adopts the combined switching power supply and battery pack power supply mode; the distributed base station and radio frequency remote base station usually adopt the integrated AC power supply (including battery) and the integrated DC power supply (including battery).

2.1 Configuration of Switching Power Supply Equipment

The switching power supply mainly includes three parts: frame capacity, module configuration and DC distribution unit. (1) In terms of frame capacity, 200A, 300A, 600A or 900A should be selected. Considering that China’s mobile, Unicom and telecom three major communication operators share the status of tower room, in order to ensure the stable operation of communication network, 600A or 900A is the best choice for the frame capacity of switching power supply in the room. (2) In terms of module configuration, it shall be configured

ISSN 2616-7433 Vol. 2, Issue 10: 28-30, DOI: 10.25236/FSST.2020.021007

according to the current load current of communication equipment. The number of rectifier modules shall be configured according to the redundancy principle of n+1 (n ⩾ current / rated output current of each rectifier module). If the number of rectifier modules is greater than 10, one standby shall be added for each 10. At present, the commonly used rectifier module specifications are 30A and 50A. The two specifications of rectifier module are relatively mature now, so it is convenient to configure. (3) In terms of DC distribution unit, it is necessary to ensure that its distribution circuit meets the use requirements of wireless, transmission and monitoring equipment. At the same time, it should have the function of secondary power supply, so as to ensure that the battery can not discharge and provide longer power supply time for communication equipment. The secondary power supply function of DC distribution unit shall be flexible and the voltage of power supply can be adjusted flexibly. In addition, it also has the function of secondary power supply and low voltage protection to ensure the normal operation of communication network. In order to facilitate upgrading and maintenance, DC fuse (control switch) or breaker terminal box of DC distribution unit shall be able to expand capacity flexibly and be able to be replaced without power failure.

2.2 Configuration of Battery Equipment

Battery is a complete and independent power system, which is mainly composed of rectifier, charger, inverter, static bypass switch, manual maintenance bypass switch and battery pack. The battery can be powered by the inverter to the load under the state of power supply. The battery configuration in the iron tower room can significantly reduce the operation cost of communication operators. However, if the power supply in the area is frequently interrupted, it is necessary to configure a large-capacity battery pack or generator set, so the cost will increase. The iron tower computer room must select the battery correctly and reasonably. The main influence on the capacity of the battery in the iron tower computer room is the power consumption of the iron tower computer room.

In addition, the city power outage rarely occurs in our country, so the battery capacity in the city tower room only needs to be configured according to the normal operation of the main equipment for two hours. However, there are many times of power failure in suburbs, so the battery capacity in the tower room in suburbs needs to be configured according to 3-4 hours of normal operation of main equipment. However, there are more times of power outage in the village, so the battery capacity in the tower room of the village needs to be configured according to 5 hours of normal operation of the main equipment.

2.3 Configuration of Ac Equipment

In addition to the configuration of switching power supply and battery, the tower room also has the configuration of AC equipment. The main contents include an AC distribution box, an over-voltage protector, an oil engine/municipal power conversion panel (or oil engine/municipal power conversion switch). Among them, the configuration of the AC distribution panel shall fully consider the construction requirements of the origin; the over-voltage protector (surge protector) can be installed in the AC distribution box, its maximum discharge current (Imax) shall meet the design requirements, and the installation location and method shall meet the design requirements or the product design and installation instructions. The oil turbine/municipal power conversion panel can also be installed in the AC distribution box.

3. Energy Saving and Emission Reduction of Power System

Energy saving and emission reduction is an important measure to implement the scientific development concept and build a socialist harmonious society. In recent years, China is actively building a resource-saving society, which requires all walks of life to attach great importance to the theoretical research and practice of energy saving and emission reduction in the development process. In the same way, the power system configuration of the iron tower room also needs to pay attention to energy saving and emission reduction. At present, the realization of energy saving and emission reduction of power system configuration in iron tower room is mainly realized through equipment upgrading. For example, in the configuration of switching equipment, a new type of high efficiency switching power supply is used instead of a general type switching power supply; in the configuration of battery equipment, the lithium iron phosphate battery is used instead of the high temperature resistant battery to improve the working efficiency of the battery, so as to effectively reduce the power consumption of the power supply system in the computer room.

ISSN 2616-7433 Vol. 2, Issue 10: 28-30, DOI: 10.25236/FSST.2020.021007

4. Conclusion

The configuration of the power supply system of the tower computer room is a scientific and rigorous work. When configuring, switch equipment configuration, storage battery equipment configuration and AC equipment configuration must be carried out in strict accordance with relevant industry standards and relevant product technical specifications to ensure the stable operation of the computer room power system. In addition, it is necessary to adopt various feasible technical means to reduce the energy consumption of the power supply system of the computer room to achieve the purpose of energy saving and emission reduction.

References

[1] Kong Hongbin (2017). Research on power system configuration of tower machine room[J].China new communication, no.15, pp.90-91.
[2] Wei Dengfeng, Tong Zhaohui (2019). Discussion on the construction of base station power supply based on 5g network[J].Digital communication world, no.11, pp.78-79.
[3] Xia Xiaowen (2017). Discussion on transformation of communication power combined switching power system [J].Telecommunication technology, no.4, pp.34-35.
[4] Li Yanbing (2015). Suggestions on power configuration of new base station of iron tower company[J].Communication power technology, no.3, pp.12-13.
[5] Yang Xu (2017). Discussion on power environment system configuration of iron tower company [J]. Management and technology of small and medium-sized enterprises(zhongxunxi), no. 4, pp.12-13.