Research on Vehicle Lubricating Oil Detection Device

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Abstract. The existing maintenance service mode is basically “fire-fighting” after-the-event maintenance and repair. After the failure of mechanical equipment, it takes a time to report the requirement to the service personnel to achieve the success of maintenance. The consequences of sudden failure in the operation of mechanical equipment are very serious. In order to predict the operation status of mechanical equipment in advance and avoid causing heavy losses, the operation status of mechanical equipment can be predicted by testing the lubricant composition of mechanical equipment, which can effectively reduce or even avoid the occurrence of faults and accidents.

1. Research Background
Lubricating oil is a liquid or semi-solid lubricant used in various types of vehicles and mechanical equipment to reduce friction and protect machinery and workpiece. It mainly plays the roles of lubrication, auxiliary cooling, rust prevention, cleaning, sealing and buffering. As long as it is applied between two objects in relative motion, and can reduce the friction and wear caused by contact between the two objects, that is, lubricating oil. Lubricating oil in use after a period of time, due to the lubricating oil itself, oxidation and condensation, hydrolysis and so on, will happen or external impurities, particles, water and other invasion reason cause lubricating oil metamorphism, reduce its lubrication performance, especially water and impurities such as iron can cause the lube oil metamorphic fell sharply, lead to a sharp drop in the basic performance of the lubrication. However, the existing lubricating oil detection devices are basically judged by operators’ visual observation, but even experienced operators sometimes make mistakes in judgment, resulting in the replacement of lubricating oil too early or too late. At present, there is no lubricating oil detection device to detect the performance of lubricating oil, so it can only detect the amount of engine lubricating oil and cannot see any parameters of lubricating oil. Therefore, it is urgent to design a detection device for lubricating oil components of mechanical equipment.

2. Research Content
In order to solve the above technical problems, the author designed a kind of lubricating oil component detection device for mechanical equipment. Mainly includes: the device body and concentration detector and viscosity detector. The bottom and top of the device body are respectively provided with a concentration detector and a viscosity detector. A driving motor is arranged in the middle between the concentration detector and viscosity detector. The output end of one side of the driving motor is fixed connected with a rotating rod, and the upper end of the rotating rod is connected with a bearing. A fixed block is fixed on one side of the rotating rod, and a stirring blade is fixed on the upper end of the fixed block. An oil inlet is provided on both sides of the middle part of the rotating rod, and a solenoid valve is provided at one end of the inlet. At the same time, the other end of the rotating rod is connected to a signal processor, and the signal processor is connected to a
temperature sensor on one side. In addition, the other side of the drive motor is connected with a signal display. Finally, a handle is arranged on one side of the detection device body, and the handle is connected with the concentration detector and the viscosity detector respectively.

The following embodiments of this study are described in detail in combination with the attached drawings, and it should be understood that the preferred embodiments described here are only used to illustrate and explain the design scheme of this study.

**Figure 1.** Schematic diagram of the front structure of the detection device

**Figure 2.** Side structure diagram of the detection device

1. Device body; 2. Concentration detector; 3. Viscosity detector; 4. Drive motor; 5. Bearing; 6. Rotating rod; 7. Oil inlet; 8. Solenoid valve; 9. Fixed block; 10. Mixing blade; 11. Signal processor; 12. Temperature sensor; 13. Signal display; 14. Handle
As shown in figure 1-2, this mechanical equipment lubricating oil composition detection device, including 1 and 2 concentration detector device ontology and viscosity detector (3, 1 on the bottom of the device ontology has concentration detector 2, 1 the top is equipped with 3 viscosity detector, device ontology concentration detector 2 and 3 middle viscosity detector has 4 drive motor, drive motor 4 side output fixed connection with rotary rod (6, 6 top connected with bearing rotating rod 5, 6 on one side of the rotating rod fixed connection with fixed 9, fixed block upper end fixed connection with mixing blades 9 10, rotating rod has into the oil outlet 7 on all 6 sides of central one end into the oil outlet 7 equipped with solenoid valve 8. The other end of the rotating rod 6 is connected with a signal processor 11, one side of the signal processor is connected with a temperature sensor 12, and the other side of the driving motor 4 is connected with a signal display 13. One side of the device body 1 is equipped with a handle 14, which is connected with the concentration detector 2 and viscosity detector 3 respectively.

Drive motor 4 through rotary rod (6) and mixing blade 10 transmission connection, solenoid valve detector 2 and 8 respectively with concentration viscosity detector connected 3, 2, viscosity concentration detector detector 8 and 3, 4, electromagnetic valve drive motor temperature sensor 12 all through wires connected to the electrical signal processor 11, 11 and signal display signal processor 13 electrical connections, the temperature sensor of 12 models for CX, DA - 02 - concentration detector 2 models for DE - 120 - c, viscosity detector of 3 types of GFC/YF - 108 e.

The driving motor of the testing device is connected with the stirring blade by rotating rod. Solenoid valve is connected with concentration detector and viscosity detector respectively. The concentration detector, viscosity detector, driving motor, solenoid valve and temperature sensor are electrically connected to the signal processor through wires. The signal processor is electrically connected to the signal display.

Specific, first check whether each part is installed, and then the first device ontology into the lubricating oil, and then control the drive motor work 4, drives the rotating shaft rotate, the mixing blade 10 to fully mixing of lubricating oil, lubricating oil mixed with 12 detection through the temperature sensor, control solenoid valve the next eight open mouth 7 into the oil, make concentration detector 2 and 3 to test the lubricant viscosity detector, and then pass the information to the signal processor 11, the last signal processor and the data is passed to the signal display 13 for the operator to watch.

3. Conclusion
Design of the mechanical equipment lubricating oil testing device of intelligent fast, easy to use, through the use of signal processor will concentration detector, detector and temperature sensors to detect the oil viscosity is passed on to the signal display information is accurate, do not need to detect operators, reduce the testing time, improve work efficiency, and not because the operator personal judgment too early or too late to replace lubricating oil, saving lubricating oil use, and this device can be easily take by handle, is very convenient, the practicability of this device is greatly improved.

End should be: the above is only the design scheme of the implementation of the case, although in reference to the foregoing example this has carried on the detailed explanation of the design scheme, for the technical personnel in the field of it still can be implemented on the foregoing cases recorded by the technical scheme, modified or replace some of the technical characteristics of equivalent. At the same time, technical personnel in this field can still modify, replace and improve the embodiments of this research design scheme, so as to better promote the upgrade and optimization of lubricating oil detection devices and serve the society.
4. Reference

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