

机械手夹持器机械结构设计

摘 要

本次课题主要对机械手夹持器机械结构的设计，通过了解此类产品国内外的现状和未来发展方向，进行了细致的研究。首先，根据夹持末端的结构进行相关力学知识的计算，并根据校核结果选取合适的楔块结构以及相关的连接材料。其次，按照手腕部分的设计需求，计算并校核其具体的尺寸。根据以上的结构和质量，得出手臂部分的尺寸和伸缩距离。最后，根据整体的设计改造方案，对驱动压力进行合理的选取分配。本文着重解决了动力不足和开口范围难以控制等问题。对夹持末端开口方式的设计本着结构简单、精度高的基本原则，通过楔块的往复运动进行控制，这种设计在充分保障系统刚度的同时还能够保证充足的夹紧力。伸缩臂部分依靠滑板来保持运行过程的平行结构，替换单一的活塞杆驱动结构，使设备载荷运行时依旧具有良好的精度。此次机械手的设计结构具有快速完成安装拆卸、依照不同的工作平台可以实现不同作用、更加符合现代化的模块化设计等优点，真正的实现了一机多用、多机并用。

关键词：机械手；刚度；伸缩臂

ABSTRACT

This project mainly focuses on the design of the mechanical structure of the manipulator gripper. Through understanding the current situation and future development direction of this kind of products at home and abroad, a detailed study has been carried out. First of all, according to the structure of the clamping end, the relevant mechanical knowledge is calculated, and the appropriate wedge structure and related connection materials are selected according to the check results. Secondly, according to the design requirements of the wrist part, calculate and check its specific size. According to the above structure and mass, the size and extension distance of the arm part are obtained. Finally, according to the overall design and transformation scheme, the driving pressure is reasonably selected and distributed. This paper focuses on solving the problems of insufficient power and difficult to control the opening range. Based on the principle of simple structure, the design of the opening mode of the clamping end is controlled by the reciprocating motion of the wedge. This design can ensure the sufficient clamping force while the system stiffness is fully guaranteed. The telescopic arm part relies on sliding plate to maintain the parallel structure in the operation process, replacing a single piston rod driving structure, so that the equipment still has a good accuracy in the load operation. The design structure of the manipulator has the advantages of quickly completing the installation and disassembly, realizing different functions according to different working platforms, and more in line with the modern modular design. It truly realizes the multi-purpose and multi meter combination of one machine.

Keywords: Manipulator; Stiffnes; Telescopic boom

目 录

摘 要.....	1
ABSTRACT	11
1 绪论	1
1.1 研究背景.....	1
1.2 研究目的及意义	1
1.3 机械手夹持器的发展.....	2
1.3 机械手夹持器的具体应用	3
1.4 研究方案.....	3
2 夹持器设计	5
2.1 夹紧力的计算	5
2.2 驱动力计算.....	6
2.3 液压缸驱动力计算以及选取	7
2.4 安装结构分析	8
2.5 楔块的确定.....	9
2.6 块的传动效率率和倾斜角度	10
2.7 行程与末端开口范围.....	10
2.8 楔块高度 L 的确定	11
2.9 材料及连接件选择.....	11
3 腕部	12
3.1 基本要求.....	12
3.2 腕部的具体结构	12
3.3 腕部相关力的计算.....	13
3.4 回转缸驱动力矩计算.....	15
3.5 回转缸内径 D 计算.....	16
3.6 腕部轴承选择	16
3.7 其它工件的选择	17
4 缩臂设计	18

4.1 缩臂的设计要求	18
-------------------	----

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：

<https://d.book118.com/597116053151006121>