Application of PLC technology in electrical automatic control

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Abstract: at present, the development of electrical engineering automation has been very mature, in which the progress and breakthrough of PLC technology is very significant, and its value and role in electrical automation control are becoming more and more critical. In this paper, the application of PLC technology in electrical automatic control is further explored, and the application of PLC technology in electrical automatic control is analyzed in detail.

1. INTRODUCTION

The old-fashioned electrical automatic control will be carried out with the help of electrical connection. This method needs to pay a higher cost, and the internal line is more complex, and the corresponding maintenance work is very inconvenient. At the same time, the automatic control can not meet the expected requirements. However, PLC technology belongs to the digital computing electronic operating system, which can not only reduce the disadvantages of the old electric automatic control system To make up for the shortcomings, it can also make the electrical automatic control system have a higher level of automation, so as to give higher protection and promotion to the development of enterprises. Therefore, for the application of PLC technology in electrical automatic control, this paper gives the following analysis.

2. Introduction of PLC Technology

2.1 PLC technology concept

PLC is a kind of programmable logic controller, which can improve the safety of industrial environment in the form of simulation and industrial data editing. The memory of PLC system can carry out different specific operations, such as sequential operation and logic operation. In addition, it can expand the inlets and outlets of some analog and digital quantities, so as to achieve the goal of controlling motors and instruments. In electrical automation, through the application of the old-fashioned traditional controller system, the internal wiring will be more, and there is no ideal flexibility. However, under the premise of computer technology and contactor control technology, the construction of PLC can assist the relay, so as to replace the mechanical contact relay, which overcomes the disadvantages existing in the past, and will Using logical relation, the problem of return coefficient will not appear. Therefore, the node displacement time will be closer to zero. The system also has a very strong anti-interference function, so it can still play its own function and role in the face of complex operating environment. In addition, the form of the instruction is not complex, so there will be no complex situation in the operation process, which makes the work more convenient [1].

2.2 composition and application principle of PLC Technology

PLC system is composed of central processing unit, input interface, output interface, storage medium,
power supply, etc. users can add external auxiliary equipment according to specific requirements, and the working principle of PLC control system is very similar to that of computer. When the power is just turned on, the central processing unit will carry out self diagnosis and process the network information content. After finishing the preparatory work, it will scan the user program, and can scientifically control it in the process of passing through the input and output channels [2]. In the application process of PLC control system, if there are bad conditions, the process can be self diagnosed with the help of central processing unit, and then restart. In addition, the principle of the system is to guarantee the PLC control system, make it have very ideal reliability and strengthen safety, so that it can be completely consistent with the standard proposed by the control object, and under the premise of ensuring normal operation, reduce the output of cost, so as to create a more ideal economic effect.

3. Feature analysis

3.1 it has strong reliability and anti-interference
PLC host, whether to carry out input or output work, the power supply is independent, and the single power supply does not interfere with each other. In the form of electro-optic isolation, the output and input modules can be separated. In order to ensure the stable operation of CPU, the monitor circuit will be installed. For the development of external work, it will carry out the design of sealing, dust-proof and anti-seismic, so that each internal construction has corresponding shielding measures, and thus has strong anti-interference performance, at the same time, it has more outstanding anti-interference performance, so as to improve the corresponding anti-interference ability and make it more reliable. At present, due to the continuous improvement of electronic components manufacturing process, construction level, etc., it is necessary to further optimize various technologies to consolidate them, so as to make PLC have more ideal reliable performance [3]. In addition, in the application mode of PLC technology, the system also has a very strong ability of fault diagnosis. Once there is a fault, an alarm will be sent out in time, so that the relevant personnel can handle the accident at the first time.

3.2 rich interfaces and convenient installation
For the current industrial production, there are many kinds of signals. In PLC, there are also a variety of interfaces, such as: module interface, dialogue interface, equipment interface, I / O interface and so on. The outstanding feature of these interfaces is that the volume is very smart and light, which realizes the effect of plug and play, and does not have very large energy consumption, which provides greater convenience for the overall optimization. In addition, PLC also has a monitoring system and fault diagnosis procedures, in its application, not only can timely and effectively diagnose the fault, but also can maintain and optimize it [4].

3.3 it has high versatility and is easy to transform
Because the interface of PLC technology is very rich, module hardware has a very complete variety, so the richness is very strong, can effectively play and realize the automatic control function. Users can change the hardware according to their own specific development and requirements, so as to optimize and adjust the functions of PLC. Because of its strong versatility, the convenience provided for active transformation is ideal. In the process of applying PLC technology, the wiring logic can also be changed into storage logic to avoid the appearance of peripherals. At the same time, when controlling the design of the system, it can also shorten the corresponding transformation time, making the maintenance work very convenient. By changing the program code, the user can realize the effective play of the control function and guarantee the higher universality of PLC technology, so the corresponding transformation work is very convenient [5].
4. Electrical automatic control, the application of PLC technology analysis

4.1 sequence control
In the electric automatic control PLC system, through the form of information cooperation module, it can effectively coordinate and control the specific production process. Compared with the old control technology, in the specific application of PLC technology, it can meet the individual control requirements of the production process. In the electrical automation control, with the help of this technology, the master station layer, remote station and field sensors can be set. The master station layer is connected to the remote station area, and the sensor is connected to the remote station through the communication bus, which needs to be implemented with the help of secondary cables. Through this technology, the staff in the control room can detect and control the actual operation of electrical equipment, thus simplifying the control work and further improving the quality of work and detection.

4.2 switching value control
In the control of the circuit, the electrical control system used before needs to be completed with the help of electromagnetic relay, because the contact of the system is more complex, there are a large number of lines. In application, because of poor contact, the probability of problems is very high. In addition, because of the complicated wiring, there is a high risk in the operation process. At present, the application of PLC technology can effectively avoid various problems in the operation process, so as to improve the operation safety of electrical equipment. In electrical automatic control, for the effective application of PLC system, it can shorten the response time of corresponding circuits such as relay in the first time, so as to ensure the accuracy of data detection, and play an important role in maintaining the safe operation of the system and improving the operation quality.

5. The concrete application analysis of PLC technology of electric automatic control

5.1 application analysis in thermal power system
Before the use of thermal power system, for each control of the development, need to use electromagnetic relay. The system uses a lot of electromagnetic components, at the same time, there are many relay contacts. In the actual operation, it will be affected by various factors, which will reduce its stability. Now through the effective application of PLC technology, the controller has been simplified in terms of operation and installation. The operator can master different operation skills in a very short time, and the PLC system does not have a large number of interfaces. When there is a system fault, it can be opened through the PLC system, so as to provide stable operation of the circuit Maintain. In addition, the effective application of PLC technology can help the staff to reduce part of the work pressure and burden, and the anti-interference performance of the system is very outstanding.

5.2 application in coal handling system
The main parts of the system include the master station layer, field sensors, etc. in the master station layer, the application of PLC technology can cooperate with human interaction interface. With the help of optical fiber communication, the master station layer can effectively connect the remote I/O station layer, and then use the display to control different system equipment. In the process of specific application of PLC technology, the emergency button can also be set, so that the system status control will be very ideal and timely.

5.3 application in air conditioning system
PLC technology in the air conditioning system, can make the corresponding control effect has a great degree of improvement, before the use of DDS system, because of the lack of anti-interference ability, can not meet the actual needs. Now, in the air conditioning system, the application of PLC technology not only makes the corresponding operation more convenient, but also enhances its anti-interference ability, and then makes up for all kinds of problems and defects existing in the previous control system,
so as to meet the requirements of the air conditioning system control level [6].

5.4 application in transportation system
The application of PLC technology in the traffic system can effectively control the traffic lights and improve the effectiveness. In the specific use, the technology can gather the signals of regional road sections in the LAN, and with the help of centralized control, avoid the problem of vehicles waiting too long. In the toll station, through the application of PLC system, it can be used as the interface of upper computer, and then effectively receive a series of data in the upper charging list, so as to launch a more ideal control of fog lamp and shed lamp.

5.5 in electrical control of machine tool
In the process of machine tool processing, it is necessary to guarantee the coordination between hydraulic mechanical and electrical integration. Among them, in the control of hydraulic and electrical level, time control can be used to complete the task content, but in this part of the control content, there are often fault problems, and the type is relatively complex, there is a certain difficulty to solve. Now, in the electrical control of machine tools, the use of PLC technology, can be very effective to ensure the safety of the system, because PLC has a very high reliability, can optimize the time control, and then carry out real-time detection of the operation of the equipment, and display the state changes of the equipment, the final detection and control effect will be very ideal, beneficial to the machine. The stability of bed production is improved, and the final product quality is strengthened.

6. Conclusion
In short, in the electrical braking control, the application of PLC technology can further optimize the logic of the relay, so that it has more ideal safety and reliability, and will also have corresponding improvement. In addition, the structure will be optimized, which makes the later maintenance and application very convenient. Therefore, in the gradual development and breakthrough of electrical automation technology, it is necessary to optimize the corresponding system, give full play to the advantages and value of PLC technology, so as to make it have stronger reliability and safety performance, and meet the requirements of electrical automatic control.

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