

The Application of Electrical Automation Technology in Automobile Manufacturing

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Abstract: The application of information technology in electrical automation is gaining more momentum in the field of automobile manufacturing. High-quality electrical automation system enables the managers monitoring the various conditions of the system equipment in an all-round way, and furthing interaction with the equipment, making the use of electrical equipment and related production equipment more scientific, thus not only improves the production efficiency, but also make automobile manufacturing more standardised, and effectively enhanced the efficiency of the entire industry. At the same time, there are still many problems with electrical automation technology in the manufacturing process. In order to ensure the efficiency of automobile manufacturing and promote the sustainable development of automobile manufacturing, there is an urgent need to strengthen the research and development investment.

Keywords: Electrical automation; Automotive manufacturing; Applications

Introduction

The efficient application of electrical automation technology in the automobile manufacturing industry is pivotal to the improvement of the efficiency and quality of automobile manufacturing, and also an important prerequisite to promote the sustainable development of enterprises. In it's development, we should pay attention to the in-depth research and application of electrical automation technology, increase the engineering support of enterprises, cultivate high-quality talents, and effectively combine advanced electrical automation technology with automobile manufacturing.

1. The significance of the application of electrical automation technology in automobile manufacturing

1.1 Controlling the cost of automobile manufacturing

In the course of development, cost control has always been the focus of attention the automobile manufacturing industry. According to the rules of law in the automobile manufacturing industry, the use of electrical automation technology can make the production more standardised, ensure the consistency of the parameters, and enhance the degree of automation of production. We have to analyse the impact of raw material costs, technical research costs, etc. in the current automotive manufacturing process. Therefore, to achieve effective control of raw material and labour costs, we need to carry out continuous technical optimization and introduce new manufacturing technologies. At the same time, the introduction of electrical automation technology into automobile manufacturing can optimize human interference and improve the automation degree of the production process, which is of great significance in reducing the cost of automobile manufacturing and improving the competitiveness of automobile manufacturing enterprises.

1.2 Improving automobile manufacturing efficiency

The introduction of electrical automation technology into automobile manufacturing can effectively improve production efficiency. Compare with the traditional automobile manufacturing technology, the use of electrical automation technology can monitor the production process more effectively. Once a fault occurs, it can alarm in time to ensure the normal operation of automobile manufacturing technology. In addition, the introduction of electrical automation technology into the automobile manufacturing process can realize the effective integration of various modules, further improve the efficiency of information interaction in the automobile manufacturing process, reduce production costs and improve production efficiency.

1.3 The enhancement of automobile manufacturing technology

China's automotive industry is gradually maturing, which has higher technical requirements for the production process. The use of elec-

trical automation technology can effectively improve the automobile manufacturing process, so as to achieve the overall development of the process production at the technical level. The effective use of electrical automation technology in automobile manufacturing provides a reliable guarantee for automobile manufacturing.

2. The specific applications of electrical automation technology in automotive manufacturing

2.1 Integrated system application

The integrated system is a very important technology as to the automobile manufacturing industry, and its main value is to optimise the internal structure of the car, so as to promote the development of China's automobile manufacturing industry. In the past, the various systems of the automobile manufacturing industry were independent of each other, and the role of each system was different, which lowering the efficiency and quality of production. The progress of electrical automation technology has effectively integrated the original independent systems, optimized the traditional integrated systems, simplified the production process of automobiles, and optimized the internal structure of automobiles, which can not only improve the production efficiency and quality of automobiles, but also meet the performance needs of people to the greatest extent. Currently, the system is still facing many problems in practical application, For example, the cooperation among subsystems is not satisfying, and the performance is barely satisfactory, especially under the influence of related unfavorable factors, all of this affecting the stability and reliability of automobile manufacturing. This is mainly because there are many kinds of systems and equipment involved in the automobile manufacturing process, and the performance of each system and component is quite different, so it is difficult to achieve mutual coordination. Therefore, it is necessary to study multiple systems in depth in order to achieve efficient integration between multiple systems, so as to make full use of multiple systems.

2.2 PLC safety system application

In the process of automobile manufacturing, there are potential safety hazards in every link of production, such as stamping, welding, assembly and painting. The control of each production link and the ensurance of the safety and efficiency of the production process can be realized by the application of PLC safety system to automobile manufacturing. For example, there are strict control requirements for height stations, stamping areas, and robot arm operation areas. When using the safety PLC system, to prevent operator injuries, the corresponding equipment will automatically stop working when the operator approaches these dangerous areas. To reduce production accidents, the system will perform safety blocking on all types of equipment in the production line to ensure that the corresponding safety requirements are met. At the same time, it can also detect the operating conditions of the production line automatically. When faults are diagnosed, the system issues warnings and provides troubleshooting reports to maintenance personnel, such as showing the location of the error and assisting in analysing the cause of the error. On this basis, the engineers realised the simulation of the car crash test and obtained the corresponding experimental data. Finally, by analysing the safety of the car, it ensures the safety of the car in the process of using.

2.3 Application of on-site electrical control system

The application of electrical control system plays a great role in the process of automobile manufacturing, which has a great influence on the efficiency and quality of production. In order to meet the needs of each link in the process of automobile manufacturing, it is often required to divide different control circuits into different areas, so as to achieve precise control of each production link. For example, in the quality inspection of automotive parts, the use of on-site electrical control technology can detect parts that do not meet the requirements automatically, and identification of parts that do not meet the requirements, so as to improve the production efficiency of the working conditions, to prevent non-compliance with the requirements of the parts due to human error, and therefore ensure the overall quality of the car. At the same time, the use of on-site electrical control system the real-time monitoring of energy consumption and scientific energy allocation management, to achieve the purpose of improving energy efficiency and saving energy. In addition, the use of this system can also improve the production environment, such as the monitoring of humidity and temperature, etc., and adopt appropriate operating methods to optimise the production environment.

2.4 Application of flexible automation technology

With the development of electrical automation technology, the emergence of many flexible automation systems has promoted the intelligence of automobile manufacturing, flexible automation systems are also called variable programming automation because it have great flexibility and variability. In the new era, with the increasing demand for the performance, quality and function of automobiles, the complexity of automobiles is increasing, and the rate of product renewal and iteration is also accelerating, the traditional mass production mode has been difficult to adapt to this change. In order to ensure the quality of automotive manufacturing, increase productivity, and reduce manufacturing costs, there is a need to improve the flexibility and productivity of manufacturing. In this context, flexible automation system came into being. Its main content includes CNC machine tools, machining centres, flexible manufacturing units, flexible manufacturing system, etc., for the

realization of multi-species, small and medium-sized batch production, high-quality production has played an important role, which promotes the development of automotive industry in China.

3. Conclusion

To sum up, the automobile industry plays an indispensable role in the development of the national economy. At present, China's automobile enterprises are gaining rapid development, and have become a pillar industry of China's economy to sustained development. In order to promote the high-quality development of China's automotive industry, enterprises and practitioners should pay full attention to the use of electrical automation technology in the automotive manufacturing process, so as to improve the efficiency and quality of automotive manufacturing.

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