



# Application and Optimization of Electrical Automation Technology in Mechanical Manufacturing

Shuang Chen

Daqing Oilfield Equipment Manufacturing Group Petroleum Special Equipment Co., Ltd., Daqing 163453, Heilongjiang, China.

**How to cite this paper:** Shuang Chen. (2024). Application and Optimization of Electrical Automation Technology in Mechanical Manufacturing. *Mechanical Engineering and Manufacturing Technology*, 1(1), 1-4.

DOI: 10.26855/memt.2024.12.001

**Received:** October 15, 2024

**Accepted:** November 6, 2024

**Published:** November 28, 2024

\***Corresponding author:** Shuang Chen, Daqing Oilfield Equipment Manufacturing Group Petroleum Special Equipment Co., Ltd., Daqing 163453, Heilongjiang, China.

## Abstract

With the rapid economic development of our country, the level of science and technology in machinery manufacturing and the application of science and technology are also increasing. The promotion and application of automatic electrical technology in the field of machinery manufacturing, on the one hand, improves the production efficiency of machinery manufacturing and greatly improves the scale of machinery manufacturing, on the other hand, automatic electrical technology in the field of machinery manufacturing also reduces the loss of production materials, reduces the application of labor force, and then improves the production efficiency and economic efficiency of enterprises. In this paper, the significance of the application of automatic electrical technology in the field of mechanical manufacturing is deeply analyzed, and the characteristics and situation of the application of automatic electrical technology in the field of mechanical manufacturing are studied and analyzed. At the same time, the application of automatic electrical technology in various industries of mechanical manufacturing is deeply explored. It is hoped that this study will provide certain help to the application of automatic electrical technology in the field of mechanical manufacturing.

## Keywords

Automatic electrical technology; Machinery manufacturing field; Technology extension

Along with the rapid development of science and technology in the field of mechanical manufacturing, the application and innovation of automated electrical technology in the field of mechanical manufacturing has also made great strides. Due to the innovation and application of automated electrical technology, mechanical manufacturing has thrived. Therefore, the application of automated electrical technology in the field of mechanical manufacturing has been increasingly favored and valued by various fields. The promotion of the use of automated electrical technology in the field of mechanical manufacturing can reduce production time, thereby achieving the goal of increasing production. Moreover, the application of automated electrical technology can greatly improve the accuracy and efficiency of mechanical manufacturing processing, and can greatly improve the quality of mechanical manufacturing products. With the rapid development of computers, automated electrical technology has gradually developed into intelligent control based on computer technology, which has promoted the rapid development of the field of mechanical manufacturing. However, there are still certain problems in the actual process of mechanical manufacturing. Therefore, the field of mechanical manufacturing still needs to conduct corresponding research on the application of automated electrical technology.

## **1. The significance of applying automation electrical technology in the field of mechanical manufacturing**

The application of automated electrical technology in the field of mechanical manufacturing can promote the rapid development of the field of mechanical manufacturing. Especially with the help of computer technology, the use of computer programming, calculation and control can complete the precision of mechanical manufacturing operation and control, thereby improving the efficiency and quality of mechanical manufacturing.

### **1.1 The application of automation electrical technology can promote the development of mechanical manufacturing**

The application of automated electrical technology in the field of mechanical manufacturing can promote the rapid development of this field, especially in the current era of rapid development of computer technology, which can achieve intelligent control of the entire process of mechanical manufacturing with the help of computers. The advantages of automated electrical technology are simple structure and fast control, so it can promote the rapid development of the field of mechanical manufacturing. At the same time, due to the application of automated electrical technology and the fact that automated electrical technology is suitable for the actual situation of mechanical manufacturing, it can improve the benefits and efficiency of mechanical manufacturing [1].

The characteristics of the machinery manufacturing field are long industrial chains and many supporting industries. Therefore, the operation is complex and difficult. The application of automated electrical technology in this field can completely solve the above problems and enable machinery manufacturing to achieve intelligent and digital operation. Enterprises can use the advantages of automated electrical technology to promote industrial upgrading, improve the efficiency and quality of machinery manufacturing, and thus provide the market with high-quality and low-cost machinery. In addition, the application of automated electrical technology in the machinery manufacturing field can change the problem of low production efficiency in the original traditional manufacturing industry. It can combine various links of machinery manufacturing, thereby achieving the purpose of improving the efficiency of enterprise production and economic efficiency.

### **1.2 The application of automation electrical technology can reduce consumption and save energy**

There is a problem of high energy consumption in the field of mechanical manufacturing. As the scale of manufacturing increases, the energy demand will continue to increase. After the application of automated electrical technology in the field of mechanical manufacturing, the production and manufacturing process and mechanical equipment can be streamlined, which can greatly reduce the demand for energy and achieve the purpose of energy saving. In practical applications, unnecessary manufacturing processes should be reduced according to the requirements of mechanical manufacturing technology, so as to make the entire manufacturing process more perfect and efficient.

## **2. The current situation and characteristics of the application of automation electrical technology in mechanical manufacturing**

With the rapid development of social economy, all walks of life are also developing continuously. Under the background of rapid development and improvement of all walks of life, the competition in the field of machinery manufacturing is becoming increasingly fierce. At the same time, people's expectations for machinery are also constantly improving. This requires the field of machinery manufacturing to adapt to the needs of consumers through continuous innovation and continuous technological improvement. The application of automated electrical technology in machinery manufacturing can solve the above problems. Therefore, in recent years, the application and promotion of automated electrical technology in the field of machinery manufacturing has become a development trend in this field and a feature of the operation of machinery manufacturing enterprises [2]. However, many problems have arisen in the process of using and promoting automated electrical technology in the current machinery manufacturing industry.

Because the automated electrical technology used in the mechanical manufacturing process needs to process and analyze a large amount of data information, at the same time, the technology also needs corresponding auxiliary equipment and components to make the system a controlled whole. Otherwise, it cannot ensure that the various processes of mechanical manufacturing are closely integrated and seamlessly connected. To ensure the normal operation of the system, professional hardware and software support are required. However, the current mechanical

manufacturing field develops, researches and applies according to its own ideas and requirements, and there is no professional research team. Therefore, the automated electrical technology for mechanical manufacturing is not perfect enough and the application cost is too high. This is also the current status of the application of automated electrical technology in the mechanical manufacturing field.

### **3. Measures and development direction of applying automation electrical technology in mechanical manufacturing**

The application and promotion of automated electrical technology in mechanical manufacturing should be combined with the actual mechanical manufacturing situation and needs, and corresponding plans should be formulated to give full play to the advantages of automated electrical technology to improve the efficiency of mechanical manufacturing and further achieve the goal of improving the competitiveness of mechanical manufacturing enterprises.

#### **3.1 Realizing the networking and modularization of mechanical manufacturing**

The integration of networking and modularization in the field of mechanical manufacturing can enable more resources to be optimally integrated, make the task allocation of each link in mechanical manufacturing more scientific and reasonable, and make the level of mechanical manufacturing automation higher. Therefore, in the process of mechanical manufacturing design, designers should give full play to their own level, scientifically decompose the manufacturing process according to the needs of mechanical manufacturing and the functions of the product, so that the entire process of mechanical manufacturing is composed of modularization. At the same time, when designing, it is necessary to combine the advantages of other manufacturing industries to improve design efficiency and work progress, and ultimately achieve the purpose of improving the quality of manufacturing product design. In addition, the combination of networking and modularization of mechanical manufacturing can connect all links of mechanical manufacturing, realize resource sharing and information exchange of mechanical manufacturing systems, and thus make mechanical manufacturing more scientific and efficient, which plays a very important role in improving mechanical manufacturing design and automation control [3].

#### **3.2 Realizing the application of electronic drawings**

In the field of mechanical manufacturing, design and manufacturing drawings are very important, as they contain all the data, performance, functions and manufacturing processes of the designed products. Therefore, having scientific, precise and complete drawings is a very important factor in subsequent design and mechanical manufacturing. Traditional mechanical manufacturing generally uses paper drawings, which often lead to the serious problem of drawings being damaged, unclear handwriting, or even lost, which will bring great difficulties to subsequent work.

With the rapid development of computer technology and the Internet, paper drawings are rarely used and have been gradually replaced by electronic drawings. Electronic drawings can not only prevent damage and unclear handwriting, but also avoid the dilemma of being unable to recover after being lost. At the same time, electronic drawings also have the advantages of being easy to carry, easy to transfer, easy to use, and easy to modify. More importantly, electronic drawings can achieve intelligent drawing, and the system can intelligently prompt incorrect drawing and parameters. In addition, electronic drawings are easy to use, take up little space, and can be enlarged at will during use. These advantages are advantages that paper drawings cannot achieve.

#### **3.3 Realizing Automation of Integrated Machinery**

Automated mechanical manufacturing is the product of combining traditional mechanical manufacturing with today's automation and intelligent technologies. Mechanical manufacturing enterprises can use automated electrical technology according to their own needs and product requirements to make the entire mechanical manufacturing process very easy. At present, the organic integration of automated electrical technology and computer technology has led to the formation of automated control technology in the control field. This technology enables data classification, data collection, data organization and data sharing in all aspects of mechanical manufacturing. At the same time, through the establishment of a database and computer analysis and processing, the optimization and digital control of all aspects of mechanical manufacturing can be achieved. The use of automated integrated technology in mechanical manufacturing can not only improve the level of automated control, but also improve product quality and production efficiency [4].

The mechanical manufacturing industry uses automation integration technology according to its own conditions, so that each link of mechanical manufacturing can be deeply optimized. In order to promote the application of automation integration technology in the mechanical manufacturing industry, on the one hand, it is necessary to improve the technical level of relevant personnel, and on the other hand, it is necessary to update the corresponding equipment. In addition, the data information recorded by the automation integration technology used in mechanical manufacturing can be used to provide a technical basis for subsequent system optimization and updating [5].

#### 4. Conclusion

The use of automated electrical technology in the field of mechanical manufacturing can make up for the deficiencies and defects of traditional mechanical manufacturing to a great extent, and can greatly improve the quality and efficiency of mechanical manufacturing. The application of automated electrical technology in the field of mechanical manufacturing can not only improve the product quality and production efficiency of mechanical manufacturing, but also bring considerable benefits to the mechanical manufacturing industry and promote the rapid development of the mechanical manufacturing industry.

#### References

- [1] Ma Hongde. Application of electrical automation technology in agricultural machinery control[J]. *Southern Agricultural Machinery*, 2024, 55(04): 89-92+107.
- [2] Ding Lijuan. Application of electrical automation technology in coal mine machinery and equipment[J]. *Energy and Environmental Protection*, 2024, 46(01): 221-226.
- [3] Ye Yuhe. Research on optimization of electrical automation system of intelligent mechanical equipment[J]. *Papermaking Equipment and Materials*, 2024, 53(01): 60-62.
- [4] Dong Shuai. Application status and prospect analysis of electrical automation in agricultural machinery[J]. *Modern Agriculture*, 2023, (11): 85-87.
- [5] Gu Xiong, Zhang Ting. On the application of artificial intelligence technology in electrical automation control of chemical equipment[J]. *Tianjin Chemical Industry*, 2023, 37(04): 149-152.
- [6] Wang Yibo. Application of electrical automation technology in mechanical manufacturing[J]. *Chinese Science and Technology Journal Database (Full Text Edition) Engineering Technology*, 2023(4):4.
- [7] Zhang Lili. Analysis on the application of electrical automation technology in mechanical manufacturing[J]. *Chinese Science and Technology Journal Database (Full Text Edition) Engineering Technology*, 2023.
- [8] Liao Shaopeng. Application and optimization research of electrical automation technology in mechanical manufacturing[J]. *Papermaking Equipment and Materials*, 2022, 51(11):3.
- [9] Nan Kewei. Research and analysis on the application of electrical automation technology in mechanical manufacturing[J]. *China Flight*, 2022(21):31-34.
- [10] Yang Mingxin. An electrical automation intelligent manufacturing equipment: CN2021220 31519. 4[P]. CN215998961U[2024-07-31].
- [11] Chen Xiangyang. Analysis of the application of electrical and automation in electromechanical engineering[J]. *Engineering Technology Development*, 2022, 3(1):44-46.
- [12] Xing Jinyu. *Engineering Quality Training*[M]. Higher Education Press, 2022.
- [13] Lu Jianxia. Application of electrical automation technology in automobile manufacturing[J]. *Mechanical and Electronic Control Engineering*, 2022.
- [14] Zhou Xiaoqing, Gu Feng. A processing device for electrical automation machinery manufacturing: CN 202111108352.5[P].CN202111108352.5[2024-07-31].
- [15] Cao Jinjiang, Huang Jiakai, Chen Daoqing. Intelligent manufacturing production line control design and implementation for mechanical processing[J]. *Manufacturing Automation*, 2023, 45(7): 70-74.