
数控车床立式六刀位回转刀架及伺服系统结构设计

摘 要

本文研究课题为数控车床立式六刀位回转刀架及伺服系统结构设计。本文研究内容主要有两部分：一是数控车床立式六刀位回转刀架总体结构设计，二是数控车床的 Z 轴伺服系统机械结构设计。第一部分的数控车床立式六刀位回转刀架为 CAK6150 系列数控卧式车床的主要组成部分之一。该刀架由动力源、机械传动机构、预分度机构、定位机构、锁紧机构等构成。该刀架最多可以同时安装六把刀具，同时利用液压系统控制刀架自动换刀，适用于复杂回转体零件的回转表面多工序连续加工。在使用数控车床加工过程中，使用该刀架省去了人工卸刀、换刀等一系列繁琐装卸刀具的人工操作步骤，缩短了换刀工时的同时也提高了换刀的可靠性，节省加工时间，提升加工效率。第二部分为数控车床 Z 轴伺服系统机械结构设计，其中包括根据数控车床的运动参数，计算并选取合适的滚珠丝杠副、丝杠轴承、导轨副等，同时还包括完成了上述标准零件的相关配套非标零件设计。

关键字：数控车床；刀架；伺服机构

Abstract

The research topic of this paper is the structure design of CNC lathe vertical six-position rotary tool holder and servo system. The research content of this article mainly has two parts: one is the overall structure design of the vertical six-position rotary tool holder of the CNC lathe, and the second is the mechanical structure design of the Z-axis servo system of the CNC lathe. The first part of the CNC lathe vertical six-position rotary tool holder is one of the main components of the CAK6150 series CNC horizontal lathe. The tool holder is composed of a power source, a mechanical transmission mechanism, a pre-indexing mechanism, a positioning mechanism, a locking mechanism and the like. The tool holder can install up to six tools at the same time. At the same time, the hydraulic system is used to control the tool holder to automatically change the tools. It is suitable for the continuous processing of the rotary surface multi-process of complex rotary body parts. In the process of using CNC lathe, the use of this tool holder eliminates a series of cumbersome manual steps of loading and unloading tools such as manual tool unloading and tool changing, which shortens the time of tool changing and also improves the reliability of tool changing and saves processing. Time, improve processing efficiency. The second part is the mechanical structure design of the Z-axis servo system of the CNC lathe, which includes calculating and selecting the appropriate ball screw pair, screw bearing, rail pair, etc. according to the motion parameters of the CNC lathe, and also includes the completion of the above standard parts Related supporting non-standard parts design.

Keywords: CNC lathe; tool holder; servo mechanism

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