Abstract. Electric vehicle has become a popular product since its emergence. It has both the advantages of simple operation and the characteristics of energy saving and environmental protection in macro development. However, the history of pure electric vehicles is very short, so the electric drive system needs to be further developed and improved. In order to ensure the timely detection of the faults of the electric drive system and meet the needs of driving safety. The author designs the fault diagnosis monitoring system with the convenience of the current computer development.

Keywords: Computer, Electric Vehicle, Fault Diagnosis

1. Introduction
The speed of social development continues to accelerate, before human development focused on the economy, less attention to the environment and resources, now it is difficult to carry the environment and resources[1]. The automobile industry brings people unprecedented convenience and contribution to society, but the traditional fuel car has brought serious negative impact on resources and environment. At present, human beings have realized the importance of protecting the ecological environment and the earth's resources, the manufacturing cost and the use cost of fuel vehicles continue to increase, and the research direction of people on vehicles has changed, and the oil-electric hybrid vehicles and pure electric vehicles have emerged as the times require[2]. The field of new energy vehicles has quickly attracted the competitive forces of all countries in the world, especially pure electric vehicles, which have become the national strategic level industry because of their convenient access to electricity and friendly resources and environment. However, in the initial stage of the development of pure electric vehicles, there are still many technical and infrastructure deficiencies in the development, which is still in the stage of in-depth study and solution. Electric drive system is an important part of pure electric vehicle[3]. Once it fails, it will affect the normal driving of the vehicle and even cause traffic accidents when it is serious. It is necessary to establish a new energy vehicle electric drive fault diagnosis system and monitor the pure electric vehicle electric drive fault reliably.

2. Current situation and trend of electric drive fault diagnosis and monitoring system for pure electric vehicle at home and abroad
2.1. Abroad
There are many fault diagnosis tools for electric vehicle electric drive system, but at the beginning, they are all special tools, each tool can only monitor some of them. Until the 1980s, the development of computer communication technology made the automobile online self-diagnosis system appear in people's vision. The development of pure electric vehicle fault diagnosis equipment can draw lessons from the development idea of traditional automobile fault diagnosis\[4\].

2.2. Domestic
The development of automobile industry has been years, and domestic fault diagnosis in traditional automobile is more mature. However, in the fault diagnosis and monitoring of pure electric vehicles, limited by the development of computer technology and the weak industrial foundation, the domestic research period is later than that of foreign countries, and the degree of intelligence of diagnostic equipment is low. Pure electric vehicle fault diagnosis system application is also less. Furthermore, the fault detection and diagnosis of computer-based vehicle electric drive system depends on professionals and technical personnel, but the domestic technology and related education are relatively backward, so the degree of development is not high\[5\].

2.3. Status of issues
First of all, the existing fault diagnosis tools are mostly special tools, the parts of the drive system for one-to-one testing since the application is narrow, single function. Moreover, because of the rapid development of computer science and technology, the content of the test bed used at present is too simple to realize the dynamic fault detection of the electric drive system of pure electric vehicle. Secondly, pure electric vehicle belongs to one of high voltage equipment. Many problems need monitoring and diagnosis system to simulate high voltage fault, but the current equipment system does not have the condition of simulating high voltage, and cannot standardize the standard operation habits of trainers. Greatly reduces the real maintenance pure electric vehicle safety.

3. Common fault analysis of electric drive of pure electric vehicle
There are many kinds of fault classification methods, but this paper mainly studies its on-line self-test fault. The self-test adopts the built-in self-test method, which is different from the external scanning test. The built-in self-test lacks the external test incentive, so it needs to be tested step by step, so the test fault classification adopts the method of classifying according to the fault location point\[6\].

3.1. Chip failure
Chip failure is mainly reflected in the impact on the clock. Generally speaking, the internal clock circuit of the chip is simple, but its accuracy is slightly less than that of the external clock circuit of the chip. Clock fault refers to the fault that the chip cannot work because of the loss of clock signal. Crystal oscillator is required in all clock design schemes, which is a fragile component in an oscillating environment. Most of the clock faults are caused by crystal oscillator damage. Moreover, the clock signal of the chip needs PLL frequency doubling to supply to the core, and the PLL capacitance damage of the chip may also cause clock loss failure. There are other aspects of failure, but are small probability events, there is no online diagnosis technology.

3.2. Electric faults
At present, bootstrap drive structure and independent power supply drive structure are mostly used in pure electric vehicle electric drive system. Compared with the drive structure of independent power supply, bootstrap drive structure has the advantages of simple structure and small cost, but in the era of high quality and high efficiency products, its reliability and driving ability are fatal weaknesses. In the bootstrap drive structure, the bootstrap chip usually integrates logic protection and voltage and current protection functions in addition to controlling the drive voltage waveform, so the optical coupling in the bootstrap drive structure adopts common nonlinear high-speed optical coupling. in the
independent power supply drive structure, these functions need to be accomplished by dedicated drive optical coupling.

4. Design of fault diagnosis monitoring system for electric drive system

Driven by computer technology, the automobile fault diagnosis and monitoring system has made a qualitative leap. On the basis of absorbing the traditional automobile industry fault diagnosis and detection tools and technologies, the on-line fault diagnosis and monitoring system appears in this field. Its emergence almost marks the development of the automobile industry into a new era, not only a large number of high-tech achievements in computer technology, but also the use of traditional technology to promote strengths and circumvent weaknesses[7]. Therefore, not only in hardware and software is far from tradition, but also undeniable origin. Fault diagnosis subsystem is not only a system which can run independently and has the function of safe recording and storage, but also a system which is highly integrated with electric drive system in information sampling and fault determination. In the design of the fault diagnosis subsystem of the electric drive system, it is required that when the electric drive system is out of control because of the fault, the fault diagnosis subsystem can safely store the fault information of the system. Ensure that information can be extracted and analyzed by external fault diagnosis system under bad conditions.

4.1. Control chip design

The control chip is indispensable in the electric drive system, similar to the human heart and brain, which determines the level of operation and the ability to communicate with other parts. In the development and application of these years, the reliability of single-core chip is poor, and many problems have been exposed in the long-term application. Some problems make the frequency-locked multi-core processor appear quickly and become the protagonist of the control chip of electric drive system. It not only wins in reliability and processing ability, processing speed, but also can run independently from the electric drive system, which has little effect on the operation of the whole system.

4.2. Drive stage circuit design

The function of driving stage circuit is to control high power switch, but in the new high-tech high power product, it already has the function of driving circuit and protecting circuit. At present, in the devices specially equipped with drive stage circuits, different electric drive mode are set up for different power level devices, that is, bootstrap drive chip mode, which is often used small power. The special drive op-to-coupler isolator is often used in large power devices, and the optical cable is used in super power drive circuits. The driving stage circuit model is shown in figure 1, and the design principle comes from the original electromagnet.

Figure 1. Electromagnetic iron model of drive level circuit.
4.3. Communication design
In the design of electric drive system of pure electric vehicle, the communication design of the system is also particularly important, which serves the stable and reliable communication and safe operation of the system. In most industrial systems, for the optimal allocation of economic benefits, different communication modes will be configured according to different security level requirements. In addition to the difference between reliability and efficiency, the cost gap cannot be underestimated. The safest and most reliable of these modes of communication is CAN communication, CAN is the abbreviation of Control Area Network, and some auxiliary and irrelevant intelligent sensors use LIN communication to control costs. There are also UART communications designed for short-distance communication. The design of electric drive of electric vehicle is to ensure the stability and reliability of electric drive system and maintain the safety of the system while realizing economic benefit.

4.4. Private memory chip
The memory chip itself does not play any role in the process of fault monitoring and diagnosis, but its design is still of great significance. With the special memory chip for fault diagnosis and monitoring, all information records can be followed in the later stage. For subsequent repair, maintenance, rich fault database are essential. In the design of electric vehicle, there are many options for the placement of fault diagnosis chip, which can be designed independently, integrated in the system, and shared with the fault information system. At present, most designs adopt independent design patterns. As shown in figure 2, the data information is not disturbed and affected, the content is reliable and accurate, and even if the whole system is broken and the memory chip is not damaged, it is still available.

![Figure 2. Design of special storage card in electric drive system.](image_url)

5. Conclusion
Electric drive is the technical core of electric vehicle. Its design has an important effect on improving the safety of automobile driving and reducing the failure rate of electric vehicle. It is our common goal to realize the idea of good and fast on electric new energy vehicle.

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