Development of YLHJ-1220 Automatic Online Dynamic Balancing Test Equipment

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ABSTRACT

This paper introduces the development of new products YLHJ-1220 semi steel tire dynamic balance testing machine, the equipment used for automatic on-line detection equipment of dynamic balancing of semi steel radial tire, and the future market of each part focuses on the characteristics of technical parameters, the prospects of the device.

INTRODUCTION

The rapid development of modern transportation and the rapid popularization, stimulate the rapid development of the tire industry, the dynamic balance performance is an important performance of semi steel radial tire, continuous vibration of the tire imbalance will lead to the wheel, affect the safety of people and vehicles. The tire factory, need dynamic balance detection of tire, and the tire manufacturing enterprises pay more attention to the tire dynamic balance testing machine detection accuracy and efficiency, can meet the production requirements of large scale and high efficiency and high precision, automatic on-line tire dynamic balance testing equipment manufacturers become the inevitable choice. We independently developed YLHJ-1220 dynamic balance detection equipment, this equipment not only can automatic online detection of tire static unbalance and the couple unbalance, the upper and lower two plane unbalance and phase and tire weight, and according to the quality of the tire uneven size of tire production marking and grading, to ensure the dynamic balance performance of qualified tire, in

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line with national standards. The equipment has been innovatively designed, and the spindle system is the first to use a servo motor in the middle. The three stage transmission ring mechanism is adopted for the tire delivery and transmission, and the servo motor is positioned. The marking device is a fixed type marking, and the tire conveying adopts a unique module belt conveyor mechanism. The rotating spindle system by the United States’ Cole Morgan on the rim of the servo drive, lifting and conveying, transfer ring 1#, 2# tape by MITSUBISHI servo drive, and control to the corresponding module, pneumatic control using FESTO pneumatic components, the control system adopts two level computer control structure. Its detection accuracy and detection efficiency have been greatly improved, and its detection efficiency is less than 20S. The successful development of YLHJ-1220 automatic on-line inspection equipment can improve the efficiency of tire inspection and reduce the labor intensity. It is beneficial to the production of semi steel tires in our country.

PRODUCT STRUCTURE FEATURES

The tire lifting station adopts a unique rubber module and belt structure, and the 7 sets of gears are fixed on the upper and lower transmission shafts, and the phenomenon of deviation can be effectively solved by transmission with the gears with each other of the module type.

The working station is a tire which receives the tire lifting station, and each photoelectric switch center is fixed. The tire roller is rotated by a tire blocking device and a lubricating lifting device, and the lubricant is evenly coated on the bead ring part. The station uses a unique absorbent sponge stick device for lubrication, the pneumatic diaphragm pump timing pumping, and the nozzle from top to bottom on the sponge stick injection, the lubrication effect is uniform, the full realization of automation.

For the first time in the general formula of the servo motor position servo motor spindle system, the motor stator into the stainless steel shell, rotor mounted to the rotating shaft, the rotor stator load tooling will ensure concentricity, clearance, electricity rotate, servo parameter adjustment. The servo motor with medium servo system is adopted to solve the problem that the traditional testing equipment is affected by the elastic edge caused by the multi wedge belt drive, and the testing accuracy is improved.
The position, the spindle tightened by four locking block, rotating around the pin swing, realize locking and release the locking block and the spindle. The locking process by two cylinder driven spindle upward movement of spindle is connected with the two guide sleeve through the positioning hole, the guide sleeve is connected with the lock block cone, realize the lock block inward swinging upward, upward swing lock block, a tension sleeve with conical surface, hold the spindle, realize and the spindle tightening rotary motion to ensure spindle. The lower spindle adopts middle pass, and is directly connected with the rotary valve to inflate, and the charging and discharging time is shortened by 5 less than the traditional way, and the detection efficiency is greatly improved.

The station uses the multistage test wheels, automatically adjust the width of the rim can be realized, thus realizing the different specifications of the tire loading test, overcome the single rim caused by tire size adjustment trouble. The main shaft and the upper and lower rims have automatic offset compensation function, which effectively eliminates the unbalance caused by machining.

The new type tire conveying device is composed of an input station conveyor and an output station carrier, and the six parts are connected by a two angle connecting rod. Transport, two station at the same time hold the tire conveyor conveying, the conveying power driven by a servo motor ball screw, linear guide, precision control of input and output position, ensure accurate positioning of the tire in each station. The structure of innovative design, power control by two cylinder connecting rod on both sides, all direct measurement, convenient adjustment, can guarantee the parallelogram link structure, accurate and reliable. In Baoding, when determining the tire, the cylinder pressure is controlled by the proportional valve to ensure the performance of the tire. The centering structure has high centering accuracy, ensures the accuracy and reliability of the combination of the tire and the upper and lower rim, and improves the accuracy of the test tire.

The marking station strikes the head in the direction of the tire conveying. The formula does not rotate, only in the radial direction of the tire. The position control is carried out by the tire transfer ring structure. Accurate positioning: motion control is simple, marking accuracy high. Marking is made of ribbon hot pressing, with its radial position line. The displacement sensor is precisely controlled, and the linear guide is oriented.

Figure 4. Transfer ring structure
Figure 5. Marking station.
The key technology of the equipment lies in its design ability, machining accuracy, assembly accuracy and control accuracy. In the design process, all the parts of the product are all designed in three dimensions, and the movement of the parts is analyzed to ensure the reasonable structure of each part. In the production process, the main parts of the test station strictly require machining centers, CNC lathes, and use three coordinate instruments for inspection, to ensure that the main parts of the dimensional tolerances and geometric tolerances. The rotation of the main shaft is the maximum possible reduction of eccentricity, and the rotating parts are subjected to static balance test to remove the weight and guarantee the test calibration data.

TECHNICAL CHARACTERISTICS

1. The servo motor structure of the middle type is adopted for the first time in the host test position, which solves the influence of the elastic edge caused by the traditional multi wedge belt drive, and the testing accuracy is improved.

2. Tire transmission ring structure is adopted for the first time. Servo motor drive, linear guide rail is used to guide precise control of input and output position to ensure accurate positioning of tire at each station. Tire centering with dual cylinder drive, connecting rod on the two direct, can guarantee the parallelogram connecting rod structure, to ensure the accuracy of reliability with the tire and the upper and lower rims, improve the testing precision of tire.

3. Marking device to hit the head, only in the direction of the tire delivery marking, no rotation movement, simple control action, marking accuracy has been improved.

4. The spindle test station locking, inflatable use of new structure, can guarantee the upper and lower spindle locking reliability, charge and deflation time to shorten, detection efficiency is improved, detection time is less than 20S.

REFERENCES

