Maintenance of electrical equipment and wiring of new energy vehicles

Chengzhi Han
Wuhan University Of Technology, Wuhan, Hubei, 430000, China
Author’s e-mail: 761180968@qq.com

Abstract. In order to comply with the call of the scientific development concept and actively implement the coordinated development of ecological economy, China vigorously promotes the development of new energy industries. As one of the main mobility tools for modern people, cars have greatly improved people's travel efficiency. Under the general environment, fuel vehicles have gradually moved closer to new energy vehicles. I hope that this will help to reduce urban pollution, environmental pollution and energy consumption. With the support of national policies, the scale of China's new energy vehicles is getting larger and larger. As of the end of 2019, the number of domestic new energy vehicles had exceeded two million. However, after all, new energy vehicles are an emerging industry, and there are still immature areas in technology. Therefore, it is not difficult to avoid some electrical equipment or line failures during use. Once such situations are found, it will not only affect people's driving. Experience, there may also be life threatening. For this reason, it is necessary to strengthen the maintenance and protection of the electrical equipment or lines of new energy vehicles on a regular basis. Therefore, this article focuses on the maintenance of new energy vehicle equipment lines to provide technical guidance and reference for the sustainable development of the industry.

1. Introduction
Energy is a non-renewable resource. With the popularity of private cars, the energy crisis has sounded the alarm for China as a whole. Automobiles consume a large amount of energy, which will also cause environmental pollution and increase the traffic pressure of urban traffic. For this reason, the development of new energy vehicles has become the first choice to achieve this win-win situation. New energy vehicles are vehicles that use unconventional vehicle fuel as a source of power and integrate advanced technologies in vehicle power control and drive to form advanced technology principles, new technologies, and new structures. Based on the differences in their power supply methods, they can be divided into: pure electric vehicles, hybrid vehicles, fuel cell electric vehicles, hydrogen engine vehicles, etc. However, the development of new energy vehicles is not long, and many technologies are not yet mature. Therefore, it is imperative to strengthen the regular inspection and protection of automobiles. On the basis of clarifying the basic structure of new energy vehicle electrical equipment, this article analyzes the causes of common equipment and line faults, and proposes feasible suggestions to improve the stability of new energy vehicles.
2. Electrical system composition of new energy vehicles

2.1 Power system
The power of new energy vehicles is mainly from the internal power supply system, which is composed of three parts: battery, generator and regulator.[1] The existence of the power supply system is to provide a continuous supply of power to the car. Its working mode is that the battery first functions when the car starts, and after stable operation, it is powered by the generator to recharge the work. Yes, in this process, the regulator is mainly used to stabilize the power pressure to ensure that the new energy vehicle can drive smoothly.

2.2 Starting system
Starting system is also the main electrical system component of new energy vehicles. A common starting system is composed of control devices such as a battery, a generator, and a starter. Only after the starter operates normally, other control devices will start to operate independently. In the process of driving a new energy vehicle, the battery is generally used to drive the starter and then the engine. When the engine has a certain amount of kinetic energy, it will cause the generator to rotate, which in turn will stimulate the motor to supply power again, forming a cyclic power supply operation. Starting system is the key to safe and stable driving of new energy vehicles, and the starting process is the basic principle of driving [2].

2.3 Signal System
The signal system of new energy vehicles is mainly composed of some signal lights, such as work lights and warning lights. During the driving process of new energy vehicles, the relevant control buttons are used to turn on or off the signal lights to understand the power supply of the car. Conditions to ensure that new energy vehicles can be used safely and stably.

3. Cause Analysis of New Energy Vehicle Electrical Equipment and Circuit Failure
New energy vehicles have been rapidly popularized in the market under the impetus of national policies, and the market size is constantly expanding every year, which is gratifying. However, with the increase in the use of new energy vehicles, the problem of faults is also increasing, especially the failure of electrical equipment and wiring makes the owner feel the existence of hidden dangers. In order to effectively solve such failure problems and improve the driving safety of vehicle owners, specialized car technicians are required to judge the causes of electrical equipment or line failures, and to propose targeted maintenance programs. At present, the main causes of common failures are as follows:

3.1 The cause of gradual failure
In many cases, the failure of the electrical equipment and lines of new energy vehicles is caused by aging, which affects the normal operation of the equipment. Such causes can be attributed to gradual failure. Over a long driving distance, the batteries of new energy vehicles will experience slow discharge, voltage drop, and failure to supply power normally. The situation, once these problems occur, the signal lights of the car will not work normally, and the power of the car will be unstable. Gradual failure is a problem that occurs in any electrical equipment. Therefore, regular maintenance and repairs need to be strengthened to prevent the deterioration of the aging problem and affect the subsequent safe use of the vehicle.

3.2 The cause of sudden failure
In addition to gradual failures, new energy vehicles also have sudden failures. As the name implies, sudden failure is a sudden short circuit in the electrical equipment or wiring of the car, which makes the car unable to operate normally. The main reason for this failure is that the electrical system has been overloaded for a long period of time, causing some parts to consume too much energy and generate
insufficient power. For new energy vehicles, the causes of this kind of failure include vocal operation errors during driving, short circuits on some lines, and stoppage of electrical equipment [3].

4. Maintenance of new energy vehicle electrical equipment and wiring failures
Under normal circumstances, the faults of electrical equipment and wiring of new energy vehicles mainly exist in the power supply system, starting system and signal system. Specific corresponding faults and maintenance methods are shown in Table 1.

Table 1 Common faults and maintenance of electrical equipment and wiring of new energy vehicles

| Electrical equipment and wiring | Common malfunctions          | Overhaul method                                      |
|--------------------------------|------------------------------|------------------------------------------------------|
| Power system                   | Flameout, abnormal indicator light | Check engine, generator, indicator light, replace filament |
| Starting system                | Lack of motivation           | Replace the battery, change the wiring, tighten the wiring |
| Signal system                  | Lighting equipment abnormal  | Replace lamps and detect short circuits              |

4.1 Power system failure and maintenance
The failure of the power supply system is mainly manifested in the following: during the ignition process of the car, there is a problem of flameout, and when the vehicle is turned off, the indicator light on the dashboard of the vehicle does not indicate an abnormality. There are three main reasons for this kind of failure: First, there is a problem with the charging equipment. The voltage after startup has not been controlled. Once the voltage is not stable enough, the filament of the signal lamp will be burned out, causing failure. Secondly, the current battery is loosely connected to the relevant signal guidelines. Because of poor contact, the signal lights cannot be turned on normally. There is also the problem of the charging indicator. Although the various systems of the car are normal, the signal light cannot be controlled, so it cannot alert the abnormality.

For the failure of the power supply system, the first thing to do is to observe whether the engine can start normally. After starting, observe whether the charging system is faulty, and check the problems in each link one by one to find the source of the fault. If the engine is operating normally and the indicator light is abnormal, it means that there is no problem with the engine and the charging system, so that the source of the generator's fault can be eliminated. In this way, it is necessary to detect the filament problem. If it is a filament problem, then replace the filament and replace the indicator light to check. If the indicator light is still off after the replacement, you need to use a multimeter to troubleshoot the lamp. Replacing various parts until the root cause is found can effectively solve such problems.

4.2 Failure and maintenance of starting system
New energy vehicles fail after driving, you can observe the corresponding throttle and gear, neutral and parking gear to step on the accelerator, the tachometer rotates quickly, indicating that the current state of the car is normal. When the gear is shifted to the first gear or forward gear, the car can move forward, indicating that the state is normal. If the speed of the car is slowing down, it means that the power of the car has failed. When this kind of failure occurs, we must first determine whether the car is in an idle state for a long time. Once it has been idle for too long, the power storage capacity of the car will decrease, and the problem of insufficient power will also occur. The second is to carry out inspections with the help of related instruments. If there is no problem with the power storage capacity, further inspection of other power systems is needed to detect whether it is an electrical system and wiring connection problem. Poor contact of the transmission system will also cause insufficient power.

For the failure of the starting system, it is generally repaired by replacing the battery. Of course, you can also supplement the electricity with the help of charging. Wait until the battery is fully charged.
before starting the vehicle. If the problem is still not resolved, you should further investigate the connection problem. In the process, borrowing the instrument for investigation is more efficient and more accurate. If a certain circuit is displayed on the instrument, the voltage display is 0, which means that the circuit in this part has been cut off and needs to be replaced with a new one[4]. At the same time, it is also necessary to ensure that there is no loose connection in other related circuits. This type of fault must be eradicated after the circuit is tightened.

4.3 Signal system failure and maintenance
The failure of the signal system is mainly due to a problem with the lighting system, which causes the light to fail to turn on or off normally according to the set mode. This type of failure basically occurs after the car is started. Of course, there are also a few light system failures that occur before the car starts. There are many reasons for the failure of the light. First of all, it is necessary to rule out the aging of the lamp due to the increase of the service life. The main causes of failure can be divided into three categories: First, the voltage of new energy vehicles is unstable, and the output current fluctuates. During the startup process of the car, sudden and large currents can easily cause the lamp filament to be damaged. Secondly, the poor contact between the lamp and the circuit line, especially the excessively complicated driving section of the car, and poor line contact due to bumps. Finally, there is a malfunction of the lighting system, such as: internal circuits burned out[5].

Most of these problems occur in new energy vehicle models or vehicles with a service life of more than 3 years. In response to these problems, you can identify whether there is a problem with the indicator lights, visually detect, and replace the new lamps. Can be resolved. If the indicator light is still off after replacing the lamp, you can use the instrument table to check it, check the related electrical equipment and circuits for short-circuit problems, and perform related processing. Finally, after inspecting and replacing the lamp, start again to check that the car can run normally and control the correct procedure of the car.

5. Conclusion
In summary, the emergence and rapid development of new energy vehicles has greatly improved China's current environmental pollution problems and eased the intensification of the energy crisis. However, as an emerging technology product, its electrical equipment or wiring is still an important hidden danger that threatens the life safety of car owners. Therefore, it is necessary to strengthen regular inspection and maintenance. Only in this way can new energy vehicles achieve stable and safe driving and become an important force for the sustainable development of the national economy.

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